KU KANSAS GEOLOGICAL SURVEY
The University of Kansas

July 22, 2007

Donna J. Crawford
Grant Administrator
Governmental Assistance Services
905 Joseph Drive
Lawrence KS 66049

RE: Environmental Review – Princeton, KS
Sanitary Sewer System Improvements Project

Dear Ms. Crawford:

The Kansas Geological Survey (KGS) has received your letter dated June 22, 2007, asking us to review the above referenced project. In general, the project involves installation of a solar mixer, duckweed harvester, and rehabilitation of the existing three-cell lagoon treatment system at the existing site on the south edge of Princeton, Kansas.

A review of regional geologic information and project information provided by Governmental Assistance Services indicate that there are no unduly adverse geologic conditions that should affect this project. Site-specific conditions should be considered by the applicant prior to construction.

This letter is an assessment based on the regional geologic conditions available at the KGS and cannot be used in substitute of a detailed site characterization. Other geologic conditions, not discussed herein, or for which the KGS has no knowledge, may affect the viability of the project. It is the responsibility of the applicant to provide any necessary characterization, geotechnical or environmental testing, or design by a licensed professional geologist or engineer to complete the project.

If you have any questions please feel free to contact me at (785) 864-2099.

Sincerely,

Robert S. Sawin
Geologist

Enclosures

cc: Dan Suchy, KGS Data Resources Library

Governmental Assistance Services
905 Joseph Drive
Lawrence, Kansas 66049
785-832-2141 • Fax 785-832-1111
Toll Free 888-832-3335
e-mail: gasdonnaa@sunflower.com

June 22, 2007

Dr. William Harrison
Kansas Geological Survey
University of Kansas
1930 Constant Ave.-Campus West
Lawrence, KS 66047

RE: Environmental Review - Princeton, KS – Sanitary Sewer System Improvements

Dear Dr. Harrison:

Princeton, Kansas received $152,175 from the Kansas Department of Commerce to complete installation of a solar mixer, duckweed harvester, and to re-line the treatment cells to include desludging and re-piping of the sanitary sewer system. The total project cost is $304,350. KDHE has approved a $152,175 loan to complete the project.

I am attaching a map, alternatives and the Engineer's Supplemental Report so you may comment on any concerns. Improvements will occur in Section 14, Township 18, Range 19.

The city is aware that a review was conducted in 2005, however, grant guidelines state the city must re-submit an environmental comment period again.

Please submit all comments to my office, Governmental Assistance Services, 905 Joseph Dr., Lawrence, KS 66049. If you have questions please call me at 888-832-3335.

Sincerely,

Donna J. Crawford

Donna J. Crawford
Grant Administrator

Enc/ Engineer's Supplemental Report
Map
Project Alternatives

The sanitary sewer system improvements have been identified as a priority by the citizens and city planners of Princeton because of the potential health risks linked to their non-compliance. The City has a high percentage of LMI citizens. A recent survey has set the LMI at 62.42%. The citizens of Princeton cannot afford to make these improvements to their wastewater system without the assistance of a Department of Commerce Small Cities Grant.

In 2006 the City raised local sewer rates to $17.50 to meet the impending financial shortages of the system. The City has arranged for financing from KDHE in the amount of $152,175. Recently, the city acquired a grant/loan from Rural Development to complete construction on local water improvements. Residents are paying an average water bill of $37.50. Coupled with the sewer charge each home spends an average of $55.00 monthly. Both fees exceed the State average.

2. Project Alternatives

a. Alternatives

In addressing the reduced lagoon detention time and all proposed improvements the following alternatives were considered:

Option 1: Rehabilitation of the Existing 3-Cell Lagoon System

The rehabilitation of the existing lagoon system includes the installation of new distribution piping, control structures and the "dry removal and disposal of the accumulated biosolids. Improved piping will not only allow for flow bypassing of Cell 1 and Cell 2 during rehabilitation, but will also improve the flow distribution to reduce short circuiting and will allow for future parallel operation of the first two lagoon cells, if desired.

