

CALCULATIONS

SITE CHARACTERISTICS

I. PRECIPITATION ZONE = 1

II. $P_{100} = P_{360} = 2.20$ IN.

III. TOTAL AREA (A_T) = 7.2 AC

IV. EXISTING LAND TREATMENT

BASIN A ($A_T = 122,000$ SF/2.80 AC)

TREATMENT	AREA (SF/AC)	%
B	5,700/0.13	4.6
C	27,800/0.64	22.9
D	88,500/2.03	72.5

BASIN B ($A_T = 192,000$ SF/4.40 AC)

TREATMENT	AREA (SF/AC)	%
B	120,500/2.77	63.0
C	25,880/0.58	16.1
D	40,000/0.92	20.9

V. DEVELOPED LAND TREATMENT

BASIN A ($A_T = 122,000$ SF/2.80 AC)

TREATMENT	AREA (SF/AC)	%
B	2,000/0.05	1.8
C	25,750/0.59	21.1
D	94,250/2.16	77.1

BASIN B

TREATMENT	AREA (SF/AC)	%
B	120,500/2.77	63.0
C	25,880/0.58	13.1
D	45,620/1.05	23.9

VI. EXISTING CONDITION

A. BASIN A

1. VOLUME

$$E_w = (E_{A_A} + E_{B_A} + E_{C_A} + E_{D_A}) / A_T$$

$$E_w = (0.67(0.13) + 0.99(0.64) + 1.97(2.03)) / 2.80 = 1.69 \text{ IN.}$$

$$V_{100} = (E_w / 12) A_T$$

$$V_{100} = (1.69 / 12) 2.80 = 0.3943 \text{ AC-FT} = 17,180 \text{ CF}$$

$$V_{10\text{-DAY}} = V_{100} + A_T (P_{10} - P_{360}) / 12$$

$$= 0.3943 + 2.03(3.67 - 2.20) / 12 = 0.6430 \text{ AC-FT} = 28,000 \text{ CF}$$

2. PEAK DISCHARGE

$$Q_p = Q_{PA} A + Q_{PB} B + Q_{PC} C + Q_{PD} D$$

$$Q_p = Q_{100} = 2.03(0.13) + 2.87(0.64) + 4.37(2.03) = 11.0 \text{ CFS}$$

B. BASIN B

1. VOLUME

$$E_w = (E_{A_B} + E_{B_B} + E_{C_B} + E_{D_B}) / A_T$$

$$E_w = (0.67(2.77) + 0.99(0.71) + 1.97(0.92)) / 4.40 = 0.99 \text{ IN.}$$

$$V_{100} = (E_w / 12) A_T$$

$$V_{100} = (0.99 / 12) 4.40 = 0.3630 \text{ AC-FT} = 15,810 \text{ CF}$$

$$V_{10\text{-DAY}} = V_{100} + A_T (P_{10} - P_{360}) / 12$$

$$= 0.3630 + 0.92(3.67 - 2.20) / 12 = 0.4757 \text{ AC-FT} = 20,720 \text{ CF}$$

2. PEAK DISCHARGE

$$Q_p = Q_{PA} A + Q_{PB} B + Q_{PC} C + Q_{PD} D$$

$$Q_p = Q_{100} = 2.03(2.77) + 2.87(0.71) + 4.37(0.92) = 11.7 \text{ CFS}$$

VII. DEVELOPED CONDITION

A. BASIN A

1. VOLUME

$$E_w = (E_{A_A} + E_{B_A} + E_{C_A} + E_{D_A}) / A_T$$

$$E_w = (0.67(0.05) + 0.99(0.59) + 1.97(2.16)) / 2.80 = 1.74 \text{ IN.}$$

$$V_{100} = (E_w / 12) A_T$$

