CITY OF ALBUQUERQUE

April 14, 2006

Dennis Lorenz, P.E.
Brasher & Lorenz
2201 San Pedro NE, Building 1 Suite 1200
Albuquerque, NM 87110

Re: Carestone at Quintessence Expansion, 7101 Eubank Blvd NE, Grading and Drainage Plan
Engineer's Stamp dated 2-27-06 (D21-D3A)

Dear Mr. Lorenz,

Based upon the information provided in your submittal received 3-01-06, the above referenced plan is approved for Building Permit. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology. Prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

If you have any questions, you can contact me at 924-3981.

Sincerely,

Kristal D. Metro, P.E.
Senior Engineer, Planning Dept.
Development and Building Services

C: File

P.O. Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

CITY OF
Albuquerque

October 26, 1998

Dennis A. Lorenz, P.E.
Brasher & Lorenz, Inc.
2201 San Pedro NE Building 1, Suite 210
Albuquerque, New Mexico 87110

RE: ***Engineer's Certification for Hearthstone Assisted Living (D21/D3A) Submitted for Certificate of Occupancy Approval, Engineer's Stamp Dated 10/21/98.***

Dear Mr. Lorenz:

Based on the information provided, the above referenced Engineer's Certification for the Hearthstone Assisted Living Facility at 7101 Eubank Boulevard NE is adequate for Certificate of Occupancy release.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Andrew Garcia, City Hydrology
Elizabeth Mason, Hearthstone Assisted Living
File

DRAINAGE REPORT

FOR

HEARTHSTONE ASSISTED LIVING

Albuquerque, New Mexico

Prepared By:

BRASHER & LORENZ, INC.
Consulting Engineers
San Pedro NE Suite 210
Albuquerque, New Mexico 87110

May 1997

PURPOSE AND SCOPE

Pursuant to the established Drainage Ordinance for the City of Albuquerque and the Development Process Manual, this Drainage Report outlines the drainage management criteria for controlling developed runoff from the project site. The property is to be developed as a Hearthstone Assisted Living Facility. Paving, landscaping, utility, grading, and drainage improvements will be provided to support the project. The scope of this plan is to provide drainage criteria for the safe management of excess runoff, and design detail for the construction of the required grading, paving and drainage improvements.

SITE DESCRIPTION

The project site is approximately 2.3 acres in size and is located at the northwest corner of the Eubank Boulevard and Es Salt NE (See Figure 1). Presently the site is undeveloped. The site is vegetated with native grasses and shrubs. Site terrain slopes east to west at approximately 5 percent. A natural ridge line is located through the midsection of the site which divides the site into 2 drainage basins. The site is presently described as Lots 1,2,31 & 32, Block 20, Tract 3, Unit 1, North Albuquerque Acres. The site is bounded on the east by Eubank Boulevard, on the south by Es Salt Road, on the west by residential properties, and on the north by a public detention pond.

On-site soils consist mainly of Embudo and Tijeras soils (See Figure 2). These soils are found on alluvial fans on the east mesa. Slopes range from 1 to 9 percent. Runoff and the hazard of wind and water erosion is moderate. Both soils ares classified as hydrologic group "B" soils.

As shown by the attached FIRM Panel, this site is impacted by a designated flood hazard zone (see Figure 3). An encroachment occurs at the northwest corner of the site from the North Pino Arroyo. Improvements constructed by Quintessence have removed the floodplain from the property. FEMA approval of a LOMR request is pending.

EXISTING DRAINAGE MASTERPLAN

The drainage criteria for this site is established by the following Drainage Masterplan:

1. **Drainage Report for Quintessence Subdivision**, prepared by Community Sciences Corporation, dated September 19, 1995.

   This Drainage Report was prepared to support the development of Quintessence Subdivision, located within the Quintessence Sector Development Plan area. The Quintessence Subdivision is located north and west of Hearthstone, and provides the public infrastructure which Hearthstone will utilize. Quintessence provided the following public infrastructure:

A. Collection structure, 72 inch storm drain and regional detention pond located at Eubank, north of Santa Monica, which removes the floodplain resulting from the North Pino Arroyo.

B. Downstream paving and storm drains located within Es Salt Avenue which allow free discharge of runoff from Hearthstone.

C. Temporary paving improvements to Eubank Boulevard and Es Salt Avenue, including a temporary dip section at Es Salt which conveys existing runoff south to the Pino Arroyo located within the Tanoan Golf Course.

D. Water, sanitary sewer, gas, electric and telephone lines.

In summary, the Quintessence Report programmed the site to fee discharge into 1) the Quintessence East Detention Pond, and 2) Es Salt Road and downstream storm drain.

