

KAW VALLEY ENGINEERING, INC.

ENGINEERING • PLANNING • SURVEYING • INSPECTION • TESTING

JUNCTION CITY, KANSAS 66441 • 2319 N Jackson, P O Box 1304 • TEL: (913) 762-5040 FAX: (913) 762-7744

July 29, 1994
94-1598

**DRAINAGE STUDY
I-135 POWER CENTER
INTERSTATE 135 & HYDRAULIC AVENUE
WICHITA, KANSAS**

The proposed site is a 38.5 acre tract of undeveloped land. The site is presently covered with grass, brush and some trees. At this time these are the only 2 developments planned for the subdivision. A manufacturing facility is planned for Lot 1 and a fast food restaurant is proposed for Lot 5.

The present drainage pattern is to the southeast intercepting the drainage along Interstate 135. This ditch then drains to a 42" CMP under I-135 with an ultimate destination of the Arkansas River. The original drainage pattern has been altered with the construction of a ditch in the eastern portion of the site. This ditch prohibits low level run-off from entering the 42" CMP and instead channels it northeast to an existing lake. Run-off ponding above elevation 87, presently flows through the existing 42" CMP.

This drainage study will be split into 2 parts. The first part being what affect the initial development of Lots 1 and 5 has on the storm water run-off and the second part being what affect the ultimate development of the entire site has on the run-off.

Several assumptions were made in regards to this study.

1. The man made drainage ditch changed the original drainage pattern for water supply storage and therefore is ignored.
2. The entire site drains to the 42" CMP under I-135.
3. The detention pond will outlet to a structure under I-135.

INITIAL DEVELOPMENT

Initially there are plans for construction of a 25,000 square foot manufacturing facility on Lot 1 as well as a fast food restaurant on Lot 5.

As per the "Interim Drainage and Storm Sewer Policy for Design Criteria and Documentation for the City of Wichita" the run-off from the site was analyzed by SCS TR 55 methods, to provide quick estimates of a probable size of detention ponds. The results of these calculations are summarized below for the 5 and 100 year storm.

	5 Year Storm	100 Year Storm
Predeveloped Run-Off	5 cfs	13 cfs
Developed Run-Off	37 cfs	71 cfs
Detention Required	1.4 Ac Ft	2.4 Ac Ft

The above results only reflect the run-off from the manufacturing facility. In conjunction with development of this facility a small detention pond would be constructed with the outlet being to the existing drainage ditch across the east portion of the site.

Due to the much smaller area involved, the run-off from Lot 5 will be allowed to run off undetained to the northeast as it presently does. The Lot 5 run-off is summarized below.

	5 Year Storm	100 Year Storm
Predeveloped	2 cfs	6 cfs
Developed	6 cfs	12 cfs

ULTIMATE DEVELOPMENT

Some additional assumptions needed to be made in order to predict the ultimate increase in run-off.

1. Lot 2 will be developed with 75% of it being impervious.
2. Lots 3 and 4 will be developed with 90% being impervious.

Again, using SCS TR 55 methods, the run-off from the entire site, as well as an estimate of required detention storage was calculated. The run-off and estimated detention volumes are summarized below.

	5 Year Storm	100 Year Storm
Predeveloped Run-Off	22 cfs	57 cfs
Developed Run-Off	162 cfs	308 cfs
Detention Required	6.1 Ac Ft	10.5 Ac Ft

The detention pond would be constructed in the northeast corner of the site. In order to handle the 100 year outflow a pipe would need to be bored underneath I-135. The principle outlet from the pond, as well as the overflow, would be channeled through the new structure to the Arkansas River. Depending on the developed storm drainage system and required flow line elevations, the principle outlet may require the installation of a lift station.

SUMMARY

The size of the detention ponds are only estimates at this time. As the development plans are finalized a more accurate picture of the run-off and detention requirements will be calculated. However, what we have presented in this report is worst case scenario.

