Pre-Sub · Aug. 28, 86

1. Board of Sedg. Cnty. Comms. . Vacation of utility easements. No water lines in alley, no water problem.

2. St. Francis Regional Medical Center. Vacation of Pvt. St., Util. Esmt., San. Sewer Esmt. Existing 6" main, fire hydrant, 6" fire service, and 2" domestic service in area to be vacated. Cost of relocation to be at St. Francis Reg. Med. Center expense. Main may have to be extended in Santa Fe to serve the area.

3. Sixth Addition to Cedar Ridge. Preliminary Plat. Item A, services to be removed or relocated. Cost to be at expense of Developer. Existing 8" main in Skinner serves the plat. New services to be installed by Water Dept. as needed when development occurs.

4. Rent-A-Center. Preliminary Plat. Item B, mains to be extended. No water problem. 20" Main to be extended north along Rock Road from 37th as project # 88105 by Mid-States Construction.

5. Lyle and Evelyn Wheatcraft. Grant additional Utility Esmt.. No water problem.

6. Carl and Karen Jaax. Grant Utility Esmt. . No water problem.

7. Daniel M. Loyd. Grant Utility Esmt. · No water problem.

8. 45 Rock Road Industrial Park. Revised Final Plat. Water mains in Rock Rd. will be extended by petitions.

9. Other Matters.

WICHITA—SEDGWICK COUNTY

W-SC

METROPOLITAN AREA PLANNING COMMISSION
CITY HALL — TENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202
(316) 268-4561

August 28, 1986

Mid-Kansas Engineering Consultants, P.A.
3500 N. Rock Road #800
Wichita, KS 67226

Re: Preliminary Plat S/D 86-69 - RENT-A-CENTER

Dear Gentlemen:

At the regular meeting of the Subdivision Committee of the Metropolitan Area Planning Commission on Thursday, August 28, 1986, the above-captioned plat was considered. The action of the Committee was to approve the preliminary and authorize preparation of the final plat, subject to the following:

A. The applicant is advised that the portion of Reserve J of Willowbend First Addition that is included within the boundary of this plat is zoned "AA" single-family. A zone change request for "AA" to "E" will need to be filed in order for all of Lot 1, Block 1 to be zoned for industrial purposes. Approval of this preliminary plat is subject to approval of the zone change needed for all of Lot 1, Block 1 to be zoned "E" (light industrial).

B. The applicant shall guarantee the extension of City water to serve the lots being platted.

C. The applicant shall guarantee the extension of sanitary sewer to serve the lots being platted.

D. The applicant shall guarantee the paving of the proposed interior streets.

E. The applicant shall guarantee any drainage improvements required by the platting of this property.

F. If improvements are guaranteed by petition, a notarized certificate listing the petitions shall be submitted to the Planning Department for recording.

G. The final plat shall indicate on the face of the plat the following access controls:

1. 40 feet of "complete access control" back north and east from the southwest corner of Lot 1, Block 1 to Rock Road and 37th Street, respectively.
2. "Access control except for two openings" to 37th Street across the south line of Lot 1, Block 1, except the west 40 feet thereof.
3. "Access control except for three openings" to Rock Road across the west line of Lot 1, Block 1, except the south 40 feet thereof.
4. "Complete access control" to 37th Street across the south line of Lot 2, Block 1.

H. The applicant shall obtain the off-site utility easement needed to provide sanitary sewer by way of the new route proposed by this replat.

I. The final plat shall indicate a 20-foot wide utility easement adjacent to the south line of Lot 1, Block 2.

J. Prior to, or at the time of submitting the final plat, the applicant shall submit a drainage plan to City Engineering for review and approval.

K. The applicant shall install or guarantee the installation of all utilities and facilities which are applicable and described in Article 8 of the MAPC Subdivision Regulations.

L. Requirements for a final plat (see pages 20-25, Part 4, Article 5 of the MAPC Subdivision Regulations).

The enclosed "marked" copy of the plat is for your information and files. If you should have any questions, please call.

Sincerely,

FLN

Forrest L. Nagley
Senior Planner

FLN:dlk

Enclosure

cc: Rent-A-Center, 9920 E. Harry, Wichita, KS 67207
Mike Lindebak, City Engineer

1. Dr. Kernie V. Binyon. Vacation of Alley R/W. No water problem.

2. Fern Peterson. Vacation of platted easement. No water problem.

3. Edward Boody Jr. . Vacation of platted easement. No water problem.

4. Riverview Estates. Final Plat. No water problem. Area now served.

5. Burlington Northern Industrial Center Second Addition. Revised Final Plat Existing main in Ohio. No water problem

6. John Weitzel Addition. Final Plat. Area now served, no water problem.

7. Skyline Heights Second Addition. Preliminary Plat. Item D., mains to be extended. Note: Water to be extended in Skyline Heights Addition. Need extension in York and Flora to serve plat.

8. Woodland Estates 2nd Addition. Preliminary Plat. Item B, mains to be extended. No existing mains to tie to at this time. Main in Linden / Shannon Way must be installed to allow main extension into this plat.

9. Rent-A-Center. Final Plat. Item B, mains to be extended No water problem.

10. Willowbend Third Addition. Final plat. Item B, mains to be extended. No water problem. Revised water plans need to be submitted prior to construction.

11. Golf Courses of America. Vacation of platted drainage and Utility Esm't. No water lines in Reserve A, no water problem.

12. Leedy - Voyles Addition. Final Plat. Item A, mains to be extended. Existing 12" on S side of Mac Arthur not shown on sketch plat. No water problem.

