Flow Monitoring
Little Rock Wastewater

RJN Group, Inc. was retained by Little Rock Wastewater to update a System Evaluation and Capacity Assurance Plan (SECAP) for the wastewater system. As part of this update RJN Group, Inc. conducted a City wide (109 day) flow monitoring study. This Technical Memorandum outlines the approach and the results of the rainfall and flow monitoring.

The 2009-2010 flow monitoring evaluation consisted of:

- Flow/Rainfall Monitoring: sixty-nine (69) flow meters and twenty (20) rain gauges
- Analysis/Report

Description of Existing Conditions

The existing wastewater collection system for the Study Area contains approximately 6,558,054 linear feet of sanitary sewer line and 35,072 manholes which are owned and maintained by Little Rock Wastewater.

Definitions and Abbreviations

This section contains definitions and abbreviations commonly used throughout this report.

(1) Infiltration (as defined by USEPA) - the water entering a sewer system and service connections from the ground through such means as, but not limited to, defective pipes, pipe joints, service connections, service laterals, or manhole walls.

(2) Inflow (as defined by USEPA) - the water discharged into a sewer system, including service connections, from such sources as roof leaders; cellar, yard, and area drains; foundation drains; cooling water discharges; drains from springs and swampy areas; manhole covers; cross connections from storm sewers, combined sewers, or catch basins; storm waters; surface runoff; or drainage.

(3) Excessive infiltration and inflow (I/I) - the extraneous clean water that enters the sanitary sewer system which can be eliminated on a cost effective basis.

(4) Base Flow - wastewater flow exclusive of infiltration or inflow. Generally determined from water records during months when most of the water consumption is returned to the wastewater collection system.

(5) Permanent Infiltration - extraneous flow that enters the sewer system through the ground during periods of dry-weather/low-groundwater. Generally determined by subtracting base flow during winter months from the average daily dry-weather monitored flow.

(6) Peak Infiltration - the maximum extraneous flow that enters the wastewater collection system during high groundwater conditions after the inflow effects of a rain event have ended. Generally determined by subtracting dry-weather/low-groundwater flow (average daily dry weather monitored flow) from flow recorded during periods of high groundwater.

(7) Average Daily Dry-Weather Flow - dry-weather/low-groundwater flow exclusive of dry-weather/high-groundwater (peak infiltration) and wet weather (inflow) flow. Includes base flow and permanent infiltration only.

(8) Average Daily Dry-Weather Flow Peaking Factor - the ratio between the peak hourly flow rate and the average daily flow.

(9) 1-Year/60-Minute Storm - a storm event that produces 1.55 inches of rain per hour and is expected to occur once in any given year.

(10) 2-Year/60-Minute Storm - a storm event that produces 1.80 inches of rain per hour and has a 50 percent probability of occurring in a given year.

(11) 5-Year/60-Minute Storm - a storm event that produces 2.32 inches of rain per hour and has a 20 percent probability of occurring in a given year.

(12) Design Storm Event - a storm event selected for purposes of analyzing its effect on the wastewater collection system.

(13) gpd - gallons per day.

(14) mgd - million gallons per day.

(15) idm - inch-diameter-miles. The product of sewer pipe diameter in inches and length of sewer in feet divided by 5,280 feet.

(16) gpd/idm - gallons per day per inch-diameter-mile.

(17) Surcharge Condition – When the sewer flow depth equals or exceeds the diameter of the discharging sewer lines. (WEF Manual of Practice FD-6)

(18) Infiltration and Inflow (I/I) – A combination of infiltration and inflow wastewater volume in sanitary sewer.

Flow Monitoring

Flow monitoring is one of the most important steps in evaluating a sanitary sewer collection system. It is typically performed during Spring and Fall seasons when the chances of rainfall are greater than any other season. The flow monitoring data is used to examine the existing dry and wet weather flows, the affects of rainfall on the wastewater collection system, and the extent of I/I entering the system.

Temporary flow monitoring was performed for a period of (109) days from October 22, 2009 to February 08, 2010. Flow monitoring locations were chosen based upon a previous city wide flow monitoring study performed in 2000. Flow site locations from the previous 2000 study were considered based on suitable hydraulics and installation conditions, locations found unsuitable for monitoring were adjusted. An additional six (6) flow meters were installed giving a more accurate representation of the sewer system flow for modeling purposes. An Area Map denoting the locations of the flow meters and rain gauges are shown in Exhibit A-1 at the back of this report.

Table A-1 lists the location and pipe diameter of the flow metering locations. Flow meter site investigation and installation reports were performed for each monitoring location and are included in the back of this Appendix.

Flow meters were used to record depth of flow and velocity at five-minute intervals. Engineering review and input of additional calibration data was used to finalize the metered flow data. Manual depth and velocity readings (velocity profiles) were taken on a weekly basis to verify the metered data. Average flow rates for one-hour intervals were determined for each monitoring location. The hourly, average flow rates were used to determine daily dry-weather and wet weather flow rates. Flow data collected during rainfall events was evaluated to determine peak instantaneous inflow rates.

Rainfall Monitoring

Twenty (20) rain gauges were utilized to determine the amount of rainfall that occurred during these periods. Twelve (12) of the rain gauges were maintained by the Little Rock Wastewater while the remaining eight (8) were installed by RJN Group, Inc.

Historical rainfall intensities data for various storm recurrence intervals is given in Table A-2. Rainfall summaries and the locations of the eight (8) temporary rain gauges are listed in Table A-3.

Table A-1

FLOW METER LOCATIONS
LITTLE ROCK SECAP

Meter Basin	Manhole Number	Street Location	Manhole Depth (ft)	Average Pipe Diameter (in)
LR001	0F003	9720 Rodney Parham (Butler Park)	9.8	24
LR002	0F013	9720 North Rodney Parham Road	14.5	15
LR002R	18H003	4300 E. 9th Street	3.0	60
LR003	0F146	9300 Treasure Hill Road	7.7	19
LR003R	19I003	900 Temple Street	3.0	58
LR004	1G076	9010 Markham	8.7	12
LR004R	18J001	2400 Dave Grundfest Road	2.0	58
LR005	1G119	300 John Barrow Road	7.9	37
LR005R	9F018	Waterworks Road	42.0	41
LR006	1F056	807 Shae	8.5	12
LR006R	5M019	4800 Mabelvale Pike Road	48.0	48
LR007	2G044	212 Rodney Parham Road	12.7	15
LR007R	6M001	4800 Mabelvale Pike Road	48.0	48
LR008	3H011	7510 Ouchita Drive	13.3	12
LR008R	4N023	South University	4.0	42
LR009	2J066	7800 25th Street	5.5	15
LR009R	6L011	Mabelvale Pike	4.0	48
LR010	2K143	3427 Wynne	5.1	19
LR010R	3I007	1801 Leander Road	15.6	43
LR012	3M004	Fairways Drive	7.0	15
LR014	-2E015	1602 Merrill Drive	11.0	18
LR015	-2E010	1602 Merrill Drive	6.6	15
LR018	2O003	Hindman Park Golf Course	7.5	36
LR021	14K005	2684 Vance Street	18.3	21
LR023	12K019	3017 Martel Street	8.7	12
LR025	11L023	Crump Park	10.6	24
LR026	11L049	Chester	7.8	12
LR028	9K034	2438 Roosevelt Avenue	9.3	19
LR029	9I064	1920 Appianway Street	7.6	15
LR031	6K022	5021 Asher	10.2	15
LR032	6L008	5219 34th Street	12.4	30
LR034	5G158	Near Intersection Of Fair Park Blvd. and Club House Drive.	9.1	30
LR035	5M008	4705 University	18.1	30
LR036	5M009	4705 S. University	6.7	12
LR037	7O012	6011 Scott Hamilton Drive	14.7	18
LR043	2R053	8001 Assembly Court	18.1	24
LR044	2Q004	7669 Mabelvale Pike	8.7	24
LR050	15H110	405 Fletcher Street	20.3	53

Table A-1 (Cont.)

FLOW METER LOCATIONS
LITTLE ROCK SECAP

Meter Basin	Manhole Number	Street Location	Manhole Depth (ft)	Average Pipe Diameter (in)
LR055	9F024	2326 Cantrell	16.1	23
LR057	6C047	3500 Rebsamen Park Road	4.1	10
LR058	2C112	38 Tallyho	7.3	18
LR059	2B002	Big Dam Bridge	14.0	25
LR062	14L002	Under Intersection Of 440 And Springer	14.8	12
LR063	13I049	722 Frontage Road (Rockefeller Elem. School)	6.2	18
LR100	7K092	3200 Washington	8.1	35
LR101	-8G007	16105 Chenal	15.4	25
LR102	-1L003	4023 ShacklefoRoad Road	10.0	24
LR103	2O008	Hindman Park Golf Course	10.7	42
LR104B	2O026	Hindman Park Golf Course	10.5	25
LR105	4N014	Yellow City Gate Behind Old Crane Ford Dealership on University.	10.1	42
LR106	11L092	Little Rock Animal Services off of Arch Street	29.6	43
LR107	8Q015	8001 Jamison Road	15.0	25
LR108	6T059	End Of Sunset Lane (Farm Field To The Right, Behind Barn)	72.0	30
LR109	6T057	9526 Reck Road	15.3	29
LR110	4U014	6201 Mabelvale CTF (Cut Off)	5.3	15
LR111	4V001	11301 Gyer Springs Road	18.1	18
LR112	10G066	1600 Cantrell (Inside Episcopal School Enclosure)	18.3	36
LR113	-7-A005	18 Pinnacle Circle	15.5	18
LR114	-8-A002	7820 Cantrell Road	14.5	21
LR116	-10-B008	3 Buckland Drive	6.0	18
LR117	-4T008	13100 Otter Creek Road (In Front Of Cruizzers Car Wash)	25.8	42
LR118	-1Q006	8804 Mabelvale Pike	11.7	24
LR119	-3R004	Look For A Right Away With Power Lines On The Right Side Of W. Baseline.	15.9	12
LR120	-4T002	10100 Block Of Stagecoach Road	20.9	24
LR122	16K009	2900 Bond (Bond And Roosevelt)	20.6	60
LR123	16K005	2900 Bond Street	29.5	60
LR124	8R051	8223 Jamison Road	20.4	35
LR125	8E013	1710 Lilac Circle	7.9	12
LR126	8E099	1704 Lilac Circle	7.2	18

Table A-2

RAINFALL INTENSITIES FOR VARIOUS STORM RECURRENCE INTERVALS[1/]

Storm Recurrence Interval (Year)	Total Rainfall 60-Minute Duration Storm (in)
1	1.55
2	1.80
5	2.32

1/ *Based on National Weather Service Technical Paper No. 40.*

DETERMINATION OF AVERAGE DAILY DRY-WEATHER FLOW

Flow data collected during dry-weather/low-groundwater periods was analyzed to determine the average daily dry-weather flow for each of the sixty-nine (69) basins. The dry-weather period selected for this analysis was from November 14, 2009 through November 21, 2009. The analysis determined that the average daily dry-weather flow during the monitoring period was approximately 34.5 mgd. From this, 1.8 mgd will convey its flow to the new Little Maumelle Treatment Facility, while 32.7 mgd will flow to the Adams and Fourche Treatment Plants.

A summary of average daily dry-weather flow by basin is given in Table A-4 and is shown graphically on page A-15. A basin flow diagram giving average daily dry-weather flow is shown on Exhibit A-2. Hydrographs of the dry-weather flow overlaid with wet-weather periods for each basin are included in the back of this Appendix.

AVERAGE DAILY DRY-WEATHER FLOW PEAKING FACTOR

Wastewater flow during dry-weather periods will vary during the day in response to water consumption. By examining the diurnal curves for each monitored drainage basin, a peaking factor was determined. The peaking factor is the ratio of the peak hourly flow rate and the average daily flow. The average peaking factor for the Study area was 1.73. Peaking factors varied from a minimum of 1.27 to a maximum of 3.13. These are given for each basin in Table A-5 and shown graphically on page A-18.

Table A-3

RAINFALL SUMMARY

Date	RG 01 McClellan High School 9417 Geyer Springs Road		RG 02 Reddy Ice 1640 E. 15th Street		RG 03 Endoscopy Center of Ark. 1024 N. University		RG 04 College Station Liquor 5301 Asher	
	Total Daily Rainfall (in)	**Peak 60-Minute Rainfall Intensity (in/hr)**	**Total Daily Rainfall (in)**	**Peak 60-Minute Rainfall Intensity (in/hr)**	**Total Daily Rainfall (in)**	**Peak 60-Minute Rainfall Intensity (in/hr)**	**Total Daily Rainfall (in)**	**Peak 60-Minute Rainfall Intensity (in/hr)**
2009								
Oct. 12	1/	1/	1/	1/	1/	1/	1/	1/
13	1/	1/	1/	1/	1/	1/	1/	1/
14	0.00	0.00	1/	1/	1/	1/	1/	1/
15	0.13	0.09	1/	1/	0.13	0.10	0.14	0.13
22	1.77	0.33	1.95	0.32	1.95	0.38	1.74	0.24
26	0.27	0.05	0.25	0.05	0.28	0.06	0.25	0.05
27	0.97	0.30	0.89	0.23	0.98	0.29	0.91	0.29
29	4.11	1.98	4.02	1.36	4.30	2.15	4.14	1.92
30	0.86	0.14	0.88	0.15	0.96	0.19	0.08	0.17
Nov. 16	0.22	0.14	0.23	0.17	0.31	0.21	0.30	0.18
20	1/	1/	1/	1/	1/	1/	1/	1/
24	0.03	0.02	0.03	0.02	0.04	0.04	0.06	0.04
25	1/	1/	1/	1/	1/	1/	1/	1/
29	0.89	0.64	0.89	0.64	0.63	0.45	0.60	0.43
30	0.01	0.01	0.01	0.01	1/	1/	1/	1/
Dec. 02	1.62	0.30	1.62	0.30	1.49	0.27	1.54	0.29
06	0.05	0.02	0.05	0.02	0.06	0.03	0.04	0.02
07	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01
08	0.96	0.46	0.96	0.46	1.03	0.55	0.84	0.47
12	0.22	0.11	0.22	0.11	0.17	0.07	0.17	0.07
13	1/	1/	1/	1/	1/	1/	0.01	0.01

1/ *No rainfall recorded.*

Table A-3 (Cont.)

RAINFALL SUMMARY

Date	RG 01 McClellan High School 9417 Geyer Springs Road		RG 02 Reddy Ice 1640 E. 15th Street		RG 03 Endoscopy Center of Ark. 1024 N. University		RG 04 College Station Liquor 5301 Asher	
	Total Daily Rainfall (in)	Peak 60-Minute Rainfall Intensity (in/hr)	Total Daily Rainfall (in)	Peak 60-Minute Rainfall Intensity (in/hr)	Total Daily Rainfall (in)	Peak 60-Minute Rainfall Intensity (in/hr)	Total Daily Rainfall (in)	Peak 60-Minute Rainfall Intensity (in/hr)
Dec. 22	1/	1/	0.07	0.06	0.04	0.02	1/	1/
23	1/	1/	4.57	0.73	4.34	0.58	1/	1/
24	1/	1/	5.28	0.64	4.26	0.56	1/	1/
25	1/	1/	1/	1/	0.01	0.01	1/	1/
30	1/	1/	0.11	0.10	0.02	0.01	1/	1/
2010								
Jan. 04	1/	1/	0.01	0.01	0.01	0.01	1/	1/
07	1/	1/	0.01	0.01	1/	1/	1/	1/
16	0.25	0.05	0.19	0.05	0.21	0.05	0.21	0.05
17	0.58	0.16	0.73	0.16	0.63	0.15	0.54	0.14
19	1/	1/	1/	1/	1/	1/	1/	1/
20	0.82	0.19	0.74	0.34	0.87	0.16	0.83	0.41
21	0.23	0.19	0.12	0.10	0.06	0.04	0.11	0.08
23	0.70	0.64	0.87	0.83	0.72	0.69	0.75	0.72
24	1/	1/	1/	1/	1/	1/	1/	1/
30	0.01	0.01	0.01	0.01	1/	1/	1/	1/
31	0.31	0.12	0.61	0.20	0.69	0.25	0.41	0.22
Feb. 01	1/	1/	1/	1/	1/	1/	1/	1/
04	0.87	0.13	0.83	0.11	0.83	0.10	0.68	0.09
05	0.19	0.06	0.23	0.07	0.25	0.07	0.20	0.05
06	1/	1/	1/	1/	1/	1/	1/	1/

1/ *No rainfall recorded.*

Table A-3 (Cont.)

RAINFALL SUMMARY

	RG 01 McClellan High School 9417 Geyer Springs Road		RG 02 Reddy Ice 1640 E. 15th Street		RG 03 Endoscopy Center of Ark. 1024 N. University		RG 04 College Station Liquor 5301 Asher	
Date	**Total Daily Rainfall (in)**	**Peak 60-Minute Rainfall Intensity (in/hr)**	**Total Daily Rainfall (in)**	**Peak 60-Minute Rainfall Intensity (in/hr)**	**Total Daily Rainfall (in)**	**Peak 60-Minute Rainfall Intensity (in/hr)**	**Total Daily Rainfall (in)**	**Peak 60-Minute Rainfall Intensity (in/hr)**
Feb. 08	0.80	0.30	1.04	0.39	0.64	0.35	0.97	0.35
09	0.68	0.12	0.35	0.05	0.65	0.11	0.57	0.12
10	0.33	0.07	0.27	0.08	0.27	0.15	0.21	0.06
11	0.13	0.03	0.17	0.05	0.13	0.04	0.10	0.03
12	0.05	0.05	0.17	0.17	0.01	0.01	0.04	0.04
14	0.18	0.08	0.22	0.11	0.21	0.12	0.21	0.12
Total	**18.25**		**28.61**		**27.20**		**16.66**	

1/ *No rainfall recorded.*

Table A-3 (Cont.)

RAINFALL SUMMARY

	RG 05 Ron Pack Carpet 9524 I-30		RG 06 Gamestop 1329 Chenal Pkwy		RG 07 Verizon Store - STE 4524 Cantrell Road		RG 08 LR Raquet Club 1 Huntington Road	
Date	**Total Daily Rainfall (in)**	**Peak 60-Minute Rainfall Intensity (in/hr)**	**Total Daily Rainfall (in)**	**Peak 60-Minute Rainfall Intensity (in/hr)**	**Total Daily Rainfall (in)**	**Peak 60-Minute Rainfall Intensity (in/hr)**	**Total Daily Rainfall (in)**	**Peak 60-Minute Rainfall Intensity (in/hr)**
2009								
Oct. 12	1/	1/	0.03	0.01	0.04	0.02	0.04	0.01
13	1/	1/	1.84	0.56	1.73	0.49	1.71	0.51
14	1/	1/	1/	1/	0.02	0.01	0.02	0.01
15	0.18	0.15	0.14	0.11	0.18	0.15	0.13	0.11
22	1.85	0.25	2.31	0.36	2.61	0.36	1.86	0.26
26	0.26	0.05	0.37	0.08	0.44	0.08	0.29	0.07
27	0.91	0.28	1.00	0.27	1.01	0.24	0.90	0.28
29	4.34	1.91	2.49	0.89	1.87	0.54	3.80	1.65
30	0.69	0.16	0.78	0.19	0.87	0.18	0.81	0.18
Nov. 16	0.26	0.13	0.31	0.21	0.25	0.14	0.31	0.22
20	1/	1/	1/	1/	0.04	0.02	1/	1/
24	0.05	0.02	0.03	0.03	0.03	0.03	0.03	0.03
25	1/	1/	0.05	0.05	1/	1/	1/	1/
29	0.92	0.75	0.64	0.42	1.07	0.69	0.75	0.47
30	1/	1/	1/	1/	1/	1/	1/	1/
Dec. 02	1.62	0.31	1.60	0.28	1.48	0.24	1.33	0.21
06	0.06	0.03	0.06	0.03	0.10	0.05	0.07	0.04
07	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.01
08	0.96	0.53	0.90	0.49	1.26	0.79	0.91	0.51
12	0.20	0.09	0.14	0.06	0.20	0.08	0.15	0.06
13	1/	1/	1/	1/	1/	1/	1/	1/

1/ *No rainfall recorded.*

Table A-3 (Cont.)

RAINFALL SUMMARY

Date	RG 05 Ron Pack Carpet 9524 I-30 Total Daily Rainfall (in)	Peak 60-Minute Rainfall Intensity (in/hr)	RG 06 Gamestop 1329 Chenal Pkwy Total Daily Rainfall (in)	Peak 60-Minute Rainfall Intensity (in/hr)	RG 07 Verizon Store - STE 4524 Cantrell Road Total Daily Rainfall (in)	Peak 60-Minute Rainfall Intensity (in/hr)	RG 08 LR Raquet Club 1 Huntington Road Total Daily Rainfall (in)	Peak 60-Minute Rainfall Intensity (in/hr)
Dec. 22	0.07	0.06	0.13	0.02	1/	1/	0.03	0.02
23	4.03	0.52	5.14	0.71	4.97	0.80	4.49	0.70
24	4.17	0.66	4.20	0.52	4.88	0.68	3.64	0.47
25	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
30	0.03	0.01	0.01	0.01	0.01	0.01	0.02	0.01
2010								
Jan. 04	1/	1/	0.01	0.01	0.01	0.01	0.01	0.01
07	0.01	0.01	1/	1/	1/	1/	1/	1/
16	0.27	0.06	0.15	0.04	0.22	0.05	0.20	0.05
17	0.54	0.16	0.54	0.14	0.55	0.13	0.55	0.13
19	1/	1/	1/	1/	1/	1/	0.05	0.05
20	0.75	0.17	0.77	0.12	0.80	0.45	0.64	0.12
21	0.18	0.12	0.09	0.06	0.12	0.09	0.06	0.04
23	0.73	0.70	0.72	0.65	0.93	0.77	0.76	0.71
24	0.01	0.01	0.01	0.01	1/	1/	1/	1/
30	0.03	0.02			0.040	0.02	0.03	0.02
31	0.38	0.18	0.53	0.20	0.72	0.26	0.50	0.21
Feb. 01	1/	1/	0.01	0.01	1/	1/	1/	1/
04	0.82	0.13	0.79	0.11	0.96	0.13	0.66	0.09
05	0.19	0.05	0.22	0.06	0.23	0.07	0.22	0.05
06	1/	1/	1/	1/	0.01	0.01	1/	1/

1/ No rainfall recorded.

Table A-3 (Cont.)

RAINFALL SUMMARY

	RG 05 Ron Pack Carpet 9524 I-30		RG 06 Gamestop 1329 Chenal Pkwy		RG 07 Verizon Store - STE 4524 Cantrell Road		RG 08 LR Raquet Club 1 Huntington Road	
Date	**Total Daily Rainfall (in)**	**Peak 60-Minute Rainfall Intensity (in/hr)**	**Total Daily Rainfall (in)**	**Peak 60-Minute Rainfall Intensity (in/hr)**	**Total Daily Rainfall (in)**	**Peak 60-Minute Rainfall Intensity (in/hr)**	**Total Daily Rainfall (in)**	**Peak 60-Minute Rainfall Intensity (in/hr)**
Feb. 08	0.89	0.31	0.04	0.01	0.86	0.38	0.37	0.29
09	0.40	0.06	0.52	0.14	0.27	0.04	0.39	0.13
10	0.16	0.07	0.30	0.11	0.12	0.06	0.33	0.17
11	0.10	0.03	0.11	0.04	0.16	0.05	1/	1/
12	0.31	0.13	0.12	0.08	0.43	0.17	1/	1/
14	0.18	0.08	0.20	0.12	0.18	0.10	0.19	0.11
Total	**26.58**		**27.32**		**29.70**		**26.27**	

1/ *No rainfall recorded.*

Table A-4

AVERAGE DAILY DRY-WEATHER FLOW
LITTLE ROCK SECAP
DRY WEEK 11/14/2009 TO 11/21/2009

Meter Basin	Cumulative Average Daily Dry-Weather Flow (mgd)	Basin Average Daily Dry-Weather Flow (mgd)
Little Maumelle Service Area		
L113	0.518	0.518
L114	0.989	0.989
L116	0.311	0.311
Subtotal		1.818
Adams & Fourche Service Areas		
L001 & L002	1.511	0.704
L001	1.393	1/
L002	0.118	1/
L002R	8.032	0.071
L003	0.541	0.541
L003R	12.983	0.276
L004	0.188	0.188
L004R	1.557	0.127
L005	2.579	2.146
L005R	3.503	0.884
L006	0.089	0.089
L007	0.326	0.326
L008	0.062	0.062
L008R	3.685	0.555
L009	0.312	0.312
L009R	10.221	0.608
L010	0.462	0.462
L010R	6.881	3.096
L012	0.179	0.179
L014	0.549	0.549
L015	0.258	0.258
L018	1.422	0.302
L021	0.626	0.297
L023	0.133	0.133
L025	0.365	0.365
L026	0.055	0.055
L028	0.295	0.111
L029	0.184	0.184
L031	0.102	0.102
L032	2.511	1.235
L034	1.276	1.276

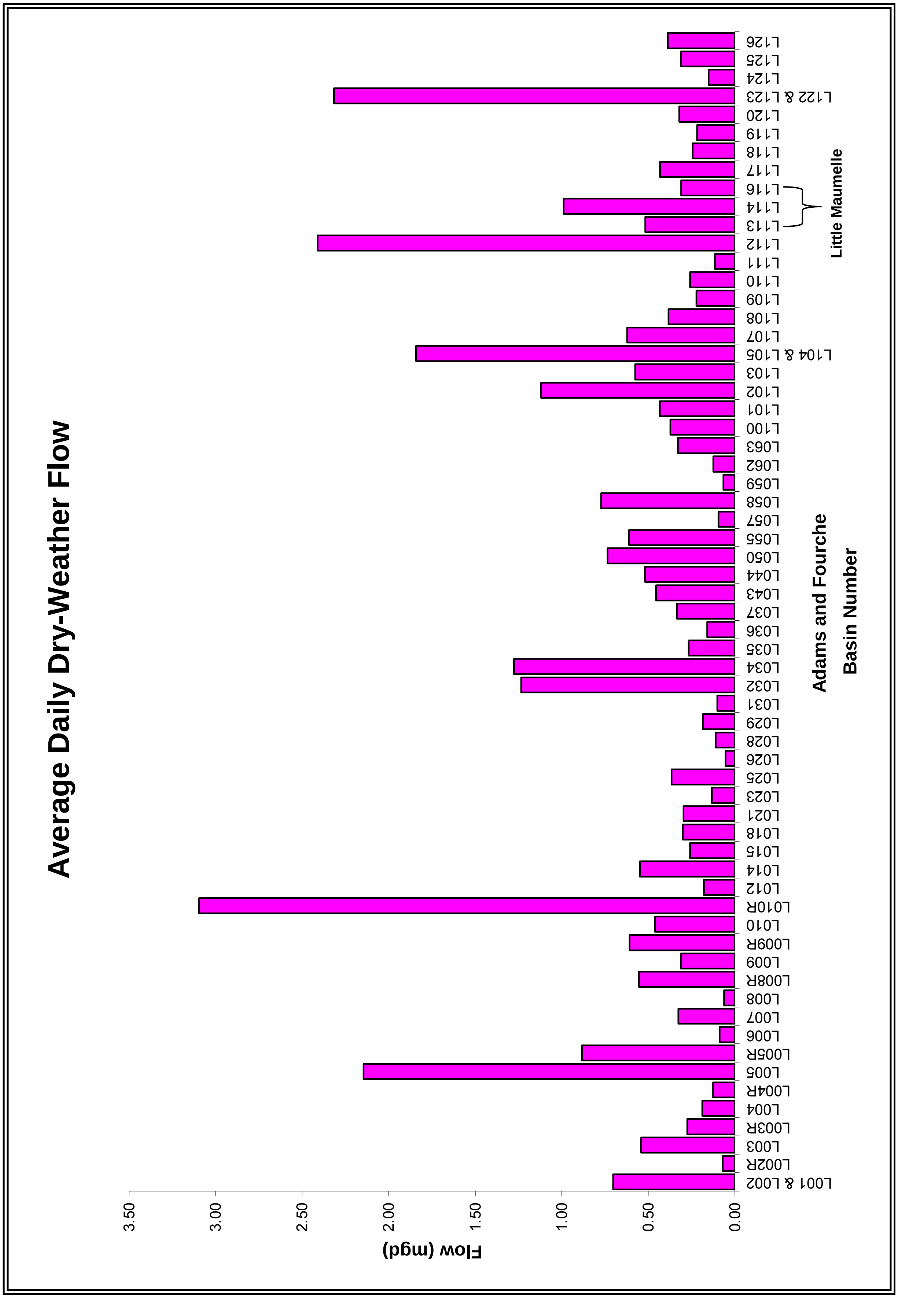
1/ *Included in combined meters.*

Table A-4 (Cont.)

AVERAGE DAILY DRY-WEATHER FLOW
LITTLE ROCK SECAP
DRY WEEK 11/14/2009 TO 11/21/2009

Meter Basin	Cumulative Average Daily Dry-Weather Flow (mgd)	Basin Average Daily Dry-Weather Flow (mgd)
L035	0.267	0.267
L036	0.161	0.161
L037	0.336	0.336
L043	0.455	0.455
L044	0.974	0.519
L050	7.961	0.736
L055	1.311	0.611
L057	0.095	0.095
L058	0.773	0.773
L059	0.706	0.067
L062	0.125	0.125
L063	0.329	0.329
L100	0.373	0.373
L101	0.433	0.433
L102	1.120	1.120
L103	1.791	0.576
L104B & L105	2.144	1.842
L104B	0.365	1/
L105	1.779	1/
L107	0.622	0.622
L108	0.384	0.384
L109	0.222	0.222
L110	0.259	0.259
L111	0.115	0.115
L112	2.411	2.411
L117	0.432	0.432
L118	0.244	0.244
L119	0.218	0.218
L120	0.321	0.321
L122 & 123	14.137	2.317
L122	1.430	1/
L123	12.707	1/
L124	1.132	0.152
L125	0.312	0.312
L126	0.388	0.388
Subtotal		32.708
Total		**34.526**

1/ *Included in combined meter basins.*



Average Daily Dry-Weather Flow
Flow (mgd)
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
L001 & L002
L002R
L003
L003R
L004
L004R
L005
L005R
L006
L007
L008
L008R
L009
L009R
L010
L010R
L012
L014
L015
L018
L021
L023
L025
L026
L028
L029
L031
L032
L034
L035
L036
L037
L043
L044
L050
L055
L057
L058
L059
L062
L063
L100
L101
L102
L103
L104 & L105
L107
L108
L109
L110
L111
L112
L113
L114
L116
L117
L118
L119
L120
L122 & L123
L124
L125
L126
Little Maumelle
Adams and Fourche
Basin Number

Table A-5

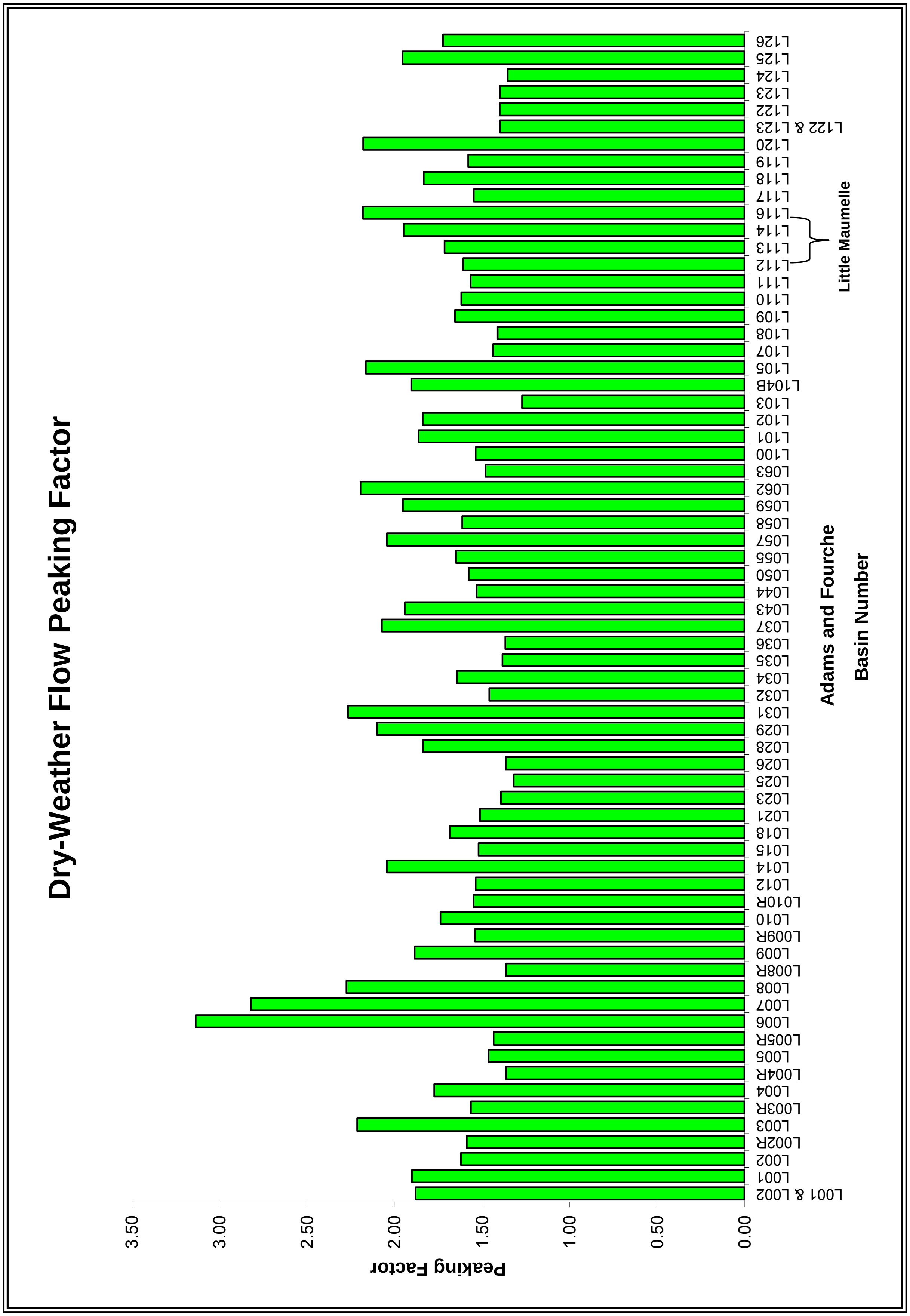
DRY-WEATHER FLOW PEAKING FACTOR
LITTLE ROCK SECAP
DRY WEEK 11/14/2009 TO 11/21/2009

Meter Basin	Cumulative Average Daily Flow Rate (mgd)	Cumulative Peak Hourly Flow Rate (mgd)	Cumulative Average Daily Peaking Factor
Little Maumelle Service Area			
L113	0.518	0.888	1.71
L114	0.989	1.925	1.95
L116	0.311	0.678	2.18
Subtotal			1.95 (average)
Adams & Fourche Service Areas			
L001 & L002	1.511	2.838	1.88
L001	1.393	2.647	1.90
L002	0.118	0.191	1.62
L002R	8.032	12.739	1.59
L003	0.541	1.197	2.21
L003R	12.983	20.306	1.56
L004	0.188	0.333	1.77
L004R	1.557	2.120	1.36
L005	2.579	3.770	1.46
L005R	3.503	5.020	1.43
L006	0.089	0.279	3.13
L007	0.326	0.919	2.82
L008	0.062	0.141	2.27
L008R	3.685	5.020	1.36
L009	0.312	0.588	1.88
L009R	10.221	15.740	1.54
L010	0.462	0.802	1.74
L010R	6.881	10.652	1.55
L012	0.179	0.275	1.54
L014	0.549	1.122	2.04
L015	0.258	0.392	1.52
L018	1.422	2.395	1.68
L021	0.626	0.946	1.51
L023	0.133	0.185	1.39
L025	0.365	0.481	1.32
L026	0.055	0.075	1.36
L028	0.295	0.542	1.84
L029	0.184	0.386	2.10
L031	0.102	0.231	2.26
L032	2.511	3.660	1.46
L034	1.276	2.096	1.64

Table A-5 (Cont.)

DRY-WEATHER FLOW PEAKING FACTOR
LITTLE ROCK SECAP
DRY WEEK 11/14/2009 TO 11/21/2009

Meter Basin	**Cumulative Average Daily Flow Rate (mgd)**	**Cumulative Peak Hourly Flow Rate (mgd)**	**Cumulative Average Daily Peaking Factor**
L035	0.267	0.369	1.38
L036	0.161	0.220	1.37
L037	0.336	0.696	2.07
L043	0.455	0.883	1.94
L044	0.974	1.490	1.53
L050	7.961	12.540	1.58
L055	1.311	2.160	1.65
L057	0.095	0.194	2.04
L058	0.773	1.246	1.61
L059	0.706	1.377	1.95
L062	0.125	0.274	2.19
L063	0.329	0.487	1.48
L100	0.373	0.573	1.54
L101	0.433	0.806	1.86
L102	1.120	2.059	1.84
L103	1.791	2.275	1.27
L104B	0.365	0.695	1.90
L105	1.779	3.850	2.16
L107	0.622	0.893	1.44
L108	0.384	0.541	1.41
L109	0.222	0.367	1.65
L110	0.259	0.419	1.62
L111	0.115	0.180	1.57
L112	2.411	3.873	1.61
L117	0.432	0.668	1.55
L118	0.244	0.447	1.83
L119	0.218	0.344	1.58
L120	0.321	0.699	2.18
L122 & L123	14.137	19.746	1.40
L122	1.430	1.999	1.40
L123	12.707	17.747	1.40
L124	1.132	1.532	1.35
L125	0.312	0.610	1.96
L126	0.388	0.668	1.72
Subtotal			1.72
Total			**1.73**
			Average


Dry-Weather Flow Peaking Factor
Peaking Factor
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
L001 & L002
L001
L002
L002R
L003
L003R
L004
L004R
L005
L005R
L006
L007
L008
L008R
L009
L009R
L010
L010R
L012
L014
L015
L018
L021
L023
L025
L026
L028
L029
L031
L032
L034
L035
L036
L037
L043
L044
L050
L055
L057
L058
L059
L062
L063
L100
L101
L102
L103
L104B
L105
L107
L108
L109
L110
L111
L112
L113
L114
L116
L117
L118
L119
L120
L122 & L123
L122
L123
L124
L125
L126
Adams and Fourche
Little Maumelle
Basin Number

INFILTRATION CONDITIONS

Infiltration may enter the system through pipe joints, sewer line defects (including main sewer lines and building sewer lines), and defective manhole walls, benches, and pipe seals. There are two types of infiltration that can be determined during a study, permanent infiltration and peak infiltration. Permanent infiltration is defined as extraneous flow that enters the sewer system through the ground during periods of dry-weather and low-groundwater. Peak infiltration is defined as the maximum extraneous flow that enters the sanitary sewer system during high-groundwater conditions after the inflow effects of a rain event have ended. Peak infiltration was used to evaluate the effects of infiltration on the sewer system.

DETERMINATION OF PEAK INFILTRATION

Determining peak infiltration requires analysis of flow data obtained during dry-weather/high-groundwater conditions. Care must be exercised in the analysis to exclude days that are too close to rainfall events. This is necessary to avoid including residual inflow (rainfall induced infiltration) that may lead to an over-estimation of peak infiltration. Generally, periods following significant rainfall, excluding the day immediately following a rain event, are used for determining peak infiltration.

Due to high amounts of rainfall that occurred during the study, it was determined that groundwater conditions were favorable during the monitoring period. Analyses of the flow data following major rain events indicated significant infiltration entering the wastewater collection system. A number of basins for example, L122, L123, and L124 exhibit prolong surcharging that occurred for 3-4 days. In these cases an alternative storm event was analyzed when available for infiltration analysis.

For this study, each basin is compared relative to the other by expressing the infiltration rate in units of gpd/idm. It was determined that eighteen (18) basins exhibited significant infiltration rates over 5,000 gpd/idm. The system resulted in a total peak infiltration rate of 36.7 mgd. This is comprised of 2.0 mgd from the Little Maumelle Sewershed and 34.7 mgd from the Adams and Fourche tributary areas. Table A-6 provides the results of the analysis. A basin flow diagram showing peak infiltration is shown on Exhibit A-3. Also, a ranking is given in Table A-6 where one (1) is the most severe.

INFLOW CONDITIONS

Inflow in a sanitary sewer system is defined as extraneous flow that is a direct result of stormwater runoff. Inflow may enter the sanitary sewer system through directly connected downspouts, area drains, cleanouts, and building sewers. Stormwater may also enter the system through direct or indirect connections between the sanitary sewers and storm drains or ditches and sewer line defects, and through defective manhole covers, frame seals, corbels, and manhole walls.

Table A-6

SUMMARY OF PEAK INFILTRATION

Meter Basin	Basin Inch-Diameter-Mile (idm)	Cumulative Peak Monitored infiltration (mgd)	Basin Peak Monitored infiltration (mgd)	Basin Peak Unit Infiltration (gpd/idm)	Basin Peak Unit Infiltration Ranking
Little Maumelle Service Area					
L113	213.97	0.516	0.516	2,412	36
L114	581.32	1.088	1.088	1,871	39
L116[1/]	188.80	0.383	0.383	2,029	38
Subtotal			1.987		
Adams & Fourche Service Areas					
L001 & L002	188.66	0.989	0.401	2,124	37
L001	2/	0.939	2/	2/	2/
L002	2/	0.050	2/	2/	2/
L002R	116.23	4.201	1.169	10,058	4
L003	174.16	0.646	0.646	3,710	25
L003R	383.03	11.221	3.649	9,527	5
L004	54.59	0.329	0.329	6,020	13
L004R[3/4/]	147.76	15.861	3/	3/	3/
L005	700.72	1.050	0.870	1,242	45
L005R	537.13	1.974	4/	4/	9/
L006	53.28	0.190	0.190	3,562	27
L007	111.51	0.764	0.764	6,852	11
L008	170.12	0.133	0.133	780	50
L008R[5/]	218.00	2.529	0.316	1,449	43
L009	96.03	0.239	0.239	2,488	35
L009R[6/]	354.73	3.775	6/	6/	5/
L010	181.85	0.565	0.565	3,105	30
L010R	374.47	6.022	1.922	5,133	17
L012	62.73	0.275	0.275	4,377	20
L014	126.22	0.490	0.490	3,880	24
L015	62.54	0.098	0.098	1,573	41
L018	227.91	1.335	0.635	2,788	32

1/ *Used alternate Infiltration period.*
2 *Included in combined meters.*
3/ *Bypass connection upstream precludes net Infiltration calculation. Value most likely underestimates infiltration.*
4/ *Storage at Little Maumelle Lift Station precludes net infiltration calculation.*
5/ *Partial infiltration diverts South to Arch.*
6/ *Sewer line upstream was surcharged during Infiltration period.*
7/ *Additional flow diverted from L034 to a Lift Station most likely results in over estimate of the net Infiltration.*
8/ *Overflow upstream precludes net Infiltration calculation*
9/ *Some flow from L009R is being diverted to a lift station; therefore, meters L122 and L123 infiltration may be an overestimate.*

Table A-6 (Cont.)

SUMMARY OF PEAK INFILTRATION

Meter Basin	Basin Inch-Diameter-Mile (idm)	Cumulative Peak Monitored infiltration (mgd)	Basin Peak Monitored infiltration (mgd)	Basin Peak Unit Infiltration (gpd/idm)	Basin Peak Unit Infiltration Ranking
L021[5/]	87.68	0.298	5/	5/	4/
L023	32.84	0.192	0.192	5,842	14
L025	160.49	1.291	1.291	8,044	8
L026	26.35	0.196	0.196	7,422	9
L028	51.07	0.435	<0.001	<10	56
L029	82.29	0.435	0.435	5,282	16
L031	172.53	0.093	0.093	538	53
L032[7/]	395.94	2.113	1.031	2,604	33
L034	251.37	1.082	1.082	4,305	21
L035	67.75	0.387	0.387	5,711	15
L036	29.13	0.297	0.297	10,187	3
L037	104.05	0.156	0.156	1,501	42
L043	169.85	0.569	0.569	3,350	28
L044	140.29	0.677	0.108	770	51
L050[5/]	406.48	3.032	5/	5/	5/
L055	117.64	1.072	<0.001	<10	57
L057	50.36	0.049	0.049	973	47
L058	139.32	0.459	0.459	3,297	29
L059	125.00	1.030	0.571	4,566	19
L062	40.35	0.464	0.464	11,489	1
L063	77.69	0.394	0.394	5,066	18
L100	133.88	0.573	0.573	4,276	22
L101	360.83	0.180	0.180	497	54
L102	552.05	0.700	0.700	1,268	44
L103[8/]	422.88	0.940	8/	8/	7/
L104B & L105	59.28	1.282	0.646	10,905	2
L104B	2/	0.596	2/	2/	2/
L105	2/	0.686	2/	2/	2/
L107	95.83	0.376	0.376	3,920	23
L108	286.35	0.167	0.167	583	52

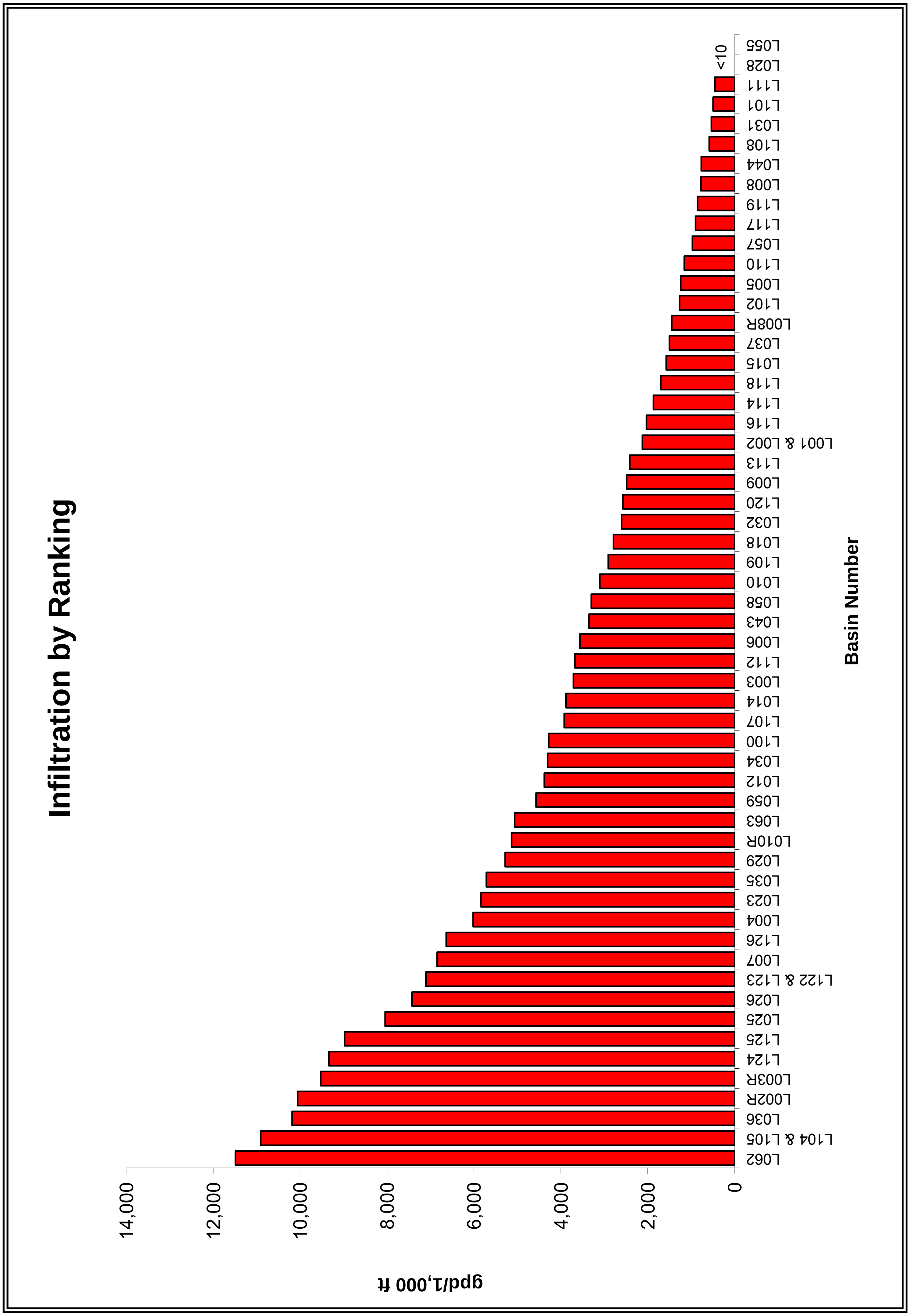
1/ *Used alternate Infiltration period.*
2 *Included in combined meters.*
3/ *Bypass connection upstream precludes net Infiltration calculation. Value most likely underestimates infiltration.*
4/ *Storage at Little Maumelle Lift Station precludes net infiltration calculation.*
5/ *Partial infiltration diverts South to Arch.*
6/ *Sewer line upstream was surcharged during Infiltration period.*
7/ *Additional flow diverted from L034 to a Lift Station most likely results in over estimate of the net Infiltration.*
8/ *Overflow upstream precludes net Infiltration calculation*
9/ *Some flow from L009R is being diverted to a lift station; therefore, meters L122 and L123 infiltration may be an overestimate.*

Table A-6 (Cont.)

SUMMARY OF PEAK INFILTRATION

Meter Basin	Basin Inch-Diameter-Mile (idm)	Cumulative Peak Monitored infiltration (mgd)	Basin Peak Monitored infiltration (mgd)	Basin Peak Unit Infiltration (gpd/idm)	Basin Peak Unit Infiltration Ranking
L109	51.07	0.148	0.148	2,906	31
L110	149.21	0.173	0.173	1,161	46
L111	170.27	0.078	0.078	459	55
L112	479.59	1.763	1.763	3,676	26
L117	388.81	0.351	0.351	903	48
L118	139.00	0.236	0.236	1,700	40
L119	89.84	0.077	0.077	852	49
L120	145.94	0.375	0.375	2,570	34
L122 & L123[9/]	847.49	11.915	6.023	7,107	10
L122	2/	4.343	2/	2/	2/
L123	2/	7.572	2/	2/	2/
L124[1/]	139.69	1.871	1.304	9,336	6
L125	75.27	0.676	0.676	8,981	7
L126	60.99	0.405	0.405	6,641	12
Subtotal			34.713		
Total			**36.700**		

1/ *Used alternate Infiltration period.*
2 *Included in combined meters.*
3/ *Bypass connection upstream precludes net Infiltration calculation. Value most likely underestimates infiltration.*
4/ *Storage at Little Maumelle Lift Station precludes net infiltration calculation.*
5/ *Partial infiltration diverts South to Arch.*
6/ *Sewer line upstream was surcharged during Infiltration period.*
7/ *Additional flow diverted from L034 to a Lift Station most likely results in over estimate of the net Infiltration.*
8/ *Overflow upstream precludes net Infiltration calculation*
9/ *Some flow from L009R is being diverted to a lift station; therefore, meters L122 and L123 infiltration may be an overestimate.*



Infiltration by Ranking
gpd/1,000 ft
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
Basin Number
L062
L104 & L105
L036
L002R
L003R
L124
L125
L025
L026
L122 & L123
L007
L126
L004
L023
L035
L029
L010R
L063
L059
L012
L034
L100
L107
L014
L003
L112
L006
L043
L058
L010
L109
L018
L032
L120
L009
L113
L001 & L002
L116
L114
L118
L015
L037
L008R
L102
L005
L110
L057
L117
L119
L008
L044
L108
L031
L101
L111
L028
L055
<10

DETERMINATION OF INFLOW

Flow data collected during wet-weather periods was analyzed to determine peak inflow originating in each basin. To determine the peak inflow rate, the calibrated model was used to perform the analysis. By isolating each basin's inflow component and treating its outfall as free flow, the peak design inflow rates were calculated. Several storm events of various intensities were used to calibrate the model. This ensures that the model has appropriately distributed inflow.

The analysis projected the peak 1-year storm inflow (1.55 inches/hour) to be 263.358 mgd; 11.4 mgd is generated from the Little Maumelle Sewershed while 252.0 mgd is from the Adams and Fourche Sewersheds. The system overall exhibited severe inflow with rates exceeding 10,000 gpd/linear foot of 1-year/60-minute inflow. A summary of the projected peak wet-weather flow rates during a 1-year/60-minute storm event is given in Table A-7 and is shown graphically on page A-27. The basin unit inflow rate expresses the magnitude of peak inflow relative to other basins. A basin flow diagram giving 1-year/60-minute storm inflow rates are shown on Exhibit A-4.

During the flow monitoring period, seven (7) rain events were recorded with peak 60-minute rainfall intensity greater than 0.25 inches/hour. These intensities ranged from 0.25 inches/hour to 2.00 inches/hour.

TOTAL PEAK 1-YEAR STORM FLOW

The total peak wet-weather flow projected to occur during a 1-year storm event for Little Rock is approximately 353.721 mgd. This consists of 53.663 mgd of peak hourly dry-weather flow, 36.700 mgd of peak infiltration, and 263.358 mgd of 1-year inflow. Based on an average daily dry-weather flow of 34.526 mgd, this would result in a wet-weather peaking factor average of approximately 10.2. A summary of the projected peak wet-weather flow rates during a 1-year/60-minute storm event is given in Table A-8. Peaking factors varied from 3.0 to 59.3 and are given for each basin in Table A-8 and shown graphically on page A-31.

Table A-7

SUMMARY OF INFLOW RATES[1/]

Meter Basin	Length (lf)	Cumulative Peak 1-Year/60-Minute Inflow (mgd)	Basin Peak 1-Year/60-Minute Inflow (mgd)	Basin Peak 1-Year/60-Minute Inflow per 1000 lf (gpd/1,000 ft)	Rank
Little Maumelle Service Area					
L113	130,444	3.088	3.088	23,673	50
L114	355,738	6.846	6.846	19,246	52
L116	115,433	1.444	1.444	12,505	56
Subtotal	601,615		11.378	18,475	
Adams & Fourche Service Areas					
L001 & L002	107,760	12.006	2/	60,722	18
L001	93,497	9.642	2/	56,021	22
L002	14,263	2.364	1.306	91,543	4
L002R	30,510	72.776	0.774	25,384	47
L003	116,219	6.656	6.656	57,272	20
L003R	111,543	95.415	0.791	7,094	65
L004	38,772	2.188	2.188	56,428	21
L004R	29,154	57.727	0.905	31,043	38
L005	384,290	11.462	11.462	29,826	40
L005R	250,535	22.603	2.108	8,414	62
L006	38,318	1.596	1.596	41,652	30
L007	80,149	6.043	6.043	75,398	12
L008	115,577	0.907	0.907	7,850	63
L008R	109,549	19.646	2/	24,805	48
L008R & L105	127,548	31.556	3.429	64,347	16
L009	61,453	2.215	2.215	36,049	35
L009R	119,045	82.292	2.862	24,044	49
L010	125,763	7.786	7.786	61,910	17
L010R	153,201	40.858	16.467	107,488	3
L012	45,102	2.911	2.911	64,552	15
L014	82,343	4.404	4.404	53,486	24
L015	38,344	1.058	1.058	27,593	44
L018	105,405	8.481	1.942	18,424	53
L021	54,381	4.665	0.515	9,477	61
L023	23,446	2.036	2.036	86,830	6
L025	111,101	6.055	6.055	54,496	23
L026	18,654	0.528	0.528	28,307	43
L028	33,168	6.820	2.739	82,583	7
L029	58,261	4.081	4.081	70,050	14
L031	107,594	2.837	2.837	26,363	45

1/ *Based on Model inflow analysis.*
2/ *Included in the combined basin.*

Table A-7 (Cont.)

