MEMO

TO: City of Wichita
Department of Engineering
City Hall - 455 N. Main
Wichita, KS 67202
ATTN: Chris Breitenstein, P.E.

PROJECT NO. 36-84090-177
PROJECT: Chuzy Business Park Addition
DATE: February 29, 1984

COPIES TO:
Carl Chuzy
Louise Olivarez, MAPD
File

FROM: Charles S. Brown, P.E.
REFERENCE: File

PLEASE ADVISE IMMEDIATELY OF ANY MISCONCEPTIONS OR OMISSIONS YOU BELIEVE TO BE CONTAINED HEREIN.

Transmitted herewith are two copies of the Drainage Plan and supporting calculations for the proposed Chuzy Business Park Addition to Wichita.

The Preliminary Plat will be submitted to MAPD on March 2, 1984, for hearing by MAPC Subdivision Committee on March 15, 1984.

If you have any questions or need any additional information, please advise.

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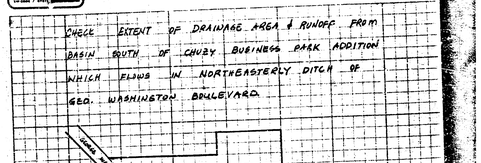
Project Chuzy Business Park
Item Drainage

CHECK EXTENT OF DRAINAGE AREA & RUNOFF FROM BASIN SOUTH OF CHUZY BUSINESS PARK ADDITION WHICH FLOWS IN NORTHEASTERLY DITCH OF GEO. WASHINGTON BOULEVARD.



D.A. = 26.6 Ac.
(Not verified by field survey)

Use Rational Formula Q = CIA

C: 50% Ind./Commercial (0.9)
50% Open (0.3)
Composite C = 0.6

t_c Assume 400' @ 2% grass = 25
1500' ditch @ 6fps = 4
31'

I = 3.82

Q = CIA = 0.6 x 3.82 x 26.6
= 61 cfs

If is assumed this drainage will be intercepted via curb & gutter, storm sewer, etc. when Geo. Washington Boulevard is improved.

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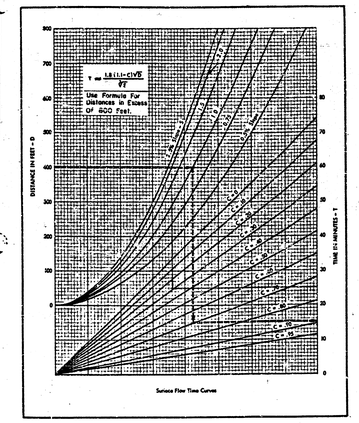

FIGURE 7. Surface flow time curves.

being investigated. In some instances the "inlet time" will be the time of concentration. Such is the case for an inlet at the upper end of a drainage line.

(1) Furthermore, a condition may exist where the "inlet time" to a structure along the line may exceed the time required for water falling on a more distant subarea to reach that

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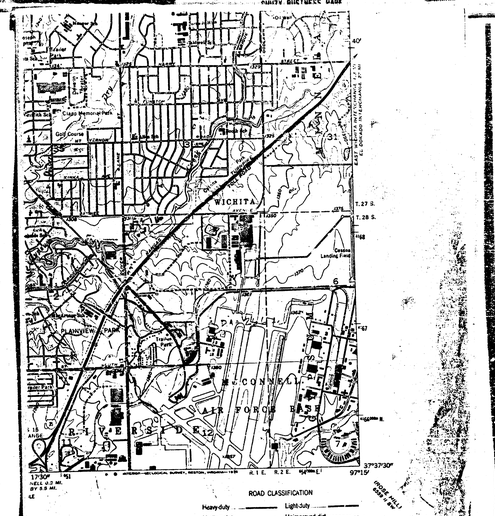

Revisions shown in purple compiled from aerial photographs taken 1970 and 1975. This information not field checked
Purple tint indicates extension of urban areas

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Project Chuzy Business Park
Item Drainage - Alternate No. 2

USE RATIONAL FORMULA FOR RUNOFF CALCS.