For the steady improvement of the system operation, an increase in the oxygen concentration of the lagoon water is required. The installation of solar powered mixers is recommended to aid in the oxygenation of the lagoon cells. Control of aquatic plant life will also be necessary. The lagoon system has become covered with duckweed which limits light to the surface water and competes for oxygen with the lagoons cell microbial organisms. Sunlight plays an important role in the proper treatment of the wastewater. Engineers recommend the harvesting of the duckweed. A professional contractor will be used for the initial harvest while the solar mixers will keep future growth closer to the banks allowing local crews access for future maintenance.

Over time the clay lining of the cells has been compromised and must be rebuilt. It has been estimated 96,500 SF of liner must be rebuilt to help limit the amount of wastewater leaking from the lagoon cells into the groundwater.

Bypass pumping from Cell 2 to the discharge structure is required for the rehabilitation of Cell 3 and the reduction of the lagoon detention time during construction must be approved by KDHE. Taking each cell out of operation will facilitate the removal of the biosolids but the length of time the cells are out of service will be minimized. The liquid and solid contents will be disposed of in accordance with KDHE and EPA Part 503 Sludge Regulations.

The lagoon system discharges into a Middle Creek tributary that is located approximately 50 feet from the lagoon dike. It is recommended that bank erosion be corrected to reduce the impact on the lagoon structures in the future. The installation of rock gabions, as an example, will act as a more permanent bank stabilization device.

Financial Analysis: Option 1

Solar Mixer ($40,000)
Duckweed Harvest ($14,400)
Sludge Removal and Disposal ($45,325)
Rebuild Clay Liner ($24,125)
8" DIP ($2,500)
8" Valve & Structure ($5,000)
Bypass Pumping ($12,000)
Discharge Structure Grating ($5,000)
Rip-Rap ($60,500)
Bank Stabilization ($26,000)
Mobilization ($5,000)
Total: $239,850

Option 1 has been recommended as the course of action to improve the sanitary sewer system in Princeton. Option 1 is the least expensive of the three options investigated and will also bring the city into compliance with State and Federal regulations while insuring they will not risk fines or shutdowns. Option 1 also is also the only Option which makes significant improvements to the existing facility.

Option 2: New Lagoon Cell

The construction of a new cell located northwest of the existing facility was investigated for this option. Unfortunately, to utilize the existing gravity collection system and lagoon structures, part of this location is within the 100-year floodplain. Preliminary analysis of the gravity collection system indicates an influent pumping station may not be required for the operation of a new lagoon cell. The construction of this cell would require significant excavation and the budget estimate assumes no rock will be encountered.

With an influent BOD concentration of 200 parts per million the lagoon loading is 45 pounds per day. Assuming the initial cell receives 100% of this loading, and with a recommended design loading of 34 pounds per day per acre, the primary cell should have a surface area of 1.5 acres.

The cell is located on partially forested farm ground. The State Water Resource Planning Act requires Kansas riparian areas be maintained and enhanced. Verification the area is considered riparian may impact the construction. Also, the cost of deforestation will likely not be covered by most funding agencies.

For proper water distribution between cells, while utilizing the existing discharge structure, a significant amount of piping must be installed. The piping is configured to provide a bypass of the primary cell to the existing Cell 1, or allows parallel operation of the new cell and Cell 1. The head loss associated with the increase in piping lengths, in addition to the installation of an inlet screening structure, may impact the ability to utilize the existing gravity system and discharge structure.

Financial Analysis Option 2:
Excavation, Backfill and Compaction ($160,000)
Liner ($86,000)
8" DIP ($1,500)
8" valve ($7,500)
4ft. Manhole ($1,000)
Inlet with screening (2,000)
Discharge Structure Grating ($1,000)
Rip-Rap ($59,500)
Bank Stabilization ($10,000)
Site Clearing ($3,000)
Land Acquisition ($3,000)
Seeding ($210)
Fencing ($1,000)
Mobilization ($5,000)
Total: $356,167.

