LAWRENCE E. WELLS

Architect

254 LAURA - SUITE 205
WICHITA, KANSAS 67211
PHONE (316) 262-3649

Oct. 24, 1980

Chris J. Breitenstein
Dept. of Engineering,
City of Wichita,
455 N. Main
Wichita, Kansas 67202

Dear Mr. Breitenstein:

With this letter, We would like to resubmit the Drainage Plan for Smithmoor 1st Addition for approval. The Developer wishes to continue with final platting and due to the extended length of time spent for processing this plat; it was suggested that our office resubmit this plan for your review.

If additional copies or other information is needed, please let me know.

Sincerely,

for L. E. Wells, Architect

JF/jf

cc: Louise Olivarez, Senior Planner, City of Wichita.
American Landmark Corp., Mr. Ron Smith,
838 S. Edgemoor, Wichita, Kansas 67218.

12-3-79
#423

Smithmoor Drainage (100 yr)

Peak discharge:

Incoming from Huntcrest Channel (Point M) obtained from County Records.

Station 20+00 from Harry Outlet

M-DA = 100.4 + 65.04 = 165.44 Acres
L = 2700 + 1600 = 4300 ft
H = 30 + 12 = 42 ft
*T_c = 29 min
I_{100} = 6.95
Q_{100} = (.5)(6.95)(165.44) = 575 cfs

Smithmoor Parcel B = 35 Acres
Huntcrest 1st Addn. = 9.1 + 12.5 = 21.6
Smithmoor 1st Addn = 7.4

Station 8+00 From Harry Outlet

X-DA = 100.4 + 65.04 + 35 + 21.6 + 7.4 = 229.44 acres
L = 4300 + 1350 = 5650'
H = 42 + 6 = 48'
T_c = 38 min
I_{100} = 5.64 in/hr
Q_{100} = (.5)(5.64)(229.44) = 647.02

*T_c for Rational Method Calculations is based on Kirpich formula where $T_c = \left(\frac{11.9\,L^3}{H}\right)^{.385} \times 60$

12-3-79
#423

Smithmoor DRAINAGE (100yr) cont.

Remainder Smithmoor 1st ADDN. 30.26-7.4 = 22.9 Acres

Station 0+00

Y-DA = 229.44 + 22.9 = 252.30 Acres

L = 5650 + 950 = 6400

H = 48 + 6 = 54'

T_c = 42 min.

I_{100} = 5.22 in/hr

Q_{100} = (.5)(5.22)(252.3) = 658.5 cfs peak discharg to Harry St.

BACKWATER COMPUTATION WORK SHEET

Project: Smithmoor - Channel for combined flow of Smithmoor and Park Meadows (1215cfs) is b=50', Side slope 8:1, bottom gradient = 0.25% **Page** 1 of 1

Channel for Smithmoor (725 cfs - 655 cfs) change b to 30' **Computed by:** MSM **Date** 12-24-79

Checked by: _____ **Date** _____

Q = 0+00 - 1215 cfs; 4+00 725"; ~~7+00 685~~ 10+00 655; 5+00-705, 6+00-695, 9+00-665, 9+50-660, ~~8+00 675~~ WEIGHTED

