

Kansas Geological Survey
The University of Kansas
1930 Constant Ave.
Lawrence, KS 66047-3726
Phone: 785-864-3965

Proposed Project for Application to the Kansas Department of Health and Environment for the Kansas Water Pollution Control Revolving Loan Fund, and to the Kansas Department of Commerce for a Community Development Block Grant

Applicant: City of Lehigh, Marion County
Rehabilitation of Existing Wastewater Treatment Lagoon Facility
Rehabilitation/Replacement of Existing Sanitary Sewer Lines

Contact Person: Donna Crawford
Address: Governmental Assistance Services
905 Joseph Drive
Lawrence, KS 66049

Sent to the Kansas Geological Survey for environmental review.

Agency Review Comments:

The following review comments included in an environmental review dated October 18, 2006 still apply because the project will still include the rehabilitation of the sewage collection system as well as the new option of the rehabilitation of the wastewater treatment lagoon facility:

The long-term benefits of the improvements, which should improve the quality of ground water if the rehabilitated wastewater lagoons and rehabilitated/replaced sewer lines decrease the amount of effluent reaching the ground water, and improve the quality of surface water if there is a discharge of treated effluent to surface water, should offset any short-term adverse environmental impacts during construction.

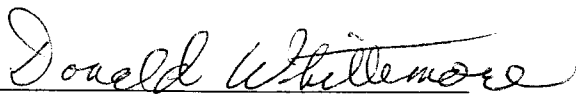
Recommended Action:

- ☒ Clearance of project should be granted
☐ Clearance of project should not be granted
☐ Clearance of project should be delayed until the issues or questions have been clarified
☐ Clearance of project should not be delayed, but the applicant (in the application) should address or clarify the questions or concerns indicated above

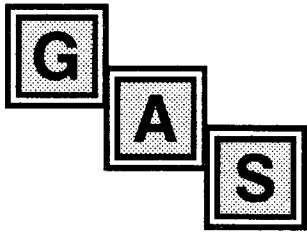
Donald Whittemore
Reviewer's Name

Geohydrology Section, Kansas Geological Survey
Division/Agency

6/08/07
Date


Reviewer's Signature

The above discussion represents our best assessment based on the information that the Kansas Geological Survey has about this locality and/or proposed project at the time of this writing. Other geologic conditions, not discussed herein, or for which the Kansas Geological Survey has no knowledge, may affect the viability or safe operation of this facility or property. The information provided in this letter is from regional or county-wide studies and should not be used as a substitute for detailed site characterization by a licensed geologist or engineer. It is the responsibility of the applicant to provide any required site characterizations.



Governmental Assistance Services

905 Joseph Drive

Lawrence, Kansas 66049

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Toll Free 888-832-3335

e-mail: gasdonnaa@sunflower.com

May 24, 2007

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

RE: Environmental Review – Change in Scope of Work – Lehigh, Kansas

Dear Dr. Harrison:

In September of 2006 Midwest Assistance Program requested environmental comments from your department. As of May 2007 the City of Lehigh has decided to complete Option 4 instead of Option 3. Option 3 specified re-piping and rehabilitation of the existing cells.

Chosen Option No. 4 includes re-piping and rehabilitation of Cells 1 & 3, but will expand Cell #2 from approximately 0.6 acres to approximately 1.2 acres. (Alternatively, Cell #1 could be enlarged instead). The estimate depicts a change in total project cost for Option 4 - \$819,600. KDOC funds of \$384,800, Local funds \$50,000, and a KDHE loan of \$384,800.

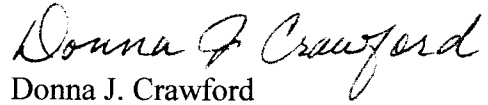
If you have questions after reviewing the attached documentation, please call the City's Engineer, EBH Associates, Jim Kohman at 620-793-8411. Alternatives, mapping, estimate of costs, and drawings are within the attachments.

The upgrade of the treatment system is in the NW ¼, SW ¼, and NE ¼ of Section 26, Township 19 South and Range 1 East of Marion County, Kansas as shown on Figure 1 – Site Location Map.

Please state within your reply floodplain determination, if possible.

I will appreciate all comments being submitted to my office, Governmental Assistance Services, 905 Joseph Dr., Lawrence, KS 66049.

Sincerely,

A handwritten signature in cursive script that reads "Donna J. Crawford". The signature is written in black ink and is positioned above the printed name and title.

