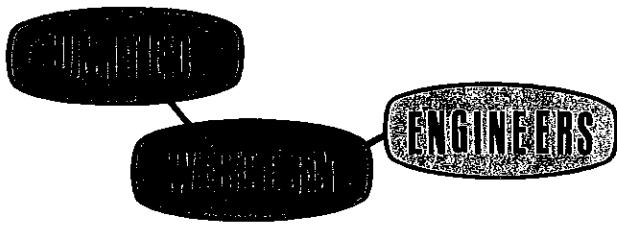


File Copy.



planners · consultants · engineers

GENTRY INNERSPACE MASTER

DRAINAGE PLAN

Approved - Geo Jung, 8.2.72
(See Comments)



planners · consultants · engineers
Suite 200
4525 Northpark Drive
Colorado Springs, Colo. 80907
(303) 598-3222

May 12, 1972

Mr. DeWitt Miller
City Hall
P.O. Box 1575
Colorado Springs, Colorado

Subject: Drainage Plan, Gentry Innerspace Master

Dear Deke:

Transmitted herewith is subject drainage plan for your review and approval.

Please call me if you have any questions.

Respectfully,

UNITED WESTERN ENGINEERS.

O. E. Watts
Engineering Director

/cel

GENTRY INNERSPACE DEVELOPMENT
MASTER DRAINAGE PLAN

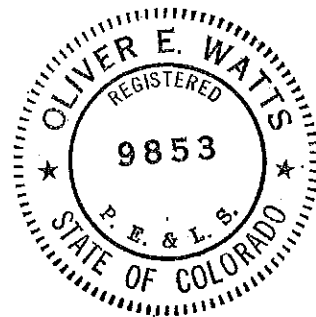
Certifications and Approvals

Registered Engineer

I, Oliver E. Watts, a registered engineer in the State of Colorado, hereby certify that the attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. I further certify that said drainage report is in accordance with all City of Colorado Springs Ordinances and specifications and criteria.

Oliver E. Watts

Colorado P.E. - L.S. No. 9853



Owner or Developer of the Site:

"The developer has read and will comply with all of the requirements specified in this drainage report as approved by the City Engineer."

By *Clyde Summers*

Title *Const. Manager*

Approved:

City of Colorado Springs, Department of Public Works:

City Engineer

Date

GENTRY INNERSPACE
MASTER DRAINAGE PLAN

Table of Contents:

<u>Page</u>	<u>Item</u>
1	Transmittal Letter
2	Certificates and Approvals
3	Contents
4-6	Descriptive Report

Appendix:

Letter of Agreement to Accept Outflows
Soils Map
Standard Plan - Street Outlets for Culverts
Standard Plan - Curb Inlets
Modified Catch Basin to Receive Ditch Inflow
Hydrologic Computation Sheets - 5 pages
Hydraulic Computation Sheets - 4 Pages
Drainage Plan

1. Description of Location:

a. The Gentry Innerspace Development is located as shown on the vicinity map on the enclosed drainage plan, occupying a portion of the Northwest quarter of Section 5 and the Northeast quarter of Section 6 in Township 15 South, Range 66 West of the 6th P.M., within the City of Colorado Springs, Colorado.

b. The total area enclosed by the development is approximately 67.252 acres.

c. The development lies in a drainage basin for which no study has been made for the City of Colorado Springs. Hartzell - Pfeiffenberger and Associates, Inc. of Denver, Colorado, prepared a drainage study on Cheyenne Mountain Ranch for Gates Land Company, which includes the area of this report. The rational method of analysis was used, therefore, the quantities of flow of the major basin study may be less than those of this report.

d. Natural drainage is defined by the topography shown on the attached plan, generally Southerly across the development. The natural drainage pattern is maintained although considerable grading will be accomplished within the development. Elevations controlling this grading are shown on the plan.

2. Method of Runoff Computations:

a. Method: The method of computations utilized in this report is the SCS synthetic hydrograph method as modified by the Bureau of Reclamation Small Dams Publication. The 50-year storm of two-inch intensity, duration of one hour was used in all computations in accordance with criteria of the City of Colorado Springs. Runoff computation sheets are included in this report.

b. Soil Types: The soil types within the area are shown on an enclosed drawing. The Limon series (A1-B) varies from silty clay loam to clay; calcium carbonate occurs at variable depths. This type falls in the "C" hydrologic group.

The wet alluvial land (XWI) consists of dark colored sandy loams to light clay loams to a depth of 20 inches or more, sand and gravel occurs at 20 to 40 inches. This type falls in the "D" hydrologic group.

The RB2 type is an association of Samsil soils and gravelly, cobbly materials over shale. The Samsil series consist of shallow clayey soils over shale at a depth of 20 inches or less. The gravelly, cobbly material is 30 to 70% coarse fragments and may extend to a depth of 1 to 30 feet over shale. This soil type is in the "D" hydrologic group.

3. External Water Entering the Subdivision:

a. 6.9 CFS will enter the development at the North-West corner, which will be contained by the existing borrow ditches at the property boundary on the West. This will be picked up by a 30 inch CMP culvert with metal flared end section (MFES) and carried by a 30 inch CMP with a minimum slope of 1% to the 8 foot curb outlet on the North end of Innerspace Circle West.

10.1 CFS will be picked up by an 18" CMP culvert and carried by an 18" CMP at 4% minimum slope to the 4' curb outlet on the Northwest end of Innerspace Square.

5.6 CFS will enter as sheet flows from the North on the Westerly half of the development. We feel that no structures or provisions are required to carry these flows.

8.0 CFS will enter in the greenbelt from the North approximately in the center of the development. This flow will be picked up in 2'-0" x 1'-0" concrete ditch at a minimum slope of 2.85%, and carried to the 4' curb outlet at Innerspace Drive.

In the Easterly half of the development, there are several "sheet flows" of; 1.4 CFS, 0.7 CFS, 0.8 CFS, and 0.4 CFS which we feel require no structures. There are also some concentrated flows of; 1.5 CFS, 1.5 CFS, 1.6 CFS, and 2.8 CFS which will be picked up by 18 inch CMP culverts and carried at 1% minimum slopes to the 4' curb outlets at the respective streets.

b. Adjoining Developments and Structures: There is no development adjacent to this one and no existing or proposed structures to affect this development on the North.

4. Flow Through the Development:

Runoff is generally contained within the streets, routed as shown on the attached plan. Where street capacities are exceeded, storm drains are utilized to contain the excess flow to the outfall points.

5. Outfall Points:

The outfall points are on the Southerly edge of the development as shown on the attached plan. These outfall points were coordinated with Mr. Warren DeLapp of Hartzell-Pfeiffenberger.

56.2 CFS is discharged into a major greenbelt near the Southwest corner of the development. All other flows are routed to Cheyenne Meadows Boulevard. All outflows will be accomodated by designs of Hartzell-Pfeiffenberger as stated in the enclosed letter of agreement.