We would be pleased to respond to any questions, comments, or requests for additional information.



Samuel D Malinowsky, P E
Project Engineer

SDM/dh

>>>> DETENTION STORAGE ESTIMATE <<<<<

I 135 Power Center, Wichita
 Developed Conditions
 Entire Site

CALCULATED
 DISK FILE: 598-SITE.DET

Drainage Area (acres) 29.5 0.0461 sq.mi.
 Rainfall Distribution (Type) II

	Storm #1	Storm #2	Storm #3
Frequency (years)	5	25	100
Peak Inflow, qi (cfs)	124	180	236
Inflow Runoff, Q (in)	3.68	5.33	7
Peak Outflow, qo (cfs)	17	29	43
qo/qi Ratio	0.137	0.161	0.182
* Vs/Vr Ratio	0.515	0.491	0.471
Inflow Volume, Vr (ac-ft)	9.0	13.1	17.2
STORAGE VOLUME, Vs (ac-ft)	4.7	6.4	8.1

Summary of Volume Computations

C0	0.682	0.682	0.682
C1	-1.430	-1.430	-1.430
C2	1.640	1.640	1.640
C3	-0.804	-0.804	-0.804
* Vs/Vr	0.515	0.491	0.471

$$* \text{ Vs/Vr} = C_0 + (C_1 * (q_o/q_i)) + (C_2 * (q_o/q_i)^2) + (C_3 * (q_o/q_i)^3)$$

Graphical Peak Discharge File Used for Inflow Data:
 598-POST.GPD
 Graphical Peak Discharge File Used for Outflow Data:
 598-PRE .GPD

>>>> DETENTION STORAGE ESTIMATE <<<<<

I 135 Power Center, Wichita
 Developed Conditions
 Soap Factory Only

CALCULATED
 DISK FILE: 598-SOAP.DET

Drainage Area (acres) 8.84 0.0138 sq.mi.
 Rainfall Distribution (Type) II

	Storm #1	Storm #2	Storm #3
Frequency (years)	5	25	100
Peak Inflow, qi (cfs)	37	54	71
Inflow Runoff, Q (in)	3.68	5.33	7
Peak Outflow, qo (cfs)	5	9	13
qo/qi Ratio	0.135	0.167	0.183
* Vs/Vr Ratio	0.517	0.485	0.470
Inflow Volume, Vr (ac-ft)	2.7	3.9	5.2
STORAGE VOLUME, Vs (ac-ft)	1.4	1.9	2.4

Summary of Volume Computations

C0	0.682	0.682	0.682
C1	-1.430	-1.430	-1.430
C2	1.640	1.640	1.640
C3	-0.804	-0.804	-0.804
* Vs/Vr	0.517	0.485	0.470

$$* \text{ Vs/Vr} = C0 + (C1*(qo/qi)) + (C2*(qo/qi)^2) + (C3*(qo/qi)^3)$$

Graphical Peak Discharge File Used for Inflow Data:
 598SP-PO.GPD
 Graphical Peak Discharge File Used for Outflow Data:
 598SP-PR.GPD

Quick TR-55 Version: 5.46 S/N:

>>>> GRAPHICAL PEAK DISCHARGE METHOD <<<<

I 135 Power Center, Wichita
Predeveloped Conditions
Entire Site

CALCULATED
DISK FILE: 598-PRE .GPD

Drainage Area	(acres)	38.5	---	0.0602 sq.mi.
Runoff Curve Number	(CN)	70		
Time of Concentration, Tc	(hrs)	2.3		
Rainfall Distribution	(Type)	II		
Pond and Swamp Areas	(%)	0	---	0.0 acres

