

THE MOORINGS 5TH ADDITION

DRAINAGE PLAN CALCULATIONS

FEBRUARY 15, 1990

POE AND ASSOCIATES OF KANSAS INC.

434 NORTH OLIVER

WICHITA, KANSAS 67208

WATER & SEWER / ENGINEERING
MONTHLY STAFF MEETING
DECEMBER 6, 1995
1:30 P.M., ENGINEERING CONF. ROOM

PAVEMENT CUT SURCHARGES

FEE IN LIEU OF ASSESSMENT - NEW RATES FOR 1996

ACQUISITION OF W. SEDGWICK COUNTY SEWER LINE

DISTRIBUTION MAIN REPLACEMENT PROGRAM

DESIGN OPTIONS

THIRD ST. DRAINAGE AREA

G&A PROJECTS

CONTINGENT DRAINAGE DEDICATION

FILE 272 PAGE 1025

WHEREAS Miles Sand, Inc.

own property in the SW1/4 of Section 19, T-26-S, R-1-E of the 6th Principal Meridian, Sedgewick County, Kansas, on which Conditional Use permits were granted for sand pit purposes as CU-129 and CU-137; and,

WHEREAS, as a condition of subdividing land in Sections 24 and 25, T-26-S, R-1-W as "The Moorings" said owner are being asked to dedicate a DRAINAGE EASEMENT across a portion of said CU-129 described as follows:

A tract of land in the SW1/4 Section 19, T-26-S, R-1-E of the 6th P.M. Sedgewick County, Kansas described as beginning at the NW corner of said SW1/4; thence east along the north line of said SW1/4 115'; thence southeasterly at a deflection angle right of 42'30" to the edge of water of an existing sand pit; thence southwesterly with a deflection angle to the right 90°00' 90"; thence northwesterly with a deflection angle to the right 90° to a point that is 115' south and 95' east of the NW corner of said SW1/4; thence west 95' to a point on the west line of said SW1/4 thence north 115' to the point of beginning; and,

WHEREAS, said owner agree to provide said Drainage Easement and to permit the public to transport storm water from the approximate 2000 acre contributing area along said easement and to discharge it into the sandpit-lake located in said SW1/4 of Section 19 but said easement and permission be effective only in the event of certain contingencies hereinafter specified,

NOW THEREFORE, Miles Sand, Inc.

do hereby dedicate to the public for drainage purposes the property hereinabove set forth; but the right of the public and the City of Wichita and the Board of Commissioners of Sedgewick County, Kansas to make use thereof for drainage purposes shall be conditioned on the following:

- 1) An appropriate governing body shall install a culvert across Marillian Avenue whose discharge would be directed into said drainage easement, and
- 2) An appropriate governing body shall construct on said drainage easement a trapezoidal shaped concrete lined canal 35 feet wide at the bottom with 1.5 horizontal to 1 vertical side slopes which extend up the sides to a vertical height 2 feet above the bottom, such canal extending from the discharge end of the culvert described above to the south edge of the residential parcels set out on the redevelopment plan for CU-129 filed with the Wichita-Sedgewick County Metropolitan Area Planning Department December 3, 1973, said distance being approximately 290 feet, and
- 3) An appropriate governing body shall construct a bridge or culvert across said canal at the location crossed by the residential street as set out on the redevelopment plan for CU-129 subject to an appropriate plat or street be approved;
- 4) Items 1, 2 and 3 shall be constructed without cost to grantor, or assessment of cost to lands owned by grantor, or lands being subdivided as "The Moorings".

It is understood that upon the action of the governing body by contract or resolution to provide the above described facilities, that this drainage easement shall be and become, without further notice or act, in full force and effect.

It is the intent of the grantor and owner that this Contingent Dedication shall be a covenant running with the land and shall be binding upon their successors and assigns and all subsequent owners of any part or parcel of said property covered by said Dedication.

WITNESSED AND EXECUTED THIS 25th DAY OF September, 1977. *Harley Miles* President

FILED IN BOOK OF COMMISSIONERS OCT 1 1977

FILED FOR RECORD OCT 20 1977 3 54711 TITLE RECORDS

RECORDS

WICHITA-SEDGWICK COUNTY

DATE July 27, 197

METROPOLITAN AREA PLANNING DEPARTMENT

TO John Dekker, Director of Law
FROM Robert A. Lakin, Director of Planning
SUBJECT SD 76-125 The Moorings

At the request of M. S. Mitchell, Galbraith and I met with the owner of The Moorings, Harley Miles, and Mitchell to discuss a drainage problem relating to the above plat and the general area surrounding the plat. This plat, as you may be aware, lies on the west side of Meridian between 42nd Street North and 49th Street North. There is an existing drainage problem in that entire general area extending north on both sides of Meridian to an area north of 53rd Street. Some 1800 acres of land comprise the flow coming into the Moorings area.

