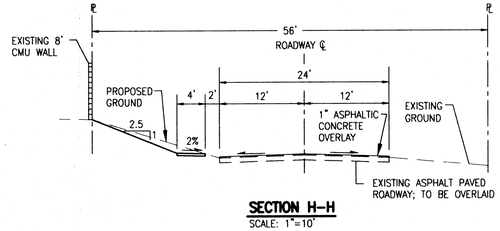
SCALE: 1" = 50'

50 0 100

25 50



SECTION H-H
SCALE: 1"=10'

BOUNDARY TABLES

LINE	DIRECTION	DISTANCE
L1	S 83°21'33" E	15.11'
L2	S 21°44'39" W	90.96'

CURVE	RADIUS	LENGTH	CHORD	BEARING	DELTA
C1	380.00'	106.28'	105.94'	N 87°07'24" E	16°01'30"
C2	436.00'	133.40'	132.88'	N 87°52'33" E	17°31'48"

TRACT 1, LANDS OF
WESTLAND DEVELOPMENT Co., Inc.
(FILED 09-08-1983, C22-21)

TRACT A-2
LANDS OF H.V. LOGAN
(FILED 02-08-1979, A7-22)

TRACT B
LANDS OF H.V. LOGAN
(FILED 03-29-1978, A6-174)

PARCEL B-2-A
TRACT 9, M.R.G.C.D. MAP No. 47
(FILED 10-06-1983, C22-61)

MATCH LINE FOR CONTINUATION
SEE SHEET 4

674.12'

N 84°51'51" W

TRACT 2
25.9977 AC.±

56' PRIVATE ACCESS, WATER AND SEWER EASEMENT GRANTED BY PLAT C22-21

20'R

OVERLAY EXISTING ASPHALT PAVING

LIMIT OF NEW ASPHALT OVERLAY

ERVIEN LANE S.W.
(56' R.O.W.)
(ASSUMED COUNTY)

COORS BOULEVARD S.W.
(100' R.O.W.)
(NMSHTD)

TRACT B
LANDS OF MONTOYA
(FILED 07-16-1997, 97C-219)

TRACT C
LANDS OF MONTOYA
(FILED 07-16-1997, 97C-219)

TRACT D
LANDS OF MONTOYA
(FILED 07-16-1997, 97C-219)

TRACT 1
LANDS OF BRACKEN
(FILED 12-06-1993, 93C-336)

NEW MEXICO 8547 REGISTERED PROFESSIONAL ENGINEER
JEFFREY G. MORTENSEN

07-26-99
10-14-99

File Path: E:\MAX\WORK\980711\
File Name: 980712NUC.DWG
Plot Date: 07-22-1999
Plot Time: 3:45 pm

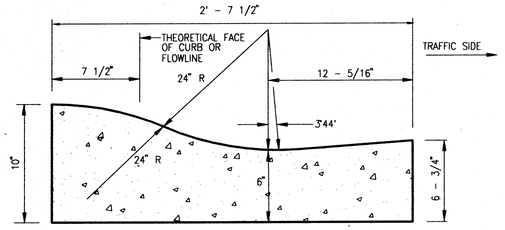
JEFF MORTENSEN & ASSOCIATES, INC.
6010-B MIDWAY PARK BLVD. N.E.
ALBUQUERQUE ☐ NEW MEXICO 87109
ENGINEERS ☐ SURVEYORS (505) 345-4250

CONCEPTUAL GRADING PLAN
VALLE VISTA SELF STORAGE AND MOBILE HOME PARK

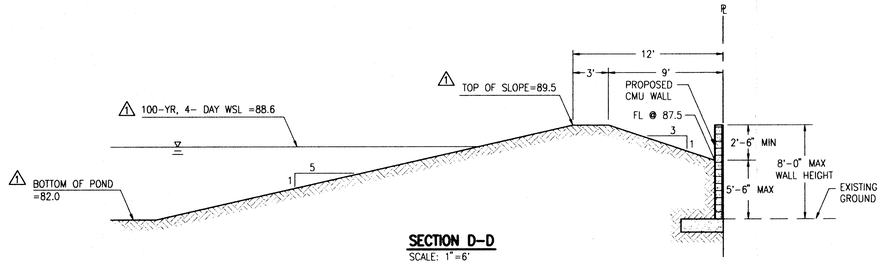
DESIGNED BY C.J.S.
DRAWN BY J.M.A./D.L.M.
APPROVED BY J.G.M.

NO.	DATE	BY	REVISIONS

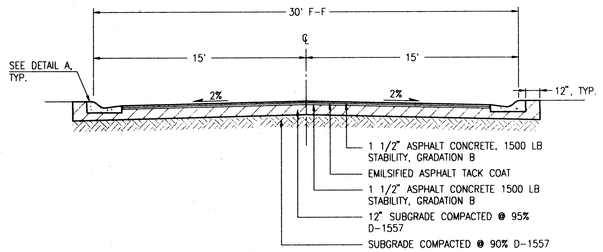
JOB NO. 980711
DATE 07-1999
SHEET 2 OF 4



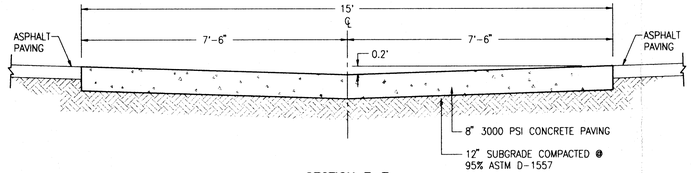
TYPICAL MOUNTABLE CURB - ROLL TYPE
SCALE: 1" = 6"



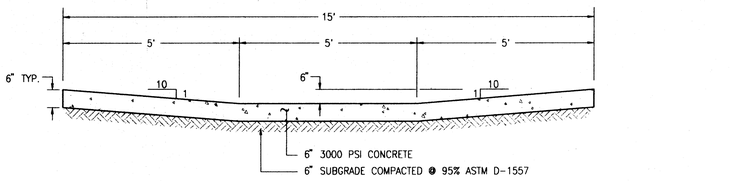
SECTION D-D
SCALE: 1"=6'



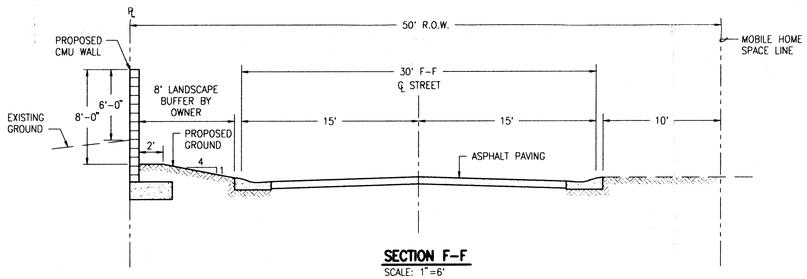
SECTION A-A
TYPICAL STREET SECTION
SCALE: 1" = 5'