SUMMARY OF INFLOW RATES[1/]

Meter Basin	Length (lf)	Cumulative Peak 1-Year/60-Minute Inflow (mgd)	Basin Peak 1-Year/60-Minute Inflow (mgd)	Basin Peak 1-Year/60-Minute Inflow per 1000 lf (gpd/1,000 ft)	Rank
L032	195,215	23.277	10.180	52,149	25
L034	163,627	13.097	13.097	80,040	9
L035	38,056	1.941	1.941	51,009	26
L036	20,145	1.199	1.199	59,501	19
L037	63,633	5.055	5.055	79,447	10
L043	105,458	3.082	3.082	29,227	42
L044	82,650	5.741	2.659	32,174	36
L050	172,196	72.001	5.202	30,209	39
L055	65,814	11.963	1.931	29,342	41
L057	35,302	1.106	1.106	31,328	37
L058	96,033	4.742	4.742	49,375	28
L059	84,210	8.011	3.269	38,824	32
L062	27,497	1.336	1.336	48,600	29
L063	50,512	4.150	4.150	82,155	8
L100	89,605	6.860	6.860	76,558	11
L101	213,600	1.598	1.598	7,482	64
L102	294,477	6.539	6.539	22,205	51
L103	142,557	11.187	1.368	9,593	60
L105	17,999	9.193	2/	39,542	31
L107	52,335	2.661	2.661	50,851	27
L108	158,630	1.639	1.639	10,330	58
L109	34,854	1.305	1.305	37,452	33
L110	88,768	0.911	0.911	10,259	59
L111	95,830	1.052	1.052	10,976	57
L112	291,009	32.234	32.234	110,765	2
L117	179,336	6.503	6.503	36,263	34
L118	72,639	1.860	1.860	25,604	46
L119	55,546	0.235	0.235	4,223	66
L120	91,447	1.222	1.222	13,365	55
L122 & L123	199,000	136.706	14.740	74,069	13
L122	2/	2/	2/	2/	2/
L123	2/	2/	2/	2/	2/
L124	29,200	5.340	0.433	14,842	54
L125	55,915	4.971	4.971	88,897	5
L126	43,707	5.061	5.061	115,791	1
Subtotal	5,956,439		251.980	(45,109)	
Total	**6,558,054**		**263.358**	**43,899** (average)	

1/ Based on Model inflow analysis.
2/ Included in the combined basin.

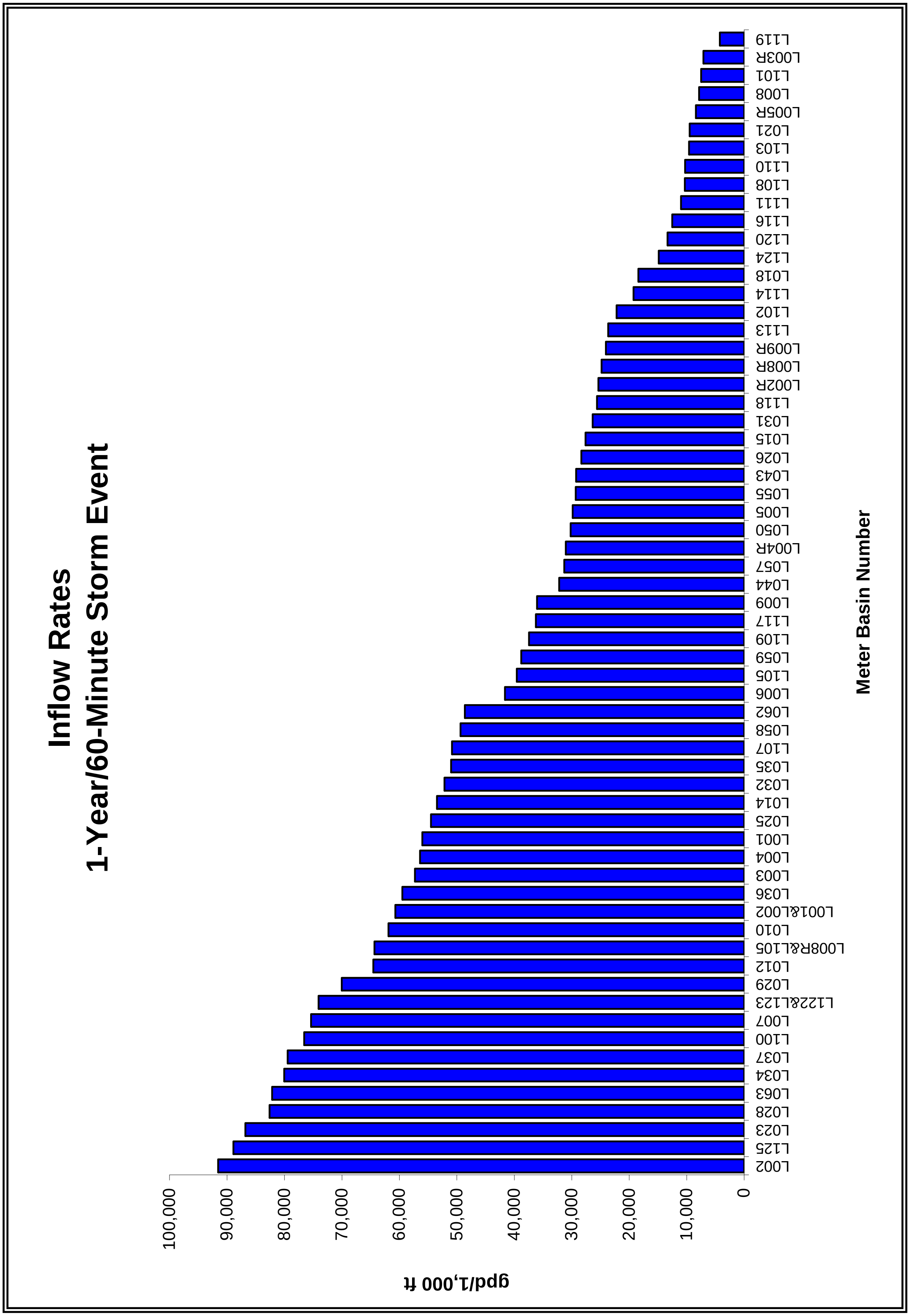

Inflow Rates
1-Year/60-Minute Storm Event
gpd/1,000 ft
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
100,000
Meter Basin Number
L002
L125
L023
L028
L063
L034
L037
L100
L007
L122&L123
L029
L012
L008R&L105
L010
L001&L002
L036
L003
L004
L001
L025
L014
L032
L035
L107
L058
L062
L006
L105
L059
L109
L117
L009
L044
L057
L004R
L050
L005
L055
L043
L026
L015
L031
L118
L002R
L008R
L009R
L113
L102
L114
L018
L124
L120
L116
L111
L108
L110
L103
L021
L005R
L008
L101
L003R
L119

Table A-8

TOTAL PEAK 1-YEAR/60-MINUTE WET-WEATHER FLOW

Basin	2009 Basin Peak Hourly Flow Rate (mgd)	2009 Basin Peak Monitored infiltration (mgd) 12/24 Storm	2009 Basin Peak 1-Year/60-Minute Inflow (mgd)	2009 Basin Peak Wet Weather Flow (mgd)	Wet Weather Peaking Factor
Little Maumelle Service Area					
L113	0.888	0.516	3.088	4.492	8.7
L114	1.925	1.088	6.846	9.859	10.0
L116	0.678	0.383 1/	1.444	2.505	8.1
Subtotal	3.491	1.987	11.378	16.856	
Adams & Fourche Service Areas					
L001&L002	1.322	0.401	6.543	8.267	11.7
L001	2/	2/	5.238	2/	2/
L002	2/	2/	1.306	2/	2/
L002R	0.113	1.169	0.774	2.056	29.0
L003	1.197	0.646	6.656	8.499	15.7
L003R	0.432	3.649	0.791	4.872	17.7
L004	0.333	0.329	2.188	2.849	15.2
L004R 3/	0.173	3/	0.905	1.078	8.5
L005	3.137	0.870	11.462	15.469	7.2
L005R	1.267	4/	2.108	3.375	3.8
L006	0.279	0.190	1.596	2.065	23.2
L007	0.919	0.764	6.043	7.726	23.7
L008	0.141	0.133	0.907	1.181	19.0
L008R	0.756	0.316	2.717	3.789	6.8
L009	0.588	0.239	2.215	3.042	9.8
L009R	0.936	4/	2.862	3.799	6.2
L010	0.802	0.565	7.786	9.153	19.8
L010R	4.793	1.922	16.467	23.182	7.5

1/ *Used alternate Infiltration period.*
2/ *Included in combined meters.*
3/ *Bypass connection upstream precludes net infiltration period.*
4/ *Storage at Little Maumelle Lift Station precludes net infiltration calculation.*
5/ *Partial infiltration diverts South to Arch.*
6/ *Sewer line upstream was surcharged during Infiltration period.*
7/ *Additional flow diverted from L034 to a Lift Station most likely results in over estimate of the net Infiltration.*
8/ *Overflow upstream precludes net Infiltration calculation.*
9/ *Some flow from L009R is being diverted to a pump station so meter L122 and L123 infiltration may be an overestimate.*

Table A-8 (Cont.)

TOTAL PEAK 1-YEAR/60-MINUTE WET-WEATHER FLOW

Basin	2009 Basin Peak Hourly Flow Rate (mgd)	2009 Basin Peak Monitored infiltration (mgd) 12/24 Storm	2009 Basin Peak 1-Year/60-Minute Inflow (mgd)	2009 Basin Peak Wet Weather Flow (mgd)	Wet Weather Peaking Factor
L012	0.275	0.275	2.911	3.461	19.3
L014	1.122	0.490	4.404	6.016	11.0
L015	0.392	0.098	1.058	1.548	6.0
L018	0.509	0.635	1.942	3.086	10.2
L021	0.449	6/	0.515	0.964	3.2
L023	0.185	0.192	2.036	2.413	18.1
L025	0.481	1.291	6.055	7.827	21.4
L026	0.075	0.196	0.528	0.799	14.5
L028	0.204	0.000	2.739	2.943	26.5
L029	0.386	0.435	4.081	4.902	26.6
L031	0.231	0.093	2.837	3.160	31.0
L032[7/]	1.800	1.031	10.180	13.011	10.5
L034	2.096	1.082	13.097	16.275	12.8
L035	0.369	0.387	1.941	2.697	10.1
L036	0.220	0.297	1.199	1.715	10.7
L037	0.696	0.156	5.055	5.908	17.6
L043	0.883	0.569	3.082	4.534	10.0
L044	0.794	0.108	2.659	3.561	6.9
L050	1.159	6/	5.202	6.361	8.6
L055	1.007	<0.001	1.931	2.938	4.8
L057	0.194	0.049	1.106	1.349	14.2
L058	1.246	0.459	4.742	6.447	8.3
L059	0.131	0.571	3.269	3.971	59.3
L062	0.274	0.464	1.336	2.074	16.6
L063	0.487	0.394	4.150	5.030	15.3
L100	0.573	0.573	6.860	8.005	21.5

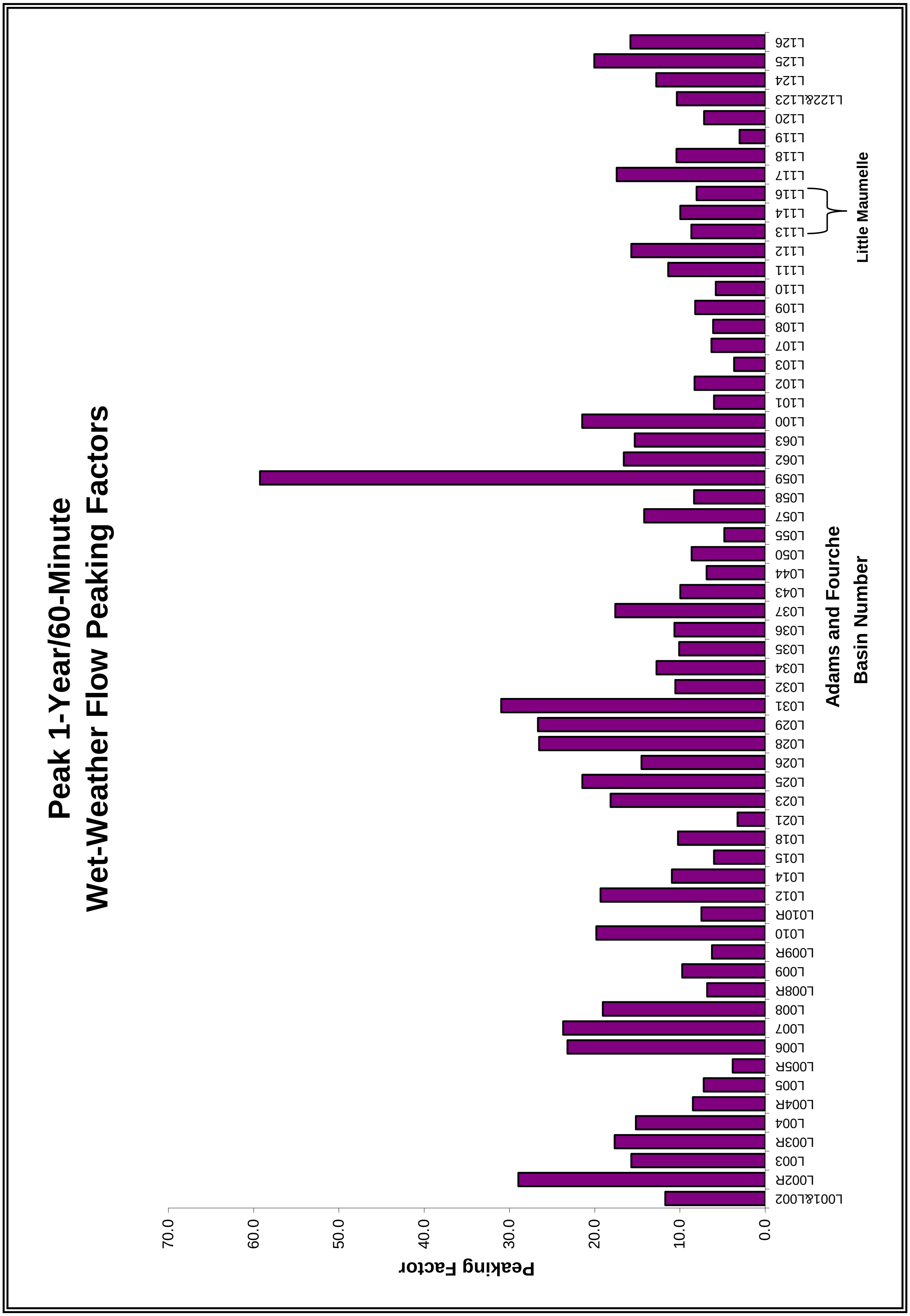
1/ *Used alternate Infiltration period.*
2/ *Included in combined meters.*
3/ *Bypass connection upstream precludes net infiltration period.*
4/ *Storage at Little Maumelle Lift Station precludes net infiltration calculation.*
5/ *Partial infiltration diverts South to Arch.*
6/ *Sewer line upstream was surcharged during Infiltration period.*
7/ *Additional flow diverted from L034 to a Lift Station most likely results in over estimate of the net Infiltration.*
8/ *Overflow upstream precludes net Infiltration calculation.*
9/ *Some flow from L009R is being diverted to a pump station so meter L122 and L123 infiltration may be an overestimate.*

Table A-8 (Cont.)

TOTAL PEAK 1-YEAR/60-MINUTE WET-WEATHER FLOW

Basin	2009 Basin Peak Hourly Flow Rate (mgd)	2009 Basin Peak Monitored infiltration (mgd) 12/24 Storm	2009 Basin Peak 1-Year/60-Minute Inflow (mgd)	2009 Basin Peak Wet Weather Flow (mgd)	Wet Weather Peaking Factor
L101	0.806	0.180	1.598	2.584	6.0
L102	2.059	2/	6.539	9.298	8.3
L103	0.732	8/	1.368	2.099	3.6
L105	2/	2/	0.712	0.712	2/
L107	0.893	0.376	2.661	3.930	6.3
L108	0.541	0.167	1.639	2.347	6.1
L109	0.367	0.148	1.305	1.821	8.2
L110	0.419	0.173	0.911	1.503	5.8
L111	0.180	0.078	1.052	1.310	11.4
L112	3.873	1.763	32.234	37.869	15.7
L117	0.668	0.351	6.503	7.522	17.4
L118	0.447	0.236	1.860	2.543	10.4
L119	0.344	0.077	0.235	0.655	3.0
L120	0.699	0.375	1.222	2.296	7.2
L122&L123[9/]	3.236	6.023	14.740	23.999	10.4
L122	2/	2/	3.745	2/	2/
L123	2/	2/	10.995	2/	2/
L124	0.206	1.304	0.433	1.943	12.8
L125	0.610	0.676	4.971	6.257	20.1
L126	0.668	0.405	5.061	6.134	15.8
Subtotal	50.172	34.713	251.980	336.865	
Total	**53.663**	**36.700**	**263.358**	**353.721**	13.5 (average)

1/ *Used alternate Infiltration period.*
2/ *Included in combined meters.*
3/ *Bypass connection upstream precludes net infiltration period.*
4/ *Storage at Little Maumelle Lift Station precludes net infiltration calculation.*
5/ *Partial infiltration diverts South to Arch.*
6/ *Sewer line upstream was surcharged during Infiltration period.*
7/ *Additional flow diverted from L034 to a Lift Station most likely results in over estimate of the net Infiltration.*
8/ *Overflow upstream precludes net Infiltration calculation.*
9/ *Some flow from L009R is being diverted to a pump station so meter L122 and L123 infiltration may be an overestimate.*


Peak 1-Year/60-Minute
Wet-Weather Flow Peaking Factors
Peaking Factor
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
L001&L002
L002R
L003
L003R
L004
L004R
L005
L005R
L006
L007
L008
L008R
L009
L009R
L010
L010R
L012
L014
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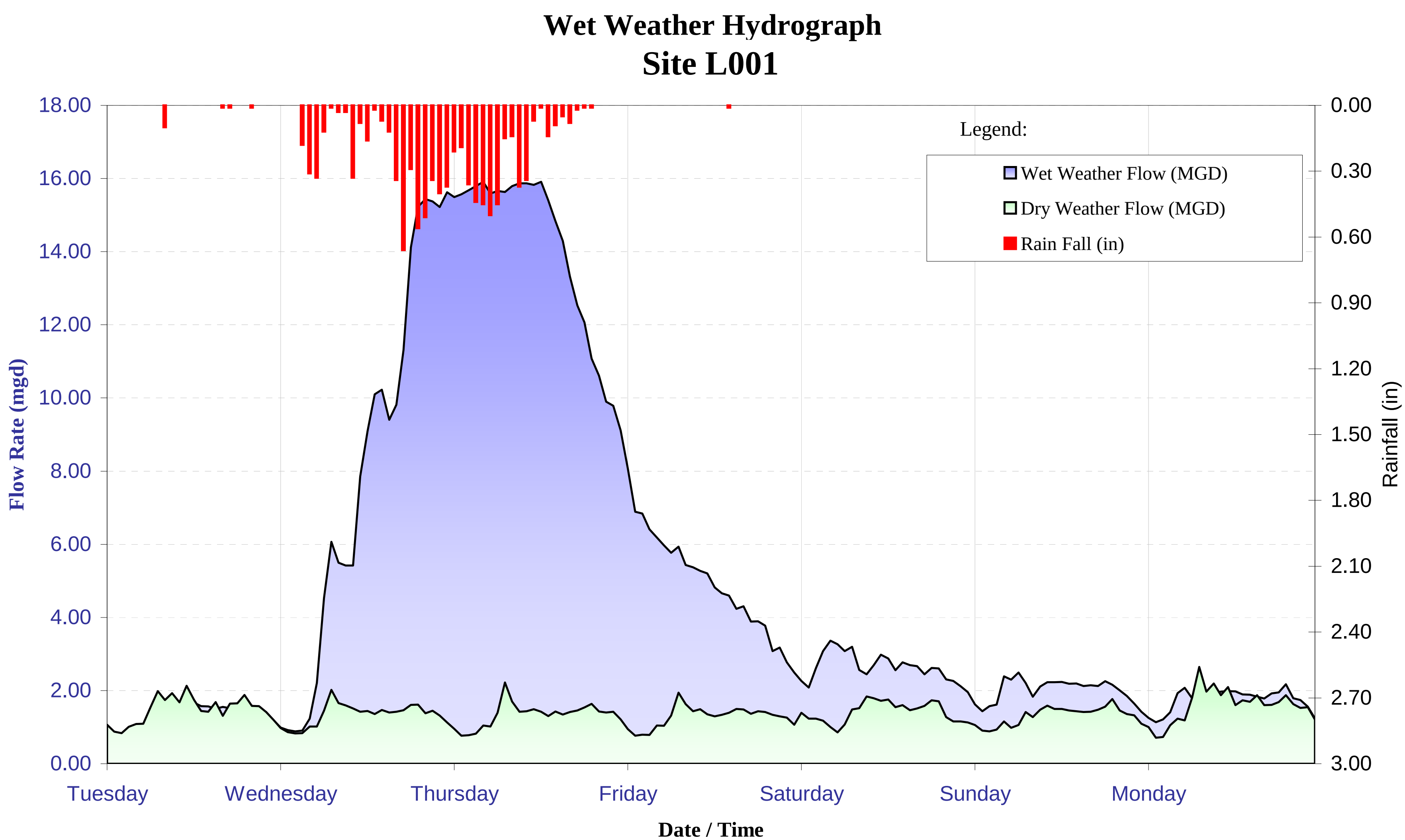
L120
L122&L123
L124
L125
L126
Adams and Fourche
Little Maumelle
Basin Number

APPENDIX A

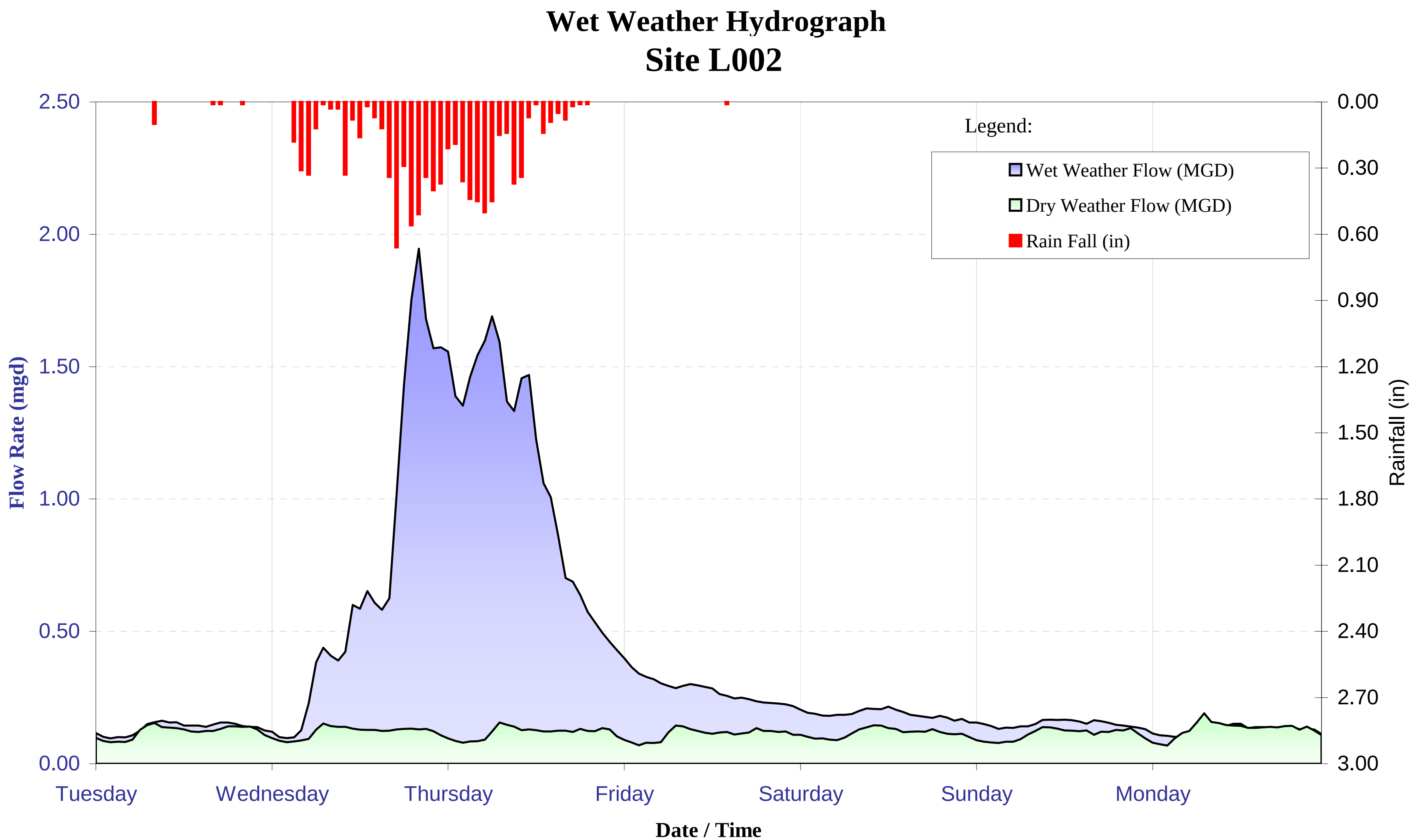
WET VS. DRY HYDROGRAPHS



rjngroup
The Choice for Collection System Solutions

Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**



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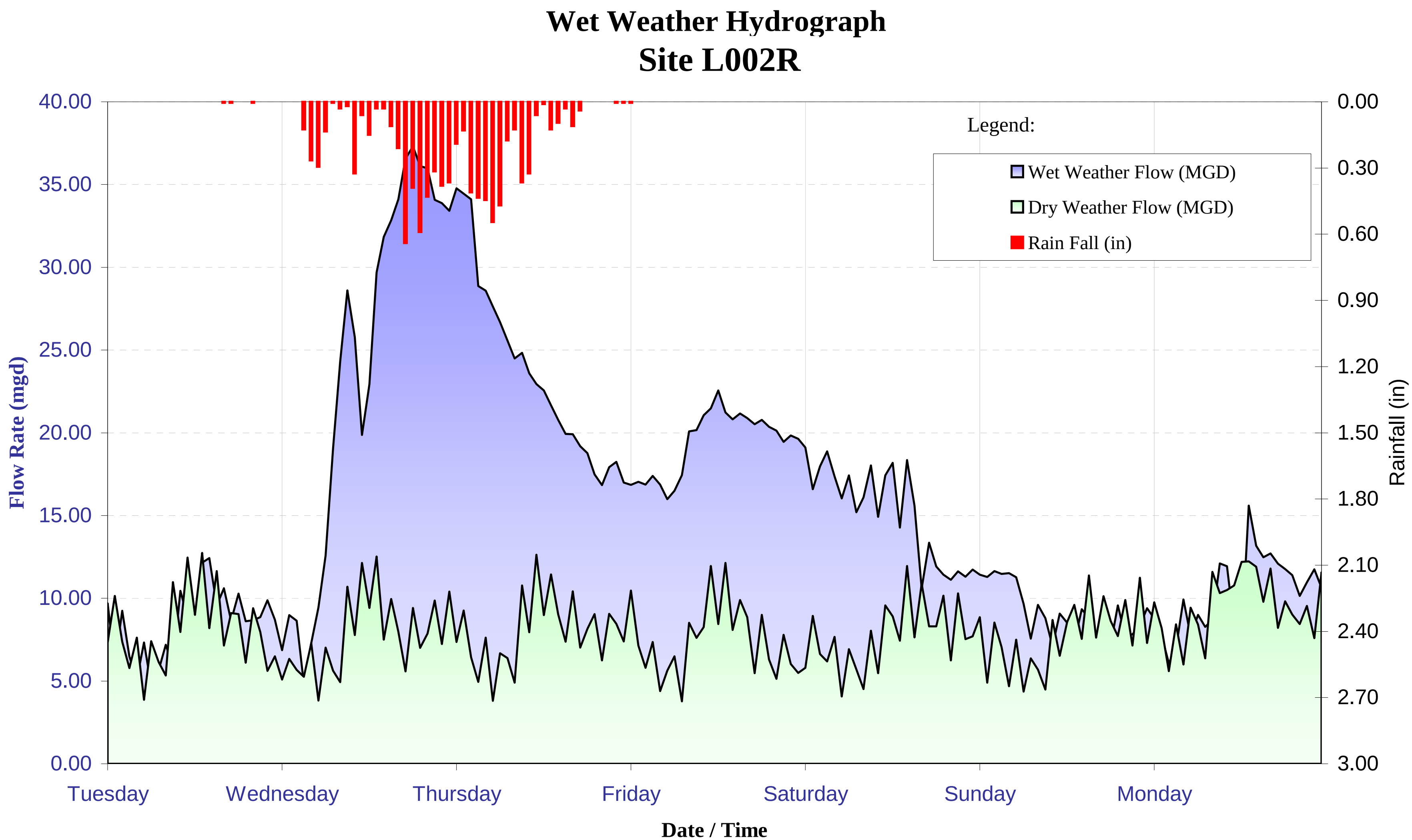
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** **to** **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** **to** **12/28/09 23:00**



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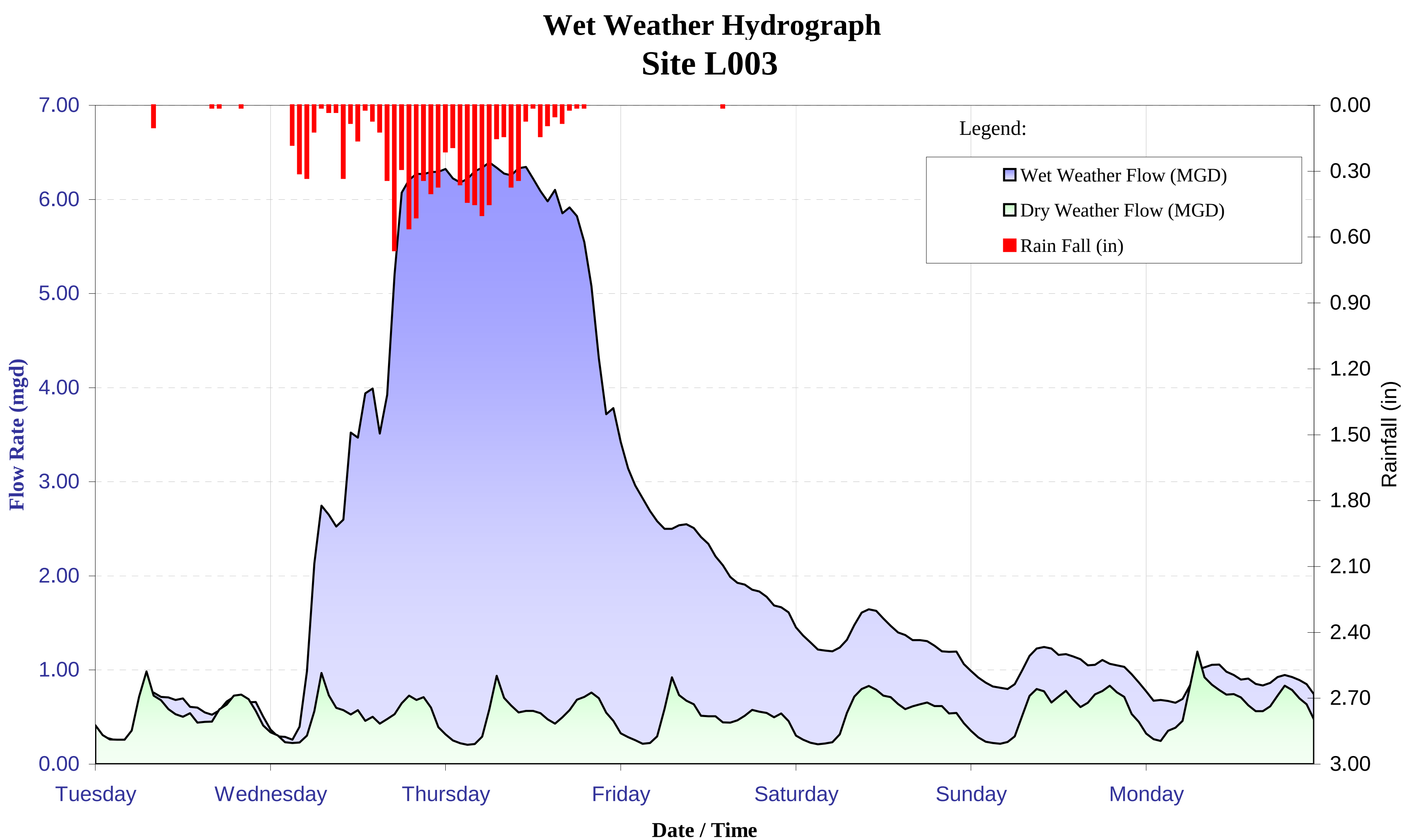
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00



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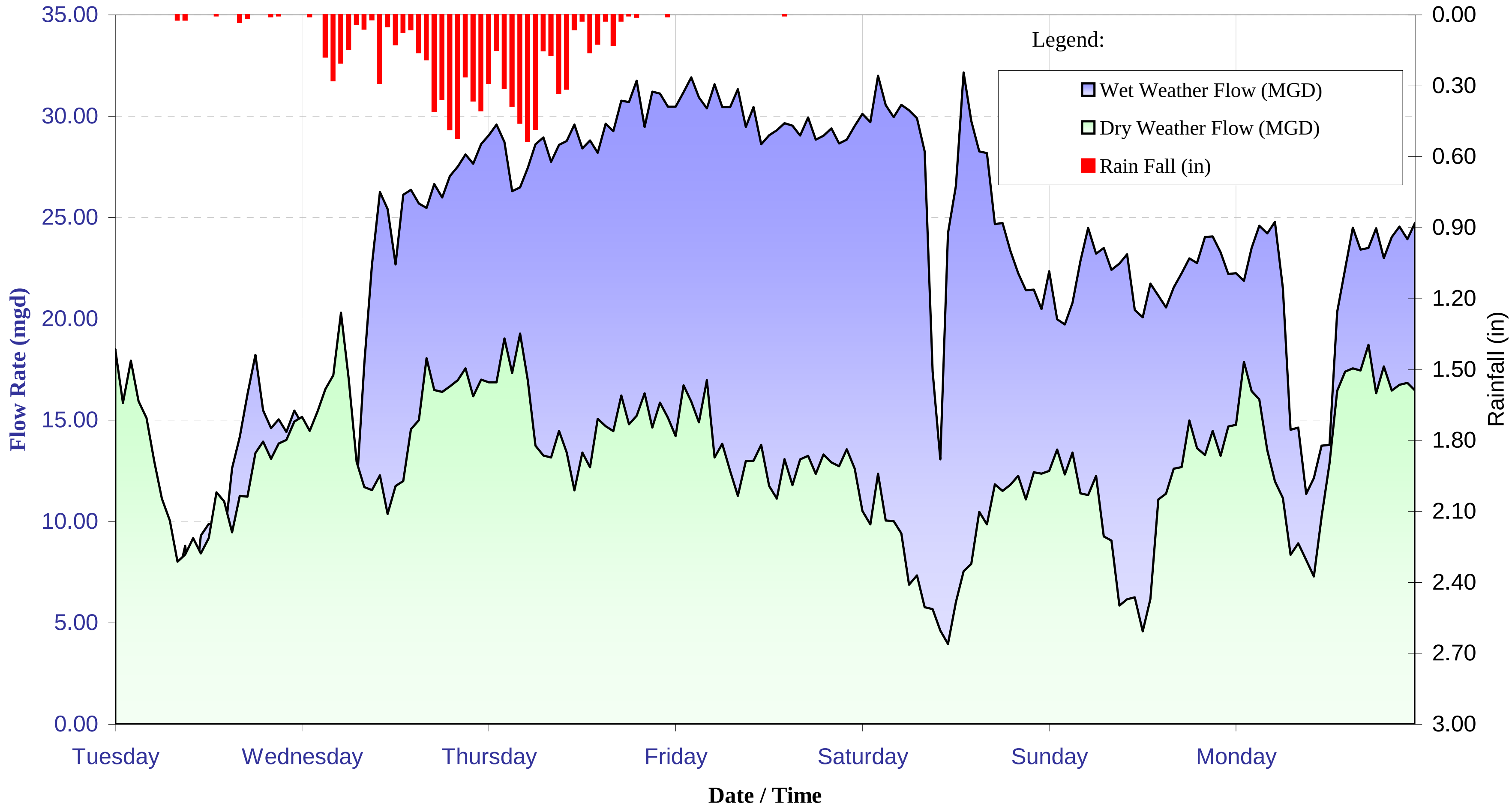
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** **to** **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** **to** **12/28/09 23:00**

Wet Weather Hydrograph
Site L003R



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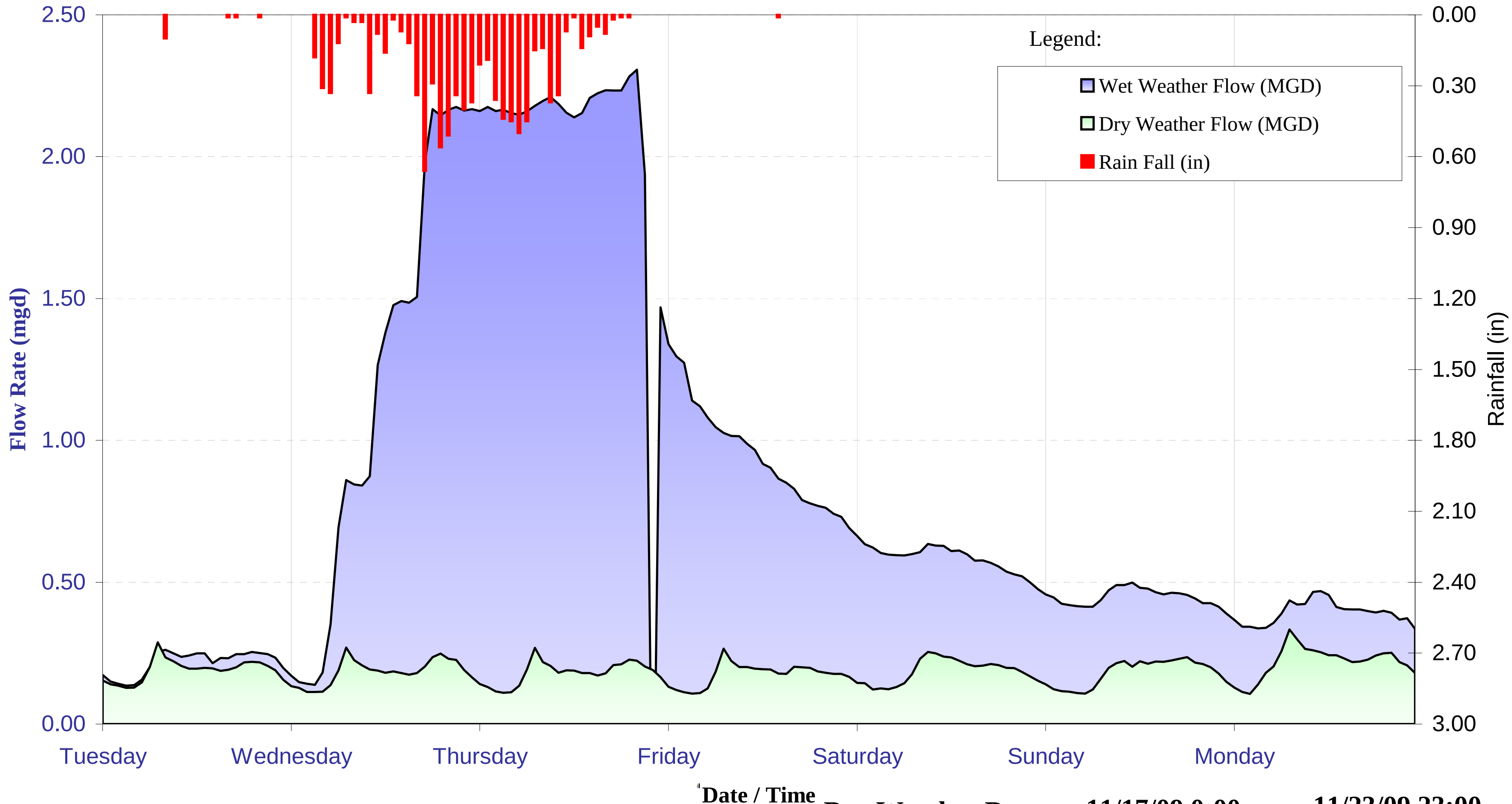
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**

Wet Weather Hydrograph
Site L004



Little Rock, AR Flow Monitoring
18-2382-00

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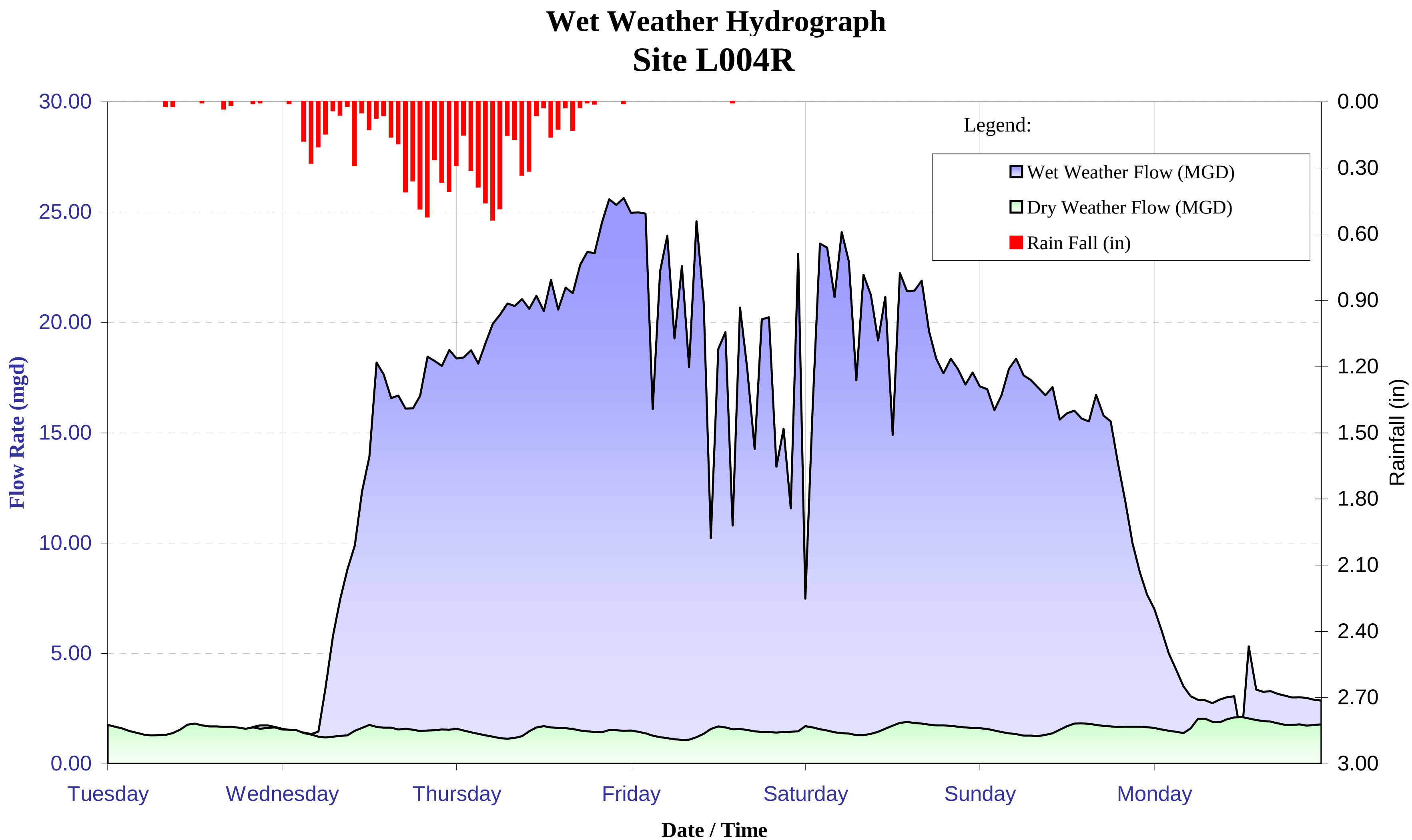
Dry Weather Date: **11/17/09 0:00** **to** **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** **to** **12/28/09 23:00**



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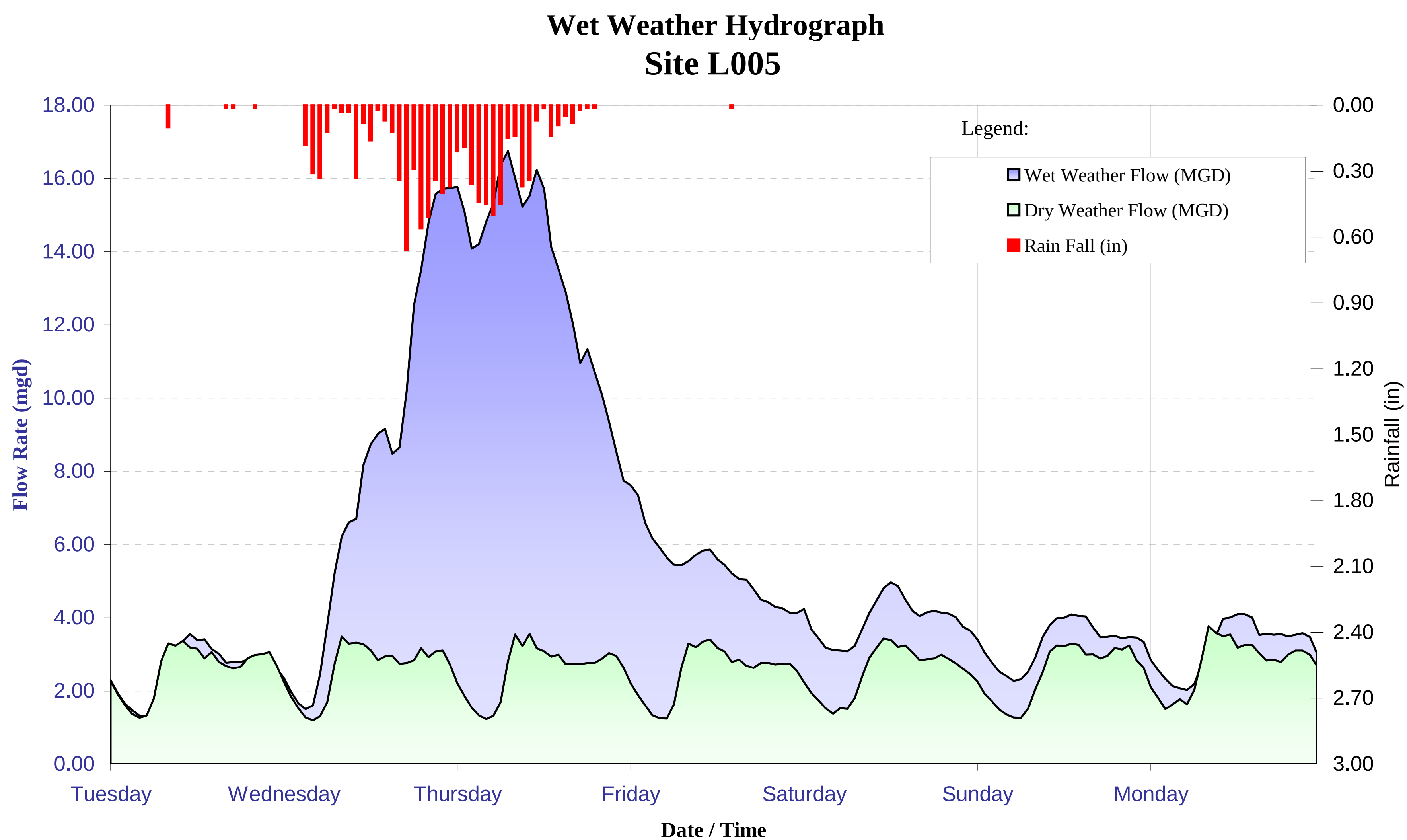
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**



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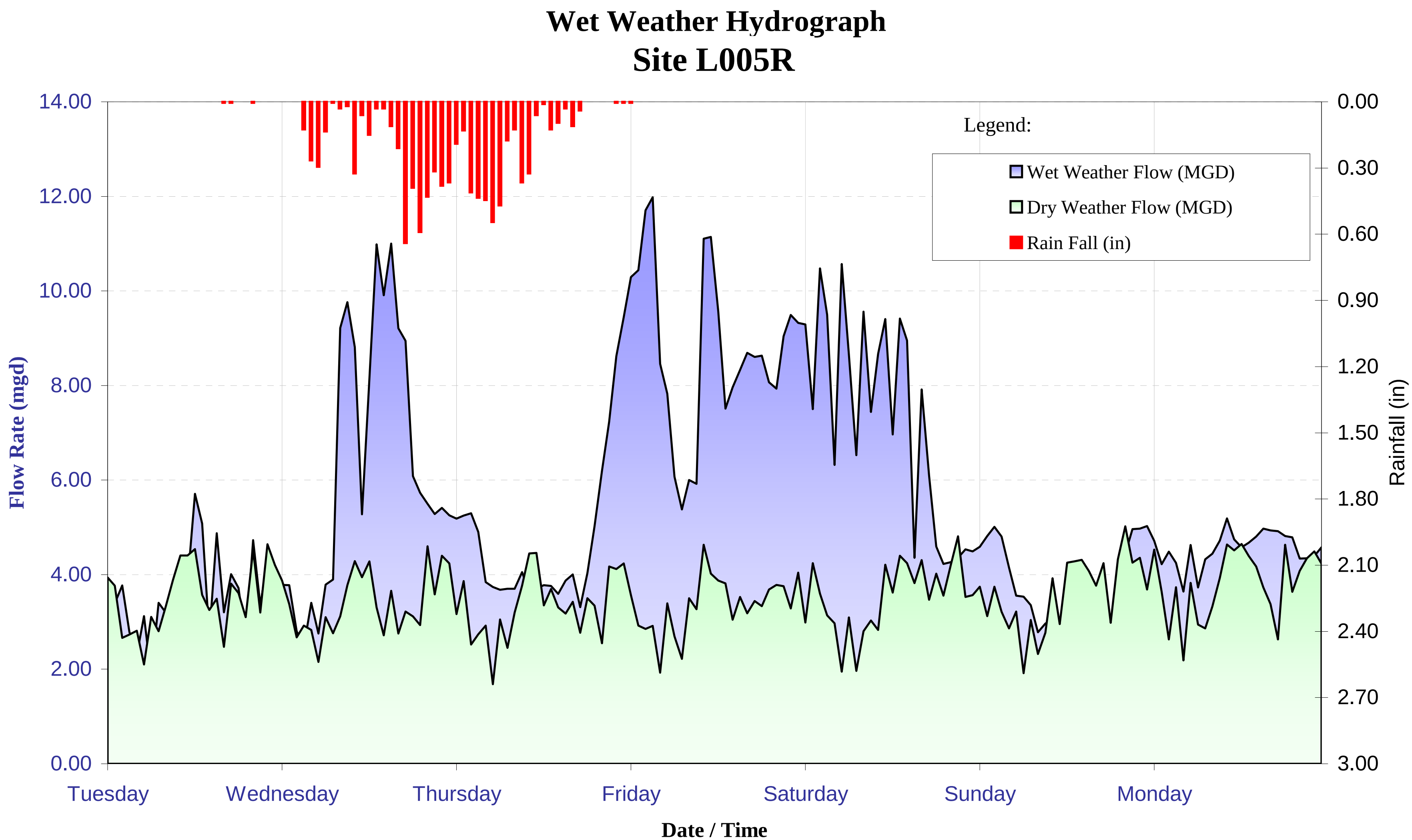
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**



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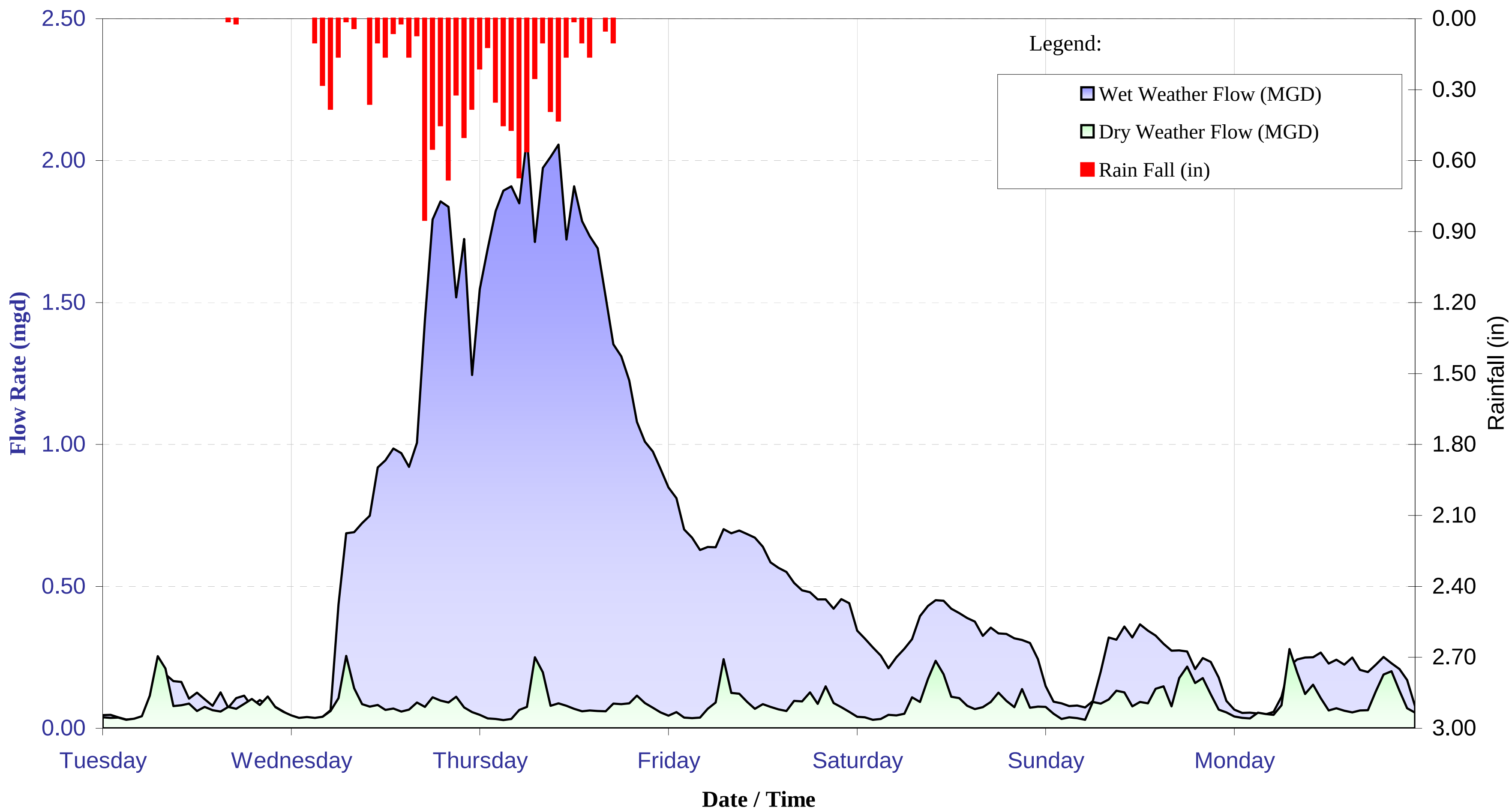
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** **to** **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** **to** **12/28/09 23:00**