13. Keagan Addition. Final plat. Existing water in Douglas, no water problem.

14. Gentry 5th Addition. Final Plat. Existing water in Control, no water problem.

15. Other matters.

WICHITA—SEDGWICK COUNTY
W-SC
METROPOLITAN AREA PLANNING DEPARTMENT
CITY HALL — TENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202
(316) 268-4561

September 25, 1986

Mid-Kansas Engineering Consultants, P.A.
3500 N. Rock Road #800
Wichita, KS 67226

Re: Final Plat S/D 86-69 - RENT-A-CENTER

Dear Gentlemen:

At the regular meeting of the Subdivision Committee of the Metropolitan Area Planning Commission on Thursday, September 25, 1986, the above-captioned plat was considered. The action of the Committee was to recommend that this plat be approved subject to:

A. Approval of this final plat is subject to approval of the applicant's associated zone case (Z-2809) requesting "AA" to "E" for the portion of Lot 1, Block 1 which is not zoned for industrial purposes. The associated zone case will need to be approved by the City Commission prior to, or at the same time, the plat is considered by that governing body.

B. The applicant shall guarantee the extension of City water to serve the lots being platted.

C. The applicant shall guarantee the extension of sanitary sewer to serve the lots being platted.

D. The applicant shall guarantee the paving of the proposed interior streets.

E. The applicant shall guarantee the drainage improvements required by the platting of this property.

F. If improvements are guaranteed by petition, a notarized certificate listing the petitions shall be submitted to the Planning Department for recording.

G. The applicant shall obtain the off-site utility easement needed to provide sanitary sewer by way of the new route proposed by this replat.

H. The final plat tracing shall correct the M.A.P.C signature block to reference JOHN TERRY MOORE as the M.A.P.C. Chairman.

I. The final plat tracing shall indicate the existing half-street rights-of-way for Rock Road and 37th Street North adjacent to this property. The centerline of these adjacent streets shall be labeled along with the centerline of Rent-A-Center Street.

J. On the final plat tracing, the intersection of Rent-A-Center Street with Rock Road shall be indicated with a dashed line rather than a heavy solid line. The use of a solid line for a street denotes the platting of a reserve for private street purposes. A dashed line shall also be indicated on the east line of the plat's perimeter, where Rent-A-Center Street continues to the east.

K. Unless the Southwestern Bell easement near the southeast corner of proposed Lot 1, Block 1 has been released, (Film 705, Pgs. 764 & 765), it shall be indicated on the final plat tracing along with appropriate recording information.

L. Perimeter closure computations shall be submitted with the final plat tracing. Section 5-101(C).

M. Recording of the plat within 30 days after approval by the Board of City Commissioners.

Enclosed with the applicant's copy of this letter is a list of the five methods which have been adopted as being acceptable for guaranteeing improvements required in the approval of plats. The certificate will be required if petitions are submitted. Forms for the bond and irrevocable Letter of Credit are available from this office.

The enclosed "marked" copy of the final plat is for your information and files.

This matter will be forwarded to the Planning Commission for its consideration on Thursday, October 2, 1986 at 1:30 p.m. If you have any questions concerning this matter, please call.

Sincerely,

FLN

Forrest L. Nagley
Senior Planner

FLN:dlk

Enclosure

cc: Rent-A-Center, 9920 E. Harry, Wichita, KS 67207
Mike Lindebak, City Engineer

PROJECT: Rent-A-Center

Status Report

PROJECT #: _____ DATE: 06/10/87

TO: Gossen Livingston Assoc., P.A.
420 S. Emporia
Wichita, KS 67202

ATTN: Tom Montgomery

MID-KANSAS ENGINEERING
CONSULTANTS, P.A.
3500 N. Rock Road, #800
Wichita, KS 67226

The storm water sewer plans serving Rent-A-Center should be through the bid process by July 3, 1987. The plans which you have been copied on, reflect all the changes and adjustments we have been made aware of by interested parties associated with surrounding projects such as; Rock Road and 37th Street intersection, Rent-A-Centers Parking lot drains and the requested changes in the pond elevation with Reserve "J" of Rent-A-Center addition made in April and May.

Should you have any questions regarding on site work or related projects please feel free to call.

MID-KANSAS ENGINEERING CONSULTANTS, P.A.

Kenneth H. Bengtson

Kenneth H. Bengtson, P.E.

KHB/dh

passive solar energy assistance.
Rent-A-Center, Inc., the only publicly held household durable

5/19/93

Stormwater Calculations for Rent-A-Center

Table of Contents

use: $t_c = 15$ min. (min. COW t_c)
use $t_c = 15$ min since $t_c < 15$ min (6.2 min)
for entire system - see attachments, pg. 1-7
$i_5 = 4.61$ in/hr, $i_{10} = 5.19$ in/hr, $i_{100} = 7.36$ in/hr

INLET No. 1

Drainage Area = 0.3 acres
C = 0.90 (paved)

$Q_5 = CiA = (0.90)(4.61)(0.3) =$ $Q_5 = 1.24$ cfs

$Q_{10} = (0.90)(5.19)(0.3)$ $Q_{10} = 1.40$ cfs

$Q_{100} = (0.90)(7.36)(0.3)$ $Q_{100} = 1.99$ cfs

INLET No. 1A

Drainage Area = 0.8 ac.