$$V_{100} = (1.74 / 12) 2.80 = 0.4060 \text{ AC-FT} = 17,700 \text{ CF}$$

$$V_{10\text{-DAY}} = V_{100} + A_T (P_{10} - P_{360}) / 12$$

$$= 0.4060 + 2.16(3.67 - 2.20) / 12 = 0.6706 \text{ AC-FT} = 29,210 \text{ CF}$$

2. PEAK DISCHARGE

$$Q_p = Q_{PA} A + Q_{PB} B + Q_{PC} C + Q_{PD} D$$

$$Q_p = Q_{100} = (2.03(0.05) + 2.87(0.59) + 4.37(2.16)) = 11.2 \text{ CFS}$$

B. BASIN B

1. VOLUME

$$E_w = (E_{A_B} + E_{B_B} + E_{C_B} + E_{D_B}) / A_T$$

$$E_w = (0.67(2.77) + 0.99(0.58) + 1.97(1.05)) / 4.40 = 1.02 \text{ IN.}$$

$$V_{100} = (E_w / 12) A_T$$

$$V_{100} = (1.02 / 12) 4.40 = 0.3740 \text{ AC-FT} = 16,290 \text{ CF}$$

$$V_{10\text{-DAY}} = V_{100} + A_T (P_{10} - P_{360}) / 12$$

$$= 0.3740 + 1.05(3.67 - 2.20) / 12 = 0.5026 \text{ AC-FT} = 21,890 \text{ CF}$$

2. PEAK DISCHARGE

$$Q_p = Q_{PA} A + Q_{PB} B + Q_{PC} C + Q_{PD} D$$

$$Q_p = Q_{100} = (2.03(2.77) + 2.87(0.58) + 4.37(1.05)) = 11.9 \text{ CFS}$$

VIII. COMPARISON

A. BASIN A

$$1. \Delta V_{100} = 17,700 - 17,180 = 520 \text{ CF (INCREASE)}$$

$$2. \Delta Q_{100} = 11.2 - 11.0 = 0.2 \text{ CFS (INCREASE)}$$

$$3. \Delta V_{10\text{-DAY}} = 29,210 - 28,000 = 1210 \text{ CF (INCREASE)}$$

B. BASIN B

$$1. \Delta V_{100} = 16,290 - 15,810 = 480 \text{ CF (INCREASE)}$$

$$2. \Delta Q_{100} = 11.9 - 11.7 = 0.2 \text{ CFS (INCREASE)}$$

$$3. \Delta V_{10\text{-DAY}} = 21,890 - 20,720 = 1170 \text{ CF (INCREASE)}$$

IX. POND VOLUMES

A. PROPOSED BASIN A

ELEV	AREA (SF)	VOLUME (CF)	Σ VOLUME (CF)
25.0	1,450		
26.0	2,500	1,975	1,975
27.0	10,350	6,425	8,400

$$V_{10\text{-DAY}} = 29,210 \text{ CF} >> 8,400 \text{ CF} = \text{POND VOLUME}$$

B. EXISTING BASIN B POND CAPACITY

ELEV	AREA (SF)	VOLUME (CF)	Σ VOLUME (CF)
26.0	2,850		
27.0	6,730	4,790	4,790
27.5	8,670	3,850	8,640

C. EXPANDED BASIN B POND CAPACITY

ELEV	AREA (SF)	VOLUME (CF)	Σ VOLUME (CF)
26.0	4,200		
27.0	8,100	6,150	6,150
27.5	11,900	5,000	11,150

$$\text{NEW POND VOLUME} = 11,150 \text{ CF} > \text{NEW POND VOLUME REQUIRED} = 9,810 \text{ CF}$$

CONSTRUCTION NOTES:

- TWO (2) WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT NEW MEXICO ONE CALL SYSTEM 260-1990 (ALBUQUERQUE AREA), 1-800-321-ALERT(2537) (STATEWIDE), FOR LOCATION OF EXISTING OFFSITE PUBLIC UTILITIES. ANA A.P.S. M&O (765-5950) FOR LOCATION OF EXISTING ON-SITE PRIVATE UTILITIES.
- PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL POTENTIAL OBSTRUCTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INTERPRETATIONS IT MAKES WITHOUT FIRST CONTACTING THE ENGINEER AS REQUIRED ABOVE.
- ALL WORK ON THIS PROJECT SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL LAWS, RULES AND REGULATIONS CONCERNING CONSTRUCTION SAFETY AND HEALTH.
- ALL CONSTRUCTION WITHIN PUBLIC RIGHT-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE BERNALILLO COUNTY STANDARDS AND PROCEDURES.
- IF ANY UTILITY LINES, PIPELINES, OR UNDERGROUND UTILITY LINES ARE SHOWN ON THESE DRAWINGS, THEY ARE SHOWN IN AN APPROXIMATE MANNER ONLY, AND SUCH LINES MAY EXIST WHERE NONE ARE SHOWN. IF ANY SUCH EXISTING LINES ARE SHOWN, THE LOCATION IS BASED UPON INFORMATION PROVIDED BY THE OWNER OF SAID UTILITY, AND THE INFORMATION MAY BE INCOMPLETE, OR MAY BE OBSOLETE BY THE TIME CONSTRUCTION COMMENCES. THE ENGINEER HAS CONDUCTED ONLY PRELIMINARY INVESTIGATION OF THE LOCATION, DEPTH, SIZE, OR TYPE OF EXISTING UTILITY LINES, PIPELINES, OR UNDERGROUND UTILITY LINES. THIS INVESTIGATION IS NOT CONCLUSIVE, AND MAY NOT BE COMPLETE, THEREFORE, MAKES NO REPRESENTATION PERTAINING THERETO, AND ASSUMES NO RESPONSIBILITY OR LIABILITY THEREFOR. THE CONTRACTOR SHALL INFORM ITSELF OF THE LOCATION OF ANY UTILITY LINE, PIPELINE, OR UNDERGROUND UTILITY LINE IN OR NEAR THE AREA OF THE WORK IN ADVANCE OF AND DURING EXCAVATION WORK. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE CAUSED BY ITS FAILURE TO LOCATE, IDENTIFY AND PRESERVE ANY AND ALL EXISTING UTILITIES, PIPELINES, AND UNDERGROUND UTILITY LINES. IN PLANNING AND CONDUCTING EXCAVATION, THE CONTRACTOR SHALL COMPLY WITH STATE STATUTES, MUNICIPAL AND LOCAL ORDINANCES, RULES AND REGULATIONS, IF ANY, PERTAINING TO THE LOCATION OF THESE LINES AND FACILITIES.
- AN EXCAVATION/CONSTRUCTION PERMIT WILL BE REQUIRED BEFORE BEGINNING ANY WORK WITHIN CITY RIGHT-OF-WAY. AN APPROVED COPY OF THESE PLANS MUST BE SUBMITTED AT THE TIME OF APPLICATION FOR THIS PERMIT.

EROSION CONTROL MEASURES:

- THE CONTRACTOR SHALL ENSURE THAT NO SOIL ERODES FROM THE SITE INTO PUBLIC RIGHT-OF-WAY OR ONTO PRIVATE PROPERTY.
- THE CONTRACTOR SHALL PROMPTLY CLEAN UP ANY MATERIAL EXCAVATED WITHIN THE PUBLIC RIGHT-OF-WAY SO THAT THE EXCAVATED MATERIAL IS NOT SUSCEPTIBLE TO BEING WASHED DOWN THE STREET.
- THE CONTRACTOR SHALL SECURE "TOPSOIL DISTURBANCE PERMIT" PRIOR TO BEGINNING CONSTRUCTION.
- ANY AREAS OF EXCESS DISTURBANCE (TRAFFIC ACCESS, STORAGE YARD, EXCAVATED MATERIAL, ETC.) SHALL BE RE-SEEDING ACCORDING TO NMAPWA SPECIFICATION 1011 "SEEDING". THIS WILL BE CONSIDERED INCIDENTAL TO CONSTRUCTION, THEREFORE, NO SEPARATE PAYMENT WILL BE MADE.

