DRAINAGE REPORT

for

NORTH GATEWAY

Prepared by

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NEW MEXICO
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3/1/07

March 2007

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I. PROJECT DESCRIPTION

The proposed project site covers approximately 22.79 Acres and is located along the North side of Balloon Fiesta Parkway NE. The current legal description of the site is Tract B, C-1 and C-2 North Gateway, Bernalillo County, New Mexico6/2/06.

The purpose of this report is to present the master drainage management plan for the North Gateway Subdivision which is comprised of 4 tracts, of which only one is already developed. All applicable ordinances, the DPM and AHYMO were utilized to prepare this plan.

II. DRAINAGE DESIGN CRITERIA

The design criteria used in this report was in accordance with Section 22.2 Hydrology of the Development Process Manual. The 100-year, 6-hour storm event was utilized to determine site runoff rates using P (1 hr) = 2.10", P (6 hr) =2.50"and P (24 hr) = 2.80". The onsite Land Treatment values used were Treatment D=85 and Treatment B=15.

III. EXISTING DRAINAGE CONDITION

The site presently consists of existing office building in Tract C-2, undeveloped land covered by native vegetation and small open areas of the native sandy surface. Slope is predominantly toward the north. At the present time there is no offsite runoff entering any portion of the site.

IV. DEVELOPED DRAINAGE CONDITIONS

The total 100 year developed conditions flow from the site is 102.86 cfs. The site is divided into 5 basins (4 Tracts and 1 cul-de-sac) as shown in the plan. According to AHYMO total developed flow generated within the site during the 100-year, 6-hour storm, is 11.06 cfs (Tract C-1-A), 2.87 cfs (Cul-de-sac), 36.92 cfs (Tract C-2-A), 29.34 cfs (Tract B-1) and 22.67 cfs(Tract C-2-B). The developed runoff from Tract B-1 and Tract C-2-B is designed to discharge into existing concrete lined channel on north side. According to approved drainage report dated 1-14-07 from Mark Goodwin and Associates, from existing development on Tract C-2-A, 9.2 cfs will be discharged freely onto Balloon Fiesta Parkway NE and remaining into the channel on north side. The developed runoff from Tract C-1-A and cul-de-sac is designed to discharge freely onto the Balloon Fiesta Parkway NE, this can be achieved by adding a Type "A" storm inlet at intersection of Balloon Fiesta Parkway NE and San Mateo Blvd NE along the north side of Balloon Fiesta Parkway NE.

All the capacity calculations and AHYMO printouts are attached in the Appendix A.

APPENDIX A

AHYMO PRINTOUTS
CAPACITY CALCULATIONS

```
*S    AHYMO_97 MODEL FOR: NORTH GATEWAY DRAINAGE REPORT
*S    PREPARED FOR:  COA
*S    PREPARED BY:  MARK GOODWIN & ASSOCIATES
*S
*S    MODEL DESCRIPTION -
*S 1. 100-YEAR 6-HOUR RAINFALL EVENT
*S 2. THIS MODEL ASSUMES DEVELOPED CONDITIONS
*S
START                TIME=0.0
*S***** AHYMO -GATEWAY. DAT
*S***** January 4TH 2007
*S***** HYDROLOGY FOR NORTH GATEWAY

RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=2.10 IN RAIN SIX=2.50 IN
                     RAIN DAY=2.80 IN DT=0.0333 HR

*S***** TRACT C-1-A - ONSITE DEVELOPED (2.4377 ACRES)

COMPUTE NM HYD       ID=1 HYD NO=101 AREA=0.00379 SQ MI
                     PER A=0 PER B=15 PER C=0 PER D=85
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=24

*S***** Cul-De-Sac - ONSITE DEVELOPED (0.6313 ACRES)

COMPUTE NM HYD       ID=2 HYD NO=102 AREA=0.00098 SQ MI
                     PER A=0 PER B=15 PER C=0 PER D=85 100
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=2 CODE=24

*S***** TRACT C-2-A - ONSITE DEVELOPED (8.2228 ACRES)

COMPUTE NM HYD       ID=3 HYD NO=103 AREA=0.01266 SQ MI
                     PER A=0 PER B=15 PER C=0 PER D=85
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=3 CODE=24

*S***** TRACT B-1 - ONSITE DEVELOPED (6.5111 ACRES)

COMPUTE NM HYD       ID=4 HYD NO=104 AREA=0.01006 SQ MI
                     PER A=0 PER B=15 PER C=0 PER D=85
```

```
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=4 CODE=24

*S***** TRACT C-2-B - ONSITE DEVELOPED (5.00 ACRES)

COMPUTE NM HYD      ID=5 HYD NO=105 AREA=0.00777 SQ MI
                    PER A=0 PER B=15 PER C=0 PER D=85
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=5 CODE=24


FINISH
```