FIND: "C"		C	%	
	Grassed	0.3	60%	= 0.18
	Paved	0.9	40%	= 0.36
				C = 0.54

$Q_5 = 0.54(4.61)(0.8) =$ $Q_5 = 1.99$ cfs

$Q_{10} = 2.24$ cfs

$Q_{100} = 3.18$ cfs

INLET No. 2

Drainage Area = 1.21 ac.
c = 0.90 (paved)

$Q_5 = 0.9(4.61)(1.21)$ $Q_5 = 5.02$ cfs

$Q_{10} = 5.65$ cfs

$Q_{100} = 8.02$ cfs

INLET No. 3

Drainage Area = 0.96 ac
C = 0.90 (paved)

$Q_5 = (0.9)(4.61)(0.96)$

$Q_5 = 3.98$ cfs

$Q_{10} = 4.48$ cfs

$Q_{100} = 6.36$ cfs

INLET No. 4

Drainage Area = 1.20 ac
C = 0.90 (paved)

$Q_5 = (0.9)(4.61)(1.20)$

$Q_5 = 4.98$ cfs

$Q_{10} = 5.61$ cfs

$Q_{100} = 7.95$ cfs

INLET No. 5

Drainage Area = 1.08 ac.
C = 0.60 (50% grassed, 50% paved)

$Q_5 = (0.6)(4.61)(1.08)$

$Q_5 = 2.99$ cfs

$Q_{10} = 3.36$ cfs

$Q_{100} = 4.77$ cfs

INLET No. 6

Drainage Area = 0.22 ac
C = 0.90 (paved)

$Q_5 = (0.9)(4.61)(0.22)$

$Q_5 = 0.91$ cfs

$Q_{10} = 1.03$ cfs

$Q_{100} = 1.46$ cfs

PIPE No. 1

$Q_5 = 1.24$ cfs
$Q_{10} = 1.40$ cfs
$Q_{100} = 1.99$ cfs

PIPE No. 2

$Q_5 = 3.23$ cfs
$Q_{10} = 3.64$ cfs
$Q_{100} = 5.17$ cfs

Pipe No. 3

$Q_5 = 8.25$ cfs
$Q_{10} = 9.29$ cfs
$Q_{100} = 13.19$ cfs

Pipe No. 4

$Q_5 = 4.98$ cfs
$Q_{10} = 5.61$ cfs
$Q_{100} = 7.95$ cfs

← Piping to South

Pipe No. 5

$Q_5 = 7.97$ cfs
$Q_{10} = 8.97$ cfs
$Q_{100} = 12.72$ cfs

← Piping to South

Pipe No. 6

$Q_5 = 12.23$ cfs
$Q_{10} = 13.77$ cfs
$Q_{100} = 19.55$ cfs

Pipe No. 7

$Q_5 = 13.14$ cfs
$Q_{10} = 14.80$ cfs
$Q_{100} = 21.01$ cfs

$$Q/A = \frac{1.49}{n}\left(\frac{D}{4}\right)^{2/3} S^{1/2}$$

$n = 0.013$ (RCP)

$S = ?$

$A_{8''} = 0.35\,ft^2$, $A_{12''} = 0.785\,ft^2$, $A_{15} = 1.23\,ft^2$, $A_{18''} = 1.77\,ft^2$

$A_{21''} = 2.41\,ft^2$, $A_{24''} = 3.14\,ft^2$

PIPE No 1

Try 8":

$Q_S = 1.24$ cfs

$$S = \left[\frac{1.24}{0.35}\left(\frac{0.013}{1.49}\right)\left(\frac{1}{\left(\frac{8/12}{4}\right)^{2/3}}\right)\right]^2$$

8" pipe → min slope = 1.04 %

12" pipe → min slope = 0.12 %

PIPE No 2

$Q = 3.23$ cfs

Try 12":

$$S = \left[\frac{3.23}{0.785}\left(\frac{0.013}{1.49}\right)\left(\frac{1}{\left(\frac{1}{4}\right)^{2/3}}\right)\right]^2$$

12" pipe → min slope = 0.82 %

15" pipe → min slope = 0.25 %

Pipe No 3

$Q = 8.25$ cfs

Try 15":

$$S = \left[\frac{8.25}{1.23}\left(\frac{0.013}{1.49}\right)\left(\frac{1}{\left(\frac{15/12}{4}\right)^{2/3}}\right)\right]^2$$

15" pipe → min slope = 1.61 %

18" pipe → min slope = 0.61 %

Pipe No 6

$Q = 12.23$ cfs

Try 21":

$$S = \left[\left(\frac{12.23}{2.41}\right)\left(\frac{0.013}{1.49}\right)\left(\frac{1}{\left(\frac{21/12}{4}\right)^{2/3}}\right)\right]^2$$

21" pipe → min slope = 0.60 %

Pipe No. 7

$Q = 13.14$ cfs

Try 24":

$$S = \left[\frac{13.14}{3.14}\left(\frac{0.013}{1.49}\right)\left(\frac{1}{\left(\frac{24/12}{4}\right)^{2/3}}\right)\right]^2$$

24" pipe → min slope = 0.34 %

21" pipe → min slope = 0.69 %

Pipe No. 4

$Q = 4.98$ cfs

Try 12":

$$S = \left[\frac{4.98}{0.785}\left(\frac{0.013}{1.49}\right)\left(\frac{1}{\frac{1}{4}}\right)^{2/3}\right]^2$$