6. Internal Design Computations:

a. Street flows will be contained by ramp-type curbs where their capacity is sufficient. Where necessary 8-inch vertical curbs will be provided as follows:

<u>Street Name</u>	<u>Width Ft.</u>	<u>Min. Slope %</u>	<u>St. Flow -CFS-</u>	<u>Capacity -CFS-</u>
Innerspace Square	36	1.0	21.6	41.7
	36	0.5	6.8	29.5
Innerspace Circle	36	2.0	29.1	59.0
Innerspace Dr. W.	36	1.0	16.1	41.7
	36	3.0	36.7	72.2
Innerspace Dr. E.	36	0.5	8.2	29.5
		2.0	20.2	59.0
		2.0	34.0	59.0

b. Concrete lined channels (n=0.015) are provided as shown on the plan, summarized below. 15-foot easements are to be provided to allow a 10-foot access road along their length.

<u>Size Channel Width x Depth</u>	<u>Slope %</u>	<u>Design Flows -CFS-</u>	<u>Maximum Capacity -CFS-</u>
2 x 1	2.85	8.2	36.5
2 x 1	3.00	31.1	96

c. Metal pipe of standard corrugation and bands (n=0.024) are used for all buried storm drains. A minimum of one foot of cover will be provided to subgrade and guage requirements will be determined from resistivity testing and shown on plan and profile sheets. Calculations pertaining to the size and capacity of the storm drains are enclosed, summarized as follows:

<u>Location</u>	<u>Size In.</u>	<u>Slope %</u>	<u>Design Flows -CFS-</u>	<u>Maximum Capacity -CFS-</u>
Innerspace Cir. W.	24	1.0	12.0	12.2
	24	1.0	12.0	12.2
	36	1.0	24.0	36.1
	30	1.0	16.1	22.2
	48	1.78	56.2	103.8
Innerspace Dr.	27	1.0	18.4	16.8
	36	1.0	32.0	36.8
Innerspace Sq.	24	1.0	10.8	12.2
	21	6.3	21.6	21.6
	30	2.0	21.6	31.4
Curb Inlets	18*	1.0 min.	2.8 max.	5.7

* Used as minimum size for maintenance.

d. Curb inlets and street outlets for culverts were sized in accordance with the enclosed plans. The flows from these outlets will adequately dissipate within the streets.

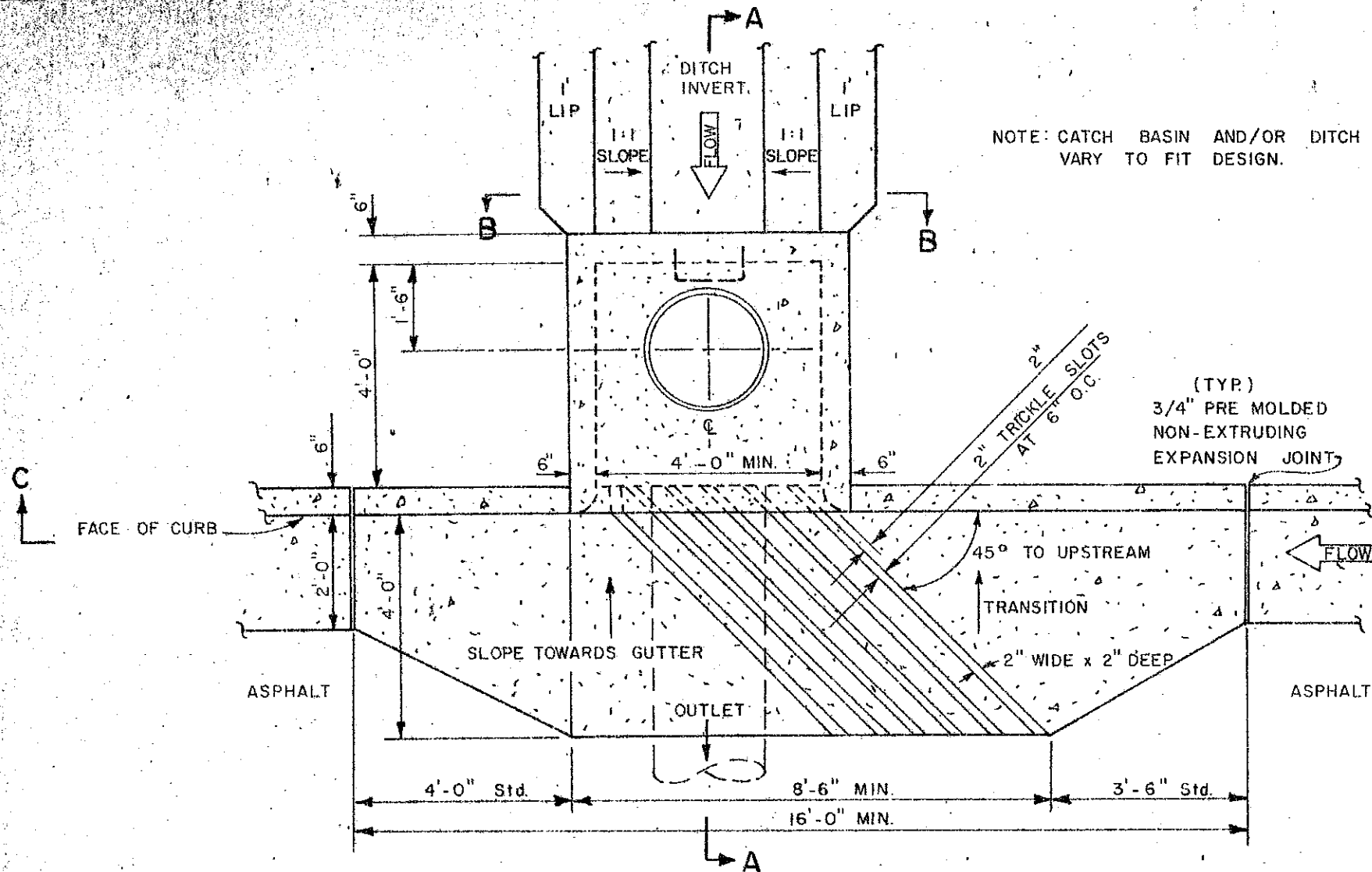
7. Cost Estimate of Facilities:

<u>Item</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Cost</u>
2x1 Conc. Ditch	490 LF	\$ 6.30	\$ 3087.00
Curb Outlet w=4'	6	350.00	2100.00
Curb Outlet w=8'	2	450.00	900.00
Std. Curb Inlet	2	350.00	700.00
12' Catch Basin	4	700.00	2800.00
10' Catch Basin	4	600.00	2400.00
8' Catch Basin	2	450.00	900.00
48" CMP	140 LF	25.00	3500.00
36" CMP	550 LF	17.00	9350.00
30" CMP	200 LF	12.00	2400.00
30" MFES	1 each	115.00	115.00
27" CMP	40 LF	11.00	440.00
24" CMP	90 LF	10.00	900.00
21" CMP	80 LF	9.00	720.00
18" CMP	500 LF	8.00	4000.00
18" MFES	5 each	60.00	300.00

