[redacted]

MARK GOODWIN & ASSOCIATES
CONSULTING ENGINEERS

DRAINAGE REPORT
for
SUNSET WEST UNIT IV

Prepared for:

Sunset West
PO Box 44698
Rio Rancho, NM 87174

October 1995

D. MARK GOODWIN & ASSOCIATES

PURPOSE

The purpose of this report is to present the drainage management plan for the Tracts 435, 436 437 and 438, Unit 3, Town of Atrisco Grant, **Sunset West Unit IV Subdivision** to obtain final plat and work order approval. All applicable ordinances and the DPM were utilized to prepare this plan.

EXISTING CONDITIONS

The project comprises an area of 20.00 acres between 90th and 94th Streets. This site is bounded by San Ygnacio to the south and Tower Road to the north. (See attached Vicinity Map.)

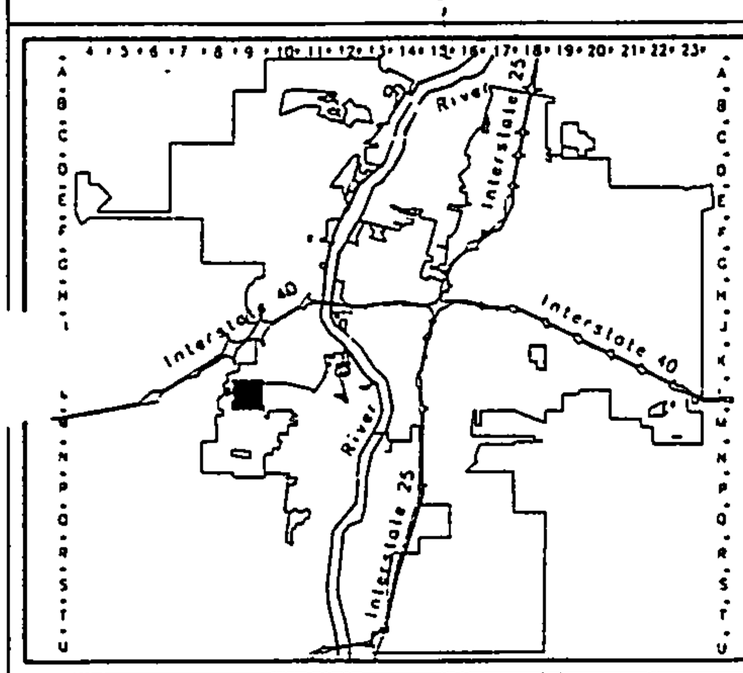
The tracts slope from northwest to southeast at approximately 3 percent. Vegetative cover is typical of west side property, and the soils are sandy. The site drains to the southeast along San Ygnacio Road.

HYDROLOGIC ANALYSIS

HYMO was utilized for this analysis. All of the pertinent hydrologic parameters and calculation methods are located in the appendix of this report.

PROPOSED MANAGEMENT PLAN

This project falls within the limits of S.A.D. 222. As a developed site, this plan proposes to discharge stormwater runoff at one location, an on-site temporary retention pond. This is only until the 42" San Ygnacio Road stormdrain can be constructed. Once this happens the site will discharge 61.70 cfs through a 42" RCP to the proposed 42" RCP in San Ygnacio Road. Until that time, runoff will be collected in the temporary retention pond sized for the 100 year - 10 day storm with an emergency spillway. The design is shown in this report and is based on the Tower/Sage Drainage Master Plan prepared by Adrews, Asbury and Roberts (Appendix A).



750 375 0 750

Scale: 1" = 750'

Albuquerque Geographic Information System

City of Albuquerque

© Planning Department July 04, 1993

LEGAL DESCRIPTION

T10N

R2E

SEC 28

UNIFORM PROPERTY CODE

1-009-056

2

L-9-Z

INTERIM EROSION CONTROL

Due to the sensitive nature of the sandy soils associated with this site, an Erosion Control Plan is part of this report and project.

The plan centers on the fact that storm waters will not be allowed free discharge during the construction process until all street paving is accomplished.

CONCLUSIONS

The proposed Sunset West Unit III Subdivision comprising 97 lots on 20.00 acres, can be readily accommodated through the implementation of this plan. It has been adequately shown in this report and others cited, that the other off-site conveyance systems are adequate and, indeed, were masterplanned with this project in mind. It has also been shown in this report that the internal conveyance of stormwater can be accomplished while meeting all current City requirements.

CALCULATIONS

D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT SONSET WEST IV
SUBJECT DRAINAGE CALCS
BY GJK DATE 10-19-95
CHECKED _____ DATE _____
SHEET 1 OF ____

TOTAL SITE = 20.00 AC = 0.03125 SM
PADS (97) = 5.567 AC P_1 = 1.90 in P_6 = 2.20 in P_{24} = 2.65 in
ROADWAY/SIDEWALK = 3.1108 T_p = 0.1333 HR DT = 0.03333 HR

TYPE "D" = 3.1108 + 5.567 = 8.6778 AC = 43.39 %
TYPE "B" = 56.61 %

* PER THE TOWER/SAGE DRAINAGE MASTER PLAN (APPENDIX A)

- THIS SITE IS WITHIN DRAINAGE BASIN B3-D
- SIZE OF BASIN = 27.9 AC
- Q = 89 CFS
- 50% B & 50% D? is this developed? What about Dome "C" - see pg 2
- CALCULATE RIGHT OF WAY OF 90th & SAN YGNACIO

AREA = 2.8705 AC = 0.004485 SM
TYPE B = 13.13 % Where's median?
TYPE D = 86.67 % Area between C+G + sidewalk

FROM HYMO SHEETS 2-4 FOR SITE
Q = 61.70 CFS
V = 2.0645 AC-FT

FROM HYMO SHEETS 5-7 FOR ROW:
Q = 11.84 CFS
V = 0.4299 CFS

Looks like Basin B3-D also includes Tower Road row mt.

** FIND PRORATED SHARE OF ALLOWABLE 89 CFS

89 - 11.84 = 77.16 CFS 4 out of 5 lots are being developed
77.16 x 4/5 = 61.73 CFS > 61.70 CFS ok

DIRECT DISCHARGE IS ALLOWED ONCE SAD 222 IS CONSTRUCTED.

- ALLOWABLE Q FOR 5 ACRE PARCE TO THE WEST OF THIS SITE

77.16 - 61.70 = 15.46 CFS

97 units/20 acres = 4.85 units/acre = N

$7\sqrt{(N \times N) + (5 \times N)} = \%D$

48.4

~~37.8~~% ⇒ %D (min)

∴ %D is not w/in limits → what if homeowners use rock LS or build patios → Maybe some type "C" Land treatment should be considered.

```
START                    TIME=0.0
***** HYDROGRAPH FOR SUNSET WEST UNIT IV SITE
RAINFALL                 TYPE=1 RAIN QUARTER=0.0 IN
                         RAIN ONE=1.90 IN RAIN SIX=2.20 IN
                         RAIN DAY=2.65 IN DT=0.03333 HR
COMPUTE NM HYD           ID=1 HYD NO=101.1 AREA=0.03125 SQ MI
                         PER A=00.00 B=56.61 C=00 D=43.39
                         TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD                 ID=1 CODE=1
FINISH
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He actually measured streets + pad.

%D min of 48.4%

What about some "C"?

```
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                     RAIN ONE=1.90 IN RAIN SIX=2.20 IN

                     RAIN DAY=2.65 IN DT=0.03333 HR

                     COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2
- PEAK AT 1.40 HR.
                     DT =     .033330 HOURS        END TIME =     5.999400 HOURS
                        .0000   .0013   .0027   .0041   .0055   .0069   .0084
                        .0099   .0115   .0131   .0147   .0164   .0181   .0199
                        .0217   .0236   .0256   .0276   .0296   .0318   .0340
                        .0363   .0387   .0412   .0438   .0465   .0493   .0523
                        .0554   .0587   .0622   .0675   .0731   .0791   .0920
                        .1208   .1651   .2289   .3159   .4302   .5759   .7574
                        .9790  1.1846  1.2704  1.3429  1.4074  1.4661  1.5201
                       1.5702  1.6171  1.6610  1.7023  1.7413  1.7781  1.8130
                       1.8460  1.8774  1.9071  1.9353  1.9621  1.9681  1.9736
                       1.9789  1.9839  1.9887  1.9932  1.9976  2.0018  2.0059
                       2.0098  2.0136  2.0172  2.0208  2.0242  2.0275  2.0308
                       2.0339  2.0370  2.0400  2.0430  2.0458  2.0486  2.0514
                       2.0540  2.0567  2.0592  2.0617  2.0642  2.0666  2.0690
                       2.0714  2.0737  2.0759  2.0781  2.0803  2.0825  2.0846
```

2.0867	2.0887	2.0907	2.0927	2.0947	2.0966	2.0985
2.1004	2.1023	2.1041	2.1059	2.1077	2.1095	2.1112
2.1130	2.1147	2.1164	2.1180	2.1197	2.1213	2.1229
2.1245	2.1261	2.1277	2.1292	2.1307	2.1322	2.1337
2.1352	2.1367	2.1382	2.1396	2.1410	2.1425	2.1439
2.1452	2.1466	2.1480	2.1494	2.1507	2.1520	2.1533
2.1547	2.1560	2.1572	2.1585	2.1598	2.1611	2.1623
2.1635	2.1648	2.1660	2.1672	2.1684	2.1696	2.1708
2.1720	2.1731	2.1743	2.1754	2.1766	2.1777	2.1789
2.1800	2.1811	2.1822	2.1833	2.1844	2.1855	2.1866
2.1876	2.1887	2.1897	2.1908	2.1918	2.1929	2.1939
2.1949	2.1960	2.1970	2.1980	2.1990	2.2000	

4

```
COMPUTE NM HYD          ID=1 HYD NO=101.1 AREA=0.03125 SQ MI

                        PER A=00.00 B=56.61 C=00 D=43.39

                        TP=0.1333 HR MASS RAINFALL=-1

    K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE
CONSTANT, N =  7.106420
        UNIT PEAK =    53.533     CFS   UNIT VOLUME =     .9992        B =    526.28
    P60 = 1.9000
        AREA =       .013559 SQ MI     IA =     .10000 INCHES     INF =     .04000 I
NCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT
=    .033330


        K =    .130761HR     TP =    .133300HR     K/TP RATIO =    .980950      SHAPE
CONSTANT, N =  3.599930
        UNIT PEAK =    43.470     CFS   UNIT VOLUME =     1.000        B =    327.55
    P60 = 1.9000
        AREA =       .017691 SQ MI     IA =     .50000 INCHES     INF =    1.25000 I
NCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT
=    .033330

  PRINT HYD             ID=1 CODE=1


                                        PARTIAL HYDROGRAPH    101.10


        RUNOFF VOLUME =       1.23873 INCHES       =        2.0645 ACRE-FEET
        PEAK DISCHARGE RATE =        61.70 CFS   AT    1.500 HOURS    BASIN AREA =
.0313 SQ. MI.


  FINISH


        NORMAL PROGRAM FINISH              END TIME (HR:MIN:SEC) = 13:59:58
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```
ST RT                    TIME=0.0
***** HYDROGRAPH FOR SUNSET WEST UNIT IV ROW
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                         RAIN ONE=1.90 IN RAIN SIX=2.20 IN
                         RAIN DAY=2.65 IN DT=0.03333 HR
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                         PER A=00.00 B=13.13 C=00 D=86.67
                         TP=0.1333 HR MASS RAINFALL=-1
RINT HYD                  ID=1 CODE=1
I ISH
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                         RAIN ONE=1.90 IN RAIN SIX=2.20 IN

                         RAIN DAY=2.65 IN DT=0.03333 HR

                    COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2
PEAK AT 1.40 HR.
                    DT =     .033330 HOURS        END TIME =     5.999400 HOURS
                       .0000    .0013    .0027    .0041    .0055    .0069    .0084
                       .0099    .0115    .0131    .0147    .0164    .0181    .0199
                       .0217    .0236    .0256    .0276    .0296    .0318    .0340
                       .0363    .0387    .0412    .0438    .0465    .0493    .0523
                       .0554    .0587    .0622    .0675    .0731    .0791    .0920
                       .1208    .1651    .2289    .3159    .4302    .5759    .7574
                       .9790   1.1846   1.2704   1.3429   1.4074   1.4661   1.5201
                      1.5702   1.6171   1.6610   1.7023   1.7413   1.7781   1.8130
                      1.8460   1.8774   1.9071   1.9353   1.9621   1.9681   1.9736
                      1.9789   1.9839   1.9887   1.9932   1.9976   2.0018   2.0059
                      2.0098   2.0136   2.0172   2.0208   2.0242   2.0275   2.0308
                      2.0339   2.0370   2.0400   2.0430   2.0458   2.0486   2.0514
                      2.0540   2.0567   2.0592   2.0617   2.0642   2.0666   2.0690
                      2.0714   2.0737   2.0759   2.0781   2.0803   2.0825   2.0846
                      2.0867   2.0887   2.0907   2.0927   2.0947   2.0966   2.0985
                      2.1004   2.1023   2.1041   2.1059   2.1077   2.1095   2.1112
                      2.1130   2.1147   2.1164   2.1180   2.1197   2.1213   2.1229
                      2.1245   2.1261   2.1277   2.1292   2.1307   2.1322   2.1337
                      2.1352   2.1367   2.1382   2.1396   2.1410   2.1425   2.1439
                      2.1452   2.1466   2.1480   2.1494   2.1507   2.1520   2.1533
                      2.1547   2.1560   2.1572   2.1585   2.1598   2.1611   2.1623
                      2.1635   2.1648   2.1660   2.1672   2.1684   2.1696   2.1708
                      2.1720   2.1731   2.1743   2.1754   2.1766   2.1777   2.1789
                      2.1800   2.1811   2.1822   2.1833   2.1844   2.1855   2.1866
                      2.1876   2.1887   2.1897   2.1908   2.1918   2.1929   2.1939
                      2.1949   2.1960   2.1970   2.1980   2.1990   2.2000

COMPUTE NM HYD           ID=1 HYD NO=101.1 AREA=0.004485 SQ MI

                         PER A=00.00 B=13.13 C=00 D=86.67

                         TP=0.1333 HR MASS RAINFALL=-1

     *****WARNING*****  SUM OF TREATMENT TYPES DOES NOT EQUAL 100 PERCENT OR
TOTAL AREA

     K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000     SHAPE
CONSTANT, N =  7.106420
```

```
        UNIT PEAK =    15.377     CFS   UNIT VOLUME =     .9987          B =    526.28
    P60 = 1.9000
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NCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT
=  .033330


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CONSTANT, N =  3.599930
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    P60 = 1.9000
        AREA =       .000590 SQ MI     IA =     .50000 INCHES     INF =    1.25000 I
NCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT
=  .033330

    PRINT HYD              ID=1 CODE=1


                                          PARTIAL HYDROGRAPH    101.10


        RUNOFF VOLUME =      1.79727 INCHES      =          .4299 ACRE-FEET
        PEAK DISCHARGE RATE =       11.84 CFS   AT    1.500 HOURS    BASIN AREA =
.0045 SQ. MI.