Q = CIA where C = 0.9
t_c = 15 min. (assumed due to
I_2 = 4.06 I_5 = 5.21 I_10 = 6.08 I_100 = 8.98

Inlet No. 4
D.A. = 9.1 Ac.
Q_2 = 0.9 x 4.06 x 9.1 = 33.2 cfs
Q_5 = 0.9 x 5.21 x 9.1 = 42.7 cfs
Q_10 = 0.9 x 6.08 x 9.1 = 49.8 cfs
Q_100 = 0.9 x 8.95 x 9.1 = 73.5 cfs

Inlet No. 3
D.A. = 9.9 Ac.
Q_2 = 0.9 x 4.06 x 9.9 = 36.2
Q_5 = 0.9 x 5.21 x 9.9 = 46.4
Q_10 = 0.9 x 6.08 x 9.9 = 54.2
Q_100 = 0.9 x 8.98 x 9.9 = 80.0

Inlet No. 2
D.A. = 7.2 Ac.
Q_2 = 0.9 x 4.06 x 7.2 = 26.3
Q_5 = 0.9 x 5.21 x 7.2 = 33.8
Q_10 = 0.9 x 6.08 x 7.2 = 39.4
Q_100 = 0.9 x 8.98 x 7.2 = 58.2

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Project Chuzy Business Park
Item Drainage - Alternate No. 2

Inlet No. 1
D.A. 6.6
Q_2 = 0.9 x 4.06 x 6.6 = 24.1
Q_5 = 0.9 x 5.21 x 6.6 = 30.9
Q_10 = 0.9 x 6.08 x 6.6 = 36.1
Q_100 = 0.9 x 8.98 x 6.6 = 53.3

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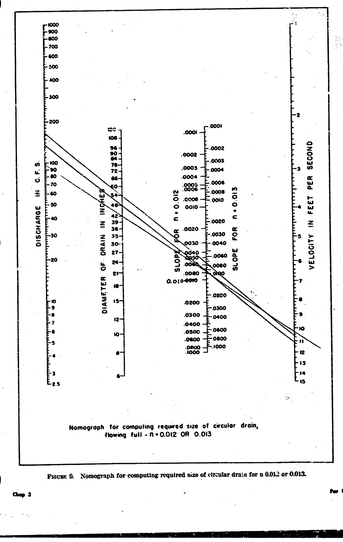

Nomograph for computing required size of circular drain, flowing full - n = 0.012 OR 0.013

FIGURE 9. Nomograph for computing required size of circular drain for n 0.012 or 0.013.

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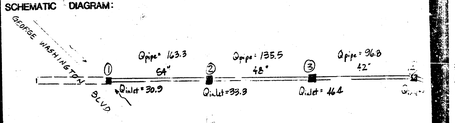
PROFESSIONAL ENGINEERING CONSULTANTS
1440 EAST ENGLISH
WICHITA, KANSAS 67211
(316) 262-2691

HYDROLOGY DATA

PROJECT: Chuzy Business Park
ITEM: Storm Sewer Design
RETURN PERIOD: 5 COM

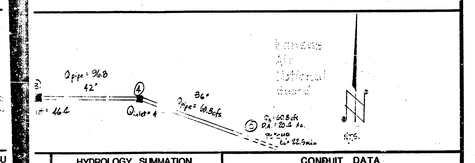
SCHEMATIC DIAGRAM:



SUB-BASIN (1)	C (2)	AREA (acres) (3)	SLOPE (%) (4)	LENGTH (feet) (5)	t_c (minutes) (6)	i_0 in/hr (7)	Q_0 (cfs) (8)	T_t (minutes) (9)	i in/hr (10)	Q (cfs) (11)
5	0.67	20.4			22.5	4.45	60.8	22.5	4.45	60.8
4	0.9	9.1			15	5.21	42.7	23.3	4.39	36.0
3	0.9	9.9			15	5.21	46.4	24.0	4.34	38.5
2	0.9	7.2			15	5.21	33.8	24.7	4.29	27.8
1	0.9	6.6			15	5.21	30.9	25.4	4.24	25.1

HYDROLOGY DATA SHEET

PAGE 1 OF 1
Chuzy Business Park PROJECT NO. 36-84090-177
Storm Sewer Design - Alt. No. 2 DATE: Feb. 27, 1984
PERIOD: 5 COMPUTATIONS BY: CSB REVISIONS BY:



(1)	T_c (minutes) (9)	I in/hr (10)	Q (cfs) (11)	Σ Q (cfs) (12)	PIPE (inches) (13)	SLOPE (%) (14)	VELOCITY (ft/sec) (15)	LENGTH (feet) (16)	T_t (minutes) (17)	$T_c + T_t$ (Col. 9 + Col. 17) (18)
3	22.5	4.45	60.8	60.8						
					36"	0.9	8.8	410	0.8	23.3
4	23.3	4.39	36.0	96.8						
					42	1.0	10.5	440	0.7	24.0
1	24.0	4.34	38.5	135.3						
					48	1.0	11.0	430	0.7	24.7
2	24.7	4.29	27.8	163.3						
					54	0.9	10.5	430	0.7	25.4
3	25.4	4.24	25.1	188.5	use two 48"s					

Use 6 - 48" optional pipe for better connection
→ to existing RCB

Date 12-15-83 NB Page ____ of ____
Project KAHLO
Item Culvert Sta 7+00 Collins Drive

Crown Grade = 1357.33
E Lt = 51.10
E Rt = 61.50

Plans call for 14.0 Sq Ft CRP, McPherson Cove. Wants to know if 60x98" (12.5 Sq Ft) or 68x43 (16.5 Sq Ft) is acceptable.
KDOT Std calls for 68x43" when "14.0 Sq. Ft." is called out.
Check hydraulics of system (Assuming inlet control)
Q_5 = 60 cfs
Q_100 = 103 cfs

PIPE SIZE	MAT'L.	Q_5 elev.	Q_100 elev.
68x43 (16.5 Sq Ft)	RCPHE	54.12	55.24
60x98 (12.5 Sq Ft)	RCPHE	54.69	56.89
65x45 (16.3 Sq Ft)	CMPAC	54.23	56.30

Although Wtd. area is less, The 12.5 Sq Ft RCPHE is approx. equivalent to 16.3 Sq Ft CMPAC, in inlet control. The 60x38 will fit inside the ditch inlet easier, ∴ the 12.5 Sq Ft RCPHE should probably be allowed.

REFERENCE MARKS	ELEVATION FEET (NGVD)
RM 30	1303.71
RM 39	1301.13
RM 40	1304.85
RM 41	1302.16
RM 42	1298.51
RM 43	1303.01
RM 44	1302.66
RM 45	1297.36
RM 46	1295.70
RM 47	1295.45

Date Feb. 27, 1984 Page 1 of 1
Project Chuzy Business Park
Item Drainage

Check Capacity of Existing 8'x3' RCB @ George Washington Blvd.

INLET CONTROL Height of Box (D) = 3'
Allowable HW elev. = 133.8'
E. Box = 129.36
HW = 133.8 - 129.36 = 4.44' say 4.5
H/D = 4.5/3 = 1.5

From Chart 1 attached, Q/B = .83 cfs/foot

Total capacity = 29 cfs/foot x 8' = 184 cfs

Capacity of Existing Box = 5 yr. storm =

OUTLET CONTROL q = allowable
L = 70'
n = 0.012 (concrete Box)
k_e = 0.5 assumed
k_o = 1.0 "
LS = 0.4 (129.36 - 123.76) Elev. Drop across box
HW = H + LS + k_o see above HW = H + LS + k_o
∴ H = 1.0
Q = 1.0 cfs

