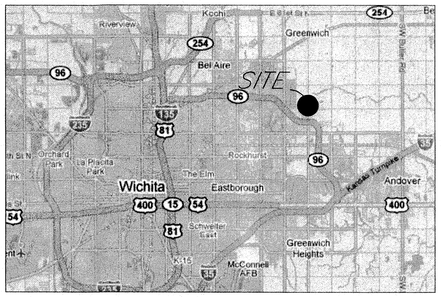
Storm Sewer

AS BUILT PLANS
Contractor: Dondlinger
Inspector: Fred Smith, Baughman Co.
pdf's by: KEK, 9/25/13

DRAINAGE TO SERVE
STONEY POINTE APARTMENTS
(East of Greenwich, South of 29th Street North)
0141 PPD (607861)
CITY OF WICHITA, KANSAS
Gary Janzen, P.E., City Engineer



LOCATION MAP
(For Visual Use Only)

GENERAL NOTES:

1. Contractor will be required to provide notice to utility companies a minimum of twenty-four (24) hours prior to any excavation, as follows:

   Kansas One-Call (316)687-2470

   The Contractor must notify the fallowing in case of an emergency:

Cox Communications	(316)262-4270
or	(316)263-2061
Westar Energy/ Kansas Gas & Electric Company	(800)482-4950
AT&T	1-555-1212
City of Wichita Water Department	(316)268-4908
City of Wichita Sewer Department	(316)268-4071
Aquila Natural Gas	(316)941-1608
or	(800)303-0357

2. Exist. utilities and their locations, as shown on the plans, represent the best information attainable for design. Location information has been obtained from the various utility companies and is either from company record drawings or company-provided field locations. The Contractor will be required to work around existing utilities which do not conflict with proposed constructions.

3. The Contractor to verify utility locations prior to construction of this project.

4. Utility service and installation shall be coordinated with the respective utility owner.
   Contacts are:

Kansas Gas Service	Jim Coe	(316)832-3126
Westar Energy	Miles Capps	(316)261-6251
Aquila Networks	Calvin Briggs	(316)942-8811
Wichita Water & Sewer	Kerry Gibson	(316)268-4555
AT&T	Jim Toben	(316)268-2759
Cox Communications	Mark Anaya	(316)262-4270

5. All lawn/turf areas disturbed by construction of proposed improvements shall be restored with the same grass as existing. Restoration of disturbed areas shall include, but not limited to, to soil preparation, fertilizing, seeding, mulching (all seeded areas, outside the limits of erosion mat placement), and/or reseeding, and installation of erosion control mat. All seeding work shall be in accordance with the City of Wichita Standard Specifications and the City of Wichita Administrative Regulations No. AR 6.5 which governs cleanup and respiration or replacement following construction. all cost for the soil preparation, seeding and mulching (all seeded areas, outside the limits of erosion mat placement) shall be paid for through the lump sum bid item for "Seeding." All seeded areas within eight feet of the back of new curb shall be covered with an approved erosion mat, which shall be paid for by the measured quantity bed item "Back of Curb Protection (8' wide)."

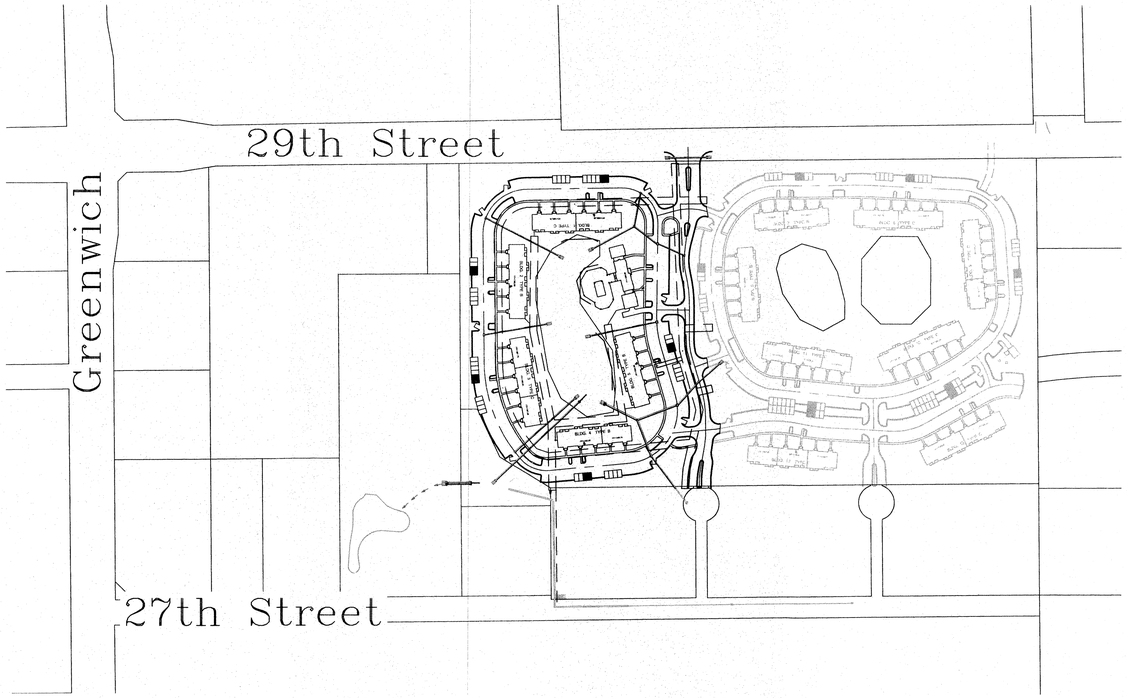
6. Traffic affected by the construction of this project shall be handled in accordance with the latest edition of the Manual on Uniform Traffic Control Devices.

7. It is the contractor's responsibility to visit this site to better understand the extent of site clearing and restoration to be performed. Site Clearing and Restoration shall include all costs for removal of items which a pay item is not provided.

8. The contractor shall be responsible for preserving property irons. The contractor will be required to re-establish any property irons which are damaged or destroyed by the construction operations. Such irons shall be re-established by a licensed land surveyor in accordance with state laws.

9. Properties within the project limits may have underground sprinkler systems in public right-of-way which conflict with new construction. Contractor will be required to remove such improvements should they not be removed by their owner at the time of construction of the project. The contractor will be required to salvage all sprinkler heads and/or valves and give such material to owner. Portions of underground sprinkler systems not in conflict with new construction shall be protected from damage and shall remain in place. All work in connection with underground sprinkler systems shall be considered as subsidiary to the contract pay items for work.

10. Cuts made in paved surfaces on public property will be repaired by the City's Contractor and charged against the contractor. Unit Repair prices are avalable from the city at 268-4418. A surcharge may be applicable: Call 268-4418 for deatails. Repair costs to be paid prior to release of utility service if utilities are effected.



Index of Sheets:

Benchmark:

Top of "T" Post 129.17' East and 1177.81' North of W. 1/4, COR, Sec 3, T27S, R2E, 6TH P.M.
Elev. = 1376.51 NAVD88

GYANENDRA POKHAREL
LICENSED
22082
2-27-13
KANSAS
PROFESSIONAL ENGINEER

APPROVED AS NOTED
Storm Water Utility Office: 2-28-13
City Engineers Office: 2-28-13

NOTE TO CONTRACTORS

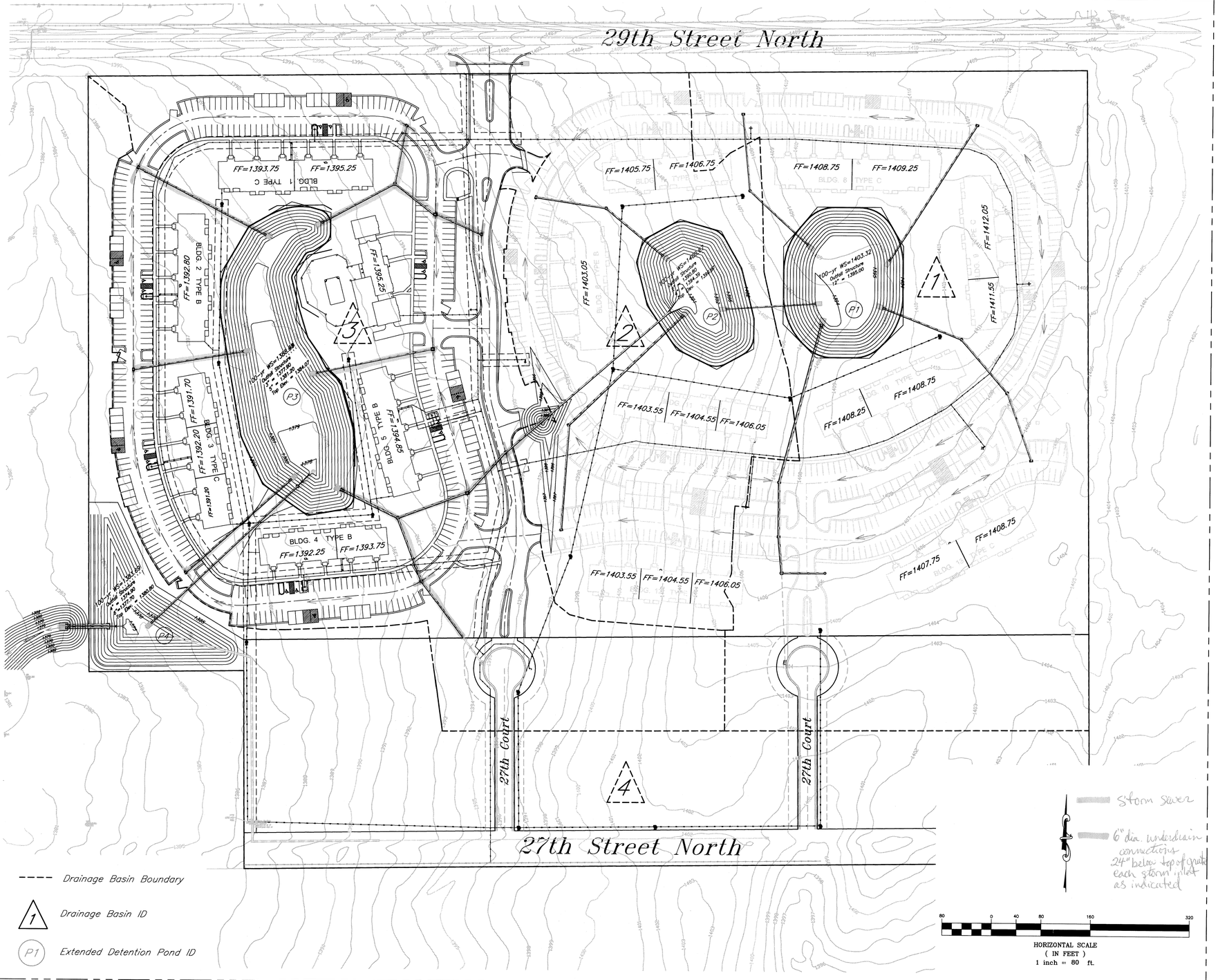
Installation, inspection and testing for this project is to be provided by a Licensed Consulting Engineering Firm under contract with the Owner/Developer. Said Inspection to be in accordance with the City of Wichita standard construction engineering practices and certified by a Licensed Prfessional Engineer. No work shall be performed in dedicated easements or public right-of-way by the Contractor without such inspection nor shall any work be commenced without written authorization by the City Engineer. All Construction and Materials shall comply with the City of Wichita Specifications and Standards (on file and available in the City Engineer's Office).

200 0 100 200 400 800
(IN FEET)
1 inch = 200 ft.

August 2012

kemiller engineering
516 S. Market, Wichita, KS 67202 (316)264-0242

February 27, 2013



February 25, 2013

Project Narrative

The proposed site is located between 27th and 29th St. North, east of the Greenwich Road. The proposed development include an apartment complex of 438 unit covering 34.17 acres and two commercial lots of 11.60 acres. The apartment complex include multi storey apartment buildings, parking lots, drives, office building, an outdoor swimming pool, and other facilities. There will be four detention basins in series to acquire the required extended detention for downstream channel protection, extended detention for water quality and detention for flood protection. The detention basins are designed for the entire development of 45.77 acres. The two south commercial lots of area 11.60 acres is expected to develop in later time.

Water Quality Volume and Water Quality Flow

Water Quality Volume (WQv) and Flow Calculation

Drainage Basin	Acres	85th percentile storm event P, inches	Rainfall Coeff, Rv	Water Quality Vol, ac-ft	Corresponding Water Quality Flow, cfs
1	13.52	1.20	0.60	0.81	**7.99**
2	7.57	1.20	0.60	0.45	**4.47**
3	15.00	1.20	0.60	0.90	**8.86**
4	9.68	1.20	0.60	0.58	**5.72**

Extended Detention (WQV) and TSS Removal

Dry extended detention basins are rated as 60% TSS removal. Each drainage basin will acquire 60% TSS removal through dry extended detention basins. The four extended detention basins will act in series for the water quality and TSS removal. Areas 1 and 2 are treated three times in series in ponds P2, P3 and P4. Area 3 is treated twice in series in pond P3 and P4. Area 4 is treated once in pond 4.

Extended Detention for WQV (P=1.2 inches)

Centroid of inflow hydrograph for Pond P2=14.06 hrs
Centroid of outflow hydrograph for Pond P2=38.67 hrs
Centroid–Centroid separation of inflow and outflow hydrograph= 38.67–14.06 = 24.61 hrs

Centroid of inflow hydrograph for Pond P3=13.97 hrs
Centroid of outflow hydrograph for Pond P3=42.70 hrs
Centroid–Centroid separation of inflow and outflow hydrograph= 42.70–28.73 = 28.73 hrs

Centroid of inflow hydrograph for Pond P4=14.01 hrs
Centroid of outflow hydrograph for Pond P4=38.36 hrs
Centroid–Centroid separation of inflow and outflow hydrograph= 38.36–14.01 = 24.35 hrs

Which meets the current city requirement of 24–48 hrs detention time.

TSS Removal:

TSS removal of drainage basin 1 and 2=60% in Pond P2 +60% in Pond P3+60% in Pond P4=93.6%
TSS removal of drainage basin 3 = 60% in Pond P3+60% in Pond P4=83.3%
TSS removal of drainage basin 4 = 60% in Pond P4= 60%
Effective TSS removal of entire site
=(21.09*93.6+15.00*83.3+9.68x*60)/45.77 = 83.12 %

which meets the current city requirement of 80% TSS removal

Channel Protection (Extended Detention)

Channel Protection Volume Calculation

Drainage Area	Acres	24 hr 1 yr Storm	Developed			Existing		
			CN	S	Runoff Volume ac-ft	CN	S	Runoff Volume ac-ft
1	13.52	2.80	93	0.753	**2.32**	84	1.905	**1.56**
2	7.57	2.80	93	0.753	**1.30**	84	1.905	**0.85**
3	15.00	2.80	93	0.753	**2.58**	84	1.905	**1.69**
4	9.68	2.80	93	0.753	**1.66**	84	1.905	**1.09**

Channel Protection volume in developed condition is detained in series of extended detention ponds.

The separation between the combined inflow hydrograph and outflow hydrograph of downstream pond (P4) is considered in design of channel protection volume detention.