    FINISH


        NORMAL PROGRAM FINISH              END TIME (HR:MIN:SEC) = 09:39:15
```

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PROJECT SUNSET WEST II
SUBJECT DRAINAGE CALCS
BY GJK DATE 10-19-95
CHECKED _____ DATE _____
SHEET 8 OF ____

STREET HYDRAULICS

- FOR THESE CALCS ASSUME A PER LOT RUNOFF

$$\frac{61.70 \text{ CFS}}{97 \text{ LOTS}} = 0.636 \text{ CFS/LOT}$$

- SUNDECK CT, SUNFISH AVE & SUNFLOWER AVE 28'-F-F
- FIND TRANSITION FROM MOUNTABLE TO STANDARD C+G

18 LOTS = 11,448 CFS S = 1.5% n = 0.017

d = 0.3025 (1 of 49)
WP = 28.605 see next sheet
A = 3.965
V = 2.867 F/s
Q = 11.369 CFS

$d + V^2/2g = 0.43 < .33 + .2$ OK

Q = 11,369 ≈ 11,448 OK

INSTALL 2 "A" INLETS AT THIS POINT IN SUNFISH AVE AND SUNFLOWER AVE

Q grate = 2.30 CFS SEE SHEET 9

Q PAST INLETS

11,448 − 2(2.30) = 6.848 CFS

- SUNDANCE DR AT SUNFLOWER AVE NORTH SIDE 32'-F-F

14 LOTS = 8,904 CFS S = 1% n = 0.017
STD C+G

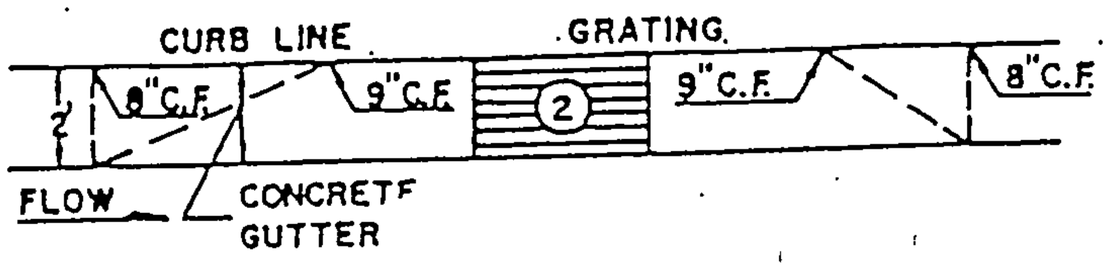
Q = 8,904 + 11,448 + 6.848
= 27.20 CFS

d = 0.49
WP = 32.98
A = 8.01
V = 3.4027 F/s
Q = 27.26 CFS ≈ 27.20 OK

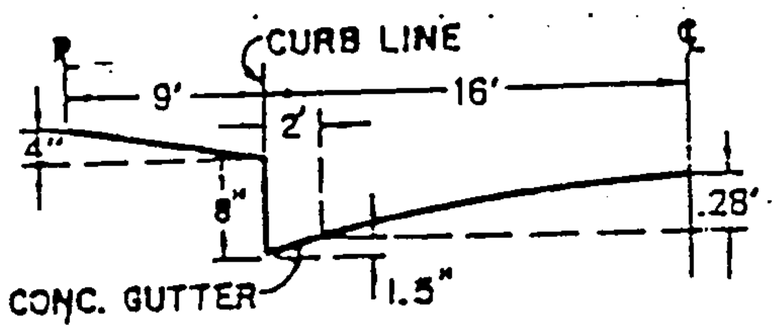
$d + V^2/2g = 0.67 < .67 + .2$ OK

9

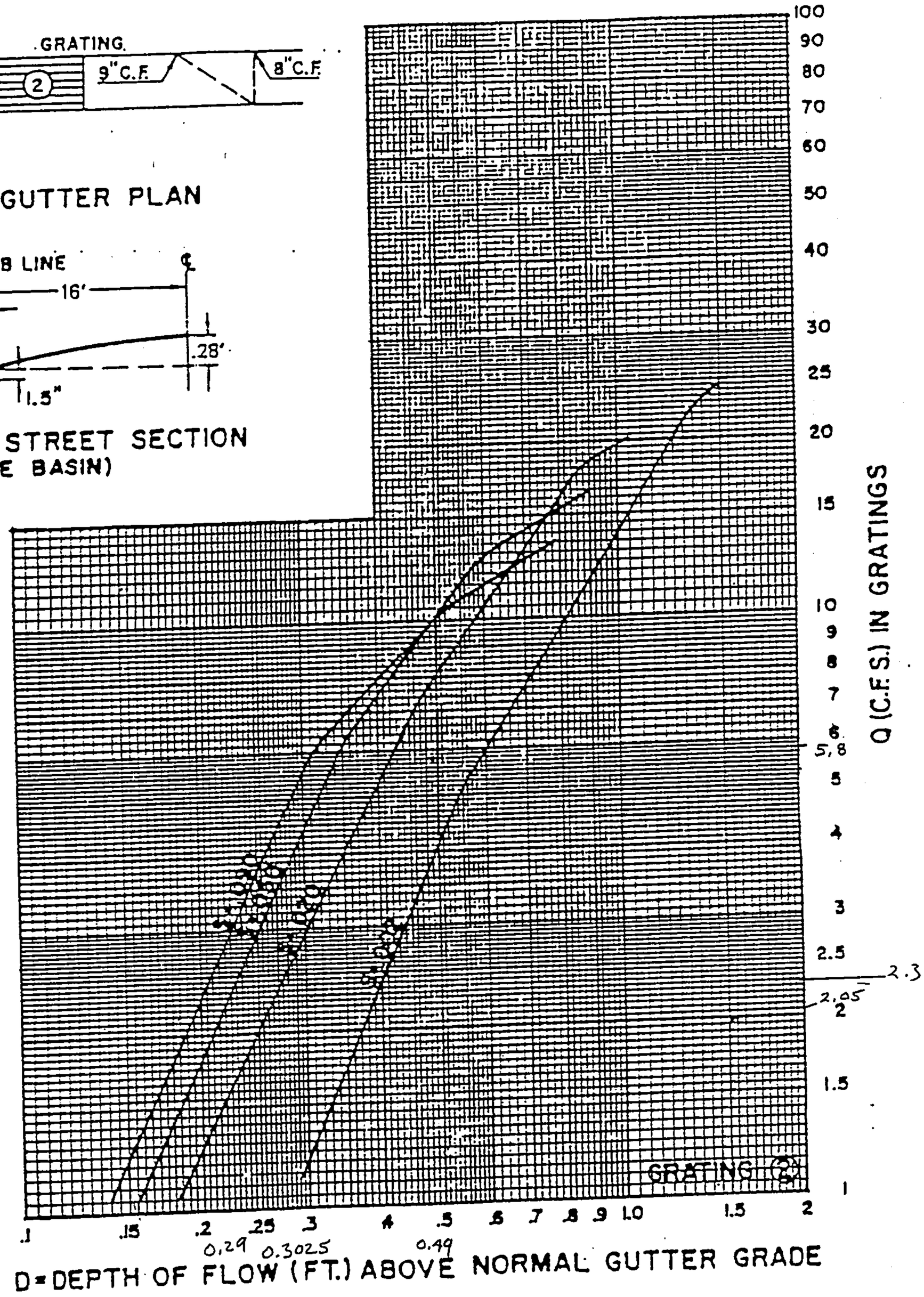
GRATING CAPACITIES FOR TYPE "A", "C" and "D".



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



INSTALL 2 "A" INLETS AT THIS POINT IN SUNDANCE DR

$Q_{grate} = 5.8$ CFS see sheet 9

Q PAST INLETS

$= 27.20 - 2(5.8) = 15.60$ CFS

- SUNDANCE DR AT SUMP INLETS NORTHSIDE

6 LOTS = 3.816 CFS

$Q = 3.816 + 6.848 + 15.60$ CFS
$= 26.264$ CFS

- SUNBURST AVE

FIND TRANSITION FROM MOUNTABLE TO STANDARD C+G 32½F-F

17 LOTS = 10.812 CFS $S = 1.5\%$ $n = 0.017$

$d = 0.29$
$wp = 13.665$
$A = 1.811$
$V = 2.783$ FPS
$Q_{1/2} = 5.04$ CFS

$d + V^2/2g = 0.41 < .33 + .2$ OK

$Q = 10.08$ CFS ≈ 10.812 OK

ADD 2 "A" INLETS AT THIS POINT

$Q_{grate} = 2.05$ CFS see SHEET 9

Q PAST INLETS

$10.812 - 2(2.05) = 6.712$ CFS

- SUNDANCE DR AT SUMP INLETS SOUTH SIDE

6 LOTS = 3.816 CFS

$Q = 3.816 + 6.712$
$= 10.528$ CFS

- DETERMINE 2 "DBL C" INLETS IN SUMP

$Q = 10.528 + 26.264$
$= 36.792$ CFS

TOO MUCH FOR SUMP!

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PROJECT SUNSET WEST IV
SUBJECT DRAINAGE CALCS
BY GJK DATE 10-19-95
CHECKED _____ DATE _____
SHEET 11 OF ____

- ADD TWO "A" INLETS BEFORE SUMP INLETS ON SUNDANCE DR NORTH SIDE 32'-F-F

$d = 0.49$ $S = 1\%$ $n = 0.017$

$wp = 32.98$

$A = 8.01$ $d + V^2/2g = 0.67 < .67 + .2$ OK

$V = 3.4027$ F/S

$Q = 27.26$ CFS $\approx 26,264$ OK

$Q_{grate} = 5.8$ CFS SEE SHEET 9

$Q_{PAST\ INLETS}$

$26.264 - 2(5.8) = 14.664$ CFS

- FIND SUMP INLET CAPACITY

$Q = 14.664 + 10.528$
$= 25.192$ CFS

2 "DBL C" IN SUMP

$P = 2 \times 17 = 34$ SINCE TYPE "A" INLETS ARE WITHIN 150' OF DBL C INLETS NO REDUCTION IS REQUIRED.

$Q/P = 3.0\,H^{3/2}$

$H = 0.39 < 0.67$ OK

- FIND SUMP CAPACITY

$Q/P = 3.0\,H^{3/2}$

USE $H = 0.67$

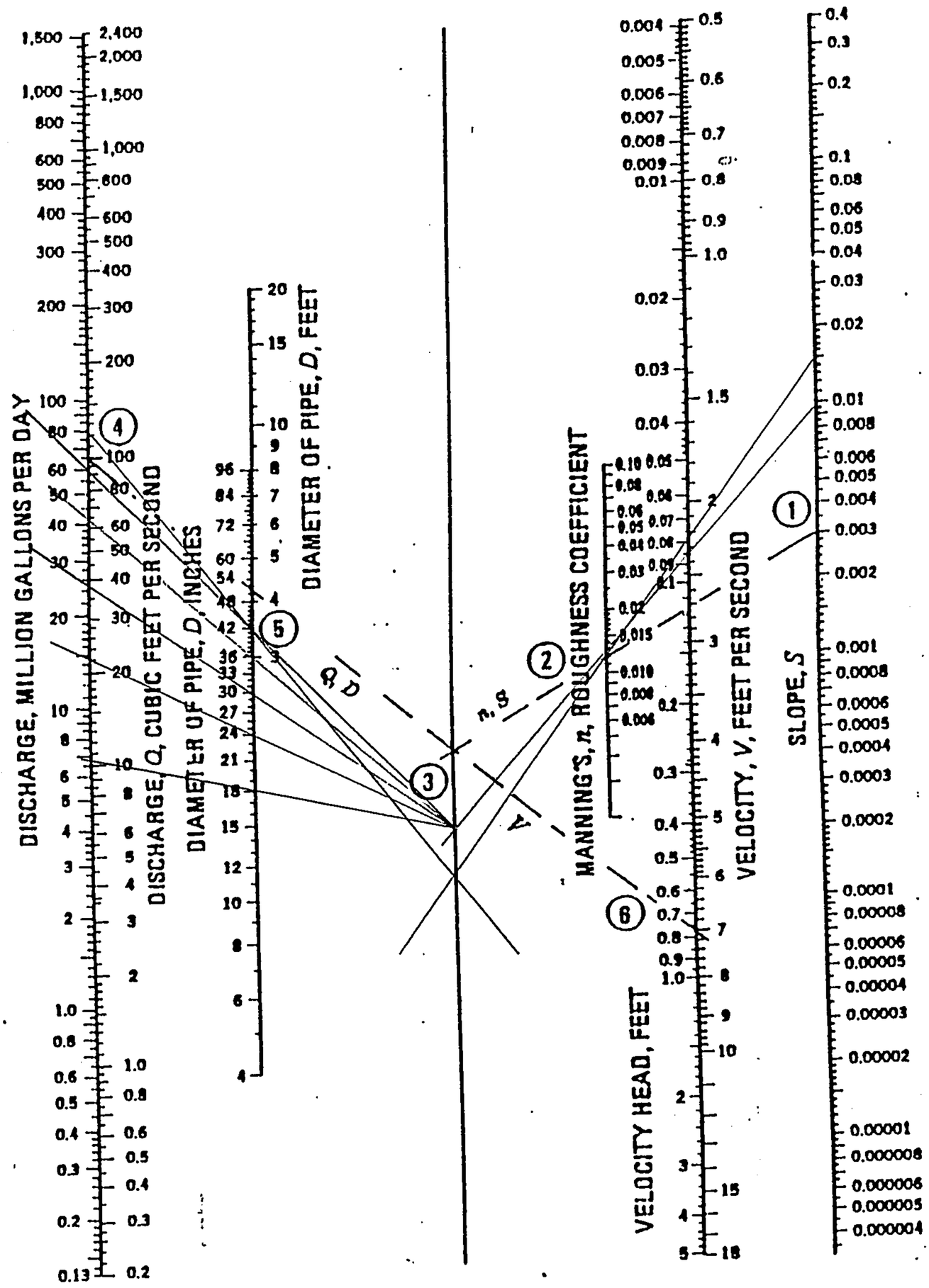
$Q = 55.94$ CFS OK

- SIZE OUTFALL

42" RCP AT 1.5% CAN CARRY 120 CFS SEE SHEET 12

120 CFS $\approx$ 2 TIMES THE GENERATED RUNOFF

Reference: American Concrete Pipe Association (1980).



B) Circular Pipe Solution

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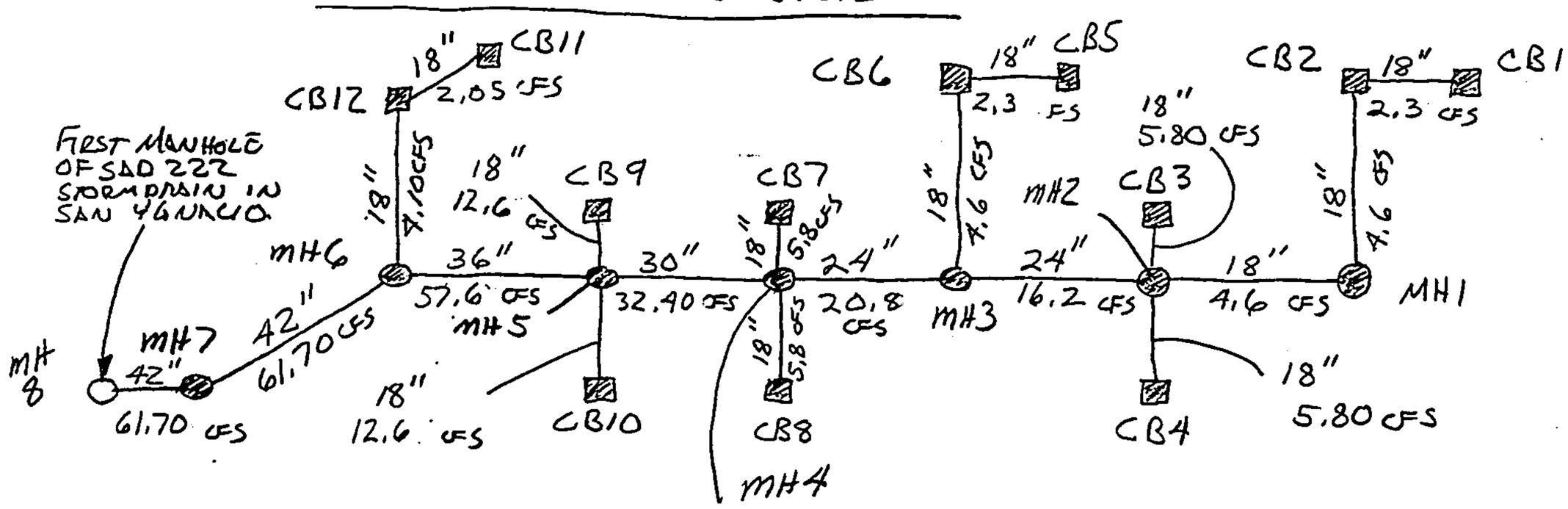
PROJECT SUNSET WEST IV
SUBJECT DRAINAGE CALCS
BY GJK DATE 10-19-95
CHECKED _____ DATE _____
SHEET 13 OF ____

• SIZE STORM DRAIN SYSTEM



STRUCTURE	RIM/GRATE	INV IN	INV IN	INV IN	INV OUT
CB1	25.97	—	—	—	22.47 (S)
CB2	25.92	22.23 (W)	—	—	22.23 (E)
MH1	24.60	21.33 (W)	—	—	21.33 (S)
MH2	22.71	19.48 (W)	19.03 (W)	18.91 (E)	18.41 (S)
CB3	22.59	—	—	—	19.09 (E)
CB4	22.59	—	—	—	19.09 (W)
MH3	22.04	17.71 (W)	18.79 (W)	—	17.71 (S)
CB5	23.43	—	—	—	19.93 (S)
CB6	23.43	19.69 (W)	—	—	19.69 (E)
MH4	20.85	17.11 (W)	16.87 (E)	16.58 (W)	16.08 (S)
CB7	20.73	—	—	—	17.23 (E)
CB8	20.73	—	—	—	17.23 (W)
MH5	20.37	15.52 (W)	16.63 (W)	16.39 (E)	15.02 (S)
CB9	20.25	—	—	—	16.75 (E)
CB10	20.11	—	—	—	16.75 (W)
MH6	20.90	17.03 (W)	14.19 (W)	—	13.69 (S)
CB11	21.83	—	—	—	18.33 (S)
CB12	21.60	18.03 (W)	—	—	18.03 (E)
MH7	15.71	11.29 (W)	—	—	11.29 (S)
MH8	15.46	10.34 (W)	—	—	10.34 (E)

FROM NOMO SHEET 12

18" @ 1% CARRIES 10.5 CFS
24" @ 1% CARRIES 22.0 CFS
30" @ 1% CARRIES 37.5 CFS
36" @ 1% CARRIES 62.5 CFS

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PROJECT SUNSET WEST III
SUBJECT DRAINAGE CALCS
BY GJK DATE 10-19-95
CHECKED _____ DATE _____
SHEET 14 OF ____

• SIZE RETENTION POND FOR 100 yr 10 day STORM

FROM SHEET 1 $Q = 61.70$ CFS
$V_6 = 2.0645$ AC-FT

$$V_{10day} = V_6 + \frac{A_D\,(P_{10day} - P_6)}{12}$$

$$= 2.0645 + \frac{8.6778\,(3.67 - 2.2)}{12}$$

$$= 3.13 \text{ AC-FT} = 136{,}235 \text{ CF}$$

• SIZE POND

ELEV	AREA (SF)	VOLUME (CF)
8	3444	0
9	4511	3977.5
10	5659	9062.5
11	6885	15334.5
12	8185	22869.5
13	9557	31740.5
14	11003	42020.5
15	12523	53783.5
16	14115	67102.5
17	15778	82049
18	17510	98693
19	19312	117104
20	21185	137352.5
21	23128	159509
22	25142	183644

ELEVATION OF 136,235 CF = 19.95

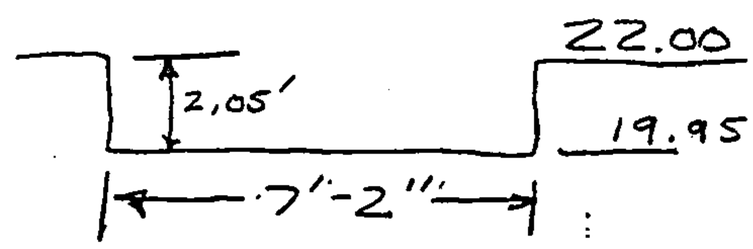
• SIZE SPILLWAY

WIER OPENING

$Q = 2.95\,L\,H^{1.5}$

$H = 2.05$

$L = 7.126'$ SAY 7'-2"



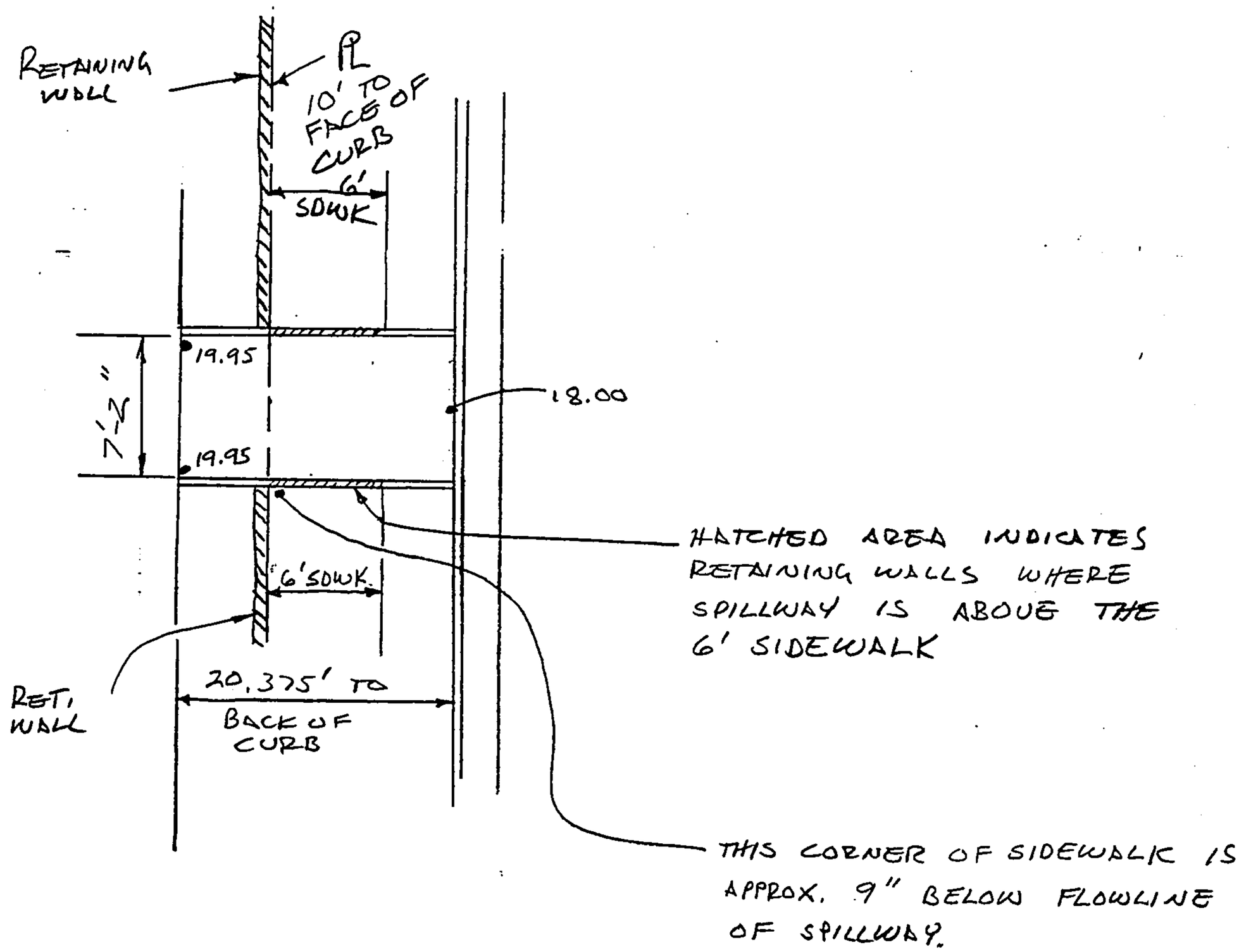
LENGTH OF SPILLWAY = 20.375'
DROP = 1.95' INV. AT CURB IN SAN YGNACIO = 18.00

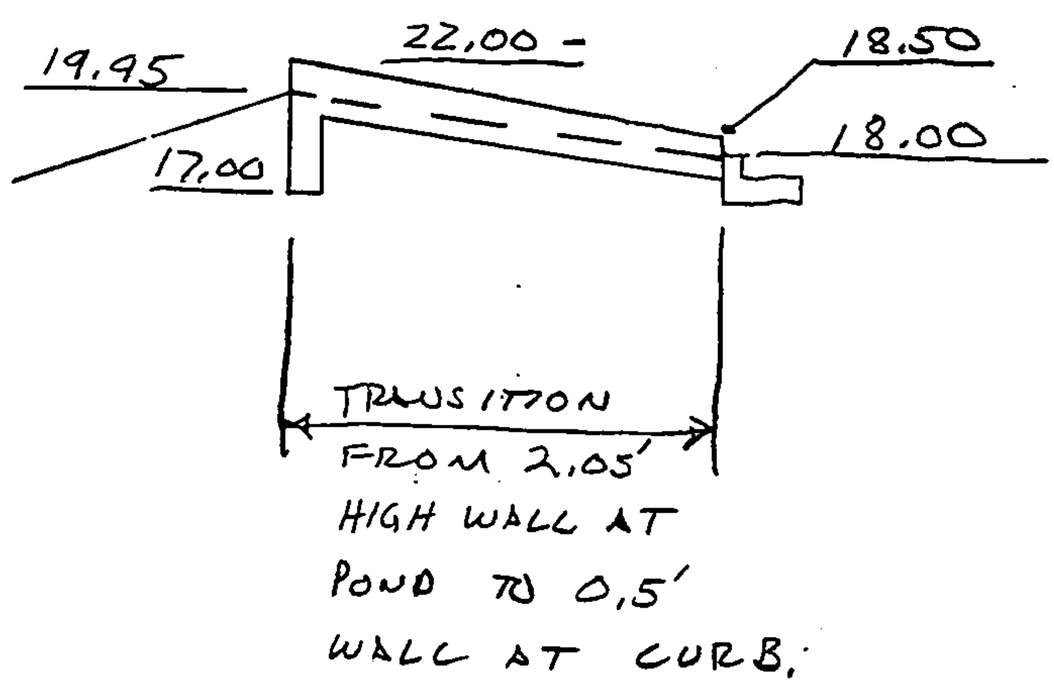
SLOPE 9.57 % USE 7'-2" WIDE CHANNEL

$d = 0.45$
$WP = 8.067$
$A = 3.225$
$V = 19.19$ m/s
$Q = 61.89$ CFS $\approx$ 61.70 OK

D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT SUNSET WEST IV
SUBJECT DRAINAGE CALCS
BY GJK DATE 10-19-95
CHECKED _____ DATE _____
SHEET 15 OF ____





APPENDIX A

CITY OF ALBUQUERQUE
NEW MEXICO

AMOLE DEL NORTE
STORM DRAINAGE FACILITIES

TOWER/SAGE
DRAINAGE MASTER PLAN

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
ALBUQUERQUE, NEW MEXICO

CITY OF ALBUQUERQUE
NEW MEXICO

AMOLE DEL NORTE
STORM DRAINAGE FACILITIES

TOWER/SAGE
DRAINAGE MASTER PLAN

APRIL 1995

Prepared By

ANDREWS, ASBURY & ROBERT, INC.
149 Jackson Street, N.E.
Albuquerque, New Mexico 87108

APR 2 4 1995

City of Albuquerque

TOWER/SAGE DRAINAGE MASTER PLAN

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City of Albuquerque

TOWER/SAGE DRAINAGE MASTER PLAN

1.0 INTRODUCTION

The Tower/Sage Drainage Basin is a sub-basin of an overall drainage area known as the Amole Del Norte Drainage Basin located on the West Mesa in the southwest quadrant of the Albuquerque metropolitan area. (See enclosed Vicinity Map, Map No. 1)

In February 1985, Boyle Engineering, Inc. submitted the Design-Development Report for the Evaluation Study of the Amole Del Norte Diversion Facility and the plan presented in such report was adopted by the City of Albuquerque as the Master Drainage Plan for the Amole Del Norte Drainage Basin.

The Amole Del Norte Drainage Basin, which encompasses an area of approximately 6.6 square miles can be broken down into three sub-basins and are identified as follows:

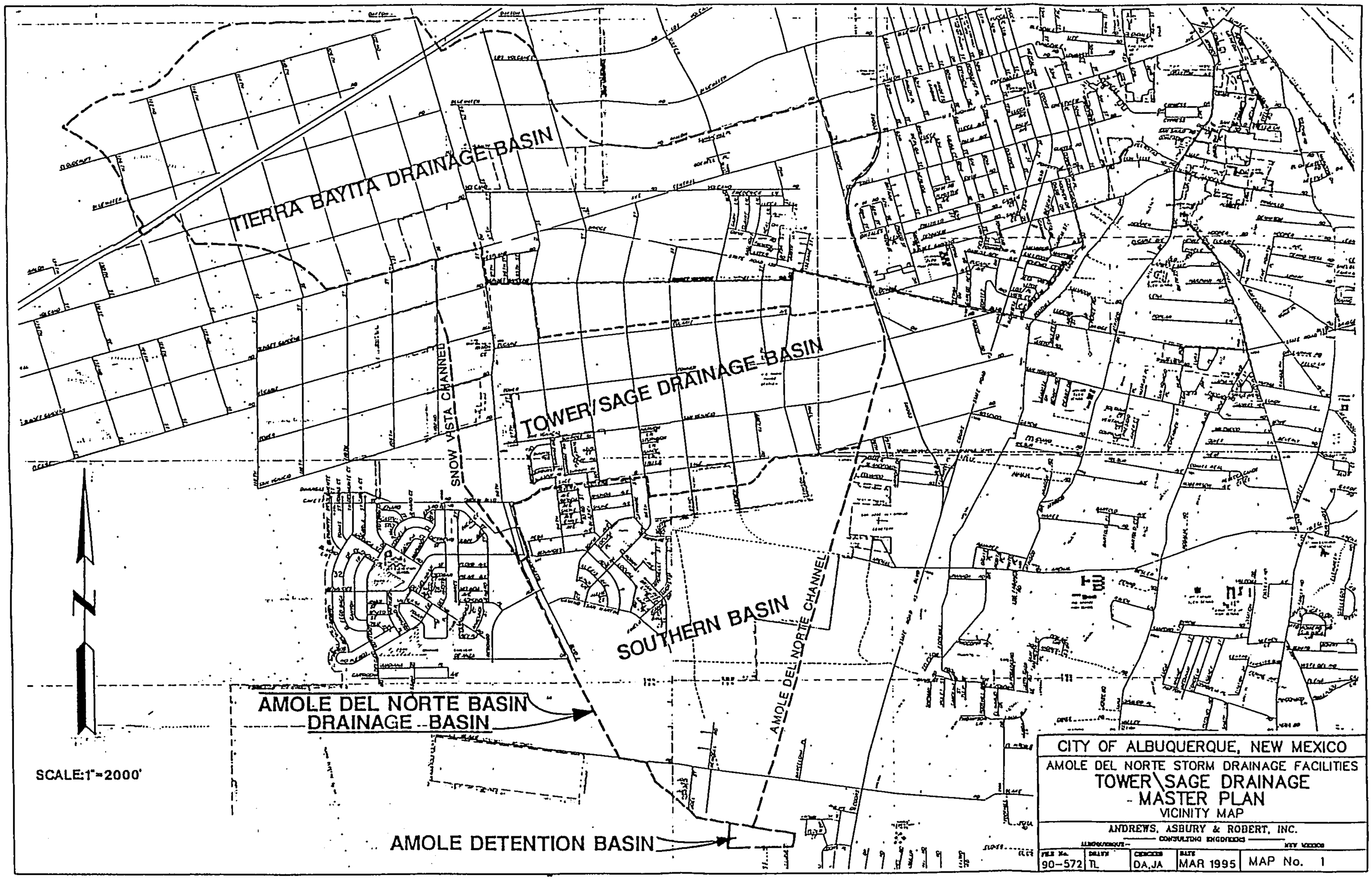
- The Tierra Bayita Drainage Basin - The northern sub-basin of the Amole Del Norte Basin
- The Tower/Sage Drainage Basin - The middle sub-basin of the Amole Del Norte Basin
- The Southern Basin - The southern sub-basin of the Amole Del Norte Basin

The analysis presented in the Boyle Engineering report was utilized in the design and construction of the Amole Del Norte Channel. This channel is to carry the storm water runoff from the overall Amole Del Norte Drainage Basin. Subsequent to the Boyle Engineering Report, and the construction of the Amole Del Norte Channel, the City of Albuquerque adopted revised hydrology standards called AHYMO (Albuquerque Hydrologic Model). This AHYMO standard creates substantially more runoff from drainage basins than the standard previously used. It is, therefore, necessary to re-analyze the drainage basins being served by the Amole Del Norte Channel, and to prepare a plan to manage the storm water runoff.

Greiner Inc. has developed a refined drainage plan including proposed drainage facilities for the Tierra Bayita Drainage Basin. The facilities proposed were to be constructed in four phases. Two of these four phases have been constructed, with the remaining two phases planned to be completed by December 1996. The southern basin remains as presented in the Boyle Engineering, Inc. report and has not been refined or updated as of this date.

This Tower/Sage Drainage Master Plan is prepared to re-evaluate the runoff generated by the Tower/Sage Drainage Basin utilizing the current AHYMO hydrology standard and to present proposed facilities, as necessary, to accommodate the rate and volume of runoff, and to deliver the runoff to the Amole Del Norte Channel at an acceptable rate so as not to exceed the channel's capacity.

In addition, the City of Albuquerque presently has a Special Assessment District (SAD-222) project in progress for the construction of infrastructure improvements within the westerly portion of the Tower/Sage Drainage Basin. This master plan of drainage is to provide a method for managing the storm drainage from the City's SAD 222 project that is consistent with an overall drainage plan for the basin.


TIERRA BAYITA DRAINAGE BASIN
SNOW VISTA CHANNEL
TOWER/SAGE DRAINAGE BASIN
SOUTHERN BASIN
AMOLE DEL NORTE CHANNEL
AMOLE DEL NORTE BASIN
DRAINAGE BASIN
AMOLE DETENTION BASIN
N
SCALE:1"=2000'
CITY OF ALBUQUERQUE, NEW MEXICO
AMOLE DEL NORTE STORM DRAINAGE FACILITIES
TOWER\SAGE DRAINAGE
- MASTER PLAN
VICINITY MAP
ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
ALBUQUERQUE
NEW MEXICO
FILE No. 90-572
DRAWN TL
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DATE MAR 1995
MAP No. 1

2.0 DRAINAGE AREA BOUNDARIES

The basin boundaries are generally described as bounded on the east by the Amole Del Norte Channel; on the west by the Snow Vista Channel; on the north by the southerly boundary of the Tierra Bayita Basin; and, on the south, generally by Sage Road. Map No. 2, included in the back pocket of this report, shows the drainage area boundaries of the Tower/Sage Drainage Basin under the proposed, developed conditions.

The limits of the developed Tower/Sage Drainage Basin were determined primarily from information provided in the "Design-Development Report for the Re-evaluation Study of the Amole Del Norte Storm Diversion Facility." The "Improved Conditions Report for Amole Watershed Drainage Management Plan" was also used; however, to a lesser degree.

Updated topography of the Tower/Sage Basin area dated April 1991 was obtained from Resources Technology, Inc., who are currently preparing a restudy report of the area for FEMA. Based on the updated topography along with reviewing the existing platted streets, some adjustments to the previous boundary have been made:

2.1 The northwest corner of the boundary was modified by down-sizing sub-basin A1-D. A meeting was held with AMAFCA (Albuquerque Metropolitan Arroyo Flood Control Association) drainage engineer, and it was determined that the area west of 102nd Street could become part of the Amole Drainage Basin and allowed to drain into the Snow Vista Channel without significantly affecting the channel capacity.

2.2 Area A8-D, located east of 98th Street between Sunset Gardens Road and Eucariz Avenue, was made a part of the Tower/Sage Basin for practical topographic reasons. This area slopes easterly to 94th Street and then 94th

Street slopes to Eucariz Avenue which lies within the Tower/Sage Basin. Previously, A8-D was a portion of the Tierra Bayita Basin.

2.3 At the northeast corner of the basin, the area between Bridge Boulevard and north of sub-basin A16-D was placed in the Tierra Bayita Basin. This area slopes steeply to the north and presently drains to the Tierra Bayita Channel.

2.4 The southern boundary was modified slightly by including a 400-strip south of Sage Road to sub-basins S5-D, S6-D, S7-D, and S8-D. The 400-foot wide strip is relatively flat and, when developed, could drain to Sage Road.

3.0 DRAINAGE BASIN CHARACTERISTICS

3.1 TOPOGRAPHY

The Tower/Sage Drainage Area generally slopes from the northwest to the southeast and has a surface gradient varying from approximately 1.5 percent to 3 percent. The upper northwesterly portions have the steeper slopes. A natural playa currently exists east of Unser Boulevard and west of Stinson Street. Also, fairly steep slopes occur in the far east portion of the drainage basin. The topography of the area is shown on Map No. 2 included in the back pocket of this report.

3.2 SOILS AND VEGETATION

The major portion of the soils within the drainage basin consist of hydrologic Soil Group A and Soil Group B. Generally, Group A soils occur on the westerly portion of the basin in the vicinity of 98th Street and on the far easterly portion of the basin on the steeper slopes directly west of the Amole Del Norte Channel. The remainder of the area consists of Group B soils.

Existing vegetation is relatively sparse throughout the area and consists of an open-type desert grassland. Generally, vegetative coverage is estimated at less than 20 percent. Under developed conditions, it is anticipated that the area will be covered with hard surfaces and various types of landscaping that are consistent with the Land Use proposed in the Tower/Unser Sector Development Plan.

3.3 LAND USE

Under existing conditions, approximately 90 percent of the Tower/Sage Basin area is currently undeveloped. Some development exists adjacent to 98th Street with most of this development near Sage Road at the southwest corner of the basin.

For drainage purposes, developed conditions of the Tower/Sage Drainage Basin assumes development occurring in accordance with zoning and land use presented in the Tower/Unser Sector Development Plan. The majority of the zoning presented in this sector plan provides for residential uses ranging from single family homes to multi-family units up to 20 dwelling units per acre. Proposed commercial and office zoning is minimal within the basin and is limited to areas near the major roadway intersections.

3.4 PLATTING

The major portion of the land in the Tower/Sage Basin area was originally subdivided in 1944, as part of the Town of Atrico Grant. This original subdivision divides the land on a grid into 25-acre blocks separated with public rights-of-way. Each block generally contains five rectangular parcels of approximately five acres, each measuring approximately 204 feet by 1067 feet. Generally, there are separate owners for each five acre parcel, although some individuals own multiple tracts. Replatting in the area is mostly limited to some lands adjacent to 98th Street and at the southwest corner of the basin, east of 98th Street and north of Sage Road.

3.5 ANNEXATION

The westerly portion of the drainage basin consisting of approximately 60 percent of the basin area has been annexed and is currently within the City of Albuquerque municipal limits. The easterly and remaining portion of the basin remains outside the municipal limits. A line designating the municipal limits generally extends north-south through the basin just east of 86th Street.

4.0 EXISTING DRAINAGE FACILITIES

Historically, the drainage areas impacting the Tower/Sage drainage basin from the west were relatively large. However, the construction of the Snow Vista Drainage Channel (concrete-lined) aligned north-south and located approximately 1000 feet west of 98th Street has intercepted and diverted the major historic storm water flows south to the Amole Arroyo and Amole Detention Basin, and away from the Tower/Sage drainage area. This Snow Vista Channel, therefore, determines the west boundary of the basin.

The Amole Del Norte Storm Diversion Facility, located at the east boundary of the drainage basin, consists of a sedimentation basin from Bridge Boulevard to Tower Road, then drains to a concrete-lined channel that begins at Tower Road and Coors Road, then extends southerly varying from approximately 300 feet to 1300 feet west of Coors Road and discharges into the Amole Detention Basin to the south. This facility was installed in 1989 and 1990 and serves as the outlet for the Amole Del Norte Drainage Basin.

Recently, a drainage channel to serve the northerly adjacent Tierra Bayita Drainage Basin was constructed along the southerly side of Bridge Boulevard and extends westerly from the Amole Del Norte Diversion Channel Sedimentation Basin. This channel intercepts flows from the Tierra Bayita Basin and serves as the north boundary of the Tower/Sage Basin along its easterly reaches.

At the present time, no drainage facilities exist within the basin itself. The drainage in the basin is basically natural and follows the terrain which slopes from west to east.

The City's recent adoption of AHYMO (Albuquerque Hydrologic Model) as its hydrology standard has caused many of its existing storm drainage systems to be undersized and the Amole Del Norte Channel is one of these systems. This channel

was designed from hydrology developed as part of the "Design Development Report for the Re-Evaluation Study of the Amole Del Norte Storm Diversion Facility" in 1985. The recently adopted AHYMO computer program, together with smaller sub-basin delineation, produces flows considerably higher than flows generated using the older HYMO computer program. Therefore, a drainage plan is required to be developed to control the flows from the drainage basins that are served by the Amole Del Norte Channel so that the capacity of the channel is not exceeded.

5.0 FLOOD PLAINS

In reviewing the flood boundary and floodway maps for the City of Albuquerque, New Mexico, Bernalillo County (Panel 32 of 50 Community-Panel Number 350002 0032 and Panel 33 of 50 Community-Panel Number 350002 0033) dated October 14, 1983, flood plains are shown to exist on properties in the drainage area. Since the construction of the Snow Vista Channel in 1987, there has been no Letter of Map Revision made for this area. A "Draft-Flood Insurance Restudy Report for Six Areas Within the City of Albuquerque, Bernalillo County, New Mexico Community Number 350002," December 1993 is currently being reviewed by FEMA; however, comments on this restudy report have not been received from FEMA at the time of the writing of this report. The proposed drainage plan, when implemented, will remove the flood plains from the basin.

6.0 HYDROLOGY

Frequency flows were quantified using the latest version of the computer program AHYMO (January 1994) according to "Section 22.2 Hydrology of the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque, New Mexico," January 1993. For the purpose of this master drainage plan, only fully developed conditions were considered in the computer model.

Rainfall amounts for the frequency events were derived from the NOAA Atlas and as shown in "Section 22.2 Hydrology of the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque, New Mexico, January 1993," Figures C-1, C-2, and C-3. Sub-basin boundaries were generally broken down into the platted blocks; however, in certain instances, topographic features were considered to determine appropriate boundaries. Sub-basin areas were computed from a 1" = 500' orthophoto topographic map that was produced from April 1991 photography. Land uses were determined from the recommended zoning documented in the "Tower/Unser Sector Development Plan." Time of concentrations were calculated using the SCS Upland Method.

Table 1, included hereinafter, links the recommended zoning provided in the "Tower/Unser Sector Development Plan" to the appropriate land treatments used in the AHYMO computer model. Table 2, herein, contains the AHYMO basin parameter worksheet together with peak flows and volumes for each sub-basin. Table 3 presents peak flows and volumes at each analysis point as shown on Map No. 2. AHYMO Output Summary Tables are included in Appendix A of this report. Detailed computer printouts of the AHYMO Model are available for observation at the offices of Andrews, Asbury, & Robert, Inc.

TABLE 1

TOWER/SAGE DRAINAGE MASTER PLAN
LAND TREATMENTS

	LAND TREATMENTS			
ZONE DESIGNATION	"A"	"B"	"C"	"D"
RESIDENTIAL				
R-1		50		50
R-T		35		65
R-D (9 UNITS/ACRE)		40		60
R-D (14 UNITS/ACRE)		35		65
R-D (20 UNITS/ACRE)		30		70
R-2		30		70
OFFICE				
O-1		20		80
COMMERCIAL				
C-1		10		90
C-2		10		90

NOTE: ZONING TAKEN FROM TOWER/UNSER SECTOR DEVELOPMENT PLAN

TABLE 2

TOWER/SAGE DRAINAGE MASTER PLAN

AHYMO BASIN PARAMETER WORKSHEET

PEAK BASIN FLOWS AND VOLUMES

(ALL FLOWS & VOLUMES INCLUDE A 5% BULKING FACTOR)

BASIN	AREA (ac.)	AREA (sq.mi.)	LENGTH (ft.)	ELEV. DIFF. (ft.)	SLOPE (%)	K*	VEL (fps)	T(c) (hr.)	T(p) (hr.)	LAND TREATMENT (%) A	B	C	D	10 YEAR PEAK FLOW (6hr.) (cfs)	10 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)	100 YEAR PEAK FLOW (6hr.) (cfs)	100 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)
A1-D	29.3	0.0458	400	8.0	2.00	1.0	1.41	0.08	0.05								
			500	3.0	0.60	2.0	1.55	0.09	0.06								
			900	25.0	2.78	3.0	5.00	0.05	0.03								
		TOTAL =						0.22	0.15		24		76	70	3.2	112	5.2
A2-D	25.3	0.0395	200	6.0	3.00	0.7	1.21	0.05	0.03								
			850	23.0	2.71	3.0	4.93	0.05	0.03								
			1000	6.0	0.60	3.0	2.32	0.12	0.08								
		TOTAL =						0.21	0.14		30		70	59	2.6	96	4.2
A3-D	26.8	0.0419	200	4.0	2.00	0.7	0.99	0.06	0.04								
			900	9.0	1.00	3.0	3.00	0.08	0.06								
			750	18.0	2.40	3.0	4.65	0.04	0.03								
		TOTAL =						0.18	0.12		35		65	62	2.6	103	4.3
A4-D	28.1	0.0439	200	6.0	3.00	0.7	1.21	0.05	0.03								
			800	16.0	2.00	3.0	4.24	0.05	0.03								
			1000	6.0	0.60	3.0	2.32	0.12	0.08								
		TOTAL =						0.22	0.15		20		80	69	3.2	110	5.1
A5-D	28.9	0.0452	200	4.0	2.00	0.7	0.99	0.06	0.04								
			950	8.0	0.84	3.0	2.75	0.10	0.06								
			900	18.0	2.00	3.0	4.24	0.06	0.04								
		TOTAL =						0.21	0.14		40		60	61	2.6	103	4.4
A6-D	28.9	0.0452	200	4.0	2.00	0.7	0.99	0.06	0.04								
			950	8.0	0.84	3.0	2.75	0.10	0.06								
			900	18.0	2.00	3.0	4.24	0.06	0.04								
		TOTAL =						0.21	0.14		50		50	54	2.3	95	4.0

SEE MAP NO. 2 FOR BASIN IDENTIFICATION

TABLE 2

TOWER/SAGE DRAINAGE MASTER PLAN

AHYMO BASIN PARAMETER WORKSHEET
PEAK BASIN FLOWS AND VOLUMES

(ALL FLOWS & VOLUMES INCLUDE A 5% BULKING FACTOR)

BASIN	AREA (ac.)	AREA (sq.mi.)	LENGTH (ft.)	ELEV. DIFF. (ft.)	SLOPE (%)	K	VEL (fps)	T(c) (hr.)	T(p) (hr.)	LAND TREATMENT (%) A	B	C	D	10 YEAR PEAK FLOW (6hr.) (cfs)	10 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)	100 YEAR PEAK FLOW (6hr.) (cfs)	100 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)
A7-D	13.2	0.0206	150	1.0	0.67	0.7	0.57	0.07	0.05								
			400	1.0	0.25	3.0	1.50	0.07	0.05								
			900	18.0	2.00	3.0	4.24	0.06	0.04								
		TOTAL =						0.21	0.14		50		50	25	1.0	43	1.8
A8-D	36.5	0.0570	200	4.0	2.00	0.7	0.99	0.06	0.04								
			900	21.0	2.33	3.0	4.58	0.05	0.04								
			1250	6.0	0.48	3.0	2.08	0.17	0.11								
		TOTAL =						0.28	0.19		30		70	73	3.7	119	6.1
A9-D	6.5	0.0102	200	1.0	0.50	0.7	0.49	0.11	0.07								
			900	22.0	2.44	3.0	4.69	0.05	0.04								
		TOTAL =						0.17	0.11		50		50	13	0.5	23	0.9
A10-D	6.5	0.0102	150	2.0	1.33	0.7	0.81	0.05	0.03								
			900	18.0	2.00	3.0	4.24	0.06	0.04								
			100	2.0	2.00	3.0	4.24	0.01	0.00								
		TOTAL =						0.12	0.08		50		50	13	0.5	23	0.9
A11-D	5.5	0.0086	200	1.0	0.50	1.0	0.71	0.08	0.05								
			1000	13.0	1.30	3.0	3.42	0.08	0.05								
			200	2.0	1.00	3.0	3.00	0.02	0.01								
		TOTAL =						0.18	0.12		24		76	14	0.6	23	1.0
A12-D	23.0	0.0359	200	2.0	1.00	0.7	0.70	0.08	0.05								
			950	12.0	1.26	3.0	3.37	0.08	0.05								
			650	8.0	1.23	3.0	3.33	0.05	0.04								
		TOTAL =						0.21	0.14		24		76	56	2.5	91	4.1

SEE MAP NO. 2 FOR BASIN IDENTIFICATION

TABLE 2

TOWER/SAGE DRAINAGE MASTER PLAN

AHYMO BASIN PARAMETER WORKSHEET
PEAK BASIN FLOWS AND VOLUMES

(ALL FLOWS & VOLUMES INCLUDE A 5% BULKING FACTOR)

BASIN	AREA (ac.)	AREA (sq.mi.)	LENGTH (ft.)	ELEV. DIFF. (ft.)	SLOPE (%)	K	VEL (fps)	T(c) (hr.)	T(p) (hr.)	LAND TREATMENT (%) A	B	C	D	10 YEAR PEAK FLOW (6hr.) (cfs)	10 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)	100 YEAR PEAK FLOW (6hr.) (cfs)	100 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)
A13-D	28.9	0.0452	200	3.0	1.50	0.7	0.86	0.06	0.04								
			1000	3.0	0.30	3.0	1.64	0.17	0.11								
			850	7.0	0.82	3.0	2.72	0.09	0.06								
		TOTAL =						0.32	0.21		35		65	52	2.8	86	4.6
A14-D	28.9	0.0452	300	0.5	0.17	1.0	0.41	0.20	0.14								
			1000	4.0	0.40	3.0	1.90	0.15	0.10								
			800	1.0	0.13	3.0	1.06	0.21	0.14								
		TOTAL =						0.56	0.37		30		70	39	2.9	63	4.8
A15-D	16.2	0.0253	200	1.0	0.50	0.7	0.49	0.11	0.07								
			950	4.0	0.42	3.0	1.95	0.14	0.09								
			300	1.0	0.33	3.0	1.73	0.05	0.03								
		TOTAL =						0.30	0.20		40		60	28	1.4	48	2.5
A16-D	40.8	0.0638	200	0.5	0.25	0.7	0.35	0.16	0.11								
			950	1.0	0.11	3.0	0.97	0.27	0.18								
			500	3.0	0.60	3.0	2.32	0.06	0.04								
			1250	56.0	4.48	3.0	6.35	0.05	0.04								
		TOTAL =						0.54	0.36		50		50	43	3.2	76	5.6
A17-D	6.9	0.0108	150	3.0	2.00	0.7	0.99	0.04	0.03								
			900	14.0	1.56	3.0	3.74	0.07	0.04								
			100	1.0	1.00	3.0	3.00	0.01	0.01								
		TOTAL =						0.12	0.08		50		50	14	0.5	24	0.9

SEE MAP NO. 2 FOR BASIN IDENTIFICATION

TABLE 2
TOWER/SAGE DRAINAGE MASTER PLAN
AHYMO BASIN PARAMETER WORKSHEET
PEAK BASIN FLOWS AND VOLUMES

(ALL FLOWS & VOLUMES INCLUDE A 5% BULKING FACTOR)

BASIN	AREA (ac.)	AREA (sq.mi.)	LENGTH (ft.)	ELEV. DIFF. (ft.)	SLOPE (%)	K	VEL (fps)	T(c) (hr.)	T(p) (hr.)	LAND TREATMENT (%) A	B	C	D	10 YEAR PEAK FLOW (6hr.) (cfs)	10 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)	100 YEAR PEAK FLOW (6hr.) (cfs)	100 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)
A18-D	6.6	0.0103	150	2.0	1.33	0.7	0.81	0.05	0.03								
			900	8.0	0.89	3.0	2.83	0.09	0.06								
			100	1.0	1.00	3.0	3.00	0.01	0.01								
		TOTAL =						0.15	0.10		40		60	14	0.6	24	1.0
A19-D	6.9	0.0108	150	1.0	0.67	0.7	0.57	0.07	0.05								
			900	2.0	0.22	3.0	1.41	0.18	0.12								
			100	0.5	0.50	3.0	2.12	0.01	0.01								
		TOTAL =						0.26	0.18		40		60	13	0.6	22	1.1
A20-D	4.4	0.0069	150	1.0	0.67	0.7	0.57	0.07	0.05								
			500	1.0	0.20	3.0	1.34	0.10	0.07								
			100	0.5	0.50	3.0	2.12	0.01	0.01								
		TOTAL =						0.19	0.13		40		60	10	0.4	16	0.7
B1-D	14.7	0.0230	200	5.0	2.50	0.7	1.11	0.05	0.03								
			1150	25.0	2.17	3.0	4.42	0.07	0.05								
		TOTAL =						0.12	0.08		32		68	35	1.5	58	2.4
B2-D	22.4	0.0350	200	6.0	3.00	0.7	1.21	0.05	0.03								
			1100	19.0	1.73	3.0	3.94	0.08	0.05								
			700	15.0	2.14	3.0	4.39	0.04	0.03								
		TOTAL =						0.17	0.11		40		60	49	2.0	83	3.4
B3-D	27.9	0.0436	200	2.0	1.00	0.7	0.70	0.08	0.05								
			1000	16.0	1.60	3.0	3.79	0.07	0.05								
			900	13.0	1.44	3.0	3.61	0.07	0.05								
		TOTAL =						0.22	0.15		50		50	51	2.2	89	3.8

SEE MAP NO. 2 FOR BASIN IDENTIFICATION

TABLE 2
TOWER/SAGE DRAINAGE MASTER PLAN
AHYMO BASIN PARAMETER WORKSHEET
PEAK BASIN FLOWS AND VOLUMES

(ALL FLOWS & VOLUMES INCLUDE A 5% BULKING FACTOR)

BASIN	AREA (ac.)	AREA (sq.mi.)	LENGTH (ft.)	ELEV. DIFF. (ft.)	SLOPE (%)	K	VEL (fps)	T(c) (hr.)	T(p) (hr.)	LAND TREATMENT (%) A	B	C	D	10 YEAR PEAK FLOW (6hr.) (cfs)	10 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)	100 YEAR PEAK FLOW (6hr.) (cfs)	100 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)
B4-D	14.7	0.0230	200	5.0	2.50	0.7	1.11	0.05	0.03								
			450	6.0	1.33	3.0	3.46	0.04	0.02								
			1050	12.0	1.14	3.0	3.21	0.09	0.06								
		TOTAL =						0.18	0.12		50		50	29	1.1	51	2.0
B5-D TOWER POND	25.0	0.0391						0.20	0.13	30	50	15	5	21	0.6	55	1.6
B6-D	29.4	0.0459	200	1.0	0.50	0.7	0.49	0.11	0.07								
			950	1.0	0.11	3.0	0.97	0.27	0.18								
			850	5.0	0.59	3.0	2.30	0.10	0.07								
		TOTAL =						0.49	0.32		35		65	41	2.8	68	4.7
B7-D	37.8	0.0591	400	3.0	0.75	1.0	0.87	0.13	0.09								
			1000	3.0	0.30	3.0	1.64	0.17	0.11								
			950	5.0	0.53	3.0	2.18	0.12	0.08								
		TOTAL =						0.42	0.28		33		67	58	3.7	97	6.2
B8-D	57.0	0.0891	200	1.0	0.50	0.7	0.49	0.11	0.07								
			1000	1.0	0.10	3.0	0.95	0.29	0.20								
			800	1.0	0.13	3.0	1.06	0.21	0.14								
			950	5.0	0.53	3.0	2.18	0.12	0.08								
		TOTAL =						0.74	0.49		50		50	49	4.4	86	7.8

SEE MAP NO. 2 FOR BASIN IDENTIFICATION

TABLE 2

TOWER/SAGE DRAINAGE MASTER PLAN

AHYMO BASIN PARAMETER WORKSHEET

PEAK BASIN FLOWS AND VOLUMES

(ALL FLOWS & VOLUMES INCLUDE A 5% BULKING FACTOR)

BASIN	AREA (ac.)	AREA (sq.mi.)	LENGTH (ft.)	ELEV. DIFF. (ft.)	SLOPE (%)	K	VEL (fps)	T(c) (hr.)	T(p) (hr.)	LAND TREATMENT (%) A	B	C	D	10 YEAR PEAK FLOW (6hr.) (cfs)	10 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)	100 YEAR PEAK FLOW (6hr.) (cfs)	100 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)
S1-D	20.1	0.0314	100	2.0	2.00	0.7	0.99	0.03	0.02								
			675	10.0	1.48	3.0	3.65	0.05	0.03								
			325	8.0	2.46	3.0	4.71	0.02	0.01								
			400	8.0	2.00	3.0	4.24	0.03	0.02								
		TOTAL =						0.12	0.08		35		65	46	1.9	77	3.2
S2-D	10.4	0.0163	100	2.0	2.00	0.7	0.99	0.03	0.02								
			675	10.0	1.48	3.0	3.65	0.05	0.03								
			325	8.0	2.46	3.0	4.71	0.02	0.01								
			325	8.0	2.46	3.0	4.71	0.02	0.01								