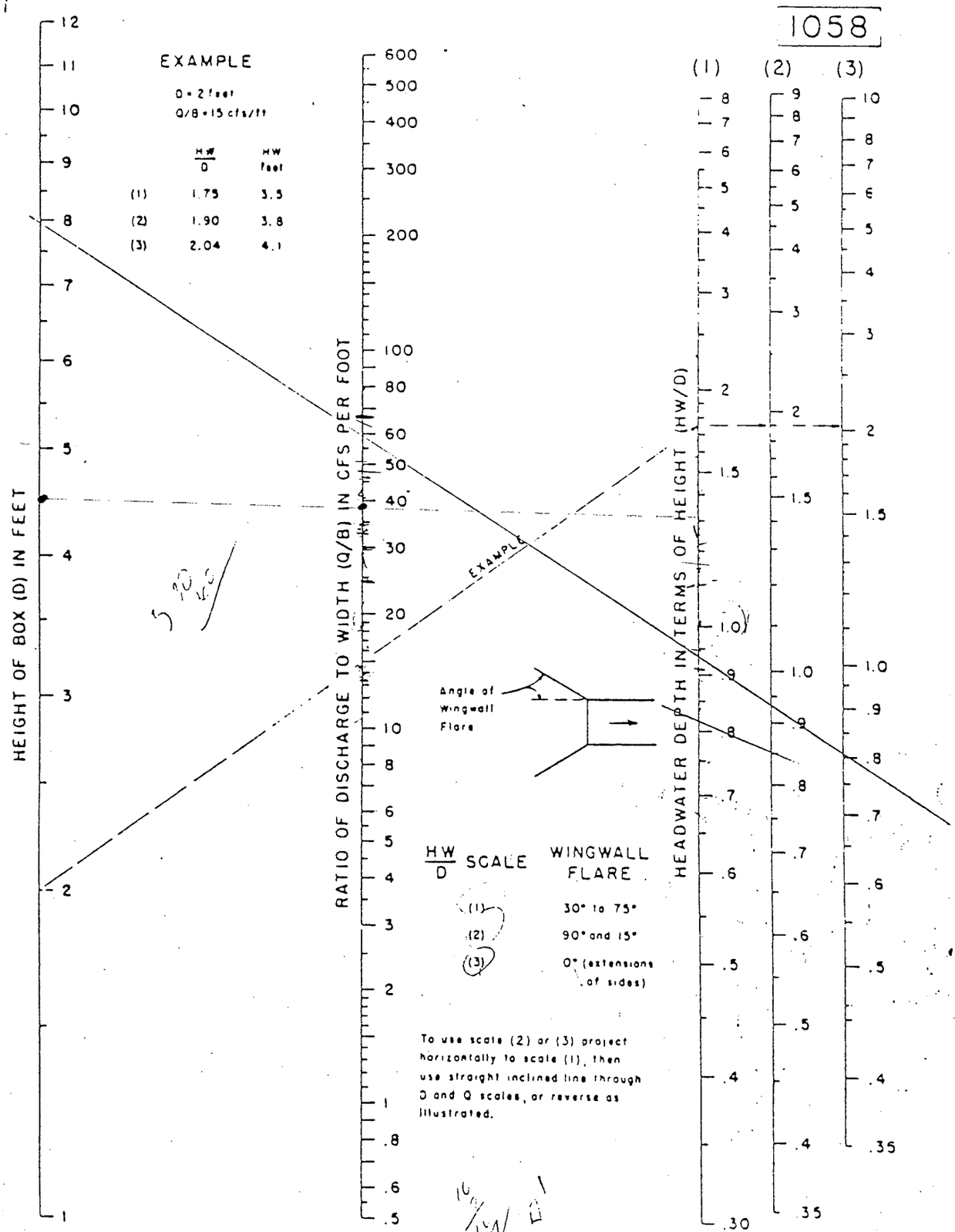
n = .035 c = .4246

Mile or Sec. No.	Reach Length	Est. W.S. Elev.	Area	2/3 r	$\frac{S1/2}{I} = \frac{0.01}{Q_1}$		S	Mean S	hf	TRUE V	TRUE Q	V^2Q	h_v	h_v Diff.	H	Comp. Elev.	
0+00	100	1335	300	1.95	0.83	248	.0024	.0024	.24	4.07	1220		0.26	0	.24	1335.0	
1+00	100	1335.3	306	1.96	.83	255	.0023	.0023	.23	3.95	1209		0.24	.02	.25	1335.25	
2+00	100	1335.5	300	1.95	.83	248	.0024	.0024	.24	4.07	1220		.26	.01	.25	1335.5	
3+00	100	1335.7	295	1.94	.82	242	.0025	.0024	.24	4.11	1213		.26	0	.24	1335.74	
Change		channel @	Confluence.		Smithmoor		channel		is 30'	bottom,	8:1	slope.	Q=	725cfs			
4+00	100	1335.9	216	1.81	0.77	166	.0019	.0022	.22	3.32	716		0.17	0.09	.31	1336.05	715cfs
5+00	100	1336.2	221	1.83	0.78	172	.0017	.0018	.18	3.20	707		0.16	0.01	.19	1336.24	705cfs
6+00	100	1336.5	225	1.84	0.78	175	.0016	.0017	.17	3.09	695		0.15	.02	.19	1336.43	695cfs
7+00	100	1336.6	212	1.8	0.76	162	.0018	.0017	.17	3.22	682		0.16	0	.17	1336.60	685cfs
8+00	100	1336.75	203	1.77	0.75	153	.0020	.0019	.19	3.31	672		.0.17	0	.19	1336.79	675cfs
9+00	100	1337.0	203	1.77	0.75	153	.0019	.0019	.19	3.26	662		.17	0	.19	1336.98	665cfs
9+50	50	1337.13	203	1.77	0.75	153	.0019	.0019	.10	3.24	657		.16	.01	.11	1337.09	660cfs
10+00	50	1337.25	203	1.77	0.75	153	.0018	.0019	.09	3.21	652		.16	0	.09	1337.18	655cfs

$V_1 = C r^{2/3} S^{1/2}$ $C = \frac{1.486}{n} \times .01$ $S = (0.01 \frac{Q}{Q_1})^2$ $V = V_1 \frac{Q}{Q_1}$ $h_v = \frac{V^2 Q}{64.4 Q}$ $H = h_v$ Diff. $+ h_f$

SWT Form 49-C
Rev 18 Dec 61

1058



MAY 1956

HEADWATER DEPTH FOR BOX CULVERTS WITH ENTRANCE CONTROL

SMITHMOOR 1-4-80

CHECK OUTLET CONTROL @ HARRY STREET CULVERTS.

FOR EXISTING DOUBLE 5x2x30 RCBC

$H.W._{ELEV.} = He + H_v + Hf + TW$ ELEVATION (1337.2 FROM PROFILE)

① ENTRANCE LOSS $He = K_e\left(\frac{V^2}{2g}\right)$ w/ K_e FOR CULVERT HEADWALL = .4

$V = Q/A = 72.5/10 = 7.25$

$He = .4\left[\frac{(7.25)^2}{64.4}\right] = .32$ feet

② VELOCITY HEAD LOSS, $H_v = \frac{V^2}{2g} = \frac{(7.25)^2}{64.4} = .82$ feet

③ FRICTION HEAD LOSS, $H_F = \frac{29\,n^2 L}{(r)^{4/3}}\left(\frac{V^2}{2g}\right) = .16$

$n = .012$ $r = \frac{5x2}{2(5x2)} = .714$

H_W ELEV. $= .32 + .82 + .16 + 1337.2 = 1338.5$

FOR PROPOSED TRIPLE 5x4.5x100 RCBC

H_W ELEV. $= He + H_v + Hf +$ TW ELEV. (1337.2 FROM PROFILE)

① $He = K_e\left(\frac{V^2}{2g}\right)$ w/ K_e FOR CULVERT HEADWALL = .4

$V = Q/A = \frac{172.5}{22.5} = 7.67$

$He = .4\left[\frac{(7.67)^2}{64.4}\right] = .36$

② $H_v = \frac{V^2}{2g} = \frac{(7.67)^2}{64.4} = .91$

③ $H_F = \frac{29\,n^2 L}{(r)^{4/3}}\left(\frac{V^2}{2g}\right) = .30$

$n = .012$ $r = \frac{5x4.5}{2(5+4.5)} = 1.18$

HW ELEV. $= .36 + .91 + .30 + 1337.2 = 1338.77$

SMITHMOOR 1-4-80

CHECK INLET CONTROL @ HARRY STREET CULVERTS.

