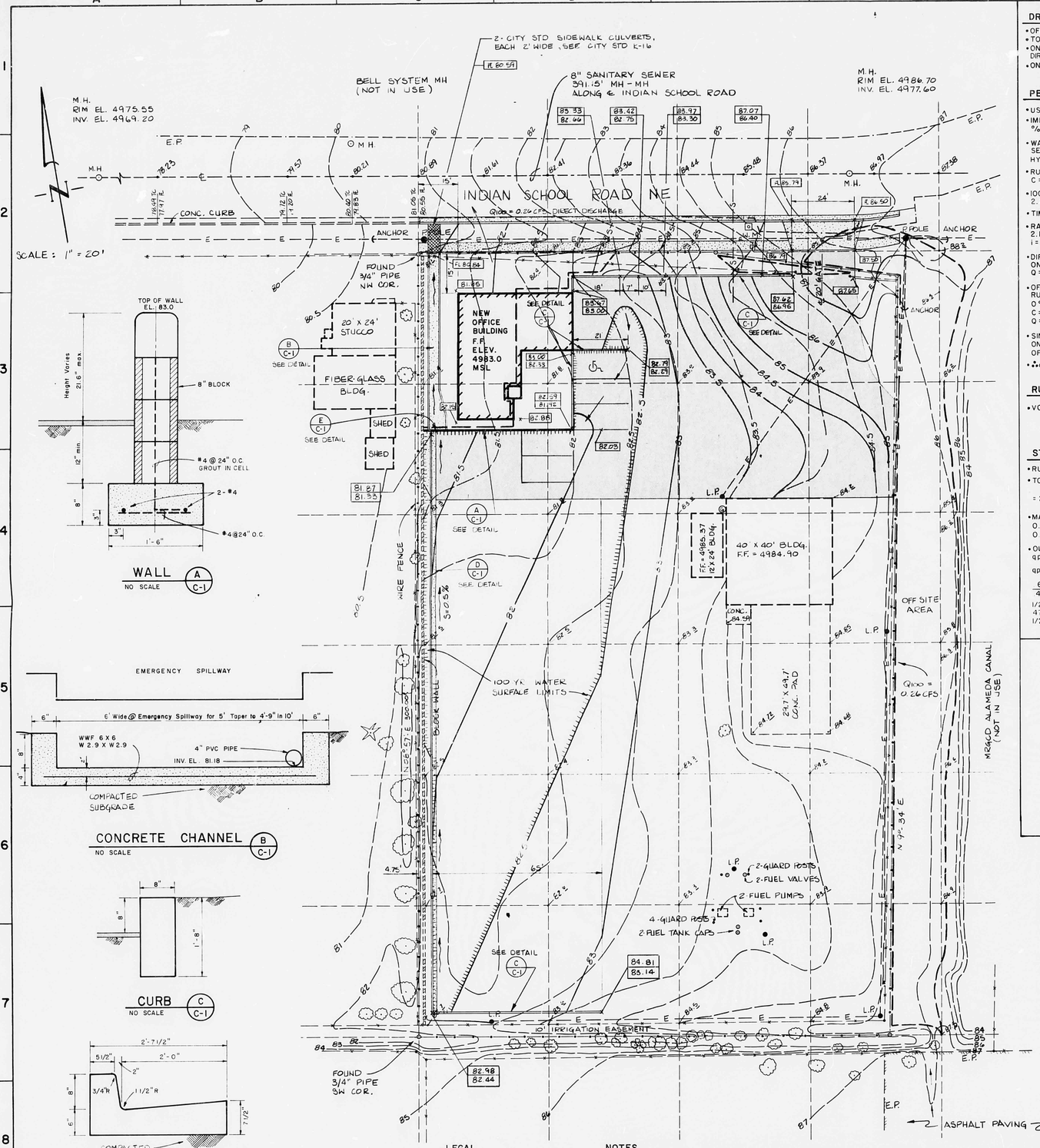
HYDROLOGY

H15/D25
1 PLAN

H15/D25

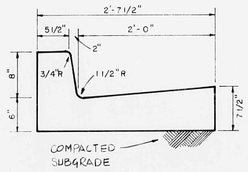
1 Plan



WALL (A / C-1)
NO SCALE

CONCRETE CHANNEL (B / C-1)
NO SCALE

CURB (C / C-1)
NO SCALE



CURB & GUTTER (D / C-1)
NO SCALE

DRAINAGE AREAS

- OFFSITE - 0.16 AC
- TOTAL ONSITE - 1.24 AC
- ONSITE AREA THAT DISCHARGES DIRECTLY OFFSITE - 0.08 AC
- ONSITE PERVIOUS AREA - 0.37 AC