			400	8.0	2.00	3.0	4.24	0.03	0.02								
		TOTAL =						0.14	0.10		50		50	21	0.8	36	1.4
S3-D	36.3	0.0567	50	1.0	2.00	0.7	0.99	0.01	0.01								
			400	9.0	2.25	3.0	4.50	0.02	0.02								
			500	5.0	1.00	3.0	3.00	0.05	0.03								
			250	6.0	2.40	3.0	4.65	0.01	0.01								
			250	2.0	0.80	3.0	2.68	0.03	0.02								
			850	14.0	1.65	3.0	3.85	0.06	0.04								
			150	1.0	0.67	3.0	2.45	0.02	0.01								
		TOTAL =						0.20	0.14		50		50	68	2.8	120	5.0
S4-D	27.9	0.0436	200	3.0	1.50	0.7	0.86	0.06	0.04								
			950	10.0	1.05	3.0	3.08	0.09	0.06								
			900	9.0	1.00	3.0	3.00	0.08	0.06								
		TOTAL =						0.23	0.16		40		60	55	2.5	93	4.2

SEE MAP NO. 2 FOR BASIN IDENTIFICATION

TABLE 2

TOWER/SAGE DRAINAGE MASTER PLAN

AHYMO BASIN PARAMETER WORKSHEET

PEAK BASIN FLOWS AND VOLUMES

(ALL FLOWS & VOLUMES INCLUDE A 5% BULKING FACTOR)

BASIN	AREA (ac.)	AREA (sq.ml.)	LENGTH (ft.)	ELEV. DIFF. (ft.)	SLOPE (%)	K	VEL (fps)	T(c) (hr.)	T(p) (hr.)	LAND TREATMENT (%) A	B	C	D	10 YEAR PEAK FLOW (6hr.) (cfs)	10 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)	100 YEAR PEAK FLOW (6hr.) (cfs)	100 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)
S5-D	15.2	0.0238	400	6.0	1.50	3.0	3.67	0.03	0.02								
			1000	4.0	0.40	3.0	1.90	0.15	0.10								
		TOTAL =						0.18	0.12		41		59	33	1.3	56	2.3
S6-D	24.2	0.0378	400	1.0	0.25	1.0	0.50	0.22	0.15								
			400	1.0	0.25	3.0	1.50	0.07	0.05								
			200	2.0	1.00	3.0	3.00	0.02	0.01								
			1100	5.0	0.45	3.0	2.02	0.15	0.10								
		TOTAL =						0.47	0.31		40		60	32	2.2	55	3.7
S7-D	36.5	0.0570	400	2.0	0.50	1.0	0.71	0.16	0.10								
			950	1.0	0.11	2.0	0.65	0.41	0.27								
			650	3.0	0.46	2.0	1.36	0.13	0.09								
		TOTAL =						0.70	0.46		29		71	43	3.7	70	6.2
S8-D	43.7	0.0683	400	2.0	0.50	1.0	0.71	0.16	0.10								
			1000	1.0	0.10	3.0	0.95	0.29	0.20								
			1100	6.0	0.55	3.0	2.22	0.14	0.09								
		TOTAL =						0.59	0.39		37		63	52	4.1	87	6.8
S9-D	47.9	0.0748	300	10.0	3.33	1.0	1.83	0.05	0.03								
			950	9.0	0.95	3.0	2.92	0.09	0.06								
			1150	33.0	2.87	3.0	5.08	0.06	0.04								
		TOTAL =						0.20	0.13		50		50	94	3.7	166	6.5

SEE MAP NO. 2 FOR BASIN IDENTIFICATION

TABLE 2
TOWER/SAGE DRAINAGE MASTER PLAN
AHYMO BASIN PARAMETER WORKSHEET
PEAK BASIN FLOWS AND VOLUMES

(ALL FLOWS & VOLUMES INCLUDE A 5% BULKING FACTOR)

BASIN	AREA (ac.)	AREA (sq.mi.)	LENGTH (ft.)	ELEV. DIFF. (ft.)	SLOPE (%)	K	VEL (fps)	T(c) (hr.)	T(p) (hr.)	LAND TREATMENT (%) A	B	C	D	10 YEAR PEAK FLOW (6hr.) (cfs)	10 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)	100 YEAR PEAK FLOW (6hr.) (cfs)	100 YEAR RUNOFF VOLUME (24hr.) (ac.ft.)
C1-D	24.7	0.0386	200	6.0	3.00	0.7	1.21	0.05	0.03								
			500	3.0	0.60	3.0	2.32	0.06	0.04								
			850	23.0	2.71	3.0	4.93	0.05	0.03								
			250	4.0	1.60	3.0	3.79	0.02	0.01								
		TOTAL =						0.17	0.11		33		67	58	2.4	96	4.0
C2-D	12.0	0.0188	100	2.0	2.00	0.7	0.99	0.03	0.02								
			750	8.0	1.07	3.0	3.10	0.07	0.04								
			400	6.0	1.50	3.0	3.67	0.03	0.02								
		TOTAL =						0.13	0.08		35		65	28	1.1	46	1.9
C3-D	15.0	0.0234	400	8.0	2.00	2.0	2.83	0.04	0.03								
			200	2.0	1.00	3.0	3.00	0.02	0.01								
			800	13.0	1.63	3.0	3.82	0.06	0.04								
		TOTAL =						0.12	0.08		10		90	43	1.9	67	3.0
C4-D	19.7	0.0308	200	5.0	2.50	0.7	1.11	0.05	0.03								
			500	4.0	0.80	3.0	2.68	0.05	0.03								
			300	9.0	3.00	3.0	5.20	0.02	0.01								
			1050	13.0	1.24	3.0	3.34	0.09	0.06								
		TOTAL =						0.21	0.14		26		74	48	2.1	77	3.4
C5-D	5.8	0.0091	1250	4.0	0.32	3.0	1.70	0.20	0.14			50	50	13	0.5	22	0.9
C6-D	12.4	0.0194	1400	16.0	1.14	2.0	2.14	0.18	0.12		10		90	36	1.5	55	2.5

SEE MAP NO. 2 FOR BASIN IDENTIFICATION

TABLE 3

TOWER/SAGE DRAINAGE MASTER PLAN

SUMMARY OF PEAK DISCHARGES AND PEAK VOLUMES

(ALL FLOWS INCLUDE A 5% BULKING FACTOR)

ANALYSIS POINT	Q(10) (6hr.) (cfs)	V(10) (24hr.) (ac.ft.)	Q(100) (6hr.) (cfs)	V(100) (24hr.) (ac.ft.)
1	70	3.2	112	5.2
2	126	5.7	204	9.4
3	179	8.3	292	13.7
4	244	11.4	397	18.8
5	298	14.0	490	23.2
6	73	3.7	119	6.1
7	78	4.2	132	7.0
8	86	4.7	147	7.9
9	445	22.0	748	36.8
10	457	22.6	766	37.8
11	35	1.5	58	2.4
12	77	3.5	132	5.8
13	118	5.6	211	9.6
14	142	6.8	252	11.6
15	46	1.9	77	3.2
16	65	2.7	109	4.6
17	132	5.5	228	9.6
18	185	8.0	318	13.8
19	202	9.4	348	16.4
20	345	16.5	599	27.7
21	820	39.3	1414	67.2
22	23	39.3	25	67.2
23	59	42.1	90	71.9
24	111	45.8	178	78.1
25	151	50.2	250	85.9
26	56	2.5	91	4.1
27	104	5.2	170	8.7
28	127	8.2	207	13.5
29	14	0.5	24	0.9
30	22	1.1	39	1.9
31	24	1.7	46	3.0
32	30	2.1	57	3.7
33	180	11.7	303	19.6
34	217	14.9	368	25.2
35	32	2.2	55	3.7
36	71	5.9	118	9.8
37	120	9.9	201	16.7
38	149	13.7	251	23.2
39	58	2.4	96	4.0
40	83	3.6	138	5.9
41	124	5.4	199	8.9
42	48	2.1	77	3.4
43	171	7.5	276	12.3
44	175	8.0	283	13.2
45	36	1.5	55	2.5

NOTE: SEE MAP NO. 2 FOR LOCATION OF ANALYSIS POINTS

7.0 PROPOSED STORM DRAINAGE SYSTEM

The master planned Tower/Sage Storm Drainage System is shown on Map No. 3 included in the back pocket of this report. Pipe sizes shown are preliminary and may vary when the final facility design is performed.

As previously stated in the existing facilities section of this report, the Amole Del Norte Channel does not have the capacity to carry flows originating from the Sage/Tower Drainage Basin under developed conditions when applying the new AHYMO hydrology program. Therefore, a permanent detention facility is required upstream of the Amole Del Norte Channel to collect a portion of the storm water and then provisions for drainage of the pond at a controlled rate. Existing inlet pipes to the Amole Del Norte Channel have been provided at Tower Road and at Sage Road to serve the Tower/Sage Drainage Basin. These two inlets were designed to receive 601 cfs from the Tower Road storm drain line and 211 cfs from the Sage Road storm drain line.

The location of the detention pond is critical, so that the flows generated by the area below and east of the detention pond will be equal to or less than the rate of flow for which the Amole Del Norte Channel is designed to receive from the Tower/Sage Drainage Basin. To meet this criteria, a detention facility designated herein as the "Tower Detention Pond" is proposed to be constructed within the block bounded by Tower Road and San Ygnacio Road on the north and south respectively, and 86th Street and 82nd Street on the west and east respectively.

The pond will be designed to collect and detain the runoff from the upper, western portion of the Tower/Sage Drainage Basin (west of the Tower Detention Pond). The Tower/Unser Sector Development Plan proposes a Neighborhood City Park in the same vicinity as the proposed Tower Detention Pond. In this regard, City Parks and General Services was contacted and, in turn, they have expressed interest in

the concept of a joint-use facility consisting of a neighborhood park and storm water detention facility (see letter enclosed as Appendix B.

7.1 STORM DRAINS

Storm water from the westerly portion of Drainage Basin A (Sub-basins A-1 thru A-11) will be collected and carried to the detention pond by a storm drain located in 98th Street and Tower Road. This storm drain will discharge to the Tower Pond just east of 86th Street.

Storm water from the westerly portion of Drainage Basin S (Sub-basins S-1 thru S-5) will be collected and carried to the detention pond by a storm drain in Sage Road. This storm drain turns north approximately 400 feet east of 86th Street to carry the flows to the detention pond. The northerly alignment of this storm drain was chosen as the farthest east and most feasible location relative to the existing topography as Sage Road ranges from four feet to six feet lower than the southerly side of the detention pond. It is proposed that the storm drain will be located on the easterly portion of the platted subdivision known as South Mesa Patio Townhomes. Although this area is subdivided, no development has occurred as of the date of this report. A 10-foot wide storm drainage easement exists along the easterly side of this subdivision; however, additional right-of-way for an easement of up to approximately 50 feet in width will be needed to accommodate the storm drain installation.

Storm water from the westerly portion of Drainage Basin B (Sub-basins B-1 through B-4) will be collected and carried in San Ygnacio Street until the street capacity is reached; then a combination of street and storm drain will be utilized to carry and discharge the water to the detention pond.

Storm water runoff generated from Drainage Basin C (Sub-basins C-1 through C-6) west of 98th Street and south of Tower Road will be collected and carried south by

a storm drain in 98th Street and Snow Vista Boulevard. This storm drain will discharge into the Snow Vista Channel south of Benavidas Road. The discharge of the storm water from this basin to the Snow Vista Channel was reviewed at a meeting with AMAFCA's drainage engineer and it was determined that the flow from this basin could be drained to the Snow Vista Channel without significantly affecting the channel capacity.

Storm water runoff generated from the easterly portion of the Basin will be collected and carried to the Amole Del Norte Channel by storm drains located in Tower Road, San Ygnacio Road, and Sage Road as shown on Map No. 3

7.2 HYDRAULICS

The hydraulics of the proposed storm drain system are based on utilizing the following three basic system parts:

1. Streets - which act as open channels to convey storm water runoff to drop inlets.

2. Underground piping - which convey storm water runoff from the drop inlets to the Tower Detention Pond or to the Amole Del Norte Channel.

3. Tower Detention Pond - which will detain the storm water runoff and discharge it at a controlled rate to the Amole Del Norte Channel.

Street capacities were approximated within the Tower/Sage Drainage Area using Manning's Equation for open channel flow, proposed street sections, and existing terrain as street grades. Hydraulic grade lines were calculated for the storm drain pipes, again using Manning's principles for pressure flow and, in some instances, nonpressurized flow. Storm water runoff upstream of the Tower Detention Pond was routed through the pond as part of the AHYMO computer model. Table 4

displays a tabular version of the stage/storage curve and outflow curve for the Tower Detention Pond used in the AHYMO computer model. Section 7.3 below, discusses in more detail the proposed Tower Detention Pond configuration and hydraulic characteristics.

7.3 TOWER DETENTION POND/NEIGHBORHOOD PARK

The Tower Detention Pond is proposed to be constructed south and east of the intersection of Tower Road and 86th Street. Figure 1 shows a conceptual Tower Detention Pond layout for a joint-use facility with a public neighborhood park. It is proposed that the block area outlined by public streets and consisting of 25 acres of land be made available for the City Park and the Tower Detention Pond. Twenty of the twenty-five available acres can be used as a neighborhood park. Six of these 20 acres will be utilized on infrequent occasions as part of the Tower Detention Pond. Approximately four to five acres of the 25 acres available will be used solely for detention pond purposes.

The park, in concept, will consist of grass and trees with slopes averaging two percent. A shallow concrete-lined low flow channel/swale will run through the park. Park patrons will be able to easily walk across the shallow channel/swale. There will be a 40-foot strip within the park, around the perimeter of the pond area, that will slope at 14 percent (7:1 ±). This slope is part of the overall detention pond that is required to contain the 100 year storm. The four to five acres to be used solely for detention purposes will be approximately 20 feet deep with three to one, horizontal to vertical, side slopes. This depth is required to receive the storm drain line from Sage Road. This area will be designed to contain a two-year storm and is proposed to be fenced and seeded with a native vegetation. Figure 1 also shows high water levels in the Tower Detention Pond for various 24-hour storm frequencies.

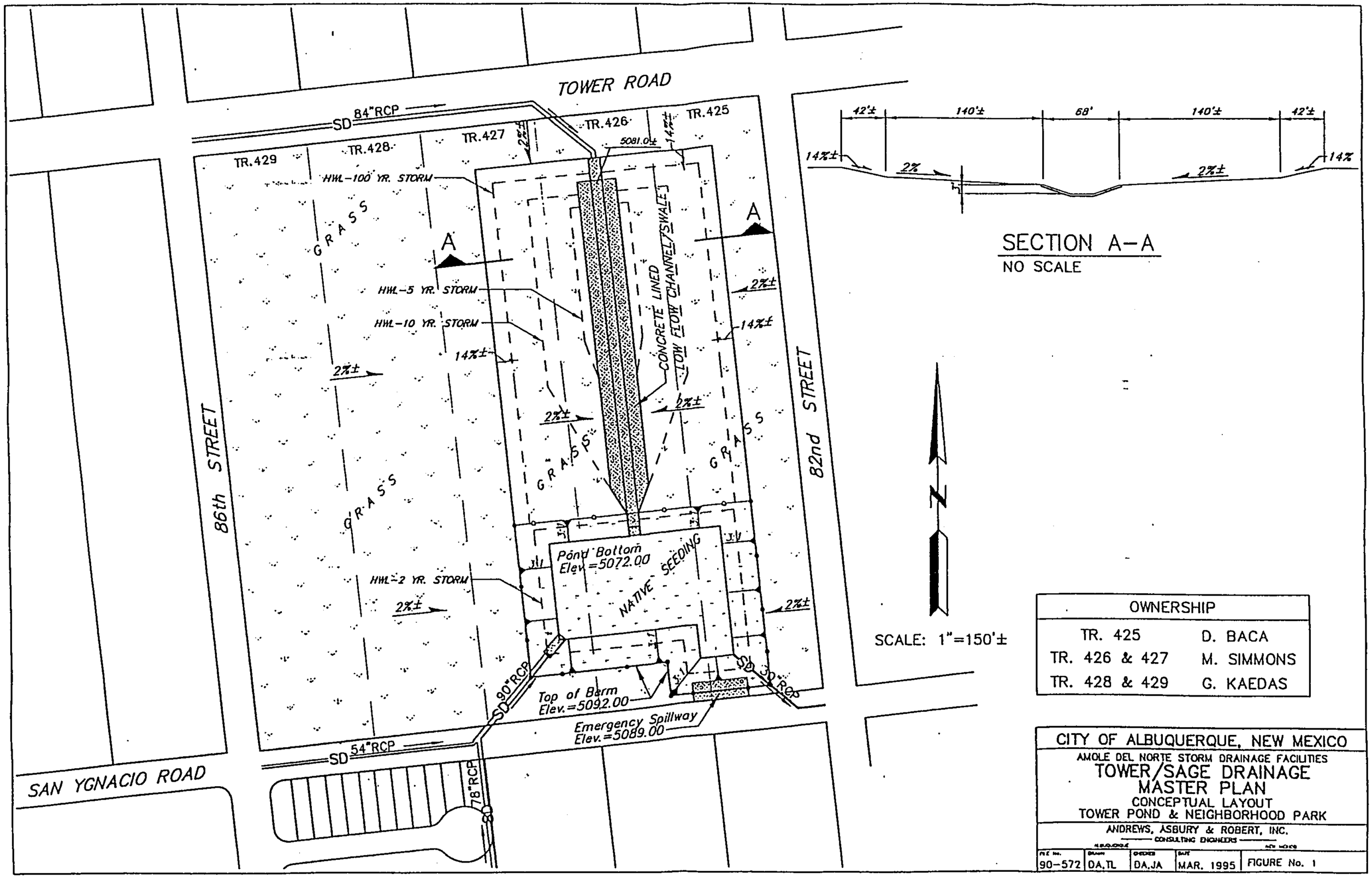

TOWER ROAD
SD 84"RCP
TR.429
TR.428
TR.427
TR.426
TR.425
5081.0±
HWL-100 YR. STORM
HWL-5 YR. STORM
HWL-10 YR. STORM
HWL-2 YR. STORM
GRASS
A
A
14%±
2%±
CONCRETE LINED LOW FLOW CHANNEL/SWALE
Pond Bottom Elev.=5072.00
NATIVE SEEDING
Top of Berm Elev.=5092.00
Emergency Spillway Elev.=5089.00
90"RCP
SD
SD 54"RCP
78"RCP
86th STREET
82nd STREET
SAN YGNACIO ROAD
42'±
140'±
68'
140'±
42'±
14%±
2%
2%±
14%
SECTION A-A
NO SCALE
N
SCALE: 1"=150'±
OWNERSHIP
TR. 425 D. BACA
TR. 426 & 427 M. SIMMONS
TR. 428 & 429 G. KAEDAS
CITY OF ALBUQUERQUE, NEW MEXICO
AMOLE DEL NORTE STORM DRAINAGE FACILITIES
TOWER/SAGE DRAINAGE MASTER PLAN
CONCEPTUAL LAYOUT
TOWER POND & NEIGHBORHOOD PARK
ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
90-572 DA.TL DA.JA MAR. 1995 FIGURE No. 1

TABLE 4

TOWER/SAGE MASTER DRAINAGE PLAN

TOWER POND

STORAGE AND OUTFLOW
RATING CURVE INFORMATION

ELEVATION (ft.)	INCREMENTAL VOLUME (ac.ft.)	TOTAL VOLUME (ac.ft.)	OUTFLOW (cfs)
5072		0.0	0.0
	5.8		
5076		5.8	11.9
	7.1		
5080		13.0	17.4
	2.2		
5081		15.2	18.5
	2.5		
5082		17.7	19.6
	2.8		
5083		20.5	20.6
	3.3		
5084		23.8	21.5
	4.4		
5085		28.2	22.5
	6.2		
5086		34.4	23.3
	15.4		
5088		49.9	25.0
	8.2		
5089		58.0	25.8
	26.4		
5092		84.4	3000*

TOP OF BERM ELEVATION = 5092.00 FT.
EMERGENCY SPILLWAY ELEVATION = 5089.00 FT.

* EMERGENCY SPILLWAY FLOW

TABLE 5

TOWER/SAGE MASTER DRAINAGE PLAN

TOWER POND DATA

	24 - HOUR STORM DURATION			
	2 - YEAR STORM	5 - YEAR STORM	10 - YEAR STORM	100 - YEAR STORM
TOTAL VOLUME ENTERING TOWER POND	21.8 ac.ft.	31.4 ac.ft.	39.3 ac.ft.	67.2 ac.ft.
HIGH WATER LEVEL IN TOWER POND	5080.9 ft.	5083.6 ft.	5085.1 ft.	5088.1 ft.
TIME TO DRAIN TOWER POND	63 hr.*	67 hr.*	70 hr.*	82 hr.*

TOP OF BERM ELEVATION = 5092.00 FT.
EMERGENCY SPILLWAY ELEVATION = 5089.00 FT.

* TIME TO DRAIN LAST FOOT OF STORM WATER IN POND = 38 HRS.

8.0 RIGHT-OF-WAY

The major portion of the master-planned storm drain lines proposed herein are located within existing street right-of-way.

The City of Albuquerque is currently in the process of obtaining right-of-way for the widening and construction of 98th Street and includes the right-of-way to provide for realignment of the streets intersection 98th Street. The storm drains proposed in 98th Street and in Tower Road can be constructed within the existing right-of-way and/or the street right-of-way being obtained.

8.1 TOWER DETENTION POND/NEIGHBORHOOD PARK

The lands on which the Tower Detention Pond and the Neighborhood Park are proposed to be constructed is presently in private ownership. Therefore, this pond and park area will require acquisition prior to construction of these facilities.

The detention pond and park are proposed for the block area bounded on the north by Tower road, on the east by 82nd Street, on the south by San Ygnacio Road, and on the west by 86th Street, and consists of approximately 25 acres. Based on the conceptual layout plan included in this report, the required area for the detention pond and park area is divided approximately equal (i.e., 12.5 acres for the detention pond and 12.5 acres for the neighborhood park).

8.2 SAGE ROAD STORM DRAIN

To provide for construction of the Sage Road Storm Drain between Sage Road and San Ygnacio Road, additional right-of-way will need to be acquired. An existing 10-foot wide drainage right-of-way exists along the east side of the South Mesa Townhomes Subdivision; however, additional right-of-way varying from 30 feet to

40 feet in width is required for construction of this portion of the Sage Road Storm Drain. The additional right-of-way area to be acquired is estimated at one (1) acre.

9.0 CONCLUSIONS AND RECOMMENDATIONS

This Master Plan of Drainage presents a storm drainage system and plan to manage the storm water generated by the Tower/Sage Drainage Basin using the City's current AHYMO hydrologic model.

Within the designated land uses and the limits established by the hydrologic analysis included herein, the implementation of this plan will allow the areas within the basin to be developed, based on approved drainage plans without restricting runoff.

Flood plains in the area can also be removed by providing proper documentation and application to FEMA when the construction of the facilities has been completed.

The plan provides for a system that can be separated into construction project phases and it is recommended that an initial phase be implemented as follows:

9.1 PHASE I

As mentioned previously in this report, the City of Albuquerque presently has Special Assessment District 222 in progress to provide for improvements in the westerly portion of the Tower/Sage Drainage Basin. It is recommended that the first phase of the planned facilities be constructed as a portion of this Special Assessment District 222. This first phase, Phase I, should include the following:

- 98th Street and Tower Road Storm Drain to Tower Detention Pond.
- San Ygnacio Road Storm Drain to Tower Detention Pond.
- Tower Detention Pond
- 98th Street Storm Drain to Snow Vista Channel

9.2 OTHER PHASES

Other phases, including one or all of the following systems, should be programmed and arrangements made for implementation based on their need and availability of funds. These other phases are:

- Sage Road Storm Drain to Tower Pond.
- Tower Road Storm Drain to Amole Del Norte Channel.
- San Ygnacio Storm Drain to Amole Del Norte Channel.
- Sage Road Storm Drain to Amole Del Norte Channel.

10.0 EXISTING DRAINAGE DATA - REFERENCES

Previous drainage reports have been prepared relative to this area. These reports and appropriate criteria were reviewed and used in the preparation of this report. The references used are as follows:

Albuquerque Metropolitan Arroyo Flood Authority, January 1994, "AHYMO Computer Program Users Manual."

Andrews, Asbury & Robert, Inc., December 1990, "Sage Road Improvements Drainage Report."

Boyle Engineering Corp., July 1984, "Investigation Phase Report for the Re-evaluation Study of the Amole Del Norte Storm Diversion Facility."

Boyle Engineering, February 1985, "Design - Development Report for the Re-evaluation Study of the Amole Del Norte Storm Diversion Facility."

City of Albuquerque, January 1982, "Development Process Manual Volume 2, Design Criteria" (Including all revisions).

City of Albuquerque, January 1993, "Section 22.2, Hydrology of the Development Process Manual Volume 2, Design Criteria."

City of Albuquerque Planning Department, September 1989, "Tower/Unser Sector Development Plan."

Gordon Herkenhoff & Associates, Inc., December 1980, "Interim Design Report Westgate Diversion Channels."

Gordon Herkenhoff & Associates, Inc., July 1982, "Phase III Design Guidelines Snow Vista Channel Westgate Diversion Channels."

Greiner, Inc., October 1990, "Preliminary Design Report for Amole Del Norte Diversion Facilities Tierra Bayita Drainage Facilities."

Greiner, Inc., June 1994, "Design Report for Amole Del Norte Diversion Facilities Tierra Bayita Drainage Facilities phase IIIC."

Holmes and Narver Inc., November 1985, "Existing Conditions for Amole Watershed Drainage Management Plan."

Holmes and Narver Inc., April 1986, "Improved Conditions Report for Amole Watershed Drainage Management Plan."

Leedshill-Herkenoff, Inc., April 1994, "Drainage Report for Sunset West Unit 2 Albuquerque, New Mexico."

Resource Technology, Inc., December 1993, "Draft - Flood Insurance Restudy Report for Six Areas Within The City of Albuquerque, Bernalillo County, New Mexico Community Number 350002."

Soil Conservation Service, June 1977, "Soil Survey of Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico."

11.0 ESTIMATED CONSTRUCTION COSTS

City of Albuquerque

TOWER/SAGE DETENTION POND

SUMMARY

Estimated Construction Costs

11.1 PHASE I

	Estimated Construction Cost
• 98th Street and Tower Road Storm Drain System to Tower Detention Pond	$1,512,229.13
• San Ygnacio Road Storm Drain System to Tower Detention Pond	344,303.03
• Tower Detention Pond	606,001.00
• 98th Street Storm Drain System to Snow Vista Channel	678,623.00
TOTAL ESTIMATED CONSTRUCTION COST	$3,141,216.16

• Right-of-Way for Tower Detention Pond/Neighborhood Park

25 acres @ $28,314.00/Ac = $707,850.00

As an interim measure to drain the Tower Detention Pond, prior to the time the easterly portion of the San Ygnacio Storm Drain is constructed, an 18" dia. drain line may need to be installed from the Tower Detention Pond to the Amole Del Norte Channel. The estimated cost of this drain line is $150,000 to $200,000.

11.2 OTHER PHASES

• Sage Road Storm Drain System to Tower Detention Pond	$826,115.40
• Tower Road Storm Drain System to Amole Del Norte Channel	941,204.00
• San Ygnacio Road Storm Drain System to Amole Del Norte Channel	609,650.00
• Sage Road Storm Drain System to Amole Del Norte Channel	521,891.15
TOTAL ESTIMATED CONSTRUCTION COST	$2,898,8681.35

- Right-of-Way for Sage Road Storm Drain between Sage Road and San Ygnacio Road

  1 Acre @ $43,560/Ac = $43,560.00

ESTIMATED CONSTRUCTION COST

98TH STREET & TOWER ROAD STORM DRAIN SYSTEM TO TOWER DETENTION POND SERVING THE WESTERLY PORTION OF BASIN A

ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
18" RCP, furnish & install in open trench, cip.	LF	1,175	$20.50	$24,087.50
Trenching, backfill & compaction for 18" sewer pipe, cip.	LF	1,175	$11.00	$12,925.00
24" RCP, furnish & install in open trench, cip.	LF	1,175	$27.20	$31,960.00
Trenching, backfill & compaction for 24" sewer pipe, cip.	LF	1,175	$12.50	$14,687.50
42" RCP, furnish & install in open trench, cip.	LF	1,375	$55.00	$75,625.00
Trenching, backfill & compaction for 42" sewer pipe, cip.	LF	1,375	$30.75	$42,281.25
48" RCP, furnish & install in open trench, cip.	LF	900	$60.00	$54,000.00
Trenching, backfill & compaction for 48" sewer pipe, cip.	LF	900	$35.00	$31,500.00
54" RCP, furnish & install in open trench, cip.	LF	2,400	$112.00	$268,800.00
Trenching, backfill & compaction for 54" sewer pipe, cip.	LF	2,400	$39.50	$94,800.00
60" RCP, furnish & install in open trench, cip.	LF	2,250	$104.00	$234,000.00
Trenching, backfill & compaction for 60" sewer pipe, cip.	LF	2,250	$43.75	$98,437.50
84" RCP, furnish & install in open trench, cip.	LF	800	$150.00	$120,000.00
Trenching, backfill & compaction for 84" sewer pipe, cip.	LF	800	$61.25	$49,000.00
Manhole, 6' diameter Type "C", cip.	EA	3	$2,300.00	$6,900.00
4' diam. tee manhole, cip.	EA	18	$2,000.00	$36,000.00
Furnish & install RCP Class IV bulkhead, cip.	EA	3	$1,250.00	$3,750.00
Furnish & install 54" RCP bend, cip.	EA	2	$700.00	$1,400.00
Furnish & install 84" RCP bend, cip.	EA	2	$1,500.00	$3,000.00
Catch basin, type "A", cip.	EA	78	$2,200.00	$171,600.00

ESTIMATED CONSTRUCTION COST SUBTOTAL	$1,374,753.75
10% CONTINGINCES	$137,475.38
ESTIMATED CONSTRUCTION COST	$1,512,229.13

ESTIMATED CONSTRUCTION COST.

SAN YGNACIO ROAD STORM DRAIN SYSTEM TO TOWER DETENTION POND SERVING THE WESTERLY PORTION OF BASIN B

ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
18" RCP, furnish & install in open trench, cip.	LF	395	$20.50	$8,097.50
Trenching, backfill & compaction for 18" sewer pipe, cip.	LF	395	$11.00	$4,345.00
24" RCP, furnish & install in open trench, cip.	LF	395	$27.20	$10,744.00
Trenching, backfill & compaction for 24" sewer pipe, cip.	LF	395	$12.50	$4,937.50
42" RCP, furnish & install in open trench, cip.	LF	1,075	$55.00	$59,125.00
Trenching, backfill & compaction for 42" sewer pipe, cip.	LF	1,075	$30.75	$33,056.25
54" RCP, furnish & install in open trench, cip.	LF	450	$112.00	$50,400.00
Trenching, backfill & compaction for 54" sewer pipe, cip.	LF	450	$39.50	$17,775.00
90" RCP, furnish & install in open trench, cip.	LF	230	$160.00	$36,800.00
Trenching, backfill & compaction for 90" sewer pipe, cip.	LF	230	$65.75	$15,122.50
Manhole, 6' diameter Type "C", cip.	EA	3	$2,300.00	$6,900.00
4' diam. tee manhole, cip.	EA	2	$2,000.00	$4,000.00
Furnish & install RCP Class IV bulkhead, cip.	EA	2	$1,250.00	$2,500.00
Furnish & install 90" RCP bend, cip.	EA	1	$2,000.00	$2,000.00
Catch basin, type "A", cip.	EA	26	$2,200.00	$57,200.00

ESTIMATED CONSTRUCTION COST SUBTOTAL	$313,002.75
10% CONTINGINCES	$31,300.28
ESTIMATED CONSTRUCTION COST	$344,303.03

ESTIMATED CONSTRUCTION COST

TOWER DETENTION POND

ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
Excavation for detention pond, cip.	CY	110,000	$3.00	$330,000.00
Reinforced structural concrete within pond, cip.	LS	Lump Sum	$200,000.00	$200,000.00
Chain link fence, inc. posts and hardware, cip.	SF	9,000	$2.10	$18,900.00
Gated for chain link fence, inc. all hardware, cip.	SF	300	$6.70	$2,010.00

ESTIMATED CONSTRUCTION COST SUBTOTAL	$550,910.00
10% CONTINGINCES	$55,091.00
ESTIMATED CONSTRUCTION COST	$606,001.00

ESTIMATED CONSTRUCTION COST

98TH STREET STORM DRAIN SYSTEM TO SNOW VISTA CHANNEL SERVING BASIN C

ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
18" RCP, furnish & install in open trench, cip.	LF	525	$20.50	$10,762.50
Trenching, backfill & compaction for 18" sewer pipe, cip.	LF	525	$11.00	$5,775.00
24" RCP, furnish & install in open trench, cip.	LF	525	$27.20	$14,280.00
Trenching, backfill & compaction for 24" sewer pipe, cip.	LF	525	$12.50	$6,562.50
36" RCP, furnish & install in open trench, cip.	LF	1,750	$47.00	$82,250.00
Trenching, backfill & compaction for 36" sewer pipe, cip.	LF	1,750	$15.00	$26,250.00
42" RCP, furnish & install in open trench, cip.	LF	950	$55.00	$52,250.00
Trenching, backfill & compaction for 42" sewer pipe, cip.	LF	950	$30.75	$29,212.50
72" RCP, furnish & install in open trench, cip.	LF	1,625	$125.00	$203,125.00
Trenching, backfill & compaction for 72" sewer pipe, cip.	LF	1,625	$52.50	$85,312.50
Manhole, 6' diameter Type "C", cip.	EA	6	$2,300.00	$13,800.00
4' diam. tee manhole, cip.	EA	4	$2,000.00	$8,000.00
Furnish & install RCP Class IV bulkhead, cip.	EA	1	$1,250.00	$1,250.00
Furnish & install 72" RCP bend, cip.	EA	1	$1,100.00	$1,100.00
Catch basin, type "A", cip.	EA	35	$2,200.00	$77,000.00
ESTIMATED CONSTRUCTION COST SUBTOTAL				$616,930.00
10% CONTINGINCES				$61,693.00
ESTIMATED CONSTRUCTION COST				$678,623.00

ESTIMATED CONSTRUCTION COST

SAGE ROAD STORM DRAIN SYSTEM TO TOWER DETENTION POND SERVING THE WESTERLY PORTION OF BASIN S

ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
18" RCP, furnish & install in open trench, cip.	LF	545	$20.50	$11,172.50
Trenching, backfill & compaction for 18" sewer pipe, cip.	LF	545	$11.00	$5,995.00
24" RCP, furnish & install in open trench, cip.	LF	545	$27.20	$14,824.00
Trenching, backfill & compaction for 24" sewer pipe, cip.	LF	545	$12.50	$6,812.50
36" RCP, furnish & install in open trench, cip.	LF	1,830	$47.00	$86,010.00
Trenching, backfill & compaction for 36" sewer pipe, cip.	LF	1,830	$15.00	$27,450.00
48" RCP, furnish & install in open trench, cip.	LF	1,080	$60.00	$64,800.00
Trenching, backfill & compaction for 48" sewer pipe, cip.	LF	1,080	$35.00	$37,800.00
78" RCP, furnish & install in open trench, cip.	LF	1,600	$140.00	$224,000.00
Trenching, backfill & compaction for 78" sewer pipe, cip.	LF	1,600	$57.00	$91,200.00
Manhole, 6' diameter Type "C", cip.	EA	5	$2,300.00	$11,500.00
4' diam. tee manhole, cip.	EA	7	$2,000.00	$14,000.00
Furnish & install RCP Class IV bulkhead, cip.	EA	1	$1,250.00	$1,250.00
Catch basin, type "A", cip.	EA	36	$2,200.00	$79,200.00
Arterial pavement removal & replacement, cip.	LS	LS	$75,000.00	$75,000.00

ESTIMATED CONSTRUCTION COST SUBTOTAL	$751,014.00
10% CONTINGINCES	$75,101.40
ESTIMATED CONSTRUCTION COST	$826,115.40

ESTIMATED CONSTRUCTION COST

TOWER ROAD STORM DRAIN SYSTEM TO AMOLE DEL NORTE CHANNEL SERVING THE EASTERLY PORTION OF BASIN A

ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
18" RCP, furnish & install in open trench, cip.	LF	575	$20.50	$11,787.50
Trenching, backfill & compaction for 18" sewer pipe, cip.	LF	575	$11.00	$6,325.00
24" RCP, furnish & install in open trench, cip.	LF	575	$27.20	$15,640.00
Trenching, backfill & compaction for 24" sewer pipe, cip.	LF	575	$12.50	$7,187.50
36" RCP, furnish & install in open trench, cip.	LF	1,075	$47.00	$50,525.00
Trenching, backfill & compaction for 36" sewer pipe, cip.	LF	1,075	$15.00	$16,125.00
42" RCP, furnish & install in open trench, cip.	LF	1,175	$55.00	$64,625.00
Trenching, backfill & compaction for 42" sewer pipe, cip.	LF	1,175	$30.75	$36,131.25
48" RCP, furnish & install in open trench, cip.	LF	875	$60.00	$52,500.00
Trenching, backfill & compaction for 48" sewer pipe, cip.	LF	875	$35.00	$30,625.00
60" RCP, furnish & install in open trench, cip.	LF	1,075	$104.00	$111,800.00
Trenching, backfill & compaction for 60" sewer pipe, cip.	LF	1,075	$43.75	$47,031.25
66" RCP, furnish & install in open trench, cip.	LF	1,750	$114.00	$199,500.00
Trenching, backfill & compaction for 66" sewer pipe, cip.	LF	1,750	$48.25	$84,437.50
Manhole, 6' diameter Type "C", cip.	EA	6	$2,300.00	$13,800.00