EXISTING DRAINAGE CONDITIONS

As shown by Figure 4, the project site is bisected into 2 small on-site basins. Basin "I" drains north and west to the existing public detention pond located immediately north of the site. Basin "II" drains west and south into Es Salt Road. Presently, Es Salt exists as a temporary roadway with a "dip" section located at a natural low point just south of the site. On-site flows from Basin "II" and Off-site Basin "OS-1" exit Es Salt through the dip section and drain southwesterly through the Masters at Tanoan and into the Pino Arroyo, which flows through the Tanoan Golf Course.

The site is impacted by off-site flows originating east of Eubank Boulevard. As shown by Figure 5, Basin "OS-1", a 15.75 acre basin located east of Eubank, drains across Eubank, through the site and into Es Salt Road. These flows combine with on-site Basin "II" flows and drain into the golf course as described above.

North of the site is the recently constructed Quintessence East Detention Pond, which collects flows from the North Pino Arroyo and contributing basins. The pond provides a storage volume of 8.3 acre feet, which includes approximately 2.3 acre feet reserved for sediment storage. A 72 inch storm drain conveys the North Pino floodplain flows from a collection structure located east of Eubank and north of Santa Monica to the detention pond. The detention pond drains west to the Quintessence West Detention Pond, located just east of Holbrook Street. The West Detention Pond drains into the North Pino Arroyo, which is concrete lined through Heritage Hills Subdivision. These improvements remove the floodplain from the site, as well as Quintessence. FEMA approval of the LOMR request is pending.

South of the site the Eubank Extension Project has recently been completed. This project provided street improvements from Academy, north to Es Salt Road. Storm drainage improvements were provided at the Pino Arroyo crossing to provide an outfall

for street flows generated by Eubank between Academy and Es Salt. No provision was made to collect runoff from off-site Basin "OS-1". As described above, Basin "OS-1" drains across Eubank into Es Salt and exists through a dip section south of Hearthstone.

Summary of Existing Flows

Basin	Description	100 yr/6 hr peak (cfs)
I	2.57 acre on-site basin which drains to the Quintessence East Pond	5.7
II	1.45 acre on-site basin which drains to Es Salt Avenue	3.2
OS-1	15.75 acre basin originating east of Eubank which drains to Es Salt dip section	38.5

PROPOSED CONDITIONS

As shown by the Plan, the project consists of the development of the property into an Assisted Living Facility, with associated paving, utility landscaping and drainage improvements. The Plan shows the elevations required to properly grade and construct the recommended improvements. The direction of drainage flows are given by flow arrows and on-site drainage basins are identified. All drainage improvements recommended by the Plan are detailed on Grading and Drainage Plan located in the back pocket of this report.

On-site drainage basins

The site will discharge excess runoff to 2 public drainage systems. On-site Basins A, B and C will drain south into Es Salt Road. Es Salt will be reconstructed to remove the temporary dip section. Removal of the dip section results in all runoff being conveyed approximately 900' west to the drop inlets and storm drain provided by Quintessence. The storm drain outfalls at the West Detention Pond. On-site Basins D, E and F will discharge into the Quintessence East Detention Pond. Basins D and E will be collected by an on-site storm drain which will drain by direct connection to the East Detention Pond. Basin F represents the existing public trail system, which will continue to surface flow into the pond.

Off-site drainage basins

The project is impacted by 3 off-site drainage basins. Basin OS-1 is a 15.75 acre basin located east of Eubank. By Drainage Ordinance developed runoff from this basin will not be allowed to cross Eubank (a principal arterial street) as surface flow. Unfortunately,

the Eubank Extension Project did not make provisions to collect this flow. This Plan recommends the construction of a storm drain with a drop inlet collection system located at San Antonio, at the Eubank east right-of-way, to prohibit surface drainage from crossing Eubank. A likely corridor for the storm drain is behind the west curb adjacent to the Eubank west right-of-way line, outfalling at the Pino Arroyo crossing structure. A programmed City project to construct Eubank from Es Salt/San Antonio, south to the terminus of the Eubank Extension Project will provide the required storm drain.

During the interim, existing excess runoff will be allowed to cross Eubank. It is anticipated that existing flows will drain into Eubank and flow south to the Pino Arroyo crossing. It is possible that a division of flows could occur, sending a portion of the runoff down Eubank and the remainder down Es Salt. Existing drop inlets will drain the flows in either case. Some temporary ponding and sedimentation problems are expected, since downstream drainage improvements were not designed to drain off-site flows.

Summary of Developed Flows

Basin	Description	100 yr/6 hr peak (cfs)
A	0.90 acre basin draining to Es Salt	4.2
B	0.36 acre basin draining to Es Salt	1.9
C	0.08 acre basin draining to Es Salt	0.3
D	0.72 acre basin draining by storm drain to the East Detention Pond	3.4
E	0.55 acre basin draining by storm drain to the East Detention Pond	2.7
F	0.17 acre basin draining to the East Detention Pond	0.7
OS-1	15.75 acre basin originating east of Eubank that will be collected by future storm drain	49.6
OS-2	1.46 acre basin representing future Eubank	7.0
OS-3	0.36 acre basin representing future Es Salt	1.8

TEMPORARY EROSION CONTROL PLAN

1. The intent of the Temporary Erosion Control Plan (see back Pocket) is to limit the

discharge of sediment into the public street and/or storm drainage system and to protect adjacent properties from excess runoff during construction.