12" pipe → min slope = 1.95%
15" pipe → min slope = 0.59%

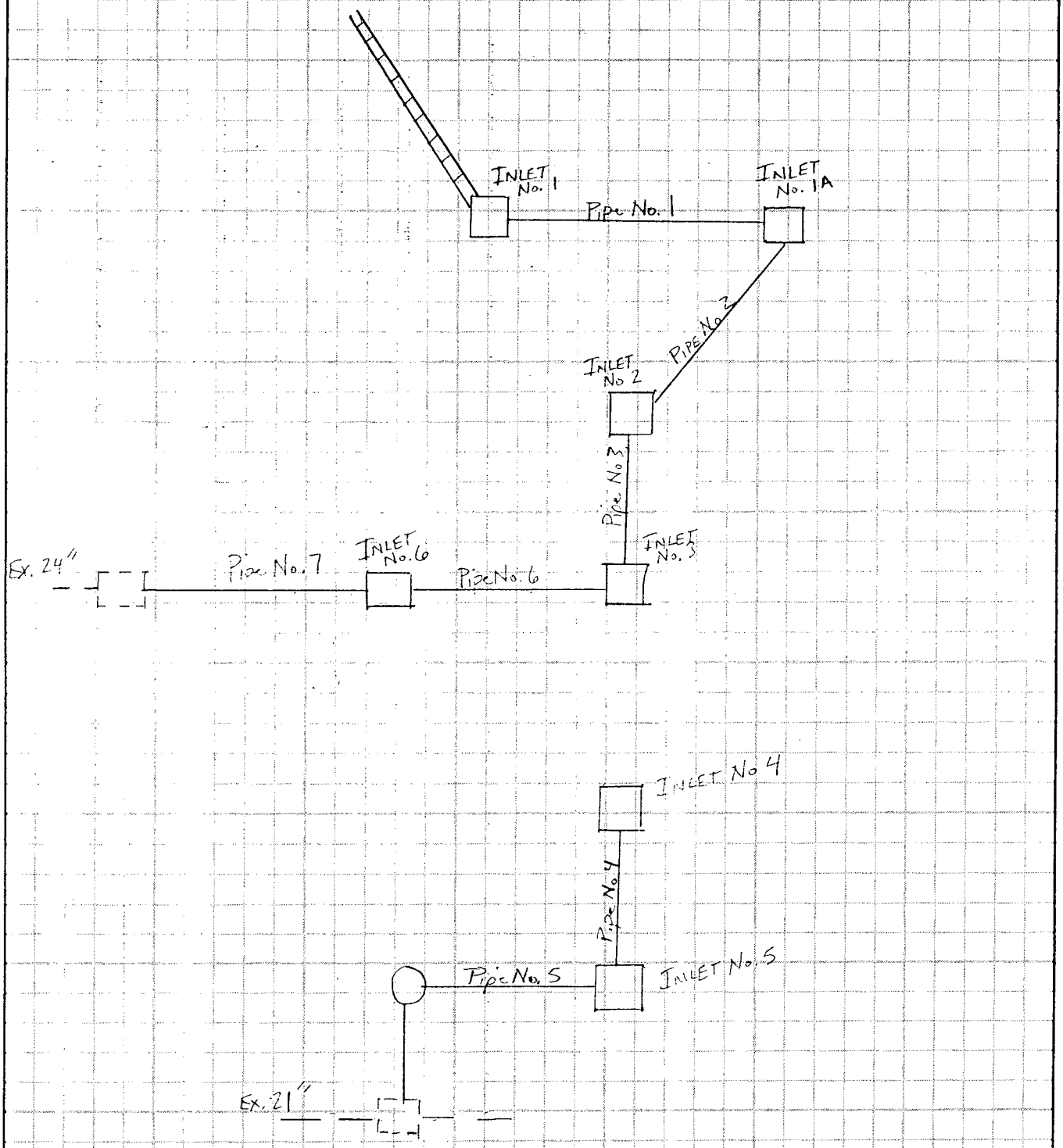
Pipe No. 5

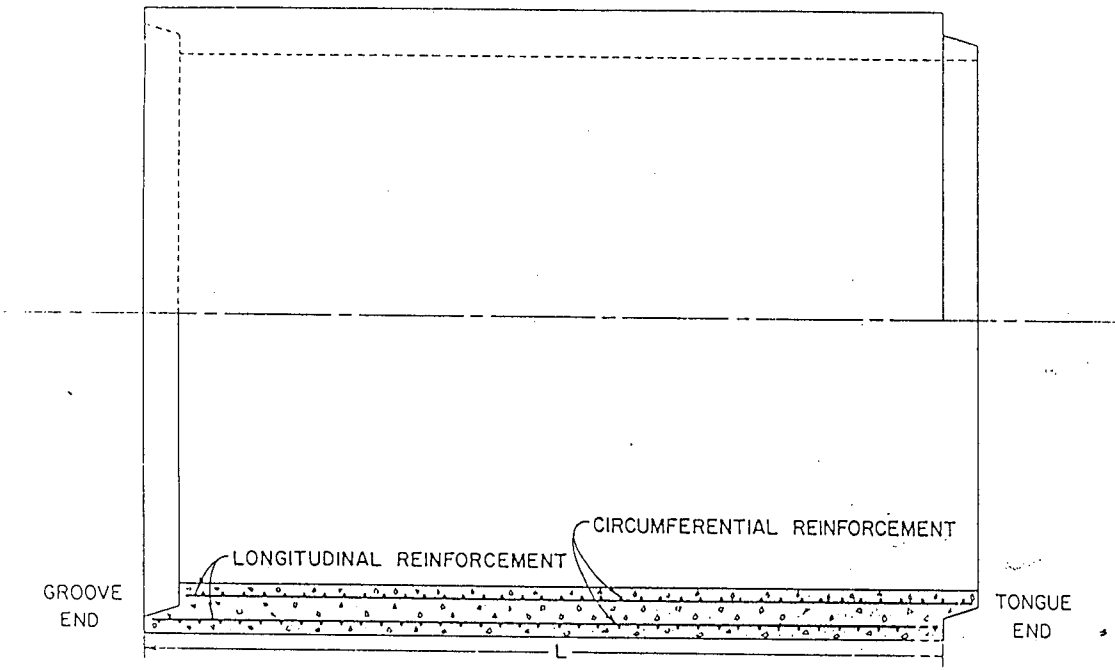
$Q = 7.97$ cfs

Try 18":

$$S = \frac{7.97}{1.77}\left(\frac{0.013}{1.49}\right)\left(\frac{1}{\frac{18/12}{4}}\right)^{2/3}\Bigg]^2$$

18" pipe → min slope = 0.57%
21" pipe → min slope = 0.25%
24" pipe → min slope = 0.12%


INLET No. 1
Pipe No. 1
INLET No. 1A
Pipe No. 2
INLET No 2
Pipe No. 3
INLET No. 3
Ex. 24"
Pipe No. 7
INLET No. 6
Pipe No. 6
INLET No 4
Pipe No. 4
Pipe No. 5
INLET No. 5
Ex. 21"



PLAN VIEW

SECTION X-X

STEEL REINFORCEMENT SHOWN IS SCHEMATIC.