4' diam. tee manhole, cip.	EA	9	$2,000.00	$18,000.00
Furnish & install RCP Class IV bulkhead, cip.	EA	4	$1,250.00	$5,000.00
Furnish & install 66" RCP bend, cip.	EA	1	$1,000.00	$1,000.00
Catch basin, type "A", cip.	EA	38	$2,200.00	$83,600.00

ESTIMATED CONSTRUCTION COST SUBTOTAL	$855,640.00
10% CONTINGINCES	$85,564.00
ESTIMATED CONSTRUCTION COST	$941,204.00

ESTIMATED CONSTRUCTION COST

SAN YGNACIO ROAD STORM DRAIN SYSTEM TO AMOLE DEL NORTE CHANNEL SERVING THE EASTERLY PORTION OF BASIN B

ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
18" RCP, furnish & install in open trench, cip.	LF	390	$20.50	$7,995.00
Trenching, backfill & compaction for 18" sewer pipe, cip.	LF	390	$11.00	$4,290.00
24" RCP, furnish & install in open trench, cip.	LF	390	$27.20	$10,608.00
Trenching, backfill & compaction for 24" sewer pipe, cip.	LF	390	$12.50	$4,875.00
30" RCP, furnish & install in open trench, cip.	LF	1,300	$39.20	$50,960.00
Trenching, backfill & compaction for 30" sewer pipe, cip.	LF	1,300	$14.00	$18,200.00
48" RCP, furnish & install in open trench, cip.	LF	3,300	$60.00	$198,000.00
Trenching, backfill & compaction for 48" sewer pipe, cip.	LF	3,300	$35.00	$115,500.00
60" RCP, furnish & install in open trench, cip.	LF	200	$104.00	$20,800.00
Trenching, backfill & compaction for 60" sewer pipe, cip.	LF	200	$43.75	$8,750.00
Manhole, 6' diameter Type "C", cip.	EA	3	$2,300.00	$6,900.00
4' diam. tee manhole, cip.	EA	9	$2,000.00	$18,000.00
Furnish & install RCP Class IV bulkhead, cip.	EA	1	$1,250.00	$1,250.00
Furnish & install 60" RCP bend, cip.	EA	1	$900.00	$900.00
Catch basin, type "A", cip.	EA	26	$2,200.00	$57,200.00
Connect 60" RCP to Amole Del Norte Channel	LS	1	$30,000.00	$30,000.00

ESTIMATED CONSTRUCTION COST SUBTOTAL	$554,228.00
10% CONTINGINCES	$55,422.80
ESTIMATED CONSTRUCTION COST	$609,650.80

ESTIMATED CONSTRUCTION COST

SAGE ROAD STORM DRAIN SYSTEM TO AMOLE DEL NORTE CHANNEL SERVING THE EASTERLY PORTION OF BASIN S

ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
18" RCP, furnish & install in open trench, cip.	LF	395	$20.50	$8,097.50
Trenching, backfill & compaction for 18" sewer pipe, cip.	LF	395	$11.00	$4,345.00
24" RCP, furnish & install in open trench, cip.	LF	395	$27.20	$10,744.00
Trenching, backfill & compaction for 24" sewer pipe, cip.	LF	395	$12.50	$4,937.50
30" RCP, furnish & install in open trench, cip.	LF	1,050	$39.20	$41,160.00
Trenching, backfill & compaction for 30" sewer pipe, cip.	LF	1,050	$14.00	$14,700.00
48" RCP, furnish & install in open trench, cip.	LF	2,700	$60.00	$162,000.00
Trenching, backfill & compaction for 48" sewer pipe, cip.	LF	2,700	$35.00	$94,500.00
60" RCP, furnish & install in open trench, cip.	LF	350	$104.00	$36,400.00
Trenching, backfill & compaction for 60" sewer pipe, cip.	LF	350	$43.75	$15,312.50
Manhole, 6' diameter Type "C", cip.	EA	3	$2,300.00	$6,900.00
4' diam. tee manhole, cip.	EA	8	$2,000.00	$16,000.00
Furnish & install RCP Class IV bulkhead, cip.	EA	1	$1,250.00	$1,250.00
Furnish & install 60" RCP bend, cip.	EA	1	$900.00	$900.00
Catch basin, type "A", cip.	EA	26	$2,200.00	$57,200.00
ESTIMATED CONSTRUCTION COST SUBTOTAL				$474,446.50
10% CONTINGINCES				$47,444.65
ESTIMATED CONSTRUCTION COST				$521,891.15

APPENDIX A

AMOLE DEL NORTE STORM DRAINAGE FACILITIES
TOWER/SAGE DRAINAGE MASTER PLAN

AHYMO SUMMARY TABLE - 2 YEAR - 24 HOUR STORM

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =12/10/1994
USER NO.= ANASRONM.I01
INPUT FILE = MASTER2.IN

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
										TIME= .00
START										RAIN24= 1.160
RAINFALL TYPE= 2										PK BF = 1.05
SEDIMENT BULK										
COMPUTE NM HYD	A1-D&AP#1	-	3	.04580	40.45	1.842	.75409	1.500	1.380	PER IMP= 76.00
ROUTE	AP-1R	3	2	.04580	39.97	1.842	.75410	1.550	1.364	
COMPUTE NM HYD	A2-D	-	3	.03950	33.62	1.466	.69579	1.500	1.330	PER IMP= 70.00
ADD HYD	AP#2	2& 3	10	.08530	70.50	3.308	.72709	1.550	1.291	
ROUTE	AP#2R	10	2	.08530	70.77	3.308	.72710	1.550	1.296	
COMPUTE NM HYD	A3-D	-	3	.04190	34.25	1.446	.64721	1.500	1.277	PER IMP= 65.00
ADD HYD	AP#3	2& 3	10	.12720	100.19	4.754	.70078	1.550	1.231	
ROUTE	AP#3R	10	2	.12720	101.05	4.754	.70078	1.550	1.241	
COMPUTE NM HYD	A4-D	-	3	.04390	40.76	1.857	.79296	1.500	1.451	PER IMP= 80.00
ADD HYD	AP#4	2& 3	10	.17110	140.05	6.611	.72443	1.550	1.279	
ROUTE	AP#4R	10	2	.17110	140.22	6.611	.72443	1.550	1.280	
COMPUTE NM HYD	A5-D	-	3	.04520	33.17	1.443	.59863	1.500	1.147	PER IMP= 60.00
ADD HYD	AP#5	2& 3	10	.21630	170.37	8.054	.69814	1.550	1.231	
ROUTE	AP#5R	10	2	.21630	169.15	8.054	.69814	1.550	1.222	
COMPUTE NM HYD	A6-D	-	3	.04520	27.86	1.209	.50146	1.500	.963	PER IMP= 50.00
ADD HYD	PART_AP#9	2& 3	10	.26150	194.52	9.263	.66414	1.550	1.162	
COMPUTE NM HYD	A7-D	-	3	.02060	12.70	.551	.50146	1.500	.963	PER IMP= 50.00
ADD HYD	PART_AP#9	10& 3	10	.28210	206.09	9.813	.65226	1.550	1.141	
COMPUTE NM HYD	A8-D&AP#6	-	3	.05700	41.85	2.115	.69579	1.550	1.147	PER IMP= 70.00
ROUTE	AP&6R	3	2	.05700	37.67	2.115	.69580	1.600	1.033	
COMPUTE NM HYD	A9-D	-	3	.01020	6.49	.273	.50146	1.500	.995	PER IMP= 50.00
ADD HYD	AP#7	2& 3	20	.06720	41.94	2.388	.66629	1.600	.975	
ROUTE	AP#7R	20	2	.06720	41.44	2.388	.66630	1.650	.963	
COMPUTE NM HYD	A10-D	-	3	.01020	6.49	.273	.50146	1.500	.995	PER IMP= 50.00
ADD HYD	AP#8	2& 3	20	.07740	45.24	2.661	.64456	1.600	.913	
ROUTE	AP#8R	20	2	.07740	45.07	2.661	.64457	1.650	.910	
ADD HYD	AP#9	10& 2	10	.35950	238.50	12.474	.65060	1.550	1.037	
ROUTE	AP#9R	10	2	.35950	237.62	12.474	.65060	1.550	1.033	
COMPUTE NM HYD	A11-D	-	3	.00860	8.17	.346	.75409	1.500	1.485	PER IMP= 76.00
ADD HYD	AP#10	2& 3	20	.36810	244.63	12.820	.65302	1.550	1.038	
COMPUTE NM HYD	B1-D&AP#11	-	3	.02300	19.63	.830	.67636	1.500	1.334	PER IMP= 68.00
ROUTE	AP#11R	3	2	.02300	16.50	.830	.67638	1.550	1.121	
COMPUTE NM HYD	B2-D	-	3	.03500	26.50	1.117	.59863	1.500	1.183	PER IMP= 60.00
ADD HYD	AP#12	2& 3	10	.05800	40.73	1.947	.62944	1.500	1.097	
ROUTE	AP#12R	10	2	.05800	35.20	1.947	.62946	1.600	.948	
COMPUTE NM HYD	B3-D	-	3	.04360	25.73	1.166	.50146	1.500	.922	PER IMP= 50.00
ADD HYD	AP#13	2& 3	10	.10160	58.91	3.113	.57452	1.550	.906	
ROUTE	AP#13R	10	2	.10160	57.77	3.113	.57452	1.600	.888	
COMPUTE NM HYD	B4-D	-	3	.02300	14.64	.615	.50146	1.500	.994	PER IMP= 50.00
ADD HYD	AP#14	2& 3	10	.12460	69.46	3.728	.56103	1.550	.871	
ROUTE	AP#14R	10	12	.12460	69.06	3.728	.56103	1.550	.866	
COMPUTE NM HYD	S1-D&AP#15	-	3	.03140	25.67	1.084	.64721	1.500	1.277	PER IMP= 65.00
ROUTE	AP-15R	3	2	.03140	24.64	1.084	.64723	1.500	1.226	
COMPUTE NM HYD	S2-D	-	3	.01630	10.38	.436	.50146	1.500	.995	PER IMP= 50.00
ADD HYD	AP#16	2& 3	10	.04770	35.01	1.520	.59739	1.500	1.147	
ROUTE	AP#16R	10	2	.04770	34.72	1.520	.59741	1.550	1.137	

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
COMPUTE NM HYD	S3-D	-	3	.05670	34.95	1.516	.50146	1.500	.963	PER IMP= 50.00
ADD HYD	AP#17	2& 3	10	.10440	67.58	3.036	.54529	1.500	1.012	
ROUTE	AP#17R	10	2	.10440	68.61	3.036	.54529	1.550	1.027	
COMPUTE NM HYD	S4-D	-	3	.04360	29.38	1.392	.59862	1.550	1.053	PER IMP= 60.00
ADD HYD	AP#18	2& 3	10	.14800	97.99	4.428	.56100	1.550	1.035	
ROUTE	AP#18R	10	2	.14800	90.91	4.428	.56100	1.600	.960	
COMPUTE NM HYD	S5-D	-	3	.02380	17.73	.748	.58891	1.500	1.164	PER IMP= 59.00
ADD HYD	AP#19	2& 3	10	.17180	104.08	5.176	.56486	1.550	.947	
ADD HYD	AP#20	12&10	10	.29640	173.15	8.904	.56325	1.550	.913	
ADD HYD	PART_AP#21	20&10	10	.66450	417.78	21.724	.61298	1.550	.982	
COMPUTE NM HYD	B5-D_TWRPND	-	3	.03910	2.79	.112	.05389	1.500	.112	PER IMP= 5.00
ADD HYD	AP#21	10& 3	20	.70360	420.24	21.836	.58191	1.550	.933	
ROUTE RESERVOIR	AP#22	20	12	.70360	18.44	21.136	.56324	2.550	.041	AC-FT= 15.081
ROUTE	AP#22R	12	2	.70360	18.44	21.123	.56291	2.600	.041	
COMPUTE NM HYD	B6-D	-	3	.04590	23.22	1.584	.64721	1.700	.790	PER IMP= 65.00
ADD HYD	AP#23	2& 3	10	.74950	36.14	22.708	.56807	1.750	.075	
ROUTE	AP#23R	10	2	.74950	35.42	22.689	.56760	1.800	.074	
COMPUTE NM HYD	B7-D	-	3	.05910	33.40	2.101	.66664	1.650	.883	PER IMP= 67.00
ADD HYD	AP#24	2& 3	10	.80860	64.31	24.790	.57484	1.700	.124	
ROUTE	AP#24R	10	2	.80860	64.24	24.774	.57445	1.750	.124	
COMPUTE NM HYD	B8-D	-	3	.08910	25.88	2.383	.50146	1.900	.454	PER IMP= 50.00
ADD HYD	AP#25	2& 3	30	.89770	86.89	27.156	.56721	1.800	.151	
COMPUTE NM HYD	A12-D&AP#26	-	3	.03590	33.09	1.444	.75409	1.500	1.440	PER IMP= 76.00
ROUTE	AP#26R	3	2	.03590	31.80	1.444	.75411	1.550	1.384	
COMPUTE NM HYD	A13-D	-	3	.04520	28.90	1.560	.64721	1.600	.999	PER IMP= 65.00
ADD HYD	AP#27	2& 3	10	.08110	60.36	3.004	.69452	1.550	1.163	
ROUTE	AP#27R	10	2	.08110	58.12	3.004	.69452	1.600	1.120	
COMPUTE NM HYD	A14-D	-	3	.04520	22.40	1.677	.69579	1.750	.774	PER IMP= 70.00
ADD HYD	AP#28	2& 3	10	.12630	72.95	4.681	.69497	1.600	.903	
ROUTE	AP#28R	10	2	.12630	72.22	4.681	.69497	1.600	.893	
COMPUTE NM HYD	A15-D	-	3	.02530	15.45	.808	.59863	1.550	.954	PER IMP= 60.00
ADD HYD	PART_AP#33	2& 3	20	.15160	87.33	5.489	.67889	1.600	.900	
COMPUTE NM HYD	A17-D&AP#29	-	3	.01080	6.88	.289	.50146	1.500	.995	PER IMP= 50.00
ROUTE	AP&29R	3	2	.01080	4.23	.289	.50150	1.600	.613	
COMPUTE NM HYD	A18-D	-	3	.01030	7.80	.329	.59863	1.500	1.183	PER IMP= 60.00
ADD HYD	AP#30	2& 3	10	.02110	10.81	.618	.54886	1.500	.800	
ROUTE	AP&30R	10	2	.02110	6.01	.618	.54885	1.750	.445	
COMPUTE NM HYD	A19-D	-	3	.01080	7.04	.345	.59863	1.550	1.019	PER IMP= 60.00
ADD HYD	AP#31	2& 3	10	.03190	11.70	.962	.56566	1.600	.573	
ROUTE	AP#31R	10	2	.03190	11.43	.962	.56568	1.600	.560	
COMPUTE NM HYD	A20-D	-	3	.00690	5.23	.220	.59863	1.500	1.184	PER IMP= 60.00
ADD HYD	AP#32	2& 3	10	.03880	14.86	1.183	.57152	1.600	.598	
ROUTE	AP#32R	10	22	.03880	13.79	1.183	.57153	1.650	.555	
ADD HYD	AP#33	20&22	10	.19040	100.33	6.672	.65701	1.600	.823	
ROUTE	AP#33R	10	2	.19040	100.61	6.672	.65701	1.650	.826	
COMPUTE NM HYD	A16-D	-	3	.06380	23.21	1.706	.50146	1.750	.568	PER IMP= 50.00
ADD HYD	AP#34	2& 3	10	.25420	120.71	8.378	.61796	1.650	.742	
COMPUTE NM HYD	S6-D&AP#35	-	3	.03780	18.01	1.207	.59863	1.700	.744	PER IMP= 60.00
ROUTE	AP#35R	3	2	.03780	17.52	1.207	.59863	1.750	.724	
COMPUTE NM HYD	S7-D	-	3	.05700	24.87	2.145	.70551	1.850	.682	PER IMP= 71.00
ADD HYD	AP#36	2& 3	10	.09480	40.63	3.351	.66287	1.800	.670	
ROUTE	AP#36R	10	2	.09480	39.76	3.352	.66288	1.850	.655	

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
COMPUTE NM HYD	S8-D	-	3	.06830	29.31	2.287	.62778	1.800	.671	PER IMP= 63.00
ADD HYD	AP#37	2& 3	10	.16310	68.00	5.638	.64817	1.850	.651	
ROUTE	AP#37R	10	2	.16310	68.32	5.638	.64817	1.850	.655	
COMPUTE NM HYD	S9-D	-	3	.07480	47.24	2.000	.50146	1.500	.987	PER IMP= 50.00
ADD HYD	AP#38	2& 3	20	.23790	83.36	7.639	.60204	1.800	.548	
COMPUTE NM HYD	C1-D&AP#39	-	3	.03860	32.48	1.372	.66664	1.500	1.315	PER IMP= 67.00
ROUTE	AP#39R	3	2	.03860	31.42	1.372	.66666	1.500	1.272	
COMPUTE NM HYD	C2-D	-	3	.01880	15.37	.649	.64721	1.500	1.277	PER IMP= 65.00
ADD HYD	AP#40	2& 3	10	.05740	46.79	2.021	.66027	1.500	1.274	
ROUTE	AP#40R	10	2	.05740	45.96	2.021	.66028	1.550	1.251	
COMPUTE NM HYD	C3-D	-	3	.02340	26.19	1.111	.89013	1.500	1.749	PER IMP= 90.00
ADD HYD	AP#41	2& 3	10	.08080	69.84	3.132	.72683	1.500	1.350	
COMPUTE NM HYD	C4-D&AP#42	-	3	.03080	27.67	1.207	.73466	1.500	1.403	PER IMP= 74.00
ROUTE	AP#42R	3	2	.03080	27.17	1.207	.73468	1.500	1.378	
ADD HYD	AP#43	10& 2	10	.11160	97.00	4.339	.72899	1.500	1.358	
ROUTE	AP#43R	10	2	.11160	94.99	4.339	.72900	1.550	1.330	
COMPUTE NM HYD	C5-D	-	3	.00910	6.89	.272	.56068	1.500	1.184	PER IMP= 50.00
ADD HYD	AP#44	2& 3	10	.12070	101.40	4.611	.71630	1.550	1.313	
COMPUTE NM HYD	C6-D&AP#45	-	3	.01940	21.71	.921	.89013	1.500	1.749	PER IMP= 90.00
FINISH										

AMOLE DEL NORTE STORM DRAINAGE FACILITIES
TOWER/SAGE DRAINAGE MASTER PLAN

AHYMO SUMMARY TABLE - 5 YEAR - 24 HOUR STORM

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =12/10/1994
USER NO.= ANASRONM.101
INPUT FILE = MASTER5.IN

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
										TIME= .00
START										RAIN24= 1.510
RAINFALL TYPE= 2										PK BF = 1.05
SEDIMENT BULK										
COMPUTE NM HYD	A1-D&AP#1	-	3	.04580	56.31	2.570	1.05230	1.500	1.921	PER IMP= 76.00
ROUTE	AP-1R	3	2	.04580	55.67	2.570	1.05231	1.550	1.899	
COMPUTE NM HYD	A2-D	-	3	.03950	47.41	2.063	.97905	1.500	1.875	PER IMP= 70.00
ADD HYD	AP#2	2& 3	10	.08530	99.05	4.633	1.01838	1.500	1.814	
ROUTE	AP#2R	10	2	.08530	99.73	4.633	1.01838	1.550	1.827	
COMPUTE NM HYD	A3-D	-	3	.04190	49.01	2.051	.91802	1.500	1.828	PER IMP= 65.00
ADD HYD	AP#3	2& 3	10	.12720	142.13	6.684	.98532	1.550	1.746	
ROUTE	AP#3R	10	2	.12720	144.11	6.684	.98532	1.550	1.770	
COMPUTE NM HYD	A4-D	-	3	.04390	56.30	2.578	1.10113	1.500	2.004	PER IMP= 80.00
ADD HYD	AP#4	2& 3	10	.17110	197.91	9.262	1.01503	1.550	1.807	
ROUTE	AP#4R	10	2	.17110	199.33	9.263	1.01503	1.550	1.820	
COMPUTE NM HYD	A5-D	-	3	.04520	48.09	2.066	.85698	1.500	1.662	PER IMP= 60.00
ADD HYD	AP#5	2& 3	10	.21630	243.31	11.328	.98200	1.550	1.758	
ROUTE	AP#5R	10	2	.21630	243.29	11.328	.98200	1.550	1.758	
COMPUTE NM HYD	A6-D	-	3	.04520	41.93	1.772	.73491	1.500	1.450	PER IMP= 50.00
ADD HYD	PART_AP#9	2& 3	10	.26150	281.86	13.100	.93929	1.550	1.684	
COMPUTE NM HYD	A7-D	-	3	.02060	19.11	.807	.73491	1.500	1.450	PER IMP= 50.00
ADD HYD	PART_AP#9	10& 3	10	.28210	299.44	13.907	.92436	1.550	1.659	
COMPUTE NM HYD	A8-D&AP#6	-	3	.05700	58.97	2.976	.97905	1.550	1.617	PER IMP= 70.00
ROUTE	AP&6R	3	2	.05700	55.63	2.976	.97906	1.600	1.525	
COMPUTE NM HYD	A9-D	-	3	.01020	9.82	.400	.73491	1.500	1.505	PER IMP= 50.00
ADD HYD	AP#7	2& 3	20	.06720	62.19	3.376	.94199	1.600	1.446	
ROUTE	AP#7R	20	2	.06720	61.60	3.376	.94200	1.600	1.432	
COMPUTE NM HYD	A10-D	-	3	.01020	9.82	.400	.73491	1.500	1.505	PER IMP= 50.00
ADD HYD	AP#8	2& 3	20	.07740	68.16	3.776	.91470	1.600	1.376	
ROUTE	AP#8R	20	2	.07740	66.98	3.776	.91470	1.650	1.352	
ADD HYD	AP#9	10& 2	10	.35950	352.50	17.683	.92228	1.550	1.532	
ROUTE	AP#9R	10	2	.35950	351.81	17.683	.92228	1.550	1.529	
COMPUTE NM HYD	A11-D	-	3	.00860	11.37	.483	1.05230	1.500	2.066	PER IMP= 76.00
ADD HYD	AP#10	2& 3	20	.36810	361.61	18.166	.92532	1.550	1.535	
COMPUTE NM HYD	B1-D&AP#11	-	3	.02300	27.86	1.171	.95464	1.500	1.893	PER IMP= 68.00
ROUTE	AP#11R	3	2	.02300	24.16	1.171	.95466	1.550	1.642	
COMPUTE NM HYD	B2-D	-	3	.03500	38.53	1.600	.85698	1.500	1.720	PER IMP= 60.00
ADD HYD	AP#12	2& 3	10	.05800	59.77	2.771	.89570	1.500	1.610	
ROUTE	AP#12R	10	2	.05800	54.02	2.771	.89571	1.550	1.455	
COMPUTE NM HYD	B3-D	-	3	.04360	38.59	1.709	.73491	1.500	1.383	PER IMP= 50.00
ADD HYD	AP#13	2& 3	10	.10160	91.38	4.480	.82670	1.550	1.405	
ROUTE	AP#13R	10	2	.10160	89.04	4.480	.82670	1.550	1.369	
COMPUTE NM HYD	B4-D	-	3	.02300	22.14	.901	.73491	1.500	1.504	PER IMP= 50.00
ADD HYD	AP#14	2& 3	10	.12460	108.35	5.381	.80975	1.550	1.359	
ROUTE	AP#14R	10	12	.12460	107.85	5.381	.80976	1.550	1.352	
COMPUTE NM HYD	S1-D&AP#15	-	3	.03140	36.73	1.537	.91802	1.500	1.828	PER IMP= 65.00
ROUTE	AP-15R	3	2	.03140	35.33	1.537	.91803	1.500	1.758	
COMPUTE NM HYD	S2-D	-	3	.01630	15.69	.639	.73491	1.500	1.504	PER IMP= 50.00
ADD HYD	AP#16	2& 3	10	.04770	51.02	2.176	.85544	1.500	1.671	
ROUTE	AP#16R	10	2	.04770	50.50	2.176	.85545	1.550	1.654	

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
COMPUTE NM HYD	S3-D	-	3	.05670	52.60	2.222	.73491	1.500	1.449	PER IMP= 50.00
ADD HYD	AP#17	2& 3	10	.10440	100.58	4.399	.78997	1.500	1.505	
ROUTE	AP#17R	10	2	.10440	101.92	4.399	.78998	1.550	1.525	
COMPUTE NM HYD	S4-D	-	3	.04360	42.58	1.993	.85698	1.550	1.526	PER IMP= 60.00
ADD HYD	AP#18	2& 3	10	.14800	144.50	6.391	.80971	1.550	1.526	
ROUTE	AP#18R	10	2	.14800	135.23	6.391	.80972	1.550	1.428	
COMPUTE NM HYD	S5-D	-	3	.02380	25.87	1.072	.84477	1.500	1.698	PER IMP= 59.00
ADD HYD	AP#19	2& 3	10	.17180	157.67	7.464	.81457	1.550	1.434	
ADD HYD	AP#20	12&10	10	.29640	265.52	12.845	.81254	1.550	1.400	
ADD HYD	PART_AP#21	20&10	10	.66450	627.13	31.011	.87502	1.550	1.475	
COMPUTE NM HYD	B5-D_TWRPND	-	3	.03910	11.33	.343	.16453	1.500	.453	PER IMP= 5.00
ADD HYD	AP#21	10& 3	20	.70360	637.93	31.354	.83553	1.550	1.417	
ROUTE RESERVOIR	AP#22	20	12	.70360	21.14	30.140	.80320	2.650	.047	AC-FT= 22.490
ROUTE	AP#22R	12	2	.70360	21.14	30.122	.80271	2.700	.047	
COMPUTE NM HYD	B6-D	-	3	.04590	32.98	2.247	.91802	1.700	1.123	PER IMP= 65.00
ADD HYD	AP#23	2& 3	10	.74950	48.86	32.369	.80977	1.750	.102	
ROUTE	AP#23R	10	2	.74950	47.94	32.343	.80912	1.800	.100	
COMPUTE NM HYD	B7-D	-	3	.05910	47.30	2.971	.94243	1.650	1.251	PER IMP= 67.00
ADD HYD	AP#24	2& 3	10	.80860	90.81	35.314	.81886	1.700	.175	
ROUTE	AP#24R	10	2	.80860	90.32	35.289	.81828	1.750	.175	
COMPUTE NM HYD	B8-D	-	3	.08910	38.26	3.492	.73491	1.900	.671	PER IMP= 50.00
ADD HYD	AP#25	2& 3	30	.89770	122.92	38.781	.81001	1.800	.214	
COMPUTE NM HYD	A12-D&AP#26	-	3	.03590	46.03	2.015	1.05230	1.500	2.003	PER IMP= 76.00
ROUTE	AP#26R	3	2	.03590	44.24	2.015	1.05231	1.550	1.925	
COMPUTE NM HYD	A13-D	-	3	.04520	41.11	2.213	.91802	1.600	1.421	PER IMP= 65.00
ADD HYD	AP#27	2& 3	10	.08110	85.04	4.228	.97745	1.550	1.638	
ROUTE	AP#27R	10	2	.08110	81.75	4.228	.97746	1.600	1.575	
COMPUTE NM HYD	A14-D	-	3	.04520	31.52	2.360	.97905	1.750	1.089	PER IMP= 70.00
ADD HYD	AP#28	2& 3	10	.12630	103.43	6.588	.97802	1.600	1.280	
ROUTE	AP#28R	10	2	.12630	102.75	6.588	.97803	1.600	1.271	
COMPUTE NM HYD	A15-D	-	3	.02530	22.32	1.156	.85698	1.550	1.379	PER IMP= 60.00
ADD HYD	PART_AP#33	2& 3	20	.15160	124.54	7.744	.95782	1.600	1.284	
COMPUTE NM HYD	A17-D&AP#29	-	3	.01080	10.40	.423	.73491	1.500	1.505	PER IMP= 50.00
ROUTE	AP&29R	3	2	.01080	6.82	.423	.73495	1.600	.986	
COMPUTE NM HYD	A18-D	-	3	.01030	11.34	.471	.85698	1.500	1.721	PER IMP= 60.00
ADD HYD	AP#30	2& 3	10	.02110	16.27	.894	.79446	1.550	1.205	
ROUTE	AP&30R	10	2	.02110	9.74	.894	.79445	1.700	.721	
COMPUTE NM HYD	A19-D	-	3	.01080	10.18	.494	.85698	1.550	1.473	PER IMP= 60.00
ADD HYD	AP#31	2& 3	10	.03190	18.22	1.388	.81559	1.600	.893	
ROUTE	AP#31R	10	2	.03190	17.85	1.388	.81560	1.600	.874	
COMPUTE NM HYD	A20-D	-	3	.00690	7.60	.315	.85698	1.500	1.721	PER IMP= 60.00
ADD HYD	AP#32	2& 3	10	.03880	22.90	1.703	.82294	1.600	.922	
ROUTE	AP#32R	10	22	.03880	21.53	1.703	.82295	1.650	.867	
ADD HYD	AP#33	20&22	10	.19040	145.20	9.447	.93033	1.600	1.192	
ROUTE	AP#33R	10	2	.19040	144.79	9.447	.93033	1.650	1.188	
COMPUTE NM HYD	A16-D	-	3	.06380	34.20	2.501	.73491	1.750	.838	PER IMP= 50.00
ADD HYD	AP#34	2& 3	10	.25420	174.99	11.948	.88128	1.650	1.076	
COMPUTE NM HYD	S6-D&AP#35	-	3	.03780	25.85	1.728	.85698	1.700	1.068	PER IMP= 60.00
ROUTE	AP#35R	3	2	.03780	25.19	1.728	.85698	1.750	1.041	
COMPUTE NM HYD	S7-D	-	3	.05700	34.90	3.013	.99126	1.850	.957	PER IMP= 71.00
ADD HYD	AP#36	2& 3	10	.09480	57.66	4.741	.93770	1.800	.950	
ROUTE	AP#36R	10	2	.09480	56.61	4.741	.93771	1.850	.933	

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
COMPUTE NM HYD	S8-D	-	3	.06830	41.75	3.255	.89360	1.800	.955	PER IMP= 63.00
ADD HYD	AP#37	2& 3	10	.16310	97.31	7.996	.91923	1.800	.932	
ROUTE	AP#37R	10	2	.16310	97.38	7.996	.91924	1.850	.933	
COMPUTE NM HYD	S9-D	-	3	.07480	71.67	2.932	.73491	1.500	1.497	PER IMP= 50.00
ADD HYD	AP#38	2& 3	20	.23790	120.04	10.928	.86127	1.800	.788	
COMPUTE NM HYD	C1-D&AP#39	-	3	.03860	46.22	1.940	.94243	1.500	1.871	PER IMP= 67.00
ROUTE	AP#39R	3	2	.03860	44.71	1.940	.94245	1.500	1.810	
COMPUTE NM HYD	C2-D	-	3	.01880	22.00	.920	.91802	1.500	1.828	PER IMP= 65.00
ADD HYD	AP#40	2& 3	10	.05740	66.71	2.861	.93443	1.500	1.816	
ROUTE	AP#40R	10	2	.05740	65.45	2.861	.93444	1.550	1.782	
COMPUTE NM HYD	C3-D	-	3	.02340	35.46	1.527	1.22320	1.500	2.368	PER IMP= 90.00
ADD HYD	AP#41	2& 3	10	.08080	98.24	4.387	1.01805	1.500	1.900	
COMPUTE NM HYD	C4-D&AP#42	-	3	.03080	38.65	1.688	1.02788	1.500	1.961	PER IMP= 74.00
ROUTE	AP#42R	3	2	.03080	37.98	1.688	1.02790	1.500	1.927	
ADD HYD	AP#43	10& 2	10	.11160	136.22	6.076	1.02077	1.500	1.907	
ROUTE	AP#43R	10	2	.11160	133.80	6.076	1.02077	1.550	1.873	
COMPUTE NM HYD	C5-D	-	3	.00910	10.46	.403	.82943	1.500	1.795	PER IMP= 50.00
ADD HYD	AP#44	2& 3	10	.12070	143.51	6.478	1.00634	1.550	1.858	
COMPUTE NM HYD	C6-D&AP#45	-	3	.01940	29.40	1.266	1.22320	1.500	2.368	PER IMP= 90.00
FINISH										

AMOLE DEL NORTE STORM DRAINAGE FACILITIES
TOWER/SAGE DRAINAGE MASTER PLAN

AHYMO SUMMARY TABLE - 10 YEAR - 6 HOUR STORM

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =12/10/1994
INPUT FILE = MASTER10.IN USER NO.= ANASRONM.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	PAGE = 1
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	1.470
SEDIMENT BULK										PK BF =	1.05
COMPUTE NM HYD	A1-D&AP#1	-	3	.04580	69.84	2.555	1.04607	1.533	2.383	PER IMP=	76.00
ROUTE	AP-1R	3	2	.04580	68.19	2.555	1.04608	1.533	2.326		
COMPUTE NM HYD	A2-D	-	3	.03950	58.73	2.070	.98256	1.500	2.323	PER IMP=	70.00
ADD HYD	AP#2	2& 3	10	.08530	126.03	4.625	1.01666	1.533	2.309		
ROUTE	AP#2R	10	2	.08530	121.55	4.625	1.01666	1.567	2.227		
COMPUTE NM HYD	A3-D	-	3	.04190	62.00	2.077	.92964	1.500	2.312	PER IMP=	65.00
ADD HYD	AP#3	2& 3	10	.12720	178.95	6.703	.98799	1.533	2.198		
ROUTE	AP#3R	10	2	.12720	176.30	6.703	.98799	1.567	2.166		
COMPUTE NM HYD	A4-D	-	3	.04390	69.37	2.548	1.08841	1.533	2.469	PER IMP=	80.00
ADD HYD	AP#4	2& 3	10	.17110	244.00	9.251	1.01375	1.533	2.228		
ROUTE	AP#4R	10	2	.17110	243.66	9.251	1.01376	1.567	2.225		
COMPUTE NM HYD	A5-D	-	3	.04520	60.67	2.113	.87671	1.500	2.097	PER IMP=	60.00
ADD HYD	AP#5	2& 3	10	.21630	298.09	11.364	.98511	1.533	2.153		
ROUTE	AP#5R	10	2	.21630	300.22	11.364	.98512	1.567	2.169		
COMPUTE NM HYD	A6-D	-	3	.04520	54.14	1.858	.77086	1.500	1.872	PER IMP=	50.00
ADD HYD	PART_AP#9	2& 3	10	.26150	348.39	13.223	.94808	1.567	2.082		
COMPUTE NM HYD	A7-D	-	3	.02060	24.68	.847	.77086	1.500	1.872	PER IMP=	50.00
ADD HYD	PART_AP#9	10& 3	10	.28210	370.35	14.069	.93514	1.567	2.051		
COMPUTE NM HYD	A8-D&AP#6	-	3	.05700	73.08	2.987	.98256	1.567	2.003	PER IMP=	70.00
ROUTE	AP&6R	3	2	.05700	69.35	2.987	.98256	1.600	1.901		
COMPUTE NM HYD	A9-D	-	3	.01020	12.85	.419	.77086	1.500	1.968	PER IMP=	50.00
ADD HYD	AP#7	2& 3	20	.06720	78.19	3.406	.95042	1.600	1.818		
ROUTE	AP#7R	20	2	.06720	77.45	3.406	.95042	1.600	1.801		
COMPUTE NM HYD	A10-D	-	3	.01020	12.85	.419	.77086	1.500	1.968	PER IMP=	50.00
ADD HYD	AP#8	2& 3	20	.07740	86.29	3.826	.92675	1.600	1.742		
ROUTE	AP#8R	20	2	.07740	84.57	3.826	.92676	1.633	1.707		
ADD HYD	AP#9	10& 2	10	.35950	444.68	17.895	.93333	1.567	1.933		
ROUTE	AP#9R	10	2	.35950	445.31	17.895	.93333	1.567	1.935		
COMPUTE NM HYD	A11-D	-	3	.00860	14.12	.480	1.04607	1.500	2.566	PER IMP=	76.00
ADD HYD	AP#10	2& 3	20	.36810	456.74	18.375	.93596	1.567	1.939		
COMPUTE NM HYD	B1-D&AP#11	-	3	.02300	35.05	1.179	.96139	1.500	2.381	PER IMP=	68.00
ROUTE	AP#11R	3	2	.02300	30.26	1.179	.96140	1.567	2.056		
COMPUTE NM HYD	B2-D	-	3	.03500	49.22	1.637	.87671	1.500	2.197	PER IMP=	60.00
ADD HYD	AP#12	2& 3	10	.05800	76.96	2.816	.91028	1.533	2.073		
ROUTE	AP#12R	10	2	.05800	70.87	2.816	.91029	1.567	1.909		
COMPUTE NM HYD	B3-D	-	3	.04360	50.81	1.793	.77086	1.533	1.821	PER IMP=	50.00
ADD HYD	AP#13	2& 3	10	.10160	117.94	4.608	.85045	1.533	1.814		
ROUTE	AP#13R	10	2	.10160	118.15	4.608	.85045	1.567	1.817		
COMPUTE NM HYD	B4-D	-	3	.02300	28.97	.946	.77086	1.500	1.968	PER IMP=	50.00
ADD HYD	AP#14	2& 3	10	.12460	142.09	5.554	.83575	1.567	1.782		
ROUTE	AP#14R	10	12	.12460	142.64	5.554	.83576	1.567	1.789		
COMPUTE NM HYD	S1-D&AP#15	-	3	.03140	46.47	1.557	.92964	1.500	2.312	PER IMP=	65.00
ROUTE	AP-15R	3	2	.03140	45.36	1.557	.92964	1.533	2.257		
COMPUTE NM HYD	S2-D	-	3	.01630	20.53	.670	.77086	1.500	1.968	PER IMP=	50.00
ADD HYD	AP#16	2& 3	10	.04770	64.98	2.227	.87537	1.533	2.129		
ROUTE	AP#16R	10	2	.04770	64.75	2.227	.87538	1.533	2.121		

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
COMPUTE NM HYD	S3-D	-	3	.05670	67.91	2.331	.77086	1.500	1.872	PER IMP= 50.00
ADD HYD	AP#17	2& 3	10	.10440	132.26	4.558	.81861	1.533	1.979	
ROUTE	AP#17R	10	2	.10440	129.72	4.558	.81861	1.533	1.942	
COMPUTE NM HYD	S4-D	-	3	.04360	55.28	2.039	.87671	1.533	1.981	PER IMP= 60.00
ADD HYD	AP#18	2& 3	10	.14800	185.00	6.597	.83572	1.533	1.953	
ROUTE	AP#18R	10	2	.14800	174.83	6.597	.83572	1.567	1.846	
COMPUTE NM HYD	S5-D	-	3	.02380	33.12	1.099	.86612	1.500	2.175	PER IMP= 59.00
ADD HYD	AP#19	2& 3	10	.17180	201.97	7.696	.83993	1.567	1.837	
ADD HYD	AP#20	12&10	10	.29640	344.61	13.250	.83818	1.567	1.817	
ADD HYD	PART_AP#21	20&10	10	.66450	801.35	31.625	.89235	1.567	1.884	
COMPUTE NM HYD	B5-D_TWRPND	-	3	.03910	20.97	.559	.26796	1.533	.838	PER IMP= 5.00
ADD HYD	AP#21	10& 3	20	.70360	820.24	32.184	.85765	1.567	1.822	
ROUTE RESERVOIR	AP#22	20	12	.70360	22.56	27.419	.73067	2.733	.050	AC-FT= 28.648
ROUTE	AP#22R	12	2	.70360	22.56	27.370	.72937	2.767	.050	
COMPUTE NM HYD	B6-D	-	3	.04590	40.84	2.276	.92964	1.700	1.390	PER IMP= 65.00
ADD HYD	AP#23	2& 3	10	.74950	58.74	29.646	.74163	1.733	.122	
ROUTE	AP#23R	10	2	.74950	57.42	29.578	.73995	1.767	.120	
COMPUTE NM HYD	B7-D	-	3	.05910	58.43	2.997	.95081	1.667	1.545	PER IMP= 67.00
ADD HYD	AP#24	2& 3	10	.80860	110.96	32.575	.75537	1.700	.214	
ROUTE	AP#24R	10	2	.80860	110.02	32.517	.75400	1.733	.213	
COMPUTE NM HYD	B8-D	-	3	.08910	48.60	3.663	.77086	1.900	.852	PER IMP= 50.00
ADD HYD	AP#25	2& 3	30	.89770	151.40	36.180	.75568	1.767	.264	
COMPUTE NM HYD	A12-D&AP#26	-	3	.03590	56.49	2.003	1.04607	1.500	2.459	PER IMP= 76.00
ROUTE	AP#26R	3	2	.03590	55.04	2.003	1.04608	1.533	2.395	
COMPUTE NM HYD	A13-D	-	3	.04520	51.60	2.241	.92964	1.567	1.784	PER IMP= 65.00
ADD HYD	AP#27	2& 3	10	.08110	104.41	4.244	.98117	1.567	2.012	
ROUTE	AP#27R	10	2	.08110	100.48	4.244	.98117	1.600	1.936	
COMPUTE NM HYD	A14-D	-	3	.04520	38.70	2.369	.98256	1.767	1.338	PER IMP= 70.00
ADD HYD	AP#28	2& 3	10	.12630	126.50	6.612	.98166	1.600	1.565	
ROUTE	AP#28R	10	2	.12630	125.93	6.612	.98166	1.633	1.558	
COMPUTE NM HYD	A15-D	-	3	.02530	28.32	1.183	.87671	1.567	1.749	PER IMP= 60.00
ADD HYD	PART_AP#33	2& 3	20	.15160	152.70	7.795	.96414	1.600	1.574	
COMPUTE NM HYD	A17-D&AP#29	-	3	.01080	13.61	.444	.77086	1.500	1.968	PER IMP= 50.00
ROUTE	AP&29R	3	2	.01080	9.06	.444	.77088	1.600	1.311	
COMPUTE NM HYD	A18-D	-	3	.01030	14.49	.482	.87671	1.500	2.198	PER IMP= 60.00
ADD HYD	AP#30	2& 3	10	.02110	21.78	.926	.82249	1.533	1.613	
ROUTE	AP&30R	10	2	.02110	13.18	.926	.82251	1.667	.976	
COMPUTE NM HYD	A19-D	-	3	.01080	12.75	.505	.87671	1.567	1.845	PER IMP= 60.00
ADD HYD	AP#31	2& 3	10	.03190	24.19	1.430	.84080	1.600	1.185	
ROUTE	AP#31R	10	2	.03190	23.73	1.431	.84081	1.633	1.162	
COMPUTE NM HYD	A20-D	-	3	.00690	9.71	.323	.87671	1.500	2.199	PER IMP= 60.00
ADD HYD	AP#32	2& 3	10	.03880	30.03	1.753	.84717	1.600	1.209	
ROUTE	AP#32R	10	22	.03880	28.02	1.753	.84718	1.633	1.128	
ADD HYD	AP#33	20&22	10	.19040	179.65	9.548	.94031	1.600	1.474	
ROUTE	AP#33R	10	2	.19040	178.37	9.549	.94031	1.633	1.464	
COMPUTE NM HYD	A16-D	-	3	.06380	43.34	2.623	.77086	1.733	1.061	PER IMP= 50.00
ADD HYD	AP#34	2& 3	10	.25420	216.66	12.171	.89778	1.667	1.332	
COMPUTE NM HYD	S6-D&AP#35	-	3	.03780	32.34	1.767	.87671	1.700	1.337	PER IMP= 60.00
ROUTE	AP#35R	3	2	.03780	31.61	1.767	.87671	1.733	1.307	
COMPUTE NM HYD	S7-D	-	3	.05700	42.77	3.019	.99315	1.867	1.173	PER IMP= 71.00
ADD HYD	AP#36	2& 3	10	.09480	71.13	4.787	.94670	1.800	1.172	
ROUTE	AP#36R	10	2	.09480	69.58	4.787	.94671	1.833	1.147	

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
COMPUTE NM HYD	S8-D	-	3	.06830	51.91	3.309	.90847	1.767	1.187	PER IMP= 63.00
ADD HYD	AP#37	2& 3	10	.16310	120.45	8.096	.93069	1.833	1.154	
ROUTE	AP#37R	10	2	.16310	120.46	8.096	.93069	1.833	1.154	
COMPUTE NM HYD	S9-D	-	3	.07480	93.91	3.075	.77086	1.500	1.962	PER IMP= 50.00
ADD HYD	AP#38	2& 3	20	.23790	148.71	11.171	.88043	1.800	.977	
COMPUTE NM HYD	C1-D&AP#39	-	3	.03860	58.26	1.957	.95081	1.500	2.358	PER IMP= 67.00
ROUTE	AP#39R	3	2	.03860	56.81	1.957	.95081	1.533	2.300	
COMPUTE NM HYD	C2-D	-	3	.01880	27.83	.932	.92964	1.500	2.313	PER IMP= 65.00
ADD HYD	AP#40	2& 3	10	.05740	83.20	2.889	.94386	1.533	2.265	
ROUTE	AP#40R	10	2	.05740	83.01	2.890	.94387	1.533	2.260	
COMPUTE NM HYD	C3-D	-	3	.02340	43.23	1.490	1.19426	1.500	2.887	PER IMP= 90.00
ADD HYD	AP#41	2& 3	10	.08080	123.65	4.380	1.01638	1.533	2.391	
COMPUTE NM HYD	C4-D&AP#42	-	3	.03080	47.58	1.684	1.02490	1.500	2.414	PER IMP= 74.00
ROUTE	AP#42R	3	2	.03080	47.65	1.684	1.02491	1.533	2.417	
ADD HYD	AP#43	10& 2	10	.11160	171.29	6.063	1.01873	1.533	2.398	
ROUTE	AP#43R	10	2	.11160	162.28	6.063	1.01873	1.567	2.272	
COMPUTE NM HYD	C5-D	-	3	.00910	13.14	.429	.88414	1.500	2.256	PER IMP= 50.00
ADD HYD	AP#44	2& 3	10	.12070	174.80	6.493	1.00858	1.533	2.263	
COMPUTE NM HYD	C6-D&AP#45	-	3	.01940	35.85	1.236	1.19426	1.500	2.887	PER IMP= 90.00
FINISH										

AMOLE DEL NORTE STORM DRAINAGE FACILITIES
TOWER/SAGE DRAINAGE MASTER PLAN

AHYMO SUMMARY TABLE - 10 YEAR - 24 HOUR STORM

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =12/10/1994
INPUT FILE = MAST2410.IN USER NO.= ANASRONM.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	PAGE = 1
START										TIME=	.00
RAINFALL TYPE= 2										RAIN24=	1.780
SEDIMENT BULK										PK BF =	1.05
COMPUTE NM HYD	A1-D&AP#1	-	3	.04580	68.62	3.162	1.29435	1.500	2.341	PER IMP=	76.00
ROUTE	AP-1R	3	2	.04580	67.80	3.162	1.29436	1.550	2.313		
COMPUTE NM HYD	A2-D	-	3	.03950	58.32	2.551	1.21103	1.500	2.307	PER IMP=	70.00
ADD HYD	AP#2	2& 3	10	.08530	121.60	5.713	1.25576	1.500	2.227		
ROUTE	AP#2R	10	2	.08530	122.25	5.713	1.25577	1.550	2.239		