Centroid of combined inflow hydrograph for 1 yr storm=13.44 hrs
Centroid of outflow hydrograph from Pond P4= 38.31 hrs
Centroid–Centroid separation of inflow and outflow hydrograph= 39.79–13.44 = 26.35 hrs

which meets the current city requirement of 24–48 hrs detention time.
The extended detention ponds in series will acquire the channel protection volume for entire 45.77 acres of site (Apartment complex+Commercail Site)

Benchmark:

Top of "T" Post 129.17' East and 1177.81' North of W. 1/4, COR, Sec 3, T27S, R2E, 6TH P.M.
Elev. = 1376.51 NAVD88

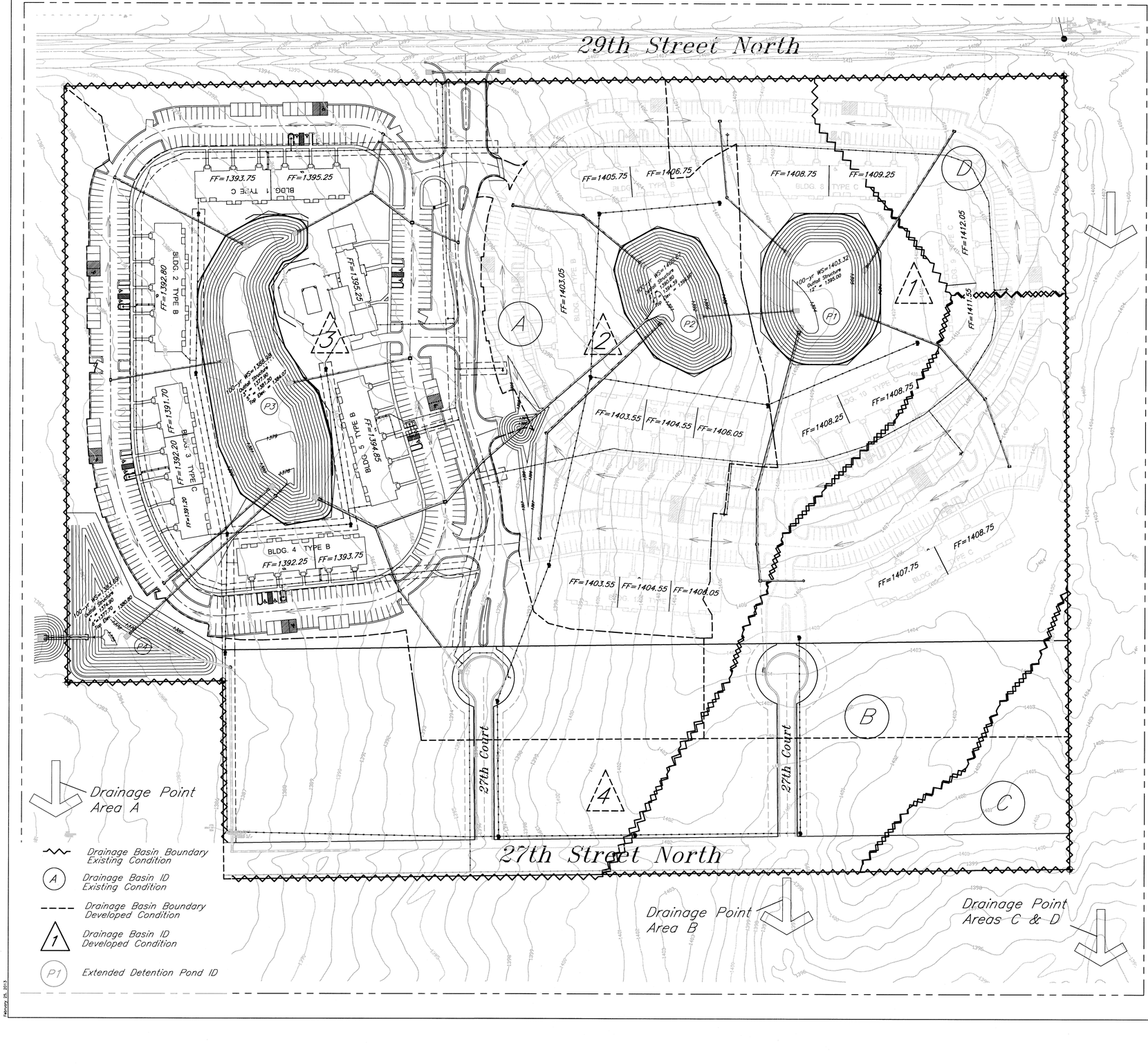
Stoney Pointe Apartments

Drainage Plan, WQV and CPV

Wichita, Kansas

kemiller engineering
516 S. Market, Wichita, KS 67202 (316)264-0242

PROJECT NUMBER 0141 PPD (607861)			
KEM NO. 12037	FILE drainage	DATE 11/2012	SHEET 2.0
DESIGN GP	DRAWN GP	REVISED	



February 25, 2013

Flood Detention (2–, 5–, 10–, 25–, 100–yr)

Existing Condition:
Total Site Area= 45.77 Acres
Land use: Pasture land
Hydrologic Soil Group 'D'

Existing Runoff Calculation

Drainage Basin	Acres	Curve No. (CN)	Time of Concentration	24-hr Rainfall Depth, in					Peak Runoff, Q (cfs)					Remark
				2-yr	5-yr	10-yr	25-yr	100-yr	2-yr	5-yr	10-yr	25-yr	100 -yr	
A	33.28	84	44	3.50	4.50	5.20	6.10	7.80	43.15	62.94	77.07	95.38	130.10	Area draining into southwest coner
B	8.66	84	48	3.50	4.50	5.20	6.10	7.80	10.57	15.43	18.90	23.39	31.92	Area draining into south ditch
C	1.30	84	41	3.50	4.50	5.20	6.10	7.80	1.77	2.58	2.58	3.91	5.33	Area draining into east ditch
D	2.53	84	39	3.50	4.50	5.20	6.10	7.80	5.07	7.36	8.99	11.10	15.09	Area draining into southeast corner

Only 36.80 cfs of peak discharge is allowed to leave the site due to downstream conveyance restriction (Culvert under K–96) according to Drainage Report, Stoney Pointe Addition.

Developed Condition:
Total Site Area= 45.77 Acres
Land use: 34.17 Acres Apartment Complex and 11.60 Commercial Site
Based on available site plan and assumed % impervious for commercial site, a combined CN value of 93 is used in analysis.
Hydrologic Soil Group 'D'

Developed Runoff Calculation

Drainage Basin	Acres	Curve No. (CN)	Time of Concentration	24-hr Rainfall Depth, in					Peak Runoff, Q (cfs)					Remark
				2-yr	5-yr	10-yr	25-yr	100-yr	2-yr	5-yr	10-yr	25-yr	100 -yr	
1	13.52	93	21	3.50	4.50	5.20	6.10	7.80	34.33	45.79	53.77	63.96	83.09	Basin draining to pond 1
2	7.57	93	16	3.50	4.50	5.20	6.10	7.80	20.59	27.56	32.41	38.61	50.24	Basin draining to pond 2
3	15.00	93	16	3.50	4.50	5.20	6.10	7.80	40.80	62.07	72.89	86.96	113.15	Basin draining to pond 3
4	9.68	93	19	3.50	4.50	5.20	6.10	7.80	24.61	32.83	38.55	45.86	59.58	Basin draining to pond 4

DED Pond	Outflow, Qout				
	Runoff, Q				
	2-yr	5-yr	10-yr	25-yr	100 -yr
1	5.87	5.65	5.49	5.54	6.43
2	4.32	6.69	8.18	9.75	11.94
3	3.66	6.06	7.25	8.50	10.32
4	8.24	17.44	22.81	28.77	36.72

Note:

All of the 45.77 acres of proposed development drains to the southwest corner (to existing pond at Greenwich Business Center Addition). The over detention is achieved through series of extended detention ponds. Internal storm sewers are designed to collect the runoff to the corresponding detention basin.

Developed peak flows are calculated using the SCS hydrograph method, "CN" & "T" values are established from the City of Wichita Stormwater Design Manual.

80 0 40 80 160 320
HORIZONTAL SCALE
(IN FEET)
1 inch = 80 ft.

Benchmark:

Top of "T" Post 129.17' East and 1177.81' North of W. 1/4, COR, Sec 3, T27S, R2E, 6TH P.M.
Elev. = 1376.51 NAVD88

Stoney Pointe Apartments
Drainage Plan
Wichita, Kansas

kemiller engineering
516 S. Market, Wichita, KS 67202 (316)264-0242

PROJECT NUMBER 0141 PPD (607861)

KEM NO.	FILE	DATE	SHEET
12037		11/2012	2.1
DESIGN GP	DRAWN GP	REVISED	

Benchmark:

Top of "T" Post 129.17' East and 1177.81' North of W. 1/4, COR, Sec 3, T27S, R2E, 6TH P.M.

Elev. = 1376.51 (NAVD88)

50 0 25 50 100 200

HORIZONTAL SCALE
(IN FEET)
1 inch = 50 ft.

Stoney Pointe Apartments

Grading Plan

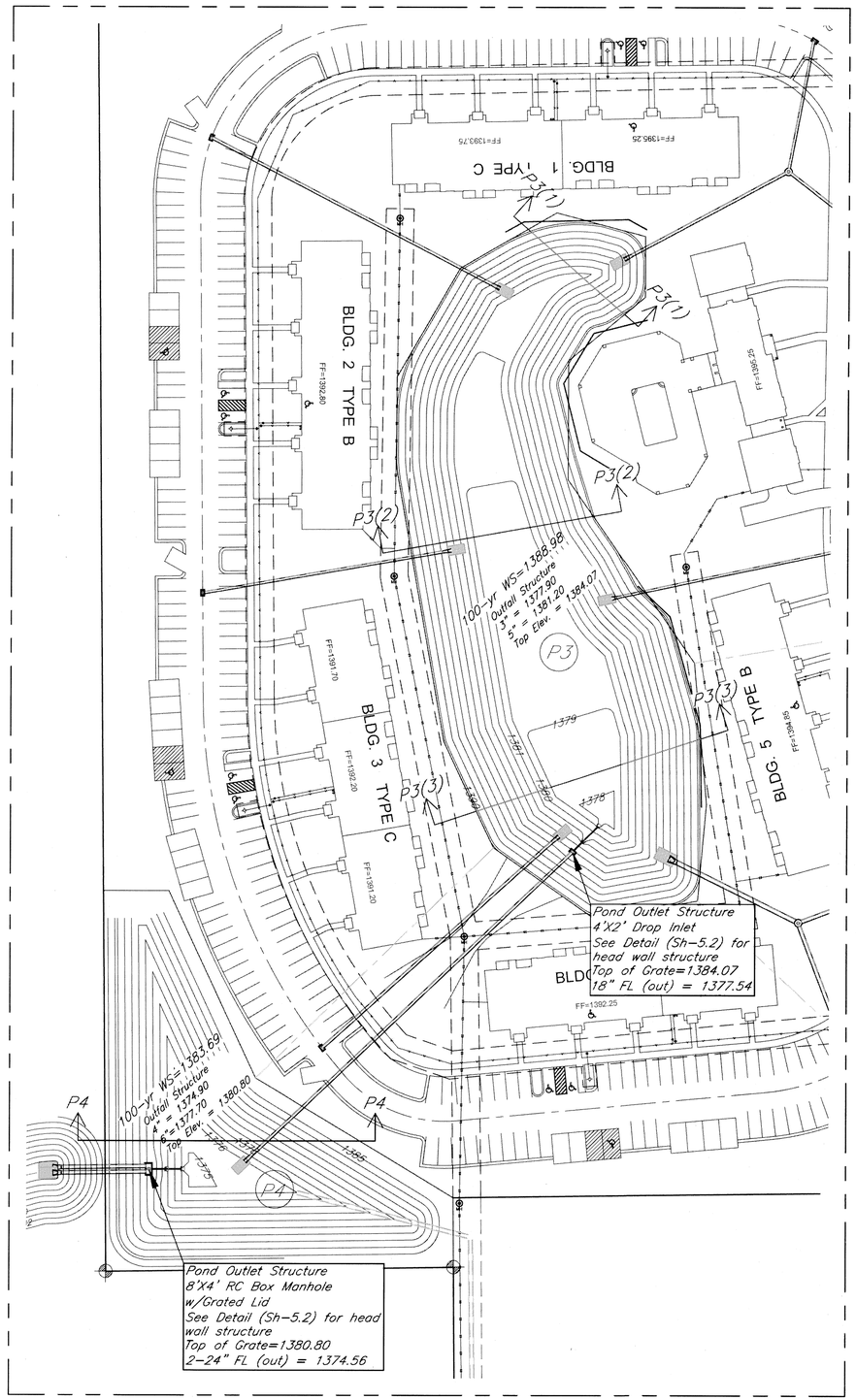
Wichita, Kansas

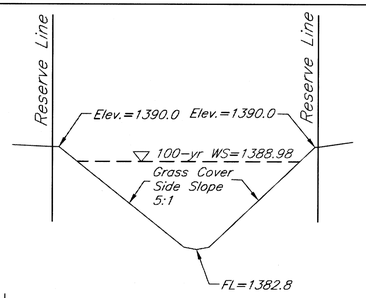
kemiller engineering
516 S. Market, Wichita, KS 67202 (316)264-0242

PROJECT NUMBER 0141 PPD (607861)

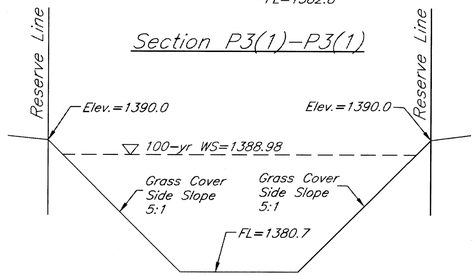
KEM NO.	FILE	DATE	SHEET
12037		11/2012	4.0
DESIGN GP	DRAWN GP	REVISED	

February 25, 2013

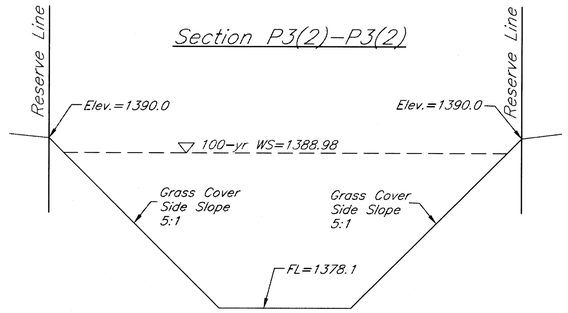




Section P3(1)–P3(1)

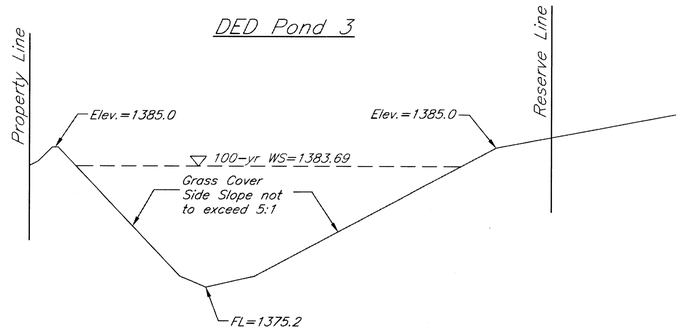


Section P3(2)–P3(2)



Section P3(3)–P3(3)

DED Pond 3

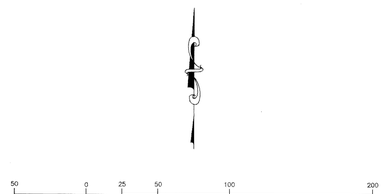


Section P4–P4

DED Pond 4

Dry Extended Detention Pond

(Not to Scale)



Stoney Pointe Apartments

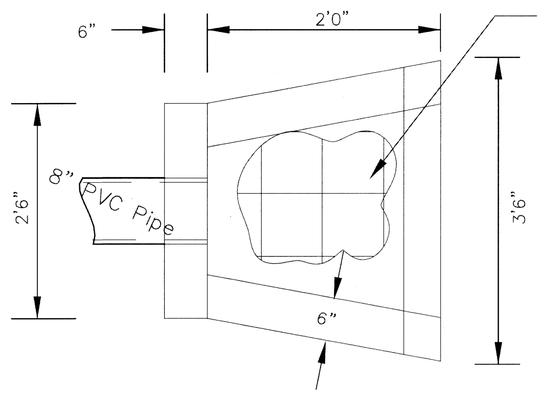
Pond Detail, P3&P4

Wichita, Kansas

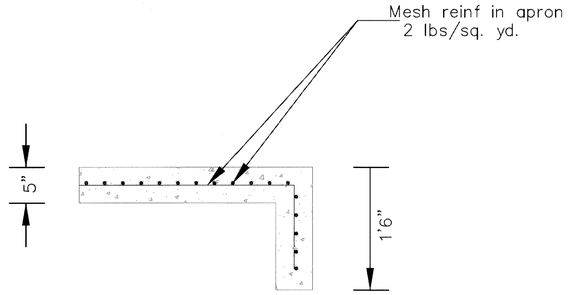
kemiller engineering
516 S. Market, Wichita, KS 67202 (316)264-0242

PROJECT NUMBER			
0141 PPD (607861)			
KEM NO. 12037	FILE drainage	DATE 11/2012	SHEET 5.1
DESIGN GP	DRAWN GP	REVISED	

January 25, 2013



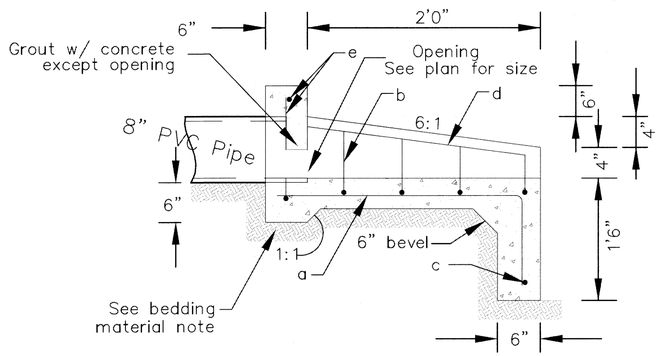
PLAN



Conc. Apron

Bedding Material

The material for bedding shall confirm to the requirements of UD-1 according to KDOT specification.



SECTION

All rebars (a,b,c,d,e) to be #4
All exposed edges to have 1/2" bevel.