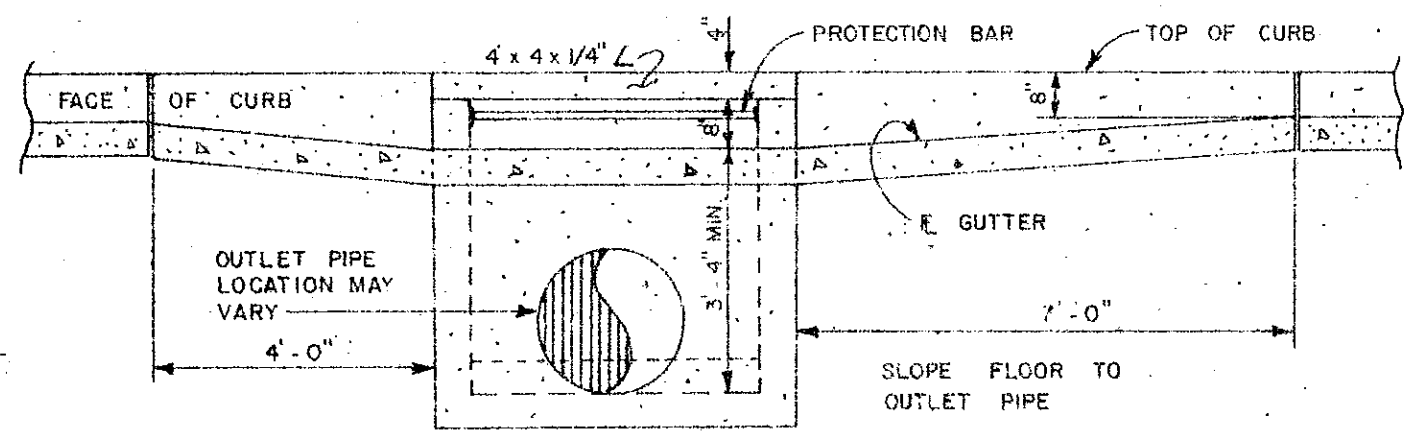
Subtotal-----\$34612.00
 10% Engr'g. & Cont.-----\$ 3461.20

TOTAL-----\$38073.20

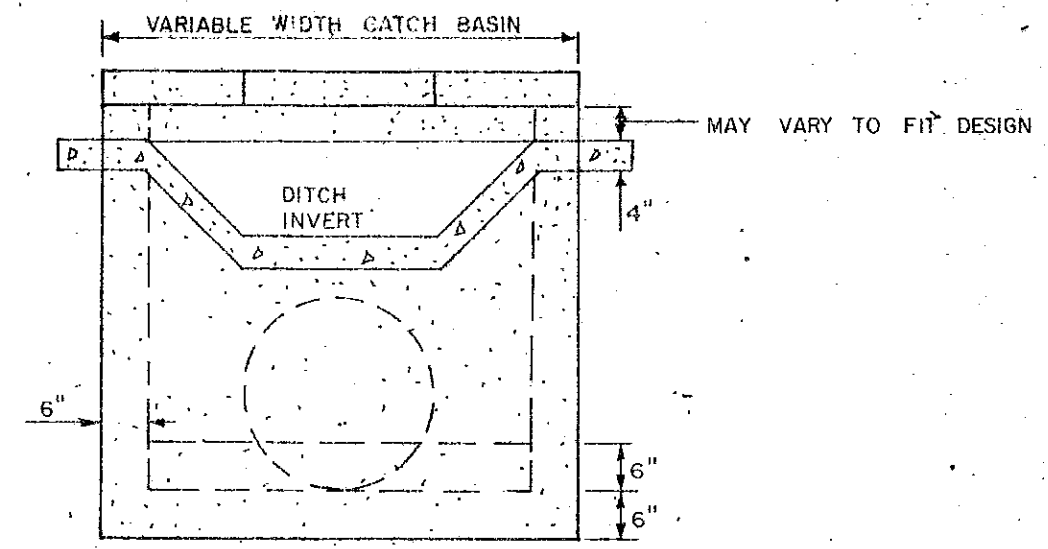
8. The developer is required to construct all facilities in accordance with a previous agreement and no drainage fees are to be assessed.



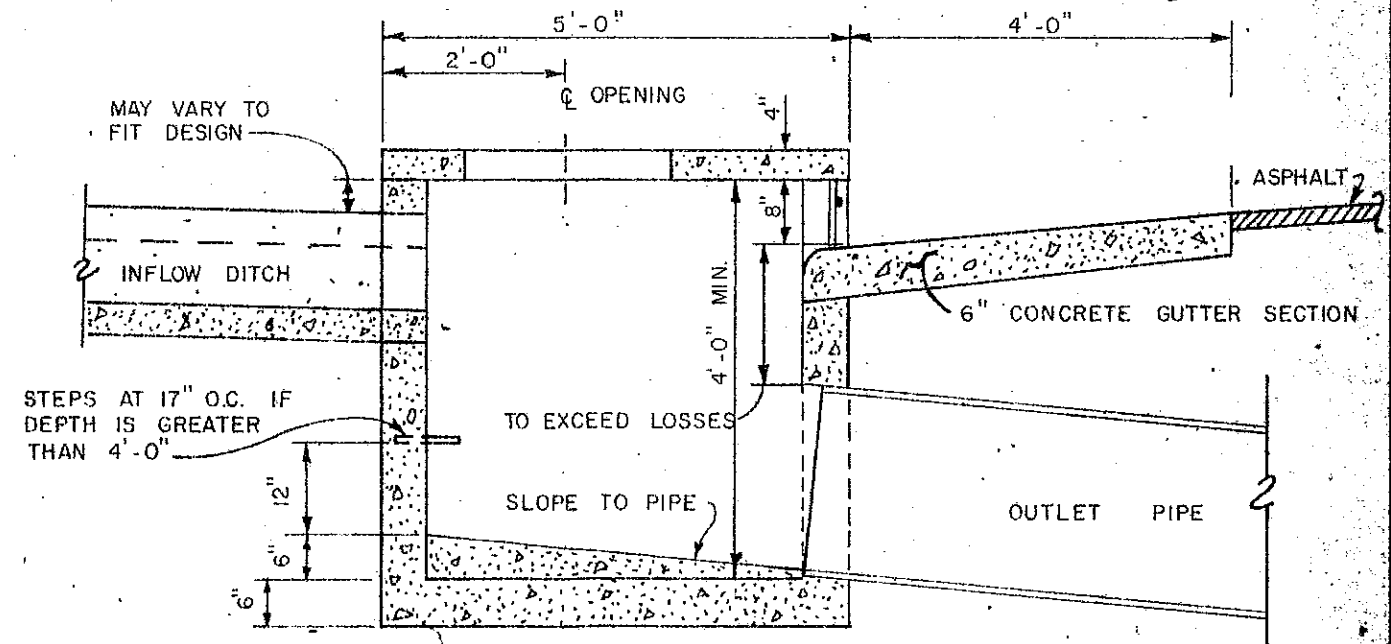
PLAN VIEW
3/8" = 1'



SECTION C-C
3/8" = 1'



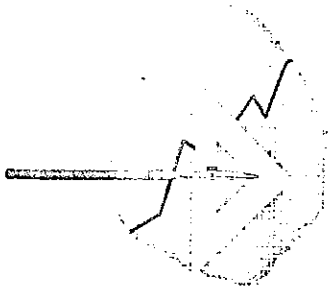
SECTION B-B
1/2" = 1'



SECTION A-A
1/2" = 1'

NOTE: SEE CITY DRAWING D-10R FOR ADDITIONAL DETAILS

CITY OF COLORADO SPRINGS
CATCH BASIN - MODIFIED TO
RECEIVE DITCH INFLOW
TYPE 2
B.E.J. MAY 72



Hartzell - Pfeiffenberger and Associates, Inc.