Donna J. Crawford
Grant Administrator

Enc/ Eng. Report Info

SUMMARY OF NEED
Prepared for
KDOCH CDBG APPLICATION

SANITARY SEWER and TREATMENT FACILITY IMPROVEMENTS
City of Lehigh, Kansas
May 2007

NAME OF APPLICANT: City of Lehigh, Kansas
City Hall
110 E. Main
Lehigh, Kansas 67073
(V) (620) 483-4176
(F) (620) 483-4176

ENGINEERING Co.: EBH & Associates
1105 Williams
Great Bend, Kansas 67530-4487
(V) (620) 793-8411
(F) (620) 793-8413

INTRODUCTION

Wastewater Treatment Facility

The sanitary sewer treatment facility at Lehigh, Kansas is operated under Kansas Water Pollution Control Permit No. M-NE41-0001. The facility is located in the NW1/4 SW1/4 NE1/4 of Section 26 Township 19 South Range 1 East, Marion County, Kansas, as shown on Figure 1. The facility is located in the Neosho River Basin with the receiving stream being the North Cottonwood River (Marion Reservoir) via an unnamed tributary to French Creek. It is currently operated as a three-cell discharging treatment facility with a total surface area of approximately 1.9 acres and a design depth of five feet. Wastewater is collected by a gravity sewer system and conveyed to the treatment facility via gravity. The existing facility was constructed with a clay liner with rock rip-rap for slope protection.

The wastewater treatment facility was constructed in 1968 as a discharging facility. The 2000 census population is 214. At an estimated average flow rate of 100 gallons per capita per day, or 21,400 gallons per day, the existing treatment facility has a total estimated detention time of 122 days, very near the minimum of 120 days.

The City of Lehigh is currently under direction from KDHE to improve its wastewater treatment facility. *The City's WWTF has not consistently met the NPDES discharge limitations for BOD₅ and TSS since March of 2001.*

The City's 2003 NPDES Permit renewal included a Schedule of Compliance that directed the City to take actions to address and correct the deficiencies in the WWTF by December 31, 2006. The Schedule of