Mitchell had agreed with the owners of the property and the County Engineer to generally handle this drainage by (1) erecting a berm on the north side of the plat to divert any sheet flow to Meridian and thence into any drainage system that may exist; and (2) to provide an underground crossing at about 49th Street to pick up this water flow and to build a drainage channel southeasterly to the new sand pit operation. The drainage water would then go into this sand pit as a holding area. It would also generally flow further to the south and ultimately into the flood control system. As a condition of accepting this water, Harley Miles, who owns the receiving sand pit, as well as the plat to the west, requested that (1) the bottom of the channel be lined; and (2) a bridge structure over the channel be guaranteed at such time as an internal street system is later developed for that sand pit area. All of this was to be done without cost to that particular quarter section and future development. Although the county had thought that it might be able to undertake this work, the County Counselor has advised the County Engineer that they might not make any expenditure on the road crossing or the drainage facility. Secondly, M. S. Mitchell and Harley would just as soon defer making these improvements until additional information re drainage characteristics is known so the ultimate design of the drainage facilities can be based on additional information.

To resolve the drainage requirements on the plat then, it was suggested by me that a contingent dedication for the drainage easement be made to the City of Wichita with the contingency that the acceptance of water and the right-of-way for the easement be based on the city undertaking the drainage improvements set forth as a part of the contingency, i.e., crossing, ditch, ditch lining and bridge. This would be submitted to the City Commission for

COPY

Receiver

JUL 23 1977

6
Memorandum to John Dekker
Re: SD 76-125 The Moorings

6
July 27, 1977
Page 2

their action and consideration to see if this was an acceptable arrangement. Since we would actually not be contracting for any expenditure but only setting a future right to be acquired at such time as a then governing body agreed to make certain expenditures, I thought this would resolve (1) acquiring essentially an option to handle the water, and (2) the specifics as to how we would pay for it and protecting the quarter section of land against assessments.

Is such a contingent easement proposition an appropriate and legal way to accomplish this? I would be happy to arrange to discuss this with you further along with M. S. Mitchell, if you have questions. If you feel it is legal, I will have M. S. Mitchell and my staff draw up such an easement with the contingencies for your review and approval.

Robert A. Lakin, Director of Planning

~~cc.~~ M. S. Mitchell, Flood Control
RAL:ew

P.S. Harley says to tell you he wants an answer immediately!

POE & ASSOCIATES OF KANSAS INC.
CONSULTING ENGINEERS
434 N. Oliver, Suite 110 • Wichita, KS 67208 • 316/685-4114

February 16, 1990

Mr. David Spears, P.E.
Sedgwick County Engineer
1248 South Seneca
Wichita, Kansas 67213

Dear David:

This report has been prepared for the purpose of obtaining approval of the drainage plan for the proposed Moorings 5th Addition. This drainage plan is shown on a drawing dated February 16, 1990.

The preliminary calculations in this report are to determine both peak flow and the amount of runoff which drains to the northeast corner of the Addition. These computations indicate that 609 Ac/Ft of runoff can be anticipated to accumulate at the design point during a six hour 100-year storm. Runoff from a twenty-four hour 100-year storm will increase this amount to 906 Ac/Ft for this 1800 acre drainage area.

The pond east of Meridian has a water surface elevation of 128.0 and a surface area of about 58.0 acres. The elevation of the low end of the pond banks at 45th Street are about 137.6. A 500 foot wide spillway at this point will discharge 920 cfs at a depth of 1.5 feet. If this spillway is constructed with a F.L. of 135.0 the water surface in this pond should not exceed 136.5. This would determine the water surface of the pond west of Meridian which is shown by our calculations to be 138.2 while discharging 1500 cfs under these conditions.

These preliminary calculations indicate that if provisions are made to maintain the east lake water surface at a maximum elevation of 136.5, the proposed structures will be adequate to discharge a 100-year storm. It will be necessary to extend the existing lake on the east side of Meridian to the east side of the proposed RCBC bridge across Meridian.

Calculations for the pond spillway west of Meridian and for the capacity of the bridge across Meridian do not include allowance for storm water storage. These calculations, therefore, should be somewhat conservative.

Mr. David Spears


-2-

February 16, 1990

Construction of these drainage improvements benefit the property upstream and downstream from this site. Some of the proposed improvements may be beyond the ability of the developer to remedy. Any assistance from either the City or County to resolve this problem will be appreciated.

