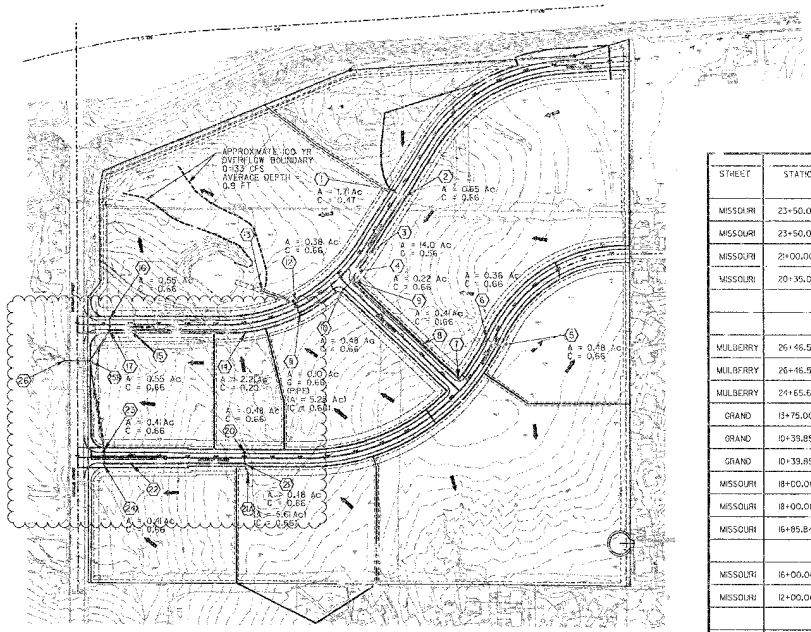

N

1" = 200'

200 0 200 400
scale Feet

Design Notes:

(a) 10 year design storm.
(b) Time of Concentration (C.urb Inlets)
5 minutes max.
5 minutes min.
(c) tc = inlet time + flow time in pipe
(d) Pipe lengths measured along ℄ of pipe from inside face to inside face of structures
(e) Pipe lengths exclude end sections
(f) Roughness Coefficient = 0.013 (RCP)
(g) Station offsets for curb inlets are measured from centerline to the center of the nearest inside face of structure.
(h) Station offsets for manholes, area inlets, field inlets and junction boxes are measured from centerline to center of structure.
(i) Station offsets for end sections are measured from centerline to farthest edge of end section at pipe centerline.
(j) Gutter Spread is measured from the back of curb.
(k) Curb inlets on longitudinal grades steeper than 4.0% shall include gutter deflectors.
(l) C values are weighted based on 0.2 for turf and 0.95 for pavement. Pipes to receive site drainage from on-site detention basins at the developed peak runoff.
(m) The system is designed to receive partial discharge from Lot 1 due to the limited development anticipated). discharges from Lots 3,4 and 7 and disc tract A. Flows from the remainder of Lot 1and Lots 2,5,6,8 and 9 discharge off-site to existing systems.
(n) The system from structure 6 to structure 9 is sized for Q100 to eliminate the need for flow across Lot 3. Another discharges in excess of system design capacity will be carried by the streets.