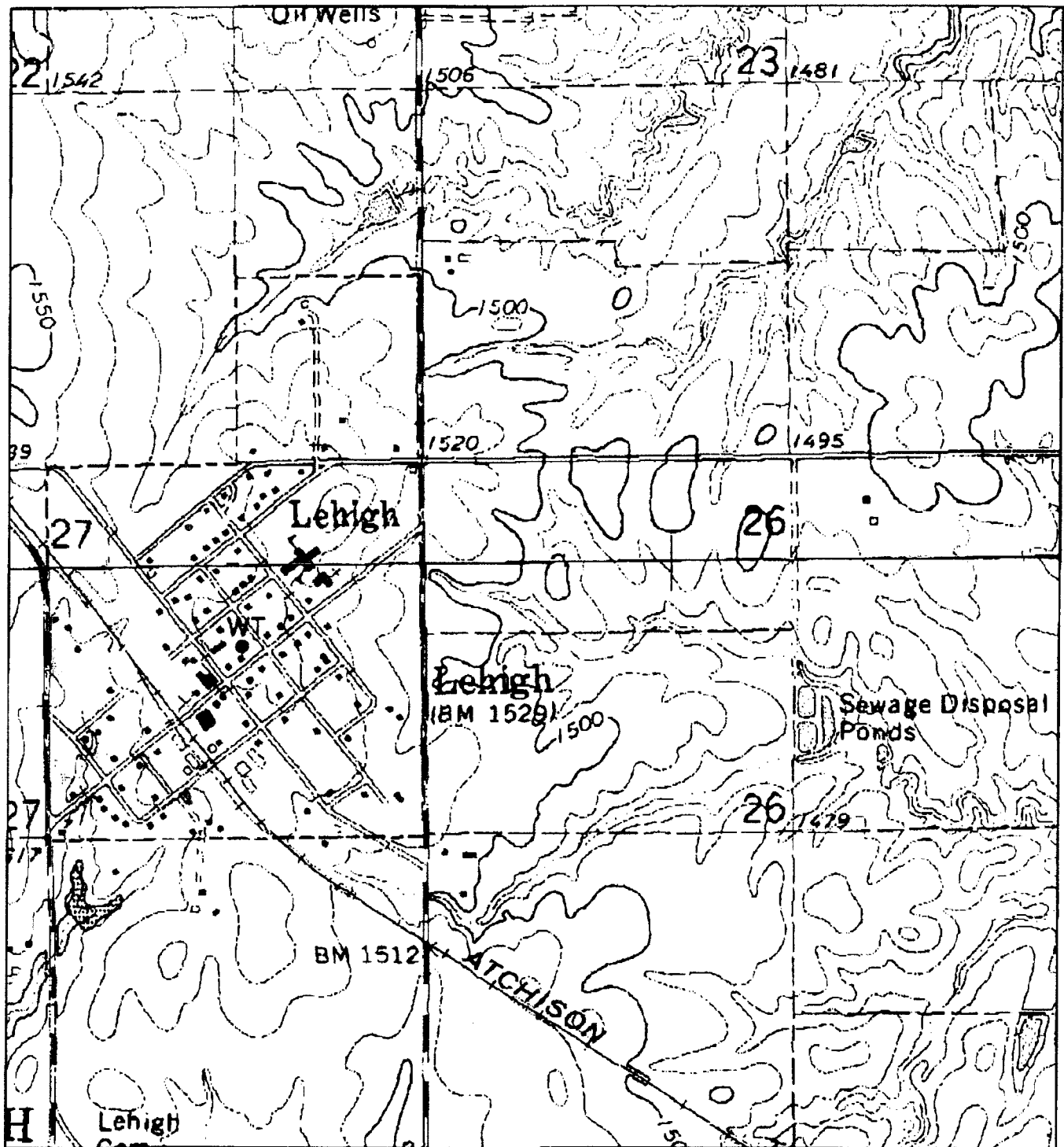


FIGURE 1. SITE LOCATION MAP
LEHIGH, KANSAS

Compliance required the City to hire an engineer to evaluate the system, prepare a Facility Plan including an implementation schedule for treatment facility improvements.

As a result of these requirements, the city made an effort to improve the efficiency of the wastewater treatment facility. The KDHE agreed to suspend the Schedule of Compliance and further actions by KDHE until these improvements could be made and the results evaluated. This work primarily included:

- The city completed work in 2003 in an attempt to reduce short circuiting. This work primarily included cutting off the pipes entering cells 1 and 2 from the division box, at a location near the toe of the wet side berm slope. It was anticipated that this would reduce short circuiting
- The City completed dredging of cells 1 and 2 in 2003. It was believed that this work would provide for additional detention time to improve treatment efficiency.
- During the preparation of the Draft Facility Plan it was identified that the treatment facility should be operated in a different manner because of failed piping from the division box to cell 2 and because of the poorly located flow control structures. These operational changes were made in September 2005. The weir plank in the control structure between cells 1 and 2 was lowered and the weir plank between cells 1 and 3 was raised to force the flow from cell 1 into 2. The weir plank