FOR EXISTING DOUBLE 5 x 2 x 30 RCBC

ASSUME WATER SURFACE = 1339.4
FLOWLINE = 1336.0
HEADWATER DEPTH 3.4

FROM CHART 1058

$\frac{HW}{D} = \frac{3.4}{2} = 1.7$; $\frac{Q}{B} = 14.5$; $Q = 14.5 \times 5 = 72.5$ cfs

$V = \frac{72.5}{10} = 7.25$ fps

FOR DOUBLE CULVERTS $Q = 72.5 \times 2 = 145$ cfs @ 1339.4

FOR PROPOSED TRIPLE 5 x 4.5 x 100 RCBC

ASSUME WATER SURFACE = 1339.4
FLOWLINE = 1334.0
HEADWATER DEPTH = 5.4

FROM CHART 1058

$\frac{HW}{D} = \frac{5.4}{4.5} = 1.2$; $\frac{Q}{B} = 34.5$; $Q = 34.5 \times 5 = 172.5$ cfs

$V = \frac{172.5}{22.5} = 7.67$ fps

FOR TRIPLE CULVERTS $Q = 172.5 \times 3 = 517$ cfs @ 1339.4

TOTAL DISCHARGE THRU 2-5x2 + 3-5x4.5 RCBC =
145 + 517 = 662

BACKWATER COMPUTATION WORK SHEET

423

Project: SMITHMOOR ADDN - CHANNEL FOR SMITHMOOR/HUNTCREST BASIN Page _____ _____

655 cfs b=14 side slope 4:1 gradient .3% Computed by: _____ Date _____

STRUCTURE UNDER: EXISTING Double 5x2 + Proposed triple 5x4.5 Checked by: _____ Date _____

0+00 to 4+00 = 655 cfs .035 .4246
5+00 to 8+00 = 645 cfs

Q = _____ n = .045 c = .33 riprap

riprap channel 6+50 to 9+00 WEIGHTED

Mile or Sec. No.	Reach Length	Est. W.S. Elev.	Area	2/3 r	S1/2 = 0.01 I	S1/2 = 0.01 Q I	S	Mean S	hf	TRUE V	TRUE Q	V²Q	hv	hv Diff.	H	Comp. Elev.	
Bottom	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1334	0+00		1339.4	from 11 adjusted. Comp for 172 cfs through						5x	4.5x100			.90			1339.4	
3A3	1+00	100	1339.9	204.0	2.25	.96	194	.0011	.0011	.11	3.22	657	–	.16	.74	.85	1340.25	655 cfs
3A6	2+00	100	1340.2	204.0	2.25	.96	194	.0011	.0011	.11	3.22	657	–	.16	0	.11	1340.36	655cfs
3A9	3+00	100	1340.5	204.0	2.25	.96	194	.0011	.0011	.11	3.22	657	–	.16	0	.11	1340.47	655cfs
3B2	4+00	100	1340.7	198.0	2.24	.95	188	.0012	.0012	.12	3.31	655	–	.17	0	.12	1340.59	655cfs
3B5	5+00	100	1340.9	192.0	2.22	.94	180.5	.0013	.0013	.13	3.36	645	–	.18	0	.13	1340.72	645cfs
3B8	6+00	100	1341.1	186.5	2.18	.92	176.3	.0013	.0013	.13	3.37	628.5	–	.18	0	.13	1340.85	645cfs
	riprap	@ 6+50																
3C1	7+00	100	1341.2	175.4	2.09	.75	132.4	.0024	.0019	.19	3.65	640	–	.21	-.01	.18	1341.30	645cfs
3C4	8+00	100	1341.4	170	2.07	.68	116.1	.0030	.0027	.27	3.78	642	–	.22	0	.27	1341.57	645cfs

$V_1 = C r^{2/3} S^{1/2}$ $C = \frac{1.486}{n}$ $S = (0.01\frac{Q}{Q_1})^2$ $V = V_1\frac{Q}{Q_1}$ $h_v = \frac{V^2 Q}{64.4 Q}$ $H = h_v$ Diff. $+ h_f$

SWT Form 49-C
Rev 10 Dec 61

BACKWATER COMPUTATION WORK SHEET

423

Project: SMITHMOOR ADDITION - CHANNEL FOR SMITHMOOR & HUNTCREST

BASIN b=14, side slope 4:1, gradient .3%

rip rap 9+00 to 6+50

9+00 to 12+00 = 636 cfs
13+00 to 17+00 = 627 cfs
17+00 to 20+00 = 609 cfs

Q = ____ n = .035 (.045) c = .4246 (.33)

Page ____ ____

Computed by: ____ Date ____

Checked by: ____ Date ____

BTM	Mile or Sec. No.	Reach Length	Est. W.S. Elev.	Area	2/3 r	WEIGHTED S1/2 = 0.01 / I	WEIGHTED S1/2 = 0.01 / Q I	S	Mean S	hf	TRUE V	TRUE Q	V^2Q	h_v	h_v Diff.	H	Comp. Elev.	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
37.4	8+00							.0030						.22			1341.59	645cfs
37.7	9+00	100	1341.7	170	2.07	.68	116.1	.0030	.0030	.30	3.72	633	-	.22	0	.30	1341.87	636cfs
37.0	10+00	100	1342.0	170	2.07	.87	149.4	.0018	.0024	.24	3.7	629.5	-	.21	.01	.25	1342.12	636cfs
37.3	11+00	100	1342.7	164	2.05	.87	142.8	.0020	.0019	.19	3.88	635.5	-	.23	-.01	.18	1342.30	636cfs
37.6	12+00	100	1342.5	164	2.05	.87	142.8	.0020	.0020	.20	3.88	635.5	-	.23	0	.20	1342.50	636cfs
37.9	13+00	100	1342.8	164	2.05	.87	142.8	.0019	.0020	.20	3.81	626.5	-	.22	.01	.21	1342.71	627cfs
38.2	14+00	100	1343.0	160	2.01	.85	136.4	.0021	.0020	.20	3.9	625	-	.24	-.01	.19	1342.90	627cfs
38.5	15+00	100	1343.2	154	1.96	.83	128.4	.0023	.0022	.22	4.05	624	-	.26	-.01	.21	1343.11	627cfs
38.8	16+00	100	1343.5	154	1.96	.83	128.4	.0023	.0023	.23	4.05	624	-	.26	0	.23	1343.34	627cfs
39.1	17+00	100	1343.7	149	1.92	.82	122.2	.0026	.0024	.24	4.2	626	-	.27	0	.24	1343.58	627cfs
39.4	18+00	100	1343.9	144	1.88	.80	114.8	.0028	.0027	.27	4.24	611	-	.28	0	.27	1343.85	609cfs
39.7	19+00	100	1344.2	144	1.88	.80	114.8	.0028	.0028	.28	4.24	611	-	.28	0	.28	1344.13	609cfs
40.0	20+00	100	1344.5	144	1.88	.80	114.8	.0028	.0028	.28	4.24	611	-	.28	0	.28	1344.41	609cfs

