STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

UNDERGROUND INJECTION CONTROL
MISSOURI STATE OPERATING PERMIT

Permit No.	UI-0000037
Owner:	Dean Realty Co.
Address:	1201 West 31st Street, Suite 2, Kansas City, MO 64108
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	Greystone Mine – Dean Realty Co.
Facility Address:	East Bi-State Drive, Kansas City, Missouri, 64108
Legal Description:	SW ¼, SW ¼, Sec. 07, T49N, R33W, Jackson County
UTM Coordinates:	Facility: X = 361170, Y = 4326729
Receiving Stream:	n/a
First Classified Stream and ID:	n/a
USGS Basin & Sub-watershed No.:	Turkey Creek – Kansas River 10270104-0607

is authorized to perform underground injection by the facility described herein, in accordance with the limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

Class V well system for underground injection of coal combustion residual fly ash or flue gas desulphurization (FGD) ash slurry mixed with cement to provide former limestone mine with stabilization backfill. No discharge permit.

In compliance with the Safe Drinking Water Act and authorized by 40 CFR 147 Subpart AA, this permit authorizes only underground injection activities; it does not apply to other regulated areas. This permit may be appealed in accordance with Sections 640.013, 621.250, and 644.051.6 of the Law.

October 1, 2019
Effective Date

Edward B. Galbraith
Edward B. Galbraith, Director, Division of Environmental Quality

September 30, 2024
Expiration Date

Chris Wieberg
Chris Wieberg, Director, Water Protection Program

A. ASH INJECTION LIMITATIONS AND MONITORING REQUIREMENTS

UIC FACILITY	TABLE A-1 ASH INJECTION LIMITATIONS AND REPORTING REQUIREMENTS					
The permittee is authorized for UIC activities at this site. The below listed requirements and limitations shall become effective on **October 1, 2019** and remain in effect until expiration of the permit. Such activities shall be controlled, limited, and monitored by the permittee as specified below:						
PARAMETERS	UNITS	FINAL ASH INJECTION LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY AVERAGE MINIMUM	DAILY TOTAL	MONTHLY AVERAGE MAXIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
UIC INJECTION						
Ash Weight †	tons	-	*	*	each load †	measured
Cement Weight	tons	-	*	*	each load †	measured
Percent Cement (by weight), Minimum	%	5	*	*	daily average ‡	calculated
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE NOVEMBER 28, 2019.						
ASH MONITORING						
Arsenic, TCLP	mg/L	-	-	*	once/year	composite ††
Barium, TCLP	mg/L	-	-	*	once/year	composite ††
Boron, TCLP	mg/L	-	-	*	once/year	composite ††
Chromium, TCLP	mg/L	-	-	*	once/year	composite ††
Mercury, TCLP	mg/L	-	-	*	once/year	composite ††
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE JANUARY 28, 2020.						

* Monitoring and reporting requirement only.

† The facility will weigh each truckload and provide a summary with the monthly report. Each truckload's data shall be provided to the department in a format which is consistent and readily understandable as provided in the example below (this exact format is not required but a similar format should be used):

‡ Daily average: the facility shall comply with the daily percent cement minimum at each injection site. If more than one injection site is used in one day, the facility must maintain a minimum 5% cement average at each injection site. The facility will note any issues or problems with the loads on the monthly reports.

Example:

Injection Site: #1		**Date of Injection:**	**MM/DD/YYYY**
LOAD #	**ASH TONNAGE**	**CEMENT TONNAGE**	**% CEMENT**
Truck #1	25.21 tons	1.15 tons	4.36 %
Truck #2	25.80 tons	0.00 tons	0 %
Truck #3	23.30 tons	2.59 tons	9.0 %
Truck #4	23.70 tons	2.19 tons	8.5 %
Total	**98.01 tons**	**5.93 tons**	**5.4 %**

†† Composite sampling is a sample consisting of a minimum of eight representative aliquots collected from the ash during a one month period.

B. STANDARD CONDITIONS

In addition to specified conditions stated herein, this permit is subject to the attached Part I standard conditions dated August 1, 2014 and hereby incorporated as though fully set forth herein.

C. SPECIAL CONDITIONS

1. In accordance with 40 CFR 144.82, construction, operation, maintenance, conversion, plugging, or closure of injection wells shall not cause movement of fluids containing any contaminant into Underground Sources of Drinking Water (USDWs) if the presence of any contaminant may cause a violation of primary drinking water standards or groundwater standards under 10 CSR 20-7.031, or other health based standards, or may otherwise adversely affect human health. If the director finds your injection activity may endanger USDWs, the Department may require closure of the injection wells, or other actions listed in 40 CFR 144.12(c), (d), or (e).

2. This permit does not authorize:
   (a) Injection of waste or ash classified as hazardous in accordance with 40 CFR 261.
   (b) Land disturbance activities greater than 1 acre or less than 1 acre and part of a common promotional plan;
   (c) Activities or discharges occurring in Kansas;
   (d) Fueling or maintenance of vehicles on site (this permit does not include stormwater);
   (e) If the permittee intends to place fill materials in flood plains, place solid materials into any waterway, obstruct stream flow, or change the channel of a defined drainage course. The facility must contact the U.S. Army Corps of Engineers (Corps) to determine if a CWA §404 Department of Army permit is required.

3. Well Requirements:
   (a) Well drillers must hold a non-restricted permit and must be registered in accordance with 10 CSR 23-1.090 in Missouri, be current, and in good standing.
   (b) All wells must be registered with Wellhead Protection in accordance with 40 CFR 144.26, the permittee shall submit a Class V Well Inventory Form for each active or new underground injection well drilled, or when the status of a well changes (including closure).
   (c) All wells must be closed in accordance with 10 CSR 23-4.080.

4. Duty to establish and maintain mechanical integrity for new and existing wells:
   (a) The permittee shall establish mechanical integrity prior to commencing injection; the owner must maintain mechanical integrity per the following:
      (1) Ensuring no significant leaks in the casing, tubing, or packing occur;
      (2) Ensuring each well casing, tubing, and packing are installed as designed;
      (3) Ensuring flows of slurry remain uninterrupted within the well casings and no conditions develop which would allow the escape of slurry from the well casing except as designed.
      (4) Ensuring no significant fluid movement into USDW through vertical channels adjacent to the injection well bore.
   (b) When the permittee of the Department determines a well lacks mechanical integrity, the permittee shall cease injection into the well immediately or within 48 hours of receipt of written notice from the Department. The Department may allow plugging of the well or require the permittee to perform additional construction, operation, monitoring, reporting and corrective action as is necessary to prevent the movement of fluid into or between USDWs caused by the lack of mechanical integrity.
   (c) The Department may allow a well which lacks mechanical integrity to continue or resume injection, if the permittee has made a satisfactory demonstration there is no movement of fluid into or between USDWs.
   (d) The discovery of a loss in well integrity as defined in this special condition shall be reported to the Kansas City Regional Office as soon as practicable, but no later than 96 hours after discovery.

5. Permittee shall adhere to the following minimum Best Management Practices (BMPs):
   (a) The operators shall be present at all times during injection and shall inspect all areas surrounding the injection site for spills, leaks, or other issues during and after injection.
   (b) Ash or slurry spills (occurring outside the containment berm) shall be remediated as soon as practicable and no more than 24 hours after any spill; and immediately if precipitation is falling or is forecast. Surface discharge is prohibited under this permit.
   (c) A containment berm shall be constructed around the periphery of each injection bore hole; the berm shall be removed after injection is completed for the well. The berm shall be drained of stormwater only after checking for solids or sheen which may be entrained in stormwater runoff. If solid contaminants are found, the stormwater should be injected, or disposed of in an appropriate method, such as sent to a landfill. If a sheen is found, the stormwater must be treated appropriately prior to discharge. Stormwater with a sheen cannot be discharged under this permit.
   (d) The containment berm shall be continuously monitored for spills and cleaned out if the volume of the containment berm exceeds roughly 50% of the total berm volume.
   (e) Ensure dust suppression is performed if required to prevent atmospheric deposition of contaminants off site.
   (f) Prevent the spillage or loss of fluids, oil, grease, fuel, etc. from vehicles, equipment, and other areas thereby preventing the contamination of stormwater from these substances.

C. SPECIAL CONDITIONS (CONTINUED)

(g) Provide collection facilities and arrange for proper disposal of waste products including but not limited to petroleum waste products, garbage, and solvents.
(h) Maintain all storage containers (such as drums, cans, or cartons) so materials are not exposed to stormwater or provide other prescribed BMPs such as plastic lids and/or portable spill pans to prevent the commingling of stormwater with container contents. Commingled water may not be discharged under this permit. Provide spill prevention control, and/or management sufficient to prevent any spills of pollutants from entering waters of the state. Any containment system used to implement this requirement shall be constructed of materials compatible with the substances contained and shall also prevent the contamination of groundwater. Spill records should be retained on-site.
(i) Provide good housekeeping practices on the site to keep trash and other debris from entry into waters of the state.
(j) Provide sediment and erosion control sufficient to minimize sediment loss off of the property.

6. Monitoring and Records:
(a) All samples obtained for the purposes of monitoring in accordance with this permit shall be representative of the monitored activity.
(b) Records Retention: the facility shall retain all records as required by this permit for a period of no less than five years. All records shall contain, at a minimum, the date and time of collection, the collectors name or identifier, the procedures used to collect the data, and the data generated by the procedures.
(c) If more frequent data collection occurs, all results obtained during the monitoring period shall be reported to the Department at the regularly scheduled intervals.
(d) Calculations shall use an arithmetic mean for averages.
(e) Reports may be submitted to the Department electronically using the Kansas City Regional Office's general email: KCRO@dnr.mo.gov, or other email as requested by the Department.

7. Upon cessation of injection activity at this site, and prior to termination of this UI-0000037 permit, the primary responsible party for the site shall appropriately and accurately record all title and deed restrictions with all interested parties, including, but not limited to, the Recorder of Deeds for the County of Jackson, Missouri, by and within 90 days from the last injection well closure. The primary responsible party shall disclose all necessary waste placement in accordance with 10 CSR 80-2.020(9)(B) and should use a form entitled "Statement of Beneficial Use Closure" or similar as desired by the Waste Management Program of the Department of Natural Resources and as appropriate for this deed disclosure. The primary responsible party shall also supply a copy of the completed Statement to the Waste Management Program and Water Protection Program each.

8. The full implementation of this operating permit, which includes implementation of any applicable schedules of compliance, shall constitute compliance with all applicable federal and state statutes and regulations in accordance with §644.051.16, RSMo, and the CWA section 402(k); however, this permit may be reopened and modified, or alternatively revoked and reissued to comply with any applicable effluent standard or limitation issued or approved under Clean Water Act Sections 301(b)(2)(C) and (D), §304(b)(2), and §307(a) (2), if the effluent standard or limitation so issued or approved contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or controls any pollutant not limited in the permit. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, termination, notice of planned changes, or anticipated non-compliance does not stay any permit condition.

9. Failure to pay fees associated with this permit is a violation of the Missouri Clean Water Law (644.055 RSMo).

MISSOURI DEPARTMENT OF NATURAL RESOURCES
FACT SHEET
FOR THE PURPOSE OF RENEWAL
OF
UI-0000037
GREYSTONE MINE – DEAN REALTY CO.

In compliance with the Safe Drinking Water Act and authorized by 40 CFR 147 Subpart AA, this permit authorizes only underground injection activities; it does not apply to other regulated areas. This permit may be appealed in accordance with Sections 640.013, 621.250, and 644.051.6 of the Law. All discharges not specifically authorized under this permit are unlawful without a permit (Section 301 of the "Clean Water Act"). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal "Safe Drinking Water Act" and "Missouri Clean Water Law" Section 644 as amended). MSOPs are issued for a period of five (5) years unless otherwise specified for less.

As per [40 CFR Part 124.8(a)] and [10 CSR 20-6.020(1)(A)2.] a factsheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of limitations and conditions, and the public participation process for the Missouri State Operating Permit (MSOP or operating permit) listed below. A factsheet is not an enforceable part of an operating permit.

PART I. FACILITY INFORMATION

Facility Type:	underground injection
SIC Code(s):	1629
NAICS Code(s):	237110
Application Date:	12/07/2018
Expiration Date:	07/01/2014

FACILITY DESCRIPTION:
40 CFR 144.81(8) Class V well system for underground injection of ash slurry mixed with cement to provide former limestone mine with stabilization backfill. This facility is subject to 40 CFR 146 Subpart F: Criteria and Standards Applicable to Class V Injection Wells. The facility has disclosed the backfill will be cementitious in nature therefore the permit writer has included permit requirements for mechanical integrity based on 40 CFR 146.8(c)(4). The former mine footprint is 10.6 acres.

The charter number for the continuing authority for this facility is 00093084; this number was verified by the permit writer to be associated with the facility and precisely matches the continuing authority reported by the facility via email on March 8, 2019.

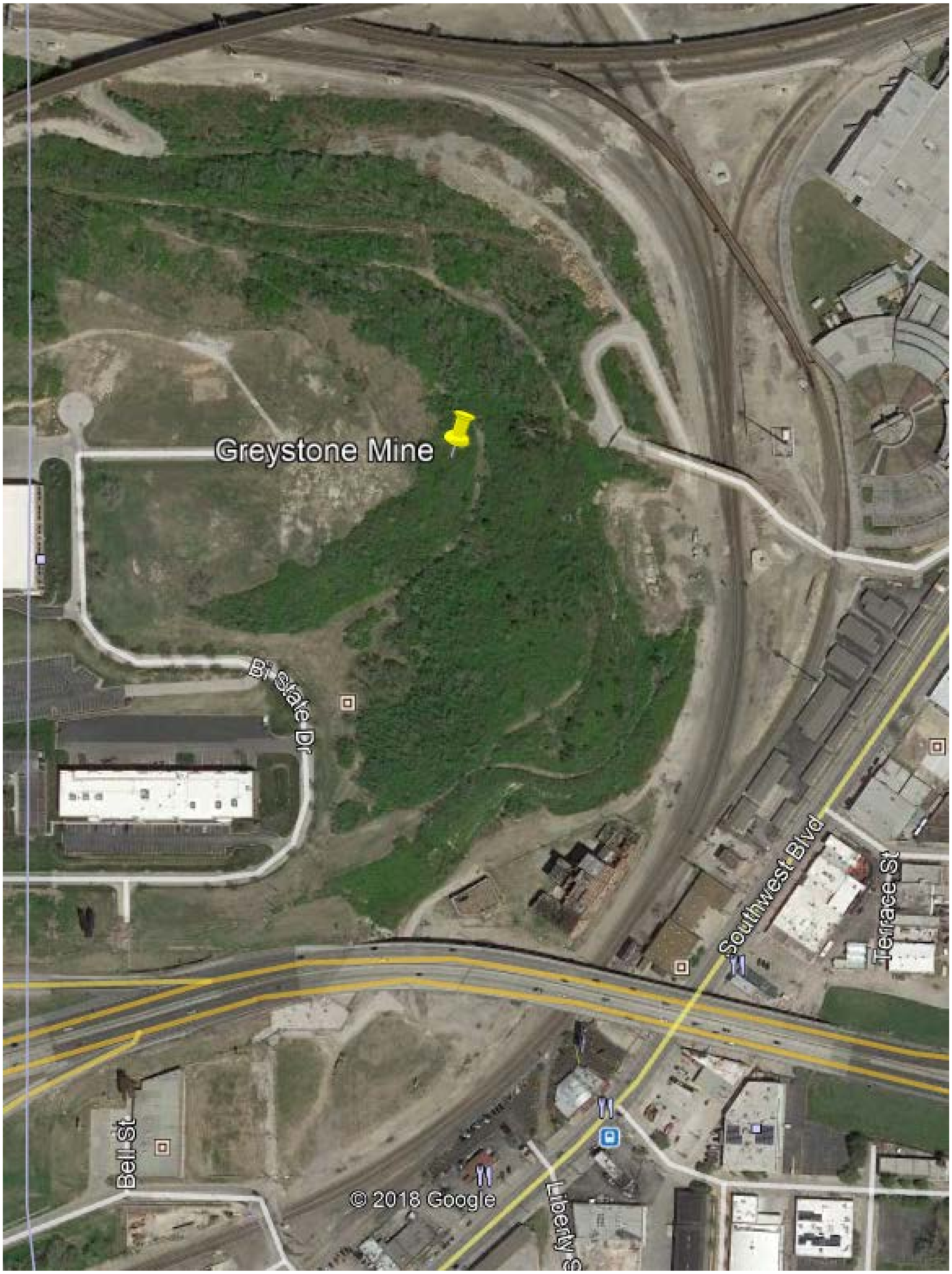
The Waste Management Program issued a beneficial use exemption to the facility for this activity on March 6, 2019. The permittee submitted data, and the permit writer researched this activity, and determined the ash, when properly cemented and injected, may provide the mine with a beneficial fill to prevent dome outs in the future for the eventual use of potential commercial development as disclosed in the application materials.

The facility disclosed approximately 35 boreholes will be used to prevent dome-outs of the former limestone mine. This permit allows as many boreholes to be drilled as necessary.

FACILITY PERFORMANCE HISTORY & COMMENTS:
The facility, while authorized to backfill beginning July 2, 2009, has not yet begun to fill the mine with coal combustion residual ash. The previous permit allowed injection without classification or monitoring of any sort. This facility shall begin classifying the ash used to backfill in accordance with permit conditions in part A of the permit. Well requirements were added to Part C of the permit.

The permit writer has determined this is a Class V well system and not a Class I well system. The wells used to backfill the former limestone mine are above the water table and the data submitted to the department have shown the ash mixed with cement is not a hazardous waste.

FACILITY MAP:



PART II. RECEIVING WATERBODY INFORMATION

RECEIVING WATERBODY'S WATER QUALITY:
This facility is a UIC facility therefore the discharge is not to surface waters. The permittee has established the mine undergoing backfilling is stratigraphically isolated from the groundwater.

303(D) LIST:
Section 303(d) of the federal Clean Water Act requires each state identify waters not meeting water quality standards and for which adequate water pollution controls have not been required. Water quality standards protect such beneficial uses of water as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock, and wildlife. The 303(d) list helps state and federal agencies keep track of impaired waters not addressed by normal water pollution control programs. http://dnr.mo.gov/env/wpp/waterquality/303d/303d.htm
✓ Not applicable; this facility does not discharge.

TOTAL MAXIMUM DAILY LOAD (TMDL):
A TMDL is a calculation of the maximum amount of a given pollutant a water body can absorb before its water quality is affected; hence, the purpose of a TMDL is to determine the pollutant loading a specific waterbody can assimilate without exceeding water quality standards. If a water body is determined to be impaired as listed on the 303(d) list, then a watershed management plan or TMDL may be developed. The TMDL shall include the WLA calculation. http://dnr.mo.gov/env/wpp/tmdl/
✓ Not applicable; this facility does not discharge.

APPLICABLE DESIGNATIONS OF WATERS OF THE STATE:
Per Missouri's Effluent Regulations [10 CSR 20-7.015(1)(B)], waters of the state are divided into seven categories. Each category lists effluent limitations for specific parameters, which are presented in each outfall's effluent limitation table and further discussed in Part IV: Effluents Limits Determinations
✓ No discharge

PART III. RATIONALE AND DERIVATION OF LIMITATIONS & PERMIT CONDITIONS

ALTERNATIVE EVALUATIONS FOR NEW FACILITIES:
As per [10 CSR 20-7.015(4)(A)], discharges to losing streams shall be permitted only after other alternatives including land application, discharges to a gaining stream and connection to a regional wastewater treatment facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons.
✓ Not applicable; this is a UIC facility.

ANTIBACKSLIDING:
Federal Regulations [CWA §303(d)(4); CWA §402(c); 40 CFR Part 122.44(l)] require a reissued permit to be as stringent as the previous permit with some exceptions. Backsliding (a less stringent permit limitation) is only allowed under certain conditions.
✓ All limits in this operating permit are at least as protective as those previously established; therefore, backsliding does not apply. This permit reissuance conforms to 40 CFR 122.41 (d)(1)(vii)(A); limitations within this permit are not less stringent than the previous permit.

ANTIDEGRADATION REVIEW:
Process water discharges with new, altered, or expanding flows, the Department is to document, by means of antidegradation review, if the use of a water body's available assimilative capacity is justified. In accordance with Missouri's water quality regulations for antidegradation [10 CSR 20-7.031(3)], degradation may be justified by documenting the socio-economic importance of a discharge after determining the necessity of the discharge. Facilities must submit the antidegradation review request to the Department prior to establishing, altering, or expanding discharges. See http://dnr.mo.gov/env/wpp/permits/antideg-implementation.htm
✓ Not applicable; the facility has not submitted information proposing wastewater discharge.

CHANGES IN DISCHARGES OF TOXIC POLLUTANT:
This special condition reiterates the federal rules found in 40 CFR 122.44(f) and 122.42(a)(1). In these rules, the facility is required to report changes in amounts of toxic substances discharged. Toxic substances are defined in 40 CFR 122.2 as "…any pollutant listed as toxic under section 307(a)(1) or, in the case of "sludge use or disposal practices," any pollutant identified in regulations implementing section 405(d) of the CWA." Section 307 of the clean water act then refers to those parameters found in 40 CFR 401.15. The permittee should also consider any other toxic pollutant in the discharge as reportable under this condition.

COMPLIANCE AND ENFORCEMENT:
Enforcement is the action taken by the Water Protection Program (WPP) to bring an entity into compliance with the Missouri Clean Water Law, its implementing regulations, and/or any terms and conditions of an operating permit. The primary purpose of the enforcement activity in the WPP is to resolve violations and return the entity to compliance.
✓ Not applicable; the permittee/facility is not currently under Water Protection Program enforcement action.

DEED DISCLOSURE:
The Waste Management Program (WMP), upon issuance of this project's exemption from having to obtain a solid waste permit, included a condition that Dean Realty (or current owner of the site) file a deed disclosure with the county recorder of deeds containing information about this project. In response to that condition, Dean Realty offered to provide the WMP with a draft disclosure statement with intent to file such disclosure with the recorder at the time of site closure. The WMP reportedly agreed with this approach and asked the facility to coordinate with the Water Protection Program (WPP) to include the requirement to file such a statement with the recorder of deeds as part of the conditions when seeking termination of the UIC permit. To satisfy the WMP's request, the facility asked the WPP to include the following paragraph in the conditions relating to the terms for terminating the UIC permit: "The owner of the project site shall, when seeking termination of the UIC permit, shall file in a format as prescribed by the Waste Management Program, a Beneficial Use Closure Statement with the county recorder of deeds which provides the information (survey of project activities and description of ash byproducts used).
✓ There is a special condition in the permit for this requirement.

DOMESTIC WASTEWATER:
Domestic wastewater is defined as wastewater (i.e., human sewage) originating primarily from the sanitary conveniences of residences, commercial buildings, factories, and institutions, including any water which may have infiltrated the sewers. Domestic wastewater excludes stormwater, animal waste, process waste, and other similar waste.
✓ Not applicable, there is no domestic wastewater system at this site.

ELECTRONIC DISCHARGE MONITORING REPORT (eDMR) SUBMISSION SYSTEM:
The U.S. Environmental Protection Agency (EPA) promulgated a final rule on October 22, 2015, to modernize Clean Water Act reporting for municipalities, industries, and other facilities by converting to an electronic data reporting system. The final rule requires regulated entities and state and federal regulators to use information technology to electronically report data required by the National Pollutant Discharge Elimination System (NPDES) permit program instead of filing paper reports. To comply with the federal rule, the Department is requiring all permittees to begin submitting discharge monitoring data and reports online.

Per 40 CFR 127.15 and 127.24, permitted facilities may request a temporary waiver for up to 5 years or a permanent waiver from electronic reporting from the Department. To obtain an electronic reporting waiver, a permittee must first submit an eDMR Waiver Request Form: http://dnr.mo.gov/forms/780-2692-f.pdf. A request must be made for each facility. If more than one facility is owned or operated by a single entity, then the entity must submit a separate request for each facility based on its specific circumstances. An approved waiver is not transferable.

The Department must review and notify the facility within 120 calendar days of receipt if the waiver request has been approved or rejected [40 CFR 124.27(a)]. During the Department review period as well as after a waiver is granted, the facility must continue submitting a hard-copy of any reports required by their permit. The Department will enter data submitted in hard-copy from those facilities allowed to do so and electronically submit the data to the EPA on behalf of the facility.
✓ Not applicable, this facility is not an NPDES facility and the parameters contained herein are not compatible with the eDMR data reporting system. This facility will report all data directly to the Kansas City Regional Office using kcro@dnr.mo.gov (unless other arrangements are made). If the EPA promulgates additional rules for UIC facilities, then this facility may need to be enrolled at that time.

EFFLUENT LIMITATION GUIDELINE:
Effluent Limitation Guidelines, or ELGs, are found at 40 CFR 400-499. These are limitations established by the EPA based on the SIC code and the type of work a facility is conducting. Most ELGs are for process wastewater and some address stormwater. All are technology based limitations which must be met by the applicable facility at all times.
✓ The facility does not have an associated ELG.

GENERAL CRITERIA CONSIDERATIONS:
In accordance with 40 CFR 122.44(d)(1), effluent limitations shall be placed into permits for pollutants determined to cause, have reasonable potential to cause, or to contribute to an excursion above any State water quality standard, including State narrative criteria for water quality. The rule further states pollutants which have been determined to cause, have the reasonable potential to cause, or contribute to an excursion above a narrative criterion within an applicable State water quality standard, the permit shall contain a numeric effluent limitation to protect the specified narrative criterion. In order to comply with this regulation, the permit writer has completed a reasonable potential determination on whether the discharge has reasonable potential to cause, or contribute to an excursion of the general criteria listed in 10 CSR 20-7.031(4). These specific requirements are listed below followed by derivation and

discussion (the lettering matches the rule itself, under 10 CSR 20-7.031(4)). In instances where reasonable potential exists, the permit includes numeric limitations to address the reasonable potential. In instances where reasonable potential does not exist, the permit may include monitoring to later determine the discharges potential to impact the receiving stream's narrative criteria. Finally, all of the previous permit narrative criteria prohibitions have been removed from the permit given they are addressed by numeric limits where reasonable potential exists. It should also be noted Section 644.076.1, RSMo as well as Section D – Administrative Requirements of Standard Conditions Part I of this permit state it shall be unlawful for any person to cause or permit any discharge of water contaminants from any water contaminant or point source located in Missouri is in violation of sections 644.006 to 644.141 of the Missouri Clean Water Law or any standard, rule, or regulation promulgated by the commission.

GROUNDWATER MONITORING:
Groundwater is a water of the state according to 10 CSR 20-2.010(82), and is subject to regulations at 10 CSR 20-7.015(7) and 10 CSR 20-7.031(6) and must be protected accordingly.

✓ This permit does not require groundwater monitoring of the site; the Missouri Geological Survey indicated in an email dated 4/3/2019 the uppermost aquifer was isolated from the proposed injection area by an impenetrable shale layer. While perched groundwater may be present at the site, the isolation and low permeability areas make groundwater monitoring at this site unnecessary.

HAZARDOUS WASTE DETERMINATION:
In accordance with Safe Drinking Water Act regulations, this facility is not permitted to inject any wastewater, slurry, or solids which have been identified as hazardous waste into any Class V well. The permit writer has established five pollutants are present in the waste. These were detected using TCLP analytical methods and compared to the list at 40 CFR 261.24(b): Arsenic, D004; Barium, D005; Chromium, D007; Mercury, D009; and Selenium, D010. The cementitious slurry pollutant concentrations were shown to be below the thresholds established for hazardous waste. The facility will be required to maintain a cementitious mixture of at least 5% by weight.

MAJOR WATER USER:
Any surface or groundwater user with a water source and the equipment necessary to withdraw or divert 100,000 gallons (or 70 gallons per minute) or more per day combined from all sources from any stream, river, lake, well, spring, or other water source is considered a major water user in Missouri. All major water users are required by law to register water use annually (Missouri Revised Statues Chapter 256.400 Geology, Water Resources and Geodetic Survey Section). https://dnr.mo.gov/pubs/pub2337.htm

✓ Not applicable; this permittee cannot withdraw water from the state in excess of 70 gpm/0.1 MGD.

NO-DISCHARGE LAND APPLICATION:
Land application of wastewater or sludge shall comply with the all applicable no-discharge requirements listed in 10 CSR 20-6.015 and all facility operations and maintenance requirements listed in 10 CSR 20-8.020(15). These requirements ensure appropriate operation of the no-discharge land application systems and prevent unauthorized and illicit discharges to waters of the state. Land applications by a contract hauler on fields the permittee has a spreading agreement on are not required to be in this permit. A spreading agreement does not constitute the field being rented or leased by the permittee as they do not have any control over management of the field.

✓ Not applicable; this permit does not authorize operation of a no-discharge land application system to treat wastewater or sludge.

REASONABLE POTENTIAL (RP):
Federal regulation [40 CFR Part 122.44(d)(1)(i)] requires effluent limitations for all pollutants which are (or may be) discharged at a level causing or have the reasonable potential to cause (or contribute to) an in-stream excursion above narrative or numeric water quality standards. Per 10 CSR 20-7.031(4), general criteria shall be applicable to all waters of the state at all times; however, acute toxicity criteria may be exceeded by permit in zones of initial dilution, and chronic toxicity criteria may be exceeded by permit in mixing zones. If the permit writer determines any given pollutant has the reasonable potential to cause or contribute to an in-stream excursion above the WQS, the permit must contain effluent limits for the pollutant per 40 CFR Part 122.44(d)(1)(iii) and the most stringent limits per 10 CSR 20-7.031(9)(A). Permit writers may use mathematical reasonable potential analysis (RPA) using the Technical Support Document for Water Quality Based Toxics Control (TSD) methods (EPA/505/2-90-001) as found in Section 3.3.2, or may also use reasonable potential determinations (RPD) as provided in Sections 3.1.2, 3.1.3, and 3.2 of the TSD.

✓ Not applicable; a mathematical RPA was not conducted for this facility. This is a UIC permit.

SCHEDULE OF COMPLIANCE (SOC):
A schedule of remedial measures included in a permit, including an enforceable sequence of interim requirements (actions, effluent limits, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit. SOCs are allowed under 40 CFR 122.47 providing certain conditions are met.

✓ Not applicable; this permit does not contain a SOC.

SPILL REPORTING:
Per 260.505 RSMo, any emergency involving a hazardous substance must be reported to the Department's 24 hour Environmental Emergency Response hotline at (573) 634-2436 at the earliest practicable moment after discovery. The Department may require the submittal of a written report detailing measures taken to clean up a spill. These reporting requirements apply whether or not the spill results in chemicals or materials leaving the permitted property or reaching waters of the state. This requirement is in addition to the noncompliance reporting requirement found in Standard Conditions Part I. http://dnr.mo.gov/env/esp/spillbill.htm

SLUDGE – DOMESTIC BIOSOLIDS:
Biosolids are solid materials resulting from domestic wastewater treatment meeting federal and state criteria for beneficial use (i.e. fertilizer). Sewage sludge is solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works; including but not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in a treatment works. Additional information: http://extension.missouri.edu/main/DisplayCategory.aspx?C=74 (WQ422 through WQ449).
✓ Not applicable; the facility has not disclosed domestic wastewater is managed on-site.

SLUDGE – INDUSTRIAL:
Industrial sludge is solid, semi-solid, or liquid residue generated during the treatment of industrial process wastewater in a treatment works; including but not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment process; scum and solids filtered from water supplies and backwashed; and a material derived from industrial sludge.
✓ Not applicable; industrial sludge is not generated at this facility. The slurry being injected is not generated at the facility but has been provided a beneficial use exemption by the solid waste program.

STORMWATER PERMITTING: LIMITATIONS AND BENCHMARKS:
✓ Not applicable; this facility's SIC code does not require stormwater monitoring per 40 CFR 122.26(b)(14). The facility must obtain a separate general land disturbance permit if deemed necessary.

UNDERGROUND INJECTION CONTROL (UIC):
The UIC program for all classes of wells in the State of Missouri is administered by the Missouri Department of Natural Resources and approved by EPA pursuant to section 1422 and 1425 of the Safe Drinking Water Act (SDWA) and 40 CFR 147 Subpart AA. Injection wells are classified based on the liquids which are being injected. Class I wells are hazardous waste wells which are banned by RSMo 577.155; Class II wells are established for oil and natural gas production; Class III wells are used to inject fluids to extract minerals; Class IV wells are also banned by Missouri in RSMo 577.155; Class V wells are shallow injection wells; some examples are heat pump wells and groundwater remediation wells. Domestic wastewater being disposed of sub-surface is also considered a Class V well. In accordance with 40 CFR 144.82, construction, operation, maintenance, conversion, plugging, or closure of injection wells shall not cause movement of fluids containing any contaminant into Underground Sources of Drinking Water (USDW) if the presence of any contaminant may cause a violation of drinking water standards or groundwater standards under 10 CSR 20-7.031, or other health based standards, or may otherwise adversely affect human health. If the director finds the injection activity may endanger USDWs, the Department may require closure of the injection wells, or other actions listed in 40 CFR 144.12(c), (d), or (e). In accordance with 40 CFR 144.26, the permittee shall submit a Class V Well Inventory Form for each active or new underground injection well drilled, or when the status of a well changes, to the Missouri Department of Natural Resources, Geological Survey Program, P.O. Box 250, Rolla, Missouri 65402. The Class V Well Inventory Form can be requested from the Geological Survey Program or can be found at the following web address: http://dnr.mo.gov/forms/780-1774-f.pdf
✓ Applicable; this is a UIC permit. This facility must register each well which is drilled with MGS.

VARIANCE:
Per the Missouri Clean Water Law §644.061.4, variances shall be granted for such period of time and under such terms and conditions as shall be specified by the commission in its order. The variance may be extended by affirmative action of the commission. In no event shall the variance be granted for a period of time greater than is reasonably necessary for complying with the Missouri Clean Water Law §§644.006 to 644.141 or any standard, rule or regulation promulgated pursuant to Missouri Clean Water Law §§644.006 to 644.141.
✓ Not applicable; this permit is not drafted under premise of a petition for variance.

WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:
As per [10 CSR 20-2.010(78)], the WLA is the amount of pollutant each discharger is allowed to discharge into the receiving stream without endangering water quality. Two general types of effluent limitations, technology-based effluent limits (TBELs) and water quality based effluent limits (WQBELs) are reviewed. If one limit does not provide adequate protection for the receiving water, then the other must be used per 10 CSR 20-7.015(9)(A).
✓ Not applicable; wasteload allocations were not calculated.

PART IV. PERMIT DETERMINATIONS

FACILITY REQUIREMENTS:

PARAMETERS	UNIT	DAILY AVERAGE MINIMUM	DAILY TOTAL	MONTHLY AVERAGE MAXIMUM	MINIMUM MONITORING FREQUENCY	REPORTING FREQUENCY	SAMPLE TYPE
UIC INJECTION							
ASH BY WEIGHT	tons	-	*	*	EACH LOAD	MONTHLY	MEASURED
CEMENT BY WEIGHT	tons	-	*	*	EACH LOAD	MONTHLY	MEASURED
PERCENT CEMENT (BY WEIGHT), MINIMUM	%	5	*	*	DAILY AVERAGE	MONTHLY	CALCULATION
ASH MONITORING							
Arsenic, TCLP	mg/L	-	-	*	once/year	once/year	composite ††
Barium, TCLP	mg/L	-	-	*	once/year	once/year	composite ††
Boron, TCLP	mg/L	-	-	*	once/year	once/year	composite ††
Chromium, TCLP	mg/L	-	-	*	once/year	once/year	composite ††
Mercury, TCLP	mg/L	-	-	*	once/year	once/year	composite ††

* Monitoring and reporting requirement only

† The facility will weigh each truckload and provide a summary with the monthly report. Each truckload's data shall be provided to the department in a format which is consistent and readily understandable as provided in the example below (this exact format is not required but a similar format should be used):

‡ Daily average: the facility shall comply with the daily percent cement minimum at each injection site. If more than one injection site is used in one day, the facility must maintain a minimum 5% cement average at each injection site. The facility will note any issues or problems with the loads on the monthly reports.

†† Composite sampling is a sample consisting of a minimum of eight representative aliquots collected from the ash during a one month period.

DERIVATION AND DISCUSSION OF LIMITS:

UIC INJECTION:

Ash Weight
The facility will weigh each truckload and report the total amount, in tons, of ash injected into the mine (without water or cement).

Cement Weight
The facility will determine the weight of the cement added to each load.

Percent Cement
The facility shall use at least 5% cement average for each day of injection. The facility shall report the minimum, daily total, and monthly total. 5% was the minimum value the facility indicated would be used in the application for UIC for this facility; and is also the minimum requirement to apply pozzolanic reactions to protect for boron leaching.

See permit for reporting requirements.

ASH MONITORING:

TCLP of Metals
The facility shall perform TCLP of arsenic, barium, boron, chromium, and mercury at least once per year. The composite ash samples shall be obtained over the course of a one month period and reported annually to the Department. This permit does not allow emplacement of ash where TCLP values are considered hazardous waste.

PART V. ADMINISTRATIVE REQUIREMENTS

On the basis of preliminary staff review and the application of applicable standards and regulations, the Department, as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions contained herein and within the operating permit. The proposed determinations are tentative pending public comment.

PERMIT SYNCHRONIZATION:
The Department of Natural Resources is currently undergoing a synchronization process for operating permits. Permits are normally issued on a five-year term, but to achieve synchronization many permits will need to be issued for less than the full five years allowed by regulation. The intent is all permits within a watershed will move through the Watershed Based Management (WBM) cycle together will all expire in the same fiscal year. http://dnr.mo.gov/env/wpp/cpp/docs/watershed-based-management.pdf. This will allow further streamlining by placing multiple permits within a smaller geographic area on public notice simultaneously, thereby reducing repeated administrative efforts. This will also allow the Department to explore a watershed based permitting effort at some point in the future. Renewal applications must continue to be submitted within 180 days of expiration, however, in instances where effluent data from the previous renewal is less than two years old, such data may be re-submitted to meet the requirements of the renewal application. If the permit provides a schedule of compliance for meeting new water quality based effluent limits beyond the expiration date of the permit, the time remaining in the schedule of compliance will be allotted in the renewed permit.
✓ Not applicable, this is a UIC permit which does not discharge to a surface watershed.

PUBLIC NOTICE:
The Department shall give public notice a draft permit has been prepared and its issuance is pending. http://dnr.mo.gov/env/wpp/permits/pn/index.html. Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest in or with water quality concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and permittee must be notified of the denial in writing.

The Department must issue public notice of a pending operating permit or of a new or reissued statewide general permit. The public comment period is the length of time not less than 30 days following the date of the public notice which interested persons may submit written comments about the proposed permit.

For persons wanting to submit comments regarding this proposed operating permit, then please refer to the Public Notice page located at the front of this draft operating permit. The Public Notice page gives direction on how and where to submit appropriate comments.
✓ The Public Notice period for this operating permit was from 8/16/2019-9/16/2019, no comments were received.

DATE OF FACT SHEET: SEPTEMBER 17, 2019

COMPLETED BY:
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MISSOURI DEPARTMENT OF NATURAL RESOURCES
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STANDARD CONDITIONS FOR NPDES PERMITS ISSUED BY THE MISSOURI DEPARTMENT OF NATURAL RESOURCES MISSOURI CLEAN WATER COMMISSION REVISED AUGUST 1, 2014

These Standard Conditions incorporate permit conditions as required by 40 CFR 122.41 or other applicable state statutes or regulations. These minimum conditions apply unless superseded by requirements specified in the permit.

Part I – General Conditions
Section A – Sampling, Monitoring, and Recording

1. **Sampling Requirements.**
   a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
   b. All samples shall be taken at the outfall(s) or Missouri Department of Natural Resources (Department) approved sampling location(s), and unless specified, before the effluent joins or is diluted by any other body of water or substance.

2. **Monitoring Requirements**.
   a. Records of monitoring information shall include:
      i. The date, exact place, and time of sampling or measurements;
      ii. The individual(s) who performed the sampling or measurements;
      iii. The date(s) analyses were performed;
      iv. The individual(s) who performed the analyses;
      v. The analytical techniques or methods used; and
      vi. The results of such analyses.
   b. If the permittee monitors any pollutant more frequently than required by the permit at the location specified in the permit using test procedures approved under 40 CFR Part 136, or another method required for an industry-specific waste stream under 40 CFR subchapters N or O, the results of such monitoring shall be included in the calculation and reported to the Department with the discharge monitoring report data (DMR) submitted to the Department pursuant to Section B, paragraph 7.

3. **Sample and Monitoring Calculations.** Calculations for all sample and monitoring results which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in the permit.

4. **Test Procedures**. The analytical and sampling methods used shall conform to the reference methods listed in 10 CSR 20-7.015 unless alternates are approved by the Department. The facility shall use sufficiently sensitive analytical methods for detecting, identifying, and measuring the concentrations of pollutants. The facility shall ensure that the selected methods are able to quantify the presence of pollutants in a given discharge at concentrations that are low enough to determine compliance with Water Quality Standards in 10 CSR 20-7.031 or effluent limitations unless provisions in the permit allow for other alternatives. A method is "sufficiently sensitive" when; 1) the method minimum level is at or below the level of the applicable water quality criterion for the pollutant or, 2) the method minimum level is above the applicable water quality criterion, but the amount of pollutant in a facility's discharge is high enough that the method detects and quantifies the level of pollutant in the discharge, or 3) the method has the lowest minimum level of the analytical methods approved under 10 CSR 20-7.015. These methods are also required for parameters that are listed as monitoring only, as the data collected may be used to determine if limitations need to be established. A permittee is responsible for working with their contractors to ensure that the analysis performed is sufficiently sensitive.

5. **Record Retention.** Except for records of monitoring information required by the permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five (5) years (or longer as required by 40 CFR part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time.

6. **Illegal Activities.**
   a. The Federal Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under the permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than two (2) years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four (4) years, or both.
   b. The Missouri Clean Water Law provides that any person or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained pursuant to sections 644.006 to 644.141 shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than six (6) months, or by both. Second and successive convictions for violation under this paragraph by any person shall be punished by a fine of not more than $50,000 per day of violation, or by imprisonment for not more than two (2) years, or both.

Section B – Reporting Requirements

1. **Planned Changes.**
   a. The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility when:
      i. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or
      ii. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42;
      iii. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan;
      iv. Any facility expansions, production increases, or process modifications which will result in a new or substantially different discharge or sludge characteristics must be reported to the Department 60 days before the facility or process modification begins. Notification may be accomplished by application for a new permit. If the discharge does not violate effluent limitations specified in the permit, the facility is to submit a notice to the Department of the changed discharge at least 30 days before such changes. The Department may require a construction permit and/or permit modification as a result of the proposed changes at the facility.

2. **Non-compliance Reporting.**
   a. The permittee shall report any noncompliance which may endanger health or the environment. Relevant information shall be provided orally or via the current electronic method approved by the Department, within 24 hours from the time the permittee becomes aware of the circumstances, and shall be reported to the appropriate Regional Office during normal business hours or the Environmental Emergency Response hotline at 573-634-2436 outside of normal business hours. A written submission shall also be provided within five (5) business days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

b. The following shall be included as information which must be reported within 24 hours under this paragraph.
   i. Any unanticipated bypass which exceeds any effluent limitation in the permit.
   ii. Any upset which exceeds any effluent limitation in the permit.
   iii. Violation of a maximum daily discharge limitation for any of the pollutants listed by the Department in the permit required to be reported within 24 hours.
c. The Department may waive the written report on a case-by-case basis for reports under paragraph 2. b. of this section if the oral report has been received within 24 hours.

3. **Anticipated Noncompliance**. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. The notice shall be submitted to the Department 60 days prior to such changes or activity.

4. **Compliance Schedules.** Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of the permit shall be submitted no later than 14 days following each schedule date. The report shall provide an explanation for the instance of noncompliance and a proposed schedule or anticipated date, for achieving compliance with the compliance schedule requirement.

5. **Other Noncompliance.** The permittee shall report all instances of noncompliance not reported under paragraphs 2, 3, and 6 of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in paragraph 2. a. of this section.

6. **Other Information**. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information.

7. **Discharge Monitoring Reports.**
   a. Monitoring results shall be reported at the intervals specified in the permit.
   b. Monitoring results must be reported to the Department via the current method approved by the Department, unless the permittee has been granted a waiver from using the method. If the permittee has been granted a waiver, the permittee must use forms provided by the Department.
   c. Monitoring results shall be reported to the Department no later than the 28th day of the month following the end of the reporting period.

Section C – Bypass/Upset Requirements

1. **Definitions.**
   a. *Bypass*: the intentional diversion of waste streams from any portion of a treatment facility, except in the case of blending.
   b. *Severe Property Damage*: substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
   c. *Upset*: an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

2. **Bypass Requirements.**
   a. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 2. b. and 2. c. of this section.
   b. Notice.
      i. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass.
      ii. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Section B – Reporting Requirements, paragraph 5 (24-hour notice).
   c. Prohibition of bypass.
      i. Bypass is prohibited, and the Department may take enforcement action against a permittee for bypass, unless:
         1. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
         2. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
         3. The permittee submitted notices as required under paragraph 2. b. of this section.
      ii. The Department may approve an anticipated bypass, after considering its adverse effects, if the Department determines that it will meet the three (3) conditions listed above in paragraph 2. c. i. of this section.

3. **Upset Requirements.**
   a. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph 3. b. of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.
   b. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
      i. An upset occurred and that the permittee can identify the cause(s) of the upset;
      ii. The permitted facility was at the time being properly operated; and
      iii. The permittee submitted notice of the upset as required in Section B – Reporting Requirements, paragraph 2. b. ii. (24-hour notice).
      iv. The permittee complied with any remedial measures required under Section D – Administrative Requirements, paragraph 4.
   c. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

Section D – Administrative Requirements

1. **Duty to Comply.** The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Missouri Clean Water Law and Federal Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.
   a. The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Federal Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.
   b. The Federal Clean Water Act provides that any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed $25,000 per day for each violation. The Federal Clean Water Act provides that any person who negligently violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement

imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than one (1) year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than two (2) years, or both. Any person who knowingly violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than three (3) years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than six (6) years, or both. Any person who knowingly violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.

c. Any person may be assessed an administrative penalty by the EPA Director for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.

d. It is unlawful for any person to cause or permit any discharge of water contaminants from any water contaminant or point source located in Missouri in violation of sections 644.006 to 644.141 of the Missouri Clean Water Law, or any standard, rule or regulation promulgated by the commission. In the event the commission or the director determines that any provision of sections 644.006 to 644.141 of the Missouri Clean Water Law or standard, rules, limitations or regulations promulgated pursuant thereto, or permits issued by, or any final abatement order, other order, or determination made by the commission or the director, or any filing requirement pursuant to sections 644.006 to 644.141 of the Missouri Clean Water Law or any other provision which this state is required to enforce pursuant to any federal water pollution control act, is being, was, or is in imminent danger of being violated, the commission or director may cause to have instituted a civil action in any court of competent jurisdiction for the injunctive relief to prevent any such violation or further violation or for the assessment of a penalty not to exceed $10,000 per day for each day, or part thereof, the violation occurred and continues to occur, or both, as the court deems proper. Any person who willfully or negligently commits any violation in this paragraph shall, upon conviction, be punished by a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than one year, or both. Second and successive convictions for violation of the same provision of this paragraph by any person shall be punished by a fine of not more than $50,000 per day of violation, or by imprisonment for not more than two (2) years, or both.

2. **Duty to Reapply.**
   a. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit.
   b. A permittee with a currently effective site-specific permit shall submit an application for renewal at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Department. (The Department shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)
   c. A permittees with currently effective general permit shall submit an application for renewal at least 30 days before the existing permit expires, unless the permittee has been notified by the Department that an earlier application must be made. The Department may grant permission for a later submission date. (The Department shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)

3. **Need to Halt or Reduce Activity Not a Defense.** It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

4. **Duty to Mitigate.** The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

5. **Proper Operation and Maintenance**. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

6. **Permit Actions.**
   a. Subject to compliance with statutory requirements of the Law and Regulations and applicable Court Order, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:
      i. Violations of any terms or conditions of this permit or the law;
      ii. Having obtained this permit by misrepresentation or failure to disclose fully any relevant facts;
      iii. A change in any circumstances or conditions that requires either a temporary or permanent reduction or elimination of the authorized discharge; or
      iv. Any reason set forth in the Law or Regulations.
   b. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

7. **Permit Transfer.**
   a. Subject to 10 CSR 20-6.010, an operating permit may be transferred upon submission to the Department of an application to transfer signed by the existing owner and the new owner, unless prohibited by the terms of the permit. Until such time the permit is officially transferred, the original permittee remains responsible for complying with the terms and conditions of the existing permit.
   b. The Department may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Missouri Clean Water Law or the Federal Clean Water Act.
   c. The Department, within 30 days of receipt of the application, shall notify the new permittee of its intent to revoke or reissue or transfer the permit.

8. **Toxic Pollutants.** The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Federal Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the Federal Clean Water Act within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.

9. **Property Rights.** This permit does not convey any property rights of any sort, or any exclusive privilege.

10. **Duty to Provide Information.** The permittee shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the Department upon request, copies of records required to be kept by this permit.

11. **Inspection and Entry.** The permittee shall allow the Department, or an authorized representative (including an authorized contractor acting as a representative of the Department), upon presentation of credentials and other documents as may be required by law, to:
    a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;
    b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
    c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
    d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Federal Clean Water Act or Missouri Clean Water Law, any substances or parameters at any location.

12. **Closure of Treatment Facilities.**
    a. Persons who cease operation or plan to cease operation of waste, wastewater, and sludge handling and treatment facilities shall close the facilities in accordance with a closure plan approved by the Department.
    b. Operating Permits under 10 CSR 20-6.010 or under 10 CSR 20-6.015 are required until all waste, wastewater, and sludges have been disposed of in accordance with the closure plan approved by the Department and any disturbed areas have been properly stabilized. Disturbed areas will be considered stabilized when perennial vegetation, pavement, or structures using permanent materials cover all areas that have been disturbed. Vegetative cover, if used, shall be at least 70% plant density over 100% of the disturbed area.

13. **Signatory Requirement.**
    a. All permit applications, reports required by the permit, or information requested by the Department shall be signed and certified. (See 40 CFR 122.22 and 10 CSR 20-6.010)
    b. The Federal Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six (6) months per violation, or by both.
    c. The Missouri Clean Water Law provides that any person who knowingly makes any false statement, representation or certification in any application, record, report, plan, or other document filed or required to be maintained pursuant to sections 644.006 to 644.141 shall, upon conviction, be punished by a fine of not more than ten thousand dollars, or by imprisonment for not more than six months, or by both.

14. **Severability.** The provisions of the permit are severable, and if any provision of the permit, or the application of any provision of the permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of the permit, shall not be affected thereby.

APPLICATION FOR CLASS V PERMIT

Proposed Mine Filling with Fly Ash Slurry
Abandoned Underground Greystone Mine Facility
Kansas City, Missouri

Submitted to:
Missouri Department of Natural Resources
Water Protection Program Water Pollution Branch

Submitted by:
Gary J. Van Riessen, P.C.
A Professional Corporation

On Behalf of:
Dean Realty Company

December 5, 2018

Gary Van Riessen, P.C.
A Professional Corporation
Gary J. Van Riessen, P.E.
Consulting Geotechnical Engineer
34505 East Drinkwater Road
Lone Jack, Missouri 64070-8567
816.566.0133 (Office)
816.830.6576 (Cell)
816.566.0139 (Facsimile)
Email: gvrlsmo@aol.com

December 5, 2018

Mr. Chris Wieberg, Director
Water Protection Program
Division of Environmental Quality
Department of Natural Resources
P.O. Box 176
Jefferson City, Missouri 65102

Reference: **Submittal of Form UIC – Application for Class V Permit**
Renewal of Permit UI-0000037
Beneficial Reuse of Solid Waste (Fly Ash)
Proposed Mine Filling with Fly Ash Slurry
Abandoned Underground Greystone Mine Facility
Kansas City, Missouri

Dear Mr. Wieberg:

In accordance with the stipulations contained on the enclosed Form UIC-Application for Class V Permit (MO 780-1826), this office, on behalf of Dean Realty Company, respectfully requests a renewal of Permit UI-0000037 from the Missouri Department of Natural Resources for the proposed injection of fly ash slurry into the abandoned Greystone Mine in Kansas City, Jackson County, Missouri. This process also represents the beneficial use/reclamation of a solid waste comprised of fly ash generated from the burning of coal.

Your records should indicate that annual permit fees have been paid by Dean Realty to keep the current permit in effect.

If you have any questions concerning the contents of this letter, please contact the undersigned.

Sincerely,

STATE OF MISSOURI
GARY J.
VAN RIESSEN
NUMBER
E-19058
REGISTERED PROFESSIONAL ENGINEER

12/5/2018

Gary J. Van Riessen, P.E.
Consulting Geotechnical Engineer
Missouri Registration No. 019058

Allison N. Sperber, P.E.
Senior Engineer

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM WATER POLLUTION BRANCH
P.O. BOX 176, JEFFERSON CITY, MO 65102

FORM UIC – APPLICATION FOR CLASS V PERMIT

FOR AGENCY USE ONLY	
CHECK NO.	
DATE RECEIVED	FEE SUBMITTED

ART A – DO NOT ATTEMPT TO COMPLETE THIS FORM BEFORE READING THE ACCOMPANYING INSTRUCTIONS.

1.00 ACTION REQUESTED

☒ Construction Permit Application ☒ Operating Permit Application

2.00 FACILITY INFORMATION

FACILITY NAME	TELEPHONE NUMBER
GREYSTONE MINE (INACTIVE) - DEAN REALTY CO	(816) 531-0800
ADDRESS	FAX NUMBER
EAST BI-STATE DRIVE, KANSAS CITY, MISSOURI	(816) 753-4311

2.1 CONSTRUCTION PERMIT NUMBER, IF APPLICABLE
N/A

2.2 OPERATING PERMIT NUMBER, IF APPLICABLE
n/a

2.3 FACILITY LOCATION (ATTACH A 1" = 2000' SCALE USGS TOPOGRAPHIC MAP SHOWING LOCATION)
SW ¼, SW ¼, Sec. 7, TOWNSHIP 49N, RANGE 33W, JACKSON COUNTY

3.00 OWNER INFORMATION

OWNER NAME	TELEPHONE NUMBER
DEAN REALTY CO	(816) 531-0800
ADDRESS	FAX NUMBER
1201 WEST 31ST STREET, SUITE 2, KANSAS CITY, MISSOURI 64108	(816) 753-4311

4.00 CONTINUING AUTHORITY INFORMATION

NAME	TELEPHONE NUMBER
DEAN REALTY CO	(816) 531-0800
DDRESS	FAX NUMBER
201 WEST 31st STREET, SUITE 2, KANSAS CITY, MISSOURI 64108	(816) 753-4311

5.00 FACILITY CONTACT INFORMATION

NAME	TITLE	TELEPHONE NUMBER
KEVIN ROWLEY	PROJECT MANAGER	(816) 531-0800

6.00 GENERAL INFORMATION

6.1 BRIEF DESCRIPTION OF PURPOSE OF INJECTION. INCLUDE ANALYSES AND CONCENTRATIONS OF ANY POLLUTANTS TO BE REMEDIATED. (ATTACH A SEPARATE SHEET IF NECESSARY)

THE PURPOSE OF THE FGD ASH SLURRY INJECTION IS TO STABILIZE DOME-OUT COLLAPSES OF THE UNDERGROUND MINE, THEREBY ALLOWING FOR THE DEVELOPMENT OF THE LAND ABOVE THE MINE. NO REMEDIATION OF POLLUTANTS IS REQUIRED AT THIS SITE.

6.2 BRIEF DESCRIPTION OF FACILITIES TO ACCOMPLISH INJECTION. ATTACH A SIMPLIFIED GEOLOGIC CROSS SECTION SHOWING DEPTH OF BEDROCK, DEPTH OF AQUIFERS, AND DEPTH OF INJECTION. ALSO ATTACH MATERIAL SAFETY DATA SHEETS FOR EACH OF THE INJECTED MATERIALS. IF INJECTION WELL IS TO BE CASED, PROVIDE SCHEMATIC.

SEE ATTACHED NARRATIVES.

6.3 IF BIOLOGICAL AGENTS ARE TO BE INTRODUCED IN THIS PROCESS, A BIOLOGICAL PROFILE AND LITERATURE RESEARCH MUST BE SUBMITTED WITH THIS APPLICATION.

6.4 WILL THIS PROCESS INVOLVE A HAZARDOUS WASTE AS DEFINED IN 10 CSR 25-4.010?
☐ YES ☒ NO

6.5 WILL THIS PROCESS RESULT IN DISCHARGE TO SURFACE WATER?
☐ YES ☒ NO If yes, an NPDES permit must be obtained.

6.00 GENERAL INFORMATION (CONTINUED)

6.6 HOW MANY TOTAL POUNDS OF CHEMICALS OR BIOLOGIC MATERIALS WILL BE INJECTED?

NONE.

6.7 IF THIS INJECTION IS INTO AN AQUIFER, HOW WILL THE INJECTED CHEMICALS BE WITHDRAWN OR REDUCED TO INJECTION LEVELS?

INJECTION INTO AN AQUIFER IS NOT INTENDED,SINCE NO AQUIFER EXISTS AT THE SITE. SEE SECTION 6.2 FOR ADDITIONAL SITE INFORMATION.

6.8 IF THE CHEMICALS OR BIOLOGIC AGENTS TO BE INJECTED ARE ALREADY PRESENT IN THE GROUNDWATER, GIVE CONCENTRATIONS:

CHEMICAL/BIOLOGIC AGENT	PRE-INJECTION CONCENTRATION (mg/L)
1.	1.
2.	2.
3.	3.

7. OTHER WELL TYPES ON SITE

YES	NO	TYPE	# AT LOCATION	WELL STATUS		
				ACTIVE	INACTIVE PLUGGED	INACTIVE NOT PLUGGED
☐	☒	ABANDONED WATER WELL		☐	☐	☐
☐	☒	AQUIFER RECHARGE WELL		☐	☐	☐
☐	☒	AQUIFER REMEDIATION WELL		☐	☐	☐
☐	☒	AUTOMOBILE SERVICE STATION DISPOSAL WELL		☐	☐	☐
☐	☒	GROUND SOURCE HEAT PUMP (OPEN LOOP)		☐	☐	☐
☐	☒	IMPROVED SINKHOLE		☐	☐	☐
☐	☒	INDUSTRIAL DRAINAGE WELL		☐	☐	☐
☐	☒	MINE BACKFILL WELL		☐	☐	☐
☐	☒	SEPTIC TANK WITH LATERAL FIELD THAT HAS THE POTENTIAL TO BE USED BY MORE THAN 20 PEOPLE PER DAY.		☐	☐	☐
☐	☒	OTHER _____		☐	☐	☐

7.1 WILL INJECTION WELLS BE CASED?

☒ YES ☐ NO

IF YES, A PERMIT MAY BE REQUIRED FROM THE GIOLOGICAL SURVEY AND RESOURSE ASSESSMENT DIVISION, P.O. BOX 250, ROLLA, MO 65402-0250 OR CALL (573) 368-2101.

STATE OF MISSOURI GARY J. VAN RIESSEN NUMBER E-18058

Gary J. Van Riessen 12/5/2018

8.00 SIGNATURE INFORMATION

NAME AND OFFICIAL TITLE (TYPE OR PRINT)	TELEPHONE NUMBER
GARY J. VAN RIESSEN, PE - SENIOR GEOTECHNCIAL CONSULTING ENGINEER	(816) 566-0133
SIGNATURE Gary J. Van Riessen	DATE SIGNED 12/5/2018

9.00 DATA

9.1 THIS SECTION MUST BE COMPLETED IF INJECTION IS INTO AN AQUIFER, IT MUST BE COMPLETED PRIOR TO INJECTION, AT LEAST ONE ANALYSIS MUST BE PREFORMED FOR EACH POLLUTANT LISTED. IF INJECTION IS NOT TO AN AQUIFER, SKIP AND GO TO PART 9.2.

POLLUTANT	MAXIMUM DAILY VAULE	
	CONCENTRATION	MASS
Biochemical Oxygen Demand (BOD)	N/A	N/A
Chemical Oxygen Demand (COD)	N/A	N/A
Total Organic Carbon (TOC)	N/A	N/A
Ammonia as N	N/A	N/A
Flow	VALUE N/A	
Temperature (winter)	VALUE N/A	
Temperature (summer)	VALUE N/A	
pH	MINIMUM N/A	MAXIMUM n/a

9.2 MARK "X" IN COLUMN (a) FOR EACH POLLUTANT YOU KNOW OR HAVE REASON TO BELIEVE IS PRESENT. MARK "X" IN COLUMN (b) FOR EACH POLLUTANT YOU BELIEVE TO BE ABSENT. IF YOU MARK COLUMN (a) FOR ANY POLLUTANT, YOU MUST PROVIDE THE RESULTS OF AT LEAST ONE ANALYSIS FOR THAT POLLUTANT. COMPLETE ONE TABLE FOR EACH WELL. SEE THE INSTRUCTIONS FOR ADDITIONAL DETAILS AND REQUIREMENTS.

POLLUTANT AND CAS. NO. (IF AVAILABLE)	MARK "X"		MAXIMUM DAILY VALUE	
	(a) PRESENT	(b) ABSENT	CONCENTRATION	MASS
Bromide (24959-67-9)	☐	☒		
ɔtal Residual Chloine	☐	☒		
Color	☐	☒		
Fecal Coliform	☐	☒		
Floride (16984-48-8)	☐	☒		
Nitrate/Nitrite (as N)	☐	☒		
Nitrogen, Total Organic (as N)	☐	☒		
Oil and Grease	☐	☒		
Total Phosphorus (as P) (7723-14-0)	☐	☒		
Radioactivity	☐	☒		
Alpha, Total	☐	☒		
Beta, Total	☐	☒		
Radium, Total	☐	☒		

9.00 DATA (CONTINUED)				
POLLUTANT AND CAS. NO. (IF AVAILABLE)	MARK "X"		MAXIMUM DAILY VALUE	
	(a) PRESENT	(b) ABSENT	CONCENTRATION	MASS
Sulfate (as SO^4) (14808-79-8)	☐	☒		
ulfide (as S)	☐	☒		
Sulfite (as SO^3)	☐	☒		
Surfactants	☐	☒		
Aluminum, Total (7429-90-5)	☐	☒		
Barium, Total (7440-39-3)	☐	☒		
Boron, Total (740-42-8)	☐	☒		
Cobalt, Total (7440-48-4)	☐	☒		
Iron, Total (7439-89-6)	☐	☒		
Magnesium, Total (7439-95-4)	☐	☒		
Molybdenum, Total (7439-98-7)	☐	☒		
Manganese, Total (7439-96-5)	☐	☒		
Tin, Total (7440-31-5)	☐	☒		
Titanium, Total (7440-32-6)	☐	☒		
METALS, CYANIDE, AND TOTAL PHENOLS				
1M. Antimony, Total (7440-36-0)	☐	☒		
2M. Arsenic, Total (7440-38-2)	☐	☒		
3M. Beryllium, Total (7440-41-7)	☐	☒		
4M. Cadmium, Total (7440-43-9)	☐	☒		
5M. Chromium, Total (7440-47-3)	☐	☒		
6M. Copper, Total (7550-50-8)	☐	☒		
7M. Lead, Total (7439-97-6)	☐	☒		
8M. Mercury, Total (7439-97-6)	☐	☒		
9M. Nickel, Total (7440-02-0)	☐	☒		
10M. Selenium, Total (7782-49-2)	☐	☒		
11M. Silver, Total (7440-22-4)	☐	☒		
12M. Thallium, Total (7440-28-0)	☐	☒		
13M. Zinc, Total (7440-66-6)	☐	☒		
14M. Cyanide, Total (57-12-5)	☐	☒		
15M. Phenols, Total	☐	☒		
GC/MS FRACTION – VOLATILE COMPOUNDS				
1V. Acrolein (107-02-8)	☐	☒		
2V. Acrylonitrite (107-13-1)	☐	☒		
3V. Benzene (71-43-2)	☐	☒		
4V. Bis (Chloromethyl) Ether (542-88-1)	☐	☒		
5V. Bromoform (75-25-2)	☐	☒		
/. Carbon Tetracholoride (56-23-5)	☐	☒		
7V. Cholorenzene (108-90-7)	☐	☒		

9.00 DATA (CONTINUED)				
POLLUTANT AND CAS. NO. (IF AVAILABLE)	MARK "X"		MAXIMUM DAILY VALUE	
	(a) PRESENT	(b) ABSENT	CONCENTRATION	MASS
8V. Cholodibromomethane (124-48-1)	☐	☒		
./. Chloroethane (75-00-3)	☐	☒		
10V. 2-Chloroethylvinyl Ether (110-75-8)	☐	☒		
11V. Chloroform (67-66-3)	☐	☒		
12V. Dichlorobromomethane (75-27-4)	☐	☒		
13V. Dichlorodifluoromethane (75-71-8)	☐	☒		
14V. 1,1 – Dichloroethane (75-34-3)	☐	☒		
15V. 1,2 – Dichloroethane (107-06-2)	☐	☒		
16V. 1,1 – Dichloroethylene (75-35-4)	☐	☒		
17V. 1,2 – Dichloropropane (78-87-5)	☐	☒		
18V. 1,2 – Dichloropropylene (542-75-6)	☐	☒		
19V. Ethylbenzene (100-41-4)	☐	☒		
20V. Methyl Bromide (74-83-9)	☐	☒		
21V. Methyl Chloride (74-87-3)	☐	☒		
22V. Methylene Chloride (75-09-2)	☐	☒		
23V. 1,1,2,2 – Tetrachlorothane (79-35-4)	☐	☒		
24V. Tetrachloroethylene (127-18-4)	☐	☒		
25V. Toluene (106-88-3)	☐	☒		
›6V. 1,2 – Trans Dichloroethylene (156-60-5)	☐	☒		
27V. 1,1,1 – Trichloroethane (71-55-6)	☐	☒		
28V. 1,1,2 – Trichloroethane (79-00-5)	☐	☒		
29V. Trichloroethylene (79-01-6)	☐	☒		
30V. Tricholorluoromethane (75-89-4)	☐	☒		
31V. Vinyl Chloride (75-01-4)	☐	☒		
GS/MS FRACTION – ACID COMPOUNDS				
1A. 2 – Chloropheno (95-57-8)	☐	☒		
2A. 2,4 – Dichlorophenol (120-83-2)	☐	☒		
3A. 2,4 – Dimethylphenol (105-67-9)	☐	☒		
4A. 4, 6 – Dinitro – O – Cresol (534-52-1)	☐	☒		
5A. 2,4 – Dinitrophenol (51-28-5)	☐	☒		
6A. 2 – Nitrophenol (88-75-5)	☐	☒		
7A. 4 – Nitrophenol (100-82-7)	☐	☒		
8A. P – Chloro – M – Cresol (59-50-7)	☐	☒		
9A. Pentachlorophenol (87-86-5)	☐	☒		
10A. Phenol (106-95-2)	☐	☒		
ˑ1A. 2,4,6 – Trichlorophenol (88-06-2)	☐	☒		

9.00 DATA (CONTINUED)				
POLLUTANT AND CAS. NO. (IF AVAILABLE)	MARK "X"		MAXIMUM DAILY VALUE	
	(a) PRESENT	(b) ABSENT	CONCENTRATION	MASS
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS				
'B. Acenaphthene (83-32-9)	☐	☒		
2B. Acenaphtylene (208-96-8)	☐	☒		
3B. Anthracene (120-12-7)	☐	☒		
4B. Benzidine (92-87-5)	☐	☒		
5B. Benzo (a) Anthracene (56-55-3)	☐	☒		
6B. Benzo (a) Pyrene (50-32-8)	☐	☒		
7B. 3,4 – Benzofluoranthene (205-99-2)	☐	☒		
8B. Benzo (ghi) Perylene (191-24-2)	☐	☒		
9B. Benzo (k) Fluoranthene (207-08-9)	☐	☒		
10B. Bis (2-Chloroethoxy) Methane (111-91-1)	☐	☒		
11B. Bis (2-Chloroethyl) Ether (111-44-4)	☐	☒		
12B. Bis (2-Chloroisopropyl) Ether (39638-32-9)	☐	☒		
13B. Bis (2-Ethylhexyl) Phthalate (117-81-7)	☐	☒		
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	☐	☒		
15B. Butyl Benzyl Phthalate (85-68-7)	☐	☒		
16B. 2-Chloronaphthalene (91-58-7)	☐	☒		
17B. 4-Chloronaphenyl (7005-72-3)	☐	☒		
18B. Chrysene (218-01-9)	☐	☒		
9B. Dibenzo (a,h) Anthracene (53-70-3)	☐	☒		
20B. 1,2 – Dichlorobenzene (95-50-1)	☐	☒		
21B. 1,3 – Dichlorobenzene (541-73-1)	☐	☒		
22B. 1,4 – Dichlorobenzene (106-46-7)	☐	☒		
23B. 3,3 – Dichlorobenzidine (91-94-1)	☐	☒		
24B. Diethyl Phthalate (84-66-2)	☐	☒		
25B. Dimethyl Phthalate (113-11-3)	☐	☒		
26B. Di-N-Butyl Phthalate (84-74-2)	☐	☒		
27B. 2,4 – Dinitrotoluene (121-14-2)	☐	☒		
28B. 2,6 – Dinitrotoluene (606-20-2)	☐	☒		
29B. Di – N – Octyl Phthalate (117-84-0)	☐	☒		
30B. 1,2–Diphenylhydrazine (as Azobenzene) (122-66-7)	☐	☒		
31B. Fluoranthene (206-44-0)	☐	☒		
32B. Fluorene (86-73-7)	☐	☒		
33B. Hexachlorobenzene (118-71-1)	☐	☒		
34B. Hexachlorobutadiene (87-68-3)	☐	☒		
35B. Hexachlorocyclopentadiene (77-47-4)	☐	☒		
. Hexachloroethane (67-72-1)	☐	☒		
37B. Indeno (1,2,3-c,d) Pyrene (193-39-5)	☐	☒		

9.00 DATA (CONTINUED)				
POLLUTANT AND CAS. NO. (IF AVAILABLE)	MARK "X"		MAXIMUM DAILY VALUE	
	(a) PRESENT	(b) ABSENT	CONCENTRATION	MASS
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS (CONTINUED)				
3B. Isophorone (78-59-1)	☐	☒		
39B. Napthalene (91-20-3)	☐	☒		
40B. Nitrobenzene (98-95-3)	☐	☒		
41B. N-Nitrosodimethylamine (62-75-9)	☐	☒		
42B. N-Nitrosodi-N-Propylamine (621-64-7)	☐	☒		
43B. N-Nitrosodiphenylamine (83-30-6)	☐	☒		
44B. Phenanthrene (85-01-8)	☐	☒		
45B. Pyrene (129-00-0)	☐	☒		
46B. 1,2,4 – Trichlorobenzene (120-82-1)	☐	☒		
GC/MS FRACTION - PESTICIDES				
1P. Aldrin (309-00-2)	☐	☒		
2P. α-BHC (319-84-6)	☐	☒		
3P. β-BHC (319-85-7)	☐	☒		
4P. χ-BHC (58-89-9)	☐	☒		
5P. δ-BHC (319-86-8)	☐	☒		
6P. Chlordane (57-74-9)	☐	☒		
7P. 4,4 – DDT (50-29-3)	☐	☒		
8P. 4,4 – DDE (72-55-9)	☐	☒		
?. 4,4 – DDD (72-54-8)	☐	☒		
10P. Dieldrin (60-57-1)	☐	☒		
11P. α-Endosulfan (115-29-7)	☐	☒		
12P. β-Endosulfan (115-29-7)	☐	☒		
13P. Endosulfan (1031-07-8)	☐	☒		
14P. Endrin (72-20-8)	☐	☒		
15P. Endrin (7421-93-4)	☐	☒		
16P. Heptachlor (76-44-8)	☐	☒		
17P. Heptachlor Epoxide (1024-57-3)	☐	☒		
18P. PCB-1242 (53469-21-9)	☐	☒		
19P. PCB-1254 (11097-69-1)	☐	☒		
20P. PCB-1221 (11104-28-2)	☐	☒		
21P. PCB-1232 (11141-16-5)	☐	☒		
22P. PCB-1248 (12672-29-6)	☐	☒		
23P. PCB-1260 (11096-82-5)	☐	☒		
24P. PCB-1016 (12674-29-6)	☐	☒		
25P. Toxaphene (8001-35-2)	☐	☒		
OXIN				
2,3,7,8 – Tetrachlorodibenzo-P-Dixon (1764-01-6)	☐	☒	DESCRIBE RESULTS	

GENERAL INFORMATION

Form UIC – Application for Class V Permit

Section 6.2

Brief History and Introduction

This proposed project provides for the beneficial use of fly ash, a waste material generated from the burning of coal. This waste material, which is often stored or disposed of in some type of landfill, would be injected into the abandoned mine via a carefully controlled mixing/slurry technique. The slurry, which will be a combination of scrubber solids, water, and approximately 5-6% cement, will ultimately harden, with long-term compressive strengths typically between 100 to 200 pounds/square inch. This hardened slurry material fills all voids in the mine, resulting in a stabilized/reclaimed mine that no longer exhibits unstable mine roof conditions that could lead to unacceptable surface conditions in the form of surface subsidence or sinkholes. This stabilized mine condition ultimately allows for the safe and economical commercial development of the overlying land surface.