	Storm #1	Storm #2	Storm #3
	-----	-----	-----
Frequency (years)	5	25	100
Rainfall, P, 24-hr (in)	4.8	6.5	8.2
Initial Abstraction, Ia (in)	0.857	0.857	0.857
Ia/p Ratio	0.179	0.132	0.105
Unit Discharge, * qu (csm/in)	190	198	203
Runoff, Q (in)	1.89	3.21	4.64
Pond & Swamp Adjustment Factor	1.00	1.00	1.00
PEAK DISCHARGE, qp (cfs)	22	38	57

Summary of Computations for qu

Ia/p #1	0.100	0.100	0.100
C0 #1	2.553	2.553	2.553
C1 #1	-0.615	-0.615	-0.615
C2 #1	-0.164	-0.164	-0.164
qu (csm) #1	203.827	203.827	203.827
Ia/p #2	0.300	0.300	0.300
C0 #2	2.465	2.465	2.465
C1 #2	-0.623	-0.623	-0.623
C2 #2	-0.117	-0.117	-0.117
qu (csm) #2	167.829	167.829	167.829
* qu (csm)	190	198	203

* Interpolated for computed Ia/p ratio (between Ia/p #1 & Ia/p #2)
If computed Ia/p exceeds Ia/p limits, bounding limit for Ia/p is used.

$$\log(qu) = C0 + (C1 * \log(Tc)) + (C2 * (\log(Tc))^2)$$

$$qp \text{ (cfs)} = qu(\text{csm}) * \text{Area}(\text{sq.mi.}) * Q(\text{in.}) * (\text{Pond \& Swamp Adj.})$$

Quick TR-55 Version: 5.46 S/N:

>>>> GRAPHICAL PEAK DISCHARGE METHOD <<<<<

I 135 Power Center, Wichita
 Developed Conditions
 Entire Site

CALCULATED
 DISK FILE: 598-POST.GPD

Drainage Area	(acres)	38.5	---	0.0602 sq.mi.
Runoff Curve Number	(CN)	90		
Time of Concentration, Tc	(hrs)	.25		
Rainfall Distribution	(Type)	II		
Pond and Swamp Areas	(%)	0	---	0.0 acres

	Storm #1	Storm #2	Storm #3
	-----	-----	-----
Frequency (years)	5	25	100
Rainfall, P, 24-hr (in)	4.8	6.5	8.2
Initial Abstraction, Ia (in)	0.222	0.222	0.222
Ia/p Ratio	0.046	0.034	0.027
Unit Discharge, * qu (csm/in)	731	731	731
Runoff, Q (in)	3.68	5.33	7.00
Pond & Swamp Adjustment Factor	1.00	1.00	1.00
PEAK DISCHARGE, qp (cfs)	162	235	308

Summary of Computations for qu

Ia/p #1	0.100	0.100	0.100
C0 #1	2.553	2.553	2.553
C1 #1	-0.615	-0.615	-0.615
C2 #1	-0.164	-0.164	-0.164
qu (csm) #1	731.328	731.328	731.328
Ia/p #2	0.100	0.100	0.100
C0 #2	2.553	2.553	2.553
C1 #2	-0.615	-0.615	-0.615
C2 #2	-0.164	-0.164	-0.164
qu (csm) #2	731.328	731.328	731.328
* qu (csm)	731	731	731

* Interpolated for computed Ia/p ratio (between Ia/p #1 & Ia/p #2)
 If computed Ia/p exceeds Ia/p limits, bounding limit for Ia/p is used.

$$\log(\text{qu}) = \text{C0} + (\text{C1} * \log(\text{Tc})) + (\text{C2} * (\log(\text{Tc}))^2)$$

$$\text{qp (cfs)} = \text{qu(csm)} * \text{Area(sq.mi.)} * \text{Q(in.)} * (\text{Pond \& Swamp Adj.})$$

Quick TR-55 Version: 5.46 S/N:

>>>> GRAPHICAL PEAK DISCHARGE METHOD <<<<<

I 135 Power Center, Wichita
Predeveloped Conditions
Soap Factory Only

CALCULATED
DISK FILE: 598SP-PR.GPD

Drainage Area (acres) 8.84 ---> 0.0138 sq.mi.
Runoff Curve Number (CN) 70
Time of Concentration, Tc (hrs) 2.3
Rainfall Distribution (Type) II
Pond and Swamp Areas (%) 0 ---> 0.0 acres

	Storm #1	Storm #2	Storm #3
	-----	-----	-----
Frequency (years)	5	25	100
Rainfall, P, 24-hr (in)	4.8	6.5	8.2
Initial Abstraction, Ia (in)	0.857	0.857	0.857
Ia/p Ratio	0.179	0.132	0.105
Unit Discharge, * qu (csm/in)	190	198	203
Runoff, Q (in)	1.89	3.21	4.64
Pond & Swamp Adjustment Factor	1.00	1.00	1.00
PEAK DISCHARGE, qp (cfs)	5	9	13

Summary of Computations for qu

Ia/p #1	0.100	0.100	0.100
C0 #1	2.553	2.553	2.553
C1 #1	-0.615	-0.615	-0.615
C2 #1	-0.164	-0.164	-0.164
qu (csm) #1	203.827	203.827	203.827
Ia/p #2	0.300	0.300	0.300
C0 #2	2.465	2.465	2.465
C1 #2	-0.623	-0.623	-0.623
C2 #2	-0.117	-0.117	-0.117
qu (csm) #2	167.829	167.829	167.829
* qu (csm)	190	198	203

* Interpolated for computed Ia/p ratio (between Ia/p #1 & Ia/p #2)
If computed Ia/p exceeds Ia/p limits, bounding limit for Ia/p is used.

$$\log(\text{qu}) = \text{C0} + (\text{C1} * \log(\text{Tc})) + (\text{C2} * (\log(\text{Tc}))^2)$$
$$\text{qp (cfs)} = \text{qu(csm)} * \text{Area(sq.mi.)} * \text{Q(in.)} * (\text{Pond \& Swamp Adj.})$$

Quick TR-55 Version: 5.46 S/N:

>>>> GRAPHICAL PEAK DISCHARGE METHOD <<<<<

I 135 Power Center, Wichita
Developed Conditions
Soap Factory Only

CALCULATED
DISK FILE: 598SP-PO.GPD

Drainage Area	(acres)	8.84	---	0.0138 sq.mi.
Runoff Curve Number	(CN)	90		
Time of Concentration, Tc	(hrs)	.25		
Rainfall Distribution	(Type)	II		
Pond and Swamp Areas	(%)	0	---	0.0 acres

	Storm #1	Storm #2	Storm #3
	-----	-----	-----
Frequency (years)	5	25	100
Rainfall, P, 24-hr (in)	4.8	6.5	8.2
Initial Abstraction, Ia (in)	0.222	0.222	0.222
Ia/p Ratio	0.046	0.034	0.027
Unit Discharge, * qu (csm/in)	731	731	731
Runoff, Q (in)	3.68	5.33	7.00
Pond & Swamp Adjustment Factor	1.00	1.00	1.00
PEAK DISCHARGE, qp (cfs)	37	54	71

Summary of Computations for qu

Ia/p #1	0.100	0.100	0.100
C0 #1	2.553	2.553	2.553
C1 #1	-0.615	-0.615	-0.615
C2 #1	-0.164	-0.164	-0.164
qu (csm) #1	731.328	731.328	731.328
Ia/p #2	0.100	0.100	0.100
C0 #2	2.553	2.553	2.553
C1 #2	-0.615	-0.615	-0.615
C2 #2	-0.164	-0.164	-0.164
qu (csm) #2	731.328	731.328	731.328
* qu (csm)	731	731	731

* Interpolated for computed Ia/p ratio (between Ia/p #1 & Ia/p #2)
If computed Ia/p exceeds Ia/p limits, bounding limit for Ia/p is used.