$V_1 = C r^{2/3} S^{1/2}$ $\quad C = \frac{1.486}{n} \times .01$ $\quad S = (0.01 \frac{Q}{Q_1})^2$ $\quad V = V_1 \frac{Q}{Q_1}$ $\quad h_v = \frac{V^2 Q}{64.40}$ $\quad H = h_v$ Diff. $+ h_f$

SWT Form 49-C
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BACKWATER COMPUTATION WORK SHEET

423

Project: SMITHMOOR ADDITION - CHANNEL FOR SMITHMOOR & HUNTCREST BASIN - SECTION OVER PIPELINE

Page _____ _____

Computed by: _____ Date _____

GRADIENT 2% 4:1 SIDE SLOPES
BASE TRANSITION FROM 25' to 14' 21+00 to 20+00

Checked by: _____ Date _____

Q = 575 cfs n = .045 c = .33

CH BTM

Mile or Sec. No.	Reach Length	Est. W.S. Elev.	Area	2/3 r	WEIGHTED $S^{1/2} = 0.01$ I	WEIGHTED $S^{1/2} = 0.01$ Q I	S	Mean S	hf	TRUE V	TRUE Q	V^2Q	h_v	h_v Diff	H	Comp. Elev.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
20+00							.0028						.28				
21+00	100	1345.00	117	1.63	.55	64.77	.0079	.0053	.53	4.83	571	—	.37	.045	.58	1344.99	575cfs

$V_1 = C r^{2/3} S^{1/2}$ $C = \frac{1.486}{n}$ $S = (0.01 \frac{Q}{Q_1})^2$ $V = V_1 \frac{Q}{Q_1}$ $h_v = \frac{V^2 Q}{64.4 Q}$ $H = h_v$ Diff. $+ h_f$

SWT Form 49-C
Rev 18 Dec 61

CITIES SERVICE GAS COMPANY

FIRST NATIONAL CENTER EAST · OKLAHOMA CITY, OKLAHOMA
PHONE (405) 236-0601

REPLY TO
POST OFFICE BOX 25128
OKLAHOMA CITY, 73125

January 4, 1980

Mr. Lawrence E. Wells
254 Laura, Suite 205
Wichita, Kansas 67211

Attention: Mr. Jim Fisher

Re: Smithmoore Addition Drainage Plan

Dear Mr. Fisher:

We have been advised that your plans for a drainage channel will remove cover over our 20" high pressure natural gas pipeline but will allow for 36-inches of cover above the top of the pipe to remain. This would meet our approval. Also, due to the potential for wash and erosion, it is our concern that a 20-foot strip of riprap centered over the pipeline be placed and grouted across the bottom (approximately 15-feet) of the channel.

Very truly yours,

Ammon V. Caffey

Ammon V. Caffey
Manager
Pipeline Department

AVC:ph

LAWRENCE E. WELLS

Architect

254 LAURA - SUITE 205
WICHITA, KANSAS 67211
PHONE (316) 262-3649

April 11, 1980

Chief Engineer of the Division
of Water Resources
Kansas State Board of Agriculture
1720 South Topeka Ave.
Topeka, Kansas 66612

Re: Smithmoor Drainage Plan, Wichita, Kansas

Dear Sir:

In response to a meeting on January 11,1980, with Dwane Jehlik, I am submitting the following items included with this letter:

1. Application for change in drainage channel.
2. Letter of Application for construction of levees.
3. Computations for channel flows and related information.
4. Seven (7) sheets of plans, profiles and sections of the proposed ditch with related topographic and development information.

Please contact me if you have any questions or need any additional information.

Sincerely,

Jim Fisher
for Lawrence E. Wells

cc: Ron Smith
American Landmark Corp.
835 S. Edgemoor, Wichita, Ks 67218

1-5-76 CME

RED OAK ADDITION

No. MT VERNON BASIN $C = 0.50$ $T_c = \left(\frac{11.9\,L^3}{H}\right)^{.385}$

A. $DA = 17.45\ Ac$ ✓

$L = 1400'$ (.265 miles) $F = 17'$ $t_c = 11.28$ min

$i_2 = 3.6$ "/HR (4.58)

$Q_2 = 39.26$ (39.96) CFS ✓ $Q_{100} = 88$ cfs $i_{100} = 10.14$

B. 540A — $DA = 2.14 + 0.43 + \frac{17.45}{2} = 11.30\ Ac$

$L = 1530'$ $F = 19'$ $t_c = 11.97$ min

$i_2 = 3.5$ "/HR

$Q = 24.72$ CFS ✓

540 — $DA = 0.86 + \frac{17.45}{2} = 9.59\ Ac$ ✓

$L = 1530'$ $F = 19'$ $t_c = 11.97$ min

$i_2 = 3.5$ "/HR

$Q = 20.99$ CFS ✓

550 — $DA = 0.63$ ✓

$L = 370'$ $F = 1.50'$ $t_c = 6.17$ min

$i_2 = 4.4$ "/HR

$Q = 1.73$ CFS ✓

520 — 47.44 CFS ✓ Σ 24.72 + 20.99 + 1.73 (21.52A)

C. 510 — $DA = 1.53 + 0.93 = 2.46\ Ac$

$L = 670'$ $F = 8'$ $t_c = 6.43$ min

$i_2 = 4.2$ "/HR

$Q = 6.46$ CFS ✓

500 — $DA = 0.38\ Ac$ ✓

$L = 250'$ $F = 5'$ $t_c = 2.47$ min

$i_2 = 4.7$ "/HR

$Q = 1.12$ CFS ✓

Red Oaks - Huntcrest I-5-76 CMB

Mt Vernon Basin

490 — 55.02 cfs ✓ Σ 47.44 + 6.46 + 1.12 (24.36 A)

D. 480 — DA - 0.92 + 0.57 + 0.40 = 1.89 Ac ✓

L = 300' F = 3' t_c = 3.7 min

i_2 = 4.7"/hr

Q = 5.55 cfs

470 — DA = 0.36 Ac ✓

L = 210' F = 1.75' t_c = 3.02 min

i_2 = 4.7"/hr

Q = 1.06 cfs

460 — 61.63 cfs ✓ Σ 55.02 + 5.55 + 1.06 (26.61A)