Yours truly,

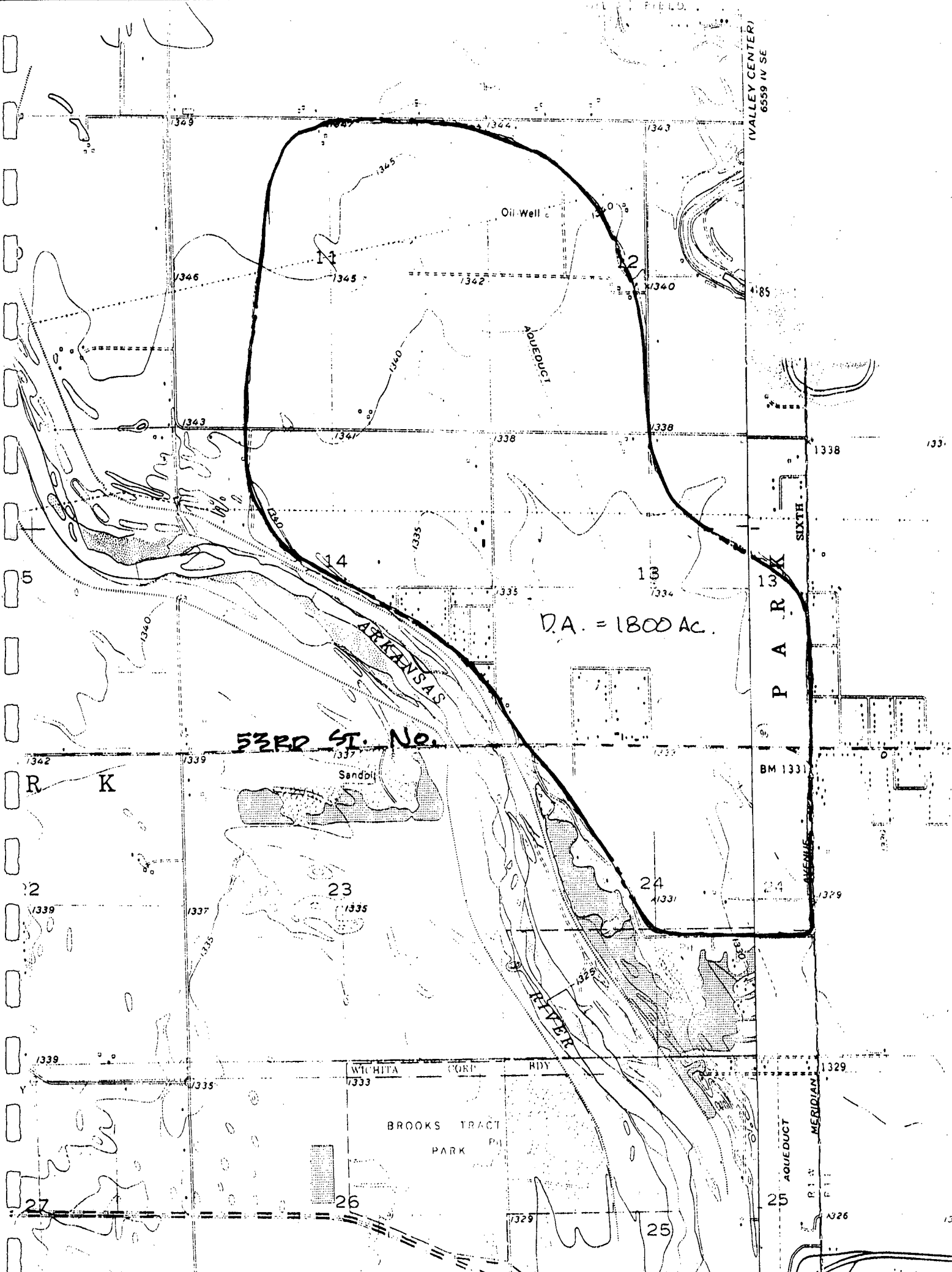
POE & ASSOCIATES OF KANSAS, INC.


Kenny E. Hill, P.E.
Project Manager

KEH:crb

cc: Mike Lindebak, P.E.

(VALLEY CENTER)
6559 IV SE



D.A. = 1800 AC.

53RD ST. NO.