Head Wall Detail

Not to Scale

February 25, 2013

Stoney Pointe Apartments
Head Wall Detail
Wichita, Kansas

kemiller engineering
516 S. Market, Wichita, KS 67202 (316)264-0242

PROJECT NUMBER
0141 PPD (607861)

KEM NO.	FILE	DATE	SHEET
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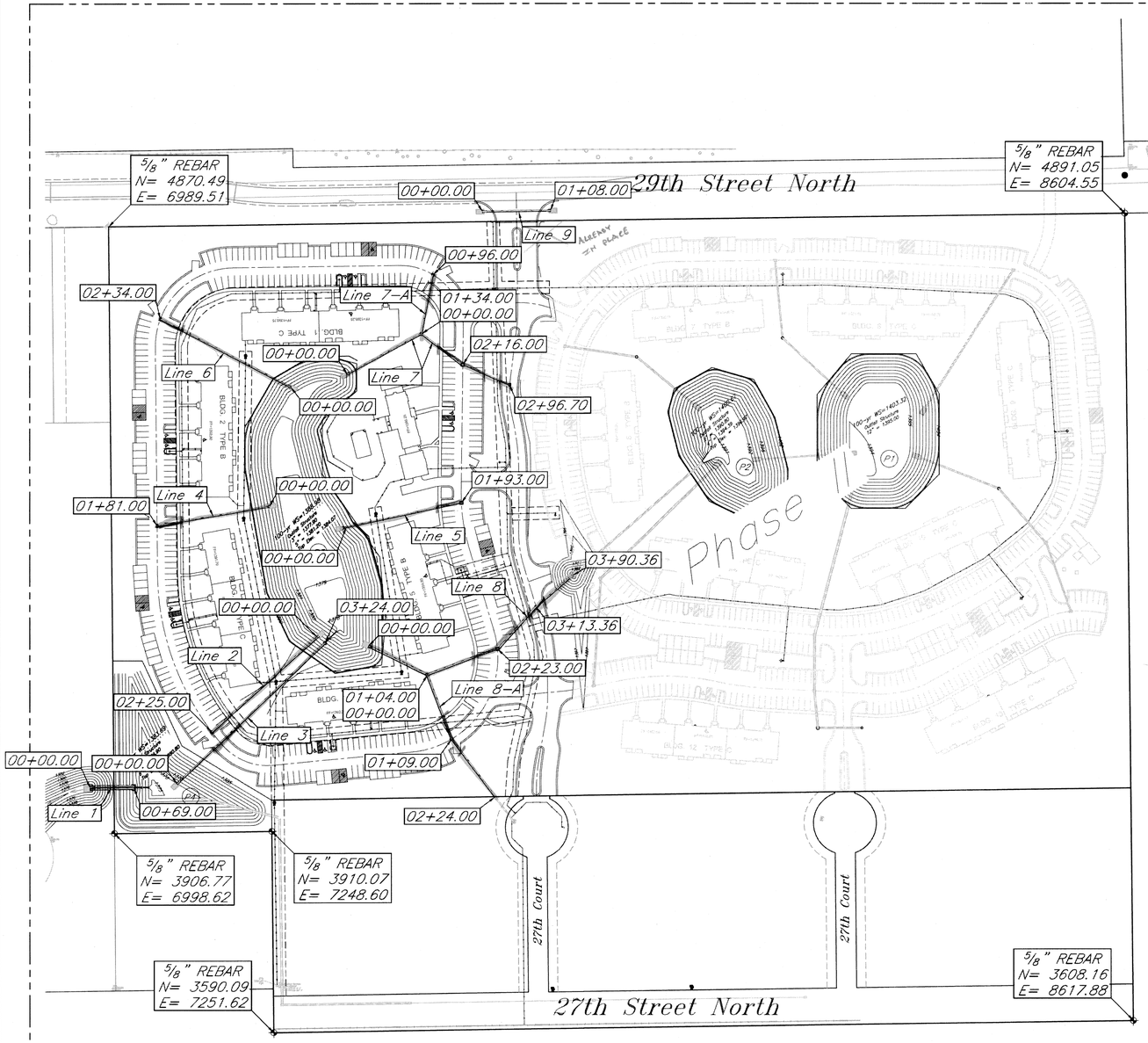
DESIGN GP	DRAWN GP	REVISED	



LINE 1

STRUCTURE	℄ LOCATION DESIGN	℄ LOCATION BUILT	RIM ELEV. DESIGN	RIM ELEV. BUILT	FLOWLINE INFO. DESIGN	FLOWLINE INFO. BUILT
00+00.00 L1	N= 3979.28	N=			24" FL (out) = 1374.28	
	E= 6980.11	E=				
00+69.00 L2	N= 3980.14	N=	1380.80		24" FL (out) = 1374.56	
	E= 7029.33	E=				

LINE 2

STRUCTURE	℄ LOCATION DESIGN	℄ LOCATION BUILT	RIM ELEV. DESIGN	RIM ELEV. BUILT	FLOWLINE INFO. DESIGN	FLOWLINE INFO. BUILT
00+00.00 L2	N= 4320.15	N=			18" FL (out) = 1383.42	
	E= 7323.15	E=				
02+28.00 L2	N= 4067.80	N=	1387.26		18" FL (out) = 1384.56	
	E= 7153.53	E=				

LINE 3

STRUCTURE	℄ LOCATION DESIGN	℄ LOCATION BUILT	RIM ELEV. DESIGN	RIM ELEV. BUILT	FLOWLINE INFO. DESIGN	FLOWLINE INFO. BUILT
00+00.00 L3	N= 3985.71	N=			18" FL (out) = 1375.92	
	E= 7098.30	E=				
03+24.00 L3	N= 4208.87	N=	1384.07		18" FL (out) = 1377.54	
	E= 7333.33	E=				

LINE 4

STRUCTURE	℄ LOCATION DESIGN	℄ LOCATION BUILT	RIM ELEV. DESIGN	RIM ELEV. BUILT	FLOWLINE INFO. DESIGN	FLOWLINE INFO. BUILT
00+00.00 L4	N= 4426.43	N=			15" FL (out) = 1383.69	
	E= 7244.92	E=				
01+81.00 L4	N= 4395.96	N=	1388.34		15" FL (out) = 1385.34	
	E= 7086.50	E=				

LINE 5

STRUCTURE	℄ LOCATION DESIGN	℄ LOCATION BUILT	RIM ELEV. DESIGN	RIM ELEV. BUILT	FLOWLINE INFO. DESIGN	FLOWLINE INFO. BUILT
00+00.00 L5	N= 4392.14	N=			15" FL (out) = 1386.32	
	E= 7361.07	E=				
01+93.00 L5	N= 4431.70	N=	1391.67		15" FL (out) = 1387.67	
	E= 7549.97	E=				

LINE 6

STRUCTURE	℄ LOCATION DESIGN	℄ LOCATION BUILT	RIM ELEV. DESIGN	RIM ELEV. BUILT	FLOWLINE INFO. DESIGN	FLOWLINE INFO. BUILT
00+00.00 L6	N= 4615.55	N=			18" FL (out) = 1384.98	
	E= 7278.98	E=				
02+34.00 L6	N= 4723.92	N=	1389.15		18" FL (out) = 1386.15	
	E= 7071.59	E=				

LINE 7

STRUCTURE	℄ LOCATION DESIGN	℄ LOCATION BUILT	RIM ELEV. DESIGN	RIM ELEV. BUILT	FLOWLINE INFO. DESIGN	FLOWLINE INFO. BUILT
00+00.00 L7	N= 4636.38	N=			18" FL (out) = 1387.31	
	E= 7388.70	E=				
01+34.00 L7	N= 4700.07	N=	1394.25		18" FL (out) = 1388.38	
	E= 7486.60	E=			18" FL (in) = 1388.48	
					15" FL (in) = 1388.63	
02+16.00 L7	N= 4650.97	N=	1392.37		18" FL (out) = 1389.14	
	E= 7532.28	E=			15" FL (in) = 1389.39	
02+97.30 L7	N= 4618.18	N=	1396.41		15" FL (out) = 1392.64	
	E= 7626.98	E=				

LINE 7-A

STRUCTURE	℄ LOCATION DESIGN	℄ LOCATION BUILT	RIM ELEV. DESIGN	RIM ELEV. BUILT	FLOWLINE INFO. DESIGN	FLOWLINE INFO. BUILT
00+00.00 L7-A	N= 4700.07	N=	1394.25		18" FL (out) = 1388.38	
	E= 7486.60	E=			18" FL (in) = 1388.48	
					15" FL (in) = 1388.63	
00+96.00 L7-A	N= 4794.26	N=	1391.91		15" FL (out) = 1389.11	
	E= 7505.06	E=				

LINE 8

STRUCTURE	℄ LOCATION DESIGN	℄ LOCATION BUILT	RIM ELEV. DESIGN	RIM ELEV. BUILT	FLOWLINE INFO. DESIGN	FLOWLINE INFO. BUILT
00+00.00 L8	N= 4204.11	N=			30" FL (out) = 1385.68	
	E= 7402.50	E=				
01+04.00 L8	N= 4158.06	N=	1392.20		30" FL (out) = 1386.20	
	E= 7495.75	E=			24" FL (in) = 1386.70	
					24" FL (in) = 1386.70	
02+23.00 L8	N= 4139.26	N=	1391.10		24" FL (out) = 1387.41	
	E= 7607.29	E=			24" FL (in) = 1387.51	
03+13.36 L8	N= 4265.47	N=	1395.32		24" FL (out) = 1388.55	
	E= 7668.78	E=			18" FL (in) = 1388.05	
03+90.36 L8	N= 4315.84	N=			18" FL (out) = 1389.01	
	E= 7727.02	E=				

LINE 8-A

STRUCTURE	℄ LOCATION DESIGN	℄ LOCATION BUILT	RIM ELEV. DESIGN	RIM ELEV. BUILT	FLOWLINE INFO. DESIGN	FLOWLINE INFO. BUILT
00+00.00 L8-A	N= 4158.06	N=	1392.20		30" FL (out) = 1386.20	
	E= 7495.75	E=			24" FL (in) = 1386.70	
					24" FL (in) = 1386.70	
01+09.00 L8-A	N= 4056.11	N=	1392.21		24" FL (out) = 1388.66	
	E= 7534.32	E=			18" FL (in) = 1389.16	
02+24.00 L8-A	N= 3964.24	N=			18" FL (out) = 1390.66	
	E= 7603.50	E=				

LINE 9

STRUCTURE	℄ LOCATION DESIGN	℄ LOCATION BUILT	RIM ELEV. DESIGN	RIM ELEV. BUILT	FLOWLINE INFO. DESIGN	FLOWLINE INFO. BUILT
00+00.00 L9	N= 4894.05	N=			18" FL (out) = 1397.30	
	E= 7583.70	E=				
01+08.00 L9	N= 4895.42	N=			18" FL (in) = 1398.81	
	E= 7691.69	E=				

HORIZONTAL SCALE
(IN FEET)
1 inch = 100 ft.

Stoney Pointe Apartments

Plan Sheet

Wichita, Kansas

kemiller engineering
316 S. Market, Wichita, KS 67202 (316)264-0242

PROJECT NUMBER 0141 PPD (607861)

KEM NO.	FILE	DATE	SHEET
12037		11/2012	6.0
DESIGN GP	DRAWN HD	REVISED	

January 25, 2013

Note: 8" PVC pipes are two pipe system with headwall structures as shown in profile. Refer Sh 5.2 for headwall detail.

Line 1

SWS Sta. 00+69.00 Line 1
SWS Sta 00+00.00 Line 1a
1-8'x4' RC Box
with Grated Lid on Top
Top of Grate = 1380.90
8" FL(in) = 1377.58
8" FL(in) = 1374.66
24" FL(out)=1374.56
N= 3980.14 E= 7029.33

12.00 LF of 8" PVC @ 1.00%

SWS Sta. 00+23.00 Line 1a
1-Head Wall structure
See Sheet 5.2 for detail
4" Opening FL=1374.90
8" FL (out) = 1374.90
N= 3980.27 E= 7052.83

SWS Sta. 00+00.00 Line 1
2- 24" RCP Restrained
End Section with Light
Stone Rip-Rap
24" FL(out) = 1374.28
N= 3979.28 E= 6960.33

69.00 LF of 2-24" RCP @ 0.40%

23.50 LF of 8" PVC @ 1.00%

SWS Sta. 00+81.00 Line 1
1-Head Wall structure
See Sheet 5.2 for detail
6" Opening FL=1377.70
8" FL(out) = 1377.70
N= 3980.21 E= 7041.32

Line 2

BLDG. 4

FF=1391.20

Prop. SS Line 2

Line 3

SWS Sta. 00+00.00 Line 2
1- 18" RCP Restrained
End Section with Light
Stone Rip-Rap
18" FL(out) = 1383.42
N= 4220.16 E= 7323.15

Caution!!!
Prop. 8" SS
Line Crossing

228.00 LF of 18" RCP @ 0.50%

Caution!!!
Prop. 8" WL
Line Crossing

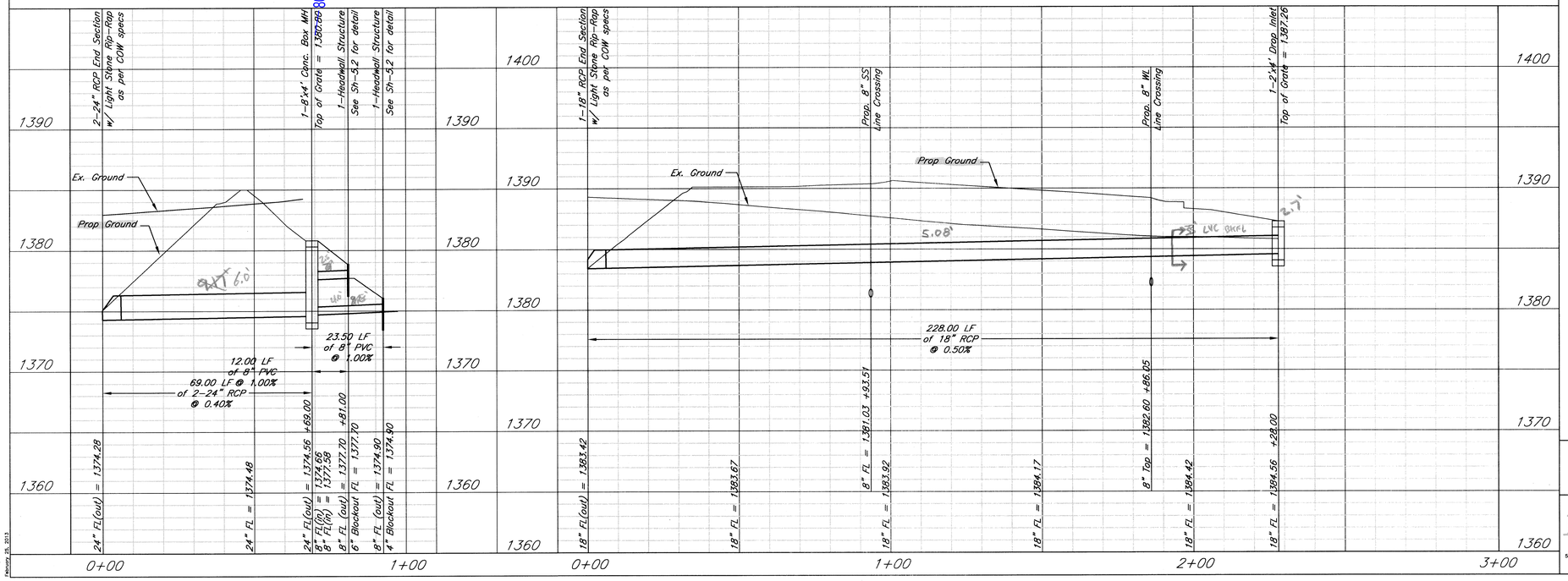
SWS Sta. 02+28.00 Line 2
1-2'x4' Drop Inlet
Top of Grate=1387.26
18" FL(out)=1384.56
N= 4067.80 E= 7153.53

Prop WL

Prop. SS Line

Line 1 80.90

Line 2



VERTICAL SCALE
(IN FEET)
1 inch = 5 ft.

HORIZONTAL SCALE
(IN FEET)
1 inch = 20 ft.