Wet Weather Hydrograph
Site L006



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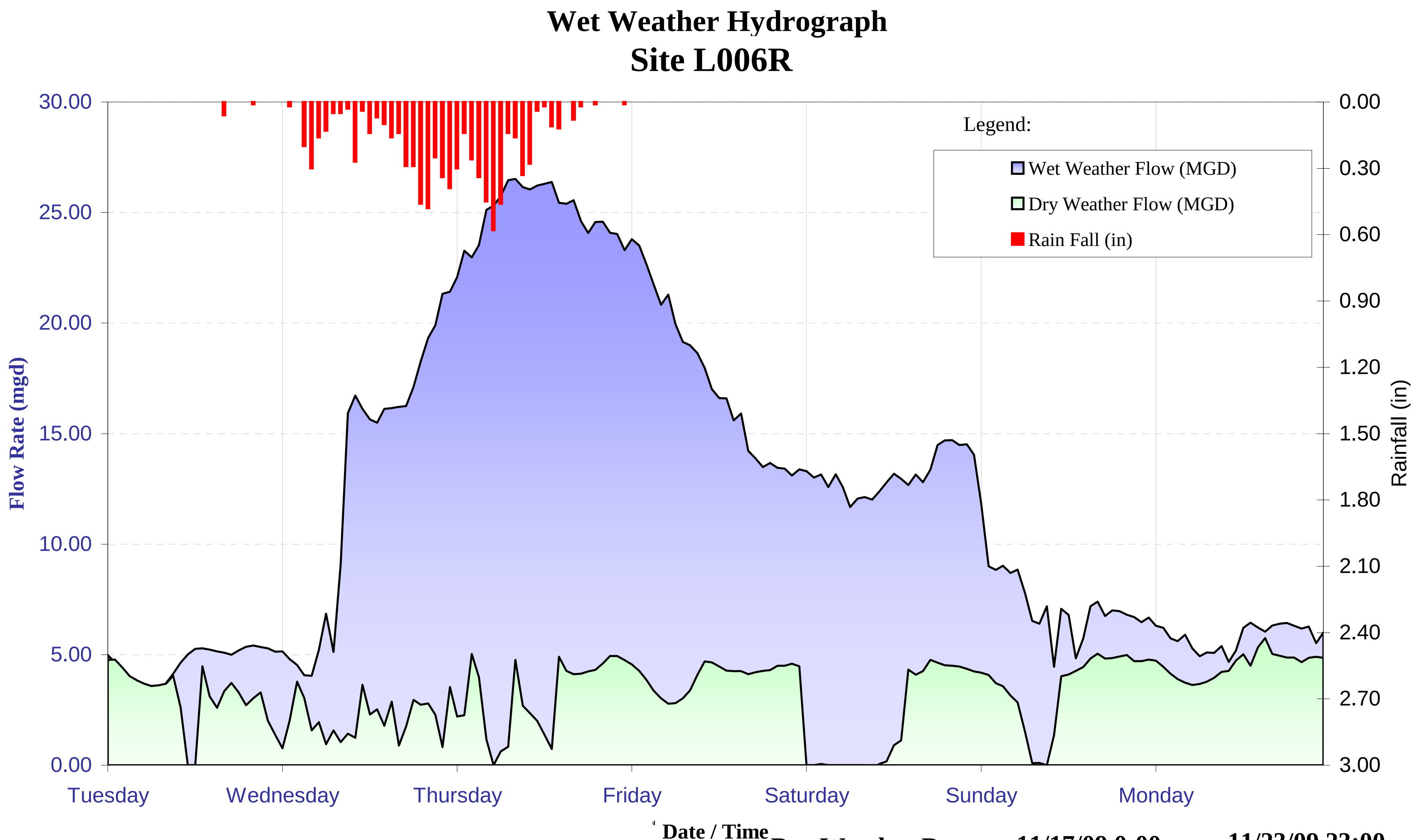
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** **to** **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** **to** **12/28/09 23:00**



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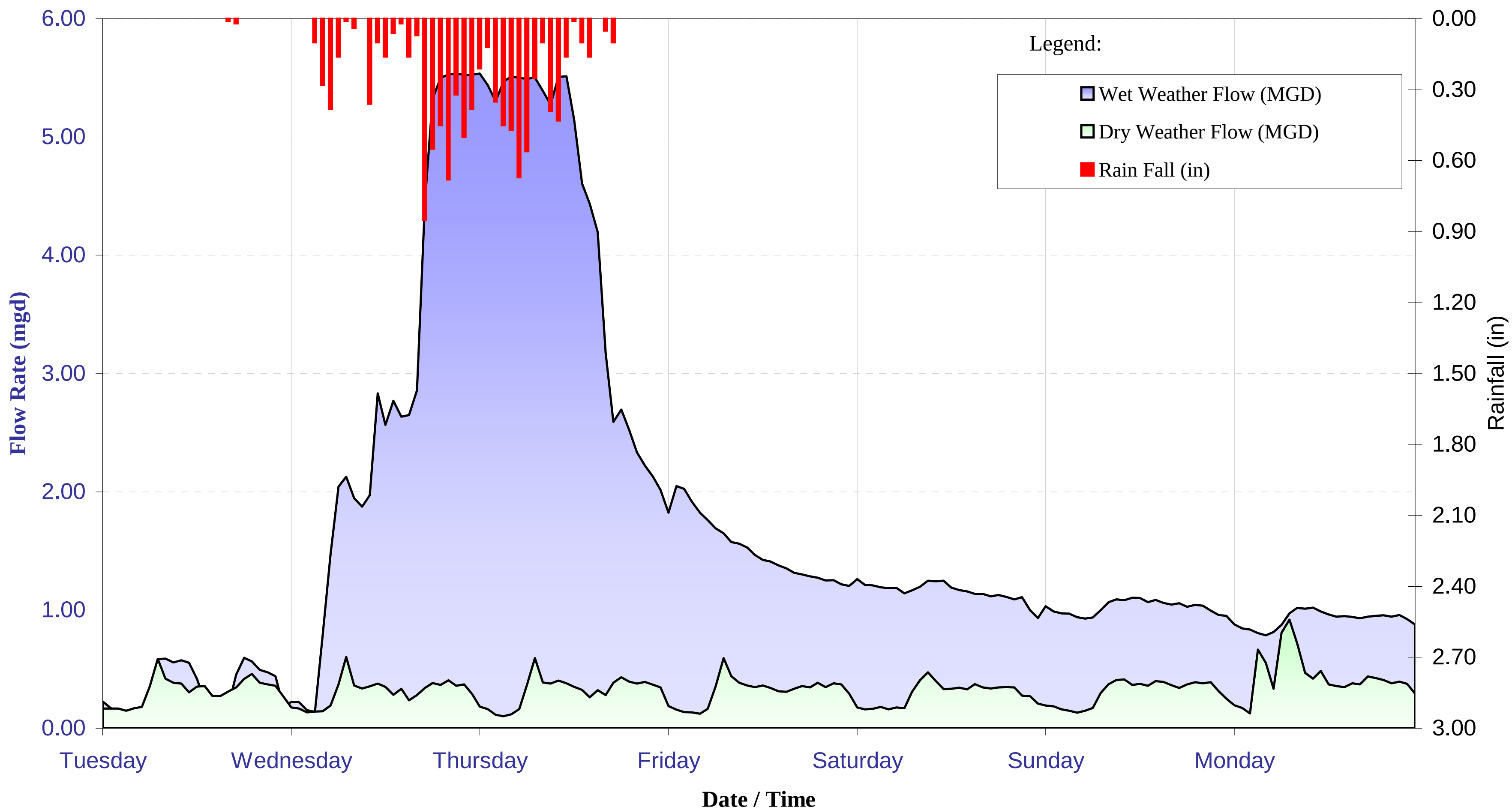
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00

Wet Weather Hydrograph
Site L007



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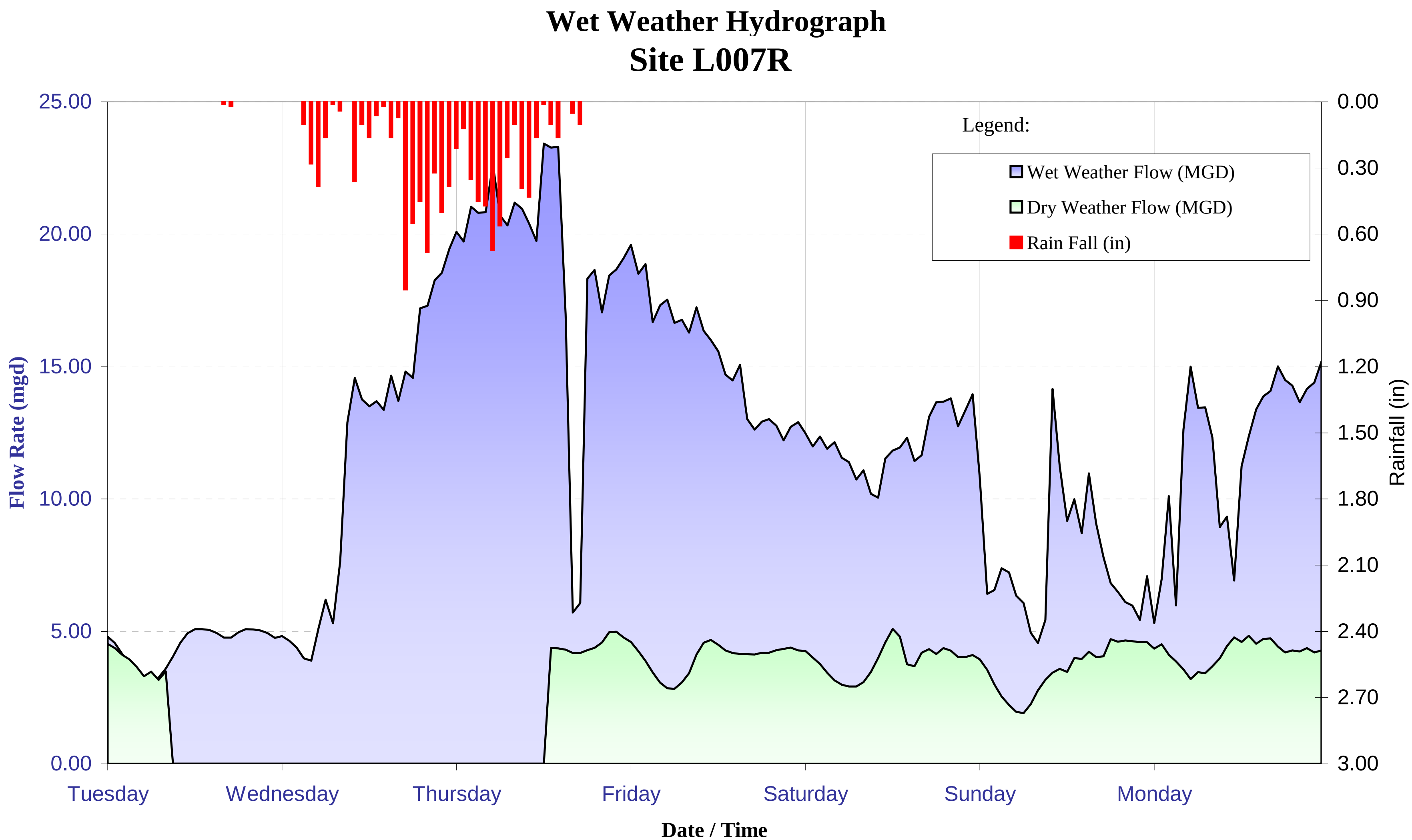
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00



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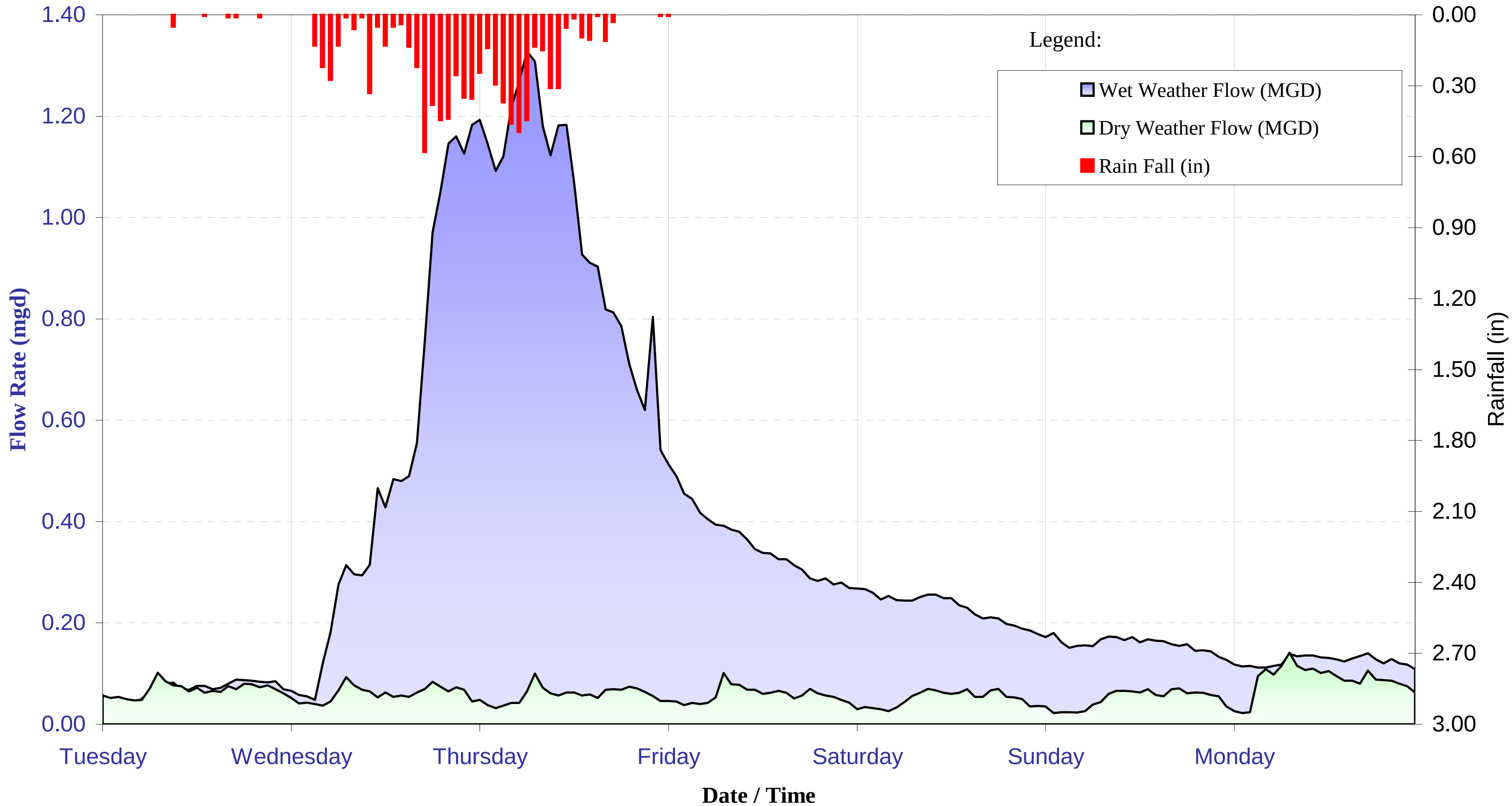
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00

Wet Weather Hydrograph
Site L008



rjngroup
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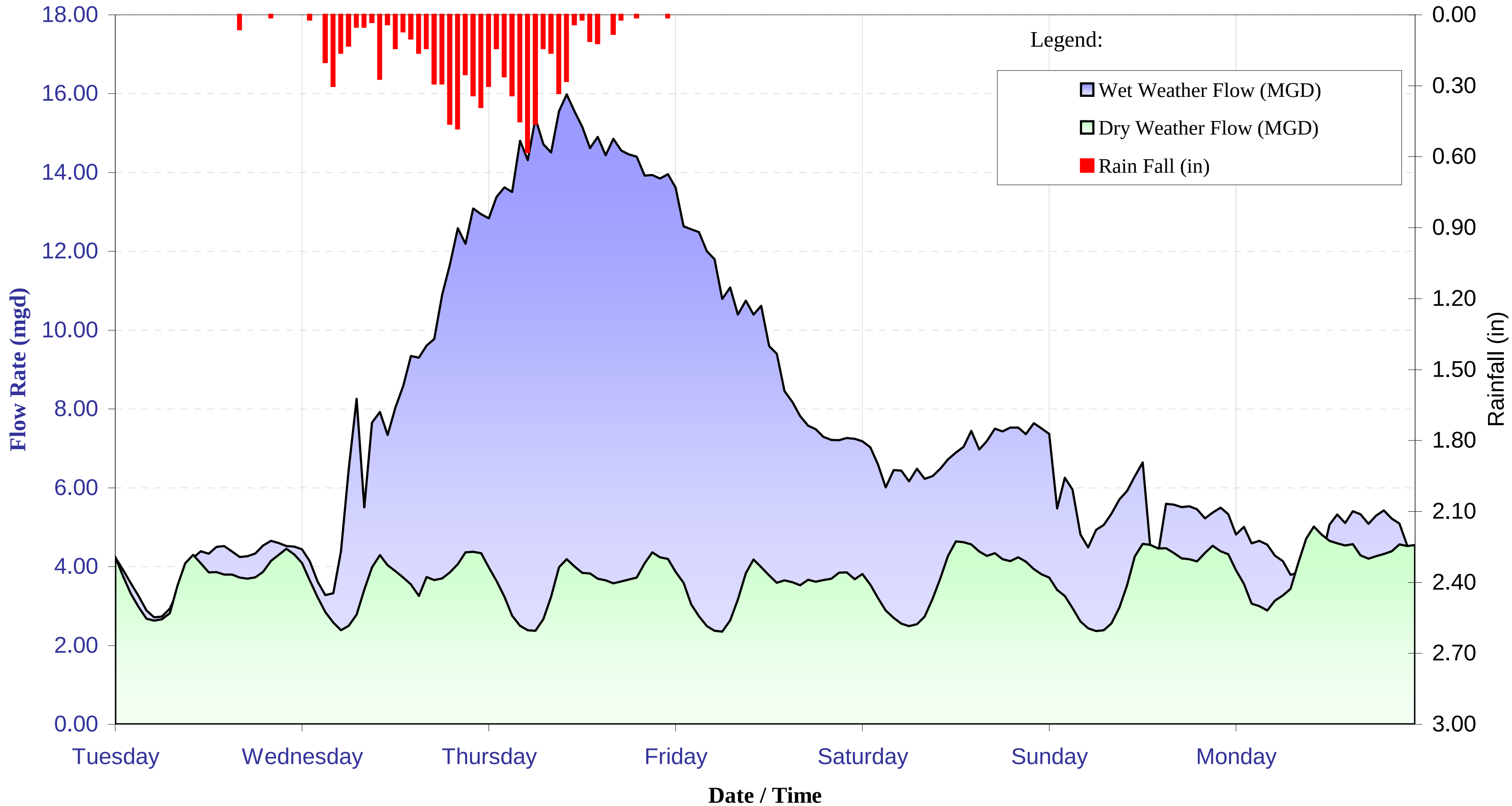
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** to **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** to **12/28/09 23:00**

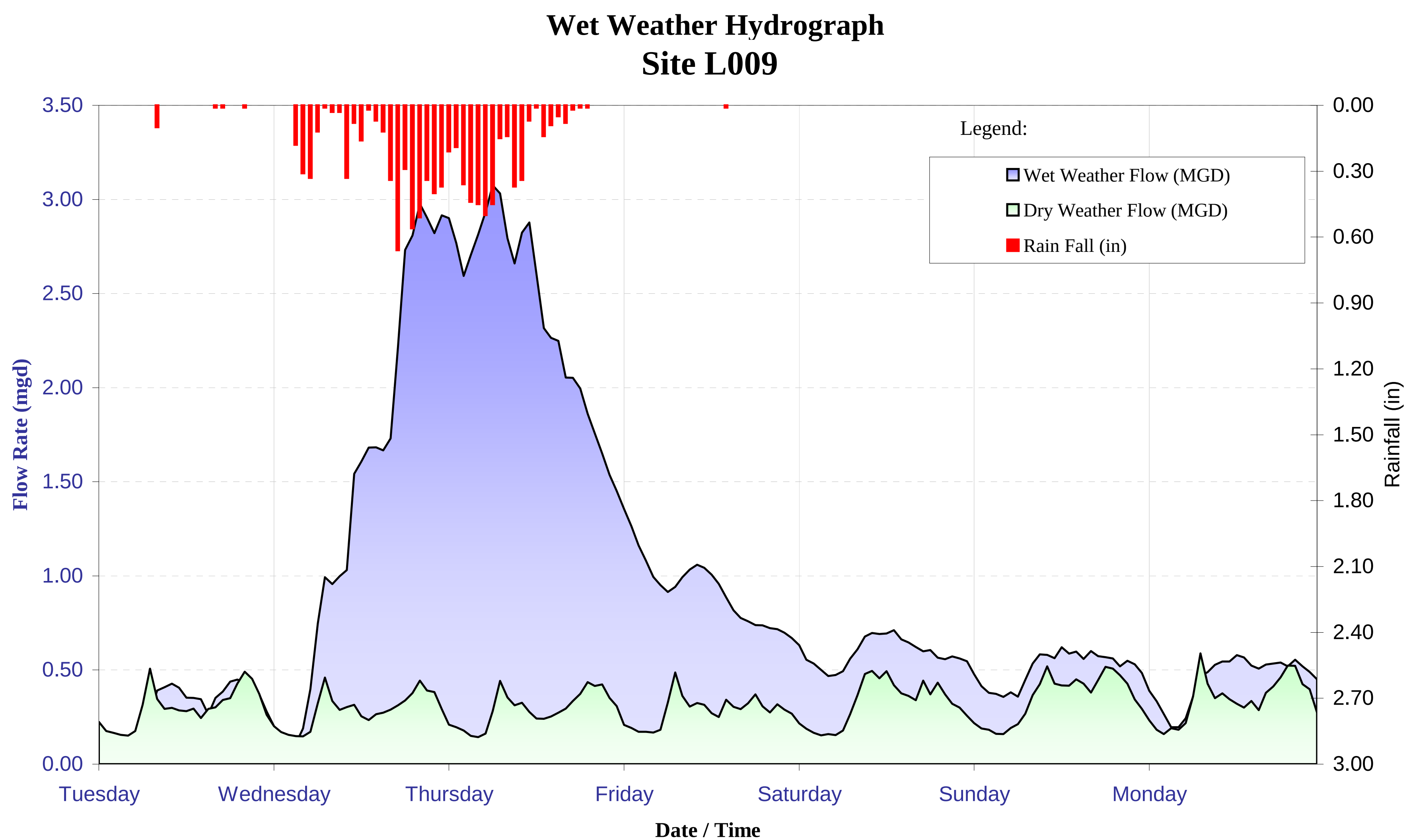
Wet Weather Hydrograph
Site L008R



rjngroup
The Choice for Collection System Solutions

Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**

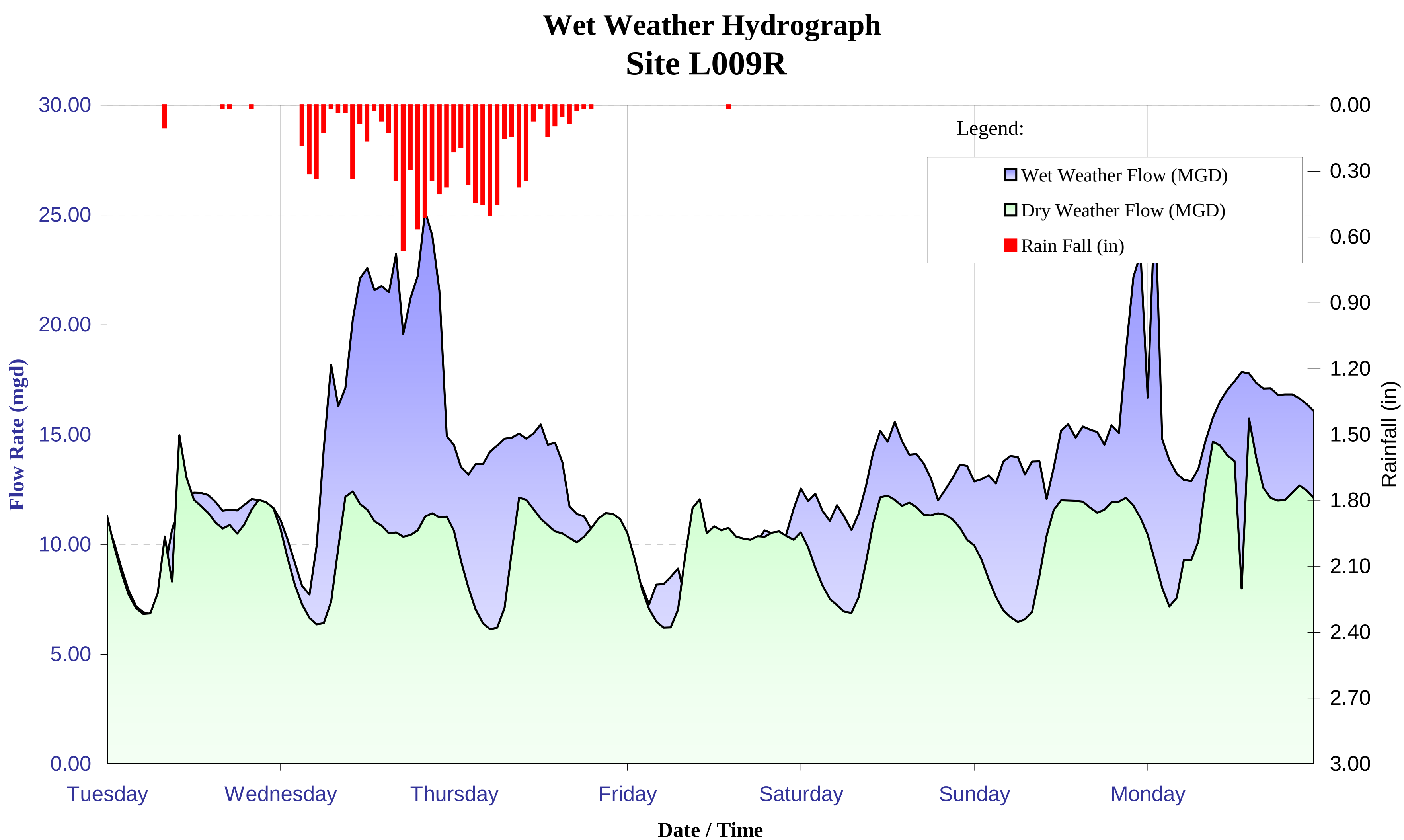


rjngroup
The Choice for Collection System Solutions

Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00



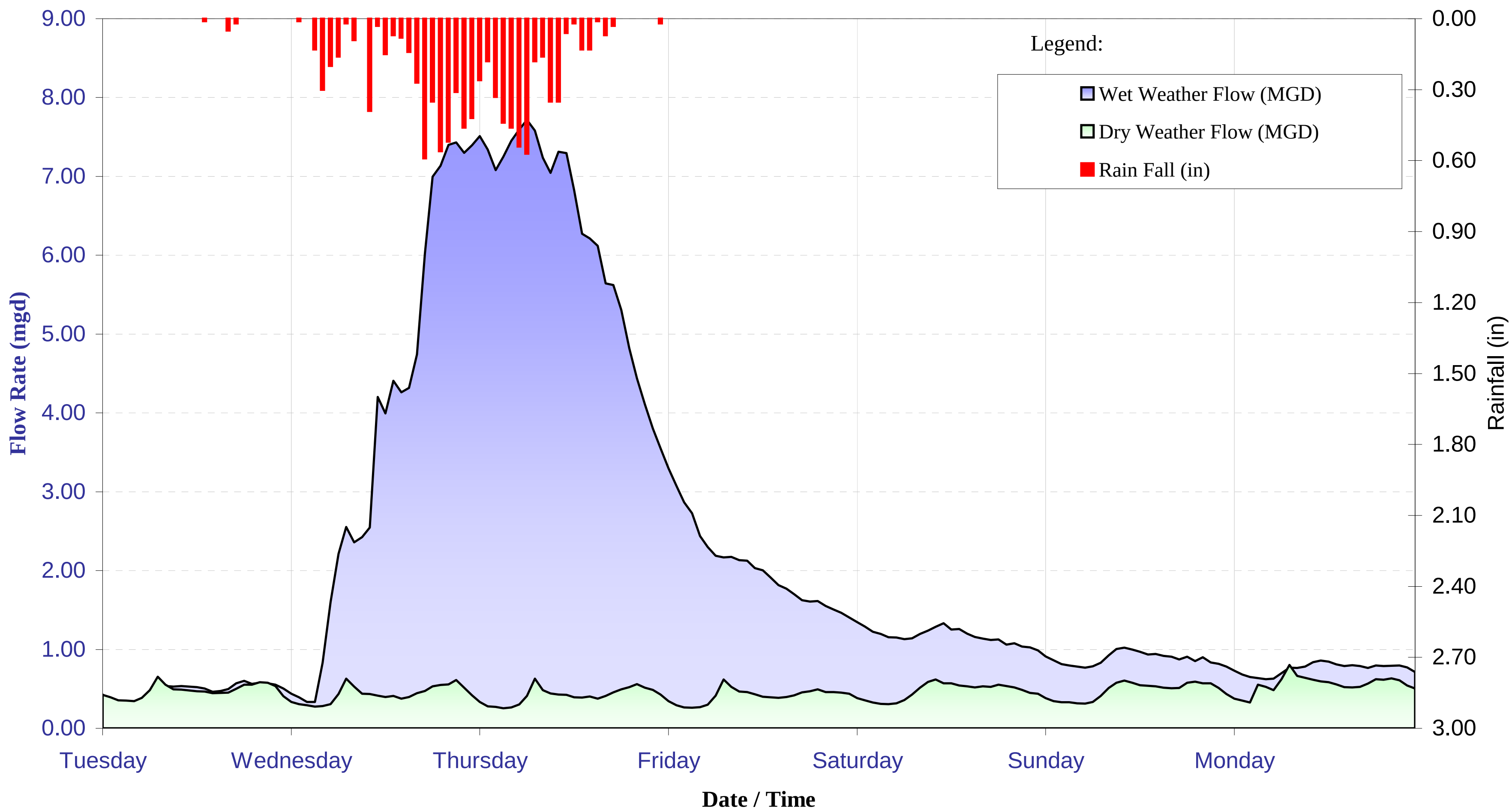
rjngroup
The Choice for Collection System Solutions

Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00

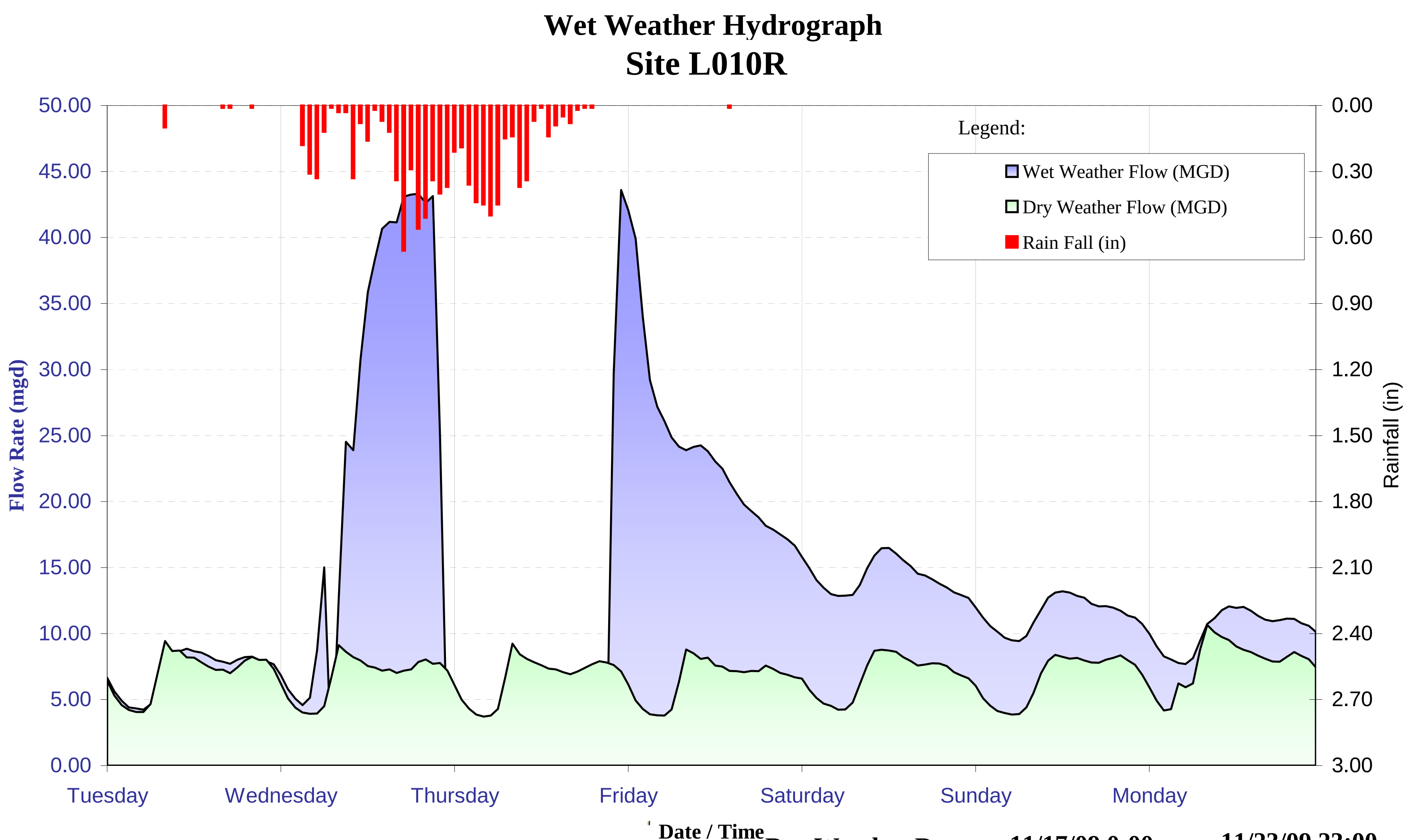
Wet Weather Hydrograph
Site L010



rjngroup
The Choice for Collection System Solutions

Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**

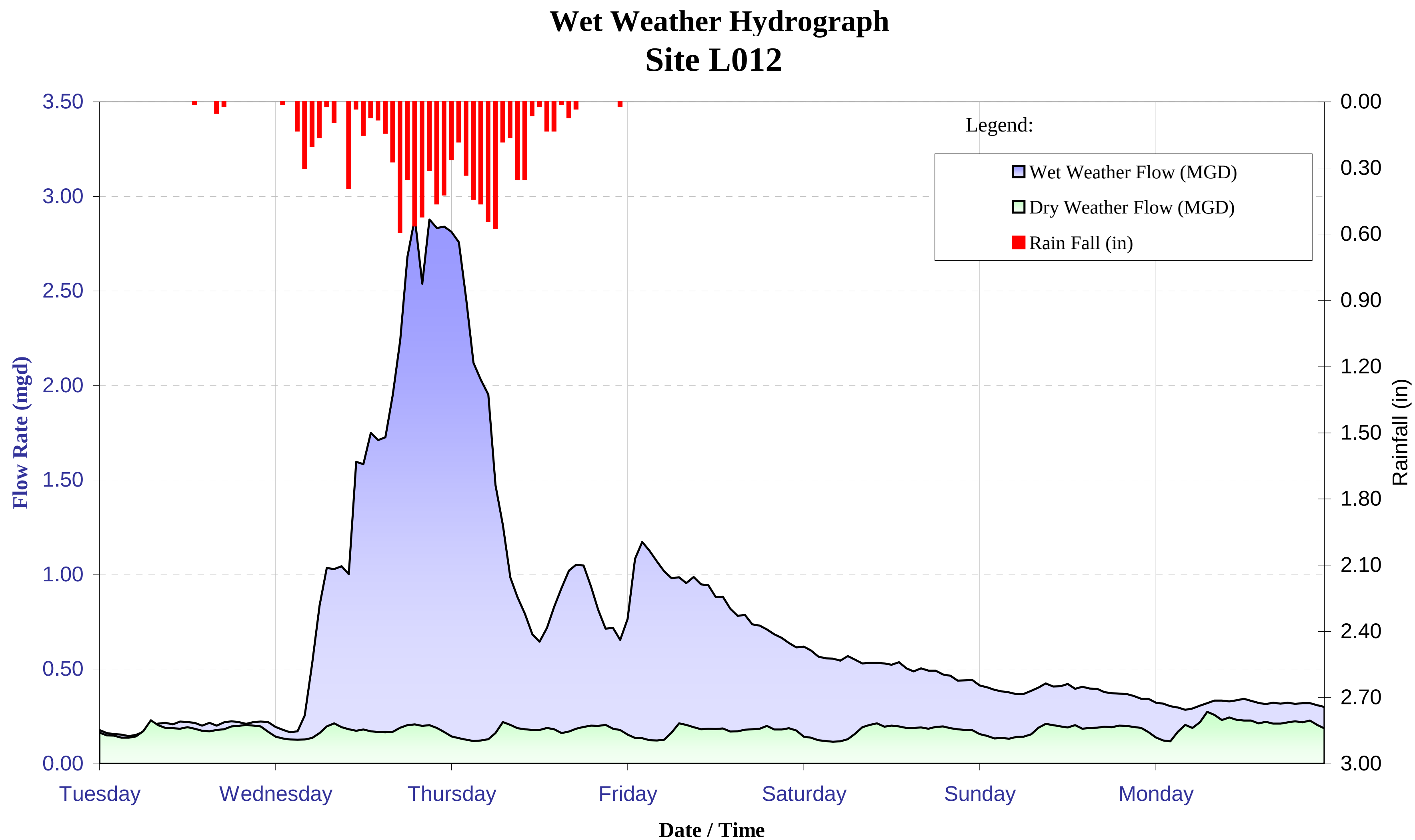


rjngroup
The Choice for Collection System Solutions

Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** **to** **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** **to** **12/28/09 23:00**

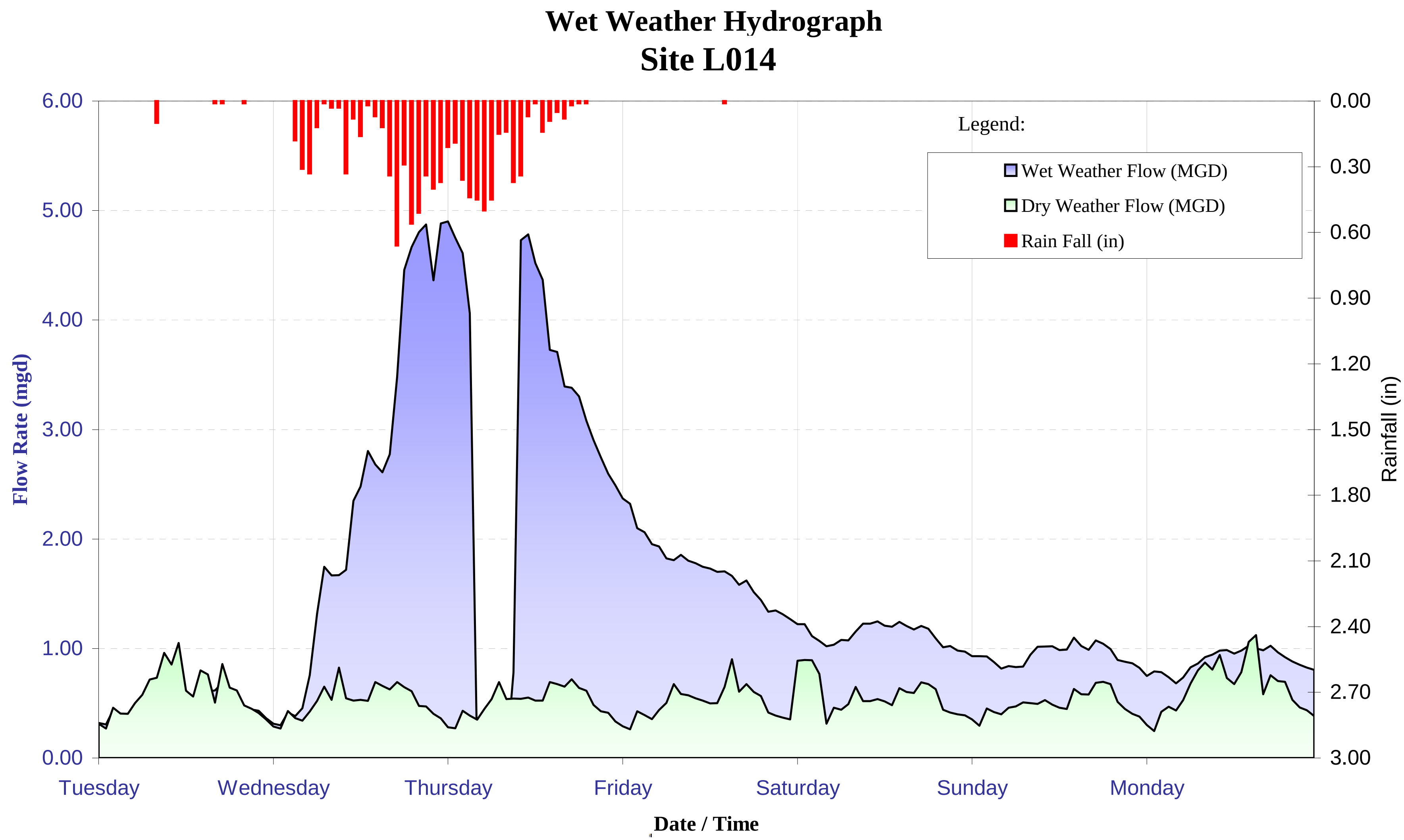


rjngroup
The Choice for Collection System Solutions

Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** **to** **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** **to** **12/28/09 23:00**

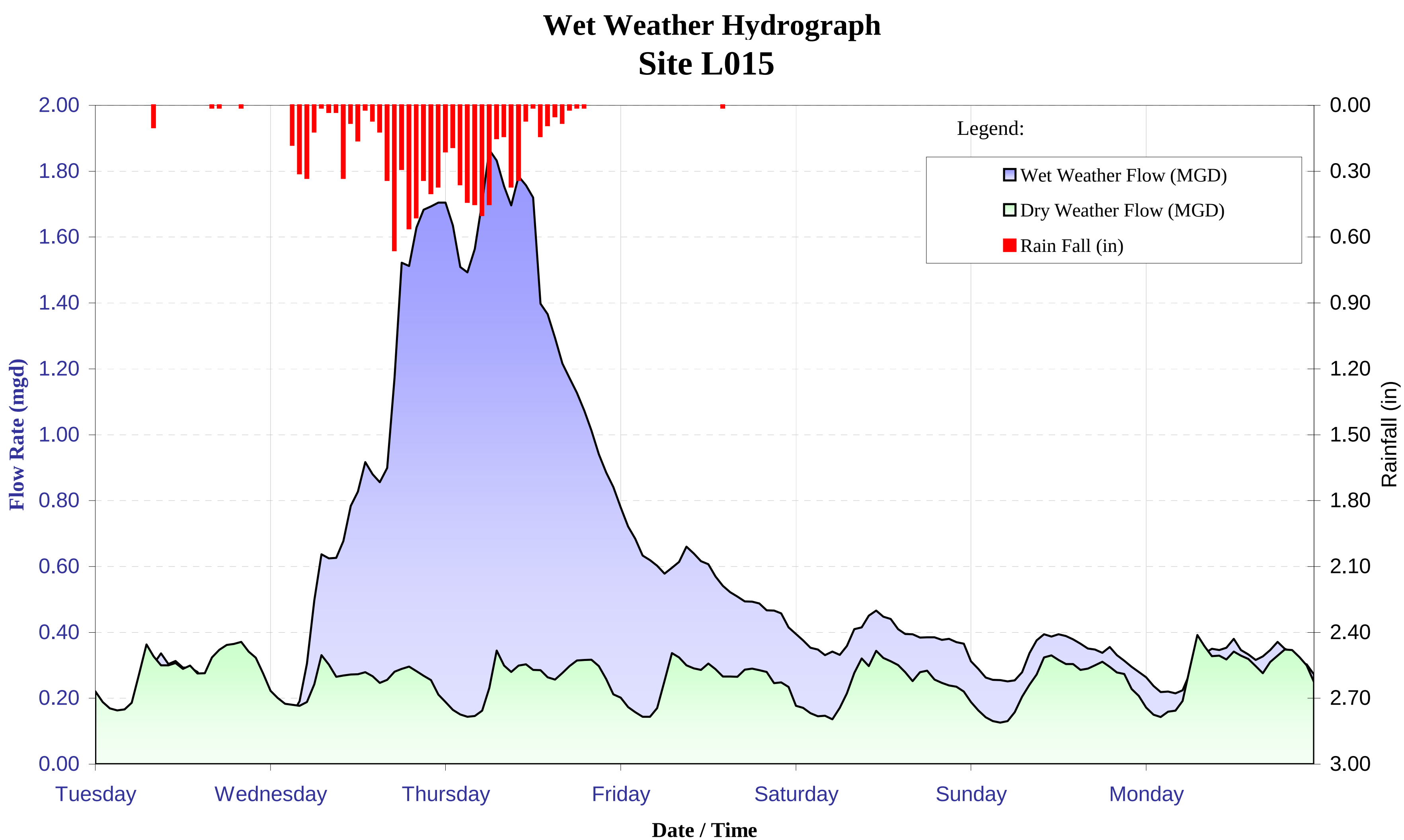


rjngroup
The Choice for Collection System Solutions

Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00



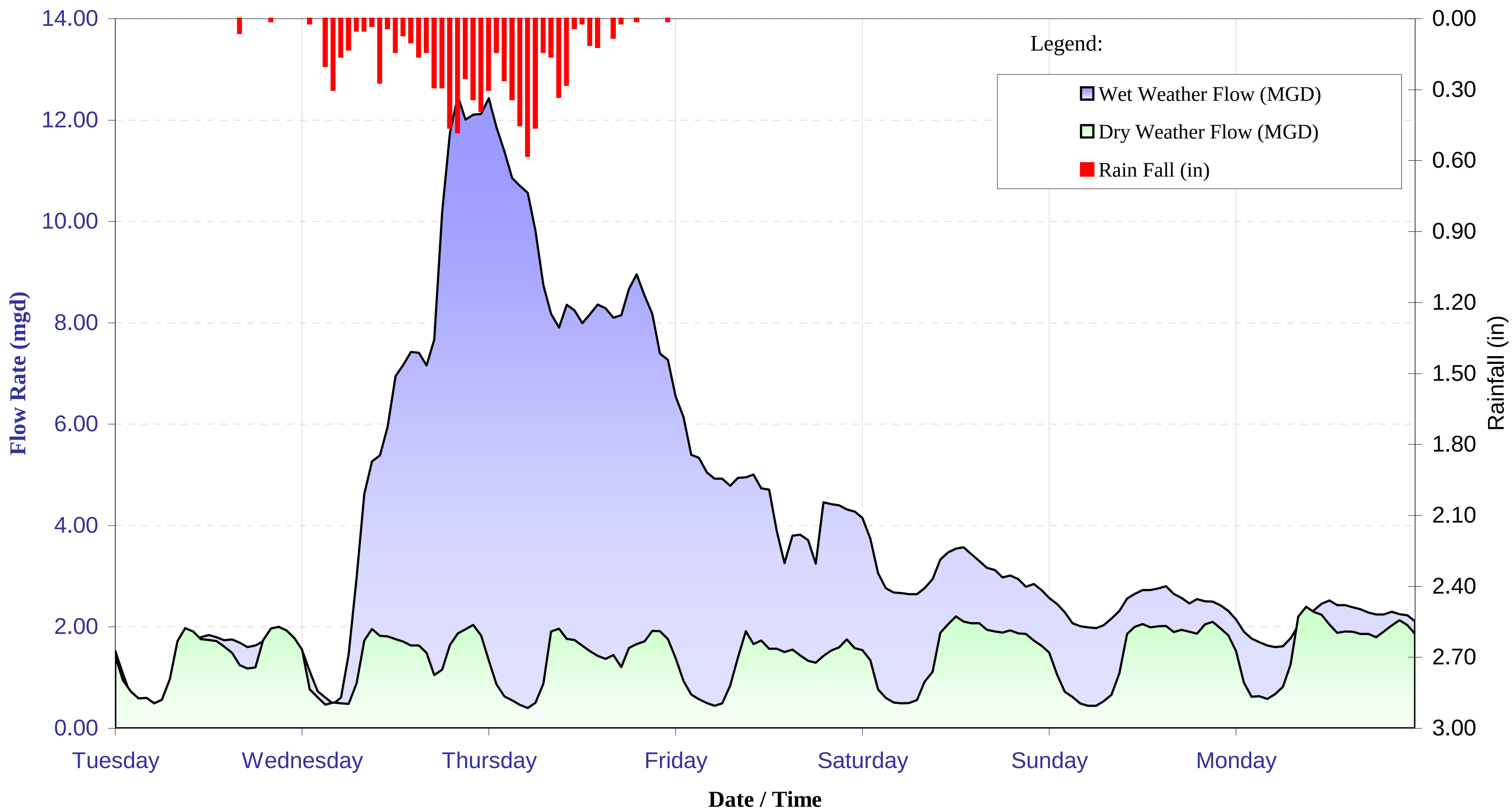
rjngroup
The Choice for Collection System Solutions

Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** to **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** to **12/28/09 23:00**

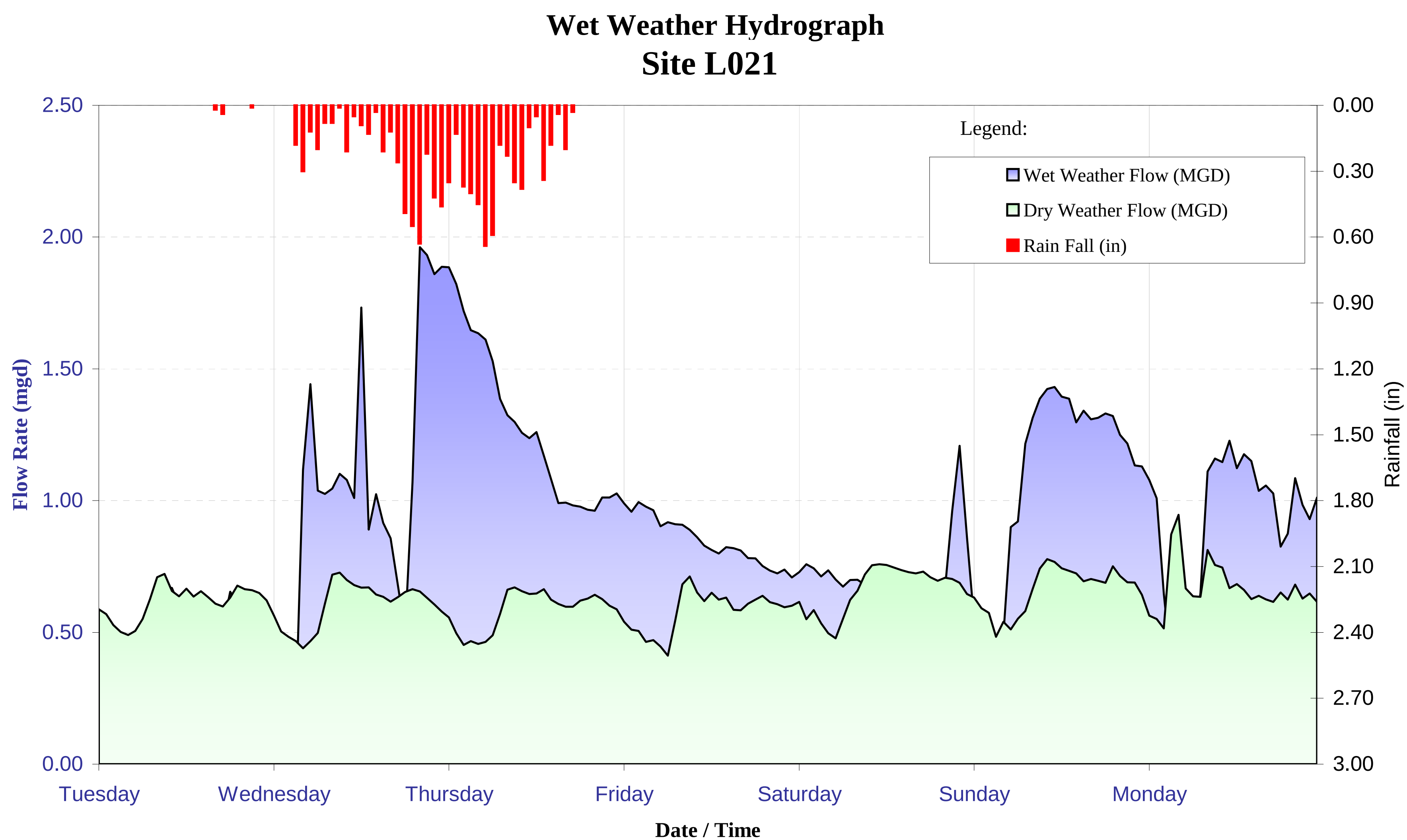
Wet Weather Hydrograph
Site L018



Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00



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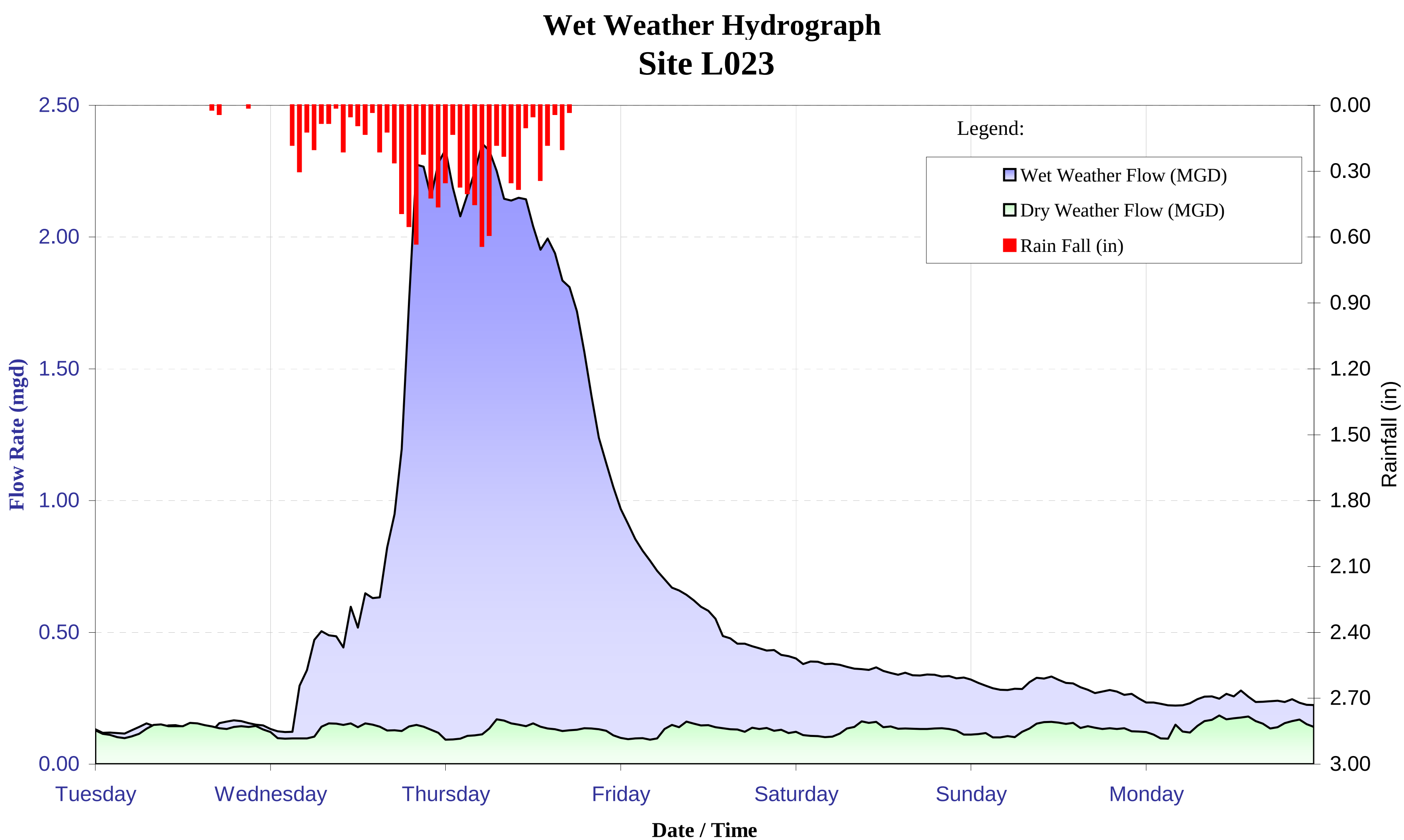
Little Rock, AR Flow Monitoring 18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**



rjngroup
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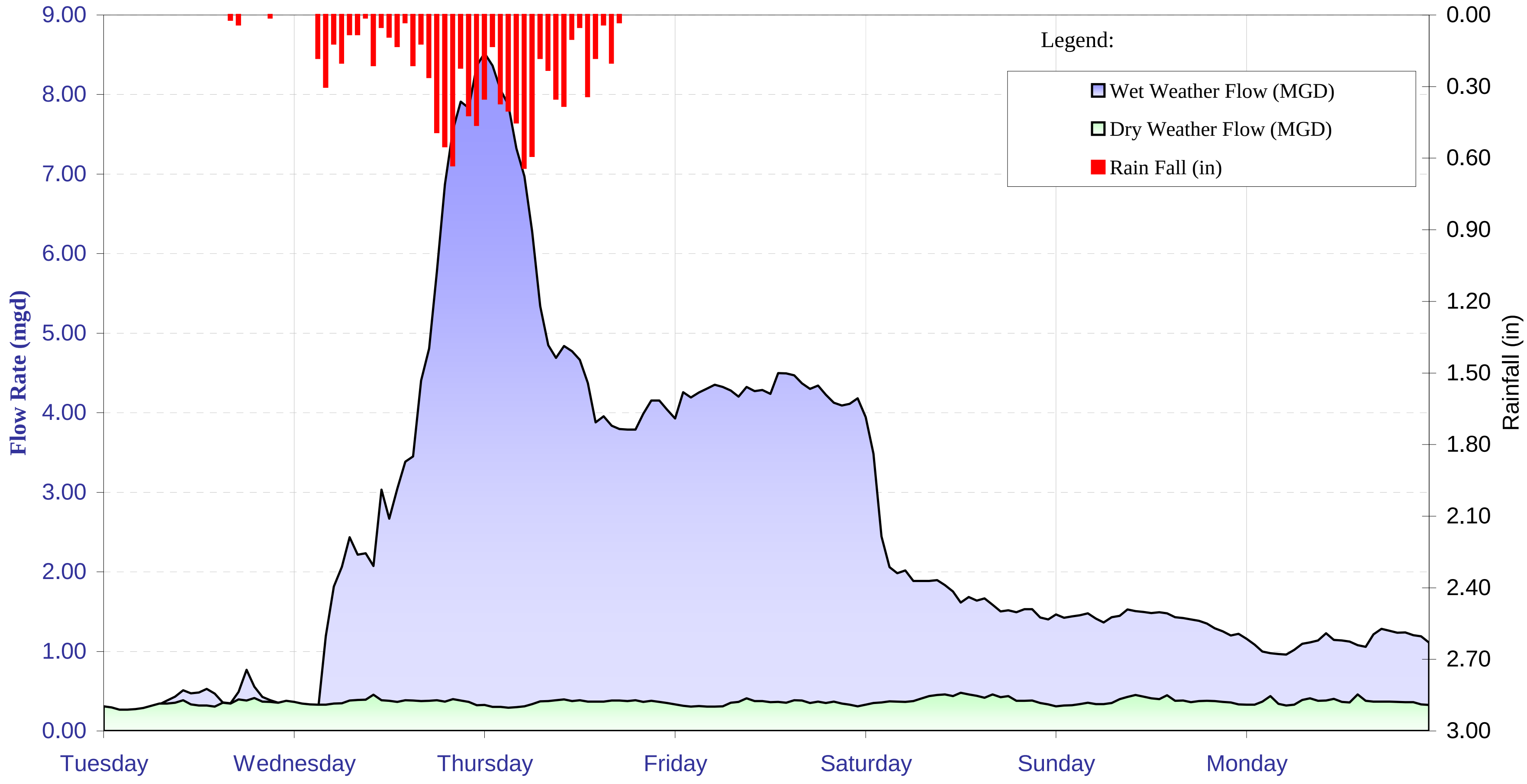
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** **to** **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** **to** **12/28/09 23:00**