between cells 2 and 3 was lowered allowing flow from cell 2 into cell 3. This configuration still does not utilize half of cell 3, and a large portion of cell 1 may not be used because of short circuiting. However, this is the best configuration to maximize detention time in the system with the existing conditions.

Even though the improvements have seemed to help, the facility has not demonstrated that it can consistently meet permit limitations. KDHE provided the city with a letter dated June 22, 2005 that revived the Schedule of Compliance requiring the City hire an engineer to develop the Facility Plan and proceed with the other requirements of the schedule. The City complied and submitted the DRAFT Facility Plan to KDHE in October of 2005.

The Draft Facility Plan included 3 viable options to upgrade the treatment facility. These options are provided, below. KDHE rejected the least cost option and stated that the City must complete either Option 3 or Option 4. Option 3 included rehabilitation of the existing treatment facility at its current size and Option 4 expanded the existing facility by enlarging one primary cell from approximately 0.6 acres to approximately 1.2 acres to allow additional treatment. *The city has selected Option 4 because it offers the best chance for achieving the project goal of NPDES Compliance.*

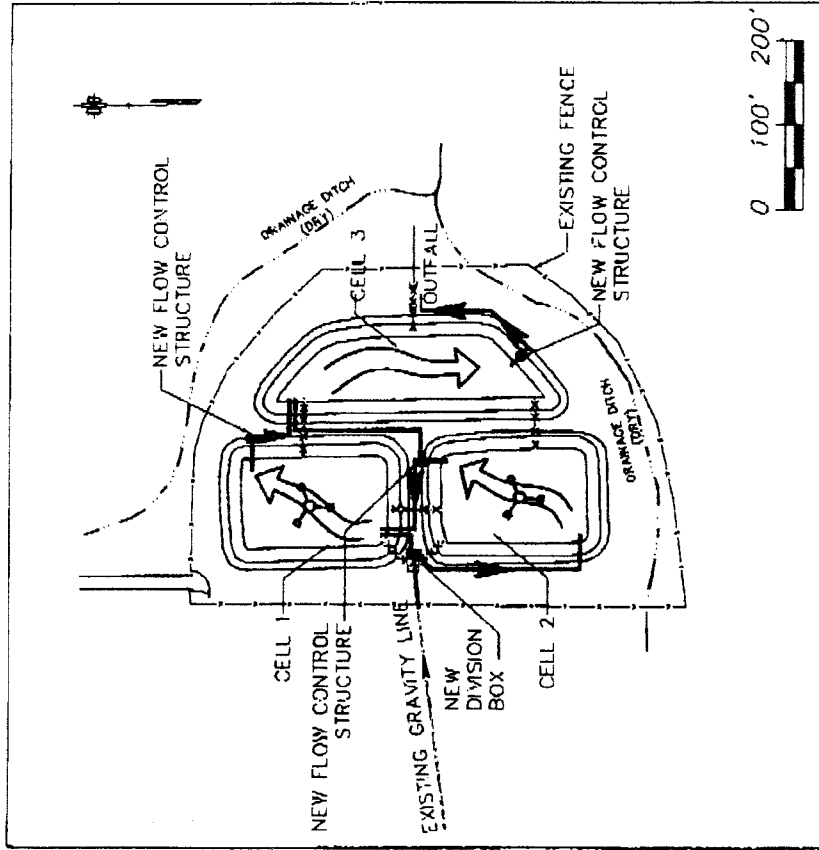
ACCEPTABLE OPTIONS EVALUATED

The following is a discussion of the two options KDHE has deemed acceptable.