P A R K
SIXTH AVENUE

WICHITA GOLF COURSE

BROOKS TRACT PARK

AGUEDUCT
R.I.W. MERIDIAN

12-14-89

MOORINGS - ROUGH CALC

P.A. = 1800 AC TO NE COR OF ORIGINAL MOORINGS PLAT

LENGTH OF WATER WAY 16500' @ 2 FPS AVERAGE

OVERLAND FLOW 1500' @ 0.5 FPS AVERAGE

$$16500' \div 2 \div 60 \div 60 = 2.29 \text{ HR}$$

$$1500' \div 0.5 \div 60 \div 60 = .83$$

3.1 HR T.C.

$$i_{100} = 1.65$$

$$Q = a c i$$

$$Q_{100} = 1800 \times 0.5 \times 1.65 = 1485 \text{ cfs}$$

**URBAN HYDROLOGY FOR SMALL WATERSHEDS (TR-55)
PEAK DISCHARGE WORKSHEET
FOR CHAPTER 4 (APPENDICES D & E)**

Project THE MOORINGS 5TH ADDN. By K. HILL Date 2-15-90
 Checked _____ Date _____

Steps Peak Discharge Computations for up to 3 Storms: Type II, Duration 24 hours.

1. Data: Watershed Condition = FUTURE TO 53RD ST. (present or future).
 Drainage Area (DA) = 1800 acres. Ave. Watershed Slope (S) = 0.14 %.

2. Runoff Curve Number (CN)

Hydrologic Soil Group (Appendix B)	Land Use Description Include Treatment, Practice & Condition (Table 2-2)	CN (Table 2-2) (3)	% or Area (acres) (4)	Product (3)x(4) (5)
	SEE ATTACHED SHEET			
Totals =				

CN (weighted) = $\frac{\text{total col. (5)}}{\text{total col. (4)}}$ [_____] = _____ ; use CN = 85

3. Rainfall Frequency (F)
 Rainfall Depth (P)

1st Storm	2nd Storm	3rd Storm	
25		100	yrs.
6.5		8	inches

4. Runoff Depth (Q)
 Use P, CN, and Table 2-1.

4.79		6.22	inches
------	--	------	--------

5. Basic Peak Discharge (q)
 Use S, DA, CN, and Figure D-2.
 For graph labeled: Flat (S = less than 3%)
 Moderate (S = 3% to 7.9%)
 Steep (S = 8% & greater)

295		cfs/inch of Q	
x			
0.46			
=			
650.0		844.0	cfs

*6. Watershed Slope Factor
 Use S, DA, and Table E-1.

7. Peak Discharge (q_p)
 where q_p = Steps #4 x 5 x 6

See Steps 8 to 13 for adjustments that may be applicable.

TR-55, CHAPTER 4 (APPENDICES D & E), PEAK DISCHARGE WORKSHEET (CONT.)

Steps Peak Discharge Computations with Adjustments

8. Data: Obtain if Adjustments are Applicable

Ponding and Swampy areas (PND) = 30 acres, 1.7 % of DA
 Impervious Area (IMP) = 80 acres, 4.4 % of DA
 Total Hydraulic Length (HL) = 16000 feet
 Hydraulic Length Modified (HLM) = 3500 feet, 22 % of HL

Rainfall Frequency (F) from Step 3

Peak Discharge (q_p) from Step 7

1st Storm	2nd Storm	3rd Storm
25		100
650		844
X	X	X
.82		.87

yrs.

cfs

*9. Ponding and Swampy Area Peak Factor

Use % PND, F, and Tables E-2, 3 or 4.
 Location in } at Design Point (E-2)
 Watershed: } Center or Spreadout (E-3)
 (check one) } Upper Reaches (E-4)

*10. Watershed Shape Peak Factor

Use HL with Figure E-1 and read;
 Equiv. Drainage Area (EDA) = 1400 acres.

Use Figure D-2 graph from Step 5, CN, and EDA for;
 Equiv. Peak/Inch Runoff (q_e) = 250 cfs/in.

$$\text{Factor} = \left[\frac{q_e}{q \text{ from Step 5}} \right] \times \left[\frac{DA}{EDA} \right]$$

$$\text{Factor} = \left[\frac{250}{295} \right] \times \left[\frac{1800}{1400} \right] =$$

X
 1.09

*11. Impervious Area Peak Factor

Use % IMP, CN and Figure 4-1.

X
 1.02

*12. Hydraulic Length Modified Peak Factor

Use % HLM, CN and Figure 4-2.

X
 1.09

*13. Adjusted Peak Discharge (q_p)

$$q_p = q_p \text{ (from Step 7)} \times \text{Steps } \#9 \times 10 \times 11 \times 12$$

645.9		889.8
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cfs

* If the adjustment is not applicable, enter a Factor of 1.0

12-14-89

MOORHILLS - 1800 AC D.A. NORTH OF KEVUEAT

SOIL TYPE

HYDR. GROUP

P ₄	5%		5	2.5%	D
T _a	50%	20	70	35%	D
T _b	20%	20	40	20%	D
L _a	10%		10	5%	C
C _a	5%		5	2.5%	B
E _a	10%	30	40	20%	B
N _a		10	10	5%	B
C _c		10	10	5%	D
S _b		10	10	5%	D
				<u>100%</u>	

