

**SUPPLEMENT NO. 1
TO
ENGINEERING SERVICES AGREEMENT
FOR CONSTRUCTION OF PUBLIC IMPROVEMENTS
BETWEEN
THE CITY OF LAWRENCE, KANSAS AND
GHD FOR FL1701 AND FARMLAND REMEDIATION**

The purpose of this Supplement No. 1 is to define additional engineering services requested by the City of Lawrence, Kansas, hereinafter called the Owner, to be provided by GHD, hereinafter called the Engineer, for the FL1701 and Farmland Remediation contract. This agreement is a supplement to the ENGINEERING SERVICES AGREEMENT FOR CONSTRUCTION OF PUBLIC IMPROVEMENTS BETWEEN THE CITY OF LAWRENCE, KANSAS AND GHD, dated April 3, 2018.

SECTION I – SCOPE OF SERVICES

Under the terms of Supplement No. 1, the Owner and Engineer agree to modify the scope of services to include 2018 Data Gap Study Work Plan Preparation and Implementation/Supplemental Requested Services for the FL1701 and Farmland Remediation as described in Exhibit A to this Supplement No. 1.

SECTION II – COMPENSATION

As compensation for the additional services required as described in Supplement No. 1, the Owner agrees to pay the Engineer an amount equal to the Engineer's salary billings plus reimbursable expenses at cost, and subcontract billings at cost, up to a maximum of one hundred forty three thousand seven hundred thirty eight dollars (\$143,738). This supplement shall increase the total maximum billing limit to three hundred forty five thousand three hundred fifty two dollars (\$345,352).

Billing procedures and all other items pertaining to compensation remain as described in Exhibit B of the Original Agreement.

SECTION III – OTHER MATTERS

It is mutually agreed and understood that all terms of the original Agreement, not specifically revised by this Supplement No. 1, shall remain unchanged and in full force.

IN WITNESS WHEREOF, the parties have executed this Supplement No. 1 on this _____ day of _____, 2019.

City of Lawrence, Kansas
Owner

By _____

Title _____

Date _____

Attest

By _____

Title _____

Date _____

GHD
Engineer

By  _____
Michael Staffileno

Title Vice President _____

Date 2/14/2019 _____

**EXHIBIT A
TO
SUPPLEMENT NO. 1 TO ENGINEERING SERVICES AGREEMENT**

Owner: City of Lawrence, Kansas
Engineer: GHD
Project: FL1701 and Farmland Remediation

DESCRIPTION OF SCOPE OF SERVICES

**See attached
Dated February 5, 2019**



February 14, 2019

Reference No. 11152783

Sarah Graves
Project Engineer
Utilities Department, City of Lawrence
PO Box 708
Lawrence, Kansas 66044

Dear Ms. Graves:

**Re: Supplement Number 1, Exhibit A – Scope of Work and Cost Estimate
2018 Data Gap Study Preparation and Implementation/Supplemental Requested Services
Farmland Nitrogen Plant Remediation
1608 North 1400 Road
Lawrence, Kansas 66046
Consent Order 10-E-94 BER KDHE
KDHE Project Code: C4-023-00009**

1. Introduction

As requested by the City of Lawrence (the City), GHD Services Inc. (GHD) is providing this scope of services and cost estimate to prepare and implement the *2018 Data Gap Study Work Plan* (GHD, January 22, 2019). On April 16, 2018, the City of Lawrence (the City) and GHD executed an Engineering Services Agreement for Construction of Public Improvements. The City selected GHD to support their remediation at the former Farmland Nitrogen Plant (Farmland/Site), which is being overseen by the Kansas Department of Health and Environment (KDHE) - Bureau of Environmental Remediation (BER) under the Consent Order 10E-94 BER (the Order). The City authorized GHD to begin work on the project by approving our scope of work (SOW) and cost estimate dated March 26, 2018, and revised April 4, 2018. This is Exhibit A to Supplement Number 1 of the Engineering Services Agreement.