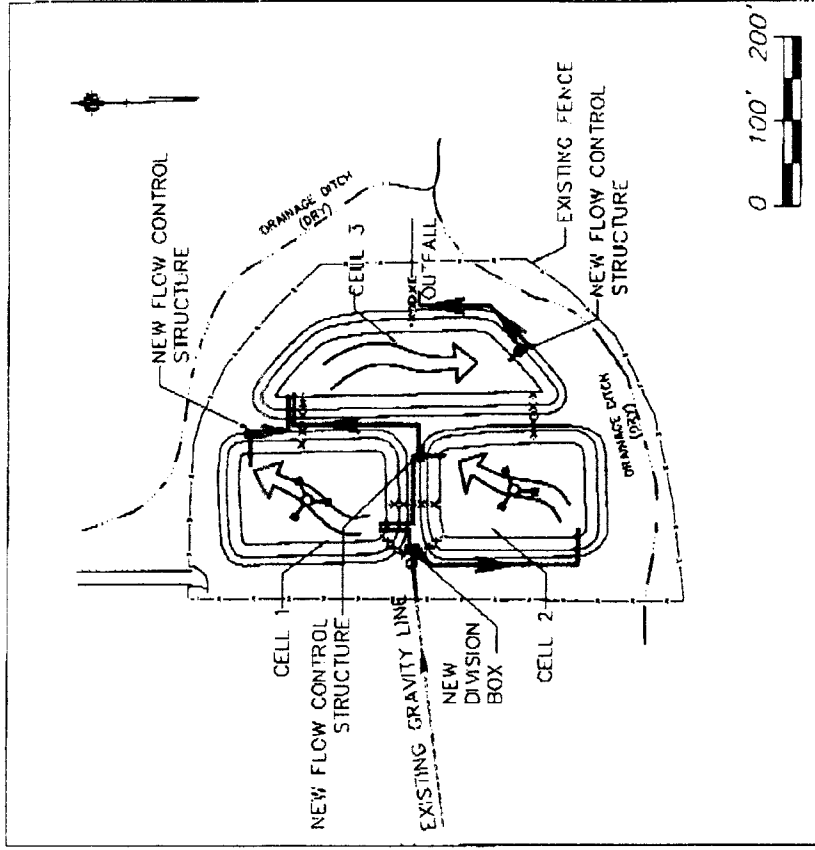
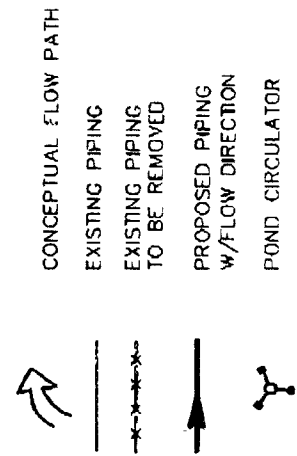
Option 3. Repipe and Rehabilitate the Existing Cells.

Any rehabilitation effort will require new piping that will allow the system to be operated in series and parallel in a way that minimizes short circuiting. A proposed piping layout is provided for this alternative as Figure 2. This alternative would not alter the capacity of the existing system but would repair the wet side berm slopes and provide either rip-rap or concrete aprons for slope protection. Option 3 with rip-rap is referred to as Option 3A and with concrete is referred to as Option 3B. Other required work includes removing accumulated sludge from cell 3, providing new piping, new level and flow control structures, fencing, and repairing the access road and associated drainage for all weather access.

This alternative would likely allow the city to meet the short term goal of consistently meeting permit limitations, but does have a risk that NPDES Permit limitations would still not be met, because the cells would remain the same, only the piping configuration would change. If the city realizes an increase in population of more than a few percent or the average BOD loading increases, it is possible that the system



SERIES OPERATION



PARALLEL OPERATION

FIGURE 2. PROPOSED IMPROVEMENTS
OPTION 3
LEHIGH, KANSAS

would again be out of compliance before the end of the 20 year design period, and an expansion of the WWTF would be required. It must also be considered that the improvements, if properly constructed, will likely last 40 or more years, with the circulators needing replacement in 20 years.