STRUCTURE DRAINAGE CALCULATION TABLE

STREET	STATION OFFSET	STRUCT. NO.	TYPE	DIRECT RUNOFF: AREA (acres) A	RUNOFF COEF. "C"	tc (min.)	CxA	K	I (in/hr)	Q CFS	INLET CAPACITY: GUTTER FLOW (subtracted by-pass)	TOTAL flow	GUTTER SLOPE %	GUTTER SPREAD FT.	INLET SIZE LxW	INLET CAP. CFS	80% CAP	BY-PASS DOWNST.	STRUCT. NO.	TOTAL RUNOFF: CUMM. tc MIN.	CxA	I (in/hr)	TOTAL Q CFS	PIPE: PIPE SIZE DIA.	PIPE SLOPE %	PIPE LENGTH LF	PIPE CAP. CFS	VELOCITY (ft/sec)	DEPTH OF FLOW (INCHES)
MISSOURI	23+50.00, 19.50' Lt.	1	CI	1.71	0.47	5.0	0.80	1.0	7.4	5.92	0	5.92	2.1	10.1	5x3	7.4	5.9	0.02	1										
MISSOURI	23+50.00, 19.50' Rt.	2	CI	0.65	0.66	5.0	0.43	1.0	7.4	3.17	0	3..	2.1	9.6	5x3	7.4	5.9	0	2	5.00	0.80	7.4	5.92	15	1.0	39.00	6.4	6.0	9.6
MISSOURI	21+00.00, 19.50' Rt.	3	MH	14.0	0.56	5.0	7.84	1.0	7.4	---	---	---	---	---	5' ø	---	---	---	3	5.14	1.23	7.4	9.10	15	2.1	246.79	9.5	8.5	11.0
MISSOURI	20+35.00, 19.50' Rt.	4	CI	0.22	0.66	5.0	0.15	1.0	7.4	1.07	0	1.07	2.1	5.3	5x4	7.4	5.9	0	4	5.63	9.07	7.1	64.40	30	2.5	63.46	69.0	15.0	24.0
		9		SEE DATA BELOW															9	5.73	9.22	7.0	64.54	30	2.5	34.41	69.0	15.0	24.0
MULBERRY	26+46.57, 19.50' Rt.	5	SI	0.48	0.66	5.0	0.32	1.0	10.0	3.17	0	3.17	SUMP	10.1	5x3	8.6	6.8	0	5										
MULBERRY	26+46.57, 19.55' Lt.	6	SI	0.36	0.66	5.0	0.24	1.0	10.0	2.38	0	2.38	SUMP	2.9	5x3	8.6	6.8	0	6	5.0	0.32	10.0	3.20	15	0.5	39.0	4.5	4.1	8.4
MULBERRY	24+65.63, 31.27' Lt.	7	MH	---	---	---	---	---	---	---	---	---	---	---	4' ø	---	---	---	7	5.13	0.56	10.0	5.60	15	0.8	170.47	5.8	5.4	12.0
GRAND	13+75.00, 25.00' Lt.	8	MH	---	---	---	---	---	---	---	---	---	---	---	4' ø	---	---	---	8	---	---	---	5.60	15	1.47	173.14	7.9	6.9	9.6
GRAND	10+39.85, 21.20' Rt.	9	SI	0.41	0.66	5.0	0.27	1.0	7.4	2.00	0	2.00	SUMP	10.1	5x3	8.6	6.8	0	9	---	---	---	5.60	15	5.0	331.71	15.0	8.0	6.6
GRAND	10+39.85, 21.20' Rt.	10	SI	0.48	0.66	5.0	0.32	1.0	7.4	2.34	0	2.34	SUMP	10.6	5x3	8.6	6.8	0	10	6.48	10.05	7.0	70.35	36	1.0	42.40	70.5	13.0	28.8
MISSOURI	18+00.00, 19.50' Rt.	11	CI	0.10 / 5.29	0.66 / 0.66	5.0	0.07 / 3.47	1.0	7.4	0.52	0	0.52	2.1	4.2	6x4	7.4	5.9	0	11	6.55	10.37	7.0	75.59	36	1.5	176.00	90.0	14.0	26.4
MISSOURI	18+00.00, 19.50' Lt.	12	CI	0.38	0.66	5.0	0.25	1.0	7.4	1.85	0.02	1.87	2.1	7.7	6x3	7.4	5.9	0	12	6.94	13.84	6.9	95.50	53x34 EL.	0.8	39.00	96.0	8.0	26.4
MISSOURI	16+85.84, 100.00' Lt.	13	ES																13	6.99	14.09	6.8	95.81	53x34 EL.	0.8	120.00	96.0	8.0	26.4
MISSOURI	16+00.00, 30.00' Rt.	14	AI	2.21	0.20	5.0	0.44	1.0	7.4	3.26	0	3.26	---	---	4x4	6.0	4.6	0	14										
MISSOURI	12+00.00, 22.00' Rt.	15	MH	---	---	---	---	---	---	---	---	---	---	---	4' ø	---	---	---	15	5.0	0.44	7.4	3.26	15	2.1	396.0	9.7	7.0	6.0
		17		SEE DATA BELOW															17	---	---	---	3.26	15	0.5	71.16	4.5	4.0	9.6
MISSOURI	11+24.84, 19.50' Lt.	16	SI	0.55	0.66	5.0	0.36	1.0	7.4	2.66	0	2.66	SUMP	11.5	5x3	8.6	6.8	0	16										
MISSOURI	11+24.84, 19.50' Rt.	17	SI	0.55	0.66	5.0	0.36	1.0	7.4	2.66	0	2.66	SUMP	11.5	5x3	8.6	6.8	0	17	5.0	0.36	7.4	2.66	15	0.3	35.00	3.7	3.2	9.6
		25R		SEE DATA BELOW															25R	6.24	1.16	7.0	8.12	30x19 EL.	0.15	131.00	9.0	3.2	14.4
MULBERRY	16+00.00, 19.50' Lt.	20	CI	0.48	0.66	5.0	0.32	1.0	7.4	2.37	0	2.37	3.30	2.9	5x3	6.8	5.4	0	20										
MULBERRY	16+00.00, 19.50' Rt.	21	CI	SEE DATA BELOW															21	5.0	0.32	7.4	2.37	15	0.4	39.00	4.0	3.5	7.9
MULBERRY	16+12.00, 55.00' Rt.	21A	AI	5.61	0.66	5.0	3.7	1.0	7.4	27.40	0	27.40	---	---	6x4	6.0	4.6	0	21A										
MULBERRY	16+00.00, 19.50' Rt.	21	CI	0.48	0.66	5.0	0.32	1.0	7.4	2.37	0	2.37	3.30	6.7	5x3	6.8	5.4	0	21	5.0	3.70	7.4	27.40	24	1.5	32.8	27.8	10.02	19.4
MULBERRY	12+00.00, 21.50' Rt.	22	MH	---	---	---	---	---	---	---	---	---	---	---	4' ø	---	---	---	22	5.19	4.34	7.2	31.25	24	5.0	396.00	50.0	17.0	13.2
MULBERRY	11+01.49, 21.50' Rt.	24	SI	0.41	0.66	5.0	0.27	1.0	7.4	2.00	0	2.00	SUMP	10.1	6x3	9.6	6.8	0	24	---	---	---	31.25	24	4.8	94.52	33.0	11.0	19.2
MULBERRY	11+01.49, 21.50' Lt.	23	SI	0.41	0.66	5.0	0.27	1.0	7.4	2.00	0	2.00	SUMP	9.1	5x3	8.6	6.8	0	23	5.63	4.61	7.1	32.73	24	2.0	43.00	34.0	11.0	19.2
MISSOURI	10+46.20, 128.70' Rt.	25R	JB	---	---	---	---	---	---	---	---	---	---	---	6x5	---	---	---	25R	5.70	4.88	7.1	34.65	30	0.7	323.00	35.0	8.0	26.0
DOUGLAS		26	ES	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	26	6.59	6.04	7.0	42.28	48x27 EL.	0.4	104.00	43.0	8.0	24.0