COMPUTE NM HYD	A3-D	-	3	.04190	60.91	2.551	1.14160	1.500	2.271	PER IMP=	65.00
ADD HYD	AP#3	2& 3	10	.12720	175.06	8.264	1.21816	1.550	2.150		
ROUTE	AP#3R	10	2	.12720	177.74	8.264	1.21816	1.550	2.183		
COMPUTE NM HYD	A4-D	-	3	.04390	68.23	3.161	1.34990	1.500	2.429	PER IMP=	80.00
ADD HYD	AP#4	2& 3	10	.17110	242.91	11.425	1.25196	1.550	2.218		
ROUTE	AP#4R	10	2	.17110	244.83	11.425	1.25196	1.550	2.236		
COMPUTE NM HYD	A5-D	-	3	.04520	60.28	2.585	1.07217	1.500	2.084	PER IMP=	60.00
ADD HYD	AP#5	2& 3	10	.21630	300.08	14.009	1.21439	1.550	2.168		
ROUTE	AP#5R	10	2	.21630	300.55	14.009	1.21439	1.550	2.171		
COMPUTE NM HYD	A6-D	-	3	.04520	53.83	2.250	.93330	1.500	1.861	PER IMP=	50.00
ADD HYD	PART_AP#9	2& 3	10	.26150	350.21	16.259	1.16580	1.550	2.093		
COMPUTE NM HYD	A7-D	-	3	.02060	24.54	1.025	.93330	1.500	1.861	PER IMP=	50.00
ADD HYD	PART_AP#9	10& 3	10	.28210	372.85	17.284	1.14882	1.550	2.065		
COMPUTE NM HYD	A8-D&AP#6	-	3	.05700	72.44	3.682	1.21103	1.550	1.986	PER IMP=	70.00
ROUTE	AP&6R	3	2	.05700	69.75	3.682	1.21104	1.600	1.912		
COMPUTE NM HYD	A9-D	-	3	.01020	12.64	.508	.93330	1.500	1.936	PER IMP=	50.00
ADD HYD	AP#7	2& 3	20	.06720	78.23	4.189	1.16887	1.600	1.819		
ROUTE	AP#7R	20	2	.06720	78.03	4.189	1.16888	1.600	1.814		
COMPUTE NM HYD	A10-D	-	3	.01020	12.64	.508	.93330	1.500	1.936	PER IMP=	50.00
ADD HYD	AP#8	2& 3	20	.07740	86.51	4.697	1.13782	1.600	1.746		
ROUTE	AP#8R	20	2	.07740	84.14	4.697	1.13783	1.650	1.699		
ADD HYD	AP#9	10& 2	10	.35950	443.11	21.981	1.14645	1.550	1.926		
ROUTE	AP#9R	10	2	.35950	442.23	21.981	1.14645	1.550	1.922		
COMPUTE NM HYD	A11-D	-	3	.00860	13.87	.594	1.29435	1.500	2.519	PER IMP=	76.00
ADD HYD	AP#10	2& 3	20	.36810	454.18	22.575	1.14991	1.550	1.928		
COMPUTE NM HYD	B1-D&AP#11	-	3	.02300	34.43	1.451	1.18326	1.500	2.339	PER IMP=	68.00
ROUTE	AP#11R	3	2	.02300	30.50	1.451	1.18328	1.550	2.072		
COMPUTE NM HYD	B2-D	-	3	.03500	48.37	2.001	1.07217	1.500	2.159	PER IMP=	60.00
ADD HYD	AP#12	2& 3	10	.05800	75.46	3.453	1.11621	1.500	2.033		
ROUTE	AP#12R	10	2	.05800	70.44	3.453	1.11623	1.550	1.898		
COMPUTE NM HYD	B3-D	-	3	.04360	49.48	2.170	.93330	1.500	1.773	PER IMP=	50.00
ADD HYD	AP#13	2& 3	10	.10160	118.42	5.623	1.03772	1.550	1.821		
ROUTE	AP#13R	10	2	.10160	116.28	5.623	1.03772	1.550	1.788		
COMPUTE NM HYD	B4-D	-	3	.02300	28.48	1.145	.93330	1.500	1.935	PER IMP=	50.00
ADD HYD	AP#14	2& 3	10	.12460	141.21	6.768	1.01844	1.550	1.771		
ROUTE	AP#14R	10	12	.12460	140.69	6.768	1.01845	1.550	1.764		
COMPUTE NM HYD	S1-D&AP#15	-	3	.03140	45.64	1.912	1.14160	1.500	2.271	PER IMP=	65.00
ROUTE	AP-15R	3	2	.03140	44.09	1.912	1.14162	1.500	2.194		
COMPUTE NM HYD	S2-D	-	3	.01630	20.19	.811	.93330	1.500	1.935	PER IMP=	50.00
ADD HYD	AP#16	2& 3	10	.04770	64.28	2.723	1.07041	1.500	2.106		
ROUTE	AP#16R	10	2	.04770	63.42	2.723	1.07042	1.550	2.077		

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
COMPUTE NM HYD	S3-D	-	3	.05670	67.53	2.822	.93330	1.500	1.861	PER IMP= 50.00
ADD HYD	AP#17	2& 3	10	.10440	128.10	5.545	.99594	1.500	1.917	
ROUTE	AP#17R	10	2	.10440	129.55	5.545	.99595	1.550	1.939	
COMPUTE NM HYD	S4-D	-	3	.04360	53.32	2.493	1.07217	1.550	1.911	PER IMP= 60.00
ADD HYD	AP#18	2& 3	10	.14800	182.86	8.039	1.01840	1.550	1.931	
ROUTE	AP#18R	10	2	.14800	173.14	8.039	1.01840	1.550	1.828	
COMPUTE NM HYD	S5-D	-	3	.02380	32.55	1.343	1.05828	1.500	2.137	PER IMP= 59.00
ADD HYD	AP#19	2& 3	10	.17180	201.46	9.382	1.02392	1.550	1.832	
ADD HYD	AP#20	12&10	10	.29640	342.15	16.150	1.02162	1.550	1.804	
ADD HYD	PART_AP#21	20&10	10	.66450	796.34	38.725	1.09268	1.550	1.872	
COMPUTE NM HYD	B5-D_TWRPND	-	3	.03910	20.53	.589	.28248	1.500	.821	PER IMP= 5.00
ADD HYD	AP#21	10& 3	20	.70360	815.60	39.314	1.04766	1.550	1.811	
ROUTE RESERVOIR	AP#22	20	12	.70360	22.55	37.241	.99242	2.700	.050	AC-FT= 28.615
ROUTE	AP#22R	12	2	.70360	22.55	37.214	.99170	2.750	.050	
COMPUTE NM HYD	B6-D	-	3	.04590	40.70	2.795	1.14160	1.700	1.385	PER IMP= 65.00
ADD HYD	AP#23	2& 3	10	.74950	58.48	40.009	1.00088	1.700	.122	
ROUTE	AP#23R	10	2	.74950	57.47	39.971	.99994	1.750	.120	
COMPUTE NM HYD	B7-D	-	3	.05910	58.27	3.686	1.16937	1.650	1.541	PER IMP= 67.00
ADD HYD	AP#24	2& 3	10	.80860	111.08	43.657	1.01233	1.700	.215	
ROUTE	AP#24R	10	2	.80860	110.07	43.624	1.01156	1.750	.213	
COMPUTE NM HYD	B8-D	-	3	.08910	48.46	4.435	.93330	1.900	.850	PER IMP= 50.00
ADD HYD	AP#25	2& 3	30	.89770	151.32	48.059	1.00379	1.750	.263	
COMPUTE NM HYD	A12-D&AP#26	-	3	.03590	56.08	2.478	1.29435	1.500	2.441	PER IMP= 76.00
ROUTE	AP#26R	3	2	.03590	53.92	2.478	1.29437	1.550	2.347	
COMPUTE NM HYD	A13-D	-	3	.04520	50.84	2.752	1.14160	1.600	1.758	PER IMP= 65.00
ADD HYD	AP#27	2& 3	10	.08110	104.48	5.230	1.20921	1.550	2.013	
ROUTE	AP#27R	10	2	.08110	100.28	5.230	1.20922	1.600	1.932	
COMPUTE NM HYD	A14-D	-	3	.04520	38.63	2.919	1.21103	1.750	1.335	PER IMP= 70.00
ADD HYD	AP#28	2& 3	10	.12630	127.40	8.150	1.20986	1.600	1.576	
ROUTE	AP#28R	10	2	.12630	126.72	8.150	1.20986	1.600	1.568	
COMPUTE NM HYD	A15-D	-	3	.02530	27.89	1.447	1.07217	1.550	1.723	PER IMP= 60.00
ADD HYD	PART_AP#33	2& 3	20	.15160	153.94	9.596	1.18688	1.600	1.587	
COMPUTE NM HYD	A17-D&AP#29	-	3	.01080	13.38	.538	.93330	1.500	1.936	PER IMP= 50.00
ROUTE	AP&29R	3	2	.01080	9.06	.538	.93334	1.600	1.311	
COMPUTE NM HYD	A18-D	-	3	.01030	14.24	.589	1.07217	1.500	2.160	PER IMP= 60.00
ADD HYD	AP#30	2& 3	10	.02110	21.01	1.127	1.00106	1.550	1.556	
ROUTE	AP&30R	10	2	.02110	13.26	1.126	1.00104	1.650	.982	
COMPUTE NM HYD	A19-D	-	3	.01080	12.72	.618	1.07217	1.550	1.841	PER IMP= 60.00
ADD HYD	AP#31	2& 3	10	.03190	24.03	1.744	1.02509	1.600	1.177	
ROUTE	AP#31R	10	2	.03190	23.54	1.744	1.02510	1.600	1.153	
COMPUTE NM HYD	A20-D	-	3	.00690	9.54	.395	1.07217	1.500	2.161	PER IMP= 60.00
ADD HYD	AP#32	2& 3	10	.03880	29.89	2.139	1.03345	1.600	1.204	
ROUTE	AP#32R	10	22	.03880	28.27	2.139	1.03345	1.650	1.138	
ADD HYD	AP#33	20&22	10	.19040	181.25	11.735	1.15561	1.600	1.487	
ROUTE	AP#33R	10	2	.19040	180.24	11.735	1.15561	1.650	1.479	
COMPUTE NM HYD	A16-D	-	3	.06380	43.27	3.176	.93330	1.750	1.060	PER IMP= 50.00
ADD HYD	AP#34	2& 3	10	.25420	218.83	14.910	1.09981	1.650	1.345	
COMPUTE NM HYD	S6-D&AP#35	-	3	.03780	32.14	2.161	1.07217	1.700	1.329	PER IMP= 60.00
ROUTE	AP#35R	3	2	.03780	31.42	2.161	1.07217	1.700	1.299	
COMPUTE NM HYD	S7-D	-	3	.05700	42.70	3.724	1.22492	1.850	1.170	PER IMP= 71.00
ADD HYD	AP#36	2& 3	10	.09480	71.06	5.885	1.16400	1.800	1.171	
ROUTE	AP#36R	10	2	.09480	69.80	5.885	1.16400	1.850	1.150	

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
COMPUTE NM HYD	S8-D	-	3	.06830	51.63	4.057	1.11383	1.800	1.181	PER IMP= 63.00
ADD HYD	AP#37	2& 3	10	.16310	120.57	9.942	1.14298	1.800	1.155	
ROUTE	AP#37R	10	2	.16310	120.27	9.942	1.14299	1.850	1.152	
COMPUTE NM HYD	S9-D	-	3	.07480	92.37	3.723	.93330	1.500	1.929	PER IMP= 50.00
ADD HYD	AP#38	2& 3	20	.23790	148.94	13.666	1.07705	1.800	.978	
COMPUTE NM HYD	C1-D&AP#39	-	3	.03860	57.22	2.407	1.16937	1.500	2.316	PER IMP= 67.00
ROUTE	AP#39R	3	2	.03860	55.48	2.407	1.16939	1.500	2.246	
COMPUTE NM HYD	C2-D	-	3	.01880	27.33	1.145	1.14160	1.500	2.272	PER IMP= 65.00
ADD HYD	AP#40	2& 3	10	.05740	82.81	3.552	1.16027	1.500	2.254	
ROUTE	AP#40R	10	2	.05740	81.05	3.552	1.16028	1.550	2.206	
COMPUTE NM HYD	C3-D	-	3	.02340	42.41	1.858	1.48877	1.500	2.832	PER IMP= 90.00
ADD HYD	AP#41	2& 3	10	.08080	120.53	5.410	1.25540	1.500	2.331	
COMPUTE NM HYD	C4-D&AP#42	-	3	.03080	47.24	2.081	1.26658	1.500	2.396	PER IMP= 74.00
ROUTE	AP#42R	3	2	.03080	46.52	2.081	1.26660	1.500	2.360	
ADD HYD	AP#43	10& 2	10	.11160	167.05	7.490	1.25848	1.500	2.339	
ROUTE	AP#43R	10	2	.11160	164.06	7.491	1.25849	1.550	2.297	
COMPUTE NM HYD	C5-D	-	3	.00910	13.07	.508	1.04738	1.500	2.244	PER IMP= 50.00
ADD HYD	AP#44	2& 3	10	.12070	176.14	7.999	1.24257	1.550	2.280	
COMPUTE NM HYD	C6-D&AP#45	-	3	.01940	35.16	1.540	1.48877	1.500	2.832	PER IMP= 90.00
FINISH										

AMOLE DEL NORTE STORM DRAINAGE FACILITIES
TOWER/SAGE DRAINAGE MASTER PLAN

AHYMO SUMMARY TABLE - 100 YEAR - 6 HOUR STORM

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =12/10/1994
INPUT FILE = MASTER6.IN USER NO.= ANASRONM.101

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	PAGE = 1
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.210
SEDIMENT BULK										PK BF =	1.05
COMPUTE NM HYD	A1-D&AP#1	-	3	.04580	111.86	4.273	1.74932	1.533	3.816	PER IMP=	76.00
ROUTE	AP-1R	3	2	.04580	109.16	4.273	1.74933	1.533	3.724		
COMPUTE NM HYD	A2-D	-	3	.03950	95.91	3.514	1.66790	1.500	3.794	PER IMP=	70.00
ADD HYD	AP#2	2& 3	10	.08530	203.51	7.787	1.71161	1.533	3.728		
ROUTE	AP#2R	10	2	.08530	194.79	7.787	1.71162	1.567	3.568		
COMPUTE NM HYD	A3-D	-	3	.04190	102.87	3.576	1.60006	1.500	3.836	PER IMP=	65.00
ADD HYD	AP#3	2& 3	10	.12720	291.85	11.362	1.67486	1.533	3.585		
ROUTE	AP#3R	10	2	.12720	286.92	11.362	1.67487	1.533	3.524		
COMPUTE NM HYD	A4-D	-	3	.04390	109.89	4.223	1.80360	1.533	3.911	PER IMP=	80.00
ADD HYD	AP#4	2& 3	10	.17110	396.80	15.585	1.70789	1.533	3.624		
ROUTE	AP#4R	10	2	.17110	392.87	15.585	1.70790	1.567	3.588		
COMPUTE NM HYD	A5-D	-	3	.04520	102.56	3.694	1.53221	1.500	3.545	PER IMP=	60.00
ADD HYD	AP#5	2& 3	10	.21630	490.46	19.279	1.67118	1.533	3.543		
ROUTE	AP#5R	10	2	.21630	488.61	19.279	1.67118	1.567	3.530		
COMPUTE NM HYD	A6-D	-	3	.04520	95.37	3.367	1.39652	1.500	3.297	PER IMP=	50.00
ADD HYD	PART_AP#9	2& 3	10	.26150	573.77	22.645	1.62370	1.567	3.428		
COMPUTE NM HYD	A7-D	-	3	.02060	43.47	1.534	1.39651	1.500	3.297	PER IMP=	50.00
ADD HYD	PART_AP#9	10& 3	10	.28210	616.11	24.180	1.60711	1.533	3.413		
COMPUTE NM HYD	A8-D&AP#6	-	3	.05700	119.28	5.070	1.66790	1.567	3.270	PER IMP=	70.00
ROUTE	AP&6R	3	2	.05700	115.76	5.070	1.66791	1.600	3.173		
COMPUTE NM HYD	A9-D	-	3	.01020	22.61	.760	1.39652	1.500	3.464	PER IMP=	50.00
ADD HYD	AP#7	2& 3	20	.06720	131.61	5.830	1.62670	1.600	3.060		
ROUTE	AP#7R	20	2	.06720	131.12	5.830	1.62671	1.600	3.049		
COMPUTE NM HYD	A10-D	-	3	.01020	22.61	.760	1.39652	1.500	3.464	PER IMP=	50.00
ADD HYD	AP#8	2& 3	20	.07740	146.97	6.590	1.59636	1.600	2.967		
ROUTE	AP#8R	20	2	.07740	143.44	6.590	1.59637	1.633	2.896		
ADD HYD	AP#9	10& 2	10	.35950	747.50	30.769	1.60480	1.567	3.249		
ROUTE	AP#9R	10	2	.35950	747.19	30.769	1.60480	1.567	3.248		
COMPUTE NM HYD	A11-D	-	3	.00860	22.64	.802	1.74932	1.500	4.113	PER IMP=	76.00
ADD HYD	AP#10	2& 3	20	.36810	765.60	31.572	1.60817	1.567	3.250		
COMPUTE NM HYD	B1-D&AP#11	-	3	.02300	57.58	2.013	1.64077	1.500	3.912	PER IMP=	68.00
ROUTE	AP#11R	3	2	.02300	53.26	2.013	1.64077	1.533	3.618		
COMPUTE NM HYD	B2-D	-	3	.03500	83.14	2.860	1.53221	1.500	3.712	PER IMP=	60.00
ADD HYD	AP#12	2& 3	10	.05800	132.29	4.873	1.57525	1.533	3.564		
ROUTE	AP#12R	10	2	.05800	124.14	4.873	1.57526	1.567	3.344		
COMPUTE NM HYD	B3-D	-	3	.04360	89.24	3.247	1.39652	1.533	3.198	PER IMP=	50.00
ADD HYD	AP#13	2& 3	10	.10160	210.88	8.120	1.49854	1.533	3.243		
ROUTE	AP#13R	10	2	.10160	209.23	8.120	1.49855	1.567	3.218		
COMPUTE NM HYD	B4-D	-	3	.02300	50.97	1.713	1.39652	1.500	3.463	PER IMP=	50.00
ADD HYD	AP#14	2& 3	10	.12460	251.67	9.833	1.47971	1.567	3.156		
ROUTE	AP#14R	10	12	.12460	251.49	9.833	1.47971	1.567	3.154		
COMPUTE NM HYD	S1-D&AP#15	-	3	.03140	77.10	2.680	1.60006	1.500	3.836	PER IMP=	65.00
ROUTE	AP-15R	3	2	.03140	75.27	2.680	1.60006	1.533	3.745		
COMPUTE NM HYD	S2-D	-	3	.01630	36.13	1.214	1.39652	1.500	3.463	PER IMP=	50.00
ADD HYD	AP#16	2& 3	10	.04770	109.77	3.894	1.53049	1.533	3.596		
ROUTE	AP#16R	10	2	.04770	109.08	3.894	1.53050	1.533	3.573		

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
COMPUTE NM HYD	S3-D	-	3	.05670	119.63	4.223	1.39652	1.500	3.297	PER IMP= 50.00
ADD HYD	AP#17	2& 3	10	.10440	227.71	8.117	1.45773	1.533	3.408	
ROUTE	AP#17R	10	2	.10440	224.43	8.117	1.45773	1.533	3.359	
COMPUTE NM HYD	S4-D	-	3	.04360	93.23	3.563	1.53221	1.533	3.341	PER IMP= 60.00
ADD HYD	AP#18	2& 3	10	.14800	317.66	11.679	1.47967	1.533	3.354	
ROUTE	AP#18R	10	2	.14800	301.32	11.680	1.47967	1.567	3.181	
COMPUTE NM HYD	S5-D	-	3	.02380	56.16	1.928	1.51864	1.500	3.687	PER IMP= 59.00
ADD HYD	AP#19	2& 3	10	.17180	347.65	13.607	1.48506	1.567	3.162	
ADD HYD	AP#20	12&10	10	.29640	599.14	23.440	1.48281	1.567	3.158	
ADD HYD	PART_AP#21	20&10	10	.66450	1364.74	55.012	1.55226	1.567	3.209	
COMPUTE NM HYD	B5-D_TWRPND	-	3	.03910	54.90	1.551	.74390	1.500	2.194	PER IMP= 5.00
ADD HYD	AP#21	10& 3	20	.70360	1414.13	56.563	1.50734	1.567	3.140	
ROUTE RESERVOIR	AP#22	20	12	.70360	25.11	35.845	.95522	2.967	.056	AC-FT= 51.036
ROUTE	AP#22R	12	2	.70360	25.11	35.760	.95294	3.000	.056	
COMPUTE NM HYD	B6-D	-	3	.04590	67.94	3.917	1.60006	1.700	2.313	PER IMP= 65.00
ADD HYD	AP#23	2& 3	10	.74950	89.59	39.676	.99257	1.700	.187	
ROUTE	AP#23R	10	2	.74950	87.10	39.564	.98976	1.767	.182	
COMPUTE NM HYD	B7-D	-	3	.05910	96.51	5.129	1.62720	1.667	2.552	PER IMP= 67.00
ADD HYD	AP#24	2& 3	10	.80860	178.28	44.693	1.03635	1.700	.345	
ROUTE	AP#24R	10	2	.80860	176.50	44.595	1.03409	1.733	.341	
COMPUTE NM HYD	B8-D	-	3	.08910	85.98	6.636	1.39652	1.900	1.508	PER IMP= 50.00
ADD HYD	AP#25	2& 3	30	.89770	249.59	51.232	1.07006	1.767	.434	
COMPUTE NM HYD	A12-D&AP#26	-	3	.03590	90.60	3.349	1.74932	1.500	3.943	PER IMP= 76.00
ROUTE	AP#26R	3	2	.03590	88.53	3.349	1.74933	1.533	3.853	
COMPUTE NM HYD	A13-D	-	3	.04520	85.68	3.857	1.60006	1.567	2.962	PER IMP= 65.00
ADD HYD	AP#27	2& 3	10	.08110	170.19	7.207	1.66612	1.567	3.279	
ROUTE	AP#27R	10	2	.08110	163.37	7.207	1.66613	1.567	3.148	
COMPUTE NM HYD	A14-D	-	3	.04520	63.41	4.021	1.66790	1.767	2.192	PER IMP= 70.00
ADD HYD	AP#28	2& 3	10	.12630	206.62	11.227	1.66675	1.600	2.556	
ROUTE	AP#28R	10	2	.12630	205.14	11.227	1.66676	1.633	2.538	
COMPUTE NM HYD	A15-D	-	3	.02530	47.80	2.067	1.53221	1.567	2.952	PER IMP= 60.00
ADD HYD	PART_AP#33	2& 3	20	.15160	250.62	13.295	1.64430	1.600	2.583	
COMPUTE NM HYD	A17-D&AP#29	-	3	.01080	23.94	.804	1.39652	1.500	3.464	PER IMP= 50.00
ROUTE	AP&29R	3	2	.01080	17.25	.804	1.39654	1.567	2.496	
COMPUTE NM HYD	A18-D	-	3	.01030	24.48	.842	1.53221	1.500	3.713	PER IMP= 60.00
ADD HYD	AP#30	2& 3	10	.02110	39.23	1.646	1.46272	1.533	2.905	
ROUTE	AP&30R	10	2	.02110	27.05	1.646	1.46274	1.633	2.003	
COMPUTE NM HYD	A19-D	-	3	.01080	21.52	.883	1.53221	1.567	3.114	PER IMP= 60.00
ADD HYD	AP#31	2& 3	10	.03190	46.47	2.529	1.48619	1.600	2.276	
ROUTE	AP#31R	10	2	.03190	45.55	2.529	1.48621	1.633	2.231	
COMPUTE NM HYD	A20-D	-	3	.00690	16.40	.564	1.53221	1.500	3.715	PER IMP= 60.00
ADD HYD	AP#32	2& 3	10	.03880	56.70	3.092	1.49437	1.600	2.283	
ROUTE	AP#32R	10	22	.03880	53.24	3.092	1.49438	1.633	2.144	
ADD HYD	AP#33	20&22	10	.19040	302.55	16.387	1.61374	1.600	2.483	
ROUTE	AP#33R	10	2	.19040	300.65	16.387	1.61375	1.633	2.467	
COMPUTE NM HYD	A16-D	-	3	.06380	76.29	4.752	1.39652	1.733	1.868	PER IMP= 50.00
ADD HYD	AP#34	2& 3	10	.25420	368.19	21.139	1.55922	1.667	2.263	
COMPUTE NM HYD	S6-D&AP#35	-	3	.03780	54.70	3.089	1.53221	1.700	2.261	PER IMP= 60.00
ROUTE	AP#35R	3	2	.03780	53.55	3.089	1.53221	1.733	2.213	
COMPUTE NM HYD	S7-D	-	3	.05700	69.88	5.112	1.68147	1.867	1.915	PER IMP= 71.00
ADD HYD	AP#36	2& 3	10	.09480	118.32	8.201	1.62194	1.800	1.950	
ROUTE	AP#36R	10	2	.09480	115.67	8.201	1.62195	1.833	1.906	

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
COMPUTE NM HYD	S8-D	-	3	.06830	87.17	5.730	1.57292	1.767	1.994	PER IMP= 63.00
ADD HYD	AP#37	2& 3	10	.16310	201.19	13.930	1.60141	1.800	1.927	
ROUTE	AP#37R	10	2	.16310	201.09	13.930	1.60141	1.833	1.926	
COMPUTE NM HYD	S9-D	-	3	.07480	165.79	5.571	1.39652	1.500	3.463	PER IMP= 50.00
ADD HYD	AP#38	2& 3	20	.23790	251.17	19.501	1.53698	1.767	1.650	
COMPUTE NM HYD	C1-D&AP#39	-	3	.03860	96.00	3.350	1.62720	1.500	3.886	PER IMP= 67.00
ROUTE	AP#39R	3	2	.03860	93.15	3.350	1.62720	1.533	3.771	
COMPUTE NM HYD	C2-D	-	3	.01880	46.17	1.604	1.60006	1.500	3.837	PER IMP= 65.00
ADD HYD	AP#40	2& 3	10	.05740	137.58	4.954	1.61830	1.500	3.745	
ROUTE	AP#40R	10	2	.05740	136.26	4.954	1.61831	1.533	3.709	
COMPUTE NM HYD	C3-D	-	3	.02340	66.79	2.420	1.93929	1.500	4.460	PER IMP= 90.00
ADD HYD	AP#41	2& 3	10	.08080	199.05	7.374	1.71126	1.533	3.849	
COMPUTE NM HYD	C4-D&AP#42	-	3	.03080	76.75	2.829	1.72218	1.500	3.893	PER IMP= 74.00
ROUTE	AP#42R	3	2	.03080	76.59	2.829	1.72219	1.533	3.885	
ADD HYD	AP#43	10& 2	10	.11160	275.63	10.203	1.71427	1.533	3.859	
ROUTE	AP#43R	10	2	.11160	261.93	10.203	1.71427	1.533	3.667	
COMPUTE NM HYD	C5-D	-	3	.00910	21.80	.762	1.57073	1.500	3.742	PER IMP= 50.00
ADD HYD	AP#44	2& 3	10	.12070	283.42	10.966	1.70345	1.533	3.669	
COMPUTE NM HYD	C6-D&AP#45	-	3	.01940	55.38	2.007	1.93929	1.500	4.460	PER IMP= 90.00
FINISH										

AMOLE DEL NORTE STORM DRAINAGE FACILITIES
TOWER/SAGE DRAINAGE MASTER PLAN

AHYMO SUMMARY TABLE - 100 YEAR - 24 HOUR STORM

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =12/10/1994
INPUT FILE = MASTER24.IN USER NO.= ANASRONM.101

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	PAGE = 1 NOTATION
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 2.670
SEDIMENT BULK										PK BF = 1.05
COMPUTE NM HYD	A1-D&AP#1	-	3	.04580	110.15	5.172	2.11755	1.500	3.758	PER IMP= 76.00
ROUTE	AP-1R	3	2	.04580	108.15	5.172	2.11756	1.550	3.690	
COMPUTE NM HYD	A2-D	-	3	.03950	95.25	4.228	2.00697	1.500	3.768	PER IMP= 70.00
ADD HYD	AP#2	2& 3	10	.08530	197.61	9.400	2.06634	1.500	3.620	
ROUTE	AP#2R	10	2	.08530	195.92	9.401	2.06635	1.550	3.589	
COMPUTE NM HYD	A3-D	-	3	.04190	101.17	4.279	1.91483	1.500	3.773	PER IMP= 65.00
ADD HYD	AP#3	2& 3	10	.12720	284.05	13.679	2.01643	1.550	3.489	
ROUTE	AP#3R	10	2	.12720	288.58	13.679	2.01643	1.550	3.545	
COMPUTE NM HYD	A4-D	-	3	.04390	108.30	5.130	2.19127	1.500	3.855	PER IMP= 80.00
ADD HYD	AP#4	2& 3	10	.17110	391.99	18.810	2.06129	1.550	3.580	
ROUTE	AP#4R	10	2	.17110	395.01	18.810	2.06129	1.550	3.607	
COMPUTE NM HYD	A5-D	-	3	.04520	101.94	4.394	1.82268	1.500	3.524	PER IMP= 60.00
ADD HYD	AP#5	2& 3	10	.21630	488.75	23.204	2.01143	1.550	3.531	
ROUTE	AP#5R	10	2	.21630	489.83	23.204	2.01143	1.550	3.538	
COMPUTE NM HYD	A6-D	-	3	.04520	94.89	3.950	1.63839	1.500	3.280	PER IMP= 50.00
ADD HYD	PART_AP#9	2& 3	10	.26150	577.67	27.153	1.94694	1.550	3.452	
COMPUTE NM HYD	A7-D	-	3	.02060	43.26	1.800	1.63839	1.500	3.281	PER IMP= 50.00
ADD HYD	PART_AP#9	10& 3	10	.28210	617.72	28.953	1.92441	1.550	3.421	
COMPUTE NM HYD	A8-D&AP#6	-	3	.05700	118.36	6.101	2.00698	1.550	3.245	PER IMP= 70.00
ROUTE	AP&6R	3	2	.05700	116.16	6.101	2.00698	1.600	3.184	
COMPUTE NM HYD	A9-D	-	3	.01020	22.28	.891	1.63839	1.500	3.412	PER IMP= 50.00
ADD HYD	AP#7	2& 3	20	.06720	131.46	6.992	1.95102	1.600	3.057	
ROUTE	AP#7R	20	2	.06720	132.02	6.992	1.95103	1.600	3.070	
COMPUTE NM HYD	A10-D	-	3	.01020	22.28	.891	1.63839	1.500	3.412	PER IMP= 50.00
ADD HYD	AP#8	2& 3	20	.07740	147.32	7.884	1.90982	1.600	2.974	
ROUTE	AP#8R	20	2	.07740	145.00	7.884	1.90983	1.600	2.927	
ADD HYD	AP#9	10& 2	10	.35950	747.91	36.837	1.92127	1.550	3.251	
ROUTE	AP#9R	10	2	.35950	745.86	36.837	1.92127	1.550	3.242	
COMPUTE NM HYD	A11-D	-	3	.00860	22.24	.971	2.11755	1.500	4.040	PER IMP= 76.00
ADD HYD	AP#10	2& 3	20	.36810	765.11	37.808	1.92586	1.550	3.248	
COMPUTE NM HYD	B1-D&AP#11	-	3	.02300	56.61	2.417	1.97012	1.500	3.845	PER IMP= 68.00
ROUTE	AP#11R	3	2	.02300	52.84	2.417	1.97014	1.550	3.589	
COMPUTE NM HYD	B2-D	-	3	.03500	81.81	3.402	1.82268	1.500	3.652	PER IMP= 60.00
ADD HYD	AP#12	2& 3	10	.05800	130.68	5.819	1.88114	1.500	3.521	
ROUTE	AP#12R	10	2	.05800	125.22	5.819	1.88115	1.550	3.373	
COMPUTE NM HYD	B3-D	-	3	.04360	87.28	3.810	1.63839	1.500	3.128	PER IMP= 50.00
ADD HYD	AP#13	2& 3	10	.10160	209.92	9.629	1.77697	1.550	3.228	
ROUTE	AP#13R	10	2	.10160	209.40	9.629	1.77697	1.550	3.220	
COMPUTE NM HYD	B4-D	-	3	.02300	50.21	2.010	1.63839	1.500	3.411	PER IMP= 50.00
ADD HYD	AP#14	2& 3	10	.12460	253.60	11.639	1.75138	1.550	3.180	
ROUTE	AP#14R	10	12	.12460	250.94	11.639	1.75139	1.550	3.147	
COMPUTE NM HYD	S1-D&AP#15	-	3	.03140	75.82	3.207	1.91483	1.500	3.773	PER IMP= 65.00
ROUTE	AP-15R	3	2	.03140	73.86	3.207	1.91484	1.500	3.675	
COMPUTE NM HYD	S2-D	-	3	.01630	35.59	1.424	1.63839	1.500	3.412	PER IMP= 50.00
ADD HYD	AP#16	2& 3	10	.04770	109.45	4.631	1.82035	1.500	3.585	
ROUTE	AP#16R	10	2	.04770	106.53	4.631	1.82037	1.550	3.489	

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
COMPUTE NM HYD	S3-D	-	3	.05670	119.03	4.954	1.63839	1.500	3.280	PER IMP= 50.00
ADD HYD	AP#17	2& 3	10	.10440	222.73	9.585	1.72153	1.500	3.333	
ROUTE	AP#17R	10	2	.10440	222.44	9.586	1.72153	1.550	3.329	
COMPUTE NM HYD	S4-D	-	3	.04360	90.14	4.238	1.82268	1.550	3.230	PER IMP= 60.00
ADD HYD	AP#18	2& 3	10	.14800	312.58	13.824	1.75132	1.550	3.300	
ROUTE	AP#18R	10	2	.14800	300.36	13.824	1.75133	1.550	3.171	
COMPUTE NM HYD	S5-D	-	3	.02380	55.26	2.290	1.80425	1.500	3.628	PER IMP= 59.00
ADD HYD	AP#19	2& 3	10	.17180	348.69	16.114	1.75866	1.550	3.171	
ADD HYD	AP#20	12&10	10	.29640	599.64	27.753	1.75560	1.550	3.161	
ADD HYD	PART_AP#21	20&10	10	.66450	1364.74	65.561	1.84991	1.550	3.209	
COMPUTE NM HYD	B5-D_TWRPND	-	3	.03910	54.51	1.599	.76663	1.500	2.178	PER IMP= 5.00
ADD HYD	AP#21	10& 3	20	.70360	1415.47	67.160	1.78971	1.550	3.143	
ROUTE RESERVOIR	AP#22	20	12	.70360	25.11	53.623	1.42899	2.950	.056	AC-FT= 51.017
ROUTE	AP#22R	12	2	.70360	25.11	53.548	1.42698	3.000	.056	
COMPUTE NM HYD	B6-D	-	3	.04590	67.74	4.688	1.91483	1.700	2.306	PER IMP= 65.00
ADD HYD	AP#23	2& 3	10	.74950	89.59	58.235	1.45685	1.700	.187	
ROUTE	AP#23R	10	2	.74950	87.30	58.135	1.45433	1.750	.182	
COMPUTE NM HYD	B7-D	-	3	.05910	96.33	6.152	1.95169	1.650	2.547	PER IMP= 67.00
ADD HYD	AP#24	2& 3	10	.80860	178.07	64.286	1.49069	1.700	.344	
ROUTE	AP#24R	10	2	.80860	176.26	64.199	1.48865	1.700	.341	
COMPUTE NM HYD	B8-D	-	3	.08910	85.79	7.786	1.63839	1.900	1.504	PER IMP= 50.00
ADD HYD	AP#25	2& 3	30	.89770	249.51	71.984	1.50352	1.750	.434	
COMPUTE NM HYD	A12-D&AP#26	-	3	.03590	89.93	4.054	2.11755	1.500	3.914	PER IMP= 76.00
ROUTE	AP#26R	3	2	.03590	86.27	4.054	2.11756	1.550	3.755	
COMPUTE NM HYD	A13-D	-	3	.04520	84.50	4.616	1.91483	1.600	2.921	PER IMP= 65.00
ADD HYD	AP#27	2& 3	10	.08110	170.34	8.670	2.00456	1.550	3.282	
ROUTE	AP#27R	10	2	.08110	161.75	8.670	2.00457	1.600	3.116	
COMPUTE NM HYD	A14-D	-	3	.04520	63.35	4.838	2.00697	1.750	2.190	PER IMP= 70.00
ADD HYD	AP#28	2& 3	10	.12630	207.69	13.508	2.00542	1.600	2.569	
ROUTE	AP#28R	10	2	.12630	205.93	13.509	2.00542	1.600	2.548	
COMPUTE NM HYD	A15-D	-	3	.02530	47.15	2.459	1.82268	1.550	2.912	PER IMP= 60.00
ADD HYD	PART_AP#33	2& 3	20	.15160	252.00	15.968	1.97492	1.600	2.597	
COMPUTE NM HYD	A17-D&AP#29	-	3	.01080	23.59	.944	1.63839	1.500	3.412	PER IMP= 50.00
ROUTE	AP&29R	3	2	.01080	17.21	.944	1.63844	1.600	2.489	
COMPUTE NM HYD	A18-D	-	3	.01030	24.08	1.001	1.82268	1.500	3.654	PER IMP= 60.00
ADD HYD	AP#30	2& 3	10	.02110	37.99	1.945	1.72833	1.550	2.814	
ROUTE	AP&30R	10	2	.02110	27.33	1.945	1.72829	1.650	2.024	
COMPUTE NM HYD	A19-D	-	3	.01080	21.49	1.050	1.82268	1.550	3.110	PER IMP= 60.00
ADD HYD	AP#31	2& 3	10	.03190	46.33	2.995	1.76023	1.600	2.269	
ROUTE	AP#31R	10	2	.03190	45.57	2.995	1.76023	1.600	2.232	
COMPUTE NM HYD	A20-D	-	3	.00690	16.14	.671	1.82268	1.500	3.655	PER IMP= 60.00
ADD HYD	AP#32	2& 3	10	.03880	56.53	3.665	1.77133	1.600	2.276	
ROUTE	AP#32R	10	22	.03880	53.38	3.665	1.77131	1.650	2.150	
ADD HYD	AP#33	20&22	10	.19040	304.40	19.633	1.93343	1.600	2.498	
ROUTE	AP#33R	10	2	.19040	301.70	19.633	1.93343	1.650	2.476	
COMPUTE NM HYD	A16-D	-	3	.06380	76.21	5.575	1.63839	1.750	1.867	PER IMP= 50.00
ADD HYD	AP#34	2& 3	10	.25420	370.33	25.208	1.85938	1.650	2.276	
COMPUTE NM HYD	S6-D&AP#35	-	3	.03780	54.41	3.675	1.82268	1.700	2.249	PER IMP= 60.00
ROUTE	AP#35R	3	2	.03780	53.37	3.675	1.82269	1.700	2.206	
COMPUTE NM HYD	S7-D	-	3	.05700	69.82	6.157	2.02540	1.850	1.914	PER IMP= 71.00
ADD HYD	AP#36	2& 3	10	.09480	118.15	9.832	1.94456	1.800	1.947	
ROUTE	AP#36R	10	2	.09480	115.65	9.832	1.94456	1.850	1.906	

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
COMPUTE NM HYD	S8-D	-	3	.06830	86.71	6.841	1.87797	1.750	1.984	PER IMP= 63.00
ADD HYD	AP#37	2& 3	10	.16310	201.53	16.672	1.91667	1.800	1.931	
ROUTE	AP#37R	10	2	.16310	200.55	16.672	1.91667	1.800	1.921	
COMPUTE NM HYD	S9-D	-	3	.07480	163.31	6.536	1.63839	1.500	3.411	PER IMP= 50.00
ADD HYD	AP#38	2& 3	20	.23790	251.06	23.209	1.82917	1.750	1.649	
COMPUTE NM HYD	C1-D&AP#39	-	3	.03860	94.39	4.018	1.95169	1.500	3.821	PER IMP= 67.00
ROUTE	AP#39R	3	2	.03860	91.67	4.018	1.95170	1.500	3.711	
COMPUTE NM HYD	C2-D	-	3	.01880	45.40	1.920	1.91483	1.500	3.773	PER IMP= 65.00
ADD HYD	AP#40	2& 3	10	.05740	137.07	5.938	1.93961	1.500	3.731	
ROUTE	AP#40R	10	2	.05740	132.85	5.938	1.93962	1.550	3.616	
COMPUTE NM HYD	C3-D	-	3	.02340	65.54	2.965	2.37556	1.500	4.376	PER IMP= 90.00
ADD HYD	AP#41	2& 3	10	.08080	195.47	8.902	2.06586	1.500	3.780	
COMPUTE NM HYD	C4-D&AP#42	-	3	.03080	76.20	3.418	2.08069	1.500	3.865	PER IMP= 74.00
ROUTE	AP#42R	3	2	.03080	75.14	3.418	2.08070	1.500	3.812	
ADD HYD	AP#43	10& 2	10	.11160	270.61	12.320	2.06995	1.500	3.789	
ROUTE	AP#43R	10	2	.11160	262.56	12.320	2.06996	1.550	3.676	
COMPUTE NM HYD	C5-D	-	3	.00910	21.64	.880	1.81242	1.500	3.716	PER IMP= 50.00
ADD HYD	AP#44	2& 3	10	.12070	282.44	13.200	2.05053	1.550	3.656	
COMPUTE NM HYD	C6-D&AP#45	-	3	.01940	54.34	2.458	2.37556	1.500	4.377	PER IMP= 90.00
FINISH										

APPENDIX B

DEC 13 1994

572

CITY OF ALBUQUERQUE

Albuquerque, New Mexico

INTER-OFFICE MEMORANDUM

December 9, 1994

TO: Dan Hogan, Division Manager, Hydrology Division

FROM: Colleen K. Frenz, Assistant Div. Manager, Design & Dev. Div.

SUBJECT: POTENTIAL FUTURE PARK SITE - 98TH & TOWER
SAD 222 Master Drainage Plan

A meeting was held on September 23, 1994 regarding the above captioned project. This letter is to inform you that Parks and General Services is interested in pursuing the idea of joint use for a neighborhood park near the detention pond. The Tower/Unser Sector Development Plan identifies two park sites and the Park System Facility Plan supports the need for neighborhood parks in this area, specifically between 98th Street and Unser Boulevard.

Although the planning is in its infancy the opportunity to collocate facilities has proven to be beneficial for both providers of City services and to the public. Once the project progresses,some of the basic design concerns will need to be addressed and notification and approval from the administration will be required.

Thank you for this opportunity. Please continue to keep me informed of project status. My phone number is 857-8636.

cc: Lee Lunsford, SAD Engineer
Douglas L. Andrews
Sandy Zuschlag/Project File
R. J. Herbert/Carmen Chavez

macpark/park planning/new parks/sad222

APPENDIX B

Sunset West 4 (L-9/D13)

12-12-96
JPC

Looking South across Pond

Looking East into pond

Sunset West 4 (L-9/D13)

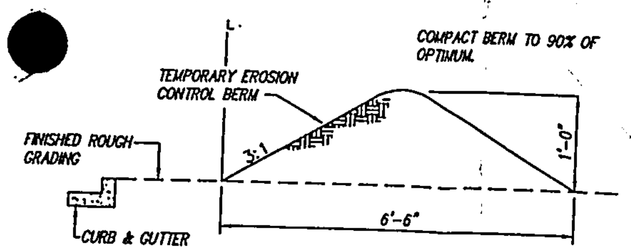
12-12-96

JPC

Looking South across Pond at the spillway

EROSION CONTROL NOTES

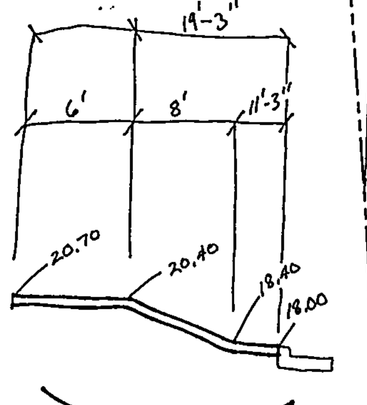
1. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A TOPSOIL DISTURBANCE PERMIT PRIOR TO BEGINING WORK.
2. CONTRACTOR IS RESPONSIBLE FOR KEEPING ALL SEDIMENT OUT OF EXISTING RIGHT-OF-WAY.
3. CONTRACTOR IS RESPONSIBLE FOR CLEANING UP ANY SEDIMENT THAT GETS INTO EXISTING RIGHT-OF-WAY.
4. EROSION CONTROL BERMS ARE REQUIRED AROUND THE ENTIRE SITE.
5. ALL EROSION CONTROL BERMS MUST BE IN PLACE AND ENGINEER CERTIFIED PRIOR TO BUILDING PERMIT RELEASE.

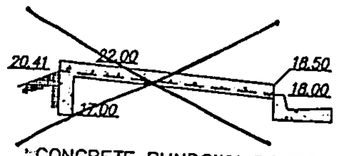


EROSION CONTROL BERM DETAIL
N.T.S.

NATURAL GROUND PREPARATION

PRIOR TO PLACING STRUCTURAL FILL AND SUBSEQUENT TO FINAL GRADING IN CUT AREAS, THE EXPOSED SOILS SHOULD BE SCARIFIED TO A DEPTH OF EIGHT INCHES AND MOISTURE CONDITIONED TO A NEAR OPTIMUM (-1 TO +3%) MOISTURE CONTENT. MOISTURE PENETRATION SHOULD EXTEND TO A DEPTH OF THREE FEET. THE EXPOSED SOILS SHOULD THEN BE COMPACTED TO A MINIMUM OF TEN PASSES OF A MINIMUM OF 95% OF MAXIMUM DENSITY AS DETERMINED BY ASTM D-1557 WITH A MINIMUM OF TEN PASSES OF A MINIMUM THENTY TON VIBRATORY COMPACTOR. IF VIBRATORY COMPACTION POSES A THREAT TO NEARBY STRUCTURES, STATIC COMPACTION SHOULD BE UTILIZED.

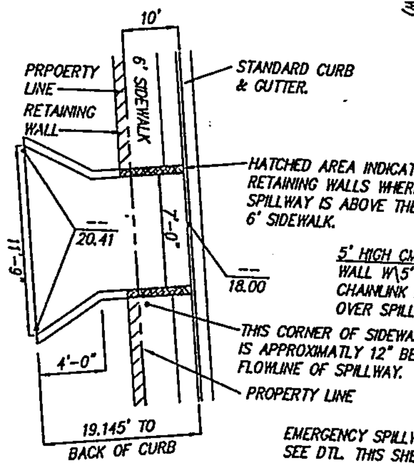




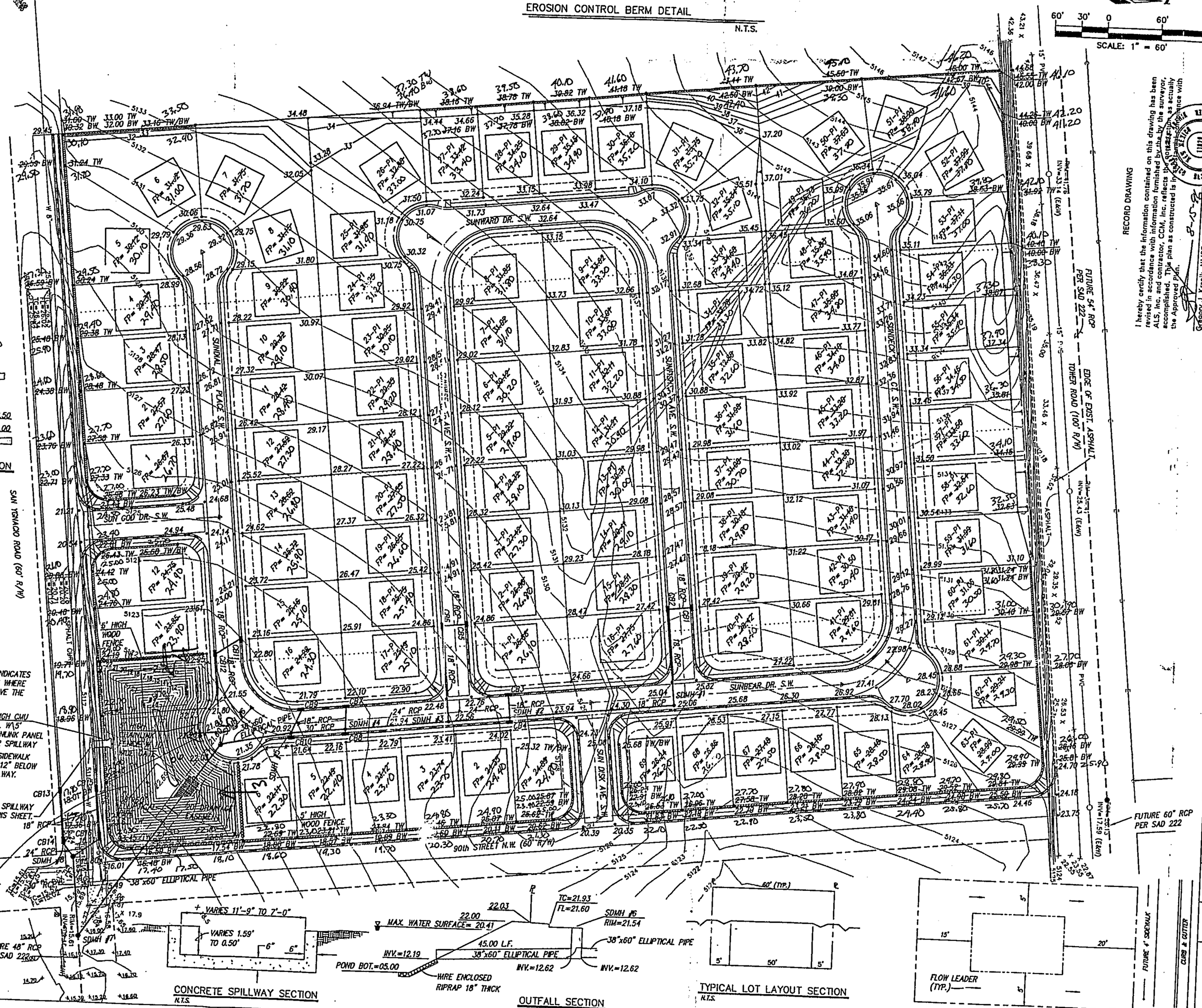
CONCRETE RUNDOWN SECTION
N.T.S.

NOTE:

TEMPORARY DRAINAGE EASEMENT GRANTED TO THE CITY OF ALBUQUERQUE LOTS 7, 8, 9 & 10, BLOCK 1



EMERGENCY SPILLWAY PLAN
N.T.S.



CONCRETE SPILLWAY SECTION
N.T.S.

OUTFALL SECTION
N.T.S.

TYPICAL LOT LAYOUT SECTION
N.T.S.

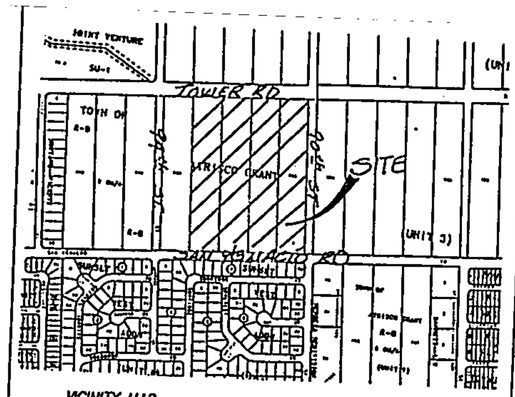
TYPICAL LOT LAYOUT PLAN
N.T.S.

60' 30' 0 60' 120'
SCALE: 1" = 60'

RECORD DRAWING

I hereby certify that the information contained on this drawing has been revised in accordance with information furnished by the surveyor, ALS, Inc. and the contractor, CCM, Inc. reflects the work as actually accomplished. This plan as constructed is in substantial compliance with the Approved Plan.

Gregory J. Krenik NMPE 11929 12-6-96



VICINITY MAP
ZONE MAP: L-9-Z

LEGAL DESCRIPTION

TRACTS 435-438 UNIT 3, TOWN OF ATRISCO GRANT

NOTES

1. SITE DOES NOT LIE WITHIN A 100 YEAR FLOOD ZONE.
2. FREE DISCHARGE IS NOT ALLOWED. (SAD 222)
3. ALL LANDSCAPE AREAS ADJACENT TO BUILDING TO BE GRADED SUCH THAT ROOF RUNOFF DOES NOT POND.
4. CONTRACTOR MUST OBTAIN A TOPSOIL DISTURBANCE PERMIT FROM THE ENVIRONMENTAL HEALTH DIVISION PRIOR TO CONSTRUCTION.
5. CITY OF ALBUQUERQUE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, LATEST EDITION SHALL GOVERN ALL WORK.