E.* DA = 2.33 Ac

L = 410' F = 6' t_c = 4.08 min

i_2 = 4.7"/hr

Q = 6.84 cfs

E. 440 — DA = 1.94 Ac

L = 420' F = 9' t_c = 3.59 min

i_2 = 4.7"/hr

Q = 5.70 + 6.84 = 12.54 cfs ✓

430 — DA = 2.18 Ac

L = 540' F = 9' t_c = 4.79 min

i_2 = 4.7"/hr

Q = 6.40 + 12.54 = 18.94 cfs ✓

? 420 — 73.73 cfs

F. 410 — DA = 0.50 Ac

L = 200' F = 3' t_c = 2.32 min

i_2 = 4.7"/hr

Q = 1.47 cfs

Red oaks - Huntcrest 1-5-76 MB

Mt Vernon Basin

(F) 400 = 82.04 CFS ✓ Σ 61.63 + 6.8 + 5.70 + 6.90 + 1.47

(33.56A)

Red Oaks - Huntcrest 1-5-76 CMB

Mt. Vernon Basin

Storm Sewers

(0.010 SLOPE ASSUMED IF NOT OTHERWISE NOTE

540A → 520 $Q/S^{1/2}$ = 247.2 24" CONC PIPE n=0.013

540 → 550 $Q/S^{1/2}$ = 209.9 24", as abive

550 → 520 $Q/S^{1/2}$ = 227.2 24", as above

520 → 490 $Q/S^{1/2} = \frac{47.44}{\sqrt{0.013}}$ = 410.84 30", as ab

500 → 490 $Q/S^{1/2}$ = 11.2 15" as above

510 → 490 $Q/S^{1/2}$ = 64.6 15" as above

490 → 460 $Q/S^{1/2} = \frac{55.02}{\sqrt{0.007}}$ = 651.01 36" as above

470 → 460 $Q/S^{1/2}$ = 10.6 15" as above

480 → 460 $Q/S^{1/2}$ = 55.5 15" as above

460 → 420 $Q/S^{1/2} = \frac{61.63}{\sqrt{0.017}}$ = 472.05 ~~36~~ 42" as above

440 → 430 $Q/S^{1/2}$ = 425.4 24" as above

430 → 420 $Q/S^{1/2}$ = 189.4 24" as above

420 → 410 $Q/S^{1/2}$ = 805.7 42" as above

410 → 400 $Q/S^{1/2}$ = 820.4 42" as above

Redoaks · Huntcrest

Drainage Channel (2nd) 1-5-76 CMB

Huntcrest Basin

G. DA = 100.40 Ac

L = 2700' F = 30' t_c = 19.35 min

i_2 = 2.9"/HR

Q = 181.98 CFS

H. da. = 1.63 Ac ✓

L = 600' F = 8' t_c = 5.66 min

i_2 = 4.6"/HR

q = 4.69 CFS

Q = 181.98 + 4.69 = 186.67 CFS

I DA = 2.37 Ac. ✓

L = 600' F = 5' t_c = 6.79 min

i_2 = 4.3"/HR

Q = 6.37 CFS

* J da. = 0.45 Ac ✓

i_2 = 4.3"/HR

q = 1.21 CFS

see pg 6 J* to add q from Ea ✓

Q = 186.67 + 6.37 + 1.21 = 194.25 CFS*

K DA = 2.61 Ac. ✓

L = 545' F = 6' t_c = 5.66 min

q = 7.50 i_2 = 4.6"/HR

Q = 7.50 CFS + 82.04 CFS = 89.54 CFS

* L da = 0.55 Ac ✓

i_2 = 4.6"/HR

q = 1.58 CFS

see pg 6 L* to add q from E ✓

Q = 194.25 + 89.54 + 1.58 = 285.37 CFS*

J

$da = 2.14 Ac$

$L = 400'$ $F = 8'$ $t_c = 3.55 min$

$i_2 = 4.7"/HR$

$Q = 6.29 CFS$

$Q_{TOTAL} = 194.25 + 6.29 = 200.54 CFS$

L

$da = 2.14 + 2.45 = 4.59 Ac$

$L = 600'$ $F = 13'$ $t_c = 4.70 min$

$i_2 = 4.7"/HR$

$Q = 13.48 CFS$

$Q_{TOTAL} = 285.37 + 13.48 = 298.85 CFS$

M

$da = 1.29 + 2.05 + 4.10 = 7.45 Ac$

$L = 900'$ $F = 12'$ $t_c = 7.74 min$

$i_2 = 4.1"/HR$

$Q = 19.09 CFS$

$da = 12.24 Ac$

$L = 900'$ $F = 10'$ $t_c = 8.30 min$

$i_2 = 4.0"/HR$

$Q = 30.60 CFS$

$Q = 298.85 + 19.09 CFS + 30.60 = 348.54 CFS$

Σ DA H thru M = 21.79 Acres

Red Oaks - Huntcrest

1-6-76 CMB

Red Oaks Basin

N. Assuming that pt ⑥ is to pick up natural creek drainage at ⑧ - is nominally zero.

260 — DA = 3.57 Ac

L = 930' F = 16.5' t_c = 8.17 min

i_2 = 4.1"/HR

Q = 9.15 CFS

250 — da = 2.20 Ac

L = 680' F = 8.5' t_c = 6.39 min

i_2 = 4.3"/HR

q = 5.91 CFS

Q = 9.15 + 5.91 = 15.06 CFS

240 — da = 0.83 Ac

L = 930' F = 3.5' t_c = 3.90 min

i_2 = 4.7"/HR

q = 2.44 CFS

Q = 15.06 + 2.44 = 17.50 CFS

230 — da = 0.91 Ac

L = 200' F = 2' t_c = 2.72 min

i_2 = 4.7"/HR

q = 2.67 CFS

Q = 17.50 + 2.67 = 20.17 CFS

Red Oaks - Huntcrest 1-6-76 CMB

Red Oaks Basin

0. $D_4 = 91.83$ Ac.

$L = 4500'$ $F = 32'$ $t_c = 34.05$ min

$i_{100} = 4.6$"/HR

$Q = 264.01$ CFS

200 — $da_1 = 1.86$ Ac.

$L = 440'$ $F = 6'$ $t_c = 4.42$ M

$i_2 = 4.7$"/HR

$q_1 = 5.46$ CFS

$da_2 = 1.33$ Ac.