Stoney Pointe Apartments

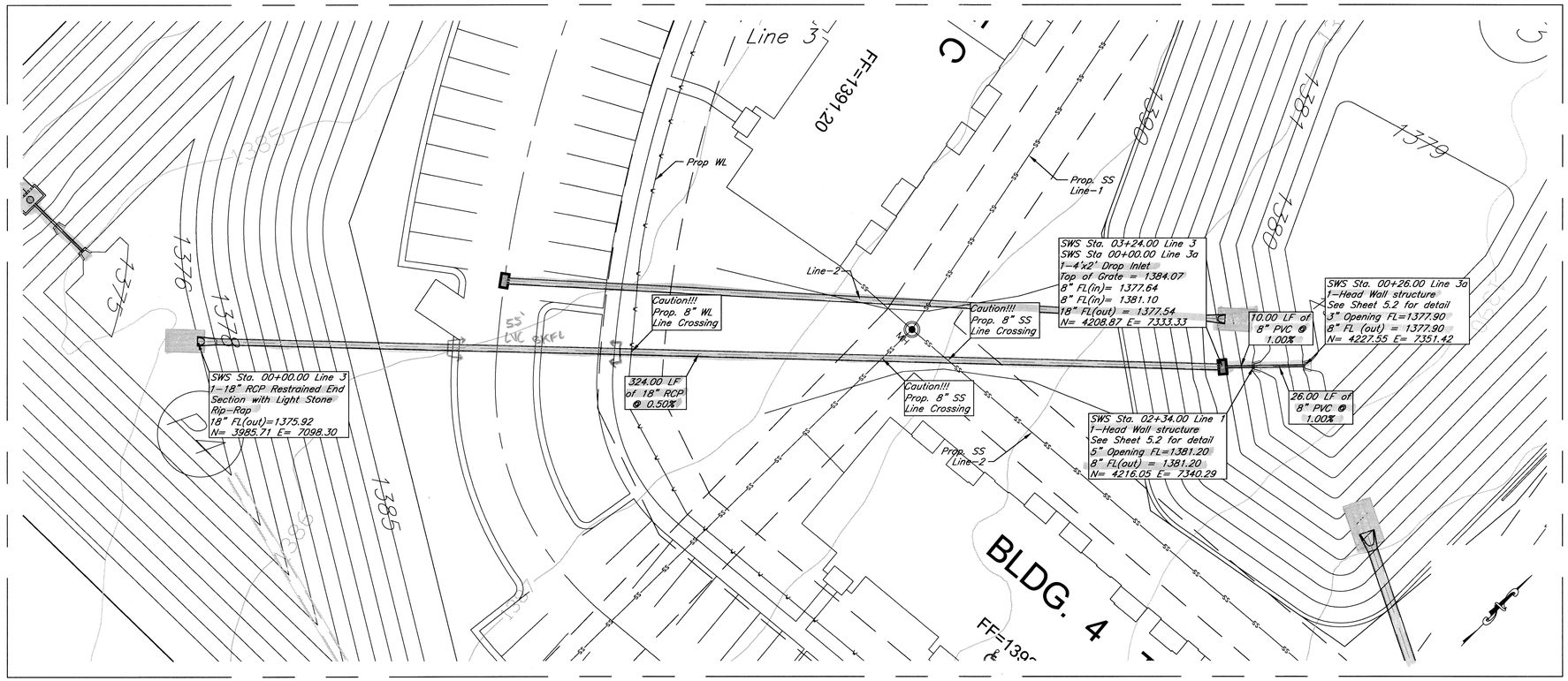
SWS Lines 1 & 2

Wichita, Kansas

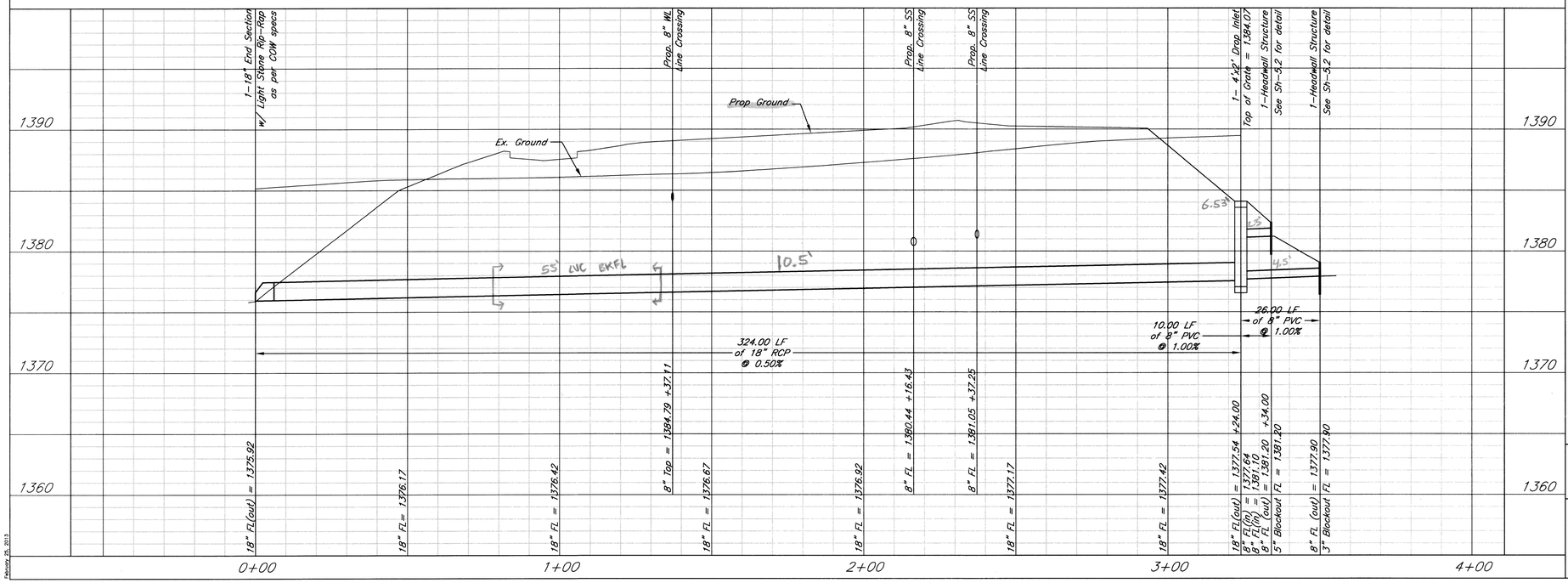
kemiller engineering
516 S. Market, Wichita, KS 67202 (316)264-0242

PROJECT NUMBER			
0141 PPD (607861)			
KEM NO. 12037	FILE	DATE 11/2012	SHEET 7.0
DESIGN GP	DRAWN HD	REVISED	

February 25, 2013



Line 3



Note: 8" PVC pipes are two pipe system with headwall structures as shown in profile. Refer Sheet 5.2 for headwall detail.

VERTICAL SCALE
(IN FEET)
1 inch = 5 ft.

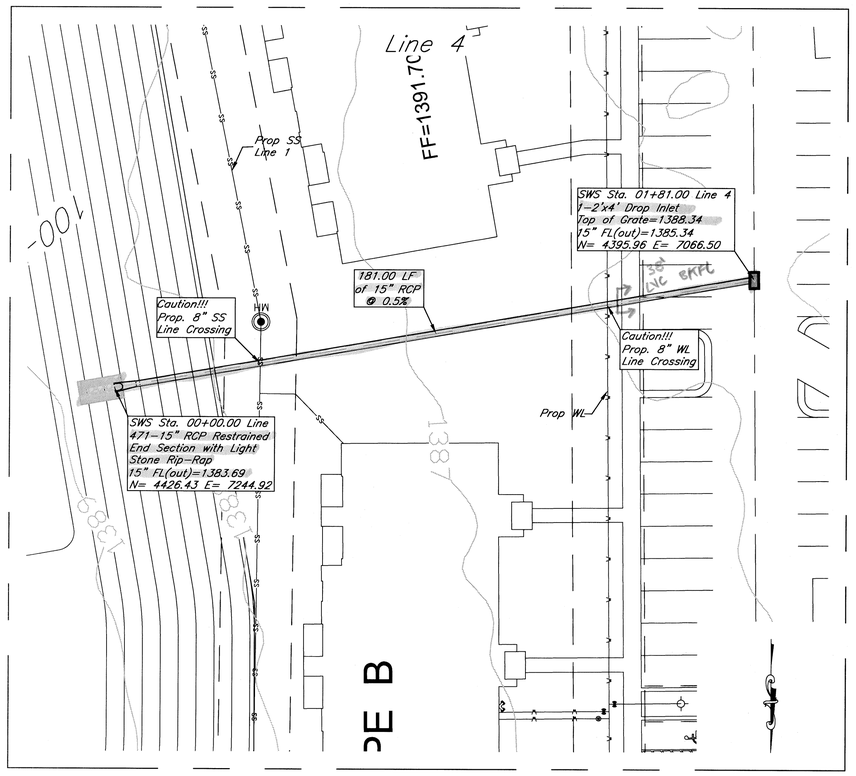
HORIZONTAL SCALE
(IN FEET)
1 inch = 20 ft.

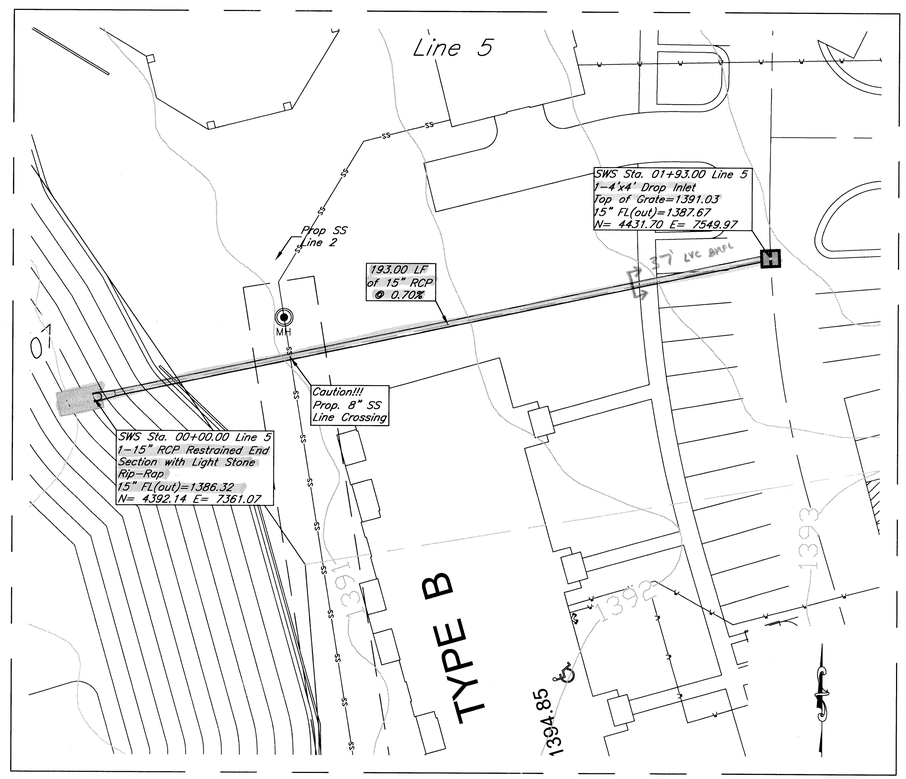
Stoney Pointe Apartments
SWS Line 3
Wichita, Kansas

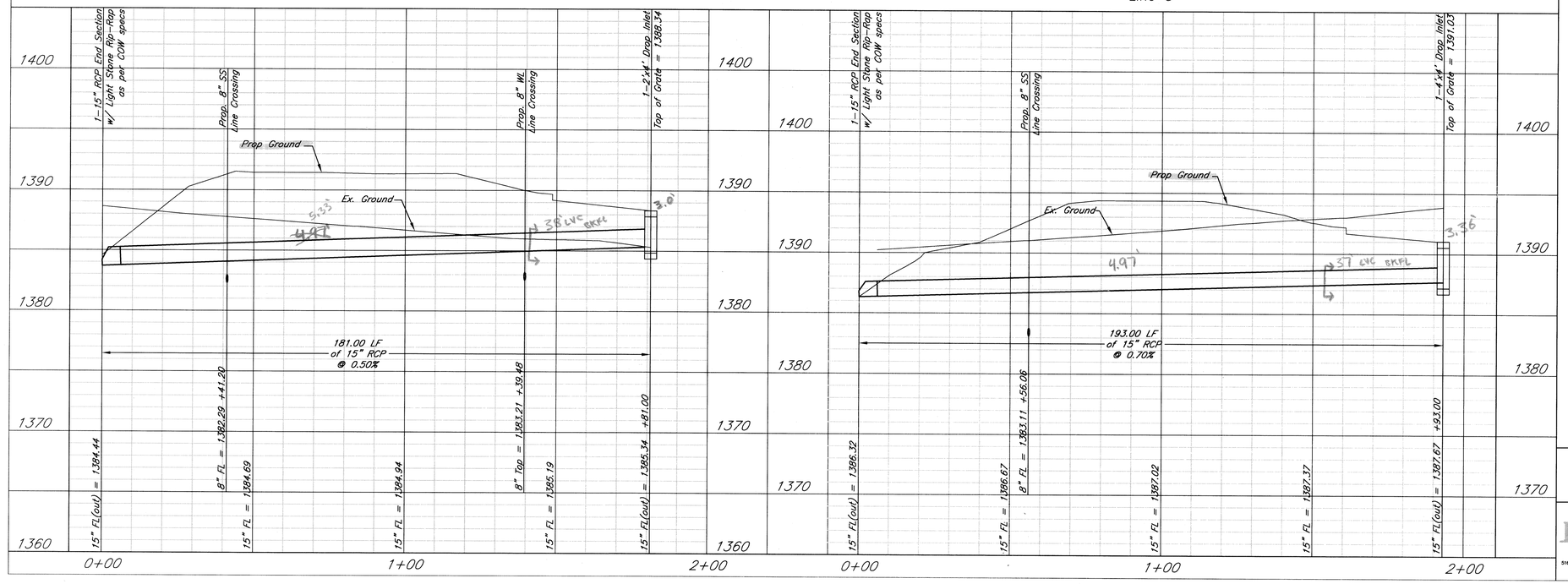
kemiller engineering
516 S. Market, Wichita, KS 67202 (316)264-0242

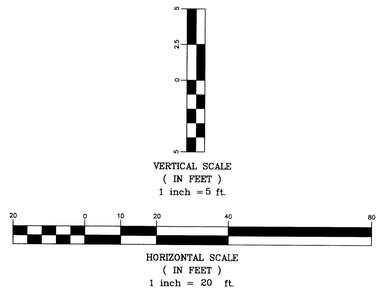
PROJECT NUMBER			
0141 PPD (607861)			
KEM NO. 12037	FILE	DATE 11/2012	SHEET 7.1
DESIGN GP	DRAWN HD	REVISED	