Wet Weather Hydrograph
Site L025



rjngroup
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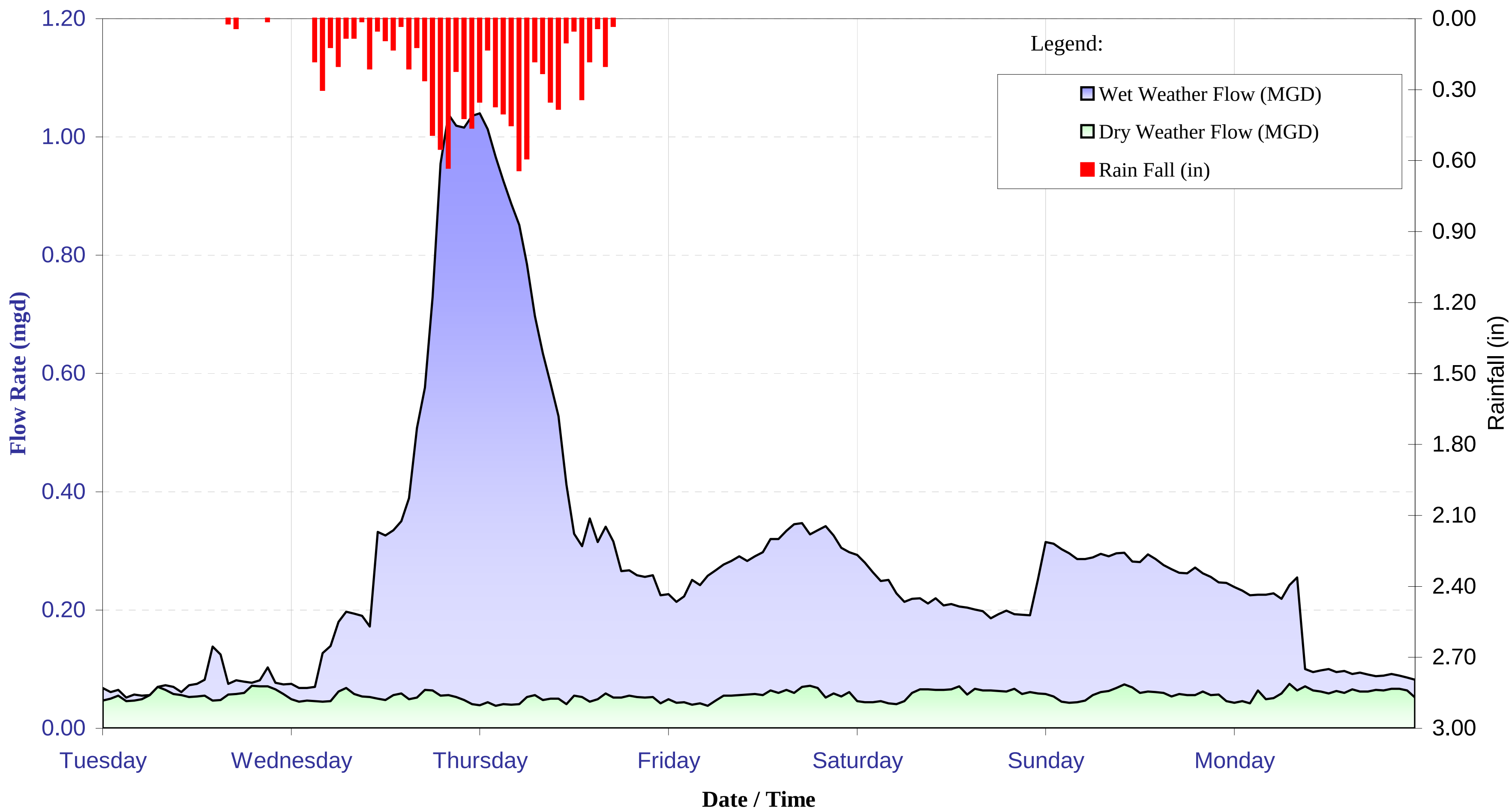
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** **to** **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** **to** **12/28/09 23:00**

Wet Weather Hydrograph
Site L026



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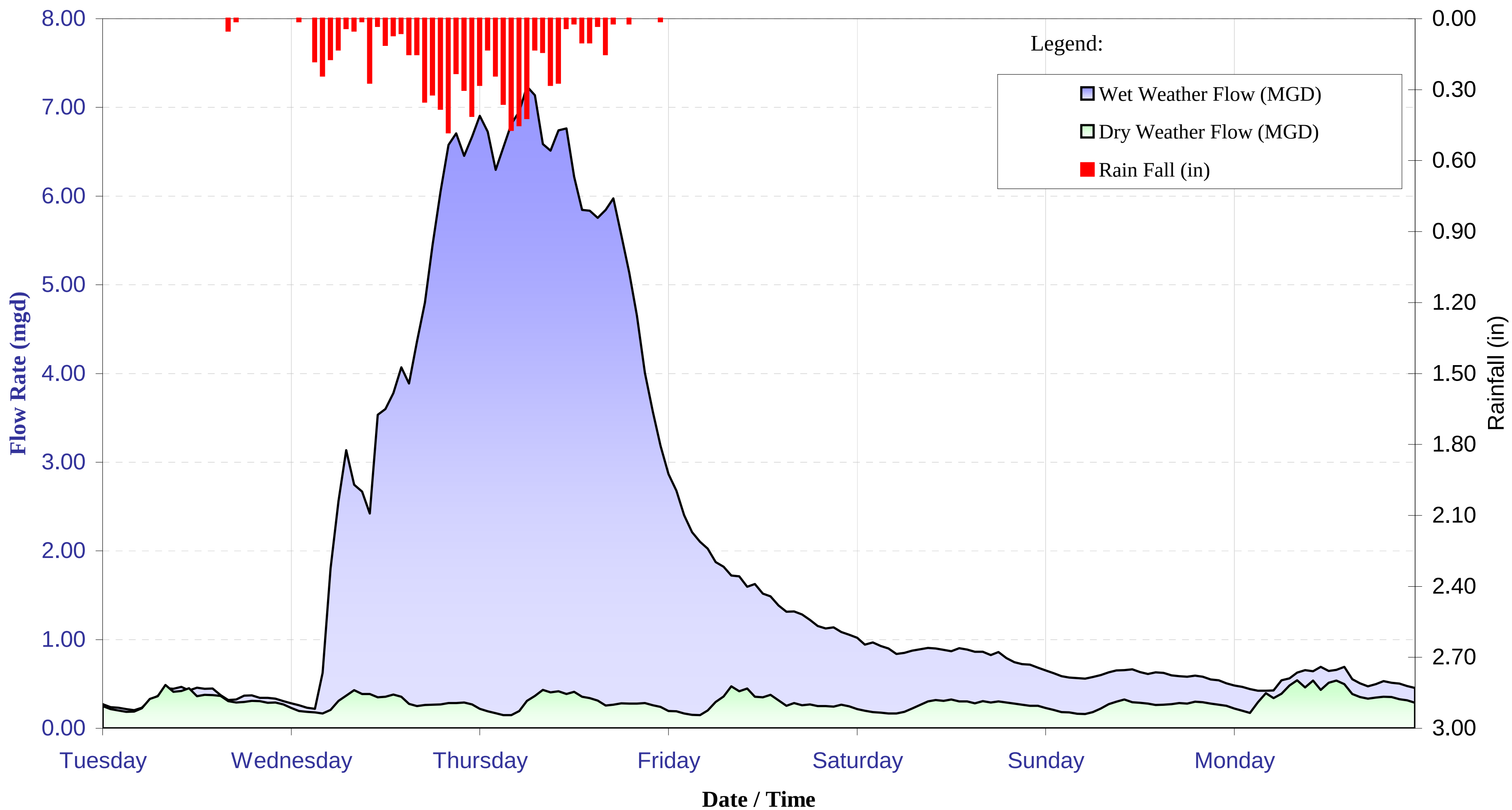
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** to **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** to **12/28/09 23:00**

Wet Weather Hydrograph
Site L028



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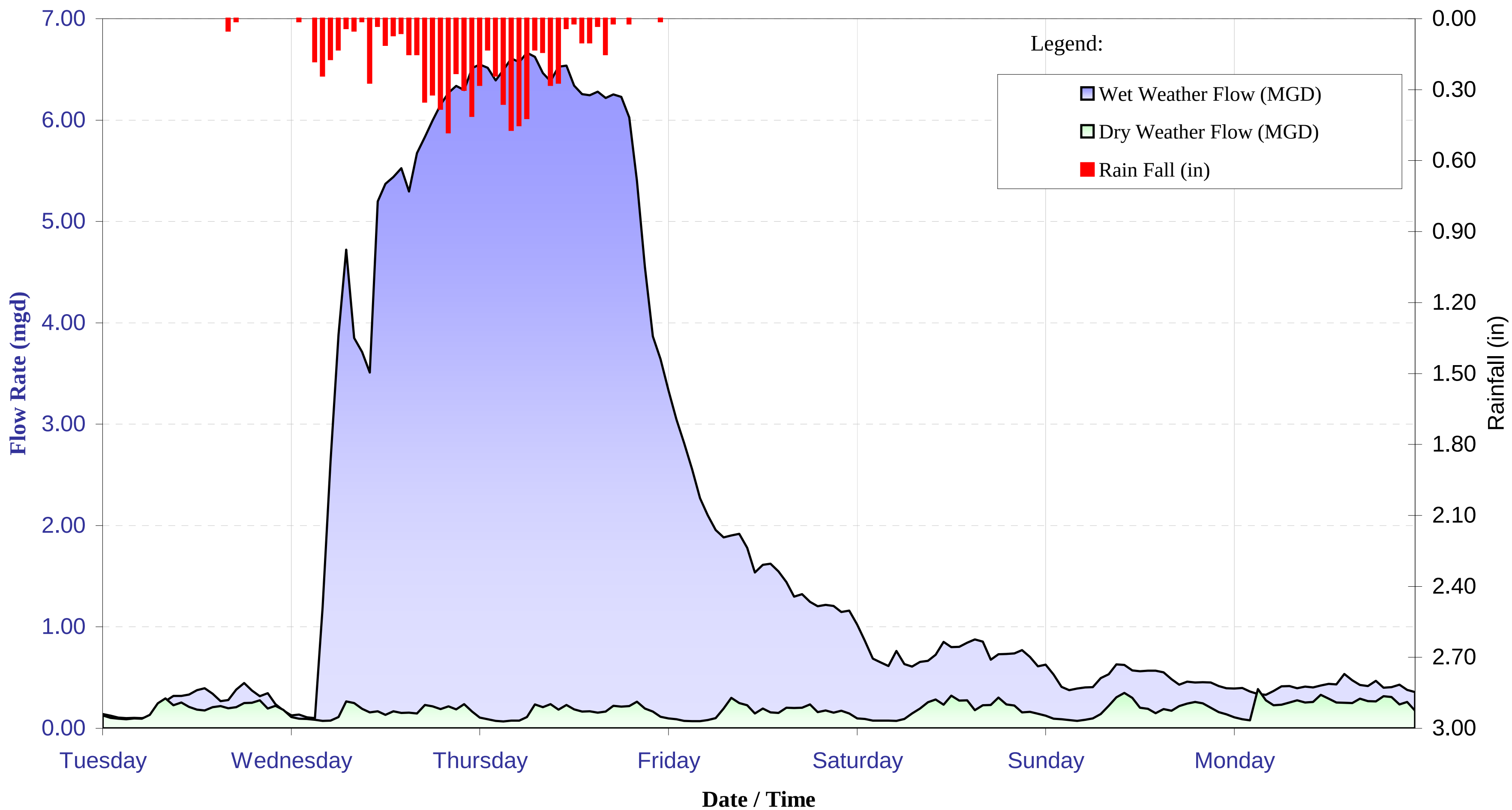
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** **to** **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** **to** **12/28/09 23:00**

Wet Weather Hydrograph
Site L029



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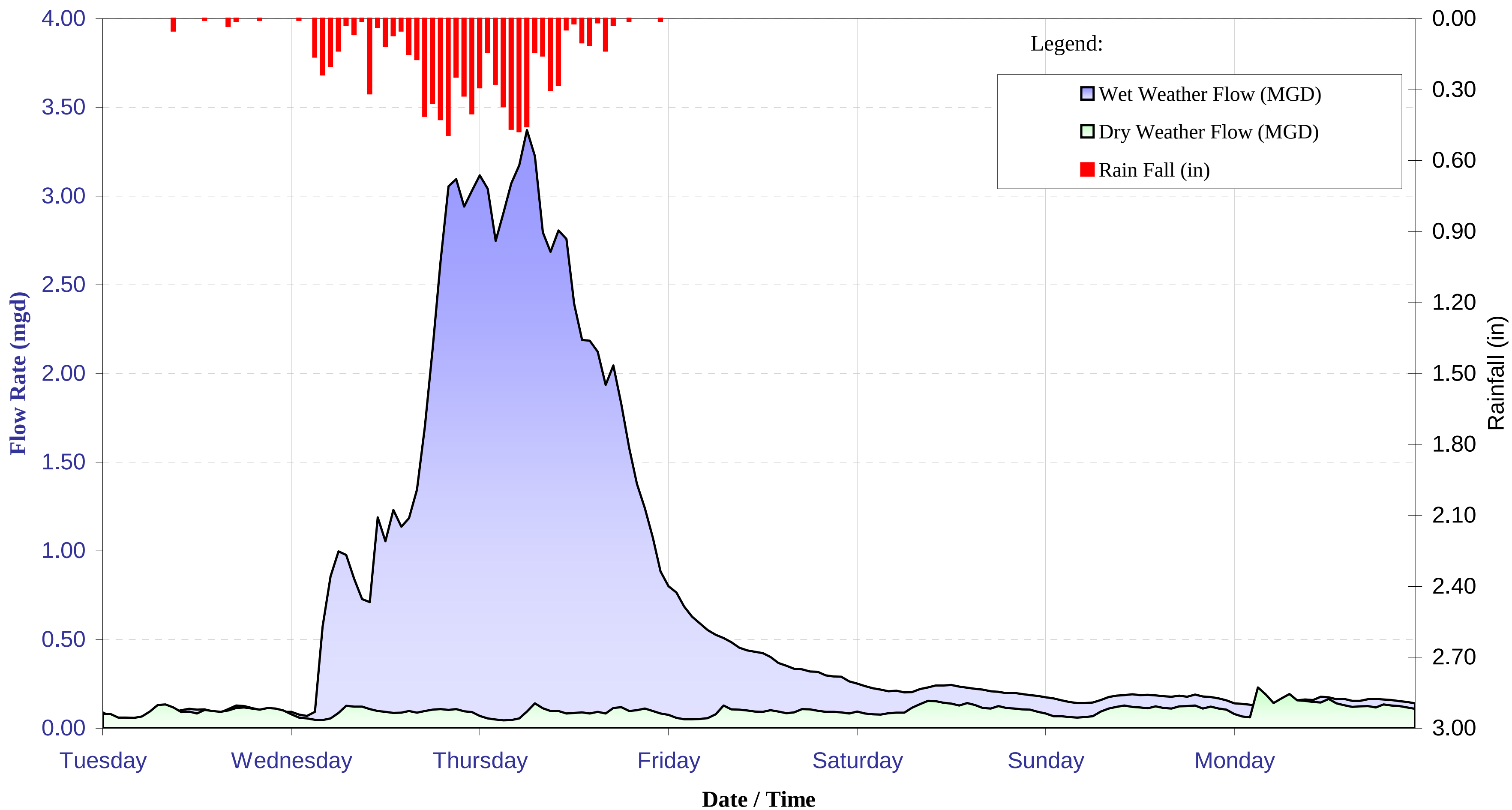
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00

Wet Weather Hydrograph
Site L031



rjngroup
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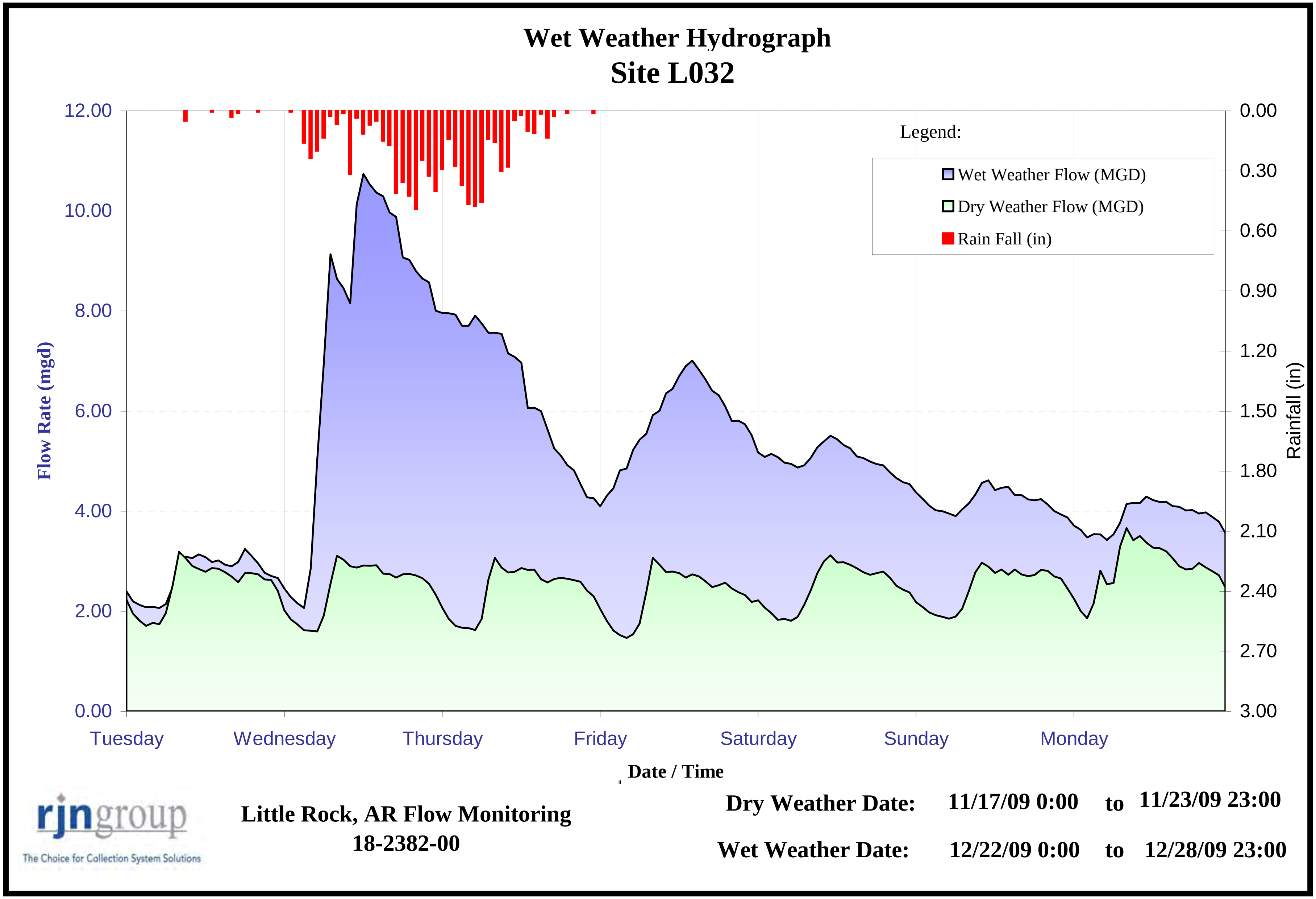
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**



Wet Weather Hydrograph
Site L032
Legend:
Wet Weather Flow (MGD)
Dry Weather Flow (MGD)
Rain Fall (in)
Flow Rate (mgd)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Rainfall (in)
0.00
0.30
0.60
0.90
1.20
1.50
1.80
2.10
2.40
2.70
3.00
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday
Monday
Date / Time
rjngroup
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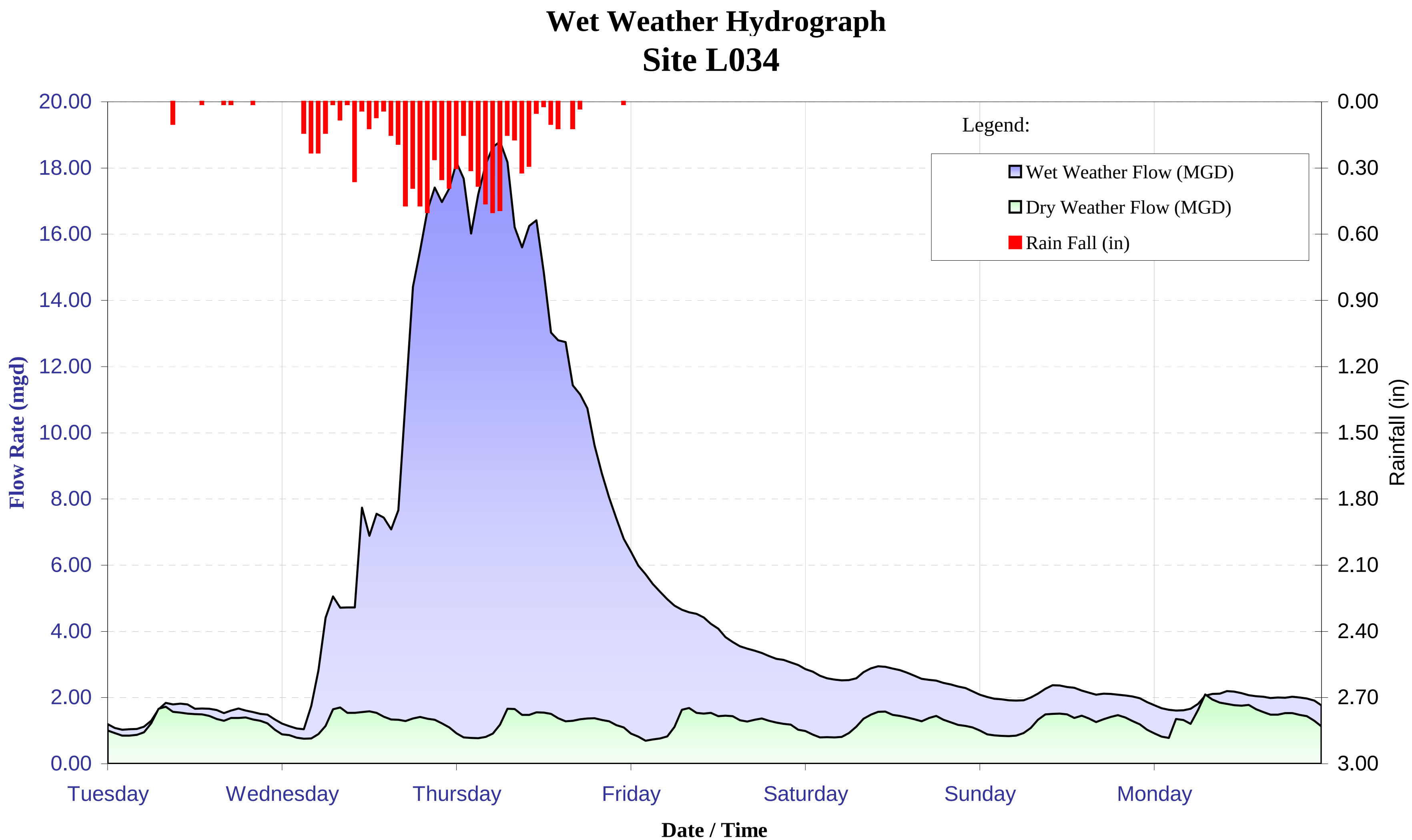
Little Rock, AR Flow Monitoring
18-2382-00
Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00
Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00



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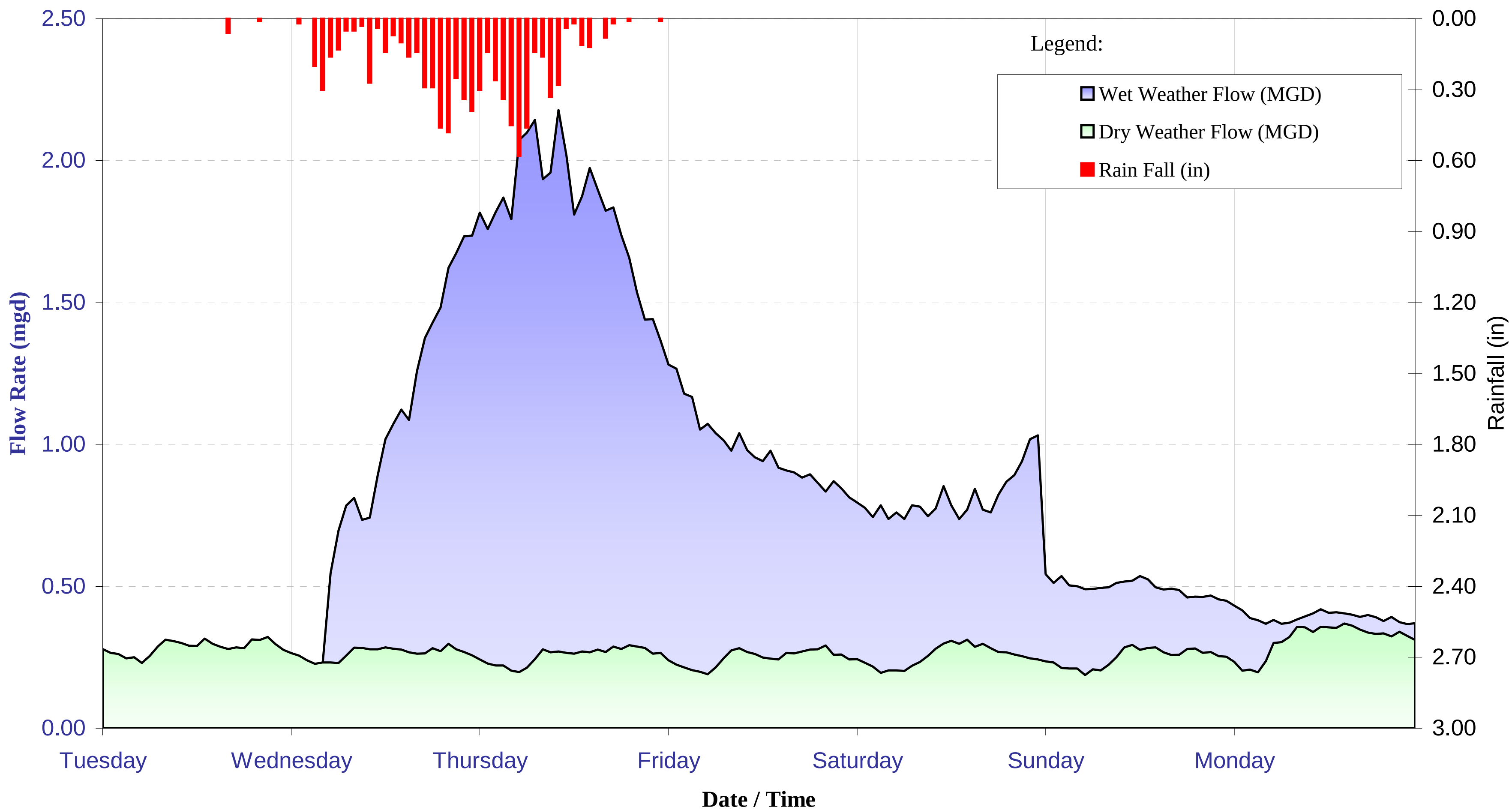
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00

Wet Weather Hydrograph
Site L035



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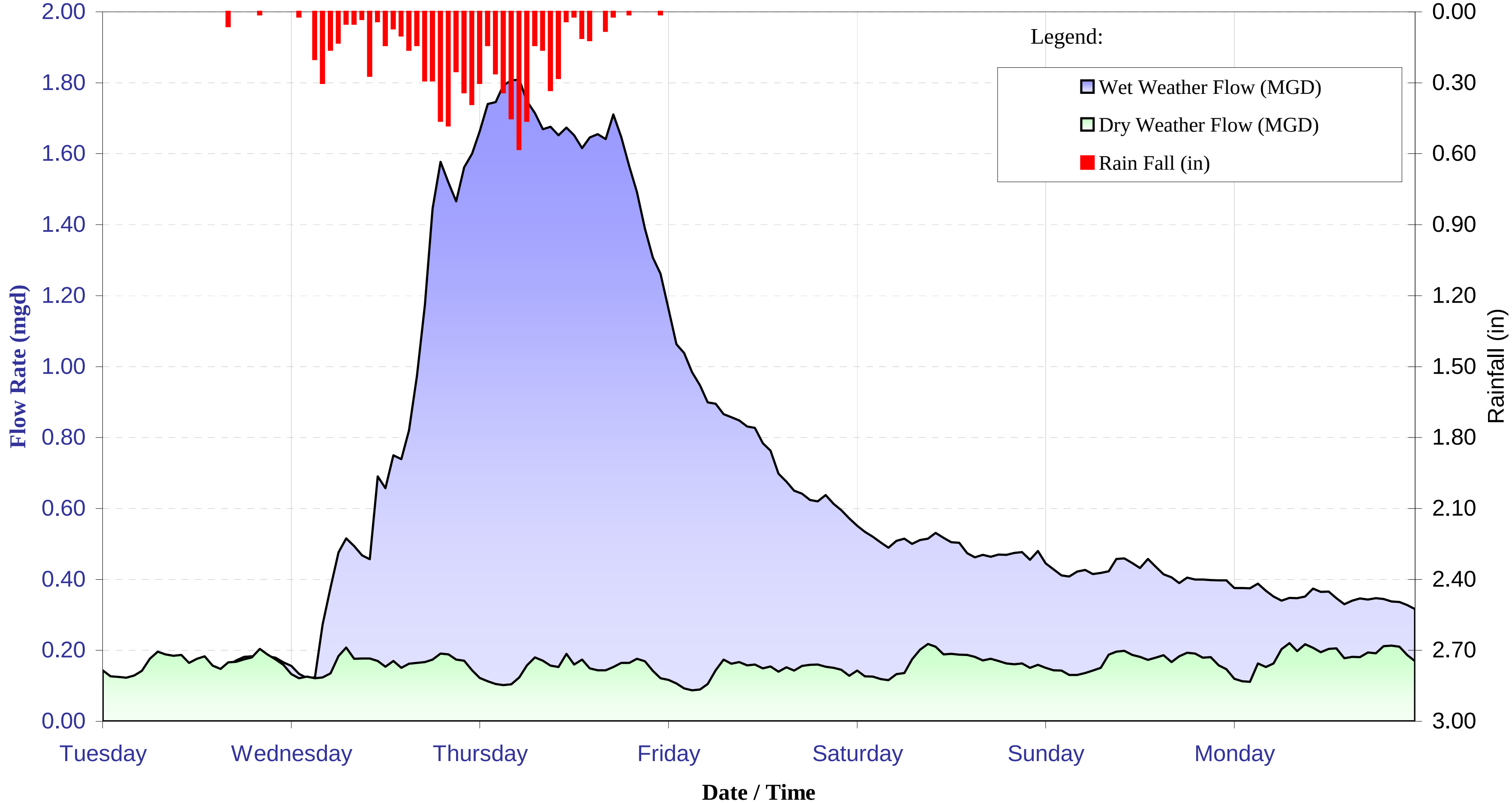
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**

Wet Weather Hydrograph
Site L036



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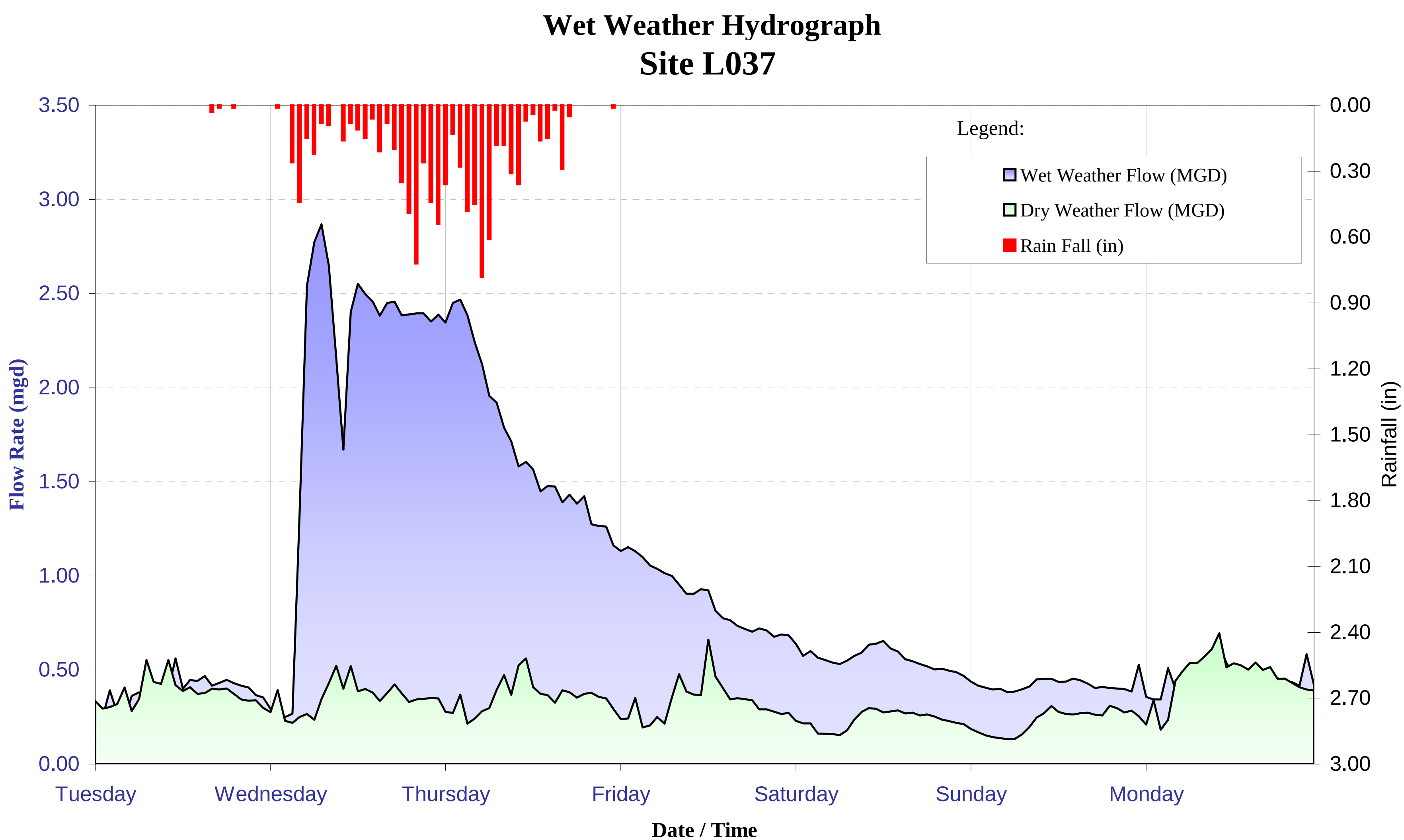
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** **to** **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** **to** **12/28/09 23:00**



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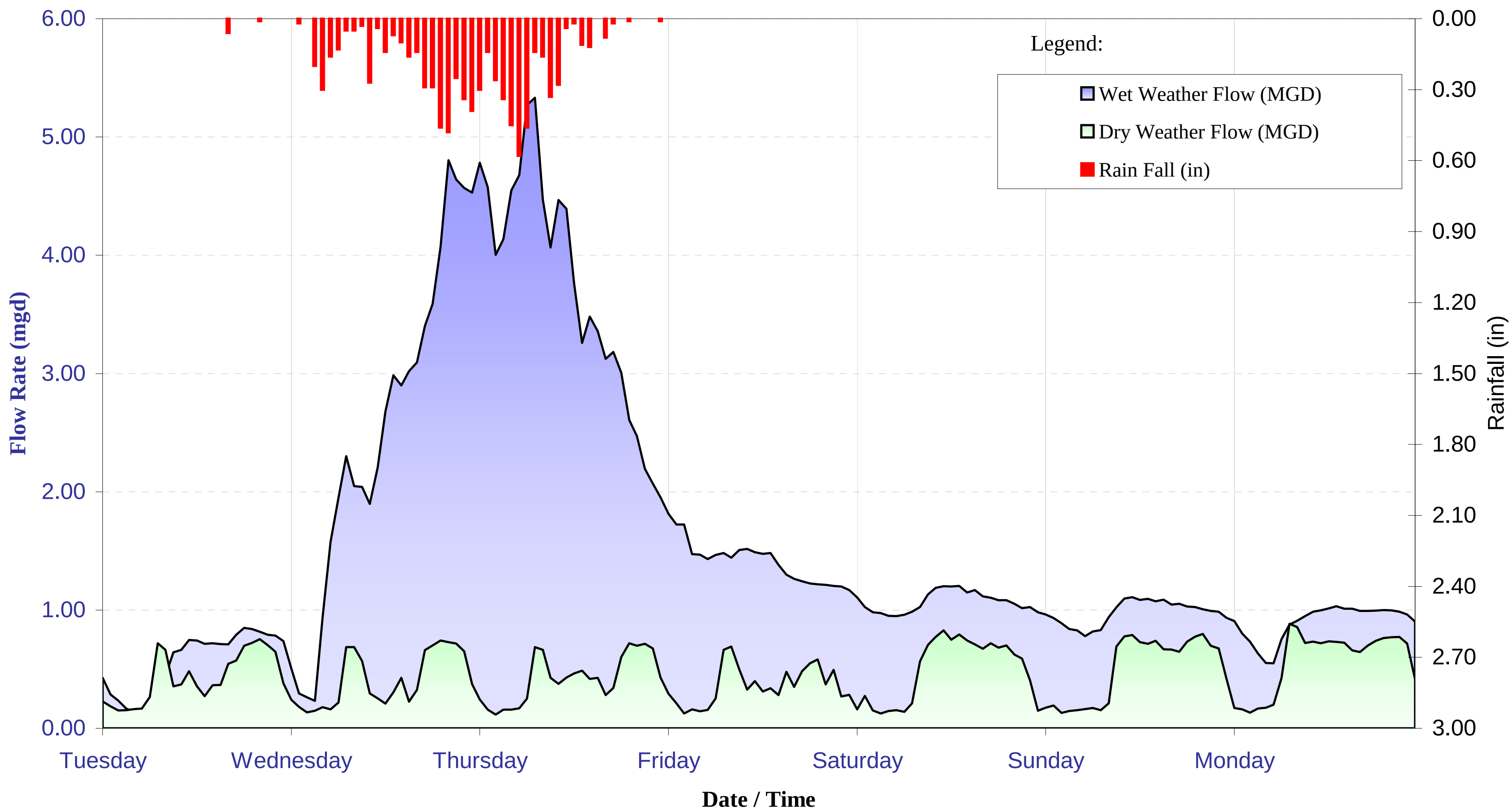
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** **to** **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** **to** **12/28/09 23:00**

Wet Weather Hydrograph
Site L043



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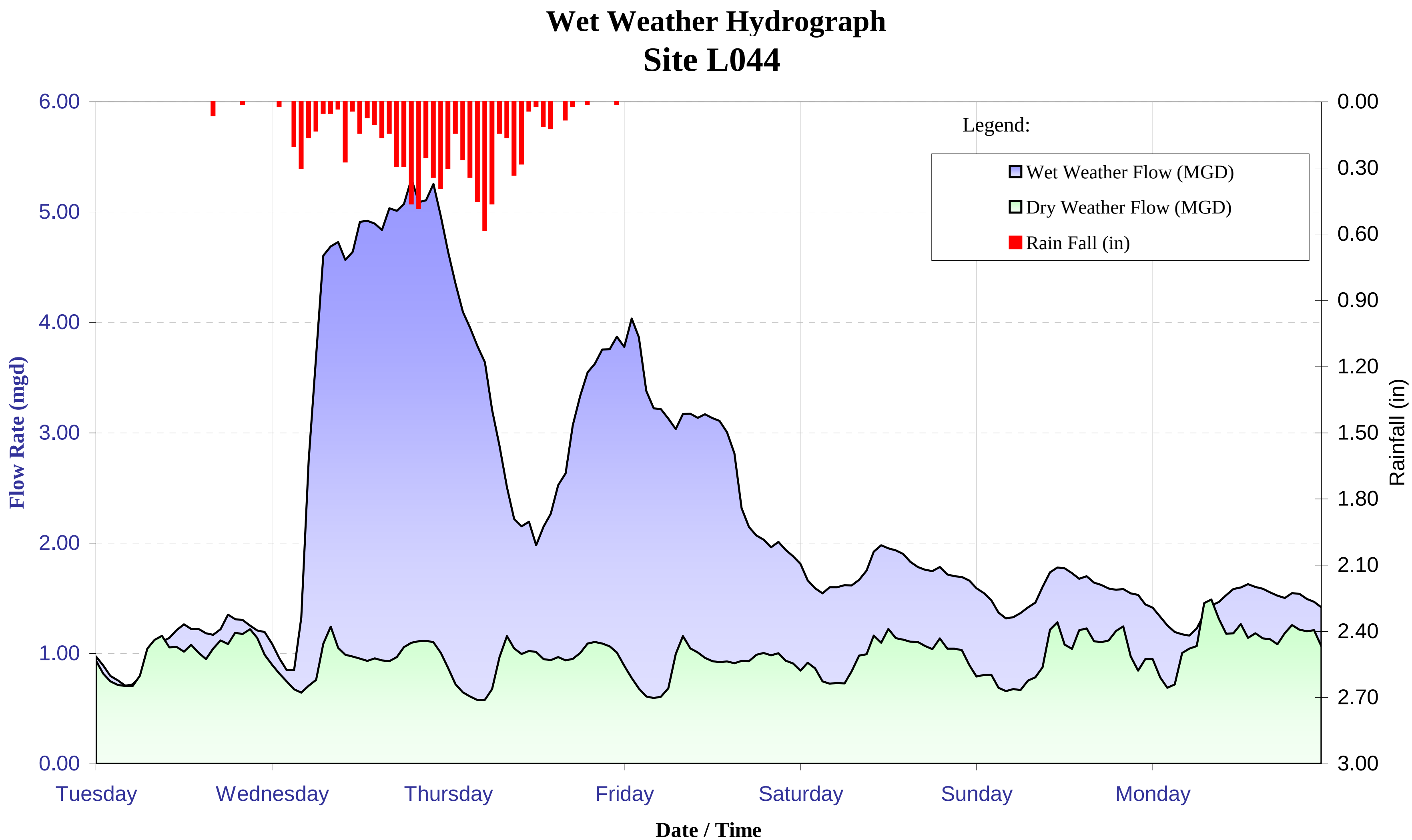
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** to **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** to **12/28/09 23:00**



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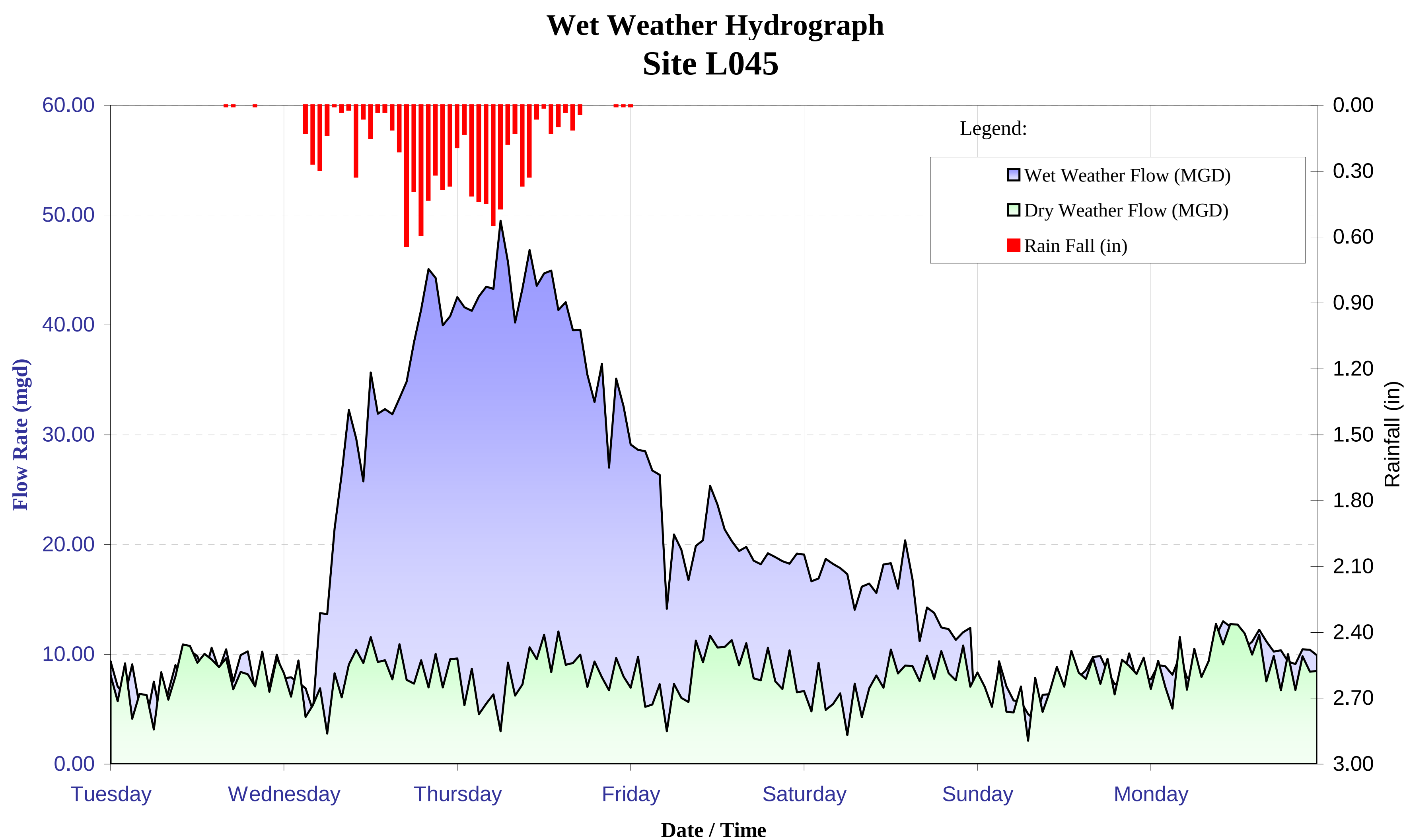
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** to **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** to **12/28/09 23:00**



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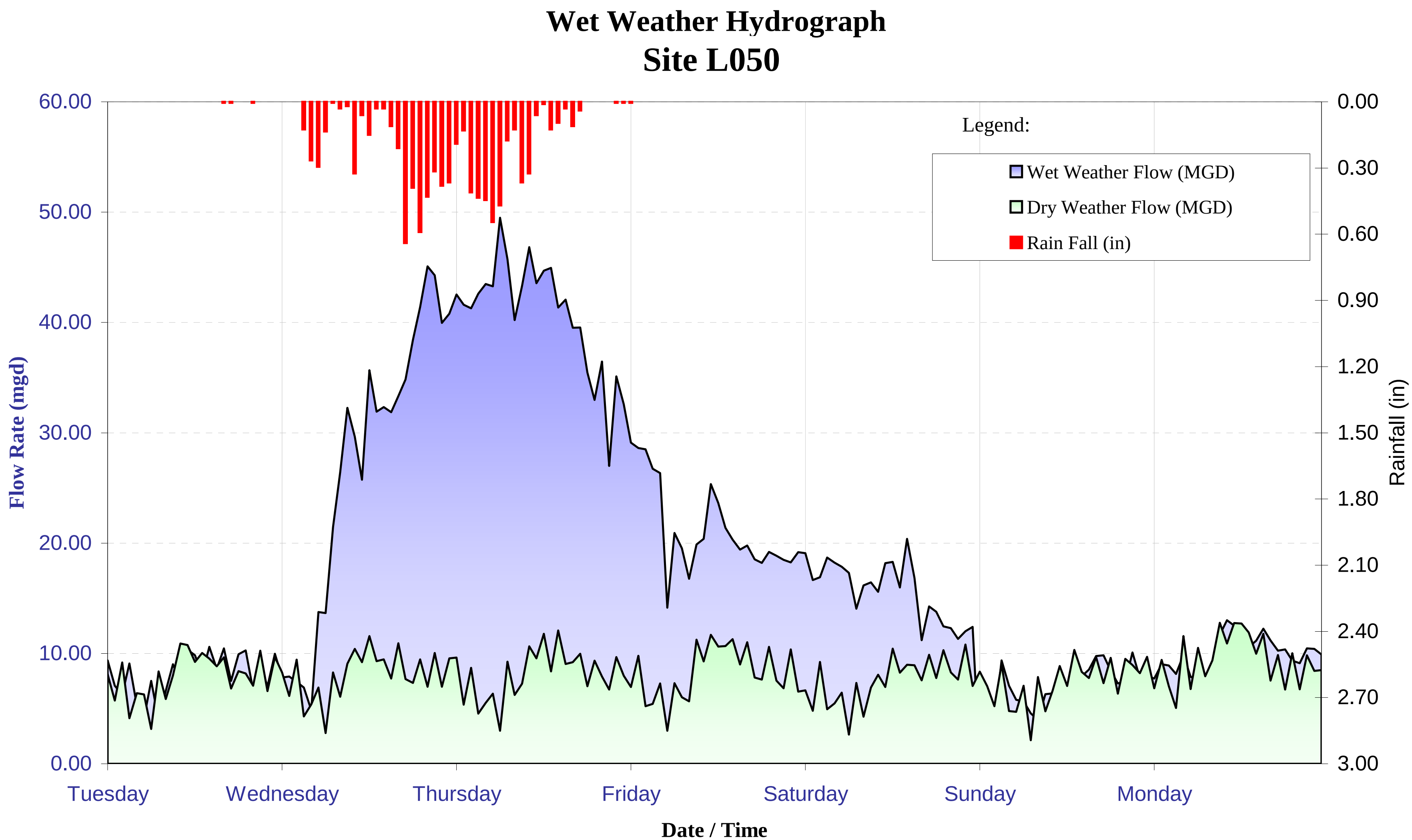
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00