PEAK RATE OF RUNOFF

- USE RATIONAL FORMULA Q = CiA
- IMPERVIOUS AREA 1.24 - 0.37 = 0.87 AC
  % IMPERVIOUS 0.87/1.24 = 70%
- WATERSHED SOILS
  SERIES - GILA Gb
  HYDROLOGIC SOIL GROUP 'B'
- RUNOFF COEFFICIENT
  C = 0.69 FROM PLATE 22.2 C-1
- 100 YEAR - 6HR RAINFALL VOLUME
  2.2 in. FROM PLATE 22.2 D-1
- TIME OF CONCENTRATION = 10 min.
- RAINFALL INTENSITY
  2.17 - FROM PLATE 22.2 D-2
  i = 2.17 X 2.2 in. = 4.77 in./hr.
- DIRECT OFFSITE DISCHARGE FROM ONSITE AREA
  Q = 0.69 (4.77)(0.08) = 0.26 CFS
- OFFSITE AREA THAT DISCHARGES ONTO SITE RUNOFF COEFFICIENT
  0% IMPERVIOUS
  C = 0.34 PLATE 22.2 C-1
  Q = 0.34 (4.77)(0.16) = 0.26 CFS
- SINCE DIRECT OFFSITE DISCHARGE FROM ONSITE EQUALS DISCHARGE ONSITE FROM OFFSITE ROUTE OFFSITE AREA THRU POND
- ∴ qp = 4.77 [(0.34)(0.16) + (0.69)(1.16)] = 4.08 CFS

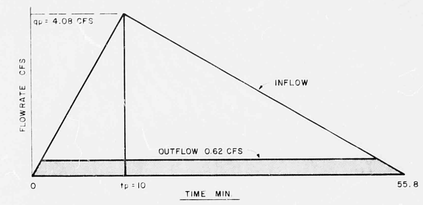
RUNOFF VOLUME

- VOL = DCA
  $= 2.2\text{ in} \times \frac{1\text{ FT}}{12\text{ IN}} \times 43{,}560\ \frac{\text{SF}}{\text{AC}} \times [(0.34)(0.16)+(0.69)(1.16)]$
  = 6826 CF

STORAGE VOLUME

- RUNOFF HYDROGRAPH PLATE 22.2 E-1
- TOTAL STORM DURATION = 2 X $\frac{\text{RUNOFF VOLUME}}{\text{Q PEAK}}$
  $= 2\left(\frac{6826\text{CF}}{4.08\text{CFS}}\right)\frac{1\text{ min.}}{60\text{ sec.}} = 55.8\text{ min.}$
- MAXIMUM RATE OF DISCHARGE
  0.5 CFS/ACRE (FROM CITY HYDROLOGY)
  0.5 CFS/ACRE X 1.24 ACRE = 0.62 CFS
- OUTFLOW
  $qp/Tp = \frac{4.08}{10} = 0.408$ SLOPE OF RISING SIDE
  $qp/T\text{-}tp = \frac{4.08}{55.8-10} = 0.0891$ SLOPE OF RECESSION SIDE
  $\frac{62}{408} = 1.5\text{ min.}$ $\frac{62}{.0891} = 70$
  1/2 (1.5)(60)(0.62) = 28
  47.3(60)(0.62) = 1760
  1/2 (7.0)(60)(0.62) = 130
  1918 CF

- VOLUME
  6826 CF - 1918 = 4908 CF OF STORAGE REQUIRED



PONDING VOLUME AVAILABLE

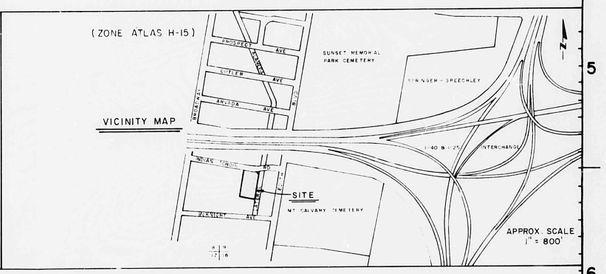
ELEV. (FT.)	ELEV. DIFF. (FT.)	SURFACE AREA(SF)	AVERAGE AREA(SF)	VOLUME (CF)	CUM VOL. (CF)
81.33		0			0
	0.07		67	5	
81.40		134			5
	0.10		271	27	
81.50		408			32
	0.10		655	66	
81.60		902			98
	0.10		1,219	122	
81.70		1,536			220
	0.10		1,958	196	
81.80		2,380			416
	0.10		2,873	287	
81.90		3,366			703
	0.10		3,989	399	
82.00		4,612			1,102
	0.10		5,363	536	
82.10		6,114			1,638
	0.10		6,940	694	
82.20		7,766			2,332
	0.10		8,667	867	
82.30		9,568			3,199
	0.10		10,392	1,039	
82.40		11,216			4,238
	0.10		12,082	1,208	
82.50		12,948			5,446