2. The Contractor shall obtain a Top Soil Disturbance Permit from Environmental Health prior to performing any earthwork related operations.

3. After the initial site clearing, the temporary erosion control facilities should be constructed per the Plan to direct excess runoff and sediment the outfall locations.

4. It is the Contractor's responsibility to properly maintain all temporary erosion control facilities during the construction phase of the project.

50 0 25 50

1 inch = 50 ft.

LOT 16

LOT 17

OS-1

OS-2

EXISTING 60' PUBLIC ACCESS & UTILITY EASEMENT

30'

30'

78' ROW TO BE DEDICATED BY OWNER

EUBANK BLVD NE

10'

15'-R

A

4'-R TYP.

25'R TYP.

ES SALT ROAD NE

TRACT 155-A-1

OS-3

EXISTING 30' PUBLIC ACCESS & UTILITY EASEMENT

46' PUBLIC R.O.W TO BE DEDICATED BY OWNER

10' ROADWAY EASEMENT

FENCE

F

E

D

B

C

4'R TYP.

36' F/F

EXISTING 30' PUBLIC ACCESS & UTILITY ESMT

LANDSCAPED COURTYARD

E-1

B-1

18" SD

TW 12.0

TW 12.0

TW 12.0

TW 9.00

50'

****

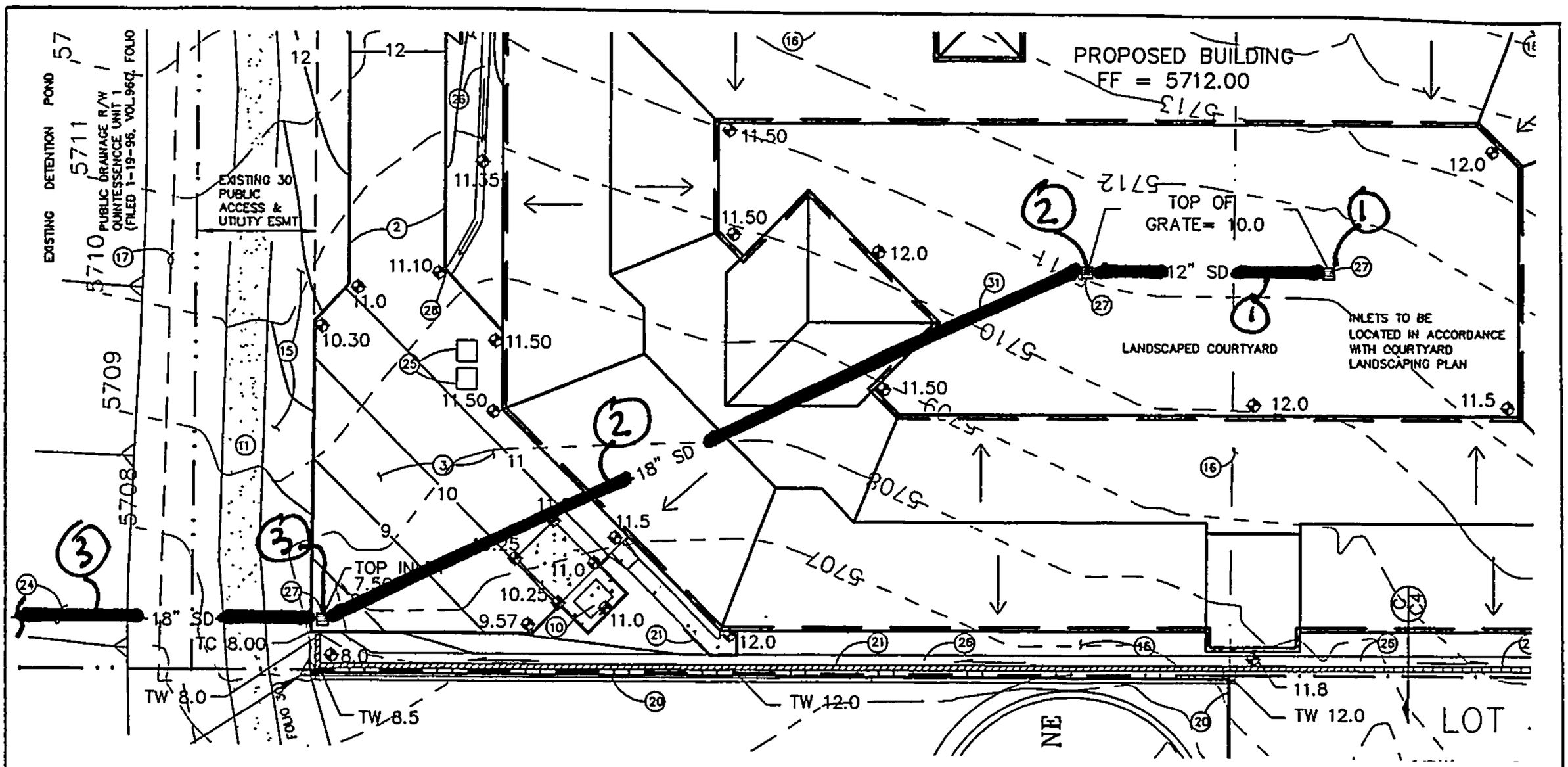
DEVELOPED DRAINAGE BASIN
FIGURE 6

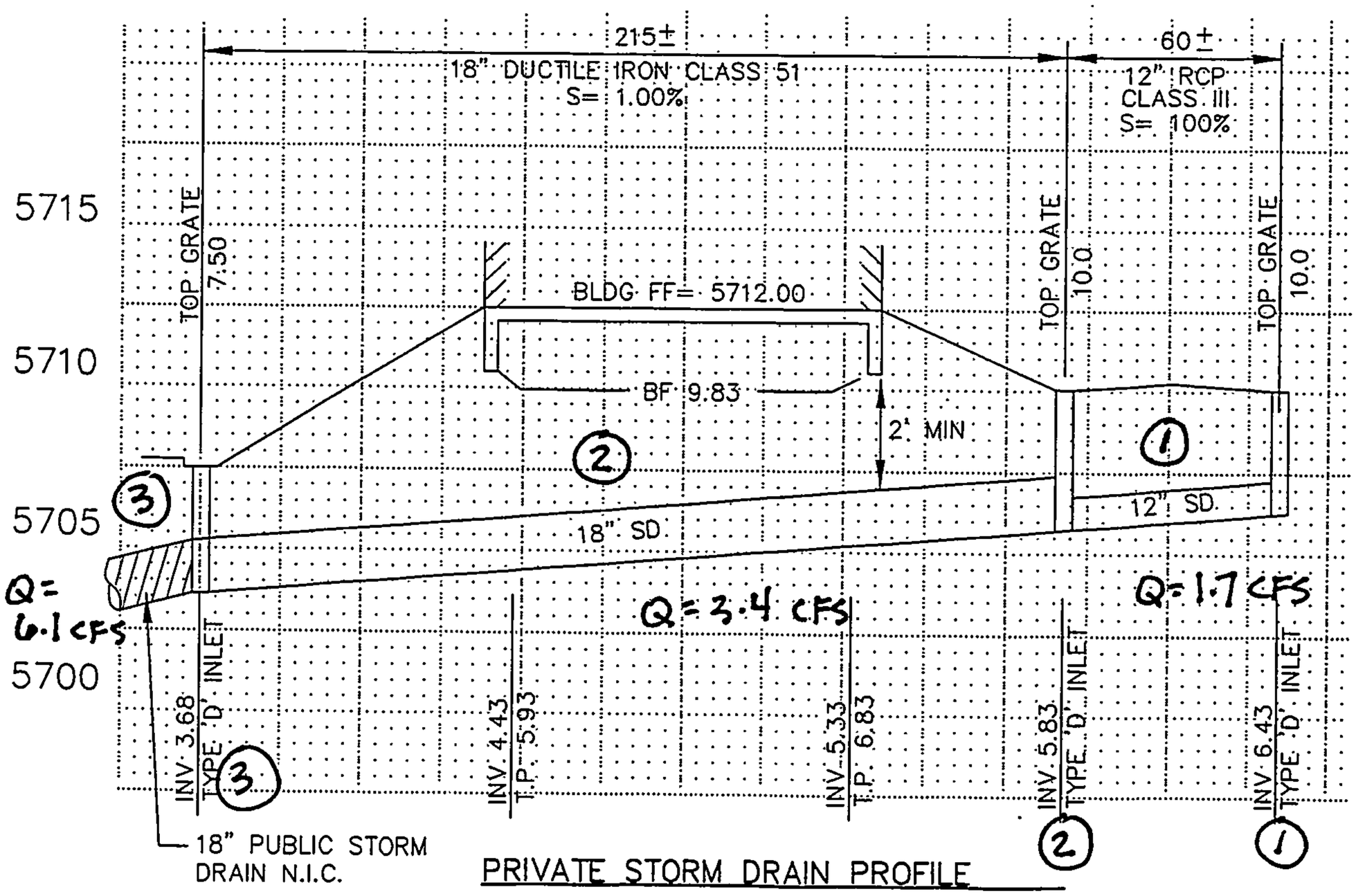
PROJECT NAME HEARTHSTONE JOB NO. 7005

SUBJECT INFRASTRUCTURE CAPACITIES.