February 25, 2013









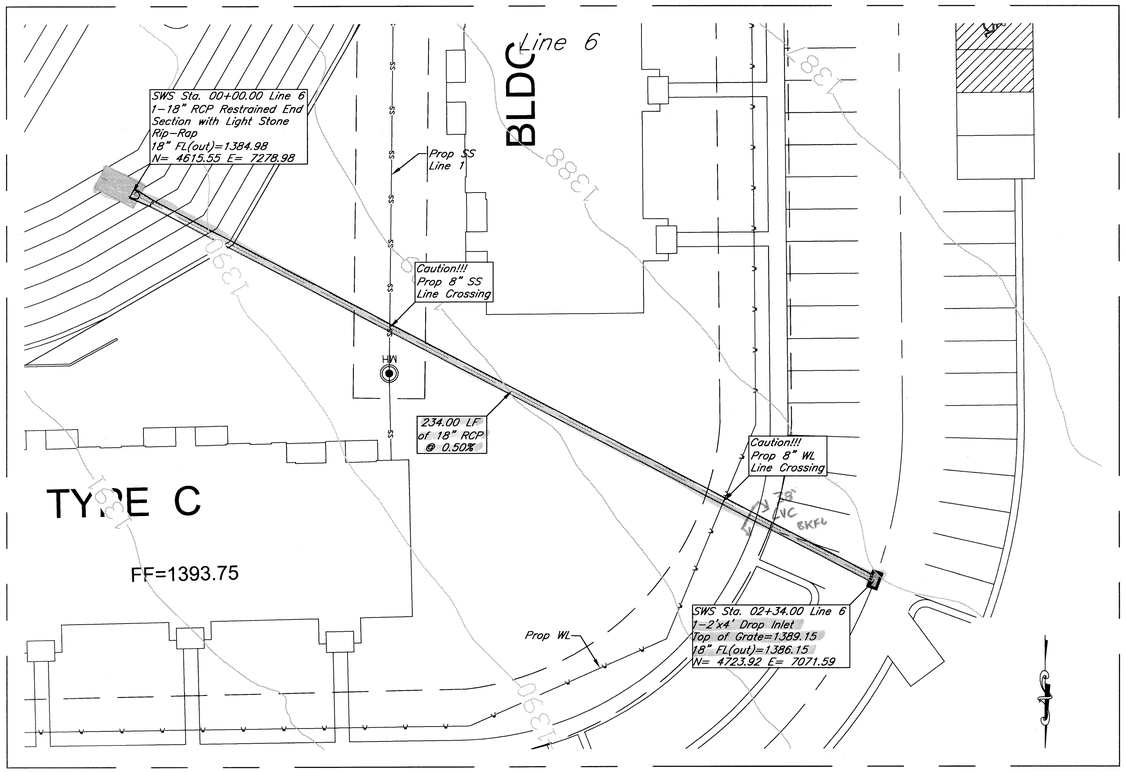
Stoney Pointe Apartments

SWS Lines 4 & 5

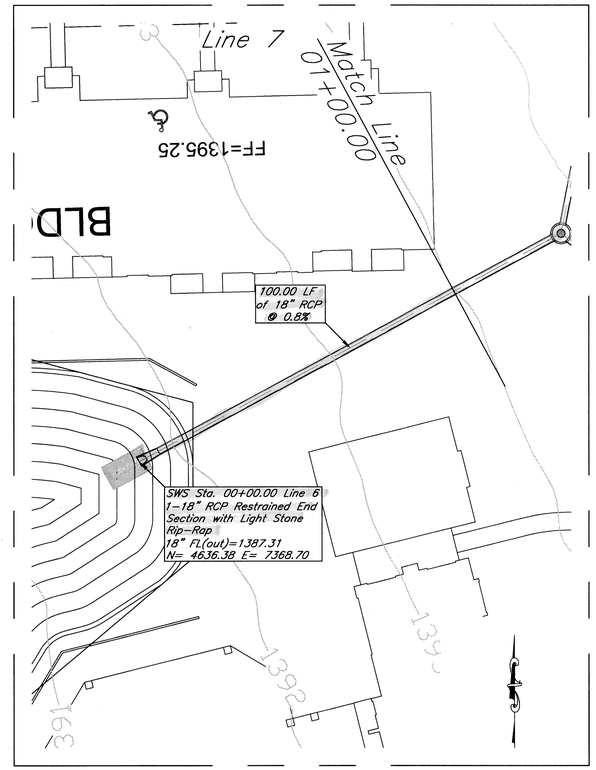
Wichita, Kansas

kemiller engineering
516 S. Market, Wichita, KS 67202 (316)264-0242

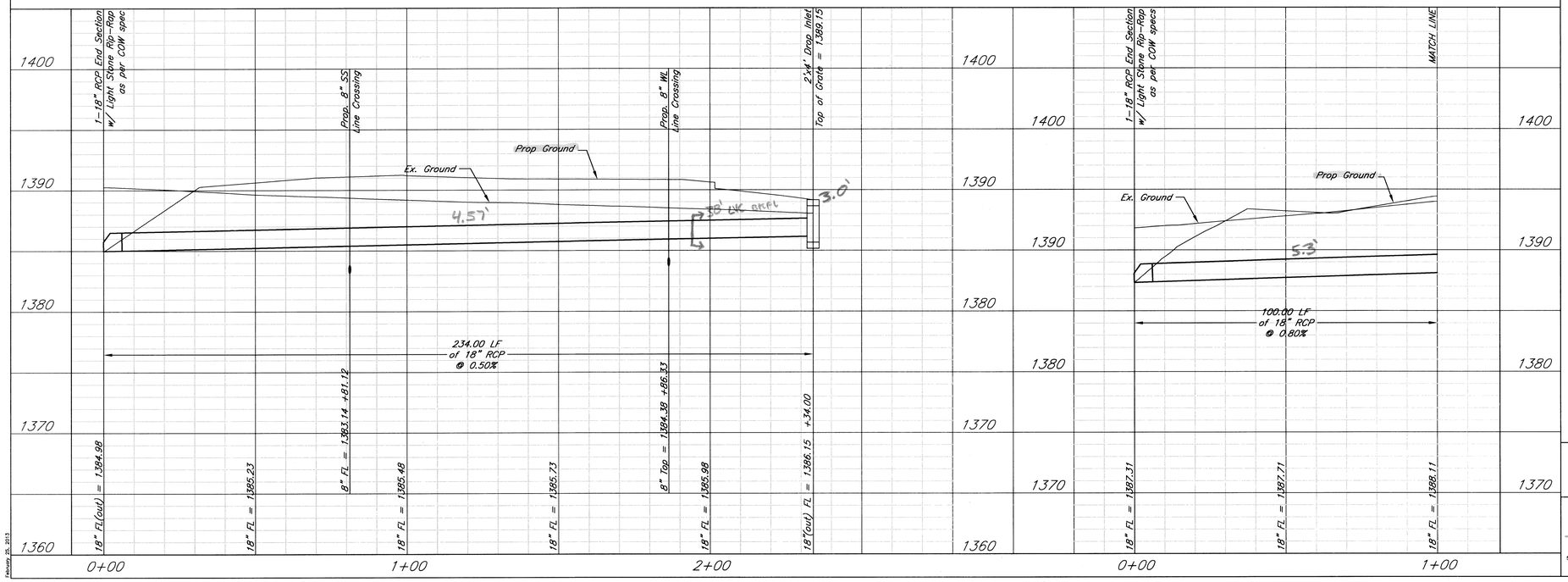
PROJECT NUMBER 0141 PPD (607861)			
KEM. NO. 12037	FILE	DATE 11/2012	SHEET 7.2
DESIGN GP	DRAWN HD	REVISED	

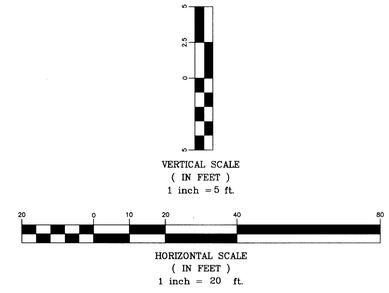


Line 6



Line 7





Stoney Pointe Apartments

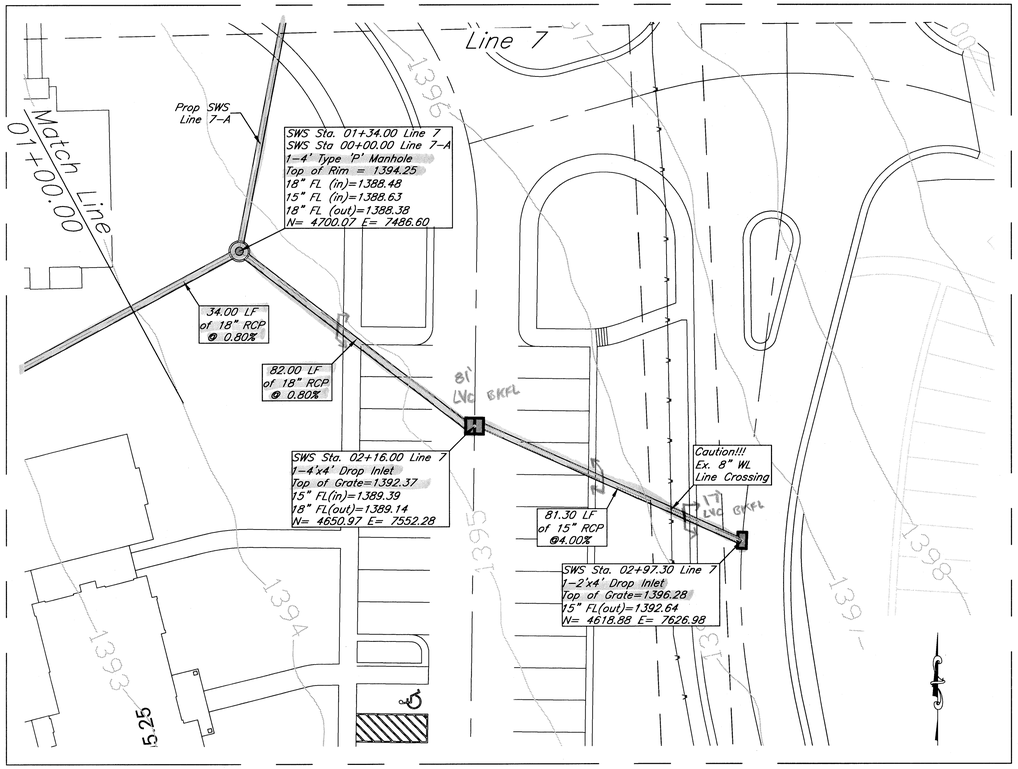
SWS Lines 6 & 7 (00+00.00-01+00.00)

Wichita, Kansas

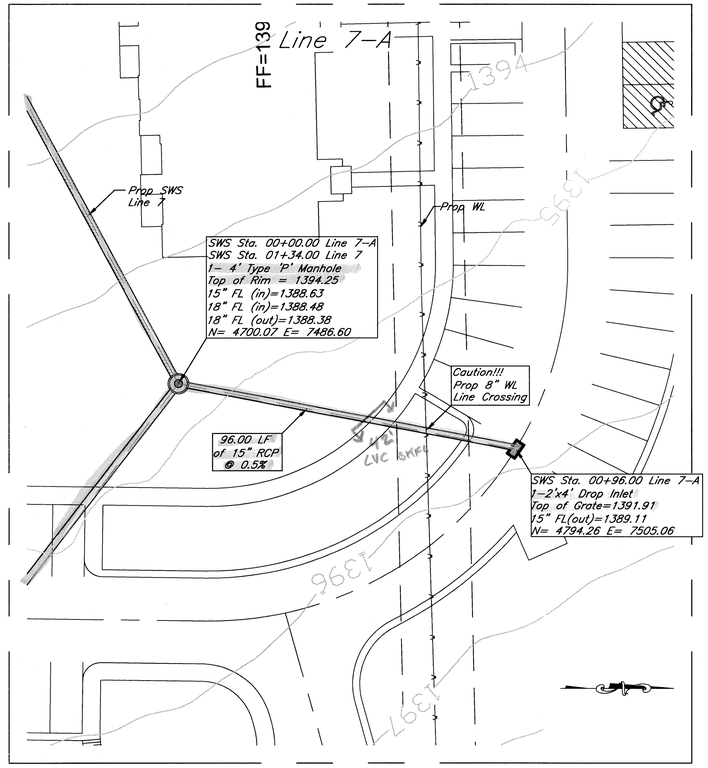
kemiller engineering
516 S. Market, Wichita, KS 67202 (316)264-0242

PROJECT NUMBER			
0141 PPD (607861)			
KEM NO. 120.37	FILE	DATE 11/2012	SHEET 7.3
DESIGN GP	DRAWN HD	REVISED	

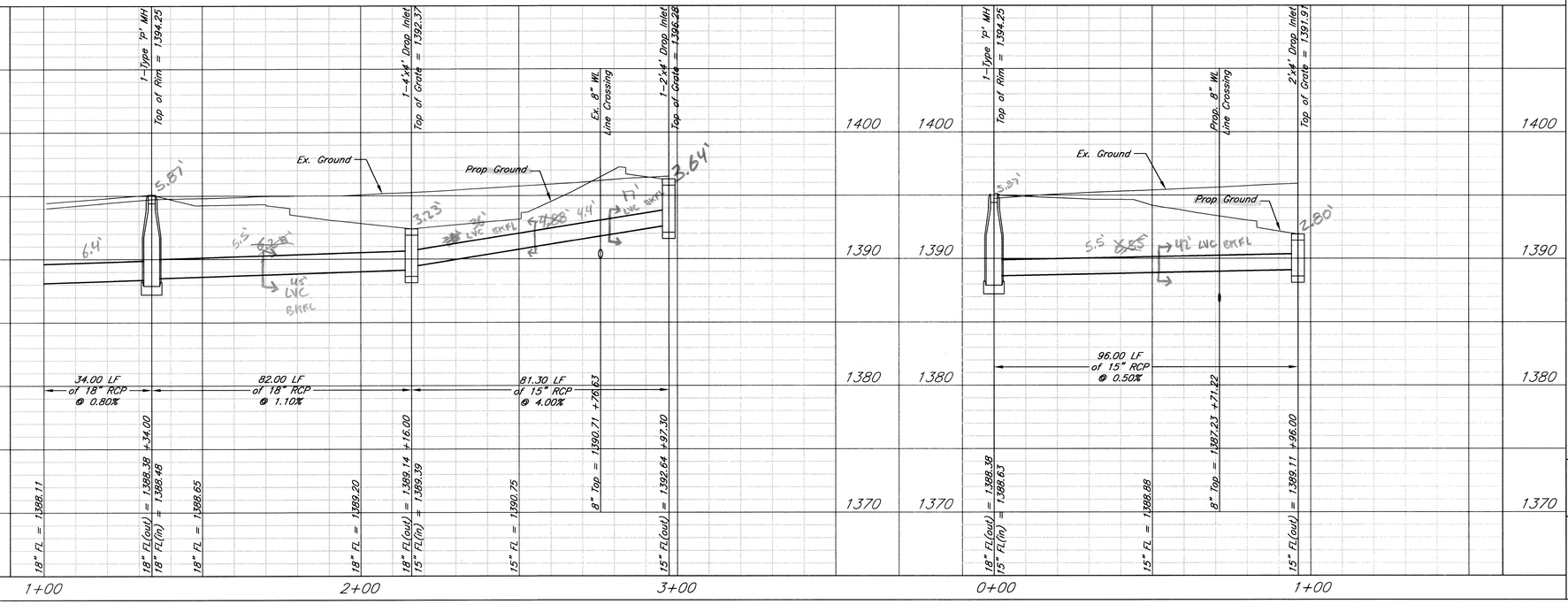
February 25, 2013



Line 7



Line 7-A



VERTICAL SCALE
(IN FEET)
1 inch = 5 ft.

5 2.5 0 5

HORIZONTAL SCALE
(IN FEET)
1 inch = 20 ft.

20 0 10 20 40 80

Stoney Pointe Apartments

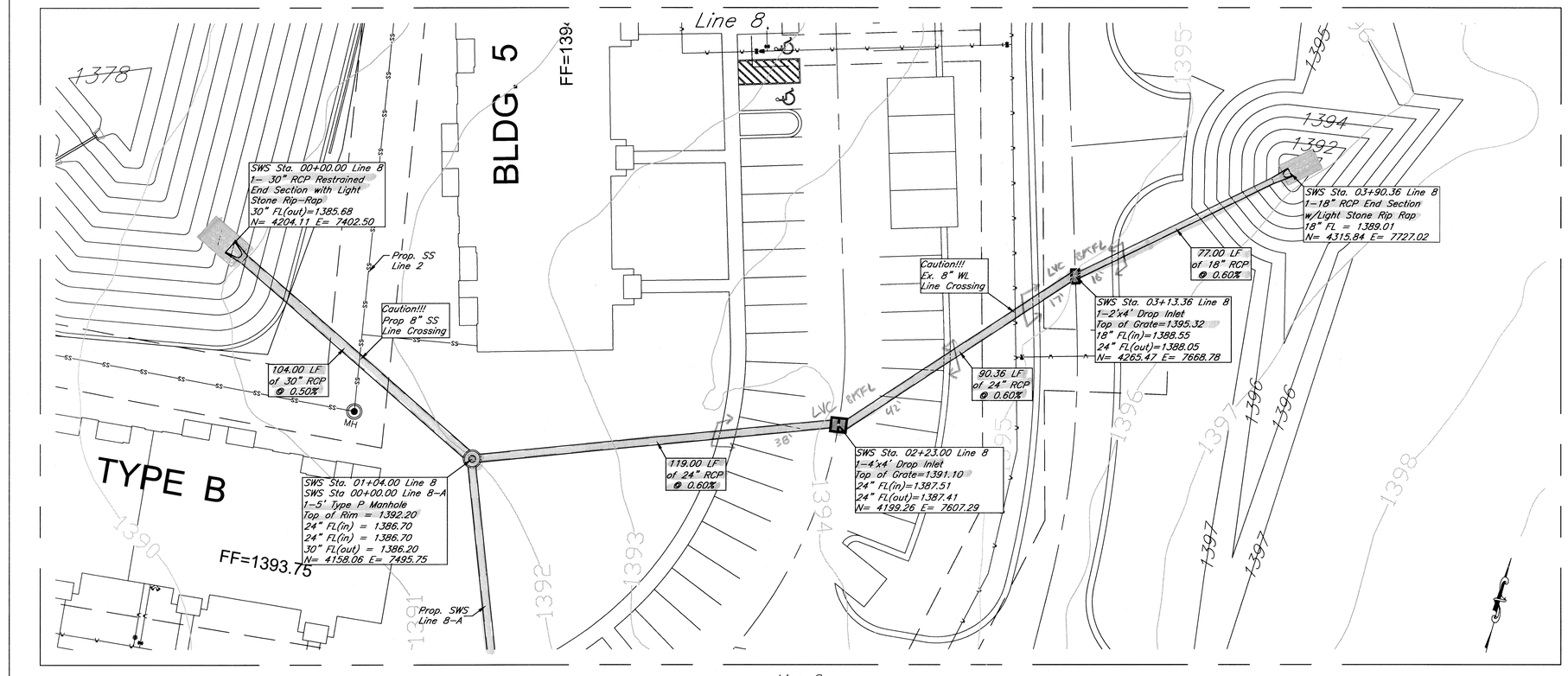
SWS Lines 7 & 7-A

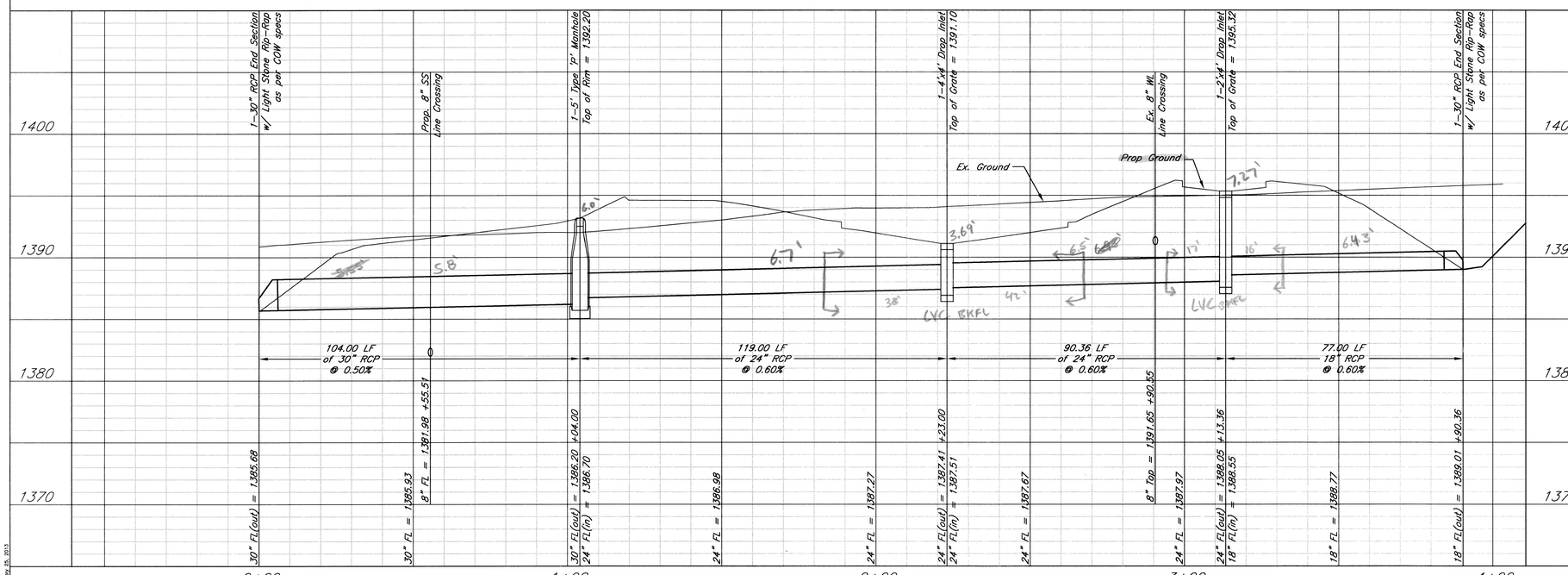
Wichita, Kansas

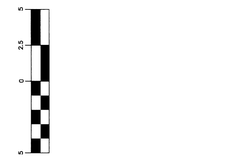
kemiller engineering
518 S. Market, Wichita, KS 67202 (316)264-0242