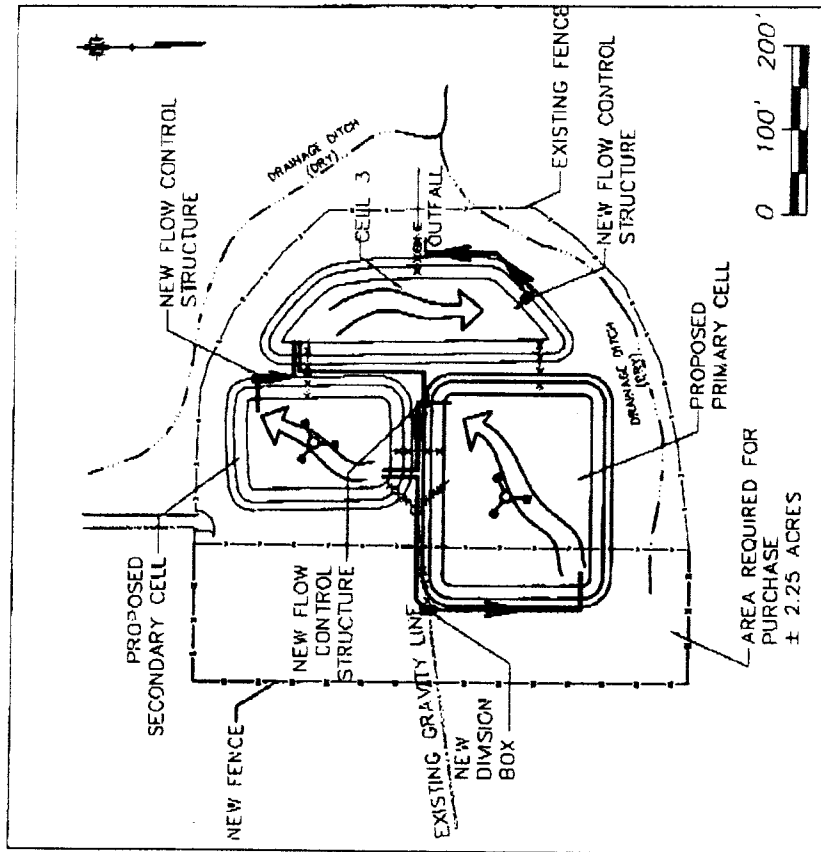
Option 4. Repipe and Rehabilitate Cells 1 and 3, expand Cell 2

Option 4 is similar in all respects to Option 3 above except that it enlarges cell 2 from approximately 0.6 acres to approximately 1.2 acres, as shown on Figure 3. (Alternatively, cell 1 could be enlarged instead). This cell would be used as the primary cell in series operation. This would be done in such a manner that the other cell could also be expanded to a similar size in the future, if population increase requires, with minimal piping changes. With a combined surface area of 1.8 acres between cells 1 and 2, a future population of about 270 people by design year 20 (calendar year 2025) would be expected to be adequately serviced. If future growth exceeds approximately 270 people, both cells 1 and 2 could be enlarged to 1.2 acres each. This facility would then have the potential to serve as many as 390 people, depending upon the actual loading conditions. Other required work includes removing accumulated sludge from cell 3, providing new piping, new level and flow control structures, fencing, and repairing the access road and associated drainage for all weather access.

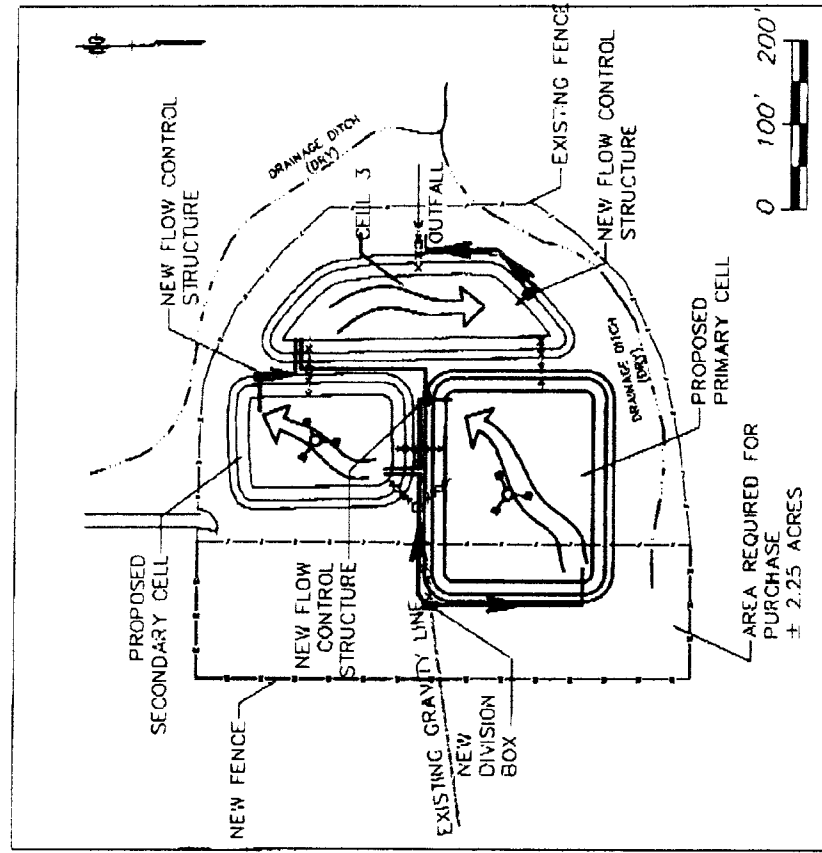
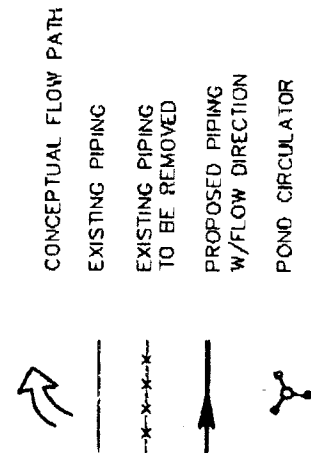
This option also includes provisions for either rip-rap or concrete slope protection and are referred to as Option 4A and Option 4B, respectively. Additional property would need to be procured to implement this option.