DRAINAGE PLAN

THE FOLLOWING ITEMS CONCERNING THE BARCELONA ELEMENTARY SCHOOL DRAINAGE PLAN ARE CONTAINED HEREON:

1. VICINITY MAP
2. FLOODPLAIN MAP
3. GRADING PLAN
4. CALCULATIONS

AS SHOWN BY THE VICINITY MAP, THE SITE IS LOCATED AT THE NORTHEAST CORNER OF THE INTERSECTION OF BARCELONA DRIVE SW AND SANCHEZ ROAD SW. THE SITE IS CURRENTLY DEVELOPED AS AN ELEMENTARY SCHOOL. THE SITE IS CHARACTERIZED BY TWO DRAINAGE BASINS, A AND B. BASIN A IS GENERALLY CHARACTERIZED BY THE WESTERN THIRD OF THE SITE INCLUDING THE MAJORITY OF THE PARKING FACILITIES, THE "CORE" SCHOOL BUILDINGS, AND SOME PORTABLE CLASSROOM BUILDINGS. BASIN B IS LOCATED AT THE EASTERN TWO-THIRDS OF THE SITE AND CONTAINS ONE CLASSROOM BUILDING, SOME PORTABLE BUILDINGS, AND ALL OF THE PLAYGROUNDS AND ATHLETIC FIELDS. ONE ATHLETIC FIELD WAS CONSTRUCTED TO SERVE AS A SHALLOW RETENTION POND IN 1987. BASIN 'A' DRAINS TO A SUMP INLET AT THE SOUTHWEST CORNER OF THE SITE.

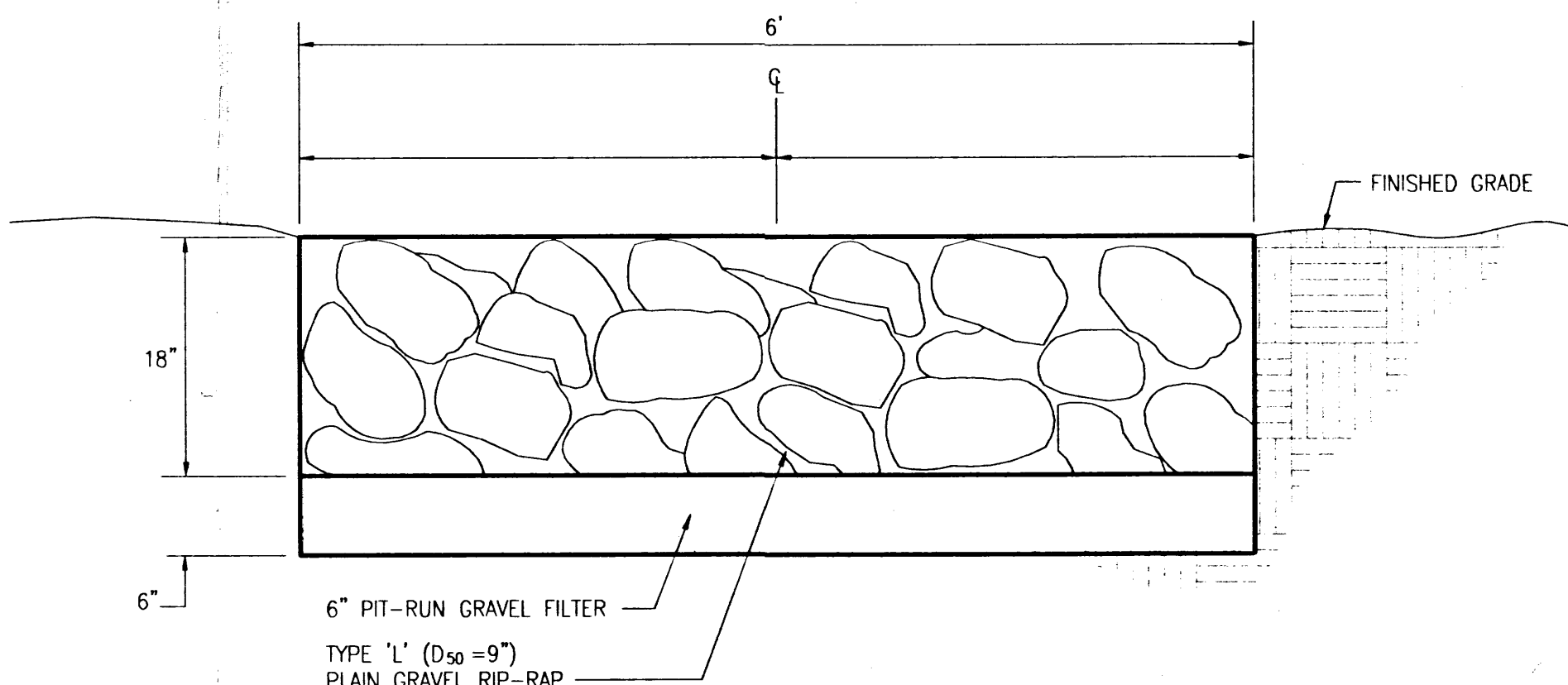
AS SHOWN BY PANELS 337 & 339 OF 825 OF THE NATIONAL FLOOD INSURANCE PROGRAM FLOOD INSURANCE RATE MAP FOR BERNALILLO COUNTY, NEW MEXICO AND INCORPORATED AREAS EFFECTIVE SEPTEMBER 20, 1996 PUBLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, A PORTION OF THE SITE LIES WITHIN ZONE AH (ELEVATION = 4927 FEET).