Concurrent with this permit request, the owner of the property and project manager of the proposed mine reclamation project, Dean Realty Co, is also submitting an application for a permit exemption from the Solid Waste Management Program for the Beneficial Reuse of Solid Waste. A copy of this request for permit exemption is enclosed as Attachment A to this document. A copy of the narrative for this permit exemption is enclosed as Attachment A to this document. Please note that because the figures and attachments for the exemption request and the injection well permit are identical, only one cop[y of the figures and attachments are enclosed with this document.

The Greystone Mine was an active underground limestone mine from 1917 to nearly 1970. The Bethany Falls limestone was mined in the Greystone Mine using the room and pillar method. Subsequent to completion of mining operations, the southern section of the underground space was utilized as a storage freezer. The freezer operations ceased at some point in the 1970s, at which time the mine was abandoned. Subsequent to the abandonment of the mine, deterioration in the roof support conditions occurred, leading to significant losses in roof support as a result of roof dome-outs. In 1984, partial verification of dome-out collapses was performed, with the verification conducted in the southern reaches of the mine. It is believed that a majority of the mine has experienced extensive dome-out collapses. Only limited access to the mine is possible today.

Location

The inactive Greystone Mine is located within the city limits of Kansas City, Jackson County, Missouri. A mine location map is presented as Figure 1. The ground surface projection of the mine falls within Lots 3, 6, 7, 8, 12, 13, 16, 17, and 18 of the Cambridge Terraces subdivision, as shown in Figure 2. The ground surface above the mine is currently undeveloped, generally wooded land, with the exception of Lot 12. The approximate footprint area of the mine is 463,340 square feet (10.6 acres). According to the United States Geological Survey's (USGS) Kansas City Quadrangle, 7.5-Minute Series Topographic Map, the Greystone Mine is located in the SW ¼ SW ¼ Section 7 and NW ¼ NW ¼ Section 18, Range 33 West (R33W), Township 49 North (T49N). A portion of the USGS Kansas City Quadrangle map showing the mine location is also presented on Figure 1.

Site Conditions and Land Use

Currently, the land above the mine is currently zoned PD/M2A, Industrial. No structures are present above the footprint of the mine. Some utilities, both above- and below-grade, are present in the extreme western limits of the properties above the mine. The properties located to the north, west, and east of the mine are comprised of railroad right-of-way. The adjacent property to the west is owned by Dean Realty Co, Inc. and consists of office and office/warehouse developments. Representative photographs of the land above the mine are provided as Attachment B

Land use within a 1,000-foot-zone around the surface projection of the mine is zoned Light Industrial (M1), Heavy Industrial District (M2a), and Urban Redevelopment District (URD) in Missouri and Heavy Industrial District (M3) in Kansas. A Land Use Map for the project site and surrounding areas for Missouri and Kansas is provided as Figure 3.

The ground surface topography above the mine footprint is highly variable. The ground surface elevations above the mine range from a high of approximately 900 feet in the northern portion of Lot 12 to a low of approximately 820 feet in the northern portion of Lot 3, the central portion of Lot 16, and the southwestern portion of Lot 17. A majority of the land above the mine is heavily wooded. Several unpaved roads and switchbacks traverse the relatively steep northern, western, and eastern edges of the land above the mine. Figures 3 and 7 illustrate the existing topography of the land surface above the mine. Additionally, recent survey data, collected for the purposes of confirming elevations of key locations on the periphery of the site, are provided in Attachment C.

Purpose of Mine Stabilization

The primary purposes of the proposed stabilization of the Greystone Mine is to stabilize a land parcel that is currently threatened by an increased probability of surface subsidence due to mine roof collapses and to enable commercial development of the land above the mine. Currently, the land above the mine is not considered suitable for development due to the likelihood of future dome-out collapses of the mine roof. Figure 4 provides the approximate locations of historical dome-outs/roof collapses documented within the footprint of the mine No current evidence of unacceptable surface manifestations, such as the formation of sinkholes or ground subsidence due to the mine roof collapses, has been recently observed. Further development of this surface property by Dean Realty Company is contingent upon the successful stabilization of the underground mine.

Benefits of Coal Combustion By-Product Slurry Injection

The three primary benefits of using a fly ash slurry injection technology for stabilization of underground limestone mines are listed below.

1. Allows for the cost effective reclamation/development of land above the mine that would otherwise not be safe to do so. Considering the current value of commercial real estate in

Kansas City, this benefit represents a potentially significant increase in the value of the surface property above the mine.

2. Provides a cost-effective method of stabilization as compared to injection of Portland cement, which could cost approximately 10 to 20 times more than backfilling with fly ash slurry.
3. Recycles fly ash by using this waste material to backfill underground mines, thereby providing a beneficial use of a waste material, rather than placing that material in a landfill.

With regard to recent regulations governing the beneficial use of Coal Combustion Residuals (CCR), it is the intent of this exemption request to demonstrate that (a) the use of the CCR does result in a functional benefit, that (b) the CCR is a suitable, cost-effective substitute for currently unavailable and costly naturally-occurring materials (borrow), that (c) the use of the CCR will be governed by applicable product specifications, regulatory standards, or design standards relevant, and that (d) the use of CCR on this project will not result in environmental releases to groundwater, surface water, soil, or air that exceed relevant regulatory and health-related benchmarks.

Generalized Geologic Setting

The Greystone Mine is located in a bedrock bluff above the Kansas River and former Turkey Creek alluvial valleys. At its nearest point, the Kansas River is approximately 2,000 feet west of the mine and flows generally from south to north to its confluence with the Missouri River approximately 2 river miles from the mine. Turkey Creek was formerly present east of the site, flowing northward on the southeastern and eastern flanks of the bluff, then flowing westward on the northern flank of the bluff to its previous confluence with the Kansas River. For flood control purposes, Turkey Creek was re-routed in 1919 through a tunnel located approximately 4,000 feet southwest of the mine.

Generally, the geology of the Kansas City area consists of relatively flat, cyclic deposits of sedimentary bedrock formed during the Pennsylvanian Period. The Pennsylvanian bedrock consists primarily of limestone and shale, with minor amounts of sandstone and coal. The stratigraphy of the Greystone Mine consists of bedrock of the lower portions of the Kansas City Group, which consists of the following geologic formations, in ascending order: Hertha, Ladore, Swope, Galesburg, and Dennis. Directly underlying the Kansas City Group is a substantial thickness (over 100 feet) of shale comprising the Pleasanton Group. The specific bedrock units directly involved with the Greystone Mine are the Middle Creek Limestone, Hushpuckney Shale, and Bethany Fall Limestone Members which comprise the Swope Formation. A generalized geologic map of the mine and surrounding area is presented as Figure 5.

The Hushpuckney Shale immediately underlies the Bethany Falls Limestone and forms the floor of the mine. The Hushpuckney is a black, fissile shale and is approximately 2-4 feet thick in the mine. The Bethany Falls is a light gray, medium to thick-bedded limestone approximately 19-20 feet thick. The Stark-Galesburg immediately overlies the Bethany Falls. The Stark-Galesburg is approximately 8-10 feet thick and consists of black fissile shale. A more-detailed, project-specific stratigraphic section (with approximate unit/formation elevations) is provided as Figure 6.

General cross sections of the mine area are presented by Figures 7 thru 10. These cross sections were developed from borings conducted during an investigative drilling program performed in June 2016, as well as regional experience and published data. Attachment D contains a summary report and boring logs resulting from the June 2016 investigation.

More recently (March 2018), test pits were excavated in the area north of the mine footprint in advance of the possible placement of random/spoil fill from a nearby construction project on Turkey Creek. These test pits were excavated to approximate elevations ranging from 759 to 764, which generally corresponds to the lower portion of the Bethany Falls Limestone. Observations conducted during the excavation of these test pits did not reveal any groundwater of free seepage water, thereby supporting the conclusion that water is currently not emanating from the abandoned Greystone Mine. A summary report for this test pit investigation, along with test pit logs and photographs, is included as Attachment E.

The interior of the mine has historically been "dry", with minimal or no evidence of lateral water infiltration from the Bethany Falls Limestone sidewalls or roof or overlying bedrock stratum in the roof comprised of the Galesburg-Stark Shale or the Winterset Limestone. Similarly, the mine typically had not exhibited any evidence of vertical water infiltration via upward percolation from bedrock units comprising the mine floor (Hushpuckney Shale or Middle Creek Limestone).

Generalized Hydrogeologic Setting

A general literature review indicates that no known or identified groundwater aquifers exist at the site. Kansas City, Missouri and Kansas City, Kansas obtain their public water supply from alluvial aquifers of the Missouri River. Kansas City, Kansas and Kansas City, Missouri alluvial wells are located upstream from the confluence of the Kansas and Missouri Rivers. The Kansas City, Missouri well field is located north of the Missouri River, approximately five (5) river miles (Kansas and Missouri Rivers) upstream from the Greystone Mine. The Kansas City, Kansas wells are located upstream from the Kansas City Missouri water works. A review of available information indicates that there is no known water supply wells located within the limits of the project site.

The Kansas River is located approximately 2,000 feet northwest of the northwestern section of the mine. The edge/outcrop exposure of the bluff in which the Greystone Mine is located is approximately 1,000 feet from the northwest section of the mine. The edge of the bluff to the northeast corner of the mine is approximately 200-300 feet from the northeastern edge of the mine.

The former entrance to the mine is located at the base of the bluff, south of the mine and north of the former Imperial Brewery. The base of the Bethany Falls approximately coincides with the elevation of base of the mine entrance, estimated to be at approximately elevation 760 feet. The ground surface above the mine footprint ranges from approximately 770 to 900 feet. According to the 1996 USGS Kansas City Quadrangle Map, the water elevation of the Kansas River at its nearest point to the mine is approximately 725 to 730 feet. The top of the Bethany Falls limestone is at an approximate elevation of 777 feet at the mine, with the base of the mine at an approximate elevation of 760 to 758 feet. It is noted that the Bethany Falls limestone, as reported in related geologic literature, exhibits a regional dip of approximately 10 feet per mile (less than 1 degree) to the west/northwest.

Based on the elevations discussed above, there is no direct hydraulic connection between the Bethany Falls limestone unit and the Kansas River.

The hydro-geologic setting of the abandoned Greystone Mine is generally defined by unsaturated, bedrock units on the north and west and bedrock outcropping on the south and east. Additionally, a substantial portion of the north side of the mine area is laterally encapsulated by natural overburden and historic fills to a current elevation ranging from 780-790 feet, effectively providing a significant lateral confinement layer for any potential water movement to/from the north through the intact, un-mined Bethany Falls limestone. Additionally, miscellaneous and random historic fill is currently present along the southern and eastern perimeters of the old mine face to elevations ranging from 765-770, resulting in a partial lateral encapsulation of the Bethany Falls Limestone that provides a direct lateral barrier against any horizontal infiltration of surface water. The horizontal infiltration of surface water into the old mine is further prohibited by an existing drainage swale/feature located between the mine site and the adjacent railroad. This swale generally slopes from an approximate elevation 755 on the south side of the mine site to an approximately elevation of 753 at a drop inlet located east of the mine site (see Figure 7).

To that end, the likelihood of any surface water accessing the old mine via lateral water movement through the Bethany Falls Limestone, with a floor at elevation 755-760 and either partial or completed lateral encapsulation on the south, east and north sides, is highly unlikely if not impossible.

Historically speaking, a Phase II Site Assessment was conducted by others for the adjacent, abandoned former Imperial Brewery site (see Attachment F). The results were submitted in a report titled *Phase II Limited Site Investigation – Gateway Union Properties, Inc. Site – Kansas City, Missouri for Kansas City Terminal Railway Company*, and dated June 26, 2002. An apparent "perched"/intermittent groundwater was encountered within a thin stratum of alluvium (in the valley located south and east from the mine site) at depths of approximately 8 to 10 feet below existing grades. Ground surface elevations were not reported in the Phase II LSI document. Based on recent topographic survey data, the ground surface in the area of the Phase II LSI borings is approximately 760 feet. Therefore, groundwater at the time of the Phase II LSI was at an approximate elevation of 751 feet. As noted previously, the base of the mine is at approximately elevation 755-760 feet, which is at least 5-10 feet above the apparent potentiometric surface in the shallow alluvium. ***Therefore, no apparent hydraulic connection between the mine and shallow alluvium is present.***

The Bethany Falls limestone is an intact, un-fractured limestone and is not considered as an aquifer since this unit does not produce any discernible amounts of groundwater. The Bethany Falls limestone is overlain by the Galesburg/Stark shale, which is approximately 8-10 feet thick at the abandoned mine. The Hushpuckney Shale, which is a low permeability material (typically less than 10^{-7} cm/sec), is approximately 2-4 feet thick and underlies the Bethany Falls limestone at the mine. The Hushpuckney Shale is underlain (in descending order) by the Middle Creek

Limestone (2 feet thick), the Ladore Formation (3 feet of claystone/shale), and the Hertha Formation that is comprised of the Sni-a-Bar Limestone (14 feet of thick-bedded limestone with shale interbed), the Mound City Member (3 feet of shale/coal), and the Critzer Limestone (2 feet thick). The Kansas City Group is ultimately underlain by a thick shale deposit (100 feet) associate with the Pleasanton Group. ***Therefore, since the existing geologic stratigraphy underlying the floor of the mine is substantially comprised of shale or thick-bedded limestone, the site is effectively encapsulated on all sides by soil or natural bedrock materials and underlain/overlain by predominately shale confining layers.***

Groundwater wells completed in bedrock in the Kansas City area are not generally used for potable water. Bedrock water wells are typically used for industrial or agricultural purposes. Bedrock units capable of producing groundwater for industrial and/or agricultural purposes are generally at depths of 500 feet or more in the mine area. The top of the Bethany Falls limestone is approximately 60-125 feet below the ground surface (Elevations 990-930) in the project area.

<u>Fly Ash Slurry Injection Operations</u>

The proposed stabilization technique for the Greystone Mine will consist of the injection of a Coal Combustion Residual (CCR)/Portland cement slurry through a series of boreholes drilled from the ground surface to the mine. The proposed technique is a proven technology used throughout the United States to stabilize underground mines, thereby providing for safe construction of structures and other development on the ground surface above the mine. The CCR/cement slurry injection technology has been used extensively in stabilizing underground limestone mines in the Kansas City area, including the Sugar Creek Limestone and Briarcliff Limestone mines.

The slurry injection operations will generally consist of preparing the injection site (typically in a manner that does not require a land disturbance permit, but does require some level of erosion control), transporting the CCR/cement material to the site in containerized tank trailers, mixing the CCR/cement material with potable water in an enclosed chamber designed to minimize any fugitive dust to form the slurry, injecting the CCP/cement slurry through pre-drilled cased boreholes, testing of the raw CCP materials, and quality control of the injected slurry and the progress of the mine filling via examination conducted by a down-hole video camera and supplemental borings and/or future injection shafts.

The western, northern, and eastern portions of the site are generally wooded with a highly variable topography. A system of unpaved roads is currently present at the site. Minor clearing of trees and limited site grading will be required to provide adequate access of the drilling and injection equipment. The south-central portion of the site has been rough graded and is relatively level. The south-central portion of the site could be used as a staging area. As areas of the site become accessible to drilling equipment, drilling of the injection boreholes will begin. It is anticipated that the mine filling project will proceed from the southwest to the northeast for the southern half of the mine, and from the southeast to the northwest for the northern half of the mine.

In general, the boreholes will be located between pillars, with the drilling equipment located above or near a pillar, if possible. The boreholes will be approximately 12-inch diameter, drilled through the roof of the mine, and cased with 8-inch-diameter, Schedule 40 polyvinyl chloride (PVC) pipe. At least 4-5 boreholes will be drilled per injection location, with one borehole serving as the injection point and the remaining boreholes being used as observational access points for the downhole video camera, as well as ventilation/air release shafts. Ultimately, each borehole will be used as some type of injection point. Due to the unknown nature of the dome-out collapses, it is likely that as the injection operations proceed, the location of the injection points will need to be modified. The proposed injection well/borehole layout is presented along with a typical injection borehole/well schematic in Figure 11.

The proposed source of fly ash is the Kansas City, Kansas Board of Public Utilities' Nearman Creek Power Plant. This plant will be the primary sources of Flue Gas Desulphurization (FGD) Scrubber Solids that will form the primary constituent of the injection slurry. Because the FGD ash has little or no cementitious properties, and because the project desire to enhance not only the strength of the final product, but also the permeability properties of the hardened slurry, cement will also be added to the slurry mixture at a rate of at least 5-6% by weight. The FGD ash will be transported to the site using pneumatic tractor-trailer tank trucks. The ash will be unloaded by discharging through a pump and hose system directly to the mixing facility. A proprietary mixing process will be employed to mix the raw fly ash and cement with potable water. A fly ash/cement to water ratio will be developed by the injection contractor to satisfy the engineering requirements of the grout. The fly ash/cement grout will have a minimum unconfined compressive strength of 100 pounds per square inch (psi), with a long-term target strength of approximately 150 psi. After mixing, the grout will be transported to the injection well/borehole through PVC pipes and injected into the open space of the mine. Attachment G contains descriptions and sketches of proposed equipment to be used for the injection process.

It is anticipated that at least 137,000 tons of fly ash will be required for the project. Assuming a 1:1 slurry ratio of fly ash to water (this ratio will be adjusted to limit the development of any "bleed" water), approximately 205,000 cubic yards of fly ash slurry will be injected for the entire project. Depending on the availability of suitable quantities of acceptable fly ash, it is estimated that at least 3 to 5 years will be required to complete the project.

Copies of recent (2017/2018) Toxicity Characteristic Leaching Procedure (TCLP) and Synthetic Precipitation Leaching Procedure (SPLP) testing analysis for the FGD ash proposed for use on this project are enclosed as Attachment H. Additionally, TCLP and SPLP testing analysis were conducted in May 2017 on each of two (2) hardened samples of cement-treated FGD ash, with the cement contents of the testing samples consisting of 4% and 10% cement by weight. *Of particular interest is that the leachate testing of FGD ash that had experienced the pozzolanic/hardening process, due to the addition of cement, indicated a binding/reduction of several constituents, most notably boron, that resulted in significantly reduced concentrations with increasing percentages of cement.* It was also surmised that the increased presence of aluminum in the cement treated samples was due to the use of aluminum paddles and containers during the pulverization of the hardened ash.

Laboratory testing for the unconfined compressive strength, as well as initial permeability of the final/hardened slurry, are presented in Attachment I.

It is respectfully noted that the SPLP test results are significant in that this testing approach better simulates actual environmental precipitation and the leaching potential of an encapsulated contaminant in soil. However, since the proposed hardened slurry fill is essentially fully encapsulated by soil/bedrock, and that the potential for infiltration of precipitation into or out of the in-filled mine space is very minimal (if not negligible), it is believed that formation and/or transportation of any chemical constituents out of the slurry-filled mine is negligible.

As part of the final permit application, supplemental falling-head permeability tests were performed on cured slurry (approximately 30 days and 60 days) to confirm the likely permeability of the completed/hardened slurry. Two tests conducted on these samples at 30 days of curing yielded results of 3.5×10^{-5} centimeters/second and 6.7×10^{-5} centimeters/second. The permeability for a sample cured for 60 days was 1.2×10^{-5} centimeters/second. These permeability values are typical for soils or weathered/fractured bedrocks that are generally classified as "semi-pervious".

A recent site visit to the on-going Inland Mine filing project, that is using the proposed FGD scrubber solids, was conducted on May 17, 2018. This project, which is located at 6800 Inland Drive in Kansas City, Kansas, also represents the filling of an old Bethany Falls mine that is permitted under the Kansas Department of Health and Environment (KDHE). A physical/qualitative examination of the hardened slurry indicated that the material was extremely flowable, of adequate strength, and or low/moderate permeability, as evidenced by standing water on the hardened material. Conservations with Mr. Richie Benninghoven of USC Technologies indicated that the initial, uncured slurry did generate very minor volumes of "bleed" water, but that this water was eventually absorbed into the hardening mass of cement-treated ash. Therefore, the likelihood of the formation of "decant" water that will become a source for infiltration/exfiltration water appear to be quite low. If there is an interest, a potential site visit to this on-going project is offered to representatives of the Missouri DNR.

Information related to the equipment typically used in a fly ash slurry injection process, is enclosed as Attachment G. Test results for the compressive strength and permeability testing of the proposed fly ash/cement slurry is enclosed as Attachment I.

Summary of Conclusions

In summary, the following conclusions are respectfully offered.

1. The primary purposes of the proposed stabilization of the Greystone Mine is to stabilize a land parcel that is currently threatened by an increased probability of surface subsidence and public safety issues due to mine roof collapses and to enable commercial development of the land above the mine. Currently, the land above the mine is not considered suitable for development due to the likelihood of future dome-out collapses of the mine roof. Consequently, the use of a CCR/cement slurry fill will result in a functional benefit.
2. The use of a CCR/cement slurry fill represents the only viable and economical approach to stabilizing an ever-increasing unstable, abandoned underground limestone mine.
3. The use of a CCR/cement slurry fill on this project will be controlled/governed by the use of a single CCR source (with regular TCLP and SPLP laboratory testing), will be injected into the mine void using established and regionally-recognized procedures, will

be regularly monitored for material quality and with regard to the progression/effectiveness of the mine filling process, and is based on minimum design values related to final compressive strength of the hardened slurry.

4. The use of a CCR/cement slurry fill on this project will not result in any detrimental environmental releases to groundwater due to several site conditions: (a) *no groundwater aquifer exists at the site*, (b) *the site represent a topographical elevated feature and surrounding drainage swales will not allow infiltration from surface water into the mined space*, (c) *the site is encapsulated on all sides by soil or natural bedrock materials and underlain by a predominately shale confining layer*),
5. Slurry mixing will be accomplished via enclosed tankers and the use of controlled mixing with potable water, with immediate injection into the mined space, thereby precluding the formation of air-borne dust.

Attachments: Figures 1 through 11

Attachment A – Renewal of Permit UI-0000037, Request for Permit Exemption Beneficial Reuse of Solid Waste (Fly Ash) Proposed Mine Filling-Greystone Mine in Kansas City, Missouri Solid Waste Management Program

Attachment B - Representative Site Photographs

Attachment C - September 2018 Topographic Survey Data Collection

Attachment D - June 2016 Subsurface Drilling Program

Attachment E - Test Pit Investigation, March 2018

Attachment F - Phase II Limited Site Investigation, Gateway Union Properties, Inc. Site, Kansas City, Missouri for Kansas City Terminal Railway Company (2002)

Attachment G - TCLP/SPLP Test Data Sheets-Proposed Fly Ash Source

Attachment H - Fly Ash Injection Process/Equipment

Attachment I - Typical Laboratory Strength Tests and Permeability of Fly Ash

Attachment J – KCMO Site Zoning/Stipulation Letter

Attachment A

Renewal of Permit UI-0000037

Request for Permit Exemption
Beneficial Reuse of Solid Waste (Fly Ash)
Solid Waste Management Program
Proposed Mine Filling
Greystone Mine
Kansas City, Missouri

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December 5, 2018

Mr. Chris Nagel, Director
Solid Waste Management Program
Division of Environmental Quality
Department of Natural Resources
P.O. Box 176
Jefferson City, Missouri 65102

Reference: **Request for Permit Exemption**
Beneficial Reuse of Solid Waste (Fly Ash)
Proposed Mine Filling with Fly Ash/Cement Slurry
Abandoned Underground Greystone Mine Facility
Kansas City, Missouri

Dear Mr. Nagel:

Pursuant to the regulations promulgated by 10 CSR 80, Chapter 2, Sections 9A.12 and 9B, this office, on behalf of Dean Realty Company, respectfully requests from the Solid Waste Management Program, Missouri Department of Natural Resources, a reconfirmation of an exemption from the requirement to obtain a solid waste disposal area permit for the beneficial use/reclamation of a solid waste (fly ash generated from the burning of coal). Please note that the original exemption was granted based on the submittal from this office dated December 23, 2008. This current request is being made in support of an Underground Injection Control permit (UI0000037) issued by the Water Protection Program in 2008 to backfill an abandoned underground limestone mine with fly ash/cement slurry. The abandoned limestone mine is known as the Greystone Mine in Kansas City, Jackson County, Missouri.

This proposed project provides for the beneficial use of fly ash, a waste material generated from the burning of coal. This waste material, which is often stored or disposed of in some type of landfill, would be injected into the abandoned mine via a carefully controlled mixing/slurry technique. The slurry, which will be a combination of scrubber solids, water, and approximately 5-6% cement, will ultimately harden, with long-term compressive strengths typically between 100 to 200 pounds/square inch. This hardened slurry material fills all voids in the mine, resulting in a stabilized/reclaimed mine that no longer exhibits unstable mine roof conditions that could lead to unacceptable surface conditions in the form of surface subsidence or sinkholes. This stabilized mine condition ultimately allows for the safe and economical commercial development of the overlying land surface.

Concurrent with this permit exemption request, the owner of the property and project manager of the proposed mine reclamation project, Dean Realty Company, is also submitting an application for a permit from the Water Protection Program-Water Pollution Branch for the renewal of the Underground Injection Control permit for the installation of Class V wells. A copy of the narrative for this permit application is enclosed as Attachment A to this document. Please note that because the figures and attachments for the exemption request and the injection well permit are identical, only one cop[y of the figures and attachments are enclosed with this document.

Project Background and Description

The Greystone Mine was an active underground limestone mine from 1917 to nearly 1970. The Bethany Falls limestone was mined in the Greystone Mine using the room and pillar method. Subsequent to completion of mining operations, the southern section of the underground space was utilized as a storage freezer. The freezer operations ceased at some point in the 1970s, at which time the mine was abandoned. Subsequent to the abandonment of the mine, deterioration in the roof support conditions occurred, leading to significant losses in roof support as a result of roof domeouts. In 1984, partial verification of domeout collapses was performed, with the verification conducted in the southern reaches of the mine. It is believed that a majority of the mine has experienced extensive domeout collapses. Only limited access to the mine is possible today.

The inactive Greystone Mine is located within the city limits of Kansas City, Jackson County, Missouri. A mine location map is presented as Figure 1. The ground surface projection of the mine falls within Lots 3, 6, 7, 8, 12, 13, 16, 17, and 18 of the Cambridge Terraces subdivision, as shown in Figure 2. The ground surface above the mine is currently undeveloped, generally wooded land, with the exception of Lot 12. The approximate footprint area of the mine is 463,340 square feet (10.6 acres).

According to the United States Geological Survey's (USGS) Kansas City Quadrangle, 7.5-Minute Series Topographic Map, the Greystone Mine is located in the SW ¼ SW ¼ Section 7 and NW ¼ NW ¼ Section 18, Range 33 West (R33W), Township 49 North (T49N). A portion of the USGS Kansas City Quadrangle map showing the mine location is also presented on Figure 1.

Currently, the land above the mine is currently zoned PD/M2A, Industrial. No structures are present above the footprint of the mine. Some utilities, both above- and below-grade, are present in the extreme western limits of the properties above the mine. The properties located to the north, west, and east of the mine are comprised of railroad right-of-way. The adjacent property to the west is owned by Dean Realty Co, Inc. and consists of office and office/warehouse developments. Representative photographs of the land above the mine are provided as Attachment B

Land use within a 1,000-foot-zone around the surface projection of the mine is zoned Light Industrial (M1), Heavy Industrial District (M2a), and Urban Redevelopment District (URD) in Missouri and Heavy Industrial District (M3) in Kansas. A Land Use Map for the project site and surrounding areas for Missouri and Kansas is provided as Figure 3.

The ground surface topography above the mine footprint is highly variable. The ground surface elevations above the mine range from a high of approximately 900 feet in the northern portion of Lot 12 to a low of approximately 820 feet in the northern portion of Lot 3, the central portion of Lot 16, and the southwestern portion of Lot 17. A majority of the land above the mine is heavily wooded. Several unpaved roads and switchbacks traverse the relatively steep northern, western, and eastern edges of the land above the mine. Figures 3 and 7 illustrate the existing topography of the land surface above the mine. Additionally, recent survey data, collected for the purposes of confirming elevations of key locations on the periphery of the site, are provided in Attachment C.

Purpose of Mine Stabilization

The primary purposes of the proposed stabilization of the Greystone Mine is to stabilize a land parcel that is currently threatened by an increased probability of surface subsidence due to mine roof collapses and to enable commercial development of the land above the mine. Currently, the land above the mine is not considered suitable for development due to the likelihood of future dome-out collapses of the mine roof. Figure 4 provides the approximate locations of historical dome-outs/roof collapses documented within the footprint of the mine No current evidence of unacceptable surface manifestations, such as the formation of sinkholes or ground subsidence due to the mine roof collapses, has been recently observed. Further development of this surface property by Dean Realty Company is contingent upon the successful stabilization of the underground mine.

Benefits of Coal Combustion By-Product Slurry Injection

The three primary benefits of using a fly ash slurry injection technology for stabilization of underground limestone mines are listed below.

1. Allows for the cost effective reclamation/development of land above the mine that would otherwise not be safe to do so. Considering the current value of commercial real estate in Kansas City, this benefit represents a potentially significant increase in the value of the surface property above the mine.
2. Provides a cost-effective method of stabilization as compared to injection of Portland cement, which could cost approximately 10 to 20 times more than backfilling with fly ash slurry.
3. Recycles fly ash by using this waste material to backfill underground mines, thereby providing a beneficial use of a waste material, rather than placing that material in a landfill.

With regard to recent regulations governing the beneficial use of Coal Combustion Residuals (CCR), it is the intent of this exemption request to demonstrate that (a) the use of the CCR does result in a functional benefit, that (b) the CCR is a suitable, cost-effective substitute for currently unavailable and costly naturally-occurring materials (borrow), that (c) the use of the CCR will be governed by applicable product specifications, regulatory standards, or design standards relevant, and that (d) the use of CCR on this project will not result in environmental releases to groundwater, surface water, soil, or air that exceed relevant regulatory and health-related benchmarks.

Generalized Geologic Setting

The Greystone Mine is located in a bedrock bluff above the Kansas River and former Turkey Creek alluvial valleys. At its nearest point, the Kansas River is approximately 2,000 feet west of the mine and flows generally from south to north to its confluence with the Missouri River approximately 2 river miles from the mine. Turkey Creek was formerly present east of the site, flowing northward on the southeastern and eastern flanks of the bluff, then flowing westward on the northern flank of the bluff to its previous confluence with the Kansas River. For flood control purposes, Turkey Creek was re-routed in 1919 through a tunnel located approximately 4,000 feet southwest of the mine.

Generally, the geology of the Kansas City area consists of relatively flat, cyclic deposits of sedimentary bedrock formed during the Pennsylvanian Period. The Pennsylvanian bedrock consists primarily of limestone and shale, with minor amounts of sandstone and coal. The stratigraphy of the Greystone Mine consists of bedrock of the lower portions of the Kansas City Group, which consists of the following geologic formations, in ascending order: Hertha, Ladore, Swope, Galesburg, and Dennis. Directly underlying the Kansas City Group is a substantial thickness (over 100 feet) of shale comprising the Pleasanton Group. The specific bedrock units directly involved with the Greystone Mine are the Middle Creek Limestone, Hushpuckney Shale, and Bethany Fall Limestone Members which comprise the Swope Formation. A generalized geologic map of the mine and surrounding area is presented as Figure 5.

The Hushpuckney Shale immediately underlies the Bethany Falls Limestone and forms the floor of the mine. The Hushpuckney is a black, fissile shale and is approximately 2-4 feet thick in the mine. The Bethany Falls is a light gray, medium to thick-bedded limestone approximately 19-20 feet thick. The Stark-Galesburg immediately overlies the Bethany Falls. The Stark-Galesburg is approximately 8-10 feet thick and consists of black fissile shale. A more-detailed, project-specific stratigraphic section (with approximate unit/formation elevations) is provided as Figure 6.

General cross sections of the mine area are presented by Figures 7 thru 10. These cross sections were developed from borings conducted during an investigative drilling program performed in June 2016, as well as regional experience and published data. Attachment D contains a summary report and boring logs resulting from the June 2016 investigation.

More recently (March 2018), test pits were excavated in the area north of the mine footprint in advance of the possible placement of random/spoil fill from a nearby construction project on Turkey Creek. These test pits were excavated to approximate elevations ranging from 759 to 764, which generally corresponds to the lower portion of the Bethany Falls Limestone. Observations conducted during the excavation of these test pits did not reveal any groundwater of free seepage water, thereby supporting the conclusion that water is currently not emanating from the abandoned Greystone Mine. A summary report for this test pit investigation, along with test pit logs and photographs, is included as Attachment E.

The interior of the mine has historically been "dry", with minimal or no evidence of lateral water infiltration from the Bethany Falls Limestone sidewalls or roof or overlying bedrock stratum in the roof comprised of the Galesburg-Stark Shale or the Winterset Limestone. Similarly, the mine typically had not exhibited any evidence of vertical water infiltration via upward percolation from bedrock units comprising the mine floor (Hushpuckney Shale or Middle Creek Limestone).

<u>Generalized Hydrogeologic Setting</u>

A general literature review indicates that no known or identified groundwater aquifers exist at the site. Kansas City, Missouri and Kansas City, Kansas obtain their public water supply from alluvial aquifers of the Missouri River. Kansas City, Kansas and Kansas City, Missouri alluvial wells are located upstream from the confluence of the Kansas and Missouri Rivers. The Kansas City, Missouri well field is located north of the Missouri River, approximately five (5) river miles (Kansas and Missouri Rivers) upstream from the Greystone Mine. The Kansas City, Kansas wells are located upstream from the Kansas City Missouri water works. A review of available information indicates that there is no known water supply wells located within the limits of the project site.

The Kansas River is located approximately 2,000 feet northwest of the northwestern section of the mine. The edge/outcrop exposure of the bluff in which the Greystone Mine is located is approximately 1,000 feet from the northwest section of the mine. The edge of the bluff to the northeast corner of the mine is approximately 200-300 feet from the northeastern edge of the mine.

The former entrance to the mine is located at the base of the bluff, south of the mine and north of the former Imperial Brewery. The base of the Bethany Falls approximately coincides with the elevation of base of the mine entrance, estimated to be at approximately elevation 760 feet. The ground surface above the mine footprint ranges from approximately 770 to 900 feet. According to the 1996 USGS Kansas City Quadrangle Map, the water elevation of the Kansas River at its nearest point to the mine is approximately 725 to 730 feet. The top of the Bethany Falls limestone is at an approximate elevation of 777 feet at the mine, with the base of the mine at an approximate elevation of 760 to 758 feet. It is noted that the Bethany Falls limestone, as reported in related geologic literature, exhibits a regional dip of approximately 10 feet per mile (less than 1 degree) to the west/northwest.

Based on the elevations discussed above, there is no direct hydraulic connection between the Bethany Falls limestone unit and the Kansas River.

The hydro-geologic setting of the abandoned Greystone Mine is generally defined by unsaturated, bedrock units on the north and west and bedrock outcropping on the south and east. Additionally, a substantial portion of the north side of the mine area is laterally encapsulated by natural overburden and historic fills to a current elevation ranging from 780-790 feet, effectively providing a significant lateral confinement layer for any potential water movement to/from the north through the intact, un-mined Bethany Falls limestone. Additionally, miscellaneous and random historic fill is currently present along the southern and eastern perimeters of the old mine face to elevations ranging from 765-770, resulting in a partial lateral encapsulation of the Bethany Falls Limestone that provides a direct lateral barrier against any horizontal infiltration of surface water. The horizontal infiltration of surface water into the old mine is further prohibited by an existing drainage swale/feature located between the mine site and the adjacent railroad. This swale generally slopes from an approximate elevation 755 on the south side of the mine site to an approximately elevation of 753 at a drop inlet located east of the mine site (see Figure 7).

To that end, the likelihood of any surface water accessing the old mine via lateral water movement through the Bethany Falls Limestone, with a floor at elevation 755-760 and

either partial or completed lateral encapsulation on the south, east and north sides, is highly unlikely if not impossible.

Historically speaking, a Phase II Site Assessment was conducted by others for the adjacent, abandoned former Imperial Brewery site (see Attachment F). The results were submitted in a report titled *Phase II Limited Site Investigation – Gateway Union Properties, Inc. Site – Kansas City, Missouri for Kansas City Terminal Railway Company*, and dated June 26, 2002. An apparent "perched"/intermittent groundwater was encountered within a thin stratum of alluvium (in the valley located south and east from the mine site) at depths of approximately 8 to 10 feet below existing grades. Ground surface elevations were not reported in the Phase II LSI document. Based on recent topographic survey data, the ground surface in the area of the Phase II LSI borings is approximately 760 feet. Therefore, groundwater at the time of the Phase II LSI was at an approximate elevation of 751 feet. As noted previously, the base of the mine is at approximately elevation 755-760 feet, which is at least 5-10 feet above the apparent potentiometric surface in the shallow alluvium. ***Therefore, no apparent hydraulic connection between the mine and shallow alluvium is present.***

The Bethany Falls limestone is an intact, un-fractured limestone and is not considered as an aquifer since this unit does not produce any discernible amounts of groundwater. The Bethany Falls limestone is overlain by the Galesburg/Stark shale, which is approximately 8-10 feet thick at the abandoned mine. The Hushpuckney Shale, which is a low permeability material (typically less than 10^{-7} cm/sec), is approximately 2-4 feet thick and underlies the Bethany Falls limestone at the mine. The Hushpuckney Shale is underlain (in descending order) by the Middle Creek Limestone (2 feet thick), the Ladore Formation (3 feet of claystone/shale), and the Hertha Formation that is comprised of the Sni-a-Bar Limestone (14 feet of thick-bedded limestone with shale interbed), the Mound City Member (3 feet of shale/coal), and the Critzer Limestone (2 feet thick). The Kansas City Group is ultimately underlain by a thick shale deposit (100 feet) associate with the Pleasanton Group. ***Therefore, since the existing geologic stratigraphy underlying the floor of the mine is substantially comprised of shale or thick-bedded limestone, the site is effectively encapsulated on all sides by soil or natural bedrock materials and underlain/overlain by predominately shale confining layers.***

Groundwater wells completed in bedrock in the Kansas City area are not generally used for potable water. Bedrock water wells are typically used for industrial or agricultural purposes. Bedrock units capable of producing groundwater for industrial and/or agricultural purposes are generally at depths of 500 feet or more in the mine area. The top of the Bethany Falls limestone is approximately 60-125 feet below the ground surface (Elevations 990-930) in the project area.

Generalized Description - Proposed Mine Stabilization Plan

The proposed stabilization technique for the Greystone Mine will consist of the injection of a Coal Combustion Residual (CCR)/Portland cement slurry through a series of boreholes drilled from the ground surface to the mine. The proposed technique is a proven technology used throughout the United States to stabilize underground mines, thereby providing for safe construction of structures and other development on the ground surface above the mine. The CCR/cement slurry injection technology has been used extensively in stabilizing underground limestone mines in the Kansas City area, including the Sugar Creek Limestone and Briarcliff Limestone mines.

Fly Ash Slurry Injection Operations

The slurry injection operations will generally consist of preparing the injection site (typically in a manner that does not require a land disturbance permit, but does require some level of erosion control), transporting the CCR/cement material to the site in containerized tank trailers, mixing the CCR/cement material with potable water in an enclosed chamber designed to minimize any fugitive dust to form the slurry, injecting the CCP/cement slurry through pre-drilled cased boreholes, testing of the raw CCP materials, and quality control of the injected slurry and the progress of the mine filling via examination conducted by a down-hole video camera and supplemental borings and/or future injection shafts.

The western, northern, and eastern portions of the site are generally wooded with a highly variable topography. A system of unpaved roads is currently present at the site. Minor clearing of trees and limited site grading will be required to provide adequate access of the drilling and injection equipment. The south-central portion of the site has been rough graded and is relatively level. The south-central portion of the site could be used as a staging area. As areas of the site become accessible to drilling equipment, drilling of the injection boreholes will begin. It is anticipated that the mine filling project will proceed from the southwest to the northeast for the southern half of the mine, and from the southeast to the northwest for the northern half of the mine.

In general, the boreholes will be located between pillars, with the drilling equipment located above or near a pillar, if possible. The boreholes will be approximately 12-inch diameter, drilled through the roof of the mine, and cased with 8-inch-diameter, Schedule 40 polyvinyl chloride (PVC) pipe. At least 4-5 boreholes will be drilled per injection location, with one borehole serving as the injection point and the remaining boreholes being used as observational access points for the downhole video camera, as well as ventilation/air release shafts. Ultimately, each borehole will be used as some type of injection point. Due to the unknown nature of the domeout collapses, it is likely that as the injection operations proceed, the location of the injection points will need to be modified. The proposed injection well/borehole layout is presented along with a typical injection borehole/well schematic in Figure 11.

The proposed source of fly ash is the Kansas City, Kansas Board of Public Utilities' Nearman Creek Power Plant. This plant will be the primary sources of Flue Gas Desulphurization (FGD) Scrubber Solids that will form the primary constituent of the injection slurry. Because the FGD ash has little or no cementitious properties, and because the project desire to enhance not only the strength of the final product, but also the permeability properties of the hardened slurry, cement will also be added to the slurry mixture at a rate of at least 5-6% by weight. The FGD ash will be transported to the site using pneumatic tractor-trailer tank trucks. The ash will be unloaded by discharging through a pump and hose system directly to the mixing facility. A proprietary mixing process will be employed to mix the raw fly ash and cement with potable water. A fly ash/cement to water ratio will be developed by the injection contractor to satisfy the engineering requirements of the grout. The fly ash/cement grout will have a minimum unconfined compressive strength of 100 pounds per square inch (psi), with a long-term target strength of approximately 150 psi. After mixing, the grout will be transported to the injection well/borehole through PVC pipes and injected into the open space of the mine.

Attachment G contains descriptions and sketches of proposed equipment to be used for the injection process.

It is anticipated that at least 137,000 tons of fly ash will be required for the project. Assuming a 1:1 slurry ratio of fly ash to water (this ratio will be adjusted to limit the development of any "bleed" water), approximately 205,000 cubic yards of fly ash slurry will be injected for the entire project. Depending on the availability of suitable quantities of acceptable fly ash, it is estimated that at least 3 to 5 years will be required to complete the project.

Copies of recent (2017/2018) Toxicity Characteristic Leaching Procedure (TCLP) and Synthetic Precipitation Leaching Procedure (SPLP) testing analysis for the FGD ash proposed for use on this project are enclosed as Attachment H. Additionally, TCLP and SPLP testing analysis were conducted in May 2017 on each of two (2) hardened samples of cement-treated FGD ash, with the cement contents of the testing samples consisting of 4% and 10% cement by weight. *Of particular interest is that the leachate testing of FGD ash that had experienced the pozzolanic/hardening process, due to the addition of cement, indicated a binding/reduction of several constituents, most notably boron, that resulted in significantly reduced concentrations with increasing percentages of cement.* It was also surmised that the increased presence of aluminum in the cement treated samples was due to the use of aluminum paddles and containers during the pulverization of the hardened ash.

Laboratory testing for the unconfined compressive strength, as well as initial permeability of the final/hardened slurry, are presented in Attachment I.

It is respectfully noted that the SPLP test results are significant in that this testing approach better simulates actual environmental precipitation and the leaching potential of an encapsulated contaminant in soil. However, since the proposed hardened slurry fill is essentially fully encapsulated by soil/bedrock, and that the potential for infiltration of precipitation into or out of the in-filled mine space is very minimal (if not negligible), it is believed that formation and/or transportation of any chemical constituents out of the slurry-filled mine is negligible.

As part of the final permit application, supplemental falling-head permeability tests were performed on cured slurry (approximately 30 days and 60 days) to confirm the likely permeability of the completed/hardened slurry. Two tests conducted on these samples at 30 days of curing yielded results of 3.5×10^{-5} centimeters/second and 6.7×10^{-5} centimeters/second. The permeability for a sample cured for 60 days was 1.2×10^{-5} centimeters/second. These permeability values are typical for soils or weathered/fractured bedrocks that are generally classified as "semi-pervious".

A recent site visit to the on-going Inland Mine filing project, that is using the proposed FGD scrubber solids, was conducted on May 17, 2018. This project, which is located at 6800 Inland Drive in Kansas City, Kansas, also represents the filling of an old Bethany Falls mine that is permitted under the Kansas Department of Health and Environment (KDHE). A physical/qualitative examination of the hardened slurry indicated that the material was extremely flowable, of adequate strength, and or low/moderate permeability, as evidenced by standing water on the hardened material. Conservations with Mr. Richie Benninghoven of USC Technologies indicated that the initial, uncured slurry did generate very minor volumes of "bleed" water, but that this water was eventually absorbed into the hardening mass of cement-treated ash. Therefore, the likelihood of the formation of "decant" water that will become a source for infiltration/exfiltration water appear to be quite low. If there is an interest, a potential site visit to this on-going project is offered to representatives of the Missouri DNR.

Information related to the equipment typically used in a fly ash slurry injection process, is enclosed as Attachment G. Test results for the compressive strength and permeability testing of the proposed fly ash/cement slurry is enclosed as Attachment I.

Summary of Conclusions

In summary, the following conclusions are respectfully offered.

1. The primary purposes of the proposed stabilization of the Greystone Mine is to stabilize a land parcel that is currently threatened by an increased probability of surface subsidence and public safety issues due to mine roof collapses and to enable commercial development of the land above the mine. Currently, the land above the mine is not considered suitable for development due to the likelihood of future dome-out collapses of the mine roof. Consequently, the use of a CCR/cement slurry fill will result in a functional benefit.
2. The use of a CCR/cement slurry fill represents the only viable and economical approach to stabilizing an ever-increasing unstable, abandoned underground limestone mine.
3. The use of a CCR/cement slurry fill on this project will be controlled/governed by the use of a single CCR source (with regular TCLP and SPLP laboratory testing), will be injected into the mine void using established and regionally-recognized procedures, will be regularly monitored for material quality and with regard to the progression/effectiveness of the mine filling process, and is based on minimum design values related to final compressive strength of the hardened slurry.
4. The use of a CCR/cement slurry fill on this project will not result in any detrimental environmental releases to groundwater due to several site conditions: (a) *no groundwater aquifer exists at the site*, (b) *the site represent a topographical elevated feature and surrounding drainage swales will not allow infiltration from surface water into the mined space*, (c) *the site is encapsulated on all sides by soil or natural bedrock materials and underlain by a predominately shale confining layer*),
5. Slurry mixing will be accomplished via enclosed tankers and the use of controlled mixing with potable water, with immediate injection into the mined space, thereby precluding the formation of air-borne dust.

Miscellaneous Information for Exemption Request

Pursuant to the requirements of 10 CSR 80, Chapter 2, Section 9B, the following supplemental and additional information is provided.

1. The Owner of the property and Operator of the proposed mine reclamation project is listed below.

   Dean Realty Co
   1201 West 31st Street/ Suite 2
   Kansas City, Missouri 641086103

Mr. Walt Clements - CEO
816.531.0800
Mr. Kevin Rowley, Project Manager
816.531.0800

2. Since the project does not involve the placement of fly ash in a typical landfill process, it is our belief that no landfill closure plan is required. The entire project/injection volume is characterized by an encapsulated system, i.e. an underground mine with containment on all sides. Appropriate re-grading and re-seeding of small areas disturbed by the injection process will be performed.

3. A management plan related to landfill site design, buffer zone development, overall site drainage control, and odor/vector control is not necessary for a mine injection process. The size and distribution of all injection sites will be minimized, along with associated land disturbance. Site-specific and localized erosion control methods, such as silt fences and hay bales, will be used to control the relatively small magnitude of runoff emanating from any given injection site.

4. Since the success of the mine filling process is highly dependent on the quality of the fly ash product, and the fly ash slurry will be continuously monitored and tested to verify that minimum unconfined compressive strengths are being achieved, the use of an "unacceptable" fly ash material, or any other material, would be limited to one load (approximately 26 tons). Periodic to near-continuous observation and inspection by engineering and management personnel for each "load" of fly ash will also ensure that unacceptable waste material is not used or inadvertently incorporated in the process.

5. To our knowledge, no specific requirements exist with regard to compliance with local zoning and planning requirements, other than the stipulation by the City of Kansas City Planning and Zoning Commission related to the need to "stabilize"/mitigate the site to maintain the current zoning classification of PD/M2A and to allow for further development. A copy of the letter dated October 1, 2004 containing the stipulation from the City of Kansas City is enclosed as Attachment H (see Point #2, Item F).

If you have any questions concerning the contents of this letter, please contact the undersigned.

STATE OF MISSOURI
GARY J.
VAN RIESSEN
NUMBER
E-19058
REGISTERED PROFESSIONAL ENGINEER
12/5/2018

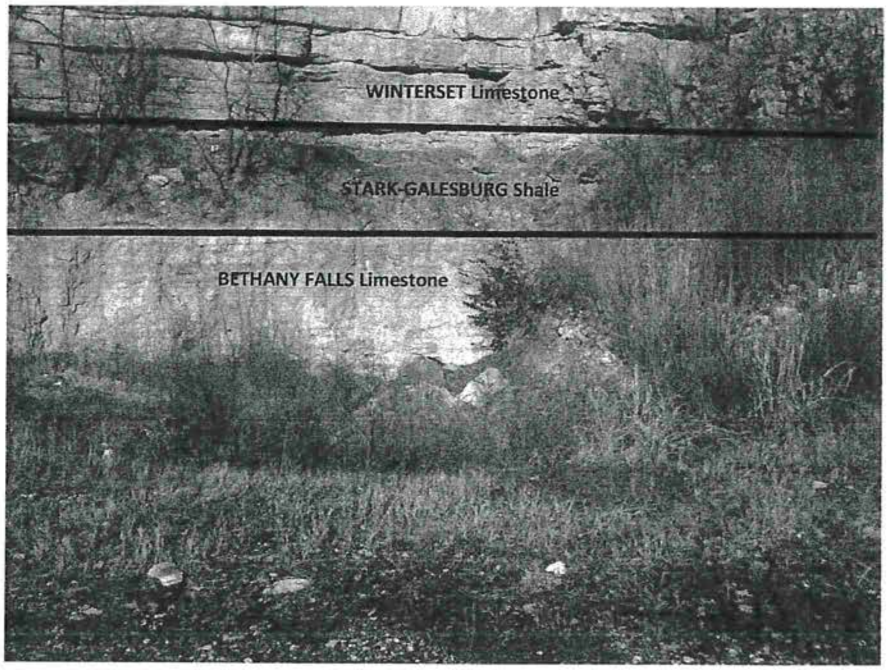
Sincerely,

Gary J. Van Riessen, P.E.
Consulting Geotechnical Engineer

Allison N. Sperber, PE
Staff Engineer

Attachments: Figures 1 through 11
Attachment A - Permit for Water Protection Program
Water Pollution Branch
Class V Underground Injection Control Well(s)
Attachment B - Representative Site Photographs

Attachment C - September 2018 Topographic Survey Data Collection
Attachment D - June 2016 Subsurface Drilling Program
Attachment E - Test Pit Investigation, March 2018
Attachment F – Phase II Limited Site Investigation, Gateway Union Properties, Inc. Site, Kansas City, Missouri for Kansas City Terminal Railway Company (2002)
Attachment G - TCLP/SPLP Test Data Sheets-Proposed Fly Ash Source
Attachment H - Fly Ash Injection Process/Equipment
Attachment I - Typical Laboratory Strength Tests and Permeability of Fly Ash
Attachment J – KCMO Site Zoning/Stipulation Letter



REQUEST FOR EXEMPTION – BENEFICIAL REUSE OF FLY ASH

Proposed Mine Filling with Fly Ash Slurry
Abandoned Underground Greystone Mine Facility
Kansas City, Missouri

Submitted to:
Missouri Department of Natural Resources
Solid Waste Management Program

Submitted by:
Gary J. Van Riessen, P.C.
A Professional Corporation

On Behalf of:
Dean Realty Company

December 5, 2018

Gary Van Riessen, P.C.
A Professional Corporation
Gary J. Van Riessen, P.E.
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December 5, 2018

Mr. Chris Nagel, Director
Solid Waste Management Program
Division of Environmental Quality
Department of Natural Resources
P.O. Box 176
Jefferson City, Missouri 65102

Reference: **Request for Permit Exemption**
Beneficial Reuse of Solid Waste (Fly Ash)
Proposed Mine Filling with Fly Ash/Cement Slurry
Abandoned Underground Greystone Mine Facility
Kansas City, Missouri

Dear Mr. Nagel:

Pursuant to the regulations promulgated by 10 CSR 80, Chapter 2, Sections 9A.12 and 9B, this office, on behalf of Dean Realty Company, respectfully requests from the Solid Waste Management Program, Missouri Department of Natural Resources, a reconfirmation of an exemption from the requirement to obtain a solid waste disposal area permit for the beneficial use/reclamation of a solid waste (fly ash generated from the burning of coal). Please note that the original exemption was granted based on the submittal from this office dated December 23, 2008. This current request is being made in support of an Underground Injection Control permit (UI0000037) issued by the Water Protection Program in 2008 to backfill an abandoned underground limestone mine with fly ash/cement slurry. The abandoned limestone mine is known as the Greystone Mine in Kansas City, Jackson County, Missouri.

This proposed project provides for the beneficial use of fly ash, a waste material generated from the burning of coal. This waste material, which is often stored or disposed of in some type of landfill, would be injected into the abandoned mine via a carefully controlled mixing/slurry technique. The slurry, which will be a combination of scrubber solids, water, and approximately 5-6% cement, will ultimately harden, with long-term compressive strengths typically between 100 to 200 pounds/square inch. This hardened slurry material fills all voids in the mine, resulting in a stabilized/reclaimed mine that no longer exhibits unstable mine roof conditions that could lead to unacceptable surface conditions in the form of surface subsidence or sinkholes. This stabilized mine condition ultimately allows for the safe and economical commercial development of the overlying land surface.

Concurrent with this permit exemption request, the owner of the property and project manager of the proposed mine reclamation project, Dean Realty Company, is also submitting an application for a permit from the Water Protection Program-Water Pollution Branch for the renewal of the Underground Injection Control permit for the installation of Class V wells. A copy of the narrative for this permit application is enclosed as Attachment A to this document. Please note that because the figures and attachments for the exemption request and the injection well permit are identical, only one cop[y of the figures and attachments are enclosed with this document.

Project Background and Description

The Greystone Mine was an active underground limestone mine from 1917 to nearly 1970. The Bethany Falls limestone was mined in the Greystone Mine using the room and pillar method. Subsequent to completion of mining operations, the southern section of the underground space was utilized as a storage freezer. The freezer operations ceased at some point in the 1970s, at which time the mine was abandoned. Subsequent to the abandonment of the mine, deterioration in the roof support conditions occurred, leading to significant losses in roof support as a result of roof domeouts. In 1984, partial verification of domeout collapses was performed, with the verification conducted in the southern reaches of the mine. It is believed that a majority of the mine has experienced extensive domeout collapses. Only limited access to the mine is possible today.

The inactive Greystone Mine is located within the city limits of Kansas City, Jackson County, Missouri. A mine location map is presented as Figure 1. The ground surface projection of the mine falls within Lots 3, 6, 7, 8, 12, 13, 16, 17, and 18 of the Cambridge Terraces subdivision, as shown in Figure 2. The ground surface above the mine is currently undeveloped, generally wooded land, with the exception of Lot 12. The approximate footprint area of the mine is 463,340 square feet (10.6 acres).

According to the United States Geological Survey's (USGS) Kansas City Quadrangle, 7.5-Minute Series Topographic Map, the Greystone Mine is located in the SW ¼ SW ¼ Section 7 and NW ¼ NW ¼ Section 18, Range 33 West (R33W), Township 49 North (T49N). A portion of the USGS Kansas City Quadrangle map showing the mine location is also presented on Figure 1.

Currently, the land above the mine is currently zoned PD/M2A, Industrial. No structures are present above the footprint of the mine. Some utilities, both above- and below-grade, are present in the extreme western limits of the properties above the mine. The properties located to the north, west, and east of the mine are comprised of railroad right-of-way. The adjacent property to the west is owned by Dean Realty Co, Inc. and consists of office and office/warehouse developments. Representative photographs of the land above the mine are provided as Attachment B

Land use within a 1,000-foot-zone around the surface projection of the mine is zoned Light Industrial (M1), Heavy Industrial District (M2a), and Urban Redevelopment District (URD) in Missouri and Heavy Industrial District (M3) in Kansas. A Land Use Map for the project site and surrounding areas for Missouri and Kansas is provided as Figure 3.

The ground surface topography above the mine footprint is highly variable. The ground surface elevations above the mine range from a high of approximately 900 feet in the northern portion of Lot 12 to a low of approximately 820 feet in the northern portion of Lot 3, the central portion of Lot 16, and the southwestern portion of Lot 17. A majority of the land above the mine is heavily wooded. Several unpaved roads and switchbacks traverse the relatively steep northern, western, and eastern edges of the land above the mine. Figures 3 and 7 illustrate the existing topography of the land surface above the mine. Additionally, recent survey data, collected for the purposes of confirming elevations of key locations on the periphery of the site, are provided in Attachment C.

Purpose of Mine Stabilization

The primary purposes of the proposed stabilization of the Greystone Mine is to stabilize a land parcel that is currently threatened by an increased probability of surface subsidence due to mine roof collapses and to enable commercial development of the land above the mine. Currently, the land above the mine is not considered suitable for development due to the likelihood of future dome-out collapses of the mine roof. Figure 4 provides the approximate locations of historical dome-outs/roof collapses documented within the footprint of the mine No current evidence of unacceptable surface manifestations, such as the formation of sinkholes or ground subsidence due to the mine roof collapses, has been recently observed. Further development of this surface property by Dean Realty Company is contingent upon the successful stabilization of the underground mine.

Benefits of Coal Combustion By-Product Slurry Injection

The three primary benefits of using a fly ash slurry injection technology for stabilization of underground limestone mines are listed below.

1. Allows for the cost effective reclamation/development of land above the mine that would otherwise not be safe to do so. Considering the current value of commercial real estate in Kansas City, this benefit represents a potentially significant increase in the value of the surface property above the mine.
2. Provides a cost-effective method of stabilization as compared to injection of Portland cement, which could cost approximately 10 to 20 times more than backfilling with fly ash slurry.
3. Recycles fly ash by using this waste material to backfill underground mines, thereby providing a beneficial use of a waste material, rather than placing that material in a landfill.

With regard to recent regulations governing the beneficial use of Coal Combustion Residuals (CCR), it is the intent of this exemption request to demonstrate that (a) the use of the CCR does result in a functional benefit, that (b) the CCR is a suitable, cost-effective substitute for currently unavailable and costly naturally-occurring materials (borrow), that (c) the use of the CCR will be governed by applicable product specifications, regulatory standards, or design standards relevant, and that (d) the use of CCR on this project will not result in environmental releases to groundwater, surface water, soil, or air that exceed relevant regulatory and health-related benchmarks.

Generalized Geologic Setting

The Greystone Mine is located in a bedrock bluff above the Kansas River and former Turkey Creek alluvial valleys. At its nearest point, the Kansas River is approximately 2,000 feet west of the mine and flows generally from south to north to its confluence with the Missouri River approximately 2 river miles from the mine. Turkey Creek was formerly present east of the site, flowing northward on the southeastern and eastern flanks of the bluff, then flowing westward on the northern flank of the bluff to its previous confluence with the Kansas River. For flood control purposes, Turkey Creek was re-routed in 1919 through a tunnel located approximately 4,000 feet southwest of the mine.

Generally, the geology of the Kansas City area consists of relatively flat, cyclic deposits of sedimentary bedrock formed during the Pennsylvanian Period. The Pennsylvanian bedrock consists primarily of limestone and shale, with minor amounts of sandstone and coal. The stratigraphy of the Greystone Mine consists of bedrock of the lower portions of the Kansas City Group, which consists of the following geologic formations, in ascending order: Hertha, Ladore, Swope, Galesburg, and Dennis. Directly underlying the Kansas City Group is a substantial thickness (over 100 feet) of shale comprising the Pleasanton Group. The specific bedrock units directly involved with the Greystone Mine are the Middle Creek Limestone, Hushpuckney Shale, and Bethany Fall Limestone Members which comprise the Swope Formation. A generalized geologic map of the mine and surrounding area is presented as Figure 5.

The Hushpuckney Shale immediately underlies the Bethany Falls Limestone and forms the floor of the mine. The Hushpuckney is a black, fissile shale and is approximately 2-4 feet thick in the mine. The Bethany Falls is a light gray, medium to thick-bedded limestone approximately 19-20 feet thick. The Stark-Galesburg immediately overlies the Bethany Falls. The Stark-Galesburg is approximately 8-10 feet thick and consists of black fissile shale. A more-detailed, project-specific stratigraphic section (with approximate unit/formation elevations) is provided as Figure 6.

General cross sections of the mine area are presented by Figures 7 thru 10. These cross sections were developed from borings conducted during an investigative drilling program performed in June 2016, as well as regional experience and published data. Attachment D contains a summary report and boring logs resulting from the June 2016 investigation.

More recently (March 2018), test pits were excavated in the area north of the mine footprint in advance of the possible placement of random/spoil fill from a nearby construction project on Turkey Creek. These test pits were excavated to approximate elevations ranging from 759 to 764, which generally corresponds to the lower portion of the Bethany Falls Limestone. Observations conducted during the excavation of these test pits did not reveal any groundwater of free seepage water, thereby supporting the conclusion that water is currently not emanating from the abandoned Greystone Mine. A summary report for this test pit investigation, along with test pit logs and photographs, is included as Attachment E.

The interior of the mine has historically been “dry”, with minimal or no evidence of lateral water infiltration from the Bethany Falls Limestone sidewalls or roof or overlying bedrock stratum in the roof comprised of the Galesburg-Stark Shale or the Winterset Limestone. Similarly, the mine typically had not exhibited any evidence of vertical water infiltration via upward percolation from bedrock units comprising the mine floor (Hushpuckney Shale or Middle Creek Limestone).

Generalized Hydrogeologic Setting

A general literature review indicates that no known or identified groundwater aquifers exist at the site. Kansas City, Missouri and Kansas City, Kansas obtain their public water supply from alluvial aquifers of the Missouri River. Kansas City, Kansas and Kansas City, Missouri alluvial wells are located upstream from the confluence of the Kansas and Missouri Rivers. The Kansas City, Missouri well field is located north of the Missouri River, approximately five (5) river miles (Kansas and Missouri Rivers) upstream from the Greystone Mine. The Kansas City, Kansas wells are located upstream from the Kansas City Missouri water works. A review of available information indicates that there is no known water supply wells located within the limits of the project site.

The Kansas River is located approximately 2,000 feet northwest of the northwestern section of the mine. The edge/outcrop exposure of the bluff in which the Greystone Mine is located is approximately 1,000 feet from the northwest section of the mine. The edge of the bluff to the northeast corner of the mine is approximately 200-300 feet from the northeastern edge of the mine.

The former entrance to the mine is located at the base of the bluff, south of the mine and north of the former Imperial Brewery. The base of the Bethany Falls approximately coincides with the elevation of base of the mine entrance, estimated to be at approximately elevation 760 feet. The ground surface above the mine footprint ranges from approximately 770 to 900 feet. According to the 1996 USGS Kansas City Quadrangle Map, the water elevation of the Kansas River at its nearest point to the mine is approximately 725 to 730 feet. The top of the Bethany Falls limestone is at an approximate elevation of 777 feet at the mine, with the base of the mine at an approximate elevation of 760 to 758 feet. It is noted that the Bethany Falls limestone, as reported in related geologic literature, exhibits a regional dip of approximately 10 feet per mile (less than 1 degree) to the west/northwest.

Based on the elevations discussed above, there is no direct hydraulic connection between the Bethany Falls limestone unit and the Kansas River.

The hydro-geologic setting of the abandoned Greystone Mine is generally defined by unsaturated, bedrock units on the north and west and bedrock outcropping on the south and east. Additionally, a substantial portion of the north side of the mine area is laterally encapsulated by natural overburden and historic fills to a current elevation ranging from 780-790 feet, effectively providing a significant lateral confinement layer for any potential water movement to/from the north through the intact, un-mined Bethany Falls limestone. Additionally, miscellaneous and random historic fill is currently present along the southern and eastern perimeters of the old mine face to elevations ranging from 765-770, resulting in a partial lateral encapsulation of the Bethany Falls Limestone that provides a direct lateral barrier against any horizontal infiltration of surface water. The horizontal infiltration of surface water into the old mine is further prohibited by an existing drainage swale/feature located between the mine site and the adjacent railroad. This swale generally slopes from an approximate elevation 755 on the south side of the mine site to an approximately elevation of 753 at a drop inlet located east of the mine site (see Figure 7).

To that end, the likelihood of any surface water accessing the old mine via lateral water movement through the Bethany Falls Limestone, with a floor at elevation 755-760 and

either partial or completed lateral encapsulation on the south, east and north sides, is highly unlikely if not impossible.

Historically speaking, a Phase II Site Assessment was conducted by others for the adjacent, abandoned former Imperial Brewery site (see Attachment F). The results were submitted in a report titled *Phase II Limited Site Investigation – Gateway Union Properties, Inc. Site – Kansas City, Missouri for Kansas City Terminal Railway Company*, and dated June 26, 2002. An apparent "perched"/intermittent groundwater was encountered within a thin stratum of alluvium (in the valley located south and east from the mine site) at depths of approximately 8 to 10 feet below existing grades. Ground surface elevations were not reported in the Phase II LSI document. Based on recent topographic survey data, the ground surface in the area of the Phase II LSI borings is approximately 760 feet. Therefore, groundwater at the time of the Phase II LSI was at an approximate elevation of 751 feet. As noted previously, the base of the mine is at approximately elevation 755-760 feet, which is at least 5-10 feet above the apparent potentiometric surface in the shallow alluvium. ***Therefore, no apparent hydraulic connection between the mine and shallow alluvium is present.***

The Bethany Falls limestone is an intact, un-fractured limestone and is not considered as an aquifer since this unit does not produce any discernible amounts of groundwater. The Bethany Falls limestone is overlain by the Galesburg/Stark shale, which is approximately 8-10 feet thick at the abandoned mine. The Hushpuckney Shale, which is a low permeability material (typically less than 10^{-7} cm/sec), is approximately 2-4 feet thick and underlies the Bethany Falls limestone at the mine. The Hushpuckney Shale is underlain (in descending order) by the Middle Creek Limestone (2 feet thick), the Ladore Formation (3 feet of claystone/shale), and the Hertha Formation that is comprised of the Sni-a-Bar Limestone (14 feet of thick-bedded limestone with shale interbed), the Mound City Member (3 feet of shale/coal), and the Critzer Limestone (2 feet thick). The Kansas City Group is ultimately underlain by a thick shale deposit (100 feet) associate with the Pleasanton Group. ***Therefore, since the existing geologic stratigraphy underlying the floor of the mine is substantially comprised of shale or thick-bedded limestone, the site is effectively encapsulated on all sides by soil or natural bedrock materials and underlain/overlain by predominately shale confining layers.***

Groundwater wells completed in bedrock in the Kansas City area are not generally used for potable water. Bedrock water wells are typically used for industrial or agricultural purposes. Bedrock units capable of producing groundwater for industrial and/or agricultural purposes are generally at depths of 500 feet or more in the mine area. The top of the Bethany Falls limestone is approximately 60-125 feet below the ground surface (Elevations 990-930) in the project area.

<u>Generalized Description - Proposed Mine Stabilization Plan</u>

The proposed stabilization technique for the Greystone Mine will consist of the injection of a Coal Combustion Residual (CCR)/Portland cement slurry through a series of boreholes drilled from the ground surface to the mine. The proposed technique is a proven technology used throughout the United States to stabilize underground mines, thereby providing for safe construction of structures and other development on the ground surface above the mine. The CCR/cement slurry injection technology has been used extensively in stabilizing underground limestone mines in the Kansas City area, including the Sugar Creek Limestone and Briarcliff Limestone mines.

Fly Ash Slurry Injection Operations

The slurry injection operations will generally consist of preparing the injection site (typically in a manner that does not require a land disturbance permit, but does require some level of erosion control), transporting the CCR/cement material to the site in containerized tank trailers, mixing the CCR/cement material with potable water in an enclosed chamber designed to minimize any fugitive dust to form the slurry, injecting the CCP/cement slurry through pre-drilled cased boreholes, testing of the raw CCP materials, and quality control of the injected slurry and the progress of the mine filling via examination conducted by a down-hole video camera and supplemental borings and/or future injection shafts.

The western, northern, and eastern portions of the site are generally wooded with a highly variable topography. A system of unpaved roads is currently present at the site. Minor clearing of trees and limited site grading will be required to provide adequate access of the drilling and injection equipment. The south-central portion of the site has been rough graded and is relatively level. The south-central portion of the site could be used as a staging area. As areas of the site become accessible to drilling equipment, drilling of the injection boreholes will begin. It is anticipated that the mine filling project will proceed from the southwest to the northeast for the southern half of the mine, and from the southeast to the northwest for the northern half of the mine.

In general, the boreholes will be located between pillars, with the drilling equipment located above or near a pillar, if possible. The boreholes will be approximately 12-inch diameter, drilled through the roof of the mine, and cased with 8-inch-diameter, Schedule 40 polyvinyl chloride (PVC) pipe. At least 4-5 boreholes will be drilled per injection location, with one borehole serving as the injection point and the remaining boreholes being used as observational access points for the downhole video camera, as well as ventilation/air release shafts. Ultimately, each borehole will be used as some type of injection point. Due to the unknown nature of the domeout collapses, it is likely that as the injection operations proceed, the location of the injection points will need to be modified. The proposed injection well/borehole layout is presented along with a typical injection borehole/well schematic in Figure 11.

The proposed source of fly ash is the Kansas City, Kansas Board of Public Utilities' Nearman Creek Power Plant. This plant will be the primary sources of Flue Gas Desulphurization (FGD) Scrubber Solids that will form the primary constituent of the injection slurry. Because the FGD ash has little or no cementitious properties, and because the project desire to enhance not only the strength of the final product, but also the permeability properties of the hardened slurry, cement will also be added to the slurry mixture at a rate of at least 5-6% by weight. The FGD ash will be transported to the site using pneumatic tractor-trailer tank trucks. The ash will be unloaded by discharging through a pump and hose system directly to the mixing facility. A proprietary mixing process will be employed to mix the raw fly ash and cement with potable water. A fly ash/cement to water ratio will be developed by the injection contractor to satisfy the engineering requirements of the grout. The fly ash/cement grout will have a minimum unconfined compressive strength of 100 pounds per square inch (psi), with a long-term target strength of approximately 150 psi. After mixing, the grout will be transported to the injection well/borehole through PVC pipes and injected into the open space of the mine.