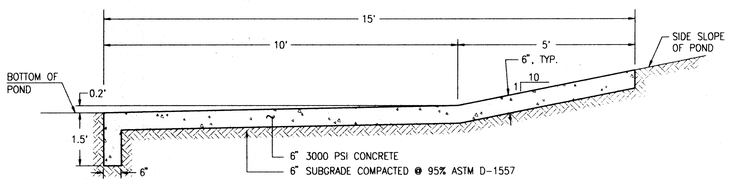
SECTION E-E
SCALE: 1"=2'



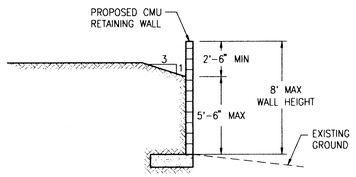
SECTION B-B
CONCRETE LOW FLOW CHANNEL
SCALE: 1" = 2'



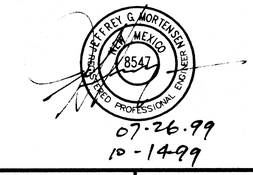
SECTION F-F
SCALE: 1"=6'



SECTION C-C
SCALE: 1"=2'



SECTION G-G
SCALE: 1"=5'



07-26-99
10-1499

File Path: G:\MWORK\98071\10TOC.DWG | Plot Date: 10-12-1999
File Name: 98071\10TOC.DWG | Plot Time: 09:21 am

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B MIDWAY PARK BLVD. N.E.
ALBUQUERQUE NEW MEXICO 87109
ENGINEERS SURVEYORS (505) 345-4250

SITE DETAILS
VALLEY VISTA SELF STORAGE AND MOBILE HOME PARK

DESIGNED BY J.G.M.
DRAWN BY J.Y.R.
APPROVED BY J.G.M.

NO.	DATE	BY	REVISIONS
1	10/99	CJS	ADJUST WSL AND POND BOTTOM ELEVATIONS

JOB NO. 980711
DATE 07-1999
SHEET 3 OF 4

DRAINAGE PLAN

EXECUTIVE SUMMARY AND INTRODUCTION

THIS PLAN REPRESENTS A CONCEPTUAL GRADING AND DRAINAGE PLAN FOR A PROPOSED MULTI-SPACE MOBILE HOME PARK ON A PARTIALLY DEVELOPED SITE FOR **VALLEY VISTA, INC.** THE SITE IS LOCATED IN THE SOUTH VALLEY, WEST OF COORS BOULEVARD AND EAST OF THE AMOLE DEL NORTE CHANNEL. THE SITE IS CURRENTLY OUTSIDE OF THE ALBUQUERQUE CITY LIMITS WITHIN BERNALILLO COUNTY. THE PROJECT WILL CONSIST OF THE CONSTRUCTION OF PAVED STREETS AS WELL AS THE INSTALLATION OF WATER AND SEWER SERVING EACH OF THE MOBILE HOME SPACES (DRAFT INFRASTRUCTURE LIST ATTACHED). BECAUSE THE SITE IS LOCATED BELOW THE AMOLE DEL NORTE CHANNEL, NO OFFSITE FLOWS FROM THE WEST ARE EXPECTED TO IMPACT THE SITE. DUE TO THE WEST TO EAST SLOPE, NO OFFSITE FLOWS ARE EXPECTED TO IMPACT THE SITE FROM THE NORTH OR SOUTH. ONSITE FLOWS WILL BE DIRECTED TO A DETENTION POND LOCATED IN THE SOUTHEAST PORTION OF THE SITE. THE PURPOSE OF THIS PLAN IS TO OBTAIN SITE DEVELOPMENT PLAN **FOR SUBDIVISION AND** FOR BUILDING PERMIT APPROVAL IN CONJUNCTION WITH ANNEXATION INTO THE CITY OF ALBUQUERQUE.

PROJECT DESCRIPTION

AS SHOWN ON THE ZONE ATLAS MAP PAGE N-10, THE SITE IS LOCATED ON ERVIEN LANE, WEST OF COORS BOULEVARD AND NORTH OF BLAKE ROAD. THE SITE CURRENTLY LIES OUTSIDE THE CITY OF ALBUQUERQUE LIMITS WITHIN BERNALILLO COUNTY. THE CURRENT LEGAL DESCRIPTION IS TRACT 2, LANDS OF WESTLAND DEVELOPMENT COMPANY, INC. THE SITE DOES NOT LIE WITHIN A DESIGNATED FLOOD HAZARD ZONE (ZONE "A") AS SHOWN BY F.I.R.M. PANEL 337 OF 825.

BACKGROUND DOCUMENTS

THE FOLLOWING DOCUMENTS WERE USED IN THE PREPARATION OF THIS PLAN:

1) SEAY BROTHERS STORAGE, GRADING AND DRAINAGE PLAN, PREPARED BY D. MARK GOODWIN & ASSOCIATES, DATED NOVEMBER, 1996.

THIS PLAN PROPOSED THE DEVELOPMENT OF THE STORAGE FACILITY IN THE NORTHERN PORTION OF THE SITE, AND WAS APPROVED BY BERNALILLO COUNTY.

2) GRADING AND DRAINAGE PLAN FOR PHASE I, SUNSHINE COUNTRY MOBILE HOME COURT, SUNSHINE COUNTRY SUBDIVISION, APPROVED BY BERNALILLO COUNTY, NEW MEXICO AND PREPARED BY VIGIL ENGINEERING, DATED AUGUST, 1996.

THIS REPORT SETS A PRECEDENT FOR PROPERTIES ADJACENTLY EAST AND TOPOGRAPHICALLY LOWER THAN THE AMOLE DEL NORTE DIVERSION FACILITY. THIS PLAN PROPOSED THE USE OF A FORCED MAIN AND PUMP SYSTEM TO DISCHARGE INTO THE AMOLE DEL NORTE DIVERSION FACILITY PROVIDING A MECHANISM FOR DRAINING THE SITE'S DETENTION POND. THIS SITE WAS LATER ANNEXED TO THE CITY OF ALBUQUERQUE.

3) INVESTIGATION PHASE REPORT FOR THE RE-EVALUATION STUDY OF THE AMOLE DEL NORTE DIVERSION FACILITY. PREPARED BY BOYLE ENGINEERING CORPORATION, DATED JUNE, 1984.