6. THE CONTRACTOR SHALL CONFORM TO ALL CITY, COUNTY, STATE AND FEDERAL DUST CONTROL MEASURES AND REQUIREMENTS AND WILL BE RESPONSIBLE FOR PREPARING AND OBTAINING ALL NECESSARY APPLICATIONS AND APPROVALS.
7. THE CONTRACTOR SHALL ENSURE THAT NO SOIL ERODES FROM THE LOTS INTO PUBLIC RIGHT-OF-WAY. THIS CAN BE ACHIEVED BY CONSTRUCTING TEMPORARY BERMS AS PER DTL. THIS SHT. AND WETTING THE SOIL TO KEEP IT FROM BLOWING.
8. THE EARTHWORK CONTACTOR SHALL STOCKPILE ENOUGH MATERIAL ADJACENT TO RETAINING WALL LOCATIONS TO BE UTILIZED FOR WALL BACKFILL.
9. ALL CONCRETE CURBING TO BE 4000 PSI @ 28 DAYS.

LEGEND

-5135-	EXIST. CONTOUR
TC= FL=	EXIST. TOP OF CURB EXIST. FLOWLINE
0.00 X	EXIST. SPOT ELEV.
	EXIST. CURB AND GUTTER
	EXIST. CONCRETE/SIDEWALK
	EXIST. SAS MANHOLE
	EXIST. CABLE T.V. PEDESTAL
	EXIST. WATER VALVE
—E—	EXIST. OVERHEAD ELECTRIC LINE
—T—	EXIST. OVERHEAD TELEPHONE LINE
	EXIST. P.P.
	EXIST. TEL. PEDESTAL
	NEW RETAINING WALL BY OTHERS
21.01 TW 18.31 BW	TOP OF WALL BOTTOM OF WALL
FP= 30.38	FINISHED PAD ELEV.
	MOUNTABLE CURB & GUTTER
	STANDARD CURB & GUTTER
28.53+	PROPOSED SPOT ELEV.
	3:1 SLOPE

dmg
D. MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS & SURVEYORS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
(505) 345-2010

AS BUILT INFORMATION

CONTRACTOR	CCM	DATE 9/96
WORK INSPECTOR'S ACCEPTANCE BY	ALS, INC	DATE 9/96
VERIFICATION BY	ALS, INC	DATE 9/96
DRAWINGS CORRECTED BY	ALS, INC	DATE 7/96
RECORDED BY	MICRO-FILM INFORMATION	DATE
NO.		

BENCH MARKS

STATION IS A STANDARD COA BRASS CAP SET IN CONCRETE 3" ABOVE GROUND AND STAMPED "9-L9", TO REACH VICINITY OF STATION FROM INTERSECTION OF SO. COORS RD. AND BRIDGE BLVD., TURN WEST ON BRIDGE, THEN SW ON TOWER RD., & TRAVEL APPROX. 1.65 MI. ON TOWER TO POINT WHERE A POWER LINE CROSSES THE ROAD. STATION IS LOCATED 52.0' NORTH OF CENTER OF TOWER RD. & 20.6' SOUTH FROM PP433 WHERE H-S & E-W POWER LINES MEET. X=356,637.68, Y=1,478,811.91, Z=NOT LISTED

SURVEY INFORMATION

NO.	BY	DATE

FIELD NOTES

ENGINEER'S SEAL

NO.	DATE	REMARKS	BY
		REVISIONS	

		DATE
DESIGNED BY	G.K.	10/95
DRAWN BY	JMB	10/95
CHECKED BY	DMG	10/95

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING DEVELOPMENT GROUP

TITLE:

SUNSET WEST SUBDIVISION UNIT IV GRADING & DRAINAGE PLAN

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	NO./DAY/YR.	NO./DAY/YR.

CITY PROJECT NO.	ZONE MAP NO.	SHEET	OF
4991.92	L9	4	21

SUNIV\GD60

CITY OF
Albuquerque

December 10, 1996

Martin J. Chávez, Mayor

Gregory Krenik
Mark Goodwin & Assoc.
P.O. Box 90606
Albuquerque, NM 87199

RE: SUNSET WEST UNIT IV (L9-D13). ENGINEER'S CERTIFICATION FOR SUBDIVISION CERTIFICATION. ENGINEER'S CERTIFICATION DATED DECEMBER 6, 1996.

Dear Mr. Krenik:

Based on the information provided on your September 30, 1996 submittal, City Hydrology accepts the Engineer's Certification of grading and drainage. Contact Terri Martin to obtain the Financial Guaranty Release.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Terri Martin
Andrew Garcia
File

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Sunset West Unit IV ZONE ATLAS/DRNG,FILE#: L-9 / 40 13

DRB #: 95-397 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: Tracts 435, 436, 437 & 438, Unit 3, Town of Atrisco Grant

CITY ADDRESS: _____

ENGINEERING FIRM: Mark Goodwin & Associates, PA CONTACT: Gregory J. Krenik PE

ADDRESS: PO Box 90606 PHONE: 345-2010

OWNER: Sunset West CONTACT: Mark Pagels

ADDRESS: PO Box 44698 PHONE: 239-5383

ARCHITECT: Sunset West CONTACT: Mark Pagels

ADDRESS: PO Box 44698 PHONE: 239-5383

SURVEYOR: ALS, Inc. CONTACT: Tim Aldrich

ADDRESS: PO Box 30701 PHONE: 884-1990

CONTRACTOR: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

- ____ DRAINAGE REPORT
- ____ DRAINAGE PLAN
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- ____ GRADING PLAN
- ____ EROSION CONTROL PLAN
- X ENGINEER'S CERTIFICATION
- ____ OTHER

PRE-DESIGN MEETING:

- ____ YES
- X NO
- ____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- ____ SKETCH PLAT APPROVAL
- ____ PRELIMINARY PLAT APPROVAL
- ____ S. DEV. PLAN FOR SUB'D APPROVAL
- ____ S. DEV. PLAN FOR BLDG PERMIT APPROVAL
- ____ SECTOR PLAN APPROVAL
- ____ FINAL PLAT APPROVAL
- ____ FOUNDATION PERMIT APPROVAL
- ____ BUILDING PERMIT APPROVAL
- ____ CERTIFICATION OF OCCUPANCY APPROVAL
- ____ GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ S.A.D. DRAINAGE REPORT
- ____ DRAINAGE REQUIREMENTS
- X OTHER Subdivision Cert (Specify)
  For Release of F.G.

12-6

DATE SUBMITTED: 12-6-96

BY: Gregory J. Krenik PE

RECEIVED
DEC - 9 1996
HYDROLOGY DIVISION

CITY OF
Albuquerque

October 14, 1996

Martin J. Chávez, Mayor

Gregory Krenik
Mark Goodwin & Assoc.
P.O. Box 90606
Albuquerque, NM 87199

RE: SUNSET WEST UNIT IV (L9-D13). ENGINEER'S CERTIFICATION FOR SUBDIVISION CERTIFICATION. ENGINEER'S CERTIFICATION DATED AUGUST 18, 1996.

Dear Mr. Krenik:

Based on the information provided on your September 30, 1996 submittal, City Hydrology has the following comments:

1. Please indicate, by as-built information, that the all the infrastructure has been constructed. This includes all retaining walls, storm drain pipe, the temporary retention pond, and the emergency spillway.

2. Certificate of Occupancy is usually given to commercial sites, where there is a Building Permit tied to the project. I assume that you are submitting this Engineer's Certification for the release of financial guarantees. If this is so, please check the "OTHER" box on the Drainage Information sheet and write in "Subdivision Certification for Release of Financial Guarantees."

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Sunset West Unit IV ZONE ATLAS/DRNG,FILE#: L-9/1413

DRB #: 95-397 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: Tracts 435, 436, 437 & 438, Unit 3, Town of Atrisco Grant

CITY ADDRESS: _____

ENGINEERING FIRM: Mark Goodwin & Associates, PA CONTACT: Gregory J. Krenik PE

ADDRESS: PO Box 90606 PHONE: 345-2010

OWNER: Sunset West CONTACT: Mark Pagels

ADDRESS: PO Box 44698 PHONE: 239-5383

ARCHITECT: Sunset West CONTACT: Mark Pagels

ADDRESS: PO Box 44698 PHONE: 239-5383

SURVEYOR: ALS, Inc. CONTACT: Tim Aldrich

ADDRESS: PO Box 30701 PHONE: 884-1990

CONTRACTOR: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

- ____ DRAINAGE REPORT
- ____ DRAINAGE PLAN
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- ____ GRADING PLAN
- ____ EROSION CONTROL PLAN
- X ENGINEER'S CERTIFICATION
- ____ OTHER

PRE-DESIGN MEETING:

- ____ YES
- X NO
- ____ COPY PROVIDED

Need TOW + BOW elev
Need WO + Rim Elev.

CHECK TYPE OF APPROVAL SOUGHT:

- ____ SKETCH PLAT APPROVAL
- ____ PRELIMINARY PLAT APPROVAL
- ____ S. DEV. PLAN FOR SUB'D APPROVAL
- ____ S. DEV. PLAN FOR BLDG PERMIT APPROVAL
- ____ SECTOR PLAN APPROVAL
- ____ FINAL PLAT APPROVAL
- ____ FOUNDATION PERMIT APPROVAL
- ____ BUILDING PERMIT APPROVAL
- X CERTIFICATION OF OCCUPANCY APPROVAL
- ____ GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ S.A.D. DRAINAGE REPORT
- ____ DRAINAGE REQUIREMENTS
- ____ OTHER _____ (Specify)

DATE SUBMITTED: 9-27-96

BY: _____
Gregory J. Krenik PE

RECEIVED
SEP 30 1996
HYDROLOGY DIVISION

Note to file:

DRC set was signed off for plans dated 4-1-96. The grading & drainage did not change - some notes were added & curb ramps were added.

LAM

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Sunset West Unit IV ZONE ATLAS/DRNG,FILE#: L-9/U13

DRB #: 95-397 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: Tracts 435, 436, 437 & 438, Unit 3, Town of Atrisco Grant

CITY ADDRESS: _____

ENGINEERING FIRM: Mark Goodwin & Associates, PA CONTACT: Gregory J. Krenik PE

ADDRESS: PO Box 90606 PHONE: 345-2010

OWNER: Sunset West CONTACT: Mark Pagels

ADDRESS: PO Box 44698 PHONE: 239-5383

ARCHITECT: Sunset West CONTACT: Mark Pagels

ADDRESS: PO Box 44698 PHONE: 239-5383

SURVEYOR: ALS, Inc. CONTACT: Tim Aldrich

ADDRESS: PO Box 30701 PHONE: 884-1990

CONTRACTOR: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

- ____ DRAINAGE REPORT
- X DRAINAGE PLAN
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- ____ EROSION CONTROL PLAN
- ____ ENGINEER'S CERTIFICATION
- ____ OTHER

PRE-DESIGN MEETING: 3-6-96

- ____ YES
- X NO
- ____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- ____ SKETCH PLAT APPROVAL
- ____ PRELIMINARY PLAT APPROVAL
- ____ S. DEV. PLAN FOR SUB'D APPROVAL
- ____ S. DEV. PLAN FOR BLDG PERMIT APPROVAL
- ____ SECTOR PLAN APPROVAL
- X FINAL PLAT APPROVAL
- ____ FOUNDATION PERMIT APPROVAL
- ____ BUILDING PERMIT APPROVAL
- ____ CERTIFICATION OF OCCUPANCY APPROVAL
- ____ GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ S.A.D. DRAINAGE REPORT
- ____ DRAINAGE REQUIREMENTS
- ____ OTHER _____ (Specify)

DATE SUBMITTED: 3-6-96

BY: Gregory J. Krenik PE

RECEIVED MAR - 6 1996 HYDROLOGY

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 20, 1996

Gregory Krenik
Mark Goodwin & Assoc.
P.O. Box 90606
Albuquerque, NM 87199

RE: SUNSET WEST UNIT 1V (L9-D13) REVISED DRAINAGE AND GRADING FOR FINAL PLAT APPROVAL. ENGINEER'S STAMP DATED MARCH 6, 1996.

Dear Mr. Krenik:

Based on the information provided on your March 6, 1996 resubmittal, the above referenced project is approved for Final Plat. As I understand it, you have made no changes to the subdivision grading and drainage.

Please be certain to contact the Utilities Division regarding the location of the proposed water tank and stockpile.

An Engineer's Certification will be required for the entire site (this includes the stockpile).

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE REPORT
for
SUNSET WEST UNIT IV

RECEIVED
MAR - 6 1996

Prepared for:

Sunset West
PO Box 44698
Rio Rancho, NM 87174

October 1995

3-6-96

D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT Sunset West Unit IV
SUBJECT Drainage Calcs
BY GJK DATE 3-6-96
CHECKED _____ DATE _____
SHEET 1 OF ____

ADDENDUM TO SUNSET WEST UNIT IV REPORT OF 11-22-95.

- WITH THE GRADING OF UNIT IV THE SITE WILL HAVE AN EXCESS OF 54,146 CY OF EXPORT.
- THE OWNER OF UNIT IV ALSO OWNS THE 5 ACRES TO THE EAST OF 90th STREET.
- OF THIS 5 ACRES THE STOCKPILE WILL OCCUR ON THE NORTH 3.7 ACRES DUE TO THE CITY CONTEMPLATING AN UNDERGROUND WATER STORAGE TANK.
- THE GRUBBING FROM THIS 3.7 ACRES PLUS THAT FROM THE UNIT IV 20 ACRES WILL BE USED TO SEED AND STABALIZE THE STOCKPILE.

• FIND EXISTING VOLUME OF STOCKPILE AREA

USE LOWEST ELEVATION ON PROPERTY = 17.0

ELEV.	AREA (SF)	VOLUME (CY)
17	154166	0
18	146004	5559
19	130397	10677
20	109810	15126
21	85891	18750
22	54908	21357
23	32023	22967
24	12440	23790
25	2256	24062

• FIND PROPOSED VOLUME OF STOCKPILE AREA

ELEV	AREA (SF)	VOLUME (CY)
17	154517	0
18	150543	5649
19	146570	11151
20	142596	16506
21	138622	21714
22	134648	26775
23	130675	31688
24	126701	36454
25	121485	41050
26	115909	45446

RECEIVED
MAR - 6 1996

D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT SUNSET WEST UNIT IV
SUBJECT DRAINAGE CALCS
BY GSK DATE 3-6-96
CHECKED _____ DATE _____
SHEET 2 OF ____

ELEV	AREA (SF)	VOLUME (CY)
27	110406	49637
28	104974	53626
29	99614	57415
30	94326	61006
31	89110	64403
32	83966	67608
33	78894	70624
34	73894	73454
35	68966	76099
36	64110	78563

• TOTAL OVER EXISTING

78563 - 24062 = 54,501 ≈ 54,146 OK

ALL EROSION CONTROL MEASURES TAKEN ON THE SUBDIVISION WILL APPLY TO THIS SITE ALSO.

RECEIVED
MAR - 6 1996

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

Lisa
FYI & FILE

INTER-OFFICE CORRESPONDENCE March 21, 1996 REF. NO._____

TO: Fred Aguirre, PWD/Hydrology

FROM: Lee Lunsford, SAD Engineer, PWD/Engineering

SUBJECT: SUNSET WEST UNIT IV, SAD 222

I have reviewed and do hereby concur with the SAD 222 costs for Sunset West Unit IV in the amount of $251,440.00 as stated in the letter from John A. Andrews, to Gregory S. Krenick dated March 8, 1996.

LL/tsl

Re: SAD 222 - Sunset West IV

FRED

We are still looking for a letter from your office stating the numbers in John Andrews letter are acceptable.

You told me in a telephone message that a memo is on Fred Aguirre's desk.

I've talked with Fred and all he has is a copy of John Andrews letter. And he doesn't know what he is suppose to do with it.

Please, issue a letter stating the number is approved by your office so we can get our SIA's in place.

Your expedient assistance is greatly appreciated.

GREGORY J. KRENIK

345-2010

ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers

149 Jackson NE, Albuquerque, New Mexico 87108
Tel: (505) 265-6631 • Fax: (505) 266-8112

John A. Andrews, P.E.
Charles T. Asbury, P.E.
John B. Robert, P.E. & L.S. (1915-1984)
James E. Millington, P.E. - V.P.
Gayle D. Jewell, L.S. - V.P.

March 8, 1996

Gregory J. Krenik, P.E.
D. Mark Goodwin & Associates
P.O. Box 90606
Albuquerque, NM 87199

Subject: Special Assessment District 222
Sunset West, Unit IV

Dear Mr. Krenik:

This letter is in response to your letter of February 28, 1996.

It is noted that you have removed all waterline improvement costs from the estimated assessments since Bob Kane of the City has stated that the line in Tower Road is not required to serve your subdivision. Since this line or other lines have not been made a requirement of your subdivision by the City, it will not be included in the estimated assessment amount.

We request that the storm drain facilities on San Ygnacio at 90th Street be constructed in conformance with the attached sketch.

Based on the above, we concur with the amount stated in your letter of February 28, 1996, as follows:

Street Improvements	$ 61,440.00
Drainage Improvements	190,000.00
TOTAL	**$251,440.00**

Very truly yours,

ANDREWS, ASBURY & ROBERT, INC.

John A. Andrews, P.E.

RECEIVED
MAR 11 1996
HYDROLOGY DIVISION

d:\projects\coa\57217\krenik

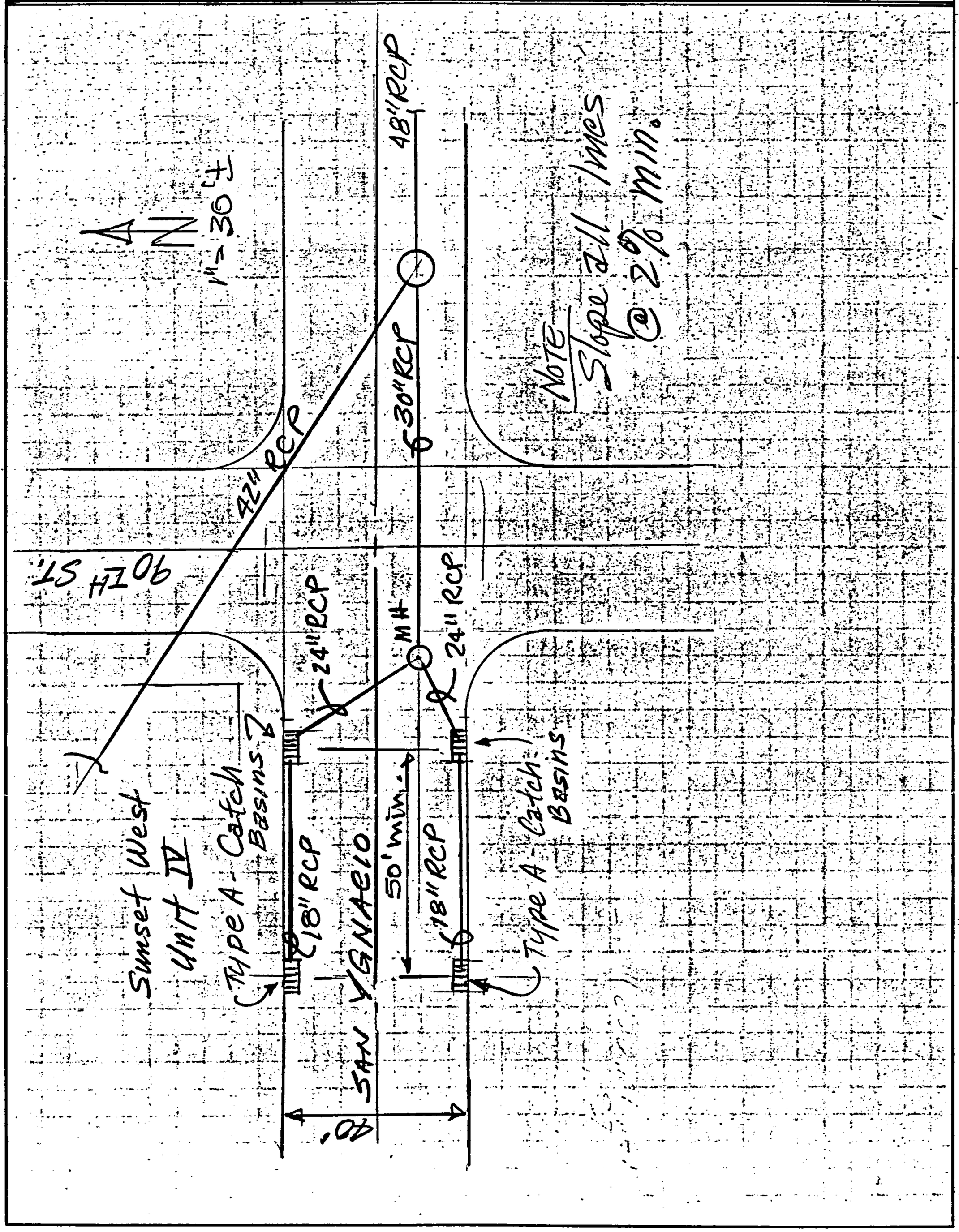
JAA:edm

Enclosures

cc: Lee Lunsford
Fred Aguirre

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
149 Jackson, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631 • FAX (505) 266-8112

Project SAD-222 Sheet 1 of 1
@ Sunset West Unit IV Job No. 572
By JK Chk'd Date 3-7-96



ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
149 Jackson, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631 • FAX (505) 266-8112

Project SAD-222 @ Sunset West, Unit IV Sheet 2 of 2
Job No. 572
By _____ Chk'd _____ Date 5-7-96

Estimated Cost-
Drainage Facilities @ San Ygnacio & 90th

18" RCP -	96 LF @ 20.50	1968-
T&B - 18" RCP	96 LF @ 11.00	1056-
24" RCP -	52 LF @ 27.20	1414-
T&B - 24" -	52 LF @ 12.50	650-
30" RCP -	85 LF @ 39.00	3315-
T&B - 30" -	85 LF @ 14.00	1190-
Type A CB -	4 Ea @ 2200.00	8800-
Manhole	1 Ea @ 1300.00	1300-
		19,693-
	Contingencies @ 20%	3938-
	Estimated Total -	$23,631-

Orig. Storm Drainage Impts Estimate
= $213,738-
Less 23,631
$190,107- Use $190,000.00

~~John~~ Lisa
FYI + FILE

LETTER OF TRANSMITTAL

dmg
D. Mark Goodwin & Associates, P.A.
Consulting Engineers & Surveyors

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 345-2010

DATE 2-6-96 | JOB NO.

ATTENTION

RE: SAD 222
SUNSET WEST UNIT IV

TO Fred Aguirre
3rd Floor Hydrology

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via _____ the following Items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1			MARKUP OF letter OF 1-10-96 FROM AAR
			RECEIVED
			FEB - 8 1996
			HYDROLOGY DIV.

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☒ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS Please review. I would like to set a meeting for All involved To finalize the SAD number (Dollar Value)

The revised number indicates what we feel is a benefit amount To OUR SITE.

This is a number we will write a check for and be free and clear of the SAD.

COPY TO Lee Lundsford, John Andrews

SIGNED: GREGORY J. KRENIK

If enclosures are not as noted, kindly notify us at once.

ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers

149 Jackson NE, Albuquerque, New Mexico 87108
Tel: (505) 265-6631 • Fax: (505) 266-8112

John A. Andrews, P.E.
Charles T. Asbury, P.E.
John B. Robert, P.E. & L.S. (1915-1984)
James E. Millington, P.E. - V.P.
Gayle D. Jewell, L.S. - V.P.

January 10, 1996

Gregory J. Krenik, P.E.
D. Mark Goodwin & Associates
P.O. Box 90606
Albuquerque, NM 87199

Subject: Special Assessment District 222
Sunset West Unit 4 Subdivision

Dear Mr. Krenik:

As requested by the City of Albuquerque, we have reviewed and are providing herewith the estimated assessments for the Sunset West Unit 4 Subdivision.

The estimated assessments included herein are based on the understanding that as a part of development of the subdivision, the following will be constructed.

- The sanitary sewer improvements
- The paving of San Ygnacio, including curb and gutter and sidewalk adjacent to the subdividison will be completed.
- The paving of the west half of 90th Street including the west curb and gutter and sidewalk from SanYgnacio to the south end of the curb returns on Tower Road.
- All waterline improvements on San Ygnacio and on 90th Street adjacent to the subdivision.

Based on the above understanding, the estimated assessments to be applied to the subdivision property are as follows:

Paving Improvements

For the paving improvements on Tower Road (one-half street width), based on an equivalent 36' wide residential type street including curb and gutter, sidewalk, and proportionate share of the intersection of Tower and 90th Street and Tower and 94th Street, and also street lighting.

Estimated Assessment. . . . . .~~$60,113.29~~
59,203.29

Waterline Improvements

For proportionate share of 12" waterline improvements in Tower Road adjacent to property.

Estimated Assessment. $26,409.34

Storm Drainage Improvements

For proportionate share of Storm Drainage Improvements

Estimated Assessment. . . . . ~~$213,738.46~~
181,086.52 266,699.15

This estimated assessment for storm drainage is based on some drainage facilities being constructed with the development of the subdivision at the intersection of San Ygnacio and 90th Street. See attached sheet 9 of 9.

Also, to provide for drainage capacity, San Ygnacio must be constructed to 40 feet wide face-to-face of curb.

It is understood that the estimated assessments included herein are estimates only and the final assessment may vary from the amounts shown.

As per Mr. Lunsford's suggestion at our meeting at City Hall, it is requested that should the final assessment amounts be more than the estimated assessments, the City will have the right to place any increase in assessments on the four lots in the subdivision that are to be used as an interim retention pond.

Attached are back-up computations and sketches showing how the estimated assessments were determined.

Should you have any questions, please call.

Very truly yours,

ANDREWS, *ASBURY & ROBERT, INC.*

John A. Andrews, P.E.

JAA:edm

Attachments

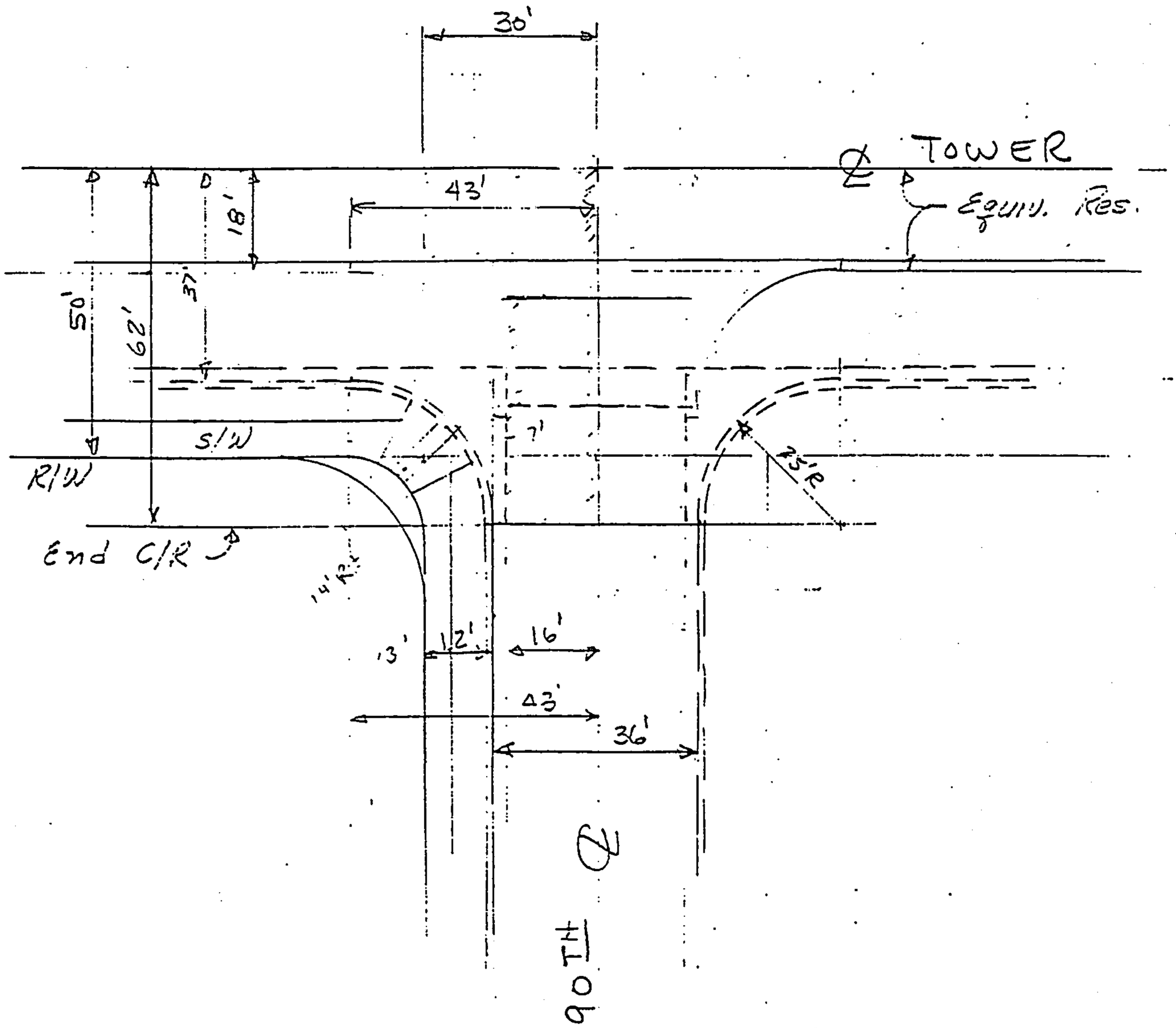
cc: Lee Lunsford, w/attachments
Fred Aguirre, w/attachments

d:\projects\572-17\subd.krenik

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
149 Jackson, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631 • FAX (505) 266-8112

Project SAD-222 Sheet 1 of 9
Sunset West Unit 4 Job No. 572
By JA Chk'd — Date 1-03-96

PAVING



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PAVING

TOWER & 90th Intersection - 1/4

Valley Gutter & CR Fillets	359 SF	@ 4.00	= 1436.00
Grading.	207 SY	@ 1.00	207.00
Paving.	125 SY	@ 7.35	918.75
Sidewalk.	140 SF	@ 2.20	308.00
Curb & Gutter -	- 6 LF	@ 8.00	- 48.00
			$ 2821.75
	10% Cont. & misc		282.18
	Total		3103.93

~~TOWER & 94th Intersection - 1/4 Proportion~~

~~1/2 dist. Each way -~~
~~Total = 1067.50 (94th) + 1020 (Tower) = 2087.5/2 = 1043.75'~~

~~Use Same Cost as Tower & 90th~~

~~$2821.75 / 1043.75' = $2.7035/LF~~

~~1/2 (1020) - 204 = 306' frontage × 2.7035 = $827.22~~
~~10% Contg & misc. 82.73~~
~~Total 910.00~~

TOWER ROAD PAVING -

Per LF	Paving - 66/9 =	× 7.35/SY =	13.07
1/2 street	C&G -		8.00
	Grading 50/9 =	× 1.00/SY =	5.56
	Sidewalk 6 ft² × 2.20 =		13.20
	SubTotal/LF =		39.83
	Contingency & misc @ 10% =		3.98
	Total		43.81

814.86 LF @ 43.81 = 35,699.02

Est. Construction Total = ~~$39,712.95~~

38,802.95

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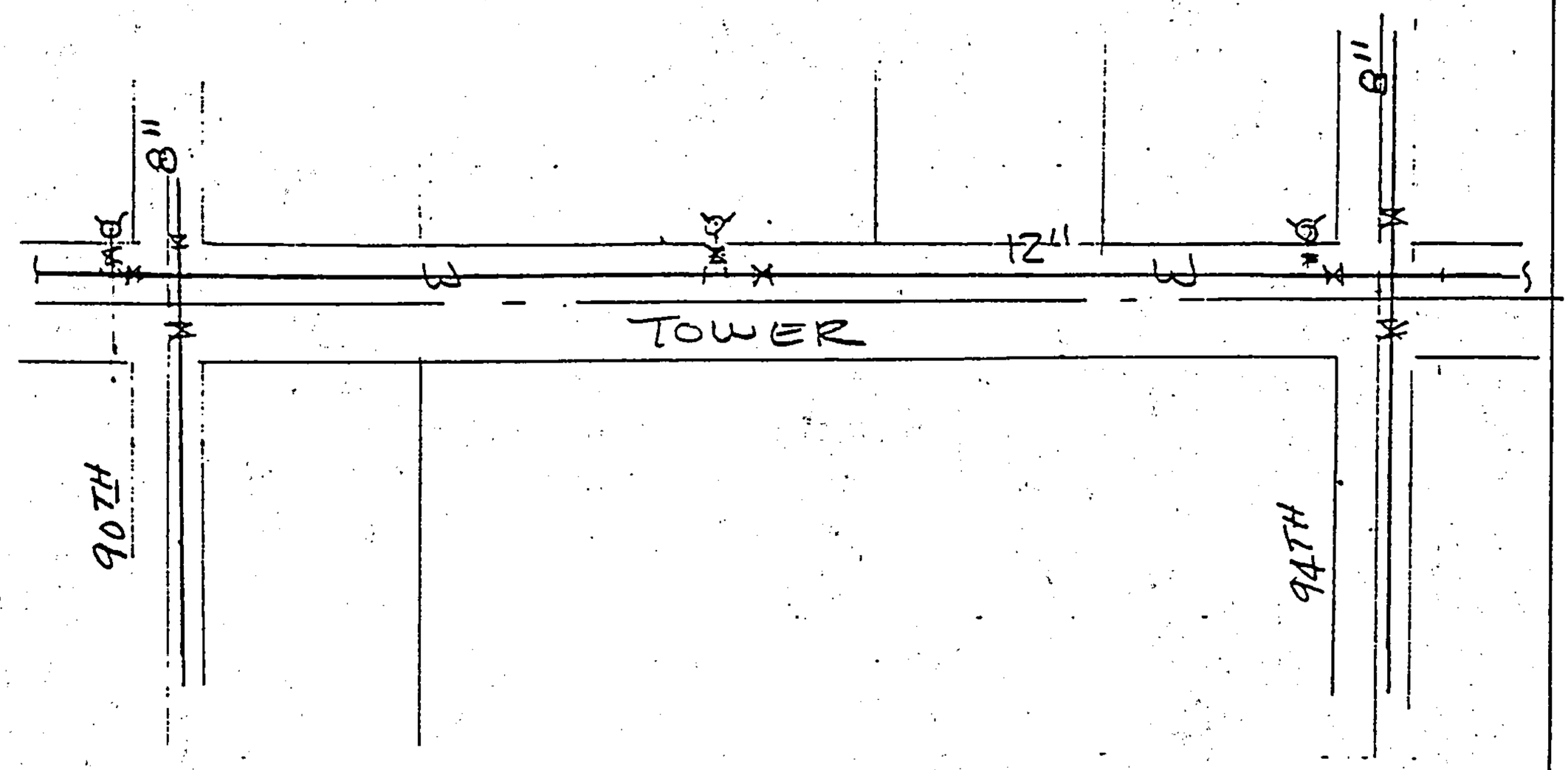
Project SAD- 222 Sheet 3 of 9
Sunset West Unit 4 Job No. 572
By [illegible] Chk'd Date 1-03-96

WATERLINE



FIRE HYDRANTS

Fire Hydrant –	1200.00 EA	1200.00
12 x 12 x 6 tee –	325 # @ 3.00	675.00
6" Gate Valve w/VB -	750 EA x 1	750.00
6" Water Line -	10.00/LF x 39	390.00
		3,015.00

12" Valve w/ VB – 1150 EA
8" Valve w/ VB – 850 EA
12 x 12 x 8 x 8 Cross - 3.00/# x 385# = 1150.00

12" Water Line – 25.00/LF
8" Water Line – 13.00/LF

WATER LINE COSTS

1.5 Fire Hydrants =	3015.00 x 1.5	4522.50
1.5 12" Valves w/VB =	1150.00 x 1.5	1725.00
2.0 8" Valves w/ VB =	850.00 x 2.0	1700.00
50LF 8" Water Line	50 x 13.00	650.00
½ - 1080 LF 12" Water Line =	½ x 1080 x 25.00	13,500.00
		22,097.50

Proportionate Share $\frac{814.86}{1020} \times 22,097.50 =$ 17,653.30
10% 1765.33
$19,418.63

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PAVING - ESTIMATED ASSESSMENTS

Paving Improvements	$38,802.95 ~~$39,712.95~~
Markup @ 36% =	14,296.66
Total -	~~54,009.61~~ 53,099.61

Street Lighting - Tower Road.

Lights @ 300' O.C. Ea. Side of Street.

Block Length = 1080'/300 = 3.6 Lights

Subd. Prop. - $3.6 \times \frac{816}{1080} = 2.72$ Lights

Lights @ 1650 Ea x 2.72 =	4488.00
markup @ 36%	1615.68
	$6103.68

Total Estimated Assessment =	~~$60,113.29~~ 59,203.29

WATERLINE - ESTIMATED ASSESSMENTS

Waterline Imputs Construction -	19,418.63
Markup @ 36% =	6,990.71
Total Estimated Assessment	$26,409.34

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Drainage Areas

A1-D	29.3 Acres
A2-D	25.3
A3-D	26.8
A4-D	28.1
A5-D	28.9
A6-D	28.9
A7-D	13.2
A8-D	36.5
A9-D	6.5
A10-D	6.5
A11-D	5.5
Total	235.5 Acres

B1-D	14.7
B2-D	22.4
B3-D	27.9
B4-D	14.7
Total	79.7 Acres ✓

ANDREWS, ASBURY & ROBERT, INC.
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Project SAD-222 Sheet 6 of 9
Sunset West Unit 4 Job No. 572
By JA Chk'd Date 1-05-96

STORM DRAINAGE IMPROVEMENTS

Drainage Area A = 235.5 Acres
Drainage Area B = 79.7 Acres
Total 315.2 Acres

Estimated Assessments

$20,000 AC Detention Pond-

Construction =	606,001.00	TOO HIGH FOR LOWD
Markup @ 36% =	218,160.36	
Subtotal-	824,161.36	
Right of Way 300,000	~~707,850.00~~	15 AC $47,190.00/AC
Total-	~~1,532,011.36~~	
Area Served = 315.2 Ac.	1,124,161.36	

Amt/Acre = ~~1,532,011.36~~ / 315.2 = ~~4860.44~~ 3566.50

Drainage Area 'B'

(See Attached) Construction =	357,234.90
Markup @ 36%	128,604.56
Total	485,839.46

Area Served = 79.7 Acres

Amt/Acre = 485,839.46 / 79.7 = 6095.85

Estimated Assess./Acre = ~~$14,956.29~~ 9662.35

Area = Platted Property - 20.0091 Ac.
ROW of Adjacent Streets - ~~2.2822~~ 0.9366 (Tower only)
Total = ~~22.2913~~ Ac. 20.9457

Estimated Assessment = ~~22.2913~~ × ~~14,956.29~~ 9662.35
= ~~$ 244,295.68~~
202,384.72

ANDREWS, ASBURY & ROBERT, INC.
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Telephone (505) 265-6631 • FAX (505) 266-8112

Storm Drainage - Cont'd.

Attached is a sketch showing storm drain facilities that are required to be installed at the intersection of 90th Street & San Ygnacio

The estimated cost to construct these facilities are as follows:

	Unit	Est. Qty.	Unit Price	Amount.
18" ~~24"~~ RCP 18"	LF	148	20.50 ~~27.20~~	~~4026.60~~ 3034.00
T&B for ~~24"~~ 18" pipe	LF	148	11.00 ~~12.50~~	~~1850.00~~ 1628.00
24" ~~42"~~ RCP 24"	LF	85	27.50 ~~55.00~~	~~4675.00~~ 2337.50
T&B for ~~42"~~ 24" pipe	LF	85	12.50 ~~30.75~~	~~2612.25~~ 1062.50
Catch Basin, Type A	EA	4	2200.00	8800.00
Manhole, 18' Dia	EA	1	2500 ~~3500.00~~	~~3500.00~~ 2500
Subtotal				~~25,464.35~~ 19,362
Contingency @ 20%				~~5092.87~~ 1936.2
Total.				$ ~~30,557.22~~ 21,298.20

When these facilities are constructed the Estimated Assessment can be reduced to the following Amount

Storm Drainage Estimated Assessment - (Adjusted) =

~~244,295.68 - 30,557.22 = $213,738.46~~

202,384.72 - 21298.20 =

181,086.52

Sheet 8 of 9

Revised 1-05-96 JA

SAD-222

ESTIMATED CONSTRUCTION COST

SAN YGNACIO ROAD STORM DRAIN SYSTEM TO TOWER DETENTION POND SERVING THE WESTERLY PORTION OF BASIN B

ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
18" RCP, furnish & install in open trench, cip.	LF	395	$20.50	$8,097.50
Trenching, backfill & compaction for 18" sewer pipe, cip.	LF	395	$11.00	$4,345.00
24" RCP, furnish & install in open trench, cip.	LF	395	$27.20	$10,744.00
Trenching, backfill & compaction for 24" sewer pipe, cip.	LF	395	$12.50	$4,937.50
48" ~~42"~~ RCP, furnish & install in open trench, cip.	LF	1,075 65.77	60.00 ~~$55.00~~	64,500.00 ~~$59,125.00~~
Trenching, backfill & compaction for 48" ~~42"~~ sewer pipe, cip.	LF	1,075	35.00 ~~$30.75~~	37,625.00 ~~$33,056.25~~
60" ~~54"~~ RCP, furnish & install in open trench, cip.	LF	450 54 84	104.00 ~~$112.00~~	46,800.00 ~~$50,400.00~~
Trenching, backfill & compaction for 60" ~~54"~~ sewer pipe, cip.	LF	450	43.75 ~~$39.50~~	19,687.50 ~~$17,775.00~~
90" RCP, furnish & install in open trench, cip.	LF	230	$160.00	$36,800.00
Trenching, backfill & compaction for 90" sewer pipe, cip.	LF	230	$65.75	$15,122.50
Manhole, 8' diameter, Type "C"	EA	1	3,500.00	3,500.00
Manhole, 6' diameter Type "C", cip.	EA	3	$2,300.00	$6,900.00
4' diam. tee manhole, cip.	EA	2	$2,000.00	$4,000.00
Furnish & install RCP Class IV bulkhead, cip.	EA	2	$1,250.00	$2,500.00
Furnish & install 90" RCP bend, cip.	EA	1	$2,000.00	$2,000.00
Catch basin, type "A", cip.	EA	26	$2,200.00	$57,200.00

ESTIMATED CONSTRUCTION COST SUBTOTAL	324,759.00 ~~$313,002.75~~
10% CONTINGINCES	32,475.90 ~~$31,300.28~~
ESTIMATED CONSTRUCTION COST	357,234.90 ~~$344,303.03~~

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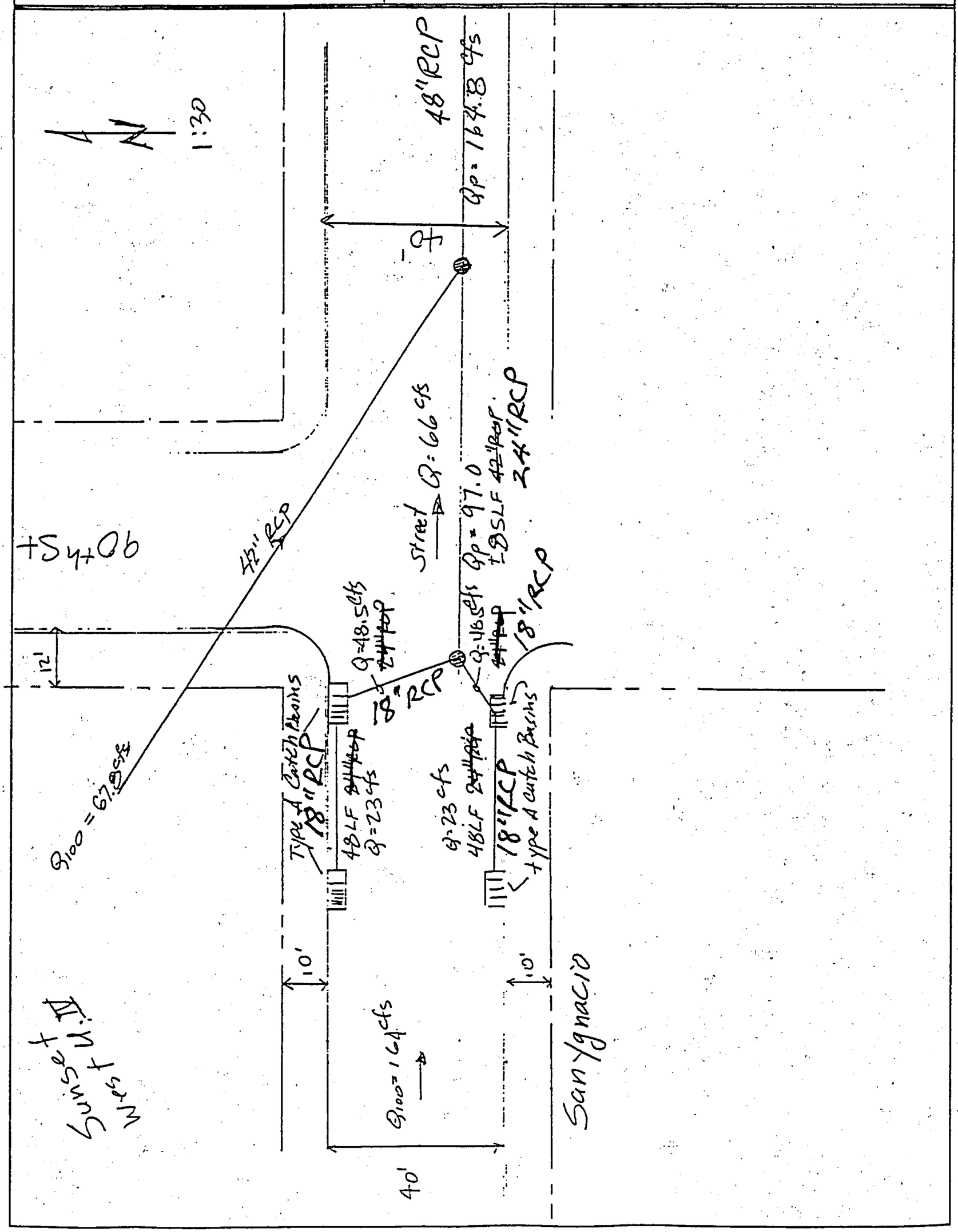
Project SAD-222 Sheet 9 of 9
Sunset West Unit 4 Job No. 572
By SB Chk'd JA Date 1-05-96



City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 12, 1995

Gregory Krenik
Mark Goodwin & Assoc.
P.O. Box 90606
Albuquerque, NM 87199

RE: SUNSET WEST UNIT 1V (L9-D13) DRAINAGE REPORT FOR PRELIMINARY PLAT, FINAL PLAT, AND ROUGH GRADING APPROVAL. ENGINEER'S STAMP DATED DECEMBER 12, 1995.

Dear Mr. Krenik:

Based on the information provided on your November 22, 1995 submittal, the above referenced project is approved for Preliminary Plat, Final Plat, and Rough Grading.

I am forwarding your flow calculations to Andrews, Asbury and Roberts so that the SAD 222 can be changed to accept your developed flows.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Sunset West Unit IV ZONE ATLAS/DRNG,FILE#: L-9

DRB #: 95-397 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: Tracts 435, 436, 437 & 438, Unit 3, Town of Atrisco Grant

CITY ADDRESS: _____

ENGINEERING FIRM: Mark Goodwin & Associates, PA CONTACT: Gregory J. Krenik PE

ADDRESS: PO Box 90606 PHONE: 345-2010

OWNER: Sunset West CONTACT: Mark Pagels

ADDRESS: PO Box 44698 PHONE: 239-5383

ARCHITECT: Sunset West CONTACT: Mark Pagels

ADDRESS: PO Box 44698 PHONE: 239-5383

SURVEYOR: ALS, Inc. CONTACT: Tim Aldrich

ADDRESS: PO Box 30701 PHONE: 884-1990

CONTRACTOR: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

X DRAINAGE REPORT
X DRAINAGE PLAN
___ CONCEPTUAL GRADING & DRAINAGE PLAN
X GRADING PLAN
___ EROSION CONTROL PLAN
___ ENGINEER'S CERTIFICATION
___ OTHER

PRE-DESIGN MEETING:

___ YES
X NO
___ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL
X PRELIMINARY PLAT APPROVAL
___ S. DEV. PLAN FOR SUB'D APPROVAL
___ S. DEV. PLAN FOR BLDG PERMIT APPROVAL
___ SECTOR PLAN APPROVAL
X FINAL PLAT APPROVAL
___ FOUNDATION PERMIT APPROVAL
___ BUILDING PERMIT APPROVAL
___ CERTIFICATION OF OCCUPANCY APPROVAL
___ GRADING PERMIT APPROVAL
___ PAVING PERMIT APPROVAL
___ S.A.D. DRAINAGE REPORT
___ DRAINAGE REQUIREMENTS
X OTHER Rough Grading (Specify)

DATE SUBMITTED: 11-27-95

BY: Gregory J. Krenik PE

RECEIVED NOV 22 1995

D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT SONSE WEST IV
SUBJECT DRAINAGE CALCS
BY GJK DATE 10-19-95
CHECKED _____ DATE _____
SHEET 1 OF ____

REVISED 11-22-95

TOTAL SITE = 20.00 AC = 0.03125 SM
PADS (97) = 5.275 AC P_1 = 1.90 in P_6 = 2.20 in P_{24} = 2.65 in
ROADWAY/SIDEWALK = 5.832 T_p = 0.1333 HR OT = 0.03333 HR

TYPE "D" = 5.275 + 5.832 = 11.107 AC = 55.54 %
TYPE "B" = 34.46 % TYPE "C" = 10 %
} PER CITY REQUIREMENTS

* PER THE TOWER/SAGE DRAINAGE MASTER PLAN (APPENDIX A)

- THIS SITE IS WITHIN DRAINAGE BASIN B3-D
- SIZE OF BASIN = 27.9 AC
- Q = 89 CFS
- 50% B & 50% D

- CALCULATE RIGHT OF WAY OF 90th & SAN YGNACIO

AREA = 2.8705 AC = 0.004485 SM
TYPE B = 24.73
TYPE D = 75.27 %

FROM HYMO SHEETS 2-4 FOR SITE
Q = 69.14 CFS
V = 2.3725 AC-FT

FROM HYMO SHEETS 5-7 FOR ROW
Q = 11.05 CFS
V = 0.3943 CFS

** FIND PRORATED SHARE OF ALLOWABLE 89 CFS

89 - 11.05 = 77.95 CFS

77.95 x 4/5 = 62.36 CFS

*** SINCE 62.36 < 69.14 CFS THE STORMORDIN FOR SAD 222 WILL HAVE TO BE RESISED.

- ALLOWABLE Q FOR 5 ACRE PARCE TO THE WEST OF THIS SITE

77.95 - 62.36 = 15.59 CFS

PLEASE NOTE: THE INTENT OF THE SAD IS TO ALLOW DIRECT DISCHARGE FOR THE AREA. TO OBTAIN THIS FOR THIS SITE AN INCREASE OF 6.78 CFS WILL NEED TO BE ADDED TO THE SAD STORMORDIN.