* Spread is calculated at a point upstream of sump with a longitudinal grade of 0.50% and is calculated on the side of the sump receiving the greatest flow.

** Sump inlet capacity is calculated at maximum spread

† 100 year design storm for structures 5 and 6 (k=1.0)

†† 10 year design storm for balance of structures (k=1.0)

††† All pipes are RCP (n=0.013) unless noted otherwise

* Structures 3, 11and 21are receiving points for detention basin discharges. Structure 14 receives discharge from the undeveloped Common Area. Structure 1 receives partial flow from Lot 1because limited grading is expected for this lot.

Key:
EXIST - existing structures
CI - curb inlet
SI - curb inlet in sump
DI - single drop inlet
DI-2 - double drop inlet
ES - prefabricated endsection
JB - junction box
YI - yard inlet
AI - area inlet
MH - manhole
R - rad. cap
FI - field inlet
BEND - prefabricated vertical bend

AS-BUILTS
FEBRUARY 11, 1998
THESE CONSTRUCTION RECORD DRAWINGS HAVE BEEN PREPARED BASED ON INFORMATION PROVIDED BY OTHERS. THE ENGINEER HAS NOT VERIFIED THE ACCURACY AND/OR COMPLETENESS OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.

NO.	MADE	DATE	REVISION
4	MDG	2/11/98	AS BUILT
3	KEW	1/7/97	REVISED STORM SEWER
2	KEW	10/10/96	REVISED STORM SEWER
1	KEW	9/6/96	PER CITY COMMENTS

ROLLINS MEADOWS

BUSINESS PARK SUBDIVISION
PHASE I

STORM DRAINAGE CALCULATIONS

FILE NO. 3635-00

STATE OF MISSOURI
JEFFERSON L. REEDER
NUMBER E-24052
REGISTERED PROFESSIONAL ENGINEER
2/11/98

BOYD BROWN STUDE & CAMBERN
CONSULTING ENGINEERS
A division of TRANSYSTEMS CORPORATION

DWN: KEW
CKD: RMS
DATE: 9/06/96

SHEET 18

9680

02/18/98