THIS REPORT INVESTIGATES THE VOLUME OF DEVELOPED RUNOFF GENERATED BY THE AMOLE DEL NORTE DRAINAGE BASIN. THE 100-YEAR DEVELOPED RUNOFF FOR THE BASIN WAS FOUND TO BE 262 ACRE-FEET WHILE THE CAPACITY OF THE AMOLE DEL NORTE DETENTION FACILITY IS 377 ACRE-FEET.

EXISTING CONDITIONS

THE NORTHERN PORTION OF THE SITE AS WELL AS THE ERVIEN LANE EXTENSION IS CURRENTLY DEVELOPED **AS A SELF-STORAGE FACILITY AND PAVED ACCESS** AND HENCE REPRESENTS AN EXISTING CONDITION. THE REMAINING PORTION OF THE SITE IS UNDEVELOPED, BUT HAS BEEN GRADED AND USED FOR EQUIPMENT AND CONTAINER STORAGE. FOR HYDROLOGIC CALCULATIONS, THE EXISTING LANDS WERE ASSIGNED TREATMENTS OF BOTH C AND D. THREE DRAINAGE BASINS EXIST ON THE SITE. DRAINAGE BASIN A IS LOCATED AT THE FAR NORTH EDGE OF THE SITE. ALL FLOWS ORIGINATING WITHIN THIS BASIN TRAVEL EAST TO A RETENTION POND LOCATED AT THE NORTHEAST CORNER OF THE SITE. **AS DETERMINED FROM THE ABOVE REFERENCED DRAINAGE PLAN PREPARED BY D. MARK GOODWIN & ASSOCIATES, THE EXISTING POND WITHIN BASIN A LACKS THE CAPACITY TO CONTAIN THE 100-YEAR, 10-DAY VOLUME. THEREFORE, THE POND OVERFLOWS AT ITS SOUTH END AND FLOWS TOWARD THE SOUTH.** DRAINAGE BASIN B ENCOMPASSES THE MAJORITY OF THE SITE. DEVELOPED RUNOFF GENERATED BY THIS BASIN IS DIRECTED TOWARD THE SOUTHEAST TO A SECOND RETENTION POND AREA LOCATED IN THE EAST CENTRAL PORTION OF THE SITE. EMERGENCY OVERFLOW FROM BASIN B DISCHARGES EAST ONTO ERVIEN LANE. A PORTION OF THE UNDEVELOPED RUNOFF GENERATED BY THIS SITE IS CAPTURED BY THE PONDING AREA, WHILE THE REMAINDER OF THE UNDEVELOPED RUNOFF DISCHARGES AS SHEET FLOW TO ADJACENT PROPERTIES TO THE EAST. DRAINAGE BASIN C COMPRISES ERVIEN LANE. DEVELOPED RUNOFF *GENERATED BY BASIN C FLOWS EAST AND DISPERSES AT THE INTERSECTION OF ERVIEN LANE AND* COORS BOULEVARD. COORS BLVD. LACKS PUBLIC DRAINAGE FACILITIES; A WELL DEFINED DRAINAGE PATTERN IN THE PROXIMITY OF COORS BLVD. IS NOT RECOGNIZED. THE CONCRETE LINED AMOLE DEL NORTE DRAINAGE FACILITY IS LOCATED ADJACENT AND WEST OF THE SITE. AND HENCE INTERCEPTS OFFSITE FLOWS.

DEVELOPED CONDITIONS

THE PROPOSED IMPROVEMENTS WILL TAKE PLACE ON THE CURRENTLY UNDEVELOPED PORTION OF THE SITE AND WILL INCREASE ONSITE STORMWATER RUNOFF. IN THE SITE'S PROPOSED DEVELOPED CONDITIONS, THE SITE CONTAINS LAND TREATMENTS OF **B**, C, AND D. AS MENTIONED EARLIER, ONSITE DEVELOPED RUNOFF WILL BE DIRECTED INTO A DETENTION PONDING AREA LOCATED AT THE SOUTHEAST PORTION OF THE SITE. BECAUSE THE ROADS DIRECTLY DOWNSTREAM OF THE PROPOSED POND DO NOT HAVE CURB AND GUTTER, DRAINING THE POND INTO THESE AREAS IS NOT A GOOD DESIGN. THEREFORE, THE POND WILL BE DRAINED USING A PUMP AND PRIVATE FORCED MAIN RUNNING WEST ALONG THE SOUTH PROPERTY LINE AND DISCHARGING INTO THE AMOLE DEL NORTE CONCRETE CHANNEL. THE USE OF A PUMP AND FORCED MAIN TO DRAIN THE DETENTION POND WAS COORDINATED WITH GLENN JURGENSEN OF THE CITY OF ALBUQUERQUE STORM DRAIN MAINTENANCE. THE POND WILL DRAIN THE **4**-DAY, **100-YEAR** VOLUME IN 96 HOURS. THE AMOLE DEL NORTE CHANNEL IS A CITY OF ALBUQUERQUE FACILITY AND DISCHARGES INTO THE AMOLE DEL NORTE DETENTION FACILITY. BASED UPON THE AFOREMENTIONED STUDY OF THE AMOLE DEL NORTE DIVERSION FACILITY, THE 100-YEAR VOLUME CAPACITY OF THE DOWNSTREAM AMOLE DEL NORTE DETENTION POND IS FAR IN EXCESS OF THE DEVELOPED VOLUME GENERATED BY THE AMOLE DEL NORTE DRAINAGE BASIN. THEREFORE, THE AMOLE DEL NORTE DETENTION FACILITY IS CAPABLE OF ACCEPTING THE ADDITIONAL VOLUME OF RUNOFF DISCHARGED BY THE PROJECT SITE.