BY DL CHECKED BY _____ DATE 5-27-97 PAGE 1 OF _____

PRIVATE STORM DRAIN





PRIVATE STORM DRAIN PROFILE

BRASHER & LORENZ, INC.
Consulting Engineers

PROJECT NAME HEARTHSTONE JOB NO. 7005

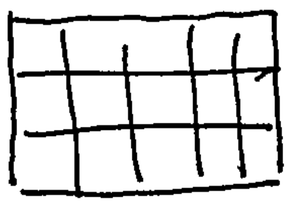
SUBJECT INFRASTRUCTURE CAPACITIES.

BY DL CHECKED BY _____ DATE 5-27-97 PAGE 2 OF _____

PRIVATE STORM DRAIN

(1.) INLET CAPACITY

CHECK BY WEIR FOR $H \leq 4''$



TYP 'D' INLET GRATING
$P = 130'' = 10.83'$

WEIRS

Enter up to 10 weirs.
Enter <Return> only for flowrate and length to end.

FLOWRATE (CFS)	LENGTH (FT)	COEFF (-)	HEAD (FT)	INLET #
1.70	10.8	2.500	0.16	1 + 2
2.70	10.8	2.500	0.22	3

(2) CHECK SD PIPE FOR INLET CONTROL

ORIFICES

Enter up to 10 orifices.
Enter <Return> only for flowrate and area to end.

FLOWRATE (CFS)	INLET #	AREA (SF)	COEFF (-)	ELEVATIONS HEADWATER (FT)	ELEVATIONS CENTER (FT)	ELEVATIONS TAILWATER (FT)	AVAIL. H (FT)
1.70	1	0.79	0.600	0.70	0.50	0.50	3.07'
3.40	2	1.77	0.600	0.91	0.75	0.75	3.4'
6.10	3	1.77	0.600	1.26	0.75	0.75	3.07'

PROJECT NAME HEARTHSTONE JOB NO. 7003

SUBJECT INFRASTRUCTURE CAPACITIES.

BY DL CHECKED BY _____ DATE 5-27-97 PAGE 3 OF _____

(3) PIPE FLOW

SEWER PIPES

Enter up to 10 pipes.
Enter <Return> only for flowrate and diameter to end.

LINE #	FLOWRATE (CFS)	DIAMETER (IN)	FRICTION (FT^1/6)	SLOPE (%)	VELOCITY (FPS)	ACTUAL DIA (IN)
1	1.70	9.09	0.0130	1.00	3.77	12
2	3.40	11.79	0.0130	1.00	4.48	18
3	6.10	8.73	0.0130	16.00	14.68	18

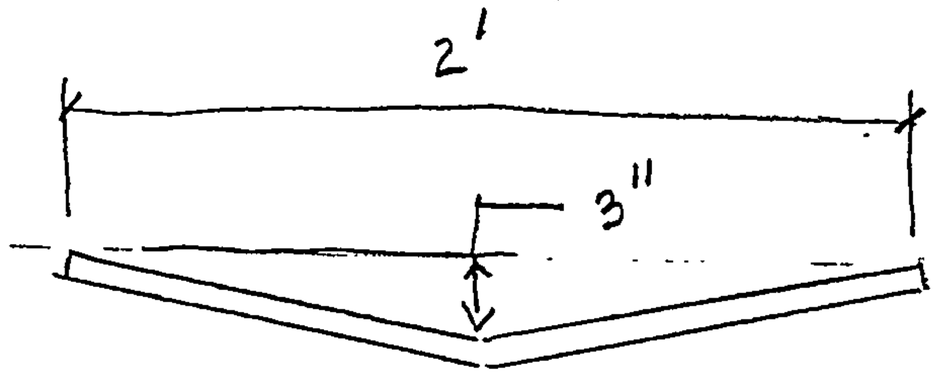
BRASHER & LORENZ, INC.
Consulting Engineers

PROJECT NAME HEARTHSTONE JOB NO. 7005

SUBJECT INFRASTRUCTURE CAPACITIES.