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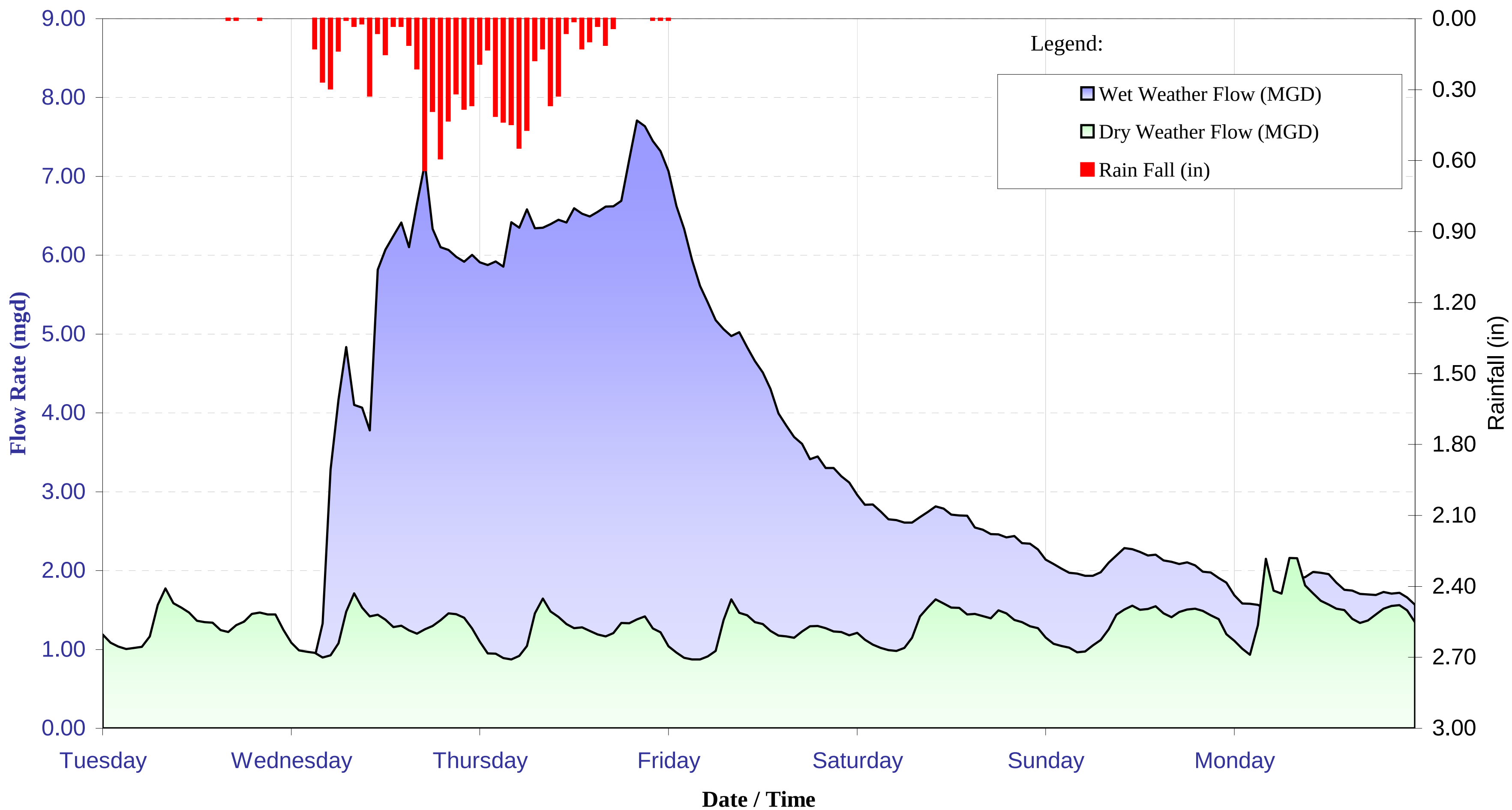
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** to **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** to **12/28/09 23:00**

Wet Weather Hydrograph
Site L055



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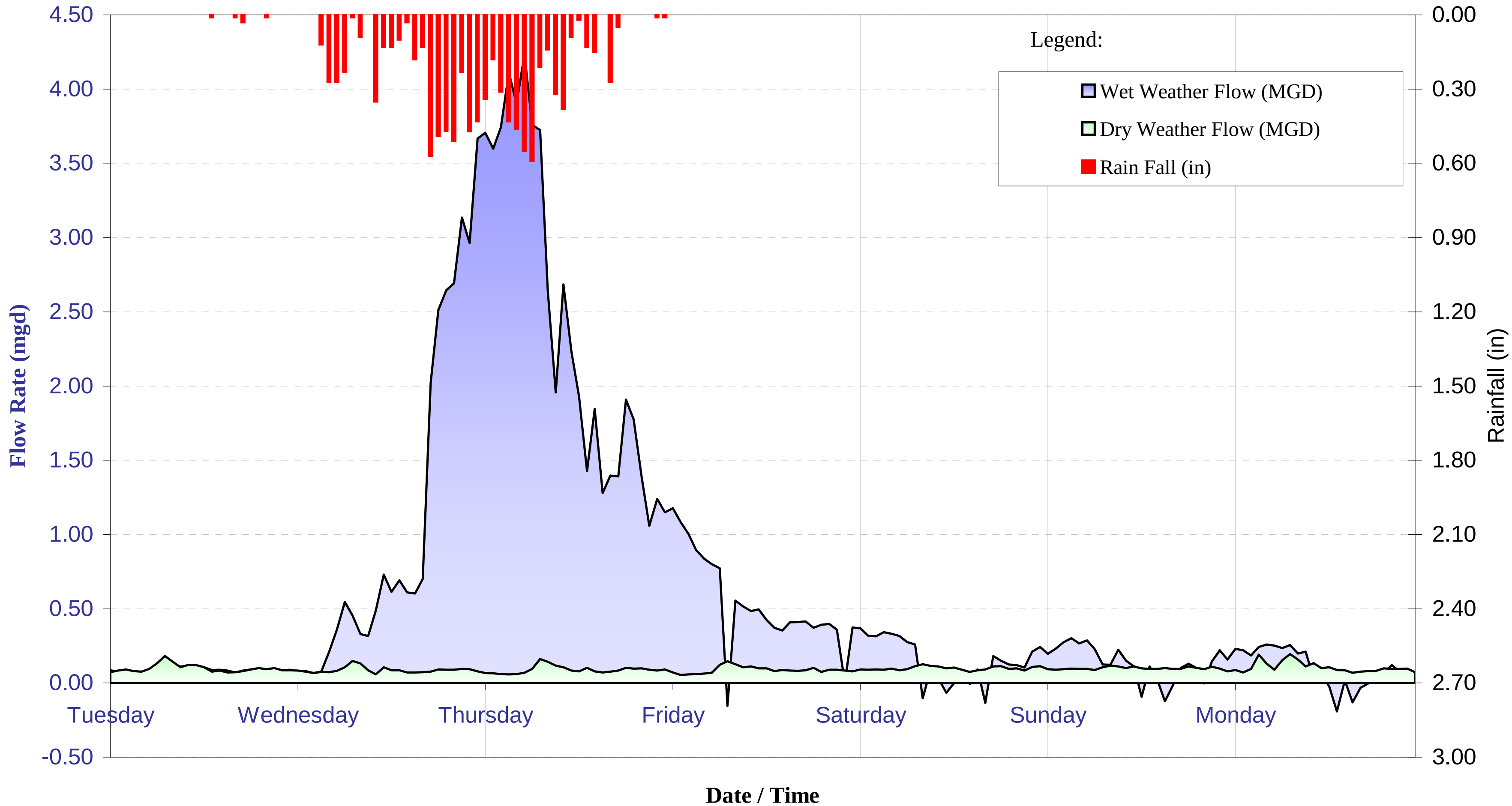
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** to **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** to **12/28/09 23:00**

Wet Weather Hydrograph
Site L057



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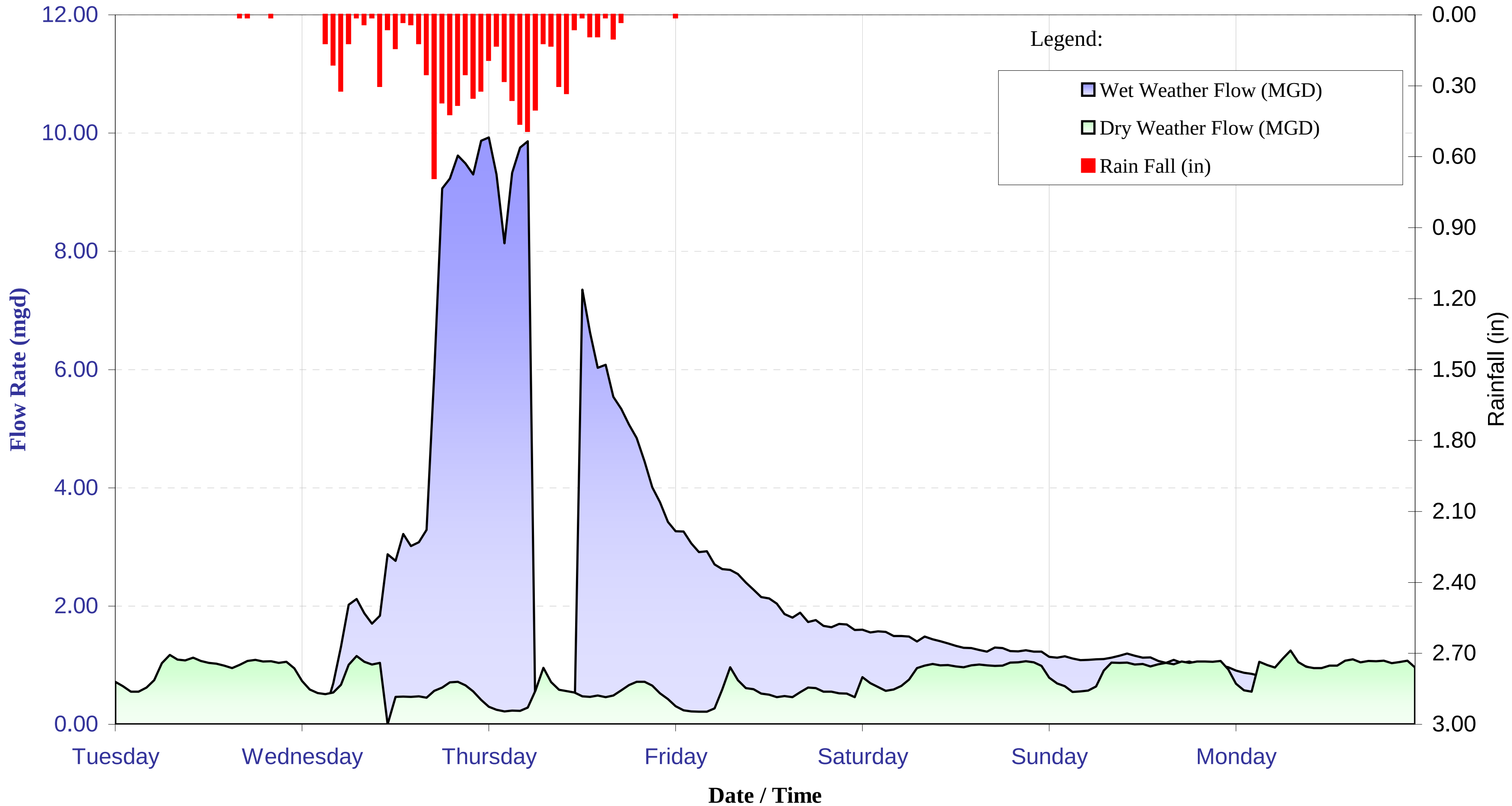
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**

Wet Weather Hydrograph
Site L058



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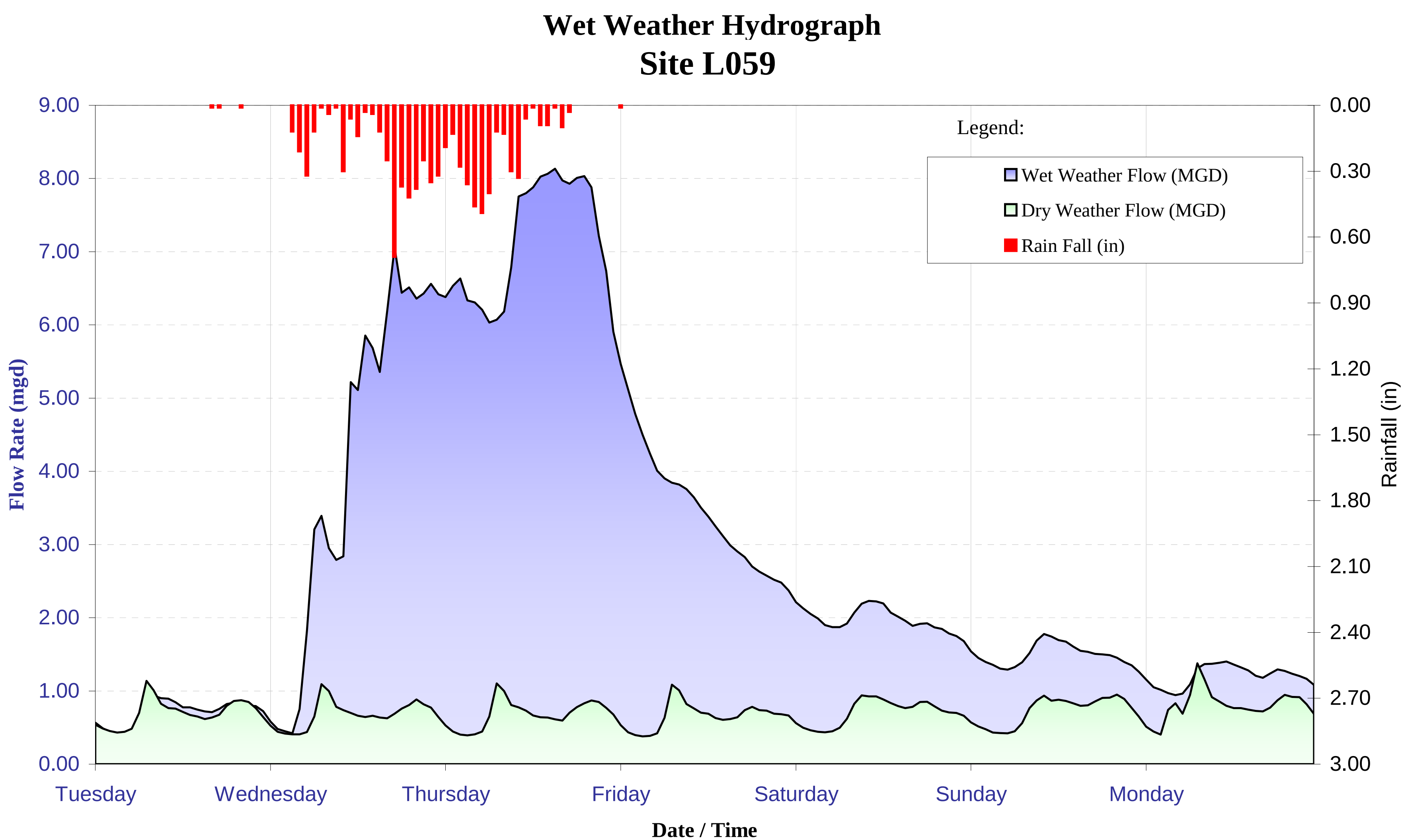
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00



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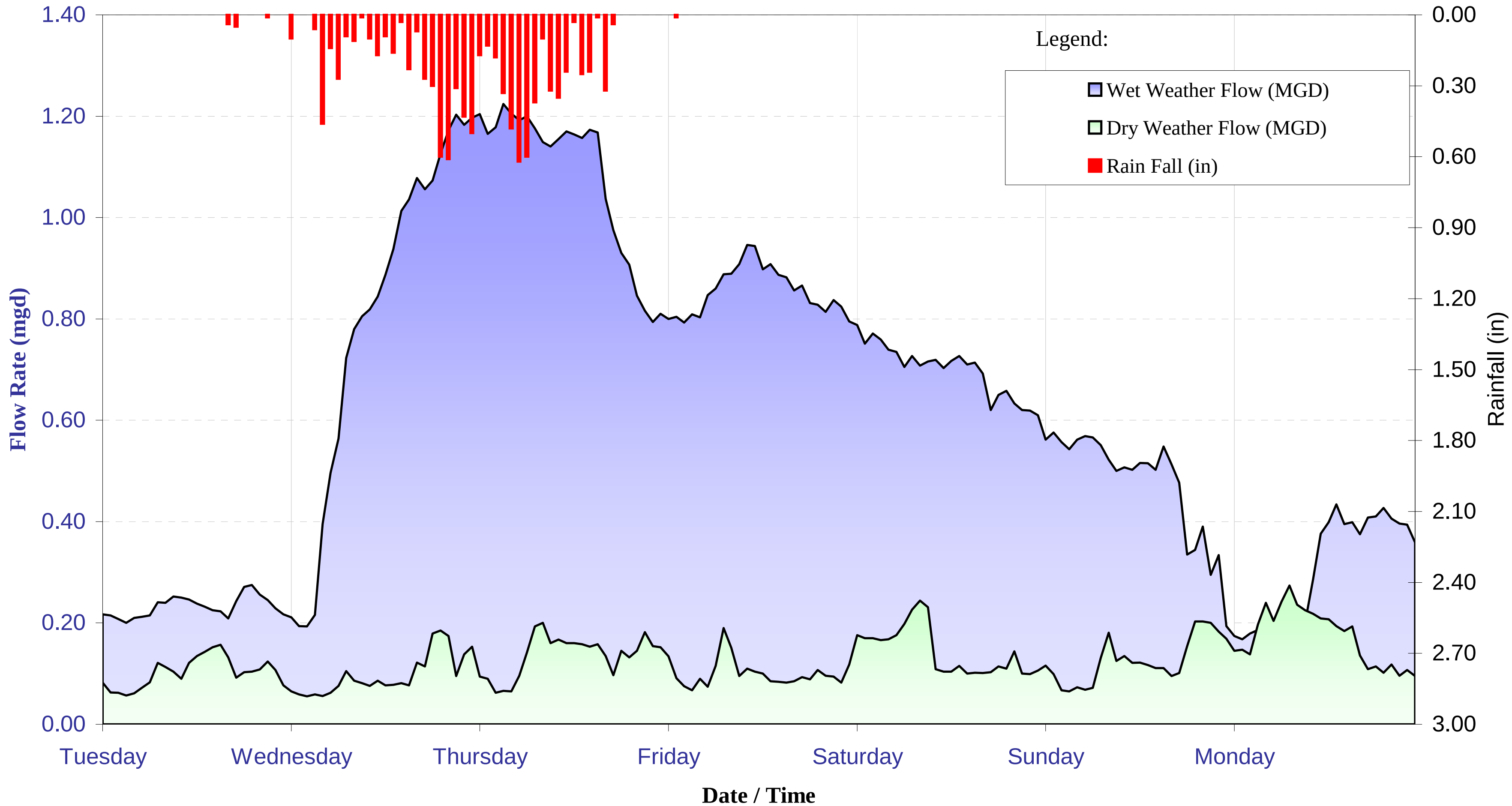
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** to **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** to **12/28/09 23:00**

Wet Weather Hydrograph
Site L062



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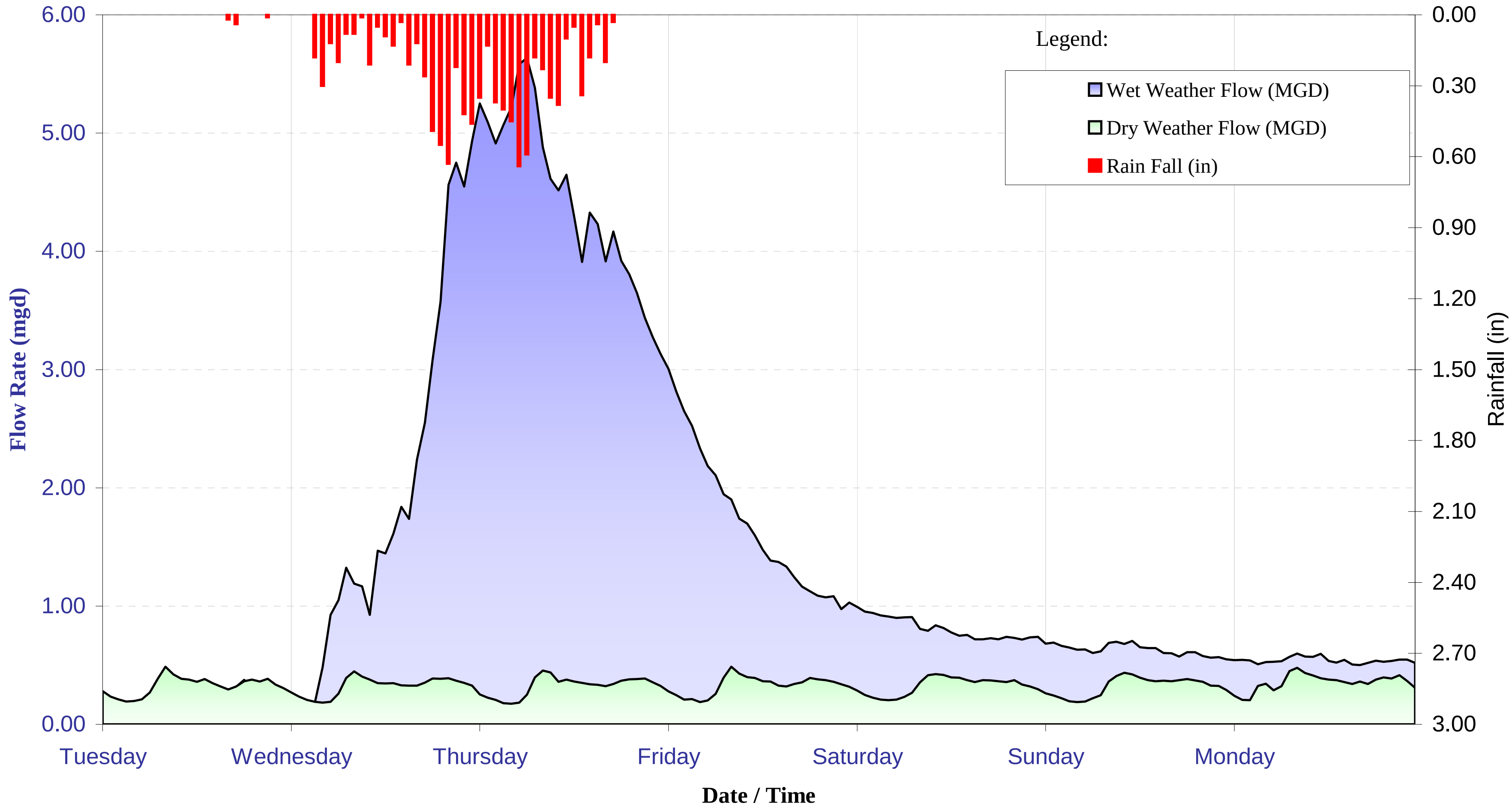
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**

Wet Weather Hydrograph
Site L063



rjngroup
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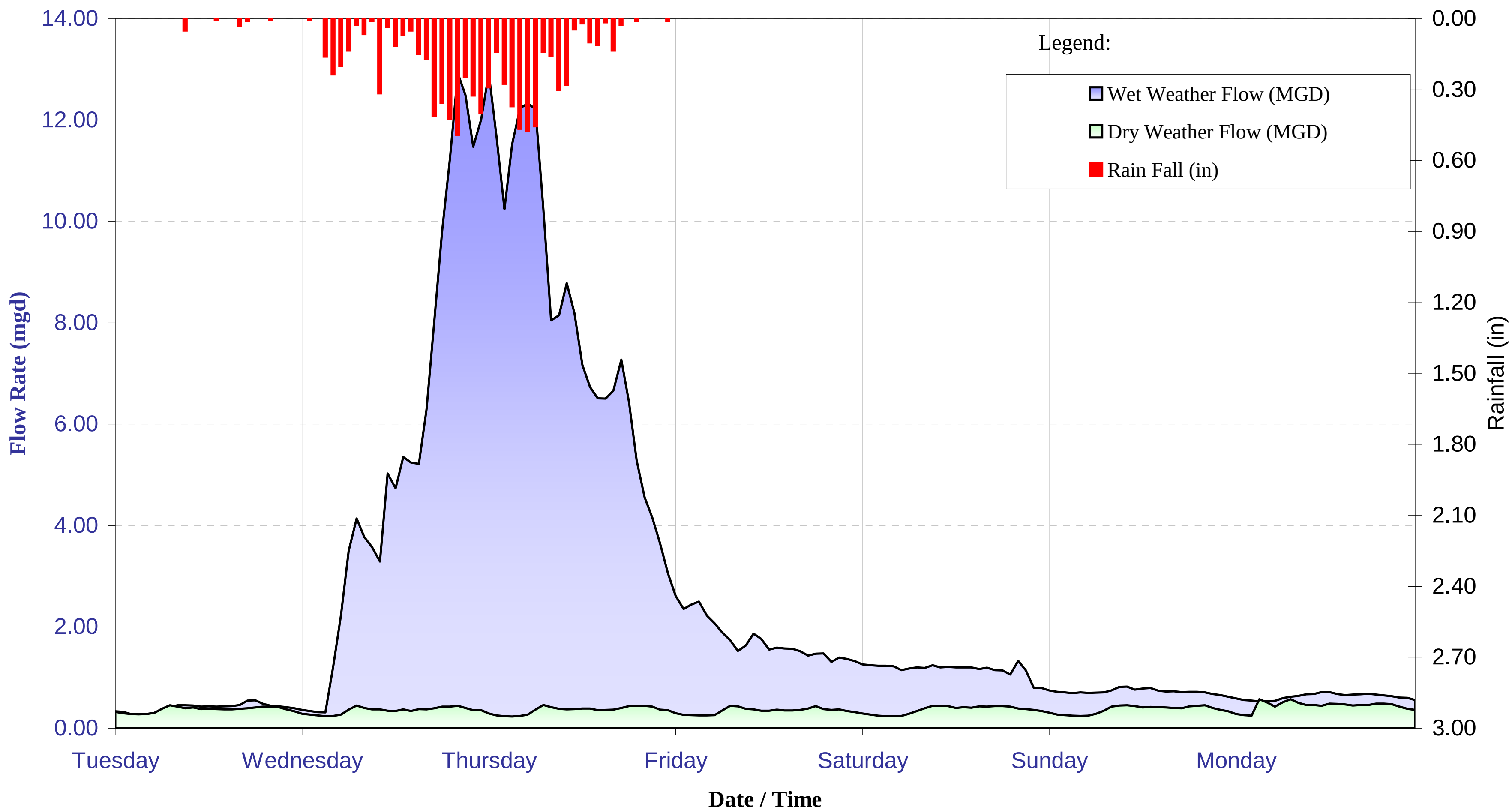
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00

Wet Weather Hydrograph
Site L100



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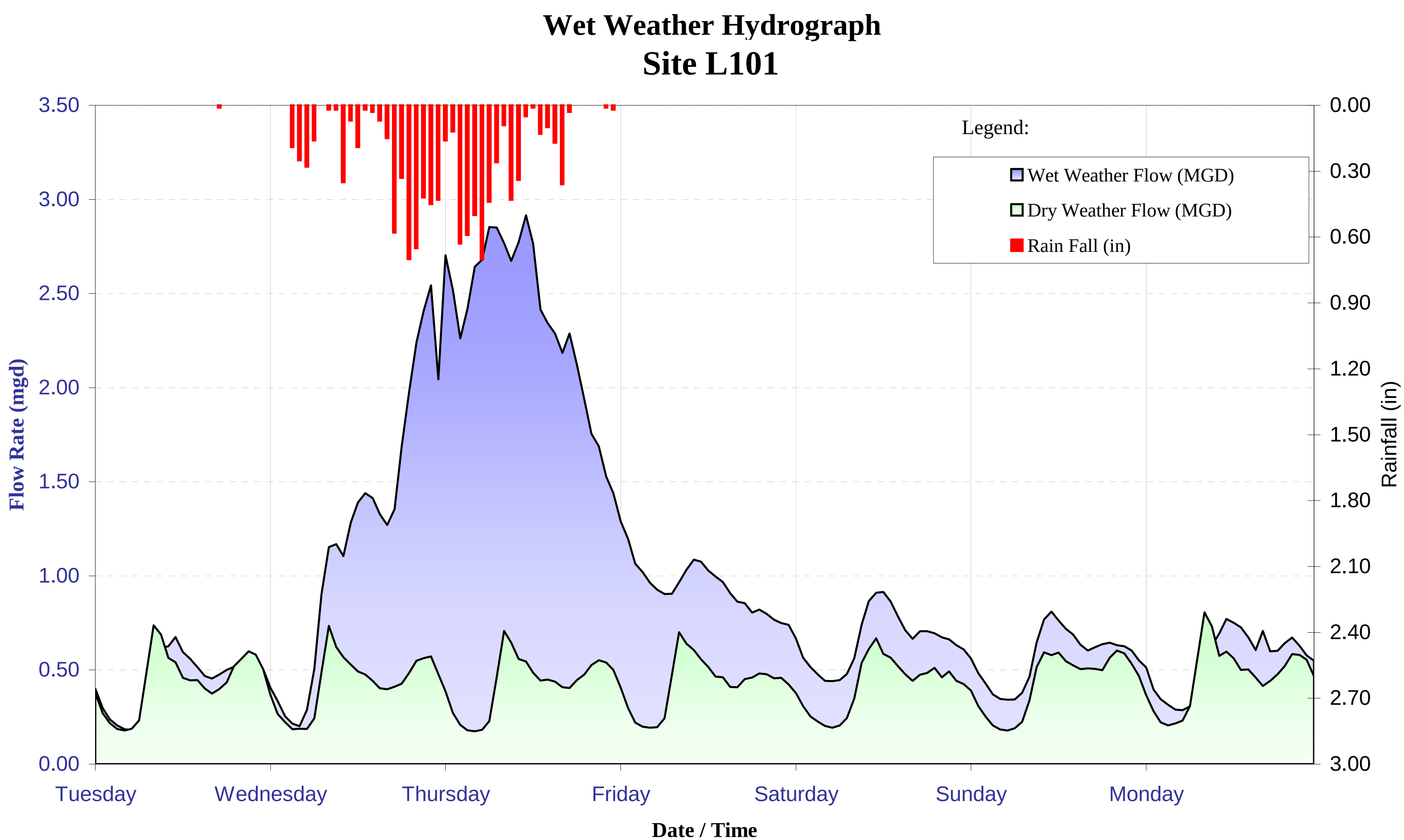
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**



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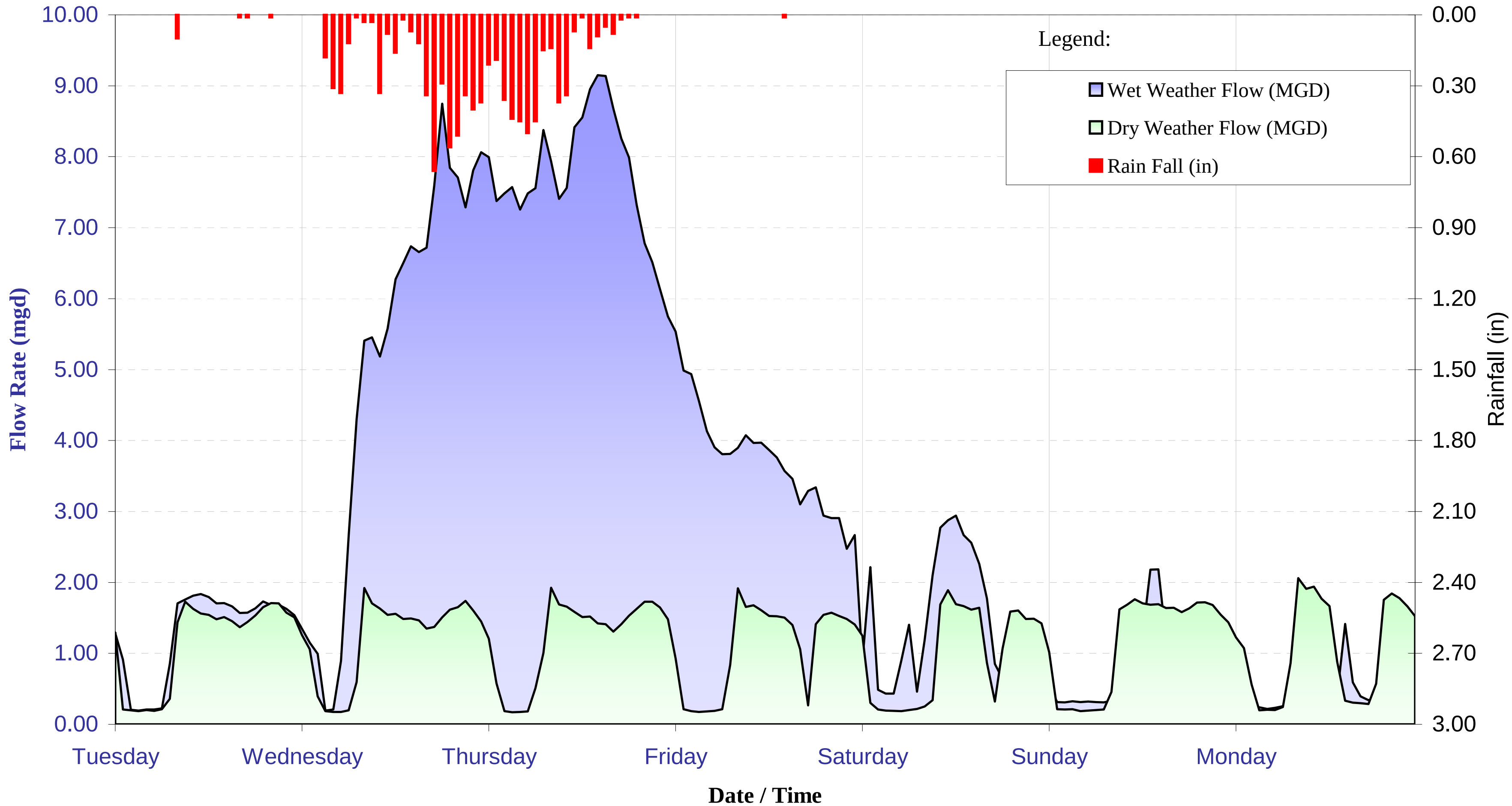
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**

Wet Weather Hydrograph
Site L102



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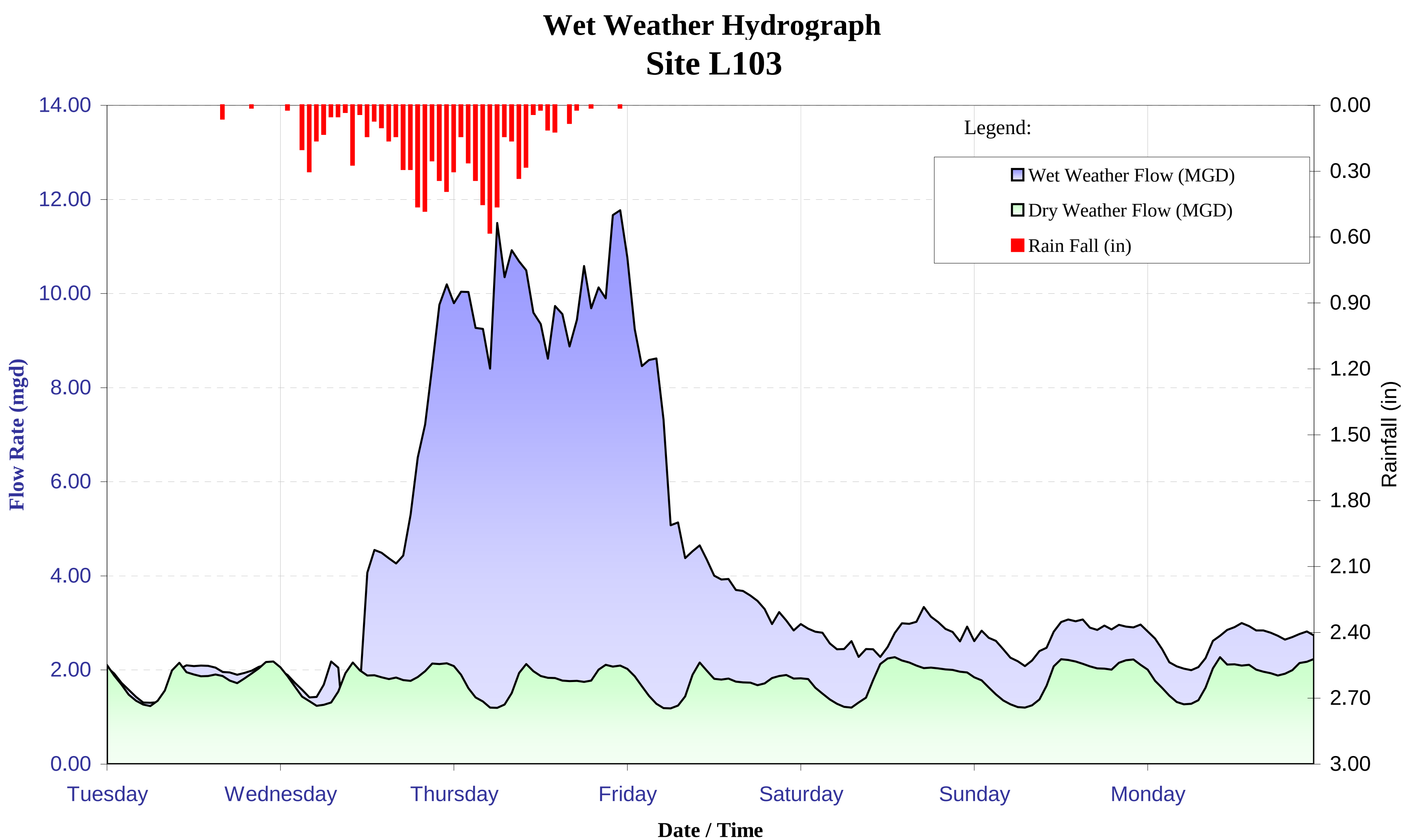
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00



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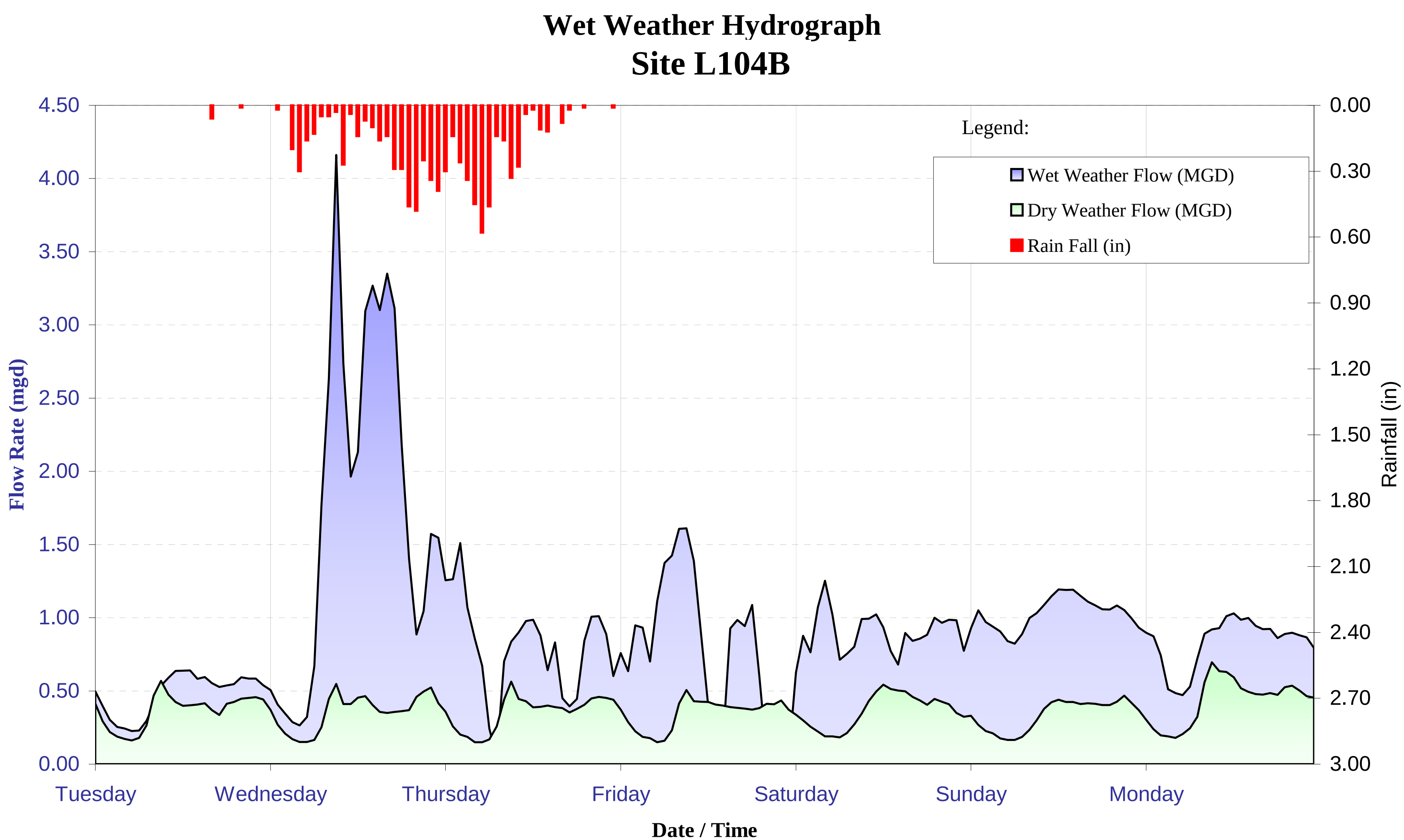
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00



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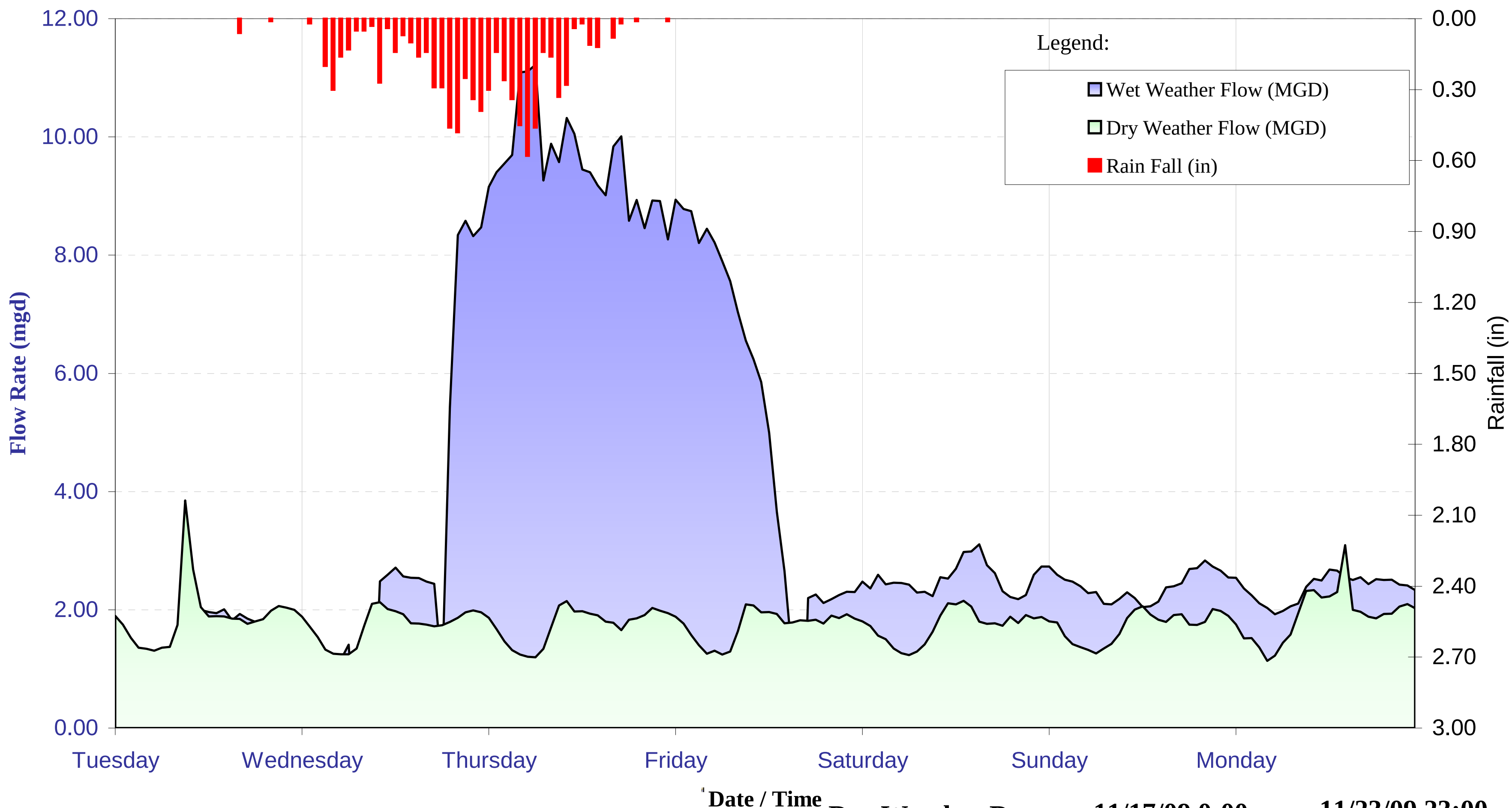
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** to **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** to **12/28/09 23:00**

Wet Weather Hydrograph
Site L105



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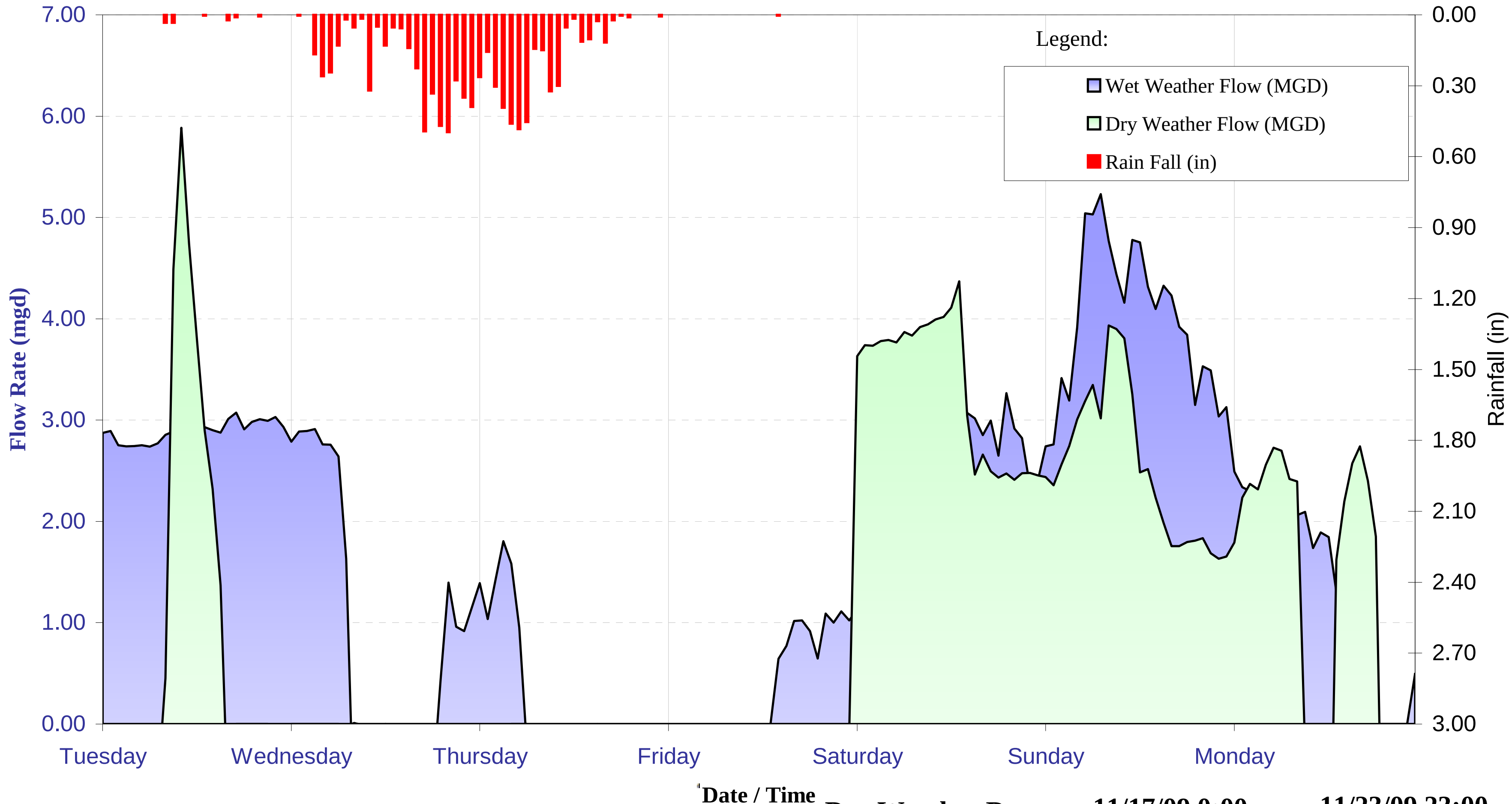
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00

Wet Weather Hydrograph
Site L106



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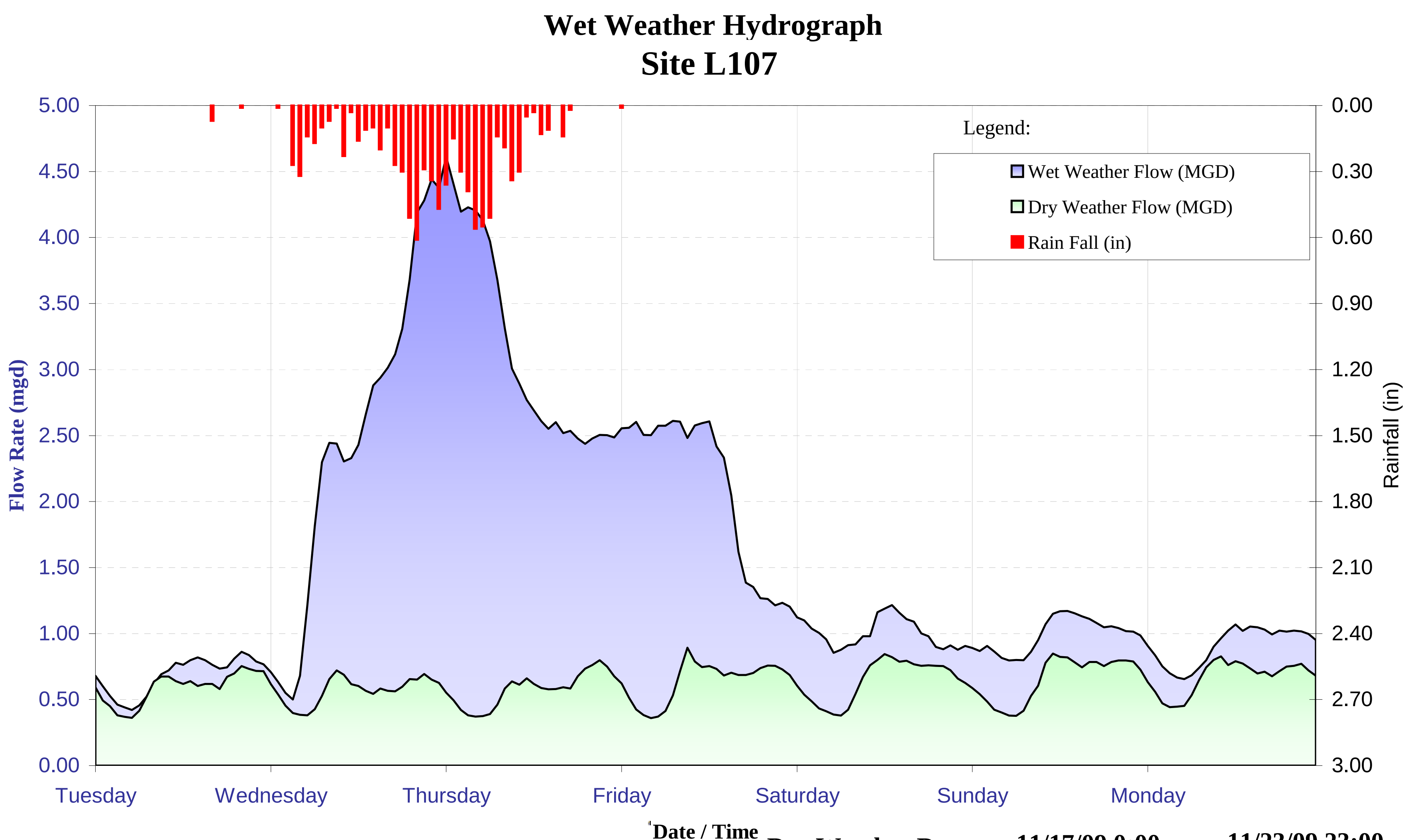
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**



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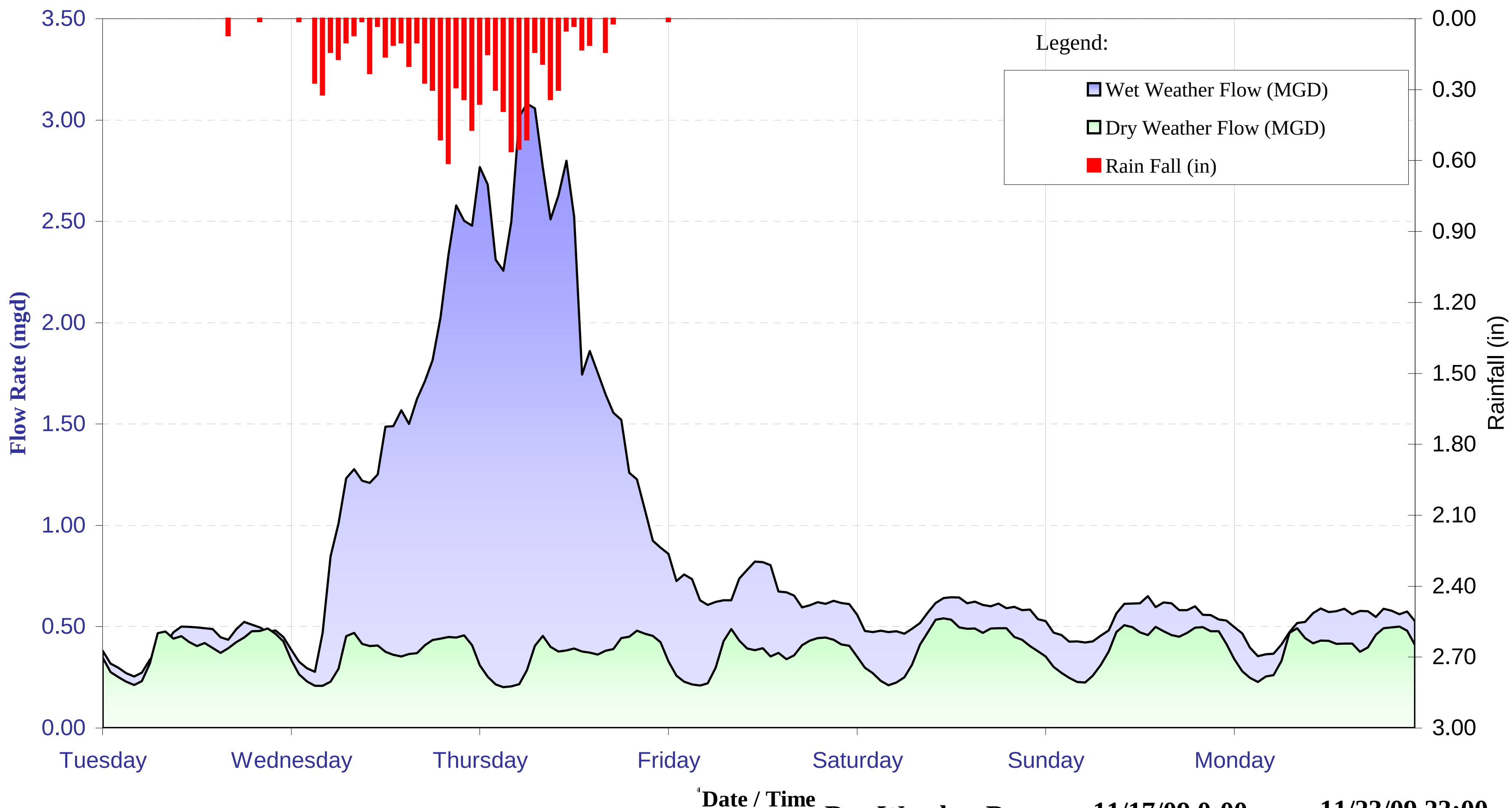
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** to **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** to **12/28/09 23:00**