Zone 3

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   AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -                        - VERSION:  1997.02d      RUN DATE (MON/DAY/YR)
=02/22/2007
   INPUT FILE = F:\PAVAN\AHYMOI~1\CULDES~1.TXT                                                  USER NO.= AHYMO-I-
9702dGoodwinM-AH

                                  FROM  TO                         PEAK        RUNOFF                TIME TO    CFS
PAGE =   1
                      HYDROGRAPH   ID   ID          AREA        DISCHARGE      VOLUME      RUNOFF      PEAK      PER
   COMMAND        IDENTIFICATION   NO.  NO.        (SQ MI)        (CFS)        (AC-FT)    (INCHES)   (HOURS)    ACRE
NOTATION

   *S    AHYMO_97 MODEL FOR: NORTH GATEWAY DRAINAGE REPORT
   *S    PREPARED FOR:  COA
   *S    PREPARED BY:  MARK GOODWIN & ASSOCIATES
   *S
   *S    MODEL DESCRIPTION -
   *S 1. 100-YEAR 6-HOUR RAINFALL EVENT
   *S 2. THIS MODEL ASSUMES DEVELOPED CONDITIONS
   *S
   START                                                                                                    TIME=
.00
   *S***** AHYMO -GATEWAY. DAT
   *S***** January 4TH 2007
   *S***** HYDROLOGY FOR NORTH GATEWAY
   RAINFALL  TYPE= 1                                                                                        RAIN6=
2.500
   *S***** TRACT C-1-A - ONSITE DEVELOPED (2.4377 ACRES)
   COMPUTE NM HYD        101.00   -     1         .00379         11.06         .415     2.05227    1.499    4.562 PER
IMP=  85.00
   *S***** Cul-De-Sac - ONSITE DEVELOPED (0.6313 ACRES)
   COMPUTE NM HYD        102.00   -     2         .00098          2.87         .107     2.05227    1.499    4.583 PER
IMP=  85.00
   *S***** TRACT C-2-A - ONSITE DEVELOPED (8.2228 ACRES)
   COMPUTE NM HYD        103.00   -     3         .01266         36.92        1.386     2.05227    1.499    4.557 PER
IMP=  85.00
   *S***** TRACT B-1 - ONSITE DEVELOPED (6.5111 ACRES)
   COMPUTE NM HYD        104.00   -     4         .01006         29.34        1.101     2.05227    1.499    4.557 PER
IMP=  85.00
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   COMPUTE NM HYD        105.00   -     5         .00777         22.67         .850     2.05227    1.499    4.558 PER
IMP=  85.00
   FINISH
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AHYMO PROGRAM (AHYMO_97) -                                - Version:  1997.02d
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     INPUT FILE = F:\PAVAN\AHYMOI~1\CULDES~1.TXT