$L = 600'$ $F = 5'$ $t_c = 6.79$ min

$i_2 = 4.2$"/HR

$q_2 = 3.49$ CFS

$Q = 264.01 + 5.46 + 3.49 = 272.96$ CFS

Red Oaks - Huntcrest

1-6-76 cnb

CHANNEL AT PT O — Red Oaks Basin

$S = 0.0020$ $Q = 272.96$ CFS $n = 0.025$ (straight with grass)

TRIAL #1 —

$A = [6 + (4)(3.5)](3.5) = 70.0$ sq ft

$P = 6 + (2)(3.5)\sqrt{1+(4)^2} = 34.9'$

$R = 2.01'$

$V = 4.23$ FPS

$Q = 296.16$ CFS

ACCEPTABLE CHANNEL BUT MINIMAL FREEBOARD

Red Oaks - Huntcrest 1-6-76 CMB

DRAINAGE CHANNEL (100 YR) Huntcrest Basin

G. DA = 100.40 Ac t_c = 19.35 min i_{100} = 6.1 "/Hr (8.03)

See pg 5 Q = 382.78 CFS? 100.4 × .5 × 6.1 = 306 cfs × 8.03 = 400 cfs

H. Ida = 1.63 Ac t_c = 5.66 min i_{100} = 9.0 "/Hr

q = 9.17 CFS

Q = 382.78 + 9.17 = 391.95 CFS

I. DA = 2.37 Ac t_c = 6.79 min i_{100} = 8.8 "/Hr

Q = 13.04 CFS

J. da = 0.45 Ac t_c = 6.79 min i_{100} = 8.8 "/Hr

q = 2.48 CFS

da = 2.44 Ac t_c = 3.55 min i_{100} = 9.5 "/Hr

q = 23.18 CFS

Q = 391.95 + 13.04 + 2.48 + 23.18 = 430.65 CFS

K. da = 2.61 Ac t_c = 5.66 min i_{100} = 9.0 "/Hr

q = 14.68 CFS

see Pg 3 → da = 33.15 Ac (= 33.56 A)

L = 2200' F = 28' t_c = 15.68 i_{100} = 6.8 "/Hr

q = 140.89 CFS

Q = 14.68 + 140.89 = 155.57 CFS

L. da = 0.55 Ac t_c = 5.66 min i_{100} = 9.0 "/Hr

q = 3.09 CFS

da = 4.59 Ac t_c = 4.70 min i_{100} = 9.5 "/Hr

q = 27.25 CFS

Q = 430.65 + 155.57 + 3.09 + 27.25 = 616.56 CFS

M. da = 7.45 Ac t_c = 7.74 min i_{100} = 8.4 "/Hr

q = 39.11 CFS

da = 17.24 Ac t_c = 8.30 min i_{100} = 8.1 "/Hr

q = 61.97 CFS

Red Oaks - Huntcrest 1-6-76 cms

Drainage Channel - Huntcrest Basin

$Q = 616.56 + 39.11 + 61.97 = 717.64$ cfs

Σ DA H thru M = 65.04 Acres

Red Oaks - Huntcrest 12

DRAINAGE CHANNEL

1-6-76 CMB

Huntcrest Basin

$V_{MAX} = 5.00$ FPS $Q = 396.95$ CFS $n = 0.025$

$T = 80'$ $L = 300'$

TRIAL #1

try $S = 0.002$

$b = 20'$ $z = 4$ $y = 1.5'$

$A = [20 + (1.5)(4)](1.5) = 39.00$ SF

$P = 20 + (2)(1.5)\sqrt{1+(4)^2} = 32.37'$

$R = 1.20'$

$V = 3.01$ FPS

$Q = 117.38$ CFS

TRIAL #2

try $S = 0.002$

$b = 40'$ $z = 3$ $y = 2.0'$

$A = [40 + (2.0)(3)](2.0) = 92.00$ SF

$P = 40 + (2)(2.0)\sqrt{1+(3)^2} = 52.65'$

$R = 1.75'$

$V = 3.86$ FPS

$Q = 354.80$ CFS

TRIAL #3

try $S = 0.002$

$b = 50'$ $z = 3$ $y = 3.0'$

$A = [50 + (3.0)(3)](3.0) = 177.00$ SF

$P = 50 + (2)(3.0)\sqrt{1+(3)^2} = 68.97'$

$R = 2.57'$

$V = 4.98$ FPS

$Q = 881.92$ CFS

Red Oaks - Hunterest

1-6-76 CMB

Drainage Channel Hunterest Basin

TRIAL #4 try $S = 0.0015$

$b = 50'$ $z = 3$ $y = 2.5'$

$A = [50 + (2.5)(3)](2.5) = 143.75\ ^{\square'}$

$P = 50 + (2)(2.5)\sqrt{1+(3)^2} = 65.81'$

$R = 2.18'$

$V = 3.88$ FPS

$Q = 557.10$ CFS

TRIAL #5 try $S = 0.0015$

$b = 50'$ $z = 3$ $y = 2.0'$

$A = [50 + (2.0)(3)](2.0) = 112.00\ ^{\square'}$

$P = 50 + (2)(2.0)\sqrt{1+(3)^2} = 62.65'$

$R = 1.79'$

$V = 3.39$ FPS

$Q = 379.79$ CFS

TRIAL #6 try $S = 0.002$

$b = 50'$ $z = 3$ $y = 2.0'$ $T = 62'$

$A = 112.00\ ^{\square'}$

$P = 62.65'$

$R = 1.79'$

$V = 3.92$ FPS

$Q = 438.54$ CFS

SHOULD RIPRAP BOTH SIDES THRU CURVE 1 AND 20' BOTH BEFORE AND AFTER.