Wet Weather Hydrograph
Site L108



rjngroup
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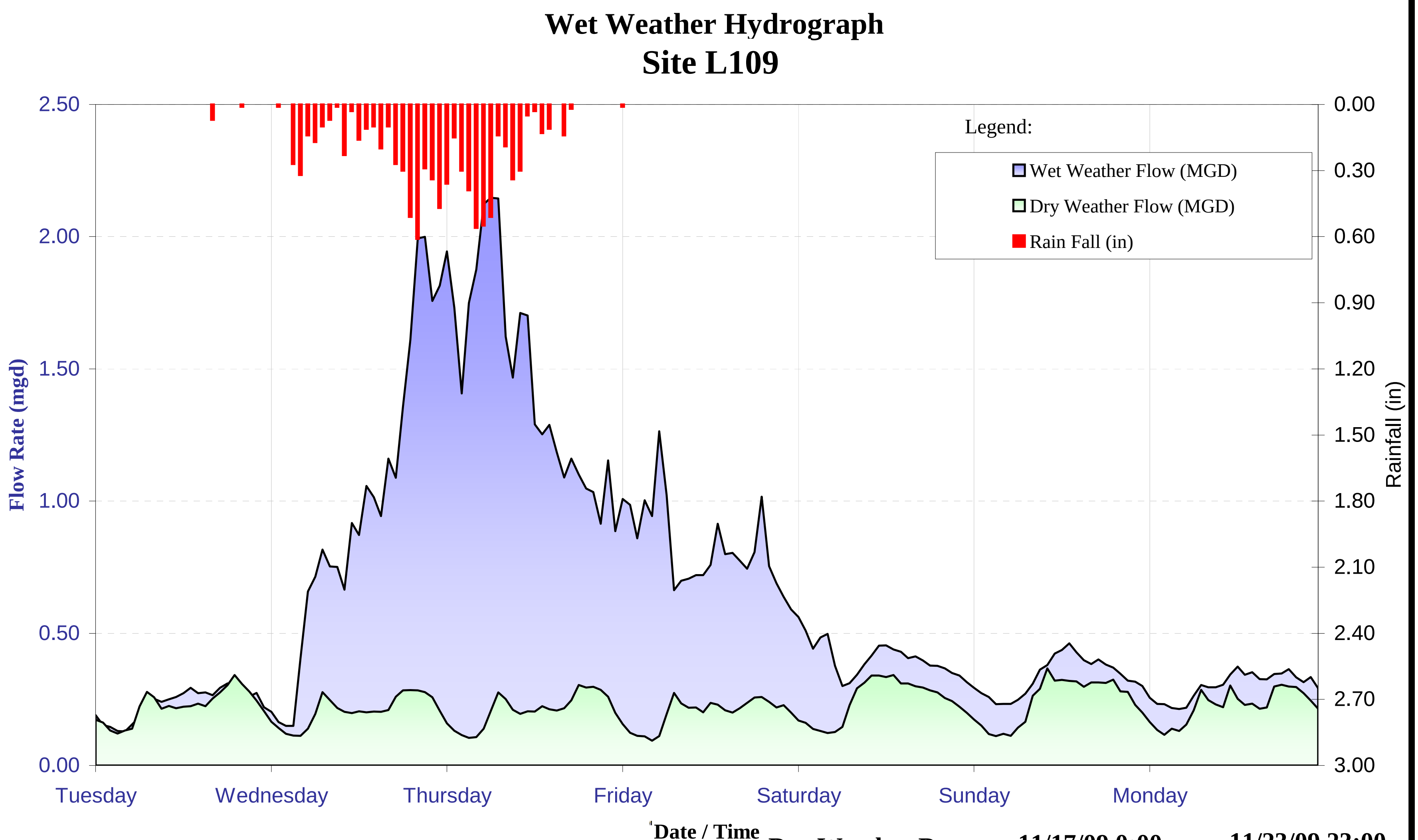
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00



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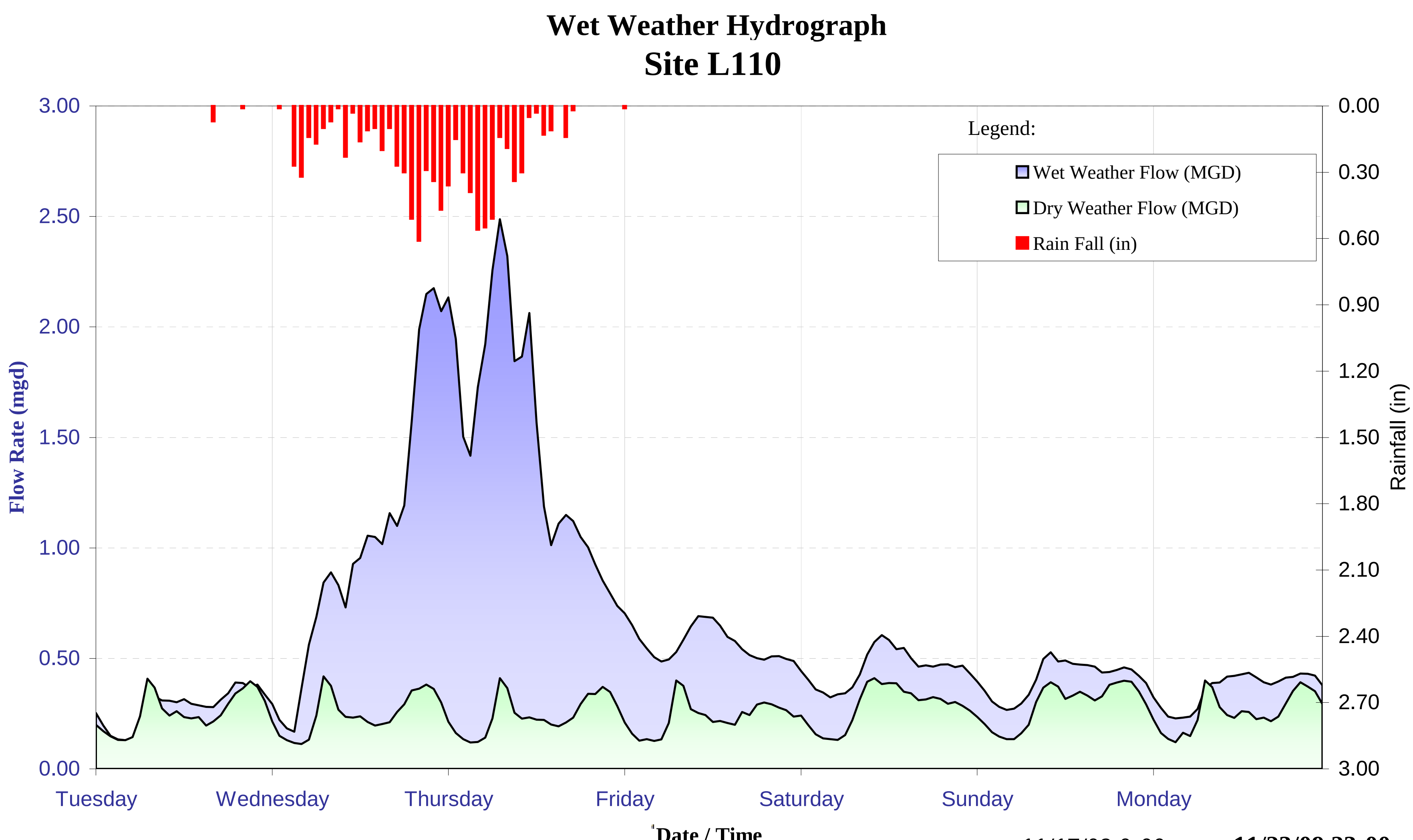
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**



Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**

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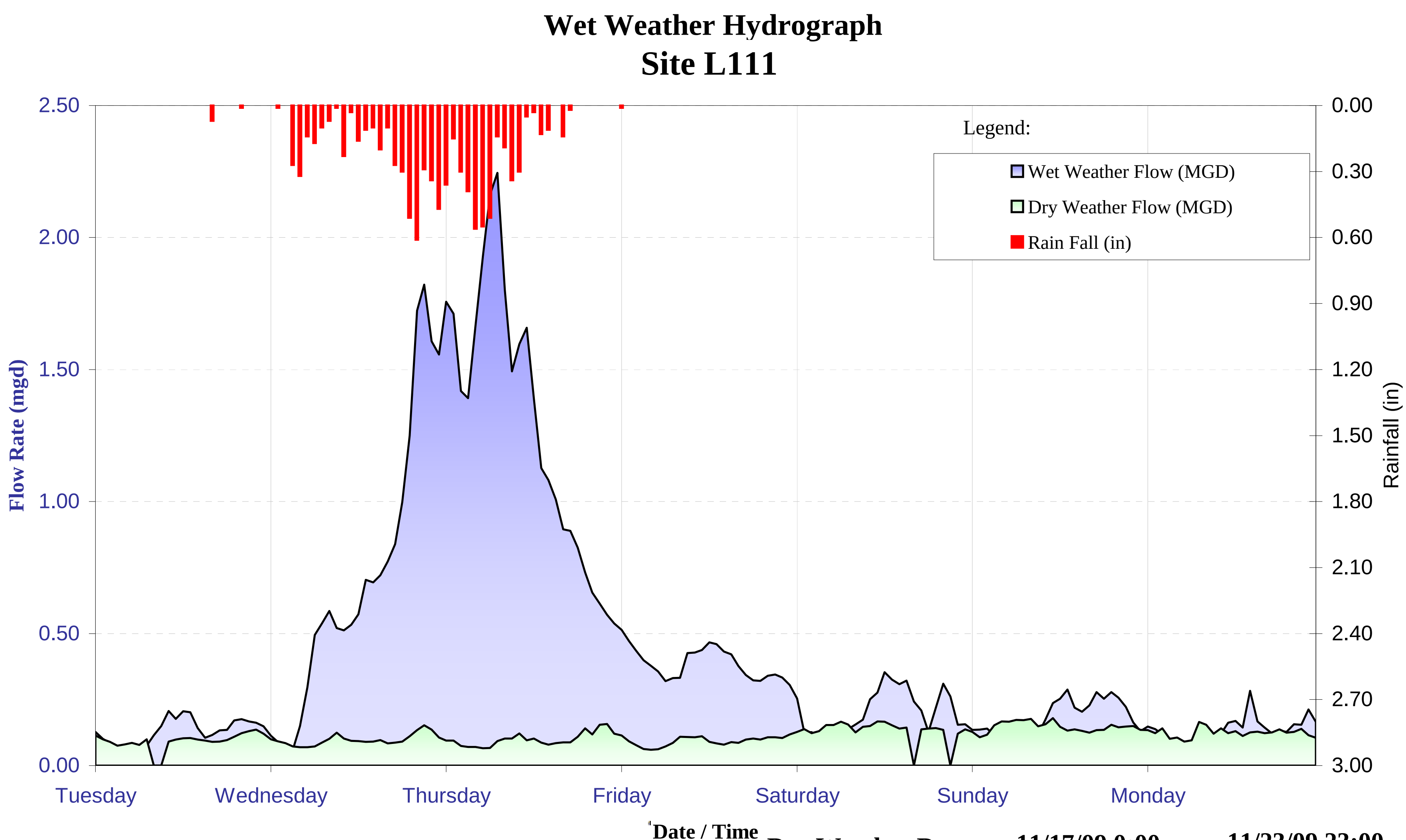

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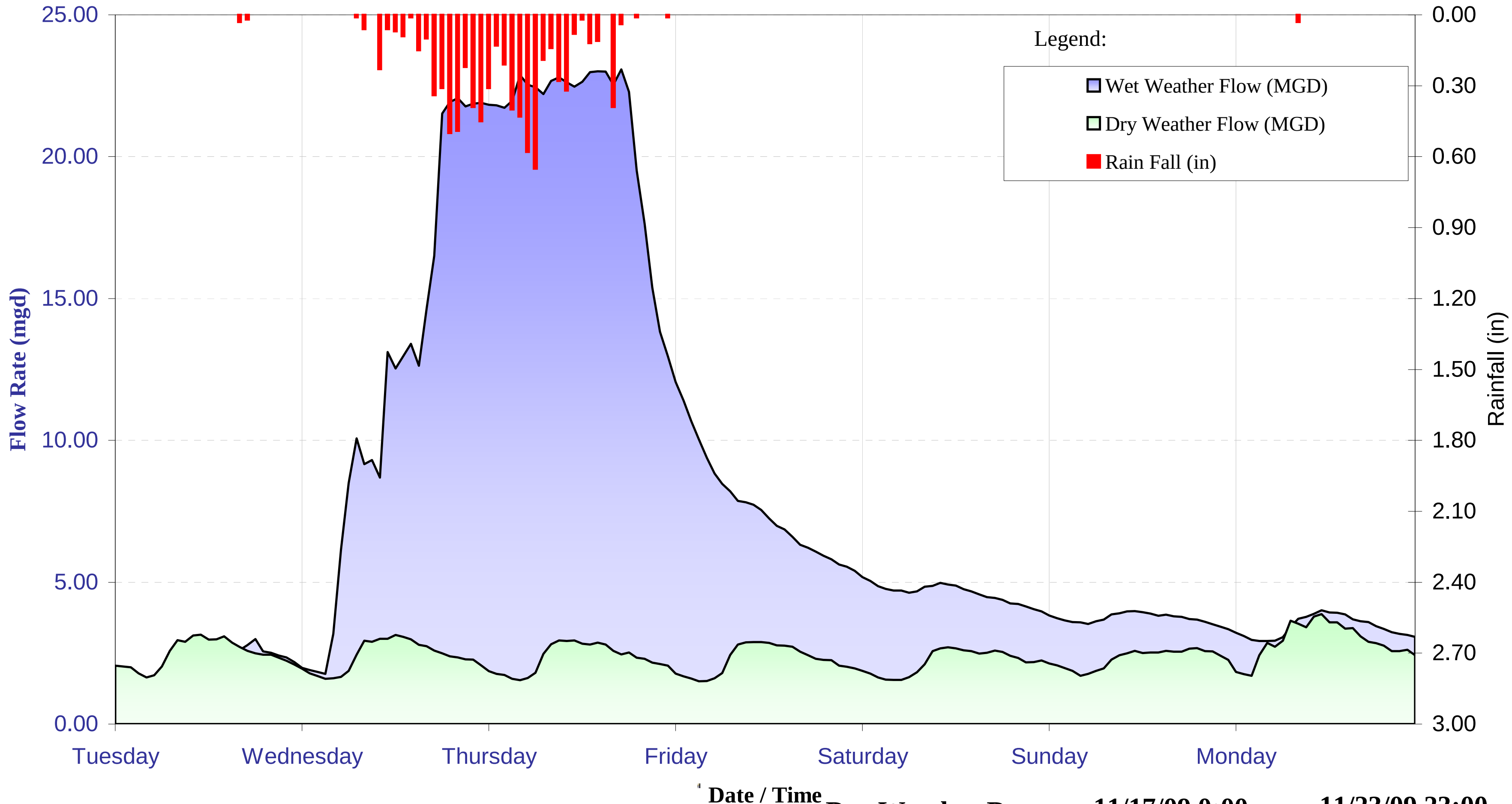
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** **to** **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** **to** **12/28/09 23:00**

Wet Weather Hydrograph
Site L112



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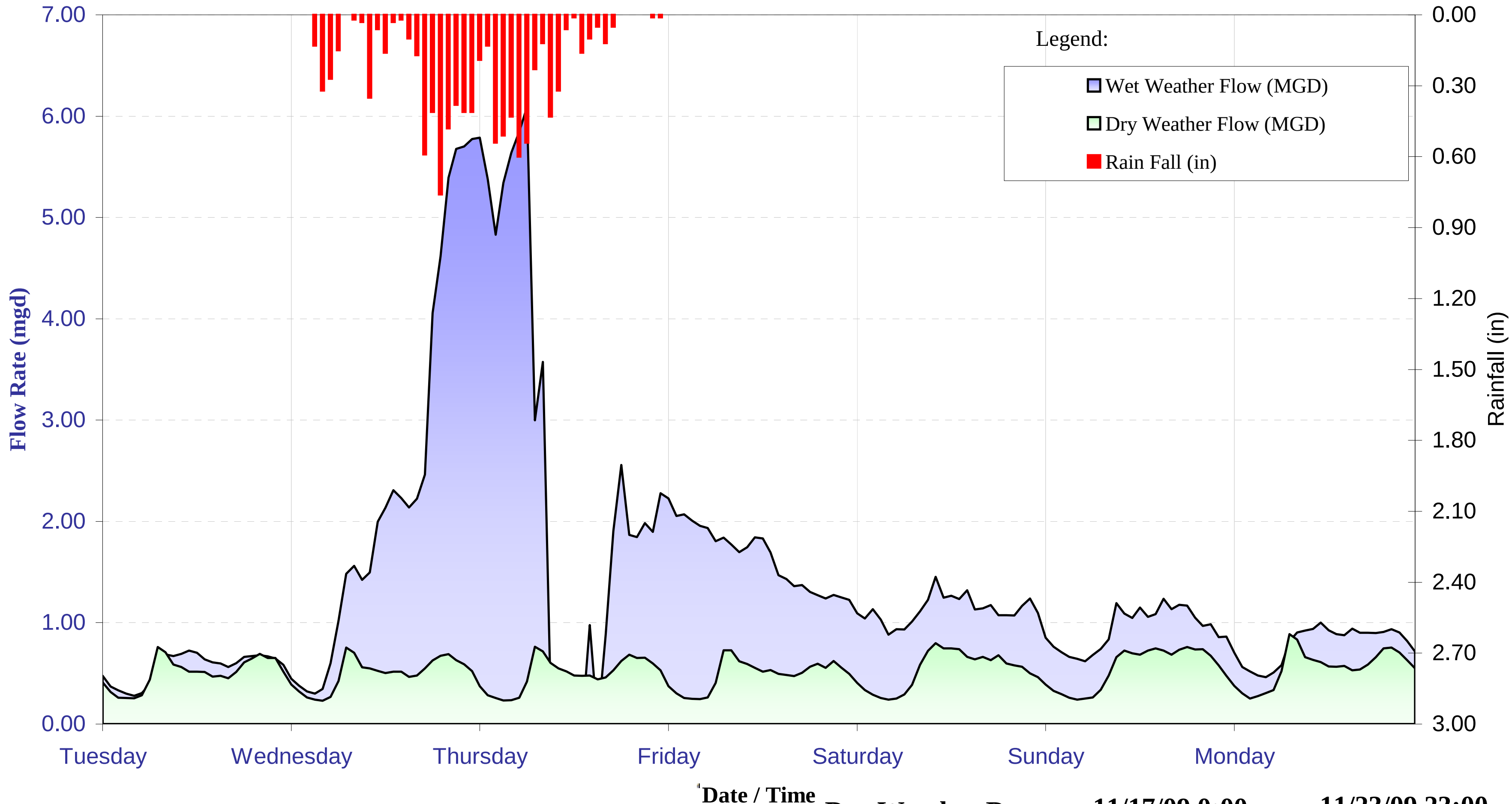
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** to **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** to **12/28/09 23:00**

Wet Weather Hydrograph
Site L113



rjngroup
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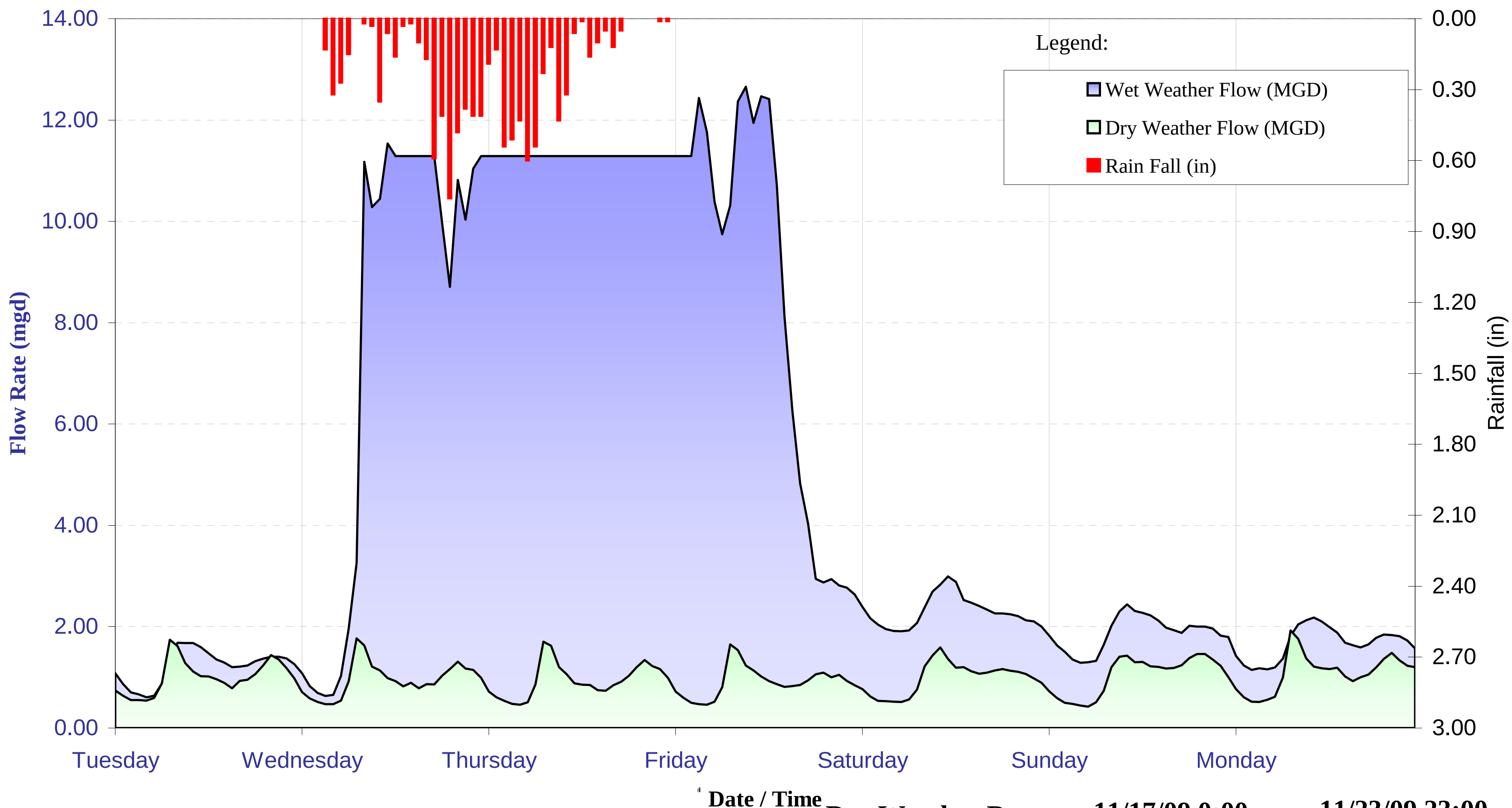
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** to **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** to **12/28/09 23:00**

Wet Weather Hydrograph
Site L114



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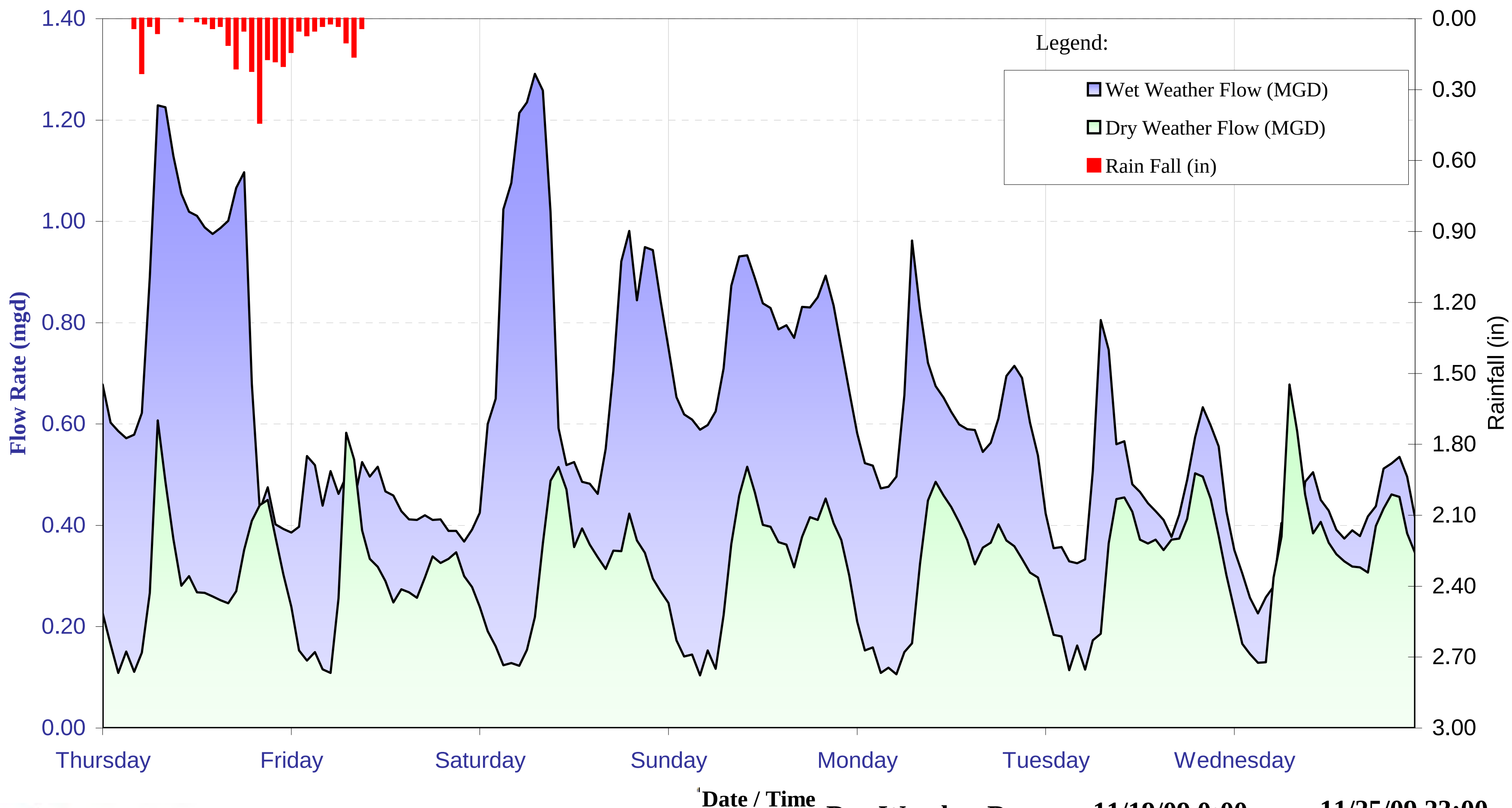
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**

Wet Weather Hydrograph
Site L116



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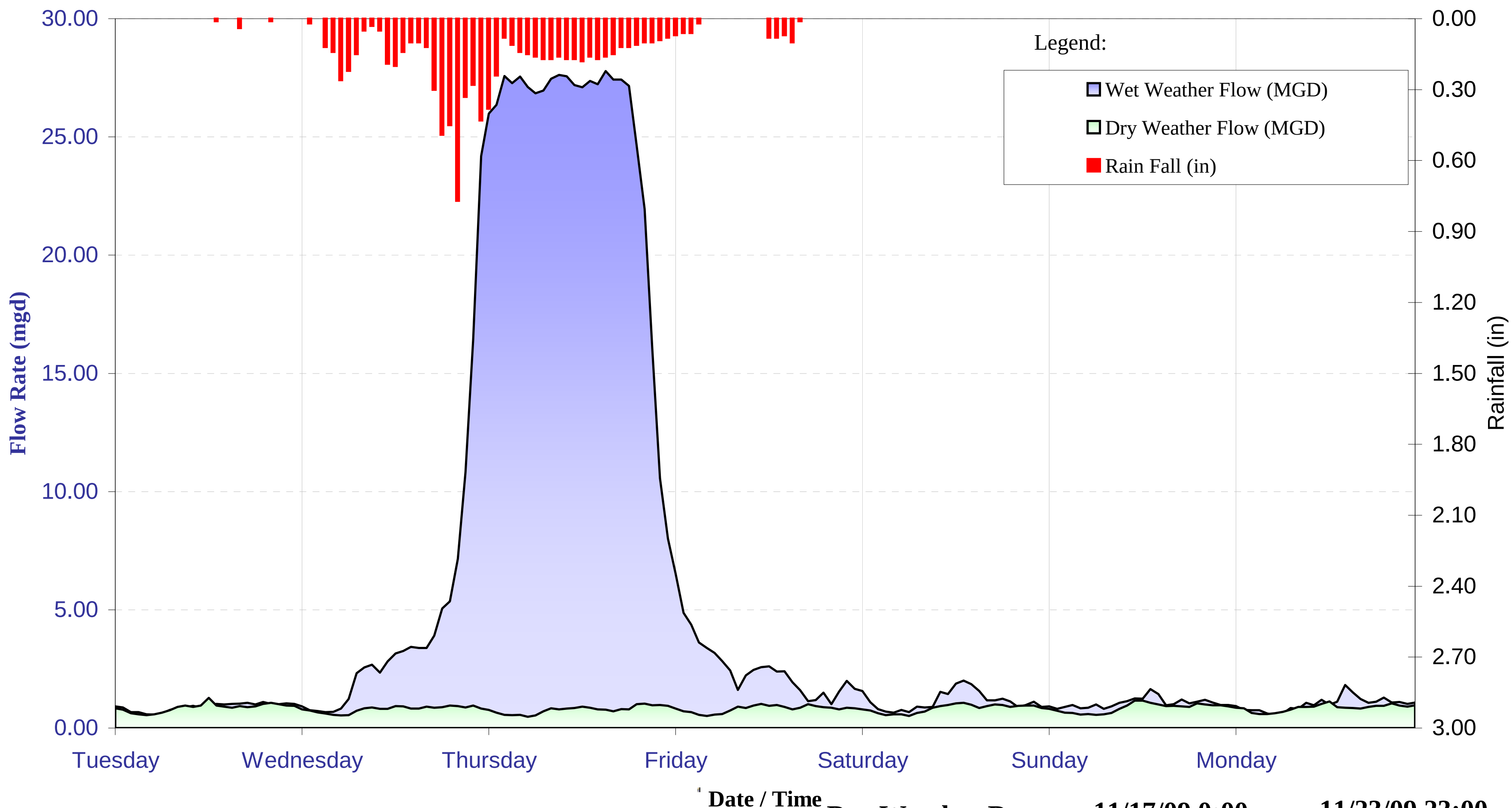
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/19/09 0:00**	**to**	**11/25/09 23:00**
Wet Weather Date:	**10/29/09 0:00**	**to**	**11/4/09 23:00**

Wet Weather Hydrograph
Site L117



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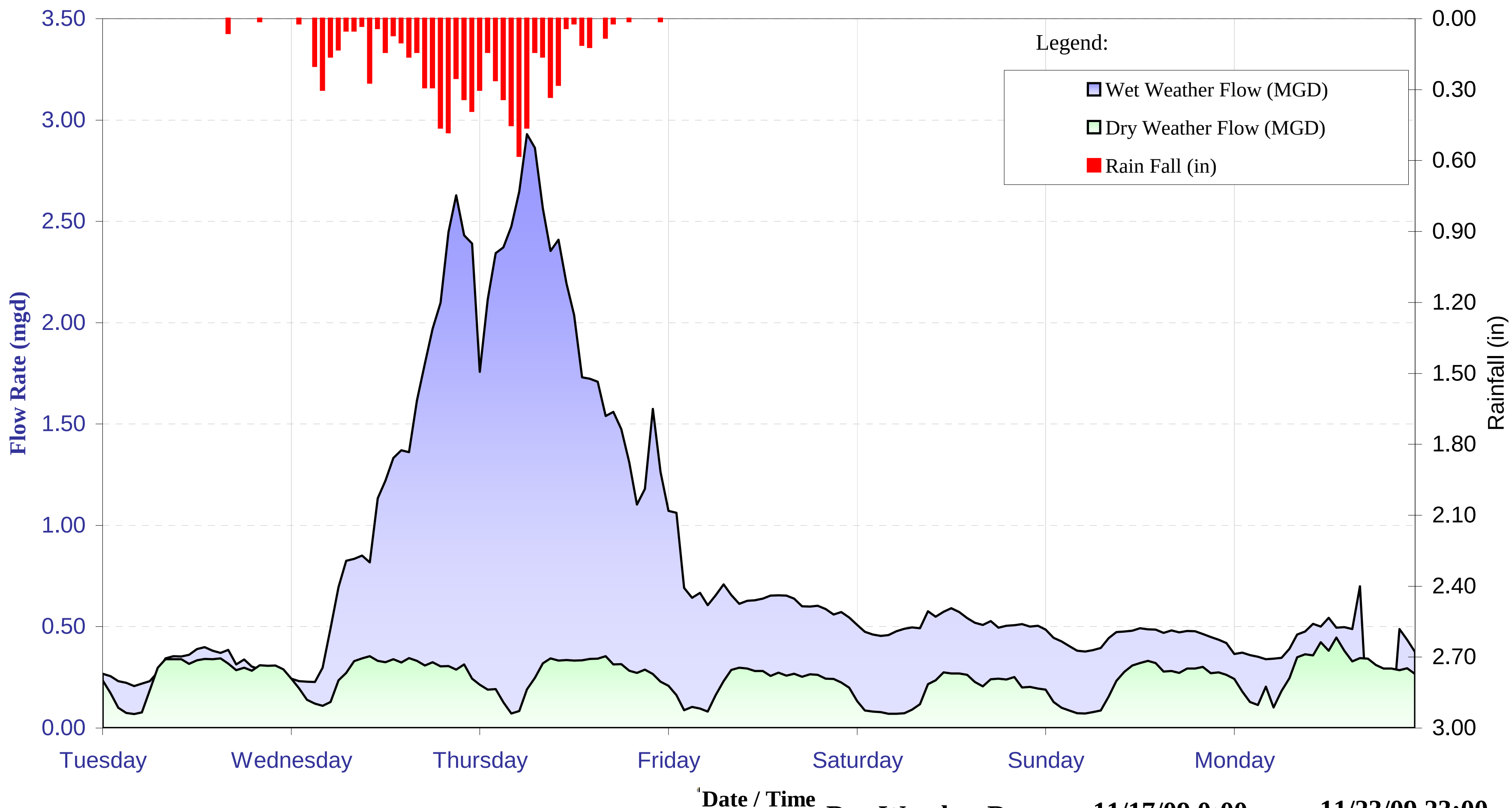
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: 11/17/09 0:00 to 11/23/09 23:00

Wet Weather Date: 12/22/09 0:00 to 12/28/09 23:00

Wet Weather Hydrograph
Site L118

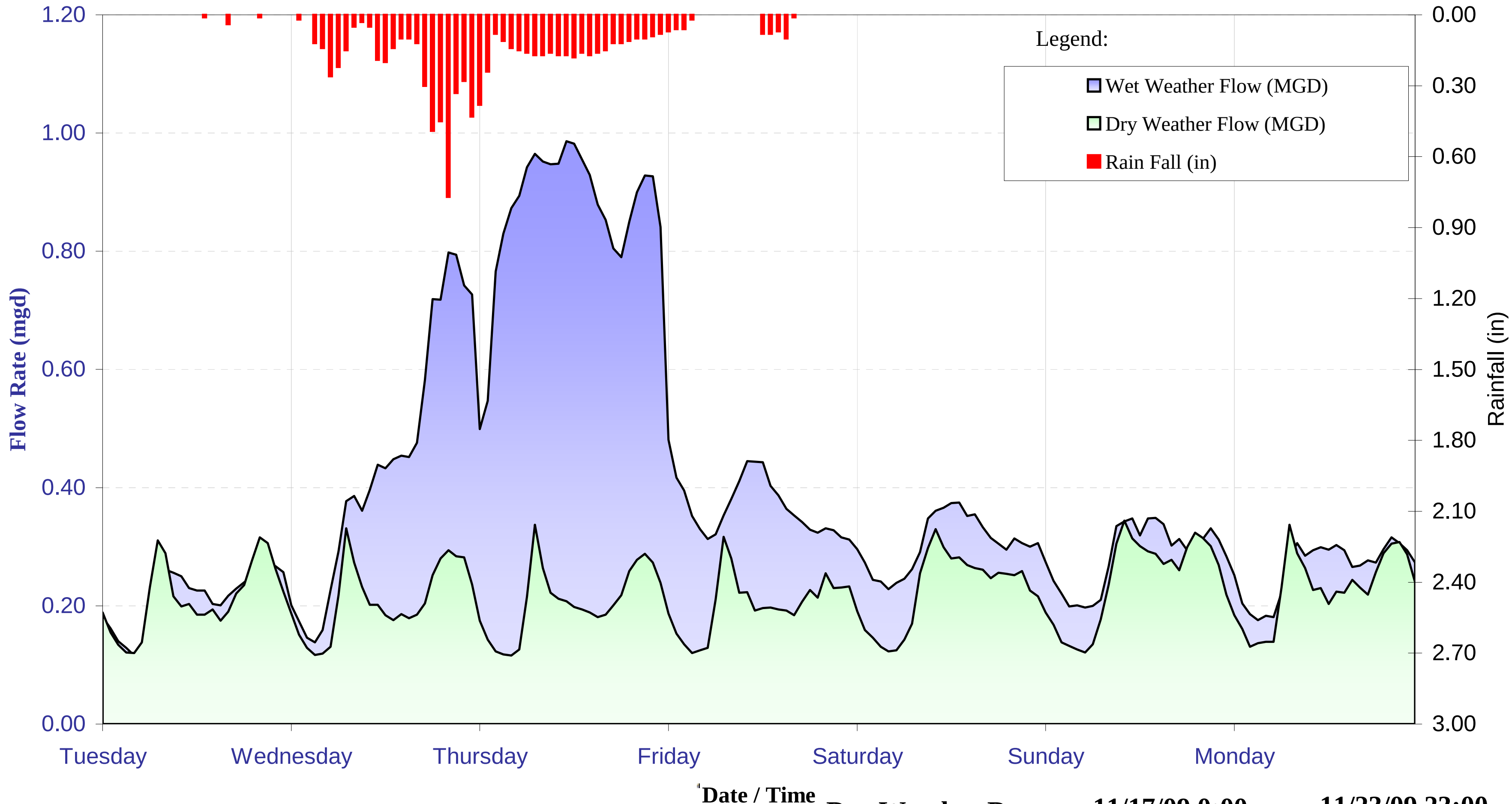


rjngroup
The Choice for Collection System Solutions

Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**

Wet Weather Hydrograph
Site L119

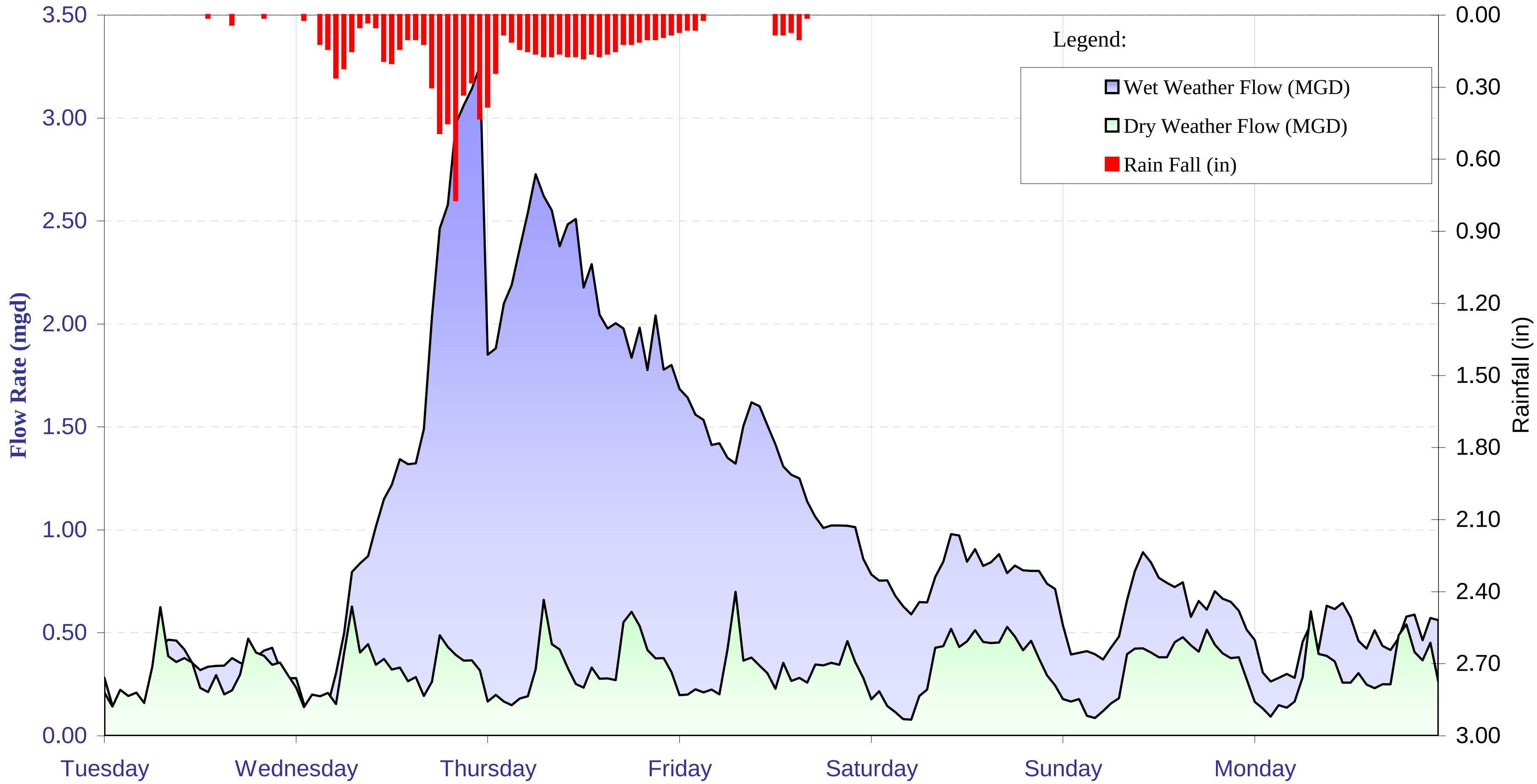


rjngroup
The Choice for Collection System Solutions

Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**

Wet Weather Hydrograph
Site L120



Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** to **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** to **12/28/09 23:00**

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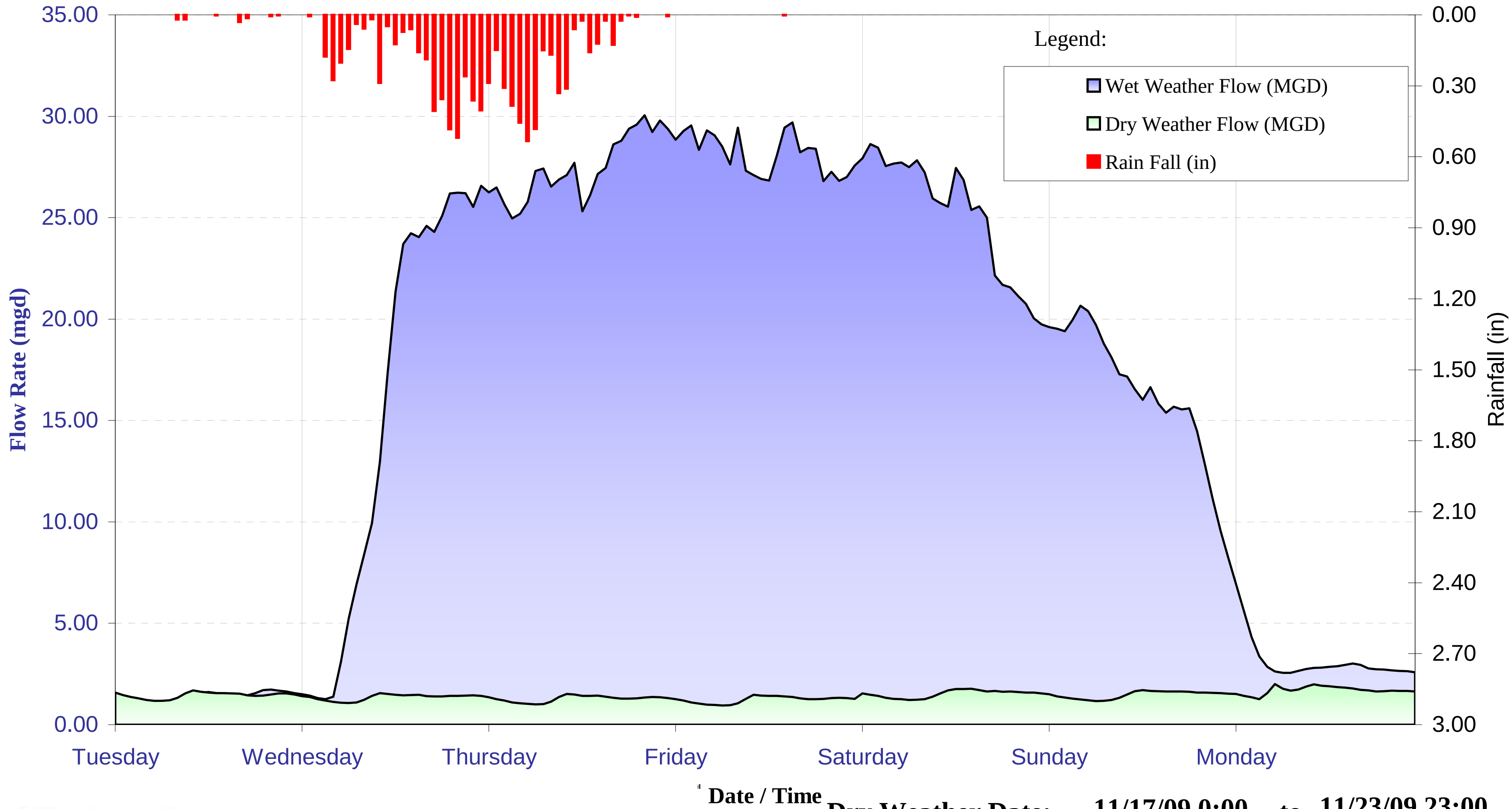
Wet Weather Hydrograph
Site L122

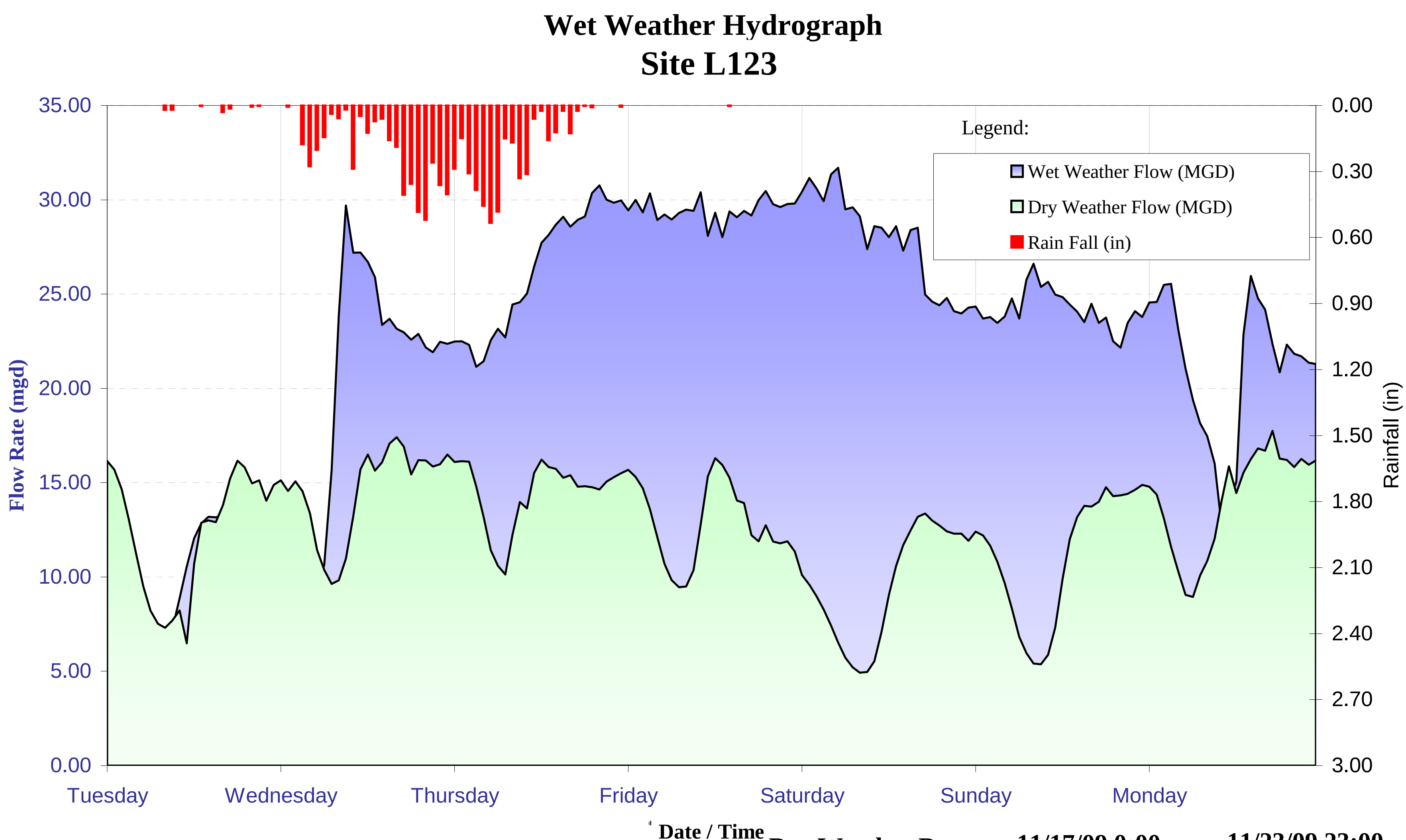


rjngroup
The Choice for Collection System Solutions

Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date: **11/17/09 0:00** to **11/23/09 23:00**

Wet Weather Date: **12/22/09 0:00** to **12/28/09 23:00**

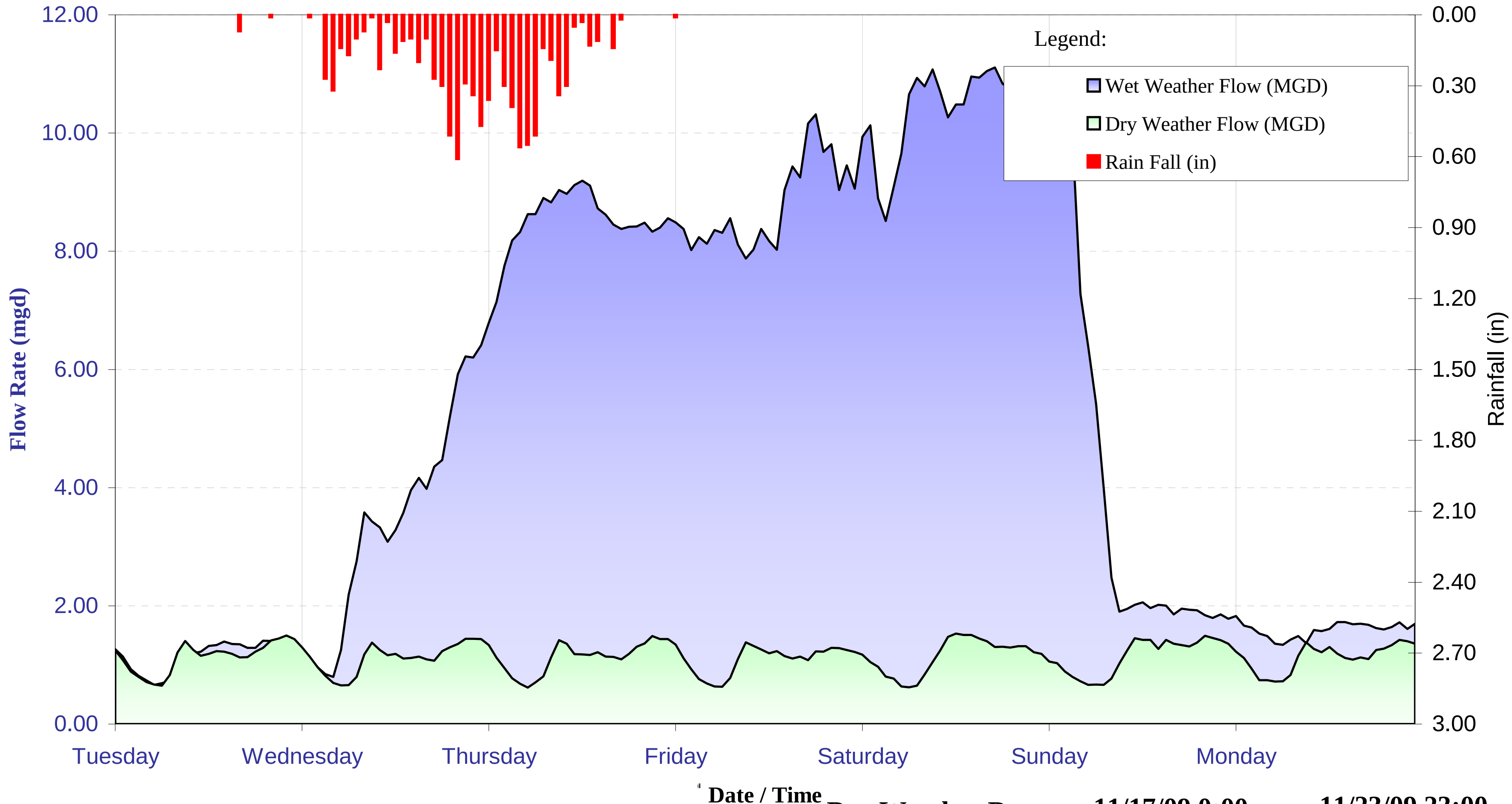


rjngroup
The Choice for Collection System Solutions

Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**

Wet Weather Hydrograph
Site L124



rjn group
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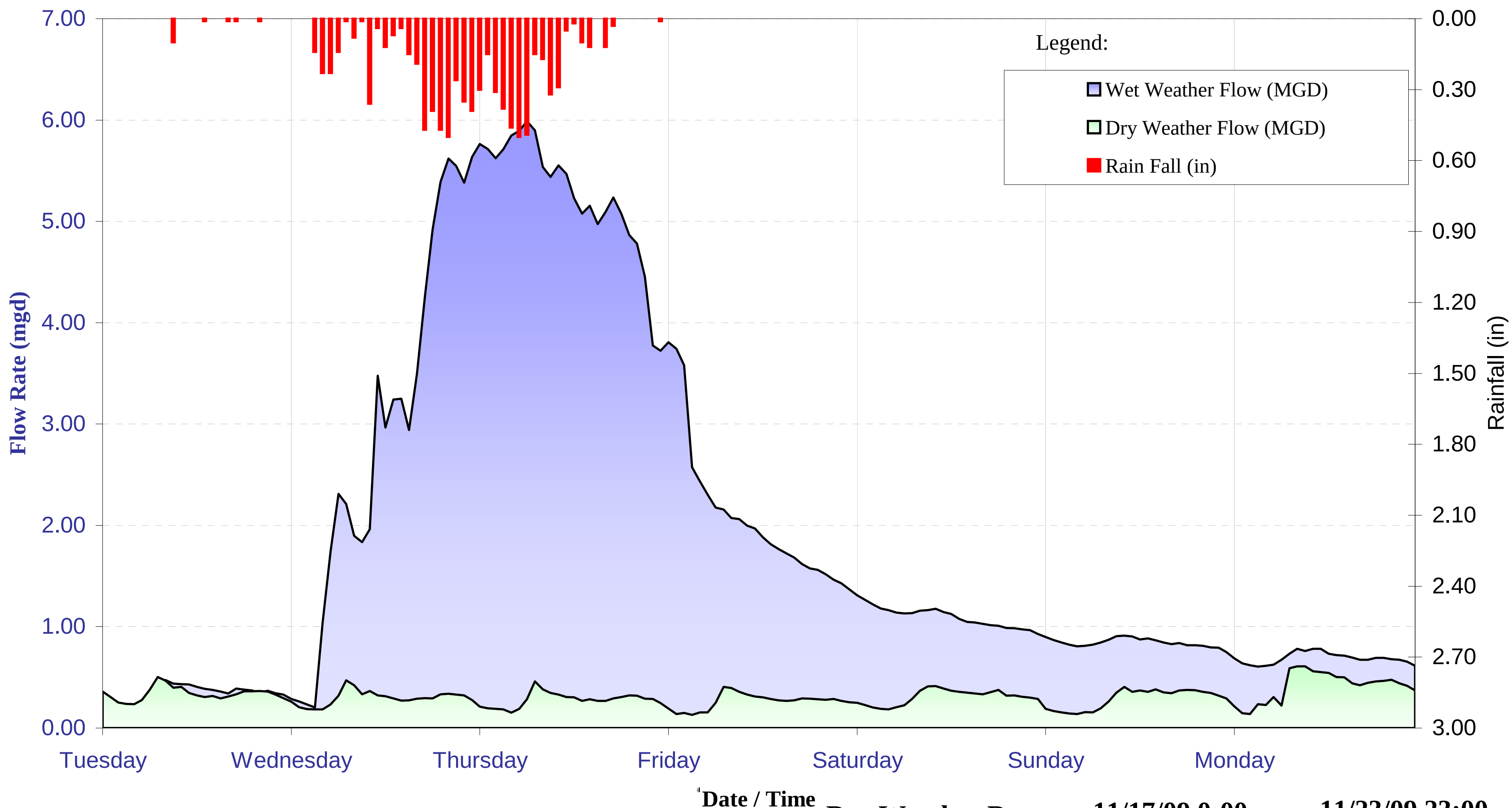
Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**

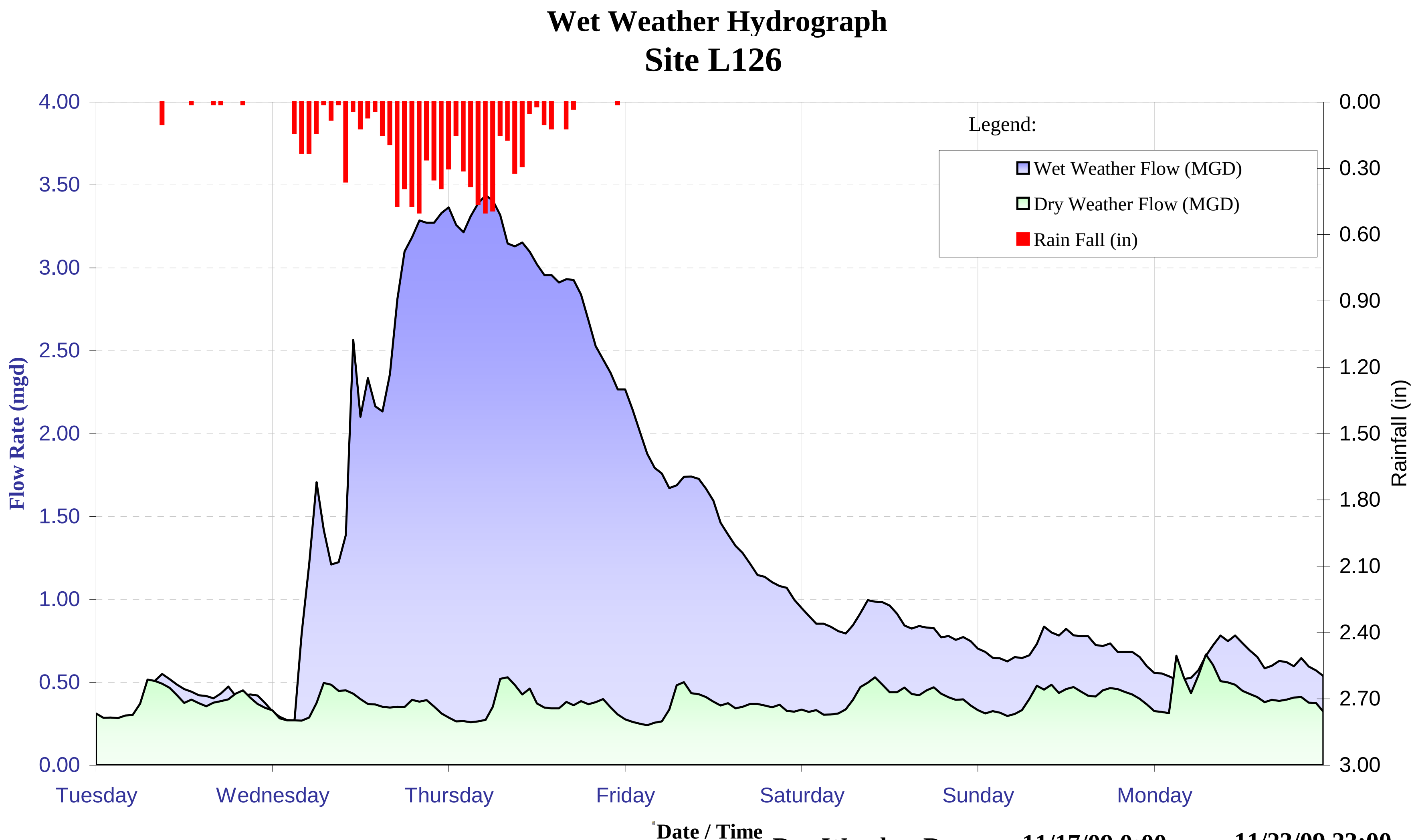
Wet Weather Hydrograph
Site L125



rjngroup
The Choice for Collection System Solutions

Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**



rjngroup
The Choice for Collection System Solutions

Little Rock, AR Flow Monitoring
18-2382-00

Dry Weather Date:	**11/17/09 0:00**	**to**	**11/23/09 23:00**
Wet Weather Date:	**12/22/09 0:00**	**to**	**12/28/09 23:00**

APPENDIX A

FLOW MONITORING SITE REPORTS

PART A - SITE INVESTIGATION

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

rjngroup — Excellence through Ownership

Site Name
LR001

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/23/09 13:34*	*0F003*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BE/JC/BO*				

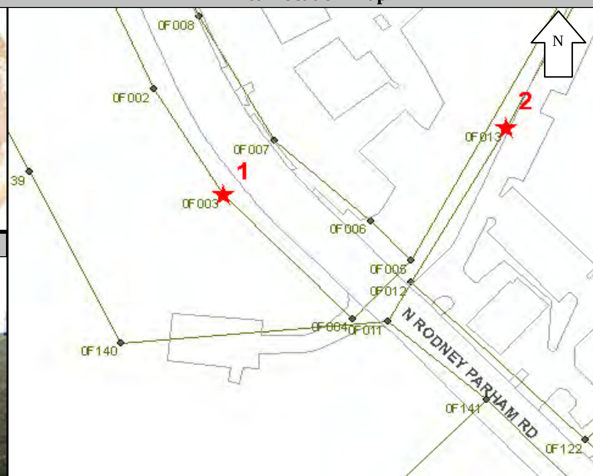
Site Address:	*9720 Rodney Parham (Butler Park)*	*9.83*	*4.00*	*24.06*	*24.06*

MH Type: *Concrete* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential	
Commercial	*Yes*
Industrial	

Measurements

Flow Depth:	*6.00*	inches
Instant Velocity:	*4.45*	fps
Surcharge Evidence:	*8.00*	feet

Debris

Silt Type:	*None*
Silt (in):	*0.0*
Needs Cleaning:	*No*

Hydraulic Influences

Backwater:		Straight:	*Yes*
Pump Station:		Bend:	
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

.