◦ engineers
◦ business consultants
◦ planners

210 St. Paul Street · Denver, Colorado 80206 · Phone 399-0360

May 10, 1972

Rec'd 5-11 06W

Mr. O. E. Watts
United Western Engineers
Suite 200
4525 Northpark Drive
Colorado Springs, Colorado 80907

Dear Mr. Watts:

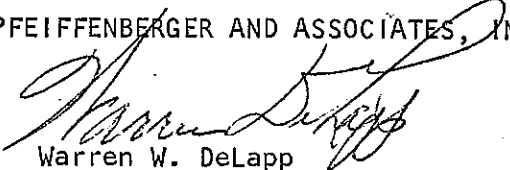
We have received and reviewed your revised drainage plan for the Gentry Innerspace Development and find the changes in general agreement with our discussion of May 2. From our standpoint at least this is a considerable improvement over the original plan.

Confirming the results of that meeting, we expect Gates Land Company to provide drainage facilities at the outfall points of your development which will be adequate to keep the maximum flows within the limits prescribed by the City. It is planned that these flows and smaller amounts from adjacent areas will be carried in pipe and gutters down Westmeadow Drive and discharged into the major storm drainage channel.

We are not aware of what agreement, if any, Gates has with Gentry for sharing the costs of these improvements.

Very truly yours,

HARTZELL - PFEIFFENBERGER AND ASSOCIATES, INC.


Warren W. DeLapp

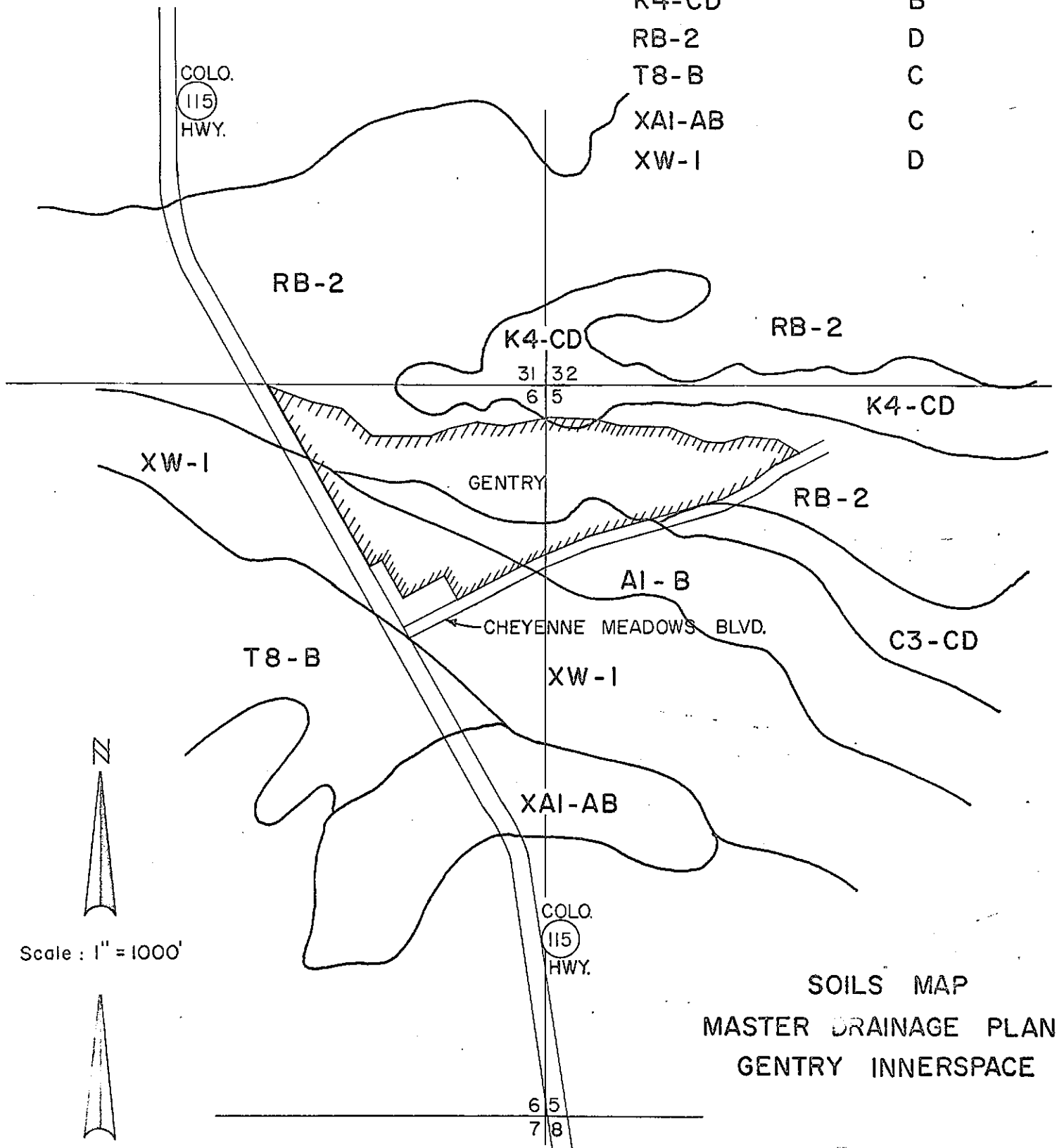
WWD:br

cc: Mr. Thomas O. Speer (w/copy of Watts' letter)