2. Background

GHD has performed a majority of the previously approved SOW. The tasks of the original SOW and status of each are summarized as follows:

1. Task 3.1 Project Management, Meetings, Reporting, Document Review, and Quality Assurance of Technical Procedures – Project management tasks have been completed weekly and monthly during the course of the project, which was to be completed by the end of calendar year 2018. However, given the long project history and transition of the project from Farmland Industries to the City, the historical information provided with the Request for Proposals (RFP) was not complete. GHD spent considerable time reviewing boxes of paper files and communicating with KDHE in an effort to find key data elements such as well logs, aquifer draw-down calculations, justification for selection of pumping rates, design documents and as-built drawings, many of which were not found in the project records.



The cost for weekly and monthly project management tasks has increased with the increase in project duration.

2. Task 3.2 – Stakeholder engagement task in the original April 4, 2018 SOW was revised by GHD at the request of the City. The revised amendment was approved by the City on April 10, 2018.
3. Task 3.3 Generate EQUIS Database, Develop 3-D Visualization, Update Conceptual Site Model, and Data Gap Analysis – While that process has begun, additional work remains to integrate the City’s electronic data with available paper records, to provide a single clearinghouse of relevant and significant Site data that is user friendly and interactive. The process has been complicated by the ability of the City’s Laboratory Information System (LIMS) to export an Electronic Data Deliverable (EDD) that can be imported into the EQUIS database.

GHD has completed the 3-D visualization using available data and updated the Conceptual Site Model (CSM). The updated CSM was used to identify the data gaps, which are subject to further investigation.

4. Task 3.4 Current Systems and Data Collection Evaluation/Optimization/Streamlining Support – The current systems of storage tanks, ponds, piping, and pumps have been evaluated and GHD has rendered our opinion of the potential future usability of the various components. However, until a list of potential alternatives for remediation of soil and groundwater has been approved by the KDHE-BER, GHD recommends that the City not act on those recommendations until a clear future remedy has been chosen and an implementation plan approved by the agency.
5. Task 3.5 Prepare Cost Benefit Analysis of Soil and Groundwater Alternatives – GHD has developed a list of applicable remedial technologies and initiated design calculations and cost estimating for those technologies for the Cost Benefit Analysis of Soil and Groundwater Alternatives. However, GHD has identified several data gaps, which must be investigated in order to estimate the volume of contaminated media, required pumping rates to achieve capture of nitrogen-affected groundwater and subsequent flow rates and volumes. These data are critical in producing reliable remedial alternatives and costs. Further, as our work has progressed on the project, Site conditions appear to have changed in the vicinity of monitoring well PSW-5B2 which likely will have an impact upon the remedial technology selection. Additional information is required to evaluate this change in Site conditions as discussed in the following Section.

3. Supplement Number 1 – Scope of Work

3.1 Identified Data Gaps

During review of existing Site data and development of the 3-D static Site model, GHD identified specific data gaps and changed Site conditions, which necessitate further investigation before alternatives can be identified or evaluated. The changed Site conditions include data obtained by monthly groundwater monitoring performed by the City that showed increasing concentrations of nitrogen in groundwater samples collected from monitoring well PSW-5B2 beginning in September 2017, which were not



consistent with historical monitoring trends. Based on our review of the historical and current monitoring information, GHD and the City met with KDHE-BER in October 2018 to discuss the project, our findings and the updated CSM. During that meeting, GHD and the City suggested, and KDHE-BER concurred, additional investigation of the Site was necessary. Based on that meeting, the City authorized GHD to prepare the *2018 Data Gap Study Work Plan* (the Plan) (November 16, 2018, revised January 18, 2019) and KDHE-BER approved the Plan on January 23, 2019. A summary of key components of the Plan are summarized below in Task 1 and Task 2.

Task 1 – Initial Aquifer Testing - PW-9, PSW-3B3, PSW-6B4, and PSW-7B2, October 2018 - The cost to perform this work was approximately **\$8,834**. This was covered by the contingency of the original SOW. However, if this Supplemental Agreement is approved, the costs will be moved from the contingency and charged to this Supplemental Agreement.