2

$$\log(\text{qu}) = \text{C0} + (\text{C1} * \log(\text{Tc})) + (\text{C2} * (\log(\text{Tc}))^2)$$

$$\text{qp (cfs)} = \text{qu(csm)} * \text{Area(sq.mi.)} * \text{Q(in.)} * (\text{Pond \& Swamp Adj.})$$

**PETITION
STORM WATER SEWER**

To the Mayor and City Council
Wichita, Kansas

Dear Council Members

1. We, the undersigned owners of record as below designated, of Lots, Parcels, and Tracts of real property described as follows:

~~I-135 Power Center, City of Wichita, Sedgwick County, Kansas~~

I-135 Power Center Add_g

Lots 1 thru 5 incl.

do hereby petition, pursuant to the provisions of K S A 1980 Supp 12-6a01 et seq, as follows:

- a. That there be constructed a storm water sewer to serve the area described above, according to plans and specifications to be furnished to the City Engineer of the City of Wichita, Kansas.
- b. That the estimated and probable cost of the foregoing improvements being \$235,240.00 with 100% payable by the improvement district. Said estimated cost as above set forth is hereby increased at the pro-rata rate of 1 percent per month from and after August 1, 1994.
- c. That the land or area above described be constituted as an improvement district against which shall be assessed 100 percent of the total actual cost of the improvement for which the improvement district is liable.
- d. That the method of assessment of all costs of the improvement for which the improvement district shall be liable shall be on a basis per lot.

Lot 1 pays $\frac{50}{100}$ lot 2 pays fractional basis =

Where the ownership of a single lot is or may be divided into two or more parcels, the assessment to the lot so divided shall be assessed to each ownership or parcel on a square foot basis.

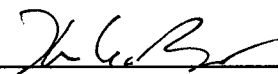
- e. Signatures on this petition are made with full knowledge and understanding that said signatures constitute a waiver of any assistance available through the Special Assessment Deferral Program.
- 2. It is requested that the improvements hereby petitioned be made without notice and hearing, which but for this request, would be required by K S A 12-6a04.
- 3. That names may not be withdrawn from this petition by the signers thereof after the Governing Body commences consideration of the petition or later than seven (7) days after filing, whichever comes first.
- 4. That when this petition has been filed with the City Clerk and it has been certified that the signatures thereon are according to the records of the Register of Deeds of Sedgwick County, Kansas, the petition may be found sufficient if signed by either (1) a majority of the resident owners of record of property liable for assessment under the proposal, or (2) the resident owners of record of more than one-half of the area liable for assessment under the proposal, or (3) the owners of record (whether resident or not) of more than one-half of the area liable for assessment under the proposal. The Governing Body is requested to proceed in the manner provided by statute to the end that the petitioned improvements may be expeditiously completed and placed in use.

WITNESS our signatures attached with respect to each of which is indicated the property owned and the date of signing.

AN ABTRACTOR'S CERTIFICATE OF OWNERSHIP MUST ACCOMPANY THIS PETITION

LEGAL DESCRIPTION	SIGNATURE	DATE
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I-135 Power Center, City of Wichita,
Sedgwick County, Kansas

	 Thomas W. Boyd President, K.C.B.B. Inc.	Date <u>9/29/1994</u>
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Engineer's Estimate
Wichita, Kansas

No. Item	Estimated Quantity	Unit	Unit Cost	Extension
1. RCP (48") Bored In Place	320	LF	400.00	128,000.00
2. End Section (48")	2	EA	800.00	1,600.00
3. RCP (24")	50	LF	30.00	1,500.00
4. End Section (24")	2	EA	320.00	640.00
5. Concrete Weir	300	LF	15.00	4,500.00
6. Rip Rap	1	LS	2,000.00	2,000.00
7. Excavation For Detention Pond	17000	CY	1.00	17,000.00
8. Lift Station	1	LS	80,000.00	80,000.00