*S    AHYMO_97 MODEL FOR: NORTH GATEWAY DRAINAGE REPORT
*S    PREPARED FOR:  COA
*S    PREPARED BY:  MARK GOODWIN & ASSOCIATES
*S
*S    MODEL DESCRIPTION -
*S 1. 100-YEAR 6-HOUR RAINFALL EVENT
*S 2. THIS MODEL ASSUMES DEVELOPED CONDITIONS
*S
START                TIME=0.0
*S***** AHYMO -GATEWAY. DAT
*S***** January 4TH 2007
*S***** HYDROLOGY FOR NORTH GATEWAY
                                      2.14        2.6     OK
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=2.10 IN RAIN SIX=2.50 IN
                     RAIN DAY=2.80 IN DT=0.0333 HR
                              3.1

     COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
     DT =    .033300 HOURS       END TIME =     5.994000 HOURS
        .0000    .0021    .0043    .0065    .0087    .0111    .0134
        .0158    .0183    .0208    .0234    .0261    .0288    .0317
        .0345    .0375    .0406    .0438    .0470    .0504    .0539
        .0575    .0613    .0652    .0693    .0736    .0780    .0827
        .0876    .0928    .0983    .1041    .1103    .1169    .1306
        .1619    .2103    .2799    .3750    .5001    .6598    .8587
       1.1016   1.3348   1.4304   1.5109   1.5824   1.6474   1.7073
       1.7628   1.8147   1.8634   1.9091   1.9523   1.9931   2.0317
       2.0683   2.1029   2.1358   2.1671   2.1967   2.2051   2.2118
       2.2181   2.2241   2.2299   2.2355   2.2408   2.2460   2.2509
       2.2557   2.2604   2.2649   2.2692   2.2735   2.2776   2.2816
       2.2856   2.2894   2.2931   2.2968   2.3004   2.3039   2.3073
       2.3107   2.3139   2.3172   2.3203   2.3235   2.3265   2.3295
       2.3325   2.3354   2.3383   2.3411   2.3438   2.3466   2.3493
       2.3519   2.3545   2.3571   2.3597   2.3622   2.3647   2.3671
       2.3695   2.3719   2.3743   2.3766   2.3789   2.3812   2.3834
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```
                2.3857  2.3879  2.3900  2.3922  2.3943  2.3964  2.3985
                2.4006  2.4026  2.4046  2.4066  2.4086  2.4106  2.4126
                2.4145  2.4164  2.4183  2.4202  2.4220  2.4239  2.4257
                2.4275  2.4293  2.4311  2.4329  2.4347  2.4364  2.4381
                2.4398  2.4416  2.4432  2.4449  2.4466  2.4482  2.4499
                2.4515  2.4531  2.4547  2.4563  2.4579  2.4595  2.4611
                2.4626  2.4641  2.4657  2.4672  2.4687  2.4702  2.4717
                2.4732  2.4747  2.4761  2.4776  2.4790  2.4805  2.4819
                2.4833  2.4847  2.4861  2.4875  2.4889  2.4903  2.4917
                2.4930  2.4944  2.4958  2.4971  2.4984  2.4998

*S***** TRACT C-1-A - ONSITE DEVELOPED (2.4377 ACRES)

COMPUTE NM HYD       ID=1 HYD NO=101 AREA=0.00379 SQ MI
                     PER A=0 PER B=15 PER C=0 PER D=85
                     TP=0.1333 HR MASS RAINFALL=-1

     K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   12.719    CFS   UNIT VOLUME =    .9985       B =   526.28      P60 = 2.1000
     AREA =      .003222 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300


     K =   .133173HR    TP =   .133300HR    K/TP RATIO =   .999050     SHAPE CONSTANT, N =  3.533693
     UNIT PEAK =   1.3766    CFS   UNIT VOLUME =    .9905       B =   322.78      P60 = 2.1000
     AREA =      .000569 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD            ID=1 CODE=24

                                   PARTIAL HYDROGRAPH   101.00

      TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME
FLOW
       HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS
CFS
      .000        .0         1.998       2.6         3.996        .1         5.994        .1
      .666        .0         2.664        .3         4.662        .1         6.660        .0
     1.332       3.2         3.330        .1         5.328        .1