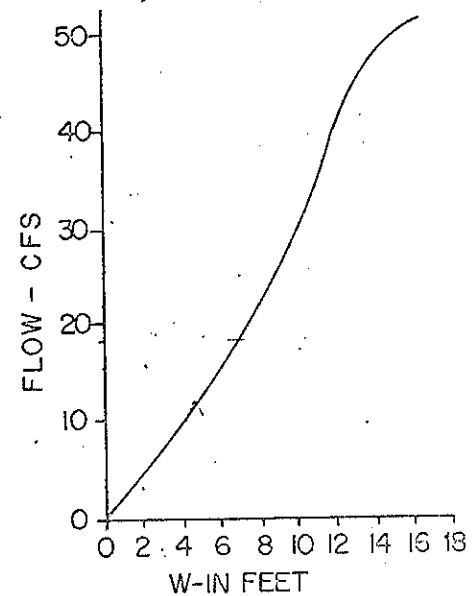
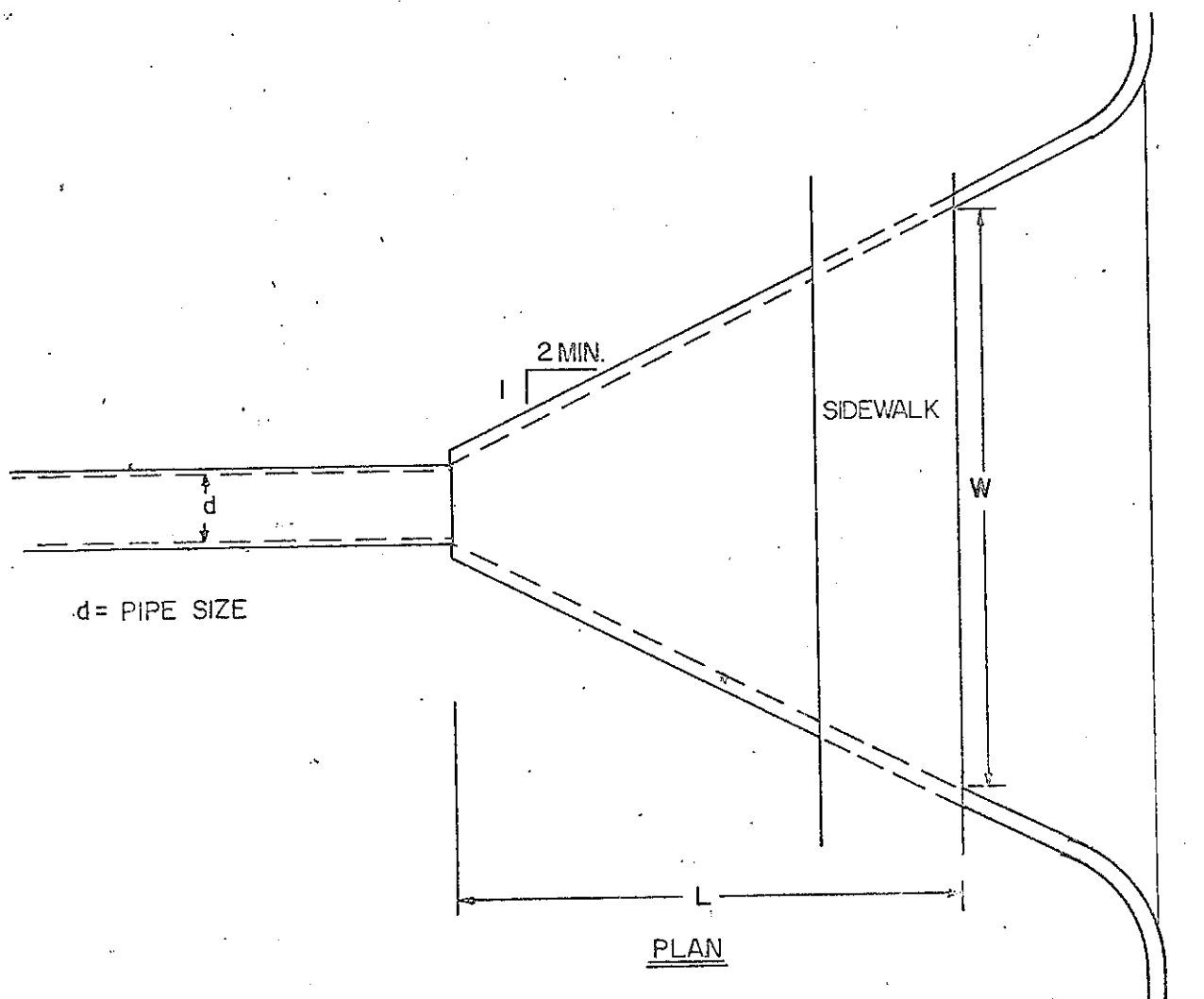
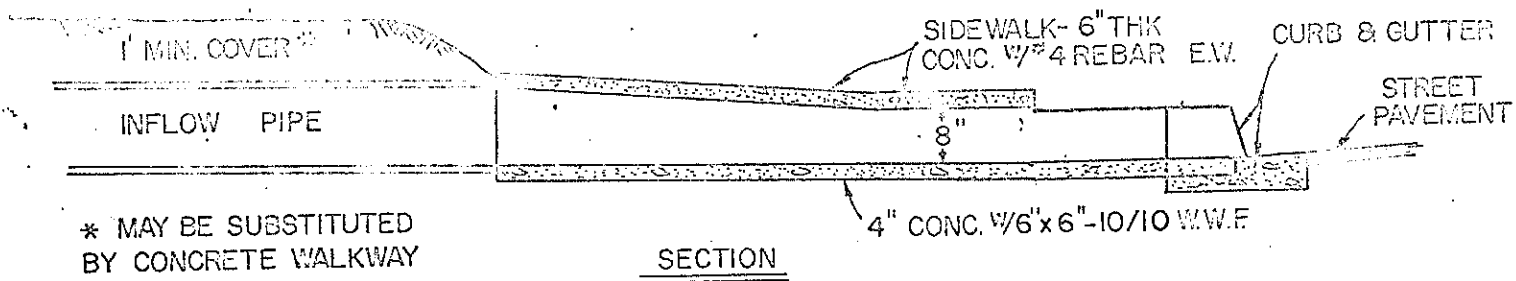
GENTRY AREA SOILS MAP