NO OFFSITE FLOWS APPEAR TO IMPACT THE SITE DUE TO THE FACT THE SURROUNDING AREA IS TOPOGRAPHICALLY LOWER AND IS GENERALLY FLAT. THE SOUTHERN PERIMETER OF THE SITE ALSO HAS A SMALL BERM AT THE BASE OF THE CHAINLINK FENCE TO BLOCK OFFSITE FLOWS AND CONTAIN ONSITE FLOWS. THE WATERBLOCK IS BEING PRESERVED AS PART OF THIS PLAN. BARCELONA ROAD S.W. AND JOE SANCHEZ ROAD S.W. BOTH DRAIN SOUTHWESTERLY, TO A STORM W/ VACUUM TRUCKS. BECAUSE THE SURROUNDING AREA IS GENERALLY FLAT, THE ORTHOTOPO MAPS DO NOT PROVIDE SUFFICIENT DETAIL TO DETERMINE THE SIZE OF THE DRAINAGE BASIN AND QUANTIFY THE RUNOFF DISCHARGING TO THE SUMP INLET.

THE GRADING PLAN SHOWS: 1) EXISTING AND PROPOSED GRADES INDICATED BY SPOT ELEVATIONS AND CONTOURS AT 1'-0" INTERVALS, 2) THE LIMIT AND CHARACTER OF THE EXISTING IMPROVEMENTS, 3) THE LIMIT AND CHARACTER OF THE PROPOSED IMPROVEMENTS, AND 4) CONTINUITY BETWEEN EXISTING AND PROPOSED GRADES. AS SHOWN BY THE GRADING PLAN, SITE IMPROVEMENTS CONSIST OF AN ADDITION TO AN EXISTING CLASSROOM BUILDING. THE BUILDING ADDITION LIES WITHIN BASIN 'B'. TO ACCOMMODATE THE CONSTRUCTION OF THE BUILDING, THREE CLASSROOM PORTABLE BUILDINGS AND ASSOCIATED ASPHALT PAVING WILL BE REMOVED. THE EXISTING POND ACCOMMODATING RUNOFF AT THE EAST SIDE OF THE BUILDING ADDITION WILL BE REGRADED TO ACCOMMODATE ADDITIONAL RUNOFF FROM THE BUILDING ADDITION. THE POND WILL INCREASE TO ACCOMMODATE TWICE THE 10-DAY VOLUME.