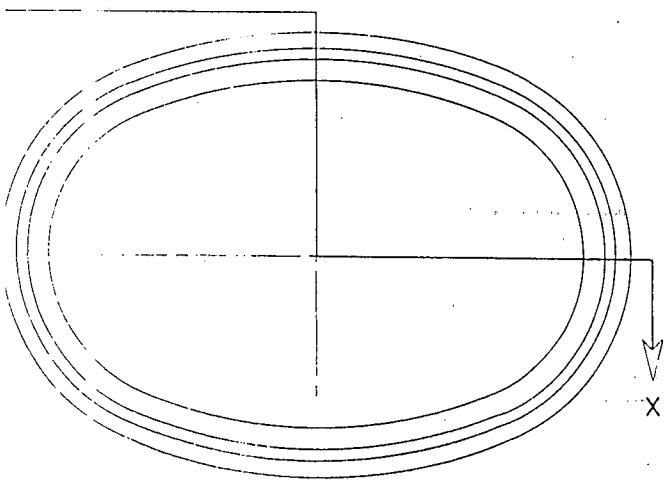
AREA OF REINFORCEMENT STEEL, NUMBER OF CAGES, AND CONCRETE COMPRESSIVE STRENGTHS SHALL CONFORM TO CONTRACT SPECIFICATION.

PIPE LENGTHS SHOWN ARE NOMINAL.

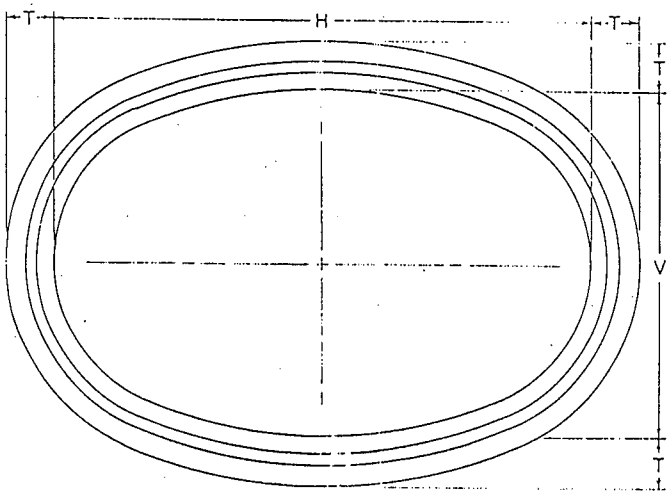
NO SCALE

NOMINAL LENGTH, PENDING EQUIPMENT AVAILABLE, MAY BE 6', 7-1/2', OR 8'.

NOMINAL EQUIVALENT DIAMETER	RISE V	SPAN H	WALL THICKNESS T	NOMINAL LENGTH L	APPROXIMATE WEIGHT PER FOOT	APPROXIMATE WATERWAY AREA
18"	14"	23"	2.75"	6.0'	195 LBS	1.8 SF
24"	19"	30"	3.25"	6.0'	300 LBS	3.3 SF
30"	24"	38"	3.75"	6.0'	430 LBS	5.1 SF
36"	29"	45"	4.50"	6.0'	625 LBS	7.4 SF
42"	34"	53"	5.00"	6.0'	815 LBS	10.2 SF
48"	38"	60"	5.50"	6.0'	1000 LBS	12.9 SF
54"	43"	68"	6.00"	6.0'	1235 LBS	16.6 SF
60"	48"	76"	6.50"	6.0'	1475 LBS	20.5 SF
66"	53"	83"	7.00"	6.0'	1745 LBS	24.8 SF
72"	58"	91"	7.50"	6.0'	2040 LBS	29.5 SF
78"	63"	98"	8.00"	6.0'	2350 LBS	34.6 SF
84"	68"	106"	8.50"	6.0'	2680 LBS	40.1 SF
90"	72"	113"	9.00"	6.0'	3050 LBS	46.1 SF
96"	77"	121"	9.50"	6.0'	3420 LBS	52.4 SF
102"	82"	128"	9.75"	6.0'	3725 LBS	59.2 SF
108"	87"	136"	10.00"	6.0'	4050 LBS	66.4 SF
114"	92"	143"	10.50"	6.0'	4470 LBS	74.0 SF
120"	97"	151"	11.00"	6.0'	4930 LBS	82.0 SF
132"	106"	166"	12.00"	6.0'	5900 LBS	99.2 SF
144"	116"	180"	13.00"	6.0'	7000 LBS	118.6 SF



GROOVE END VIEW



TONGUE END VIEW

MILLCON CORPORATION

700 East 29th Street North
Wichita, Kansas 67219
(316) 838-8651

REINFORCED CONCRETE PIPE
HORIZONTAL ELLIPTICAL WITH
TONGUE & GROOVE JOINTS

A.S.T.M. C-507

ROSCO CONCRETE PIPE COMPANY
Division Of
ROSS SAND COMPANY, INC.