IN THE DEVELOPED CONDITION, DRAINAGE BASIN A WILL CONTINUE TO DISCHARGE TO THE EXISTING POND LOCATED AT THE NORTHEAST CORNER OF THE SITE. **IN THE EVENT THAT THE BASIN A POND CAPACITY IS EXCEEDED, STORMWATER OVERFLOW FROM THE POND WILL BE CONTAINED ONSITE BY THE EXISTING CMU WALL AND WILL FLOW SOUTH AND ENTER THE PROPOSED PRIVATE STORM DRAIN TO BE LOCATED AT THE EAST END OF THE SITE. IT WILL THEN DISCHARGE TO THE PROPOSED DETENTION POND. AS SHOWN BY THE DRAINAGE CALCULATIONS, THE PROPOSED DETENTION POND WITHIN BASIN B POSSESSES THE REQUIRED VOLUME TO CONTAIN THE DEVELOPED FLOWS GENERATED BY BASIN A.** DRAINAGE BASIN B WAS DIVIDED INTO SUB-BASINS B-1 THROUGH B-5, AND ALL SUB-BASINS WILL DISCHARGE INTO THE PROPOSED DETENTION POND LOCATED AT THE SOUTHEAST CORNER OF THE SITE. A PORTION OF THE RUNOFF GENERATED BY SUB- BASIN B-1 WILL TRAVEL EAST UNTIL IT REACHES THE ERVIEN LANE ENTRANCE WHERE IT WILL BE INTERCEPTED BY A PRIVATE CATTLEGUARD INLET. THE REMAINING SUB-BASIN B-1 FLOWS WILL ENTER A STORM INLET LOCATED NEAR THE CENTER PORTION OF SUB-BASIN B-1 AND BE TRANSFERRED TO THE ABOVE MENTIONED CATTLEGUARD INLET THROUGH A PRIVATE STORM DRAIN PIPE. RUNOFF INTERCEPTED BY THE CATTLEGUARD INLET WILL THEN BE DISCHARGED INTO THE DETENTION POND THROUGH A PRIVATE STORM DRAIN PIPE RUNNING SOUTH ALONG THE EAST EDGE OF THE SITE. THE REMAINING DEVELOPED FLOWS GENERATED BY BASIN B WILL BE CONVEYED FROM THE PRIVATE STREETS TO THE PONDING AREA AS SURFACE FLOWS UTILIZING TWO CONCRETE LINED TRAPEZOIDAL CHANNELS WITHIN THE RECREATION AREA AT THE SOUTHEAST PORTION OF THE SITE. A SMALL QUANTITY OF NUISANCE STREET FLOWS TRAVELLING SOUTH TOWARD BARCELONA PLACE LOCATED SOUTH OF THE SITE WILL BE INTERCEPTED AT THE PROPERTY LINE BY STORM INLETS AND DIVERTED TO THE DETENTION PONDING AREA VIA A PRIVATE STORM DRAIN PIPE. RUNOFF GENERATED BY DRAINAGE BASIN C WILL CONTINUE IN ITS HISTORIC PATH EAST TO COORS BLVD.

AS SHOWN ON THE GRADING PLAN, A PORTION OF THE SELF STORAGE FACILITY IS DELINEATED BY A PHASE LINE AND AS A "FUTURE" CONDITION. THIS PLAN DOES NOT PROPOSE THE DEVELOPMENT OF THE FUTURE SELF STORAGE FACILITIES; HOWEVER, THE HYDROLOGIC CALCULATIONS FOR THE DEVELOPED CONDITION CONTAINED HEREIN ACCOUNT FOR THE FUTURE DEVELOPMENT. THE PROPOSED DETENTION POND WITHIN DRAINAGE BASIN B WAS SIZED TO ACCOMMODATE THE DEVELOPED AS WELL AS FUTURE CONDITION OF THE SELF-STORAGE FACILITY.

GRADING PLAN

THE GRADING PLAN SHOWS: 1) EXISTING GRADES INDICATED BY SPOT ELEVATIONS AND CONTOURS AT 1'0" INTERVALS AS TAKEN FROM THE TOPOGRAPHIC SURVEY PREPARED BY THIS OFFICE, DATED FEBRUARY 1999. 2) PROPOSED GRADES INDICATED BY SPOT ELEVATIONS AND CONTOURS AT 1'0" INTERVALS, 3) THE LIMIT AND CHARACTER OF THE EXISTING IMPROVEMENTS, 4) THE LIMIT AND CHARACTER OF THE PROPOSED IMPROVEMENTS, AND 5) CONTINUITY BETWEEN EXISTING AND PROPOSED GRADES. THE GRADING PLAN APPEARS ON SHEET 1 OF THIS SUBMITTAL.

CALCULATIONS

THE CALCULATIONS CONTAINED HEREIN ANALYZE BOTH THE EXISTING AND DEVELOPED CONDITIONS FOR THE 100-YEAR, 6-HOUR RAINFALL EVENT AND THE 100-YEAR, 4-DAY RAINFALL EVENT. THE PROCEDURE FOR 40-ACRE AND SMALLER BASINS, AS SET FORTH IN THE REVISION OF SECTION 22.2, HYDROLOGY OF THE DEVELOPMENT PROCESS MANUAL, VOLUME 2, DESIGN CRITERIA, DATED JANUARY, 1993, HAS BEEN USED TO QUANTIFY THE PEAK RATE OF DISCHARGE AND VOLUME OF RUNOFF GENERATED. THE DRAINAGE CALCULATIONS FOR THE DEVELOPED CONDITION AND THE ASSOCIATED PRIVATE STORM DRAIN IMPROVEMENTS ALLOW FOR THE FUTURE DEVELOPMENT OF THE EXISTING SELF STORAGE FACILITY LOCATED AT THE NORTH PORTION OF THE SITE. THE POND VOLUME WAS CALCULATED USING THE AVERAGE END AREA METHOD. CALCULATIONS FOR HYDRAULIC CAPACITIES OF THE PIPES, INLETS AND CHANNELS ARE SHOWN THIS SHEET.

CONCLUSION

ONSITE FLOWS ORIGINATING WITHIN DRAINAGE BASINS A AND B WILL BE PONDED. RUNOFF WITHIN BASIN A WILL CONTINUE TO TRAVEL TO AN EXISTING ONSITE RETENTION POND (EXISTING CONDITION) WHILE RUNOFF GENERATED BY BASIN B WILL BE DIRECTED TO A PROPOSED DETENTION POND WHICH WILL DISCHARGE TO THE AMOLE DEL NORTE DIVERSION CHANNEL VIA A PRIVATE LIFT STATION AND FORCED MAIN. ONSITE FLOWS ORIGINATING WITHIN DRAINAGE BASIN C WILL BE ALLOWED TO DISCHARGE IN THEIR HISTORIC PATHS. ALL OFFSITE FLOWS ARE INTERCEPTED BY THE AMOLE DEL NORTE CHANNEL.

CALCULATIONS

I. SITE CHARACTERISTICS

A. PRECIPITATION ZONE = 1

B. $P_{6,100} = P_{360} = 2.20$ IN.

$P_{4-DAY} = 3.12$ IN.