    RUNOFF VOLUME =     2.05227 INCHES     =        .4148 ACRE-FEET
    PEAK DISCHARGE RATE =      11.06 CFS  AT   1.499 HOURS   BASIN AREA =   .0038 SQ. MI.
```

```
*S***** Cul-De-Sac - ONSITE DEVELOPED (0.6313 ACRES)

COMPUTE NM HYD       ID=2 HYD NO=102 AREA=0.00098 SQ MI
                     PER A=0 PER B=15 PER C=0 PER D=85
                     TP=0.1333 HR MASS RAINFALL=-1

     K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   3.2887    CFS   UNIT VOLUME =    .9960       B =   526.28      P60 = 2.1000
     AREA =      .000833 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300


     K =   .133173HR    TP =   .133300HR    K/TP RATIO =   .999050     SHAPE CONSTANT, N =  3.533693
     UNIT PEAK =   .35595    CFS   UNIT VOLUME =    .9629       B =   322.78      P60 = 2.1000
     AREA =      .000147 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD            ID=2 CODE=24

                                   PARTIAL HYDROGRAPH   102.00

      TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME
FLOW
       HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS
CFS
      .000        .0         1.332        .8         2.664        .1         3.996        .0         5.328
.0
      .666        .0         1.998        .7         3.330        .0         4.662        .0         5.994
.0

     RUNOFF VOLUME =     2.05227 INCHES     =        .1073 ACRE-FEET
     PEAK DISCHARGE RATE =       2.87 CFS  AT   1.499 HOURS   BASIN AREA =   .0010 SQ. MI.



*S***** TRACT C-2-A - ONSITE DEVELOPED (8.2228 ACRES)
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```
COMPUTE NM HYD       ID=3 HYD NO=103 AREA=0.01266 SQ MI
                     PER A=0 PER B=15 PER C=0 PER D=85
                     TP=0.1333 HR MASS RAINFALL=-1

     K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   42.485    CFS   UNIT VOLUME =    .9991       B =   526.28      P60 = 2.1000
     AREA =      .010761 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300


     K =   .133173HR    TP =   .133300HR    K/TP RATIO =   .999050     SHAPE CONSTANT, N =  3.533693
     UNIT PEAK =   4.5983    CFS   UNIT VOLUME =    .9973       B =   322.78      P60 = 2.1000
     AREA =      .001899 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD            ID=3 CODE=24

                                   PARTIAL HYDROGRAPH   103.00

      TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME
FLOW
       HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS
CFS
      .000        .0         1.998       8.8         3.996        .3         5.994        .3
      .666        .0         2.664        .9         4.662        .2         6.660        .0
     1.332      10.6         3.330        .3         5.328        .2

    RUNOFF VOLUME =     2.05227 INCHES     =       1.3857 ACRE-FEET
    PEAK DISCHARGE RATE =      36.92 CFS  AT   1.499 HOURS   BASIN AREA =   .0127 SQ. MI.



*S***** TRACT B-1 - ONSITE DEVELOPED (6.5111 ACRES)

COMPUTE NM HYD       ID=4 HYD NO=104 AREA=0.01006 SQ MI
                     PER A=0 PER B=15 PER C=0 PER D=85
                     TP=0.1333 HR MASS RAINFALL=-1

     K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   33.760    CFS   UNIT VOLUME =    .9990       B =   526.28      P60 = 2.1000
     AREA =      .008551 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
```

```
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300


      K =   .133173HR    TP =   .133300HR    K/TP RATIO =   .999050     SHAPE CONSTANT, N =  3.533693
      UNIT PEAK =   3.6540    CFS   UNIT VOLUME =    .9967       B =   322.78      P60 = 2.1000
      AREA =      .001509 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

 PRINT HYD           ID=4 CODE=24

                                   PARTIAL HYDROGRAPH   104.00

      TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME
FLOW
       HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS
CFS
       .000       .0          1.998       7.0         3.996        .2         5.994        .2
       .666       .0          2.664        .7         4.662        .2         6.660        .0
      1.332      8.4          3.330        .3         5.328        .2

     RUNOFF VOLUME =     2.05227 INCHES     =       1.1011 ACRE-FEET
     PEAK DISCHARGE RATE =      29.34 CFS  AT   1.499 HOURS   BASIN AREA =   .0101 SQ. MI.