KDHE approved the performance of aquifer tests in a September 20, 2018 conference call. The approach was to analyze the PW-9 extraction system separately from the combined extraction system (PSW-3B3, PSW-6B4, and PSW-7B2). These two systems are approximately 2,000 feet apart and act as independent extraction systems. Both tests involved turning off the extraction wells, monitoring recovery for approximately 24 hours and then turning on the extraction well(s) and monitoring drawdown for approximately 24 hours. GHD performed aquifer tests on the four existing alluvial wells (PW-9, PSW-3B3, PSW-6B4, and PSW-7B2) during the week of October 8, 2018. The data from these tests was analyzed using AQTESOLV software to evaluate hydraulic properties of the tested aquifer.

Based on the data analysis, the current maximum pumping rate of approximately 13 gpm for recovery well PW-9 depressed the water table less than one foot and was too low to yield data for a meaningful analysis. Therefore, additional aquifer testing at PW-9 is needed and will be performed during the Data Gap Study.

Task 2 - 2018 Data Gap Study Work Plan Preparation and Implementation (assumes a maximum 6 month timeline - February 2019 through July 2019) – The total cost estimated to complete Task 2 is **\$112,067**.

Specific data gaps GHD intends to address by implementing the Data Gap Study Work Plan include:

- Nitrogen concentration data in soil and groundwater is incomplete in the vicinity of PW-9.
- A recent (beginning August 2018) increasing trend in the concentration of nitrogen compounds has developed in groundwater in the alluvial aquifer in PSW-5B2.
- Nitrogen data in groundwater and soil is incomplete in the vicinity of the Bag Warehouse and the northwest corner of Sandstone Hill.
- Nitrogen concentration data in soil and groundwater is incomplete in the area of the Old West Pond and West Extension Pond.
- Nitrogen concentration data does not exist for soil and groundwater data within the operational boundaries of the West Lime Pond, Rundown Pond and the East Lime Pond.



- Hydraulic analysis in the vicinity of PW-9, PSW-5B2, PSW-3B, PSW-6B, and PSW-7B is incomplete.
- Justification for the need to continue groundwater recovery from the alluvial aquifer in the vicinity of PSW-3B, PSW-6B and PSW-7B is questionable.

The implementation will involve:

- Contract with a direct push drilling company to advance approximately 47 soil borings for a total of approximately 2,790 linear feet.
- Collect approximately 169 soil samples and contract with an off-site laboratory to analyze each sample for nitrate, nitrite and ammonia content. This total includes analysis of additional quality control samples at the rate of approximately 20 percent.
- Collect approximately 178 groundwater samples for analysis by the City laboratory. This total includes analysis by the off-site laboratory of additional quality control samples at the rate of approximately 20 percent.
- Perform aquifer testing on PW-9, analyze drawdown and recovery data, and update hydraulic capture estimations.
- Update the 3-D visualization and CSM with the new hydraulic and lithologic information.
- Prepare a summary report with recommendations for further investigation or installation of new monitoring wells; or incorporate the findings into the evaluation of remedial alternatives for soil and groundwater.

3.2 Supplemental Requested Services

Task 3 - Supplemental Requested Services – The estimated cost to complete Task 3 is **\$22,837**.

GHD developed this task from the list of additional tasks performed during the execution of the specific authorized services, which were underestimated in terms of anticipated labor or time required to complete them. Included in this section are services GHD provided (or have been requested to provide) which were not originally anticipated by the City or GHD or are not part of the Data Gap Study Work Plan, and for which an accurate estimate of time and labor could not be prepared prior to performing them. The following sections describe these supplemental requested services.

3.2.1 Resource Conservation and Recovery Act Permit Modification Support

Upon approval of the Post-Closure Completion Certification Report by the KDHE Bureau of Waste Management (BWM) on January 16, 2019, the City requested that GHD support them in their efforts to modify the current 3.2.1 Resource Conservation and Recovery Act (RCRA) permit. The estimated time to support this request includes approximately 40 hours for the project's Professional Chemical Engineer to provide support, review, and consulting services during the public comment and response period. This period is anticipated to span approximately 90 days from authorization of this cost estimate. As the City will be in the lead role, GHD included time and expenses to participate in meetings with the City (two



meetings), the public (one meeting) and KDHE-BWM (one meeting) as their consultant. GHD has also included an estimate of time to support the City's preparation of graphics for public presentations.