Proceeding with Option 2 was considered because completion of this option would have the effect of increasing the existing capacity and improving exposure to wind and sun but the need for property acquisition, site clearing, significant excavation, minimal improvements to the existing system and higher costs are reasons for this option not being chosen.

Option 3: New Northern Cell

The construction of a new 1.5 acre cell north of the existing facility was investigated to provide construction outside the 100-year floodplain and allows for expansion if the existing facility is abandoned in the future. This option requires the installation of a new pumping station. Abandoning the existing facility would not only minimize the negative environmental impact the wastewater could have on the potential flood waters, but would also minimize the damage the flood waters could inflict on the lagoon system.

For the purpose of preliminary analysis, a general north location was chosen for the installation of the new cell. Determining the location requires the completion of a site selection study. The lagoon location and configuration, as well as, the land acquisition consideration should be carefully reviewed to account for possible future lagoon expansion.

The distribution system is configured to provide a bypass of the primary cell to the existing system. Backup power would be necessary, as loss of power would temporarily divert the flow to the existing facility. Consideration must be taken for the operation and maintenance costs associated with the installation of a pumping station.

Although a new north cell would improve exposure to wind and sun, increase capacity, and be outside the floodplain, the necessary property acquisition while making minimal improvements to the existing system are the reason Option 3 is not recommended. The need for the installation, operation and maintenance of a new pump station as well as the installation of significant LF of new piping are also reasons to pass on this option. Estimated total costs for Option 3 are $353,568.

Cost Analysis Option 3:
Excavation, Backfill and Compaction ($50,000)
Liner ($21,500)
8" DIP (47,500)
8" valve ($7,500)
4ft. Manhole (2@$1,000)
Distribution Structure with Screening ($7,000)
Discharge Structure Grating ($10,000)
Rip-Rap ($59,500)
Bank Stabilization ($10,000)
Site Clearing ($1,500)
Land Acquisition ($7,500)
Seeding ($1,050)
Fencing ($2,400)
Mobilization ($5,000)
Total: $353,568

Financial alternatives have been investigated thoroughly because citizens are 62.42% LMI. These individuals are on very tight budgets. Every cent taken from them effect quality of life for themselves and their children.

Three options were taken into consideration. A KDHE 20 year loan would establish a sewer rate of $24.09 and with a 40 year loan from Rural Development a $20.85 sewer bill would be applicable. Rural Development will not inject grant money into the equation. The city must have a rate of at least $30.00 or above to be eligible for grant funds.

The only financially sound approach to fulfilling the Schedule of Compliance issued July 8, 2004 is to request $152,175 from your department and $152,175 from KDHE. The rate of $17.50 per month will allow the city to pay debt retirement and operation & maintenance costs. This approach will lessen the financial burden on our 62.42% LMI population.

b. Scope of Work

The City, in consultation with engineering professionals, has carefully selected the rehabilitation of the existing system or Option 1 as a course of action.

The rehabilitation of the existing system requires the installation of new water distribution piping and control structure. Improved piping will not only allow for flow bypassing of Cell 1 and Cell 2 during rehabilitation but will also improve flow distribution to reduce short circuiting and will allow for future parallel operation of the first two lagoon cells if desired.

Bypass pumping from Cell 2 to the discharge structure is required for the rehabilitation of Cell 3. Taking each cell out of operation will facilitate the removal of the biosolids but the length of time each cell is out of operation will be minimized. The liquid and solids contents will be disposed of in accordance with KDHE and EPA Part 503 Sludge Regulations.

It is recommended that bank erosion be corrected to reduce the impact on the lagoon structures in the future. The installation of rock gabions, as an example, will act as a more permanent bank stabilization device.

In all, it is estimated 3700 cubic yards of sludge will be removed from the lagoons. This Option calls for the installation of two solar mixers to guard against the excessive growth of Duckweed and other aquatic plant life. Currently duckweed has covered the surface of the 3 existing cells and must be harvested. Option 1 calls for the rebuilding of the clay liners. 96,500 SF of liner must be rebuilt. 50 LF of 8" DIP will be installed. Option 1 will also require 8" Valve and Structure, bypass pumping, discharge structure grating, rip-rap, bank stabilization and mobilization. Estimates to complete Option 1 are $239,850.