C. TOTAL AREA (A_T) = 1,131,560 SF/26.00 AC

D. EXISTING LAND TREATMENT

1. BASIN A 42,380 SF/0.98 AC

TREATMENT	AREA (SF/AC)	%
C	25,690/0.59	60
D	17,500/0.39	40

2. BASIN B 1,040,650 SF/23.89 AC

TREATMENT	AREA (SF/AC)	%
C	886,950/20.36	85
D	153,700/3.53	15

3. BASIN C 49,220/1.13 AC

TREATMENT	AREA (SF/AC)	%
C	27,440/0.63	56
D	21,780/0.50	44

E. DEVELOPED LAND TREATMENT

1. BASIN A 42,380 SF/0.98 AC

TREATMENT	AREA (SF/AC)	%
C	9,000/0.21	21
D	33,540/0.77	79

2. BASIN B-1 290,990 SF/6.68 AC

TREATMENT	AREA (SF/AC)	%
B	10,500/0.24	04
C	36,590/0.84	13
D	243,790/5.60	84

3. BASIN B-2 165,590 SF/3.80 AC

TREATMENT	AREA (SF/AC)	%
B	36,590/0.84	22
C	39,640/0.91	24
D	90,170/2.07	54

4. BASIN B-3 213,500/4.90 AC

TREATMENT	AREA (SF/AC)	%
B	42,690/0.98	20
C	53,580/1.23	25
D	117,180/2.69	55

5. BASIN B-4 195,580 SF/4.49 AC

TREATMENT	AREA (SF/AC)	%
B	40,950/0.94	21
C	47,040/1.08	24
D	108,030/2.48	55

6. BASIN B-5 175,110 SF/4.02 AC

TREATMENT	AREA (SF/AC)	%
B	41,820/0.96	24
C	91,480/2.10	52
D	41,380/0.95	24

7. BASIN C 49,220 SF/1.13 AC

TREATMENT	AREA (SF/AC)	%
C	24,360/0.56	50
D	24,860/0.57	50

II. EXISTING CONDITION

A. BASIN A

1. VOLUME

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = [0.99(0.59)+1.97(0.39)]/0.98 = 1.38$ IN
$V_{100} = (E_W/12)A_T$
$V_{100} = (1.38/12)0.98 = 0.1127$ AC.FT. = 4,910 CF

2. VOLUME $V_{4\ DAY}$

$V_{4\ DAY} = V_{100} + A_D(P_{4DAY} - P_{360})/12$
$V_{4\ DAY} = 0.1127 + 0.39(3.12-2.20)/12 = 0.1426$ AC-FT = 6,210 CF

3. PEAK DISCHARGE

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = 2.87(0.59)+4.37(0.39) = 3.4$ CFS

B. BASIN B

1. VOLUME

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = [0.99(20.36)+1.97(3.53)]/23.89 = 1.13$ IN
$V_{100} = (E_W/12)A_T$
$V_{100} = (1.13/12)23.89 = 2.2592$ AC.FT. = 98,410 CF

2. VOLUME $V_{4\ DAY}$

$V_{4-DAY} = V_{100} + A_D(P_{4-DAY} - P_{360})/12$
$V_{4-DAY} = 2.2592 + 3.53(3.12-2.20)/12$
= 2.5298 AC.FT. = 110,200 CF

3. PEAK DISCHARGE

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = 2.87(20.36)+4.37(3.53) = 73.9$ CFS

C. BASIN C

1. VOLUME

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = [0.99(0.63)+1.97(0.50)]/1.13 = 1.42$ IN
$V_{100} = (E_W/12)A_T$
$V_{100} = (1.42/12)1.13 = 0.1337$ AC.FT. = 5,820 CF

2. VOLUME $V_{4\ DAY}$

$V_{4\ DAY} = V_{100} + A_D(P_{4\ DAY} - P_{360})/12$
$V_{4\ DAY} = 0.1337 + 0.5(3.12-2.20)/12$
= 0.01720 AC. FT. = 7,490 CF

3. PEAK DISCHARGE

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = 2.87(0.63)+4.37(0.50) = 4.0$ CFS

III. DEVELOPED CONDITION

A. BASIN A

1. VOLUME

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = [0.99(0.21)+1.97(0.77)]/0.98 = 1.76$ IN
$V_{100} = (E_W/12)A_T$
$V_{100} = (1.76/12)0.98 = 0.1437$ AC.FT. = 6,260 CF

2. VOLUME $V_{4\ DAY}$

$V_{4\ DAY} = V_{4\ DAY} + A_D(P_{4\ DAY} - P_{360})/12$
$V_{4\ DAY} = 0.1437 + 0.77(3.12-2.20)/12$
= 0.2028 AC.FT. = 8830 CF

3. PEAK DISCHARGE

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = 2.87(0.21)+4.37(0.77) = 4.0$ CFS

B. BASIN B-1

1. VOLUME

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = [0.67(0.24)+0.99(0.84)+1.97(5.60)]/6.68$
=1.80 IN.
$V_{100} = (E_W/12)A_T$
$V_{100} = (1.80/12)6.68 = 1.0020$ AC.FT. = 43,650 CF

2. VOLUME $V_{4\ DAY}$

$V_{4\ DAY} = V_{100} + A_D(P_{4\ DAY} - P_{360})/12$
$V_{4\ DAY} = 1.0020 + 5.60(3.12-2.20)/12$
= 1.4313 AC.FT. = 62,350 CF

3. PEAK DISCHARGE

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = 2.03(0.24)+2.87(0.84)+4.37(5.60)$
= 27.4 CFS

4. SINGLE 'D' INLET CALCULATIONS

a. GRATE CAPACITY

$Q = CA(2gh)^{1/2}$

WHERE:

C = 0.6
A = 2.28 SF (SINGLE 'D' HALF CLOGGED)
$g = 32.2\ FT/S^2$
h = 0.5 FT

THEN:

Q = 7.8 CFS

b. PIPE INLET CAPACITY

$Q = CA(2gh)^{1/2}$

WHERE:

C = 0.6
A = 1.77 SF (18" PIPE)
$g = 32.2\ FT/S^2$
h = 2.9 FT

THEN:

Q = 14.5 CFS

c. PIPE CAPACITY

$Q = 1.486/n\ R^{0.67}S^{0.5}\ A$

WHERE:

n = 0.012
A = 1.77 (18" PIPE)
P = 4.71 FT
R = A/P = 0.38 FT
S = 0.0110

THEN:

Q = 11.9 CFS

5. CATTLE GUARD INLET CALCULATIONS

a. GRATE CAPACITY

$Q = CA(2gh)^{1/2}$

WHERE:

C = 0.6
A = 39.6 SF (HALF CLOGGED)
$g = 32.2\ FT/S^2$
h = 0.2 FT

THEN:

$Q = 85.3\ CFS > Q_{100} = 27.4$ CFS

b. PIPE INLET CAPACITY

$Q = CA(2gh)^{1/2}$

WHERE:

C = 0.6
A = 4.91 SF (30" PIPE)
$g = 32.2\ FT/S^2$
h = 2.45 FT

THEN:

$Q = 37.0\ CFS > Q_{100} = 27.4$ CFS

c. PIPE CAPACITY

$Q = 1.486/n\ R^{0.67}S^{0.5}\ A$

WHERE:

n = 0.012
A = 4.91 SF (30" PIPE)
P = 7.85 FT
R = A/P = 0.63 FT
S = 0.0040

THEN:

$Q = 28.1\ CFS > Q_{100} = 27.4$ CFS

6. 36" STORM DRAIN CALCULATIONS

a. PIPE INLET CAPACITY AT MANHOLE

$Q = CA(2gh)^{1/2}$

WHERE:

C = 0.6
A = 7.07 SF (36" PIPE)
$g = 32.2\ FT/S^2$
h = 2.77 FT

THEN:

$Q = 56.7\ CFS > Q_{100} = 27.4$ CFS

b. CAPACITY OF PIPE DISCHARGING TO POND

$Q = 1.486/n\ R^{0.67}S^{0.5}\ A$

WHERE:

n = 0.012
A = 7.07 SF (36" PIPE)
P = 9.42 FT
R = A/P = 0.75 FT
S = 0.0029

THEN:

$Q = 38.9\ CFS > Q_{100} = 27.4$ CFS

C. BASIN B-2

1. VOLUME

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = [0.67(0.84)+0.99(0.91)+1.97(2.07)/3.80]$
=1.46 IN
$V_{100} = (E_W/12)A_T$
$V_{100} = (1.46/12)3.80 = 0.4618$ AC.FT. = 20,120 CF

2. VOLUME $V_{4\ DAY}$

$V_{4\ DAY} = V_{100} + A_D(P_{4\ DAY} - P_{360})/12$
$V_{4\ DAY} = 0.4618 + 1.97(3.12-2.20)/12$
= 0.6128AC.FT. = 26,700 CF

3. PEAK DISCHARGE

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = 2.03(0.84)+2.87(0.91)+4.37(2.07)$
=13.4 CFS

D. BASIN B-3

1. VOLUME

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = [0.67(0.98)+0.99(1.23)+1.97(2.69)]/4.90$
=1.46 IN.
$V_{100} = (E_W/12)A_T$
$V_{100} = (1.46/12)4.90 = 0.5978$ AC.FT. = 26,040 CF

2. VOLUME $V_{4\ DAY}$

$V_{4\ DAY} = V_{100} + A_D(P_{4\ DAY} - P_{360})/12$
$V_{4\ DAY} = 0.5978 + 2.69(3.12-2.20)/12$
= 0.8040 AC.FT. = 35,020 CF

3. PEAK DISCHARGE

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = 2.03(0.98)+2.87(1.23)+4.37(2.69)$
=17.3 CFS

E. BASIN B-4

1. VOLUME

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = [0.67(0.94)+0.99(1.08)+1.97(2.48)]/4.49$
=1.47 IN.
$V_{100} = (E_W/12)A_T$
$V_{100} = (1.47/12)4.49 = 0.5487$ AC.FT. = 23,900 CF

2. VOLUME $V_{4\ DAY}$

$V_{4\ DAY} = V_{100} + A_D(P_{4\ DAY} - P_{360})/12$
$V_{4\ DAY} = 0.5487 + 2.48(3.12-2.20)/12$
= 0.7389 AC.FT. = 32,180 CF

3. PEAK DISCHARGE

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = 2.03(0.94)+2.87(1.08)+4.37(2.48)$
=15.8 CFS

4. STORM INLET CALCULATIONS

a. DRAINAGE BASIN CALCULATIONS (AREA DRAINING TO INLETS)

1. PRECIPITATION ZONE = 1
2. $P_{6,100} = P_{360} = 2.20$ IN.
3. TOTAL AREA (A_T) = 0.40 AC
4. DEVELOPED LAND TREATMENT

TREATMENT	AREA (SF/AC)	%
B	4,360/0.10	25
C	4,360/0.10	25
D	8,720/0.20	50

5. PEAK DISCHARGE

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = 2.03(0.10)+2.87(0.10)+4.37(0.20 = 1.4$ CFS

b. GRATE CAPACITY

$Q = CA(2gh)^{1/2}$

WHERE:

C = 0.6
A = 1.91 SF (SINGLE 'A' HALF CLOGGED)
$g = 32.2\ FT/S^2$
h = 0.3 FT

THEN:

$Q = 5.0\ CFS > Q_{100} = 1.4$ CFS

c. PIPE INLET CAPACITY

$Q = CA(2gh)^{1/2}$

WHERE:

C = 0.6
A = 0.79 SF (12" PIPE)
$g = 32.2\ FT/S^2$
h = 3.25 FT

THEN:

$Q = 6.9\ CFS > Q_{100} = 1.4$ CFS

d. CAPACITY OF PIPE DISCHARGING TO POND

$Q = 1.486/n\ R^{0.67}S^{0.5}\ A$

WHERE:

n = 0.012
A = 0.79 SF (12" PIPE)
P = 3.14 FT
R = A/P = 0.25 FT
S = 0.0134

THEN:

$Q = 4.5\ CFS > Q_{100} = 1.4$ CFS

e. CAPACITY OF PIPE CONNECTING INLETS

$Q = 1.486/n\ R^{0.67}S^{0.5}\ A$

WHERE:

n = 0.012
A = 0.79 SF (12" PIPE)
P = 3.14 FT
R = A/P = 0.25 FT
S = 0.0019

THEN:

$Q = 1.7\ CFS > Q_{100} = 1.4$ CFS

C. BASIN B-5

1. VOLUME

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = [0.67(0.96)+0.99(2.10)+1.97(0.95)]/4.02$
=1.14 IN.
$V_{100} = (E_W/12)A_T$
$V_{100} = (1.14/12)4.02 = 0.3828$ AC.FT. = 16,680 CF

2. VOLUME $V_{4\ DAY}$

$V_{4\ DAY} = V_{100} + A_D(P_{4\ DAY} - P_{360})/12$
$V_{4\ DAY} = 0.3828 + 0.95(3.12-2.20)/12$
= 0.4556 AC.FT. = 19,850 CF

THEN:

$Q = 5.0\ CFS > Q_{100} = 1.5$ CFS

3. PEAK DISCHARGE

c. PIPE INLET CAPACITY

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = 2.03(0.96)+2.87(2.10)+4.37(0.95) = 12.1$ CFS
$Q = CA(2gh)^{1/2}$

4. CONCRETE CHANNEL CALCULATIONS - CHANNEL NORTH OF POND

$Q = 1.486/n\ R^{0.67}S^{0.5}\ A$

WHERE:

n = 0.013
A = 5.0 SF
P = 15.05 SF
R = A/P = 0.33 FT
S = 0.0130

THEN:

$Q = 31.0\ CFS > Q_{100} = 13.4 + 17.3 = 30.7$ CFS

5. CONCRETE CHANNEL CALCULATIONS - CHANNEL WEST OF POND

$Q = 1.486/n\ R^{0.67}S^{0.5}\ A$

WHERE:

n = 0.013
A = 5.0 SF
P = 15.05 SF
R = A/P = 0.33 FT
S = 0.0400

THEN:

$Q = 54.4\ CFS > Q_{100} = 15.8$ CFS

6. POND VOLUME

ELEV	AREA	VOL	* VOL
82	1640		
83	16910	9275	9275
84	20750	18830	28105
85	24920	22835	50940
86	29450	27185	78125
87	34560	32005	110130
88	41760	38160	148290
89	47900	44830	193120

$V_{4-DAY\ TOTAL}$ = 62,350+26,700+35,020+32,180+19,850 = 176,100 CF

100-YR, 4-DAY WSL = 88.6

7. TIME TO DRAIN POND

ASSUME $Q_{PUMP} = 0.51$ CFS = 230 GPM

$T = V_{4-DAY}/Q_{PUMP}$
T = (176,100/0.51)(1 HR/3600 SEC) = 96 HR

D. BASIN C

1. VOLUME

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = [0.99(0.56)+1.97(0.57)]/1.13 = 1.48$ IN
$V_{100} = (E_W/12)A_T$
$V_{100} = (1.48/12)1.13 = 0.1398$ AC.FT. = 6,090 CF

2. VOLUME $V_{4\ DAY}$

$V_{4-DAY} = V_{100} + A_D(P_{4-DAY} - P_{360})/12$
$V_{4-DAY} = 0.1398 + 0.5(3.12-2.20)/12$
= 0.1781 AC FT = 7,760 CF

3. PEAK DISCHARGE

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = 2.87(0.56)+4.37(0.57) = 4.1$ CFS

4. TYPICAL PRIVATE STREET CAPACITY

NORMAL DEPTH CALCULATION FOR 30' F-F WITH MOUNTABLE CURB USING FLOWMASTER BY HAESTAD METHODS

MANNING'S EQUATION

$Q = 1.486/n\ R^{0.67}\ S^{0.5}\ A$

WHERE:

n = 0.017
A = 5.39 SF
P = 31.31 FT
R = A/P = 0.17 FT
S = 0.0085 (WORST CASE: DISCHARGE PT OF BASIN B-2)

THEN:

$Q = 13.4\ CFS > OR = Q_{100,B-2} = 13.4$ CFS

IV. COMPARISON

A. VOLUME V_{100}

1. BASIN A

$\Delta V_{100} = 6260 - 4910 = 1350$ CF (INCREASE)

2. BASIN B

ΔV_{100} = (43,650 + 20,120 + 26,040 + 23,900 + 16,680) -98,410 = 31,980 CF (INCREASE)

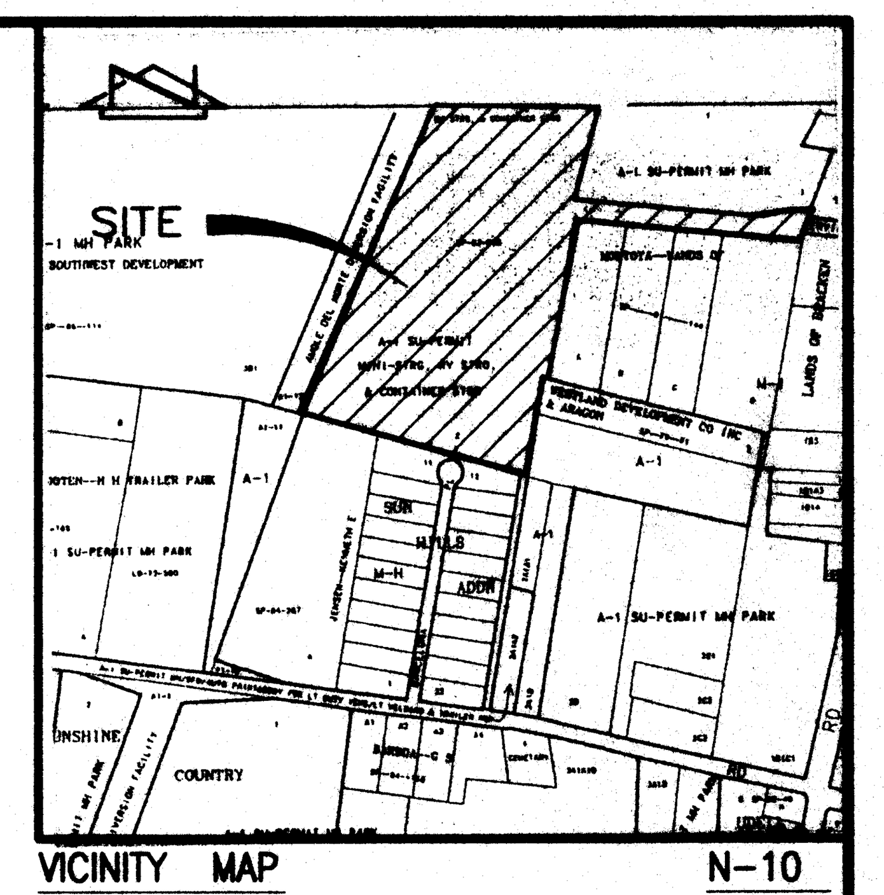
3. BASIN C

$\Delta V_{100} = 6090 - 5820 = 270$ CF (INCREASE)