Attachment G contains descriptions and sketches of proposed equipment to be used for the injection process.

It is anticipated that at least 137,000 tons of fly ash will be required for the project. Assuming a 1:1 slurry ratio of fly ash to water (this ratio will be adjusted to limit the development of any "bleed" water), approximately 205,000 cubic yards of fly ash slurry will be injected for the entire project. Depending on the availability of suitable quantities of acceptable fly ash, it is estimated that at least 3 to 5 years will be required to complete the project.

Copies of recent (2017/2018) Toxicity Characteristic Leaching Procedure (TCLP) and Synthetic Precipitation Leaching Procedure (SPLP) testing analysis for the FGD ash proposed for use on this project are enclosed as Attachment H. Additionally, TCLP and SPLP testing analysis were conducted in May 2017 on each of two (2) hardened samples of cement-treated FGD ash, with the cement contents of the testing samples consisting of 4% and 10% cement by weight. *Of particular interest is that the leachate testing of FGD ash that had experienced the pozzolanic/hardening process, due to the addition of cement, indicated a binding/reduction of several constituents, most notably boron, that resulted in significantly reduced concentrations with increasing percentages of cement.* It was also surmised that the increased presence of aluminum in the cement treated samples was due to the use of aluminum paddles and containers during the pulverization of the hardened ash.

Laboratory testing for the unconfined compressive strength, as well as initial permeability of the final/hardened slurry, are presented in Attachment I.

It is respectfully noted that the SPLP test results are significant in that this testing approach better simulates actual environmental precipitation and the leaching potential of an encapsulated contaminant in soil. However, since the proposed hardened slurry fill is essentially fully encapsulated by soil/bedrock, and that the potential for infiltration of precipitation into or out of the in-filled mine space is very minimal (if not negligible), it is believed that formation and/or transportation of any chemical constituents out of the slurry-filled mine is negligible.

As part of the final permit application, supplemental falling-head permeability tests were performed on cured slurry (approximately 30 days and 60 days) to confirm the likely permeability of the completed/hardened slurry. Two tests conducted on these samples at 30 days of curing yielded results of 3.5×10^{-5} centimeters/second and 6.7×10^{-5} centimeters/second. The permeability for a sample cured for 60 days was 1.2×10^{-5} centimeters/second. These permeability values are typical for soils or weathered/fractured bedrocks that are generally classified as "semi-pervious".

A recent site visit to the on-going Inland Mine filing project, that is using the proposed FGD scrubber solids, was conducted on May 17, 2018. This project, which is located at 6800 Inland Drive in Kansas City, Kansas, also represents the filling of an old Bethany Falls mine that is permitted under the Kansas Department of Health and Environment (KDHE). A physical/qualitative examination of the hardened slurry indicated that the material was extremely flowable, of adequate strength, and or low/moderate permeability, as evidenced by standing water on the hardened material. Conservations with Mr. Richie Benninghoven of USC Technologies indicated that the initial, uncured slurry did generate very minor volumes of "bleed" water, but that this water was eventually absorbed into the hardening mass of cement-treated ash. Therefore, the likelihood of the formation of "decant" water that will become a source for infiltration/exfiltration water appear to be quite low. If there is an interest, a potential site visit to this on-going project is offered to representatives of the Missouri DNR.

Information related to the equipment typically used in a fly ash slurry injection process, is enclosed as Attachment G. Test results for the compressive strength and permeability testing of the proposed fly ash/cement slurry is enclosed as Attachment I.

Summary of Conclusions

In summary, the following conclusions are respectfully offered.

1. The primary purposes of the proposed stabilization of the Greystone Mine is to stabilize a land parcel that is currently threatened by an increased probability of surface subsidence and public safety issues due to mine roof collapses and to enable commercial development of the land above the mine. Currently, the land above the mine is not considered suitable for development due to the likelihood of future dome-out collapses of the mine roof. Consequently, the use of a CCR/cement slurry fill will result in a functional benefit.
2. The use of a CCR/cement slurry fill represents the only viable and economical approach to stabilizing an ever-increasing unstable, abandoned underground limestone mine.
3. The use of a CCR/cement slurry fill on this project will be controlled/governed by the use of a single CCR source (with regular TCLP and SPLP laboratory testing), will be injected into the mine void using established and regionally-recognized procedures, will be regularly monitored for material quality and with regard to the progression/effectiveness of the mine filling process, and is based on minimum design values related to final compressive strength of the hardened slurry.
4. The use of a CCR/cement slurry fill on this project will not result in any detrimental environmental releases to groundwater due to several site conditions: (a) *no groundwater aquifer exists at the site*, (b) *the site represent a topographical elevated feature and surrounding drainage swales will not allow infiltration from surface water into the mined space*, (c) *the site is encapsulated on all sides by soil or natural bedrock materials and underlain by a predominately shale confining layer*),
5. Slurry mixing will be accomplished via enclosed tankers and the use of controlled mixing with potable water, with immediate injection into the mined space, thereby precluding the formation of air-borne dust.

Miscellaneous Information for Exemption Request

Pursuant to the requirements of 10 CSR 80, Chapter 2, Section 9B, the following supplemental and additional information is provided.

1. The Owner of the property and Operator of the proposed mine reclamation project is listed below.

   Dean Realty Co
   1201 West 31st Street/ Suite 2
   Kansas City, Missouri 641086103

Mr. Walt Clements - CEO
816.531.0800
Mr. Kevin Rowley, Project Manager
816.531.0800

2. Since the project does not involve the placement of fly ash in a typical landfill process, it is our belief that no landfill closure plan is required. The entire project/injection volume is characterized by an encapsulated system, i.e. an underground mine with containment on all sides. Appropriate re-grading and re-seeding of small areas disturbed by the injection process will be performed.

3. A management plan related to landfill site design, buffer zone development, overall site drainage control, and odor/vector control is not necessary for a mine injection process. The size and distribution of all injection sites will be minimized, along with associated land disturbance. Site-specific and localized erosion control methods, such as silt fences and hay bales, will be used to control the relatively small magnitude of runoff emanating from any given injection site.

4. Since the success of the mine filling process is highly dependent on the quality of the fly ash product, and the fly ash slurry will be continuously monitored and tested to verify that minimum unconfined compressive strengths are being achieved, the use of an "unacceptable" fly ash material, or any other material, would be limited to one load (approximately 26 tons). Periodic to near-continuous observation and inspection by engineering and management personnel for each "load" of fly ash will also ensure that unacceptable waste material is not used or inadvertently incorporated in the process.

5. To our knowledge, no specific requirements exist with regard to compliance with local zoning and planning requirements, other than the stipulation by the City of Kansas City Planning and Zoning Commission related to the need to "stabilize"/mitigate the site to maintain the current zoning classification of PD/M2A and to allow for further development. A copy of the letter dated October 1, 2004 containing the stipulation from the City of Kansas City is enclosed as Attachment H (see Point #2, Item F).

If you have any questions concerning the contents of this letter, please contact the undersigned.

Sincerely,

STATE OF MISSOURI
GARY J.
VAN RIESSEN
NUMBER
E-19058
REGISTERED PROFESSIONAL ENGINEER

12/5/2018

Gary J. Van Riessen, P.E.
Consulting Geotechnical Engineer

Allison N. Sperber, PE
Staff Engineer

Attachments: Figures 1 through 11
Attachment A - Permit for Water Protection Program
Water Pollution Branch
Class V Underground Injection Control Well(s)
Attachment B - Representative Site Photographs

Attachment C - September 2018 Topographic Survey Data Collection
Attachment D - June 2016 Subsurface Drilling Program
Attachment E - Test Pit Investigation, March 2018
Attachment F – Phase II Limited Site Investigation, Gateway Union Properties, Inc. Site, Kansas City, Missouri for Kansas City Terminal Railway Company (2002)
Attachment G - TCLP/SPLP Test Data Sheets-Proposed Fly Ash Source
Attachment H - Fly Ash Injection Process/Equipment
Attachment I - Typical Laboratory Strength Tests and Permeability of Fly Ash
Attachment J – KCMO Site Zoning/Stipulation Letter

Attachment C

September 2018
Topographic Survey Data Collection


Top of Fill Area
16- Top of Hill
W 26 Terrace
14 - Top BF
10 Top of Inlet
12 - Top BF
11 - Flowline Ditch
W 27th St
Bi State Dr
W 27th Terrace
4 - Top of Popcorn
5 - Flowline Ditch
E Cambridge Cir Dr
Bell St
513-Low area between Track and Old Brewery
35
Google Earth
© 2018 Google
N
900 ft

18-3166 Dean Realty - Mine Survey
Jackson County, MO

HZ Control: **NAD83 (2011) Missouri/West State Plane Coordinates**
Vt Control: **NAVD 88**
Units: **US Feet**

Pt No	Northing	Easting	Elev	Description
Spot Shots				
4	1059847.84	2759242.08	776.03	Top of popcorn
5	1059733.93	2759266.45	763.87	Flowline of Ditch opposite Pt 4
513	1059588.55	2759461.30	755.39	Low area between track and Brewery
14	1060389.05	2759438.30	771.84	Top BF
10	1060427.82	2759677.85	753.39	Top Center of Area Inlet
12	1060322.61	2759471.96	772.67	Top BF
11	1060333.07	2759681.72	754.33	Flowline of Ditch opposite Pt 12
16	1060546.30	2759059.61	897.39	Top of Mine
Top of Fill				
18	1060964.12	2759392.56	778.08	Top of Fill
19	1060951.59	2759408.38	778.99	Top of Fill
20	1060925.09	2759422.38	779.73	Top of Fill
21	1060899.02	2759426.12	791.08	Top of Fill
22	1060889.88	2759429.99	791.51	Top of Fill
23	1060880.40	2759434.12	791.03	Top of Fill
24	1060864.37	2759422.70	791.06	Top of Fill
25	1060861.59	2759416.79	792.03	Top of Fill
26	1060865.70	2759405.49	790.45	Top of Fill
27	1060873.28	2759399.29	792.29	Top of Fill
28	1060882.46	2759387.12	791.86	Top of Fill
29	1060899.20	2759425.57	791.34	Top of Fill
30	1060889.04	2759403.10	791.93	Top of Fill
31	1060888.80	2759381.72	794.39	Top of Fill
32	1060899.89	2759367.03	792.13	Top of Fill
33	1060913.79	2759357.41	790.49	Top of Fill
34	1060924.01	2759352.31	792.26	Top of Fill
35	1060932.69	2759360.69	790.98	Top of Fill
36	1060937.42	2759365.38	789.79	Top of Fill
37	1060950.67	2759344.62	781.31	Top of Fill
38	1060972.27	2759324.67	782.20	Top of Fill
39	1060998.79	2759305.14	783.49	Top of Fill
40	1061014.33	2759289.87	782.99	Top of Fill
41	1061069.97	2759334.00	779.91	Top of Fill
42	1061085.68	2759308.57	782.83	Top of Fill
43	1061100.97	2759285.98	783.98	Top of Fill

Pt No	Northing	Easting	Elev	Description
Top of Fill				
44	1061098.98	2759277.22	787.16	Top of Fill
45	1061113.06	2759262.04	788.95	Top of Fill
46	1061120.85	2759249.39	788.76	Top of Fill
47	1061127.48	2759234.61	789.38	Top of Fill
48	1061131.84	2759222.26	789.05	Top of Fill
49	1061130.86	2759212.13	789.13	Top of Fill
50	1061136.35	2759190.72	789.30	Top of Fill
51	1061140.69	2759204.94	786.61	Top of Fill
52	1061161.50	2759169.45	783.91	Top of Fill
53	1061172.62	2759115.12	785.59	Top of Fill
54	1061177.29	2759072.22	786.21	Top of Fill
55	1061178.15	2759027.32	785.59	Top of Fill
56	1061180.20	2759001.63	785.87	Top of Fill
57	1061181.10	2758953.78	785.53	Top of Fill
58	1061181.03	2758906.05	784.42	Top of Fill
59	1061184.95	2758865.67	782.26	Top of Fill
60	1061183.59	2758853.95	781.632	Top of Fill

Survey By: **Renaissance Infrastructure Consulting, Inc.**
132 Abbie Avenue
Kansas City, KS 66103
913-317-9500

Survey Date: **9/19/2018**
Revised: **9/27/2018**

18-3166 Dean Realty - Mine Survey
Jackson County, MO

HZ Control: **NAD83 (2011) Geographic**
Vt Control: **NAVD 88**
Units: **US Feet**

Pt No	Latitude	Longitude	Elev	Description
Spot Shots				
4	39 04 38.49723 N	94 36 13.67332 W	776.03	Top of popcorn
5	39 04 37.37154 N	94 36 13.36259 W	763.87	Flowline of Ditch opposite Pt 4
513	39 04 35.93674 N	94 36 10.88959 W	755.39	Low area between track and Brewery
14	39 04 43.84902 N	94 36 11.19271 W	771.84	Top BF
10	39 04 44.23494 N	94 36 08.15533 W	753.39	Top Center of Area Inlet
12	39 04 43.19271 N	94 36 10.76486 W	772.67	Top BF
11	39 04 43.29835 N	94 36 08.10499 W	754.33	Flowline of Ditch opposite Pt 12
16	39 04 45.39907 N	94 36 15.99747 W	897.39	Top of Mine
Top of Fill				
18	39 04 49.53281 N	94 36 11.78104 W	778.08	Top of Fill
19	39 04 49.40905 N	94 36 11.58031 W	778.99	Top of Fill
20	39 04 49.14729 N	94 36 11.40228 W	779.73	Top of Fill
21	39 04 48.88966 N	94 36 11.35450 W	791.08	Top of Fill
22	39 04 48.79938 N	94 36 11.30532 W	791.51	Top of Fill
23	39 04 48.70568 N	94 36 11.25276 W	791.03	Top of Fill
24	39 04 48.54709 N	94 36 11.39734 W	791.06	Top of Fill
25	39 04 48.51954 N	94 36 11.47237 W	792.03	Top of Fill
26	39 04 48.56010 N	94 36 11.61572 W	790.45	Top of Fill
27	39 04 48.63495 N	94 36 11.69442 W	792.29	Top of Fill
28	39 04 48.72553 N	94 36 11.84894 W	791.86	Top of Fill
29	39 04 48.89147 N	94 36 11.36155 W	791.34	Top of Fill
30	39 04 48.79075 N	94 36 11.64636 W	791.93	Top of Fill
31	39 04 48.78812 N	94 36 11.91750 W	794.39	Top of Fill
32	39 04 48.89761 N	94 36 12.10396 W	792.13	Top of Fill
33	39 04 49.03492 N	94 36 12.22611 W	790.49	Top of Fill
34	39 04 49.13584 N	94 36 12.29094 W	792.26	Top of Fill
35	39 04 49.22173 N	94 36 12.18483 W	790.98	Top of Fill
36	39 04 49.26859 N	94 36 12.12533 W	789.79	Top of Fill
37	39 04 49.39927 N	94 36 12.38879 W	781.31	Top of Fill
38	39 04 49.61256 N	94 36 12.64222 W	782.20	Top of Fill
39	39 04 49.87445 N	94 36 12.89022 W	783.49	Top of Fill
40	39 04 50.02791 N	94 36 13.08412 W	782.99	Top of Fill
41	39 04 50.57841 N	94 36 12.52526 W	779.91	Top of Fill
42	39 04 50.73336 N	94 36 12.84792 W	782.83	Top of Fill
43	39 04 50.88423 N	94 36 13.13466 W	783.98	Top of Fill

Pt No	Latitude	Longitude	Elev	Description
Top of Fill				
44	39 04 50.86451 N	94 36 13.24576 W	787.16	Top of Fill
45	39 04 51.00348 N	94 36 13.43844 W	788.95	Top of Fill
46	39 04 51.08036 N	94 36 13.59904 W	788.76	Top of Fill
47	39 04 51.14568 N	94 36 13.78655 W	789.38	Top of Fill
48	39 04 51.18869 N	94 36 13.94319 W	789.05	Top of Fill
49	39 04 51.17883 N	94 36 14.07163 W	789.13	Top of Fill
50	39 04 51.23288 N	94 36 14.34324 W	789.30	Top of Fill
51	39 04 51.27597 N	94 36 14.16296 W	786.61	Top of Fill
52	39 04 51.48127 N	94 36 14.61346 W	783.91	Top of Fill
53	39 04 51.59054 N	94 36 15.30257 W	785.59	Top of Fill
54	39 04 51.63627 N	94 36 15.84676 W	786.21	Top of Fill
55	39 04 51.64424 N	94 36 16.41617 W	785.59	Top of Fill
56	39 04 51.66418 N	94 36 16.74193 W	785.87	Top of Fill
57	39 04 51.67257 N	94 36 17.34881 W	785.53	Top of Fill
58	39 04 51.67129 N	94 36 17.95419 W	784.42	Top of Fill
59	39 04 51.70956 N	94 36 18.46627 W	782.26	Top of Fill
60	39 04 51.69602 N	94 36 18.61486 W	781.632	Top of Fill

Survey By: **Renaissance Infrastructure Consulting, Inc.**
132 Abbie Avenue
Kansas City, KS 66103
913-317-9500

Survey Date: **9/19/2018**

Revised: **9/27/2018**

Attachment D

June 2016 Subsurface Drilling Program

Gary Van Riessen, P.C.
A Professional Corporation
Gary J. Van Riessen, P.E.
Consulting Geotechnical Engineer
34505 E. Drinkwater Road
Lone Jack, Missouri 64070-8567
816.556.0133 (Office)
816.830.6576 (Cell)
816.556.0139 (Fax)
Email: gvrlsmo@aol.com

August 10, 2016

Mr. Kevin Rowley
Dean Realty Co.
1201 West 31st Street, Suite 2
Kansas City, Missouri 64108

Reference: Summary of Preliminary Subsurface Exploration
Greystone Mine Reclamation Site
Kansas City, Missouri

Dear Mr. Rowley:

This report has been prepared to summarize the results of a preliminary geotechnical exploration and initial assessment performed at your request of the proposed Greystone Mine reclamation site. Greystone Mine is an abandoned Bethany Falls Limestone mine located in Kansas City, Missouri and owned by Dean Realty Company. The proposed work for the Greystone Mine reclamation includes ground disturbance and stabilization activities to construct a building pad for future development. The work represented by this report reflects those activities required to assess the existing conditions of the mine and make a determination of what portion(s) of the mine ceiling and overlying layers have collapsed or are considered unstable. Based on the results of this preliminary assessment, recommendations will be provided on the best path forward for the proposed project from a geotechnical perspective.

Subsurface exploration was conducted June 20-22, 2016 and June 28-29, 2016. An air rotary drill rig was mobilized to the site and three test borings were drilled. Please reference Figure 1 for the boring locations. Borings B-1 and B-2 were drilled using disturbed auger drilling to approximately 70 to 80 feet below the ground surface. For Boring B-3, once overburden was removed and surface casing was set, an NQ wireline rock coring technique was used to extract rock core samples to an approximate depth of 160 feet below the ground surface. All borings were logged in the field at the time of drilling. The rock core samples collected from B-3 were photographed and stored for future reference and testing, as necessary. The B-3 boring log and rock core photographs are provided in Appendices A and B, respectively. A subsurface profile (Figure 2) was developed to summarize the information collected by the preliminary subsurface exploration.

Historically, it is typical for the roof in Bethany Falls mines in the area to have approximately 4 to 5 feet of intact Bethany Falls Limestone to structurally span the ceiling between adjacent rock pillar supports (comprised of Bethany Falls Limestone) within the mine. Based on the results of the subsurface exploration, it appears that there has been significant mine ceiling collapse and instability in overlying rock layers. The initial evidence suggests that, at a minimum, the collapse/instability has not only impacted the Bethany Falls ceiling, but has also impacted the overlying shale layer (Galesburg/Stark) and the lower portion of the overlying Winterset Limestone layer. The impact on the Winterset Limestone member is particularly concerning, since the strength of this competent rock layer would ultimately be relied upon to support construction equipment and personnel during land disturbance activities. Any roof/mine instability caused by intentional or unintentional over-excavation of the Winterset Limestone could pose a potential safety risk if not properly assessed/characterized.

Based on the information collected during this preliminary exploration/assessment effort, it is recommended that the remaining, proposed borings depicted in Figure 1, and/or revised locations as necessary, be conducted to further characterize the subsurface stratigraphy of the site. Additionally, it is recommended laboratory testing be conducted on select Winterset Limestone rock cores to assist in making a determination of the strength and stability. This supplemental subsurface exploration is recommended to be completed in concert with any feasibility test/study activities, but should absolutely be completed prior to any proposed final, actual production work at the site.

Thank you for the opportunity to assist Dean Realty Co. on this project. If you have any questions, please contact the undersigned.

Respectfully submitted,

STATE OF MISSOURI
GARY J. VAN RIESSEN
NUMBER E-19058
REGISTERED PROFESSIONAL ENGINEER

8/10/16

Gary J. Van Riessen, P.E.
Consulting Geotechnical Engineer

Allison N. Sperber, P.E.
Project Engineer

Attachments: Figure 1 – Boring Locations
Figure 2 – Subsurface Profile
A – B-3 Boring Log
B – B-3 Rock Core Photographs

↑ North

APPROX. BORING LOCATIONS (06/2016)

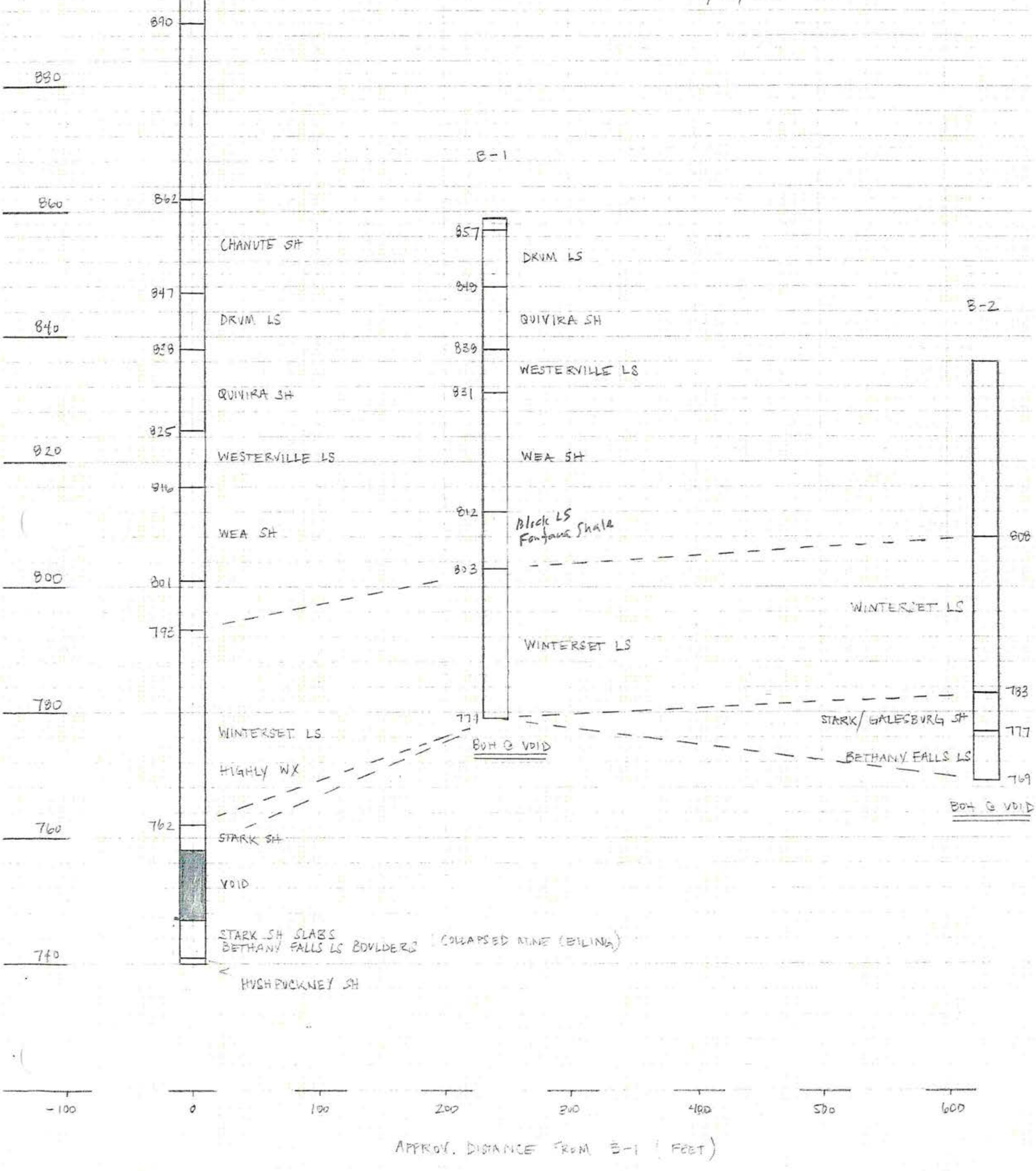
Proposed Boring Locations

Dean Realty Co.
Greystone Mine Development
Preliminary Borings

Figure 1

G. J. VanRiessen	March 17, 2016	

FIGURE 2
SUBSURFACE PROFILE
GREYSTONE MINE RECLAMATION
DEAN REALTY
7/20/2016



Appendix A:

B-3 Boring Log

Gary Van Riessen, P.C.
A Professional Corporation
34505 E. Drinkwater Road
Lone Jack, Missouri 64070-8567

Boring Number	B-3	**Page**	1/7

BORING LOG

Project:	Greystone Mine Reclamation	**Location:**	Dean Realty, Kansas City, MO
G.S. Elevation:	900	**Drilling Contractor:**	Assocated Drilling, Inc.
Drilling Equipment and Method:	Air Rotary/NQ Rock Core		
Water Levels:	Not Encountered	**Start:** 6/20/16 **Finish:** 6/20/16	**Logger:** ANS

Depth (ft)	Sample Interval	Sample ID	SPT 6"-6"-6" (N)	Moisture Content %	Dry Density (pcf)	Material Description
						Overburden
5						
10						10' Lane Shale, blue-gray, some limestone seams
15						
20						
25						

Gary Van Riessen, P.C.
A Professional Corporation
34505 E. Drinkwater Road
Lone Jack, Missouri 64070-8567

Boring Number	B-3	**Page**	2/7

BORING LOG

Project: Greystone Mine Reclamation		**Location:** Dean Realty, Kansas City, MO	
G.S. Elevation: 900	**Drilling Contractor:** Assocated Drilling, Inc.		
Drilling Equipment and Method: Air Rotary/NQ Rock Core			
Water Levels: Not Encountered	**Start:** 6/20/16	**Finish:** 6/21/16	**Logger:** ANS

Depth (ft)	Sample Interval	Sample ID	SPT 6"-6"-6" (N)	Moisture Content %	Dry Density (pcf)	Material Description
						26.2' Raytown Limestone
						27.8' Shale seam, calcarious
						28.9' Raytown Limestone
30						
						33.6' Muncie Creek Shale, carbonaceous
35						
						36' Paola Limestone
						38.1' Chanute Shale, gray-green
40						
45						45.5' Chanute Shale, maroon
						47.5' Chanute Shale, gray with limestone nodules
50						

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Lone Jack, Missouri 64070-8567

Boring Number	B-3	**Page**	3/7

BORING LOG

Project:	Greystone Mine Reclamation	**Location:**	Dean Realty, Kansas City, MO		
G.S. Elevation:	900	**Drilling Contractor:**	Assocated Drilling, Inc.		
Drilling Equipment and Method:	Air Rotary/NQ Rock Core				
Water Levels:	Not Encountered	**Start:** 6/21/16	**Finish:** 6/21/16	**Logger:**	ANS

Depth (ft)	Sample Interval	Sample ID	SPT 6"-6"-6" (N)	Moisture Content %	Dry Density (pcf)	Material Description
						52.7' Drum Limestone
55						
60						
						62' Quivira Shale, dark gray
65						64.8' Quivira Shale, black carbonaceous seam
						66' Quivira Shale
						67.3' Limestone seam
						68' Quivira Shale, light gray
70						
						72' Limestone seam
						73.4' Quivira Shale
75						74.6' Westerville Limestone

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Lone Jack, Missouri 64070-8567

Boring Number	B-3	Page	4/7

BORING LOG

Project:	Greystone Mine Reclamation	**Location:**	Dean Realty, Kansas City, MO				
G.S. Elevation:	900	**Drilling Contractor:**	Assocated Drilling, Inc.				
Drilling Equipment and Method:	Air Rotary/NQ Rock Core						
Water Levels:	Not Encountered	**Start:**	6/28/16	**Finish:**	6/28/16	**Logger:**	ANS

Depth (ft)	Sample Interval	Sample ID	SPT 6"-6"-6" (N)	Moisture Content %	Dry Density (pcf)	Material Description
						75.2' Westerville Limestone, fractured
						(0.5' not recovered)
						78' Weathered shale seam, black
						78.7' Westerville Limestone, vertical seam
80						(4' not recovered)
						84' Wea Shale, blue-gray
85						
90						
95						
						(2.2' not recovered)
						98.9' Block Limestone, with shale seams
100						

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Lone Jack, Missouri 64070-8567

Boring Number	B-3	**Page**	5/7

BORING LOG

Project:	Greystone Mine Reclamation	**Location:**	Dean Realty, Kansas City, MO		
G.S. Elevation:	900	**Drilling Contractor:**	Assocated Drilling, Inc.		
Drilling Equipment and Method:	Air Rotary/NQ Rock Core				
Water Levels:	Not Encountered	**Start:** 6/29/16	**Finish:** 6/29/16	**Logger:**	ANS

Depth (ft)	Sample Interval	Sample ID	SPT 6"-6"-6" (N)	Moisture Content %	Dry Density (pcf)	Material Description
						(0.7' not recovered)
						104' Fontana Shale, light gray
105						(0.5' not recovered)
						106' Fontana Shale, black, fissile
						106.5' Winterset Limestone, with black chert
110						
						(1.5' not recovered)
115						
						118' Black shale seam (0.5' not recovered)
						119' Winterset Limestone, highly variable, weathered
120						
125						

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Lone Jack, Missouri 64070-8567

Boring Number	B-3	**Page**	6/7

BORING LOG

Project:	Greystone Mine Reclamation	**Location:**	Dean Realty, Kansas City, MO		
G.S. Elevation:	900	**Drilling Contractor:**	Assocated Drilling, Inc.		
Drilling Equipment and Method:	Air Rotary/NQ Rock Core				
Water Levels:	Not Encountered	**Start:** 6/29/16	**Finish:** 6/29/16	**Logger:**	ANS

Depth (ft)	Sample Interval	Sample ID	SPT 6"-6"-6" (N)	Moisture Content %	Dry Density (pcf)	Material Description
130						130' Winterset Limestone fragments
135						(3' not recovered, possible void)
						137.8' Stark Shale, black
140						140' Galesburg Shale, gray
						142' Void (no recovery)
145						
150						

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A Professional Corporation
34505 E. Drinkwater Road
Lone Jack, Missouri 64070-8567

Boring Number	B-3	**Page**	7/7

BORING LOG

Project:	Greystone Mine Reclamation	**Location:**	Dean Realty, Kansas City, MO
G.S. Elevation:	900	**Drilling Contractor:**	Assocated Drilling, Inc.
Drilling Equipment and Method:	Air Rotary/NQ Rock Core		
Water Levels:	Not Encountered	**Start:** 6/29/16	**Finish:** 6/29/16 **Logger:** ANS

Depth (ft)	Sample Interval	Sample ID	SPT 6"-6"-6" (N)	Moisture Content %	Dry Density (pcf)	Material Description
						153' Limestone boulders
						154.5' Stark Shale, black, collapsed layer
155						(drilling obtained diagonal bedding layers)
						156.5' Bethany Falls Limestone, boulders
						159.7' Huspuckney Shale
160						160' Bottom of hole
165						
170						
175						

Appendix B:

B-3 Rock Core Photographs

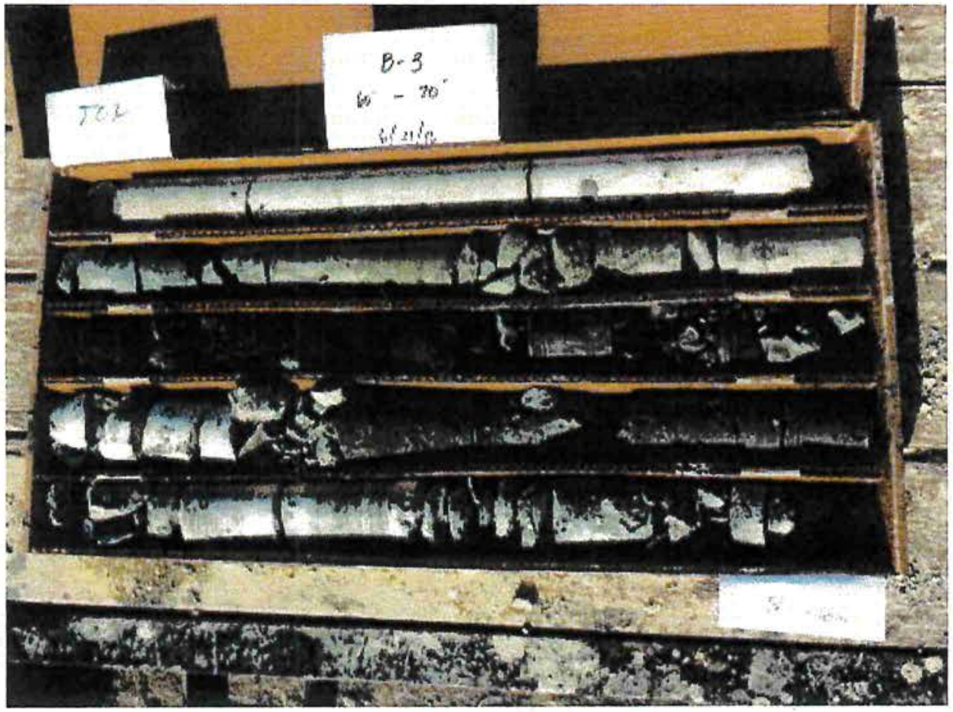

TOP
06/21/2016


B-3
20' - 30'
06/21/2016

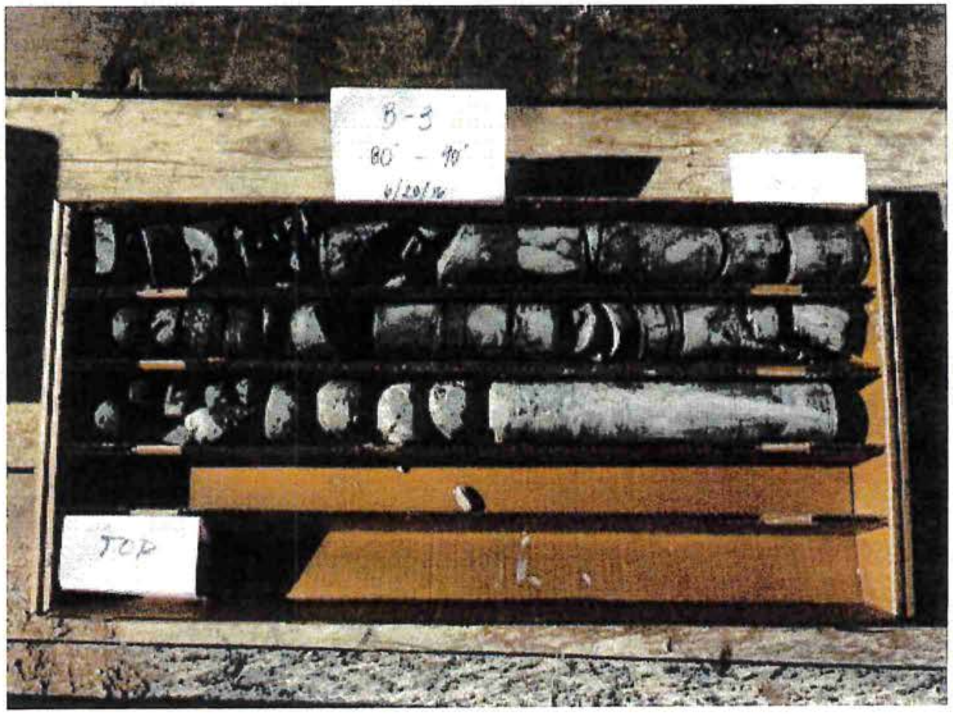

B-3
06/21/2016

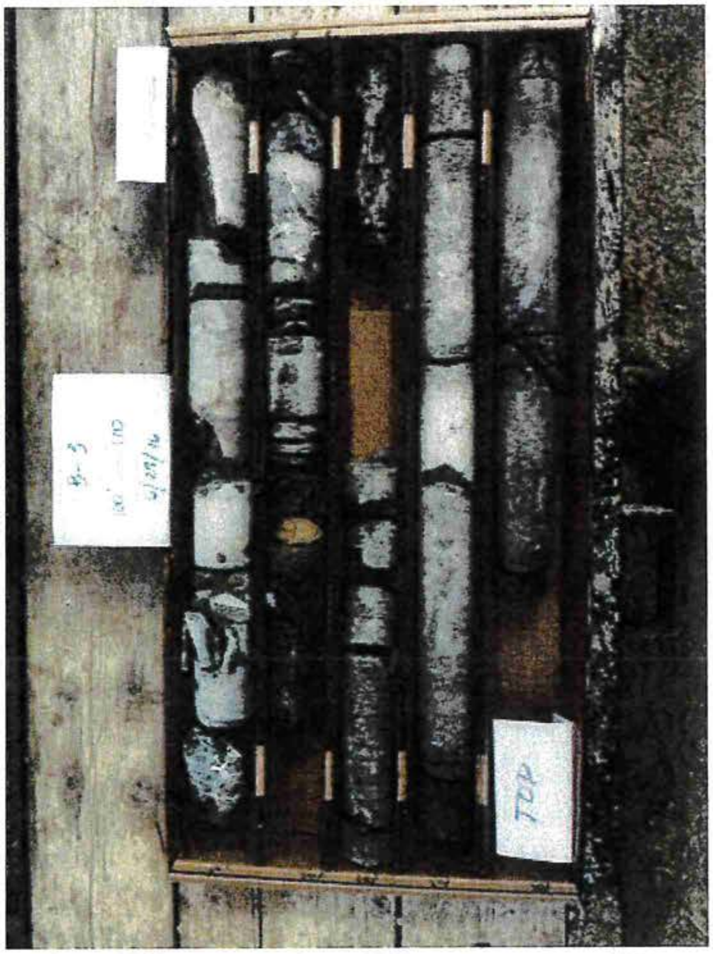

06/21/2016


TOP
06/21/2016

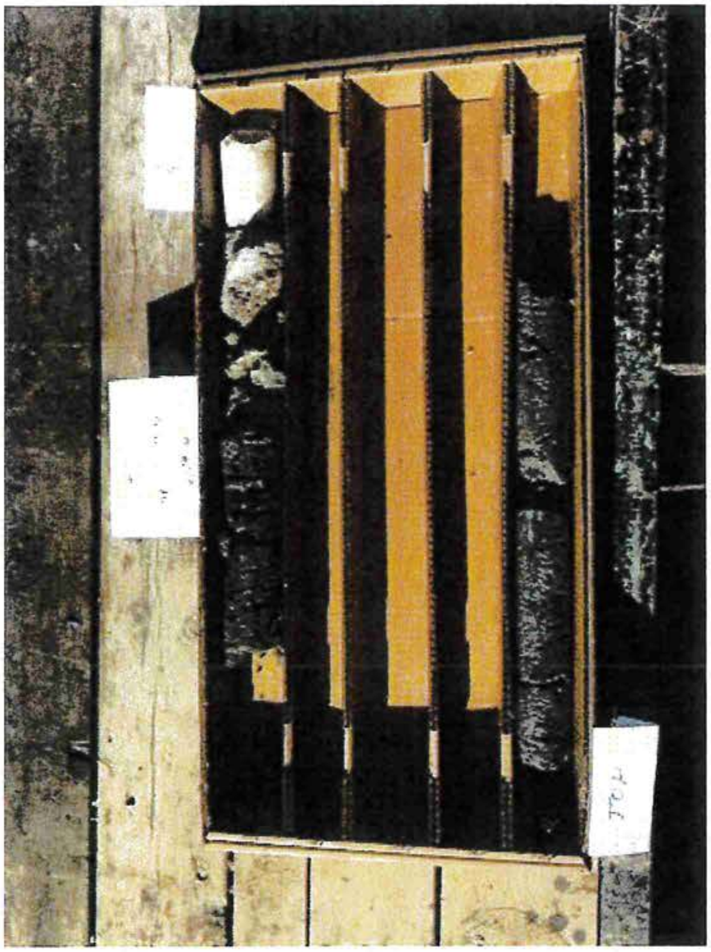

B-3
60' - 70'
TOP

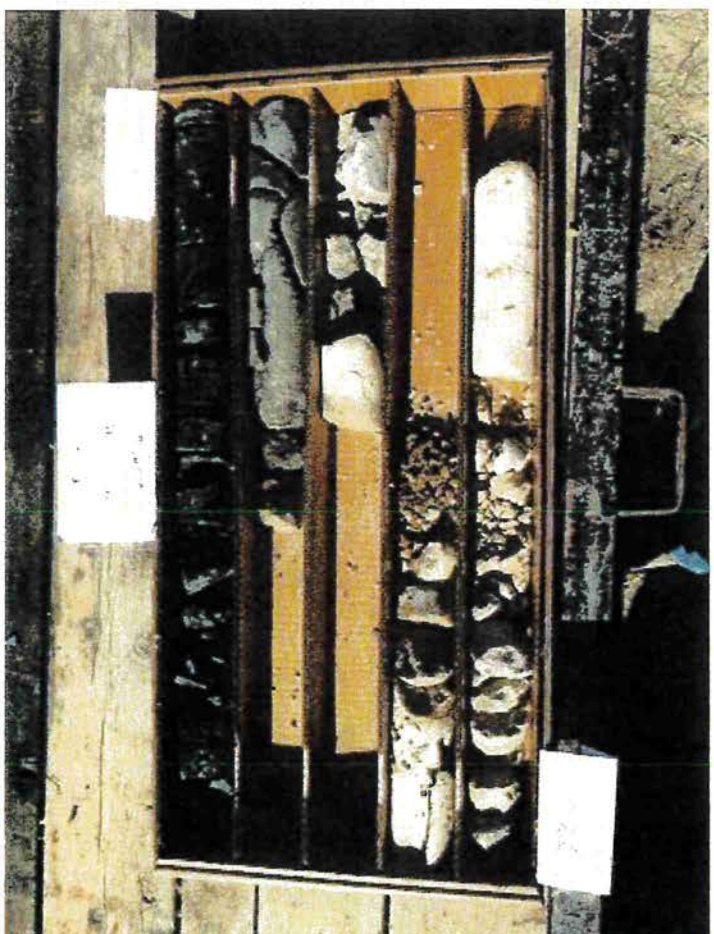

TOP
Bottom

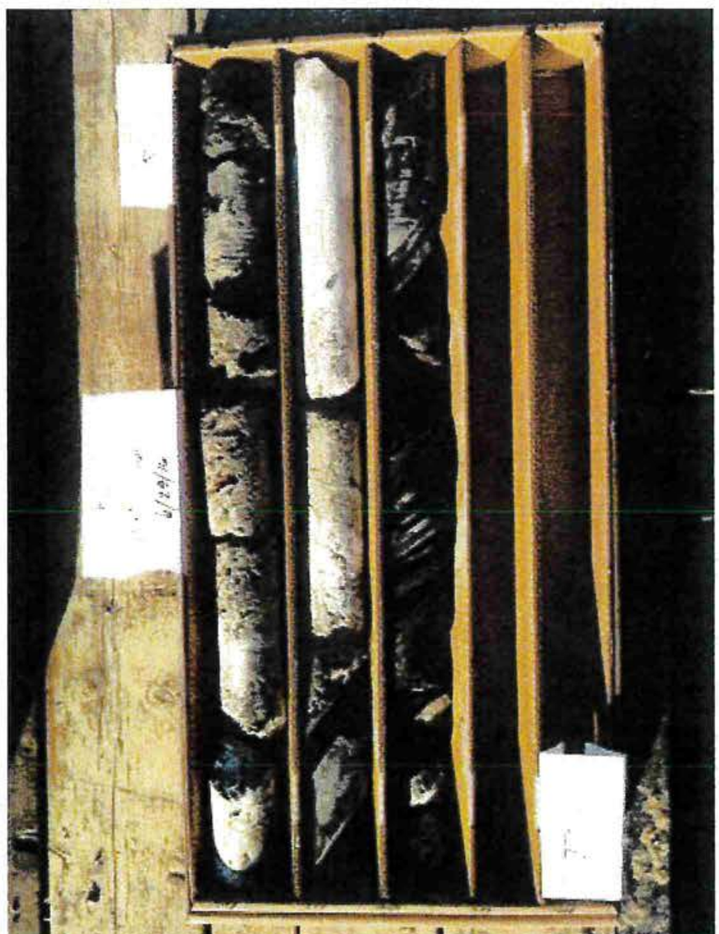

B-3
80' - 90'
6/20/16
TOP


TOP


TOP







Attachment F

Phase II Limited Site Investigation,
Gateway Union Properties, Inc. Site,
Kansas City, Missouri
for
Kansas City Terminal Railway Company (2002)

Phase II Limited Site Investigation
Gateway Union Properties, Inc. Site
Kansas City, Missouri

For

Kansas City Terminal Railway Company

Prepared by:
TranSystems Corporation
June 26, 2002
P1010230033

June 26, 2002

Mr. Bill Somervell
Kansas City Terminal Railway Company
4501 Kansas Ave.
Kansas City, Kansas 66106

Re: Report – Phase II Limited Site Investigation
Gateway Union Properties, Inc. Site, Kansas City, Missouri

Dear Mr. Somervell:

Enclosed is one copy of the above referenced report. This Phase II-Limited Site Investigation (LSI) was completed in accordance with the Scope of Work set forth and agreed to in the contract agreement dated May 16, 2002 between Kansas City Terminal Railway Company (KCT) and TranSystems Corporation. The LSI-Phase II included installation of six (6) geoprobe locations for investigation of chemical impacts to soils and groundwater at the site. The drilling investigation was conducted as a result of findings and recommendations published in the Phase I-Business Environmental Risk Assessment (BERA) report, dated June 5, 2002. The conclusions presented in this report reflect the findings of this LSI study.

TranSystems Corporation appreciates this opportunity to be of service to KCT. We are available at your convenience to discuss any questions you may have about this project and report.

Sincerely,

TranSystems Corporation

John Larson, P.G., M.P.H.
Associate

Enclosure

EXECUTIVE SUMMARY

This report presents the results of TranSystems Corporation's (TranSystems') Phase II Limited Site Investigation (LSI) of the Gateway Union Properties, Inc. site located at 1550 West 29th Street in Kansas City, Missouri (subject property). This Phase II LSI was completed in accordance with the agreed-to contract dated May 16, 2002 between *Kansas City Terminal Railway Company (KCT)* and TranSystems.

The subject property consists of what is commonly referred to as a "brownfield site". Previously, a Phase I environmental assessment, dated June 5, 2002 was published for the property that identified several historically recognized environmental conditions (HRECs) that warranted further investigation. Six borings were installed via geoprobe hydraulic-push drilling methods on June 3, 2002. Soil and groundwater samples were submitted for chemical analyses for volatile organic compounds, total petroleum hydrocarbons, metals, organo-chlorinated pesticides and polychlorinated bi-phenyls.

Results of this investigation indicate that no significant risk is present on this site associated with potential exposures to chemicals detected in media investigated. This is based on the finding that detected constituent concentrations were largely below Missouri Department of Natural Resources (MDNR) health risk-based screening levels published in the Cleanup Levels for Missouri (CALM). In fact, chemical data were largely either not detected for organic compounds or below normal background concentrations for metals in soils. The presence of a few detected analytes in groundwater above generic cleanup criteria was identified. Groundwater data indicate that detections are either the result of colloidal metals bound to suspended sediment; and/or isolated statistical anomalies. The MDNR defers to EPA maximum contaminant levels (MCLs), used for generic potable groundwater residential cleanup scenarios. The site groundwater is non-potable, non-residential, and would likely be considered for Tier 2 industrial risk-based cleanup levels if widespread groundwater impacts were found to warrant a remedial action.

Therefore, TranSystems recommends that no further investigation is warranted for assessment of hazardous substances in subsurface media. If discovery of gross contamination is identified at a later date, such as due to future site construction; however, then special handling and disposal of potentially hazardous waste materials may be required. In the event such a scenario occurs, a general visual assessment of impacted areas should be made during the course of construction so that further care and/or action can be determined at that time.

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APPENDICES

1.0 INTRODUCTION

TranSystems was retained by Kansas City Terminal Railway Company (KCT) to conduct a Phase II Limited Site Investigation (LSI) of a former industrial-use, currently abandoned, tract of land located at 1550 West 29th Street in Kansas City, Missouri. This Phase II report was conducted in accordance with the previously agreed-to contract between TranSystems and KCT, dated May 16, 2002. For reference, a site location map is provided as Figure 1.

1.1 Background and Scope of Work

The subject site, Gateway Union Property, consists of about 3.7 acres located at 1550 West 29th Street in Kansas City, Missouri 64108. As described in the Phase I BERA Report, dated June 5, 2002 the property is currently an abandoned "brownfield" site, and has been largely unused for industrial purposes since 1996. Previous industrial activities included a grain elevator storage and transfer facility owned-operated by Cargill Corp., preceded by a Seaboard Flour Mill operation. Industrial activities have occurred on this site since the late 1800's when a brewery operation was present. The grain elevators, associated with grain storage and milling operations, have been located on the site since at least the late 1920's based on historical records. Figure 2 depicts the site features as observed by TranSystems during reconnaissance activities. As noted on Figure 2, several global positioning satellite (GPS) survey locations were collected to geo-reference existing structures on the site and create a sample location design plan.

Due to the historical findings of heavy-industrial activities on this site, several historical recognized environmental conditions (HRECs) were identified subject for investigation in this Phase II. The potential for hazardous wastes, and their likely affiliated chemical compounds that might be associated with HREC substance releases into site media were identified as: volatile organic compounds (VOCs), total petroleum hydrocarbons diesel range organics (TPH-DRO), Organo-chlorinated pesticides (Pesticides), polychlorinated bi-phenyls (PCBs), and metals (RCRA metals). These chemicals were investigated due to their potential release into subsurface media as a result of historical activities and process knowledge based on the use of fumigants, pesticides, herbicides for grain storage treatment; an on-site underground storage tank for vehicular fueling; a former electrical transformer area (for on-site power) and its related past PCB cleanup; presence of lead-based paint on structures; and, site proximity to other potential industrial chemical sources. As such, the following scope of work was conducted to investigate the presence of hazardous wastes in site soils and groundwater:

- Soil borings were installed at six distinct locations (see Figure 3). Borings were installed by a licensed Missouri well driller, PSA Environmental Inc., using standard geobrobe drilling methods.
- Discrete soil samples per two-foot intervals were collected per boring location. Soil samples submitted for chemical analysis were at shallow native soil collection zones, and, one deeper soil sample interval at the groundwater interface; or at the highest level of field evidence of impact (e.g., via vapor headspace reading of photoionization detector (PID) instrument). When groundwater was encountered, a shallow 3/4-inch diameter temporary piezometer was installed for groundwater sample collection. Groundwater samples were collected using a disposable micro-bailer.
- Soil and groundwater samples were submitted to Severn Trent Laboratory for 'rush' turnaround time analyses to meet the deadlines imposed for this project.

1.2 Limitations of Investigation

Drilling and sampling locations were selected to provide an optimum spatial extent for evaluation of chemical impacts in the subsurface to assess potential substance releases associated with the features identified as HRECs. Locations were selected based on areas of concern. Because the northern portion of the site is dominated by buildings, these areas were not accessible for drilling. Therefore, areas below building structures may contain trapped or sorbed hazardous waste materials not investigated. Nevertheless, strategic positioning of the boring locations adequately served to assess potential lateral migration effects of constituents, if any were released in subsurface media. The spatial distribution of boring locations provided sufficient coverage to support the findings of this study.

2.0 FIELD INVESTIGATION

TranSystems commenced and completed the field investigation on June 3, 2002. Installations of soil borings and temporary wells were conducted by PSA Environmental, Inc., a Missouri-licensed driller. The intrusive activities were supervised and observed by Mr. John Larson, a licensed professional geologist (P.G.) of TranSystems Corporation.

2.1 Pre-Intrusive Activities and Locations Surveying

Prior to field mobilization, TranSystems received authorization from the landowner, Mr. Wayne Sandberg of Gateway Properties for access to the site. A site-specific health and safety plan was developed by TranSystems for the site and adhered to during field activities. The health and safety plan was communicated to the PSA Environmental personnel prior to drilling. Prior to field mobilization, the Missouri One-Call System was telephoned to request local utility companies to identify their subgrade utilities. Several of the lines were marked prior to commencing field activities. No underground, or aboveground utilities were penetrated during this investigation.

On May 31, 2002 TranSystems performed surveying of the proposed boring locations. A global positioning satellite (GPS) hand-held device was used to identify survey coordinates. Appendix A of this document includes the GPS boring location coordinates. Field measured locations were geo-referenced to existing landmarks such as the building corners. Figure 2 of this document includes a map of the GPS locations. Final boring locations were determined in the field and closely matched GPS collection points. Boring locations are presented as Figure 3.

2.2 Soil Boring Details

Soil borings were installed by PSA Environmental, using a van-mounted geoprobe rig. All borings were advanced with 2-inch diameter by 2-foot long steel rods. Samples were collected via pushing the split spoon steel rods with collection liners into the subsurface with continuos soil retrieval to total depth. Soil borings were drilled to first encountered groundwater or refusal (bedrock) whichever came first. Four deep soil borings, B-1, B-2, B-3, and B-4 were installed to between 12 to 15 feet below ground surface (bgs) in order to penetrate groundwater. Borings B-5 and B-6 encountered refusal conditions at shallow depths of 4 feet and 9 feet bgs, respectively.

Lithologic logs were based on the soil retrieved from the borehole in 2-foot long, 2-inch diameter split-spoon samplers with dedicated disposable liners. The soil cores were inspected by a licensed TranSystems geologist and representative samples were collected over the retrieved interval. The lithologic sample description methodology used was the United Soil Classification System (USCS). The samples were placed into individual sealable bags, and the headspace gas was monitored with a photo ionization detector (PID). The results of field observations and PID measurements were recorded on the field boring logs along with the lithologic description of the cores. The logs are provided as Appendix B. Soil samples that exhibited the highest PID reading and/or visual evidence of impact were retained and placed in 4-ounce pre-cleaned glass jars capped with a fluorocarbon-lined lid and submitted to the laboratory for analysis (see Section 2.3).

Upon reaching the saturated interval, or the first encountered groundwater zone, deep borings were extended to enhance saturated flow conditions, and then terminated. Soil borings, B-1, B-2, B-3, and B-4 were converted into temporary slim-hole monitor wells constructed of slotted (0.01-inch), 3/4-inch diameter, Schedule 40, flush-threaded polyvinyl-chloride (PVC) screen, and 3/4-inch diameter, Schedule 40, flush-threaded PVC casing for collection of groundwater. Groundwater was encountered in the above-mentioned borings at about 9 to 10 feet bgs. After temporary well placement groundwater samples were attempted in each well.

After reaching total depth of each soil boring and/or pulling temporary casing from wells, bentonite pellets were placed in boreholes to fill the shallow spaces to grade level. The boring logs of Appendix B detail the observations noted.

2.3 Sampling Procedures and Analyses

The scope of work included field screening of soils using a PID instrument for measurement of volatiles headspace, and collection, and submittal of soil and groundwater samples for laboratory chemical analyses. Samples were submitted to Severn Trent Laboratories (STL) of Pensacola, Florida for chemical testing. Samples were analyzed by the laboratory via the following SW-846 test methods:

- Method 8260B for VOCs,
- Method 6010B/7471A for the RCRA metals,

- Method OA-2 (diesel range organics, DRO) for TPH,
- Method 8081A for organochlorine pesticides, and
- Method 8082 for PCBs.

Soil samples were collected for each sample interval and analyzed using the PID instrument. Each representative sample interval was placed into two-ziploc bags; one was used for the PID analysis and the other held until total depth was reached. Based on the results of the field screening, representative samples were selected from each boring location and placed in pre-cleaned 4-ounce glass jars with a fluorocarbon lined lid. The samples were retained in an iced-chest during sampling duration to maintain a minimum 4 degree Celsius temperature until receipt by the offsite laboratory. All samples were accompanied by appropriate chain-of-custody documentation. Samples were mailed via overnight express for delivery on June 4 to STL for analyses.

Representative groundwater samples were attempted for collection (as noted above) in temporary wells B-1, B-2, B-3, and B-4 using dedicated disposable bailers. All soil and groundwater samples were handled using dedicated disposable gloves. Samples for chemical analysis were collected and dispensed into pre-cleaned sample containers and capped with a fluorocarbon-lined lid. Each container was labeled by boring location and depth to identify the sample consistent with the chain-of-custody form. Severn Trent Laboratory (STL) prepared the containers with and without preservative, depending upon the analysis method. For example, hydrochloric acid was used as the bottle preservative for groundwater sample containers for VOC analysis; whereas, no preservatives were used for soil containers per laboratory and SW-846 specifications. It is to be noted, that the groundwater sample collected for RCRA metals were lab filtered for dissolved metals analyses by STL.

Appendix C contains the laboratory analytical data.

3.0 RESULTS

3.1 Soils

The results of the PID field screening indicated the relative low presence of volatile organic vapors detected in the core samples recovered at each boring location except B-1. The PID measurements are shown on the boring logs submitted as Appendix B. In general, vapor measurements decreased with increasing depth. The maximum PID measurement was 46.5 parts per million (ppm) observed at the seven-foot interval at B-1. This boring location, B-1, also exhibited the most noticeable impacted field conditions based on odor and visible screening evidence. The B-1-7 (seven foot sample at B-1), however, was non-detect for VOCs, pesticides, and PCBs. This soil sample exhibited a relatively low concentration of TPH-DRO of 59.0 ppm and very low concentrations of metals (i.e, less than background). The remaining boring locations did not exhibit noticeable visual or odor impacts or pronounced stratigraphic alteration.

Core samples revealed that the site study area is underlain by a non-native rock and fill zone of 1 to 2 feet deep and beneath the non-native materials are native silt loams and gravelly clays. The strata below the native loams and gravelly clays include silty clays with limestone-rock inclusions. The alternating gravelly clay and silty clay sequence is unsaturated down to the intermittent zone immediately above first encountered groundwater. All deep borings penetrated groundwater at a range between 9 and 10 feet bgs. The field findings of this investigation are summarized in the geologic cross section presented as Figure 4. As shown, the uppermost strata are unsaturated or considered the vadose zone across the site. Immediately below the vadose zone is the transitional zone referred to as the intermittent zone or capillary fringe with semi-saturated to moist sediments due to a fluctuating groundwater table surface. The transmissive zone or first encountered groundwater consists of grey to buff silty clays and sands with weathered bedrock inclusions. Below the saturated zone was bedrock, the lowermost stratum unit investigated during this study.

A total of nine soil samples were submitted for laboratory chemical analyses. The highest PID and/or field evidence of impacts (per the scope of work) soil samples were analyzed. For each boring, the highest PID was the shallow-most native soil sample except B-1 at seven feet; B-4 at seven feet, and B-6 at seven feet. Thus, only one soil sample for B-2, B-3, B-5, and B-6 were submitted for analyses. All nine soil samples were analyzed for the full suite of lab analyses noted in Section 2.3.

The following table depicts the soil analytical results for the respective chemical analytes. All concentrations listed are in mg/kg or ppm. For metals, analytes are listed for those constituents that exhibit concentrations greater than MDNR CALM Tier 1 cleanup levels for direct exposures (i.e., human exposures via ingestion, inhalation, and dermal contact) at industrial sites.

Table 1 Summary of Lab Analyses for Soils

Soil Sample	TPH-DRO	VOCs	Pesticides	PCBs	Metals
B-1-3	29.0	ND	ND	ND	None>Tier 1
B-1-7	59.0	ND	ND	ND	None>Tier 1
B-2-3	3.3	ND	ND	ND	None>Tier 1
B-3-4	250.0	ND	ND	ND	None>Tier 1
B-4-3	3.8	ND	ND	ND	None>Tier 1
B-4-7	5.9	ND	ND	ND	Arsenic 23.0
B-5-4	ND	ND	ND	ND	None>Tier 1
B-6-3	3.5	ND	ND	ND	None>Tier 1
B-6-7	12.0	ND	ND	ND	None>Tier 1

ND=non-detect concentration

The majority of detected concentrations of metals are extremely low. According to published (USGS) "background" concentration ranges for the detected metal arsenic, the results may be considered within normal "background" ranges for this region. The detected concentrations of TPH are discussed with respect to regulatory criteria below in Section 3.4.

Based on the soil analytical results there are no imminent concerns that warrant a threat or risk to human health or the environment based on the laboratory data for soil samples. The lack of chemicals detected is likely due to the impervious cover that overlies the entire site.

3.2 Groundwater

Representative groundwater samples were collected from the temporary well at locations B-1, B-2, B-3, and B-4. These sample locations exhibited moderate flowing groundwater conditions for sample retrieval. Location B-5 and B-6 encountered refusal prior to sufficient saturated conditions for groundwater sampling. Both B-5 and B-6 were located near the northern portion of the site, adjacent to the rock outcrop. Therefore, B-5 and B-6 were situated at upgradient locations relative to B-1 through B-4 locations. Because B-1, B-2, B-3, and B-4 were all located at middle- to down-gradient groundwater positions to site structures and suspected chemical source areas, the collected data support the assessment of impacts in groundwater and any potential migration from upgradient areas of concern.

There were four (4) groundwater samples submitted for laboratory analysis: B1-GW, B2-GW, B3-GW, and B4-GW. All four samples were analyzed for the full suite of chemicals referenced above for soils, except B3-GW. The B3-GW sample was only analyzed for pesticides and VOCs due to insufficient sample volume in the temporary well. Pesticides and VOCs were selected for this sample location because it was situated in the 'crotch' area of the "L'-shaped grain elevator complex.

The following table depicts the groundwater analytical results for the respective chemical analytes. All concentrations listed are in mg/L or ppm. For metals, analytes are listed for those constituents that exhibit concentrations greater than MDNR CALM Tier 1 (or MCLs) cleanup levels for industrial sites.

Table 2 Summary of Lab Analyses for Groundwater

Groundwater Sample	TPH-DRO	VOCs	Pesticides	PCBs	Metals
B1-GW	2.5	ND	ND	ND	Arsenic 0.016
B2-GW	ND	Naphthalene 0.033	ND	ND	ND
B3-GW	NA	ND	ND	NA	NA
B4-GW	ND	ND	ND	ND	Selenium 0.059

ND=non-detect concentration
NA=not analyzed

The detected metals arsenic and selenium concentrations in groundwater are not unusual for shallow groundwater samples collected from non-field filtered samples. Field filtering of groundwater samples is not a standard practice for preliminary investigations. The presence of some metals detected in groundwater is largely due to colloidal metals on suspended sediment. It is highly likely that field filtering of groundwater for metals analyses would result in the complete absence of metals in groundwater for a site such as this. The absence of detected organic constituents (except naphthalene), including the very low levels of TPH in groundwater, indicates the relative lack of chemical impacts to groundwater on this site.

Based on the groundwater analytical results there are no imminent concerns that warrant a threat or risk to human health or the environment based on the laboratory data. The lack of chemicals detected is likely due to the impervious cover that overlies the entire site and potential degradation effects of subsurface materials on any non-native organic substances, if any, that may have been released to groundwater in the past.

3.3 Quality Control

Quality control (QC) was maintained in the field by adhering to the field procedures outlined in the Work Plan, by properly and fully documenting sample information on chain-of-custody forms; by maintaining field logs; and by the analyzed QC samples. The analytical results indicated quality assurance (QA) of the data collected and that proper control was maintained throughout the field procedures. The laboratory performed internal QA/QC procedures such as spikes, duplicates, method and trip blanks. The analytical results were reviewed by the laboratory and deemed appropriate and suitable for their intended use. The laboratory QC analytical data are provided as Appendix C.

3.4 Regulatory Criteria

According to information compiled in the Phase I BERA, this site is not currently subject to enforcement action by, or a consent agreement with an environmental agency. Therefore, no site-specific action levels or cleanup levels are mandated for this site.

In general, the MDNR considers 200 mg/kg (ppm) of TPH to be an appropriate cleanup action level for soils for *residential* sites and leaking underground storage tank sites (LUSTs). The generic TPH cleanup level for groundwater is considered 10.0 mg/L (ppm) by MDNR agencies. The MDNR Tier 1 soil cleanup level for *industrial* sites is 500 ppm. According to MDNR Petroleum Storage Tank section, 90% of LUST sites in Missouri are cleaned up to 200 ppm soil levels for TPH. This site, however, did not have a LUST site of record (BERA Report). The lone TPH concentration of 250.0 ppm in soil sample, B-3-4, therefore, represents the only soil sample analyte on the entire site that warrants further consideration. The absence of significant TPH concentrations (>10.0 ppm) in groundwater also indicates the lack of TPH impacts. If the site remains industrial land use, then no cleanup is warranted for TPH.

The analyte, naphthalene, a semi-volatile organic compound and polycyclic aromatic hydrocarbon (PAH) was detected in the groundwater sample B2-GW at 0.033 ppm. The concentration of naphthalene exceeds the Tier 1 target concentration of 0.02 mg/L. Napthalene is commonly associated with diesel range organics. The absence of TPH-DRO and other common PAH compounds not detected in this sample is suspicious. Therefore, because this site does not contain potable groundwater uses, and there were no confirmatory analytes of similar nature to naphthalene detected, this lone chemical exceedance does not warrant a cleanup action. The dearth of organic substance detections in the subsurface for this site suggests this lone naphthalene detection is a statistical anomaly, or, is an isolated area of impacted groundwater strata at the extreme eastern property boundary.

The RCRA metals are naturally occurring and largely exist at background levels in natural soils when not impacted by industrial activities. The arsenic concentration in B-4-7 is within the average background concentration range for this metal in Kansas City area. Again, this concentration does not constitute a cleanup action unless disturbed or removed. The absence of arsenic in groundwater, at this location immediately below the affected soil zone, suggests that this could be an anomaly or statistical outlier.

Concentrations of metals detected in groundwater samples represent colloidal metals bound to sediment due to non-filtered sample conditions. Although arsenic and selenium concentrations in samples B1-GW and B4-GW, exceed MCLs of 0.01 ppm and 0.05 ppm, respectively, this site groundwater is not subject to potable uses. Therefore, MCL-type criteria do not directly apply for this site.

Groundwater data indicate that detections are either the result of colloidal metals bound to suspended sediment; and/or isolated statistical anomalies. The MDNR defers to EPA maximum contaminant levels (MCLs), used for generic potable residential cleanup scenarios. The site groundwater is non-potable, non-residential, and would likely be considered for Tier 2 industrial risk-based cleanup levels if widespread groundwater impacts were found to warrant a remedial action.

4.0 CONCLUSIONS & RECOMMENDATIONS

This site investigation was conducted on behalf of the KCT for performance of due diligence associated with a potential property transaction for this 3.7-acre tract of land currently owned by Gateway Properties. The site investigation was warranted based on concerns associated with historically recognized environmental conditions (HRECs) identified in the Phase I environmental assessment, dated June 5, 2002. Specifically, this study focused on assessment of soil and groundwater impacts as a result of potential hazardous waste releases associated with known industrial activities and process knowledge information of past operations.

Results of the Phase II LSI indicated the relative absence of chemical impacts in site soils and groundwater. There were no exceedances of VOCs, pesticides, PCBs, TPH, and metals in soils above MDNR CALM Tier 1 generic land use scenario criteria for industrial exposures. There was one sample location with a concentration of TPH greater than generic MDNR UST and residential cleanup criteria. The site groundwater samples indicated isolated and low concentrations of chemicals, arsenic, selenium, and naphthalene above generic Tier 1 MCLs, which are relevant for residential site cleanups.

Collectively, the site data do not pose a risk to human health and environment. The few analyte concentrations detected above generic groundwater cleanup criteria are either statistical outlier anamolies, and/or would be eliminated from further consideration if such data were carried forward for a Tier 2 analysis.

Therefore, TranSystems recommends that no further investigation is warranted for assessment of hazardous substances in subsurface media. However, if discovery of gross contamination is identified at a later date; such as due to future site construction, then special handling and disposal of potentially hazardous waste materials may be required. In the event such a scenario occurs, a general visual assessment of impacted areas be made during the course of construction so that further care and/or action can be determined at that time.

ATTACHMENT 1: Limited Remedial Cost Analysis

A limited remedial cost analysis estimate is provided below. The purpose of the remedial cost estimate is to provide interested parties a demonstration of the potential for cost estimate scenarios based on mathematical forecasts of data collected on the site. This analysis accounts for anticipated activities in the near future for remediation and abatement of known site environmental conditions to meet the contractual obligations of "performance of adequate site remediation" to minimize potential risk and exposure to human health and the environment.

Based on TranSystems' review of BERA and LSI study information the analyses were conducted for each identified environmental medium or substance of concern to present various forecasted cost cleanup scenarios for this site.

- **Asbestos**

As reported in the Phase I BERA report, an historical asbestos containing materials (ACM) survey of the site indicated approximately 14,754 square feet of ACM. A site walk through with certified ACM abatement contractors was conducted to assess present-day ACM quantities and potential costs for removal. During the site walk, it was observed that some ACM had been removed from the site; and, that all ACM was not accounted for in the historical ACM survey. The contractors provided bids for their estimate of ACM abatement. Both bids (Appendix G of BERA) were based on the historical value of 14,754 square feet of ACM. One bid was submitted for $88,468 (or $6.00/sq.ft.); the other bid was submitted for $119,000 (or $8.00/sq.ft). Therefore, TranSystems has assumed the cost of ACM abatement for this analysis to be $7.00/sq. ft.

Based on the footprint of historical building dimensions, and observations that the majority of ACM is/was present in the "old flour mill" building, a more refined cost estimate for ACM abatement can be made using predictive statistics. As shown on the attached GATEWAY1 table, there is a range of potential ACM areal estimates that were used for this analysis. Based on the ACM survey, the majority of ACM was located in the flour mill and boiler room buildings. The attached Figure A-1, depicts the areal footprint of these buildings as approximately 38,798 sq. ft. [Note: the historical buildings footprint was based on a projection of sanborn map information overlain on present day footprint configurations]. Using the survey ACM value of 14,754 sq.ft. in comparison to the historical footprint area as the likely ACM concern area of 38,798 sq.ft., a percentage of about 38% of ACM is assumed to be present for abatement. However, since additional areas were observed to contain ACM not recognized in the survey report, predictive statistics were used to ascertain a most likely cost estimate based on known conditions across the entire site.

A model using monte carlo predictive statistics was conducted for the analysis. The model is based upon a range of potential ACM estimates that might require abatement. In general, the model uses mathematical assumptions of ACM present from potential footprint areas adjusted by the 38% value. The model then forecasts an output mean based on the range of assumptions used. The statistical average of the predictive model, therefore, should be close to the original estimated 14,754 square foot area, but is refined based on site observations (such as additional ACM areas not previously surveyed) and known conditions (such as due to some ACM removal).