CN FOR 1/4 AC LOTS

67.5%	TYPE D	37	5872.5
27.5%	TYPE B	75	2062.5
5%	TYPE C	83	415.0

$$8350 \div 100 = 83.5 \text{ CN}$$

	CN 30	CN 43.5	CN 65
3.0	2.89		3.37
5.9"	3.69	4.06	4.23
6.0	3.73		4.31

(6 HOUR 100 YR STORM)

$$1800 \text{ AC} \times 4.06'' \text{ RUNOFF} = 609 \text{ AC.FT}$$

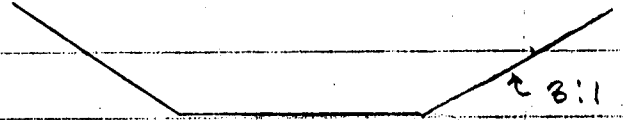
12

$$1800 \text{ AC} \times 6.04'' \text{ RUNOFF} = 906 \text{ AC.FT} \quad (24 \text{ HOUR } 100 \text{ YR})$$

2-14-90

SPILLWAY STRUCTURE I-A CAPACITY

$$Q = 3.087 LH^{3/2}$$



(H) DEPTH	(L) L @ AVE. DEPTH	Q
2.0	56	489.0
2.5	57.5	701.6
3.0	59.0	946.9
3.5	60.5	1222.9
4.0	62.0	1531.2
4.5	63.5	1871.2
5.0	65.0	2243.4