BY DL CHECKED BY _____ DATE 5-27-97 PAGE 4 OF _____

BASINS B-1, E-1 VALLEY GUTTER



SECTION

Q_{100} (B-1) = 0.53 CFS

Q_{100} (E-1) = 0.78 CFS

MAN-MADE CHANNELS

VARIABLES LIST:

Y - FLOW DEPTH	B - CHANNEL BOTTOM WIDTH	S - CHANNEL SLOPE
Q - FLOWRATE	M - CHANNEL SIDE SLOPE	N - CHANNEL ROUGHNESS

VARIABLE TO BE SOLVED (Y,Q,B,M,S OR N) ? Y

Q (CFS)	? 0.80
B (FT)	? 0
M (FT/FT)	? 3
S (FT/FT)	? 0.01
N (FT^1/6)	? 0.013

RESULTS

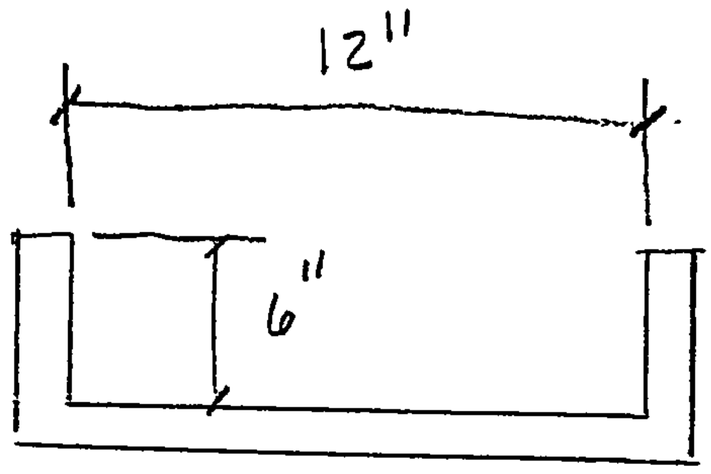
Y=	0.29 FT	
A=	0.26 SF	
P=	1.86 FT	
V=	3.09 FPS	
F=	1.42	SUPER-CRITICAL FLOW

PROJECT NAME HEARTHSTONE JOB NO. 7005

SUBJECT INFRASTRUCTURE CAPACITIES.

BY DL CHECKED BY _____ DATE 5-27-97 PAGE 5 OF _____

BASIN B RUNDOWN & SW CULVERT



SECTION

MAN-MADE CHANNELS

VARIABLES LIST:

Y - FLOW DEPTH	B - CHANNEL BOTTOM WIDTH	S - CHANNEL SLOPE
Q - FLOWRATE	M - CHANNEL SIDE SLOPE	N - CHANNEL ROUGHNESS

VARIABLE TO BE SOLVED (Y,Q,B,M,S OR N) ? Y

Q (CFS) ? 1.9
B (FT) ? 1
M (FT/FT) ? 0
S (FT/FT) ? .08
N (FT^1/6) ? .013

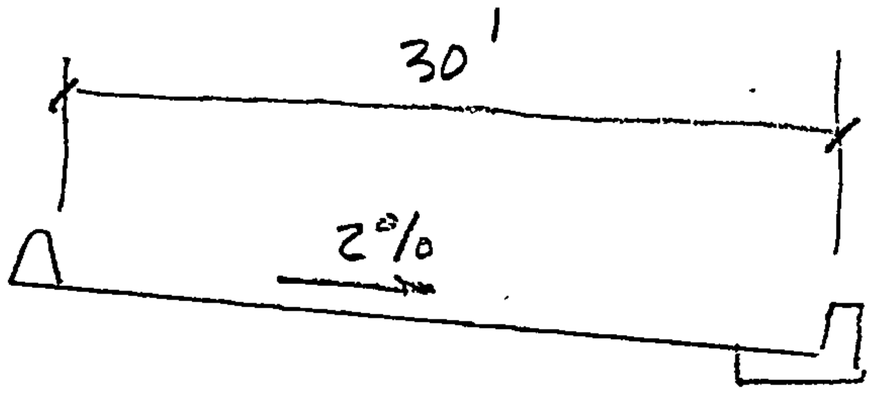
RESULTS
==========
Y= 0.21 FT
A= 0.21 SF
P= 1.42 FT
V= 9.06 FPS
F= 3.48 SUPER-CRITICAL FLOW

PROJECT NAME HEARTHSTONE JOB NO. 7005

SUBJECT INFRASTRUCTURE CAPACITIES.

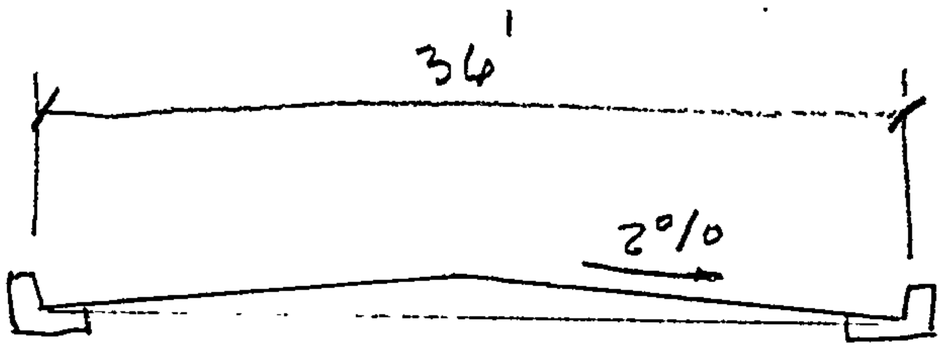
BY DL CHECKED BY _____ DATE 5-27-97 PAGE 6 OF _____

STREET DEPTHS



EUBANK SECTION

WEST LANES



ES SALT

SECTION

PROJECT NAME HEARTHSTONE JOB NO. 7005

SUBJECT INFRASTRUCTURE CAPACITIES.