TOTAL ESTIMATE STORM SEWER

\$235,240.00

+25% *58,810⁰⁰*

294,050

Use \$295,000

**PETITION
SANITARY SEWER LATERAL**

To the Mayor and City Council
Wichita, Kansas

Dear Council Members

1. We, the undersigned owners of record as below designated, of Lots, Parcels, and Tracts of real property described as follows:

I-135 Power Center, City of Wichita, Sedgwick County, Kansas

do hereby petition, pursuant to the provisions of K S A 1980 Supp 12-6a01 et seq, as follows:

- a. That there be constructed a sanitary sewer lateral to serve the area described above, according to plans and specifications to be furnished to the City Engineer of the City of Wichita, Kansas.
- b. That the estimated and probably cost of the foregoing improvements being \$58,250.00 with 100% payable by the improvement district. Said estimated cost as above set forth is hereby increased at the pro-rata rate of 1 percent per month from and after August 1, 1994.
- c. That the land or area above described be constituted as an improvement district against which shall be assessed 100 percent of the total actual cost of the improvement for which the improvement district is liable.
- d. That the method of assessment of all costs of the improvement for which the improvement district shall be liable shall be on a basis per lot. ?

Where the ownership of a single lot is or may be divided into two or more parcels, the assessment to the lot so divided shall be assessed to each ownership or parcel on a square foot basis.

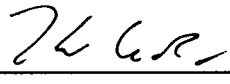
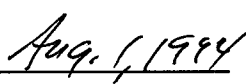
- e. Signatures on this petition are made with full knowledge and understanding that said signatures constitute a waiver of any assistance available through the Special Assessment Deferral Program.
- 2. It is requested that the improvements hereby petitioned be made without notice and hearing, which but for this request, would be required by K S A 12-6a04.
- 3. That names may not be withdrawn from this petition by the signers thereof after the Governing Body commences consideration of the petition or later than seven (7) days after filing, whichever comes first.
- 4. That when this petition has been filed with the City Clerk and it has been certified that the signatures thereon are according to the records of the Register of Deeds of Sedgwick County, Kansas, the petition may be found sufficient if signed by either (1) a majority of the resident owners of record of property liable for assessment under the proposal, or (2) the resident owners of record of more than one-half of the area liable for assessment under the proposal, or (3) the owners of record (whether resident or not) of more than one-half of the area liable for assessment under the proposal. The Governing Body is requested to proceed in the manner provided by statute to the end that the petitioned improvements may be expeditiously completed and placed in use.

WITNESS our signatures attached with respect to each of which is indicated the property owned and the date of signing.

AN ABTRACTOR'S CERTIFICATE OF OWNERSHIP MUST ACCOMPANY THIS PETITION

LEGAL DESCRIPTION	SIGNATURE	DATE
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I-135 Power Center, City of Wichita
Sedgwick County, Kansas

		
	Thomas W. Boyd	Date
	President, K.C.B.B. Inc	

Engineer's Estimate
Wichita, Kansas

No.	Item	Estimated Quantity	Unit	Unit Cost	Extension
1.	Sanitary Sewer (8")	1450	LF	15.00	21,750.00
2.	Sanitary Sewer FM (4")	550	LF	10.00	5,500.00
3.	Manhole	4	EA	1,500.00	6,000.00
4.	Lift Station	1	EA	25,000.00	25,000.00

TOTAL ESTIMATE SANITARY SEWER

\$58,250.00

+25% 14,562⁵⁰
72,812⁵⁰

Use 73,000

PAVING PETITION

To the Mayor and City Council
Wichita, Kansas

Dear Council Members

1. We, the undersigned owners of record as below designated, of Lots, Parcels, and Tracts of real property described as follows:

~~I-135 Power Center, City of Wichita, Sedgwick County, Kansas~~

do hereby petition, pursuant to the provisions of K S A 1980 Supp 12-6a01 et seq, as follows:

- a. That there be constructed pavement on Hydraulic Avenue.