THE MOORINGS 5TH ADDITION

SPILLWAY STRUCTURE 1-A

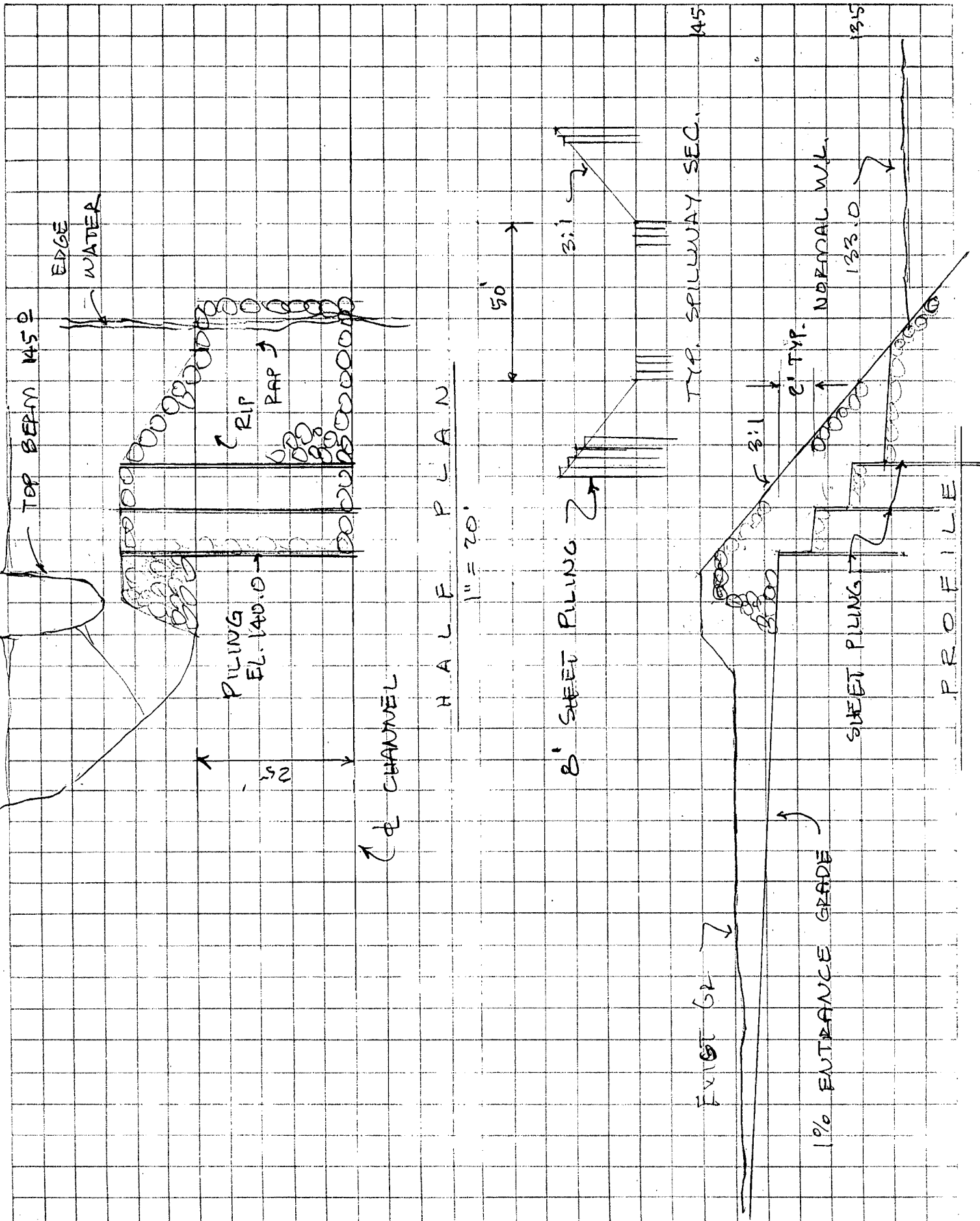
By K. HILL

Date 2-14-90

Page 1 Of 1



MILLCON CORPORATION



2-14-90

THE MOORINGS 5TH ADDN.

SPILLWAY STRUCTURE I-A

SHEET PILING $74 \times 8 \times 3 = 1776$ SF

RIP-RAP $40 \times 25 \times 2 = 2000$

$(45 + 22 \div 2) 13 \times 2 = 871$

$2871 \div 9 = 319$ C.Y.

SHEET PILING	1776 SF	# 11.30	20068.80
RIP-RAP	319 C.Y.	# 25	<u>7975.00</u>

28043.80

10% CONTINGENCIES 2804.00

CONSTRUCTION COSTS # 30847.80

ENGINEERING 5000.00

INSPECTION 2800.00

ADMIN. & OVERHEAD 6352.20

TOTAL ESTIMATED COSTS # 45000.00

PROJECT: THE MORGANS 5TH ADDN.

DESIGN FOR DBL 8' HIGH x 11' WIDE RCBC

DESIGNER: K. HILL

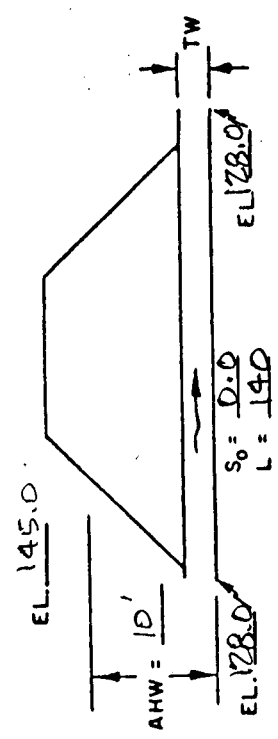
DATE: 2-15-90

HYDROLOGIC AND CHANNEL INFORMATION

Q₁ = _____
 Q₂ = _____
 TW₁ = _____
 TW₂ = _____

SKETCH

STATION: @ MERIDIAN



ALLOWABLE OUTLET VELOCITY = 8.5

CULVERT TYPE	Ø	SIZE	HEADWATER COMPUTATION										OUTLET VELOCITY	COST	COMMENTS
			INLET CONT.		OUTLET CONTROL						CONTR. ELEV.				
			HW/D	HW	K _e	d _c	d _c +D/2	h ₀	H	LS ₀		HW			
RCBC	400	88	0.65	5.2	0.2	3.4	5.7	8.0	0.45	-	8.4	8.45	4.5		
"	450	"	0.72	5.8	0.2	3.7	5.85	8.0	0.60	-	8.60	8.60	5.1		
"	600	"	0.87	7.0	0.2	4.5	6.25	8.0	1.1	-	8.1	9.1	6.8		
"	750	"	1.05	8.4	0.2	5.2	6.6	8.0	1.7	-	9.7	9.7	8.5		

SUMMARY & RECOMMENDATIONS:

USE DBL PRECAST 8' X 11' RCBC - CAPACITY WITH
 D.S. ELEV @ 136.0 AND U.S. ELEV @ 137.7 = 1500 cfs
 (MAINTAIN MAX. ELEV. 136.0 BY D.S. LAKE)