3.2.2 Document Reviews

GHD based our estimated time to review and glean relevant information within the substantial volume of documents available in electronic form. Information was provided in electronic format initially – spreadsheets and portable data format (PDF). As GHD's familiarity with the project progressed, additional requested necessary information could not be located in the electronic files. Therefore, 11 additional boxes of paper files were retrieved from the City's archived files inherited from Farmland. Information not found in the City's or Farmland's files were further supplemented by files retrieved from the KDHE website and from KDHE's hard files. GHD incurred significant additional time organizing and researching critical incomplete information.

3.2.3 Property Redevelopment

On an as-needed basis, GHD participated in additional discussions concerning potential property re-use and redevelopment with the City and the effect redevelopment might have on the alternative remediation alternative evaluation.

3.2.4 Incomplete As-Built Drawings and Expired Permits

During the lengthy document reviews, GHD learned that some available information was not the most current available for the project. For example, water rights and groundwater term permits issued for the project appeared to have been expired. Only after contacting the regulatory authority (with the knowledge and approval of City staff) were we able to confirm the status of these required permits.

Additionally, only after exhaustive reviews of the available documentation did GHD learn that critical information concerning construction details for hydraulic containment alluvial wells and as-built drawings for interception trenches are not available.

3.2.5 Compliance Support

GHD is supporting the City and their legal staff in their efforts to renegotiate terms of permits and consent agreements that govern the future remediation strategies for the site (e.g., National Pollutant Discharge Elimination System (NPDES) permit and the Corrective Action Decision). This support is in the form of explaining the potential implications of changing conditions and data gaps on future compliance and Site closure.

3.2.6 Routine Reporting Reviews

Examples of supplemental supporting services GHD performed during the course of the project that were not explicitly included in our original SOW include:

- Review monthly and quarterly status and progress reports, and routine correspondence the City is required to submit to KDHE.



- Assist with selecting a qualified contractor to perform the indoor air quality survey of the bulk and bag warehouses.
- Review of quarterly performance reports, which identified the increasing trend of nitrogen concentrations in PSW-5B2.
- Assist with identifying additional potential contractors to perform aboveground storage tank inspections and prepare refurbishment cost comparisons with salvage and or demolition and disposal.
- Participate in joint weekly project risk reporting meetings.

4. Assumptions and Limitations

GHD has prepared this SOW and estimated cost based on work performed and anticipated. The following limitations and assumptions were applied:

- GHD communicated the additional work as it was requested and the delays as they occurred.
- This schedule includes our best estimate of performing the field work, collecting the data, and incorporating the data into the updated CSM.
- The City will provide and install one electrical submersible pump capable of approximately 100 gpm under the current head conditions present at PW-9.
- The City will provide surveying of horizontal and vertical coordinates for new soil borings and PW-9.
- The City will perform analysis of an estimated 148 parent groundwater samples for nitrate and ammonia.
- Depending on the impact of the new data on the CSM, GHD may recommend (or KDHE-BER may require) additional investigation (e.g., additional monitoring or pumping wells, etc.). This cost and scope does not currently include installing any wells. A separate SOW and cost estimate will be provided in the event additional wells are required in the future.

5. Schedule

As previously stated, GHD will begin work on the Data Gap Study implementation schedule upon the City's approval of this cost estimate and scope.

Upon receipt of all the data from this effort, GHD anticipates providing the *2018 Data Gap Study Report* to KDHE-BER within 60 days after completion of the field program.



6. Cost Estimate

GHD proposes to conduct the SOW on a not-to-exceed, time-and-materials basis to be billed monthly at the unit rates and in accordance with the terms in the Engineering Services Agreement (PSA) between GHD and the City. The estimated total cost of the three tasks described herein is **\$143,738**.