B. VOLUME V_{4-DAY}

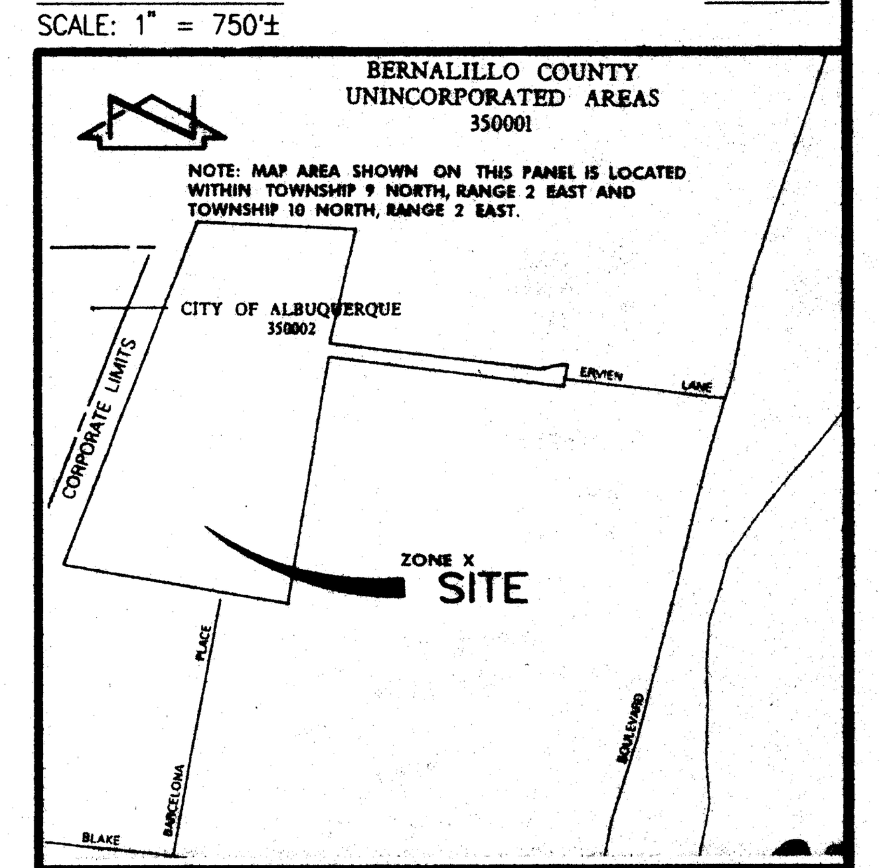
1. BASIN A

$\Delta V_{4-DAY} = 8830 - 6210 = 2620$ CF (INCREASE)



VICINITY MAP N-10

SCALE: 1" = 750'±



FLOODPLAIN MAP

SCALE: 1" = 750'±

PANEL 337 OF 825

2. BASIN B

ΔV_{4-DAY} = (62,350 + 26,700 + 35,020 + 32,180 + 19,850) -110,200 = 65,900 CF (INCREASE)

3. BASIN C

ΔV_{100} = 7760 - 7490 = 270 CF (INCREASE)

C. PEAK DISCHARGE

1. BASIN A

$\Delta Q_{100} = 0 - 0 = 0$ CFS (NO CHANGE)

2. BASIN B

$\Delta Q_{100} = 0.5 - 73.9 = -73.4$ CFS (DECREASE)

3. BASIN C

$\Delta Q_{100} = 4.1 - 4.0 = 0.1$ CFS (INCREASE)

V. TYPICAL LEASE SPACE WITHIN VALLEY VISTA MOBILE HOME PARK

A. TOTAL AREA (A_T) = 4800 SF/0.11 AC

B. DEVELOPED LAND TREATMENT

N = DU/AC = 5.4 DU/AC

SINCE N < OR = 6 DU/AC,

PERCENT TREATMENT D = $7 * (N^2 + 5N)^{1/2}$

(DPM SEC 22.2 TABLE A-5)

% D = $7 * (5.4^2 + 5 * 5.4)^{1/2} = 53$ %

TREATMENT	AREA (SF/AC)	%
B	1100/0.03	23
C	1100/0.03	24
D	2540/0.06	53

C. VOLUME

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = [0.67(0.03)+0.99(0.03)+1.97(0.06)]/0.11 = 1.53$ IN.

$V_{100} = (E_W/12)A_T$
$V_{100} = (1.53/12)0.11 = 0.0140$ AC.FT. = 610 CF

2. VOLUME $V_{4\ DAY}$

$V_{4-DAY} = V_{100} + A_D(P_{4-DAY} - P_{360})/12$
$V_{4-DAY} = 0.0140 + 0.06(3.12-2.20)/12$
= 0.0186 AC. FT. = 810 CF

3. PEAK DISCHARGE

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = 2.03(0.03)+2.87(0.03)+4.37(0.06)$
=0.4 CFS

JEFFREY G. MORTENSEN NEW MEXICO 8547 REGISTERED PROFESSIONAL ENGINEER 10-12-99 07-26-99

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B MIDWAY PARK BLVD. N.E.
ALBUQUERQUE NEW MEXICO 87109
ENGINEERS SURVEYORS (505) 345-4250

CONCEPTUAL DRAINAGE PLAN, CALCULATIONS, VICINITY MAP, FLOOD PLAIN MAP

VALLEY VISTA SELF STORAGE AND MOBILE HOME PARK

DESIGNED BY C.J.S.
DRAWN BY J.M.A./D.L.M.
APPROVED BY J.G.M.

NO.	DATE	BY	REVISIONS
1	10/99	CJS	REVISIONS PER COMMENTS FROM CITY: CALCULATIONS REVISED TO INCLUDE GREATER % D TREATMENT

JOB NO. 980711
DATE 07-1999
SHEET 4 OF 4

File Path: [illegible]
File Name: 980711CDP.DWG
Plot Date: 10-12-1999
Plot Time: 1:35 pm

CONCEPTUAL GRADING AND DRAINAGE PLAN

VALLEY VISTA SELF STORAGE AND MOBILE HOME PARK

MORTENSEN & ASSOCIATES, INC.
010-B MIDWAY PARK BLVD. N.E.
ALBUQUERQUE, NEW MEXICO 87109
ENGINEERS ☐ SURVEYORS (505) 345-4250

DESIGNED BY	C.J.S.
DRAWN BY	D.L.M./J.Y.R.
APPROVED BY	J.G.M.

NO.	DATE	BY	REVISIONS
1	9/99	CJS	ADD CROSS-LOT DRAINAGE EASEMENT AND PRIVATE ACCESS TURNAROUND EASEMENTS, SUBSTITUTE GRAVEL FOR ASPHALT @ S. EMERGENCY ACCESS
2	10/99	CJS	REGRADE POND AND CHANGES TO PRIVATE STORM DRAIN SLOPES AND INVERTS; LABELING OF PRIVATE STREETS

JOB NO.	980711
DATE	10-1999
SHEET	1 OF 4