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Topeka, Kansas 66608
Telephone: (913) 232-7221
Street Address: 501 E. Gordon

E. H. ROSS
MARILYN DAVENPORT DEWAIN LOEFFLER JULE FOLSOM MAX BAKER HERVEY WRIGHT

PRICE

JANUARY

All pipe 18" and larger will be furnish-

Inlet Size Required
4'-1"
5'-2"
6'-3"
7'-4"
8'-5"

for Pipe Sizes
21" & Smaller
24" & 27"
30" & 42"
48" & 54"
60" & 66"

Stock Lengths Ft.	Weight Per Foot Lb.	WALL "B" PIPE SIZE Outside Diameter Inch	Wall Thickness Inch	Inside Diameter Inch	ASTM C76 AASHO M170 Class II	Class III	Class IV	Class V
4,6	93	16	2	12"	1.70	1.70	1.80	2.00
4,6,8	128	19½	2¼	15"	1.95	1.95	2.20	2.50
4,6,8	169	23	2½	18"	2.55	2.55	3.00	3.50
4,6,8	216	26½	2¾	21"	3.40	3.50	4.15	4.80
4,6,8	268	30	3	24"	3.95	4.25	5.00	5.90
4,6	325	33½	3¼	*27"	5.45	5.60	6.30	7.60
4,6,8	388	37	3½	30"	5.95	6.20	7.15	8.50
4,6	455	40½	3¾	*33"	7.75	8.10	9.10	11.15
4,6,8	530	44	4	36"	7.80	8.15	9.25	11.25
4,6,7½	690	51	4½	42"	10.40	10.80	12.25	15.00
4,6	875	58	5	48"	13.00	13.40	15.25	18.50
4,6	1080	65	5½	54"	15.90	16.50	19.00	
4,6	1300	72	6	60"	19.40	20.00	23.00	
4,6	1550	79	6½	*66"	23.50	24.50	28.90	
4,6	1820	86	7	*72"	28.70	30.00	35.00	
4,6	2120	93	7½	*78"	38.95			
4	2450	100	8	*84"	46.40			

*These sizes not normally stocked in quantity.

All concrete end sections have as part of their overall length a barrel section which is counted as pipe and which is included in the pay length of pipe. The adjacent table is offered as an aid in estimating costs.

The pipe lengths in the end sections must be subtracted from the culvert length to determine the quantity of pipe required. Your order should indicate whether you have made allowance for this end section pipe length, or whether we should make the allowance for it.

End sections at the inlet of a culvert will have tongue joints and outlet end sections will have groove joints. When ordering please identify end sections as either "inlet" or "outlet."

For quick easy handling and installation, all end sections are furnished with lift holes, unless you specify differently.

These figures for estimating purposes only.

Pipe Length Ft.	Pipe Value	Flared End Cost	Length Ft.-In.	Weight Lb.	PIPE SIZE Wall Thickness Inch	Inside Diameter Inch	Class II
4	6.40	13.10	6-0⅞	530	2	12"	19.50
3¾	7.80	16.70	6-1	740	2¼	15"	24.50
3¾	10.20	19.80	6-1	990	2½	18"	30.00
2½	9.88	36.62	6-1½	1520	3	24"	46.50
1½	8.93	53.07	6-1¾	2190	3½	30"	62.00
2¾	23.40	81.60	8-1¾	4100	4	36"	105.00
2¾	31.20	103.80	8-2	5380	4½	42"	135.00
2	26.00	132.00	8-2	6550	5	48"	158.00
2¾	47.70	157.30	8-2¼	8240	5½	54"	205.00
3	58.20	171.80	8-3	8730	6	60"	230.00
1¾	50.23	314.77	8-3	12520	7	72"	365.00

ELLS, TEES and "Y"s can be custom made in almost unlimited combinations of angles and sizes up to 72".

The prices listed for reinforced fittings are for Class II pipe. Prices on other Classes will be quoted on request.

The Tees and "Y"s priced have one branch, the branch being the same size of pipe as the main pipe.

Tees and "Y"s can be made with more than one branch, the branches may be different sizes and angles, and increasers or reducers may be built onto the main pipe.

Ask for design information and quotations on the special fittings required on your next job.

PIPE SIZE Inside Diameter Inch	ASTM C-76 AASHO M-170 ELLS Price	ELLS Length	TEES & "Y"s Price	TEES & "Y"s Length	PIPE SIZE Inside Diameter Inch	ASTM C-75 AASHO M-170 ELLS Price	ELLS Length	TEES & "Y"s Price	TEES & "Y"s Length
12"	15.00	4	24.50	4	27"	42.00	6	66.00	6
15"	17.00	4	28.00	4	30"	47.00	6	74.40	6
18"	20.50	4	33.90	4	36"	66.00	6	103.00	6
21"	22.50	4	37.50	4	42"	105.00	8	132.00	6
24"	27.50	4	46.70	4	48"	127.00	8	161.00	6

Joint Type	Stock Lengths Ft.	Weight Per Foot Lb.	Outside Diameter Inch	Wall Thickness Inch	PIPE SIZE Inside Diameter Inch	Round Pipe	ASTM—C14 AASHO—M86 Ells	Tees	"Y"	Length Of Pipe Included In Fitting
Bell End	3	20	7¾	⅞	6"	0.70	7.90	11.50	11.50	3'
	3	30	10	1	8"	0.85	9.20	13.75	13.75	3'
	3	42	13	1½	10"	1.05	12.50	19.20	19.20	4'
Tongue Groove	4	90	16	2	12"	1.35	14.20	22.00	22.00	4'
	4	120	19½	2¼	15"	1.70	16.75			4'
	4	160	23	2½	18"	2.10	20.00			4'
	4	210	26½	2¾	21"	2.50	22.00			4'
	4	260	30	3	24"	3.20	26.25			4'

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Project Rent-A-Center

Item Storm Sewer Design

$Q = CiA$ (10 yr. Storm)

Drainage Area #1

Area = 0.8 ac.