Safety Considerations

LEL %	*5.0*	O_2	*19.7*
CO	*5.0*	H_2S	*0*
Elevated MH:	*Yes*		
Height Elevated:	*2.0 ft*		
Structural Integrity:	*Good*		

Hydraulic Rating

A (good)

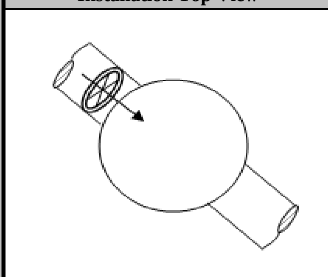
0

Recommended Equipment

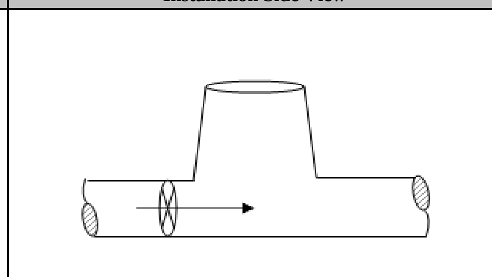
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*1.00 U/S*

PART B - SITE INSTALLATION

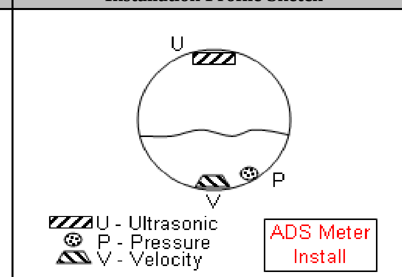
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site:	*Yes*
Recommended by FSP:	*Yes*

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

rjngroup Excellence through Ownership	**Little Rock, AR** **Flow Monitoring Services for Sanitary Sewer System**	**Site Name** LR002

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/23/09 14:00*	*0F013*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BE/JC/BO*	*14.45*	*3.89*	*15.00*	*14.94*

Site Address: *9720 North Rodney Parham Rd*

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements

Flow Depth:	2.94	inches
Instant Velocity:	1.34	fps
Surcharge Evidence:	3.00	feet

Debris

Silt Type:	None
Silt (in):	0.0
Needs Cleaning:	No

Hydraulic Influences

Backwater:		Straight:	Yes
Pump Station:		Bend:	
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

located beside drive at business park

Safety Considerations

LEL % 0.0 O_2 20.1

CO 0.0 H_2S 0

Elevated MH: Yes

Height Elevated: 2.1 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

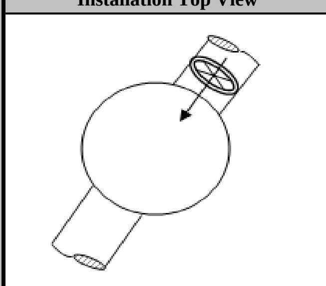
ripples

Recommended Equipment

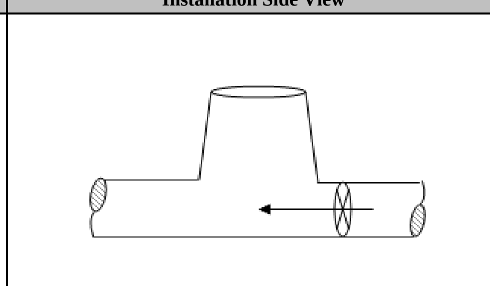
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.00 U/S

PART B - SITE INSTALLATION

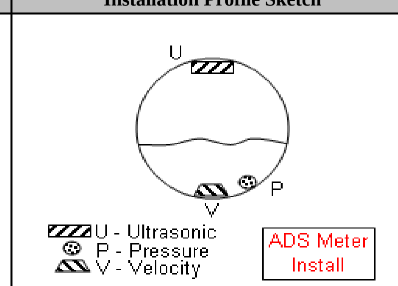
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

apparent remenants of sampler hose left in manhole above targeted pipe..installation possible (see photo #489)

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

rjngroup Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR002 R

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/29/09 10:12*	*18H003*	*U4*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BO*	*3.00*	*3.44*	*60.00*	*60.00*

Site Address: *4300 E. 9TH ST*

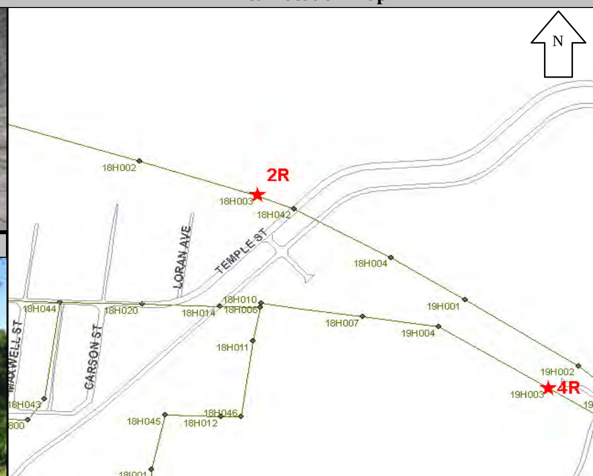
MH Type: *Concrete* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential

Commercial

Industrial *Yes*

Measurements			Debris		Hydraulic Influences			
Flow Depth:	*14.50*	inches	Silt Type:	*None*	Backwater:		Straight:	*Yes*
Instant Velocity:	*3.10*	fps	Silt (in):	*0.0*	Pump Station:		Bend:	
Surcharge Evidence:	*20.00*	feet	Needs Cleaning:	*No*	*WWTP:*	*Yes*	Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

LOCATED ON NORTH EDGE OF ROAD/IN EASEMENT

Safety Considerations

LEL % *0.0* O_2 *20.4*

CO *0.0* H_2S *0*

Elevated MH: *Yes*

Height Elevated: *4.0 ft*

Structural Integrity: *Good*

Hydraulic Rating

A (good)

GOOD SITE

Recommended Equipment

Meter Type: *ADS FlowShark*

Redundant Depth: *Yes*

Ultrasonic Depth: *Yes*

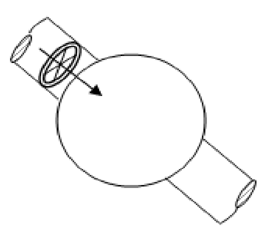
Pressure Depth: *Yes*

Velocity: *Yes*

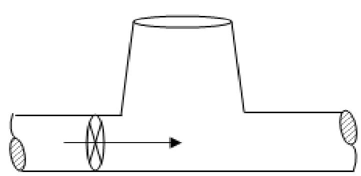
Location (ft): *2.00 U/S*

PART B - SITE INSTALLATION

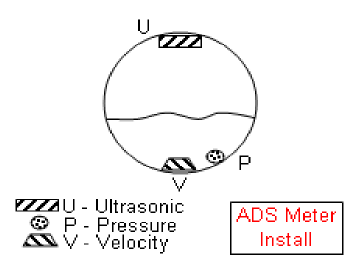
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

INSTALL 2'-3' UPSTREAM

Targeted Site: *Alternate*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR003

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/23/09 14:59	0F146	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BE/JC/BO				
Site Address: 9300 Treasure Hill Rd		7.70	5.02	18.50	18.50

MH Type: Concrete **Pipe Type:** PVC **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	4.36	inches	Silt Type:	None	Backwater:		Straight:	Yes
Instant Velocity:	3.20	fps	Silt (in):	0.0	Pump Station:		Bend:	
Surcharge Evidence:	0.00	feet	Needs Cleaning:	No	*WWTP:*		Drop Inlet:	

Site Feasibility

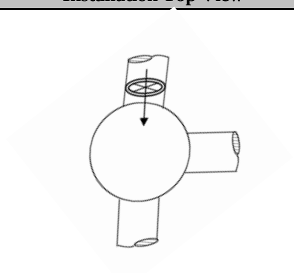
Site Access	Safety Considerations				Hydraulic Rating
FAIR (minor traffic, off-road)	LEL %	0.0	O_2	20.9	A (good)
Turn into complex, drive down to where it T's off. Take a left MH is going to be behind the apt building go around far left side of building cross the creek about 20 feet straight up into woods.	CO	0.0	H_2S	0	smooth
	Elevated MH:	Yes			
	Height Elevated:	3.0 ft			
	Structural Integrity:	Good			

Recommended Equipment

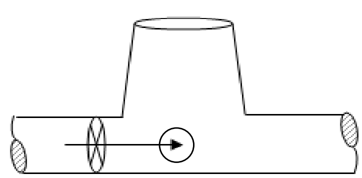
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.00 U/S

PART B - SITE INSTALLATION

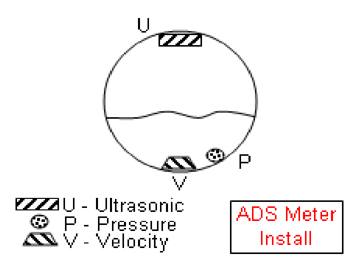
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site:	Yes
Recommended by FSP:	Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

Little Rock, AR	Site Name
Flow Monitoring Services for Sanitary Sewer System	LR003 R

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/29/09 9:07*	*19I003*	*T*

Muncipality	Inspected By	Manhole		Pipe	
		Depth (ft)	Width (ft)	Width (in)	Height (in)
Little Rock	*TB/BO*				
Site Address: *900 TEMPLE ST*		*3.00*	*4.08*	*58.00*	*57.25*

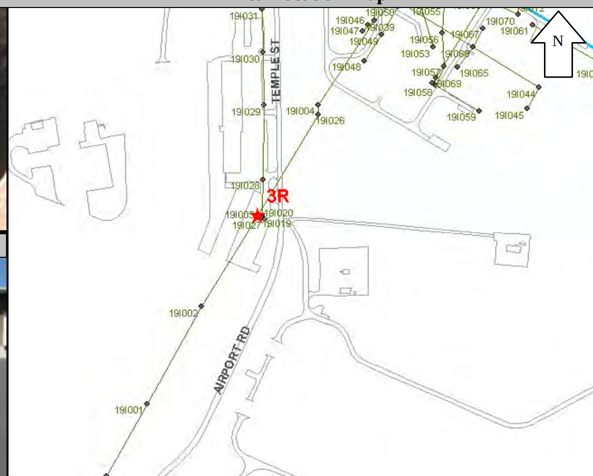
MH Type: *Concrete* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	
Industrial	*Yes*

Measurements			Debris		Hydraulic Influences			
Flow Depth:	*20.50*	inches	Silt Type:	*None*	Backwater:		Straight:	*Yes*
Instant Velocity:	*2.06*	fps	Silt (in):	*0.0*	Pump Station:		Bend:	
Surcharge Evidence:	*60.00*	feet	Needs Cleaning:	*No*	*WWTP:*	*Yes*	Drop Inlet:	*Yes*

Site Feasibility

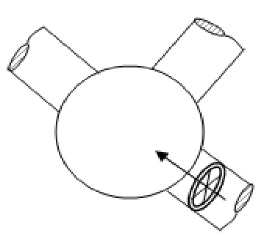
Site Access	Safety Considerations	Hydraulic Rating
GOOD (no problems accessing site)	LEL % *0.0* O_2 *19.1*	*A (good)*
LOCATED IN FRONT OF MALLORY ALEXANDER CARGO COMPANY	CO *0.0* H_2S *0* Elevated MH: *No* Height Elevated: *0.0 ft* Structural Integrity: *Fair*	*GOOD SITE/SURCHARGE OCCURENCES DUE TO WWTP @ D/S*

Recommended Equipment

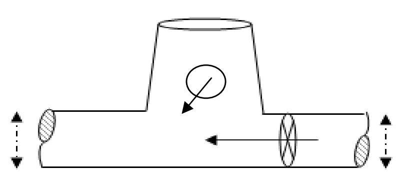
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*2.00 U/S*

PART B - SITE INSTALLATION

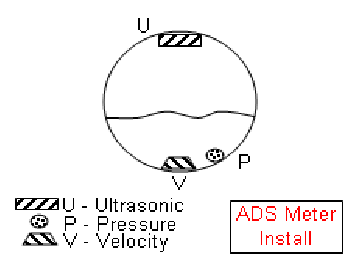
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

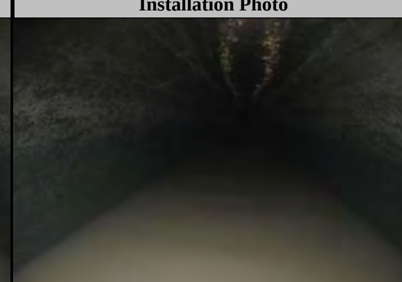
INSTALL 1-2' UPSTREAM

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

rjngroup — Excellence through Ownership

Site Name
LR004

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/23/09 10:40*	*1G076*	*U1*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BE/JC/BO*	*8.70*	*3.71*	*11.50*	*13.00*

Site Address: *9010 Markham*

MH Type: *Concrete* **Pipe Type:** *Concrete* **Pipe Shape:** *Odd*

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	*Yes*
Commercial	
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	*3.50*	inches	Silt Type:	*None*	Backwater:		Straight:	*Yes*
Instant Velocity:	*2.14*	fps	Silt (in):	*0.0*	Pump Station:		Bend:	
Surcharge Evidence:	*0.00*	feet	Needs Cleaning:	*No*	*WWTP:*		Drop Inlet:	

Site Feasibility

Site Access

TRAFFIC (extra traffic control needed)

Far right hand lane facing Burlington Coat Factory, cones nessasary, medium to heavy traffic at times.

Safety Considerations

LEL %	*0.0*	O_2	*20.9*
CO	*0.0*	H_2S	*0*

Elevated MH: *No*

Height Elevated: *0.0 ft*

Structural Integrity: *Good*

Hydraulic Rating

A (good)

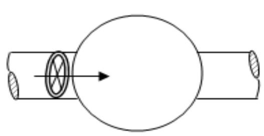
0

Recommended Equipment

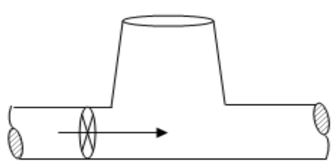
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*1.00 U/S*

PART B - SITE INSTALLATION

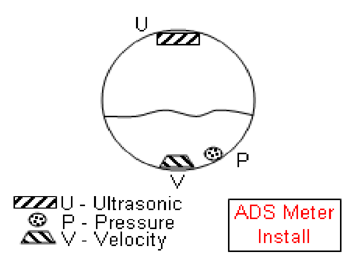
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

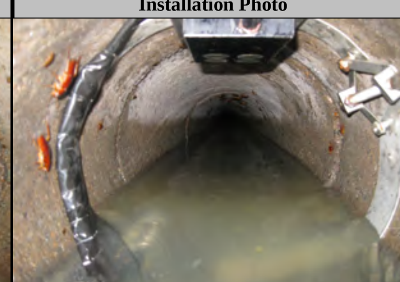
Install one foot upstream

Targeted Site: *Alternate*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo



Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

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Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR004 R

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/29/09 11:40*	*18J001*	*D2*

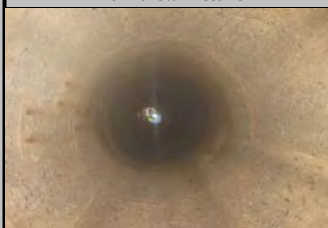
Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BO*	*2.00*	*5.00*	*58.25*	*57.25*

Site Address: *2400 DAVE GRUNDFEST RD*

MH Type: *Concrete* **Pipe Type:** *PVC* **Pipe Shape:** *Circular*

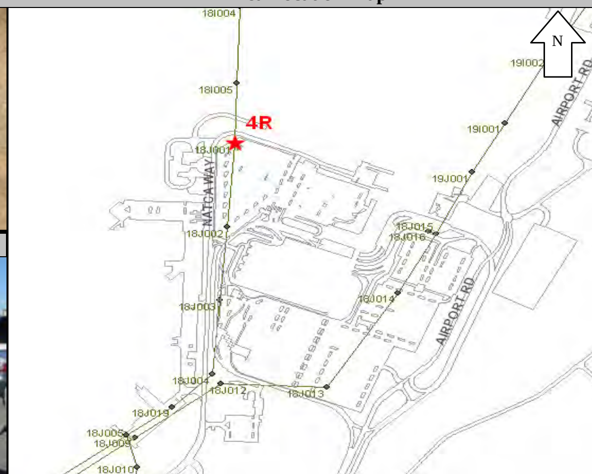
PART A - SITE INVESTIGATION

Plan View Picture



Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential

Commercial

Industrial *Yes*

Measurements			Debris		Hydraulic Influences	
Flow Depth:	*10.00*	inches	Silt Type:	*Soft*	Backwater:	Straight: *Yes*
Instant Velocity:	*1.24*	fps	Silt (in):	*3.0*	Pump Station:	Bend:
Surcharge Evidence:	*15.00*	feet	Needs Cleaning:	*Yes*	*WWTP:*	Drop Inlet:

Site Feasibility

Site Access

GOOD (no problems accessing site)

MH LOCATED INSIDE PEANUT PARKING LOT @ N/W CORNER BETWEEN PARKING SLOT 105 AND 100 IN SECTION "SS"

Safety Considerations

LEL % *0.0* O_2 *20.4*

CO *0.0* H_2S *0*

Elevated MH: *No*

Height Elevated: *0.0 ft*

Structural Integrity: *Good*

Hydraulic Rating

A (good)

SMOOTH FLOW

Recommended Equipment

Meter Type: *ADS FlowShark*

Redundant Depth: *Yes*

Ultrasonic Depth: *Yes*

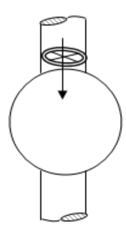
Pressure Depth: *Yes*

Velocity: *Yes*

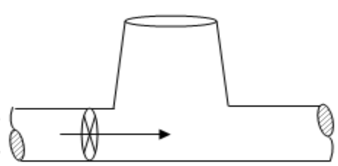
Location (ft): *2.00 U/S*

PART B - SITE INSTALLATION

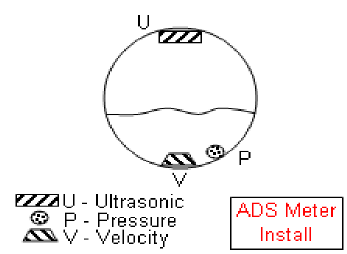
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

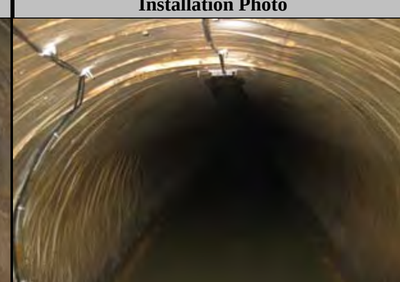
3" OF SILT IN PIPE. SENSORS SHOULD BE ROTATED TO AVOID INTERFERENCE

Targeted Site: *Alternate*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

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Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR005

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/23/09 11:19	1G119	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BE/JC/BO	7.93	4.83	38.81	35.81

Site Address: 300 John Barrow Rd

MH Type: Brick **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	15.75	inches	Silt Type:	None	Backwater:		Straight:	Yes
Instant Velocity:	3.29	fps	Silt (in):	0.0	Pump Station:		Bend:	
Surcharge Evidence:	0.00	feet	Needs Cleaning:	Yes	WWTP:		Drop Inlet:	

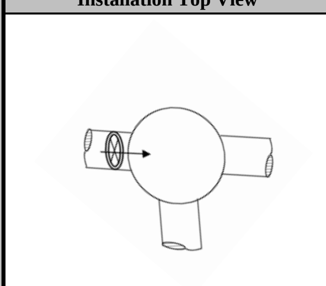
Site Feasibility

Site Access	Safety Considerations	Hydraulic Rating
FAIR (minor traffic, off-road)	LEL % 0.0 O_2 20.9	A (good)
-	CO 0.0 H_2S 0	SLIGHT RIPPLES
	Elevated MH: No	
	Height Elevated: 0.0 ft	
	Structural Integrity: Good	

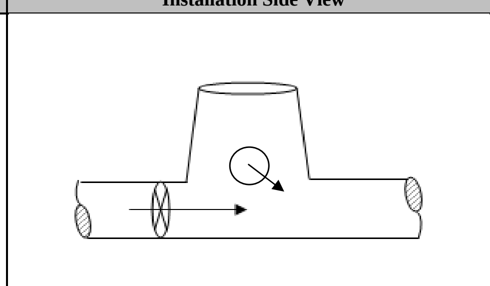
Recommended Equipment

Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.50 U/S

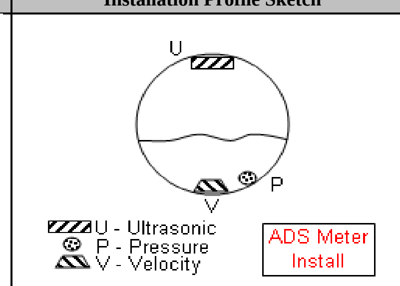
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

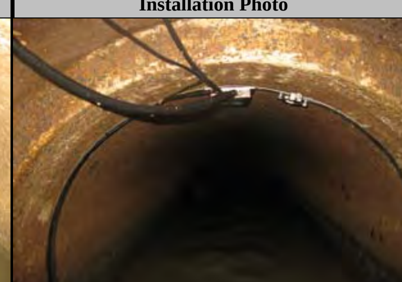
Standard

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo



PART A - SITE INVESTIGATION

PART B - SITE INSTALLATION

Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

Little Rock, AR	Site Name
Flow Monitoring Services for Sanitary Sewer System	LR005R

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	10/29/09 14:23	9F018	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/RB	42.00	4.00	42.00	41.87

Site Address: WATER WORKS ROAD

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements		Debris		Hydraulic Influences	
Flow Depth:	27.50 inches	Silt Type:	Soft	Backwater: Yes	Straight: Yes
Instant Velocity:	1.50 fps	Silt (in):	3.0	Pump Station: Yes	Bend:
Surcharge Evidence:	30.00 feet	Needs Cleaning:	No	WWTP:	Drop Inlet:

Site Feasibility

Site Access: GOOD (no problems accessing site)

SITE LOCATED BEHIND LITTLE LEAGUE BASEBALL PARK

Safety Considerations

LEL %	0.0	O_2	20.9
CO	0.0	H_2S	0

Elevated MH: No

Height Elevated: 0.0 ft

Structural Integrity: Good

Hydraulic Rating: A (good)

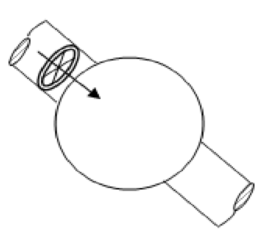
MH SHOWS SIGNS OF SURCHARGING

Recommended Equipment

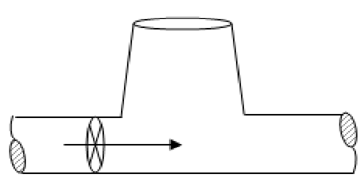
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.00 U/S

PART B - SITE INSTALLATION

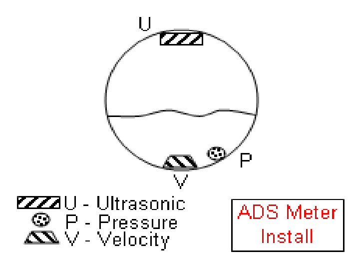
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

INSTALL SENSORS 12-16" IN UPSTREAM PIPE

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

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Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR006

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/23/09 12:13	1F056	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BE/JC/BO	8.50	4.04	12.00	12.00

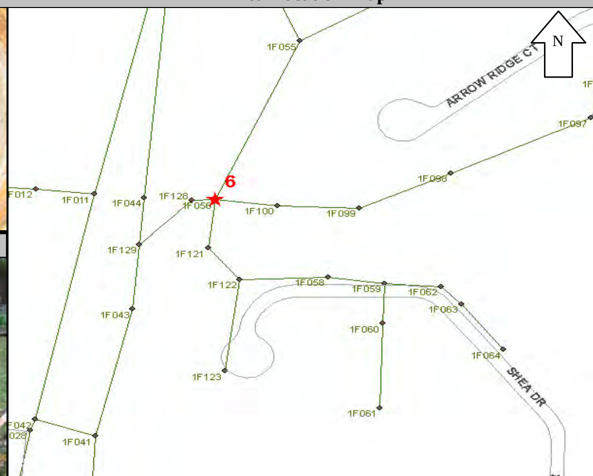
Site Address: 807 Shae

MH Type: Partial Brick & Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	2.12	inches	Silt Type:	None	Backwater:		Straight:	
Instant Velocity:	1.67	fps	Silt (in):	0.0	Pump Station:		Bend:	Yes
Surcharge Evidence:	0.00	feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

in back yard next to tree line

Safety Considerations

LEL % 0.0 O_2 20.9

CO 0.0 H_2S 0

Elevated MH: No

Height Elevated: 0.0 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

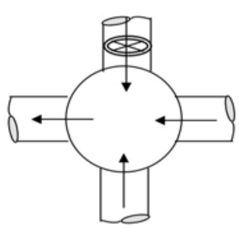
slight draw down at mouth of pipe

Recommended Equipment

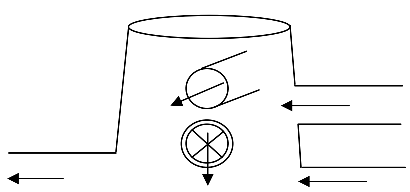
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	0.00

PART B - SITE INSTALLATION

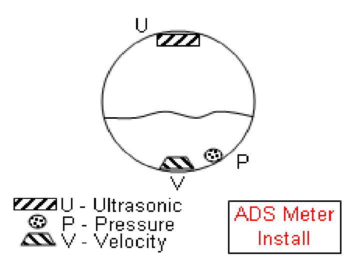
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site:	Yes
Recommended by FSP:	Yes

Investigation Photo

Installation Photo

Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

PART A - SITE INVESTIGATION

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

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Site Name
LR006R

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	10/29/09 15:13	5M019	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/RB				

Site Address:				
4800 MABELVALE PIKE RD	48.00	4.00	47.94	47.94

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements

Flow Depth:	21.50	inches
Instant Velocity:	1.23	fps
Surcharge Evidence:	19.00	feet

Debris

Silt Type:	None
Silt (in):	0.0
Needs Cleaning:	No

Hydraulic Influences

Backwater:	Yes	Straight:	Yes
Pump Station:	Yes	Bend:	
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

ACCESS CITY GATE. KEYS REQUIRED

Safety Considerations

LEL %	0.0	O_2	20.5
CO	0.0	H_2S	0
Elevated MH:	No		
Height Elevated:	0.0 ft		
Structural Integrity:	Good		

Hydraulic Rating

A (good)

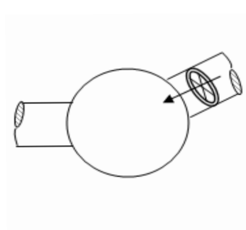
MH SHOWS SIGNS OF REGULAR SURCHARGING

Recommended Equipment

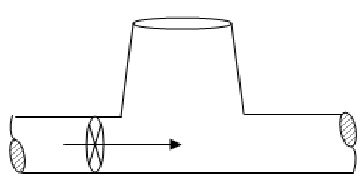
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.50 U/S

PART B - SITE INSTALLATION

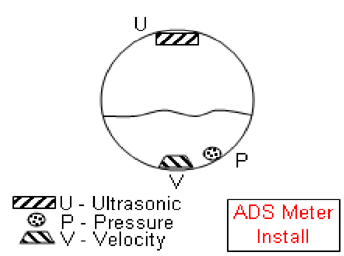
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

INSTALL SENSORS 1-2' UPSTREAM

Targeted Site:	Yes
Recommended by FSP:	Yes

Investigation Photo

Installation Photo

Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

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Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR007

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/23/09 15:25	2G044	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BE/JC/BO	12.70	3.98	15.00	15.00

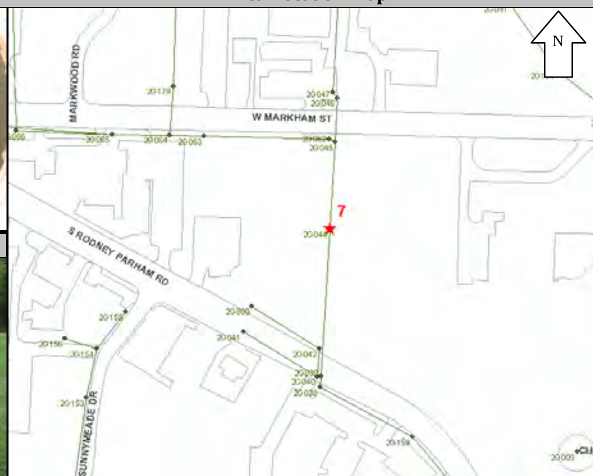
Site Address: 212 Rodney Parham RD

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements

Flow Depth:	5.00	inches
Instant Velocity:	1.90	fps
Surcharge Evidence:	0.00	feet

Debris

Silt Type:	None
Silt (in):	0.0
Needs Cleaning:	No

Hydraulic Influences

Backwater:		Straight:	Yes
Pump Station:		Bend:	
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

in ball field across from progressive auto insurance.

Safety Considerations

LEL % 3.0 O_2 20.4

CO 0.0 H_2S 0

Elevated MH: No

Height Elevated: 0.0 ft

Structural Integrity: Good

Hydraulic Rating

B (questionable)

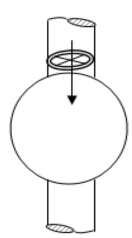
flow is bumpy

Recommended Equipment

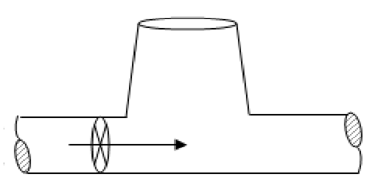
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.00 U/S

PART A - SITE INVESTIGATION

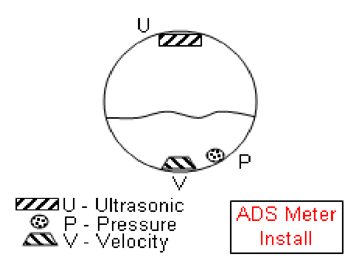
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

PART B - SITE INSTALLATION

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

rjngroup
Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR007R

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*10/29/09 15:20*	*6M001*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/RB*	*48.00*	*4.00*	*47.06*	*48.00*

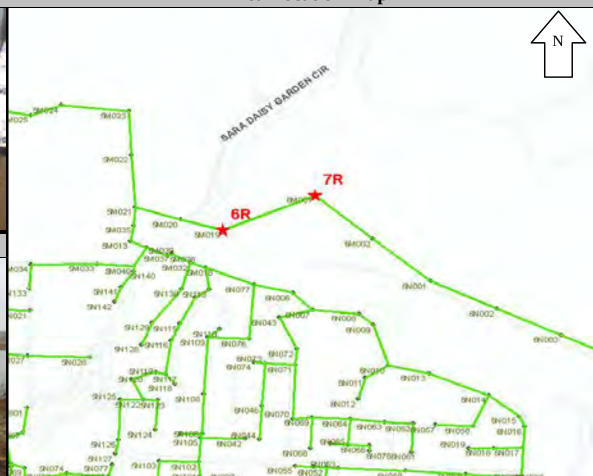
Site Address: *4800 MABELVALE PIKE*

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential

Commercial Yes

Industrial

Measurements

Flow Depth:	34.50	inches
Instant Velocity:	0.60	fps
Surcharge Evidence:	15.00	feet

Debris

Silt Type:	None
Silt (in):	0.0
Needs Cleaning:	No

Hydraulic Influences

Backwater:	Yes	Straight:	
Pump Station:	Yes	Bend:	
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

OFFROAD/MUDDY

Safety Considerations

LEL % 0.0 O_2 20.9

CO 0.0 H_2S 0

Elevated MH: Yes

Height Elevated: 2.0 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

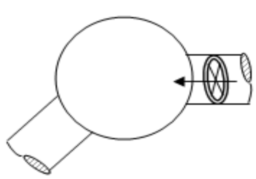
MH HAS EVIDENCE OF CONSTANT SURCHARGING

Recommended Equipment

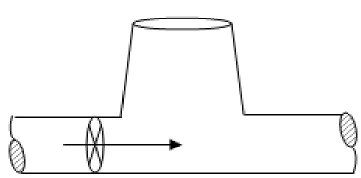
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.50 U/S

PART A - SITE INVESTIGATION

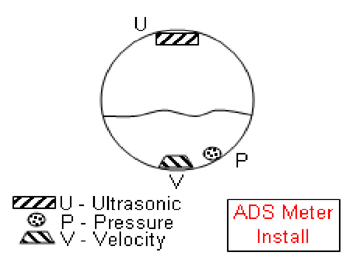
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

INSTALL SENSORS 1-2' UPSTREAM

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

0

Installation Photo

PART B - SITE INSTALLATION

Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

rjngroup
Excellence through Ownership

Little Rock, AR
Flow Monitoring Services for Sanitary Sewer System

Site Name
LR008

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/24/09 8:01	3H011	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BO				
Site Address: 7510 Ouchita Dr.		13.30	3.56	12.00	12.00

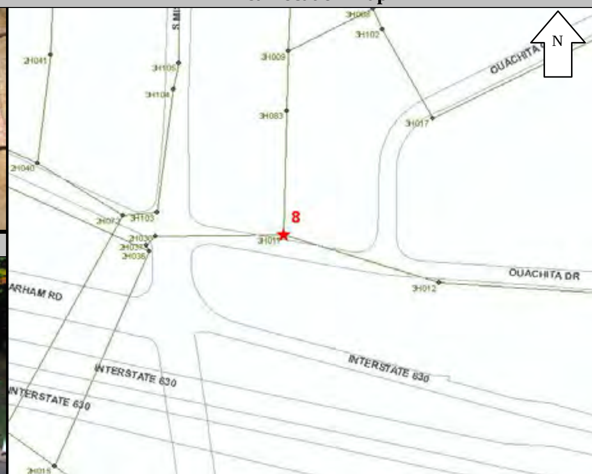
MH Type: Brick **Pipe Type:** Concrete **Pipe Shape:** Circular

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	2.25	inches	Silt Type:	None	Backwater:		Straight:	
Instant Velocity:	1.32	fps	Silt (in):	0.0	Pump Station:		Bend:	Yes
Surcharge Evidence:	no	feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

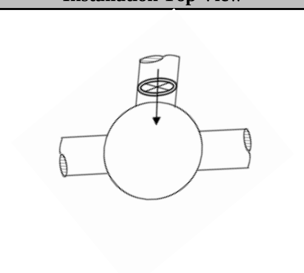
Site Access	Safety Considerations	Hydraulic Rating
GOOD (no problems accessing site)	LEL % 0.0 O_2 20.9	A (good)
90 degree bend in pipe	CO 0.0 H_2S 0	smooth
	Elevated MH: No	
	Height Elevated: 0.0 ft	
	Structural Integrity: Fair	

Recommended Equipment

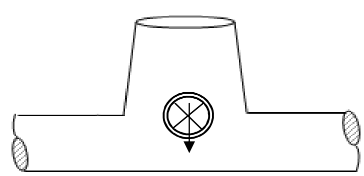
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	0.50 U/S

PART B - SITE INSTALLATION

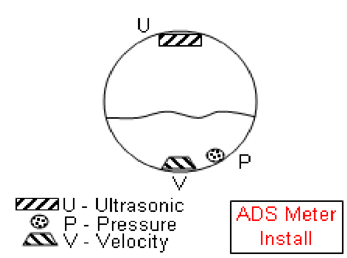
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

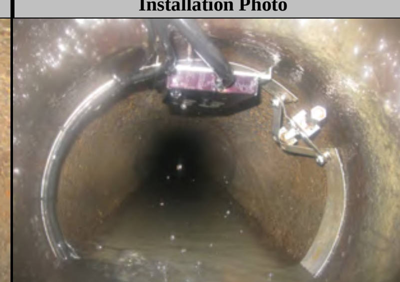
6" to 8" up stream

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

rjngroup
Excellence through Ownership

Little Rock, AR
Flow Monitoring Services for Sanitary Sewer System

Site Name: LR008R

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*11/11/09 13:42*	.	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BO*	*4.00*	*3.50*	*41.75*	*41.75*

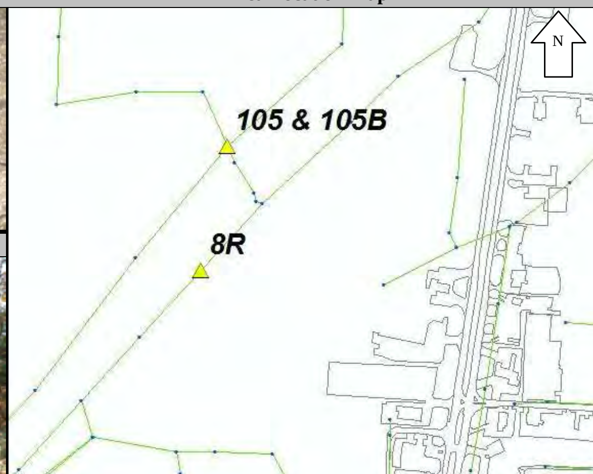
Site Address: .

MH Type: *Concrete* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00
0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	
Industrial	*Yes*

Measurements

Flow Depth:	*15.75*	inches
Instant Velocity:	*2.75*	fps
Surcharge Evidence:	*21.00*	feet

Debris

Silt Type:	*None*
Silt (in):	*0.0*
Needs Cleaning:	*No*

Hydraulic Influences

Backwater:		Straight:	*Yes*
Pump Station:		Bend:	
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

POOR (remote, steep bank, parking

Access from university dr thru gate, down easement, over wash out and 350' past elevated manhole

Safety Considerations

LEL % *0.0* O_2 *19.9*

CO *0.0* H_2S *0*

Elevated MH: *Yes*

Height Elevated: *3.8 ft*

Structural Integrity: *Good*

Hydraulic Rating

A (good)

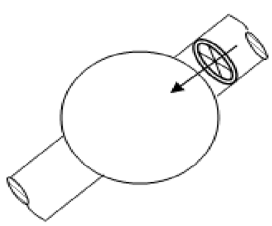
Good Hydraulics

Recommended Equipment

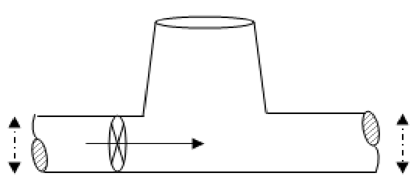
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*0.50 U/S*

PART A - SITE INVESTIGATION

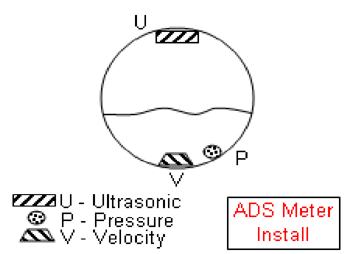
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

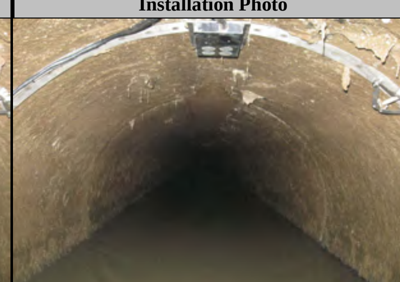
Install sensors 6-8" in upstream pipe

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo



PART B - SITE INSTALLATION

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

Little Rock, AR	Site Name
Flow Monitoring Services for Sanitary Sewer System	LR009

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/24/09 8:37	2J066	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BO	5.50	3.91	15.00	15.06

Site Address: 7800 25th St.

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	2.88	inches	Silt Type:	None	Backwater:		Straight:	Yes
Instant Velocity:	4.62	fps	Silt (in):	0.0	Pump Station:		Bend:	
Surcharge Evidence:	NO	feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

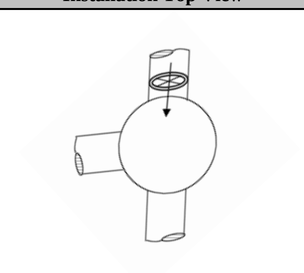
Site Access	Safety Considerations				Hydraulic Rating
FAIR (minor traffic, off-road)	LEL %	0.0	O_2	20.9	A (good)
-	CO	0.0	H_2S	0	SMOOTH
	Elevated MH:	Yes			
	Height Elevated:	3.0 ft			
	Structural Integrity:	Good			

Recommended Equipment

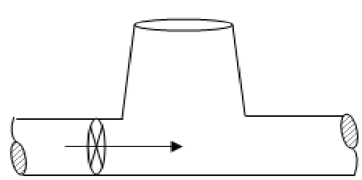
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	0.50 U/S

PART B - SITE INSTALLATION

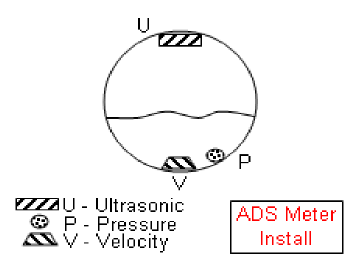
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR009R

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	11/12/09 7:59	6L011	A

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BO	4.00	4.08	47.88	48.18

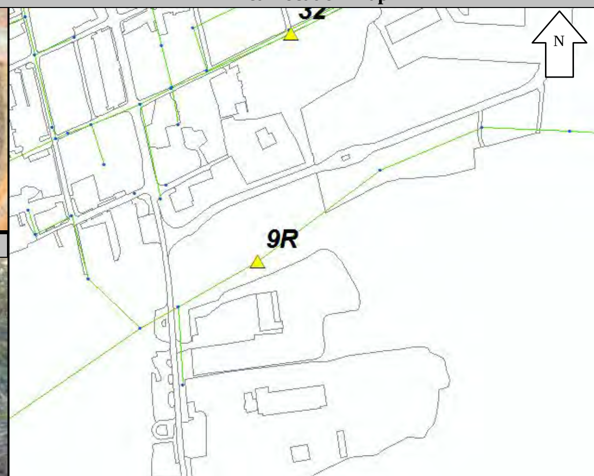
Site Address: *Mabelvale Pike*

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	Yes

Measurements			Debris		Hydraulic Influences	
Flow Depth:	24.00	inches	Silt Type:	None	Backwater:	Straight: Yes
Instant Velocity:	2.32	fps	Silt (in):	0.0	Pump Station:	Bend:
Surcharge Evidence:	9.00	feet	Needs Cleaning:	No	*WWTP:*	Drop Inlet:

Site Feasibility

Site Access

POOR (remote, steep bank, parking

Manhole is down and in middle of creek.

Safety Considerations

LEL % 0.0 O_2 20.9

CO 0.0 H_2S 0

Elevated MH: Yes

Height Elevated: 3.0 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

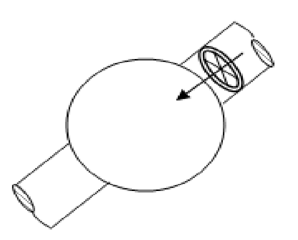
0

Recommended Equipment

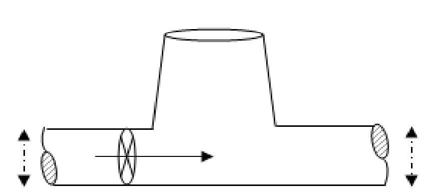
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.80 U/S

PART B - SITE INSTALLATION

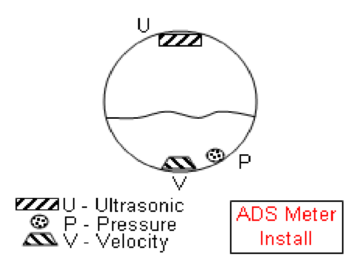
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR010

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/24/09 9:11	2K143	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BO	5.09	3.89	18.25	18.88

Site Address: 3427 WYNNE

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	
Industrial	

Measurements

Flow Depth:	5.00	inches
Instant Velocity:	1.63	fps
Surcharge Evidence:	5.09	feet

Debris

Silt Type:	None
Silt (in):	0.0
Needs Cleaning:	No

Hydraulic Influences

Backwater:		Straight:	Yes
Pump Station:		Bend:	
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

SIDE YARD BESIDE DRAINAGE DITCH

Safety Considerations

LEL %	0.0	O_2	20.9
CO	0.0	H_2S	0

Elevated MH: Yes

Height Elevated: 1.3 ft

Structural Integrity: Good

Hydraulic Rating

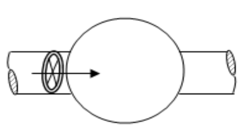
A (good)

SMOOTH

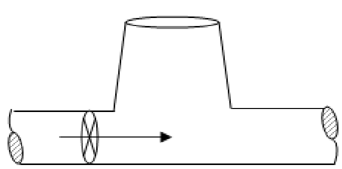
Recommended Equipment

Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	0.50 U/S

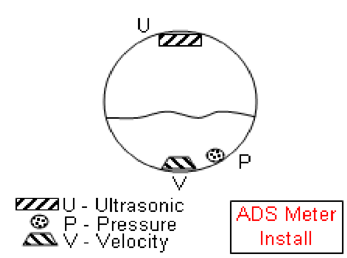
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

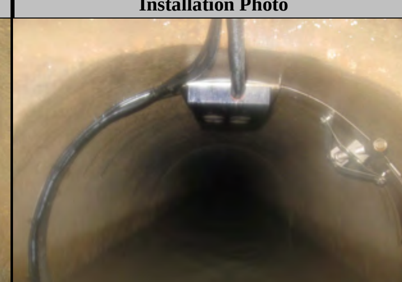
6 TO 8 INCHES UP STREAM

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

PART B - SITE INSTALLATION

rjngroup
Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR010R

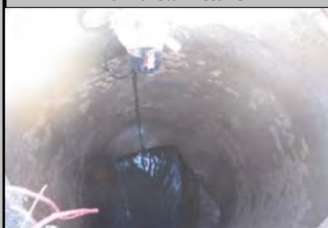
Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*11/12/09 8:09*	*3I007*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BO*	15.60	6.00	42.96	43.00

Site Address: *1801 Leander Rd*

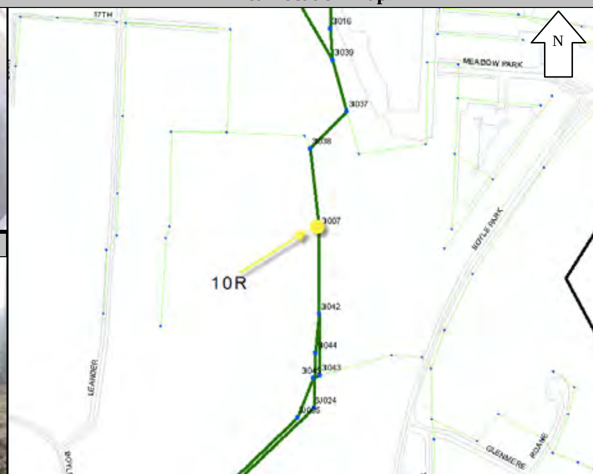
MH Type: *Brick* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

Plan View Picture



Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	*Yes*
Industrial	*Yes*

Measurements			Debris		Hydraulic Influences			
Flow Depth:	*14.00*	inches	Silt Type:	*None*	Backwater:		Straight:	
Instant Velocity:	*4.78*	fps	Silt (in):	*0.0*	Pump Station:		Bend:	*Yes*
Surcharge Evidence:	*3.00*	feet	Needs Cleaning:	*No*	*WWTP:*		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

Drive through gate and down trail

Safety Considerations

LEL %	*0.0*	O_2	*20.9*
CO	*0.0*	H_2S	*0*

Elevated MH: *Yes*

Height Elevated: *1.0 ft*

Structural Integrity: *Good*

Hydraulic Rating

A (good)

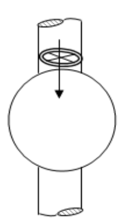
.