Figure 5

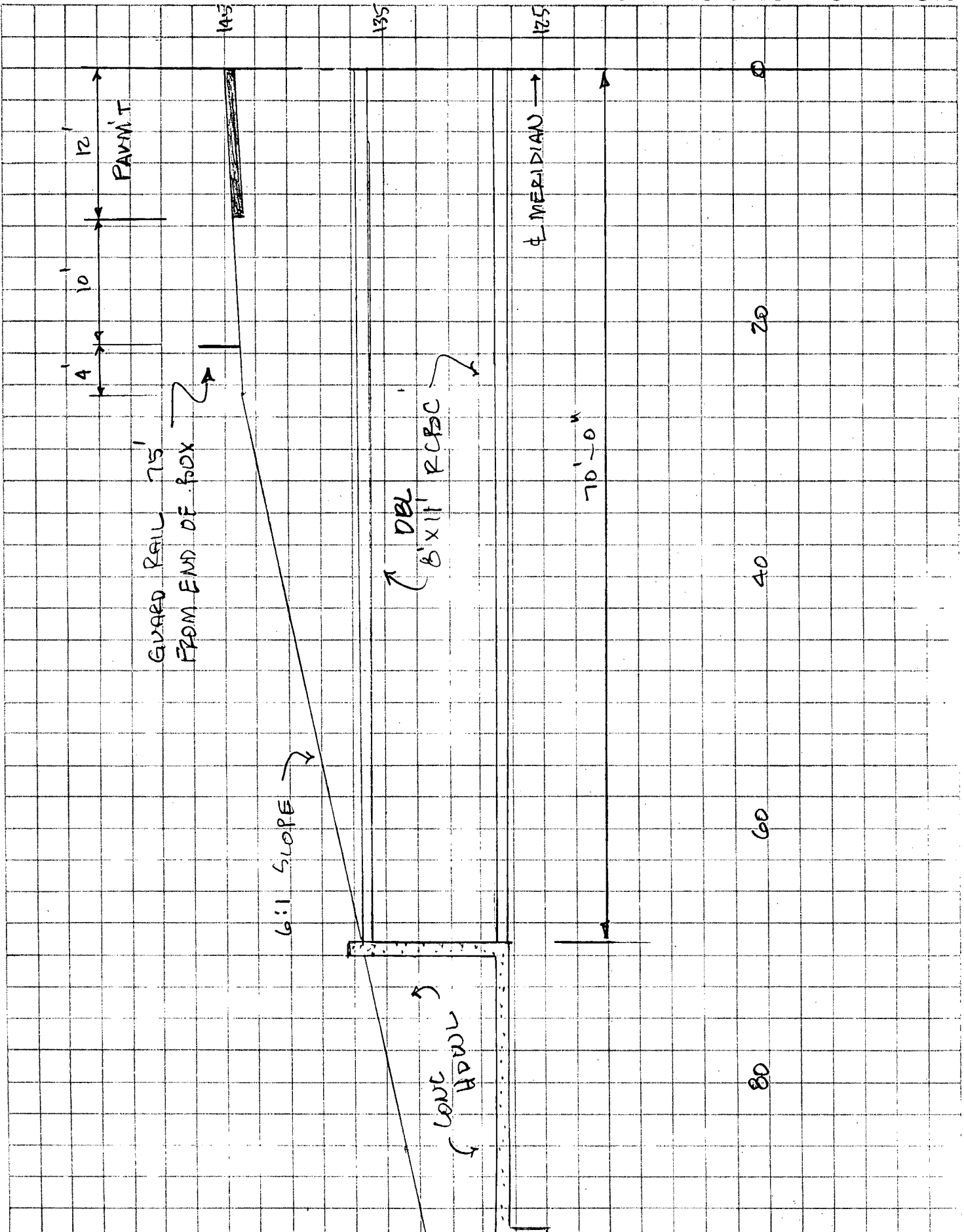
THE MOORINGS STA ADDITION

Z-8'x11' RCBC @ MERIDIAN

By K. HILL Date 2-14-90 Page 1 Of 1



MILLCON CORPORATION



THE MOORINGS 5TH ADDN.

2-14-90

BRIDGE @ MERIDIAN

1.	11'x8' PRECAST RCBC	280 LF.	# 275 ⁰⁰	77000.00
2.	GUARD RAIL	350 LF	21 ⁰⁰	7350 ⁰⁰
3.	RIP-PAV	110 SY.	25 ⁰⁰	2750 ⁰⁰
4.	CONCRETE (HDWL)	110 CY.	255 ⁰⁰	28050 ⁰⁰
5.	REINFORCING STL (HDWL)	13750 LBS	0 ⁶⁰	8250 ⁰⁰
6.	EXCAVATION CL III	1500 CY.	8 ⁰⁰	12000 ⁰⁰
7.	COMMON EXCAVATION	2000 CY.	25 ⁰⁰	5000 ⁰⁰