Red Oaks - Huntcrest

1-6-76 CMB

Drainage Channel Huntcrest Basin

1 → 11 $S = \frac{6}{480} = 0.0125$ $n = 0.025$

$Q = 1616.56$ CFS $T = 80'$

$V_{MAX} = 5$ FPS

TRIAL #1 try $b = 50'$ $z = 4$ $y = 2.0'$

$A = [50 + (2.0)(4)](2.0) = 116$ sq ft

$P = 50 + (2)(2.0)\sqrt{1+(4)^2} = 66.49'$

$R = 1.74'$

$V = 9.63$ FPS

$Q = 1117.16$ CFS

TRIAL #2 try $b = 40'$ $z = 3$ $y = 2.0'$

$A = [40 + (2.0)(3)](2.0) = 92.00$ sq ft

$P = 40 + (2)(2.0)\sqrt{1+(3)^2} = 52.65'$

$R = 1.75'$

$V = 9.64$ FPS

$Q = 886.99$ CFS

TRIAL #3 try $b = 50'$ $z = 3$ $y = 1.5'$

$A = [50 + (1.5)(3)](1.5) = 81.75$ sq ft

$P = 50 + (2)(1.5)\sqrt{1+(3)^2} = 59.49'$

$R = 1.37'$

$V = 8.21$ FPS

$Q = 671.53$ CFS $T = 59'$

Redoaks - Huntcrest 1-6-76 CMB

Drainage Channel Huntcrest Basin

E→L $S = \frac{3}{550} = 0.0055$ $n = 0.025$

$Q = 155.57$ $T = 60'$

TRIAL #1 try $b = 30'$ $z = 3$ $y = 1.5'$

$A = [30 + (1.5)(3)](1.5) = 51.75^{\square'}$

$P = 30 + (2)(1.5)\sqrt{1+(3)^2} = 39.49'$

$R = 1.31'$

$V = 5.28$ FPS

$Q = 273.20$ CFS

TRIAL #2 try $b = 25'$ $z = 3$ $y = 1.5'$

$A = [25 + (1.5)(3)](1.5) = 44.25^{\square'}$

$P = 25 + (2)(1.5)\sqrt{1+(3)^2} = 34.49'$

$R = 1.28'$

$V = 5.21$ FPS

$Q = 230.33$ CFS

TRIAL #3 try $b = 15'$ $z = 4$ $y = 1.5'$

$A = [15 + (1.5)(4)](1.5) = 31.50^{\square'}$

$P = 15 + (2)(1.5)\sqrt{1+(4)^2} = 27.37'$

$R = 1.15'$

$V = 4.84$ FPS

$Q = 152.50$ CFS $T = 27'$

Red Oaks - Huntcrest

1-6-76 cmb

Drainage Channel Huntcrest Basin

L—M $S = \frac{4}{750} = 0.0053$ $n = 0.025$

$Q = 717.64$ CFS $T = 80'$

TRIAL #1 Try $b = 50'$ $z = 3$ $y = 1.5'$

$A = [50 + (1.5)(3)](1.5) = 81.75$ sq ft

$P = 50 + (2)(1.5)\sqrt{1+(3)^2} = 59.49'$

$R = 1.37'$

$V = 5.35$ FPS

$Q = 437.27$ CFS

TRIAL #2 Try $b = 50'$ $z = 4$ $y = 1.5'$

$A = [50 + (1.5)(4)](1.5) = 84.00$ sq ft

$P = 50 + (2)(1.5)\sqrt{1+(4)^2} = 62.37'$

$R = 1.35'$

$V = 5.28$ FPS

$Q = 443.30$ CFS

TRIAL #3 Try $b = 50'$ $z = 4$ $y = 2.0'$

$A = [50 + (2.0)(4)](2.0) = 116.00$ sq ft

$P = 50 + (2)(2.0)\sqrt{1+(4)^2} = 66.49'$

$R = 1.74'$

$V = 6.27$ FPS

$Q = 727.44$ CFS $T = 66'$

Red Oaks - Huntcrest

1-6-76 CMB

Red Oaks Basin

T 190 — Q = 20.17 + 272.96 = 293.13 CFS

P 170 — DA = 1.13 Ac

L = 855' F = 5' t_c = 10.22 min

i_2 = 3.7"/Hr

Q = 2.61 CFS

180 — DA = 4.13 Ac

L = 580' F = 5' t_c = 6.53 min

i_2 = 4.3"/Hr

Q = 11.10 CFS

160 — Q = 293.13 + 2.61 + 11.10 = 306.84 CFS

Q 150 — DA = 0.36 Ac

L = 290' F = 9' t_c = 2.34 min

i_2 = 4.7"/HR

Q = 1.06 CFS

140 — da = 0.42 Ac

L = 300' F = 12' t_c = 2.58 min

i_2 = 4.7"/HR

q = 1.94 CFS

Q = 1.94 + 1.06 = 3.00 CFS

R 130 — da = 3.21 Ac

L = 560' F = 3' t_c = 7.63 min

i_2 = 4.1"/HR

q = 8.23 CFS

Q = 3.00 + 8.23 = 11.23 CFS

1-7-76 CMB

Red Oaks - Hunterest

Red Oaks Basin

120 — DA = 0.13Ac

L = 360' F = 2' t_c = 5.35 min

t_2 = 4.6 in/hr

Q = 2.10 CFS

110 — Q = 306.84 + 11.23 + 2.10 = 320.17 CFS

Red Oaks - Huntcrest 1-7-76 CMB

Storm Sewers Red Oaks Basin

(0.010 SLOPE ASSUMED IF NOT OTHERWISE GIVEN)

		(n=0.013 CONC PIPE)
260 → 250	$Q/S^{1/2} = 91.50$	18"
250 → 240	$Q/S^{1/2} = 150.60$	21"
240 → 230	$Q/S^{1/2} = 175.00$	24"
230 → 220	$Q/S^{1/2} = 201.70$	24"
220 → 210	$Q/S^{1/2} = \frac{20.17}{\sqrt{0.017}} = 154.60$	~~24~~ 24"
210 → 190	$Q/S^{1/2} = 201.70$	24"
200 → 190	$Q/S^{1/2} = \frac{272.96}{\sqrt{0.00093}} = 2836.68$	66"
190 → 160	$Q/S^{1/2} = 2931.30$	66"
170 → 160	$Q/S^{1/2} = 26.10$	15"
180 → 160	$Q/S^{1/2} = 111.00$	21"
160 → 110	$Q/S^{1/2} = \frac{306.84}{\sqrt{0.0028}} = 5821.88$	84"
120 → 110	$Q/S^{1/2} = 21.00$	15"
150 → 140	$Q/S^{1/2} = 10.60$	15"
140 → 130	$Q/S^{1/2} = 30.00$	15"