```
START                    TIME=0.0
***** HYDROGRAPH FOR SUNSET WEST UNIT IV SITE
RAINFALL                 TYPE=1 RAIN QUARTER=0.0 IN
                         RAIN ONE=1.90 IN RAIN SIX=2.20 IN
                         RAIN DAY=2.65 IN DT=0.03333 HR
COMPUTE NM HYD           ID=1 HYD NO=101.1 AREA=0.03125 SQ MI
                         PER A=00.00 B=34.46 C=10 D=55.54
                         TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD                 ID=1 CODE=1
FINISH
```

```
AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
     RUN DATE (MON/DAY/YR) = 11/15/1995
     START TIME (HR:MIN:SEC) = 11:15:26      USER NO.= M_GOODWN.I01
     INPUT FILE = sun4.dat

START                    TIME=0.0

***** HYDROGRAPH FOR SUNSET WEST UNIT IV SITE

RAINFALL                 TYPE=1 RAIN QUARTER=0.0 IN

                         RAIN ONE=1.90 IN RAIN SIX=2.20 IN

                         RAIN DAY=2.65 IN DT=0.03333 HR

                    COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2
PEAK AT 1.40 HR.
                    DT =     .033330 HOURS        END TIME =     5.999400 HOURS
                       .0000    .0013    .0027    .0041    .0055    .0069    .0084
                       .0099    .0115    .0131    .0147    .0164    .0181    .0199
                       .0217    .0236    .0256    .0276    .0296    .0318    .0340
                       .0363    .0387    .0412    .0438    .0465    .0493    .0523
                       .0554    .0587    .0622    .0675    .0731    .0791    .0920
                       .1208    .1651    .2289    .3159    .4302    .5759    .7574
                       .9790   1.1846   1.2704   1.3429   1.4074   1.4661   1.5201
                      1.5702   1.6171   1.6610   1.7023   1.7413   1.7781   1.8130
                      1.8460   1.8774   1.9071   1.9353   1.9621   1.9681   1.9736
                      1.9789   1.9839   1.9887   1.9932   1.9976   2.0018   2.0059
                      2.0098   2.0136   2.0172   2.0208   2.0242   2.0275   2.0308
                      2.0339   2.0370   2.0400   2.0430   2.0458   2.0486   2.0514
                      2.0540   2.0567   2.0592   2.0617   2.0642   2.0666   2.0690
                      2.0714   2.0737   2.0759   2.0781   2.0803   2.0825   2.0846
                      2.0867   2.0887   2.0907   2.0927   2.0947   2.0966   2.0985
                      2.1004   2.1023   2.1041   2.1059   2.1077   2.1095   2.1112
                      2.1130   2.1147   2.1164   2.1180   2.1197   2.1213   2.1229
                      2.1245   2.1261   2.1277   2.1292   2.1307   2.1322   2.1337
                      2.1352   2.1367   2.1382   2.1396   2.1410   2.1425   2.1439
                      2.1452   2.1466   2.1480   2.1494   2.1507   2.1520   2.1533
                      2.1547   2.1560   2.1572   2.1585   2.1598   2.1611   2.1623
                      2.1635   2.1648   2.1660   2.1672   2.1684   2.1696   2.1708
                      2.1720   2.1731   2.1743   2.1754   2.1766   2.1777   2.1789
                      2.1800   2.1811   2.1822   2.1833   2.1844   2.1855   2.1866
                      2.1876   2.1887   2.1897   2.1908   2.1918   2.1929   2.1939
                      2.1949   2.1960   2.1970   2.1980   2.1990   2.2000

COMPUTE NM HYD           ID=1 HYD NO=101.1 AREA=0.03125 SQ MI
```

PER A=00.00 B=34.46 C=10 D=55.54

TP=0.1333 HR MASS RAINFALL=-1

4

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 68.523 CFS UNIT VOLUME = .9992 B = 526.28
P60 = 1.9000
AREA = .017356 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .125238HR TP = .133300HR K/TP RATIO = .939517 SHAPE CONSTANT, N = 3.763733
UNIT PEAK = 35.344 CFS UNIT VOLUME = .9999 B = 339.10
P60 = 1.9000
AREA = .013894 SQ MI IA = .46626 INCHES INF = 1.15553 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 101.10

RUNOFF VOLUME = 1.42352 INCHES = 2.3725 ACRE-FEET
PEAK DISCHARGE RATE = 69.14 CFS AT 1.500 HOURS BASIN AREA = .0313 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 11:15:33

```
START                    TIME=0.0
***** HYDROGRAPH FOR SUNSET WEST UNIT IV ROW
RAINFALL                 TYPE=1 RAIN QUARTER=0.0 IN
                         RAIN ONE=1.90 IN RAIN SIX=2.20 IN
                         RAIN DAY=2.65 IN DT=0.03333 HR
COMPUTE NM HYD           ID=1 HYD NO=101.1 AREA=0.004485 SQ MI
                         PER A=00.00 B=24.73 C=00 D=75.27
                         TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD                 ID=1 CODE=1
FINISH
```

```
AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
     RUN DATE (MON/DAY/YR) = 11/22/1995
     START TIME (HR:MIN:SEC) = 11:42:02      USER NO.= M_GOODWN.I01
     INPUT FILE = sun4row.dat

START                    TIME=0.0

***** HYDROGRAPH FOR SUNSET WEST UNIT IV ROW

RAINFALL                 TYPE=1 RAIN QUARTER=0.0 IN

                         RAIN ONE=1.90 IN RAIN SIX=2.20 IN

                         RAIN DAY=2.65 IN DT=0.03333 HR

                    COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2
- PEAK AT 1.40 HR.
                    DT =     .033330 HOURS        END TIME =     5.999400 HOURS
                        .0000    .0013    .0027    .0041    .0055    .0069    .0084
                        .0099    .0115    .0131    .0147    .0164    .0181    .0199
                        .0217    .0236    .0256    .0276    .0296    .0318    .0340
                        .0363    .0387    .0412    .0438    .0465    .0493    .0523
                        .0554    .0587    .0622    .0675    .0731    .0791    .0920
                        .1208    .1651    .2289    .3159    .4302    .5759    .7574
                        .9790   1.1846   1.2704   1.3429   1.4074   1.4661   1.5201
                       1.5702   1.6171   1.6610   1.7023   1.7413   1.7781   1.8130
                       1.8460   1.8774   1.9071   1.9353   1.9621   1.9681   1.9736
                       1.9789   1.9839   1.9887   1.9932   1.9976   2.0018   2.0059
                       2.0098   2.0136   2.0172   2.0208   2.0242   2.0275   2.0308
                       2.0339   2.0370   2.0400   2.0430   2.0458   2.0486   2.0514
                       2.0540   2.0567   2.0592   2.0617   2.0642   2.0666   2.0690
                       2.0714   2.0737   2.0759   2.0781   2.0803   2.0825   2.0846
                       2.0867   2.0887   2.0907   2.0927   2.0947   2.0966   2.0985
                       2.1004   2.1023   2.1041   2.1059   2.1077   2.1095   2.1112
                       2.1130   2.1147   2.1164   2.1180   2.1197   2.1213   2.1229
                       2.1245   2.1261   2.1277   2.1292   2.1307   2.1322   2.1337
                       2.1352   2.1367   2.1382   2.1396   2.1410   2.1425   2.1439
                       2.1452   2.1466   2.1480   2.1494   2.1507   2.1520   2.1533
                       2.1547   2.1560   2.1572   2.1585   2.1598   2.1611   2.1623
                       2.1635   2.1648   2.1660   2.1672   2.1684   2.1696   2.1708
                       2.1720   2.1731   2.1743   2.1754   2.1766   2.1777   2.1789
                       2.1800   2.1811   2.1822   2.1833   2.1844   2.1855   2.1866
                       2.1876   2.1887   2.1897   2.1908   2.1918   2.1929   2.1939
                       2.1949   2.1960   2.1970   2.1980   2.1990   2.2000

COMPUTE NM HYD           ID=1 HYD NO=101.1 AREA=0.004485 SQ MI
```

```
                    PER A=00.00 B=24.73 C=00 D=75.27

                    TP=0.1333 HR MASS RAINFALL=-1


        K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE
CONSTANT, N =  7.106420
        UNIT PEAK =    13.328     CFS    UNIT VOLUME =     .9985        B =    526.28
    P60 = 1.9000
        AREA =       .003376 SQ MI     IA =     .10000 INCHES     INF =     .04000 I
NCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT
=   .033330


        K =    .130761HR     TP =    .133300HR     K/TP RATIO =    .980950      SHAPE
CONSTANT, N =  3.599930
        UNIT PEAK =    2.7254     CFS    UNIT VOLUME =     .9953        B =    327.55
    P60 = 1.9000
        AREA =       .001109 SQ MI     IA =     .50000 INCHES     INF =    1.25000 I
NCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT
=   .033330

  PRINT HYD                ID=1 CODE=1


                                          PARTIAL HYDROGRAPH    101.10


        RUNOFF VOLUME =      1.64851 INCHES      =          .3943 ACRE-FEET
        PEAK DISCHARGE RATE =       11.05 CFS   AT    1.500 HOURS    BASIN AREA =
0045 SQ. MI.