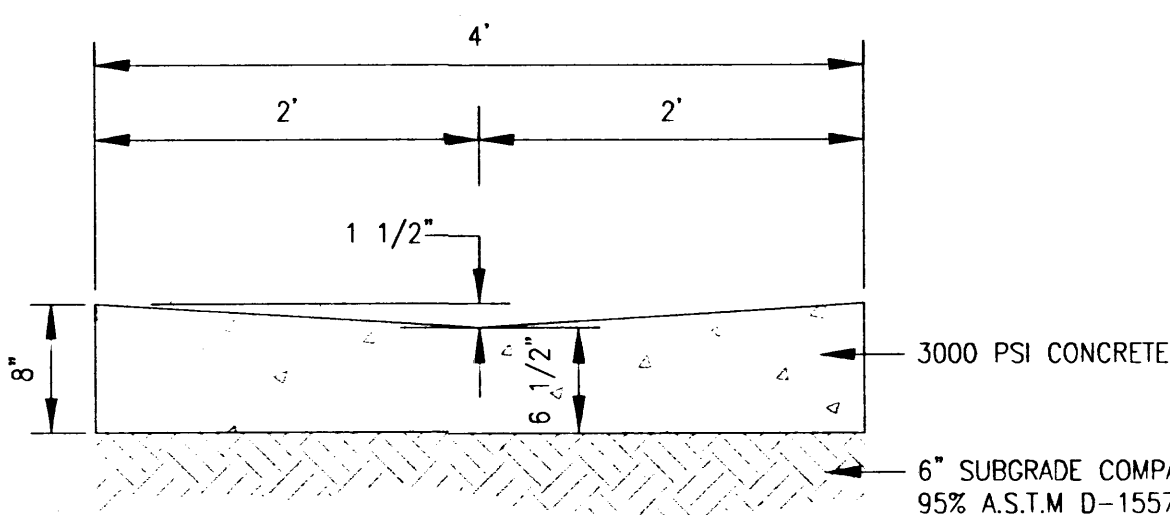
INCREMENTAL INCREASE ANTICIPATED BY THE BUILDING ADDITION, CONSISTENT WITH THE PREVIOUSLY APPROVED PLAN PREPARED BY THIS OFFICE, DATED 9/24/94. THE PARKING LOT FACILITIES ALONG THE SOUTHERN AND WESTERN PORTIONS OF THE SITE ARE ALSO BEING RECONSTRUCTED AS PART OF THIS PROJECT AND LIE WITHIN BASIN 'A'. THE PARKING FACILITIES WILL SURFACE DRAIN TO THE NORTHWESTERN CORNER OF THE SITE. VERY LITTLE OF THE SITE REMAINS UNDEVELOPED. THEREFORE, THE RETENTION POND BEING CONSTRUCTED AT THE NORTHWESTERN CORNER OF THE SITE WILL MAXIMIZE THE AVAILABLE AREA RESERVED FOR THE POND. THE PONDING VOLUME PROVIDED EXCEEDS THE INCREMENTAL INCREASE IN RUNOFF VOLUME. THE PONDING VOLUME OF 8400 CF DOES NOT MEET THE COUNTY PONDING REQUIREMENT OF 29,210 CF ($V_{10\text{-DAY}}$). THE PROPOSED CAPACITY PONDING PROVIDED IS GREATER THAN THE CURRENT PONDING PROVIDED AND IT MAXIMIZES THE POND AREA AVAILABLE. NO PONDING AREAS ARE CURRENTLY IN PLACE TO ACCOMMODATE PARKING LOT DRAINAGE, THEREFORE THE DRAINAGE POND WILL REDUCE THE IMPACT ON THE SUMP CONDITION AT THE SOUTHWEST CORNER OF THE SITE, HENCE REDUCING THE AMOUNT OF RUNOFF REQUIRED TO BE PUMPED BY BCPWD. EXCEEDING THE POND CAPACITY WILL OVERFLOW THE WEST EDGE OF THE PARKING LOT AND DRAIN TO THE EXISTING SUMP INLET AT THE SOUTHWEST CORNER OF THE SITE. BECAUSE THE SITE IS SIGNIFICANTLY HIGHER (12'-18") THAN JOE SANCHEZ ROAD S.W., IT APPEARS THAT THE RUNOFF PONDING AT THE SUMP DOES NOT ENTER THE SITE. BECAUSE THE AREAS BEING DEVELOPED LIE ABOVE THE FLOODPLAIN ELEVATION OF 4927 FEET, NO FLOODWATER IS BEING DISPLACED BY THE PROPOSED DEVELOPMENT, AND HENCE COMPENSATORY PONDING IS NOT REQUIRED TO CONTAIN DISPLACED FLOODWATERS.