$t_c = 2Ln / 3\sqrt{S}^{2.14}$

L = Length (ft) = 200'
t_c = time conc. (min) = ?
S = Slope = 0.02
n = 0.030

t_c = 4.77 min (5 min)
i_{10} = 7.32 in/hr
i_{100} = 10.20 in/hr

use: Rainfall intensity Tables

FIND: "C"

	C		
Grassed	0.30	60%	= 0.18
Paved	0.90	40%	= 0.36
			0.54 = C

$Q_{10} = (7.32 \text{ in/hr})(0.54)(0.8 \text{ ac}) = 3.2 \text{ cfs}$

$Q_{100} = (10.20 \text{ in/hr})(0.54)(0.80 \text{ c}) = 4.4 \text{ cfs}$

Drainage Area #2

Area = 1.21 ac.
$L = 230'$, $S = 3.5/230 = 0.015$, $n = 0.025$
t_c = 4.98 min (5 min) i_{10} = 7.32 in/hr
i_{100} = 10.20 in/hr
C = 0.9

$Q_{10} = (7.32 \text{ in/hr})(0.9)(1.21 \text{ ac}) = 8.0 \text{ cfs}$

$Q_{100} = (10.20 \text{ in/hr})(0.9)(1.21 \text{ ac}) = 11.1 \text{ cfs}$

Drainage Area #7

Area = 0.3 ac
L = 150
S = 0.02
n = 0.03

t_c = 4.2 min i_{10} = 7.32 in/hr
i_{100} = 10.2 in/hr

$Q_{10} = (7.32)(0.3)(0.9) = 2.0 \text{ cfs}$

$Q_{100} = (10.20)(0.3)(0.9) = 2.8 \text{ cfs}$

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Project Rent-A-Center

Item Storm Sewer Design

Drainage Area #3

Area = 0.96Ac
L = 260' S = 5/260 = 0.019 n = 0.025
t_c = 5.0 min
C = 0.9 (paved)

$Q_{10} = (7.32 \text{ in/hr})(0.9)(0.96 \text{ ac}) = 6.3 \text{ cfs}$

$Q_{100} = (10.2 \text{ in/hr})(0.9)(0.96 \text{ ac}) = 8.8 \text{ cfs}$

Drainage Area #4

Area = 1.2ac.
L = 260' S = 4/260 = 0.015 n = 0.025
t_c = 5.3 min
C = 0.9 (paved)

$Q_{10} = (7.23 \text{ in/hr})(0.9)(1.2 \text{ ac}) = 7.8 \text{ cfs}$

$Q_{100} = (10.08 \text{ in/hr})(0.9)(1.2 \text{ ac}) = 10.9 \text{ cfs}$

Drainage Area #5

Area = 1.08 acres
L = 250' S = 4/250 = 0.016 n = 0.025
t_c = 5.1 min
C = 50% paved, 50% grass ⇒ 0.6

$Q_{10} = (7.29 \text{ in/hr})(0.6)(1.08) = 4.7 \text{ cfs}$

$Q_{100} = (10.16 \text{ in/hr})(0.6)(1.08) = 6.6 \text{ cfs}$

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Project Rent a Center

Item Storm Sewer Design

Drainage Area #6

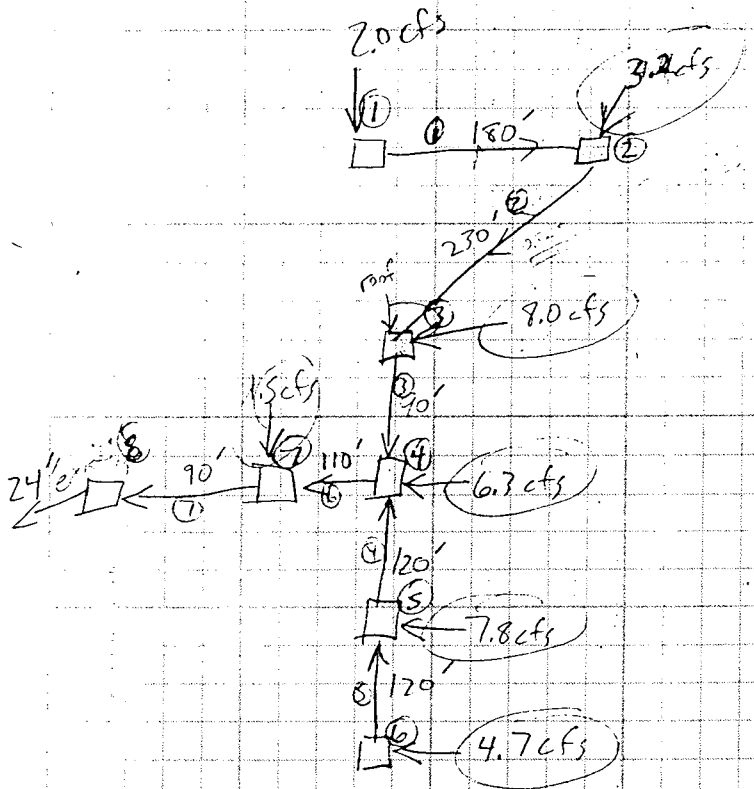
Area = 0.22 ac

$L = 200'$ $S = 5/200 = 0.025$, $n = 0.025$

$t_c = 4.2$ min use 5 min

$Q_{10} = (7.32)(.9)(0.22ac) = 1.5$ cfs

$Q_{100} = (10.20)(.9)(0.22ac) = 2.0$ cfs



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Project RAC

Item

Accumulated Flows

Inlet #1 $Q_1 = 2.0$ cfs ← Inlet #1

Inlet #2 $Q_{DA\#1} = 3.2$ cfs

$t_{c_{\#1}} = 4.2\text{min} + \frac{180'}{5\text{ft/s} \times 60\text{s}} = 4.8\text{min}$ $\quad i_{10} = 7.32\text{in/hr}$