SOIL TYPES	HYDROLOGIC GROUP
AI - B	C
C3 - CD	D
K4 - CD	B
RB - 2	D
T8 - B	C
XAI - AB	C
XW - I	D

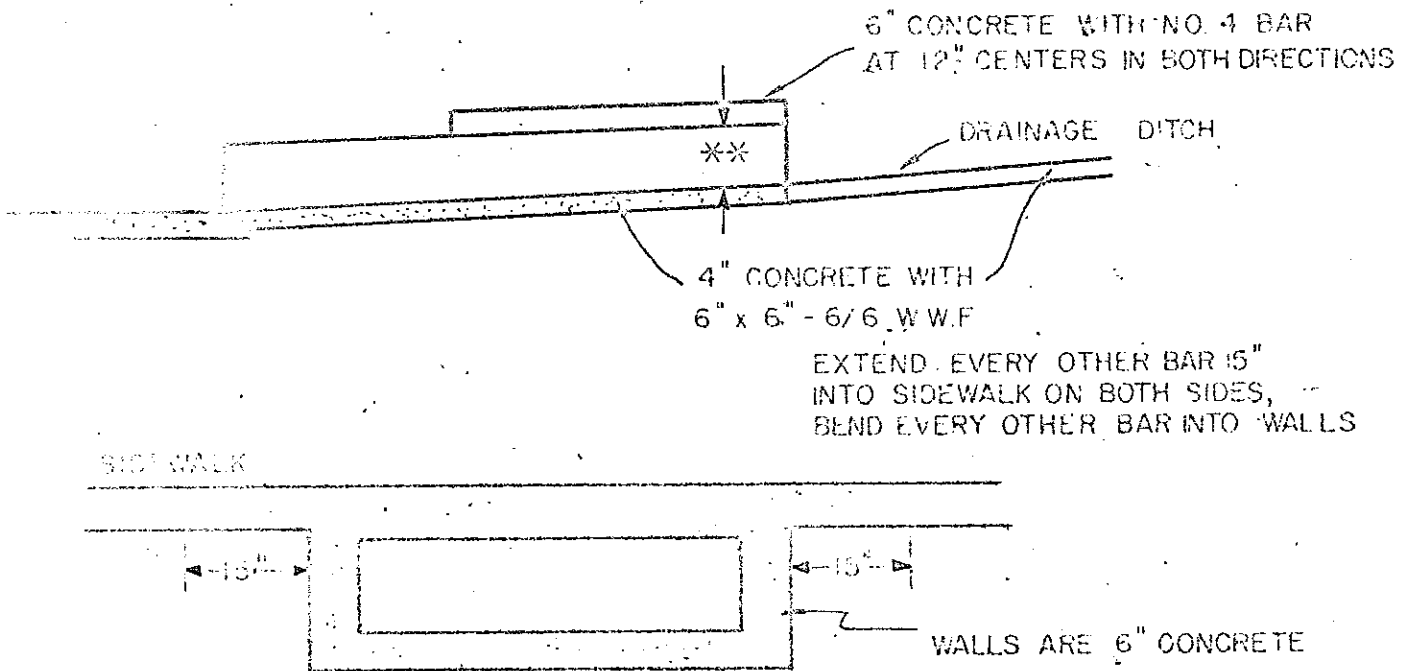
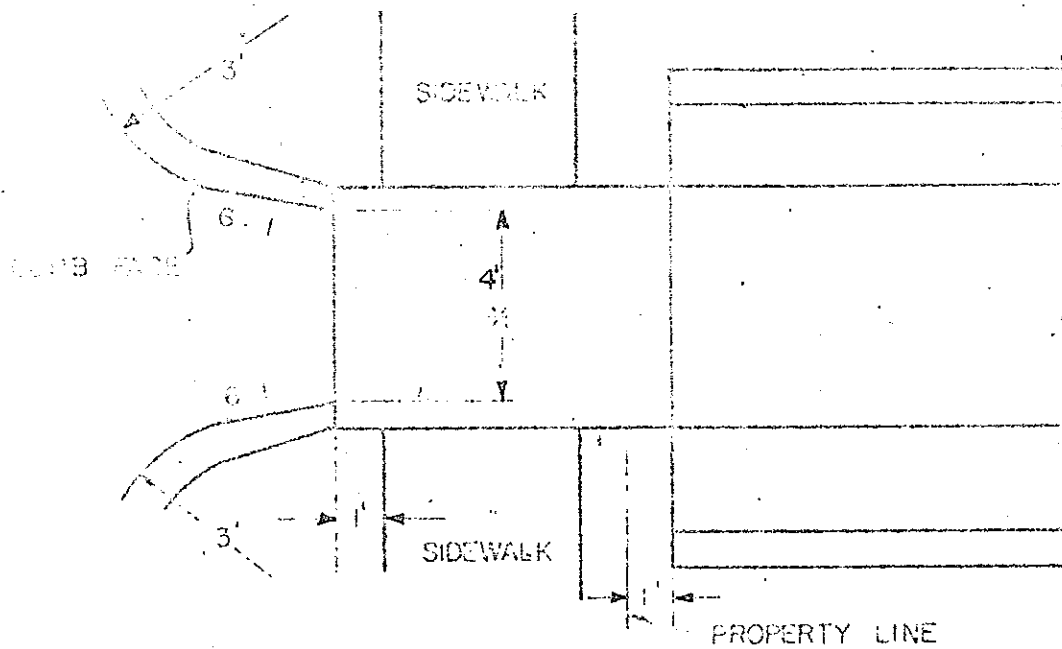
AI - B	C
C3 - CD	D
K4 - CD	B
RB - 2	D
T8 - B	C
XAI - AB	C
XW - I	D



SOILS MAP
MASTER DRAINAGE PLAN
GENTRY INNERSPACE



STREET OUTLET
FOR CULVERTS
SCALE 1"=5'



NOTES:

1. SIDEWALK MAY BE PLACED ANYWHERE FROM CURB TO PROPERTY LINE BY EXTENDING THE TOP SLAB TO MATCH THE POSITION OF THE SIDEWALK.
2. * VARIABLE DEPENDING ON QUANTITY OF WATER. MINIMUM 4"
3. ** VARIABLE DEPENDING ON QUANTITY OF WATER. MINIMUM 1"

CURB INLET

FIG. 67

M OR BASIN	SUB BASIN	AREA		BASIN		Tc	Land Use		Curve	TPO	FLOW		Tb
		Planim. Read	MILE	LENGTH	HEIGHT		Type Soil	%			Q	qp	
I	A	15.58	.00559	580	58	.022	S.F./D Und./B	.2 X 77 .8 X 74	79	.5252	0.55	2.83	1.40
	B	2.93	.00105	300	40	.022	Und./B	1 X 74	74	.5132	0.38	0.38	1.37
	C	8.84	.00317	525	57	.037	S.F./D Und./D	.2 X 97 .8 X 74	79	.5222	0.55	1.62	1.39
	D	5.43	.00195	370	57	.024	S.F./D Und./B	.1 X 97 .9 X 74	76	.5144	0.42	0.77	1.37
	E	7.79	.00279	375	53	.026	S.F./D Und./B	.25 X 97 .75 X 74	80	.5156	0.57	1.49	1.38
	F	4.62	.00166	350	56	.023	S.F./B Und./B	.1 X 94 .9 X 74	76	.5138	0.42	0.66	1.37
	G	8.86	.00318	410	45	.031	S.F./B Und./B	.2 X 94 .8 X 74	78	.5186	0.50	1.48	1.38
	H	9.67	.00347	410	63	.026	S.F./B Und./B	.1 X 94 .9 X 74	76	.5156	0.42	1.39	1.38
	I	41.33	.01483	950	77	.065	S.F./D Und./B	.3 X 97 .7 X 74	81	.5390	0.60	7.99	1.44
	J ₁	6.25	.00224	290	55	.019	S.F./B Und./B	.2 X 94 .8 X 74	78	.5114	0.50	1.06	1.37
	J ₂	7.56	.00271	270	66	.017	S.F./B Und./D Und./B	.1 X 94 .2 X 86 .7 X 74	78	.5102	0.50	1.29	1.36
	J ₃	6.61	.00237	245	74	.015	S.F./B Und./B Und./D	.1 X 94 .7 X 74 .2 X 86	78	.5090	0.50	1.13	1.36
	J ₄	5.19	.00186	360	78	.021	S.F./B Und./B Und./D	.1 X 94 .3 X 74 .6 X 86	83	.5126	0.72	1.26	1.37
	J ₅	5.62	.00202	480	72	.030	S.F./B Und./B	.1 X 94 .9 X 74	76	.5180	0.42	0.79	1.38
	K	19.23	.00690	470	77	.029	S.F./B Und./B S.F./D Und./D	.05 X 94 .15 X 74 .20 X 86 .60 X 86	87	.5174	0.90	5.81	1.38
I	L	14.24	.00511	420	85	.024	S.F./D Und./D	.1 X 97 .9 X 86	87	.5144	0.90	4.33	1.37