THE CALCULATIONS THAT APPEAR HEREON ANALYZE BOTH THE EXISTING AND DEVELOPED CONDITIONS FOR THE 100-YEAR, 6-HOUR AND 10-DAY RAINFALL EVENTS. 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 GENERATED. THE AVERAGE END AREA METHOD WAS UTILIZED TO CALCULATE THE POND VOLUMES. AS SHOWN BY THESE CALCULATIONS, THERE IS AN ANTICIPATED INCREASE IN RUNOFF VOLUME AND PEAK RATE OF DISCHARGE.



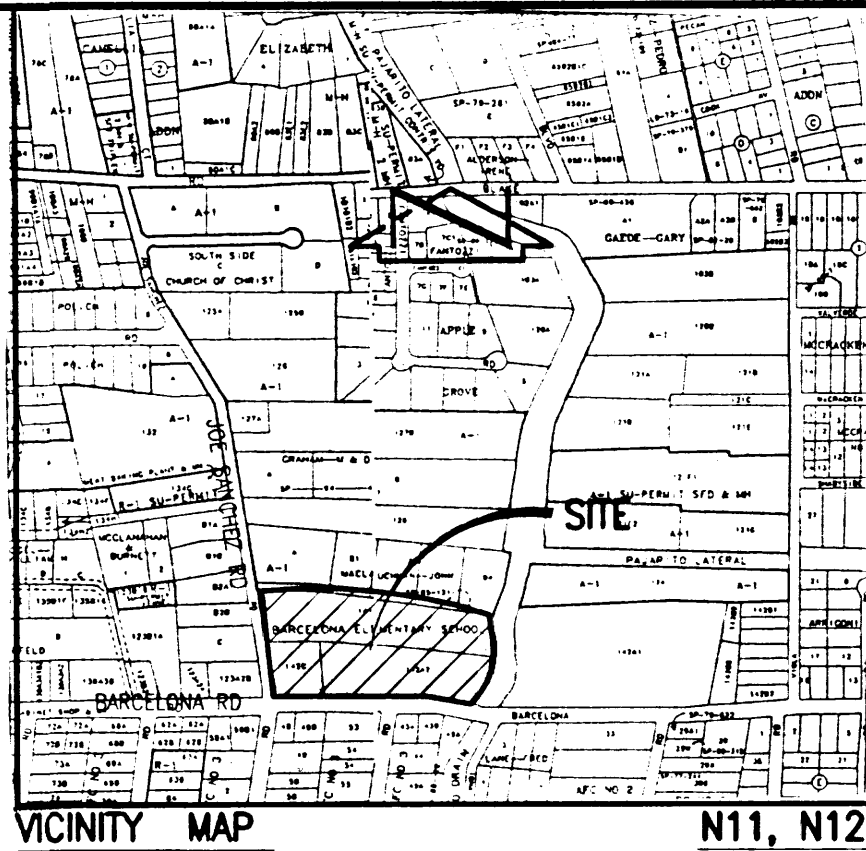
TYPICAL RIP-RAP APRON SECTION

SCALE: 1" = 1' - 0"