$Q_{10} = 7.32(0.3)(0.9) + 3.2\text{cfs} = 5.2\text{cfs}$ ← Inlet #2

Inlet #3 $Q_{DA\#2} = 8.0$ cfs

$t_{c_1} = 4.8\text{min} + \frac{230'}{5\text{ft/s} \times 60} = 5.6\text{min}$ $\quad i_{10} = 7.14\text{in/hr}$

$Q_{DA7} = 7.14(0.3)(0.9) = 1.9\text{cfs}$

$Q_{DA1} = 7.14(0.54)(0.8) = 3.1\text{cfs}$

$Q_{10} = Q_{DA\#2} + Q_{DA7} + Q_{DA1}$

$Q_{10} = 13.0$ cfs ← Inlet #3

Inlet #6 $Q_{10} = 4.7$ cfs ← Inlet #6

Inlet #5 $Q_{DA4} = 7.8$ cfs

$t_c = 5.1\text{min} + \frac{120}{5 \times 60} = 5.5\text{min}$ $\quad i_{10} = 7.17\text{in/hr}$

$Q_{DA5} = 7.17(0.6)(1.08) = 4.7\text{cfs}$

$Q_{10} = 7.8\text{cfs} + 4.7\text{cfs} = 12.5\text{cfs}$ ← Inlet #5

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Project RAC

Item

Inlet #4

$Q_{DA3} = 6.3$ cfs

$t_{c_1} = 5.6\text{ min} + \frac{90}{5(60)} = 5.9$ min ✓ $\quad i_{10} = 7.05$ in/hr

$Q_{DA7} = 7.05(0.3)(0.9) = 1.9$ cfs

$Q_{DA1} = 7.05(0.54)(0.8) = 3.1$ cfs

$Q_{DA2} = 7.05(0.9)(1.21) = 7.7$ cfs

$Q_{DA4} = 7.05(0.9)(1.2) = 7.6$ cfs

$Q_{DA5} = 7.05(0.6)(1.08) = 4.6$ cfs

$Q_{10} = 31.2$ cfs ← Inlet #4

Inlet #5

$Q_{DA6} = 1.5$ cfs

$t_c = 5.9\text{ min} + \frac{110}{5(60)} = 6.3$ min $\quad i_{10} = 6.95$ in/hr

$Q_{DA7} = 6.95(0.3)(0.9) = 1.9$ cfs
$Q_{DA1} = 6.95(0.54)(0.8) = 3.0$ cfs
$Q_{DA2} = 6.95(0.9)(1.21) = 7.6$ cfs
$Q_{DA4} = 6.95(0.9)(1.2) = 7.5$ cfs
$Q_{DA5} = 6.95(0.6)(1.08) = 4.5$ cfs
$Q_{DA3} = 6.95(0.9)(0.96) = 6.0$ cfs

$Q_{10} = 32.0$ cfs ← Inlet #5

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Project RAC

Item Pipe Sizing

Line 1 $Q = 2$ cfs min $V = 5$ ft/s $A \geq 0.4$ ft^2 8" = 0.35, 12" = 0.785

Try 8": find slope (min) for $Q = 2$ cfs

$n = 0.013$ (RCP)

$S = ?$

$D = 8" = 0.67'$

$A = 0.35$

$$Q = \left(\frac{1.49}{n}\left(\frac{D}{4}\right)^{2/3} S^{1/2}\right) A \qquad 2.0 = \left(\frac{1.49}{0.013}\left(\frac{0.67}{4}\right)^{2/3} S^{1/2}\right) 0.35$$

$S = 2.7\%$ min for 8" RCP ←

Try 12": $S = 0.3\%$ min for 12" RCP

Line 2 $Q = 5.2$ cfs $A = 1.0$

Try 12": $5.2 = \left[\frac{1.49}{0.013}\left(\frac{1}{4}\right)^{2/3} S^{1/2}\right](0.785)$

$S = 2.12\%$ min for 12" RCP ←

15": $A = 1.23$ ft^2 $S = 0.64\%$ min for 15" RCP

Line 3 $Q = 13$ cfs

Try 15": $\frac{13}{1.23} = \frac{1.49}{0.013}\left(\frac{15/12}{4}\right)^{2/3} S^{1/2}$ $S = 4.00\%$ (min) for 15" RCP

Try 18": $\frac{13}{1.77} =$ $S = 1.5\%$ (min) for 18" RCP ←

18" $A = 1.77$

Line 4.5 $Q = 4.7$ cfs 12": $S = 1.7\%$ (min) for 12" RCP ←

Line 8.4 $Q = 12.5$ cfs 15": $S = 3.7\%$ (min) for 15" RCP

18": $S = 1.4\%$ (min) for 18" RCP ←

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Project RAC

Item Pipe Sizing

Line 6 $Q = 31.2$ cfs

Try 24": $\frac{31.2}{3.14} = \frac{1.49}{0.013}\left(\frac{2}{4}\right)^{2/3} S^{1/2}$ $S = 1.9\%$ min for 24"

Line 7 $Q = 32$ cfs

Try 24": $\frac{32}{3.14} = \frac{1.49}{0.013}\left(\frac{2}{4}\right)^{2/3} S^{1/2}$ $S = 2.0\%$ min for 24"