BY DL CHECKED BY _____ DATE 5-27-97 PAGE 1 OF _____

EUBANK EXIST

```
VARIABLES LIST:
        Y - FLOW ELEVATION     Q - FLOWRATE      S - CHANNEL SLOPE

VARIABLE TO BE SOLVED (Y,Q OR S) ? Y

Q (CFS)    ? 45.5
S (FT/FT)  ? 1.49

     RESULTS
================
Y=     100.26 FT
A=       1.67 SF
P=      13.18 FT
V=      27.26 FPS
F=      13.37   SUPER-CRITICAL FLOW
```

Enter up to 20 cross-section points.
Enter <Return> only for distance to end.

CROSS-SECTION POINTS

DIST	ELEV	COEFF	DIST	ELEV	COEFF
0	100.67	.017			
0	100.0	.017			
30	100.6	.017			
30	101.1	.017			

EUBANK DEVELOPED

```
Q (CFS)    ? 53.1
S (FT/FT)  ? 1.49

     RESULTS
================
Y=     100.27 FT
A=       1.87 SF
P=      13.97 FT
V=      28.34 FPS
F=      13.50   SUPER-CRITICAL FLOW
```

CROSS-SECTION POINTS

DIST	ELEV	COEFF	DIST	ELEV	COEFF
0	100.67	.017			
0	100.0	.017			
30	100.6	.017			
30	101.1	.017			

ES SALT DEVELOPED

```
Q (CFS)    ? 8.22
S (FT/FT)  ? .005

     RESULTS
================
Y=     100.31 FT
A=       4.66 SF
P=      31.14 FT
V=       1.76 FPS
F=       0.80   SUB-CRITICAL FLOW
```