7. Closing

GHD appreciates the opportunity to provide these services. If you have any questions or would like to discuss this SOW and budget authorization request in more detail, please do not hesitate to contact Travis at (785) 783-8982 or Dave at (913) 620-4950.

Sincerely,

GHD

A handwritten signature in blue ink that reads "Travis Kogl".

Travis Kogl, P.G.
Associate

A handwritten signature in blue ink that reads "David G. Hempleman".

David G. Hempleman, P.E.

TK/mk/05

cc: Mike Staffileno, Principal, GHD

Table 1
2018 Data Gap Study Task
Cost Estimate - February 1, 2019
City of Lawrence - Farmland Nitrogen Plant Remediation Project
Lawrence, Kansas

	<u>unit rate</u>	<u>unit</u>	<u>Estimated Quantity</u>	<u>Estimated Cost</u>
Task 1 - Initial Aquifer Testing - PW-9, PSW-3B3, PSW-6B4, and PSW-7B2, October 2018				
Project Manager	\$ 195.00	hour	0	\$ -
Professional Chemical Engineer	\$ 176.00	hour	4	\$ 704.00
Professional Process Engineer	\$ 220.00	hour	0	\$ -
Professional Geologist, E1	\$ 195.00	hour	10	\$ 1,950.00
Project Geologist, (32 hours field, 8 hours office)	\$ 127.00	hour	40	\$ 5,080.00
Equipment rental, estimated, not to exceed	\$ 700.00	Lump Sum	1	\$ 700.00
Travel Expenses Allowance, estimated, not to exceed	\$ 400.00	Lump Sum	1	\$ 400.00
Task 1 - Initial Aquifer Testing PW-9, PSW-3B3, PSW-6B4, and PSW-7B2, Subtotal (previously approved and completed, October 2018)			\$	8,834.00
<hr/>				
Task 2 - 2018 Data Gap Study (assumes a maximum 6 month timeline - January - June 2019)				
2. A) Project management (BST, Invoicing, QS, monthly reporting)				
Project Manager	\$ 195.00	hour	18	\$ 3,510.00
Administrative Support	\$ 65.00	hour	8	\$ 520.00
2. A) Subtotal			\$	4,030.00
2. B) 2018 Data Review, Data Gap Study Work Plan and KDHE Negotiations				
Project Manager	\$ 195.00	hour	30	\$ 5,850.00
Professional Chemical Engineer	\$ 176.00	hour	40	\$ 7,040.00
Professional Geologist, E1	\$ 195.00	hour	30	\$ 5,850.00
CADD	\$ 105.00	Hour	16	\$ 1,680.00
Administrative Support	\$ 65.00	hour	4	\$ 260.00
2. B) Subtotal			\$	20,680.00
2. C) Field Planning, Subcontracting, Coordinating, and Support of Field Work				
Project Manager	\$ 195.00	hour	1	\$ 195.00
Professional Chemical Engineer	\$ 176.00	hour	1	\$ 176.00
Professional Geologist, E1	\$ 195.00	hour	2	\$ 390.00
Project Geologist	\$ 139.00	hour	10	\$ 1,390.00
Project Chemist	\$ 139.00	hour	4	\$ 556.00
Administrative Support	\$ 65.00	hour	4	\$ 260.00
2. C) Subtotal			\$	2,967.00
2. D) Direct Push/Monitoring Well Installation (assumes a 10 days field schedule to complete all field work)				
Project Manager	\$ 195.00	hour	10	\$ 1,950.00
Professional Chemical Engineer	\$ 176.00	hour	12	\$ 2,112.00
Professional Geologist, E1	\$ 195.00	hour	5	\$ 975.00
Project Geologist	\$ 139.00	hour	108	\$ 15,012.00
2.D) Subtotal			\$	20,049.00

Table 1
2018 Data Gap Study Task
Cost Estimate - February 1, 2019
City of Lawrence - Farmland Nitrogen Plant Remediation Project
Lawrence, Kansas