HYDROLOGIC COMPUTATION - BASIC DATA

PROJ: Gentry Innerspace Master

By: BEJ
Date: 4-7-72



planners · consultants · engineers
Suite 200
4525 Northpark Drive
Colorado Springs, Colo. 80907

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of
Pages 5

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc	Land Use		Curve	TPO	FLOW		Tb
		Planim. Read	MILE	LENGTH	HEIGHT		Type Soil	%			Q	qp	
I	M	15.07	.00541	770	71	.053	S.F. / D Und. / D	.2 x 97 .8 x 86	88	.5318	0.96	4.73	1.42
	N	14.81	.00531	650	71	.044	S.F. / D Und. / D	.2 x 97 .8 x 86	88	.5264	0.96	4.69	1.41
	O	5.21	.00187	280	75	.016	S.F. / D Und. / D	.1 x 97 .9 x 86	87	.5096	0.90	1.60	1.36
	P ₁	19.89	.00713	2050	87	.150	Rd. R/W Und. / D	.15 x 97 .85 x 86	88	.5900	0.96	5.62	1.58
	P ₂	9.06	.00325	1650	52	.140	Rd. R/W	1 x 97	97	.5840	1.70	4.58	1.56
	P ₃	7.78	.00279	1420	72	.105	Rd. R/W	1 x 97	97	.5630	1.70	4.08	1.50
	P ₄	2.02	.00072	400	27	.037	Und. / D Rd. R/W	.8 x 86 .2 x 97	88	.5222	0.96	0.64	1.39
I	P ₅	4.99	.00179	890	37	.080	Und. / D Rd. R/W	.8 x 86 .2 x 97	88	.5480	0.96	1.52	1.46

HYDROLOGIC COMPUTATION - BASIC DATA

PROJ: *Centry Innerspace Master*

By: *BET*
Date: *4-7-72*



planners · consultants · engineers
Suite 200
4525 Northpark Drive
Colorado Springs, Colo. 80907

"=10"
 $P_{\text{Red.}} \times 0.0003587 = S.M.$

= 1
 Rainfall (P) = 2"

runoff inches
 $T_{po} = \frac{1}{2} + 0.6 T_c$ or $\frac{48 T_c}{T_{po}}$
 $= 0.5 + 0.6 T_c$
 $T_{po} = 2.67 T_c$

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc	Land Use		Curve	TPO	FLOW		Tb
		Planim. Read	MILE	LENGTH	HEIGHT		Type Soil	%			Q	qp	
II	A	10.22	.0037	830	36	.075	SF/D	1.0 x 97	97	.5450	1.70	1.46	
	B	1.89	.0007	490	10 G.B.	.058	G.B/D	1.0 x 80	80	.5348	0.57	0.36	
III	A	10.04	.0036	430	20	.046	SF/D	1.0 x 97	97	.5276	1.70	1.41	
	B	8.35	.0030	530	20	.057	SF/D	1.0 x 97	97	.5342	1.70	1.43	
IV	A	11.64	.0042	480	4.8 1% 1%	.090	MF/C MF/D	.7 x 97 .3 x 97	97	.5540	1.70	1.48	
	B	16.65	.0060	760	7.6 1%	.125	MF/C,D	1.0 x 97	97	.5750	1.70	1.54	
	C	12.94	.0046	650	6.5 1%	.115	MF/C,D	1.0 x 97	97	.5690	1.70	1.52	
	D	4.63	.0017	770	11 G.B.	.110	G.B./C,D	1.0 x 80	80	.5660	0.57	0.83	
	E	5.85	.0021	330	19	.034	SF/C SF/D	.1 x 96 .9 x 97	97	.5204	1.70	1.39	
	F	10.06	.0036	490	27	.046	SF/D	1.0 x 97	97	.5276	1.70	1.41	
	G	8.12	.0029	450	28	.040	SF/D	1.0 x 97	97	.5240	1.70	1.40	
	H	9.66	.0035	470	4.7 1%	*.086	MF/C	1.0 x 97	97	.5516	1.70	1.47	
	I	5.55	.0020	360	3.6 1%	*.074	MF/C	1.0 x 97	97	.5442	1.70	1.45	
	J	13.84	.0050	650	6.5 1%	.114	MF/C MF/D	.5 x 97 .5 x 97	97	.5684	1.70	1.52	

HYDROLOGIC COMPUTATION - BASIC DATA

PROJ: Gentry Innerspace Master

By: B E G
 Date: 4-7-72



planners - consultants - engineers
 Suite 200
 4525 Northpark Drive
 Colorado Springs, Colo. 80907

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 of
 Pages 5

* Not on chart,
 approx Tc

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc	Land Use		Curve	TPO	FLOW		Tb
		Planim. Read	MILE	LENGTH	HEIGHT		Type Soil	%			Q	qp	
IV	K	4.49	.0016	550	G.B. 2.0	.059	G.B./D	1x80	80	.5354	0.57	0.82	1.43
	L	1.02	.0004	160	G.B. 12	*.017	G.B./D	1x80	80	.5102	0.57	0.22	1.36
	M	1.09	.0004	230	G.B. 23	*.022	G.B./D	1x80	80	.5132	0.57	0.22	1.37
	N	13.70	.0049	720	28	.072	SF/D	1x97	97	.5432	1.70	7.42	1.45
V	A	16.74	.0060	650	1% 6.5	.112	MF/C	1x97	97	.5672	1.70	8.70	1.51
	B	7.29	.0026	950	G.B. 34	.090	G.B./C,D	1x80	80	.5540	0.57	1.29	1.48
	C	10.18	.0037	530	1% 5.3	.095	MF/C	1x97	97	.5570	1.70	5.47	1.49
	D	4.06	.0015	320	1% 3.2	*.065	MF/C,D	1x97	97	.5390	1.70	2.29	1.44
	E	7.30	.0026	310	1% 3.1	*.065	MF/C,D	1x97	97	.5390	1.70	3.97	1.44
	F	7.69	.0028	520	1% 5.2	.098	MF/C,D	1x97	97	.5588	1.70	4.12	1.49
VI	A	9.40	.0034	610	1% 6.1	.110	MF/D	1x97	97	.5660	1.70	4.94	1.51
	B	8.16	.0029	710	G.B. 3.3	.065	GB/D	1x80	80	.5390	0.57	1.48	1.44
	C	16.78	.0060	640	2.3	.067	SF/D	1x97	97	.5402	1.70	9.14	1.44
	D	1.08	.0004	210	G.B. 10	*.030	GB./D	1x80	80	.5180	0.57	0.21	1.38