140400.00

10% CONTINGENCIES 14040.00

ESTIMATED CONST. COST 154,440.00

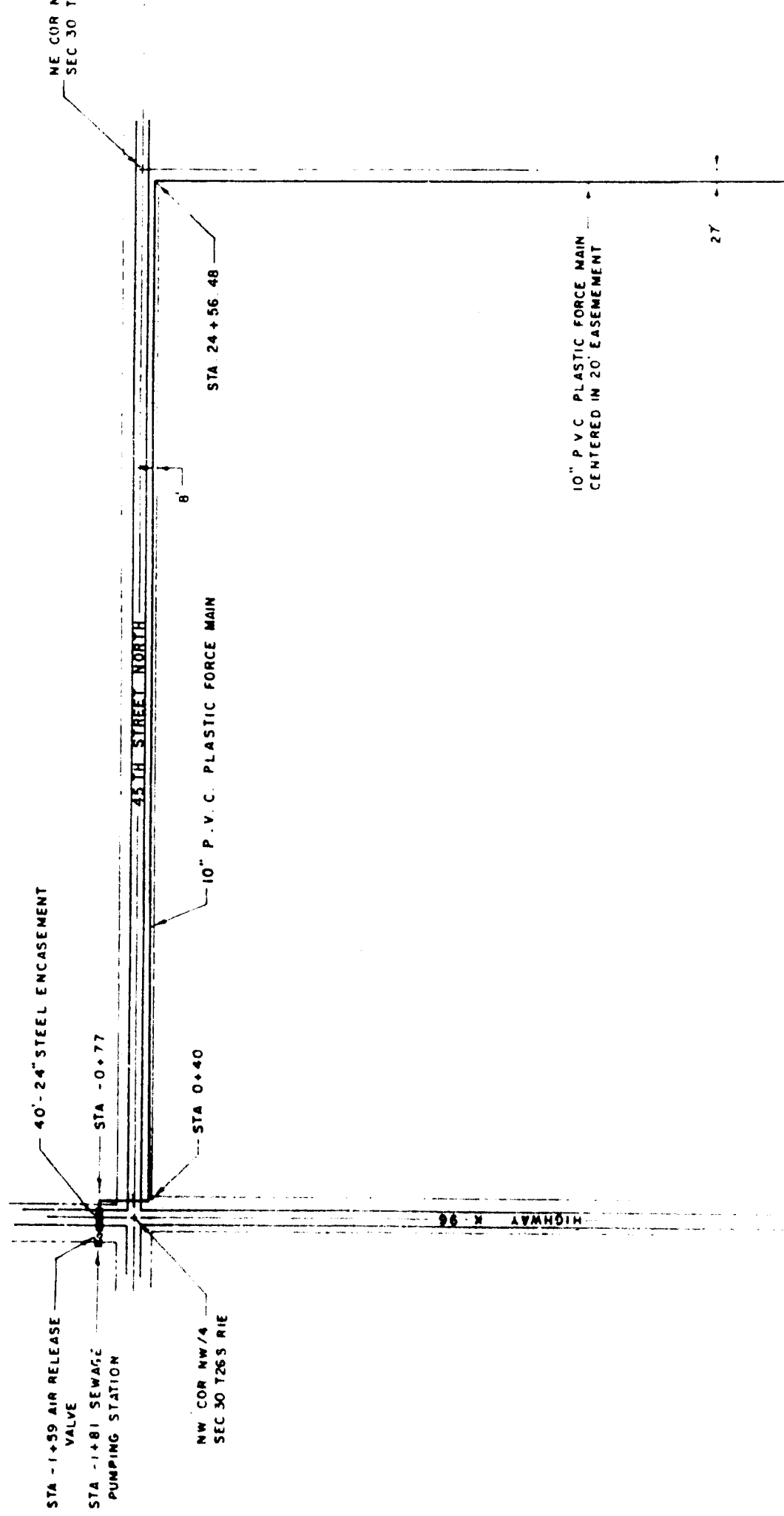
ENGR 15000.00

W&P 8000.00

ADMIN. & BOND COSTS 22560.00

\$ 210,000

D-252



STA -1+59 AIR RELEASE VALVE

STA -1+81 SEWAGE PUMPING STATION

40'-24" STEEL ENCASEMENT

STA 0+77

STA 0+40

NW COR NW/4
SEC 30 T26 S R1E

HIGHWAY R 96

10" P.V.C. PLASTIC FORCE MAIN
CENTERED IN 20' EASEMENT

AS CONSTRUCTED

SANITARY SEWER AND FORCE MAIN

SERVING

THE MOORINGS ADDITION

REISS & COONROSS ENGINEERS
 CONSULTING ENGINEERS
 1000 W. KAMAHAWA AVENUE
 (PH) 342-0228

DATE: 8-7-78

SCALE: 1" = 50'



NOTE:
 1. THE TOP OF CONCRETE CHAMBER IS 11.15'
 2. THE TOP OF 18" DIA. FORCE MAIN IS 10.50'
 3. THE TOP OF 18" DIA. S.S. IS 10.15'