Site Grading, Drainage, and All weather Access Road

Figure 4 shows a conceptual view of how the grading must be repaired in order to construct an all weather road. The configuration of the drainage will not change, but because of siltation from the adjacent farm fields, due to no erosion control, the existing drainage culverts have silted in causing the area west of the access road to pond and overtop the erode the access road during periods of wet weather. This area is normally dry and is currently farmed. By raising the road bed, installing new drainage culverts and grassed waterways, the access and drainage will be improved. This will be included in the selected Option 4.

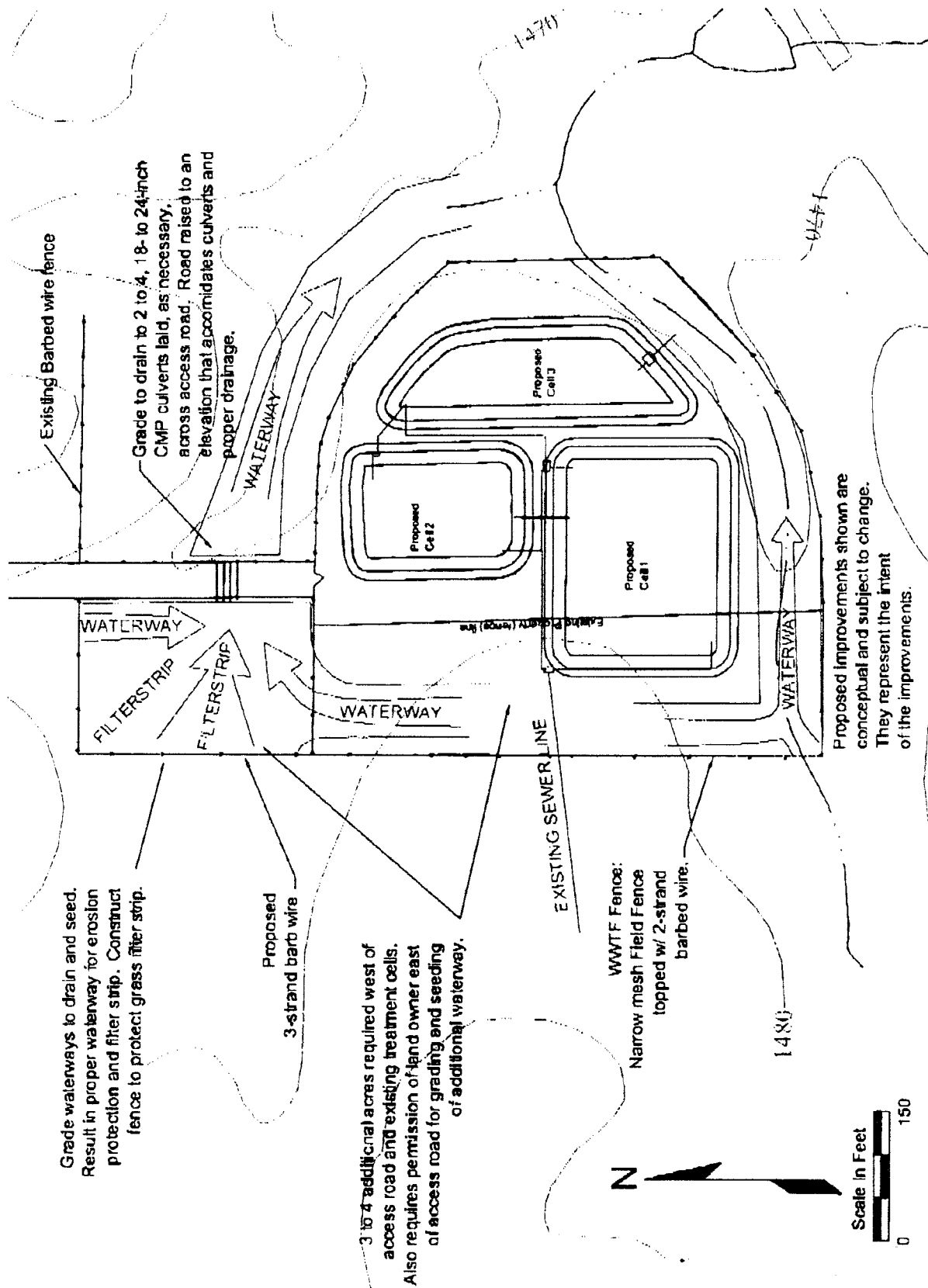


SERIES OPERATION



PARALLEL OPERATION

FIGURE 3. PROPOSED IMPROVEMENTS
OPTION 4
LEHIGH, KANSAS



Grade waterways to drain and seed. Result in proper waterway for erosion protection and filter strip. Construct fence to protect grass filter strip.

Proposed 3-strand barb wire

3 to 4 additional acres required west of access road and existing treatment cells. Also requires permission of land owner east of access road for grading and seeding of additional waterway.

WWTF Fence:
Narrow mesh Field Fence
topped w/ 2-strand
barbed wire.

Proposed improvements shown are conceptual and subject to change. They represent the intent of the improvements.

Scale in Feet
0 150

SANITARY SEWER COLLECTION SYSTEM

Rehabilitation of segments of the sanitary sewer collection system will be included with either of the wastewater treatment improvement options. The city has been trying to get this work completed for a longer period than the wastewater treatment improvements but have not been able to procure the funding assistance.

Wastewater is collected by a gravity sewer system and conveyed to the treatment facility via gravity. *The collection system was constructed in 1968, at the same time as the treatment facility.* The sewer lines were constructed 8-inch diameter vitrified clay pipe (VCP) in 5 foot sections, except at the railroad crossings where cast iron pipe was used. It consists of approximately 16,255 feet of sewer pipe and 45 manholes. Approximately 4,800 lf of sewer pipe has been specifically identified as requiring lining or replacement during cleaning and maintenance operations. The city needs to line these portions, completing point repairs before lining where failing pipe would impede the lining process. If the bids come in favorably the city desires to utilize any remaining funds to expand video tape inspect and rehabilitate additional sewer lines.

The city continues to complete repairs to the system when lines fail, collapse, or become plugged on and on-going basis.

In December 2000 the city had the entire system cleaned and 998 feet was video inspected because of blockages that would not allow the sewer cleaning machine to pass through the pipe. This cost the City \$7,640. The proposed areas for sewer lining are based on the recommendations of this sewer lining cleaning report. These are the only sections of sewer pipe the city has been able to afford video tape inspection, but more work is needed.

In 2001 and again in 2006 the city made an unsuccessful application to the Community Development Block Grant (CDBG) program to obtain a grant to assist in the funding of the sanitary sewer rehabilitation project. Since that unsuccessful attempt the collection system has degraded further. On an on-going basis the city continues to complete repairs to the system when lines fail, collapse, or become plugged, but point repairs on failed sections are not as cost effective in the long run as a general rehabilitation project. The pursuit of the collection system rehabilitation project was suspended once KDHE required the city to address the problems at the wastewater treatment facility, but are still very necessary. The city has included this work in this project in order to implement greatly needed improvements to their infrastructure.

PROJECT COSTS

A summary of the project costs for the selected Option is provided on Table 1. These costs have been adjusted for a slightly expanded scope. This option is the acceptable to KDHE and will provide the greatest opportunity for successfully meeting the project goals as well as increase the ability of city personnel to perform operation and maintenance. It includes the sewer line rehabilitation portion of the project.

OPINION OF PROBABLE COSTS
WWTF IMPROVEMENTS - LEHIGH, KANSAS
May 2007

Scope of Work: The following is our Opinion of Probable Costs to rehabilitate and expand the existing discharging wastewater treatment facility. Includes sludge removal from cell 3, repiping all cells and new flow control structures, expanding one primary cell, compacted clay liner with bentonite amendment. Rip-rap repair assumes new rip rap all sides of expanded cell and 50% repair on existing cells 2 and 3. Grading to correct drainage problems from siltation from farm field (no terraces). Also includes the rehabilitation of approximately 4,800 LF of existing sanitary sewer lines.