PROJECT NUMBER			
0141 PPD (607861)			
KEM NO. 12037	FILE	DATE 11/2012	SHEET 7.4
DESIGN CP	DRAWN HD	REVISED	

March 6, 2013







Stoney Pointe Apartments

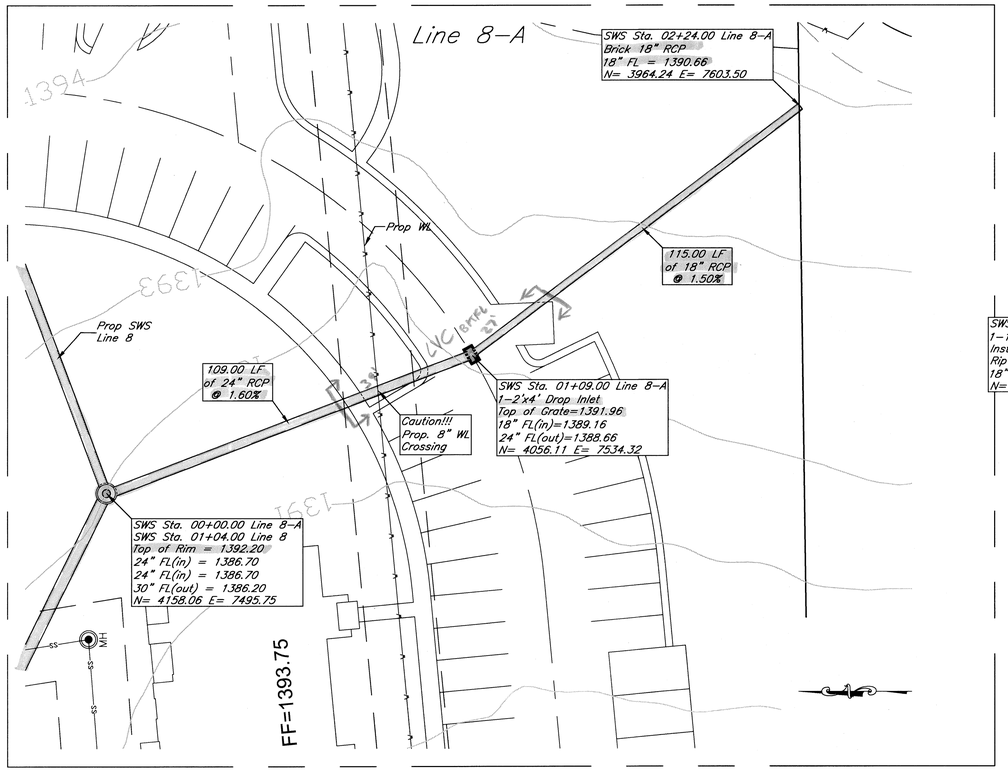
SWS Line 8

Wichita, Kansas

kemiller engineering
516 S. Market, Wichita, KS 67202 (316)264-0242

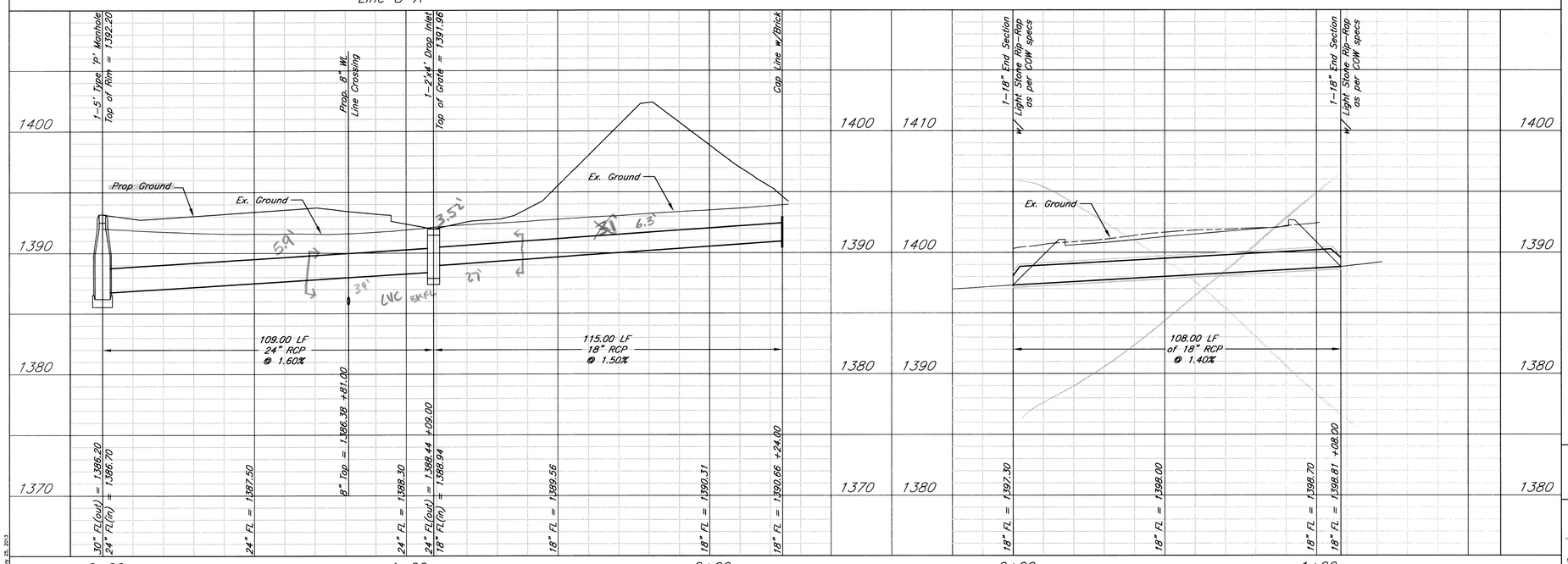
PROJECT NUMBER			
0141 PPD (607861)			
KEM NO. 12037	FILE	DATE 11/2012	SHEET 7.5
DESIGN GP	DRAWN HD	REVISED	

February 25, 2013



Line 8-A

Line 9



VERTICAL SCALE
(IN FEET)
1 inch = 5 ft.

HORIZONTAL SCALE
(IN FEET)
1 inch = 20 ft.

Stoney Pointe Apartments

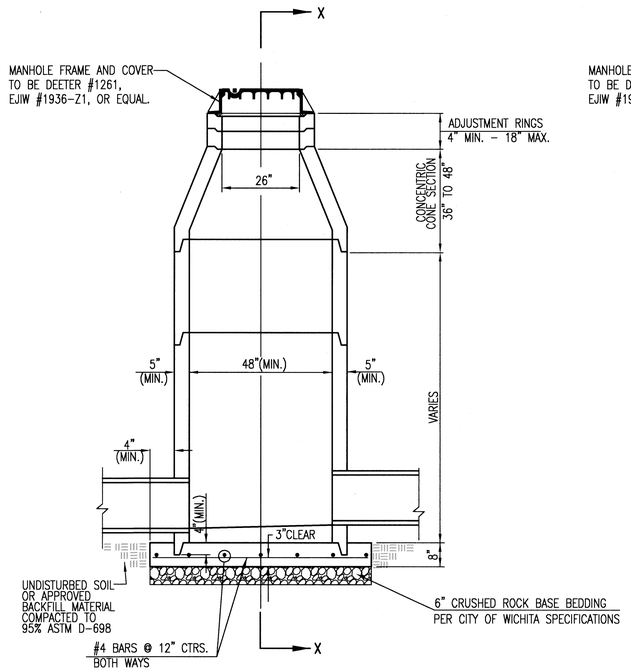
SWS Lines 8-A & 9

Wichita, Kansas

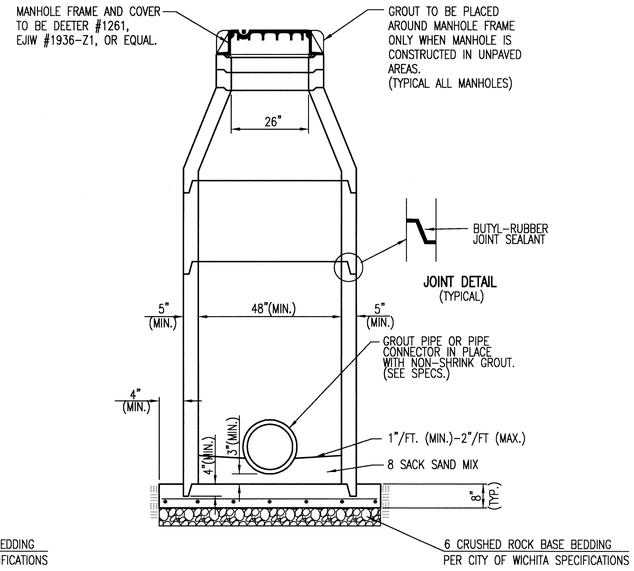
kemiller engineering
516 S. Market, Wichita, KS 67202 (316)264-0242

PROJECT NUMBER			
0141 PPD (607861)			
KEM NO. 12037	FILE	DATE 11/2012	SHEET 7.6
DESIGN GP	DRAWN HD	REVISED	

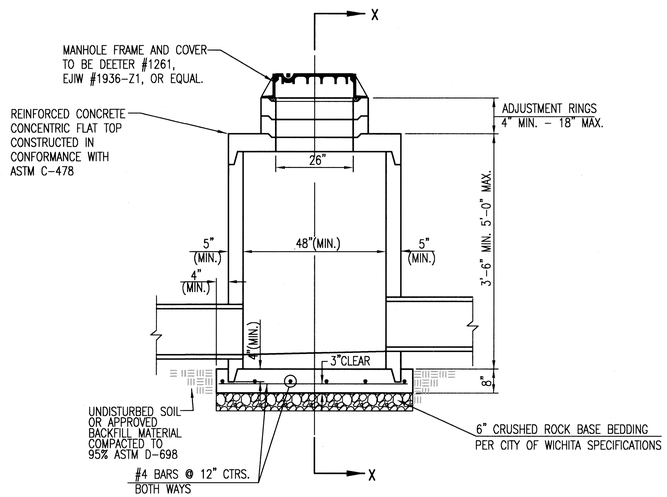
February 25, 2013



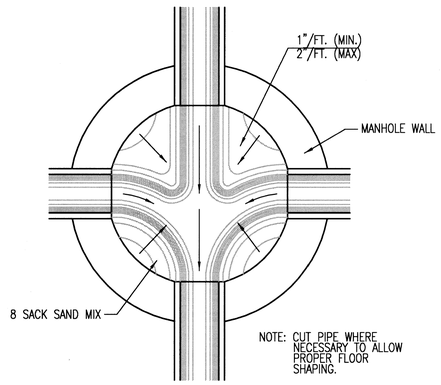
PRECAST
STANDARD MANHOLE
TYPE "A"



SECTION X-X
(TYPICAL)



PRECAST
SHALLOW MANHOLE
TYPE "B"



TYPICAL MANHOLE
FLOOR SHAPING

GENERAL NOTES

1. IF, IN THE OPINION OF THE ENGINEER, THE MANHOLE SUBGRADE APPEARS UNSTABLE, THE CONTRACTOR WILL HAVE THE OPTION TO COMPACT SUBGRADE AS SHOWN OR INCREASE THE THICKNESS OF THE MANHOLE BASE AS DIRECTED BY THE ENGINEER.
2. STEEL REINFORCING WILL BE REQUIRED IN ALL MANHOLE BASES.
3. ALL MANHOLE CONSTRUCTION SHALL BE WATER TIGHT.
4. TOP OF MANHOLE FLOOR SLAB SHALL BE AT LEAST 3 INCHES BELOW THE FLOW LINE OF THE OUTLET PIPE TO INSURE SUFFICIENT MINIMUM THICKNESS OF SHAPED INVERT.
5. ALL PRECAST CONCRETE MANHOLE SECTIONS SHALL CONFORM TO THE LATEST REVISION OF ASTM C-478 AS MODIFIED BY THE SPECIFICATIONS.
6. CONCRETE USED FOR MANHOLE CONSTRUCTION SHALL CONFORM TO CITY OF WICHITA SPECIFICATIONS FOR CONCRETE PAVEMENT MIX.
7. PRECAST MANHOLES SHALL BE SET AT LEAST 4 INCHES INTO MANHOLE BASE.
8. MANHOLES WITH PIPE SIZES 24" AND LARGER SHALL HAVE 5 FOOT INSIDE DIAMETER (MIN.)
9. MANHOLES WITH PRECAST BASES MAY BE USED AT THE CONTRACTORS OPTION. THESE MANHOLES SHALL HAVE AN 8" MINIMUM BASE THICKNESS AND SHALL BE PLACED ON AN 8" MIN. CRUSHED ROCK BASE. PIPES SHALL BE ENCASED WITH CRUSHED ROCK TO AT LEAST 3 FEET FROM THE MANHOLE WALL.
10. CONTRACTOR SHALL REMOVE LIFTING HOOKS AFTER INSTALLATION. RECESSES IN MANHOLE WALL SHALL BE GROUTED FLUSH TO THE MANHOLE WALL WITH HYDRAULIC CEMENT AFTER THE MANHOLE IS IN PLACE. LIFTING HOLES THRU THE MANHOLE WALL WILL NOT BE ACCEPTED.
11. THE ENDS OF ALL PIPES IN MANHOLES SHALL BE CUT OFF FLUSH WITH THE INSIDE FACE OF THE MANHOLE WALL.
12. MANHOLE INVERT SHALL BE SHAPED WITH 8 SACK SAND MIX CONCRETE TO CREATE FLOW CHANNELS AND TO INCREASE HYDRAULIC EFFICIENCY SUCH THAT THE MANHOLE WILL BE SELF CLEANING BETWEEN ALL INLET AND/OR OUTLET PIPES.
13. MANHOLE FRAME AND COVER TO BE DEETER #1261, EJIW #1936-Z1, OR APPROVED EQUAL, SEE SW-303.
14. FOR FLAT GRATED INLET APPLICATION, GRATE TO BE DEETER #1933, EJIW #1205 MDI, OR APPROVED EQUAL.
15. FOR BEEHIVE GRATE APPLICATION, GRATE TO BE DEETER #4495, EJIW #120545, OR APPROVED EQUAL.

CITY OF WICHITA
PUBLIC WORKS & UTILITIES
ENGINEERING DIVISION

PRECAST CONCRETE MANHOLE (STORM SEWER)

CITY ENGINEER
JAMES L. ARMOUR, P.E., L.S.