HYDROLOGIC COMPUTATION - BASIC DATA

PROJ: Gentry Innerspace Master

By: VSF
Date: 4-7-72



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MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc	Land Use		Curve	TPO	FLOW		Tb
		Planim. Read	MILE	LENGTH	HEIGHT		Type Soil	%			Q	qp	
<u>VI</u>	E	25.00	.0090	1100	57	.086	SF/D	1x97	97	.5516	1.70	13.42	1.47
<u>VII</u>	A	21.22	.0076	810	56	.061	SF/D	1x97	97	.5366	1.70	11.65	1.43
<u>VIII</u>	A	12.04	.0043	510	43	.040	SF/D	1x97	97	.5240	1.70	6.75	1.40
<u>II</u>	A	6.53	.0023	380	22	.038	SF/D	1x97	97	.5228	1.70	3.62	1.40

HYDROLOGIC COMPUTATION - BASIC DATA

PROJ: Gentry Innerspace Master

By: BEJ
Date: 4-7-72



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Street and Storm Sewer Calculations

UNITED
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Project Centry-Innerspace Page 1 of 9
 Calc. by CEA date 5-9-72
 Checked by DMJ date 5-10

STREET	LOCATION	DIST	ELEVATION & SLOPE	TOTAL RUNOFF	STREET FLOW CAPACITY	PIPE FLOW	TYPE PIPE, CATCH BASIN & SLOPE %
Innerspace Sq.	West End		5961 ²	10.1	8" Vert. Curb		
	10' catch Basin		.01	21.6	2 ^{1/2} / 41.7	21 ⁶	10' catch Basin w/24" cnp - 1% min 80' - 21" cnp - 6% min 90' - 30" cnp - 2% min to 8' curb outlet
Intersection	Innerspace Dr.		5953 ²	6.8	Ramp Curb 6.8 / 11.6		
Innerspace C. & W. West Branch	North End		5949 ²	18.5	8" Vert. Curb 18.5 / 59.0		
	8' catch Basin Intersection		5939 ²	27.1		12 ²	8' catch Basin w/24" cnp - 1% min
Innerspace C. & W. East Branch	North End		5949 ²	21.6	8" Vert. Curb 21.6 / 59.0		
	8' catch Basin		.02	29.1		12 ²	8' catch Basin w/24" cnp - 1% min

Street and Storm Sewer Calculations

UNITED
WESTERN
ENGINEERS

Project County - Innerspace Page 2 of 4
 Calc. by CEA date 9 May '72
 Checked by cmj date 5-10

STREET	LOCATION	DIST	ELEVATION & SLOPE	TOTAL RUNOFF	STREET FLOW CAPACITY	PIPE FLOW	TYPE PIPE, CATCH BASIN & SLOPE %
Innerspace Dr. W.	12' Catch Basin	170	5939 [±] .01	56 [±]	8" Vert. Curb 32.2/11.7	24	2-8' Catch Basin 160' - 36" cnp - 1% min
	12' Catch Basin	140	5938 [±] 32.5 HGW HGL = 1.78' 35.0 W4 .01	56 [±]	0 / 41.7	32.2	2-12' Catch Basin w/ 30" cnp - 1% min 140' - 48" cnp - 0.7% min to Drainage Channel outfall Inv. El. 5932 [±]
	Innerspace Dr. Int.		5933 [±]	6.2	Ramp Curb 6.2/16.1		
Innerspace Dr.	Highest Pt on North		5963 [±] .005	1.9	Ramp Curb 1.9/11.6		Ramp Curb
	Vert. P.I		5959 [±] .03	11.0	Ramp Curb		
	Inters. Innerspace Sq.		5953 [±] .03	22.1	22.1/28.4 8" Vert. Curb		
	2-8" C.B.		5933 [±] .01	36.7	36.7/72.2 8" Vert. Curb	32.0	2-10' Catch Basin w/ 27" cnp - 1% min. - 36" cnp - 1%
	Cheyenne Mead. Blvd.		5930 [±]	48.1	16.1/41.7	32.0	

Street and Storm Sewer Calculations

STREET	LOCATION	DIST	ELEVATION & SLOPE	TOTAL RUNOFF	STREET FLOW CAPACITY	PIPE FLOW	TYPE PIPE, CATCH BASIN & SLOPE %
Inner Space Dr.	No. High Pt		5963.5 .005 8" V.C.	8.2	8.2/29.5	-	
	Pt E		5960.25 .02 8" V.C.	20.2	20.2/29.5		
	Cheyenne Mead. Blvd			34.9	34.9/59.2		
Virage Way	No. End		.02 ramp curb	11.5			
	Cheyenne M. Blvd			14.0	14.0/23.2		
Sartre Lane			.02	11.6			
	Cheyenne M. Blvd		ramp curb	8.9	8.9/23.2		
Inner Space Ct.	West End		5941.6 .005 ramp curb	0			
	East End		5933.2	7.5	7.5/11.6		
Inner Space Cir. E.	West End		5933.2 .005 ramp curb	0			
			5934.8	5.5	5.5/11.5		

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Project County Improvement
 Calc. by CEH
 Checked by CEH
 date 5-9-72
 date 5-10
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Culvert & Channel Calculations

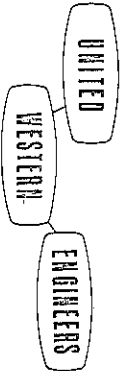
Culvert Capacities

$Q = 0.963 / 0.026$

D 8 1/2 S 1/2

all culverts cut

AREA	LOCATION & DISTANCE	ELEV & S%	S 1/2	Q50 Capacity	D 8/3	D	S F AREA	USE DITCH	CULVERT ETC.	TIME HRS
Innerspace Crd		0.010	0.10	16.8					27"	
		0.010	0.10	36.1	18.72	3.00			36"	
		0.010	0.10	22.2	11.51	2.50			30"	
		0.0178	0.1334	103.8	40.32	4.00			48"	
Innerspace Dr.		0.010	0.10	12.2	6.350	2.00			24"	
		0.010	0.10	36.1	18.72	3.00			36"	
Innerspace Sq.		0.040	0.20	11.4	2.948	1.50			18"	
		0.020	0.1414	31.4	11.51	2.50			30"	
		0.063	0.2370	21.6	4.447	1.75			21"	
18" Eulets		0.010	0.10	5.7	2.948	1.50			18"	



Project Gentry Innerspace Page 4 of 9
 Calc. by [Signature] date 5-10-72
 Checked by _____ date _____