That said pavement between aforesaid limits be constructed ^{in accordance} for a total roadway width of ~~68 (20' widening to 48' existing) feet~~, with plans and specifications to be furnished to the City Engineer. Drainage to be installed where necessary.

- b. That the estimated and probable cost of the foregoing improvements being \$108,710.00 with 100% payable by the improvement district. Said estimated cost as above set forth is hereby increased at the pro-rata rate of 1 percent per month from and after August 1, 1994.
- c. That the land or area above described as constituted as an improvement district against which shall be assessed 100 percent of the total actual cost of the improvement for which the improvement district is liable.
- d. That the method of assessment of all costs of the improvement for which the improvement district shall be liable shall be on a basis per lot.

Except when driveways are requested to serve a particular tract, lot, or parcel, the cost of said driveway shall be a direct assessment to said tract, lot, or parcel and shall be in addition to the assessment for other improvements. Where the ownership of a single lot is or may be divided into two or more parcels, the assessment to the lot so divided shall be assessed to each ownership or parcel on a square foot basis.

- e. Signatures on this petition are made with full knowledge and understanding that said signatures constitute a waiver of any assistance available through the Special Assessment Deferral Program.
- 2. It is requested that the improvements hereby petitioned by made without notice and hearing, which but for this request, would be required by K S A 12-6a01.
- 3. That names may not be withdrawn from this petition by the signers thereof after the Governing Body commences consideration of the petition or later than seven (7) days after filing, whichever comes first.
- 4. That when this petition has been filed with the City Clerk and it has been certified that the signatures thereon are according to the records of the Register of Deeds of Sedgwick County, Kansas, the petition may be found sufficient if signed by either (1) a majority of the resident owners of record of property liable for assessment under the proposal, or (2) the resident owners of record of more than one-half of the area liable for assessment under the proposal, or (3) the owners of record (whether resident or not) of more than one-half of the area liable for assessment under the proposal. The Governing Body is requested to proceed in the manner provided by statute to the end that the petitioned improvements may be expeditiously completed and placed in use.

WITNESS our signatures attached with respect to each of which is indicated the property owned and the date of signing.

AN ABTRACTOR'S CERTIFICATE OF OWNERSHIP MUST ACCOMPANY THIS PETITION

LEGAL DESCRIPTION	SIGNATURE	DATE
-------------------	-----------	------

I-135 Power Center, City of Wichita
Sedgwick County, Kansas

Lots 1 thru _____

 Thomas W. Boyd President, K.C.B.B. Inc	 Date
---	---

Engineer's Estimate
Wichita, Kansas

No.	Item	Estimated Quantity	Unit	Unit Cost	Extension
1.	PCC Pavement (9")	3620	SY	18.00	65,160.00
2.	Aggregate Base	3620	SY	3.50	12,670.00
3.	Sidewalk (4")	690	SY	18.00	12,420.00
4.	Curb & Gutter	1940	LF	8.00	15,520.00
5.	Curb & Gutter Removal	1940	LF	1.00	1,940.00
6.	Pavement Marking	1	LS	1,000.00	1,000.00

TOTAL ESTIMATE PAVEMENT WIDENING

\$108,710.00

+ 25% 27,177.50

135,887.50

Use \$136,000

KAW VALLEY ENGINEERING, INC.

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August 23, 1994
94-1598

City of Wichita
ATTN: Vicki Houg
Engineering Department
455 North Main, 7th Floor
Wichita, KS 67202

REF: I-135 Power Center Drainage Study

Dear Vicki:

Please find enclosed additional drainage information as we discussed regarding the above subdivision.

If there is anything else you need in order for the plat to go to the MAPC, please do not hesitate to call. Thank you.

Sincerely,



Samuel D. Malinowsky, P.E.
Project Engineer

SDM:kml

Enclosures