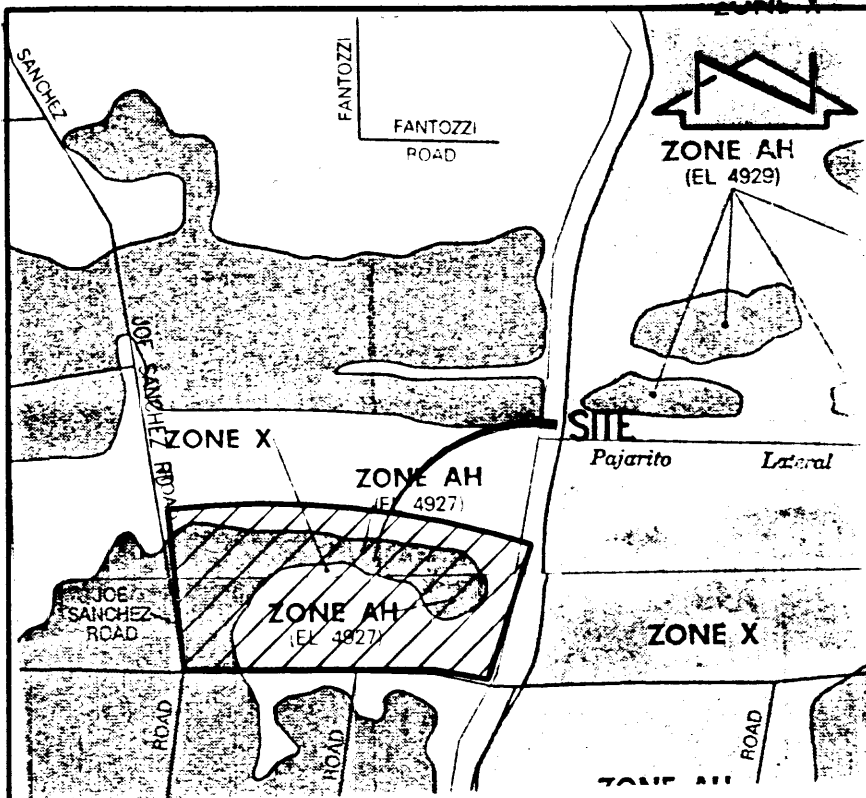


TYPICAL VALLEY GUTTER SECTION

SCALE: 1" = 4'



VICINITY MAP
SCALE: 1" = 750'



FLOODPLAIN MAP

SCALE: 1" = 500'

PROJECT BENCHMARK

A CITY OF ALBUQUERQUE ALUMINUM CAP, "3-N11" LOCATED AT THE INTERSECTION OF JOE SANCHEZ ROAD AND BARCELONA ROAD AS SHOWN ON THE DRAWING.
ELEVATION = 4927.56 FEET (M.S.L.D.)

T.B.M.

A CHISELED "T" ON TOP OF THE CURB ALONG THE WEST LEG OF THE GRAVEL TRACK AS SHOWN ON THE DRAWING.
ELEVATION = 4927.73 FEET (M.S.L.D.)

LEGAL DESCRIPTION

TRACTS 141, 142-A-2 & 142-C AS SHOWN ON MRCD MAP NO. 46.

CERTIFICATION

I, Jeffrey G. Mortensen, NMPE 8547, do hereby certify that I personally visited the subject project site on October 13, 1998. At that time, there was no evidence of recent site grading or construction activity. The contour of the land appeared consistent with the overall drainage pattern of the area and the topography as depicted by the grading plan.

Jeffrey G. Mortensen, NMPE 8547



10-19-98
Date



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Job no: 980262
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drawn by: JTR/DJM
checked: JGM
date: SEPT, 1998

revisions:									

GRADING AND DRAINAGE PLAN
BARCELONA ELEMENTARY SCHOOL
 231 BARCELONA RD SW
 ALBUQUERQUE, NEW MEXICO 87105

sheet no:
G1.2