Careful pre-planning has occurred to insure this project is completed within a 24 month timeframe. Final design plans have been completed and approved by KDHE. Upon grant award, the city will publicize the Environmental Release of Funds on 1/20/07. Publication for the Invitation to Bid will occur on March 30, 2007 with a bid opening scheduled for May 1. 2007. Bid award will take place the same evening at the regularly scheduled Princeton City Council meeting which takes place the 1st Monday of each month. Bid award will be contingent upon approval by KDHE. The city will sign construction contracts on June 1, 2007 and construction will begin June 30, 2007. Constructions will be completed by February 28, 2008.

March 3, 2005

City of Princeton
Council Members
P.O. Box 58
Princeton, KS 66078

Re: Sanitary Sewer System Facility Plan
Supplemental Report
Project No.: 12237.501

Dear Council:

In February, 2005 a Sanitary Sewer System Facility Plan was completed by Bartlett & West Engineers, Inc. This report was inconclusive in the recommendation for the improvement of the City of Princeton's Wastewater Treatment System because of the datum inconsistencies between the original facility drawings and the Flood Insurance Rate Map. A brief topographic survey was completed to confirm relevant elevations and to determine the existing lagoon water depths. The result of this survey, in conjunction with advice from the Kansas Department of Health and Environment, allows this Supplemental Report to provide recommendations for the improvement of the wastewater system operation. This Supplement Report should be reviewed in concurrence with the Sanitary Sewer System Facility Plan.

Based on the Flood Insurance Rate Map (20056501501B- June 1991) the existing City of Princeton wastewater lagoon system is located within the 100-year flood plain. The results of the wastewater system survey, as illustrated in Figure 1, indicates the minimum dike elevation of 938.36 feet is approximately 3 feet below the estimated 100-year flood elevation of 941.5 feet. The potential exists for the submergence of the lagoon system during a rain event of less than a 100-year magnitude. However, based upon the minimal damage caused by the flood waters encountered in 1993, the structural system is apparently capable of withstanding a flooding situation. Therefore with the KDHE's concurrence, it is recommended that the existing system remain active and that the lagoons be rehabilitated to improve operation.

The Sanitary Sewer Facility Plan outlined initial and final phase improvements. To receive maximum points under one category of the Community Development Block Grant (CDBG) rating system, the City must contribute at least 50 percent of the required funds. Any work completed ahead of the CDBG grant acceptance date will not count as local match dollars. With KDHE's concurrence, it is recommended the initial phase improvements described in the original Facility Plan not be completed immediately but should be included in the overall project improvement costs. Doing so will increase the overall amount of grant funds the City might receive.

The rehabilitation option (Option 1) described in the final phase improvements of the Sanitary Sewer System Facility Plan included the sludge removal and bottom rebuilding in all three cells, as well as, the construction of interconnect structures for cell flow manipulation. The completed survey information indicated that the lagoon water depth averages five feet (4.80-5.24 feet). Therefore, the capacity losses indicated in Table 2 (Page 4 of the Facility Plan) are accurate and the volume losses due to sludge buildup in Cells 1 & 2 accounts

for over 45% of the total capacity. The sludge removal in Cells 1 & 2 will provide the City with an additional 25 days of detention time resulting in a total of 137 days detention. The rehabilitation of Cell 3 will only gain the City 4 days of detention and is, therefore, not considered at this time. If the sludge removal process for Cells 1 & 2 is easily executed, the sludge removal in Cell 3 may be considered. The placement of rip-rap for dike erosion control in all three cells is recommended.

The original 1964 construction plans indicate the 8-inch gravity sewer line approaching the lagoons was to be installed at minimum slopes of 0.30-0.40 percent. The recent survey indicates that these slopes actually range from 0.06-0.25 percent. This less than minimum slope does not provide adequate head differential to install bypass structures between Cell 1 and Cell 2 or Cell 2 or Cell 3. Therefore, the influent diversion will be the only new line installed. This will allow flow to be diverted to Cell 1 or Cell 2. Pumping from cell to cell will need to be implemented during the rehabilitation of the cells.