  FINISH


        NORMAL PROGRAM FINISH            END TIME (HR:MIN:SEC) = 11:42:08
```

D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT SUNSET WEST II
SUBJECT DRAINAGE CALCS
BY GJK DATE 10-19-95
CHECKED _____ DATE _____
SHEET 8 OF ____
REVISED 11-22-95

STREET HYDRAULICS

- FOR THESE CALCS ASSUME A PER LOT RUNOFF

$$\frac{69.14 \text{ CFS}}{97 \text{ LOTS}} = 0.7128 \text{ CFS/LOT}$$

- SUNDECK CT., SUNFISH AVE & SUNWISE AVE 28'-F-F
  - FIND TRANSITION FROM MOUNTABLE TO STANDARD C+G

18 LOTS = 12.83 CFS S = 1.5% n = 0.017

d = 0.31
wp = 28.62
A = 4.175
V = 2.9667 F/s
Q = 12.386 CFS

$d + V^2/2g = 0.45 < .33 + .2$ OK

Q = 12.386 ≈ 12.83 OK

INSTALL 2 "A" INLETS AT THIS POINT IN SUNFISH AVE AND SUNWISE AVE

Q grate = 2.50 CFS SEE SHEET 9

Q PAST INLETS

12.83 - 2(2.50) = 7.83 CFS

- SUNBEAM DR AT SUNWISE AVE NORTH SIDE 32'-F-F

14 LOTS = 9.979 CFS S = 1% n = 0.017
STD C+G

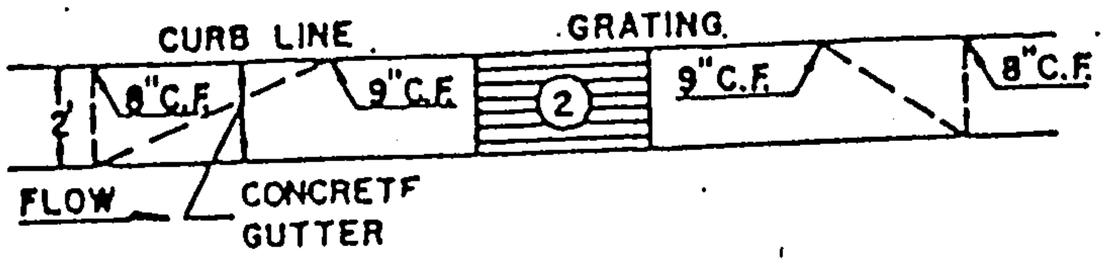
Q = 9.979 + 12.83 + 7.83
= 30.639 CFS

d = 0.51
wP = 33.02
A = 8.65
V = 3.579 F/s
Q = 30.96 CFS ≈ 30.639 OK

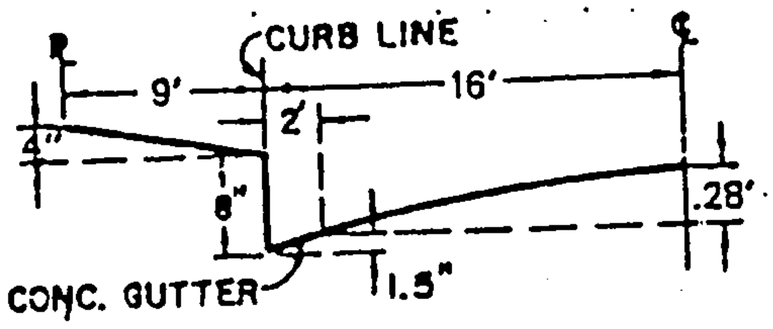
$d + V^2/2g = 0.71 < .67 + .2$ OK

9

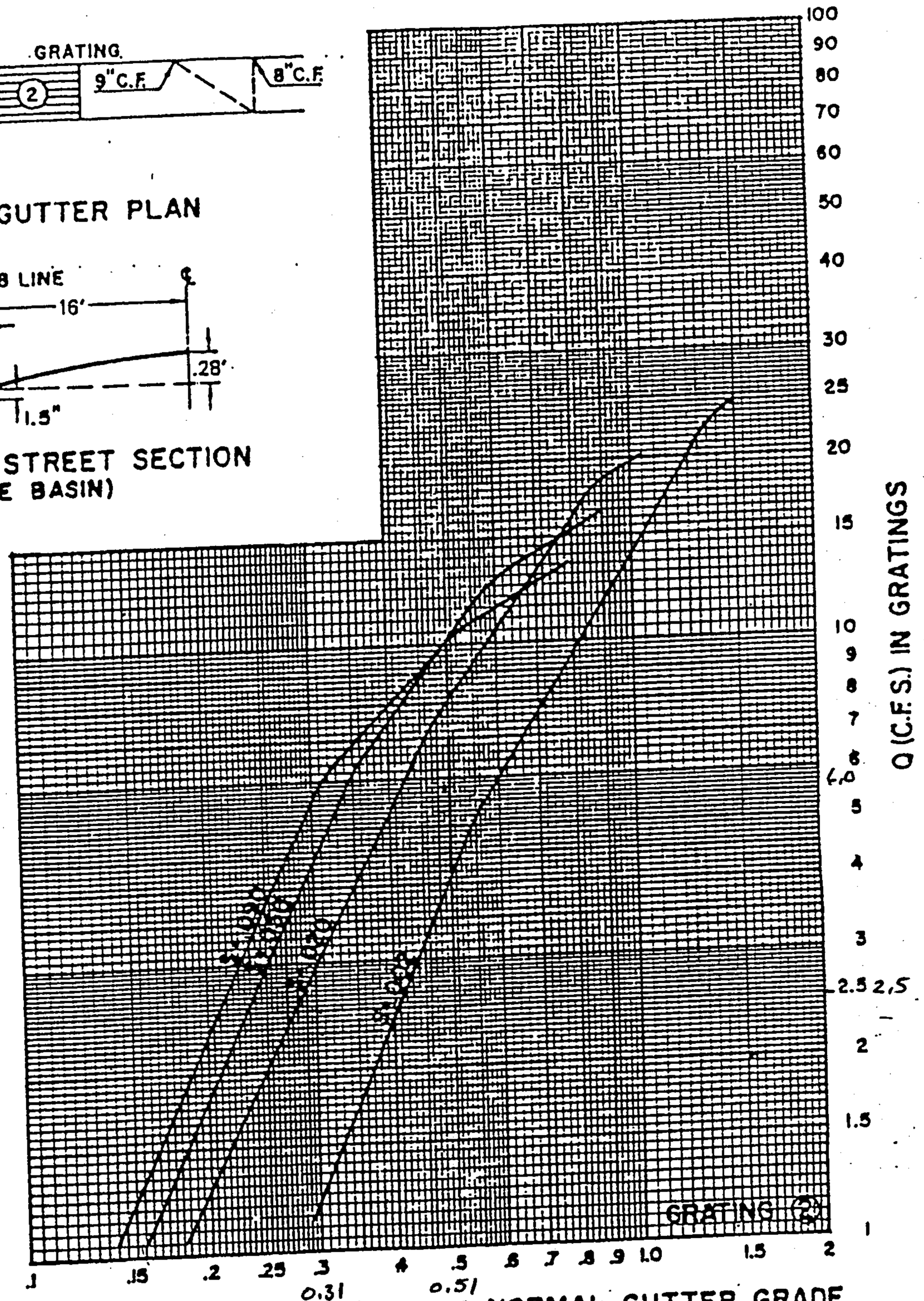
GRATING CAPACITIES FOR TYPE "A", "C" and "D".



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT SUNSET WEST IV
SUBJECT DRAINAGE CALCS
BY GJK DATE 10-19-95
CHECKED _____ DATE _____
SHEET 10 OF ____
REVISED 11-22-95

INSTALL 2 "A" INLETS AT THIS POINT IN SUNBEAR DR

$Q_{grate} = 6.0$ CFS see sheet 9

Q past inlets

$30.639 - 2(6.0) = 18.639$ CFS

- SUNBEAR DR AT SUMP INLETS NORTH SIDE

6 lots = 4.277 CFS

$Q = 4.277 + 7.83 + 18.639$ CFS
$= 30.746$ CFS

- SUNDIAL AVE

FIND TRANSITION FROM MOUNTABLE TO STANDARD C+G 32'F-F

17 LOTS = 12.117 CFS $S = 1.5\%$ $n = 0.017$

$d = 0.31$
$wp = 14.685$
$A = 2.0889$
$V = 2.917$ fps
$Q_{1/2} = 6.094$ CFS

$d + V^2/2g = 0.44 < .33 + .2$ OK

$Q = 12.187$ CFS ≈ 12.117 OK

ADD 2 "A" INLETS AT THIS POINT

$Q_{grate} = 2.50$ CFS see SHEET 9

Q past INLETS

$12.117 - 2(2.5) = 7.117$ CFS

- SUNBEAR DR AT SUMP INLETS SOUTH SIDE

6 lots = 4.277 CFS

$Q = 4.277 + 7.117$
$= 11.394$ CFS

- DETERMINE 2 "DBL C" INLETS IN SUMP

$Q = 11.394 + 30.746$
$= 42.14$ CFS

TOO MUCH FOR SUMP!

D. Mark Goodwin & Associates, P.A.
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PROJECT SUNSET WEST IV
SUBJECT DRAINAGE CALCS
BY GJK DATE 10-19-95
CHECKED _____ DATE _____
SHEET 11 OF ____
REVISED 11-22-95

- ADD TWO "A" INLETS BEFORE SUMP INLETS ON SUNBEAR DR NORTH SIDE 32'-F-F

$d = 0.51$ $S = 1\%$ $n = 0.017$
$wp = 33.02$
$A = 8.65$ $d + V^2/2g = 0.71 < .67 + .2$ OK
$V = 3.579$ f/s
$Q = 30.96$ CFS ≈ 30.746 OK

$Q_{grate} = 6.0$ CFS SEE SHEET 9

$Q_{PAST\ INLETS}$
$30.746 - 2(6.0) = 18.746$ CFS

- FIND SUMP INLET CAPACITY

$Q = 18.746 + 11.394$
$= 30.14$ CFS

2 "DBL C" IN SUMP

$P = 2 \times 17 = 34$ SINCE TYPE "A" INLETS ARE WITHIN 150' OF DBL C INLETS NO REDUCTION IS REQUIRED.

$Q/P = 3.0\,H^{3/2}$

$H = 0.44 < 0.67$ OK

- FIND SUMP CAPACITY

$Q/P = 3.0\,H^{3/2}$

USE $H = 0.67$

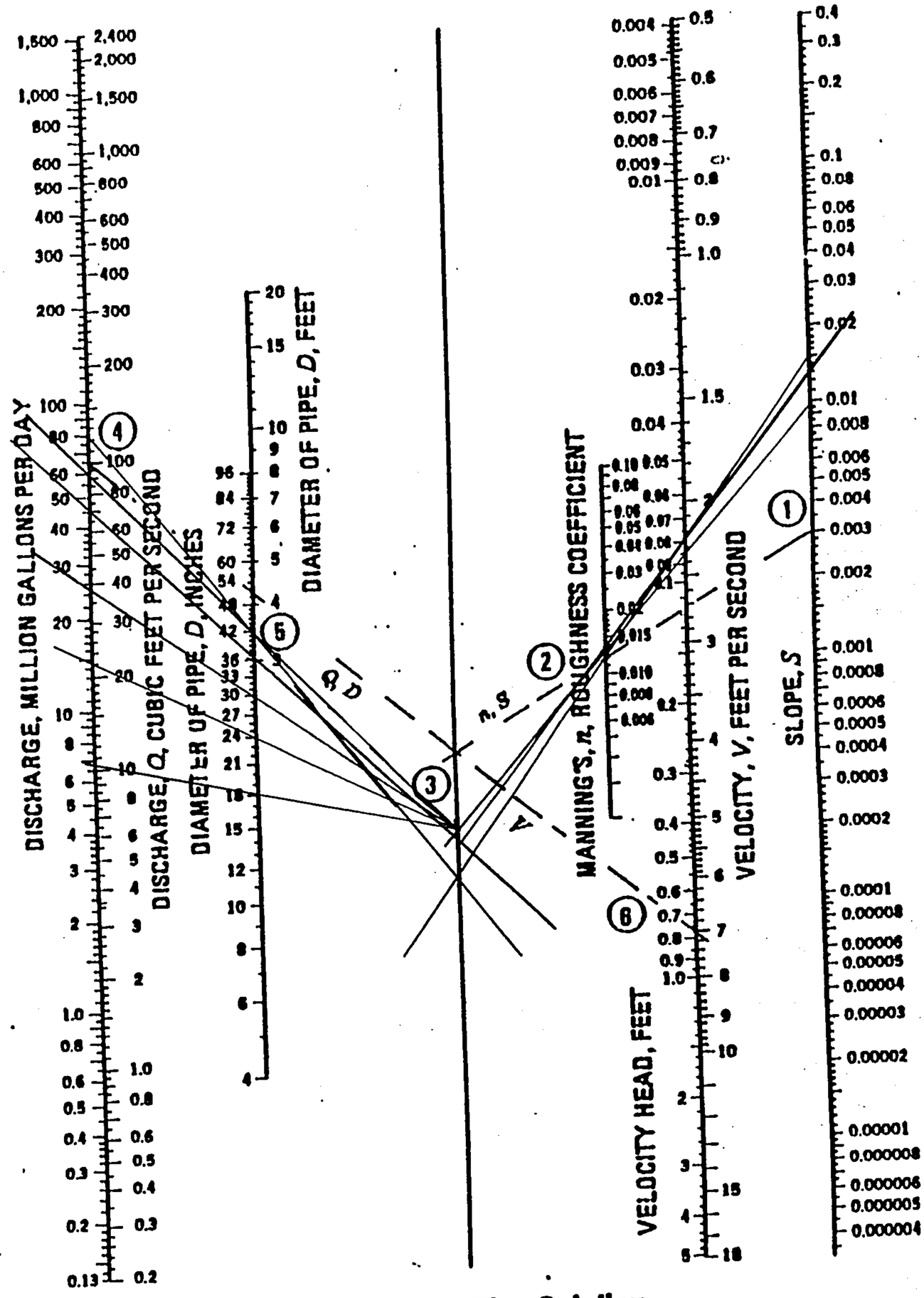
$Q = 55.94$ CFS OK

- SIZE OUTFALL

42" RCP AT 1.5% CAN CARRY 120 CFS SEE SHEET 12

120 CFS $\approx$ 2 TIMES THE GENERATED RUNOFF

Reference: American Concrete Pipe Association (1980).

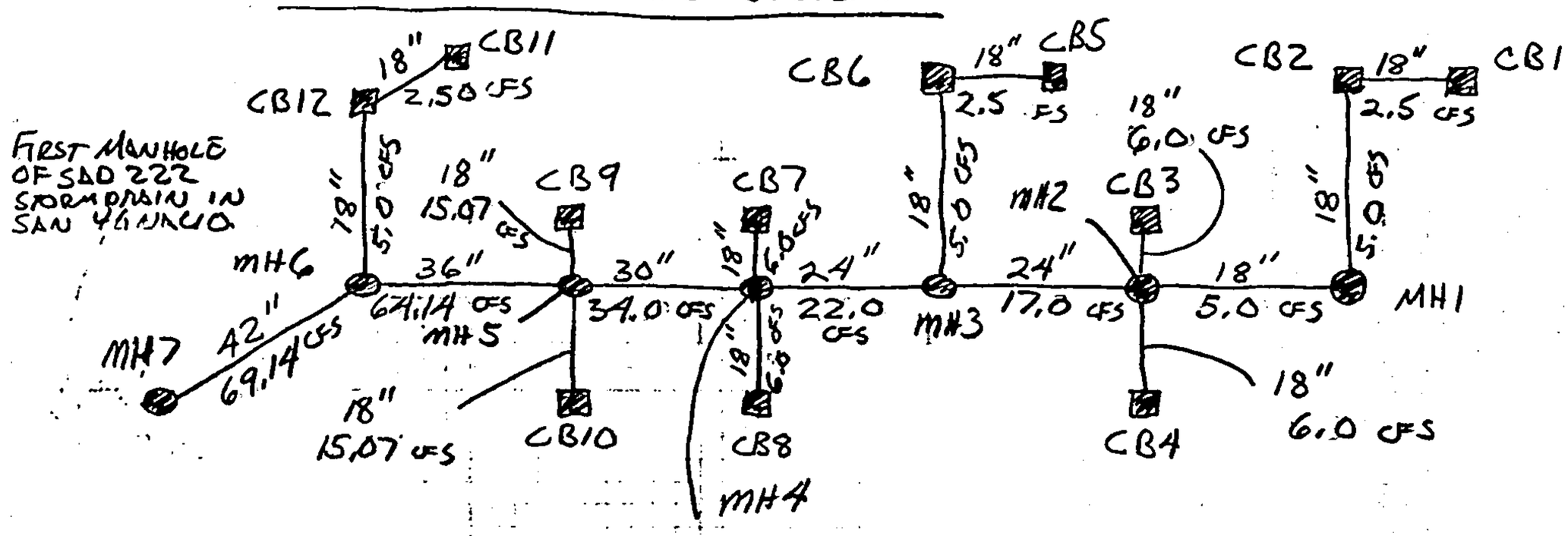


B) Circular Pipe Solution

D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT SUNSET WEST IV
SUBJECT DRAINAGE CALCS
BY GJK DATE 10-19-95
CHECKED _____ DATE _____
SHEET 13 OF ____
REVISED 11-22-95

• SIZE STORM DRAIN SYSTEM



STRUCTURE	RIM/GRATE	INV IN	INV IN	INV IN	INV OUT
CB1	26.47	—	—	—	22.47 (S)
CB2	26.42	22.23 (N)	—	—	22.23 (E)
MH1	25.10	21.33 (W)	—	—	21.33 (S)
MH2	23.21	19.48 (N)	19.03 (W)	18.91 (E)	18.41 (S)
CB3	23.09	—	—	—	19.09 (E)
CB4	23.09	—	—	—	19.09 (W)
MH3	22.54	17.71 (N)	18.79 (W)	—	17.71 (S)
CB5	23.93	—	—	—	19.93 (S)
CB6	23.93	19.69 (N)	—	—	19.69 (E)
MH4	21.35	17.11 (W)	16.87 (E)	16.58 (N)	16.08 (S)
CB7	21.23	—	—	—	17.23 (E)
CB8	21.23	—	—	—	17.23 (W)
MH5	20.87	15.52 (N)	16.63 (W)	16.39 (E)	15.02 (S)
CB9	20.75	—	—	—	16.75 (E)
CB10	20.61	—	—	—	16.75 (W)
MH6	21.46	17.03 (W)	13.94 (N)	—	13.44 (S)
CB11	22.33	—	—	—	18.33 (S)
CB12	22.10	18.03 (N)	—	—	18.03 (E)
MH7	14.79	9.00 (N)	—	—	9.00 (S)

FROM NOMO SHEET 12

18" @ 1% CARRIES 10.5 CFS
24" @ 1% CARRIES 22.0 CFS
30" @ 1% CARRIES 37.5 CFS
36" @ 1.3% CARRIES 70.0 CFS

• SIZE RETENTION POND FOR 100 YR 10 DAY STORM

FROM SHEET 1 $Q = 69.14$ CFS

$V = 2.3725$ AC-FT

$$V_{10\,day} = V_6 + A_D \frac{(P_{10d} - P_6)}{12}$$

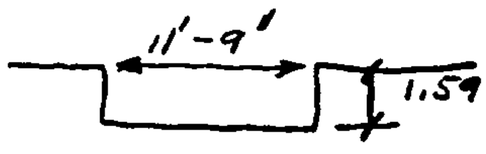
$$= 2.3725 + 11{,}107 \frac{(3.67 - 2.2)}{12}$$

$$= 3.73 \text{ AC-FT} = 162{,}614 \text{ CF}$$

ELEV	AREA (SF)	STORAGE (CF)
5	1306	0
6	2147	1726.5
7	3067	4333.5
8	4064	7899
9	5143	12502.5
10	6302	18225
11	7536	25144
12	8843	33333.5
13	10224	42867
14	11678	53818
15	13205	66259.5
16	14805	80264.5
17	16474	95904
18	18214	113248
19	20023	132366.5
20	21902	153329
21	23852	176206
22	25873	201068.5

ELEVATION OF 162,614 = 20.41

• SIZE SPILLWAY



WEIR OPENING

$Q = 2.95\,LH^{1.5}$

$H = 22.0 - 20.41 = 1.59$

$L = 11.69'$ SAY 11'-9"

LENGTH OF SPILLWAY = 19.145'

DROP = 20.41 - 18 = 2.41

SLOPE = 12.59% $n = 0.013$ USE 7' WIDE CHANNEL

$d = 0.45$

$WP = 7.90$

$A = 3.15$

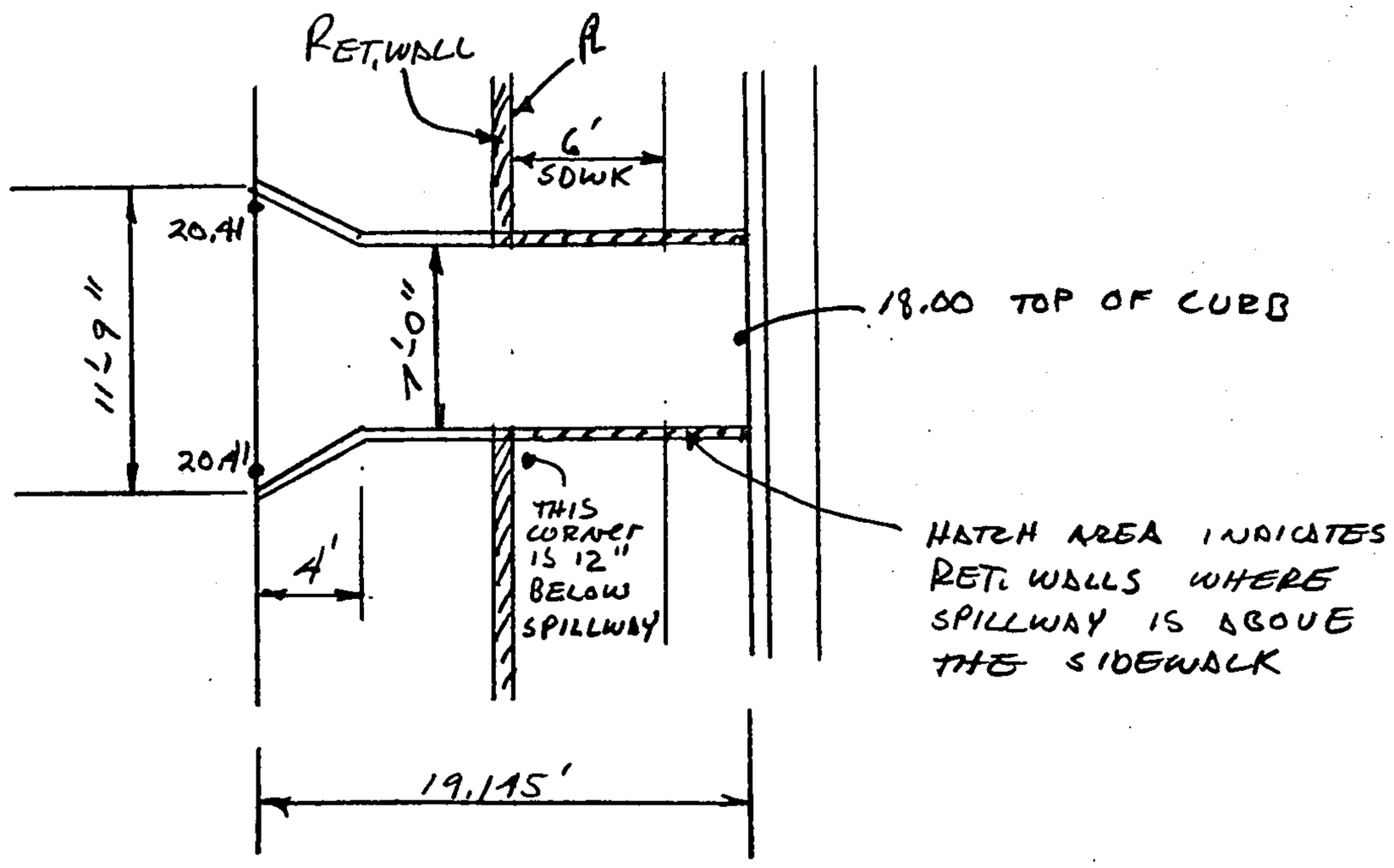
$V = 21.97$ FPS

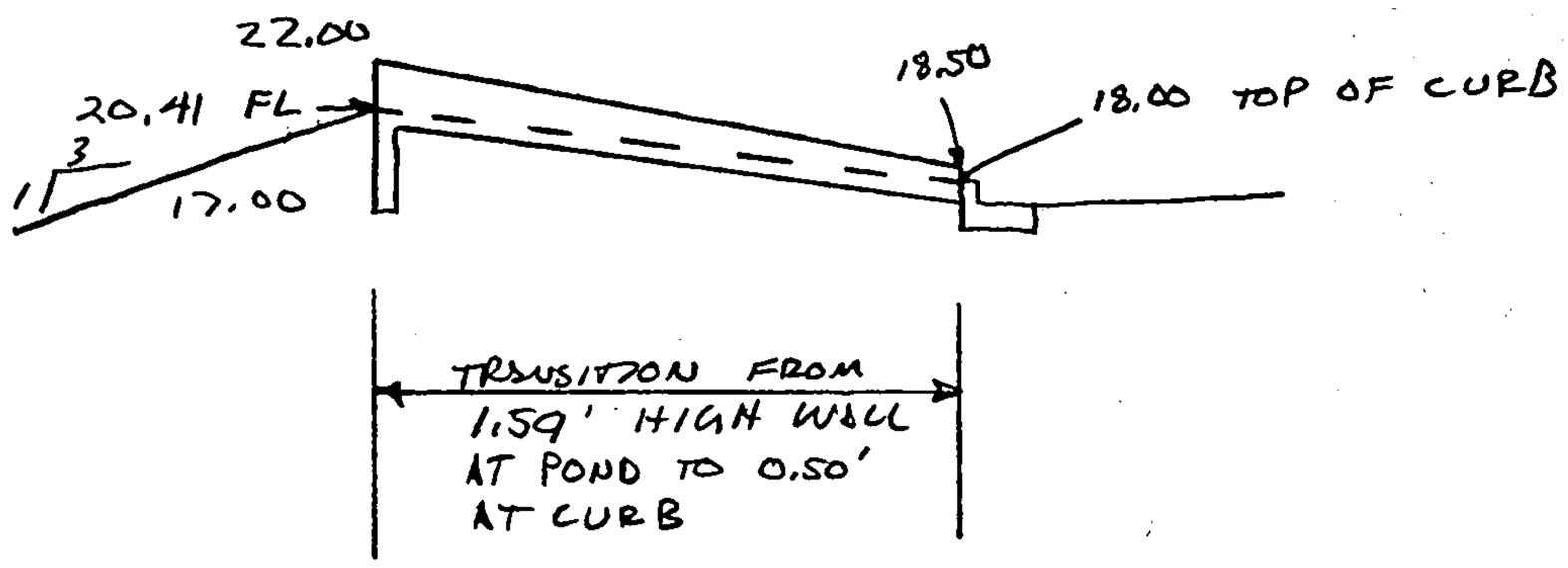
$Q = 69.22$ CFS ≈ 69.14 OK

7' CHANNEL IS OK

D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT Sunset West IV
SUBJECT Drainage Calcs
BY GJK DATE 11-22-95
CHECKED _____ DATE _____
SHEET 15 OF ____





1. Financial guarantee under procedure "c" ~~modified~~ to be provided for their portion (proportionate share) of drainage ~~improvements~~ to be constructed under SAD 222

2. Financial guarantee under Procedure "c" to be provided for ~~street~~ Tower Rd paving ~~$~~ ~~$~~ to be constructed under SAD 2220

D.R.B. Case No. 95-397
D.R.C. Project No. _____
Date Submitted 10/30/95
Prelim. Plat Approved _____
Prelim. Plat Expires _____

Figure 12

EXHIBIT "A"
To Subdivision Improvements Agreement
DEVELOPMENT REVIEW BOARD (DRB) REQUIRED INFRASTRUCTURE LISTING
for Sunset West, Unit IV

Following is a summary of Public/Private Infrastructure required to be constructed or financially guaranteed to be constructed for the above development. This summary is not necessarily a complete listing. During the design process, if the City determines that appurtenant items have not been included in the summary, those items will be included in the listing and related financial guarantee, if the items normally are the Subdivider responsibility. In addition, any unforseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility are the responsibility of the Subdivider and will be included in the financial guarantee provided to the City.

Size	Type Improvement	Location	From	To
28' FF	Residential Street Mtn. C&G, both sides 4' Sidewalk, both sides *	Sundeck Court	Cul-de-sac	Lot 42, S. side Lot 59, N. side
28' FF	Residential Street Mtn. C&G, both sides 4' Sidewalk, both sides *	Sunfish Avenue	Sunward Drive	Lot 15, S. side Lot 39, N. side
28' FF	Residential Street Mtn. C&G, both sides 4' Sidewalk, both sides *	Sunwise Avenue	Sunward Drive	Lot 18, S. side Lot 2, N. side
28' FF	Residential Street Mtn. C&G, both sides 4' Sidewalk, both sides *	Sunward Drive	Sunwise Avenue	Sunfish Avenue
28' FF	Residential Street Mtn. C&G, both sides 4' Sidewalk, both sides *	Sundial Avenue	Cul-de-sac	Lot 11, S. side Lot 15, N. side
28' FF	Residential Street Std C&G, both sides 4' Sidewalk, both sides *	Sunbear Drive	Sundial Avenue	Sundeck Court
28' FF	Residential Street Std C&G, both sides 4' Sidewalk, both sides *	Sundeck Court	Lot 42, S. side Lot 59, N. side	Sunbear Drive
28' FF	Residential Street St C&G, both sides 4' Sidewalk, both sides *	Sunfish Avenue	Lot 15, S. side Lot 39, N. side	Sunbear Drive

D.R.B. Case No. 95-397
D.R.C. Project No. _____
Date Submitted 10/30/95
Prelim. Plat Approved _____
Prelim. Plat Expires _____

Size	Type Improvement	Location	From	To
28' FF	Residential Street Std C&G, both sides 4' Sidewalk, both sides *	Sunwise Avenue	Lot 18, S. side Lot 2, N. side	Sunbear Drive
28' FF	Residential Street Std C&G, both sides 4' Sidewalk, both sides *	Sundial Avenue	Lot 11, S. side Lot 15, N. side	Sunbear Drive
36' FF	Residential Street Std C&G, both sides 4' Sidewalk, both sides *	Sun God Drive	San Ygnacio	Sundial Avenue
36' FF	Residential Street Std C&G, both sides 4' Sidewalk, both sides *	Sun Disk Avenue	Sunbear Drive	90th Street
24' FE	Residential Street Std C&G, W. side 6' Sidewalk, W. side	90th Street	Tower Road	San Ygnacio
24' FE	Residential Street Std C&G, N. side 6' Sidewalk, N. side	San Ignacio Road	90th Street	W. Property Line
N/A	Street improvements to Tower Road per SAD			
N/A	Residential Street Lights	Per DPM		
8"	SAS Gravity Line	Sundeck Court	Entire Length	
8"	SAS Gravity Line	Sunfish Avenue	Entire Length	
8"	SAS Gravity Line	Sunwise Avenue	Entire Length	
8"	SAS Gravity Line	Sunward Drive	Entire Length	
8"	SAS Gravity Line	Sundial Avenue	Entire Length	
8"	SAS Gravity Line	Sunbear Drive	Entire Length	
8"	SAS Gravity Line	Sun Disk Avenue	Entire Length	
8"	SAS Gravity Line	90th Street	Sun Disk Avenue	San Ygnacio

Sanitary sewer to include manholes and service connections.

8"	PVC Waterline	Sun God Drive	Entire Length	
8"	PVC Waterline	Sundial Avenue	Sun God Drive	Sunbear Drive
8"	PVC Waterline	Sunbear Drive	Sundial Avenue	Sun Disk Avenue
8"	PVC Waterline	Sun Disk Avenue	Entire Length	
8"	PVC Waterline	90th Street	Sun Disk Avenue	San Ygnacio
6"	PVC Waterline	Sundeck Court	Entire Length	
6"	PVC Waterline	Sunfish Avenue	Entire Length	
6"	PVC Waterline	Sunward Drive	Entire Length	
6"	PVC Waterline	Sunwise Avenue	Entire Length	
6"	PVC Waterline	Sundial Avenue	Cul-de-sac	Sun God Drive
6"	PVC Waterline	Sunbear Drive	Sundeck Court	Sun Disk Avenue

Water infrastructure to include valves, fittings, valveboxes and fire hydrants.

D.R.B. Case No. 95-397
D.R.C. Project No. _____
Date Submitted 10/30/95
Prelim. Plat Approved _____
Prelim. Plat Expires _____

Size	Type Improvement	Location	From	To
18"	RCP Stormdrain	Sunfish Avenue	Lot 15	Sunbear Drive
18"	RCP Stormdrain	Sunwise Avenue	Lot 18	Sunbear Drive
18"	RCP Stormdrain	Sundial Avenue	Lot 11	Sunbear Drive
18"	RCP Stormdrain	Sunbear Drive	Sunfish Avenue	Sunwise Avenue
24"	RCP Stormdrain	Sunbear Drive	Suflower Avenue	Lot 4
30"	RCP Stormdrain	Sunbear Drive	Lot 4	Lot 5
36"	RCP Stormdrain	Sunbear Drive	Lot 5	Cul-de-sac
42"	RCP Stormdrain	20' Drainage Easement	Cul-de-sac	90th Street
42"	RCP Stormdrain	90th Street	20' Easement	San Ignacio

*Temp. Public Retention Pond Lots 7,8,9,10

Stormdrain to include manholes, inlets, riprap and outfall.

Engineer's Certification for Grading and Drainage per DPM including Perimeter Walls as shown on the Grading Plan for Release of SIA and Financial Guarantees.

* Sidewalk Deferred

Prepared By: _____

Print Name: Gregory J. Krenik, PE

Firm: Mark Goodwin & Associates, PA

* * * \

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 6, 1995

John Andrews
Andrews, Asbury, & Robert
149 Jackson NE
Albuquerque, NM

RE: SAD 222

Dear Mr. Andrews:

I am forwarding a copy of Mark Goodwin & Associates flow calculations for Sunset West subdivision. This project is within Basin B3-D shown on the SAD 222 Drainage Area Map for Developed Conditions. Please incorporate these numbers into your report so that free discharge will be allowed this subdivision once the proposed storm drain is constructed.

Thank you for your assistance, if I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Fred Aguirre
Lee Lunsford
Greg Krenik - Mark Goodwin & Associates
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

November 14, 1995

Gregory Krenik
Mark Goodwin & Assoc.
P.O. Box 90606
Albuquerque, NM 87199

RE: SUNSET WEST UNIT 1V (L9-D13) DRAINAGE REPORT FOR PRELIMINARY PLAT, FINAL PLAT, AND ROUGH GRADING APPROVAL. ENGINEER'S STAMP DATED OCTOBER 30, 1995.

Dear Mr. Krenik:

Based on the information provided on your October 31, 1995 submittal, City Hydrology has the following comments:

1. Provide a safety fence around the temporary retention pond.

2. A drainage easement and covenant are required for the temporary retention pond.

3 Per out meeting on 11-14-95, you explained that the landscaping in this subdivision would consist of grass and rock. Please include type "C" land treatment in your flow calculations for the rock.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Sunset West Unit IV ZONE ATLAS/DRNG,FILE#: L-9/H13

DRB #: 95-397 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: Tracts 435, 436, 437 & 438, Unit 3, Town of Atrisco Grant

CITY ADDRESS: _____

ENGINEERING FIRM: Mark Goodwin & Associates, PA CONTACT: Gregory J. Krenik PE

ADDRESS: PO Box 90606 PHONE: 345-2010

OWNER: Sunset West CONTACT: Mark Pagels

ADDRESS: PO Box 44698 PHONE: 239-5383

ARCHITECT: Sunset West CONTACT: Mark Pagels

ADDRESS: PO Box 44698 PHONE: 239-5383

SURVEYOR: ALS, Inc. CONTACT: Tim Aldrich

ADDRESS: PO Box 30701 PHONE: 884-1990

CONTRACTOR: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

- X DRAINAGE REPORT
- X DRAINAGE PLAN
- ___ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- ___ EROSION CONTROL PLAN
- ___ ENGINEER'S CERTIFICATION
- ___ OTHER

PRE-DESIGN MEETING:

- ___ YES
- X NO
- ___ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- ___ SKETCH PLAT APPROVAL
- X PRELIMINARY PLAT APPROVAL
- ___ S. DEV. PLAN FOR SUB'D APPROVAL
- ___ S. DEV. PLAN FOR BLDG PERMIT APPROVAL
- ___ SECTOR PLAN APPROVAL
- X FINAL PLAT APPROVAL
- ___ FOUNDATION PERMIT APPROVAL
- ___ BUILDING PERMIT APPROVAL
- ___ CERTIFICATION OF OCCUPANCY APPROVAL
- ___ GRADING PERMIT APPROVAL
- ___ PAVING PERMIT APPROVAL
- ___ S.A.D. DRAINAGE REPORT
- ___ DRAINAGE REQUIREMENTS
- X OTHER Rough Grading (Specify)

DATE SUBMITTED: 10-30-95

BY: Gregory J. Krenik PE

RECEIVED
OCT 31 1995
DRC