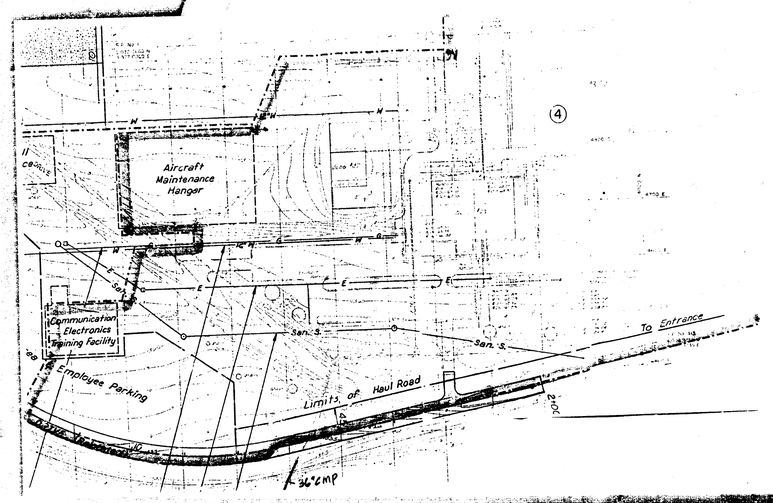
Date 7-10-82 Page 1 of 1
Project LAND
Item Hydrology - Project Design Strategies

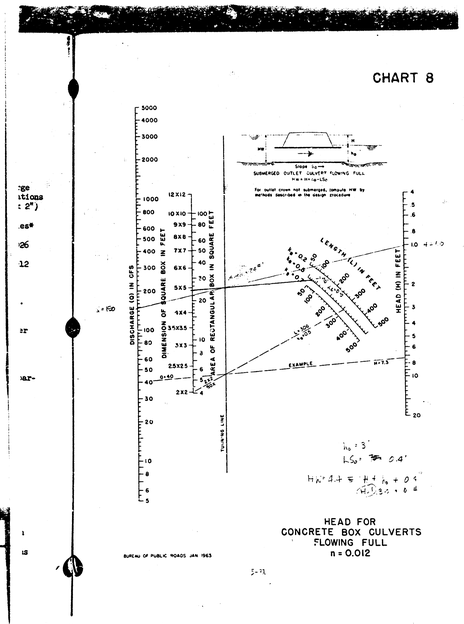
Dr. Drainage Area Map
DA No. 1
A = 2.37 Ac. S = 2% L = 400'
C: 18.35 - 2.37 = 15.98
26.65 - 2.37 = 24.28
15.98 x 0.6 = 9.59
24.28 x 0.9 = 21.85
31.44/33.37 = 0.95
T_c = 23 min.
T_2 = 4.41
T_100 = 7.00
Q_2 = 4.7 cfs
Q_100 = 11.1 cfs