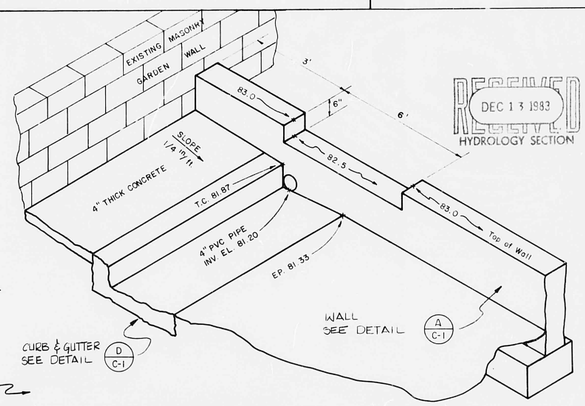
STORAGE VOLUME REQUIRED 4908 CF
APPROXIMATE DEPTH = 82.5'

- EMERGENCY SPILLWAY
  BROAD CRESTED WEIR
  $Q = CLH^{3/2}$ C = 2.9
  FOR L = 6
  $H = \left(\frac{Q}{CL}\right)^{2/3} = \left(\frac{4.08}{2.9 \times 6}\right)^{2/3} = 0.38'$
- PRINCIPAL SPILLWAY 4" Ø PVC SHORT TUBE
  $Q = Ca\sqrt{2gh}$ C = 0.82
  = .82 (0.08727) ($\sqrt{2 \times 32.2 \times 1.13}$)
  = 0.61 CFS ≤ 0.62 CFS OK
- RECTANGULAR CHANNEL
  BOTTOM WIDTH = 4.75'
  S_o = 0.0051 ft/ft
  n = 0.015
  d = 0.30'
  V = 2.90 FPS
- SIDEWALK CULVERTS
  2 - CULVERTS - EACH 2' WIDE WILL DISCHARGE 4.08 CFS AT A HEADWATER DEPTH OF 0.54'.

LEGEND

- PROPERTY LINE
- ASPHALT PAVING
- CONCRETE
- 84.2 EXISTING SPOT ELEVATION
- 82.05 PROPOSED SPOT ELEVATION
- 84.81 / 83.14 NEW TOP OF CURB ELEVATION / NEW EDGE OF PAVEMENT / TOP OF PAVEMENT ELEVATION
- FLOW ARROW
- 84 EXISTING CONTOUR
- 85 PROPOSED CONTOUR





PRINCIPAL AND EMERGENCY SPILLWAY (E / C-1)
NO SCALE

RECEIVED DEC 13 1983 HYDROLOGY SECTION

NO.	INDEX	DATE	REVISION	CK'D / APP
1		12/13/83	INCREASED EMERGENCY SPILLWAY WIDTH FROM 4' TO 6'	SFF

BOVAY ENGINEERS, INC.
HOUSTON • SPOKANE • BATON ROUGE
AUSTIN • ALBUQUERQUE • WASHINGTON, D.C.

GOLDSTON OFFICE BUILDING
418 INDIAN SCHOOL ROAD NE

DRAINAGE PLAN

DESIGNED: SFF	SCALE: 1" = 20'
DRAWN: DMR	PROJECT NUMBER 6014-226
CHECKED	
APPROVED	DRAWING NUMBER C-1
APPROVED	
DATE: 11/23/83	

Stephen F. Farley 11-23-83

LEGAL
FRANCISCAN ACRES
BLOCK 9 LOT 5

NOTES
1. CITY BM #5-H15 A SQUARE, ⊡, CHISELED ON TOP OF CURB, LOCATED AT THE INTERSECTION OF EDITH AND McKNIGHT, NNW CURB RETURN, EL. 4988.819 (MSLD 1929)
2. TBM, EAST END OF SOUTH CURB ON INDIAN SCHOOL ROAD NE., OPPOSITE NW CORNER OF SITE, EL. 4981.055 MSL.
3. ADD 4900 TO ALL SPOT ELEVATIONS