20

1-7-76 CMB

Red Oaks - Hunterest

Red Oaks Basin

130 → 110 $Q/S^{1/2} = 112.30$ 21"

110 → 100 $Q/S^{1/2} = \frac{320.17}{10.001} = 10125$ #102 ½"

1-7-76 CMB

SECTION 3 - DRAINAGE CHANNEL THRU PARK MEADOWS

ASSUMING A 0.002 SLOPE

(from Von Dorsen-Hazard-Hallmyr-Schmahl Park Meadows Estates)

ADDITIONAL $Q = 1.25 \times 119.5 = 149.38$ CFS

$Q_{TOTAL} = 149.38 + 320.17 = \underline{469.55}$ CFS

$A = [10 + (4.5)(4)](4.5) = 126.00$ sf

$P = 10 + (2)(4.5)\sqrt{1+(4)^2} = 47.11'$

$R = 2.67'$ $\quad n = 0.025$ (grassed channel)

$V = 5.12$ FPS

$Q = 645.38$ CFS

ADEQUATE

Red Oaks - Huntcrest 1-9-76 CMB

Funston Basin

5. 390 — DA = 3.28 Ac ✓

L = 600' F = 10' t_c = 5.20 min

i_2 = 4.6 "/HR

Q = 19.68 CFS

380 — da = 0.77 Ac ✓

L = 425' F = 2' t_c = 6.49 min

i_2 = 4.3 "/HR

q = 2.10 CFS

Q = 19.68 + 2.10 = 21.78 CFS

370 — DA = 0.93 Ac ✓

L = 360' F = 2' t_c = 6.99 min

i_2 = 4.2 "/HR

Q = 2.44 CFS

360 — da = 0.38 Ac ✓

L = 225' F = 2' t_c = 3.1 min

i_2 = 4.7 "/HR

q = 1.12 CFS

Q = 2.44 + 1.12 = 3.56 CFS

350 — Q = 21.78 + 3.56 = 25.34 CFS

Red Oaks - Huntcrest

1-9-76 CMB

Red Oaks Basin

T. 340 — DA = 1.47 Ac ✓
L = 325' F = 9' t_c = 2.67 min
i_2 = 4.11"/hr
Q = 4.32 cfs

330 — DA = 0.69 Ac ✓
L = 325' F = 9' t_c = 2.67 min
i_2 = 4.11"/hr
Q = 2.03 cfs

320 — Q = 25.34 + 4.32 + 2.03 = 31.69 cfs

U. 310 — da = 1.54 Ac ✓
L = 500' F = 12' t_c = 3.93 min
i_2 = 4.11"/hr
q = 4.52 cfs

Q = 31.69 ct + 4.52 = 36.21 cfs
Σ DA 390 - 310 = 9.06 A

Storm Sewers

(S = 0.010 unless otherwise shown)

390 → 380	$Q/S^{1/2}$ = 196.8	24"
380 → 350	$Q/S^{1/2}$ = 217.8	24"
370 → 360	$Q/S^{1/2}$ = 24.4	15"
360 → 350	$Q/S^{1/2}$ = 35.6	15"
350 → 320	$Q/S^{1/2} = \frac{25.34}{\sqrt{0.030}}$ = 146.30	~~24~~ 24"
340 → 320	$Q/S^{1/2}$ = 43.2	15"
330 → 320	$Q/S^{1/2}$ = 20.3	15"
320 → 310	$Q/S^{1/2} = \frac{31.69}{\sqrt{0.018}}$ = 237.68	27"
310 → 300	$Q/S^{1/2} = \frac{36.21}{\sqrt{0.017}}$ = 280.48	27"

SEDGWICK COUNTY COURTHOUSE

COUNTY OF SEDGWICK

DEPARTMENT OF PUBLIC WORKS

1250 S. SENECA
WICHITA, KANSAS 67213

PHONE 268-7901

Joe D. Freeman, P.E.
Acting County Engineer

January 28, 1981

Lawrence Wells Co.
254 Laura, Suite 205
Wichita, Kansas 67211

Att: Jim Fisher

Re: Drainage Plan, Smithmoor Addition

Dear Mr. Fisher,

This office has reviewed the Drainage Plan for the above referenced Addition and approve the same subject to the following:

1. Rip-rap needs to be indicated on the plan downstream from proposed cross-road structure on Harry beginning at Sta. 30+50 and extending to north end of proposed crossroad culvert. It should also be indicated beginning at the south end of proposed crossroad culverts and extending upstream to Sta. 32+90. This rip-rap is in the area of two sharp turns in the channel alignment.

2. Indicate on the plans the removal of the existing 2 @ 5'x2'x30' RCBC and install 5 @ 54" RCP's, or 2 @ 10'x4.5' RCBC. This would provide uniformity of flow lines of the proposed structure.

Please provide a revised set of plans indicating the above changes at your earliest convience. We would also request a duplicate set of the drainage plan be sent to the City of Wichita Engineering for their files.

If you should have any questions regarding the above items, please call.

Very truly yours,

Joe D. Freeman, P.E.
Acting County Engineer

JDF/PD/dn

cc: Louise Olivarez, MAPD
Chris Breitenstein, City of Wichita Engineering
Plat File

RECEIVED
FEB 2 1981
Dept. Of Engineering

WICHITA—SEDGWICK COUNTY
W-SC
METROPOLITAN AREA PLANNING DEPARTMENT
CITY HALL — TENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202
(316) 268-4561

February 6, 1981

Baughman Company
330 Laura
Wichita, Ks. 67211

Re: S/D 72-137 - Final plat of Smithmoor First Addition

Gentlemen:

At the February 5, 1981 meeting of the Subdivision Committee, action on the final plat of Smithmoor First Addition was deferred indefinitely until it is determined how sewer services can be provided to this property. After that determination has been made, the plat can be rescheduled.

If you have any questions, please call me at 268-4406.

Sincerely,

L.O.

Louise Olivarez
Senior Planner

LO:bh

cc: Janelle Properties, Attention: R. L. Smith, President, 838 S. Edgemoor 67218
Jim Fisher, c/o Lawrence Wells, Architect, 254 Laura, Suite 205, 67211
Andy Harkness, County Department of Public Works
Mike Lindebak, City Engineering