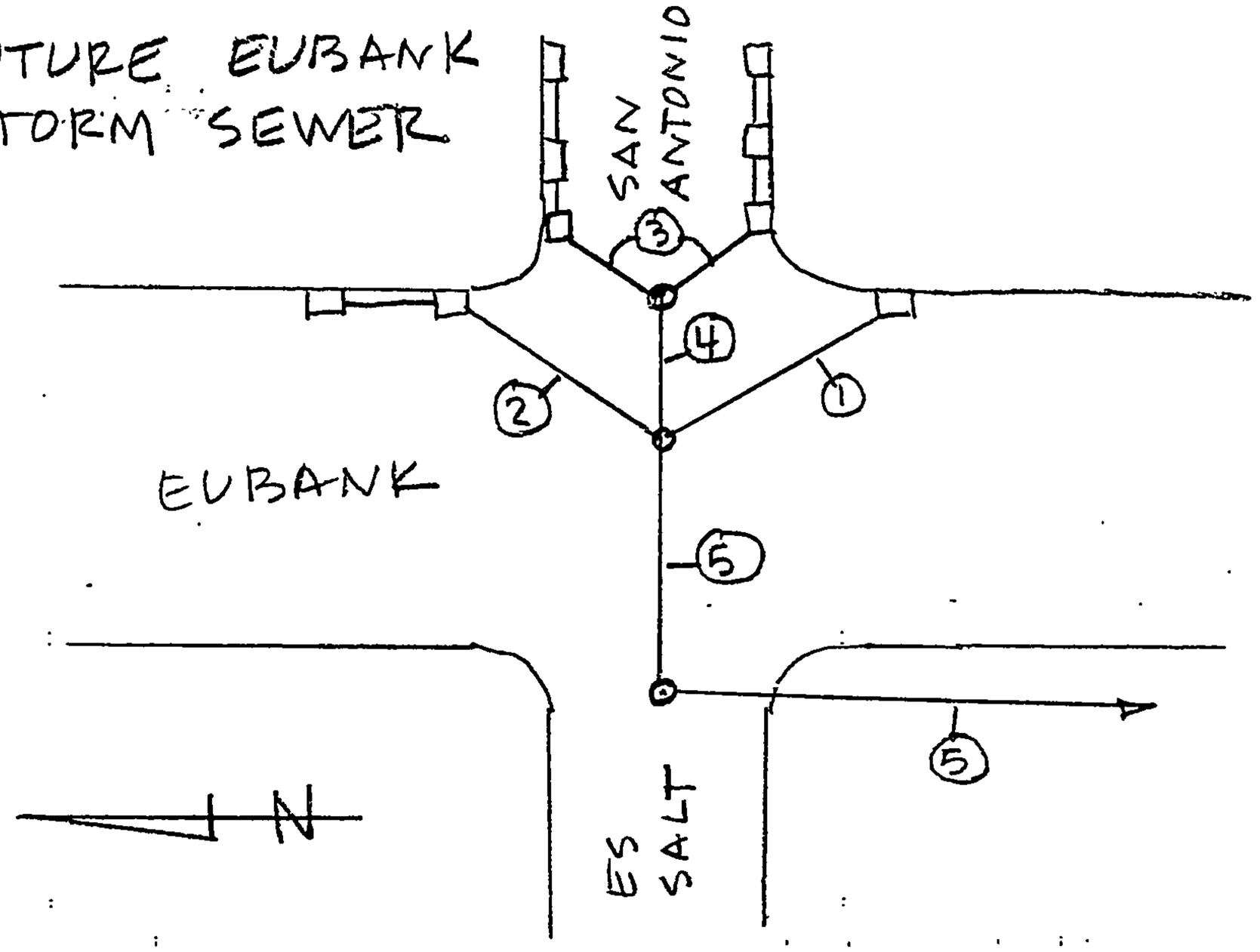
CROSS-SECTION POINTS

DIST	ELEV	COEFF	DIST	ELEV	COEFF
0	100.67	.017			
0	100.0	.017			
18	100.36	.017			
36	100.0	.017			
36	100.67	.017			

PROJECT NAME HEARTHSTONE JOB NO. 7005

SUBJECT INFRASTRUCTURE CAPACITIES.

BY DL CHECKED BY _____ DATE 5-27-97 PAGE 8 OF _____



SCHEMATIC

SEWER PIPES

Enter up to 10 pipes.
Enter <Return> only for flowrate and diameter to end.

LINE SEG	FLOWRATE (CFS)	DIAMETER (IN)	FRICTION (FT^1/6)	SLOPE (%)	VELOCITY (FPS)	RECOM. DIA (IN)
1	5.00	13.63	0.0130	1.00	4.94	18
2	12.00	18.92	0.0130	1.00	6.15	18
3	18.00	22.03	0.0130	1.00	6.80	24
4	36.00	28.57	0.0130	1.00	8.09	30
5	53.00	33.03	0.0130	1.00	8.91	36

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/02/1997
INPUT FILE = 7005.DAT USER NO.= BRASHERB.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.900
COMPUTE NM HYD	EX.SITE	-	1	.00625	8.82	.266	.79828	1.500	2.204	PER IMP=	.00
COMPUTE NM HYD	EX.I	-	2	.00402	5.67	.171	.79828	1.500	2.206	PER IMP=	.00
COMPUTE NM HYD	EX.II	-	3	.00227	3.21	.097	.79828	1.500	2.209	PER IMP=	.00
COMPUTE NM HYD	DEV.A	-	4	.00140	4.24	.168	2.24774	1.500	4.724	PER IMP=	71.00
COMPUTE NM HYD	DEV.B	-	5	.00057	1.87	.077	2.53402	1.500	5.154	PER IMP=	92.00
COMPUTE NM HYD	DEV.C	-	6	.00012	.29	.009	1.41678	1.500	3.768	PER IMP=	10.00
COMPUTE NM HYD	DEV.D	-	7	.00112	3.35	.131	2.19212	1.500	4.653	PER IMP=	67.00
COMPUTE NM HYD	DEV.E	-	8	.00086	2.68	.107	2.32735	1.500	4.848	PER IMP=	77.00
COMPUTE NM HYD	DEV.F	-	9	.00027	.74	.026	1.82626	1.500	4.248	PER IMP=	40.00
COMPUTE NM HYD	DEV.B-1	-	10	.00016	.53	.021	2.53402	1.500	5.232	PER IMP=	92.00
COMPUTE NM HYD	DEV.E-1	-	11	.00025	.78	.030	2.32735	1.500	4.944	PER IMP=	77.00
COMPUTE NM HYD	DEV.SITE	-	12	.00435	13.04	.518	2.23193	1.500	4.685	PER IMP=	70.00
COMPUTE NM HYD	EX.OS-1	-	13	.02461	38.50	1.221	.93040	1.500	2.445	PER IMP=	6.00
COMPUTE NM HYD	DEV.OS-1	-	14	.02461	49.55	1.670	1.27203	1.500	3.146	PER IMP=	17.00
COMPUTE NM HYD	DEV.OS-2	-	15	.00229	7.02	.279	2.28500	1.500	4.798	PER IMP=	70.00
COMPUTE NM HYD	DEV.OS-3	-	16	.00056	1.82	.073	2.45132	1.500	5.056	PER IMP=	84.00
FINISH											