	<u>unit rate</u>	<u>unit</u>	<u>Estimated Quantity</u>	<u>Estimated Cost</u>
2. E) Aquifer Testing (assumes 5 days to complete all field work)				
Project Manager	\$ 195.00	hour	1 \$	195.00
Professional Chemical Engineer	\$ 176.00	hour	1 \$	176.00
Professional Geologist, E1	\$ 195.00	hour	16 \$	3,120.00
Project Geologist	\$ 139.00	hour	32 \$	4,448.00
2.E) Subtotal			\$	7,939.00
2. F) Expenses and Subcontractors				
GHD Vehicle daily rate	\$ 80.00	day	8 \$	640.00
Geologist's GHD Vehicle mileage	\$ 0.28	mile	1,000 \$	280.00
Engineer, Personal Vehicle mileage	\$ 0.59	mile	200 \$	117.00
Professional Geologist travel expenses (air fare, rental car, gas, hotel, meals), estimated	\$ 1,000.00	lump sum	1 \$	1,000.00
Transducers and test equipment rental	\$ 150.00	week	1 \$	150.00
Hach 890	\$ 105.00	week	2 \$	210.00
Misc field supplies (ice for samples, personal protective equipment, etc.)	\$ 30.00	day	8 \$	240.00
Subcontractor - Direct-Push, assumes no new perched unit monitoring wells, estimated, contractor not selected yet	\$ 2,500.00	day	9 \$	22,500.00
Subcontractor - Pace Analytical (nitrate and ammonia analysis of all soil samples plus 20% of all water samples) Estimated 141 soil samples total, 30 QC groundwater samples (20% of 148 water samples total) estimated, no quotes obtained yet.	\$ 33.00	sample	199 \$	6,567.00
2. F) Subtotal			\$	31,704.00
2. G) Reporting /Model				
Project Manager	\$ 195.00	hour	10 \$	1,950.00
Professional Chemical Engineer	\$ 176.00	hour	24 \$	4,224.00
Professional Geologist, E1	\$ 195.00	hour	16 \$	3,120.00
Project Geologist	\$ 127.00	hour	24 \$	3,048.00
Information Technologist - update 3D model	\$ 195.00	hour	4 \$	780.00
Database Analyst - update 3D model	\$ 125.00	hour	50 \$	6,250.00
Project Geologist - Pump Test Data reduction	\$ 127.00	hour	8 \$	1,016.00
Project Geologist - GINT boring logs	\$ 127.00	hour	20 \$	2,540.00
Database Analyst - data tabulation	\$ 125.00	hour	6 \$	750.00
CADD	\$ 105.00	Hour	6 \$	630.00
Administrative Support	\$ 65.00	hour	6 \$	390.00
2. G) Subtotal			\$	24,698.00

Table 1
2018 Data Gap Study Task
Cost Estimate - February 1, 2019
City of Lawrence - Farmland Nitrogen Plant Remediation Project
Lawrence, Kansas

	<u>unit rate</u>	<u>unit</u>	<u>Estimated Quantity</u>	<u>Estimated Cost</u>
Task 2 - 2018 Data Gap Study Task Total				\$ 112,067.00
Task 1 - Initial Aquifer Testing Task Subtotal (previously approved and completed, October 2018)				\$ 8,834.00
2018 Data Gap Study PLUS Aquifer Testing				\$ 120,901.00

Task 3 - Supplemental Requested Services, as described in February 1, 2019 Cost Estimate

Project Manager	\$ 195.00	hour	40	\$ 7,800.00
Professional Chemical Engineer	\$ 176.00	hour	80	\$ 14,080.00
CADD	\$ 105.00	Hour	8	\$ 840.00
Travel Expenses	\$ 0.59	Lump Sum	200	\$ 117.00
Supplemental Requested Services, subtotal				\$ 22,837.00

Summary				
(Task 1 + Task 2) 2018 Data Gap Study PLUS Initial Aquifer Testing				\$ 120,901.00
Task 3 - Supplemental Requested Services, as described in February 1, 2019 , subtotal				\$ 22,837.00
Total Estimated Cost this Authorization, February 1, 2019				\$ 143,738.00