The predictive statistics results indicate the average, or mean, value of ACM was 10,852 square feet. This value was derived after 5,000 trials in the model simulation. This value of 10,852 sq. ft., therefore, is considered the "most likely" scenario of ACM present at the site for abatement. The cost analysis of ACM abatement is below:

- Most Likely Cost for ACM Abatement: 10,852 sq. ft. at $7.00/sq.ft, or $\boxed{\$75,964}$
- Worst Case Cost for ACM Abatement: 14,754 sq. ft. at $7.00/sq.ft., or $\boxed{\$103,278}$

- **Soils**

As discussed in Section 3.4 of the LSI report, the sample location B-3-4 had a TPH concentration of 250 ppm that exceeds generic MDNR UST and residential cleanup criteria. This sample location concentration is below industrial cleanup criteria and, as such, does not warrant cleanup at this time. Nevertheless, it is possible that this soil sample is an edge of a TPH "hot-spot" area. The sample, located at 4 feet bgs in the 'crotch' of the "L"-shaped grain elevator complex may be the edge of an impacted area beneath existing buildings that was not investigated in the LSI. For estimating potential future cost scenarios for this condition, we assumed that shallower, upgradient soils to B-3-4 may be encountered at concentrations greater than 500 ppm. The scenario is founded on the assumption that the shallow soils beneath the "L"-shaped grain elevator complex and/or the maintenance bulk room building area might be the chemical source area(s) to this edge of an interpolated TPH "hot-spot".

It is important to note, however, that due to the known conditions of the absence of chemicals present in vertical soils across the site, and the widespread absence of TPH impacts in groundwater, that vertical migration of TPH is unlikely if this sample location is considered the edge of a hot-spot. Thus, the assumption that shallow soils beneath potential source areas such as the "L"-shaped elevator complex and/or the bulk maintenance room may be impacted above the industrial cleanup criterion of 500 ppm TPH were the only conditions carried forward for soil remediation cost analysis at this time.

As shown on Figure A-1, the "L"-shaped grain elevator complex footprint is 17,951 square feet. Assuming shallow-only soils, less than 2 feet below elevator base, are impacted beneath this assumed source area, then the estimated total volume of potentially impacted soils is 35,902 cubic feet (or 1,330 cubic yards). Similarly, if the maintenance bulk room is the assumed source area, then the estimated total volume of potentially impacted soils is 1,616 cubic feet (60 cubic yards). Therefore, the following cost estimates are derived based on the above assumed conditions:

- Best Case Cost Estimate for TPH in Soils Cleanup: $\boxed{\$0.00}$ (at present, no cleanup is warranted).
- Most Likely Cost Estimate for TPH in Soils Cleanup: 60 cu yd (1.6 in-situ/ton), or 96 tons at $30.00/ton (transportation and disposal), or $\boxed{\$2,880}$.
- Worst Case Cost Estimate for TPH in Soils Cleanup: 1,330 cu. yd (1.6 in-situ/ton), or 2,128 tons at $30.00/ton (T&D), or $\boxed{\$63,840}$.

45965	17467	*Most Likely Scenario*	*INput*
38798	14754		
35663	13552	Mean	11226.19
10000	3800	Standard Error	1408.943
15000	5700	Median	12350
20000	7600	Mode	#N/A
25000	9500	Standard Deviation	4455.469
30000	11400	Variance	19851205
35000	13300	Kurtosis	-0.94838
40000	15200	Skewness	-0.40881
		Range	13666.7
sqft	0.38	Minimum	3800
		Maximum	17466.7
		Sum	112261.9
		Count	10

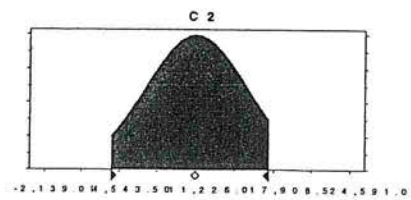
Assumption: C2

Normal distribution with parameters:

Mean	11,226.00
Standard Dev.	4,455.00

Selected range is from 3,800.00 to 17,467.00
Mean value in simulation was 11,003.67

Cell: C2

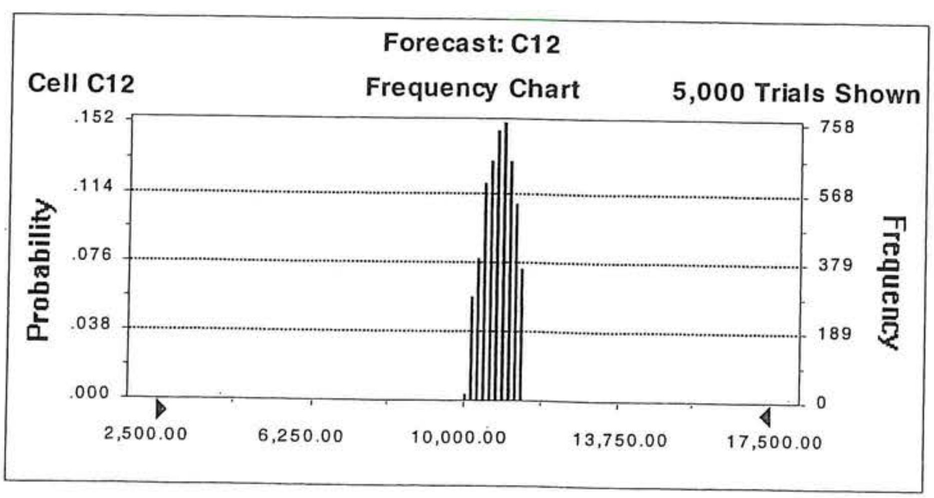


Forecast: C12

Cell: C12

Summary:
Display Range is from 2,500.00 to 17,500.00
Entire Range is from 10,132.13 to 11,498.36
After 5,000 Trials, the Std. Error of the Mean is 4.78

Statistics for Display Range:	Value
Trials	5000
Mean	10,852.27
Median (approx.)	10,862.96
Mode (approx.)	10,975.00
Standard Deviation	337.67
Variance	114,020.86
Skewness	-0.10
Kurtosis	2.12
Coeff. of Variability	0.03
Range Minimum	2,500.00
Range Maximum	17,500.00
Range Width	15,000.00
Mean Std. Error	4.78



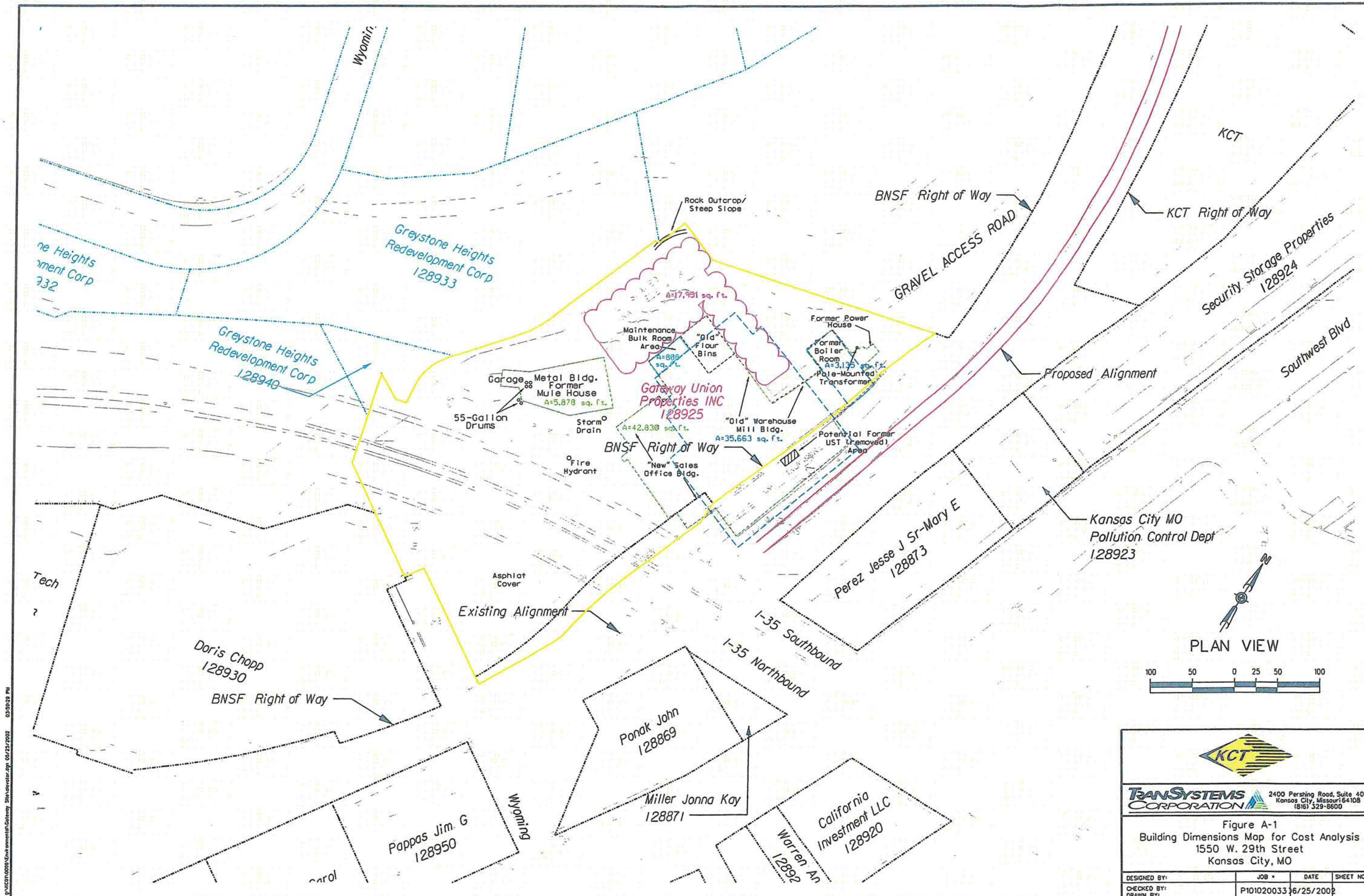


Figure A-1
Building Dimensions Map for Cost Analysis
1550 W. 29th Street
Kansas City, MO

FIGURES

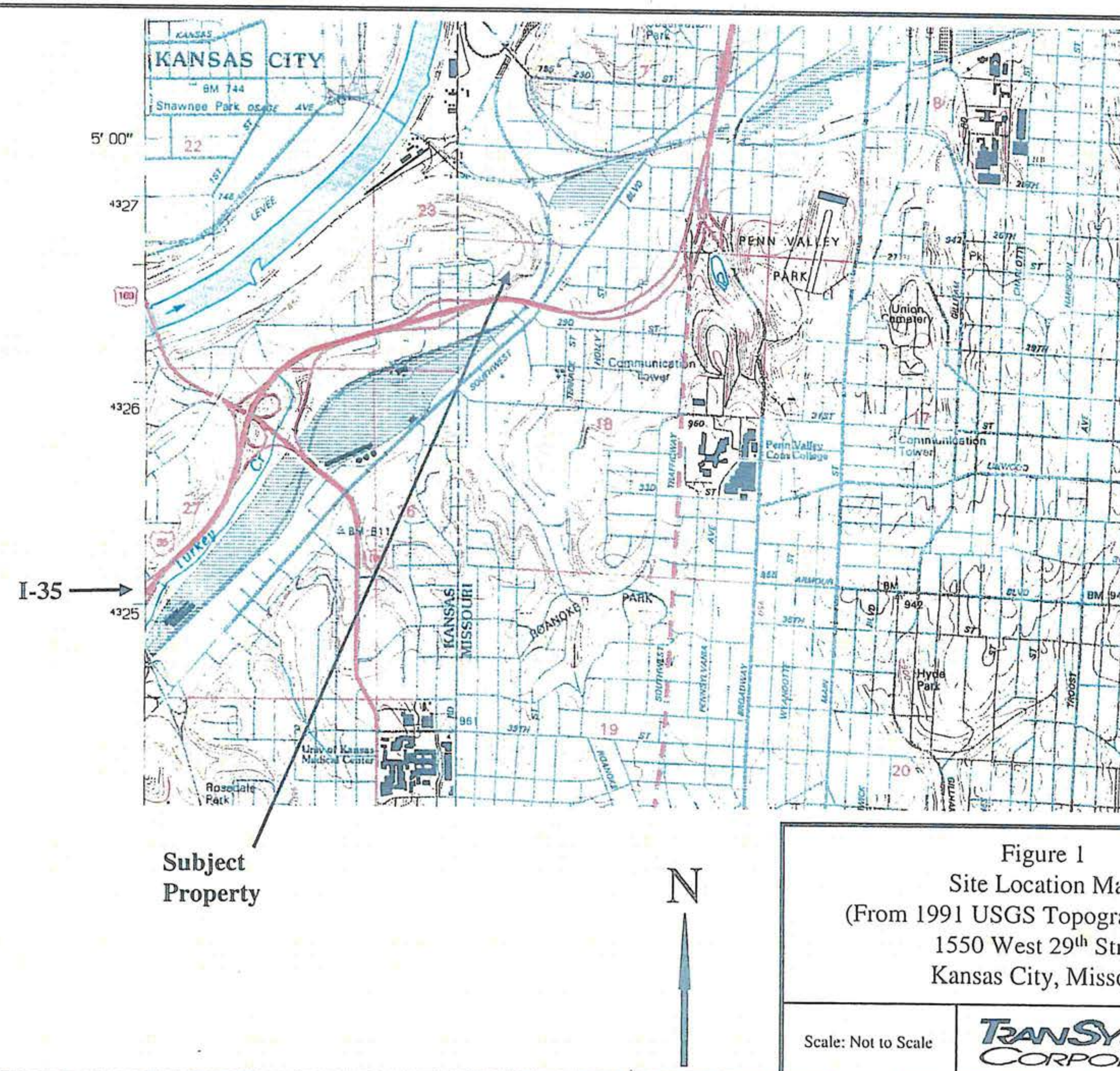
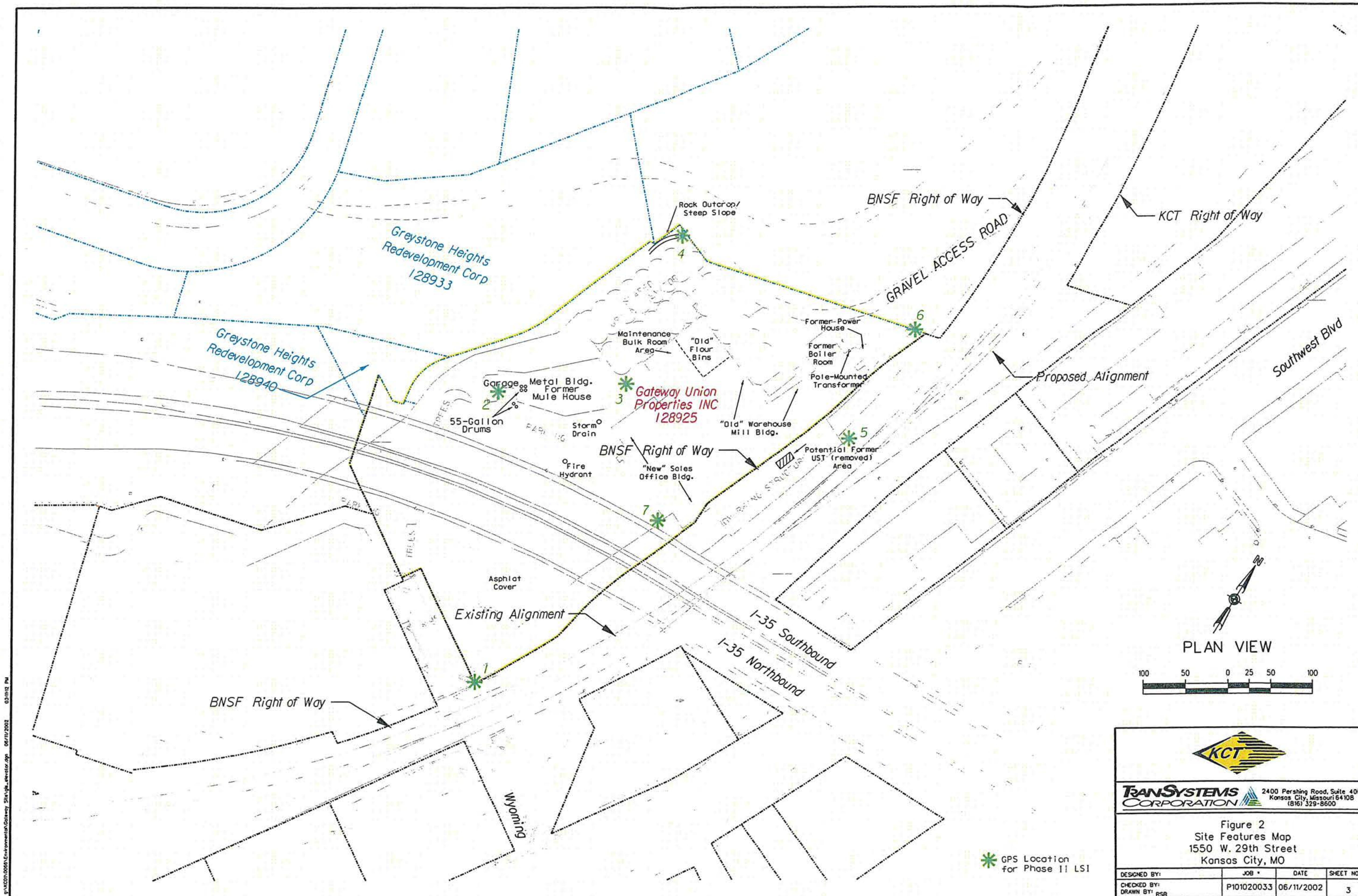


Figure 1
Site Location Map
(From 1991 USGS Topographic Quad)
1550 West 29th Street
Kansas City, Missouri

Scale: Not to Scale

TRANSYSTEMS CORPORATION



Greystone Heights Redevelopment Corp 128933
Greystone Heights Redevelopment Corp 128940
Rock Outcrop/ Steep Slope
BNSF Right of Way
KCT Right of Way
GRAVEL ACCESS ROAD
Southwest Blvd
Proposed Alignment
Former Power House
Former Boiler Room
Pole-Mounted Transformer
Maintenance Bulk Room Area
"Old" Flour Bins
Garage
Metal Bldg. Former Mule House
55-Gallon Drums
Gateway Union Properties INC 128925
Storm Drain
"Old" Warehouse Mill Bldg.
Fire Hydrant
"New" Sales Office Bldg.
Potential Former UST (removed) Area
Asphalt Cover
Existing Alignment
I-35 Southbound
I-35 Northbound
Wyoming
1
2
3
4
5
6
7
PLAN VIEW
100 50 0 25 50 100
GPS Location for Phase II LSI
KCT
TRANSYSTEMS CORPORATION
2400 Pershing Road, Suite 400 Kansas City, Missouri 64108 (816) 329-8600
Figure 2
Site Features Map
1550 W. 29th Street
Kansas City, MO
DESIGNED BY:
CHECKED BY:
DRAWN BY: RSB
JOB #
P101020033
DATE
06/11/2002
SHEET NO.
3

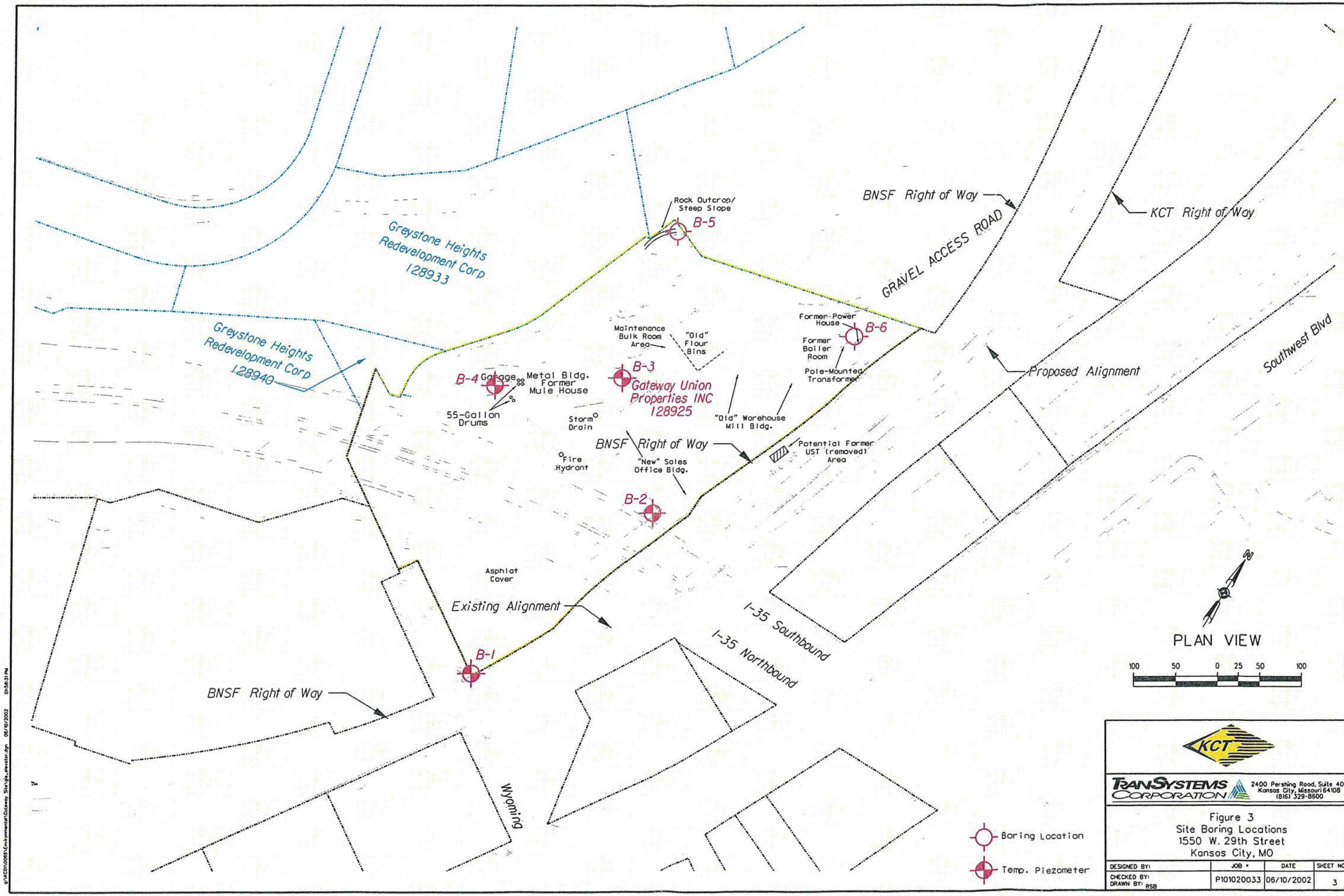
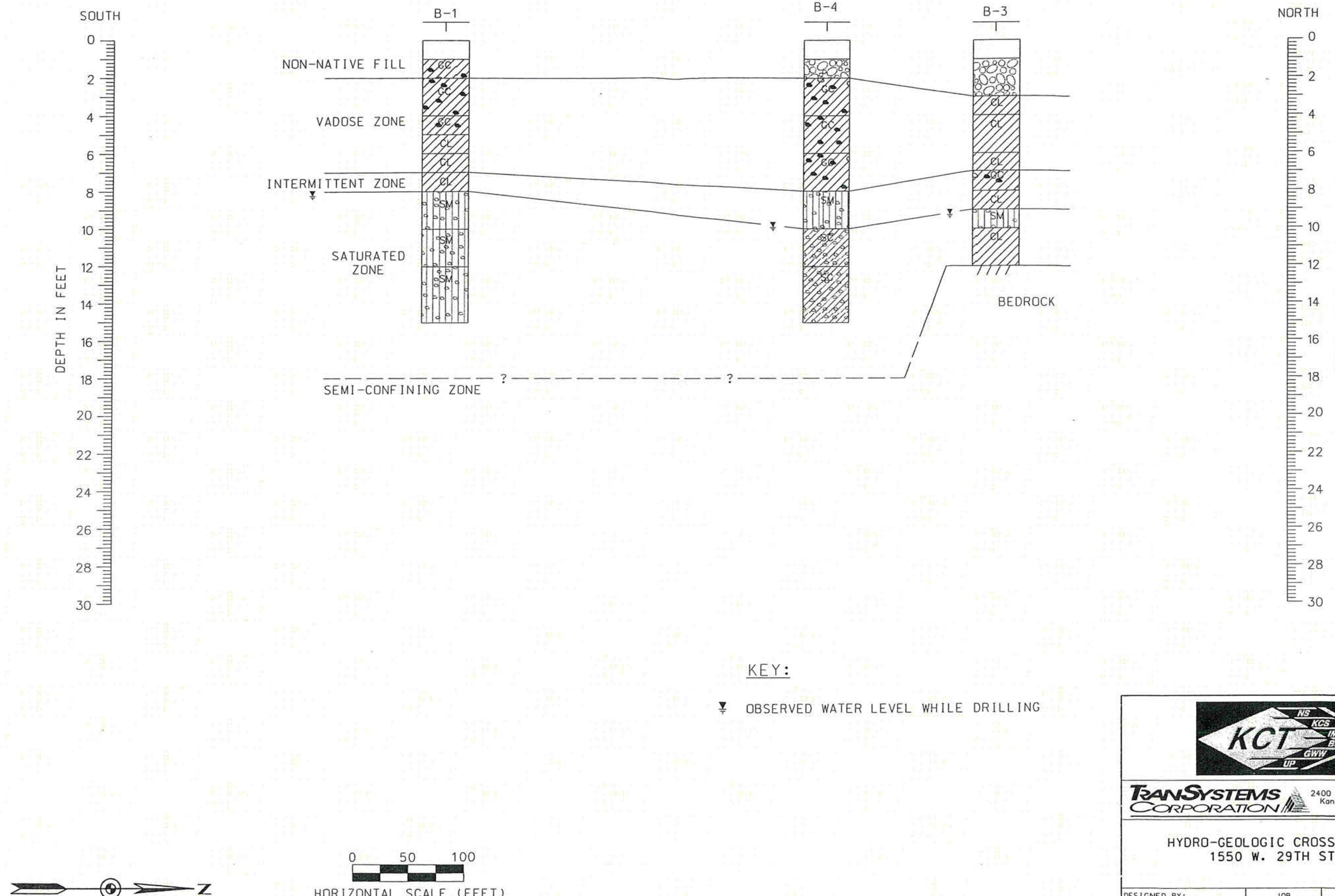


Figure 3
Site Boring Locations
1550 W. 29th Street
Kansas City, MO

DESIGNED BY:	JOB #	DATE	SHEET NO.
CHECKED BY: DRAWN BY: RSB	P101020033	06/10/2002	3



KEY:

OBSERVED WATER LEVEL WHILE DRILLING

TRANSYSTEMS CORPORATION
2400 Pershing Road, Suite 400
Kansas City, Missouri 64108
(816) 329-8600

HYDRO-GEOLOGIC CROSS-SECTION
1550 W. 29TH STREET

DESIGNED BY:	JOB	DATE	FIGURE
CHECKED BY: DRAWN BY:	P101010066	6/13/2002	4

APPENDIX A

GPS Locations
Gateway Properties Inc. Site

Point	Accuracy by Ft.	Decimal Latitude	Decimal Longitude
1	17	39.07578	-94.60403
2	19	39.07702	-94.60422
3	19	39.07692	-94.60383
4	45	39.07745	-94.60375
5	37	39.07697	-94.60282
6	16	39.07730	-94.60270
7	28	39.07667	-94.60357

APPENDIX B

SOIL BORING No.: B-1

CLIENT: KCT
JOB No.: P101020033 DATE: 6/3/02
SITE: 1550 W. 29TH STREET
LOCATION: KANSAS CITY, MO
DRILLING CONTRACTOR: PSA ENVIRONMENTAL
BOREHOLE DIAMETER: 2" MONITOR WELL DIAMETER: ¾"
DRILLING METHOD: GEOPROBE
FIELD REPRESENTATIVE: JOHN LARSON
RIG TYPE:
PAGE:
ELEVATION (T.O.C.):
NOTE:
GROUNDWATER ELEVATION

DEPTH IN FEET	GRAPHIC LOG	WELL COMPLETION	SAMPLING METHOD	INCHES DRIVEN / INCHES RECOVERED	BLOW COUNT PER 6-INCH	PID HEADSPACE (ppm)	USCS SYMBOL	LITHOLOGIC DESCRIPTION
0–1		5' BPVC						NO RECOVERY
1–2		5' BPVC					GC	ROCK/ASPHALT BECOMES GREY SOFT CLAY WITH ROCK
2–4		5' BPVC				4.9	GC	GREY CLAY WITH ROCK CHIPS, BECOMES BROWN SILT LOAM (NATIVE), CRUMBLY TO FINE GRAINED SOFT
4–5		5' BPVC					GC	GREY-BROWN SILT CLAY LOAM MINOR ROCK
5–6		SCR				14.8	CL	(2" SEAM) OF RED BRICK BECOMES BLACK SOFT-WET CLAY, SLIGHT DIESEL ODOR
6–7		SCR					CL	BLACK-GREY SOFT-PLASTIC CLAY, MINOR ODOR
7–8		SCR				46.5	CL	GREY-BLACK SOFT PLASTIC CLAY, MINOR-DULL ODOR
8–10		SCR ▽				4.6	SM	GREY-BLACK SOFT BECOMES WET SILT CLAY AT 9' DULL ODOR
10–12		SCR				0.2	SM	WET THRU-OUT, SOFT SILTY CLAY, NO ODOR
12–15		SCR, BC				0.0	SM	WET THRU-OUT SOFT BLACK SILTY CLAY, MODERATE FLOW
15								TD AT 15' BGS. INSTALLED ¾" TEMP. WELL

KEY:

ST	SHELBY TUBE
SS	SPLIT SPOON
ND	NOT DETECTED
BGS	BELOW GROUND SURFACE
FA	FLIGHT AUGER

WELL COMPLETION KEY:

BCG	BENTONITE/CEMENT GROUT	FS	FILTER SAND
BS	BENTONITE SEAL	BPVC	BLANK PVC CASING
FP	FILTER PACK	BH	BORE HOLE
SCR	SCREEN, 0.010" SLOTTED PVC CASING, 2" DIA.	SP	SAND PACK
BC	BOTTOM CAP	GS	GROUT SLURRY

TRANSYSTEMS CORPORATION
4600 Madison Avenue, Suite 500
Kansas City, Missouri 64112
(816) 561-9800

SOIL BORING No.: B-2

CLIENT: KCT	JOB No.: P101020033 DATE: 6/3/02
SITE: 1550 W. 29TH STREET	LOCATION: KANSAS CITY, MO
DRILLING CONTRACTOR: PSA ENVIRONMENTAL	BOREHOLE DIAMETER: 2" MONITOR WELL DIAMETER: 3/4"
DRILLING METHOD: GEOPROBE	FIELD REPRESENTATIVE: JOHN LARSON
RIG TYPE:	PAGE:
ELEVATION (T.O.C.):	NOTE:
GROUNDWATER ELEVATION	

DEPTH IN FEET	GRAPHIC LOG	WELL COMPLETION	SAMPLING METHOD	INCHES DRIVEN / INCHES RECOVERED	BLOW COUNT PER 6-INCH	PID HEADSPACE (ppm)	USCS SYMBOL	LITHOLOGIC DESCRIPTION
0–0.5								NO RECOVERY
0.5–2								GREY ROCK GRAVEL NON-NATIVE WITH RED BRICK SEAM
2–4		5' BPVC				3.4	CL	CRUMBLY TO LAMINATED GREY-BLACK CLAY, MINOR SILT, NO ODOR, 3' - 4' BECOMES GREY-GREEN CLAY (SOME MOTTLING?)
4–6						2.8	SM	GREY-BROWN SILTY CLAY WITH MUCH IRON OXIDE & MOTTLING THROUGHOUT
6–8						2.5	CL	AT 6' GRADES TO BLACK GREY GREEN FAT PLASTIC CLAY WITH MINOR SILT 7' - 8' BECOMES BLACK-GREY "FAT DENSE CLAY"
8–10		SCR ▽				2.4	SM	8' - 9' WET BROWN-GREY SILTY CLAY, MINOR FINE-MEDIUM GRAINED SAND AT 8.5' DULL-FAINT ODOR
10–12						2.1	CL	WET BECOMES MOIST GREY-GREEN PLASTIC CLAY LOW FLOW
12–15		BC					CL	EXTEND 3' FOR SATURATED CONDITIONS
15								TD AT 15' BGS. INSTALLED 3/4" TEMP. WELL

KEY:

ST	SHELBY TUBE
SS	SPLIT SPOON
ND	NOT DETECTED
BGS	BELOW GROUND SURFACE
FA	FLIGHT AUGER

WELL COMPLETION KEY:

BCG	BENTONITE/CEMENT GROUT	FS	FILTER SAND
BS	BENTONITE SEAL	BPVC	BLANK PVC CASING
FP	FILTER PACK	BH	BORE HOLE
SCR	SCREEN, 0.010" SLOTTED PVC CASING, 2" DIA.	SP	SAND PACK
BC	BOTTOM CAP	GS	GROUT SLURRY

TRANSYSTEMS CORPORATION
4600 Madison Avenue, Suite 500
Kansas City, Missouri 64112
(816) 561-9800

SOIL BORING No.: B-3

CLIENT: KCT

SITE: 1550 W. 29TH STREET

DRILLING CONTRACTOR: PSA ENVIRONMENTAL

DRILLING METHOD: GEOPROBE

RIG TYPE:

ELEVATION (T.O.C.):

GROUNDWATER ELEVATION

JOB No.: P101020033 DATE: 6/3/02

LOCATION: KANSAS CITY, MO

BOREHOLE DIAMETER: 2" MONITOR WELL DIAMETER: 3/4"

FIELD REPRESENTATIVE: JOHN LARSON

PAGE:

NOTE:

DEPTH IN FEET	GRAPHIC LOG	WELL COMPLETION	SAMPLING METHOD	INCHES DRIVEN / INCHES RECOVERED	BLOW COUNT PER 6-INCH	PID HEADSPACE (ppm)	USCS SYMBOL	LITHOLOGIC DESCRIPTION
0–1								NO RECOVERY
2		5' BPVC						NON-NATIVE ROCK & ASPHALT
4						2.3	CL	BECOMES NATIVE GREY-GREEN CLAY; MUCH GREEN CLAY (ALTERED?) THROUGHOUT, MANY INCLUSIONS OF ROCK & LARGE PEBBLES, MINOR ODOR
							CL	BROWN SILTY CLAY MINOR ROCK INCLUSIONS NO ODOR
6						2.3	CL	DARK BROWN LESS SILTY CLAY WITH MOTTLING BECOMES PLASTIC SILTY CLAY WITH ROCK (NATIVE)
							GC	INCLUSIONS THROUGHOUT, NO ODOR
8						2.1	CL	BROWN DENSE "FAT" CLAY
		SCR ▼					SM	6" WET BUFF SILTY SAND (LOW FLOW) NO ODOR
10						1.7	CL	GRADES TO DENSE HARD BROWN CLAY
12		BC				1.8		BEDROCK REFUSAL AT 12'
								TD AT 12' BGS. INSTALLED 3/4" TEMP. WELL

KEY:

ST	SHELBY TUBE
SS	SPLIT SPOON
ND	NOT DETECTED
BGS	BELOW GROUND SURFACE
FA	FLIGHT AUGER

WELL COMPLETION KEY:

BCG	BENTONITE/CEMENT GROUT	FS	FILTER SAND
BS	BENTONITE SEAL	BPVC	BLANK PVC CASING
FP	FILTER PACK	BH	BORE HOLE
SCR	SCREEN, 0.010" SLOTTED PVC CASING, 2" DIA.	SP	SAND PACK
BC	BOTTOM CAP	GS	GROUT SLURRY

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Kansas City, Missouri 64112
(816) 561-9800

SOIL BORING No.: B-4

CLIENT: KCT

SITE: 1550 W. 29TH STREET

DRILLING CONTRACTOR: PSA ENVIRONMENTAL

DRILLING METHOD: GEOPROBE

RIG TYPE:

ELEVATION (T.O.C.):

GROUNDWATER ELEVATION

JOB No.: P101020033 DATE: 6/3/02

LOCATION: KANSAS CITY, MO

BOREHOLE DIAMETER: 2" MONITOR WELL DIAMETER: 3/4"

FIELD REPRESENTATIVE: JOHN LARSON

PAGE:

NOTE:

DEPTH IN FEET	GRAPHIC LOG	WELL COMPLETION	SAMPLING METHOD	INCHES DRIVEN / INCHES RECOVERED	BLOW COUNT PER 6-INCH	PID HEADSPACE (ppm)	USCS SYMBOL	LITHOLOGIC DESCRIPTION
0–1		5' BPVC						NO RECOVERY
1–2								NON-NATIVE ROCK & FILL
2–4						3.7	GC	BUFF-GREY SILT LOAM AND GRAVELLY CLAY, MUCH IRON OXIDE WITH ABUNDANT ROCK CHIPS THROUGHOUT MINOR ODOR AT BLACK SEAM 3'
4–6		SCR				2.1	GC	BUFF-GREY ROCK IN CLAY MATRIX BECOMES CRUMBLY DRY ROCK, MINOR CLAY WITH COAL SEAM AT 6.5', NO ODOR
6–8						4.2	GC	GRAVELLY CLAY ROCK GRADES TO SOFT SILTY CLAY 50%/50% TAN-ORANGE, MINOR MOTTLING AT BASE, NO ODOR
8–10		▼				2.1	SM	75% SILT CLAY BECOMES MOIST BROWN SILT SAND MINOR <10% CLAY AT 9'
10–12						1.9	SC	WET FLOWING BROWN MEDIUM GRAINED SAND WITH INCLUSIONS ROCK
12–15		BC					SC	EXTEND 3' INTO WETSAND WITH WEATHERED BEDROCK
15								TD AT 15' BGS. INSTALLED 3/4" TEMP. WELL

KEY:

ST	SHELBY TUBE
SS	SPLIT SPOON
ND	NOT DETECTED
BGS	BELOW GROUND SURFACE
FA	FLIGHT AUGER

WELL COMPLETION KEY:

BCG	BENTONITE/CEMENT GROUT	FS	FILTER SAND
BS	BENTONITE SEAL	BPVC	BLANK PVC CASING
FP	FILTER PACK	BH	BORE HOLE
SCR	SCREEN, 0.010" SLOTTED PVC CASING, 2" DIA.	SP	SAND PACK
BC	BOTTOM CAP	GS	GROUT SLURRY

TRANSYSTEMS CORPORATION
4600 Madison Avenue, Suite 500
Kansas City, Missouri 64112
(816) 561-9800

SOIL BORING No.: B-5

CLIENT: KCT

SITE: 1550 W. 29TH STREET

DRILLING CONTRACTOR: PSA ENVIRONMENTAL

DRILLING METHOD: GEOPROBE

RIG TYPE:

ELEVATION (T.O.C.):

GROUNDWATER ELEVATION

JOB No.: P101020033 DATE: 6/3/02

LOCATION: KANSAS CITY, MO

BOREHOLE DIAMETER: 2" MONITOR WELL DIAMETER:

FIELD REPRESENTATIVE: JOHN LARSON

PAGE:

NOTE:

DEPTH IN FEET	GRAPHIC LOG	WELL COMPLETION	SAMPLING METHOD	INCHES DRIVEN / INCHES RECOVERED	BLOW COUNT PER 6-INCH	PID HEADSPACE (ppm)	USCS SYMBOL	LITHOLOGIC DESCRIPTION
								NO RECOVERY
2						2.1	LS	MOSTLY WHITE-BUFF HARD CRUMBLY BEDROCK NO ODOR
4						2.1	LS	BUFF-WHITE HARD CRUMBLY BEDROCK, MUCH ROCK BECOMES DENSE CHIPS/ROCK AT BASE
6							////	TD AT 6' BGS. REFUSAL, HARD DRILLING THROUGHOUT BORING
8								
10								
12								
14								
16								
18								
20								
22								
24								
26								
28								

KEY:

ST	SHELBY TUBE
SS	SPLIT SPOON
ND	NOT DETECTED
BGS	BELOW GROUND SURFACE
FA	FLIGHT AUGER

WELL COMPLETION KEY:

BCG	BENTONITE/CEMENT GROUT	FS	FILTER SAND
BS	BENTONITE SEAL	BPVC	BLANK PVC CASING
FP	FILTER PACK	BH	BORE HOLE
SCR	SCREEN, 0.010" SLOTTED PVC CASING, 2" DIA.	SP	SAND PACK
BC	BOTTOM CAP	GS	GROUT SLURRY

TRANSYSTEMS CORPORATION
4600 Madison Avenue, Suite 500
Kansas City, Missouri 64112
(816) 561-9800

SOIL BORING No.: B-6

CLIENT: KCT	JOB No.: P101020033 DATE: 6/3/02
SITE: 1550 W. 29TH STREET	LOCATION: KANSAS CITY, MO
DRILLING CONTRACTOR: PSA ENVIRONMENTAL	BOREHOLE DIAMETER: 2" MONITOR WELL DIAMETER:
DRILLING METHOD: GEOPROBE	FIELD REPRESENTATIVE: JOHN LARSON
RIG TYPE:	PAGE:
ELEVATION (T.O.C.):	NOTE:
GROUNDWATER ELEVATION	

DEPTH IN FEET	GRAPHIC LOG	WELL COMPLETION	SAMPLING METHOD	INCHES DRIVEN / INCHES RECOVERED	BLOW COUNT PER 6-INCH	PID HEADSPACE (ppm)	USCS SYMBOL	LITHOLOGIC DESCRIPTION
0–2								NO RECOVERY
2–4						0.1	GW	2' - 3' ROCK NON-NATIVE FILL GRADES TO NATIVE BUFF SAND WITH MUCH ROCK, ABUNDANT BLACK INCLUSIONS (ALTERED) WITH MINOR PUNGENT ODOR
4–6						1.0	GC	BUFF-GREY WHITE ROCK WITH SILTY CLAY MATRIX GRADES TO FINE MEDIUM GRADE WELL SORTED SAND SEAM AT 6.5'
6–8						0.6	SM	BECOMES MOIST-WET (NO-FLOW) BROWN-RED SILTY SAND WITH PUNGENT ODOR & BLACK NODULES INCLUSIONS THROUGHOUT
8–9							LS	8' - 9' DRY HARD ROCK
9							////	TD AT 9' BGS. REFUSAL

KEY:

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WELL COMPLETION KEY:

BCG	BENTONITE/CEMENT GROUT	FS	FILTER SAND
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BC	BOTTOM CAP	GS	GROUT SLURRY

TRANSYSTEMS CORPORATION
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APPENDIX C

SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C2-06056
Received: 04 JUN 02
Reported: 17 JUN 02

Mr. John Larson
Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617
Page 1

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
06056-1	B1-3	06-03-02/08:30
06056-2	B1-7	06-03-02/08:35
06056-3	B2-3	06-03-02/09:10
06056-4	B3-4	06-03-02/09:35
06056-5	B4-3	06-03-02/09:50

PARAMETER	06056-1	06056-2	06056-3	06056-4	06056-5
RCRA Metals (6010B)					
Arsenic, mg/kg dw	8.9	6.7	8.6	5.5	11
Barium, mg/kg dw	97	200	230	110	86
Cadmium, mg/kg dw	1.9	1.2	0.64	0.77	4.0
Chromium, mg/kg dw	16	16	89M2	26	23
Lead, mg/kg dw	22	25	41	13	14
Selenium, mg/kg dw	1.4	<1.0	8.7	<0.99	2.0
Silver, mg/kg dw	<0.50	<0.51	<0.54	<0.49	<0.55
Dilution Factor	1	1	1	1	1
Prep Date	06.05.02	06.05.02	06.05.02	06.05.02	06.05.02
Analysis Date	06.05.02	06.05.02	06.05.02	06.05.02	06.05.02
Batch ID	PS107	PS107	PS107	PS107	PS107
Prep Method	3050B	3050B	3050B	3050B	3050B
Analyst	GSP	GSP	GSP	GSP	GSP
Mercury (7471A), mg/kg dw	0.19	0.055	0.060	0.068	0.20
Dilution Factor	1	1	1	1	1
Prep Date	06.05.02	06.05.02	06.05.02	06.05.02	06.05.02
Analysis Date	06.05.02	06.05.02	06.05.02	06.05.02	06.05.02
Batch ID	HGS034	HGS034	HGS034	HGS034	HGS034
Prep Method	7471A	7471A	7471A	7471A	7471A
Analyst	JDE	JDE	JDE	JDE	JDE
Quantitation Factor	1	1	1	1	1

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06056-2	B1-7	06-03-02/08:35
06056-3	B2-3	06-03-02/09:10
06056-4	B3-4	06-03-02/09:35
06056-5	B4-3	06-03-02/09:50

PARAMETER	06056-1	06056-2	06056-3	06056-4	06056-5
Extractable Petroleum Hydrocarbons (DRO) (OA-2)					
Hydrocarbons as DRO, mg/kg dw	29	59	3.3	250	3.8
Surrogate - o-Terphenyl	98 %	D	74 %	D	82 %
Dilution Factor	1	2	1	2	1
Prep Date	06.05.02	06.05.02	06.05.02	06.05.02	06.05.02
Analysis Date	06.06.02	06.06.02	06.06.02	06.06.02	06.06.02
Batch ID	FPS133	FPS133	FPS133	FPS133	FPS133
Prep Method	3550B	3550B	3550B	3550B	3550B
Analyst	KA	KA	KA	KA	KA
Quantitation Factor	1	2	1	2	1

SEVERN TRENT SERVICES

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06056-2	B1-7	06-03-02/08:35
06056-3	B2-3	06-03-02/09:10
06056-4	B3-4	06-03-02/09:35
06056-5	B4-3	06-03-02/09:50

PARAMETER	06056-1	06056-2	06056-3	06056-4	06056-5
Chlorinated Pesticides (8081A)					
Aldrin, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
alpha-BHC, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
beta-BHC, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
gamma-BHC (Lindane), ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
delta-BHC, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
alpha-Chlordane, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
gamma-Chlordane, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
4,4'-DDD, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
4,4'-DDE, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
4,4'-DDT, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
Dieldrin, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
Endosulfan I, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
Endosulfan II, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
Endosulfan sulfate, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
Endrin, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
Endrin aldehyde, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
Endrin ketone, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
Heptachlor, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
Heptachlor epoxide, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
Methoxychlor, ug/kg dw	<17	<1.7	<1.7	<1.7	<1.7
Toxaphene, ug/kg dw	<1000	<100	<100	<100	<100

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Mr. John Larson
Trans Systems
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Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
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06056-2	B1-7	06-03-02/08:35
06056-3	B2-3	06-03-02/09:10
06056-4	B3-4	06-03-02/09:35
06056-5	B4-3	06-03-02/09:50

PARAMETER	06056-1	06056-2	06056-3	06056-4	06056-5
Dilution Factor	10	1	1	1	1
Prep Date	06.06.02	06.06.02	06.06.02	06.06.02	06.06.02
Analysis Date	06.06.02	06.06.02	06.06.02	06.06.02	06.06.02
Batch ID	PSS085	PSS085	PSS085	PSS085	PSS085
Prep Method	3550B	3550B	3550B	3550B	3550B
Analyst	KA	KA	KA	KA	KA
Quantitation Factor	12	1.3	1.2	1.1	1.2
Polychlorinated Biphenyls (PCBs) (8082)					
Aroclor-1016, ug/kg dw	<17	<17	<17	<17	<17
Aroclor-1221, ug/kg dw	<17	<17	<17	<17	<17
Aroclor-1232, ug/kg dw	<17	<17	<17	<17	<17
Aroclor-1242, ug/kg dw	<17	<17	<17	<17	<17
Aroclor-1248, ug/kg dw	<17	<17	<17	<17	<17
Aroclor-1254, ug/kg dw	<17	<17	<17	<17	<17
Aroclor-1260, ug/kg dw	<17	<17	<17	<17	<17
Dilution Factor	1	1	1	1	1
Prep Date	06.06.02	06.06.02	06.06.02	06.06.02	06.06.02
Analysis Date	06.06.02	06.06.02	06.06.02	06.06.02	06.06.02
Batch ID	PSS085	PSS085	PSS085	PSS085	PSS085
Prep Method	3550B	3550B	3550B	3550B	3550B
Analyst	KA	KA	KA	KA	KA
Quantitation Factor	1.2	1.3	1.2	1.1	1.2

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06056-4	B3-4	06-03-02/09:35
06056-5	B4-3	06-03-02/09:50

PARAMETER	06056-1	06056-2	06056-3	06056-4	06056-5
Volatile Organic Compounds (8260B)					
Benzene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Bromobenzene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Bromochloromethane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Bromodichloromethane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Bromoform, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Bromomethane (Methyl bromide), ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Carbon tetrachloride, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Chlorobenzene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Chloroethane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Chloroform, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Chloromethane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
2-Chlorotoluene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
4-Chlorotoluene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Dibromochloromethane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Dibromomethane (Methylene bromide), ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,2-Dibromoethane (EDB), ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,2-Dichlorobenzene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,3-Dichlorobenzene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,4-Dichlorobenzene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9

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06056-2	B1-7	06-03-02/08:35
06056-3	B2-3	06-03-02/09:10
06056-4	B3-4	06-03-02/09:35
06056-5	B4-3	06-03-02/09:50

PARAMETER	06056-1	06056-2	06056-3	06056-4	06056-5
Dichlorodifluoromethane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,1-Dichloroethane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,2-Dichloroethane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,1-Dichloroethene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
cis-1,2-Dichloroethene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
trans-1,2-Dichloroethene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,2-Dichloropropane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,3-Dichloropropane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
2,2 Dichloropropane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
cis-1,3-Dichloropropene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
trans-1,3-Dichloropropene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Ethylbenzene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Hexachlorobutadiene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Isopropylbenzene (Cumene), ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
p-Isopropyltoluene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Methylene chloride (Dichloromethane), ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Methyl t-butyl ether (MTBE), ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Naphthalene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9

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06056-3	B2-3	06-03-02/09:10
06056-4	B3-4	06-03-02/09:35
06056-5	B4-3	06-03-02/09:50

PARAMETER	06056-1	06056-2	06056-3	06056-4	06056-5
n-Butylbenzene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
n-Propylbenzene , ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
sec-Butylbenzene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Styrene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
t-Butylbenzene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,1,1,2-Tetrachloroethane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,1,2,2-Tetrachloroethane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Tetrachloroethene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Toluene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,1,1-Trichloroethane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,1,2-Trichloroethane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,2,3-Trichlorobenzene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,2,4-Trichlorobenzene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Trichloroethene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Trichlorofluoromethane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,2,3-Trichloropropane, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,2,4-Trimethylbenzene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
1,3,5-Trimethylbenzene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
Vinyl chloride, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9
o-Xylene, ug/kg dw	<5.9	<6.4	<6.1	<5.7	<5.9

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06056-4	B3-4	06-03-02/09:35
06056-5	B4-3	06-03-02/09:50

PARAMETER	06056-1	06056-2	06056-3	06056-4	06056-5
mp-Xylene, ug/kg dw	<12	<13	<12	<11	<12
Surrogate - Dibromofluoromethane	97 %	96 %	97 %	96 %	95 %
Surrogate - Toluene-d8	103 %	102 %	102 %	102 %	101 %
Surrogate - 4-Bromofluorobenzene	103 %	100 %	102 %	102 %	98 %
Dilution Factor	1	1	1	1	1
Prep Date	06.05.02	06.05.02	06.05.02	06.05.02	06.05.02
Analysis Date	06.05.02	06.05.02	06.05.02	06.05.02	06.05.02
Batch ID	KAS104	KAS104	KAS104	KAS104	KAS104
Prep Method	5030B	5030B	5030B	5030B	5030B
Analyst	DWB	DWB	DWB	DWB	DWB
Quantitation Factor	1.18	1.28	1.22	1.14	1.18
Percent Solids	85	78	82	88	85

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
06056-6	B4-7	06-03-02/09:55
06056-7	B5-4	06-03-02/10:50
06056-8	B6-3	06-03-02/11:20
06056-9	B6-7	06-03-02/11:25

PARAMETER	06056-6	06056-7	06056-8	06056-9
RCRA Metals (6010B)				
Arsenic, mg/kg dw	9.9	1.3	2.9	23
Barium, mg/kg dw	140	99	130	100
Cadmium, mg/kg dw	1.5	<0.42	<0.44	4.9
Chromium, mg/kg dw	23	6.7	7.9	20
Lead, mg/kg dw	14	2.2	7.1	75
Selenium, mg/kg dw	5.2	<0.85	<0.89	1.9
Silver, mg/kg dw	<0.57	<0.42	<0.44	0.80
Dilution Factor	1	1	1	1
Prep Date	06.05.02	06.05.02	06.05.02	06.05.02
Analysis Date	06.05.02	06.05.02	06.05.02	06.05.02
Batch ID	PS107	PS107	PS107	PS107
Prep Method	3050B	3050B	3050B	3050B
Analyst	GSP	GSP	GSP	GSP
Mercury (7471A), mg/kg dw	0.098	0.031	0.22	0.036
Dilution Factor	1	1	1	1
Prep Date	06.05.02	06.05.02	06.05.02	06.05.02
Analysis Date	06.05.02	06.05.02	06.05.02	06.05.02
Batch ID	HGS034	HGS034	HGS034	HGS034
Prep Method	7471A	7471A	7471A	7471A
Analyst	JDE	JDE	JDE	JDE
Quantitation Factor	1	1	1	1

SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C2-06056
Received: 04 JUN 02
Reported: 17 JUN 02

Mr. John Larson
Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
06056-6	B4-7	06-03-02/09:55
06056-7	B5-4	06-03-02/10:50
06056-8	B6-3	06-03-02/11:20
06056-9	B6-7	06-03-02/11:25

PARAMETER	06056-6	06056-7	06056-8	06056-9
Extractable Petroleum Hydrocarbons (DRO) (OA-2)				
Hydrocarbons as DRO, mg/kg dw	5.9	<3.0	3.5	12
Surrogate - o-Terphenyl	75 %	87 %	78 %	84 %
Dilution Factor	1	1	1	1
Prep Date	06.05.02	06.05.02	06.05.02	06.05.02
Analysis Date	06.06.02	06.06.02	06.06.02	06.06.02
Batch ID	FPS133	FPS133	FPS133	FPS133
Prep Method	3550B	3550B	3550B	3550B
Analyst	KA	KA	KA	KA
Quantitation Factor	1	1	1	1

SEVERN TRENT SERVICES

STL Pensacola

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
06056-6	B4-7	06-03-02/09:55
06056-7	B5-4	06-03-02/10:50
06056-8	B6-3	06-03-02/11:20
06056-9	B6-7	06-03-02/11:25

PARAMETER	06056-6	06056-7	06056-8	06056-9
Chlorinated Pesticides (8081A)				
Aldrin, ug/kg dw	<1.7	<1.7	<8.5	<8.5
alpha-BHC, ug/kg dw	<1.7	<1.7	<8.5	<8.5
beta-BHC, ug/kg dw	<1.7	<1.7	<8.5	<8.5
gamma-BHC (Lindane), ug/kg dw	<1.7	<1.7	<8.5	<8.5
delta-BHC, ug/kg dw	<1.7	<1.7	<8.5	<8.5
alpha-Chlordane, ug/kg dw	<1.7	<1.7	<8.5	<8.5
gamma-Chlordane, ug/kg dw	<1.7	<1.7	<8.5	<8.5
4,4'-DDD, ug/kg dw	<1.7	<1.7	<8.5	<8.5
4,4'-DDE, ug/kg dw	<1.7	<1.7	<8.5	<8.5
4,4'-DDT, ug/kg dw	<1.7	<1.7	<8.5	<8.5
Dieldrin, ug/kg dw	<1.7	<1.7	<8.5	<8.5
Endosulfan I, ug/kg dw	<1.7	<1.7	<8.5	<8.5
Endosulfan II, ug/kg dw	<1.7	<1.7	<8.5	<8.5
Endosulfan sulfate, ug/kg dw	<1.7	<1.7	<8.5	<8.5
Endrin, ug/kg dw	<1.7	<1.7	<8.5	<8.5
Endrin aldehyde, ug/kg dw	<1.7	<1.7	<8.5	<8.5
Endrin ketone, ug/kg dw	<1.7	<1.7	<8.5	<8.5
Heptachlor, ug/kg dw	<1.7	<1.7	<8.5	<8.5
Heptachlor epoxide, ug/kg dw	<1.7	<1.7	<8.5	<8.5
Methoxychlor, ug/kg dw	<1.7	<1.7	<8.5	<8.5
Toxaphene, ug/kg dw	<100	<100	<500	<500
Dilution Factor	1	1	5	5

SEVERN TRENT SERVICES

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REPORT OF RESULTS

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06056-6	B4-7	06-03-02/09:55
06056-7	B5-4	06-03-02/10:50
06056-8	B6-3	06-03-02/11:20
06056-9	B6-7	06-03-02/11:25

PARAMETER	06056-6	06056-7	06056-8	06056-9
Prep Date	06.06.02	06.06.02	06.06.02	06.06.02
Analysis Date	06.06.02	06.06.02	06.06.02	06.06.02
Batch ID	PSS085	PSS085	PSS085	PSS085
Prep Method	3550B	3550B	3550B	3550B
Analyst	KA	KA	KA	KA
Quantitation Factor	1.2	1	5.5	6.5
Polychlorinated Biphenyls (PCBs) (8082)				
Aroclor-1016, ug/kg dw	<17	<17	<17	<17
Aroclor-1221, ug/kg dw	<17	<17	<17	<17
Aroclor-1232, ug/kg dw	<17	<17	<17	<17
Aroclor-1242, ug/kg dw	<17	<17	<17	<17
Aroclor-1248, ug/kg dw	<17	<17	<17	<17
Aroclor-1254, ug/kg dw	<17	<17	<17	<17
Aroclor-1260, ug/kg dw	<17	<17	<17	<17
Dilution Factor	1	1	1	1
Prep Date	06.06.02	06.06.02	06.06.02	06.06.02
Analysis Date	06.06.02	06.06.02	06.06.02	06.06.02
Batch ID	PSS085	PSS085	PSS085	PSS085
Prep Method	3550B	3550B	3550B	3550B
Analyst	KA	KA	KA	KA
Quantitation Factor	1.2	1	1.1	1.3

SEVERN TRENT SERVICES

STL Pensacola

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
06056-6	B4-7	06-03-02/09:55
06056-7	B5-4	06-03-02/10:50
06056-8	B6-3	06-03-02/11:20
06056-9	B6-7	06-03-02/11:25

PARAMETER	06056-6	06056-7	06056-8	06056-9
Volatile Organic Compounds (8260B)				
Benzene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Bromobenzene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Bromochloromethane, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Bromodichloromethane, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Bromoform, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Bromomethane (Methyl bromide), ug/kg dw	<6.2	<5.2	<5.7	<6.5
Carbon tetrachloride, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Chlorobenzene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Chloroethane, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Chloroform, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Chloromethane, ug/kg dw	<6.2	<5.2	<5.7	<6.5
2-Chlorotoluene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
4-Chlorotoluene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Dibromochloromethane, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Dibromomethane (Methylene bromide), ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,2-Dibromoethane (EDB), ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,2-Dichlorobenzene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,3-Dichlorobenzene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,4-Dichlorobenzene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Dichlorodifluoromethane, ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,1-Dichloroethane, ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,2-Dichloroethane, ug/kg dw	<6.2	<5.2	<5.7	<6.5

SEVERN TRENT SERVICES

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Mr. John Larson
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Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
06056-6	B4-7	06-03-02/09:55
06056-7	B5-4	06-03-02/10:50
06056-8	B6-3	06-03-02/11:20
06056-9	B6-7	06-03-02/11:25

PARAMETER	06056-6	06056-7	06056-8	06056-9
1,1-Dichloroethene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
cis-1,2-Dichloroethene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
trans-1,2-Dichloroethene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,2-Dichloropropane, ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,3-Dichloropropane, ug/kg dw	<6.2	<5.2	<5.7	<6.5
2,2 Dichloropropane, ug/kg dw	<6.2	<5.2	<5.7	<6.5
cis-1,3-Dichloropropene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
trans-1,3-Dichloropropene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Ethylbenzene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Hexachlorobutadiene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Isopropylbenzene (Cumene), ug/kg dw	<6.2	<5.2	<5.7	<6.5
p-Isopropyltoluene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Methylene chloride (Dichloromethane), ug/kg dw	<6.2	<5.2	<5.7	<6.5
Methyl t-butyl ether (MTBE), ug/kg dw	<6.2	<5.2	<5.7	<6.5
Naphthalene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
n-Butylbenzene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
n-Propylbenzene , ug/kg dw	<6.2	<5.2	<5.7	<6.5
sec-Butylbenzene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Styrene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
t-Butylbenzene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,1,1,2-Tetrachloroethane, ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,1,2,2-Tetrachloroethane, ug/kg dw	<6.2	<5.2	<5.7	<6.5

SEVERN TRENT SERVICES

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Mr. John Larson
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Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
06056-6	B4-7	06-03-02/09:55
06056-7	B5-4	06-03-02/10:50
06056-8	B6-3	06-03-02/11:20
06056-9	B6-7	06-03-02/11:25

PARAMETER	06056-6	06056-7	06056-8	06056-9
Tetrachloroethene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Toluene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,1,1-Trichloroethane, ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,1,2-Trichloroethane, ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,2,3-Trichlorobenzene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,2,4-Trichlorobenzene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Trichloroethene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Trichlorofluoromethane, ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,2,3-Trichloropropane, ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,2,4-Trimethylbenzene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
1,3,5-Trimethylbenzene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
Vinyl chloride, ug/kg dw	<6.2	<5.2	<5.7	<6.5
o-Xylene, ug/kg dw	<6.2	<5.2	<5.7	<6.5
mp-Xylene, ug/kg dw	<12	<10	<11	<13
Surrogate - Dibromofluoromethane	97 %	97 %	97 %	98 %
Surrogate - Toluene-d8	101 %	101 %	101 %	101 %
Surrogate - 4-Bromofluorobenzene	99 %	99 %	101 %	101 %
Dilution Factor	1	1	1	1
Prep Date	06.05.02	06.05.02	06.05.02	06.06.02
Analysis Date	06.05.02	06.05.02	06.05.02	06.06.02
Batch ID	KAS104	KAS104	KAS104	KAS105
Prep Method	5030B	5030B	5030B	5030B
Analyst	DWB	DWB	DWB	DWB
Quantitation Factor	1.23	1.04	1.14	1.3
Percent Solids	81	96	88	77

SEVERN TRENT SERVICES

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2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
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Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-10	B2-GW	06-03-02/13:30
06056-11	B1-GW	06-03-02/11:50
06056-12	B4-GW	06-03-02/12:30

PARAMETER	06056-10	06056-11	06056-12
RCRA Metals, Dissolved (6010B)			
Arsenic, Dissolved, mg/l	<0.0050	0.016	<0.0050
Barium, Dissolved, mg/l	0.19	0.094	0.089
Cadmium, Dissolved, mg/l	<0.0050	<0.0050	<0.0050
Chromium, Dissolved, mg/l	<0.0050	<0.0050	<0.0050
Lead, Dissolved, mg/l	<0.0050	<0.0050	<0.0050
Selenium, Dissolved, mg/l	<0.010	0.010	0.059
Silver, Dissolved, mg/l	<0.0050	<0.0050	<0.0050
Dilution Factor	1	1	1
Prep Date	06.05.02	06.05.02	06.05.02
Analysis Date	06.06.02	06.06.02	06.06.02
Batch ID	PD067	PD067	PD067
Prep Method	N/A	N/A	N/A
Analyst	GSP	GSP	GSP
Mercury, Dissolved (7470A), mg/l	<0.00020	<0.00020	<0.00020
Dilution Factor	1	1	1
Prep Date	06.06.02	06.06.02	06.06.02
Analysis Date	06.06.02	06.06.02	06.06.02
Batch ID	HGW054	HGW054	HGW054
Prep Method	7470A	7470A	7470A
Analyst	JDE	JDE	JDE
Quantitation Factor	1	1	1

SEVERN TRENT SERVICES

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Mr. John Larson
Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
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Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-10	B2-GW	06-03-02/13:30
06056-11	B1-GW	06-03-02/11:50
06056-12	B4-GW	06-03-02/12:30

PARAMETER	06056-10	06056-11	06056-12
Extractable Petroleum Hydrocarbons (DRO) (OA-2)			
Hydrocarbons as DRO, ug/l	<100	2500	<100
Surrogate - o-Terphenyl	86 %	108 %	93 %
Dilution Factor	1	1	1
Prep Date	06.05.02	06.05.02	06.05.02
Analysis Date	06.06.02	06.06.02	06.06.02
Batch ID	FPW100	FPW100	FPW100
Prep Method	3520C	3520C	3520C
Analyst	KA	KA	KA
Quantitation Factor	1	1	1

SEVERN TRENT SERVICES

STL Pensacola

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Mr. John Larson
Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 131220617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-10	B2-GW	06-03-02/13:30
06056-11	B1-GW	06-03-02/11:50
06056-12	B4-GW	06-03-02/12:30

PARAMETER	06056-10	06056-11	06056-12
Chlorinated Pesticides (8081A)			
Aldrin, ug/l	<0.050	<0.050	<0.050
alpha-BHC, ug/l	<0.050	<0.050	<0.050
beta-BHC, ug/l	<0.050	<0.050	<0.050
gamma-BHC (Lindane), ug/l	<0.050	<0.050	<0.050
delta-BHC, ug/l	<0.050	<0.050	<0.050
alpha-Chlordane, ug/l	<0.050	<0.050	<0.050
gamma-Chlordane, ug/l	<0.050	<0.050	<0.050
4,4'-DDD, ug/l	<0.050	<0.050	<0.050
4,4'-DDE, ug/l	<0.050	<0.050	<0.050
4,4'-DDT, ug/l	<0.050	<0.050	<0.050
Dieldrin, ug/l	<0.050	<0.050	<0.050
Endosulfan I, ug/l	<0.050	<0.050	<0.050
Endosulfan II, ug/l	<0.050	<0.050	<0.050
Endosulfan sulfate, ug/l	<0.050	<0.050	<0.050
Endrin, ug/l	<0.050	<0.050	<0.050
Endrin aldehyde, ug/l	<0.050	<0.050	<0.050
Endrin ketone, ug/l	<0.050	<0.050	<0.050
Heptachlor, ug/l	<0.050	<0.050	<0.050
Heptachlor epoxide, ug/l	<0.050	<0.050	<0.050
Methoxychlor, ug/l	<0.050	<0.050	<0.050
Toxaphene, ug/l	<3.0	<3.0	<3.0
Dilution Factor	1	1	1
Prep Date	06.06.02	06.06.02	06.06.02
Analysis Date	06.06.02	06.06.02	06.06.02
Batch ID	PSW046	PSW046	PSW046
Prep Method	3520C	3520C	3520C
Analyst	KA	KA	KA
Quantitation Factor	1	1	1

SEVERN TRENT SERVICES

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-10	B2-GW	06-03-02/13:30
06056-11	B1-GW	06-03-02/11:50
06056-12	B4-GW	06-03-02/12:30

PARAMETER	06056-10	06056-11	06056-12
Polychlorinated Biphenyls (PCBs) (8082)			
Aroclor-1016, ug/l	<0.50	<0.50	<0.50
Aroclor-1221, ug/l	<0.50	<0.50	<0.50
Aroclor-1232, ug/l	<0.50	<0.50	<0.50
Aroclor-1242, ug/l	<0.50	<0.50	<0.50
Aroclor-1248, ug/l	<0.50	<0.50	<0.50
Aroclor-1254, ug/l	<0.50	<0.50	<0.50
Aroclor-1260, ug/l	<0.50	<0.50	<0.50
Dilution Factor	1	1	1
Prep Date	06.06.02	06.06.02	06.06.02
Analysis Date	06.06.02	06.06.02	06.06.02
Batch ID	PSW046	PSW046	PSW046
Prep Method	3520C	3520C	3520C
Analyst	KA	KA	KA
Quantitation Factor	1	1	1

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-10	B2-GW	06-03-02/13:30
06056-11	B1-GW	06-03-02/11:50
06056-12	B4-GW	06-03-02/12:30

PARAMETER	06056-10	06056-11	06056-12
Volatile Organic Compounds (8260B)			
Benzene, ug/l	<1.0	<1.0	<1.0
Bromobenzene, ug/l	<5.0	<5.0	<5.0
Bromochloromethane, ug/l	<5.0	<5.0	<5.0
Bromodichloromethane, ug/l	<5.0	<5.0	<5.0
Bromoform, ug/l	<5.0	<5.0	<5.0
Bromomethane (Methyl bromide), ug/l	<5.0	<5.0	<5.0
Carbon tetrachloride, ug/l	<5.0	<5.0	<5.0
Chlorobenzene, ug/l	<5.0	<5.0	<5.0
Chloroethane, ug/l	<5.0	<5.0	<5.0
Chloroform, ug/l	<5.0	<5.0	<5.0
Chloromethane, ug/l	<5.0	<5.0	<5.0
2-Chlorotoluene, ug/l	<5.0	<5.0	<5.0
4-Chlorotoluene, ug/l	<5.0	<5.0	<5.0
Dibromochloromethane, ug/l	<5.0	<5.0	<5.0
Dibromomethane (Methylene bromide), ug/l	<5.0	<5.0	<5.0
1,2-Dibromoethane (EDB), ug/l	<5.0	<5.0	<5.0
1,2-Dichlorobenzene, ug/l	<5.0	<5.0	<5.0
1,3-Dichlorobenzene, ug/l	<5.0	<5.0	<5.0
1,4-Dichlorobenzene, ug/l	<5.0	<5.0	<5.0
Dichlorodifluoromethane, ug/l	<5.0	<5.0	<5.0
1,1-Dichloroethane, ug/l	<5.0	<5.0	<5.0
1,2-Dichloroethane, ug/l	<5.0	<5.0	<5.0
1,1-Dichloroethene, ug/l	<5.0	<5.0	<5.0

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SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C2-06056
Received: 04 JUN 02
Reported: 17 JUN 02

Mr. John Larson
Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-10	B2-GW	06-03-02/13:30
06056-11	B1-GW	06-03-02/11:50
06056-12	B4-GW	06-03-02/12:30

PARAMETER	06056-10	06056-11	06056-12
cis-1,2-Dichloroethene, ug/l	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene, ug/l	<5.0	<5.0	<5.0
1,2-Dichloropropane, ug/l	<5.0	<5.0	<5.0
1,3-Dichloropropane, ug/l	<5.0	<5.0	<5.0
2,2 Dichloropropane, ug/l	<5.0	<5.0	<5.0
cis-1,3-Dichloropropene, ug/l	<5.0	<5.0	<5.0
trans-1,3-Dichloropropene, ug/l	<5.0	<5.0	<5.0
Ethylbenzene, ug/l	<5.0	<5.0	<5.0
Hexachlorobutadiene, ug/l	<5.0	<5.0	<5.0
Isopropylbenzene (Cumene), ug/l	<5.0	<5.0	<5.0
p-Isopropyltoluene, ug/l	<5.0	<5.0	<5.0
Methylene chloride (Dichloromethane), ug/l	<5.0	<5.0	<5.0
Methyl t-butyl ether (MTBE), ug/l	<5.0	<5.0	<5.0
Naphthalene, ug/l	33	<5.0	<5.0
n-Butylbenzene, ug/l	<5.0	<5.0	<5.0
n-Propylbenzene , ug/l	<5.0	<5.0	<5.0
sec-Butylbenzene, ug/l	<5.0	<5.0	<5.0
Styrene, ug/l	<5.0	<5.0	<5.0
t-Butylbenzene, ug/l	<5.0	<5.0	<5.0
1,1,1,2-Tetrachloroethane, ug/l	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane, ug/l	<5.0	<5.0	<5.0
Tetrachloroethene, ug/l	<5.0	<5.0	<5.0
Toluene, ug/l	<5.0	<5.0	<5.0
1,1,1-Trichloroethane, ug/l	<5.0	<5.0	<5.0

SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C2-06056
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Mr. John Larson
Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-10	B2-GW	06-03-02/13:30
06056-11	B1-GW	06-03-02/11:50
06056-12	B4-GW	06-03-02/12:30