Erosion has impacted the Middle Creek stream bed and bank stabilization is required to prevent the stream flow from washing out the lagoon system. The stream bank top is currently located approximately 16 feet from the lagoon fence line and nearly 33 feet from the lagoon dike edge. It is proposed that bank protection be installed to provide the necessary stabilization. A Corps of Engineers permit will need to be acquired to complete this part of the project.

The updated total project cost estimate for the revised rehabilitation option is outlined in Table 1 below. The stream bed and top of bank elevations were estimated in the original Facility Plan. This estimate was based on a bank height less than the actual height which is greater than 10 feet. Therefore, the cost estimate for the bank stabilization has been increased to accommodate installation. Additionally, other modifications to unit pricing and quantities have made to accommodate several categorical changes.

Table 1: Project Cost Analysis

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL COST
OPTION 1 - *Rehabilitation (Revised)*				
Solar Mixer	2	EA	20000	40,000
Duck Weed Harvest	4	EA	3600	14,400
Sludge Removal & Disposal	3,700	CY	12.25	45,325
Rebuild Clay Liner	96,500	SF	0.25	24,125
8-inch DIP	50	LF	50	2,500
8-inch Valve & Structure	2	EA	2500	5,000
Bypass Pumping	2	LS	6000	12,000
Discharge Structure Grating	1	LS	5000	5,000
Rip-Rap	12,100	SF	5.00	60,500
Bank Stabilization	1	LS	26000	26,000
Mobilization	1	LS	5000	5,000
SUBTOTAL				239,900
Engineering, Permitting, & Grant Administration				*60,000*
TOTAL PROJECT COST				**$ 299,900**

The City Council recently voted to raise the sewer fee to $13.50 per month. This is a $5.00 per month increase and will start on June 1, 2005. Based on the 2003-2005 sewer budget provided in the Appendix of the Sanitary Sewer System Facility Plan, the City has been operating with an approximate $3,300 deficit. A loan application for 50% of the total project cost ($150,000) should be completed and submitted to the KDHE for Kansas Water Pollution Revolving Loan Fund consideration. For the City to remove the existing deficit and begin repayment of the Kansas Water Pollution Revolving Loan a monthly sewer rate of approximately $16.50 will likely be required. This will be an additional rate increase of $3.00 per month per user.

The implementation of this revised Facility Plan will improve the lagoon circulation, will increase the lagoon detention time to nearly 140 days, and should result in compliance with the NPDES permit requirements under normal operating conditions. It is recommended that the City begin the KDHE and CDBG loan and

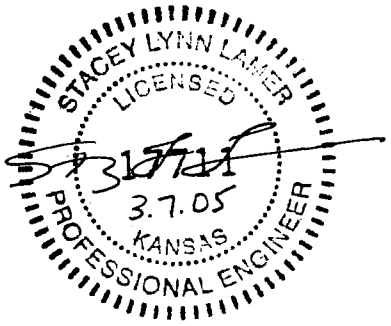
grant processes. The loan matching requirements must be completed prior to submitting the October 15, 2005, CDBG grant application. In order to qualify for CDBG funding, the City will likely have to complete an income survey. The services for completing the income survey are typically completed by the City's grant writer. The City is encouraged to select a qualified grant writer to promptly begin the process.