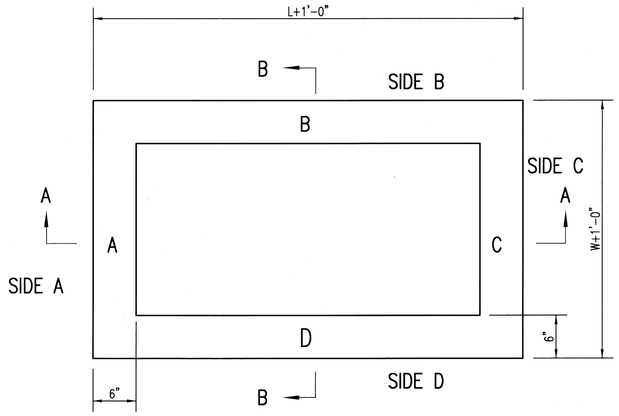
PROJECT NUMBER	OCA NUMBER	DATE
-		11/2010

CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

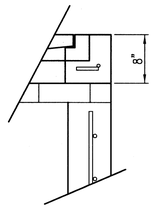
DESIGN	DRAWN

SHEET 8.0

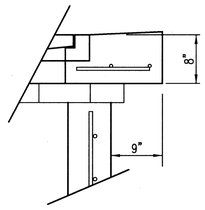
SW-301



TOP VIEW

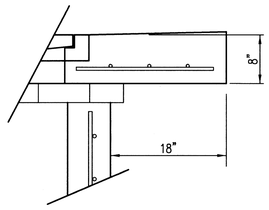


FLUSH STYLE TOP
NO APRON



9" APRON

* APRON TO EXTEND ON ALL 4 SIDES OF INLET.
DESIGNER TO DESIGNATE APRON SIZE.



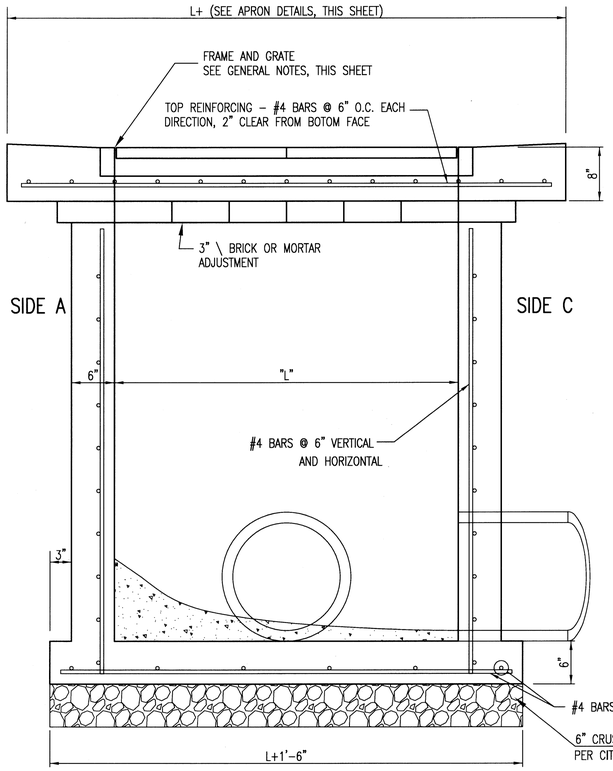
18" APRON

W=2' and L=2' for SINGLE DROP INLET
W=2' and L=4' for DOUBLE DROP INLET

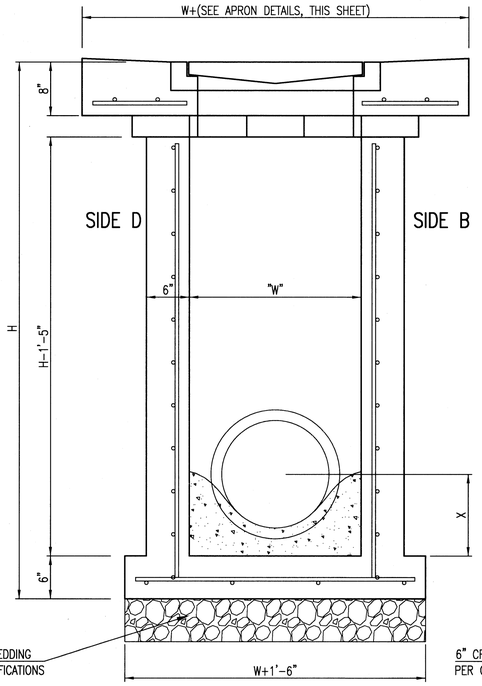
The structure(s) on this detail sheet are designed for HS-20 loading at these specific dimensions only. If larger dimensions are required, the ENGINEER shall provide a project specific structure design for approval by the City Engineer's office.

GENERAL NOTES

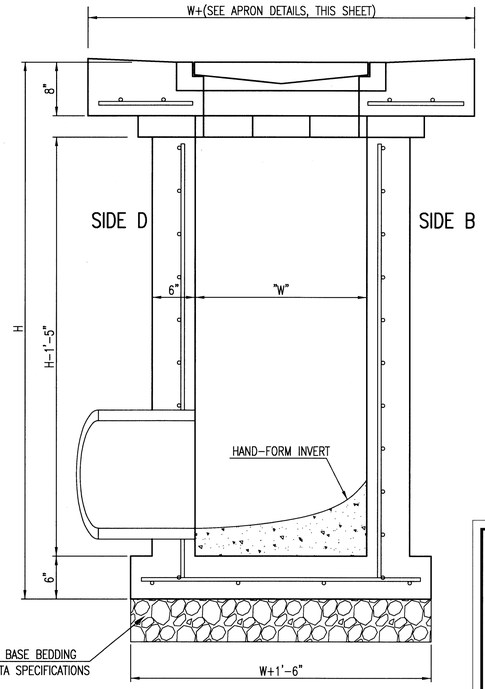
1. GRATE FRAME TO BE INSTALLED ON THIN MORTAR CUSHION TO INSURE FULL SUPPORT ALONG BRICK. CONCRETE USED FOR INLET CONSTRUCTION SHALL CONFORM TO CITY OF WICHITA SPECIFICATIONS FOR CONCRETE PAVEMENT MIX.
2. INLET INVERT SHALL BE SHAPED WITH 8 SACK SAND MIX CONCRETE TO CREATE FLOW CHANNELS AND TO INCREASE HYDRAULIC EFFICIENCY SUCH THAT THE INLET WILL BE SELF CLEANING BETWEEN ALL INLET AND/OR OUTLET PIPES.
3. THE ENDS OF ALL PIPES INSTALLED IN INLETS SHALL BE CUT OFF FLUSH WITH THE INSIDE FACE OF THE INLET WALL.
4. INLET FRAME AND GRATE TO BE DEETER #2433, EJIW #5391-Z1 OR APPROVED EQUAL FOR 2'x2' SINGLE DROP INLET AND DEETER #2434, EJIW #5391 Z3 OR APPROVED EQUAL FOR 2'x4' DOUBLE DROP INLET.
5. CONTRACTOR SHALL REMOVE LIFTING HOOKS AFTER INSTALLATION. RECESSES IN INLET WALL SHALL BE GROUTED FLUSH TO THE INLET WALL WITH HYDRAULIC CEMENT AFTER THE INLET IS IN PLACE. LIFTING HOLES THRU THE INLET WALL WILL NOT BE ACCEPTED.
6. **Inlet structure shall be prepared for connecting 6" dia. underdrain to structure as per plan sheet 2.0.**



SECTION "A-A"



SECTION "B-B"
END OUTLET



SECTION "B-B"
SIDE OUTLET

REVISED 05/10/2011 - GJ

CITY OF WICHITA
PUBLIC WORKS & UTILITIES
ENGINEERING DIVISION

SINGLE/DOUBLE
DROP INLET

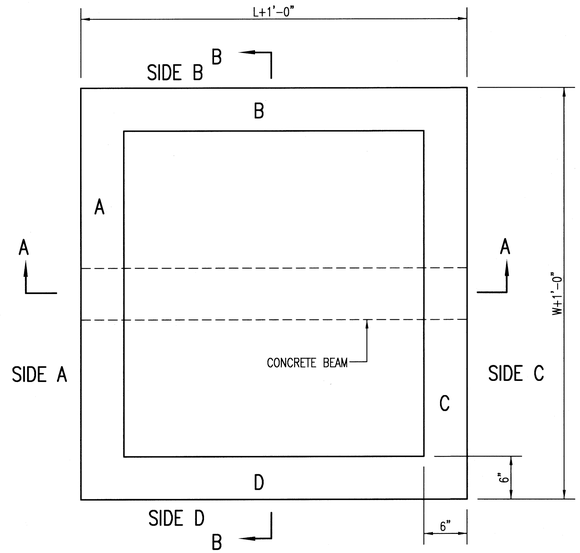
CITY ENGINEER
JAMES L. ARMOUR, P.E., L.S.

PROJECT NUMBER	OCA NUMBER	DATE
-		11/2010

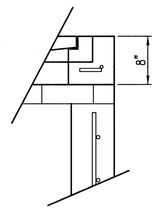
CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

SHEET
8.1

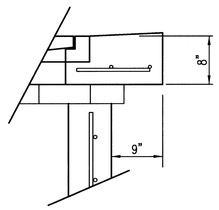
SW-201



TOP VIEW

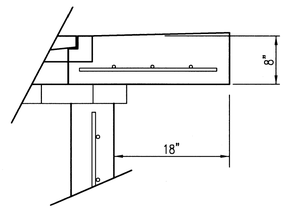


FLUSH STYLE TOP
NO APRON



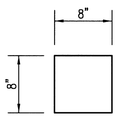
9" APRON

* APRON TO EXTEND ON ALL 4 SIDES OF INLET. DESIGNER TO DESIGNATE APRON SIZE.

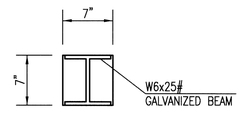


18" APRON

BEAM REQUIRED FOR THIS INLET



CONCRETE BEAM POCKET



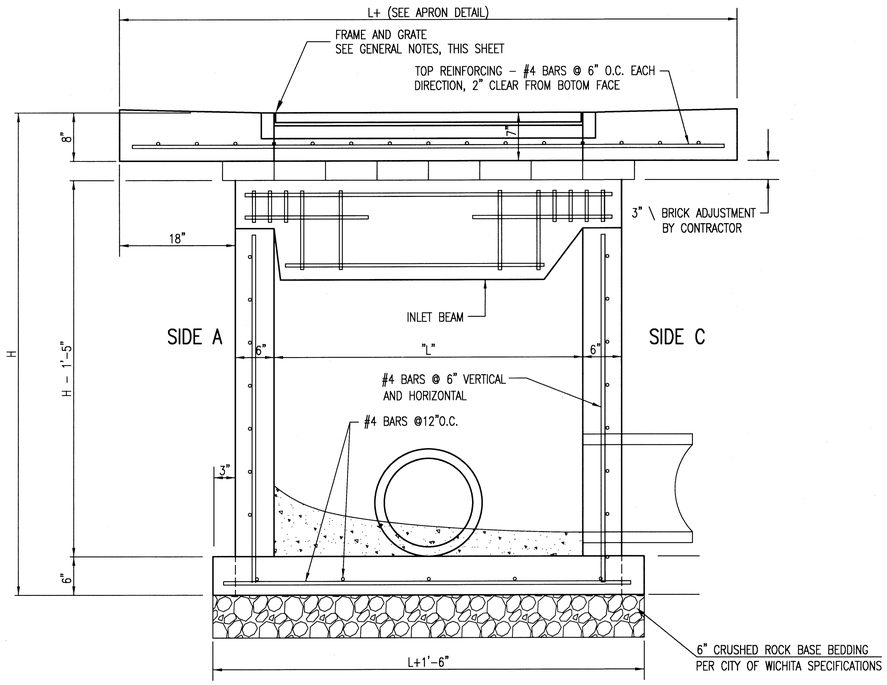
GALV. STEEL BEAM POCKET

W=4'-4" and L=4' for DOUBLE DROP INLET

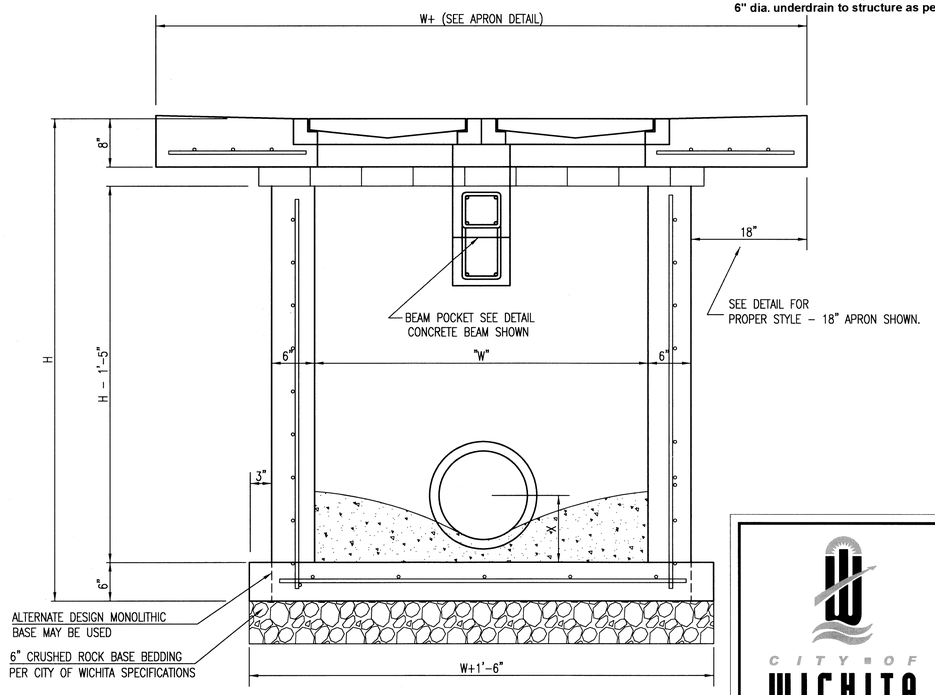
The structure(s) on this detail sheet are designed for HS-20 loading at these specific dimensions only. If larger dimensions are required, the ENGINEER shall provide a project specific structure design for approval by the City Engineer's office.

GENERAL NOTES

1. GRATE FRAME TO BE INSTALLED ON THIN MORTAR CUSHION TO INSURE FULL SUPPORT ALONG BRICK. CONCRETE USED FOR INLET CONSTRUCTION SHALL CONFORM TO CITY OF WICHITA SPECIFICATIONS FOR CONCRETE PAVEMENT MIX.
2. INLET INVERT SHALL BE SHAPED WITH 8 SACK SAND MIX CONCRETE TO CREATE FLOW CHANNELS AND TO INCREASE HYDRAULIC EFFICIENCY SUCH THAT THE INLET WILL BE SELF CLEANING BETWEEN ALL INLET AND/OR OUTLET PIPES.
3. THE ENDS OF ALL PIPES INSTALLED IN INLETS SHALL BE CUT OFF FLUSH WITH THE INSIDE FACE OF THE INLET WALL.
4. INLET FRAME AND GRATE TO BE DEETER #2433, EJIW #5391-Z1 OR APPROVED EQUAL FOR 2'x2' SINGLE DROP INLET AND DEETER #2434, EJIW #5391 Z3 OR APPROVED EQUAL FOR 2'x4' DOUBLE DROP INLET.
5. CONTRACTOR SHALL REMOVE LIFTING HOOKS AFTER INSTALLATION. RECESSES IN INLET WALL SHALL BE GROUTED FLUSH TO THE INLET WALL WITH HYDRAULIC CEMENT AFTER THE INLET IS IN PLACE. LIFTING HOLES THRU THE INLET WALL WILL NOT BE ACCEPTED.
6. **Inlet structure shall be prepared for connecting 6" dia. underdrain to structure as per plan sheet 2.0.**



SECTION "A-A"



SECTION "B-B"

REVISED 05/10/2011 - GJ

CITY OF WICHITA
PUBLIC WORKS & UTILITIES
ENGINEERING DIVISION

DOUBLE DOUBLE DROP INLET WITH BEAM

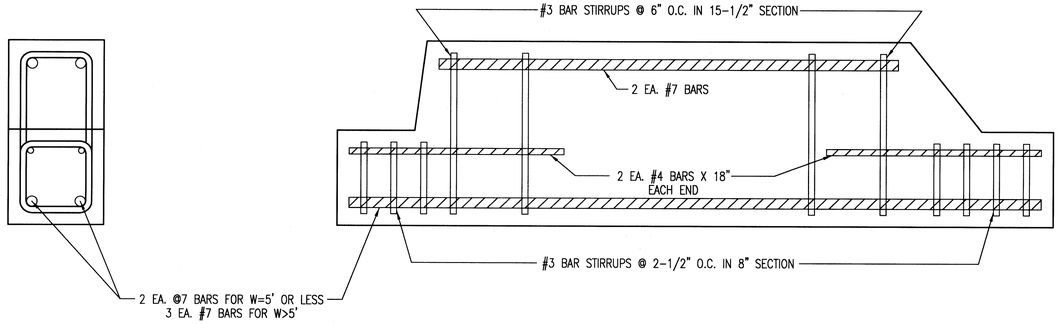
CITY ENGINEER
JAMES L. ARMOUR, P.E., L.S.