PARAMETER	06056-10	06056-11	06056-12
1,1,2-Trichloroethane, ug/l	<5.0	<5.0	<5.0
1,2,3-Trichlorobenzene, ug/l	<5.0	<5.0	<5.0
1,2,4-Trichlorobenzene, ug/l	<5.0	<5.0	<5.0
Trichloroethene, ug/l	<5.0	<5.0	<5.0
Trichlorofluoromethane, ug/l	<5.0	<5.0	<5.0
1,2,3-Trichloropropane, ug/l	<5.0	<5.0	<5.0
1,2,4-Trimethylbenzene, ug/l	<5.0	<5.0	<5.0
1,3,5-Trimethylbenzene, ug/l	<5.0	<5.0	<5.0
Vinyl chloride, ug/l	<5.0	<5.0	<5.0
o-Xylene, ug/l	<5.0	<5.0	<5.0
mp-Xylene, ug/l	<10	<10	<10
Surrogate - Dibromofluoromethane	101 %	101 %	104 %
Surrogate - Toluene-d8	99 %	98 %	99 %
Surrogate - 4-Bromofluorobenzene	92 %	93 %	90 %
Dilution Factor	1	1	1
Prep Date	06.05.02	06.05.02	06.05.02
Analysis Date	06.05.02	06.05.02	06.05.02
Batch ID	LEW090	LEW090	LEW090
Prep Method	5030B	5030B	5030B
Analyst	WD	WD	WD
Quantitation Factor	1.00	1.00	1.00

SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C2-06056
Received: 04 JUN 02
Reported: 17 JUN 02

Mr. John Larson
Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617
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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-13	B3-GW	06-03-02/13:00

PARAMETER	06056-13
Chlorinated Pesticides (8081A)	
Aldrin, ug/l	<0.050
alpha-BHC, ug/l	<0.050
beta-BHC, ug/l	<0.050
gamma-BHC (Lindane), ug/l	<0.050
delta-BHC, ug/l	<0.050
alpha-Chlordane, ug/l	<0.050
gamma-Chlordane, ug/l	<0.050
4,4'-DDD, ug/l	<0.050
4,4'-DDE, ug/l	<0.050
4,4'-DDT, ug/l	<0.050
Dieldrin, ug/l	<0.050
Endosulfan I, ug/l	<0.050
Endosulfan II, ug/l	<0.050
Endosulfan sulfate, ug/l	<0.050
Endrin, ug/l	<0.050
Endrin aldehyde, ug/l	<0.050
Endrin ketone, ug/l	<0.050
Heptachlor, ug/l	<0.050
Heptachlor epoxide, ug/l	<0.050
Methoxychlor, ug/l	<0.050
Toxaphene, ug/l	<3.0

JJS header
6-17-02

SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C2-06056
Received: 04 JUN 02
Reported: 17 JUN 02

Mr. John Larson
Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 131220617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-13	B3-GW	06-03-02/13:00

PARAMETER	06056-13
Chlorinated Pesticides (8081A)	
Aldrin, ug/l	<0.050
alpha-BHC, ug/l	<0.050
beta-BHC, ug/l	<0.050
gamma-BHC (Lindane), ug/l	<0.050
delta-BHC, ug/l	<0.050
alpha-Chlordane, ug/l	<0.050
gamma-Chlordane, ug/l	<0.050
4,4'-DDD, ug/l	<0.050
4,4'-DDE, ug/l	<0.050
4,4'-DDT, ug/l	<0.050
Dieldrin, ug/l	<0.050
Endosulfan I, ug/l	<0.050
Endosulfan II, ug/l	<0.050
Endosulfan sulfate, ug/l	<0.050
Endrin, ug/l	<0.050
Endrin aldehyde, ug/l	<0.050
Endrin ketone, ug/l	<0.050
Heptachlor, ug/l	<0.050
Heptachlor epoxide, ug/l	<0.050
Methoxychlor, ug/l	<0.050
Toxaphene, ug/l	<3.0
Dilution Factor	1
Prep Date	06.06.02
Analysis Date	06.02.02
Batch ID	PSW046
Prep Method	3520C
Analyst	KA
Quantitation Factor	1

SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C2-06056
Received: 04 JUN 02
Reported: 17 JUN 02

Mr. John Larson
Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-13	B3-GW	06-03-02/13:00

PARAMETER	06056-13
Volatile Organic Compounds (8260B)	
Benzene, ug/l	<1.0
Bromobenzene, ug/l	<5.0
Bromochloromethane, ug/l	<5.0
Bromodichloromethane, ug/l	<5.0
Bromoform, ug/l	<5.0
Bromomethane (Methyl bromide), ug/l	<5.0
Carbon tetrachloride, ug/l	<5.0
Chlorobenzene, ug/l	<5.0
Chloroethane, ug/l	<5.0
Chloroform, ug/l	<5.0
Chloromethane, ug/l	<5.0
2-Chlorotoluene, ug/l	<5.0
4-Chlorotoluene, ug/l	<5.0
Dibromochloromethane, ug/l	<5.0
Dibromomethane (Methylene bromide), ug/l	<5.0
1,2-Dibromoethane (EDB), ug/l	<5.0
1,2-Dichlorobenzene, ug/l	<5.0
1,3-Dichlorobenzene, ug/l	<5.0
1,4-Dichlorobenzene, ug/l	<5.0
Dichlorodifluoromethane, ug/l	<5.0
1,1-Dichloroethane, ug/l	<5.0
1,2-Dichloroethane, ug/l	<5.0
1,1-Dichloroethene, ug/l	<5.0
cis-1,2-Dichloroethene, ug/l	<5.0
trans-1,2-Dichloroethene, ug/l	<5.0

SEVERN TRENT SERVICES
STL Pensacola
LOG NO: C2-06056
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Mr. John Larson
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Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-13	B3-GW	06-03-02/13:00

PARAMETER	06056-13
1,2-Dichloropropane, ug/l	<5.0
1,3-Dichloropropane, ug/l	<5.0
2,2 Dichloropropane, ug/l	<5.0
cis-1,3-Dichloropropene, ug/l	<5.0
trans-1,3-Dichloropropene, ug/l	<5.0
Ethylbenzene, ug/l	<5.0
Hexachlorobutadiene, ug/l	<5.0
Isopropylbenzene (Cumene), ug/l	<5.0
p-Isopropyltoluene, ug/l	<5.0
Methylene chloride (Dichloromethane), ug/l	<5.0
Methyl t-butyl ether (MTBE), ug/l	<5.0
Naphthalene, ug/l	<5.0
n-Butylbenzene, ug/l	<5.0
n-Propylbenzene , ug/l	<5.0
sec-Butylbenzene, ug/l	<5.0
Styrene, ug/l	<5.0
t-Butylbenzene, ug/l	<5.0
1,1,1,2-Tetrachloroethane, ug/l	<5.0
1,1,2,2-Tetrachloroethane, ug/l	<5.0
Tetrachloroethene, ug/l	<5.0
Toluene, ug/l	<5.0
1,1,1-Trichloroethane, ug/l	<5.0
1,1,2-Trichloroethane, ug/l	<5.0
1,2,3-Trichlorobenzene, ug/l	<5.0
1,2,4-Trichlorobenzene, ug/l	<5.0
Trichloroethene, ug/l	<5.0

SEVERN TRENT SERVICES

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Mr. John Larson
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Kansas City, MO 64108

Project: GATEWAY, KC, MO
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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-13	B3-GW	06-03-02/13:00

PARAMETER	06056-13
Trichlorofluoromethane, ug/l	<5.0
1,2,3-Trichloropropane, ug/l	<5.0
1,2,4-Trimethylbenzene, ug/l	<5.0
1,3,5-Trimethylbenzene, ug/l	<5.0
Vinyl chloride, ug/l	<5.0
o-Xylene, ug/l	<5.0
mp-Xylene, ug/l	<10
Surrogate - Dibromofluoromethane	104 %
Surrogate - Toluene-d8	94 %
Surrogate - 4-Bromofluorobenzene	91 %
Dilution Factor	1
Prep Date	06.05.02
Analysis Date	06.05.02
Batch ID	LEW090
Prep Method	5030B
Analyst	WD
Quantitation Factor	1.00

SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C2-06056
Received: 04 JUN 02
Reported: 17 JUN 02

Mr. John Larson
Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-14	Trip Blank	06-03-02

PARAMETER	06056-14
Volatile Organic Compounds (8260B)	
Benzene, ug/l	<1.0
Bromobenzene, ug/l	<5.0
Bromochloromethane, ug/l	<5.0
Bromodichloromethane, ug/l	<5.0
Bromoform, ug/l	<5.0
Bromomethane (Methyl bromide), ug/l	<5.0
Carbon tetrachloride, ug/l	<5.0
Chlorobenzene, ug/l	<5.0
Chloroethane, ug/l	<5.0
Chloroform, ug/l	<5.0
Chloromethane, ug/l	<5.0
2-Chlorotoluene, ug/l	<5.0
4-Chlorotoluene, ug/l	<5.0
Dibromochloromethane, ug/l	<5.0
Dibromomethane (Methylene bromide), ug/l	<5.0
1,2-Dibromoethane (EDB), ug/l	<5.0
1,2-Dichlorobenzene, ug/l	<5.0
1,3-Dichlorobenzene, ug/l	<5.0
1,4-Dichlorobenzene, ug/l	<5.0
Dichlorodifluoromethane, ug/l	<5.0
1,1-Dichloroethane, ug/l	<5.0
1,2-Dichloroethane, ug/l	<5.0
1,1-Dichloroethene, ug/l	<5.0
cis-1,2-Dichloroethene, ug/l	<5.0
trans-1,2-Dichloroethene, ug/l	<5.0

SEVERN TRENT SERVICES

STL Pensacola

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Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-14	Trip Blank	06-03-02

PARAMETER	06056-14
1,2-Dichloropropane, ug/l	<5.0
1,3-Dichloropropane, ug/l	<5.0
2,2 Dichloropropane, ug/l	<5.0
cis-1,3-Dichloropropene, ug/l	<5.0
trans-1,3-Dichloropropene, ug/l	<5.0
Ethylbenzene, ug/l	<5.0
Hexachlorobutadiene, ug/l	<5.0
Isopropylbenzene (Cumene), ug/l	<5.0
p-Isopropyltoluene, ug/l	<5.0
Methylene chloride (Dichloromethane), ug/l	<5.0
Methyl t-butyl ether (MTBE), ug/l	<5.0
Naphthalene, ug/l	<5.0
n-Butylbenzene, ug/l	<5.0
n-Propylbenzene , ug/l	<5.0
sec-Butylbenzene, ug/l	<5.0
Styrene, ug/l	<5.0
t-Butylbenzene, ug/l	<5.0
1,1,1,2-Tetrachloroethane, ug/l	<5.0
1,1,2,2-Tetrachloroethane, ug/l	<5.0
Tetrachloroethene, ug/l	<5.0
Toluene, ug/l	<5.0
1,1,1-Trichloroethane, ug/l	<5.0
1,1,2-Trichloroethane, ug/l	<5.0
1,2,3-Trichlorobenzene, ug/l	<5.0
1,2,4-Trichlorobenzene, ug/l	<5.0
Trichloroethene, ug/l	<5.0

SEVERN TRENT SERVICES

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Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-14	Trip Blank	06-03-02

PARAMETER	06056-14
Trichlorofluoromethane, ug/l	<5.0
1,2,3-Trichloropropane, ug/l	<5.0
1,2,4-Trimethylbenzene, ug/l	<5.0
1,3,5-Trimethylbenzene, ug/l	<5.0
Vinyl chloride, ug/l	<5.0
o-Xylene, ug/l	<5.0
mp-Xylene, ug/l	<10
Surrogate - Dibromofluoromethane	102 %
Surrogate - Toluene-d8	100 %
Surrogate - 4-Bromofluorobenzene	92 %
Dilution Factor	1
Prep Date	06.05.02
Analysis Date	06.05.02
Batch ID	LEW090
Prep Method	5030B
Analyst	WD
Quantitation Factor	1.00

SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C2-06056
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Mr. John Larson
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2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	DATE/ TIME SAMPLED
06056-15	Method Blank	
06056-16	Lab Control Standard % Recovery	
06056-17	Matrix Spike % Recovery	
06056-18	Matrix Spike Duplicate % Recovery	

PARAMETER	06056-15	06056-16	06056-17	06056-18
RCRA Metals (6010B)				
Arsenic, mg/kg dw	<0.50	101 %	90 %	93 %
Barium, mg/kg dw	<1.0	101 %	86 %	96 %
Cadmium, mg/kg dw	<0.50	105 %	90 %	92 %
Chromium, mg/kg dw	<0.50	106 %	107 %	131 %M2
Lead, mg/kg dw	<0.50	99 %	92 %	93 %
Selenium, mg/kg dw	<1.0	101 %	84 %	85 %
Silver, mg/kg dw	<0.50	111 %	94 %	95 %
Dilution Factor	1	1	1	1
Prep Date	06.05.02	06.05.02	06.05.02	06.05.02
Analysis Date	06.05.02	06.05.02	06.05.02	06.05.02
Batch ID	PS107	PS107	PS107	PS107
Prep Method	3050B	3050B	3050B	3050B
Analyst	GSP	GSP	GSP	GSP
Mercury (7471A), mg/kg dw	<0.0083	100 %	119 %	124 %
Dilution Factor	1	---	---	---
Prep Date	06.05.02	---	---	---
Analysis Date	06.05.02	---	---	---
Batch ID	HGS034	HGS034	HGS034	HGS034
Prep Method	7471A	---	---	---
Analyst	JDE	---	---	---
Quantitation Factor	1	---	---	---

SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C2-06056
Received: 04 JUN 02
Reported: 17 JUN 02

Mr. John Larson
Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	DATE/ TIME SAMPLED
06056-15	Method Blank	
06056-16	Lab Control Standard % Recovery	
06056-17	Matrix Spike % Recovery	
06056-18	Matrix Spike Duplicate % Recovery	

PARAMETER	06056-15	06056-16	06056-17	06056-18
Chlorinated Pesticides (8081A)				
Aldrin, ug/kg dw	<1.7	110 %	80 %	90 %
alpha-BHC, ug/kg dw	<1.7	118 %	80 %	80 %
beta-BHC, ug/kg dw	<1.7	116 %	90 %	90 %
gamma-BHC (Lindane), ug/kg dw	<1.7	120 %	80 %	90 %
delta-BHC, ug/kg dw	<1.7	125 %	80 %	90 %
alpha-Chlordane, ug/kg dw	<1.7	115 %	90 %	100 %
gamma-Chlordane, ug/kg dw	<1.7	111 %	90 %	110 %
4,4'-DDD, ug/kg dw	<1.7	116 %	90 %	90 %
4,4'-DDE, ug/kg dw	<1.7	111 %	80 %	90 %
4,4'-DDT, ug/kg dw	<1.7	147 %	100 %	110 %
Dieldrin, ug/kg dw	<1.7	113 %	90 %	100 %
Endosulfan I, ug/kg dw	<1.7	111 %	80 %	90 %
Endosulfan II, ug/kg dw	<1.7	122 %	90 %	90 %
Endosulfan sulfate, ug/kg dw	<1.7	121 %	90 %	100 %
Endrin, ug/kg dw	<1.7	122 %	100 %	110 %
Endrin aldehyde, ug/kg dw	<1.7	107 %	90 %	90 %
Endrin ketone, ug/kg dw	<1.7	123 %	90 %	100 %
Heptachlor, ug/kg dw	<1.7	115 %	100 %	100 %
Heptachlor epoxide, ug/kg dw	<1.7	114 %	90 %	100 %
Methoxychlor, ug/kg dw	<1.7	112 %	120 %	130 %
Toxaphene, ug/kg dw	<100	---	---	---
Surrogate - DCB	104 %	100 %	D	D

SEVERN TRENT SERVICES

STL Pensacola

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Kansas City, MO 64108

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Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	DATE/ TIME SAMPLED
06056-15	Method Blank	
06056-16	Lab Control Standard % Recovery	
06056-17	Matrix Spike % Recovery	
06056-18	Matrix Spike Duplicate % Recovery	

PARAMETER	06056-15	06056-16	06056-17	06056-18
Surrogate - TCX	103 %	101 %	D	D
Dilution Factor	1	---		
Prep Date	06.06.02	---	---	---
Analysis Date	06.06.02	---	---	---
Batch ID	PSS085	PSS085	PSS085	PSS085
Prep Method	3550B			
Analyst	KA	---		
Quantitation Factor	1	---	---	---
Polychlorinated Biphenyls (PCBs) (8082)				
Aroclor-1016, ug/kg dw	<17	74 %	89 %	88 %
Aroclor-1221, ug/kg dw	<17	---	---	---
Aroclor-1232, ug/kg dw	<17	---	---	---
Aroclor-1242, ug/kg dw	<17	---	---	---
Aroclor-1248, ug/kg dw	<17	---	---	---
Aroclor-1254, ug/kg dw	<17	---	---	---
Aroclor-1260, ug/kg dw	<17	112 %	86 %	84 %
Surrogate - DCB	91 %	97 %	93 %	94 %
Surrogate - TCX	102 %	103 %	93 %	98 %
Dilution Factor	1	---	---	---
Prep Date	06.06.02	---	---	---
Analysis Date	06.06.02	---	---	---
Batch ID	PSS085	PSS085	PSS085	PSS085
Prep Method	3550B			---
Analyst	KA	---	---	---
Quantitation Factor	1	---	---	---

SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C2-06056
Received: 04 JUN 02
Reported: 17 JUN 02

Mr. John Larson
Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	DATE/ TIME SAMPLED
06056-15	Method Blank	
06056-16	Lab Control Standard % Recovery	
06056-17	Matrix Spike % Recovery	
06056-18	Matrix Spike Duplicate % Recovery	

PARAMETER	06056-15	06056-16	06056-17	06056-18
Volatile Organic Compounds (8260B)				
Benzene, ug/kg dw	<5.0	95 %	92 %	93 %
Bromobenzene, ug/kg dw	<5.0	111 %	114 %	101 %
Bromochloromethane, ug/kg dw	<5.0	104 %	92 %	104 %
Bromodichloromethane, ug/kg dw	<5.0	93 %	88 %	93 %
Bromoform, ug/kg dw	<5.0	104 %	94 %	111 %
Bromomethane (Methyl bromide), ug/kg dw	<5.0	87 %	85 %	86 %
Carbon tetrachloride, ug/kg dw	<5.0	96 %	91 %	93 %
Chlorobenzene, ug/kg dw	<5.0	98 %	95 %	95 %
Chloroethane, ug/kg dw	<5.0	90 %	91 %	90 %
Chloroform, ug/kg dw	<5.0	97 %	87 %	95 %
Chloromethane, ug/kg dw	<5.0	61 %	70 %	61 %
2-Chlorotoluene, ug/kg dw	<5.0	105 %	110 %	93 %
4-Chlorotoluene, ug/kg dw	<5.0	110 %	107 %	101 %
Dibromochloromethane, ug/kg dw	<5.0	99 %	87 %	98 %
Dibromomethane (Methylene bromide), ug/kg dw	<5.0	95 %	89 %	96 %
1,2-Dibromoethane (EDB), ug/kg dw	<5.0	96 %	84 %	97 %
1,2-Dichlorobenzene, ug/kg dw	<5.0	103 %	96 %	97 %
1,3-Dichlorobenzene, ug/kg dw	<5.0	108 %	105 %	101 %
1,4-Dichlorobenzene, ug/kg dw	<5.0	105 %	101 %	99 %
Dichlorodifluoromethane, ug/kg dw	<5.0	55 %	55 %	54 %
1,1-Dichloroethane, ug/kg dw	<5.0	90 %	81 %	89 %
1,2-Dichloroethane, ug/kg dw	<5.0	86 %	81 %	85 %

SEVERN TRENT SERVICES

STL Pensacola

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Mr. John Larson
Trans Systems
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Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	DATE/ TIME SAMPLED
06056-15	Method Blank	
06056-16	Lab Control Standard % Recovery	
06056-17	Matrix Spike % Recovery	
06056-18	Matrix Spike Duplicate % Recovery	

PARAMETER	06056-15	06056-16	06056-17	06056-18
1,1-Dichloroethene, ug/kg dw	<5.0	101 %	91 %	98 %
cis-1,2-Dichloroethene, ug/kg dw	<5.0	104 %	94 %	102 %
trans-1,2-Dichloroethene, ug/kg dw	<5.0	98 %	88 %	96 %
1,2-Dichloropropane, ug/kg dw	<5.0	91 %	87 %	89 %
1,3-Dichloropropane, ug/kg dw	<5.0	90 %	80 %	91 %
2,2 Dichloropropane, ug/kg dw	<5.0	94 %	86 %	93 %
cis-1,3-Dichloropropene, ug/kg dw	<5.0	96 %	91 %	95 %
trans-1,3-Dichloropropene, ug/kg dw	<5.0	95 %	83 %	93 %
Ethylbenzene, ug/kg dw	<5.0	96 %	93 %	89 %
Hexachlorobutadiene, ug/kg dw	<5.0	113 %	78 %	91 %
Isopropylbenzene (Cumene), ug/kg dw	<5.0	96 %	94 %	94 %
p-Isopropyltoluene, ug/kg dw	<5.0	101 %	101 %	97 %
Methylene chloride (Dichloromethane), ug/kg dw	<5.0	101 %	94 %	100 %
Methyl t-butyl ether (MTBE), ug/kg dw	<5.0	93 %	84 %	95 %
Naphthalene, ug/kg dw	<5.0	105 %	73 %	97 %
n-Butylbenzene, ug/kg dw	<5.0	101 %	86 %	91 %
n-Propylbenzene , ug/kg dw	<5.0	105 %	105 %	93 %
sec-Butylbenzene, ug/kg dw	<5.0	102 %	101 %	93 %
Styrene, ug/kg dw	<5.0	97 %	95 %	96 %
t-Butylbenzene, ug/kg dw	<5.0	103 %	108 %	96 %
1,1,1,2-Tetrachloroethane, ug/kg dw	<5.0	105 %	95 %	102 %
1,1,2,2-Tetrachloroethane, ug/kg dw	<5.0	87 %	87 %	102 %

SEVERN TRENT SERVICES

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Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	DATE/ TIME SAMPLED
06056-15	Method Blank	
06056-16	Lab Control Standard % Recovery	
06056-17	Matrix Spike % Recovery	
06056-18	Matrix Spike Duplicate % Recovery	

PARAMETER	06056-15	06056-16	06056-17	06056-18
Tetrachloroethene, ug/kg dw	<5.0	97 %	89 %	91 %
Toluene, ug/kg dw	<5.0	89 %	88 %	86 %
1,1,1-Trichloroethane, ug/kg dw	<5.0	100 %	90 %	98 %
1,1,2-Trichloroethane, ug/kg dw	<5.0	100 %	90 %	101 %
1,2,3-Trichlorobenzene, ug/kg dw	<5.0	116 %	71 %	101 %
1,2,4-Trichlorobenzene, ug/kg dw	<5.0	122 %	75 %	105 %
Trichloroethene, ug/kg dw	<5.0	102 %	95 %	99 %
Trichlorofluoromethane, ug/kg dw	<5.0	98 %	89 %	95 %
1,2,3-Trichloropropane, ug/kg dw	<5.0	100 %	104 %	104 %
1,2,4-Trimethylbenzene, ug/kg dw	<5.0	103 %	108 %	101 %
1,3,5-Trimethylbenzene, ug/kg dw	<5.0	105 %	110 %	100 %
Vinyl chloride, ug/kg dw	<5.0	80 %	82 %	77 %
o-Xylene, ug/kg dw	<5.0	97 %	95 %	94 %
mp-Xylene, ug/kg dw	<10	95 %	95 %	93 %
Surrogate - Dibromofluoromethane	95 %	104 %	95 %	105 %
Surrogate - Toluene-d8	103 %	95 %	101 %	95 %
Surrogate - 4-Bromofluorobenzene	102 %	98 %	98 %	102 %
Dilution Factor	1	---		
Analysis Date	06.05.02	---	---	---
Batch ID	KAS104	KAS104	KAS104	KAS104
Prep Method	5030B	5030B	5030B	5030B
Analyst	DWB	---		
Quantitation Factor	1	---	---	---

SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C2-06056
Received: 04 JUN 02
Reported: 17 JUN 02

Mr. John Larson
Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-21	Method Blank	
06056-22	Lab Control Standard % Recovery	
06056-23	Matrix Spike % Recovery	
06056-24	Matrix Spike Duplicate % Recovery	

PARAMETER	06056-21	06056-22	06056-23	06056-24
RCRA Metals, Dissolved (6010B)				
Arsenic, Dissolved, mg/l	<0.0050	99 %	104 %	106 %
Barium, Dissolved, mg/l	<0.010	99 %	98 %	99 %
Cadmium, Dissolved, mg/l	<0.0050	100 %	98 %	99 %
Chromium, Dissolved, mg/l	<0.0050	100 %	98 %	99 %
Lead, Dissolved, mg/l	<0.0050	100 %	99 %	99 %
Selenium, Dissolved, mg/l	<0.010	100 %	107 %	108 %
Silver, Dissolved, mg/l	<0.0050	98 %	95 %	97 %
Dilution Factor	1	1	1	1
Prep Date	06.05.02	06.05.02	06.05.02	06.05.02
Analysis Date	06.06.02	06.06.02	06.06.02	06.06.02
Batch ID	PD067	PD067	PD067	PD067
Prep Method	N/A	N/A	N/A	N/A
Analyst	GSP	GSP	GSP	GSP
Mercury, Dissolved (7470A), mg/l	<0.00020	100 %	94 %	94 %
Dilution Factor	1	---	---	---
Prep Date	06.06.02	---	---	---
Analysis Date	06.06.02	---	---	---
Batch ID	HGW054	HGW054	HGW054	HGW054
Prep Method	7470A			
Analyst	JDE	---	---	---
Quantitation Factor	1	---	---	---

SEVERN TRENT SERVICES

STL Pensacola

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Received: 04 JUN 02
Reported: 17 JUN 02

Mr. John Larson
Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-21	Method Blank	
06056-22	Lab Control Standard % Recovery	
06056-23	Matrix Spike % Recovery	
06056-24	Matrix Spike Duplicate % Recovery	

PARAMETER	06056-21	06056-22	06056-23	06056-24
Chlorinated Pesticides (8081A)				
Aldrin, ug/l	<0.050	111 %	NoMS	NoMS
alpha-BHC, ug/l	<0.050	125 %	---	---
beta-BHC, ug/l	<0.050	113 %	---	---
gamma-BHC (Lindane), ug/l	<0.050	124 %	---	---
delta-BHC, ug/l	<0.050	113 %	---	---
alpha-Chlordane, ug/l	<0.050	111 %	---	---
gamma-Chlordane, ug/l	<0.050	112 %	---	---
4,4'-DDD, ug/l	<0.050	122 %	---	---
4,4'-DDE, ug/l	<0.050	119 %	---	---
4,4'-DDT, ug/l	<0.050	135 %	---	---
Dieldrin, ug/l	<0.050	118 %	---	---
Endosulfan I, ug/l	<0.050	115 %	---	---
Endosulfan II, ug/l	<0.050	113 %	---	---
Endosulfan sulfate, ug/l	<0.050	117 %	---	---
Endrin, ug/l	<0.050	124 %	---	---
Endrin aldehyde, ug/l	<0.050	107 %	---	---
Endrin ketone, ug/l	<0.050	115 %	---	---
Heptachlor, ug/l	<0.050	114 %	---	---
Heptachlor epoxide, ug/l	<0.050	111 %	---	---
Methoxychlor, ug/l	<0.050	120 %	---	---
Toxaphene, ug/l	<3.0	---	---	---
Surrogate - DCB	99 %	93 %	---	---

SEVERN TRENT SERVICES

STL Pensacola

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Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-21	Method Blank	
06056-22	Lab Control Standard % Recovery	
06056-23	Matrix Spike % Recovery	
06056-24	Matrix Spike Duplicate % Recovery	

PARAMETER	06056-21	06056-22	06056-23	06056-24
Surrogate - TCX	33 %	57 %	---	---
Dilution Factor	1			
Prep Date	06.06.02	---	---	---
Analysis Date	06.06.02	---	---	---
Batch ID	PSW046	PSW046		
Prep Method	3520C			
Analyst	KA		---	---
Quantitation Factor	1	---		
Polychlorinated Biphenyls (PCBs) (8082)				
Aroclor-1016, ug/l	<0.50	96 %	NoMS	NoMS
Aroclor-1221, ug/l	<0.50	---	---	---
Aroclor-1232, ug/l	<0.50	---	---	---
Aroclor-1242, ug/l	<0.50	---	---	---
Aroclor-1248, ug/l	<0.50	---	---	---
Aroclor-1254, ug/l	<0.50	---	---	---
Aroclor-1260, ug/l	<0.50	84 %	---	---
Surrogate - DCB	55 %	74 %	---	---
Surrogate - TCX	101 %	98 %	---	---
Dilution Factor	1	---		
Prep Date	06.06.02	---	---	---
Analysis Date	06.06.02	---	---	---
Batch ID	PSW046	PSW046		
Prep Method	3520C	---		
Analyst	KA	---	---	---
Quantitation Factor	1	---		

SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C2-06056
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Reported: 17 JUN 02

Mr. John Larson
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Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617
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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-21	Method Blank	
06056-22	Lab Control Standard % Recovery	
06056-23	Matrix Spike % Recovery	
06056-24	Matrix Spike Duplicate % Recovery	

PARAMETER	06056-21	06056-22	06056-23	06056-24
Volatile Organic Compounds (8260B)				
Benzene, ug/l	<1.0	97 %	93 %	98 %
Bromobenzene, ug/l	<5.0	105 %	109 %	109 %
Bromochloromethane, ug/l	<5.0	104 %	107 %	109 %
Bromodichloromethane, ug/l	<5.0	100 %	99 %	103 %
Bromoform, ug/l	<5.0	120 %	120 %	123 %
Bromomethane (Methyl bromide), ug/l	<5.0	90 %	91 %	93 %
Carbon tetrachloride, ug/l	<5.0	105 %	101 %	106 %
Chlorobenzene, ug/l	<5.0	106 %	108 %	108 %
Chloroethane, ug/l	<5.0	92 %	90 %	95 %
Chloroform, ug/l	<5.0	100 %	98 %	103 %
Chloromethane, ug/l	<5.0	79 %	69 %	81 %
2-Chlorotoluene, ug/l	<5.0	106 %	108 %	108 %
4-Chlorotoluene, ug/l	<5.0	105 %	105 %	108 %
Dibromochloromethane, ug/l	<5.0	108 %	109 %	113 %
Dibromomethane (Methylene bromide), ug/l	<5.0	107 %	105 %	108 %
1,2-Dibromoethane (EDB), ug/l	<5.0	114 %	115 %	118 %
1,2-Dichlorobenzene, ug/l	<5.0	102 %	105 %	104 %
1,3-Dichlorobenzene, ug/l	<5.0	103 %	106 %	105 %
1,4-Dichlorobenzene, ug/l	<5.0	101 %	103 %	107 %
Dichlorodifluoromethane, ug/l	<5.0	57 %	56 %	58 %
1,1-Dichloroethane, ug/l	<5.0	96 %	95 %	97 %
1,2-Dichloroethane, ug/l	<5.0	96 %	93 %	96 %

SEVERN TRENT SERVICES

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Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 090620617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-21	Method Blank	
06056-22	Lab Control Standard % Recovery	
06056-23	Matrix Spike % Recovery	
06056-24	Matrix Spike Duplicate % Recovery	

PARAMETER	06056-21	06056-22	06056-23	06056-24
1,1-Dichloroethene, ug/l	<5.0	96 %	98 %	100 %
cis-1,2-Dichloroethene, ug/l	<5.0	105 %	105 %	105 %
trans-1,2-Dichloroethene, ug/l	<5.0	94 %	98 %	102 %
1,2-Dichloropropane, ug/l	<5.0	94 %	92 %	99 %
1,3-Dichloropropane, ug/l	<5.0	104 %	104 %	110 %
2,2 Dichloropropane, ug/l	<5.0	94 %	94 %	96 %
cis-1,3-Dichloropropene, ug/l	<5.0	98 %	99 %	103 %
trans-1,3-Dichloropropene, ug/l	<5.0	104 %	110 %	111 %
Ethylbenzene, ug/l	<5.0	109 %	111 %	113 %
Hexachlorobutadiene, ug/l	<5.0	101 %	104 %	106 %
Isopropylbenzene (Cumene), ug/l	<5.0	106 %	107 %	110 %
p-Isopropyltoluene, ug/l	<5.0	100 %	101 %	103 %
Methylene chloride (Dichloromethane), ug/l	<5.0	100 %	102 %	104 %
Methyl t-butyl ether (MTBE), ug/l	<5.0	104 %	100 %	104 %
Naphthalene, ug/l	<5.0	109 %	110 %	115 %
n-Butylbenzene, ug/l	<5.0	97 %	100 %	101 %
n-Propylbenzene , ug/l	<5.0	98 %	100 %	99 %
sec-Butylbenzene, ug/l	<5.0	101 %	103 %	105 %
Styrene, ug/l	<5.0	108 %	106 %	111 %
t-Butylbenzene, ug/l	<5.0	100 %	102 %	103 %
1,1,1,2-Tetrachloroethane, ug/l	<5.0	107 %	108 %	108 %
1,1,2,2-Tetrachloroethane, ug/l	<5.0	108 %	108 %	109 %
Tetrachloroethene, ug/l	<5.0	108 %	111 %	112 %

SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C2-06056
Received: 04 JUN 02
Reported: 17 JUN 02

Mr. John Larson
Trans Systems
2400 Pershing Road - Suite 400
Kansas City, MO 64108

Project: GATEWAY, KC, MO
Sampled By: Client
Code: 131220617

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED
06056-21	Method Blank	
06056-22	Lab Control Standard % Recovery	
06056-23	Matrix Spike % Recovery	
06056-24	Matrix Spike Duplicate % Recovery	

PARAMETER	06056-21	06056-22	06056-23	06056-24
Toluene, ug/l	<5.0	106 %	109 %	110 %
1,1,1-Trichloroethane, ug/l	<5.0	103 %	106 %	106 %
1,1,2-Trichloroethane, ug/l	<5.0	115 %	116 %	121 %
1,2,3-Trichlorobenzene, ug/l	<5.0	103 %	108 %	112 %
1,2,4-Trichlorobenzene, ug/l	<5.0	107 %	110 %	113 %
Trichloroethene, ug/l	<5.0	100 %	98 %	102 %
Trichlorofluoromethane, ug/l	<5.0	94 %	94 %	96 %
1,2,3-Trichloropropane, ug/l	<5.0	108 %	99 %	107 %
1,2,4-Trimethylbenzene, ug/l	<5.0	100 %	103 %	102 %
1,3,5-Trimethylbenzene, ug/l	<5.0	100 %	102 %	104 %
Vinyl chloride, ug/l	<5.0	87 %	84 %	86 %
o-Xylene, ug/l	<5.0	107 %	107 %	112 %
mp-Xylene, ug/l	<10	104 %	105 %	108 %
Surrogate - Dibromofluoromethane	95 %	101 %	101 %	102 %
Surrogate - Toluene-d8	100 %	96 %	93 %	98 %
Surrogate - 4-Bromofluorobenzene	91 %	97 %	97 %	100 %
Dilution Factor	1	---	---	---
Prep Date	06.05.02	---	---	---
Analysis Date	06.05.02	---	---	---
Batch ID	LEW090	LEW090	LEW090	LEW090
Prep Method	5030B	---	---	---
Analyst	WD	---	---	---
Quantitation Factor	1	---	---	---

TRENT SERVICES
STL Pensacola

STL Pensacola Data Qualifiers for Final Report

B	The analyte was detected in the associated method blank and in the client's sample.
C	The compound has been quantitated against a one point calibration.
D	Recovery is not calculable due to dilution.
E	Estimated value because the analyte concentration exceeds the upper calibration range of the instrument or method.
I	Estimated value because the analyte concentration is less than the lower calibration range of the instrument but is at the method detection limit or greater than the method detection limit.
H	Sample and/or duplicate is below 5 X (times) the STL Reporting Limit and the absolute difference between the results exceeds the STL Reporting Limit.
J1	A sample surrogate or an LCS target compound recovered above the upper control limit (UCL). Compounds qualified with a J1 may be biased high.
J2	A sample surrogate or an LCS target compound recovered outside the lower control limit (LCL). Compounds qualified with a J2 may be biased low.
M1	A matrix effect was present.
M2	The MS and/or MSD %R or RPD was outside upper or lower control limits; not necessarily due to matrix effect.
N/C	Not Calculable; Sample spiked is > 4X spike concentration (may also use this flag in place of negative numbers).
R1	Internal standard area exceeds the acceptance criteria
R2	Calibration verification exceeds the acceptance criteria.
S1	The Method of Standard Additions (MSA) has been performed on this sample.
T	Second-column or detector confirmation exceeded the SW-846 criteria of 40% RPD for this compound.
TIC	The compound is not included in the initial calibration curve. It is searched for qualitatively or as a Tentatively Identified Compound.
U	The analyte was not detected at or above the MDL or the RL, whichever is entered next to the "U" value.
W	Post-digestion spike for Furnace AA is out of control limits (85-115%), while sample absorbance is less than 50% spike absorbance.

When the laboratory receives a sample that does not meet EPA requirements for sample collection, preservation or holding time, the laboratory is required to reject the samples. The client must be notified and asked whether the lab should proceed with analysis. Data from any samples that do not meet sample acceptance criteria (collection, preservation and holding time), must be flagged, or noted on a corrective action form or case narrative, or addressed on the Project Sample Inspection Form (PSIF) in an unambiguous manner clearly defining the nature and substance of the variation. NPDES samples from North Carolina that do not meet EPA requirements for sample collection, preservation or holding time are non-reportable for NPDES compliance monitoring.

Abbreviations

ND	Not Detected at or above the STL Pensacola reporting limit (RL)
NS	Not Submitted
NA	Not Applicable
MDL	STL Pensacola Method Detection Limit
RL	STL Pensacola Reporting Limit
NoMS	Not enough sample provided to prepare and/or analyze a method-required matrix spike (MS) and/or duplicate (MSD)

Florida Projects Inorganic/Organic

Refer to FL DEP 62-160.700(7); Table 7 Data Qualifier Codes. FL DEP Rule 62-160.670(1)(h) states that laboratories shall include the analytical result for each analysis with applicable data qualifiers. FL DEP Rule 62-160.700(7), Table 7 lists the FL DEP data qualifiers. FL DEP Rule 62-160.700(3), Table 3 lists the Florida sites which require data qualifiers.

AFCEE QAPP Projects

Refer to AFCEE QAPP for appropriate data qualifiers (AFCEE QAPP Version will be specified by client for the project).

Arizona DEQ Projects

Any qualified data submitted to Arizona DEQ (ADEQ) after January 1, 2001 must be designated using the Arizona Data Qualifiers as developed by the Arizona ELAC technical subcommittee. Refer to the ADEQ qualifier list.

CLP and CLP-like Projects

Refer to referenced CLP Statement of Work (SOW) for explanation of data qualifiers. CLP SOW to be followed must be specified to client.

STL PENSACOLA
Certifications, Memberships & Affiliations

Alabama Department of Environmental Management, Laboratory ID No. 40150 (Drinking Water by Reciprocity with FL), expires 06/30/02

Arizona Department of Health Services, Lab ID No. AZ0589 (Hazardous Waste & Wastewater), expires 01/11/03

Arkansas Department of Pollution Control and Ecology, (No Laboratory ID No. assigned by state) (Environmental), expires 02/20/03

California Department of Health Services, NELAP Laboratory ID No. 01128CA (Hazardous Waste and Wastewater), expires 03/31/02

Connecticut Department of Health Services, Connecticut Lab Approval No. PH-0697 (D W, H W and Wastewater), expires 09/30/03

Florida DOH, NELAP Laboratory ID No. E81010 (Drinking Water, Hazardous Waste and Wastewater), expires 06/30/02

Florida DEP/DOH CompQAP # 980156

Kansas Department of Health & Environment, NELAP Laboratory ID No. E10253 (Wastewater and Hazardous Waste), expires 10/31/02

Kentucky NR&EPC, Laboratory ID No. 90043 (Drinking Water), expires 12/31/02.

Louisiana DEQ, LELAP, NELAP Laboratory ID No. 02075, Agency Interest ID 30748 (Environmental, expires 6/30/02)

Maryland DH&MH Laboratory ID No. 233 (Drinking Water by Reciprocity with Florida), expires 09/30/02

Massachusetts DEP, Laboratory ID No. M-FL094 (Wastewater), expires 06/30/02

Michigan Bureau of E&OccH, Laboratory ID No.9912 (Drinking Water by Reciprocity with Florida), expires 06/30/02

New Hampshire DES ELAP, NELAP Laboratory ID No. 250501 (Wastewater), expires 08/16/02

New Jersey DEP&E, NELAP Laboratory ID No. FL006 (Wastewater and Hazardous Waster), expires 06/30/02.

New York State Department of Health, NELAP Laboratory ID No. 11503 (WW and Solids/Hazardous Waste), expires 03/31/02

North Carolina DENR, Laboratory ID No. 314 (Hazardous Waste and Wastewater), expires 12/31/02.

rth Dakota DH&Consol Labs, Laboratory ID No. R-108 Wastewater and Hazardous Waste by Reciprocity with Florida), expires 06/30/02

Oklahoma Department of Environmental Quality, Laboratory ID No. 9810 (Hazardous Waste and Wastewater), expires 08/31/02

Pennsylvania Department of Environmental Resources, NELAP Laboratory ID No. 68-467 (Drinking Water & Wastewater), expires 12/01/02

South Carolina DH&EC, Laboratory ID No. 96026 (Wastewater & Solids/Hazardous Waste by Reciprocity with FL), expires 06/30/02

Tennessee Department of Health & Environment, Laboratory ID No. 02907 (Drinking Water), expires 08/03/04

Virginia Department of General Services, Laboratory ID No. 00008 (Drinking Water by Reciprocity with FL), expires 06/30/02

Washington Department of Ecology, Laboratory ID No. C282 (Hazardous Waste and Wastewater), expires 09/14/02

West Virginia DOE, Office of Water Resources, Laboratory ID No. 136 (Haz Waste and Wastewater), expires 04/30/02.

American Industrial Hygiene Association (AIHA) Accredited Laboratory, Laboratory ID No. 100704, expires April 1, 2004. Participant in AIHA sponsored Laboratory PAT Rounds

EPA ICR (Information Collection Rule) Approved Laboratory, Laboratory ID No. ICRFL031

Naval Facilities Engineering Services Center (NFESC), expires July 5, 2002.

United States Army Corps. of Engineers (USACE), MRD, expires July 5, 2002.

STL Pensacola also has a foreign soil permit to accept soils from locations other than the continental United States. Permit No. S-37599

certlist\condcert.lst revised 05/14/2002

Chain of Custody Record

SEVERN TRENT SERVICES

Severn Trent Laboratories, Inc.

STL-4124 (0901)

Client: TranSystems	Project Manager: J. LARSON	Date: 6/3/02	Chain of Custody Number: 127154
Address: 2400 Pershing	Telephone Number (Area Code)/Fax Number: 816-329-8600/8602	Lab Number: C206056	Page 1 of 3
City: Kansas City; State: MO; Zip Code: 64108	Site Contact: ; Lab Contact: M. POPE		
Project Name and Location (State): Gateway ; K.C. MO.	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.:			

Analysis (Attach list if more space is needed)

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	8081 Org. Pest	8082 PCBs	RCRA Metals	TPH OA-2 DRO	8260 VOCs		Special Instructions/Conditions of Receipt
B-1-3	6/3/02	0830				X	X						X	X	X	X		1	
B1-3		0830					X										X	↓	
B1-7		0835					X						X	X	X	X		2	
B1-7		0835					X										X	↓	
B2-3		0910					X						X	X	X	X		3	
B2-3		0910					X										X	↓	
B3-4		0935					X						X	X	X	X		4	
B3-4		0935					X										X	↓	
B4-3		0950					X						X	X	X	X		5	
B4-3		0950					X										X	↓	
B4-7		0955					X						X	X	X	X		6	
B4-7		0955					X										X	↓	

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other 64 hours (64 hours)

QC Requirements (Specify):

1. Relinquished By: John Larson	Date: 6/3/02	Time: 1500	1. Received By: Sandra A. Dixon	Date: 6-4-02	Time: 0955
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

STL-4124 (0901)

SEVERN TRENT SERVICES — Severn Trent Laboratories, Inc.

Client	TranSystems
Address	2400 Pershing
City	Kansas City,
State	MO
Zip Code	64108
Project Name and Location (State)	GATEWAY, K.C. MO
Contract/Purchase Order/Quote No.	
Project Manager	J. LARSON
Telephone Number (Area Code)/Fax Number	816-329-8600/8602
Site Contact	
Lab Contact	M. POPE
Carrier/Waybill Number	
Date	6/3/02
Lab Number	C206056
Chain of Custody Number	127155
Page	2 of 3

Analysis (Attach list if more space is needed)

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Matrix: Aqueous	Matrix: Sed.	Matrix: Soil		Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH		8081 Org. Pest	8082 PCBs	RCRA METALS	TPH OA-2 DRO	8260 VOCs	Special Instructions/ Conditions of Receipt
B5-4	6/3/02	1050				X		X							X	X	X	X		7
B5-4		1050				X		X											X	
B6-3		1120				X		X							X	X	X	X		8
B6-3		1120				X		X											X	
B6-7		1125				X		X							X	X	X	X		9
B6-7		1125				X		X											X	
B2-GW		1330		X				X							X	X				10 8081 & 8082 in (1) liter
B2-GW		1330		X				X									X			LAB TO Filter Metals (200ml)
B2-GW		1330		X			JL	~~X~~			X							X		TPH @ 500 ml
B2-GW		1330		X			JL	~~X~~			2								X	
							JL	~~X~~												

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours 64 hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other 64 hours

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: John Larson	6/3/02	1500	1. Received By: Sandra R. Dixon	SHD 6-4-02 6-8-02	0955
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Attachment E

Test Pit Investigation, March 2018

Gary Van Riessen, P.C.
A Professional Corporation
Gary J. Van Riessen, P.E.
Consulting Geotechnical Engineer
34505 E. Drinkwater Road
Lone Jack, Missouri 64070-8567
816.556.0133 (Office)
816.830.6576 (Cell)
816.556.0139 (Fax)
Email: gvrlsmo@aol.com

March 12, 2018

Mr. Kevin Rowley
Dean Realty Co.
1201 West 31st Street, Suite 2
Kansas City, Missouri 64108

Reference: Summary of Test Pit Observations
Dean Realty Greystone - Radmacher Spoil Fill Site
Kansas City, Missouri

Dear Mr. Rowley:

The following report has been prepared to summarize the qualitative geotechnical assessment performed during test pit excavation observations of the proposed Greystone Spoil Fill Site. The spoil fill site is located on property northeast of the limits of the Greystone mine in Kansas City, Missouri and owned by Dean Realty Company. The site area is composed of approximately 1 acre and is generally level, with the outside (north/northeast) limits sloping downhill at approximately 1V:3H toward the neighboring railroad tracks. The proposed work for the Greystone Spoil Fill Site is to compact fill produced by excavation/tunneling operations at a nearby construction site. The estimated volume of the fill anticipated to be placed over a 36-month period of time ranges form 35,000-50,000 cubic yards. The quality of the fill material is unknown at this time and should be evaluated by this office in the future. The test pits conducted at the proposed spoil fill site were conducted to assess the existing subgrade conditions of the site and its suitability with regard to geotechnical strength and stability to accept additional fill material.

A total of seven test pits, spaced at approximately 100 feet along the proposed spoil fill site, were completed on March 9th, 2018. The test pits were excavated using a Caterpillar 345 Excavator to depths of 10 to 15 feet below ground level. Copies of the field logs are attached. The general subsurface conditions indicated by the test pits consisted of dry, compacted clay and shale fill, with larger shale and limestone fragments encountered throughout the depths of the test excavations. The shale and limestone fragments varied from minus 1 inch to 36-inch slabs/boulders. The shale material appeared to be representative of the Galesburg/Stark geological unit, and the limestone material likely originated from the Winterset and/or Bethany Falls units. Groundwater was not encountered at the time of excavations and all of the test pits contained slight to no moisture. Test Pit 3 (TP-3) encountered a different composition of fill material at a depth of 15 feet below the ground surface. This material was composed of a moist, mottled yellow-brown clay material with some concrete and brick debris. It is assumed that this material was comprised of demolition debris originating from an unknown source.

According to test pit observations, the fill material composing the proposed spoil fill site was observed to be generally well compacted. No apparent voids were encountered during test pit excavation. It was noted the test pits located along the outside limits of the fill site (north slope area) tended to display conditions of less compaction/densification during excavation, i.e. the walls of the test pit collapsed more during excavation, when compared to the test pits located along the limits of the Greystone mine slope (southern edge of proposed fill). This variation in the density of the historic fill condition, which should be expected due to the lower confining forces present along the outside limits of the site, must be taken into consideration during additional spoil fill placement, particularly with regard to the final configuration and geometry of the spoil fill.

In conclusion, based on the results of the qualitative geotechnical assessment described previously, the proposed spoil fill site is considered adequate to accept additional fill. Please note that the additional fill material should be observed/tested, with the placement/geometry of the additional fill being appropriately assessed or selected for estimated geotechnical strengths and overall stability, prior to placing fill at the site.

The opportunity to assist Dean Realty Company in this effort is appreciated. Please contact the undersigned with any questions.

Respectfully,

Gary J. Van Riessen

STATE OF MISSOURI
GARY J.
VAN RIESSEN
NUMBER
E-19058
REGISTERED PROFESSIONAL ENGINEER

Gary J. Van Riessen
3/12/18

Allison N. Sperber

Gary J. Van Riessen, P. E.
Consulting Geotechnical Engineer
Missouri Registration Number E-19058

Allison N. Sperber, P.E.
Project Engineer

Attachments: Test Pit Locations
Test Pit Photographs – March 9, 2018
Test Pit Field Logs – March 9, 2018

Test Pit Locations

Test Pit Locations
March 9, 2018
Dean Realty Greystone Pad Site

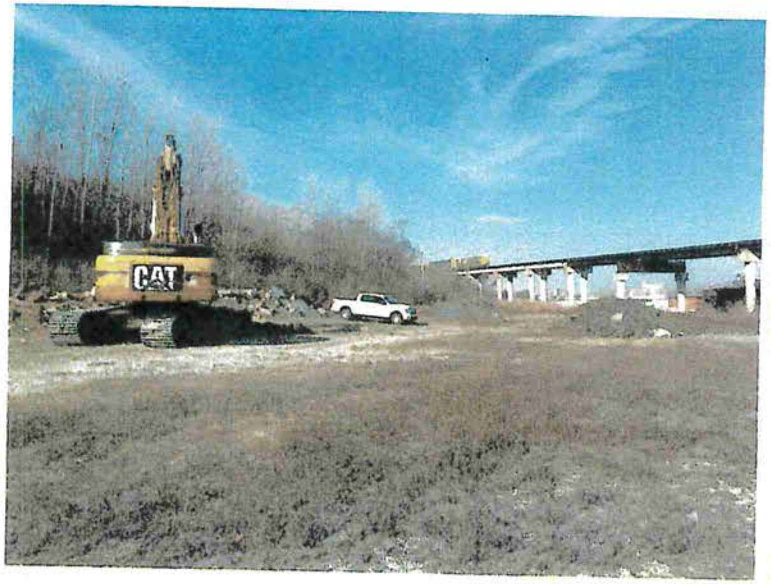
Test Pit Photographs

March 9, 2018

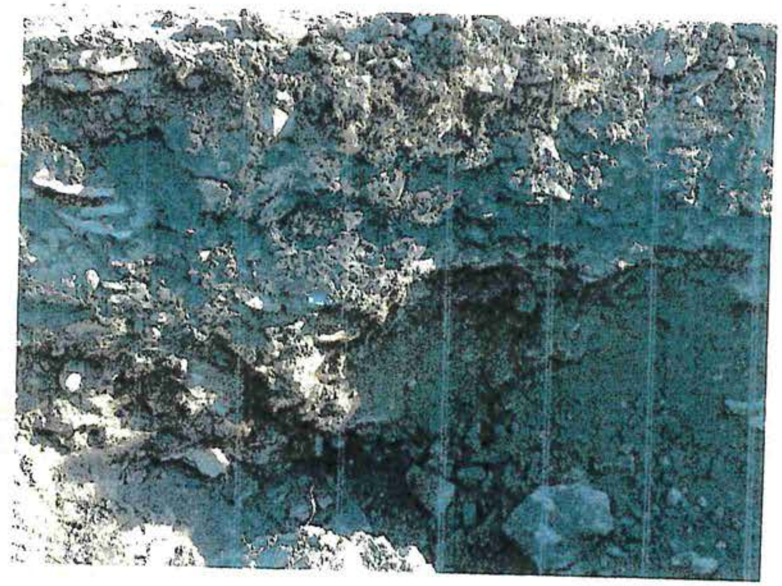
Test Pit 1 (TP-1)
March 9, 2018
Dean Realty Greystone Pad Site

Test Pit 2 (TP-2)
March 9, 2018
Dean Realty Greystone Pad Site

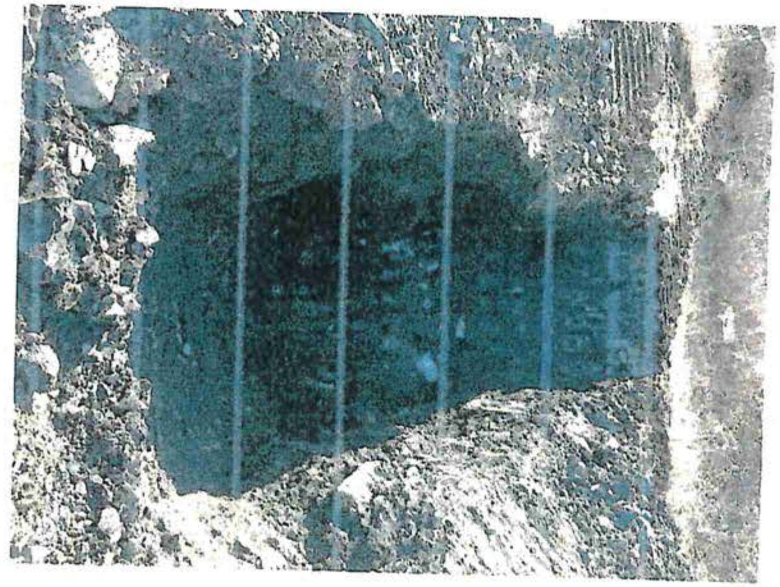
Test Pit 3 (TP-3)
March 9, 2018
Dean Realty Greystone Pad Site



Test Pit 4 (TP-4)
March 9, 2018
Dean Realty Greystone Pad Site



Test Pit 5 (TP-5)
March 9, 2018
Dean Realty Greystone Pad Site



Test Pit 6 (TP-6)
March 9, 2018
Dean Realty Greystone Pad Site

Test Pit 7 (TP-7)
March 9, 2018
Dean Realty Greystone Pad Site

Test Pit Field Logs

March 9, 2018

Gary Van Riessen, P.C.
A Professional Corporation
34505 E. Drinkwater Road
Lone Jack, Missouri 64070-8567

Test Pit Number TP-1 **Page** 1/7

TEST PIT LOG

Project: Dean Realty Pad Site		**Location:** NE of Greystone Mine, Kansas City, MO	
Elevation: 774 (Google)	**Excavation Contractor:** Radmacher		
Excavation Equipment: Cat 345 Excavator			
Water Levels: Not Encountered	**Start:** 0840	**Finish:** 0900	**Logger:** ANS

Depth (ft)	Sample Interval	Sample ID	Recovery (ft)	Moisture Content %	Dry Density (pcf)	Material Description
						Fill, compacted, gray-black clay/shale mixture with limestone fragments, dry to slight moisture, large 12" to 36" shale slabs and limestone boulders interbed throughout, no significant voids observed, groundwater not encountered
5						
10						@ 10' Bottom of TP-1
15						
20						
25						

Gary Van Riessen, P.C.
A Professional Corporation
34505 E. Drinkwater Road
Lone Jack, Missouri 64070-8567

Test Pit Number TP-2	**Page** 2/7
TEST PIT LOG	

Project: Dean Realty Pad Site	**Location:** NE of Greystone Mine, Kansas City, MO	
Elevation: 774 (Google)	**Excavation Contractor:** Radmacher	
Excavation Equipment: Cat 345 Excavator		
Water Levels: Not Encountered	**Start:** 0820	**Finish:** 0840 / **Logger:** ANS

Depth (ft)	Sample Interval	Sample ID	Recovery (ft)	Moisture Content %	Dry Density (pcf)	Material Description
						Fill, compacted, gray-black clay/shale mixture with limestone fragments, dry to slight moisture, large 12-36" shale slabs and limestone boulders interbed throughout, no significant voids observed, ground water not encountered
5						
10						@ 10' Bottom of TP-2
15						
20						
25						

Gary Van Riessen, P.C.
A Professional Corporation
34505 E. Drinkwater Road
Lone Jack, Missouri 64070-8567

Test Pit Number TP-3	Page 3/7

TEST PIT LOG

Project: Dean Realty Pad Site **Location:** NE of Greystone Mine, Kansas City, MO
Elevation: 774 (Google) **Excavation Contractor:** Radmacher
Excavation Equipment: Cat 345 Excavator
Water Levels: Not Encountered **Start:** 0900 **Finish:** 0930 **Logger:** ANS

Depth (ft)	Sample Interval	Sample ID	Recovery (ft)	Moisture Content %	Dry Density (pcf)	Material Description
						Fill, compacted, gray-black clay/shale mixture with limestone fragments, dry, large 12-36" shale slabs and limestone boulders interbed throughout, no significant voids observed, some minor collapse of sides during excavation, groundwater not encountered.
5						
10						
						@ 14' moist mottled yellow-brown clay with concrete + brick fragments
15						@ 15' Bottom of TP-3
20						
25						

Gary Van Riessen, P.C.
A Professional Corporation
34505 E. Drinkwater Road
Lone Jack, Missouri 64070-8567

Test Pit Number TP-4	Page 4/7

TEST PIT LOG

Project: Dean Realty Pad Site	Location: NE of Greystone Mine, Kansas City, MO
Elevation: 776 (Google)	Excavation Contractor: Radmacher
Excavation Equipment: Cat 345 Excavator	
Water Levels: Not Encountered	Start: 0930
Finish: 0945	Logger: ANS

Depth (ft)	Sample Interval	Sample ID	Recovery (ft)	Moisture Content %	Dry Density (pcf)	Material Description
						Fill, compacted, gray-black clay/shale mixture with limestone fragments, slightly moist, large 12"-36" shale slabs and limestone boulders interbed throughout, no significant voids observed, groundwater not encountered
5						
10						
						@ 13' Bottom of TP-4
15						
20						
25						

Gary Van Riessen, P.C.
A Professional Corporation
34505 E. Drinkwater Road
Lone Jack, Missouri 64070-8567

Test Pit Number TP-5 | **Page** 5/7

TEST PIT LOG

Project: Dean Realty Pad Site | **Location:** NE of Greystone Mine, Kansas City, MO
Elevation: 776 (Google) | **Excavation Contractor:** Radmacher
Excavation Equipment: Cat 345 Excavator
Water Levels: Not Encountered | **Start:** 0945 | **Finish:** 1000 | **Logger:** ANS

Depth (ft)	Sample Interval	Sample ID	Recovery (ft)	Moisture Content %	Dry Density (pcf)	Material Description
						Fill, compacted, gray-black clay/shale mixture with limestone fragments, dry, large 12"-36" shale slabs and limestone boulders interbed throughout some minor collapse of sides during excavation, no significant voids observed, groundwater not encountered
5						
10						
						@ 12' Bottom of TP-5
15						
20						
25						

Gary Van Riessen, P.C.
A Professional Corporation
34505 E. Drinkwater Road
Lone Jack, Missouri 64070-8567

Test Pit Number TP-6	Page 6/7

TEST PIT LOG

Project: Dean Realty Pad Site **Location:** NE of Greystone Mine, Kansas City, MO
Elevation: 777 (Google) **Excavation Contractor:** Radmacher
Excavation Equipment: Cat 345 Excavator
Water Levels: Not Encountered **Start:** 1000 **Finish:** 1015 **Logger:** ANS

Depth (ft)	Sample Interval	Sample ID	Recovery (ft)	Moisture Content %	Dry Density (pcf)	Material Description
						Fill, compacted, gray-black clay/shale mixture with limestone fragments, slightly moist, large 12"-36" shale slabs and limestone boulders interbed throughout, no significant voids observed, groundwater not encountered
5						
10						
						@ 13' Bottom of TP-6
15						
20						
25						

Attachment G

TCLP/SPLP Test Data Sheets
Proposed Fly Ash Source

Keystone LABORATORIES, INC.

NELAP ACCREDITED TNI LABORATORY

MEMBER ACIL

5/2/2017

Richie Benninghoven

USC Technologies L.L.C.

1300 NW Briarcliff Parkway, Ste., 250

Kansas City MO, 64150

RE: Project: Flyash Testing

Project Number: Nearman

This analytical report is for the samples received on 4/21/2017 1:00:00PM. If you have any questions concerning this report please feel free to contact me at 1-800-858-5227. The samples included in this analytical report are as follows:

Sample ID	Laboratory ID	Matrix	Date Sampled
Nearman FGD Ash Hardened w/ 4% cement	1D71622-01	Solid	04/20/17 00:00

Sincerely,

Carolyn L Jackson

Carolyn Jackson, Project Manager

Phone: 913-321-7856 1140 West Cambridge Circle Drive Kansas City, KS 66103 Fax: 913-831-6778

CASE NARRITIVE

All analytical results for this Work Order meet(s) the laboratory established acceptance criteria for the method(s) requested with the following exceptions.

ie: 913-321-7856 | 1140 West Cambridge Circle Drive, Kansas City, KS 66103 | Fax: 913-831-6778

Phone: 913-321-7856

1140 West Cambridge Circle Drive
Kansas City, KS 66103

Fax: 913-831-6778

Keystone LABORATORIES, INC.

C Technologies L.L.C.	Project: Flyash Testing	
..ansas City MO, 64150	Project Number: Nearman	**Reported:**
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	05/02/17 08:41

Nearman FGD Ash

1D71622-01(Solid)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
			Keystone Laboratories, Inc. - Newton							
Determination of Conventional Chemistry Parameters										
Chromium, hexavalent (SPLP)	**24**		10	ug/L	1	1AD1044	04/27/17	04/27/17	EPA 7196A	
% Solids	**66.1**		0.1	%	"	1AD0964	04/25/17	04/25/17	SM 2540 G	
Determination of Recoverable Metals										
Cobalt (SPLP)	ND		10.0	ug/L	10	1AD1005	04/26/17	04/28/17	EPA 6020A	
Determination of TCLP Metals										
Silver (TCLP)	ND		0.010	mg/L	1	1AD1062	04/27/17	04/28/17	EPA 6010B	
Aluminum (SPLP)	**9440**		100	ug/L	"	1AD1005	04/26/17	04/28/17	"	
..nic (TCLP)	ND		0.100	mg/L	"	1AD1062	04/27/17	04/28/17	"	
..um (TCLP)	**1.32**		0.500	"	"	"	"	"	"	
Boron (SPLP)	**185**		100	ug/L	"	1AD1005	04/26/17	04/28/17	"	
Cadmium (TCLP)	ND		0.005	mg/L	"	1AD1062	04/27/17	04/28/17	"	
Chromium (TCLP)	ND		0.030	"	"	"	"	"	"	
Iron (SPLP)	ND		100	ug/L	"	1AD1005	04/26/17	04/28/17	"	
Mercury (TCLP)	ND		0.00050	mg/L	"	1AD1104	04/28/17	04/28/17	EPA 7470A	
Manganese (SPLP)	ND		10	ug/L	"	1AD1005	04/26/17	04/28/17	EPA 6010B	
Lead (TCLP)	ND		0.020	mg/L	"	1AD1062	04/27/17	04/28/17	"	
Selenium (TCLP)	ND		0.050	"	"	"	"	"	"	
Zinc (SPLP)	ND		100	ug/L	"	1AD1005	04/26/17	04/28/17	"	
TCLP Extraction										
TCLP pH, Initial	**2.9**		0.1	pH	1	1AD0918	04/25/17	04/25/17	EPA 1311	
TCLP pH, Final	**7.4**		0.1	"	"	"	"	"	"	

..e results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Phone: 913-321-7856
1140 West Cambridge Circle Drive
Kansas City, KS 66103
Fax: 913-831-6778

C Technologies L.L.C.
Kansas City MO, 64150
1300 NW Briarcliff Parkway, Ste., 250

Project: Flyash Testing
Project Number: Nearman
Project Manager: Richie Benninghoven

Reported: 05/02/17 08:41

Nearman FGD Ash

1D71622-01(Solid)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Keystone Laboratories, Inc. - Newton										
Determination of SPLP Metals										
Arsenic (SPLP)	ND		20.0	ug/L	10	1AD1005	04/26/17	04/28/17	EPA 6020A	
Barium (SPLP)	**2520**		20.0	"	"	"	"	"	"	
Cadmium (SPLP)	ND		10.0	"	"	"	"	"	"	
Chromium (SPLP)	**148**		50.0	"	"	"	"	"	"	
Copper (SPLP)	ND		20.0	"	"	"	"	"	"	
Mercury (SPLP)	ND		0.50	"	1	1AD1104	04/28/17	04/28/17	EPA 7470A	
Nickel (SPLP)	ND		20	"	10	1AD1005	04/26/17	04/28/17	EPA 6020	
Lead (SPLP)	ND		20.0	"	"	"	"	"	EPA 6020A	
nony (SPLP)	ND		10.0	"	"	"	"	"	"	
aium (SPLP)	**24.7**		20.0	"	"	"	"	"	"	
Chromium III (SPLP)	**124**		50.0	"	"	[CALC]	04/27/17	"	*** DEFAULT SPECIFIC METHOD ***	
Thallium (SPLP)	ND		20.0	"	"	1AD1005	04/26/17	"	EPA 6020A	
SPLP Extraction										
SPLP pH, Initial	**5.0**			pH	1	1AD0920	04/25/17	04/25/17	EPA 1312	
SPLP pH, Final	**11.2**			"	"	"	"	"	"	

results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Phone: 913-321-7856
1140 West Cambridge Circle Drive
Kansas City, KS 66103
Fax: 913-831-6778

Determination of Conventional Chemistry Parameters - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AD0964 - Wet Chem Preparation											
Duplicate (1AD0964-DUP1)		**Source: 1D71747-02**			Prepared & Analyzed: 04/25/17						
% Solids	1.74		0.1	%		1.85			6.13	20	
Batch 1AD1044 - Wet Chem Preparation											
Blank (1AD1044-BLK1)					Prepared & Analyzed: 04/27/17						
Chromium, hexavalent (SPLP)	ND		10	ug/L							
LCS (1AD1044-BS1)					Prepared & Analyzed: 04/27/17						
Chromium, hexavalent (SPLP)	103		10	ug/L	100.000		103	78-121			
.rix Spike (1AD1044-MS1)		**Source: 1D71622-01**			Prepared & Analyzed: 04/27/17						
Chromium, hexavalent (SPLP)	220		20	ug/L	200.000	24.3	98.0	68-128			
Matrix Spike Dup (1AD1044-MSD1)		**Source: 1D71622-01**			Prepared & Analyzed: 04/27/17						
Chromium, hexavalent (SPLP)	226		20	ug/L	200.000	24.3	101	68-128	2.32	15	

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C Technologies L.L.C.	Project: Flyash Testing	
Kansas City MO, 64150	Project Number: Nearman	Reported:
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	05/02/17 08:41

Determination of Recoverable Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AD1005 - EPA 3010A TCLP ICP											
Blank (1AD1005-BLK3)					Prepared: 04/26/17 Analyzed: 04/28/17						
Cobalt (SPLP)	ND		10.0	ug/L							
Blank (1AD1005-BLK4)					Prepared: 04/26/17 Analyzed: 04/28/17						
Cobalt (SPLP)	ND		10.0	ug/L							
LCS (1AD1005-BS2)					Prepared: 04/26/17 Analyzed: 04/28/17						
Cobalt (SPLP)	477		50.0	ug/L	500.000		95.3	80-120			
Matrix Spike (1AD1005-MS2)		**Source: 1D71622-01**			Prepared: 04/26/17 Analyzed: 04/28/17						
.t (SPLP)	463		50.0	ug/L	500.000	0.3	92.5	75-125			
Matrix Spike Dup (1AD1005-MSD2)		**Source: 1D71622-01**			Prepared: 04/26/17 Analyzed: 04/28/17						
Cobalt (SPLP)	479		50.0	ug/L	500.000	0.3	95.7	75-125	3.41	20	
Post Spike (1AD1005-PS2)		**Source: 1D71622-01**			Prepared: 04/26/17 Analyzed: 04/28/17						
Cobalt (SPLP)	0.196			ug/L	0.200000	0.0003	98.1	80-120			

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Keystone LABORATORIES, INC.

Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AD1005 - EPA 3010A TCLP ICP											
Blank (1AD1005-BLK1)					Prepared: 04/26/17 Analyzed: 04/28/17						
Boron (SPLP)	ND		100	ug/L							
Aluminum (SPLP)	ND		100	"							
Iron (SPLP)	ND		100	"							
Manganese (SPLP)	ND		10	"							
Zinc (SPLP)	ND		100	"							
Blank (1AD1005-BLK2)					Prepared: 04/26/17 Analyzed: 04/28/17						
·n (SPLP)	ND		100	ug/L							
.ainum (SPLP)	ND		100	"							
Iron (SPLP)	ND		100	"							
Manganese (SPLP)	ND		10	"							
Zinc (SPLP)	ND		100	"							
LCS (1AD1005-BS1)					Prepared: 04/26/17 Analyzed: 04/28/17						
Boron (SPLP)	527		100	ug/L	500.000		105	80-120			
Aluminum (SPLP)	5760		100	"	5500.00		105	80-120			
Iron (SPLP)	2580		100	"	2500.00		103	80-120			
Manganese (SPLP)	515		10	"	500.000		103	80-120			
Zinc (SPLP)	567		100	"	500.000		113	80-120			
Matrix Spike (1AD1005-MS1)		**Source: 1D71622-01**			Prepared: 04/26/17 Analyzed: 04/28/17						
Boron (SPLP)	685		100	ug/L	500.000	185	100	70-130			
Aluminum (SPLP)	14500		100	"	5500.00	9440	93.0	70-130			
Iron (SPLP)	2550		100	"	2500.00	49	100	75-125			
Manganese (SPLP)	493		10	"	500.000	ND	98.7	70-130			
Zinc (SPLP)	515		100	"	500.000	21.4	98.7	70-130			
Matrix Spike Dup (1AD1005-MSD1)		**Source: 1D71622-01**			Prepared: 04/26/17 Analyzed: 04/28/17						
Boron (SPLP)	738		100	ug/L	500.000	185	111	70-130	7.55	20	
Aluminum (SPLP)	15700		100	"	5500.00	9440	114	70-130	7.66	20	
(SPLP)	2710		100	"	2500.00	49	107	75-125	6.28	20	

..e results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AD1005 - EPA 3010A TCLP ICP											
Matrix Spike Dup (1AD1005-MSD1)		**Source: 1D71622-01**			Prepared: 04/26/17 Analyzed: 04/28/17						
Manganese (SPLP)	521		10	ug/L	500.000	ND	104	70-130	5.39	20	
Zinc (SPLP)	533		100	"	500.000	21.4	102	70-130	3.47	20	
Post Spike (1AD1005-PS1)		**Source: 1D71622-01**			Prepared: 04/26/17 Analyzed: 04/28/17						
Boron (SPLP)	1.06			ug/L	0.800000	0.177	111	75-125			
Aluminum (SPLP)	18.5			"	8.80000	9.06	107	75-125			
Iron (SPLP)	4.29			"	4.00000	0.047	106	80-120			
Manganese (SPLP)	0.868			"	0.800000	-0.00106	109	75-125			
(SPLP)	0.860			"	0.800000	0.0205	105	75-125			
Batch 1AD1062 - EPA 1311											
Blank (1AD1062-BLK1)					Prepared: 04/27/17 Analyzed: 04/28/17						
Arsenic (TCLP)	ND		0.100	mg/L							
Barium (TCLP)	ND		0.500	"							
Cadmium (TCLP)	ND		0.005	"							
Chromium (TCLP)	ND		0.030	"							
Lead (TCLP)	ND		0.020	"							
Selenium (TCLP)	ND		0.050	"							
Silver (TCLP)	ND		0.010	"							
LCS (1AD1062-BS1)					Prepared: 04/27/17 Analyzed: 04/28/17						
Arsenic (TCLP)	0.975		0.100	mg/L	1.00000		97.5	80-120			
Barium (TCLP)	1.00		0.500	"	1.00000		100	80-120			
Cadmium (TCLP)	1.00		0.005	"	1.00000		100	80-120			
Chromium (TCLP)	1.01		0.030	"	1.00000		101	80-120			
Lead (TCLP)	1.05		0.020	"	1.00000		105	80-120			
Selenium (TCLP)	1.01		0.050	"	1.00000		101	80-120			
Silver (TCLP)	1.07		0.010	"	1.00000		107	80-120			

Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AD1062 - EPA 1311											
Matrix Spike (1AD1062-MS1)		**Source: 1D71711-01**			Prepared: 04/27/17 Analyzed: 04/28/17						
Arsenic (TCLP)	2.41		0.400	mg/L	2.50000	ND	96.3	70-130			
Barium (TCLP)	2.92		2.00	"	2.50000	0.547	94.7	70-130			
Cadmium (TCLP)	2.69		0.020	"	2.50000	0.189	100	70-130			
Chromium (TCLP)	2.38		0.120	"	2.50000	ND	95.0	70-130			
Lead (TCLP)	3.25		0.080	"	2.50000	0.840	96.2	70-130			
Selenium (TCLP)	2.41		0.200	"	2.50000	ND	96.4	70-130			
Silver (TCLP)	1.92		0.040	"	2.50000	0.00836	76.4	70-130			
rix Spike Dup (1AD1062-MSD1)		**Source: 1D71711-01**			Prepared: 04/27/17 Analyzed: 04/28/17						
Arsenic (TCLP)	2.38		0.400	mg/L	2.50000	ND	95.1	70-130	1.28	20	
Barium (TCLP)	2.84		2.00	"	2.50000	0.547	91.6	70-130	2.70	20	
Cadmium (TCLP)	2.66		0.020	"	2.50000	0.189	98.7	70-130	1.25	20	
Chromium (TCLP)	2.32		0.120	"	2.50000	ND	92.6	70-130	2.59	20	
Lead (TCLP)	3.23		0.080	"	2.50000	0.840	95.8	70-130	0.335	20	
Selenium (TCLP)	2.44		0.200	"	2.50000	ND	97.5	70-130	1.19	20	
Silver (TCLP)	1.78		0.040	"	2.50000	0.00836	70.7	70-130	7.69	20	
Post Spike (1AD1062-PS1)		**Source: 1D71711-01**			Prepared: 04/27/17 Analyzed: 04/28/17						
Arsenic (TCLP)	0.786			mg/L	0.800000	0.0449	92.7	75-125			
Barium (TCLP)	1.37			"	0.800000	0.541	103	75-125			
Cadmium (TCLP)	1.01			"	0.800000	0.187	102	75-125			
Chromium (TCLP)	0.769			"	0.800000	-0.00504	96.1	75-125			
Lead (TCLP)	1.62			"	0.800000	0.831	98.3	75-125			
Selenium (TCLP)	0.847			"	0.800000	-0.0270	106	75-125			
Silver (TCLP)	0.854			"	0.800000	0.00828	106	75-125			
Batch 1AD1104 - EPA 7470A Hg Water											
Blank (1AD1104-BLK1)					Prepared & Analyzed: 04/28/17						
Mercury (TCLP)	ND		0.00050	mg/L							

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Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AD1104 - EPA 7470A Hg Water											
Blank (1AD1104-BLK2)					Prepared & Analyzed: 04/28/17						
Mercury (TCLP)	ND		0.00050	mg/L							
Blank (1AD1104-BLK3)					Prepared & Analyzed: 04/28/17						
Mercury (TCLP)	ND		0.00050	mg/L							
LCS (1AD1104-BS1)					Prepared & Analyzed: 04/28/17						
Mercury (TCLP)	0.00240		0.00050	mg/L	0.00250000		96.0	79-116			
Matrix Spike (1AD1104-MS1)		**Source: 1D71711-01**			Prepared & Analyzed: 04/28/17						
ury (TCLP)	0.00255		0.00050	mg/L	0.00250000	ND	102	56-137			
Matrix Spike Dup (1AD1104-MSD1)		**Source: 1D71711-01**			Prepared & Analyzed: 04/28/17						
Mercury (TCLP)	0.00276		0.00050	mg/L	0.00250000	ND	110	56-137	7.91	13	

Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AD1005 - EPA 3010A TCLP ICP											
Blank (1AD1005-BLK3)					Prepared: 04/26/17 Analyzed: 04/28/17						
Antimony (SPLP)	ND		10.0	ug/L							
Arsenic (SPLP)	ND		20.0	"							
Barium (SPLP)	ND		20.0	"							
Cadmium (SPLP)	ND		10.0	"							
Chromium (SPLP)	ND		50.0	"							
Copper (SPLP)	ND		20.0	"							
Lead (SPLP)	ND		20.0	"							
el (SPLP)	ND		20	"							
Selenium (SPLP)	ND		20.0	"							
Thallium (SPLP)	ND		20.0	"							
Blank (1AD1005-BLK4)					Prepared: 04/26/17 Analyzed: 04/28/17						
Antimony (SPLP)	ND		10.0	ug/L							
Arsenic (SPLP)	ND		20.0	"							
Barium (SPLP)	51.8		20.0	"							QB-03
Cadmium (SPLP)	ND		10.0	"							
Chromium (SPLP)	ND		50.0	"							
Copper (SPLP)	ND		20.0	"							
Lead (SPLP)	ND		20.0	"							
Nickel (SPLP)	ND		20	"							
Selenium (SPLP)	ND		20.0	"							
Thallium (SPLP)	ND		20.0	"							
LCS (1AD1005-BS2)					Prepared: 04/26/17 Analyzed: 04/28/17						
Antimony (SPLP)	559		50.0	ug/L	500.000		112	80-120			
Arsenic (SPLP)	500		100	"	500.000		100	80-120			
Barium (SPLP)	514		100	"	500.000		103	80-120			
Cadmium (SPLP)	490		50.0	"	500.000		98.0	80-120			
Chromium (SPLP)	499		250	"	500.000		99.8	80-120			

C Technologies L.L.C.	Project: Flyash Testing	
Kansas City MO, 64150	Project Number: Nearman	Reported:
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	05/02/17 08:41

Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AD1005 - EPA 3010A TCLP ICP											
LCS (1AD1005-BS2)					Prepared: 04/26/17 Analyzed: 04/28/17						
Copper (SPLP)	469		100	ug/L	500.000		93.7	80-120			
Lead (SPLP)	510		100	"	500.000		102	80-120			
Nickel (SPLP)	486		100	"	500.000		97.2	80-120			
Selenium (SPLP)	498		100	"	500.000		99.6	80-120			
Thallium (SPLP)	439		100	"	500.000		87.9	80-120			
Matrix Spike (1AD1005-MS2)		**Source: 1D71622-01**			Prepared: 04/26/17 Analyzed: 04/28/17						
·imony (SPLP)	544		50.0	ug/L	500.000	1.0	109	75-125			
.nic (SPLP)	488		100	"	500.000	ND	97.7	75-125			
Barium (SPLP)	2970		100	"	500.000	2520	91.2	75-125			
Cadmium (SPLP)	486		50.0	"	500.000	ND	97.1	75-125			
Chromium (SPLP)	643		250	"	500.000	148	98.9	75-125			
Copper (SPLP)	472		100	"	500.000	ND	94.4	70-130			
Lead (SPLP)	500		100	"	500.000	ND	99.9	70-130			
Nickel (SPLP)	475		100	"	500.000	0.643	94.9	70-130			
Selenium (SPLP)	552		100	"	500.000	24.7	105	70-130			
Thallium (SPLP)	437		100	"	500.000	1.8	87.5	75-125			
Matrix Spike Dup (1AD1005-MSD2)		**Source: 1D71622-01**			Prepared: 04/26/17 Analyzed: 04/28/17						
Antimony (SPLP)	546		50.0	ug/L	500.000	1.0	109	75-125	0.431	20	
Arsenic (SPLP)	507		100	"	500.000	ND	101	75-125	3.75	20	
Barium (SPLP)	2980		100	"	500.000	2520	93.0	75-125	0.309	20	
Cadmium (SPLP)	482		50.0	"	500.000	ND	96.4	75-125	0.737	20	
Chromium (SPLP)	635		250	"	500.000	148	97.5	75-125	1.13	20	
Copper (SPLP)	463		100	"	500.000	ND	92.6	70-130	1.88	20	
Lead (SPLP)	504		100	"	500.000	ND	101	70-130	0.840	20	
Nickel (SPLP)	476		100	"	500.000	0.643	95.3	70-130	0.404	20	
Selenium (SPLP)	544		100	"	500.000	24.7	104	70-130	1.36	20	
Thallium (SPLP)	444		100	"	500.000	1.8	88.7	75-125	1.42	20	

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Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AD1005 - EPA 3010A TCLP ICP											
Post Spike (1AD1005-PS2)		**Source: 1D71622-01**			Prepared: 04/26/17 Analyzed: 04/28/17						
Antimony (SPLP)	0.213			ug/L	0.200000	0.0010	106	75-125			
Arsenic (SPLP)	0.193			"	0.200000	0.0016	95.6	80-120			
Barium (SPLP)	2.70			"	0.200000	2.47	115	80-120			
Cadmium (SPLP)	0.191			"	0.200000	0.0002	95.3	80-120			
Chromium (SPLP)	0.340			"	0.200000	0.145	97.4	80-120			
Copper (SPLP)	0.191			"	0.200000	0.0011	95.1	75-125			
˙ ¬d (SPLP)	0.196			"	0.200000	0.0002	97.9	75-125			
.el (SPLP)	0.198			"	0.200000	0.000630	98.5	75-125			
Selenium (SPLP)	0.204			"	0.200000	0.0242	90.0	75-125			
Thallium (SPLP)	0.176			"	0.200000	0.0018	87.2	80-120			
Batch 1AD1104 - EPA 7470A Hg Water											
Blank (1AD1104-BLK1)					Prepared & Analyzed: 04/28/17						
Mercury (SPLP)	ND		0.50	ug/L							
Blank (1AD1104-BLK2)					Prepared & Analyzed: 04/28/17						
Mercury (SPLP)	ND		0.50	ug/L							
Blank (1AD1104-BLK3)					Prepared & Analyzed: 04/28/17						
Mercury (SPLP)	ND		0.50	ug/L							
LCS (1AD1104-BS1)					Prepared & Analyzed: 04/28/17						
Mercury (SPLP)	2.40		0.50	ug/L	2.50000		96.0	79-116			
Matrix Spike (1AD1104-MS1)		**Source: 1D71711-01**			Prepared & Analyzed: 04/28/17						
Mercury (SPLP)	2.55		0.50	ug/L	2.50000	ND	102	56-137			

:C Technologies L.L.C.
Kansas City MO, 64150
1300 NW Briarcliff Parkway, Ste., 250

Project: Flyash Testing
Project Number: Nearman
Project Manager: Richie Benninghoven

Reported:
05/02/17 08:41

Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AD1104 - EPA 7470A Hg Water											
Matrix Spike Dup (1AD1104-MSD1)		**Source: 1D71711-01**			Prepared & Analyzed: 04/28/17						
Mercury (SPLP)	2.76		0.50	ug/L	2.50000	ND	110	56-137	7.91	13	

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Certified Analyses included in this Report

Method/Matrix	Analyte	Certifications
EPA 6010B in Solid		
	Aluminum (SPLP)	KS-NT
EPA 6010B in Water		
	Arsenic (TCLP)	KS-NT,SIA1X
	Barium (TCLP)	KS-NT,SIA1X
	Cadmium (TCLP)	KS-NT,SIA1X
	Chromium (TCLP)	KS-NT,SIA1X
	Lead (TCLP)	KS-NT,SIA1X
	Selenium (TCLP)	KS-NT,SIA1X
	Silver (TCLP)	KS-NT,SIA1X
EPA 6020 in Solid		
	Nickel (SPLP)	SIA1X,KS-NT
EPA 6020A in Solid		
	Antimony (SPLP)	SIA1X,KS-NT
	Arsenic (SPLP)	SIA1X,KS-NT
	Barium (SPLP)	SIA1X,KS-NT
	Cadmium (SPLP)	SIA1X,KS-NT
	Chromium (SPLP)	SIA1X,KS-NT
	Copper (SPLP)	SIA1X,KS-NT
	Lead (SPLP)	SIA1X,KS-NT
	Selenium (SPLP)	SIA1X,KS-NT
	Thallium (SPLP)	SIA1X,KS-NT
EPA 7470A in Water		
	Mercury (TCLP)	IA-NT,KS-NT
	Mercury (SPLP)	SIA1X
SM 2540 G in Sludge		
	% Solids	SIA1X

Code	Description	Number	Expires
KS-KC	Kansas Department of Health and Environment-KC	E-10110	04/30/2017
KS-NT	Kansas Department of Health and Environment (NELAP	E-10287	10/31/2017
MO-KC	Missouri Department of Natural Resources	140	04/30/2015
SIA1X	Iowa Department of Natural Resources	95	02/01/2019

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Notes and Definitions

QB-03	The method blank contains analyte at a concentration above the MRL; however concentration is less than 10% of the action level, which is negligible according to method criteria.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

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CHAIN OF CUSTODY RECORD

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SAMPLER:
SITE NAME:
ADDRESS:
CITY/ST/ZIP:
PHONE:

REPORT TO:
NAME: RICHIE BENNINGHOVEN
COMPANY NAME: USC TECHNOLOGIES
ADDRESS: 1300 NW BRIARCLIFF PKWY
CITY/ST/ZIP: KANSAS CITY, MO 64150
PHONE:
FAX:

BILL TO:
NAME:
COMPANY NAME:
ADDRESS:
CITY/ST/ZIP:
PHONE:
Keystone Quote No.: (If Applicable)

CLIENT SAMPLE NUMBER	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	MATRIX	GRAB/COMPOSITE	ANALYSES REQUIRED								LAB USE ONLY: SAMPLE CONDITION/COMMENTS	LABORATORY SAMPLE NUMBER
								TCLP		SPLP		BA-SPLP				
	4/21/17		NEARMAN HARDENED FGD ASH w/CEMENT	2				X		X		X				1071622-01

LAB USE ONLY
LABORATORY WORK ORDER NO. 1071622
SAMPLE TEMPERATURE UPON RECEIPT: No Ice °C

Relinquished by: (Signature)	Date 4/21/17 Time 7:30 AM	Received by: (Signature)	Date Time	Turn-Around: ☐ Standard ☒ Rush ___ Contact Lab Prior to Submission
Relinquished by: (Signature)	Date Time	Received for Lab by: (Signature)	Date 04/21/17 Time 13:00	Remarks:

Original - Lab Copy • Yellow - Sampler Copy

FORM: CCR 7-97

Keystone
LABORATORIES, INC.

MEMBER ACIL

5/16/2017

Richie Benninghoven
USC Technologies L.L.C.
1300 NW Briarcliff Parkway, Ste., 250
Kansas City MO, 64150

RE: Project: Flyash Testing
Project Number: Briarcliff Mines

This analytical report is for the samples received on 5/8/2017 12:45:00PM. If you have any questions concerning this report please feel free to contact me at 1-800-858-5227. The samples included in this analytical report are as follows:

Sample ID	Laboratory ID	Matrix	Date Sampled
Nearman Harden FGD Ash w/Cement 10%	1E70630-01	Solid	05/08/17 00:00

Sincerely,

Carolyn L. Jackson

Carolyn Jackson, Project Manager

Phone: 913-321-7856
1140 West Cambridge Circle Drive
Kansas City, KS 66103
Fax: 913-831-6778

CASE NARRITIVE

All analytical results for this Work Order meet(s) the laboratory established acceptance criteria for the method(s) requested with the following exceptions.

Phone: 913-321-7856
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Fax: 913-831-6778

SC Technologies L.L.C.	Project: Flyash Testing	
Kansas City MO, 64150	Project Number: Briarcliff Mines	Reported:
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	05/16/17 10:19

Nearman Harden FGD Ash w/Cement

1E70630-01(Solid)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
			Keystone Laboratories, Inc. - Newton							
Determination of Conventional Chemistry Parameters										
Chromium, hexavalent (SPLP)	**15**	8	10	ug/L	1	1AE0465	05/10/17	05/10/17	EPA 7196A	
pH, Soils	**11.4**		0.1	pH	"	1AE0520	05/11/17	05/11/17	EPA 9045	I-03
% Solids	**85.6**		0.1	%	"	1AE0355	05/09/17	05/10/17	SM 2540 G	
Determination of Recoverable Metals										
Cobalt (SPLP)	ND		4.0	ug/L	4	1AE0427	05/10/17	05/12/17	EPA 6020A	
Determination of TCLP Metals										
Silver (TCLP)	ND		0.040	mg/L	4	1AE0491	05/11/17	05/12/17	EPA 6010B	
minum (SPLP)	**10000**		100	ug/L	1	1AE0490	05/11/17	05/12/17	"	
enic (TCLP)	ND		0.400	mg/L	4	1AE0491	05/11/17	05/12/17	"	
Barium (TCLP)	**2.87**		2.00	"	"	"	"	"	"	
Boron (SPLP)	ND		100	ug/L	1	1AE0490	05/11/17	05/12/17	"	
Cadmium (TCLP)	ND		0.020	mg/L	4	1AE0491	05/11/17	05/12/17	"	
Chromium (TCLP)	**0.171**		0.120	"	"	"	"	"	"	
Iron (SPLP)	ND		100	ug/L	1	1AE0490	05/11/17	05/12/17	"	
Mercury (TCLP)	ND		0.00050	mg/L	"	1AE0555	05/12/17	05/12/17	EPA 7470A	
Manganese (SPLP)	ND		10	ug/L	"	1AE0490	05/11/17	05/12/17	EPA 6010B	
Lead (TCLP)	ND		0.120	mg/L	4	1AE0491	05/11/17	05/12/17	"	
Selenium (TCLP)	ND		0.200	"	"	"	"	"	"	
Zinc (SPLP)	**22**		10	ug/L	1	1AE0490	05/11/17	05/12/17	"	
TCLP Extraction										
TCLP pH, Initial	**2.9**		0.1	pH	1	1AE0305	05/08/17	05/09/17	EPA 1311	
TCLP pH, Final	**9.0**		0.1	"	"	"	"	"	"	

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Keystone LABORATORIES, INC.

MEMBER ACIL

SC Technologies L.L.C.	Project: Flyash Testing	
Kansas City MO, 64150	Project Number: Briarcliff Mines	**Reported:**
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	05/16/17 10:19

Nearman Harden FGD Ash w/Cement

1E70630-01(Solid)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
			Keystone Laboratories, Inc. - Newton							
Determination of SPLP Metals										
Arsenic (SPLP)	ND		8.0	ug/L	4	1AE0427	05/10/17	05/12/17	EPA 6020A	
Barium (SPLP)	**1790**		8.0	"	"	"	"	"	"	
Cadmium (SPLP)	ND		4.0	"	"	"	"	"	"	
Chromium (SPLP)	**87.1**		20.0	"	"	"	"	"	"	
Copper (SPLP)	ND		8.0	"	"	"	"	"	"	
Mercury (SPLP)	ND		0.50	"	1	1AE0554	05/12/17	05/12/17	EPA 7470A	
Nickel (SPLP)	ND		8	"	4	1AE0427	05/10/17	05/12/17	EPA 6020	
Lead (SPLP)	ND		8.0	"	"	"	"	"	EPA 6020A	
imony (SPLP)	ND		4.0	"	"	"	"	"	"	
enium (SPLP)	**24.8**		8.0	"	"	"	"	"	"	
Chromium III (SPLP)	**71.9**		20.0	"	"	[CALC]	05/10/17	"	*** DEFAULT SPECIFIC METHOD ***	
Thallium (SPLP)	ND		8.0	"	"	1AE0427	05/10/17	"	EPA 6020A	
SPLP Extraction										
SPLP pH, Initial	**5.0**			pH	1	1AE0343	05/08/17	05/09/17	EPA 1312	
SPLP pH, Final	**11.4**			"	"	"	"	"	"	

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SC Technologies L.L.C.	Project: Flyash Testing	
Kansas City MO, 64150	Project Number: Briarcliff Mines	Reported:
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	05/16/17 10:19

Determination of Conventional Chemistry Parameters - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AE0355 - Wet Chem Preparation											
Duplicate (1AE0355-DUP1)		**Source: 1E70511-01**			Prepared: 05/09/17 Analyzed: 05/10/17						
% Solids	94.5		0.1	%		94.0			0.531	20	
Batch 1AE0465 - Wet Chem Preparation											
Blank (1AE0465-BLK1)					Prepared & Analyzed: 05/10/17						
Chromium, hexavalent (SPLP)	ND	8	10	ug/L							
LCS (1AE0465-BS1)					Prepared & Analyzed: 05/10/17						
Chromium, hexavalent (SPLP)	104	8	10	ug/L	100.000		104	78-121			
trix Spike (1AE0465-MS1)		**Source: 1E70630-01**			Prepared & Analyzed: 05/10/17						
Chromium, hexavalent (SPLP)	231	17	20	ug/L	200.000	15.2	115	68-128			
Matrix Spike Dup (1AE0465-MSD1)		**Source: 1E70630-01**			Prepared & Analyzed: 05/10/17						
Chromium, hexavalent (SPLP)	235	17	20	ug/L	200.000	15.2	117	68-128	1.67	15	
Batch 1AE0520 - Wet Chem Preparation											
Duplicate (1AE0520-DUP1)		**Source: 1E70630-01**			Prepared & Analyzed: 05/11/17						
pH, Soils	11.4		0.1	pH		11.4			0.176	10	
Reference (1AE0520-SRM1)					Prepared & Analyzed: 05/11/17						
pH, Soils	7.0		0.1	pH	7.00000		100	0-200			

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SC Technologies L.L.C.
ansas City MO, 64150
1300 NW Briarcliff Parkway, Ste., 250

Project: Flyash Testing
Project Number: Briarcliff Mines
Project Manager: Richie Benninghoven

Reported:
05/16/17 10:19

Determination of Recoverable Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AE0427 - EPA 3005A Total Recoverable Metals											
Blank (1AE0427-BLK1)					Prepared: 05/10/17 Analyzed: 05/12/17						
Cobalt (SPLP)	ND		4.0	ug/L							
Blank (1AE0427-BLK2)					Prepared: 05/10/17 Analyzed: 05/12/17						
Cobalt (SPLP)	ND		4.0	ug/L							
LCS (1AE0427-BS1)					Prepared: 05/10/17 Analyzed: 05/12/17						
Cobalt (SPLP)	103		4.0	ug/L	100.000		103	80-120			
Matrix Spike (1AE0427-MS1)		**Source: 1E70630-01**			Prepared: 05/10/17 Analyzed: 05/12/17						
alt (SPLP)	102		4.0	ug/L	100.000	0.1	102	75-125			
Matrix Spike Dup (1AE0427-MSD1)		**Source: 1E70630-01**			Prepared: 05/10/17 Analyzed: 05/12/17						
Cobalt (SPLP)	103		4.0	ug/L	100.000	0.1	103	75-125	0.808	20	
Post Spike (1AE0427-PS1)		**Source: 1E70630-01**			Prepared: 05/10/17 Analyzed: 05/12/17						
Cobalt (SPLP)	0.0783			ug/L	0.0800000	0.0001	97.7	80-120			

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SC Technologies L.L.C.
Kansas City MO, 64150
1300 NW Briarcliff Parkway, Ste., 250

Project: Flyash Testing
Project Number: Briarcliff Mines
Project Manager: Richie Benninghoven

Reported: 05/16/17 10:19

Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AE0490 - EPA 1312											
Blank (1AE0490-BLK1)					Prepared: 05/11/17 Analyzed: 05/12/17						
Boron (SPLP)	ND		100	ug/L							
Aluminum (SPLP)	ND		100	"							
Iron (SPLP)	ND		100	"							
Manganese (SPLP)	ND		10	"							
Zinc (SPLP)	ND		10	"							
Blank (1AE0490-BLK2)					Prepared: 05/11/17 Analyzed: 05/12/17						
-ron (SPLP)	ND		100	ug/L							
.ninum (SPLP)	ND		100	"							
Iron (SPLP)	ND		100	"							
Manganese (SPLP)	ND		10	"							
Zinc (SPLP)	18.1		10	"							QB-04
LCS (1AE0490-BS1)					Prepared: 05/11/17 Analyzed: 05/12/17						
Boron (SPLP)	523		100	ug/L	500.000		105	80-120			
Aluminum (SPLP)	5810		100	"	5500.00		106	80-120			
Iron (SPLP)	2550		100	"	2500.00		102	80-120			
Manganese (SPLP)	524		10	"	500.000		105	80-120			
Zinc (SPLP)	528		10	"	500.000		106	80-120			
Matrix Spike (1AE0490-MS1)		**Source: 1E70630-01**			Prepared: 05/11/17 Analyzed: 05/12/17						
Boron (SPLP)	571		100	ug/L	500.000	72	99.7	70-130			
Aluminum (SPLP)	15300		100	"	5500.00	10000	95.7	70-130			
Iron (SPLP)	2450		100	"	2500.00	ND	98.1	75-125			
Manganese (SPLP)	521		10	"	500.000	ND	104	70-130			
Zinc (SPLP)	501		10	"	500.000	21.8	95.8	70-130			
Matrix Spike Dup (1AE0490-MSD1)		**Source: 1E70630-01**			Prepared: 05/11/17 Analyzed: 05/12/17						
Boron (SPLP)	565		100	ug/L	500.000	72	98.6	70-130	0.952	20	
Aluminum (SPLP)	15500		100	"	5500.00	10000	99.0	70-130	1.17	20	
· (SPLP)	2390		100	"	2500.00	ND	95.6	75-125	2.61	20	

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Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AE0490 - EPA 1312											
Matrix Spike Dup (1AE0490-MSD1)		**Source: 1E70630-01**			Prepared: 05/11/17 Analyzed: 05/12/17						
Manganese (SPLP)	511		10	ug/L	500.000	ND	102	70-130	1.89	20	
Zinc (SPLP)	490		10	"	500.000	21.8	93.7	70-130	2.16	20	
Post Spike (1AE0490-PS1)		**Source: 1E70630-01**			Prepared: 05/11/17 Analyzed: 05/12/17						
Boron (SPLP)	0.915			ug/L	0.800000	0.072	105	75-125			
Aluminum (SPLP)	19.8			"	8.80000	9.93	113	75-125			
Iron (SPLP)	4.20			"	4.00000	0.0144	105	80-120			
nganese (SPLP)	0.828			"	0.800000	-0.00180	103	75-125			
.c (SPLP)	0.811			"	0.800000	0.0216	98.6	75-125			
Batch 1AE0491 - EPA 1311											
Blank (1AE0491-BLK1)					Prepared & Analyzed: 05/11/17						
Arsenic (TCLP)	ND		0.100	mg/L							
Barium (TCLP)	ND		0.500	"							
Cadmium (TCLP)	ND		0.005	"							
Chromium (TCLP)	ND		0.030	"							
Lead (TCLP)	ND		0.030	"							
Selenium (TCLP)	ND		0.050	"							
Silver (TCLP)	ND		0.010	"							
Blank (1AE0491-BLK2)					Prepared & Analyzed: 05/11/17						
Arsenic (TCLP)	ND		0.100	mg/L							
Barium (TCLP)	ND		0.500	"							
Cadmium (TCLP)	ND		0.005	"							
Chromium (TCLP)	ND		0.030	"							
Lead (TCLP)	ND		0.030	"							
Selenium (TCLP)	ND		0.050	"							
Silver (TCLP)	ND		0.010	"							

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'JSC Technologies L.L.C. Kansas City MO, 64150 1300 NW Briarcliff Parkway, Ste., 250	Project: Flyash Testing Project Number: Briarcliff Mines Project Manager: Richie Benninghoven	**Reported:** 05/16/17 10:19

Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AE0491 - EPA 1311											
Blank (1AE0491-BLK3)					Prepared & Analyzed: 05/11/17						
Arsenic (TCLP)	ND		0.100	mg/L							
Barium (TCLP)	ND		0.500	"							
Cadmium (TCLP)	ND		0.005	"							
Chromium (TCLP)	ND		0.030	"							
Lead (TCLP)	ND		0.030	"							
Selenium (TCLP)	ND		0.050	"							
Silver (TCLP)	ND		0.010	"							
nk (1AE0491-BLK4)					Prepared & Analyzed: 05/11/17						
Arsenic (TCLP)	ND		0.100	mg/L							
Barium (TCLP)	ND		0.500	"							
Cadmium (TCLP)	ND		0.005	"							
Chromium (TCLP)	ND		0.030	"							
Lead (TCLP)	ND		0.030	"							
Selenium (TCLP)	ND		0.050	"							
Silver (TCLP)	ND		0.010	"							
LCS (1AE0491-BS1)					Prepared & Analyzed: 05/11/17						
Arsenic (TCLP)	0.480		0.100	mg/L	0.500000		96.0	80-120			
Barium (TCLP)	0.516		0.500	"	0.500000		103	80-120			
Cadmium (TCLP)	0.515		0.005	"	0.500000		103	80-120			
Chromium (TCLP)	0.513		0.030	"	0.500000		103	80-120			
Lead (TCLP)	0.526		0.030	"	0.500000		105	80-120			
Selenium (TCLP)	0.495		0.050	"	0.500000		99.0	80-120			
Silver (TCLP)	0.534		0.010	"	0.500000		107	80-120			
Matrix Spike (1AE0491-MS1)		**Source: 1E70558-02**			Prepared: 05/11/17 Analyzed: 05/12/17						
Arsenic (TCLP)	0.537		0.100	mg/L	0.500000	ND	107	70-130			
Barium (TCLP)	1.84		0.500	"	0.500000	1.29	111	70-130			
Cadmium (TCLP)	0.511		0.005	"	0.500000	ND	102	70-130			

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Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AE0491 - EPA 1311											
Matrix Spike (1AE0491-MS1)		**Source: 1E70558-02**			Prepared: 05/11/17 Analyzed: 05/12/17						
Chromium (TCLP)	0.497		0.030	mg/L	0.500000	ND	99.5	70-130			
Lead (TCLP)	0.491		0.030	"	0.500000	0.014	95.5	70-130			
Selenium (TCLP)	0.544		0.050	"	0.500000	0.0211	105	70-130			
Silver (TCLP)	0.521		0.010	"	0.500000	0.00140	104	70-130			
Matrix Spike Dup (1AE0491-MSD1)		**Source: 1E70558-02**			Prepared: 05/11/17 Analyzed: 05/12/17						
Arsenic (TCLP)	0.533		0.100	mg/L	0.500000	ND	107	70-130	0.737	20	
Barium (TCLP)	1.81		0.500	"	0.500000	1.29	103	70-130	2.03	20	
.nium (TCLP)	0.505		0.005	"	0.500000	ND	101	70-130	1.22	20	
Chromium (TCLP)	0.500		0.030	"	0.500000	ND	100	70-130	0.528	20	
Lead (TCLP)	0.486		0.030	"	0.500000	0.014	94.4	70-130	1.16	20	
Selenium (TCLP)	0.522		0.050	"	0.500000	0.0211	100	70-130	4.05	20	
Silver (TCLP)	0.519		0.010	"	0.500000	0.00140	104	70-130	0.320	20	
Post Spike (1AE0491-PS1)		**Source: 1E70558-02**			Prepared: 05/11/17 Analyzed: 05/12/17						
Arsenic (TCLP)	0.851			mg/L	0.800000	-0.000270	106	75-125			
Barium (TCLP)	2.19			"	0.800000	1.28	114	75-125			
Cadmium (TCLP)	0.789			"	0.800000	0.00009	98.6	75-125			
Chromium (TCLP)	0.779			"	0.800000	0.00359	97.0	75-125			
Lead (TCLP)	0.811			"	0.800000	0.013	99.6	75-125			
Selenium (TCLP)	0.804			"	0.800000	0.0209	97.9	75-125			
Silver (TCLP)	0.789			"	0.800000	0.00139	98.5	75-125			
Batch 1AE0555 - EPA 7470A Hg Water											
Blank (1AE0555-BLK1)					Prepared & Analyzed: 05/12/17						
Mercury (TCLP)	ND		0.00050	mg/L							

SC Technologies L.L.C.	Project: Flyash Testing	
Kansas City MO, 64150	Project Number: Briarcliff Mines	Reported:
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	05/16/17 10:19

Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AE0555 - EPA 7470A Hg Water											
Blank (1AE0555-BLK2)					Prepared & Analyzed: 05/12/17						
Mercury (TCLP)	ND		0.00050	mg/L							
Blank (1AE0555-BLK3)					Prepared & Analyzed: 05/12/17						
Mercury (TCLP)	ND		0.00050	mg/L							
Blank (1AE0555-BLK4)					Prepared & Analyzed: 05/12/17						
Mercury (TCLP)	ND		0.00050	mg/L							
LCS (1AE0555-BS1)					Prepared & Analyzed: 05/12/17						
cury (TCLP)	0.00215		0.00050	mg/L	0.00250000		86.0	79-116			
Matrix Spike (1AE0555-MS1)		**Source: 1E70630-01**			Prepared & Analyzed: 05/12/17						
Mercury (TCLP)	0.00285		0.00050	mg/L	0.00250000	0.000476	95.0	56-137			
Matrix Spike Dup (1AE0555-MSD1)		**Source: 1E70630-01**			Prepared & Analyzed: 05/12/17						
Mercury (TCLP)	0.00283		0.00050	mg/L	0.00250000	0.000476	94.2	56-137	0.704	13	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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'SC Technologies L.L.C.	Project: Flyash Testing	
..ansas City MO, 64150	Project Number: Briarcliff Mines	Reported:
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	05/16/17 10:19

Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AE0427 - EPA 3005A Total Recoverable Metals											
Blank (1AE0427-BLK1)					Prepared: 05/10/17 Analyzed: 05/12/17						
Antimony (SPLP)	ND		4.0	ug/L							
Arsenic (SPLP)	ND		8.0	"							
Barium (SPLP)	ND		8.0	"							
Cadmium (SPLP)	ND		4.0	"							
Chromium (SPLP)	ND		20.0	"							
Copper (SPLP)	ND		8.0	"							
Lead (SPLP)	ND		8.0	"							
:el (SPLP)	ND		8	"							
..elenium (SPLP)	ND		8.0	"							
Thallium (SPLP)	ND		8.0	"							
Blank (1AE0427-BLK2)					Prepared: 05/10/17 Analyzed: 05/12/17						
Antimony (SPLP)	ND		4.0	ug/L							
Arsenic (SPLP)	ND		8.0	"							
Barium (SPLP)	110		8.0	"							QB-03
Cadmium (SPLP)	ND		4.0	"							
Chromium (SPLP)	ND		20.0	"							
Copper (SPLP)	ND		8.0	"							
Lead (SPLP)	ND		8.0	"							
Nickel (SPLP)	ND		8	"							
Selenium (SPLP)	ND		8.0	"							
Thallium (SPLP)	ND		8.0	"							
LCS (1AE0427-BS1)					Prepared: 05/10/17 Analyzed: 05/12/17						
Antimony (SPLP)	104		4.0	ug/L	100.000		104	80-120			
Arsenic (SPLP)	103		8.0	"	100.000		103	80-120			
Barium (SPLP)	117		8.0	"	100.000		117	80-120			
Cadmium (SPLP)	101		4.0	"	100.000		101	80-120			
Chromium (SPLP)	105		20.0	"	100.000		105	80-120			

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Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AE0427 - EPA 3005A Total Recoverable Metals											
LCS (1AE0427-BS1)					Prepared: 05/10/17 Analyzed: 05/12/17						
Copper (SPLP)	106		8.0	ug/L	100.000		106	80-120			
Lead (SPLP)	101		8.0	"	100.000		101	80-120			
Nickel (SPLP)	103		8	"	100.000		103	80-120			
Selenium (SPLP)	97.3		8.0	"	100.000		97.3	80-120			
Thallium (SPLP)	96.7		8.0	"	100.000		96.7	80-120			
Matrix Spike (1AE0427-MS1)		**Source: 1E70630-01**			Prepared: 05/10/17 Analyzed: 05/12/17						
Antimony (SPLP)	104		4.0	ug/L	100.000	0.7	104	75-125			
Arsenic (SPLP)	102		8.0	"	100.000	ND	102	75-125			
Barium (SPLP)	1950		8.0	"	100.000	1790	160	75-125			QM-4X
Cadmium (SPLP)	95.8		4.0	"	100.000	ND	95.8	75-125			
Chromium (SPLP)	194		20.0	"	100.000	87.1	107	75-125			
Copper (SPLP)	101		8.0	"	100.000	ND	101	70-130			
Lead (SPLP)	97.7		8.0	"	100.000	ND	97.7	70-130			
Nickel (SPLP)	102		8	"	100.000	0.316	102	70-130			
Selenium (SPLP)	118		8.0	"	100.000	24.8	92.8	70-130			
Thallium (SPLP)	94.9		8.0	"	100.000	1.1	93.8	75-125			
Matrix Spike Dup (1AE0427-MSD1)		**Source: 1E70630-01**			Prepared: 05/10/17 Analyzed: 05/12/17						
Antimony (SPLP)	103		4.0	ug/L	100.000	0.7	103	75-125	0.950	20	
Arsenic (SPLP)	98.4		8.0	"	100.000	ND	98.4	75-125	3.87	20	
Barium (SPLP)	1860		8.0	"	100.000	1790	64.2	75-125	5.03	20	QM-4X
Cadmium (SPLP)	94.1		4.0	"	100.000	ND	94.1	75-125	1.84	20	
Chromium (SPLP)	185		20.0	"	100.000	87.1	97.4	75-125	5.20	20	
Copper (SPLP)	101		8.0	"	100.000	ND	101	70-130	0.767	20	
Lead (SPLP)	96.1		8.0	"	100.000	ND	96.1	70-130	1.63	20	
Nickel (SPLP)	103		8	"	100.000	0.316	103	70-130	0.757	20	
Selenium (SPLP)	115		8.0	"	100.000	24.8	90.6	70-130	1.89	20	
Thallium (SPLP)	93.0		8.0	"	100.000	1.1	91.9	75-125	2.02	20	

Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1AE0427 - EPA 3005A Total Recoverable Metals											
Post Spike (1AE0427-PS1)		**Source: 1E70630-01**			Prepared: 05/10/17 Analyzed: 05/12/17						
Antimony (SPLP)	0.0786			ug/L	0.0800000	0.0007	97.4	75-125			
Arsenic (SPLP)	0.0787			"	0.0800000	0.0009	97.3	80-120			
Barium (SPLP)	1.85			"	0.0800000	1.76	114	80-120			
Cadmium (SPLP)	0.0727			"	0.0800000	0.00004	90.8	80-120			
Chromium (SPLP)	0.163			"	0.0800000	0.0854	97.4	80-120			
Copper (SPLP)	0.0772			"	0.0800000	0.0010	95.2	75-125			
Lead (SPLP)	0.0751			"	0.0800000	0.0002	93.5	75-125			
'cel (SPLP)	0.0771			"	0.0800000	0.000310	96.0	75-125			
Selenium (SPLP)	0.0955			"	0.0800000	0.0243	89.0	75-125			
Thallium (SPLP)	0.0789			"	0.0800000	0.0010	97.3	80-120			
Batch 1AE0554 - EPA 7470A Hg Water											
Blank (1AE0554-BLK1)					Prepared & Analyzed: 05/12/17						
Mercury (SPLP)	ND		0.50	ug/L							
LCS (1AE0554-BS1)					Prepared & Analyzed: 05/12/17						
Mercury (SPLP)	2.43		0.50	ug/L	2.50000		97.2	79-116			
Matrix Spike (1AE0554-MS1)		**Source: 1E70630-01**			Prepared & Analyzed: 05/12/17						
Mercury (SPLP)	2.51		0.50	ug/L	2.50000	ND	100	56-137			
Matrix Spike Dup (1AE0554-MSD1)		**Source: 1E70630-01**			Prepared & Analyzed: 05/12/17						
Mercury (SPLP)	2.46		0.50	ug/L	2.50000	ND	98.4	56-137	2.01	13	

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'SC Technologies L.L.C.	Project: Flyash Testing	
Kansas City MO, 64150	Project Number: Briarcliff Mines	Reported:
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	05/16/17 10:19

Certified Analyses included in this Report

Method/Matrix	Analyte	Certifications
EPA 6010B in Water		
	Aluminum (SPLP)	KS-NT
	Arsenic (TCLP)	KS-NT,SIA1X
	Barium (TCLP)	KS-NT,SIA1X
	Cadmium (TCLP)	KS-NT,SIA1X
	Chromium (TCLP)	KS-NT,SIA1X
	Lead (TCLP)	KS-NT,SIA1X
	Selenium (TCLP)	KS-NT,SIA1X
	Silver (TCLP)	KS-NT,SIA1X
A 6020 in Solid		
	Nickel (SPLP)	SIA1X,KS-NT
EPA 6020A in Solid		
	Antimony (SPLP)	SIA1X,KS-NT
	Arsenic (SPLP)	SIA1X,KS-NT
	Barium (SPLP)	SIA1X,KS-NT
	Cadmium (SPLP)	SIA1X,KS-NT
	Chromium (SPLP)	SIA1X,KS-NT
	Copper (SPLP)	SIA1X,KS-NT
	Lead (SPLP)	SIA1X,KS-NT
	Selenium (SPLP)	SIA1X,KS-NT
	Thallium (SPLP)	SIA1X,KS-NT
EPA 7470A in Water		
	Mercury (TCLP)	IA-NT,KS-NT
	Mercury (SPLP)	SIA1X
EPA 9045 in Solid		
	pH, Soils	KS-NT,SIA1X
SM 2540 G in Sludge		
	% Solids	SIA1X

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Code	Description	Number	Expires
KS-KC	Kansas Department of Health and Environment-KC	E-10110	05/31/2017
KS-NT	Kansas Department of Health and Environment (NELAP	E-10287	10/31/2017
MO-KC	Missouri Department of Natural Resources	140	04/30/2015
SIA1X	Iowa Department of Natural Resources	95	02/01/2019

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Notes and Definitions

QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration.
QB-04	The method blank contains analyte at a concentration above the MRL.
QB-03	The method blank contains analyte at a concentration above the MRL; however concentration is less than 10% of the action level, which is negligble according to method criteria.
I-03	Analyte required to be analyzed within 15 minutes of sampling. Analysis performed upon receipt of sample at laboratory.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

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CHAIN OF CUSTODY RECORD

Keystone LABORATORIES, INC.

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PAGE 1 OF 1

PRINT OR TYPE INFORMATION BELOW
SAMPLER:
SITE NAME:
ADDRESS:
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PHONE:

REPORT TO:
NAME: RICHIE BENNINGHOVEN
COMPANY NAME: USC TECHNOLOGIES
ADDRESS: 1300 NW BRIARCLIFF PKWY
CITY/ST/ZIP: KANSAS CITY, MO 64150
PHONE:
FAX:

BILL TO:
NAME:
COMPANY NAME:
ADDRESS:
CITY/ST/ZIP:
PHONE:
Keystone Quote No.: (If Applicable)

CLIENT SAMPLE NUMBER	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	MATRIX	GRAB/COMPOSITE	ANALYSES REQUIRED: TCLP	SPLP	BA-SPLP			SAMPLE CONDITION/COMMENTS	LABORATORY SAMPLE NUMBER
	5/8/17		NEARMAN HARDENED FGD ASH w/ CEMENT	2			X	X	X				1E70630-01

LAB USE ONLY
LABORATORY WORK ORDER NO.: 1E70630
SAMPLE TEMPERATURE UPON RECEIPT: None °C

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Turn-Around
[signature]	Date 5/8/17 Time 8:20 AM		Date Time	☐ Standard ☒ Rush (Contact Lab Prior to Submission)
Relinquished by: (Signature)	Date Time	Received for Lab by: (Signature) [signature]	Date 05/08/17 Time 12:45	Remarks:

Original - Lab Copy • Yellow - Sampler Copy

FORM: CCR 7-97

Keystone
LABORATORIES, INC.

MEMBER ACIL

3/15/2018

Richie Benninghoven

USC Technologies L.L.C.

1300 NW Briarcliff Parkway, Ste., 250

Kansas City MO, 64150

RE: Project: Flyash Testing

Project Number: USC Technologies L.L.C.

This analytical report is for the samples received on 3/1/2018 11:45:00AM. If you have any questions concerning this report please feel free to contact me at 1-800-858-5227. The samples included in this analytical report are as follows:

Sample ID	Laboratory ID	Matrix	Date Sampled
Nearman FGD Ash - Sept 2017 - Comp.	1C80044-01	Solid	03/01/18 00:00

Sincerely,

Carolyn L. Jackson

Carolyn Jackson, Project Manager

Phone: 913-321-7856
1140 West Cambridge Circle Drive
Kansas City, KS 66103
Fax: 913-831-6778

CASE NARRITIVE

All analytical results for this Work Order meet(s) the laboratory established acceptance criteria for the method(s) requested with the following exceptions.

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SC Technologies L.L.C.	Project: Flyash Testing	
Kansas City MO, 64150	Project Number: USC Technologies L.L.C.	**Reported:**
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	03/15/18 16:53

Nearman FGD Ash - Sept 2017 - Comp.

1C80044-01(Solid)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
			Keystone Laboratories, Inc. - Newton							
Determination of Conventional Chemistry Parameters										
Chromium, hexavalent (SPLP)	**13**		10	ug/L	1	1BC0539	03/13/18	03/14/18	EPA 7196A	
% Solids	**99.7**		0.1	%	"	1BC0054	03/01/18	03/06/18	SM 2540 G	
Determination of Recoverable Metals										
Cobalt (SPLP)	ND		10.0	ug/L	10	1BC0268	03/07/18	03/08/18	EPA 6020A	
Determination of TCLP Metals										
Silver (TCLP)	ND		0.010	mg/L	1	1BC0131	03/05/18	03/07/18	EPA 6010B	
Aluminum (SPLP)	**831**		100	ug/L	"	1BC0268	03/07/18	03/08/18	"	
nic (TCLP)	**0.034**		0.030	mg/L	"	1BC0131	03/05/18	03/07/18	"	
.um (TCLP)	**1.74**		0.010	"	"	"	"	"	"	
Boron (SPLP)	**651**		100	ug/L	"	1BC0268	03/07/18	03/08/18	"	
Cadmium (TCLP)	ND		0.005	mg/L	"	1BC0131	03/05/18	03/07/18	"	
Chromium (TCLP)	**0.142**		0.010	"	"	"	"	"	"	
Iron (SPLP)	ND		100	ug/L	"	1BC0268	03/07/18	03/08/18	"	
Mercury (TCLP)	ND		0.00050	mg/L	"	1BC0153	03/05/18	03/06/18	EPA 7470A	
Manganese (SPLP)	ND		10	ug/L	"	1BC0268	03/07/18	03/08/18	EPA 6010B	
Lead (TCLP)	ND		0.020	mg/L	"	1BC0131	03/05/18	03/07/18	"	
Zinc (SPLP)	ND		20	ug/L	"	1BC0268	03/07/18	03/08/18	"	
TCLP Extraction										
TCLP pH, Initial	**2.9**			pH	1	1BC0101	03/02/18	03/06/18	EPA 1311	
TCLP pH, Final	**8.8**			"	"	"	"	"	"	
Determination of SPLP Metals										
Arsenic (SPLP)	ND		10.0	ug/L	10	1BC0268	03/07/18	03/08/18	EPA 6020A	
Cadmium (SPLP)	ND		5.0	"	"	"	"	"	"	
Chromium (SPLP)	**85.2**		20.0	"	"	"	"	"	"	
Copper (SPLP)	ND		10.0	"	"	"	"	"	"	
Mercury (SPLP)	ND		0.50	"	1	1BC0379	03/09/18	03/09/18	EPA 7470A	
Nickel (SPLP)	ND		20	"	10	1BC0268	03/07/18	03/08/18	EPA 6020	
Lead (SPLP)	ND		10.0	"	"	"	"	"	EPA 6020A	
Antimony (SPLP)	ND		10.0	"	"	"	"	"	"	
Selenium (SPLP)	**17.0**		10.0	"	"	"	"	"	"	

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'C Technologies L.L.C.	Project: Flyash Testing	
..ansas City MO, 64150	Project Number: USC Technologies L.L.C.	**Reported:**
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	03/15/18 16:53

Nearman FGD Ash - Sept 2017 - Comp.

1C80044-01(Solid)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
			Keystone Laboratories, Inc. - Newton							
Determination of SPLP Metals										
Chromium III (SPLP)	**72.6**		20.0	ug/L	10	[CALC]	03/13/18	03/14/18	*** DEFAULT SPECIFIC METHOD ***	
Thallium (SPLP)	ND		5.0	"	"	1BC0268	03/07/18	03/08/18	EPA 6020A	
SPLP Extraction										
SPLP pH, Initial	**5.0**			pH	1	1BC0241	03/06/18	03/07/18	EPA 1312	
SPLP pH, Final	**12.0**			"	"	"	"	"	"	

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Keystone LABORATORIES, INC.

'C Technologies L.L.C.	Project: Flyash Testing	
.ansas City MO, 64150	Project Number: USC Technologies L.L.C.	Reported:
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	03/15/18 16:53

Nearman FGD Ash - Sept 2017 - Comp.

1C80044-01RE1(Solid)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Determination of TCLP Metals										
Selenium (TCLP)	**0.261**		0.200	mg/L	4	1BC0131	03/05/18	03/07/18	EPA 6010B	
Determination of SPLP Metals										
Barium (SPLP)	**10900**		100	ug/L	100	1BC0268	03/07/18	03/09/18	EPA 6020A	
SPLP Extraction										
SPLP pH, Initial	**5.0**			pH	1	1BC0513	03/06/18	03/15/18	EPA 1312	
SPLP pH, Final	**8.7**			"	"	"	"	"	"	

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Determination of Conventional Chemistry Parameters - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC0054 - Wet Chem Preparation											
Duplicate (1BC0054-DUP1)		**Source: 1C80174-01**			Prepared: 03/01/18 Analyzed: 03/06/18						
% Solids	20.8		0.1	%		20.8			0.00	14	
Batch 1BC0539 - Wet Chem Preparation											
Blank (1BC0539-BLK1)					Prepared: 03/13/18 Analyzed: 03/14/18						
Chromium, hexavalent (SPLP)	ND		10	ug/L							
LCS (1BC0539-BS1)					Prepared: 03/13/18 Analyzed: 03/14/18						
Chromium, hexavalent (SPLP)	41.1		10	ug/L	40.0000		103	85-113			
rix Spike (1BC0539-MS1)		**Source: 1C80044-01**			Prepared: 03/13/18 Analyzed: 03/14/18						
Chromium, hexavalent (SPLP)	40.8		20	ug/L	40.0000	12.6	70.4	73-124			QM-12
Matrix Spike Dup (1BC0539-MSD1)		**Source: 1C80044-01**			Prepared: 03/13/18 Analyzed: 03/14/18						
Chromium, hexavalent (SPLP)	42.1		20	ug/L	40.0000	12.6	73.6	73-124	3.12	15	

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Determination of Recoverable Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC0268 - EPA 1312											
Blank (1BC0268-BLK4)					Prepared: 03/07/18 Analyzed: 03/08/18						
Cobalt (SPLP)	ND		10.0	ug/L							
Blank (1BC0268-BLK5)					Prepared: 03/07/18 Analyzed: 03/08/18						
Cobalt (SPLP)	ND		10.0	ug/L							
Blank (1BC0268-BLK6)					Prepared: 03/07/18 Analyzed: 03/08/18						
Cobalt (SPLP)	ND		10.0	ug/L							
LCS (1BC0268-BS2)					Prepared: 03/07/18 Analyzed: 03/08/18						
lt (SPLP)	524		50.0	ug/L	500.000		105	80-120			
Matrix Spike (1BC0268-MS2)		**Source: 1C80044-01**			Prepared: 03/07/18 Analyzed: 03/08/18						
Cobalt (SPLP)	513		50.0	ug/L	500.000	ND	103	75-125			
Matrix Spike Dup (1BC0268-MSD2)		**Source: 1C80044-01**			Prepared: 03/07/18 Analyzed: 03/08/18						
Cobalt (SPLP)	535		50.0	ug/L	500.000	ND	107	75-125	4.19	20	
Post Spike (1BC0268-PS2)		**Source: 1C80044-01**			Prepared: 03/07/18 Analyzed: 03/08/18						
Cobalt (SPLP)	0.209			ug/L	0.200000	0.00002	104	80-120			

Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC0131 - EPA 3010A TCLP ICP											
Blank (1BC0131-BLK1)					Prepared: 03/05/18 Analyzed: 03/07/18						
Arsenic (TCLP)	ND		0.030	mg/L							
Barium (TCLP)	ND		0.010	"							
Cadmium (TCLP)	ND		0.005	"							
Chromium (TCLP)	ND		0.010	"							
Lead (TCLP)	ND		0.020	"							
Selenium (TCLP)	ND		0.050	"							
Silver (TCLP)	ND		0.010	"							
S (1BC0131-BS1)					Prepared: 03/05/18 Analyzed: 03/07/18						
Arsenic (TCLP)	0.539		0.030	mg/L	0.500000		108	80-120			
Barium (TCLP)	0.506		0.010	"	0.500000		101	80-120			
Cadmium (TCLP)	0.492		0.005	"	0.500000		98.4	80-120			
Chromium (TCLP)	0.505		0.010	"	0.500000		101	80-120			
Lead (TCLP)	0.511		0.020	"	0.500000		102	80-120			
Selenium (TCLP)	0.513		0.050	"	0.500000		103	80-120			
Silver (TCLP)	0.488		0.010	"	0.500000		97.7	80-120			
Matrix Spike (1BC0131-MS1)		**Source: 1C80132-01**			Prepared: 03/05/18 Analyzed: 03/07/18						
Arsenic (TCLP)	0.608		0.030	mg/L	0.500000	0.0126	119	70-130			
Barium (TCLP)	1.10		0.010	"	0.500000	0.616	97.7	70-130			
Cadmium (TCLP)	0.557		0.005	"	0.500000	ND	111	70-130			
Chromium (TCLP)	0.487		0.010	"	0.500000	ND	97.3	70-130			
Lead (TCLP)	0.485		0.020	"	0.500000	0.015	94.1	70-130			
Selenium (TCLP)	0.627		0.050	"	0.500000	0.0338	119	70-130			
Silver (TCLP)	0.511		0.010	"	0.500000	ND	102	70-130			
Matrix Spike Dup (1BC0131-MSD1)		**Source: 1C80132-01**			Prepared: 03/05/18 Analyzed: 03/07/18						
Arsenic (TCLP)	0.619		0.030	mg/L	0.500000	0.0126	121	70-130	1.81	20	
Barium (TCLP)	1.13		0.010	"	0.500000	0.616	103	70-130	2.30	20	
Cadmium (TCLP)	0.571		0.005	"	0.500000	ND	114	70-130	2.49	20	

;C Technologies L.L.C.	Project: Flyash Testing	
Kansas City MO, 64150	Project Number: USC Technologies L.L.C.	**Reported:**
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	03/15/18 16:53

Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC0131 - EPA 3010A TCLP ICP											
Matrix Spike Dup (1BC0131-MSD1)		**Source: 1C80132-01**			Prepared: 03/05/18 Analyzed: 03/07/18						
Chromium (TCLP)	0.500		0.010	mg/L	0.500000	ND	99.9	70-130	2.63	20	
Lead (TCLP)	0.497		0.020	"	0.500000	0.015	96.5	70-130	2.48	20	
Selenium (TCLP)	0.640		0.050	"	0.500000	0.0338	121	70-130	2.02	20	
Silver (TCLP)	0.521		0.010	"	0.500000	ND	104	70-130	1.85	20	
Post Spike (1BC0131-PS1)		**Source: 1C80132-01**			Prepared: 03/05/18 Analyzed: 03/07/18						
Arsenic (TCLP)	0.904			mg/L	0.800000	0.0124	111	75-125			
Barium (TCLP)	1.41			"	0.800000	0.610	100	75-125			
.ium (TCLP)	0.829			"	0.800000	0.001	103	75-125			
Chromium (TCLP)	0.835			"	0.800000	0.00137	104	75-125			
Lead (TCLP)	0.792			"	0.800000	0.015	97.1	75-125			
Selenium (TCLP)	0.957			"	0.800000	0.0335	115	75-125			
Silver (TCLP)	0.760			"	0.800000	-0.000881	95.0	75-125			
Batch 1BC0153 - EPA 7470A Hg Water											
Blank (1BC0153-BLK1)					Prepared: 03/05/18 Analyzed: 03/06/18						
Mercury (TCLP)	ND		0.00050	mg/L							
Blank (1BC0153-BLK2)					Prepared: 03/05/18 Analyzed: 03/06/18						
Mercury (TCLP)	ND		0.00050	mg/L							
Blank (1BC0153-BLK3)					Prepared: 03/05/18 Analyzed: 03/06/18						
Mercury (TCLP)	ND		0.00050	mg/L							
Blank (1BC0153-BLK4)					Prepared: 03/05/18 Analyzed: 03/06/18						
Mercury (TCLP)	ND		0.00050	mg/L							

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C Technologies L.L.C.	Project: Flyash Testing	
Kansas City MO, 64150	Project Number: USC Technologies L.L.C.	**Reported:**
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	03/15/18 16:53

Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC0153 - EPA 7470A Hg Water											
LCS (1BC0153-BS1)					Prepared: 03/05/18 Analyzed: 03/06/18						
Mercury (TCLP)	0.00255		0.00050	mg/L	0.00250000		102	79-116			
Matrix Spike (1BC0153-MS1)		**Source: 1B81700-01**			Prepared: 03/05/18 Analyzed: 03/06/18						
Mercury (TCLP)	0.00260		0.00050	mg/L	0.00250000	ND	104	56-137			
Matrix Spike Dup (1BC0153-MSD1)		**Source: 1B81700-01**			Prepared: 03/05/18 Analyzed: 03/06/18						
Mercury (TCLP)	0.00264		0.00050	mg/L	0.00250000	ND	106	56-137	1.53	13	
Batch 1BC0268 - EPA 1312											
k (1BC0268-BLK1)					Prepared: 03/07/18 Analyzed: 03/08/18						
Boron (SPLP)	ND		100	ug/L							
Aluminum (SPLP)	ND		100	"							
Iron (SPLP)	ND		100	"							
Manganese (SPLP)	ND		10	"							
Zinc (SPLP)	ND		20	"							
Blank (1BC0268-BLK2)					Prepared: 03/07/18 Analyzed: 03/08/18						
Boron (SPLP)	ND		100	ug/L							
Aluminum (SPLP)	ND		100	"							
Iron (SPLP)	ND		100	"							
Manganese (SPLP)	ND		10	"							
Zinc (SPLP)	ND		20	"							
Blank (1BC0268-BLK3)					Prepared: 03/07/18 Analyzed: 03/08/18						
Boron (SPLP)	ND		100	ug/L							
Aluminum (SPLP)	ND		100	"							
Iron (SPLP)	ND		100	"							
Manganese (SPLP)	ND		10	"							
Zinc (SPLP)	ND		20	"							

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'C Technologies L.L.C.
..ansas City MO, 64150
1300 NW Briarcliff Parkway, Ste., 250

Project: Flyash Testing
Project Number: USC Technologies L.L.C.
Project Manager: Richie Benninghoven

Reported:
03/15/18 16:53

Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC0268 - EPA 1312											
LCS (1BC0268-BS1)					Prepared: 03/07/18 Analyzed: 03/08/18						
Boron (SPLP)	538		100	ug/L	500.000		108	80-120			
Aluminum (SPLP)	5710		100	"	5500.00		104	80-120			
Iron (SPLP)	2650		100	"	2500.00		106	80-120			
Manganese (SPLP)	510		10	"	500.000		102	80-120			
Zinc (SPLP)	505		20	"	500.000		101	80-120			
Matrix Spike (1BC0268-MS1)		**Source: 1C80044-01**			Prepared: 03/07/18 Analyzed: 03/08/18						
Boron (SPLP)	1170		100	ug/L	500.000	651	103	70-130			
.inum (SPLP)	6590		100	"	5500.00	831	105	70-130			
Iron (SPLP)	2430		100	"	2500.00	ND	97.4	75-125			
Manganese (SPLP)	469		10	"	500.000	ND	93.8	70-130			
Zinc (SPLP)	468		20	"	500.000	ND	93.7	70-130			
Matrix Spike Dup (1BC0268-MSD1)		**Source: 1C80044-01**			Prepared: 03/07/18 Analyzed: 03/08/18						
Boron (SPLP)	1190		100	ug/L	500.000	651	109	70-130	2.21	20	
Aluminum (SPLP)	6700		100	"	5500.00	831	107	70-130	1.79	20	
Iron (SPLP)	2540		100	"	2500.00	ND	101	75-125	4.11	20	
Manganese (SPLP)	487		10	"	500.000	ND	97.4	70-130	3.73	20	
Zinc (SPLP)	495		20	"	500.000	ND	99.0	70-130	5.48	20	
Post Spike (1BC0268-PS1)		**Source: 1C80044-01**			Prepared: 03/07/18 Analyzed: 03/08/18						
Boron (SPLP)	1.58			ug/L	0.800000	0.645	117	75-125			
Aluminum (SPLP)	9.97			"	8.80000	0.823	104	75-125			
Iron (SPLP)	4.06			"	4.00000	0.0167	101	80-120			
Manganese (SPLP)	0.799			"	0.800000	0.000357	99.9	75-125			
Zinc (SPLP)	0.808			"	0.800000	0.00166	101	75-125			

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TCLP Extraction - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC0101 - EPA 1311											
Blank (1BC0101-BLK1)					Prepared: 03/02/18 Analyzed: 03/06/18						
TCLP pH, Initial	4.9			pH							
TCLP pH, Final	5.0			"							

Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC0268 - EPA 1312											
Blank (1BC0268-BLK4)					Prepared: 03/07/18 Analyzed: 03/08/18						
Antimony (SPLP)	ND		10.0	ug/L							
Arsenic (SPLP)	ND		10.0	"							
Barium (SPLP)	ND		10.0	"							
Cadmium (SPLP)	ND		5.0	"							
Chromium (SPLP)	ND		20.0	"							
Copper (SPLP)	ND		10.0	"							
Lead (SPLP)	ND		10.0	"							
el (SPLP)	ND		20	"							
Selenium (SPLP)	ND		10.0	"							
Thallium (SPLP)	ND		5.0	"							
Blank (1BC0268-BLK5)					Prepared: 03/07/18 Analyzed: 03/08/18						
Antimony (SPLP)	ND		10.0	ug/L							
Arsenic (SPLP)	ND		10.0	"							
Barium (SPLP)	ND		10.0	"							
Cadmium (SPLP)	ND		5.0	"							
Chromium (SPLP)	ND		20.0	"							
Copper (SPLP)	51.4		10.0	"							QB-03
Lead (SPLP)	ND		10.0	"							
Nickel (SPLP)	ND		20	"							
Selenium (SPLP)	ND		10.0	"							
Thallium (SPLP)	ND		5.0	"							
Blank (1BC0268-BLK6)					Prepared: 03/07/18 Analyzed: 03/08/18						
Antimony (SPLP)	ND		10.0	ug/L							
Arsenic (SPLP)	ND		10.0	"							
Barium (SPLP)	10.6		10.0	"							QB-03
Cadmium (SPLP)	ND		5.0	"							
Chromium (SPLP)	ND		20.0	"							

.C Technologies L.L.C.	Project: Flyash Testing	
Kansas City MO, 64150	Project Number: USC Technologies L.L.C.	**Reported:**
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	03/15/18 16:53

Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC0268 - EPA 1312											
Blank (1BC0268-BLK6)					Prepared: 03/07/18 Analyzed: 03/08/18						
Copper (SPLP)	ND		10.0	ug/L							QB-03
Lead (SPLP)	ND		10.0	"							
Nickel (SPLP)	ND		20	"							
Selenium (SPLP)	ND		10.0	"							
Thallium (SPLP)	ND		5.0	"							
LCS (1BC0268-BS2)					Prepared: 03/07/18 Analyzed: 03/08/18						
·imony (SPLP)	519		50.0	ug/L	500.000		104	80-120			
.nic (SPLP)	509		50.0	"	500.000		102	80-120			
Barium (SPLP)	522		50.0	"	500.000		104	80-120			
Cadmium (SPLP)	505		25.0	"	500.000		101	80-120			
Chromium (SPLP)	504		100	"	500.000		101	80-120			
Copper (SPLP)	518		50.0	"	500.000		104	80-120			
Lead (SPLP)	514		50.0	"	500.000		103	80-120			
Nickel (SPLP)	520		100	"	500.000		104	80-120			
Selenium (SPLP)	477		50.0	"	500.000		95.4	80-120			
Thallium (SPLP)	522		25.0	"	500.000		104	80-120			
Matrix Spike (1BC0268-MS2)		**Source: 1C80044-01**			Prepared: 03/07/18 Analyzed: 03/08/18						
Antimony (SPLP)	512		50.0	ug/L	500.000	ND	102	75-125			
Arsenic (SPLP)	510		50.0	"	500.000	ND	102	75-125			
Barium (SPLP)	11100		50.0	"	500.000	10100	210	75-125			QM-4X
Cadmium (SPLP)	490		25.0	"	500.000	ND	98.0	75-125			
Chromium (SPLP)	574		100	"	500.000	85.2	97.8	75-125			
Copper (SPLP)	499		50.0	"	500.000	ND	99.8	70-130			
Lead (SPLP)	499		50.0	"	500.000	ND	99.9	70-130			
Nickel (SPLP)	508		100	"	500.000	ND	102	70-130			
Selenium (SPLP)	509		50.0	"	500.000	17.0	98.5	70-130			
Thallium (SPLP)	508		25.0	"	500.000	ND	102	75-125			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC0268 - EPA 1312											
Matrix Spike Dup (1BC0268-MSD2)		**Source: 1C80044-01**			Prepared: 03/07/18 Analyzed: 03/08/18						
Antimony (SPLP)	522		50.0	ug/L	500.000	ND	104	75-125	1.96	20	
Arsenic (SPLP)	529		50.0	"	500.000	ND	106	75-125	3.66	20	
Barium (SPLP)	11200		50.0	"	500.000	10100	227	75-125	0.740	20	QM-4X
Cadmium (SPLP)	505		25.0	"	500.000	ND	101	75-125	2.95	20	
Chromium (SPLP)	594		100	"	500.000	85.2	102	75-125	3.40	20	
Copper (SPLP)	517		50.0	"	500.000	ND	103	70-130	3.58	20	
Lead (SPLP)	517		50.0	"	500.000	ND	103	70-130	3.44	20	
:l (SPLP)	529		100	"	500.000	ND	106	70-130	4.16	20	
Selenium (SPLP)	530		50.0	"	500.000	17.0	102	70-130	3.89	20	
Thallium (SPLP)	534		25.0	"	500.000	ND	107	75-125	5.05	20	
Post Spike (1BC0268-PS2)		**Source: 1C80044-01**			Prepared: 03/07/18 Analyzed: 03/08/18						
Antimony (SPLP)	0.195			ug/L	0.200000	0.0009	97.2	75-125			
Arsenic (SPLP)	0.193			"	0.200000	0.0026	95.0	80-120			
Barium (SPLP)	10.2			"	0.200000	9.89	164	80-120			PS-4X
Cadmium (SPLP)	0.178			"	0.200000	-0.00002	89.2	80-120			
Chromium (SPLP)	0.271			"	0.200000	0.0835	93.7	80-120			
Copper (SPLP)	0.194			"	0.200000	0.0019	96.0	75-125			
Lead (SPLP)	0.183			"	0.200000	0.0003	91.2	75-125			
Nickel (SPLP)	0.197			"	0.200000	0.000102	98.2	75-125			
Selenium (SPLP)	0.191			"	0.200000	0.0167	87.1	75-125			
Thallium (SPLP)	0.192			"	0.200000	0.0003	96.0	80-120			
Batch 1BC0379 - EPA 1311											
Blank (1BC0379-BLK1)					Prepared & Analyzed: 03/09/18						
Mercury (SPLP)	ND		0.50	ug/L							

Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC0379 - EPA 1311											
Blank (1BC0379-BLK2)					Prepared & Analyzed: 03/09/18						
Mercury (SPLP)	ND		0.50	ug/L							
Blank (1BC0379-BLK3)					Prepared & Analyzed: 03/09/18						
Mercury (SPLP)	ND		0.50	ug/L							
LCS (1BC0379-BS1)					Prepared & Analyzed: 03/09/18						
Mercury (SPLP)	2.50		0.50	ug/L	2.50000		100	79-116			
Matrix Spike (1BC0379-MS1)		**Source: 1C80293-01**			Prepared & Analyzed: 03/09/18						
ury (SPLP)	2.63		0.50	ug/L	2.50000	0.269	94.4	56-137			
Matrix Spike Dup (1BC0379-MSD1)		**Source: 1C80293-01**			Prepared & Analyzed: 03/09/18						
Mercury (SPLP)	2.72		0.50	ug/L	2.50000	0.269	98.0	56-137	3.36	13	

SPLP Extraction - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC0241 - EPA 1312											
Blank (1BC0241-BLK1)					Prepared: 03/06/18 Analyzed: 03/07/18						
SPLP pH, Initial	5.0			pH							
SPLP pH, Final	9.4			"							
Batch 1BC0513 - EPA 1312											
Blank (1BC0513-BLK1)					Prepared: 03/13/18 Analyzed: 03/15/18						
SPLP pH, Initial	5.0			pH							
SPLP pH, Final	7.3			"							

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Certified Analyses included in this Report

Method/Matrix	Analyte	Certifications
EPA 6010B in Water		
	Aluminum (SPLP)	KS-NT
	Arsenic (TCLP)	KS-NT,SIA1X
	Barium (TCLP)	KS-NT,SIA1X
	Cadmium (TCLP)	KS-NT,SIA1X
	Chromium (TCLP)	KS-NT,SIA1X
	Lead (TCLP)	KS-NT,SIA1X
	Selenium (TCLP)	KS-NT,SIA1X
	Silver (TCLP)	KS-NT,SIA1X
. 6020 in Water		
	Nickel (SPLP)	SIA1X,KS-NT
EPA 6020A in Water		
	Antimony (SPLP)	SIA1X,KS-NT
	Arsenic (SPLP)	SIA1X,KS-NT
	Barium (SPLP)	SIA1X,KS-NT
	Cadmium (SPLP)	SIA1X,KS-NT
	Chromium (SPLP)	SIA1X,KS-NT
	Copper (SPLP)	SIA1X,KS-NT
	Lead (SPLP)	SIA1X,KS-NT
	Selenium (SPLP)	SIA1X,KS-NT
	Thallium (SPLP)	SIA1X,KS-NT
EPA 7470A in Water		
	Mercury (TCLP)	IA-NT,KS-NT
	Mercury (SPLP)	SIA1X
SM 2540 G in Sludge		
	% Solids	SIA1X

Code	Description	Number	Expires
KS-KC	Kansas Department of Health and Environment-KC	E-10110	04/30/2018
KS-NT	Kansas Department of Health and Environment (NELAP	E-10287	03/31/2018
MO-KC	Missouri Department of Natural Resources	140	04/30/2018
SIA1X	Iowa Department of Natural Resources	95	02/01/2019

Notes and Definitions

QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration.
QM-12	The spike recovery was outside acceptance limits for the MS and/or MSD.
QB-03	The method blank contains analyte at a concentration above the MRL; however concentration is less than 10% of the action level, which is negligible according to method criteria.
PS-4X	The spike recovery was outside of QC acceptance limits for the Post Spike due to analyte concentration at 4 times or greater the spike concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
'D	Relative Percent Difference

CHAIN OF CUSTODY RECORD

Keystone
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☒ 1155 Adams, Suite 120
Kansas City, KS 66103
Phone: 913-321-7856
Fax: 913-321-7937

PRINT OR TYPE INFORMATION BELOW
SAMPLER:
SITE NAME:
ADDRESS:
CITY/ST/ZIP:
PHONE:

REPORT TO:
NAME: Richie Bruninghowen
COMPANY NAME: USC Technologies
ADDRESS: 1300 NW Briarcliff Pkwy Ste 250
CITY/ST/ZIP: Kansas City, MO 64116
PHONE:
FAX:

BILL TO:
NAME:
COMPANY NAME:
ADDRESS:
CITY/ST/ZIP:
PHONE:
Keystone Quote No.: (If Applicable)

LAB USE ONLY
LABORATORY WORK ORDER NO: 1C80044
SAMPLE TEMPERATURE UPON RECEIPT: No Ice °C

CLIENT SAMPLE NUMBER	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	MATRIX	GRAB/COMPOSITE	ANALYSES REQUIRED	TCLP		SPLP		BA-SPLP			SAMPLE CONDITION COMMENTS	LABORATORY SAMPLE NUMBER
	SEPT 2017		Nearman FGD Composite	3				X		X		X				1C80044-01

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Turn-Around:
[signature]	Date 3/1/17 Time 7:20 AM		Date Time	☐ Standard ☐ Rush Contact Lab Prior to Submission
Relinquished by: (Signature)	Date Time	Received for Lab by: (Signature) [signature]	Date 03/01/18 Time 11:45	Remarks:

Keystone
LABORATORIES, INC.