ITEM NO.	DESCRIPTION	QUAN.	UNIT	UNIT PRICE	EXTENSION
Treatment Cell Rehabilitation					
1	Sludge Removal Cell 3 (Assume +/- 1 feet sludge)	370,000	Gal.	\$0.10	\$37,000
2	Dewater and Dry Existing Primary Cell	1	LS	\$5,000.00	\$5,000
3	Excavation	2,500	CY	\$3.75	\$9,375
4	Compacted Embankment	2,300	CY	\$3.00	\$6,900
5	Compacted Clay Liner (Assume entire bottom new cell 1)	2,170	CY	\$3.50	\$7,595
6	Bentonite Sealing (4 lbs/sf)	80	TN	\$200.00	\$16,000
7	Repair Wet Slope (Scarify, smooth and compact 6")	950	CY	\$5.00	\$4,750
8	Slope Protection, Rock Rip-Rap*				
8A	All Expanded Cell 1	2,620	SY	\$25.00	\$65,500
8B	25% Repair Cells 2 and 3	1,100	SY	\$25.00	\$27,500
9	Division Box w/ Weirs	1	EA	\$17,000.00	\$17,000
10	Flow Control Boxes w/ Weirs	3	EA	\$15,000.00	\$45,000
11	Concrete Outfall Structure	1	EA	\$10,000.00	\$10,000
12	8" Ductile Iron Pipe & Fittings	550	LF	\$65.00	\$35,750
13	8" PVC Pipe & Fittings	825	LF	\$25.00	\$20,625
14	Cleanouts	10	EA	\$900.00	\$9,000
15	Abandonment of Existing Structures (Include piping removal)	6	EA	\$750.00	\$4,500
16	Site Grading**	1	LS	\$35,000.00	\$35,000
17	Fencing	2,800	LF	\$8.00	\$22,400
18	Access Road (Light Type Surfacing, 900 ft x 12 ft)	1,200	SY	\$12.00	\$14,400
19	Seeding	10	AC	\$1,200.00	\$12,000

Subtotal Estimated Construction Cost: \$405,295

**OPINION OF PROBABLE COSTS
WWTF IMPROVEMENTS - LEHIGH, KANSAS
March 2007 (Continued)**

ITEM NO.	DESCRIPTION	QUAN.	UNIT	UNIT PRICE	EXTENSION
Sewer Line Rehabilitation					
20	Cured In Place Pipe Lining - Collection System	3,000	LF	\$32.00	\$96,000
21	Point Repair / Replacement	1,800	LF	\$50.00	\$90,000
Subtotal Estimated Construction Cost:					\$186,000
Opinion of Construction Cost:					\$591,295
Other Costs					
	Property and Easement Survey (NTE Maximum)				\$8,000
	Geotechnical Investigation Driller Lab Testing				\$5,000
	Geotechnical Investigation, Engineering Costs				\$1,500
	Floodplain Evaluation				\$3,250
	Design Engineering				\$59,200
	Bidding Services				\$3,000
	KWPCRF Administration				\$5,800
	KWPCRF Application				\$3,000
	KWPCRF Associated Services (NTE Maximum)				\$12,500
	Construction Engineering (NTE for <= 5 months)				\$8,750
	Construction Observation (NTE for <= 5 months)				\$75,000
	Construction Staking				\$15,000
	O & M Manual				\$2,500
	CDBG Grant Administration				\$15,800
	Legal (Land acquisition, easements, etc.)				\$2,500
	Site and Easements Est. (Assume 5 ac. at \$1,500 per acre)				\$7,500
Opinion of Total Capital Cost:					\$819,600

* Assumes all enlarged Cell 1 w/ new rip rap toe to top and 1/2 area existing cells 2 and 3 need rip-rap repair.

** Extent of site grading not yet established. Dependant upon purchase agreement for land and easements.

EVANS, BIERLY, HUTCHISON & ASSOCIATES, P.A.
E. James Kohman, P.E.

FINANCING

The following table provides the estimated cost of financing the project. Currently the interest rates from KWPCRF are less than 3%, but 3% was used as an estimate. Since the City does not have a full time operator and operations are more or less conducted on a voluntary basis by trained city resident, the actual cost of O&M at the WWTF will be on the order of \$2 or \$3 per customer. The costs associated with collection system line repairs should decrease dramatically with the rehabilitation of the selected sewer lines, but repairs will still be required unless the entire system is rehabilitated. Total system rehabilitation is beyond the ability of the City to pay at this time.

TABLE 2. Financing of Option 4

Grant Amount	\$384,800
Local Cash	\$50,000
Loan Amnt	\$384,800
Payment	(\$12,862.75)
Est. Loan Rate (APR)	0.0300
Term (years)	20
No. Payments (Semi Annual)	40
No. Sewer Connections	90
Addl Cost per Bill	(\$23.82)