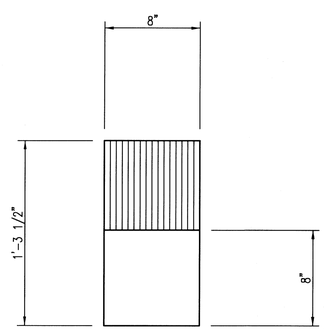
PROJECT NUMBER	OCA NUMBER	DATE
		11/2010

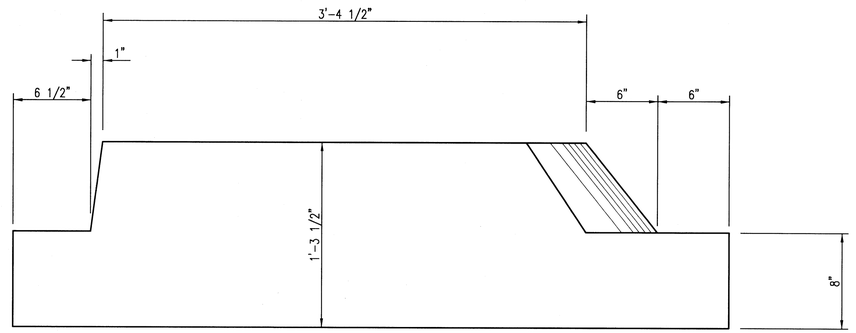
CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

SHEET 8.2

SW-202







CITY OF WICHITA

PUBLIC WORKS & UTILITIES
ENGINEERING DIVISION

INLET BEAM

CITY ENGINEER
JAMES L. ARMOUR, P.E., L.S.

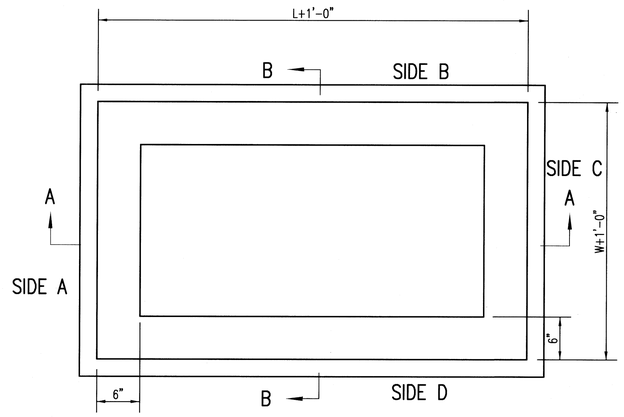
PROJECT NUMBER	OCA NUMBER	DATE
-		11/2010

CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

DESIGN	DRAWN

SHEET
8.3

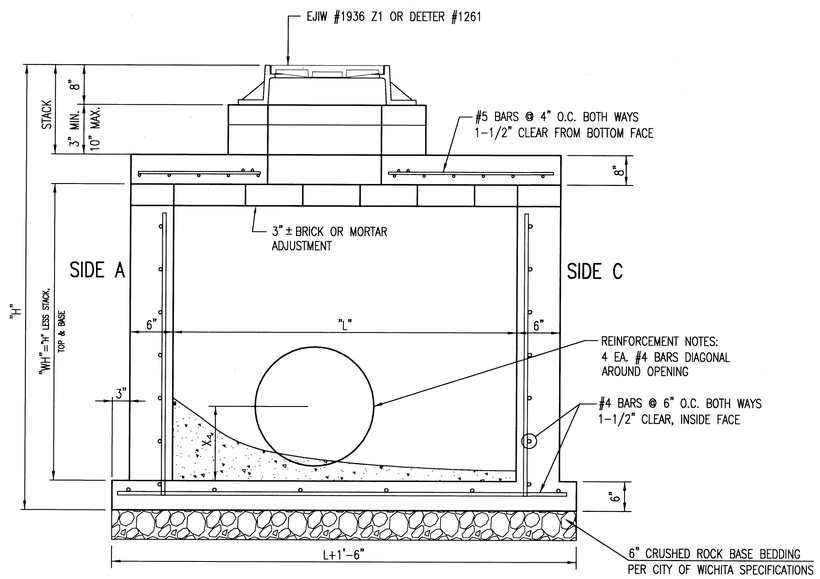
SW-110



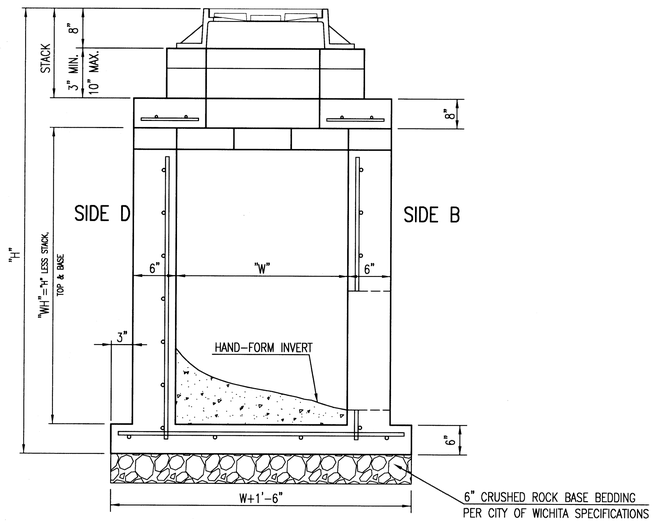
TOP VIEW

GENERAL NOTES

1. GRATE FRAME TO BE INSTALLED ON THIN MORTAR CUSHION TO INSURE FULL SUPPORT ALONG BRICK. CONCRETE USED FOR INLET CONSTRUCTION SHALL CONFORM TO CITY OF WICHITA SPECIFICATIONS FOR CONCRETE PAVEMENT MIX.
2. INLET INVERT SHALL BE SHAPED WITH 8 SACK SAND MIX CONCRETE TO CREATE FLOW CHANNELS AND TO INCREASE HYDRAULIC EFFICIENCY SUCH THAT THE INLET WILL BE SELF CLEANING BETWEEN ALL INLET AND/OR OUTLET PIPES.
3. THE ENDS OF ALL PIPES INSTALLED IN INLETS SHALL BE CUT OFF FLUSH WITH THE INSIDE FACE OF THE INLET WALL.
4. INLET FRAME AND GRATE TO BE DEETER #1261, EJIW #1936-Z1 OR APPROVED EQUAL, SEE SW-303.
5. CONTRACTOR SHALL REMOVE LIFTING HOOKS AFTER INSTALLATION. RECESSES IN MANHOLE WALL SHALL BE GROUTED FLUSH TO THE MANHOLE WALL WITH HYDRAULIC CEMENT AFTER THE MANHOLE IS IN PLACE. LIFTING HOLES THRU THE MANHOLE WALL WILL NOT BE ACCEPTED.
6. **Inlet structure shall be prepared for connecting 6" dia. underdrain to structure as per plan sheet 2.0.**



SECTION "A-A"



SECTION "B-B"

CITY OF WICHITA
PUBLIC WORKS & UTILITIES
ENGINEERING DIVISION

REINFORCED CONCRETE MANHOLE (STORM SEWER)

CITY ENGINEER
JAMES L. ARMOUR, P.E., L.S.

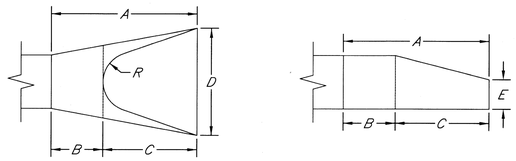
PROJECT NUMBER	OCA NUMBER	DATE
-		11/2010

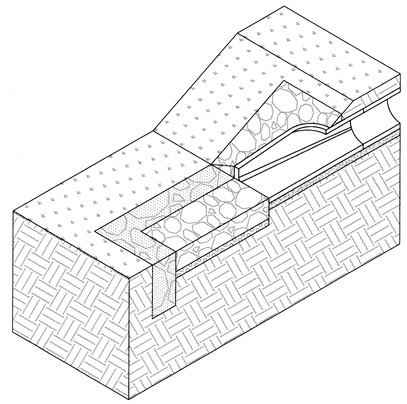
CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

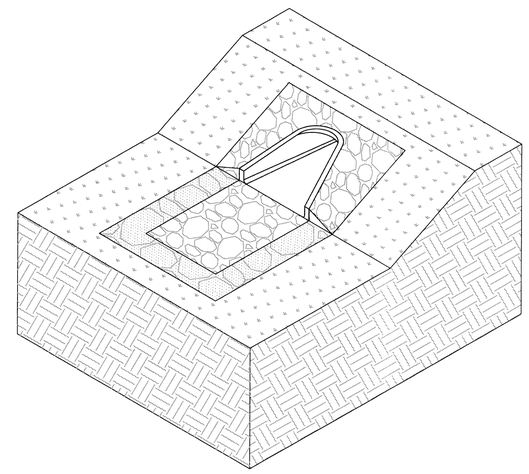
DESIGN	DRAWN

SHEET 8.4

Re-Enforced Concrete Pipe Information									
Pipe Size	Wall Thickness	Weight per ft	Elliptical Equivalent	End Section Information "A"	"B"	"C"	"D"	"E"	"R"
12"	2.0"	100 lbs	-----	6.07'	4.07'	2.00'	2.00'	0.33'	0.75'
15"	2.5"	128 lbs	-----	6.08'	3.83'	2.25'	2.50'	0.50'	0.92'
18"	2.5"	168 lbs	23"x14"	6.08'	3.83'	2.25'	3.00'	0.75'	1.00'
24"	3.0"	268 lbs	30"x19"	6.12'	2.50'	3.62'	4.00'	0.79'	1.16'
30"	3.5"	385 lbs	38"x24"	6.12'	1.64'	4.50'	5.00'	1.00'	1.25'
36"	4.0"	524 lbs	45"x29"	8.14'	2.89'	5.25'	6.00'	1.25'	1.66'
42"	4.5"	684 lbs	53"x34"	8.16'	2.92'	5.25'	6.50'	1.75'	1.83'
48"	5.0"	868 lbs	60"x38"	8.16'	2.16'	6.00'	7.00'	2.00'	1.83'
54"	5.5"	1070 lbs	68"x43"	8.18'	2.77'	5.42'	7.50'	2.25'	2.00'
60"	6.0"	1290 lbs	-----	8.25'	3.25'	5.00'	8.00'	2.92'	2.00'
66"	6.5"	1540 lbs	-----	-----	-----	-----	-----	-----	-----
72"	7.0"	1800 lbs	-----	8.25'	1.75'	6.50'	9.00'	3.00'	2.00'
84"	-----	-----	-----	9.25'	1.75'	7.54'	10.00'	3.00'	2.00'
all measurements approximate									







GRADATION REQUIREMENTS:

1. Heavy Stone Riprap: Heavy stone riprap shall be constructed twenty–four inches (24") in thickness and shall be placed on a stone filter course backing having a thickness of nine inches (9"). Stone used in riprap shall meet the required quality requirements and the following size requirements.

Weight of Individual Pieces	Minimum Percent Larger Than
1,000 lbs	0%
500 lbs	50%
75 lbs	90%

Filter course backing for heavy stone riprap shall be produced from the stone meeting the quality requirements of stone for riprap and shall have the following size requirements

Sieve Size	Percent Retained
6"	0%
5"	5–25%
2"	40–60%
3/8"	75–95%

2. Light Stone Riprap: Light stone riprap shall be constructed eighteen inches (18") in thickness and shall be placed on a stone filter course backing having a thickness of six inches (6"). Stone used in riprap shall meet the required quality requirements and the following size requirements.

Weight of Individual Pieces	Minimum Percent Larger Than
500 lbs	0%
250 lbs	50%
125 lbs	70%
10 lbs	90%

Filter course backing for heavy stone riprap shall be produced from the stone meeting the quality requirements of stone for riprap and shall have the following size requirements

Sieve Size	Percent Retained
4"	0%
2"	10–40%
1"	25–60%
3/8"	55–85%
#4	70–95%

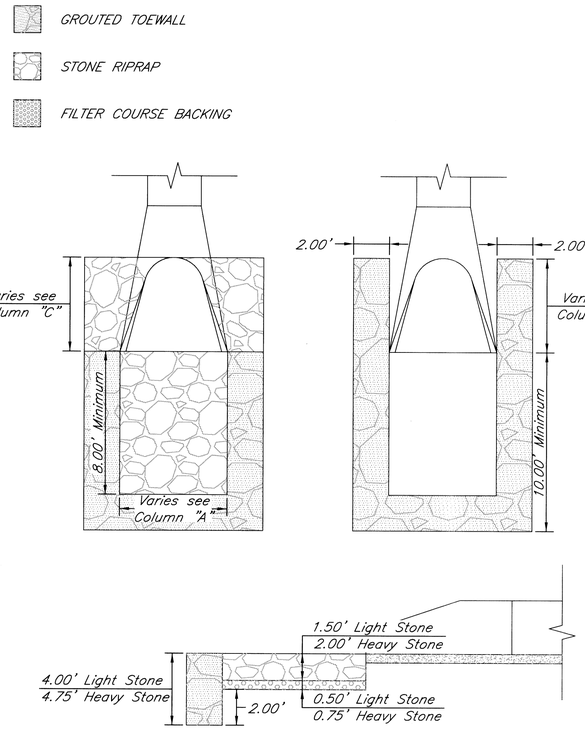
INSTALLATION OF STONE RIPRAP:

Stone riprap shall be placed on a prepared bedding layer so as to produce a reasonably well–graded mass with a minimum percentage of void. Stone riprap shall be placed to it's full course thickness in one operation without displacing the bedding. Placing stone riprap by dumping into chutes or any other method likely to cause segregation will not be permitted. Placement of stone on the slope and in toe trenches shall be accomplished by controlled dumping directly in place.

Bulldozing of stone from the upper banks will not be permitted. use of a drag line or similar equipment operated from the top of the bank to pull stone into position on the upper slope will be permitted. Stone riprap may be placed below water, providing it is placed by skip or another approved method which will prevent segregation. Larger stones should be distributed and the entire mass of stones in their final position should be stable and free of pockets of small stones and clusters of larger of larger ones; rearrangement of individual pieces by hand may be required to obtain the results described above. A tolerance of plus three inches (3") from the lines and grades shown on the continuous over an area greater than 100 square feet. Hand placing of riprap stones shall be necessary to produce reasonably true surfaces and close fit of stones. The larger spaces between the stones shall be fitted with spalls of suitable size, rammed thoroughly in place. The spaces between stones shall be fitted with smaller rock, carefully hand placed in such a manner to obtain a tight surface.

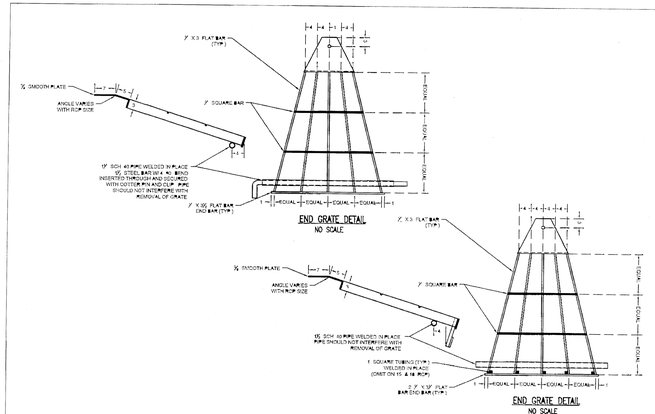
Toewalls shall be installed along all unprotected edges of edges of stone riprap construction. Such toewalls shall be constructed using the same size stone specified for t he riprap with the toewall thickness being the same thickness as specified for the riprap without the filter course backing. The toewalls shall extend a minimum distance of 2' below the bottom of the filter course backing material and they shall be constructed perpendicular to the top surface of the riprap construction. Toewall construction shall be grouted in place for the full depth from the bottom of the toewall to the top surface of the riprap for the full thickness of the toewall to the top surface of riprap for the full thickness of the toewall.

When specified, all riprap placed within the limits of a dimension of 10' from pipe ends, pipe end sections and headwall structures, as measured from the outside edges of such pipe ends or structures, shall be grouted in place. Other area shall be grouted when indicated by the plans. When grouted stone riprap is required, the spaces between the riprap stones shall be filled with water to form a plastic mix. The grout mixture shall be poured and broomed into the voids around the rock until all such voids are completely filled. Grouted stone riprap will be cured in the same manner as specified in the standard specifications for concrete pavement.



kemiller engineering
516 S. Market, Wichita, KS 67202 (316)264–0242

KEM NO. 12037
DATE 12/2012
SHEET 8.5



CITY OF WICHITA
PUBLIC WORKS & UTILITIES ENGINEERING DIVISION

END SECTION, PIPE RESTRAINT COUPLER & END GRATE

CITY ENGINEER: JAMES L ARMOUR, P.E., L.S

PROJECT NUMBER | BOX NUMBER | DATE: 01/2012

CITY ENGINEER'S OFFICE
CITY HALL, SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

DESIGN | DRAWN

SHEET: 8.4