MEMBER ACIL

4/4/2018

Richie Benninghoven
USC Technologies L.L.C.
1300 NW Briarcliff Parkway, Ste., 250
Kansas City MO, 64150

RE: Project: Flyash Testing
Project Number: USC Technologies L.L.C.

This analytical report is for the samples received on 3/22/2018 12:05:00PM. If you have any questions concerning this report please feel free to contact me at 1-800-858-5227. The samples included in this analytical report are as follows:

Sample ID	Laboratory ID	Matrix	Date Sampled
Jan. 2018 - Nearman FGD - Composite	1C81608-01	Solid	03/22/18 00:00

Sincerely,

Carolyn L. Jackson

Carolyn Jackson, Project Manager

Phone: 913-321-7856
1140 West Cambridge Circle Drive
Kansas City, KS 66103
Fax: 913-831-6778

CASE NARRITIVE

All analytical results for this Work Order meet(s) the laboratory established acceptance criteria for the method(s) requested with the following exceptions.

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1140 West Cambridge Circle Drive
Kansas City, KS 66103

Fax: 913-831-6778

Jan. 2018 - Nearman FGD - Composite

1C81608-01(Solid)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
				Keystone Laboratories, Inc. - Newton						
Determination of Conventional Chemistry Parameters										
Chromium, hexavalent (SPLP)	**82**		10	ug/L	1	1BC1056	03/27/18	03/27/18	EPA 7196A	
% Solids	**99.7**		0.1	%	"	1BC0998	03/29/18	03/29/18	SM 2540 G	
Determination of Recoverable Metals										
Cobalt (SPLP)	ND		4.0	ug/L	4	1BC1061	03/27/18	03/28/18	EPA 6020A	
Determination of TCLP Metals										
Silver (TCLP)	ND		0.040	mg/L	4	1BC1060	03/27/18	03/27/18	EPA 6010B	
Aluminum (SPLP)	**4110**		100	ug/L	1	1BD0096	04/03/18	04/03/18	"	
..nic (TCLP)	ND		0.120	mg/L	4	1BC1060	03/27/18	03/27/18	"	
..um (TCLP)	**2.88**		0.040	"	"	"	"	"	"	
Boron (SPLP)	ND		100	ug/L	1	1BD0096	04/03/18	04/03/18	"	
Cadmium (TCLP)	ND		0.020	mg/L	4	1BC1060	03/27/18	03/27/18	"	
Chromium (TCLP)	**0.101**		0.040	"	"	"	"	"	"	
Iron (SPLP)	ND		100	ug/L	1	1BD0096	04/03/18	04/03/18	"	
Mercury (TCLP)	**0.0101**		0.00200	mg/L	"	1BC1242	03/30/18	04/02/18	EPA 7470A	
Manganese (SPLP)	ND		10	ug/L	"	1BD0096	04/03/18	04/03/18	EPA 6010B	
Lead (TCLP)	ND		0.080	mg/L	4	1BC1060	03/27/18	03/27/18	"	
Selenium (TCLP)	**0.484**		0.200	"	"	"	"	"	"	
Zinc (SPLP)	ND		50	ug/L	1	1BD0096	04/03/18	04/03/18	"	
TCLP Extraction										
TCLP pH, Initial	**2.9**			pH	1	1BC1016	03/26/18	03/27/18	EPA 1311	
TCLP pH, Final	**5.8**			"	"	"	"	"	"	

Jan. 2018 - Nearman FGD - Composite

1C81608-01(Solid)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
				Keystone Laboratories, Inc. - Newton						
Determination of SPLP Metals										
Arsenic (SPLP)	ND		8.0	ug/L	4	1BC1061	03/27/18	03/28/18	EPA 6020A	
Barium (SPLP)	**13300**		200	"	100	"	"	03/29/18	"	
Cadmium (SPLP)	ND		4.0	"	4	"	"	03/28/18	"	
Chromium (SPLP)	**75.7**		20.0	"	"	"	"	"	"	
Copper (SPLP)	ND		8.0	"	"	"	"	"	"	
Mercury (SPLP)	ND		0.50	"	1	1BC1242	03/30/18	04/02/18	EPA 7470A	
Nickel (SPLP)	ND		8	"	4	1BC1061	03/27/18	03/28/18	EPA 6020	
Lead (SPLP)	ND		8.0	"	"	"	"	"	EPA 6020A	
nony (SPLP)	ND		4.0	"	"	"	"	"	"	
Selenium (SPLP)	**22.4**		8.0	"	"	"	"	"	"	
Chromium III (SPLP)	ND		20.0	"	"	[CALC]	"	"	*** DEFAULT SPECIFIC METHOD ***	
Thallium (SPLP)	ND		8.0	"	"	1BC1061	"	"	EPA 6020A	
SPLP Extraction										
SPLP pH, Initial	**5.0**			pH	1	1BC1018	03/26/18	03/27/18	EPA 1312	
SPLP pH, Final	**11.9**			"	"	"	"	"	"	

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Keystone LABORATORIES, INC.

·C Technologies L.L.C.	Project: Flyash Testing	
..ansas City MO, 64150	Project Number: USC Technologies L.L.C.	**Reported:**
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	04/04/18 15:37

Determination of Conventional Chemistry Parameters - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC0998 - Wet Chem Preparation											
Duplicate (1BC0998-DUP1)		**Source: 1C81464-02**			Prepared & Analyzed: 03/29/18						
% Solids	27.0		0.1	%		29.3			8.46	14	
Batch 1BC1056 - Wet Chem Preparation											
Blank (1BC1056-BLK1)					Prepared & Analyzed: 03/27/18						
Chromium, hexavalent (SPLP)	ND		10	ug/L							
LCS (1BC1056-BS1)					Prepared & Analyzed: 03/27/18						
Chromium, hexavalent (SPLP)	39.8		10	ug/L	40.0000		99.4	85-113			
.rix Spike (1BC1056-MS1)		**Source: 1C81608-01**			Prepared & Analyzed: 03/27/18						
Chromium, hexavalent (SPLP)	89.5		10	ug/L	20.0000	82.4	35.5	73-124			QM-15
Matrix Spike Dup (1BC1056-MSD1)		**Source: 1C81608-01**			Prepared & Analyzed: 03/27/18						
Chromium, hexavalent (SPLP)	87.6		10	ug/L	20.0000	82.4	25.8	73-124	2.19	15	QM-15

.ie results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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C Technologies L.L.C.	Project: Flyash Testing	
Kansas City MO, 64150	Project Number: USC Technologies L.L.C.	**Reported:**
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	04/04/18 15:37

Determination of Recoverable Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC1061 - EPA 3010A Digestion (Water)											
Blank (1BC1061-BLK1)					Prepared: 03/27/18 Analyzed: 03/28/18						
Cobalt (SPLP)	ND		4.0	ug/L							
LCS (1BC1061-BS1)					Prepared: 03/27/18 Analyzed: 03/28/18						
Cobalt (SPLP)	102		4.0	ug/L	100.000		102	80-120			
Matrix Spike (1BC1061-MS1)		**Source: 1C81608-01**			Prepared: 03/27/18 Analyzed: 03/28/18						
Cobalt (SPLP)	101		4.0	ug/L	100.000	ND	101	75-125			
Matrix Spike Dup (1BC1061-MSD1)		**Source: 1C81608-01**			Prepared: 03/27/18 Analyzed: 03/28/18						
lt (SPLP)	101		4.0	ug/L	100.000	ND	101	75-125	0.211	20	
Post Spike (1BC1061-PS1)		**Source: 1C81608-01**			Prepared: 03/27/18 Analyzed: 03/28/18						
Cobalt (SPLP)	0.101			ug/L	0.0800000	0.00002	127	80-120			PS-04

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Keystone LABORATORIES, INC.

Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC1060 - EPA 3010A TCLP ICP											
Blank (1BC1060-BLK1)					Prepared & Analyzed: 03/27/18						
Arsenic (TCLP)	ND		0.030	mg/L							
Barium (TCLP)	ND		0.010	"							
Cadmium (TCLP)	ND		0.005	"							
Chromium (TCLP)	ND		0.010	"							
Lead (TCLP)	ND		0.020	"							
Selenium (TCLP)	ND		0.050	"							
Silver (TCLP)	ND		0.010	"							
Blank (1BC1060-BLK2)					Prepared & Analyzed: 03/27/18						
Arsenic (TCLP)	ND		0.030	mg/L							
Barium (TCLP)	ND		0.010	"							
Cadmium (TCLP)	ND		0.005	"							
Chromium (TCLP)	ND		0.010	"							
Lead (TCLP)	ND		0.020	"							
Selenium (TCLP)	ND		0.050	"							
Silver (TCLP)	ND		0.010	"							
Blank (1BC1060-BLK3)					Prepared & Analyzed: 03/27/18						
Arsenic (TCLP)	ND		0.030	mg/L							
Barium (TCLP)	ND		0.010	"							
Cadmium (TCLP)	ND		0.005	"							
Chromium (TCLP)	ND		0.010	"							
Lead (TCLP)	ND		0.020	"							
Selenium (TCLP)	ND		0.050	"							
Silver (TCLP)	ND		0.010	"							
Blank (1BC1060-BLK4)					Prepared & Analyzed: 03/27/18						
Arsenic (TCLP)	ND		0.030	mg/L							
Barium (TCLP)	0.182		0.010	"							QB-03
Cadmium (TCLP)	ND		0.005	"							

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ꞌC Technologies L.L.C.	Project: Flyash Testing	
..ansas City MO, 64150	Project Number: USC Technologies L.L.C.	Reported:
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	04/04/18 15:37

Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC1060 - EPA 3010A TCLP ICP											
Blank (1BC1060-BLK4)					Prepared & Analyzed: 03/27/18						
Chromium (TCLP)	ND		0.010	mg/L							
Lead (TCLP)	ND		0.020	"							
Selenium (TCLP)	ND		0.050	"							
Silver (TCLP)	ND		0.010	"							
LCS (1BC1060-BS1)					Prepared & Analyzed: 03/27/18						
Arsenic (TCLP)	0.494		0.030	mg/L	0.500000		98.8	80-120			
Barium (TCLP)	0.475		0.010	"	0.500000		95.0	80-120			
ıium (TCLP)	0.467		0.005	"	0.500000		93.4	80-120			
Chromium (TCLP)	0.479		0.010	"	0.500000		95.8	80-120			
Lead (TCLP)	0.476		0.020	"	0.500000		95.2	80-120			
Selenium (TCLP)	0.477		0.050	"	0.500000		95.4	80-120			
Silver (TCLP)	0.472		0.010	"	0.500000		94.5	80-120			
Matrix Spike (1BC1060-MS1)		**Source: 1C81825-01**			Prepared: 03/27/18 Analyzed: 03/28/18						
Arsenic (TCLP)	0.537		0.120	mg/L	0.500000	ND	107	70-130			
Barium (TCLP)	1.22		0.040	"	0.500000	0.782	87.4	70-130			
Cadmium (TCLP)	0.889		0.020	"	0.500000	0.420	93.9	70-130			
Chromium (TCLP)	0.490		0.040	"	0.500000	ND	97.9	70-130			
Lead (TCLP)	1.46		0.080	"	0.500000	1.11	70.3	70-130			
Selenium (TCLP)	0.619		0.200	"	0.500000	0.130	97.9	70-130			
Silver (TCLP)	0.483		0.040	"	0.500000	ND	96.6	70-130			
Matrix Spike Dup (1BC1060-MSD1)		**Source: 1C81825-01**			Prepared: 03/27/18 Analyzed: 03/28/18						
Arsenic (TCLP)	0.536		0.120	mg/L	0.500000	ND	107	70-130	0.166	20	
Barium (TCLP)	1.16		0.040	"	0.500000	0.782	75.4	70-130	5.04	20	
Cadmium (TCLP)	0.895		0.020	"	0.500000	0.420	95.1	70-130	0.648	20	
Chromium (TCLP)	0.492		0.040	"	0.500000	ND	98.4	70-130	0.543	20	
Lead (TCLP)	1.49		0.080	"	0.500000	1.11	76.6	70-130	2.16	20	
Selenium (TCLP)	0.630		0.200	"	0.500000	0.130	100	70-130	1.67	20	

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Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC1060 - EPA 3010A TCLP ICP											
Matrix Spike Dup (1BC1060-MSD1)		**Source: 1C81825-01**			Prepared: 03/27/18 Analyzed: 03/28/18						
Silver (TCLP)	0.480		0.040	mg/L	0.500000	ND	96.0	70-130	0.604	20	
Post Spike (1BC1060-PS1)		**Source: 1C81825-01**			Prepared: 03/27/18 Analyzed: 03/28/18						
Arsenic (TCLP)	0.888			mg/L	0.800000	0.0227	108	75-125			
Barium (TCLP)	1.52			"	0.800000	0.774	93.1	75-125			
Cadmium (TCLP)	1.26			"	0.800000	0.416	106	75-125			
Chromium (TCLP)	0.820			"	0.800000	0.00735	102	75-125			
Lead (TCLP)	1.86			"	0.800000	1.10	96.0	75-125			
ıium (TCLP)	0.981			"	0.800000	0.129	107	75-125			
Silver (TCLP)	0.794			"	0.800000	-0.00496	99.2	75-125			
Batch 1BC1242 - EPA 7470A Hg Water											
Blank (1BC1242-BLK1)					Prepared: 03/30/18 Analyzed: 04/02/18						
Mercury (TCLP)	ND		0.00050	mg/L							
Blank (1BC1242-BLK2)					Prepared: 03/30/18 Analyzed: 04/02/18						
Mercury (TCLP)	ND		0.00050	mg/L							
Blank (1BC1242-BLK3)					Prepared: 03/30/18 Analyzed: 04/02/18						
Mercury (TCLP)	ND		0.00050	mg/L							
Blank (1BC1242-BLK4)					Prepared: 03/30/18 Analyzed: 04/02/18						
Mercury (TCLP)	ND		0.00050	mg/L							
LCS (1BC1242-BS1)					Prepared: 03/30/18 Analyzed: 04/02/18						
Mercury (TCLP)	0.00245		0.00050	mg/L	0.00250000		98.0	79-116			

Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC1242 - EPA 7470A Hg Water											
Matrix Spike (1BC1242-MS1)		**Source: 1C81825-01**			Prepared: 03/30/18 Analyzed: 04/02/18						
Mercury (TCLP)	0.00244		0.00050	mg/L	0.00250000	ND	97.6	56-137			
Matrix Spike Dup (1BC1242-MSD1)		**Source: 1C81825-01**			Prepared: 03/30/18 Analyzed: 04/02/18						
Mercury (TCLP)	0.00245		0.00050	mg/L	0.00250000	ND	98.0	56-137	0.409	13	
Batch 1BD0096 - EPA 1312											
Blank (1BD0096-BLK1)					Prepared & Analyzed: 04/03/18						
Boron (SPLP)	ND		100	ug/L							
..inum (SPLP)	ND		100	"							
Iron (SPLP)	ND		100	"							
Manganese (SPLP)	ND		10	"							
Zinc (SPLP)	ND		50	"							
Blank (1BD0096-BLK2)					Prepared & Analyzed: 04/03/18						
Boron (SPLP)	ND		100	ug/L							
Aluminum (SPLP)	ND		100	"							
Iron (SPLP)	ND		100	"							
Manganese (SPLP)	ND		10	"							
Zinc (SPLP)	ND		50	"							QB-02
LCS (1BD0096-BS1)					Prepared & Analyzed: 04/03/18						
Boron (SPLP)	495		100	ug/L	500.000		99.0	80-120			
Aluminum (SPLP)	5780		100	"	5500.00		105	80-120			
Iron (SPLP)	2630		100	"	2500.00		105	80-120			
Manganese (SPLP)	504		10	"	500.000		101	80-120			
Zinc (SPLP)	508		50	"	500.000		102	80-120			

Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BD0096 - EPA 1312											
Matrix Spike (1BD0096-MS1)		**Source: 1C81608-01**			Prepared & Analyzed: 04/03/18						
Boron (SPLP)	599		100	ug/L	500.000	96	101	70-130			
Aluminum (SPLP)	10100		100	"	5500.00	4110	108	70-130			
Iron (SPLP)	2560		100	"	2500.00	ND	102	75-125			
Manganese (SPLP)	484		10	"	500.000	ND	96.8	70-130			
Zinc (SPLP)	498		50	"	500.000	42.3	91.2	70-130			
Matrix Spike Dup (1BD0096-MSD1)		**Source: 1C81608-01**			Prepared & Analyzed: 04/03/18						
n (SPLP)	638		100	ug/L	500.000	96	108	70-130	6.23	20	
minum (SPLP)	10800		100	"	5500.00	4110	122	70-130	7.13	20	
Iron (SPLP)	2690		100	"	2500.00	ND	108	75-125	4.98	20	
Manganese (SPLP)	505		10	"	500.000	ND	101	70-130	4.34	20	
Zinc (SPLP)	522		50	"	500.000	42.3	96.0	70-130	4.76	20	
Post Spike (1BD0096-PS1)		**Source: 1C81608-01**			Prepared & Analyzed: 04/03/18						
Boron (SPLP)	0.933			ug/L	0.800000	0.095	105	75-125			
Aluminum (SPLP)	13.4			"	8.80000	4.07	106	75-125			
Iron (SPLP)	4.11			"	4.00000	0.00923	102	80-120			
Manganese (SPLP)	0.816			"	0.800000	0.000327	102	75-125			
Zinc (SPLP)	0.821			"	0.800000	0.0419	97.4	75-125			

TCLP Extraction - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC1016 - EPA 1311											
Blank (1BC1016-BLK1)					Prepared: 03/26/18 Analyzed: 03/27/18						
TCLP pH, Initial	4.9			pH							
TCLP pH, Final	5.0			"							

C Technologies L.L.C.
Kansas City MO, 64150
1300 NW Briarcliff Parkway, Ste., 250

Project: Flyash Testing
Project Number: USC Technologies L.L.C.
Project Manager: Richie Benninghoven

Reported:
04/04/18 15:37

Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC1061 - EPA 3010A Digestion (Water)											
Blank (1BC1061-BLK1)					Prepared: 03/27/18 Analyzed: 03/28/18						
Antimony (SPLP)	ND		4.0	ug/L							
Arsenic (SPLP)	ND		8.0	"							
Barium (SPLP)	ND		8.0	"							
Cadmium (SPLP)	ND		4.0	"							
Chromium (SPLP)	ND		20.0	"							
Copper (SPLP)	ND		8.0	"							
Lead (SPLP)	ND		8.0	"							
el (SPLP)	ND		8	"							
Selenium (SPLP)	ND		8.0	"							
Thallium (SPLP)	ND		8.0	"							
LCS (1BC1061-BS1)					Prepared: 03/27/18 Analyzed: 03/28/18						
Antimony (SPLP)	97.5		4.0	ug/L	100.000		97.5	80-120			
Arsenic (SPLP)	100		8.0	"	100.000		100	80-120			
Barium (SPLP)	114		8.0	"	100.000		114	80-120			
Cadmium (SPLP)	96.1		4.0	"	100.000		96.1	80-120			
Chromium (SPLP)	95.5		20.0	"	100.000		95.5	80-120			
Copper (SPLP)	102		8.0	"	100.000		102	80-120			
Lead (SPLP)	98.0		8.0	"	100.000		98.0	80-120			
Nickel (SPLP)	100		8	"	100.000		100	80-120			
Selenium (SPLP)	96.0		8.0	"	100.000		96.0	80-120			
Thallium (SPLP)	97.6		8.0	"	100.000		97.6	80-120			
Matrix Spike (1BC1061-MS1)		**Source: 1C81608-01**			Prepared: 03/27/18 Analyzed: 03/28/18						
Antimony (SPLP)	99.9		4.0	ug/L	100.000	ND	99.9	75-125			
Arsenic (SPLP)	102		8.0	"	100.000	ND	102	75-125			
Barium (SPLP)	12900		8.0	"	100.000	13300	NR	75-125			QM-4X
Cadmium (SPLP)	91.2		4.0	"	100.000	ND	91.2	75-125			
Chromium (SPLP)	170		20.0	"	100.000	75.7	94.4	75-125			

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Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC1061 - EPA 3010A Digestion (Water)											
Matrix Spike (1BC1061-MS1)		**Source: 1C81608-01**			Prepared: 03/27/18 Analyzed: 03/28/18						
Copper (SPLP)	96.4		8.0	ug/L	100.000	ND	96.4	70-130			
Lead (SPLP)	92.0		8.0	"	100.000	ND	92.0	70-130			
Nickel (SPLP)	97.0		8	"	100.000	ND	97.0	70-130			
Selenium (SPLP)	117		8.0	"	100.000	22.4	94.4	70-130			
Thallium (SPLP)	92.5		8.0	"	100.000	ND	92.5	75-125			
Matrix Spike Dup (1BC1061-MSD1)		**Source: 1C81608-01**			Prepared: 03/27/18 Analyzed: 03/28/18						
Antimony (SPLP)	98.8		4.0	ug/L	100.000	ND	98.8	75-125	1.14	20	
nic (SPLP)	102		8.0	"	100.000	ND	102	75-125	0.182	20	
Barium (SPLP)	12900		8.0	"	100.000	13300	NR	75-125	0.115	20	QM-4X
Cadmium (SPLP)	90.9		4.0	"	100.000	ND	90.9	75-125	0.292	20	
Chromium (SPLP)	168		20.0	"	100.000	75.7	92.4	75-125	1.15	20	
Copper (SPLP)	94.9		8.0	"	100.000	ND	94.9	70-130	1.63	20	
Lead (SPLP)	92.0		8.0	"	100.000	ND	92.0	70-130	0.00609	20	
Nickel (SPLP)	97.0		8	"	100.000	ND	97.0	70-130	0.0132	20	
Selenium (SPLP)	114		8.0	"	100.000	22.4	91.2	70-130	2.81	20	
Thallium (SPLP)	91.3		8.0	"	100.000	ND	91.3	75-125	1.30	20	
Post Spike (1BC1061-PS1)		**Source: 1C81608-01**			Prepared: 03/27/18 Analyzed: 03/28/18						
Antimony (SPLP)	0.0982			ug/L	0.0800000	0.0001	123	75-125			
Arsenic (SPLP)	0.104			"	0.0800000	0.0008	129	80-120			PS-04
Barium (SPLP)	15.9			"	0.0800000	13.0	NR	80-120			QM-4X
Cadmium (SPLP)	0.0900			"	0.0800000	0.00003	113	80-120			
Chromium (SPLP)	0.190			"	0.0800000	0.0742	144	80-120			PS-04
Copper (SPLP)	0.0959			"	0.0800000	0.0014	118	75-125			
Lead (SPLP)	0.0923			"	0.0800000	0.0005	115	75-125			
Nickel (SPLP)	0.0940			"	0.0800000	0.0000937	117	75-125			
Selenium (SPLP)	0.124			"	0.0800000	0.0220	127	75-125			PS-04
Thallium (SPLP)	0.0937			"	0.0800000	0.0003	117	80-120			

Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC1242 - EPA 7470A Hg Water											
Blank (1BC1242-BLK1)					Prepared: 03/30/18 Analyzed: 04/02/18						
Mercury (SPLP)	ND		0.50	ug/L							
LCS (1BC1242-BS1)					Prepared: 03/30/18 Analyzed: 04/02/18						
Mercury (SPLP)	2.45		0.50	ug/L	2.50000		98.0	79-116			
Matrix Spike (1BC1242-MS1)		**Source: 1C81825-01**			Prepared: 03/30/18 Analyzed: 04/02/18						
Mercury (SPLP)	2.44		0.50	ug/L	2.50000	ND	97.6	56-137			
Matrix Spike Dup (1BC1242-MSD1)		**Source: 1C81825-01**			Prepared: 03/30/18 Analyzed: 04/02/18						
ury (SPLP)	2.45		0.50	ug/L	2.50000	ND	98.0	56-137	0.409	13	

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SPLP Extraction - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BC1018 - EPA 1312											
Blank (1BC1018-BLK1)					Prepared: 03/26/18 Analyzed: 03/27/18						
SPLP pH, Initial	5.0			pH							
SPLP pH, Final	6.0			"							

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Certified Analyses included in this Report

Method/Matrix	Analyte	Certifications
EPA 6010B in Water		
	Aluminum (SPLP)	KS-NT
	Arsenic (TCLP)	KS-NT,SIA1X
	Barium (TCLP)	KS-NT,SIA1X
	Cadmium (TCLP)	KS-NT,SIA1X
	Chromium (TCLP)	KS-NT,SIA1X
	Lead (TCLP)	KS-NT,SIA1X
	Selenium (TCLP)	KS-NT,SIA1X
	Silver (TCLP)	KS-NT,SIA1X
.A 6020 in Solid		
	Nickel (SPLP)	SIA1X,KS-NT
EPA 6020A in Solid		
	Antimony (SPLP)	SIA1X,KS-NT
	Arsenic (SPLP)	SIA1X,KS-NT
	Barium (SPLP)	SIA1X,KS-NT
	Cadmium (SPLP)	SIA1X,KS-NT
	Chromium (SPLP)	SIA1X,KS-NT
	Copper (SPLP)	SIA1X,KS-NT
	Lead (SPLP)	SIA1X,KS-NT
	Selenium (SPLP)	SIA1X,KS-NT
	Thallium (SPLP)	SIA1X,KS-NT
EPA 6020A in Water		
	Antimony (SPLP)	SIA1X,KS-NT
	Arsenic (SPLP)	SIA1X,KS-NT
	Barium (SPLP)	SIA1X,KS-NT
	Cadmium (SPLP)	SIA1X,KS-NT
	Chromium (SPLP)	SIA1X,KS-NT
	Copper (SPLP)	SIA1X,KS-NT
	Lead (SPLP)	SIA1X,KS-NT

	Selenium (SPLP)	SIA1X,KS-NT
	Thallium (SPLP)	SIA1X,KS-NT
EPA 7470A in Water		
	Mercury (TCLP)	IA-NT,KS-NT
	Mercury (SPLP)	SIA1X
SM 2540 G in Sludge		
	% Solids	SIA1X

Code	Description	Number	Expires
KS-KC	Kansas Department of Health and Environment-KC	E-10110	04/30/2018
KS-NT	Kansas Department of Health and Environment (NELAP	E-10287	10/31/2018
MO-KC	Missouri Department of Natural Resources	140	04/30/2018
`IA1X	Iowa Department of Natural Resources	95	02/01/2019

Notes and Definitions

QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration.
QM-15	The spike recovery was outside acceptance limits due to dilution required for high analyte concentration and/or matrix interference.
QB-03	The method blank contains analyte at a concentration above the MRL; however concentration is less than 10% of the action level, which is negligble according to method criteria.
QB-02	The method blank contains analyte at a concentration above the MRL; however, sample concentration was less than the MRL or less than the applicable action level.
PS-04	The post spike recovery exceeded acceptance limits. However, all other QC was acceptable.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
·/	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

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CHAIN OF CUSTODY RECORD

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PAGE 1 OF 1

PRINT OR TYPE INFORMATION BELOW
SAMPLER:
SITE NAME:
ADDRESS:
CITY/ST/ZIP:
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REPORT TO:
NAME: RICHIE BENNINGHOVEN
COMPANY NAME: USC TECHNOLOGIES
ADDRESS: 1300 NW BRIARCLIFF PKWY STE 250
CITY/ST/ZIP: KANSAS CITY, MO 64150
PHONE:
FAX:

BILL TO:
NAME:
COMPANY NAME:
ADDRESS:
CITY/ST/ZIP:
PHONE:
Keystone Quote No.: (If Applicable)

CLIENT SAMPLE NUMBER	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	MATRIX	GRAB/COMPOSITE	ANALYSES REQUIRED:	TCLP		SPLP		BA-SPLP			LAB USE ONLY: LABORATORY WORK ORDER NO. 1L81608; SAMPLE TEMPERATURE UPON RECEIPT: No Ice °C; SAMPLE CONDITION/COMMENTS	LABORATORY SAMPLE NUMBER
	JAN 2018		NEARMAN FGD COMPOSITE	3				X		X		X				1L81608-01

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	
[signature]	Date 3/22/18 Time 9:27 AM		Date Time	Turn-Around: ☐ Standard ☐ Rush ______ Contact Lab Prior to Submission
Relinquished by: (Signature)	Date Time	Received for Lab by: (Signature) [signature]	Date 03/22/18 Time 12:05	Remarks:

Keystone LABORATORIES, INC.

MEMBER ACIL

4/23/2018

Richie Benninghoven
USC Technologies L.L.C.
1300 NW Briarcliff Parkway, Ste., 250
Kansas City MO, 64150

RE: Project: Flyash Testing
Project Number: USC Technologies L.L.C.

This analytical report is for the samples received on 4/10/2018 3:15:00PM. If you have any questions concerning this report please feel free to contact me at 1-800-858-5227. The samples included in this analytical report are as follows:

Sample ID	Laboratory ID	Matrix	Date Sampled
March 2018 - Nearman FGD - Composite	1D80712-01	Solid	04/10/18 00:00

Sincerely,

Carolyn L. Jackson

Carolyn Jackson, Project Manager

Phone: 913-321-7856 1140 West Cambridge Circle Drive Kansas City, KS 66103 Fax: 913-831-6778

CASE NARRITIVE

All analytical results for this Work Order meet(s) the laboratory established acceptance criteria for the method(s) requested with the following exceptions.

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Keystone LABORATORIES, INC.

C Technologies L.L.C.	Project: Flyash Testing	
..ansas City MO, 64150	Project Number: USC Technologies L.L.C.	**Reported:**
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	04/23/18 09:53

March 2018 - Nearman FGD - Composite

1D80712-01(Solid)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
			Keystone Laboratories, Inc. - Newton							
Determination of Conventional Chemistry Parameters										
Chromium, hexavalent (SPLP)	**20**	5	10	ug/L	1	1BD0523	04/12/18	04/12/18	EPA 7196A	
% Solids	**99.6**		0.1	%	"	1BD0522	04/11/18	04/13/18	SM 2540 G	
Determination of Recoverable Metals										
Cobalt (SPLP)	ND		10.0	ug/L	10	1BD0641	04/16/18	04/18/18	EPA 6020A	
Determination of TCLP Metals										
Silver (TCLP)	ND		0.010	mg/L	1	1BD0476	04/13/18	04/13/18	EPA 6010B	
Aluminum (SPLP)	**3440**		100	ug/L	"	1BD0641	04/16/18	04/18/18	"	
nic (TCLP)	**0.061**		0.030	mg/L	"	1BD0476	04/13/18	04/13/18	"	
m (TCLP)	**1.94**		0.010	"	"	"	"	"	"	
Boron (SPLP)	**2290**		100	ug/L	"	1BD0641	04/16/18	04/18/18	"	
Cadmium (TCLP)	ND		0.005	mg/L	"	1BD0476	04/13/18	04/13/18	"	
Chromium (TCLP)	**0.025**		0.010	"	"	"	"	"	"	
Iron (SPLP)	ND		100	ug/L	"	1BD0641	04/16/18	04/18/18	"	
Mercury (TCLP)	ND		0.00200	mg/L	"	1BD0635	04/16/18	04/17/18	EPA 7470A	
Manganese (SPLP)	ND		10	ug/L	"	1BD0641	04/16/18	04/18/18	EPA 6010B	
Lead (TCLP)	ND		0.020	mg/L	"	1BD0476	04/13/18	04/13/18	"	
Selenium (TCLP)	**0.214**		0.050	"	"	"	"	"	"	
Zinc (SPLP)	ND		20	ug/L	"	1BD0641	04/16/18	04/18/18	"	
TCLP Extraction										
TCLP pH, Initial	**2.9**			pH	1	1BD0477	04/11/18	04/13/18	EPA 1311	
TCLP pH, Final	**7.7**			"	"	"	"	"	"	

results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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⁊ Technologies L.L.C.	Project: Flyash Testing	
..ansas City MO, 64150	Project Number: USC Technologies L.L.C.	**Reported:**
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	04/23/18 09:53

March 2018 - Nearman FGD - Composite

1D80712-01(Solid)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
			Keystone Laboratories, Inc. - Newton							
Determination of SPLP Metals										
Arsenic (SPLP)	ND		20.0	ug/L	10	1BD0641	04/16/18	04/18/18	EPA 6020A	
Barium (SPLP)	OVERRANGE		20.0	"	"	"	"	"	"	
Cadmium (SPLP)	ND		10.0	"	"	"	"	"	"	
Chromium (SPLP)	**79.8**		50.0	"	"	"	"	"	"	
Copper (SPLP)	ND		20.0	"	"	"	"	"	"	
Mercury (SPLP)	ND		0.50	"	1	1BD0639	04/16/18	04/17/18	EPA 7470A	
Nickel (SPLP)	ND		20	"	10	1BD0641	04/16/18	04/18/18	EPA 6020	
Lead (SPLP)	ND		20.0	"	"	"	"	"	EPA 6020A	
ıony (SPLP)	ND		10.0	"	"	"	"	"	"	
.ium (SPLP)	**39.8**		20.0	"	"	"	"	"	"	
Chromium III (SPLP)	**60.1**		50.0	"	"	[CALC]	"	"	*** DEFAULT SPECIFIC METHOD ***	
Thallium (SPLP)	ND		20.0	"	"	1BD0641	"	"	EPA 6020A	
SPLP Extraction										
SPLP pH, Initial	**5.0**			pH	1	1BD0481	04/11/18	04/13/18	EPA 1312	
SPLP pH, Final	**12.2**			"	"	"	"	"	"	

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March 2018 - Nearman FGD - Composite

1D80712-01RE1(Solid)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
				Keystone Laboratories, Inc. - Newton						
Determination of SPLP Metals										
Barium (SPLP)	**10000**		200	ug/L	100	1BD0641	04/16/18	04/19/18	EPA 6020A	

Determination of Conventional Chemistry Parameters - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BD0522 - Wet Chem Preparation											
Duplicate (1BD0522-DUP1)		**Source: 1D80712-01**			Prepared: 04/11/18 Analyzed: 04/13/18						
% Solids	99.6		0.1	%		99.6			0.0301	14	
Batch 1BD0523 - Wet Chem Preparation											
Blank (1BD0523-BLK1)					Prepared & Analyzed: 04/12/18						
Chromium, hexavalent (SPLP)	ND	5	10	ug/L							
LCS (1BD0523-BS1)					Prepared & Analyzed: 04/12/18						
Chromium, hexavalent (SPLP)	39.4	5	10	ug/L	41.6667		94.6	85-113			
ix Spike (1BD0523-MS1)		**Source: 1D80712-01**			Prepared & Analyzed: 04/12/18						
Chromium, hexavalent (SPLP)	28.1	5	10	ug/L	20.4082	19.8	40.7	73-124			QM-12
Matrix Spike Dup (1BD0523-MSD1)		**Source: 1D80712-01**			Prepared & Analyzed: 04/12/18						
Chromium, hexavalent (SPLP)	28.7	5	10	ug/L	20.4082	19.8	44.0	73-124	2.32	15	QM-12

C Technologies L.L.C.	Project:	Flyash Testing	
ansas City MO, 64150	Project Number:	USC Technologies L.L.C.	**Reported:**
1300 NW Briarcliff Parkway, Ste., 250	Project Manager:	Richie Benninghoven	04/23/18 09:53

Determination of Recoverable Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BD0641 - EPA 3005A Total Recoverable Metals											
Blank (1BD0641-BLK3)					Prepared: 04/16/18 Analyzed: 04/18/18						
Cobalt (SPLP)	ND		10.0	ug/L							
Blank (1BD0641-BLK4)					Prepared: 04/16/18 Analyzed: 04/18/18						
Cobalt (SPLP)	ND		10.0	ug/L							
LCS (1BD0641-BS2)					Prepared: 04/16/18 Analyzed: 04/18/18						
Cobalt (SPLP)	505		50.0	ug/L	500.000		101	80-120			
Matrix Spike (1BD0641-MS2)		**Source: 1D80712-01**			Prepared: 04/16/18 Analyzed: 04/18/18						
t (SPLP)	506		50.0	ug/L	500.000	2.1	101	75-125			
Matrix Spike Dup (1BD0641-MSD2)		**Source: 1D80712-01**			Prepared: 04/16/18 Analyzed: 04/18/18						
Cobalt (SPLP)	501		50.0	ug/L	500.000	2.1	99.8	75-125	0.861	20	
Post Spike (1BD0641-PS2)		**Source: 1D80712-01**			Prepared: 04/16/18 Analyzed: 04/18/18						
Cobalt (SPLP)	0.189			ug/L	0.200000	0.0021	93.5	80-120			

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Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BD0476 - EPA 3010A TCLP ICP											
Blank (1BD0476-BLK1)					Prepared: 04/11/18 Analyzed: 04/13/18						
Arsenic (TCLP)	ND		0.030	mg/L							
Barium (TCLP)	ND		0.010	"							
Cadmium (TCLP)	ND		0.005	"							
Chromium (TCLP)	ND		0.010	"							
Lead (TCLP)	ND		0.020	"							
Selenium (TCLP)	ND		0.050	"							
Silver (TCLP)	ND		0.010	"							
k (1BD0476-BLK2)					Prepared: 04/11/18 Analyzed: 04/13/18						
Arsenic (TCLP)	ND		0.030	mg/L							
Barium (TCLP)	0.255		0.010	"							QB-03
Cadmium (TCLP)	ND		0.005	"							
Chromium (TCLP)	ND		0.010	"							
Lead (TCLP)	ND		0.020	"							
Selenium (TCLP)	ND		0.050	"							
Silver (TCLP)	ND		0.010	"							
Blank (1BD0476-BLK3)					Prepared: 04/11/18 Analyzed: 04/13/18						
Arsenic (TCLP)	ND		0.030	mg/L							
Barium (TCLP)	0.231		0.010	"							QB-03
Cadmium (TCLP)	ND		0.005	"							
Chromium (TCLP)	ND		0.010	"							QB-03
Lead (TCLP)	ND		0.020	"							QB-03
Selenium (TCLP)	ND		0.050	"							
Silver (TCLP)	ND		0.010	"							
LCS (1BD0476-BS1)					Prepared: 04/11/18 Analyzed: 04/13/18						
Arsenic (TCLP)	0.518		0.030	mg/L	0.500000		104	80-120			
Barium (TCLP)	0.514		0.010	"	0.500000		103	80-120			
Cadmium (TCLP)	0.508		0.005	"	0.500000		102	80-120			

Keystone LABORATORIES, INC.

C Technologies L.L.C.	Project: Flyash Testing	
..nsas City MO, 64150	Project Number: USC Technologies L.L.C.	Reported:
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	04/23/18 09:53

Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BD0476 - EPA 3010A TCLP ICP											
LCS (1BD0476-BS1)					Prepared: 04/11/18 Analyzed: 04/13/18						
Chromium (TCLP)	0.515		0.010	mg/L	0.500000		103	80-120			
Lead (TCLP)	0.497		0.020	"	0.500000		99.4	80-120			
Selenium (TCLP)	0.509		0.050	"	0.500000		102	80-120			
Silver (TCLP)	0.519		0.010	"	0.500000		104	80-120			
Matrix Spike (1BD0476-MS1)		**Source: 1D80608-02**			Prepared: 04/11/18 Analyzed: 04/13/18						
Arsenic (TCLP)	0.562		0.030	mg/L	0.500000	ND	112	70-130			
Barium (TCLP)	1.46		0.010	"	0.500000	0.977	96.4	70-130			
um (TCLP)	0.552		0.005	"	0.500000	ND	110	70-130			
Chromium (TCLP)	0.541		0.010	"	0.500000	0.0481	98.6	70-130			
Lead (TCLP)	0.466		0.020	"	0.500000	ND	93.3	70-130			
Selenium (TCLP)	0.612		0.050	"	0.500000	ND	122	70-130			
Silver (TCLP)	0.522		0.010	"	0.500000	ND	104	70-130			
Matrix Spike Dup (1BD0476-MSD1)		**Source: 1D80608-02**			Prepared: 04/11/18 Analyzed: 04/13/18						
Arsenic (TCLP)	0.551		0.030	mg/L	0.500000	ND	110	70-130	1.90	20	
Barium (TCLP)	1.48		0.010	"	0.500000	0.977	101	70-130	1.52	20	
Cadmium (TCLP)	0.549		0.005	"	0.500000	ND	110	70-130	0.472	20	
Chromium (TCLP)	0.536		0.010	"	0.500000	0.0481	97.6	70-130	0.909	20	
Lead (TCLP)	0.468		0.020	"	0.500000	ND	93.5	70-130	0.269	20	
Selenium (TCLP)	0.608		0.050	"	0.500000	ND	122	70-130	0.560	20	
Silver (TCLP)	0.515		0.010	"	0.500000	ND	103	70-130	1.37	20	
Post Spike (1BD0476-PS1)		**Source: 1D80608-02**			Prepared: 04/11/18 Analyzed: 04/13/18						
Arsenic (TCLP)	0.815			mg/L	0.800000	0.00321	101	75-125			
Barium (TCLP)	1.73			"	0.800000	0.967	95.5	75-125			
Cadmium (TCLP)	0.845			"	0.800000	0.0006	106	75-125			
Chromium (TCLP)	0.834			"	0.800000	0.0476	98.3	75-125			
Lead (TCLP)	0.770			"	0.800000	0.012	94.8	75-125			
Selenium (TCLP)	0.867			"	0.800000	0.0317	104	75-125			

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Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BD0476 - EPA 3010A TCLP ICP											
Post Spike (1BD0476-PS1)		**Source: 1D80608-02**			Prepared: 04/11/18 Analyzed: 04/13/18						
Silver (TCLP)	0.796			mg/L	0.800000	0.000270	99.4	75-125			
Batch 1BD0635 - EPA 7470A Hg Water											
Blank (1BD0635-BLK1)					Prepared: 04/16/18 Analyzed: 04/17/18						
Mercury (TCLP)	ND		0.00050	mg/L							
Blank (1BD0635-BLK2)					Prepared: 04/16/18 Analyzed: 04/17/18						
Mercury (TCLP)	ND		0.00050	mg/L							
k (1BD0635-BLK3)					Prepared: 04/16/18 Analyzed: 04/17/18						
Mercury (TCLP)	ND		0.00050	mg/L							
Blank (1BD0635-BLK4)					Prepared: 04/16/18 Analyzed: 04/17/18						
Mercury (TCLP)	ND		0.00050	mg/L							
LCS (1BD0635-BS1)					Prepared: 04/16/18 Analyzed: 04/17/18						
Mercury (TCLP)	0.00253		0.00050	mg/L	0.00250000		101	79-116			
Matrix Spike (1BD0635-MS1)		**Source: 1D80608-02**			Prepared: 04/16/18 Analyzed: 04/17/18						
Mercury (TCLP)	0.0101		0.00200	mg/L	0.0100000	ND	101	56-137			
Matrix Spike Dup (1BD0635-MSD1)		**Source: 1D80608-02**			Prepared: 04/16/18 Analyzed: 04/17/18						
Mercury (TCLP)	0.0104		0.00200	mg/L	0.0100000	ND	104	56-137	2.74	13	
Batch 1BD0641 - EPA 3005A Total Recoverable Metals											
Blank (1BD0641-BLK1)					Prepared: 04/16/18 Analyzed: 04/18/18						
Boron (SPLP)	ND		100	ug/L							
Aluminum (SPLP)	ND		100	"							
Iron (SPLP)	ND		100	"							
Manganese (SPLP)	ND		10	"							
Zinc (SPLP)	ND		20	"							

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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[illegible] Technologies L.L.C.
[illegible]ansas City MO, 64150
1300 NW Briarcliff Parkway, Ste., 250

Project: Flyash Testing
Project Number: USC Technologies L.L.C.
Project Manager: Richie Benninghoven

Reported:
04/23/18 09:53

Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BD0641 - EPA 3005A Total Recoverable Metals											
Blank (1BD0641-BLK2)					Prepared: 04/16/18 Analyzed: 04/18/18						
Boron (SPLP)	ND		100	ug/L							
Aluminum (SPLP)	ND		100	"							
Iron (SPLP)	ND		100	"							
Manganese (SPLP)	ND		10	"							
Zinc (SPLP)	20.2		20	"							QB-03
LCS (1BD0641-BS1)					Prepared: 04/16/18 Analyzed: 04/18/18						
[illegible]n (SPLP)	561		100	ug/L	500.000		112	80-120			
[illegible]inum (SPLP)	5900		100	"	5500.00		107	80-120			
Iron (SPLP)	2720		100	"	2500.00		109	80-120			
Manganese (SPLP)	535		10	"	500.000		107	80-120			
Zinc (SPLP)	516		20	"	500.000		103	80-120			
Matrix Spike (1BD0641-MS1)		**Source: 1D80712-01**			Prepared: 04/16/18 Analyzed: 04/18/18						
Boron (SPLP)	2880		100	ug/L	500.000	2290	117	70-130			
Aluminum (SPLP)	9290		100	"	5500.00	3440	106	70-130			
Iron (SPLP)	2460		100	"	2500.00	ND	98.5	75-125			
Manganese (SPLP)	474		10	"	500.000	ND	94.8	70-130			
Zinc (SPLP)	485		20	"	500.000	ND	97.0	70-130			
Matrix Spike Dup (1BD0641-MSD1)		**Source: 1D80712-01**			Prepared: 04/16/18 Analyzed: 04/18/18						
Boron (SPLP)	2860		100	ug/L	500.000	2290	114	70-130	0.559	20	
Aluminum (SPLP)	9150		100	"	5500.00	3440	104	70-130	1.49	20	
Iron (SPLP)	2480		100	"	2500.00	ND	99.0	75-125	0.478	20	
Manganese (SPLP)	475		10	"	500.000	ND	95.0	70-130	0.225	20	
Zinc (SPLP)	497		20	"	500.000	ND	99.4	70-130	2.49	20	
Post Spike (1BD0641-PS1)		**Source: 1D80712-01**			Prepared: 04/16/18 Analyzed: 04/18/18						
Boron (SPLP)	3.19			ug/L	0.800000	2.27	116	75-125			
Aluminum (SPLP)	12.0			"	8.80000	3.40	98.0	75-125			
[illegible] (SPLP)	3.94			"	4.00000	0.003	98.5	80-120			

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Determination of TCLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BD0641 - EPA 3005A Total Recoverable Metals											
Post Spike (1BD0641-PS1)		**Source: 1D80712-01**			Prepared: 04/16/18 Analyzed: 04/18/18						
Manganese (SPLP)	0.785			ug/L	0.800000	-0.000380	98.1	75-125			
Zinc (SPLP)	0.779			"	0.800000	0.0132	95.8	75-125			

TCLP Extraction - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BD0477 - EPA 1311											
Blank (1BD0477-BLK1)					Prepared & Analyzed: 04/13/18						
TCLP pH, Initial	4.8			pH							
TCLP pH, Final	4.8			"							

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Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BD0639 - EPA 7470A Hg Water											
Blank (1BD0639-BLK1)					Prepared: 04/16/18 Analyzed: 04/17/18						
Mercury (SPLP)	ND		0.50	ug/L							
Blank (1BD0639-BLK2)					Prepared: 04/16/18 Analyzed: 04/17/18						
Mercury (SPLP)	ND		0.50	ug/L							
LCS (1BD0639-BS1)					Prepared: 04/16/18 Analyzed: 04/17/18						
Mercury (SPLP)	2.55		0.50	ug/L	2.50000		102	79-116			
Matrix Spike (1BD0639-MS1)		**Source: 1D80712-01**			Prepared: 04/16/18 Analyzed: 04/17/18						
..ry (SPLP)	2.49		0.50	ug/L	2.50000	ND	99.6	56-137			
Matrix Spike Dup (1BD0639-MSD1)		**Source: 1D80712-01**			Prepared: 04/16/18 Analyzed: 04/17/18						
Mercury (SPLP)	2.47		0.50	ug/L	2.50000	ND	98.8	56-137	0.806	13	
Batch 1BD0641 - EPA 3005A Total Recoverable Metals											
Blank (1BD0641-BLK3)					Prepared: 04/16/18 Analyzed: 04/18/18						
Antimony (SPLP)	ND		10.0	ug/L							
Arsenic (SPLP)	ND		20.0	"							
Barium (SPLP)	ND		20.0	"							
Cadmium (SPLP)	ND		10.0	"							
Chromium (SPLP)	ND		50.0	"							
Copper (SPLP)	ND		20.0	"							
Lead (SPLP)	ND		20.0	"							
Nickel (SPLP)	ND		20	"							
Selenium (SPLP)	ND		20.0	"							
Thallium (SPLP)	ND		20.0	"							

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C Technologies L.L.C.
..ansas City MO, 64150
1300 NW Briarcliff Parkway, Ste., 250

Project: Flyash Testing
Project Number: USC Technologies L.L.C.
Project Manager: Richie Benninghoven

Reported: 04/23/18 09:53

Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BD0641 - EPA 3005A Total Recoverable Metals											
Blank (1BD0641-BLK4)					Prepared: 04/16/18 Analyzed: 04/18/18						
Antimony (SPLP)	ND		10.0	ug/L							
Arsenic (SPLP)	ND		20.0	"							
Barium (SPLP)	56.4		20.0	"							QB-03
Cadmium (SPLP)	ND		10.0	"							
Chromium (SPLP)	ND		50.0	"							
Copper (SPLP)	ND		20.0	"							
Lead (SPLP)	ND		20.0	"							
l (SPLP)	ND		20	"							
Selenium (SPLP)	ND		20.0	"							
Thallium (SPLP)	ND		20.0	"							
LCS (1BD0641-BS2)					Prepared: 04/16/18 Analyzed: 04/18/18						
Antimony (SPLP)	506		50.0	ug/L	500.000		101	80-120			
Arsenic (SPLP)	528		100	"	500.000		106	80-120			
Barium (SPLP)	515		100	"	500.000		103	80-120			
Cadmium (SPLP)	520		50.0	"	500.000		104	80-120			
Chromium (SPLP)	466		250	"	500.000		93.3	80-120			
Copper (SPLP)	513		100	"	500.000		103	80-120			
Lead (SPLP)	494		100	"	500.000		98.8	80-120			
Nickel (SPLP)	505		100	"	500.000		101	80-120			
Selenium (SPLP)	574		100	"	500.000		115	80-120			
Thallium (SPLP)	521		100	"	500.000		104	80-120			
Matrix Spike (1BD0641-MS2)		**Source: 1D80712-01**			Prepared: 04/16/18 Analyzed: 04/18/18						
Antimony (SPLP)	531		50.0	ug/L	500.000	ND	106	75-125			
Arsenic (SPLP)	533		100	"	500.000	ND	107	75-125			
Barium (SPLP)	11500		100	"	500.000	)VERRANGI	357	75-125			QM-4X
Cadmium (SPLP)	527		50.0	"	500.000	ND	105	75-125			
Chromium (SPLP)	562		250	"	500.000	79.8	96.5	75-125			

_ results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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C Technologies L.L.C.	Project: Flyash Testing	
..ansas City MO, 64150	Project Number: USC Technologies L.L.C.	Reported:
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	04/23/18 09:53

Determination of SPLP Metals - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BD0641 - EPA 3005A Total Recoverable Metals											
Matrix Spike (1BD0641-MS2)		**Source: 1D80712-01**			Prepared: 04/16/18 Analyzed: 04/18/18						
Copper (SPLP)	500		100	ug/L	500.000	ND	100	70-130			
Lead (SPLP)	502		100	"	500.000	ND	100	70-130			
Nickel (SPLP)	501		100	"	500.000	ND	100	70-130			
Selenium (SPLP)	599		100	"	500.000	39.8	112	70-130			
Thallium (SPLP)	531		100	"	500.000	ND	106	75-125			
Matrix Spike Dup (1BD0641-MSD2)		**Source: 1D80712-01**			Prepared: 04/16/18 Analyzed: 04/18/18						
Antimony (SPLP)	522		50.0	ug/L	500.000	ND	104	75-125	1.77	20	
..ic (SPLP)	528		100	"	500.000	ND	106	75-125	0.985	20	
Barium (SPLP)	11100		100	"	500.000	)VERRANGI	269	75-125	3.89	20	QM-4X
Cadmium (SPLP)	517		50.0	"	500.000	ND	103	75-125	1.85	20	
Chromium (SPLP)	552		250	"	500.000	79.8	94.4	75-125	1.91	20	
Copper (SPLP)	502		100	"	500.000	ND	100	70-130	0.276	20	
Lead (SPLP)	486		100	"	500.000	ND	97.3	70-130	3.17	20	
Nickel (SPLP)	500		100	"	500.000	ND	100	70-130	0.174	20	
Selenium (SPLP)	596		100	"	500.000	39.8	111	70-130	0.495	20	
Thallium (SPLP)	520		100	"	500.000	ND	104	75-125	2.17	20	
Post Spike (1BD0641-PS2)		**Source: 1D80712-01**			Prepared: 04/16/18 Analyzed: 04/18/18						
Antimony (SPLP)	0.191			ug/L	0.200000	0.0007	95.0	75-125			
Arsenic (SPLP)	0.192			"	0.200000	0.0007	95.8	80-120			
Barium (SPLP)	10.0			"	0.200000	)VERRANGI	240	80-120			PS-4X
Cadmium (SPLP)	0.182			"	0.200000	0.0001	90.9	80-120			
Chromium (SPLP)	0.249			"	0.200000	0.0782	85.4	80-120			
Copper (SPLP)	0.184			"	0.200000	0.0017	91.0	75-125			
Lead (SPLP)	0.178			"	0.200000	0.0002	89.1	75-125			
Nickel (SPLP)	0.181			"	0.200000	0.00120	90.0	75-125			
Selenium (SPLP)	0.233			"	0.200000	0.0390	97.1	75-125			
Thallium (SPLP)	0.194			"	0.200000	0.0001	96.8	80-120			

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SPLP Extraction - Quality Control

Keystone Laboratories, Inc. - Newton

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1BD0481 - EPA 1312											
Blank (1BD0481-BLK1)					Prepared & Analyzed: 04/13/18						
SPLP pH, Initial	4.8			pH							
SPLP pH, Final	4.8			"							

Certified Analyses included in this Report

Method/Matrix	Analyte	Certifications
EPA 6010B in Solid		
	Aluminum (SPLP)	KS-NT
EPA 6010B in Water		
	Arsenic (TCLP)	KS-NT,SIA1X
	Barium (TCLP)	KS-NT,SIA1X
	Cadmium (TCLP)	KS-NT,SIA1X
	Chromium (TCLP)	KS-NT,SIA1X
	Lead (TCLP)	KS-NT,SIA1X
	Selenium (TCLP)	KS-NT,SIA1X
	Silver (TCLP)	KS-NT,SIA1X
EPA 6020 in Solid		
	Nickel (SPLP)	SIA1X,KS-NT
EPA 6020A in Solid		
	Antimony (SPLP)	SIA1X,KS-NT
	Arsenic (SPLP)	SIA1X,KS-NT
	Barium (SPLP)	SIA1X,KS-NT
	Cadmium (SPLP)	SIA1X,KS-NT
	Chromium (SPLP)	SIA1X,KS-NT
	Copper (SPLP)	SIA1X,KS-NT
	Lead (SPLP)	SIA1X,KS-NT
	Selenium (SPLP)	SIA1X,KS-NT
	Thallium (SPLP)	SIA1X,KS-NT
EPA 7470A in Water		
	Mercury (TCLP)	IA-NT,KS-NT
	Mercury (SPLP)	SIA1X
SM 2540 G in Sludge		
	% Solids	SIA1X

Code	Description	Number	Expires
KS-KC	Kansas Department of Health and Environment-KC	E-10110	04/30/2018
KS-NT	Kansas Department of Health and Environment (NELAP	E-10287	10/31/2018
MO-KC	Missouri Department of Natural Resources	140	04/30/2018
SIA1X	Iowa Department of Natural Resources	95	02/01/2019

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C Technologies L.L.C.	Project: Flyash Testing	
.nsas City MO, 64150	Project Number: USC Technologies L.L.C.	**Reported:**
1300 NW Briarcliff Parkway, Ste., 250	Project Manager: Richie Benninghoven	04/23/18 09:53

Notes and Definitions

QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration.
QM-12	The spike recovery was outside acceptance limits for the MS and/or MSD.
QB-03	The method blank contains analyte at a concentration above the MRL; however concentration is less than 10% of the action level, which is negligble according to method criteria.
PS-4X	The spike recovery was outside of QC acceptance limits for the Post Spike due to analyte concentration at 4 times or greater the spike concentration.
O-11A	OVERRANGE
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
	Sample results reported on a dry weight basis
. D	Relative Percent Difference

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PAGE 1 OF 1

PRINT OR TYPE INFORMATION BELOW
SAMPLER:
SITE NAME:
ADDRESS:
CITY/ST/ZIP:
PHONE:

REPORT TO:
NAME: Richie Benninghoven
COMPANY NAME: USC Technologies
ADDRESS: 1300 NW Briarcliff Pkwy Ste 250
CITY/ST/ZIP: Kansas City, Mo 64150
PHONE:
FAX:

BILL TO:
NAME:
COMPANY NAME:
ADDRESS:
CITY/ST/ZIP:
PHONE:
Keystone Quote No.: (If Applicable)

CLIENT SAMPLE NUMBER	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	MATRIX	GRAB/COMPOSITE	TCLP	SPLP	BA-SPLP		LAB USE ONLY: SAMPLE CONDITION COMMENTS	LABORATORY SAMPLE NUMBER
March 2018			Neeman FGD Composite	3			X	X	X			1080712-01

ANALYSES REQUIRED

LAB USE ONLY
LABORATORY WORK ORDER NO: 1080712
SAMPLE TEMPERATURE UPON RECEIPT: No Ice °C

Relinquished by: (Signature)	Date 4/10/18 Time 10:50 AM	Received by: (Signature)	Date / Time	Turn-Around: ☒ Standard ☐ Rush ____ Contact Lab Prior to Submission
Relinquished by: (Signature)	Date / Time	Received for Lab by: (Signature)	Date 04/10/18 Time 15:15	Remarks:

Original - Return with Report • Yellow Copy • Pink - Sampler Copy

F CCR 7-97

Attachment H

Fly Ash Injection Process/Equipment

Proposed Operating Plan for Placement of FGD Ash/Cement Slurry
Greystone Mine
Kansas City, Missouri

When filling the approved areas of the Greystone Mine with FGD ash/cement material, USC Technologies (USC) will employ mixing and placement techniques that have been used on other limestone mine filling projects, including an on-going project at the Inland Mine in Kansas City, Kansas. The techniques used in these backfilling operations have produced successful results to achieve long-term stability, based upon observations and specifications developed by regional professional engineers.

To that end, USC will transport, mix, and place the slurry material as follows:

1. Prior to transportation of the FGD ash/cement mixture to the mine site, it is weighed and loaded into pneumatic tanker trailers at the plant site. The addition of cement is necessary to achieve enough compressive strength for mine stabilization use. In this case, the cement will be either pre-blended into the FGD ash at the plant site or the pneumatic trailer/truck will drive to a cement terminal silo and have the appropriate amount of cement added to the pneumatic trailer on top of the fly/FGD ash. Picture 1 shows an example of the pneumatic truck and trailer set up.
2. Once loaded with the ash and cement, the truck will drive to the mine site to the designated placement hole on the surface. Picture 2 shows an example of a placement hole which is drilled from the ground surface down into the mine void which may range from 80-130 feet below the ground surface. The holes are cased with PVC pipe and the void between the pipe and the drill hole is filled with grout. A custom-made mixing hopper is then placed on the placement hole, with the outlet of the hopper placed down into the casing and the hopper secured to the casing. This attachment ensures that the hopper will not detach from the borehole casing and will also allow the slurry placement to create a draw of air (suction) down the borehole as the slurry is placed. This inward/downward suction of air within the casing pulls any minor dust created during the mixing process down the borehole, thereby limiting the introduction/migration of fugitive dust into the air near the injection location.
3. Around the periphery of each injection boring, a containment berm is also constructed to contain the occasional, very minor leaking of the slurry from the hopper. It is noted that any minor quantities of contained slurry typically harden within several hours after being mixed with water. During slurry placement at an injection location, the total volume of spillage of slurry over the time an injection point is used may amount to several cubic yards of material, with the volume of contained material depending on the total time of injection. The total time of injection may extend from several weeks to several months of placement at a single placement boring. The total volume of available containment around the mixing hopper will be continuously monitored, and the containment area "cleaned out" if the volume of spilled slurry approaches 50% of the total containment volume. Additionally, in the rare occurrence of a hopper clogging/impingement that creates a larger spill volume than normal, the excess spillage will be immediately collected, removed, and mitigated. Picture 3 shows an example of a custom mixing hopper on a placement boring with a constructed, perimeter containment berm.

4. When the truck arrives at the injection site/boring, the location will have been prepared for injection by ensuring that the mixing hopper has been installed on the casing and that the site is ready for slurry placement. After arrival of the pneumatic tanker, tanker/operating personnel will connect the ash discharge hose from the placement hopper to the pneumatic trailer discharge port, followed by the connection of the waterline attached that is to the mixing hopper to the water source. Picture 4 shows the ash discharge hose connected to the pneumatic trailer. Picture 5 shows the entire set-up with the pneumatic trailer attached to the mixing hopper. In Picture 5, the larger diameter, dark color line running from the trailer to the mixing hopper is the ash discharge line, while the smaller diameter, lighter color line attached to the mixing hopper is the water line. The mixing water flows through the black HDPE pipe (see photograph 5) that is ultimately attached to a domestic water connection.
5. After the pneumatic tank is connected to the mixing hopper, operating personnel will increase the air pressure in the pneumatic tank and release air to initiate ash/cement flow through the discharge line to the mixing hopper. Once an adequate pressure level has developed in the pneumatic tanker, operating personnel will introduce water to the mixing hopper and begin injecting dry ash/cement material into the mixing hopper to create the slurry. The mixed slurry then travels down the cased placement boring and into the mine void.
6. During unloading, operating personnel monitors pressure gauges on the pneumatic tanker/trailer and adjusts the air pressure, as required, to ensure that the ash/cement discharge pressure is at an acceptable and consistent range to ensure a uniform the off-load rate.
7. The water flow rate is adjusted with a hand valve. Picture 6 shows the pressure gauges on the pneumatic trailer. Picture 7 shows the hand valve on the water connection. Typically, pneumatic tankers off-load ash/cement mixtures at a very consistent rate for similar pressure ranges, with the water injection rate being adjusted to match the dry material off-load rate. This use of this type of mixing technique has historically achieved an acceptable and the appropriate mix ratio range for the slurry. It is noted that the water setting on the valve can vary from placement boring to placement boring depending on the distance between the injection locations and the actual water source/hydrant. Operating personnel verify the volume of water that is used with each load of ash/cement by checking the meter reading before and after the actual load placement operation. This verification of water quantity used verifies and confirms that the correct/approximate mix ratio of 1:1 (water to ash/cement by weight) is achieved. Operating personnel also visually confirm that an appropriate mix consistency is being achieved by observing the slurry in the mixing hopper. By controlling the quantity of mix water, the volume of potential "bleed" water can be minimized, with the desired outcome of no excess water ponding or standing on the hardened ash.
8. Upon emptying the pneumatic trailer, operating personnel will shut off the mixing water, followed by the shut-off of the air pressure and then removal of the air discharge hoses from the transport trailer. The truck/trailer will then return to the Nearman Power Plant for another load of dry ash/cement.
9. The progress of the mine filling will be confirmed by visual examinations conducted by a down-hole video camera, as well as final backfill conditions encountered during the drilling of supplemental borings and/or future injection shafts.
10. Once an injection location is completed, any contained, hardened ash/cement slurry will be cleaned up and transported to an acceptable disposal location. The injection casing will be

cut off 6 inches to 12 inches below the ground surface and permanently capped. Disturbed surface areas around the injection site will be graded and vegetation established.

11. Daily grab samples of the FGD ash being transported to the injection site will be obtained at the Nearman Power Plant prior to mixing with cement. These daily samples will be blended together monthly, with TCLP and SPLP tests being performed on these monthly composite samples. This testing will used to confirm and document the leaching potential of the constituents in the FGD ash are as expected and within the original beneficial use approval criteria.

Picture 1: Pneumatic Truck and Trailer

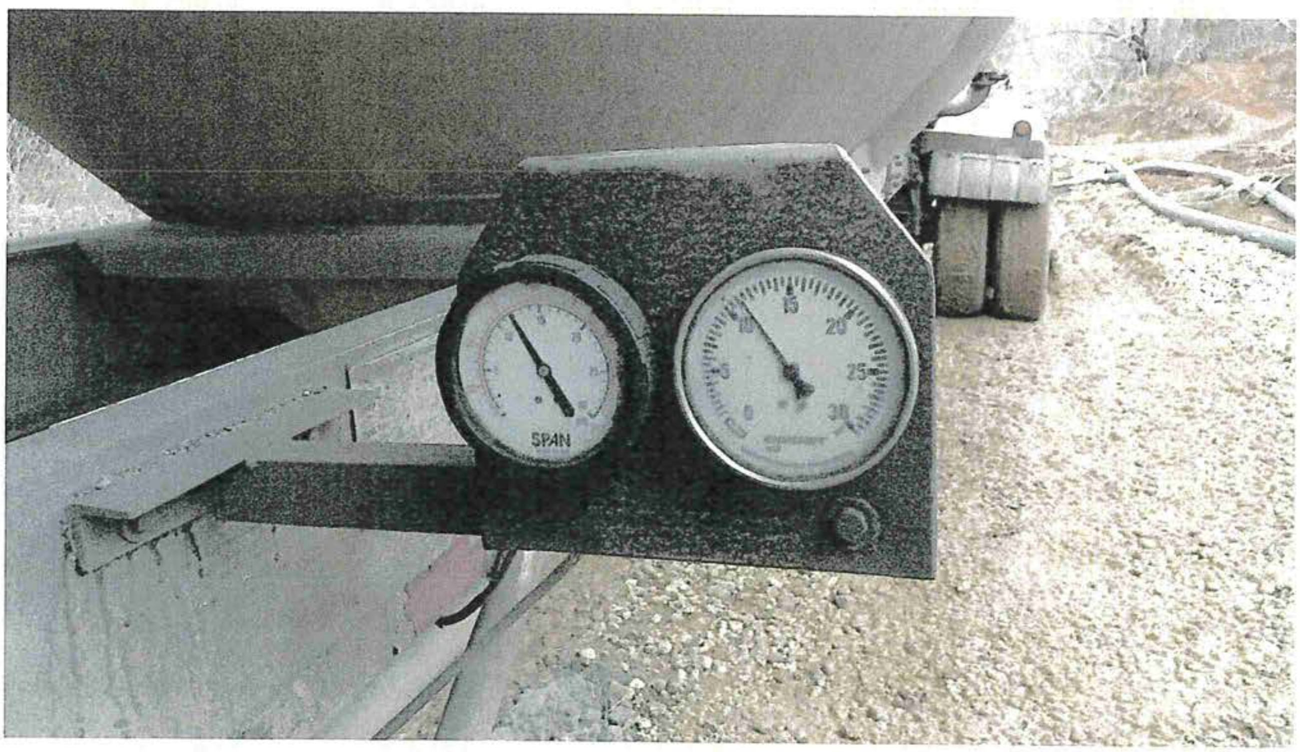
Picture 2: Placement/Injection Boring with Exposed Casing

Picture 3: Custom Mixing Hopper on Injection Casing with Containment Berm

Picture 4: Ash Discharge Hose Connected to Pneumatic Tanker

Picture 5: Pneumatic Tanker Connected to Mixing Hopper – Ready to Unload

Picture 6: Pneumatic Tanker Pressure Gauges.



Picture 7: Water Connection, with Hand Valve

Attachment I

Typical Laboratory Strength Tests and Permeability off Hardened Cement/Fly Ash

Job Number: J007886.17

Job Name: Fly Ash/ Cement Study

Job Location: Greystone Mine

GEOTECHNOLOGY INC
FROM THE GROUND UP

Summarized Table of Test Results - Compressive Strength of 3x6 cylinders

Sample ID	Test Date	Age	Avg. Height (Inches)	Avg. Diameter (Inches)	Weight (Grams)	Area (Sq. Inch)	Unit Weight (PCF)	Applied Load (Pounds)	Compressive Strength (PSI)	L/D Ratio	Corrected Strength (PSI)
18-001	8/20/18	11	4.50	3.00	831.5	7.069	99.58	263	37	1.50	36
18-002	8/23/18	14	4.54	3.00	831.2	7.069	98.67	534	76	1.51	73
18-003	8/30/18	21	4.54	3.01	771.7	7.116	90.99	678	95	1.51	91
18-004	9/6/18	28	4.50	3.00	589.7	7.069	70.62	636	90	1.50	86
18-005	9/6/18	28	4.51	3.00	628.6	7.069	75.12	1027	145	1.50	139
18-006	9/20/18	35	4.46	3.00	552.2	7.069	66.72	798	113	1.50	108
18-007	10/9/18	60	4.46	3.00	540.5	7.069	64.73	804.0	114	1.5	109
18-008	11/7/18	90	4.46	3.00	546.6	7.069	66.05	712.0	101	1.5	97

Job Number: J007886.17
Job Name: Fly Ash/ Cement Study
Job Location: Greystone Mine

GEOTECHNOLOGY INC
FROM THE GROUND UP

Summarized Table of Test Results - Compressive Strength of 2x2 cubes

Sample ID	Test Date	Age	Avg. Height (Inches)	Avg. Width (Inches)	Weight (Grams)	Area (Sq. Inch)	Unit Weight (PCF)	Applied Load (Pounds)	Compressive Strength (PSI)	L/D Ratio	Corrected Strength (PSI)
18-A	8/20/18	11	1.98	1.46	125.6	2.885	83.62	494	171	1.36	161
18-B	8/23/18	14	1.98	1.47	129.3	2.911	85.50	579	199	1.35	187
18-C	8/30/18	21	1.98	1.41	126.8	2.792	87.39	1197	429	1.40	403
18-D	9/6/18	28	1.97	1.43	121.6	2.817	83.48	847	301	1.38	283
18-E	9/20/18	35	1.97	1.42	121.0	2.797	83.67	1051	376	1.40	353
18-F	10/9/18	60	1.96	1.40	120.8	2.748	85.29	1651	601	1.4	565
18-G	11/7/18	90	1.97	1.44	120.9	2.837	82.41	1655	583	1.4	548

PERMEABILITY TEST REPORT

Test conducted in general accordance with ASTM D 5084.