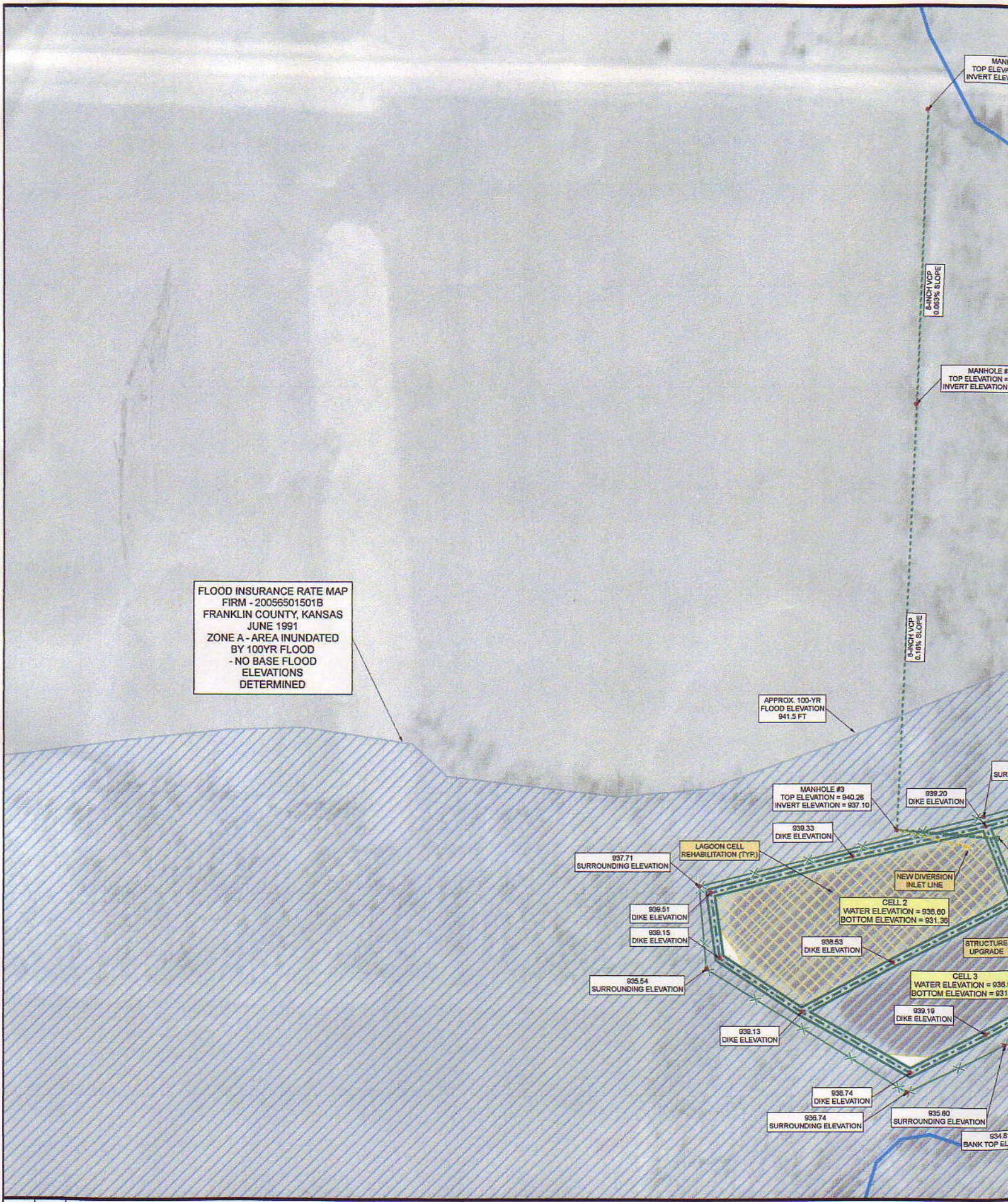
Upon your approval of this Sanitary Sewer Facility Plan Supplemental Report, it will be forwarded to KDHE. Please contact me if you have any questions or concerns regarding this information.

Sincerely,

Stacey L. Lamer, P.E.