 *S***** TRACT C-2-B - ONSITE DEVELOPED (5.00 ACRES)

 COMPUTE NM HYD      ID=5 HYD NO=105 AREA=0.00777 SQ MI
                     PER A=0 PER B=15 PER C=0 PER D=85
                     TP=0.1333 HR MASS RAINFALL=-1

      K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
      UNIT PEAK =   26.075    CFS   UNIT VOLUME =    .9989       B =   526.28      P60 = 2.1000
      AREA =      .006605 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300


      K =   .133173HR    TP =   .133300HR    K/TP RATIO =   .999050     SHAPE CONSTANT, N =  3.533693
      UNIT PEAK =   2.8222    CFS   UNIT VOLUME =    .9953       B =   322.78      P60 = 2.1000
      AREA =      .001166 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300
```

PRINT HYD ID=5 CODE=24

PARTIAL HYDROGRAPH 105.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.998	5.4	3.996	.2	5.994	.2		
.666	.0	2.664	.5	4.662	.1	6.660	.0		
1.332	6.5	3.330	.2	5.328	.2				

RUNOFF VOLUME = 2.05227 INCHES = .8505 ACRE-FEET
PEAK DISCHARGE RATE = 22.67 CFS AT 1.499 HOURS BASIN AREA = .0078 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 15:13:38

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
P.O. BOX 90606, ALBUQUERQUE,NM 87199
(505) 828-2200 FAX 797-9539