Sample Indentification:
Perm 1

Sample Description:
Fly Ash with 6% Cement

Preparation Remarks:
Shelby Tube Sample

SPECIMEN DATA

Specimen Information	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Moisture Content (%)	Void Ratio*	Saturation*
Initial Data	90.3	71.4	26.6	1.361	53%
Final Data	115.5	71.3	62.0	1.364	100%

* Assumed Specific Gravity = 2.70

Average Initial Specimen Dimensions: Diameter = 7.149 (cm)
Length = 7.178 (cm)

TEST INFORMATION

Permeant Liquid Used: De-aired Water
Magnitude of Total Back Pressure: 60 (psi)
Effective Consolidation Stress: 6 (psi)
Hydraulic Gradient Range: High = 12.86
Low = 9.98

AVERAGE HYDRAULIC CONDUCTIVITY
corrected to 20°C
3.5E-05 cm/sec.

This is a remolded sample and may not be indicative of actual in-situ conditions.

GEOTECHNOLOGY INC
FROM THE GROUND UP

Project:	Fly Ash with 6% Cement
Location:	Mix-1
Project No: J007886.17	Date: 9/13/18

PERMEABILITY TEST REPORT

Test conducted in general accordance with ASTM D 5084.

Sample Indentification:
Perm 2

Sample Description:
Fly Ash with 6% Cement

Preparation Remarks:
Shelby Tube Sample

SPECIMEN DATA

Specimen Information	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Moisture Content (%)	Void Ratio*	Saturation*
Initial Data	99.4	76.5	29.9	1.202	67%
Final Data	101.4	66.3	52.8	1.541	99%

* Assumed Specific Gravity = 2.70

Average Initial Specimen Dimensions: Diameter = 7.154 (cm)
Length = 7.417 (cm)

TEST INFORMATION

Permeant Liquid Used: De-aired Water
Magnitude of Total Back Pressure: 60 (psi)
Effective Consolidation Stress: 6 (psi)
Hydraulic Gradient Range: High = 7.21
Low = 4.52

AVERAGE HYDRAULIC CONDUCTIVITY

corrected to 20°C
6.7E-05 cm/sec.

This is a remolded sample and may not be indicative of actual in-situ conditions.

GEOTECHNOLOGY INC
FROM THE GROUND UP

Project: Fly Ash with 6% Cement
Location: Mix-1
Project No: J007886.17
Date: 9/21/18

PERMEABILITY TEST REPORT

Test conducted in general accordance with ASTM D 5084.

Sample Indentification:
Perm 3

Sample Description:
Fly Ash with 6% Cement

Preparation Remarks:
Shelby Tube Sample

SPECIMEN DATA

Specimen Information	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Moisture Content (%)	Void Ratio*	Saturation*
Initial Data	69.0	65.8	4.9	1.560	8%
Final Data	102.6	66.6	54.1	1.531	100%

* Assumed Specific Gravity = 2.70

Average Initial Specimen Dimensions: Diameter = 7.197 (cm)
Length = 7.188 (cm)

TEST INFORMATION

Permeant Liquid Used: De-aired Water
Magnitude of Total Back Pressure: 60 (psi)
Effective Consolidation Stress: 6 (psi)
Hydraulic Gradient Range: High = 12.73
Low = 11.36

AVERAGE HYDRAULIC CONDUCTIVITY
corrected to 20°C
1.2E-05 cm/sec.

This is a remolded sample and may not be indicative of actual in-situ conditions.

GEOTECHNOLOGY INC
FROM THE GROUND UP

Project:	Fly Ash with 6% Cement
Location:	Mix-1
Project No: J007886.17	Date: 10/9/18

FLYASH SLURRY DATA SHEET

USC Technologies

Project:	USC Technologies - Material Laboratory					
Project No.	B1604393.00					
Cast Date	1/12/2017	1/12/2017	1/12/2017	1/12/2017	1/12/2017	1/12/2017
Flyash Source, percent by wt.	Nearman Flyash - 90.0%					
Cement Source, percent by wt.	Ash Grove Portland Type I/II Cement - 10.0%					
Water/Cementitious Materials Ratio, by wt.	1:1	1:1	1:1	1:1	1:1	1:1

Set/ID No.	17-1007-1	17-1007-2	17-1007-3	17-1007-4	17-1007-5	17-1007-6
Test Date	2/9/2017	2/9/2017	2/9/2017	3/9/2017	3/9/2017	3/9/2017
Age (days)	**28 Days**	**28 Days**	**28 Days**	**56 Days**	**56 Days**	**56 Days**
Avg. Height, in.	5.27	5.12	4.89	5.19	5.21	5.21
Avg. Diameter, in.	3.01	3.02	3.01	3.01	3.01	3.00
Weight, gm.	790.8	777.2	757.6	692.6	691.8	696.6
Wet Density, pcf	80.2	81.0	83.2	72.1	71.3	72.1
Area (sq. in.)	7.13	7.144	7.092	7.058	7.094	7.062
Load (lb)	1092.2	1304.4	1443.8	1780	1839	1731
Strength (psi)	153	183	204	252	259	245
L/D	1.75	1.70	1.63	1.72	1.73	1.74
Correction Factor	0.98	0.9640	0.9704	0.9784	0.9784	0.9792
Corrected Strength (psi)	**150**	**176**	**198**	**247**	**254**	**240**

Equipment Used: Calipers 21923 Balance 22078 Machine Sigma-1,22007

Results only related to items tested.

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FLYASH SLURRY DATA SHEET

USC Technologies

Project:	USC Technologies - Material Laboratory					
Project No.	B1604393.00					
Cast Date	2/21/2017	2/21/2017	2/21/2017	2/21/2017	2/21/2017	2/21/2017
Flyash Source, percent by wt.	Nearman Flyash - 96%					
Cement Source, percent by wt.	Ash Grove Portland Type I/II Cement - 4%					
Water/Cementitious Materials Ratio, by wt.	1:1	1:1	1:1	1:1	1:1	1:1

Set/ID No.	17-1045-1	17-1045-2	17-1045-3	17-1045-4	17-1045-5	17-1045-6
Test Date	3/21/2017	3/21/2017	3/21/2017	4/18/2017	4/18/2017	4/18/2017
Age (days)	**28 Days**	**28 Days**	**28 Days**	**56 Days**	**56 Days**	**56 Days**
Avg. Height, in.	5.18	5.22	5.11	5.07	4.95	4.89
Avg. Diameter, in.	3.00	3.01	3.01	3.01	3.01	3.01
Weight, gm.	795.82	791.08	786.11	721.8	706.1	707.35
Wet Density, pcf	82.5	81.1	82.3	76.4	76.6	77.5
Area (sq. in.)	7.089	7.119	7.116	7.097	7.102	7.111
Load (lb)	579	622	614	961	934	1017
Strength (psi)	82	87	86	135	132	143
L/D	1.72	1.73	1.70	1.69	1.64	1.62
Correction Factor	0.9776	0.9784	0.9760	0.9752	0.9712	0.9696
Corrected Strength (psi)	**80**	**85**	**84**	**132**	**128**	**139**

Equipment Used: Calipers 21923 Balance 22078 Machine Sigma-1,22007

Results only related to items tested.

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FLYASH SLURRY DATA SHEET

USC Technologies

Project:	USC Technologies - Material Laboratory					
Project No.	B1604393.00					
Cast Date	2/21/2017	2/21/2017	2/21/2017	2/21/2017	2/21/2017	2/21/2017
Flyash Source, percent by wt.	Nearman Flyash - 93%					
Cement Source, percent by wt.	Ash Grove Portland Type I/II Cement - 7%					
Water/Cementitious Materials Ratio, by wt.	1:1	1:1	1:1	1:1	1:1	1:1

Set/ID No.	17-1046-1	17-1046-2	17-1046-3	17-1046-4	17-1046-5	17-1046-6
Test Date	3/21/2017	3/21/2017	3/21/2017	4/18/2017	4/18/2017	4/18/2017
Age (days)	**28 Days**	**28 Days**	**28 Days**	**56 Days**	**56 Days**	**56 Days**
Avg. Height, in.	4.92	5.02	5.03	5.22	5.13	4.97
Avg. Diameter, in.	3.01	3.02	3.01	3.01	3.00	3.01
Weight, gm.	775.18	790.59	779.68	765.38	723.5	725.39
Wet Density, pcf	84.4	83.9	82.8	78.5	75.8	78.2
Area (sq. in.)	7.117	7.149	7.13	7.121	7.087	7.116
Load (lb)	1037	993	1050	1458	1170	1697
Strength (psi)	146	139	147	205	165	238
L/D	1.63	1.66	1.67	1.73	1.71	1.65
Correction Factor	0.9704	0.9728	0.9736	0.9784	0.9768	0.972
Corrected Strength (psi)	**141**	**135**	**143**	**200**	**161**	**232**

Equipment Used: Calipers 21923 Balance 22078 Machine Sigma-1,22007

FLYASH SLURRY DATA SHEET

USC Technologies

Project:	USC Technologies - Material Laboratory					
Project No.	B1604393.00					
Cast Date	1/12/2017	1/12/2017	1/12/2017	1/12/2017	1/12/2017	1/12/2017
Flyash Source, percent by wt.	Nearman Flyash - 95.0%					
Cement Source, percent by wt.	Ash Grove Portland Type I/II Cement - 5.0%					
Water/Cementitious Materials Ratio, by wt.	1:1	1:1	1:1	1:1	1:1	1:1

Set/ID No.	17-1006-1	17-1006-2	17-1006-3	17-1006-4	17-1006-5	17-1006-6
Test Date	2/9/2017	2/9/2017	2/9/2017	3/9/2017	3/9/2017	3/9/2017
Age (days)	**28 Days**	**28 Days**	**28 Days**	**56 Days**	**56 Days**	**56 Days**
Avg. Height, in.	4.93	5.05	5.07	5.03	4.91	5.04
Avg. Diameter, in.	3.02	3.01	3.00	3.00	3.00	3.01
Weight, gm.	751.5	775.7	759.0	670.2	651.5	676.8
Wet Density, pcf	81.2	82.5	80.9	71.6	71.4	72.0
Area (sq. in.)	7.147	7.094	7.051	7.089	7.078	7.097
Load (lb)	477	449	404	638	733	717
Strength (psi)	67	63	57	90	104	101
L/D	1.64	1.68	1.69	1.68	1.64	1.68
Correction Factor	0.9712	0.9744	0.9752	0.9744	0.9712	0.9744
Corrected Strength (psi)	**65**	**62**	**56**	**88**	**101**	**98**

Equipment Used: Calipers 21923 Balance 22078 Machine Sigma-1,22007

FLYASH SLURRY DATA SHEET

USC Technologies

Project:	USC Technologies - Material Laboratory					
Project No.	B1604393.00					
Cast Date	1/12/2017	1/12/2017	1/12/2017	1/12/2017	1/12/2017	1/12/2017
Flyash Source, percent by wt.	Nearman Flyash - 100.0%					
Cement Source, percent by wt.	Ash Grove Portland Type I/II Cement - 0%					
Water/Cementitious Materials Ratio, by wt.	1:1	1:1	1:1	1:1	1:1	1:1

Set/ID No.	17-1005-1	17-1005-2	17-1005-3	17-1005-4	17-1005-5	17-1005-6
Test Date	2/9/2017	2/9/2017	2/9/2017	3/9/2017	3/9/2017	3/9/2017
Age (days)	**28 Days**	**28 Days**	**28 Days**	**56 Days**	**56 Days**	**56 Days**
Avg. Height, in.	4.71	4.69	4.72	4.37	4.23	4.30
Avg. Diameter, in.	3.00	3.02	3.02	3.00	3.00	3.00
Weight, gm.	712.4	716.2	709.30	576.9	562.0	569.5
Wet Density, pcf	81.3	81.4	80.2	71.3	71.7	71.6
Area (sq. in.)	7.086	7.144	7.144	7.053	7.061	7.053
Load (lb)	180	205	185	362	416	385
Strength (psi)	25	29	26	51	59	55
L/D	1.57	1.56	1.56	1.46	1.41	1.43
Correction Factor	0.9656	0.9744	0.9744	0.9552	0.9492	0.9516
Corrected Strength (psi)	**25**	**28**	**25**	**49**	**56**	**52**

Equipment Used: Calipers 21923 Balance 22078 Machine Sigma-1,22007

Results only related to items tested.

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Attachment J

KCMO Site Zoning/Stipulation Letter

THE PLANNED
INDUSTRIAL
EXPANSION
AUTHORITY
OF KANSAS CITY,
MISSOURI

Suite 200
20 E. Fifth Street
Kansas City, MO 64106
(816) 474 2227
FAX (816) 421 5500

October 1, 2004

Mr. John Eckardt
City Planning & Development
15th Floor, City Hall
414 East 12th Street
Kansas City, MO 64106

RE: **Case No. 616-S**
Southwest Boulevard PIEA General Development Plan
City Plan Commission (CPC) Disposition Letter – August 18, 2004

Dear John:

Please be advised that I received the referenced Disposition Letter on August 23rd. Although, and as we indicated at the CPC, the EDC (Applicant) and PIEA (Agent) do not agree with several of City staff's recommendations that were approved by the CPC, we nonetheless submitted six (6) copies of the Plan on August 27th revised with the changes approved by CPC. We do however intend to take up matters with which we are not in agreement with the Planning, Zoning and Economic Development Committee (PZED) meeting. We had thought that this matter would be docketed for the September 29th PZED meeting but as we looked through the on-line Agenda the Friday before last, we noticed it wasn't listed. Time is of the essence in processing this PIEA application. Bob Mayer, consultant to one of the proponents of this PIEA area contacted the City Clerks office and was assured that this would be docketed for the October 6th PZED meeting.

The EDC, PIEA, and proponents of the Plan (collectively "Plan Team") intend to petition the PZED to revise some of the recommendations of the Plan Commission that are embodied in your August 18 letter, specifically as follows:

1. **Item E** – Ford Nelson, Counsel to the proponents indicates that there appears to be some question regarding weather or not the Cambridge Business Park Property (*Map ID Nos. 1 through 20*) lies within the Westside Area Plan and speculated that it may lie within the boundaries of the Central Industrial District Plan. He discussed this with John DeBauche who indicated it was

within neither area and should refer to FOCUS Kansas City Urban Core Plan as the principal Planning Guide.

2. **Item F** – The Plan Team will be requesting the PZED to clarify Item F as contained on page 52 of the revised documents submitted to you on August 27. The Plan Team recalls that the concerns city staff expressed to the CPC which resulted in the statement under Item F being added was that developers would "cherry pick" the development site and build on properties under which no mining has been undertaken thus leaving properties lying on top of mined areas blighted due to past mining activity, thereby not addressing a cause of blight for the property. Staff recommended that no tax abatement be granted on **any** redevelopment of the Dean property (except building No. 8) until the underground mining issues in the entire tract was cured. The Plan Team will propose that… "*no tax abatement be granted on any structure until adverse underground mining conditions that might affect that structure have been examined and addressed in the permitting processes for construction of that structure*".

John, as you know, the intended use of this property is for both underground mining as well as construction of a surface business park. The mining value of the property is equally as important to the owner of the property as is the construction of warehouses and business park uses on the surface because *the mining opportunity creates warehousing opportunities below ground.* It is, therefore, in the economic interest of the owner of the property to address the impact that past mining activities might have to the full uses intended by the owner of the property. The geotechnical effort and investment that the owner has already made and which has produced, among other things, the information contained in the August 17, 2004 Revised Plan (pages 20 thru 24) is evidence of the importance of addressing past mining activities to achieve the highest and best use of all of the property. These uses, however develop in a market driven economy and need to be approaches with that in mind. Under no circumstances would any owner make an investment in surface or subsurface development of the property withouttaking in to account the impact it has on mining, underground and surface development. Development of any type will necessitate planning for all uses. In the unlikely circumstance that the owner of the property chooses not to mine the tract, surface redevelopment will require curing of the blight in order to construct surface improvements or risk compromising the investment in the surface improvements. The previous mining activities, along with other blighting factors represent extraordinary redevelopment costs that merit use of a tax abatement tool. Imposing additional requirements to cure the blight factor that past mining activities created "up front" before allowing tax abatement on future surface construction imposes an unnecessary economic constraint on development of the property and unnecessarily limits the flexibility of a developer to address economic development opportunities in a market-driven environment.

3. **Item G** – Item G indicated that tax abatement not be allowed for any tracts within the PIEA Area for owners who have tracts within the area that contain billboards unless and until the developer agrees to remove said billboards at the expiration of their existing lease term of within five (5) years of approval of the Plan whichever occurs first.

There is an elevated billboard on the tax parcel identified as *Map ID. No. 20* in the revised Plan Document. There is also a billboard within the parcel identified as *Map ID No. 28*.

The Plan Team will concur with the language recommended by CPC but will request PZED permit the removal of the parcel of property identified as *Map ID No. 10* from the PIEA Area. This parcel is very small and unusable for any purpose other than its current use as a billboard location. The personal property improvements on that billboard are taxed by the City and other taxing jurisdictions and by removing it from the PIEA Area, the taxing jurisdictions will continue to collect taxes on it. The revenue stream that the owners of the property derive from the billboard and the taxes the taxing jurisdictions receive from the billboard benefit the City as well as the current and future owners of the property. By carving it out of the PIEA Area, the issue of billboards in this specific instance is taken off the table. The billboard within the parcel identified as *Map ID No. 28* will be removed in accordance with the language recommended in this Item.

4. **Item L** – The Plan Team feels very strongly that the estimated completion time for redevelopment of this PIEA Area needs to be twenty (20) years. While everyone *hopes* that economic development opportunities abound and redevelopment occurs swiftly, everyone recognizes that development of the Cambridge Business Park tract and properties along Southwest Boulevard (except Schutte Lumber which is anticipated to begin immediately) will be market-driven over a period of time. The current owners of the Cambridge Business Park do not build "for sale' but build "to lease" and do not develop buildings on a speculative basis. If the developer is indeed to be able to address underground uses of the property as well as surface uses of the property in a manner that results in redevelopment of the entire tract, it is important that they be given the maximum amount of time to do that. The Plan Team feels that the twenty year time limit would be more appropriate given the extraordinary redevelopment requirements of this particular area.

5. **Item H** - Needs to be changed as follows:

"Chapter 353 tax abatement will not exceed . . ."

I believe this change reflects what everyone agreed to at the CPC meeting.

John, based on some additional information that the Plan Team discovered after the CPC's recommendations on this PIEA Area, we will request PZED to make the following change in the language on page 56 ("Proposed Zoning Changes") as follows:

> "As a condition of receiving Chapter 353 tax abatement, the PIEA will require that the property in the PIEA area be rezoned. The current M2a Zoning for the Cambridge Business Park tracts (*Map ID Nos. 1 through 20*) will require rezoning to a planned district type zoning which allows for both mining and other business park retail, commercial and industrial uses as contemplated in the planand which requires a plan approval

process similar to URD including, without limitation, M2aP or PD\M2a. URD zoning will be required for the balance of property within the Southwest Boulevard PIEA Area."

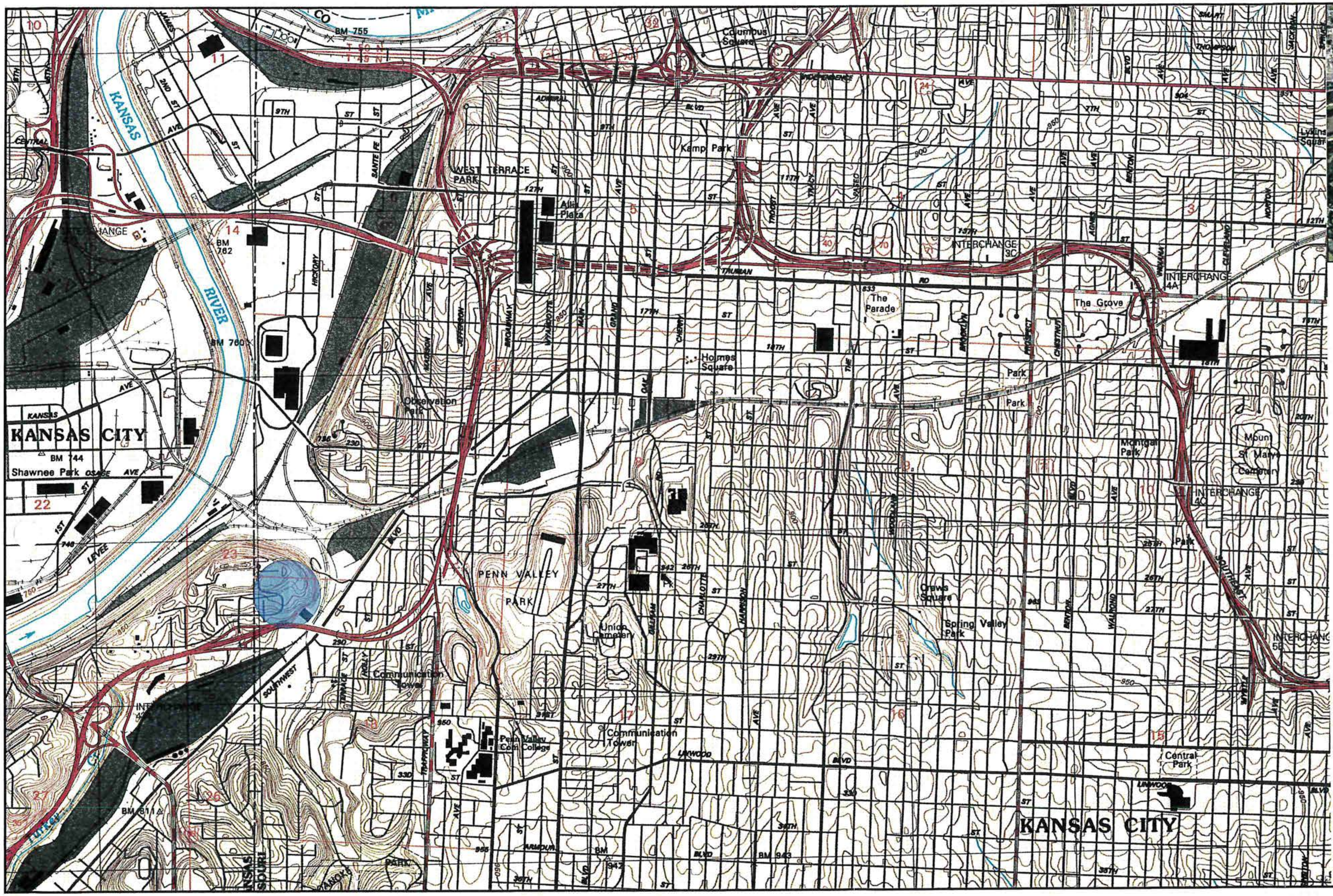
This change is necessitated by the fact that URD zoning is and can be applied in all zoning districts with the exception of M2a. M2a, however, is the only zoning district that allows mining of property. It is my understanding that the URD zoning district does not allow mining. We feel that the change suggested above meets the needs of the City with respect to securing their approval of development of the site.

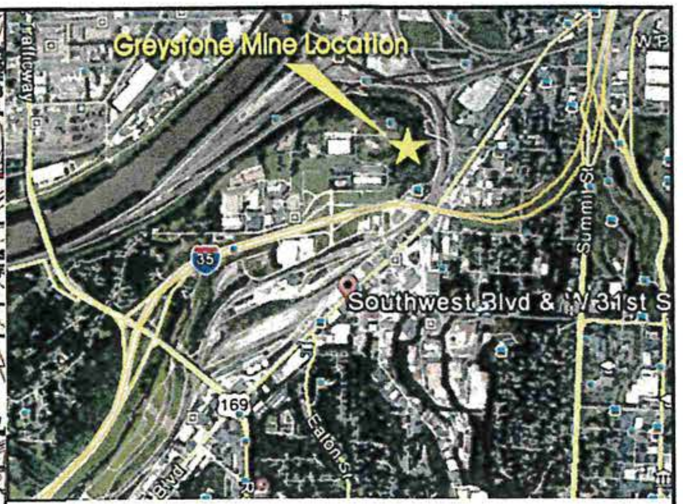
Very truly yours,

Alfred J. Figuly

Executive Director

cc: Joe Gonzales - EDC
Scott Belke - Consultant
Bob Mayer – MR Capital
Brian Hendrick – Dean Realty
Robert Byron – Dean Realty
Ford Nelson, Esq. – Dean Realty
M. Brown - Schutte Lumber





Notes:

1. Map adapted from the USGS Kansas City, Missouri-Kansas. Quadrangle Map, 1996
2. Greystone Mine is located in the SW¼ SW¼ section 7 and NW¼ NW¼ 18, range 33 West (R33W), Township 49 North (T49N)

GREYSTONE MINE AREA

CAMBRIDGE BUSINESS PARK

GREYSTONE MINE

KANSAS CITY, MO 66108

N

0 2000'

DEAN REALTY CO. ***Developers***

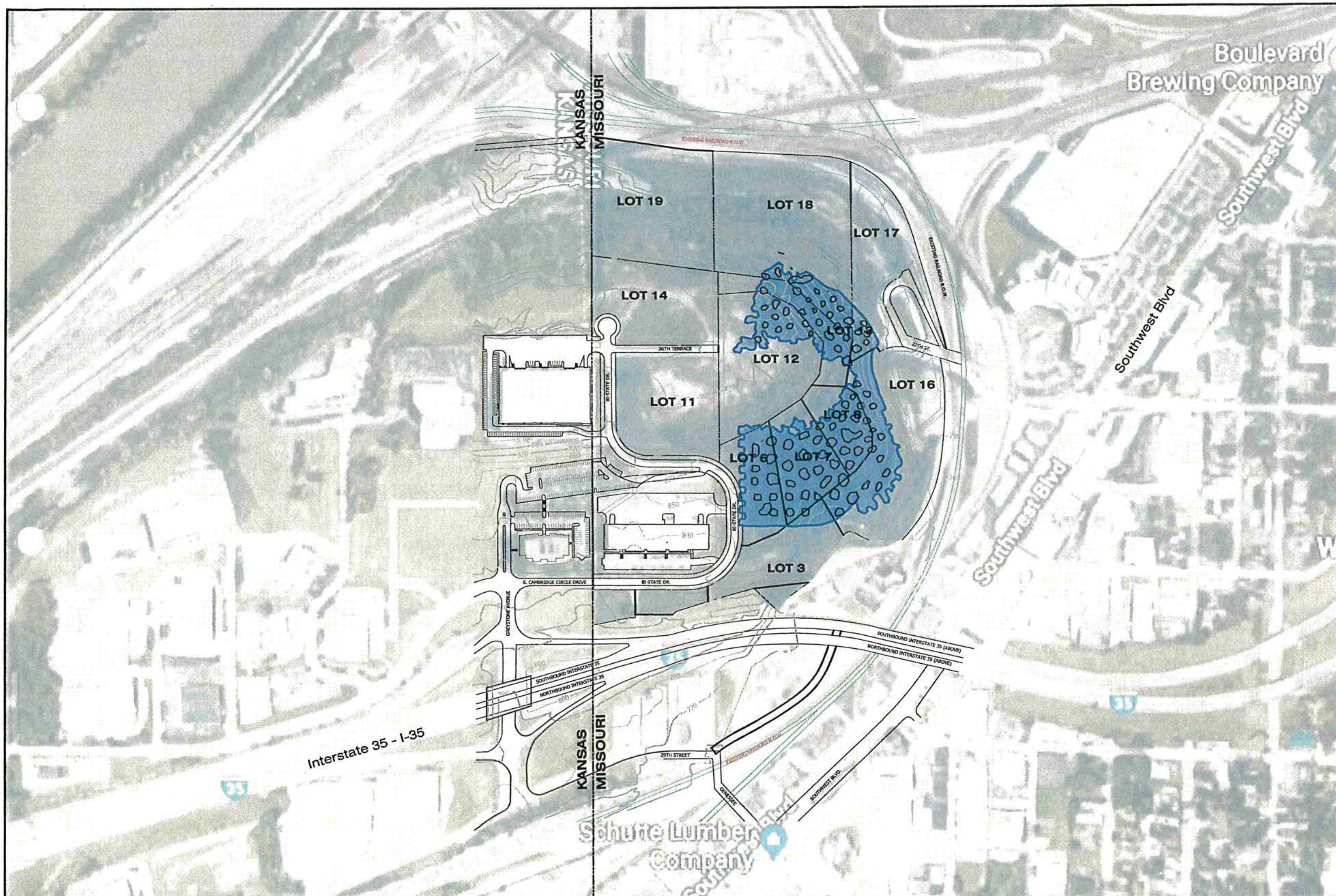
1201 W 31 STREET, SUITE 2 KANSAS CITY, MO 64108 P. 816.531.0800 F. 816.753.4311

SITE LOCATION MAP

DATE: 11.27.2018	SCALE: 1"=2000'	DRAWN BY: JEMM

FIGURE 1

SHEET: 1 OF 11



Notes:

1. Imagery taken from Google Earth. Imagery date 4/27/18
2. Approximate foot print area of mine is 463.340 S.F. 10.6 acres

GREYSTONE MINE

CAMBRIDGE BUSINESS PARK

GREYSTONE MINE

KANSAS CITY, MO 66108

N

0 400'

DEAN REALTY CO. ***Developers***

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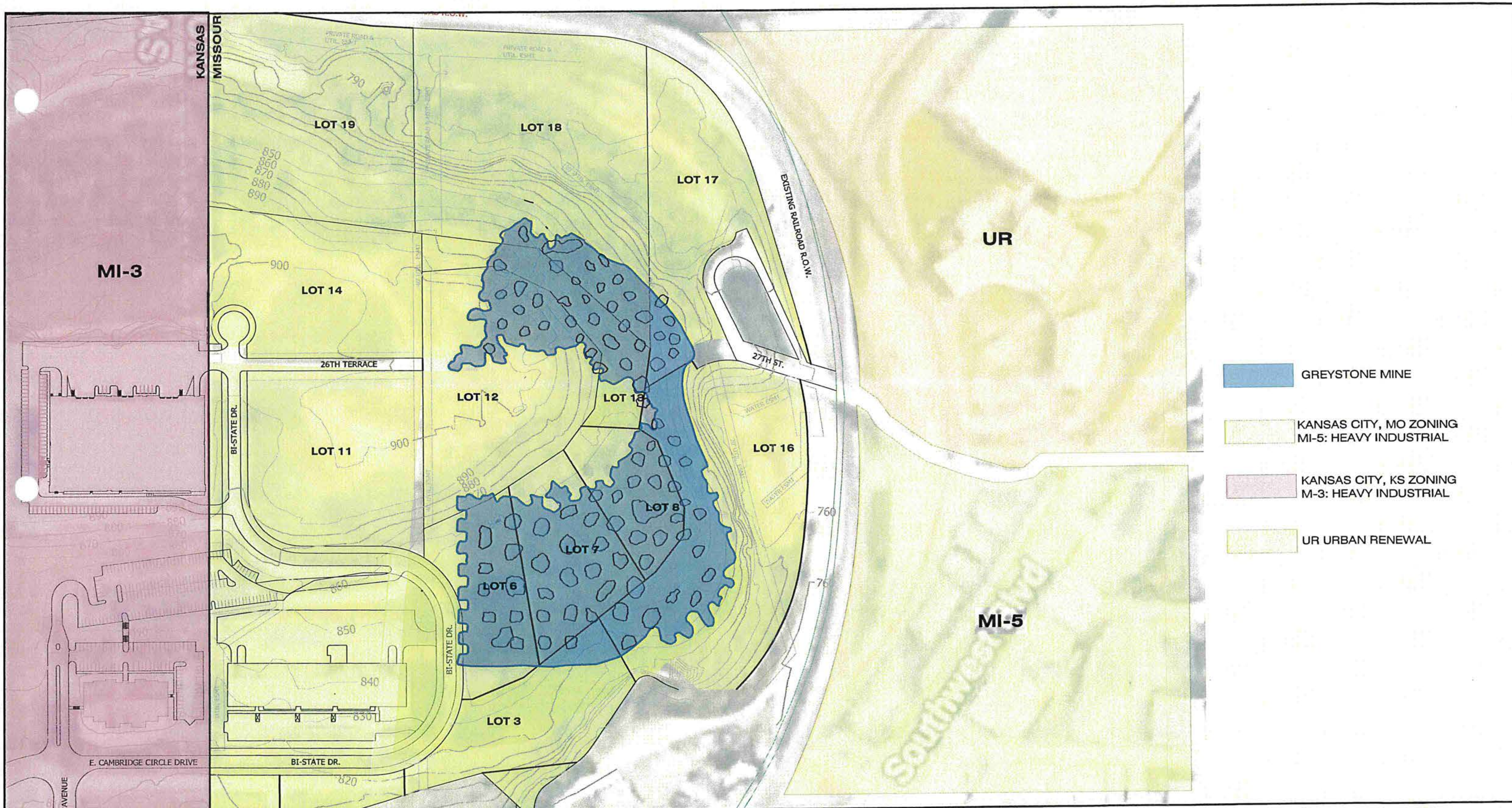
SITE PLAN

DATE: 11.27.2018 SCALE: 1"=400' DRAWN BY: JEMM

FIGURE 2

SHEET: 2 OF 11



CAMBRIDGE BUSINESS PARK

GREYSTONE MINE

KANSAS CITY, MO 66108

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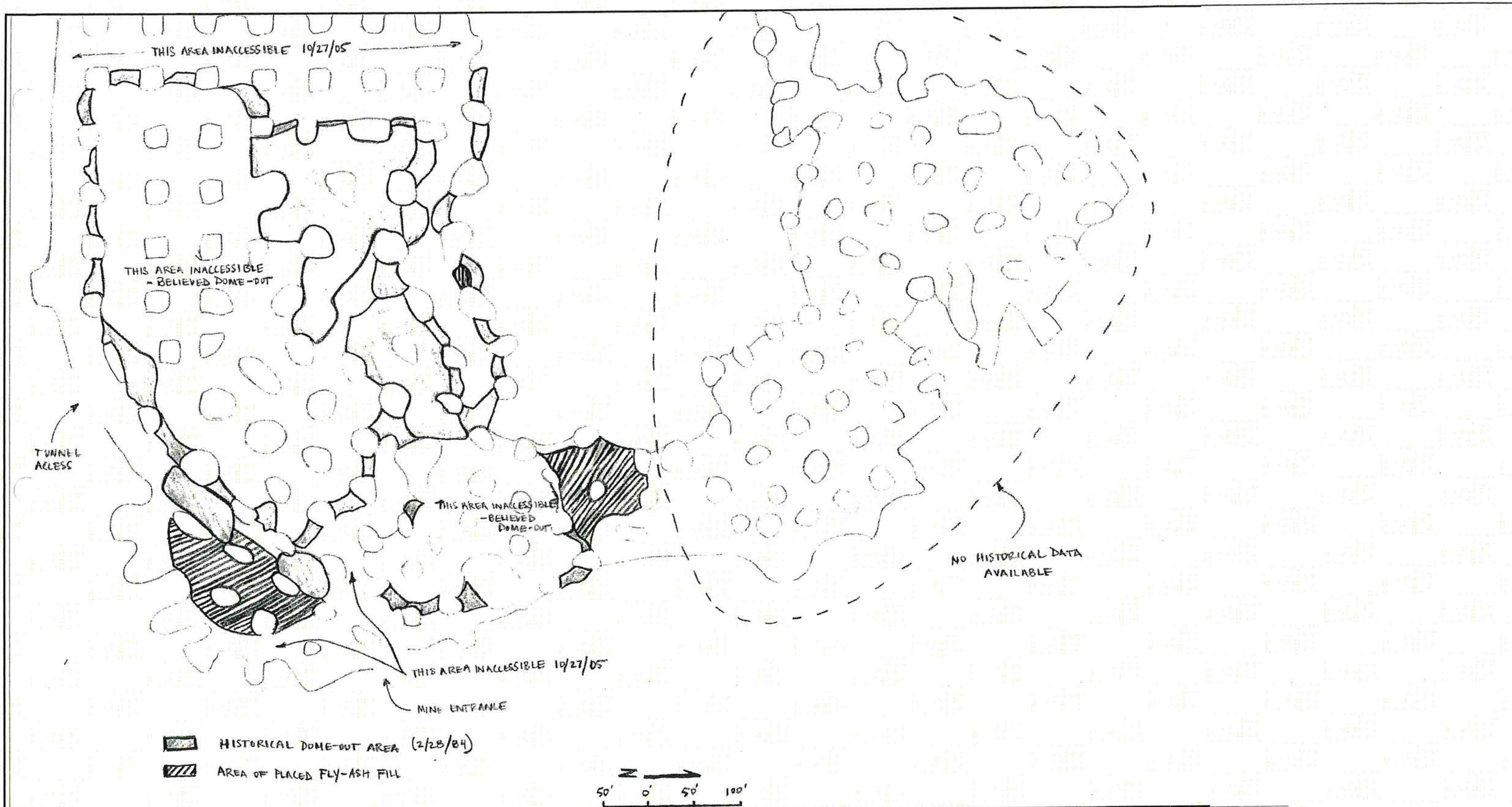
LAND USE MAP

DATE: 11.27.2018 ■ SCALE: 1"= 200' ■ DRAWN BY: JEMM

FIGURE 3

SHEET: 3 OF 11



CAMBRIDGE BUSINESS PARK

GREYSTONE MINE

KANSAS CITY, MO 66108

N
0 100'

DEAN REALTY CO. ***Developers***
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HISTORICAL MINE COLLAPSE MAP

DATE: 11.27.2018 SCALE: 1"=100' DRAWN BY: JEMM

FIGURE 4

SHEET: 4 OF 11

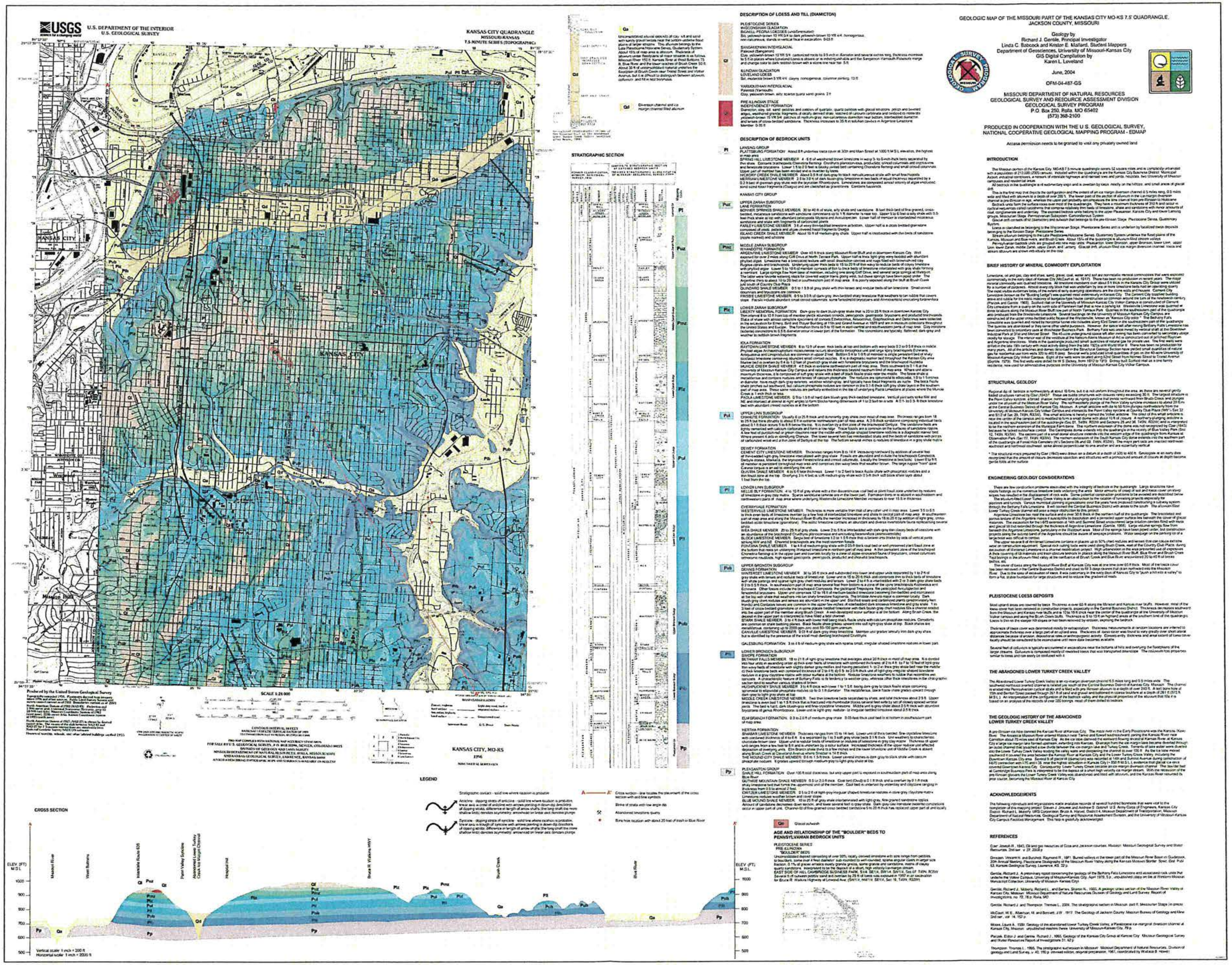


FIGURE 5

FULL SIZE INCLUDED IN INSERT

WINTERSET LIMESTONE MEMBER: 30 to 35 ft thick and subdivided into lower and upper units separated by 1 to 2 ft of gray shale with lenses and modular beds of limestone. Lower unit is 15 to 20 ft thick and comprises thin to thick beds of limestone with shale partings and sparse light-gray chert nodules and lenses. Lower 2 to 4 ft is interbedded with 2 or 3 dark-gray shale beds 0.2 to 0.5 ft thick. Upper unit comprises 12 to 16 ft of medium-bedded limestone becoming thin-bedded and intercalated at the top with shale that weathers into tan shaly limestone fragments. Dark bluish gray chert nodules and lenses are abundant in the upper unit.

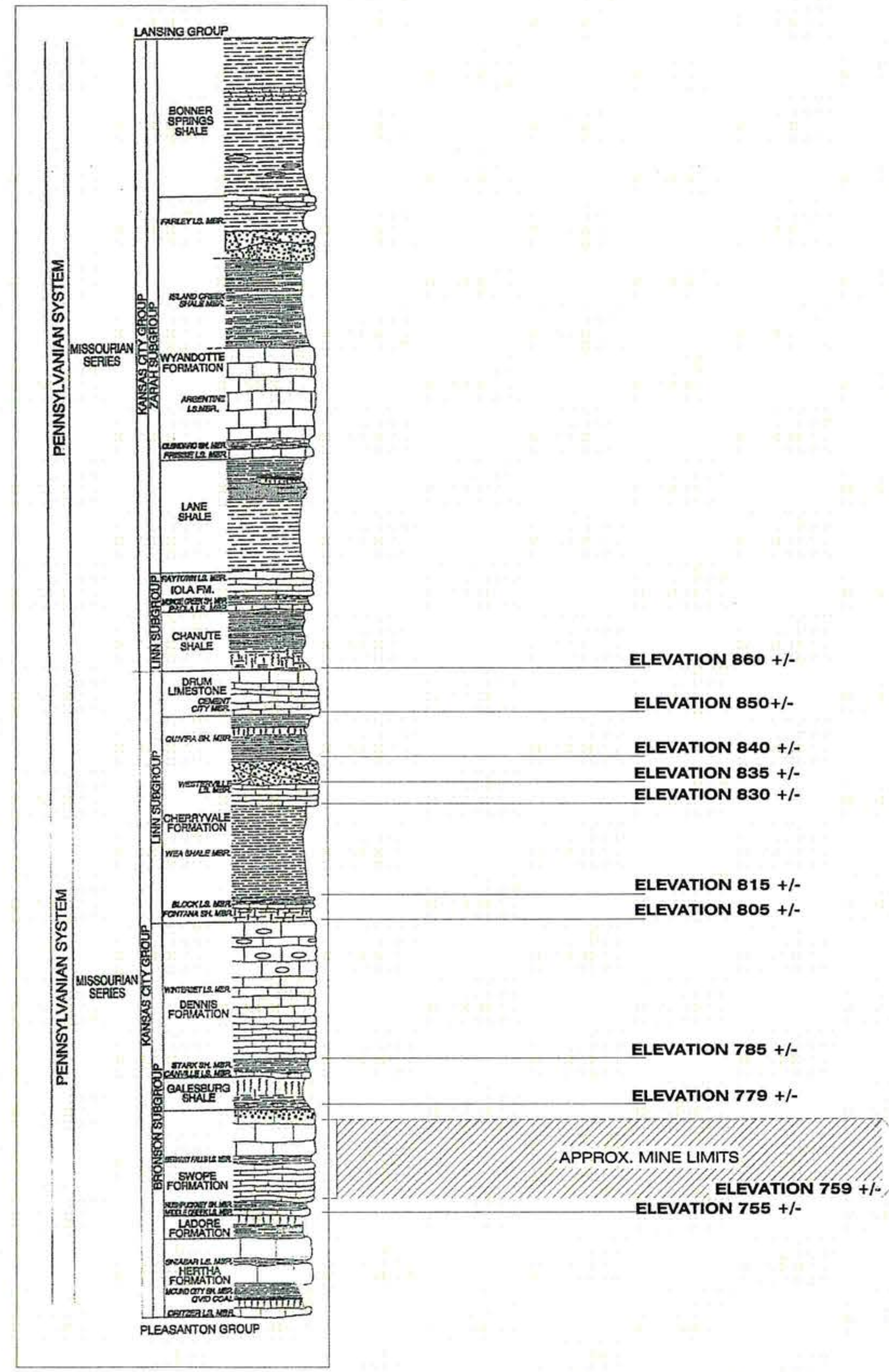
STARK SHALE MEMBER: 3 to 4 ft thick with lower half being black fissile shale with calcium phosphate nodules.

GALESBURG MEMBER: 3 to 4 ft thick of medium-gray whale with sparse small, irregular shaped limestone nodules in lower part.

BETHANY FALLS MEMBER: 18 to 21 ft of light-gray limestone that averages about 20 ft thick. It is divided into four units in ascending order a) thick even beds of limestone with combined thicknesses of 2 to 4 ft, b) 7 to 10 ft of light-gray thin wavy beds of limestone with slightly darker gray mottles and having persistent 1 to 2 in thick gray shale bed near the middle; c) thick limestone beds with combined thickness of 2 to 4 ft; d) 0.5 to 3 ft thick unit of light-gray irregular-shaped limestone nodules in a gray claystone matrix with scour surface at the bottom.

HUSHPUCKNEY SHALE MEMBER: 3 to 4 ft thick with lower 1 to 1.5 ft being dark gray to black fissile shale containing spheroidal to ellipsoidal phosphate nodules up to 0.1 ft diameter. The metalliferous, black fissile shale grades upward through dark-gray to light-gray shale at top.

MIDDLE CREEK LIMESTONE MEMBER: Two thin limestone beds separated by shale, and total thickness about 2.5 ft. Upper limestone is even bed 1 to 1.5 ft thick that is fractured into rhomboidal blocks several feet wide by set of closely spaced vertical joints. The bed is hard, dark bluish-gray and fine-crystalline limestone. Middle unit is gray shale about 0.5 ft. Lower unit is light-gray, nodular to irregular bedded limestone about 0.5 ft thick.



CAMBRIDGE BUSINESS PARK

GREYSTONE MINE

KANSAS CITY, MO 66108

N

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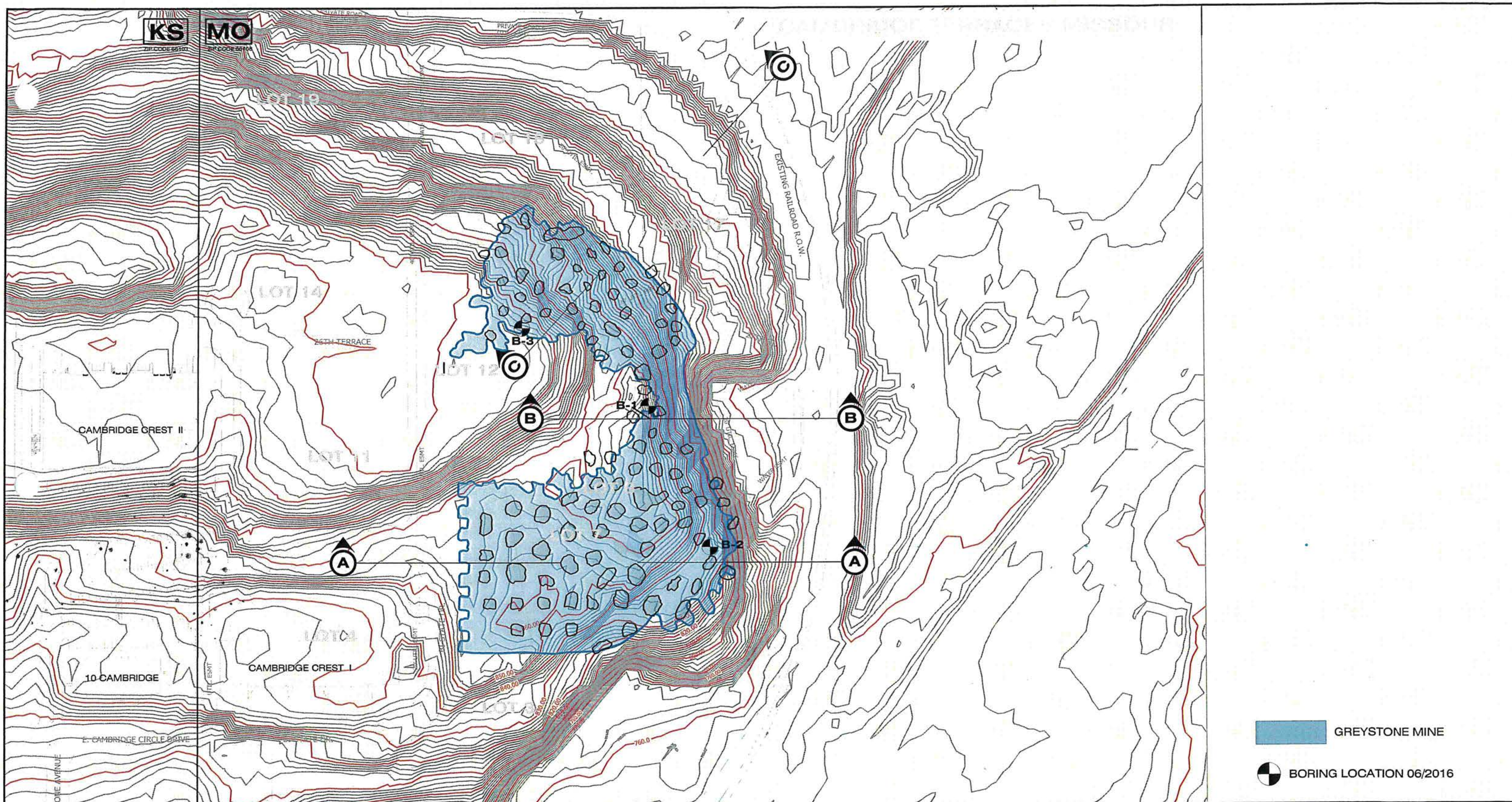
STRATIGRAPHIC COLUMN - KANSAS CITY GROUP

DATE: 11.27.2018 ■ SCALE: NTS ■ DRAWN BY: JEMM

SHEET: 6 OF 11

FIGURE 6



CAMBRIDGE BUSINESS PARK

GREYSTONE MINE

KANSAS CITY, MO 66108

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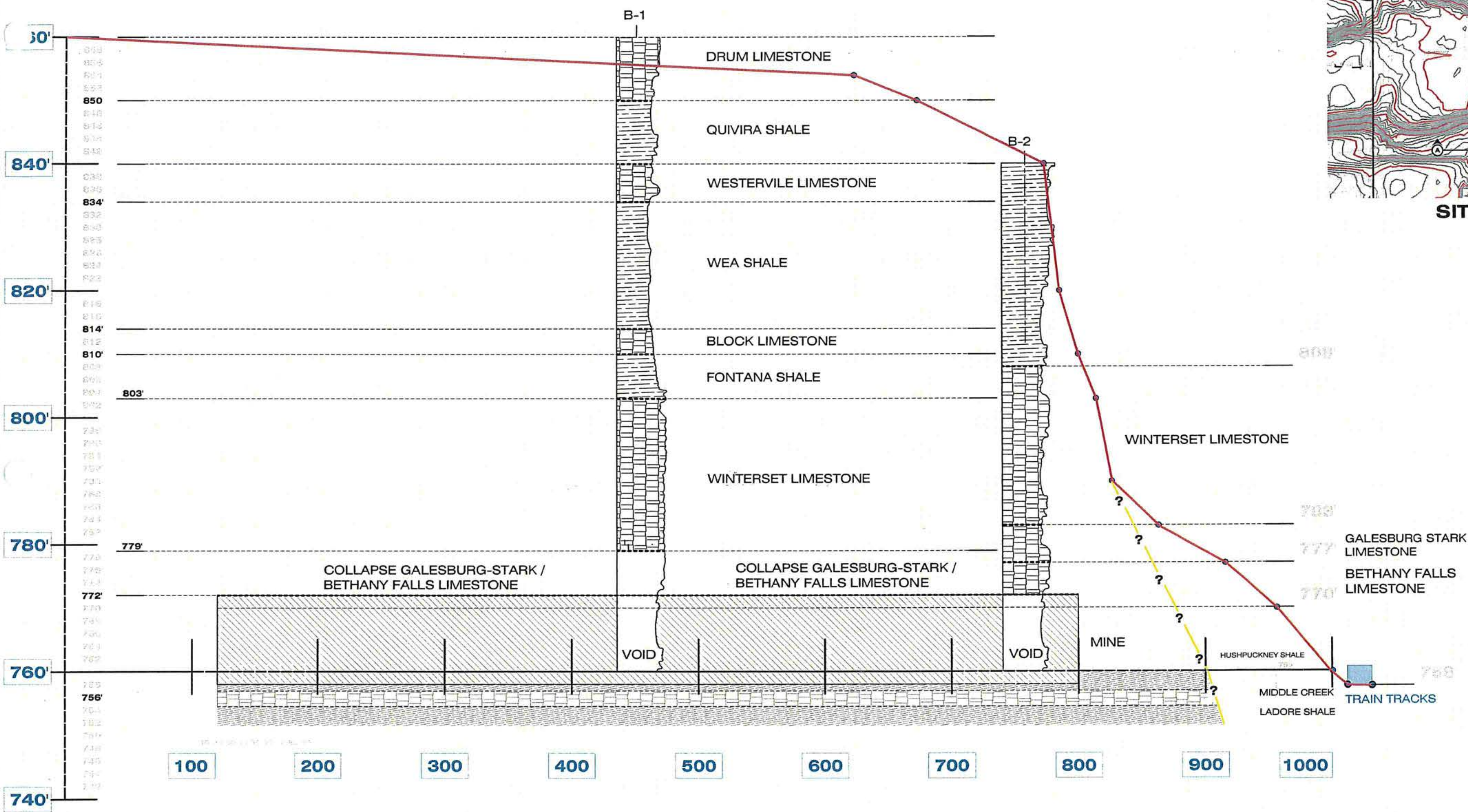
SUBSURFACE EXPLORATION PLAN

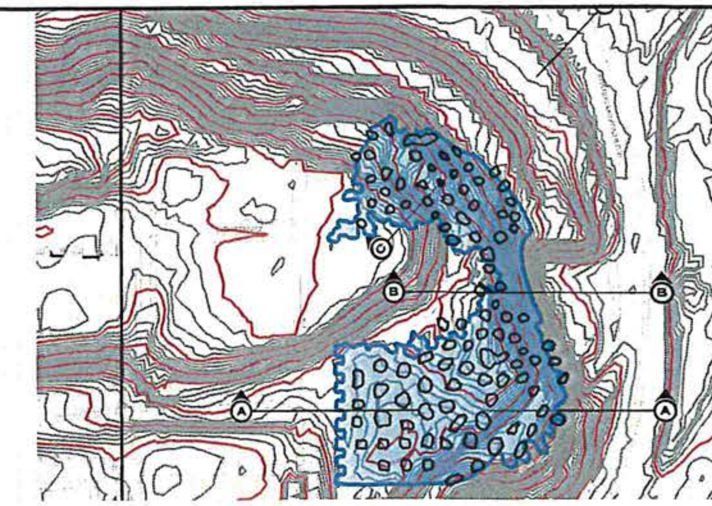
DATE: 11.27.2018 ■ SCALE: 1"= 200' ■ DRAWN BY: JEMM

FIGURE 7

SHEET: 7 OF 11

CAMBRIDGE TERRACES MISSOURI





SITE PLAN N.T.S.

CAMBRIDGE BUSINESS PARK

GREYSTONE MINE

KANSAS CITY, MO 66108

N

DEAN REALTY CO. Developers

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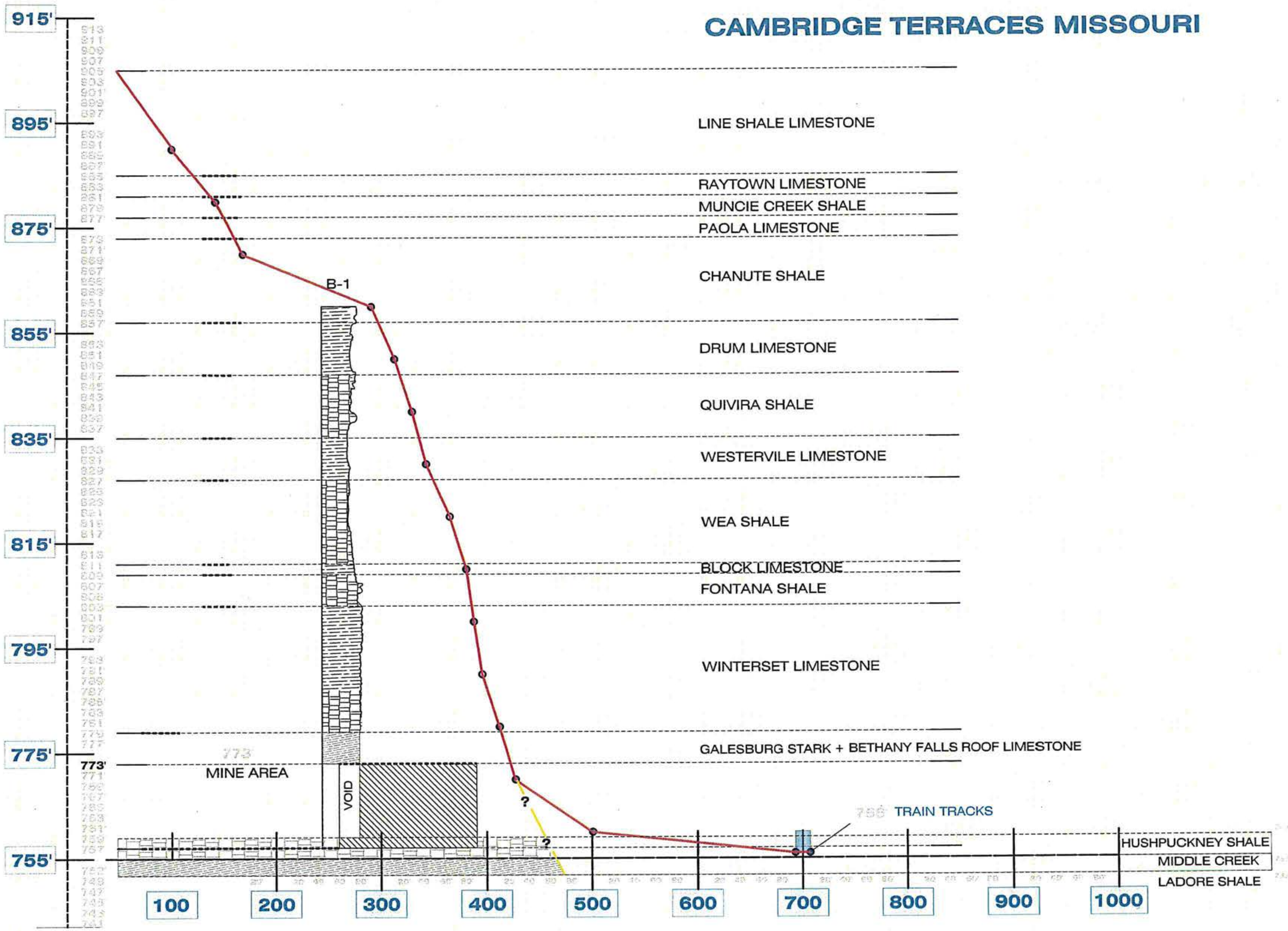
SUBSURFACE PROFILE / SECTION A - A

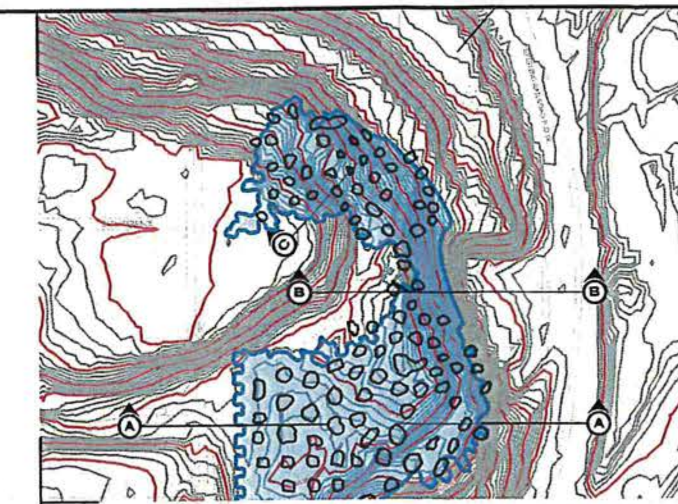
DATE: 11.27.2018 DRAWN BY: JEMM

FIGURE 8

SHEET: 8 OF 11

CAMBRIDGE TERRACES MISSOURI





SITE PLAN N.T.S.

CAMBRIDGE BUSINESS PARK

GREYSTONE MINE

KANSAS CITY, MO 66108

N

DEAN REALTY CO. **Developers**

1201 W 31 STREET, SUITE 2 KANSAS CITY, MO 64108 P. 816.531.0800 F. 816.743.4311

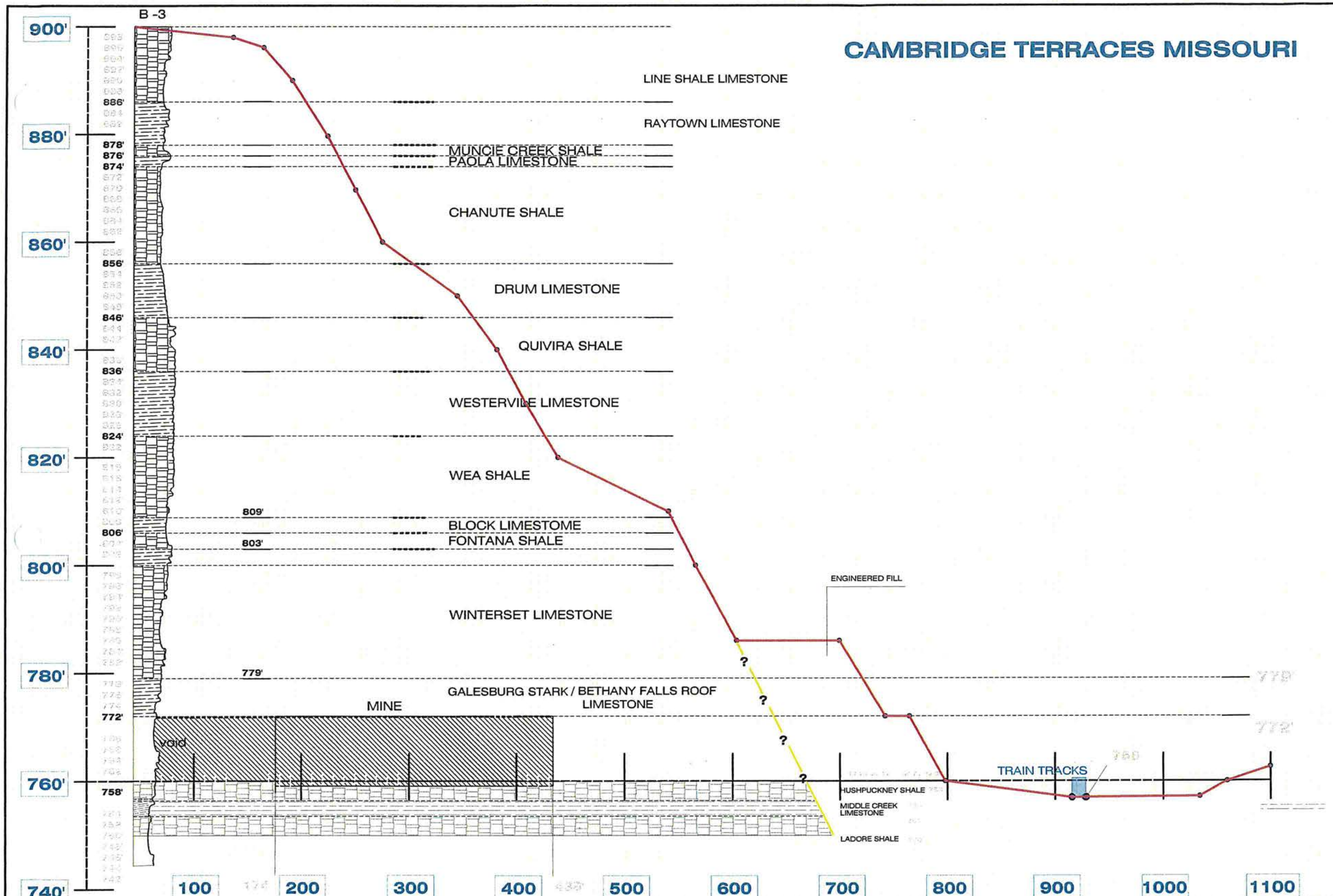
SUBSURFACE PROFILE / SECTION B - B

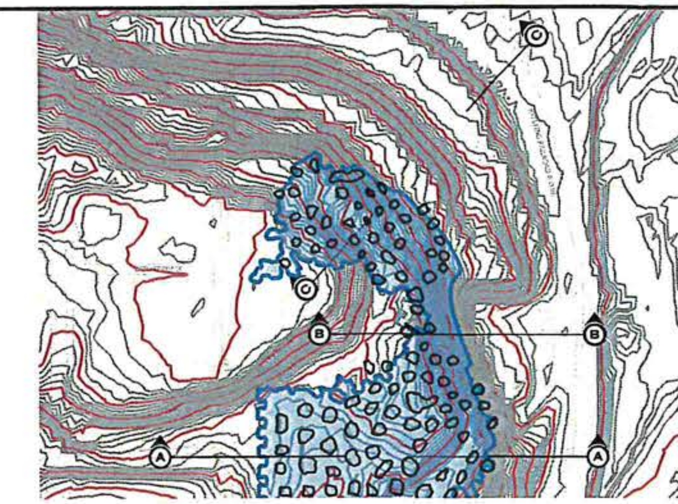
DATE: 11.27.2018 ■ ■ DRAWN BY: JEMM

FIGURE 9

SHEET: 9 OF 11

CAMBRIDGE TERRACES MISSOURI





SITE PLAN N.T.S.

CAMBRIDGE BUSINESS PARK

GREYSTONE MINE

KANSAS CITY, MO 66108

N

DEAN REALTY CO. ***Developers***

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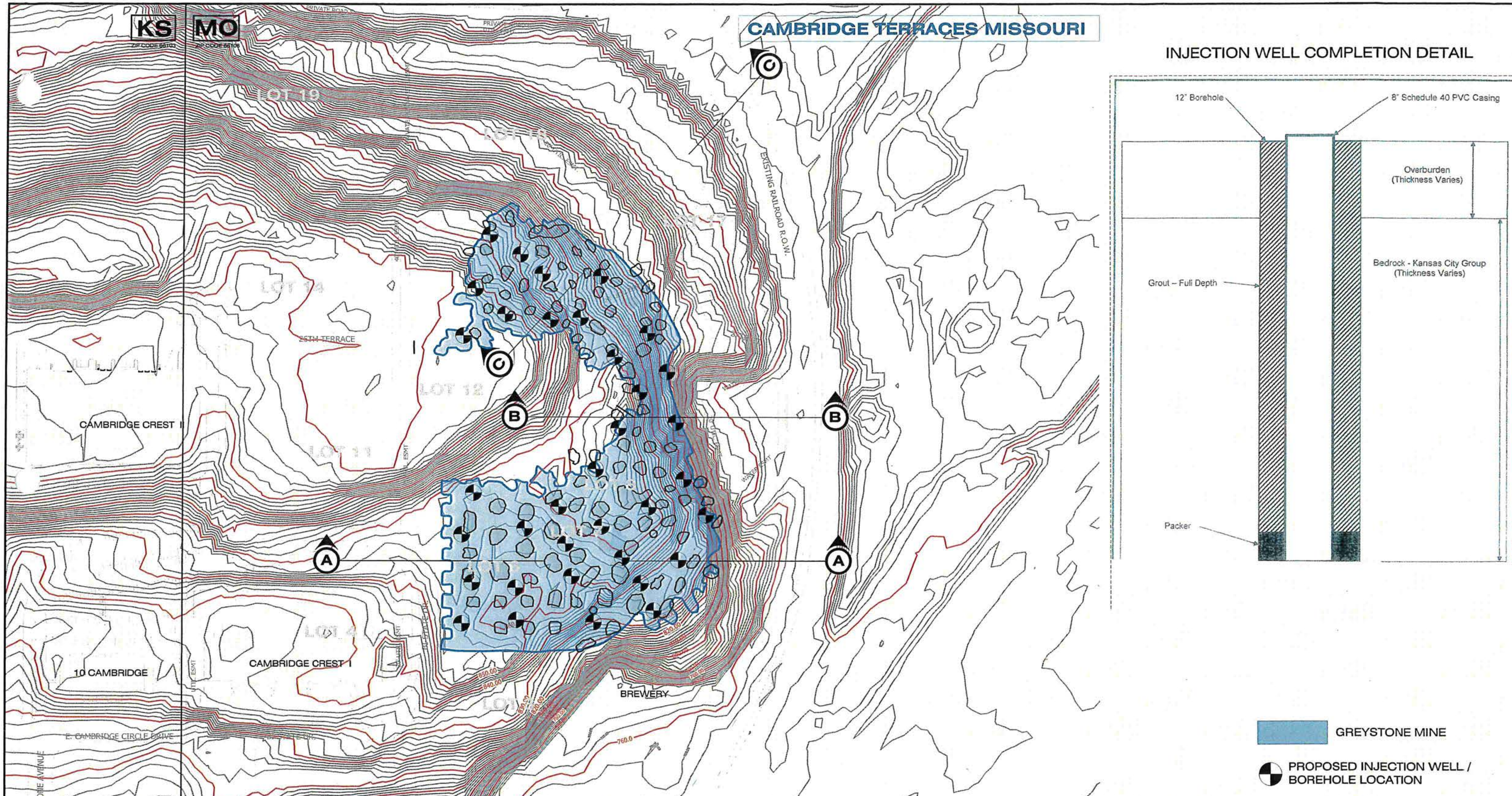
SUBSURFACE PROFILE / SECTION C - C

DATE: 11.27.2018 DRAWN BY: JEMM

FIGURE 10

SHEET: 10 OF 11



CAMBRIDGE BUSINESS PARK

GREYSTONE MINE

KANSAS CITY, MO 66108

N

0 200'

DEAN REALTY CO. Developers

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PROPOSED INJECTION WELL / BOREHOLE PLAN

DATE: 11.27.2018 SCALE: 1"= 200' DRAWN BY: JEMM

FIGURE 11

SHEET: 11 OF 11