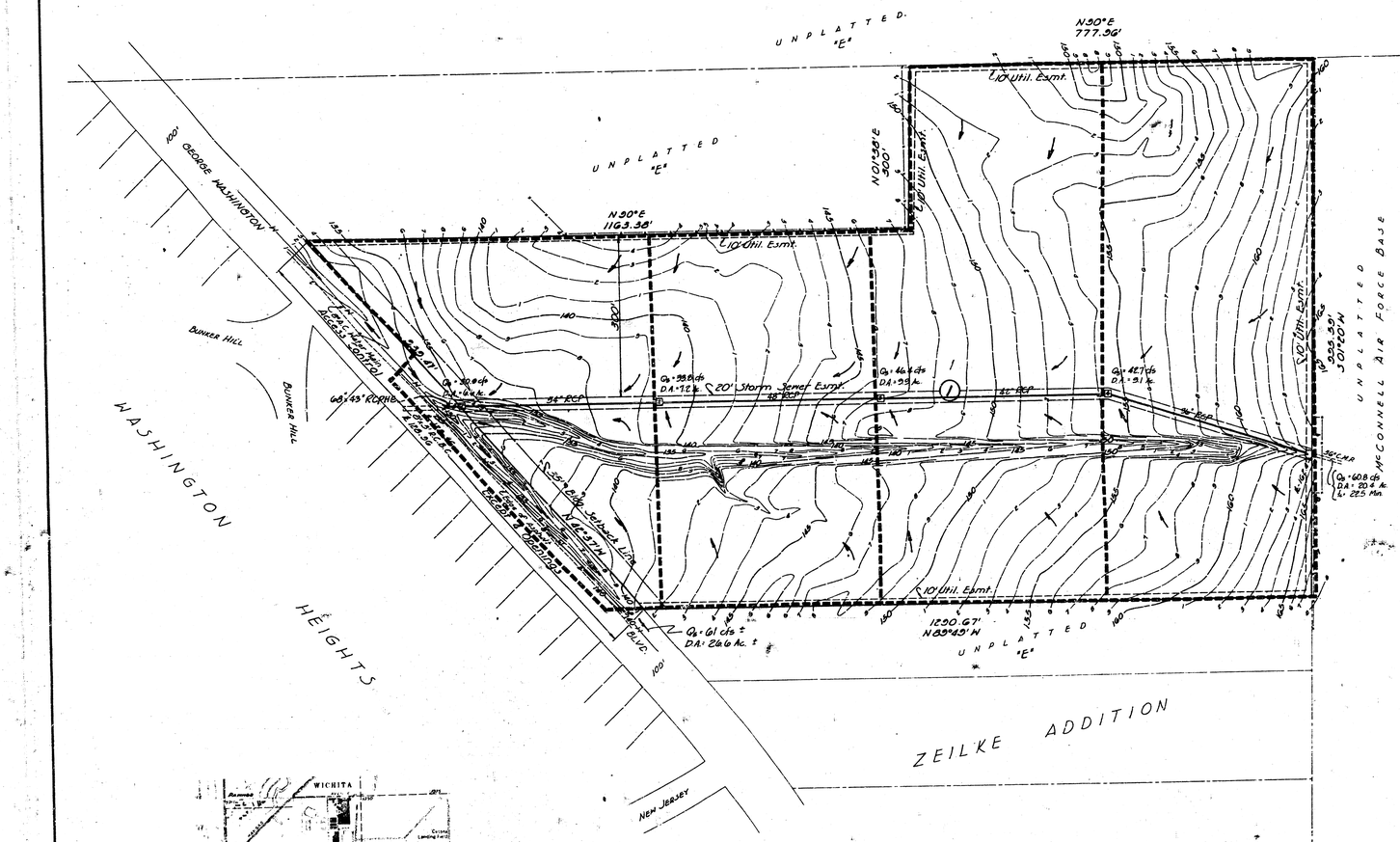
DA No. 2
A = 3.69 Ac. C: 7.67 x 0.6 = 4.60
66.6 x 0.85 = 56.61
61.29 W x 0.9
T_c = 20 min.
T_2 = 4.66
T_100 = 8.03
Q_2 = 11.04 cfs
Q_100 = 24.74 cfs

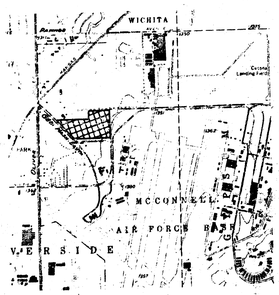
DA No. 3
A = 24.15 Ac. C = 0.60
T_c = 18 (1-0.7) 1/3
√ 5.7
D = 1000'
S = 1%
T_c = 14.08 + 1000/60
= 11.33 min.
I_2 = 5.33 Q_2 = 128 cfs
I_100 = 10.18 Q_100 = 320.4

DA No. 4
A = 22.66 Ac. C: 70.76 x 0.6 = 0.56
T_c = 18 (1-0.56) 1/3 Time 3+1% 7.55 = 0.41
√ 3.5 7.96
= 11.41 min. I_2 = 4.6
I_100 = 17.6 Q_2 = 140.3 cfs
C = 0.63 Q_100 = 399.3 cfs









VICINITY MAP
1"=2000'

1" = 100'
Elev. = City Datum
February 20, 1984

BENCH MARK
City Standard Disc. 48.2' N. and 53.0' N.E. of ℄ of Oliver and George Washington Blvd.
Elev. 1213.693 City Datum

Topography Surveyed by:
Baughman Company, P.A.
November 1982

DRAINAGE PLAN

CHUZY BUSINESS PARK

TRACT IN THE S.W.¼ OF SEC. 1, T28S, R1E

Owner: Carl Chuzy

Engineer: Professional Engineering Consultants, P.A.
1440 East English
Wichita, Kansas

LEGEND

- Manhole
- Inlet ℄ No.
- Storm Water Sewer ℄ Size
- Drainage Basin Boundary
- Drainage Direction

NOTE:
Lot 1, Block 1 shall be graded to drain to the proposed storm sewer via drives, flumes, private storm sewers, and/or other approved drainage facilities