e-mail: goodwinengrs@comcast.net

PROJECT BALLOON FIESTA PARK
SUBJECT STREET & INLET CAPACITIES
BY Pavan DATE Mar 1 '06
CHECKED _____ DATE _____
SHEET ____ OF ____

FROM Approved Report from CITI CORP DRINAGE (96177 A.2417

We have 19.3 CFS on Balloon Fiesta Park.

This 19.3 CFS IS INTERCEPTED BY SERIES OF INLETS ON BALLOON FIESTA AT INTELSECTION OF SANMATEO AND BALLOON FIESTA.

The developed flow from proposed cul-de-sac @ Farm (TRACT C-1-A) Credit is 13.93 CFS.

Existing Capacity of Catch Basin on North side of the Crown on Ballon Fiesta = 25.2 FS (2-TYPE A Inlets Existing on North side) (slope = 1.978% ; D = 0.55')

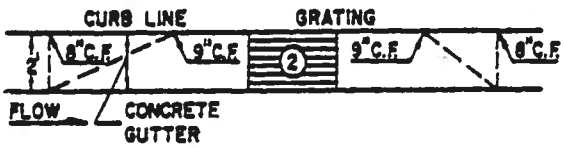
Required Capacity = Half of 19.3 CFS + 13.93 CFS + 9.2 cfs (cul-de-sac + Farm credit) FROM TRACT C-2-A)

= 9.2 + 9.65 + 13.93 = 32.78 CFS

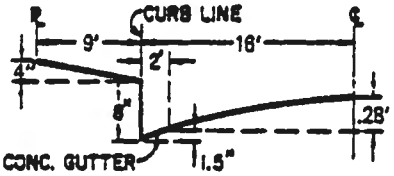
ADDITION CAPACITY OF 7.58 CFS is provided by adding Storm Inlet "TYPE A" ON DOWNSTREAM SIDE At the Intersection.

By adding One 'TYPE A' Inlet the Capacity Increase by 33.61 CFS > 32.78 ; CFS (Req) ≃ ok
24" pipe 33.05 cfs

GRATING CAPACITIES FOR TYPE 'A' , 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

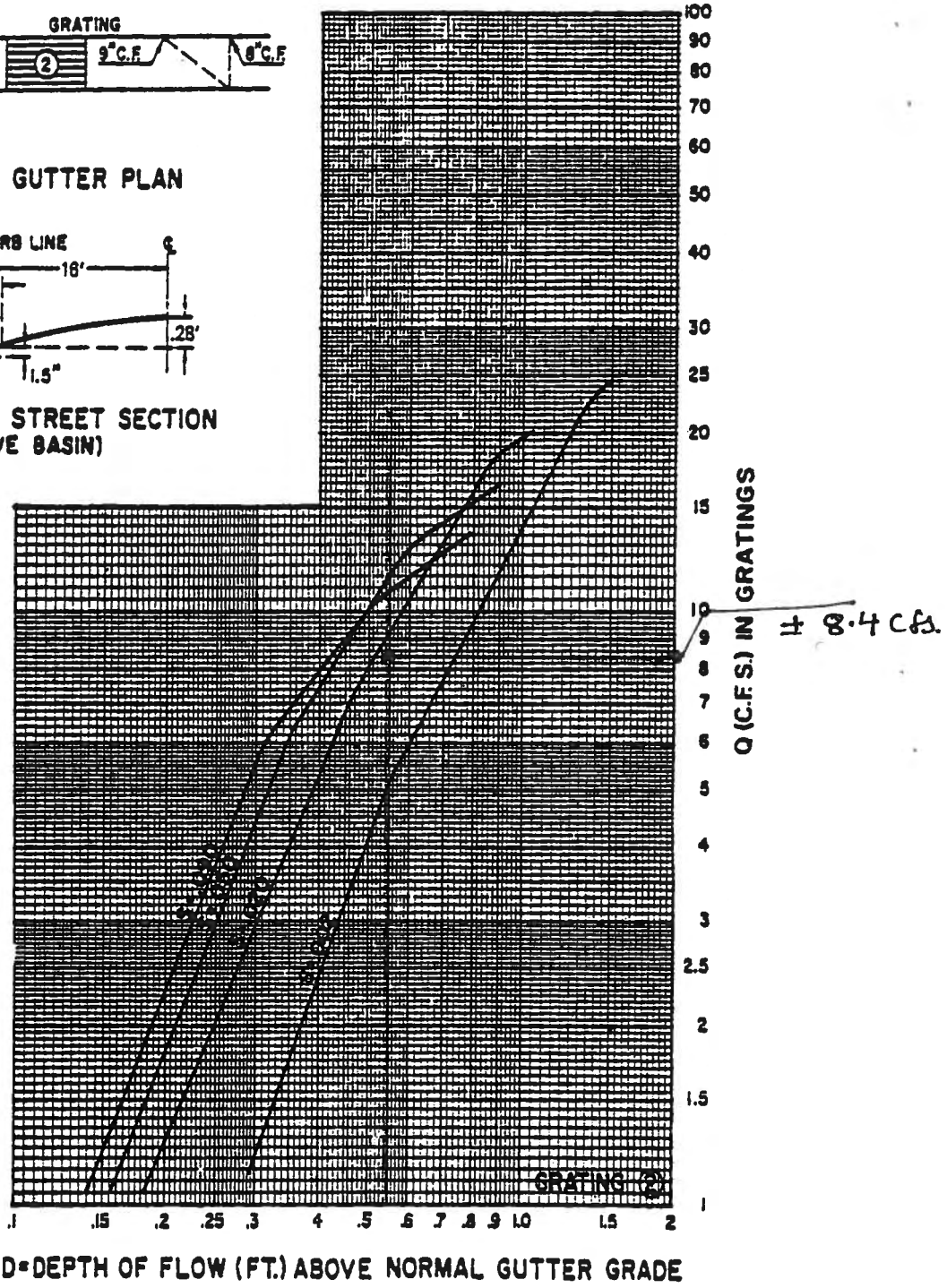


PLATE 22.3 D-5

APPENDIX B

GRADING AND DRAINAGE PLAN