Enclosures (Figure 1)



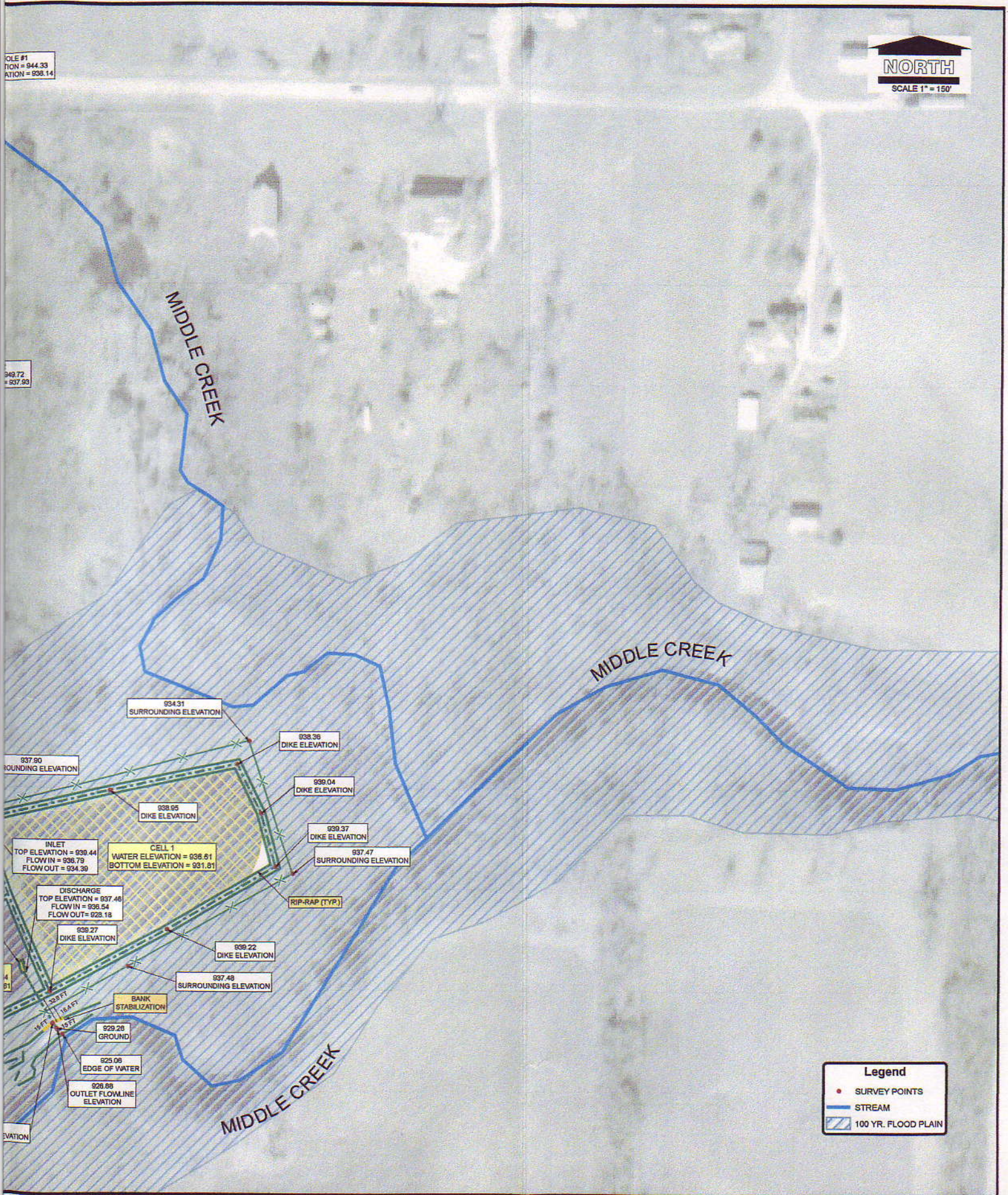


REV.	DATE	DESCRIPTION

DRAWN BY: CAR
DESIGN BY: SLL
CHECKED BY: SLL

BARTLETT & WEST
ENGINEERS

1200 EXECUTIVE DRIVE - TOPEKA, KANSAS
PHONE 785.272.2252 - FAX 785.272.7349
WWW.BARTWEST.COM



CITY OF PRINCETON FRANKLIN COUNTY, KS	FIGURE 1: REVISED WASTEWATER TREATMENT FACILITY PLAN	PROJ NO: 12237.500 SCALE: AS NOTED DATE: 03/2005	SHEET NUMBER 1 OF 1