Recommended Equipment

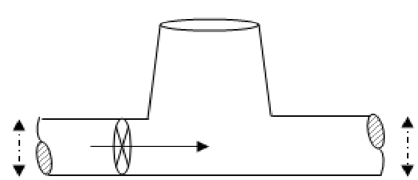
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*1.80 U/S*

PART A - SITE INVESTIGATION

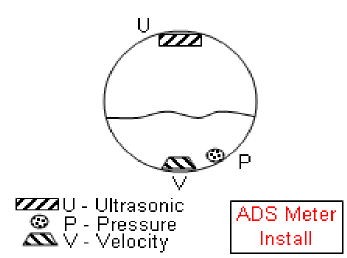
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo

PART B - SITE INSTALLATION

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

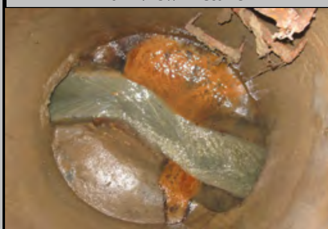
rjngroup Excellence through Ownership	Little Rock, AR Flow Monitoring Services for Sanitary Sewer System	Site Name LR012

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/24/09 10:29	3M004	D1

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BO				
Site Address: FAIRWAYS DRIVE		6.99	4.00	15.00	15.00

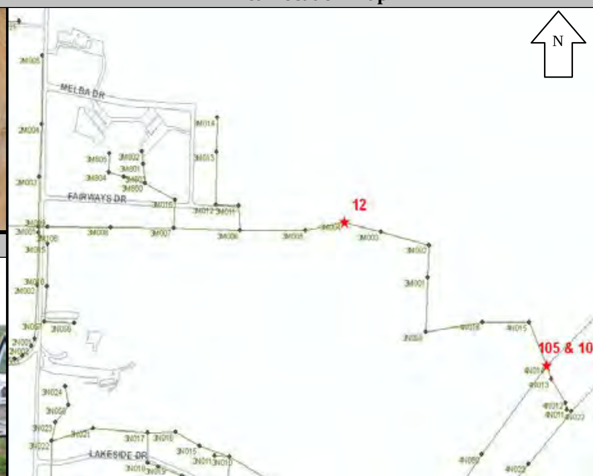
MH Type: Brick **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture



Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	
Industrial	

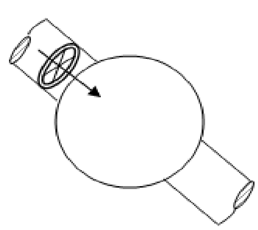
Measurements		Debris		Hydraulic Influences			
Flow Depth:	2.75 inches	Silt Type:	None	Backwater:		Straight:	
Instant Velocity:	1.22 fps	Silt (in):	0.0	Pump Station:		Bend:	Yes
Surcharge Evidence:	3.50 feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

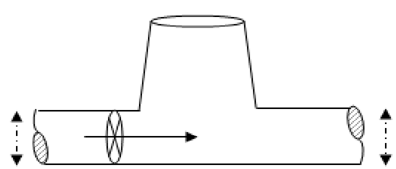
Site Access	Safety Considerations	Hydraulic Rating	Recommended Equipment
FAIR (minor traffic, off-road)	LEL % 0.0 O_2 20.9	A (good)	Meter Type: ADS FlowShark
700' EAST OF ADDRESS/SITE IS LOCATED 1 MH D/S OF TARGETED SITE	CO 0.0 H_2S 0	SLIGHT S CURVE AT MANHOLE INVERT WILL NOT AFFECT HYDRAULIC CONDITIONS	Redundant Depth: Yes
	Elevated MH: No		Ultrasonic Depth: Yes
	Height Elevated: 0.0 ft		Pressure Depth: Yes
	Structural Integrity: Fair		Velocity: Yes
			Location (ft): 1.00 U/S

PART B - SITE INSTALLATION

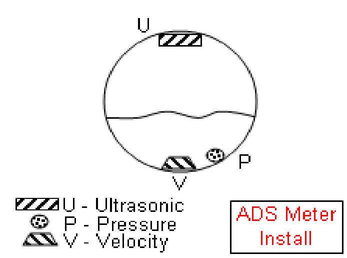
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

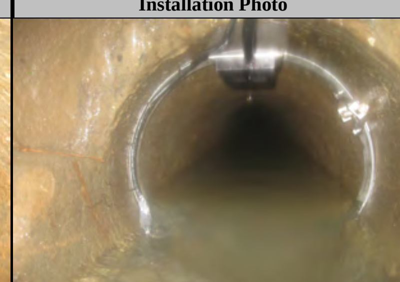
SITE IS LOCATED 1 MH D/S OF TARGETED SITE

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR014

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/24/09 11:27*	*-2E037*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BO*	*11.04*	*3.96*	*18.00*	*18.25*

Site Address: *1602 MERRILL DRIVE*

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	4.75	inches	Silt Type:	None	Backwater:		Straight:	
Instant Velocity:	2.71	fps	Silt (in):	0.0	Pump Station:		Bend:	Yes
Surcharge Evidence:	NO	feet	Needs Cleaning:	No	*WWTP:*		Drop Inlet:	

Site Feasibility

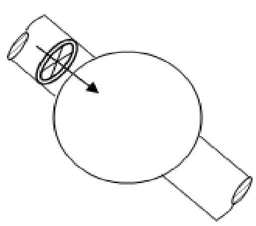
Site Access	Safety Considerations	Hydraulic Rating
GOOD (no problems accessing site)	LEL % 0.0 O_2 20.9	A (good)
SLIGHT BEND IN PIPE	CO 0.0 H_2S 0	SMOOTH FLOW GOOD SITE
	Elevated MH: No	
	Height Elevated: 0.0 ft	
	Structural Integrity: Fair	

Recommended Equipment

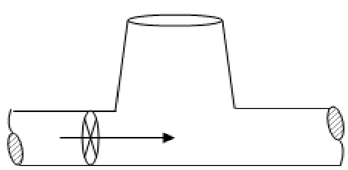
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	0.50 U/S

PART B - SITE INSTALLATION

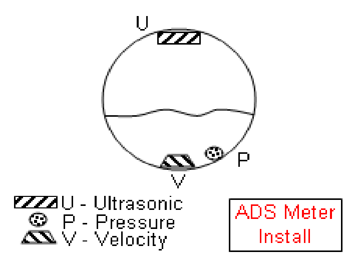
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

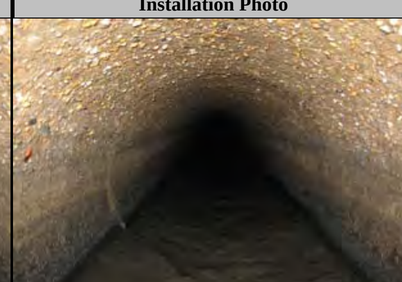
Standard

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo



Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

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Little Rock, AR
Flow Monitoring Services for Sanitary Sewer System

Site Name
LR015

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/24/09 11:40*	*-2E010*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BO*	*6.61*	*3.79*	*14.88*	*15.06*

Site Address: *1602 MERRILL DRIVE*

MH Type: Brick **Pipe Type:** Concrete **Pipe Shape:** Circular

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements

Flow Depth:	3.00	inches
Instant Velocity:	2.03	fps
Surcharge Evidence:	NO	feet

Debris

Silt Type:	None
Silt (in):	0.0
Needs Cleaning:	No

Hydraulic Influences

Backwater:		Straight:	
Pump Station:		Bend:	Yes
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

GRASS EASEMENT AT 1602 MERRILL DRIVE

Safety Considerations

LEL %	0.0	O_2	20.9
CO	0.0	H_2S	0

Elevated MH: No

Height Elevated: 0.0 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

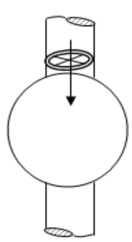
SMOOTH FLOW

Recommended Equipment

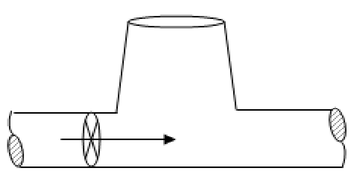
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	0.50 U/S

PART B - SITE INSTALLATION

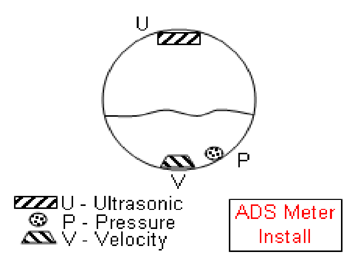
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

6 TO 8" IN PIPE UP STREAM

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

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Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR018

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/24/09 14:16	2O003	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BO	7.45	4.79	36.75	35.25

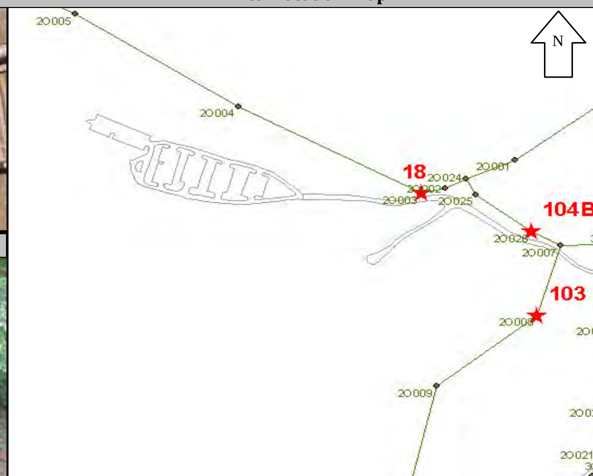
Site Address: *Hindman Park Golf Course*

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	6.00	inches	Silt Type:	None	Backwater:		Straight:	
Instant Velocity:	4.50	fps	Silt (in):	0.0	Pump Station:		Bend:	Yes
Surcharge Evidence:	4.00	feet	Needs Cleaning:	No	*WWTP:*		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

SITE LOCATED BESIDE GOLF COURSE @ HINDMAN PARK

Safety Considerations

LEL % 3.0 O_2 19.5

CO 8.0 H_2S 3

Elevated MH: Yes

Height Elevated: 3.0 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

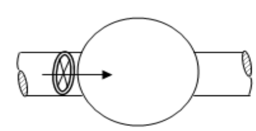
SLIGHT EDDIES AND SWIRLS IN INVERT

Recommended Equipment

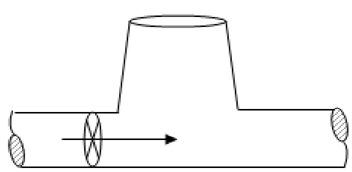
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.50 U/S

PART B - SITE INSTALLATION

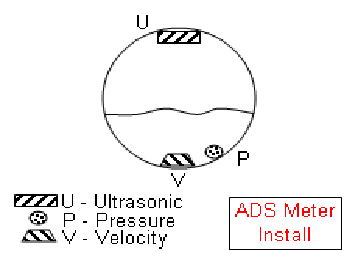
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

INSTALL FAR ENOUGH TO GET PAST SWIRLS IN INVERT

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

Little Rock, AR	Site Name
Flow Monitoring Services for Sanitary Sewer System	LR021

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/28/09 8:04*	*14K005*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BO*	*18.27*	*4.00*	*21.00*	*21.50*

Site Address: *2684 VANCE ST*

MH Type: *Brick* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential

Commercial

Industrial *Yes*

Measurements		Debris		Hydraulic Influences	
Flow Depth:	*10.00* inches	Silt Type:	*Hard Packed*	Backwater:	Straight: *Yes*
Instant Velocity:	*1.34* fps	Silt (in):	*2.5*	Pump Station:	Bend:
Surcharge Evidence:	*12.00* feet	Needs Cleaning:	*Yes*	*WWTP:*	Drop Inlet:

Site Feasibility

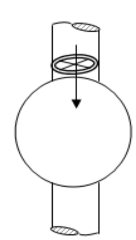
Site Access	Safety Considerations	Hydraulic Rating
GOOD (no problems accessing site)	LEL % *0.0* O_2 *20.9*	*A (good)*
SITE LOCATED BESIDE CONCRETE CONSTRUCTION STORAGE AREA/BESIDE C AND M DISTRUBUTION	CO *0.0* H_2S *0*	*SMOOTH FLOW*
	Elevated MH: *No*	
	Height Elevated: *0.0 ft*	
	Structural Integrity: *Fair*	

Recommended Equipment

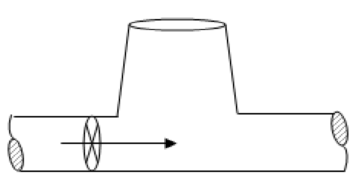
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*0.66 U/S*

PART B - SITE INSTALLATION

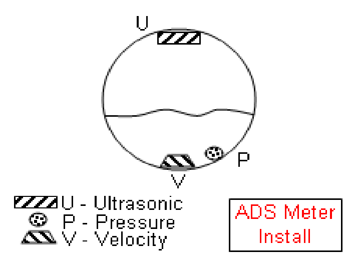
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

PIPE NEEDS VERY GOOD CLEANING

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

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Site Name
LR023

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/28/09 8:26*	*12K019*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BO*	*8.72*	*3.95*	*11.50*	*12.00*

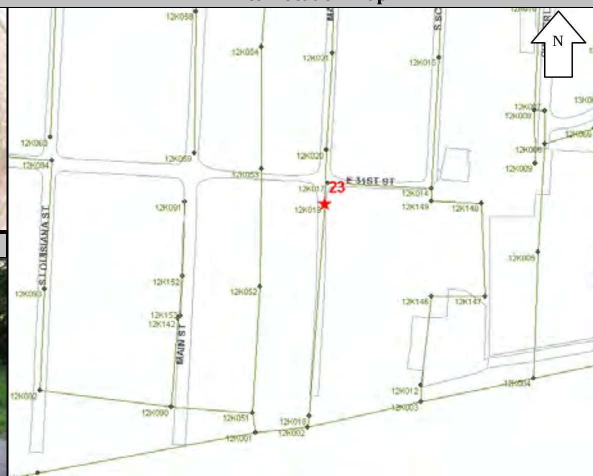
Site Address: *3017 MARTEL STREET*

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	
Industrial	

Measurements

Flow Depth:	2.00	inches
Instant Velocity:	2.33	fps
Surcharge Evidence:	NONE	feet

Debris

Silt Type:	None
Silt (in):	0.0
Needs Cleaning:	No

Hydraulic Influences

Backwater:		Straight:	Yes
Pump Station:		Bend:	
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

0

Safety Considerations

LEL %	*0.0*	O_2	*20.9*
CO	*O*	H_2S	*0*

Elevated MH: No

Height Elevated: 0.0 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

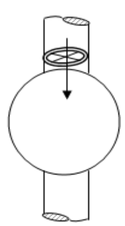
SMOOTH FLOW U\S

Recommended Equipment

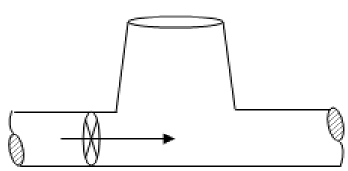
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	0.50 U/S

PART B - SITE INSTALLATION

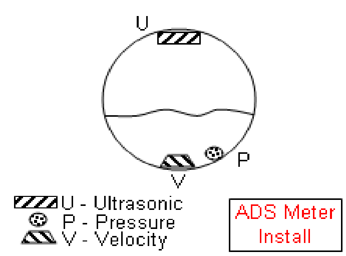
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

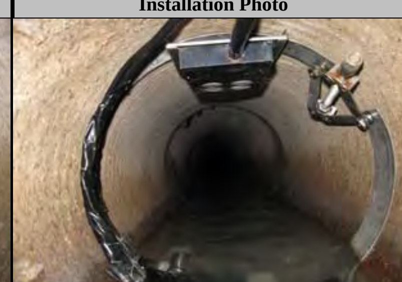
Standard

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

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Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR025

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/25/09 15:12*	*11L023*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BO*	*10.59*	*5.00*	*23.50*	*23.50*

Site Address: *CRUMP PARK*

MH Type: Concrete **Pipe Type:** PVC **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	
Industrial	

Measurements

Flow Depth:	4.00	inches
Instant Velocity:	4.05	fps
Surcharge Evidence:	10.59	feet

Debris

Silt Type:	None
Silt (in):	0.0
Needs Cleaning:	No

Hydraulic Influences

Backwater:		Straight:	Yes
Pump Station:		Bend:	Yes
WWTP:	Yes	Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

LOCATED BESIDE WALKING PATH @ CRUMP PARK

Safety Considerations

LEL %	0.0	O_2	20.9
CO	0.0	H_2S	0

Elevated MH: Yes

Height Elevated: 4.0 ft

Structural Integrity: Good

Hydraulic Rating

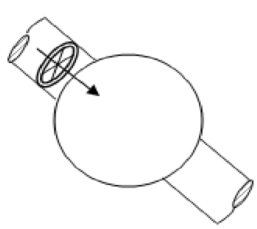
A (good)

SMOOTH FLOW…GOOD SITE

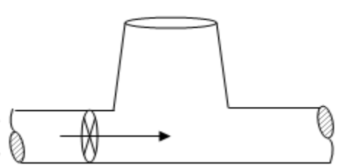
Recommended Equipment

Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.50 U/S

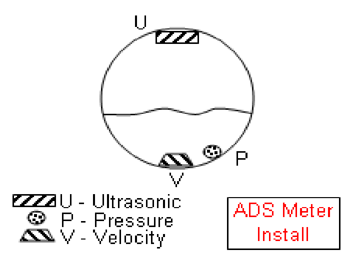
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

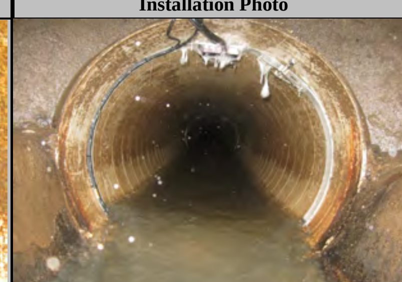
INSTALL BAND AND SENSORS 1.5 FT UPSTREAM

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo



PART A - SITE INVESTIGATION

PART B - SITE INSTALLATION

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR026

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/28/09 11:39	11L049	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BO				
Site Address: CHESTER		7.81	3.78	12.00	12.00

MH Type: Brick **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	6.00	inches	Silt Type:	None	Backwater:		Straight:	Yes
Instant Velocity:	0.06	fps	Silt (in):	4.0	Pump Station:		Bend:	
Surcharge Evidence:	7.81	feet	Needs Cleaning:	Yes	WWTP:		Drop Inlet:	

Site Feasibility

Site Access	Safety Considerations	Hydraulic Rating
FAIR (minor traffic, off-road)	LEL % 0.0 O_2 20.9	C (poor)
36TH STREET TO RAILROAD TRACKS AND FOLLOW GRAVEL ROAD BESIDE TRACKS ACCESS IN TO SS EASEMENT	CO 0.0 H_2S 0 Elevated MH: Yes Height Elevated: 0.3 ft Structural Integrity: Good	POOR HYDRAULICS DUE TO 4" OF GRAVEL AND ROCKS. LINE SHOULD BE GOOD ONCE LOCATION IS CLEANED

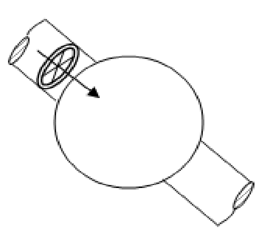
Recommended Equipment

Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	0.50 U/S

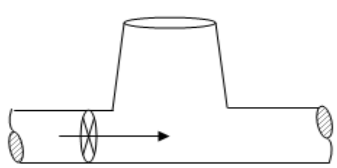
PART A - SITE INVESTIGATION

PART B - SITE INSTALLATION

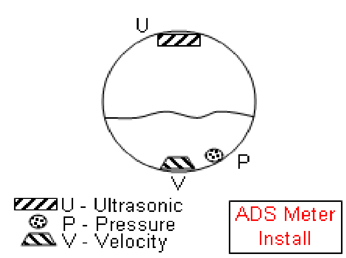
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

INSTALL UPSTREAM AND ROTATE TO AVOID GRAVEL/SEDIMENT

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

PART B - SITE INSTALLATION

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR028

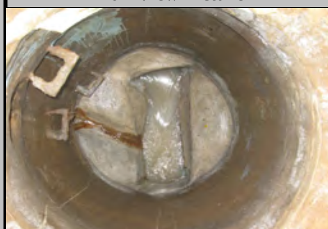
Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/28/09 12:36*	*9K034*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BO*	9.25	4.04	19.25	19.00

Site Address: *2438 ROOSEVELT AVE*

MH Type: Concrete **Pipe Type:** PVC **Pipe Shape:** Circular

Plan View Picture



Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	3.00	inches	Silt Type:	None	Backwater:		Straight:	Yes
Instant Velocity:	1.60	fps	Silt (in):	0.0	Pump Station:		Bend:	
Surcharge Evidence:	4.00	feet	Needs Cleaning:	No	*WWTP:*		Drop Inlet:	Yes

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

STATE FAIR GROUNDS ENTRY
TURN LEFT UNDER BRIDGE
WALK ACROSS RR TRACK AND
GO SOUTH IN EASEMENT
APPROX 400YDS

Safety Considerations

LEL %	0.0	O_2	20.9
CO	0.0	H_2S	0

Elevated MH: Yes

Height Elevated: 0.7 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

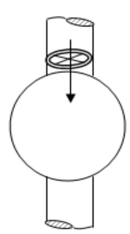
SMOOTH

Recommended Equipment

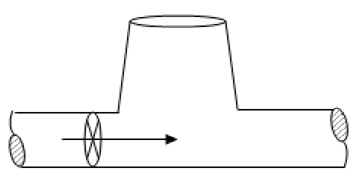
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	0.50 U/S

PART B - SITE INSTALLATION

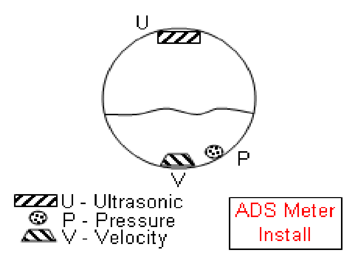
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

6 TO 8" U\S

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR029

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/28/09 12:58	9I064	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BO	7.55	4.08	15.00	15.25

Site Address: 1920 APPIANWAY ST

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	6.00	inches	Silt Type:	None	Backwater:	Yes	Straight:	Yes
Instant Velocity:	0.60	fps	Silt (in):	0.0	Pump Station:		Bend:	
Surcharge Evidence:	0.00	feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

ACCESS @ NORTH SIDE GATE OF BLDG COMPLEX BEHIND TARGET PRINTING

Safety Considerations

LEL % 0.0 O_2 20.9

CO 0.0 H_2S 0

Elevated MH: No

Height Elevated: 0.0 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

SMOOTH FLOW

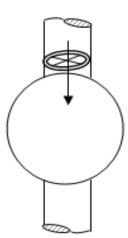
Recommended Equipment

Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.00 U/S

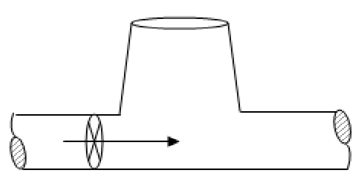
PART A - SITE INVESTIGATION

PART B - SITE INSTALLATION

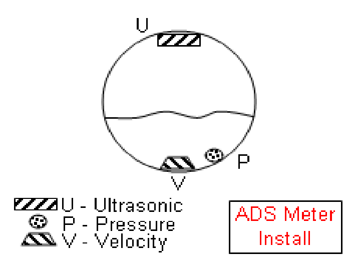
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

INSTALL 12"-18" UPSTREAM

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

PART B - SITE INSTALLATION

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

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Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR031

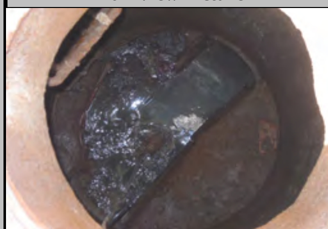
Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/25/09 14:17*	*6K022*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BO*	*10.20*	*3.91*	*15.00*	*15.00*

Site Address: *5021 ASHER*

MH Type: *Brick* **Pipe Type:** *PVC* **Pipe Shape:** *Circular*

Plan View Picture



Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	*Yes*
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	*3.00*	inches	Silt Type:	*None*	Backwater:		Straight:	*Yes*
Instant Velocity:	*0.81*	fps	Silt (in):	*0.0*	Pump Station:		Bend:	
Surcharge Evidence:	*5.00*	feet	Needs Cleaning:	*Yes*	*WWTP:*		Drop Inlet:	

Site Feasibility

Site Access

TRAFFIC (extra traffic control needed)

MH LOCATED @ INTERSECTIONS OF ASHER AND MARY ST/BUSY INTERSECTION

Safety Considerations

LEL % *0.0* O_2 *205*

CO *0.0* H_2S *0*

Elevated MH: *No*

Height Elevated: *0.0 ft*

Structural Integrity: *Fair*

Hydraulic Rating

A (good)

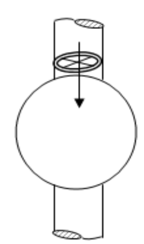
SOME SEDIMENT IN TROUGH, NONE IN US PIPE

Recommended Equipment

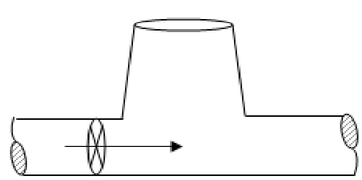
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*0.50 U/S*

PART B - SITE INSTALLATION

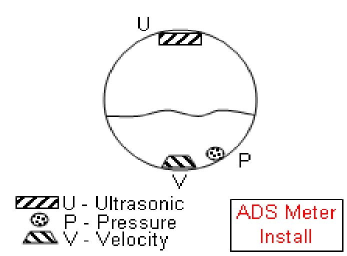
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

INSTALL 6-8" IN UPSTREAM PIPE

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR032

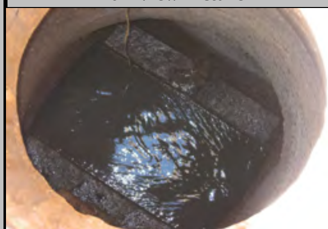
Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/25/09 14:40	6L008	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BO	12.40	4.00	30.00	30.00

Site Address: 5219 34TH ST

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture



Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	
Industrial	

Measurements

Flow Depth:	15.00	inches
Instant Velocity:	2.70	fps
Surcharge Evidence:	8.00	feet

Debris

Silt Type:	Soft
Silt (in):	5.0
Needs Cleaning:	Yes

Hydraulic Influences

Backwater:		Straight:	Yes
Pump Station:		Bend:	
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

LOCATED @ INTERSECTION OF 34TH AND ANNA STREETS

Safety Considerations

LEL %	0.0	O_2	19.4
CO	0.0	H_2S	0

Elevated MH: No

Height Elevated: 0.0 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

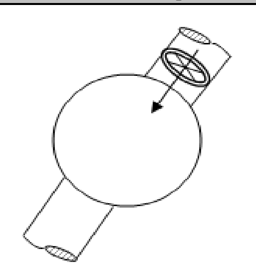
SMOOTH FLOW

Recommended Equipment

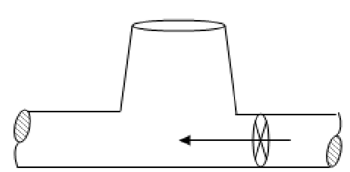
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.50 U/S

PART A - SITE INVESTIGATION

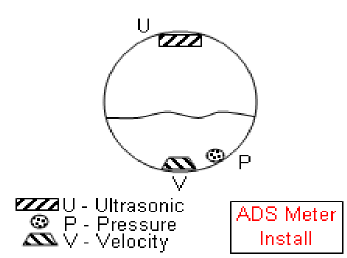
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

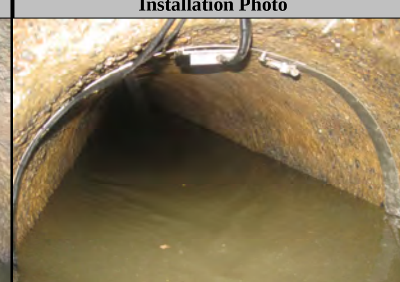
INSTALL AND ROTATE SENSOR IF SILT IS STILL IN LINE

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo



PART B - SITE INSTALLATION

Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR034

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/30/09 8:12*	*5G158*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*JC/BE*	*9.10*	*5.00*	*29.62*	*29.62*

Site Address: *Near Intersection of Fair Park Blvd. and Club House Drive.*

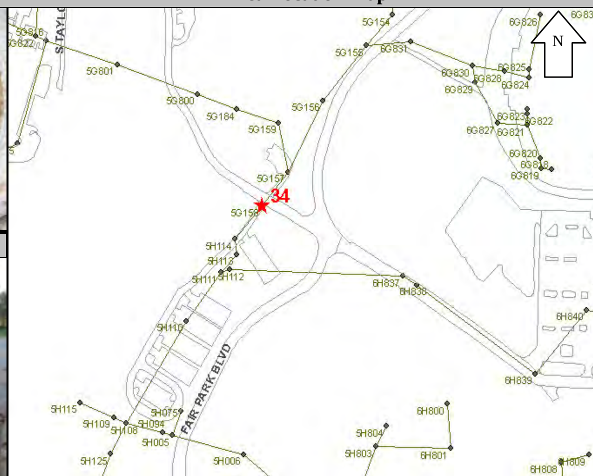
MH Type: Concrete **Pipe Type:** PVC **Pipe Shape:** Circular

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	5.12	inches	Silt Type:	None	Backwater:		Straight:	
Instant Velocity:	5.02	fps	Silt (in):	0.0	Pump Station:		Bend:	Yes
Surcharge Evidence:	0.00	feet	Needs Cleaning:	No	*WWTP:*		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

turn northwest on Club House Dr. from intersection. Go approximately 0.1 miles. Look for green paint.

Safety Considerations

LEL %	0.0	O_2	20.9
CO	0.0	H_2S	0

Elevated MH: No

Height Elevated: 0.0 ft

Structural Integrity: Good

Hydraulic Rating

B (questionable)

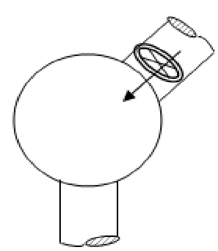
medium to high velocity and slight bend causes more than moderate ripples.

Recommended Equipment

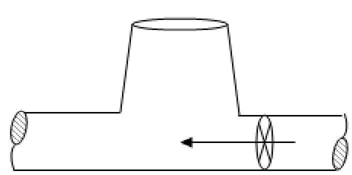
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.50 U/S

PART B - SITE INSTALLATION

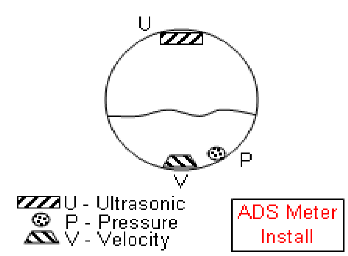
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

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Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR035

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/25/09 13:48*	*5M008*	*T*

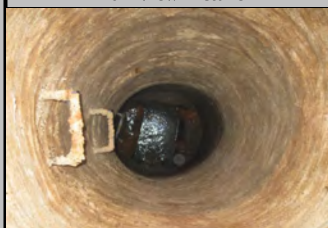
Muncipality	Inspected By
Little Rock	*TB/BO*

Site Address:	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
4705 UNIVERSITY	*18.10*	*3.87*	*30.00*	*30.00*

MH Type: *Brick* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

PART A - SITE INVESTIGATION

Plan View Picture



Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential

Commercial *Yes*

Industrial

Measurements			Debris		Hydraulic Influences	
Flow Depth:	*6.00*	inches	Silt Type:	*None*	Backwater:	Straight: *Yes*
Instant Velocity:	*0.83*	fps	Silt (in):	*0.0*	Pump Station:	Bend:
Surcharge Evidence:	*9.00*	feet	Needs Cleaning:	*No*	*WWTP:*	Drop Inlet:

Site Feasibility

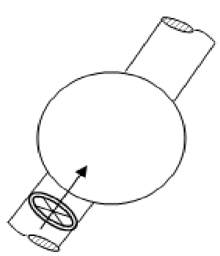
Site Access	Safety Considerations	Hydraulic Rating
FAIR (minor traffic, off-road)	LEL % *0.0* O_2 *20.9*	*A (good)*
SITE LOCATED APPROX. 100 FT SOUTH OF LEVEE @ DRIVING RANGE	CO *0.0* H_2S *0* Elevated MH: *Yes* Height Elevated: *5.3 ft* Structural Integrity: *Fair*	*SMOOTH FLOW*

Recommended Equipment

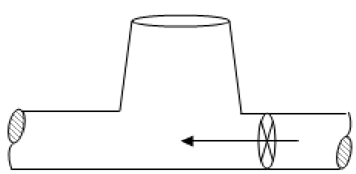
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*1.50 U/S*

PART B - SITE INSTALLATION

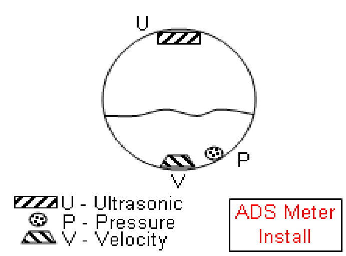
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

INSTALL 12"-18" UPSTREAM

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

Little Rock, AR Flow Monitoring Services for Sanitary Sewer System	Site Name: LR036

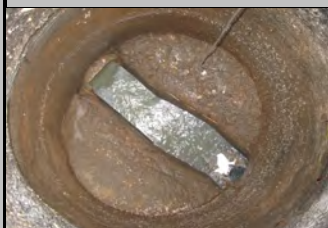
Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/25/09 11:58	5M009	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BO	6.73	3.96	12.00	12.00

Site Address: 4705 S. UNIVERSITY

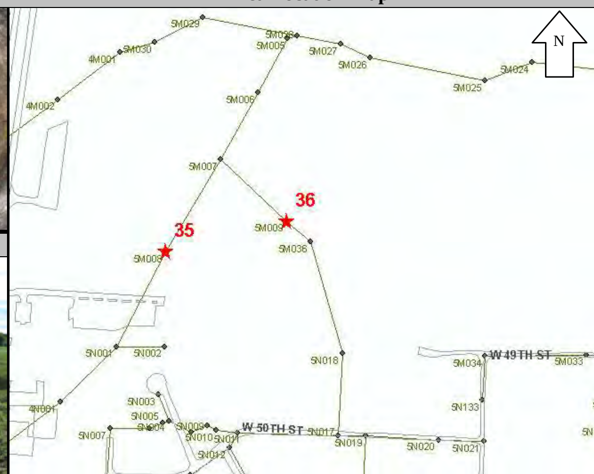
MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture



Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements

Flow Depth:	6.00	inches
Instant Velocity:	1.44	fps
Surcharge Evidence:	6.70	feet

Debris

Silt Type:	None
Silt (in):	0.0
Needs Cleaning:	Yes

Hydraulic Influences

Backwater:		Straight:	Yes
Pump Station:		Bend:	
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

MH LOCATED ON SOUTH EDGE OF LEVEE @ 250 YD MARKER IN DRIVING RANGE. SITE ACCESS AFTER HOURS WILL HAVE TO BE ATTAINED FROM OWNER..TOM BROWN (501)562-1334

Safety Considerations

LEL %	0.0	O_2	20.5
CO	0.0	H_2S	0

Elevated MH: Yes

Height Elevated: 1.5 ft

Structural Integrity: Good

Hydraulic Rating

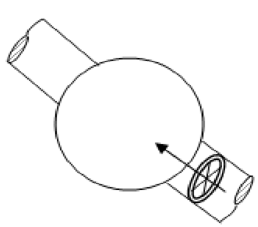
A (good)

SMOOTH HYDRAULICS/ROOTS CUT OUT OF PIPE ENTRANCE @ TIME OF INVESTIGATION

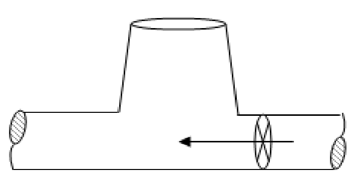
Recommended Equipment

Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	0.50 U/S

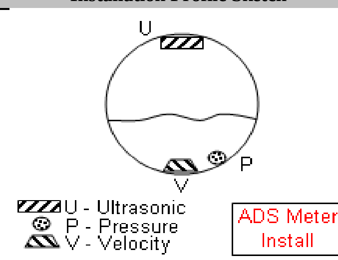
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

INSTALL 6-8" IN UPSTREAM PIPE

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

PART B - SITE INSTALLATION

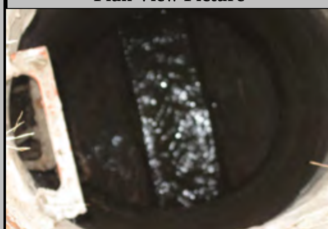
Little Rock, AR	**Site Name**
Flow Monitoring Services for Sanitary Sewer System	LR037

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/25/09 10:41*	*7O012*	*T*

Muncipality	Inspected By	Manhole		Pipe	
		Depth (ft)	Width (ft)	Width (in)	Height (in)
Little Rock	*TB/BO*				
Site Address: *6011 SCOTT HAMILTON DR*		*14.70*	*3.91*	*18.00*	*18.00*

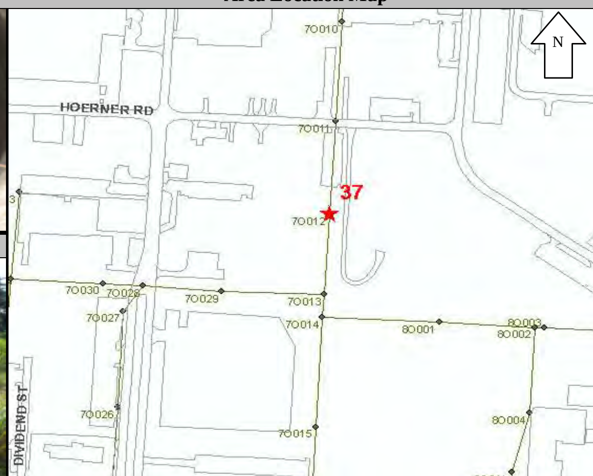
MH Type: *Partial Brick & Concrete* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

Plan View Picture



Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	*Yes*
Industrial	*Yes*

Measurements			Debris		Hydraulic Influences			
Flow Depth:	*6.00*	inches	Silt Type:	*None*	Backwater:		Straight:	*Yes*
Instant Velocity:	*1.91*	fps	Silt (in):	*0.0*	Pump Station:		Bend:	
Surcharge Evidence:	*8.00*	feet	Needs Cleaning:	*No*	*WWTP:*		Drop Inlet:	*Yes*

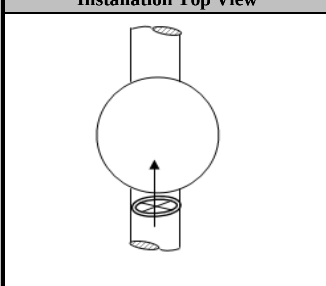
Site Feasibility

Site Access	Safety Considerations	Hydraulic Rating
GOOD (no problems accessing site)	LEL % *0.0* O_2 *201*	*A (good)*
MH LOCATED BEHIND RICH LOGISTICS TRUCK TRAILER PARKING LOT	CO *0.0* H_2S *0* Elevated MH: *No* Height Elevated: *0.0 ft* Structural Integrity: *Fair*	*GOOD SITE FOR MONITORING*

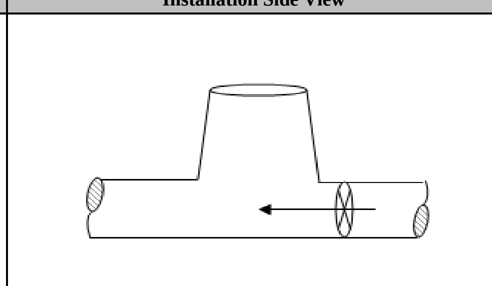
Recommended Equipment

Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*0.50 U/S*

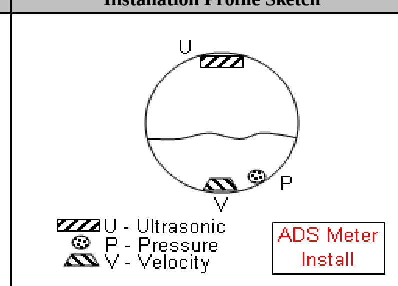
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

INSTALL BAND AND SENSORS 6-8" IN UPSTREAM PIPE

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

PART B - SITE INSTALLATION

rjngroup Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR043

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/25/09 9:49	2R053	T

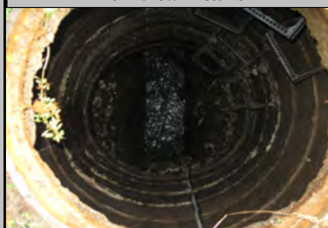
Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BO	18.10	5.00	24.00	24.00

Site Address: 8001 ASSEMBLY CT

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

PART A - SITE INVESTIGATION

Plan View Picture



Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	
Industrial	Yes

Measurements			Debris		Hydraulic Influences			
Flow Depth:	6.00	inches	Silt Type:	None	Backwater:		Straight:	Yes
Instant Velocity:	2.61	fps	Silt (in):	0.0	Pump Station:		Bend:	
Surcharge Evidence:	13.00	feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

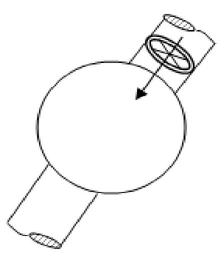
Site Access	Safety Considerations	Hydraulic Rating
FAIR (minor traffic, off-road)	LEL % 0.0 / O_2 20.9	A (good)
MH LOCATED NORTH OF ASSEMBLY CT CUL DE SAC	CO 0.0 / H_2S 0	GOOD SITE
	Elevated MH: No	
	Height Elevated: 0.0 ft	
	Structural Integrity: Good	

Recommended Equipment

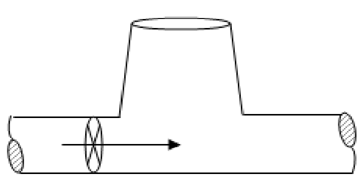
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.00 U/S

PART B - SITE INSTALLATION

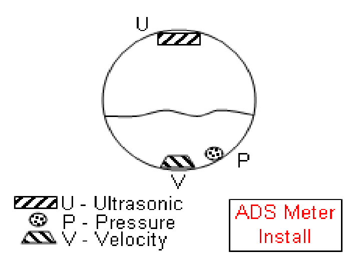
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

INSTALL BAND/SENSORS 1' UPSTREAM

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

rjngroup — Excellence through Ownership	**Little Rock, AR** — **Flow Monitoring Services for Sanitary Sewer System**	**Site Name**
		LR044

Planning Basin	**Project No.**	**Inspection Date/Time**	**MH #**	**Site Code**
.	*18-2383-00*	*9/25/09 9:09*	*2Q004*	*T*

Muncipality	**Inspected By**	**Manhole**		**Pipe**	
Little Rock	*TB/BO*	**Depth (ft)**	**Width (ft)**	**Width (in)**	**Height (in)**
Site Address: *7669 MABELVALE PIKE*		*8.70*	*3.98*	*24.00*	*24.00*

MH Type: *Brick* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	*Yes*
Commercial	
Industrial	

Measurements			**Debris**		**Hydraulic Influences**			
Flow Depth:	*10.00*	inches	Silt Type:	*Soft*	Backwater:		Straight:	*Yes*
Instant Velocity:	*2.16*	fps	Silt (in):	*3.0*	Pump Station:		Bend:	
Surcharge Evidence:	*8.00*	feet	Needs Cleaning:	*Yes*	*WWTP:*		Drop Inlet:	

Site Feasibility

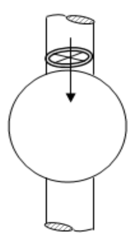
Site Access	**Safety Considerations**	**Hydraulic Rating**
GOOD (no problems accessing site)	LEL % *0.0* O_2 *19.5*	*A (good)*
MH LOCATED IN EASEMENT NORTH OF MABELVALE PIKE RD	CO *0.0* H_2S *0* Elevated MH: *No* Height Elevated: *0.0 ft* Structural Integrity: *Poor*	*GOOD HYDRAULIC CONDITIONS..LINE NEEDS CLEANING*

Recommended Equipment

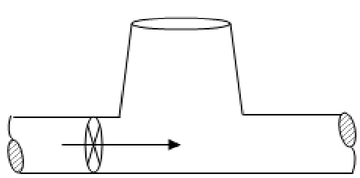
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*1.00 U/S*

PART B - SITE INSTALLATION

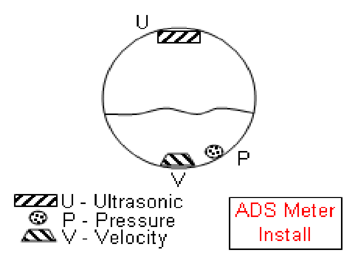
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

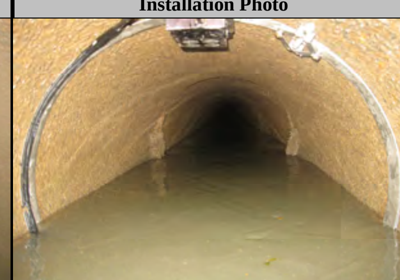
INSTALL 8-12" UPSTREAM

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo



Approved	**Not Approved**	**Recommended Alternate Site Name**
. .	. .	.

rjn group
Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR050

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/24/09 15:41*	*15H110*	*U4*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*JC/BE*	*20.30*	*3.46*	*52.75*	*53.50*

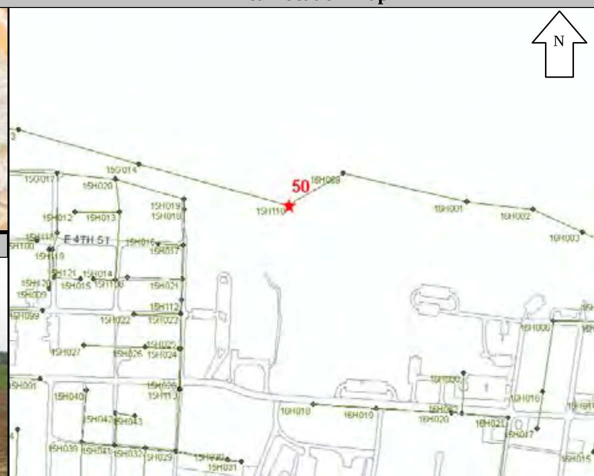
Site Address: *405 Fletcher St.*

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00
0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	Yes

Measurements			Debris		Hydraulic Influences			
Flow Depth:	15.75	inches	Silt Type:	None	Backwater:		Straight:	
Instant Velocity:	4.40	fps	Silt (in):	0.0	Pump Station:		Bend:	Yes
Surcharge Evidence:	11.00	feet	Needs Cleaning:	No	*WWTP:*		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

Behind school along levey next to power lines.

Safety Considerations

LEL % 0.0 O_2 20.9

CO 0.0 H_2S 0

Elevated MH: Yes

Height Elevated: 2.0 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

Moderate ripples.

Recommended Equipment

Meter Type: ADS FlowShark

Redundant Depth: Yes

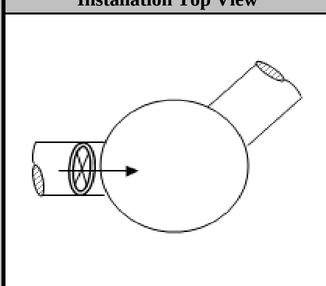
Ultrasonic Depth: Yes

Pressure Depth: Yes

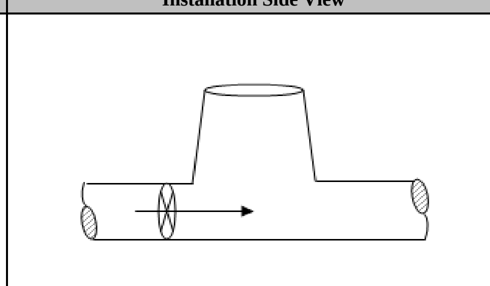
Velocity: Yes

Location (ft): 2.00 U/S

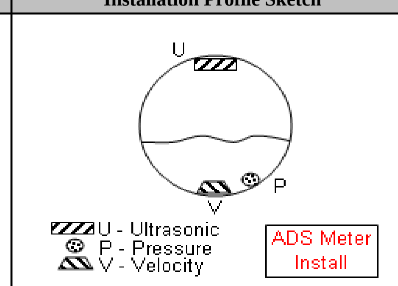
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

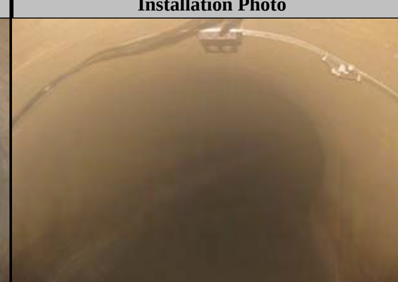
Standard

Targeted Site: *Alternate*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

PART B - SITE INSTALLATION

rjngroup
Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR055

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/24/09 10:23	9F024	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	JC/BE	16.10	5.00	23.00	24.25

Site Address: 2326 Cantrell

MH Type: Concrete **Pipe Type:** PVC **Pipe Shape:** Circular

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00
0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	
Industrial	Yes

Measurements			Debris		Hydraulic Influences			
Flow Depth:	6.12	inches	Silt Type:	None	Backwater:		Straight:	Yes
Instant Velocity:	2.20	fps	Silt (in):	0.0	Pump Station:		Bend:	
Surcharge Evidence:	0.00	feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

in gravel area next to Cajun Restaurant

Safety Considerations

LEL % 0.0 O_2 20.9
CO 0.0 H_2S 0
Elevated MH: No
Height Elevated: 0.0 ft
Structural Integrity: Fair

Hydraulic Rating

A (good)

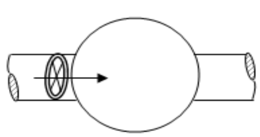
very slight ripples

Recommended Equipment

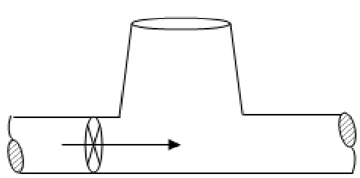
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	No
Location (ft):	1.66 U/S

PART B - SITE INSTALLATION

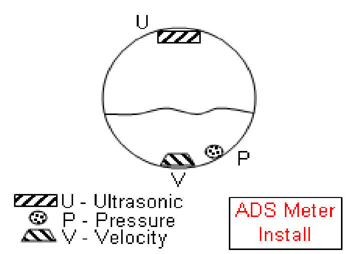
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

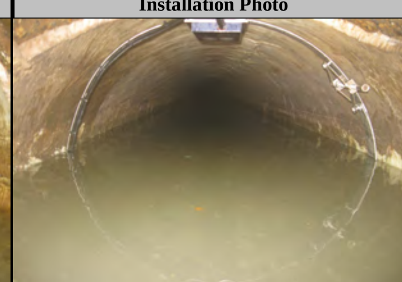
1" portrusion on right side of pipe

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo



Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

PART A - SITE INVESTIGATION

rjngroup Excellence through Ownership	**Little Rock, AR** **Flow Monitoring Services for Sanitary Sewer System**	**Site Name** LR057

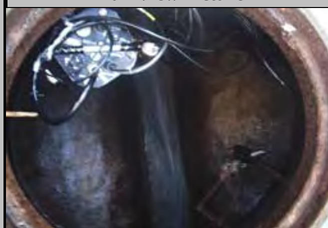
Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/24/09 14:22*	*6C047*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*JC/BE*	*4.10*	*3.83*	*10.00*	*10.25*

Site Address: *3500 Rebsamen Park Rd*

MH Type: *Partial Brick & Concrete* **Pipe Type:** *Other* **Pipe Shape:** *Circular*

Plan View Picture



Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	*2.50*	inches	Silt Type:	*None*	Backwater:		Straight:	*Yes*
Instant Velocity:	*7.25*	fps	Silt (in):	*0.0*	Pump Station:		Bend:	
Surcharge Evidence:	*4.00*	feet	Needs Cleaning:	*No*	*WWTP:*		Drop Inlet:	*Yes*

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

100' off edge of Rebsamen Park Rd

Safety Considerations

LEL % *0.0* O_2 *20.9*

CO *0.0* H_2S *0*

Elevated MH: *Yes*

Height Elevated: *4.9 ft*

Structural Integrity: *Good*

Hydraulic Rating

B (questionable)

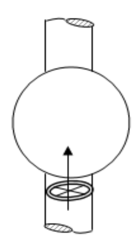
Very fast velocity

Recommended Equipment

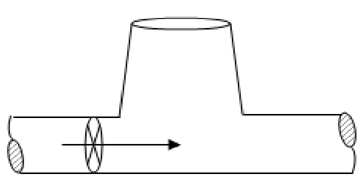
Meter Type:	*ADS FlowShark*
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	*1.00 U/S*

PART B - SITE INSTALLATION

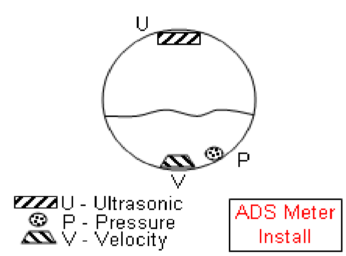
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

rjngroup Excellence through Ownership	Little Rock, AR Flow Monitoring Services for Sanitary Sewer System	Site Name LR058

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/23/09 9:50	2C112	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BE/JC/BO	7.30	4.00	18.00	18.00

Site Address: 38 Tallyho

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates
0.00
0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	
Industrial	

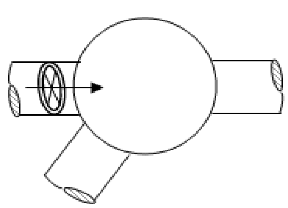
Measurements			Debris		Hydraulic Influences			
Flow Depth:	3.00	inches	Silt Type:	None	Backwater:		Straight:	Yes
Instant Velocity:	4.23	fps	Silt (in):	0.0	Pump Station:		Bend:	
Surcharge Evidence:	0.00	feet	Needs Cleaning:	No	*WWTP:*		Drop Inlet:	

Site Feasibility

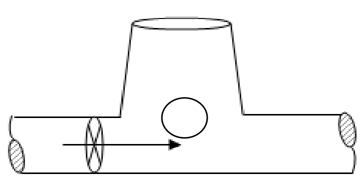
Site Access	Safety Considerations	Hydraulic Rating	Recommended Equipment
FAIR (minor traffic, off-road)	LEL % 0.0 O_2 20.9	A (good)	Meter Type: ADS FlowShark
	CO 0.0 H_2S 0		Redundant Depth: Yes
Behind 38 Tallyho	Elevated MH: Yes	0	Ultrasonic Depth: Yes
	Height Elevated: 1.0 ft		Pressure Depth: Yes
	Structural Integrity: Good		Velocity: Yes
			Location (ft): 1.00 U/S

PART B - SITE INSTALLATION

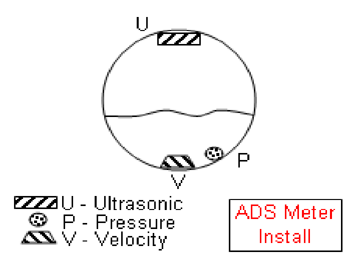
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

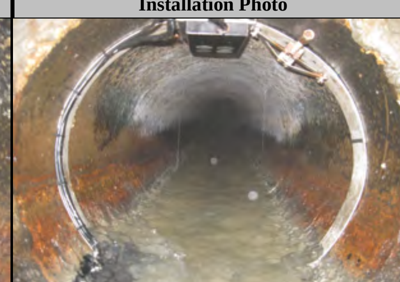
install upstream 1' from pipe opening

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

rjngroup
Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR059

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/23/09 8:57*	*2B002*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BE/JC/BO*	*14.00*	*4.83*	*23.32*	*25.60*

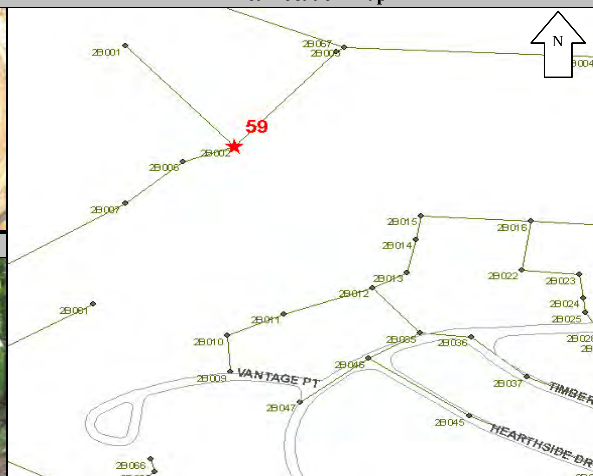
Site Address: *Big Dam Bridge*

MH Type: *Concrete* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	*Yes*
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	*7.88*	inches	Silt Type:	*None*	Backwater:		Straight:	
Instant Velocity:	*2.54*	fps	Silt (in):	*0.0*	Pump Station:		Bend:	*Yes*
Surcharge Evidence:	*2.00*	feet	Needs Cleaning:	*No*	*WWTP:*		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

sight is located next to tributary of Arkansas river on south side of RR tracks

Safety Considerations

LEL %	*0.0*	O_2	*29*
CO	*0.0*	H_2S	*0*

Elevated MH: *No*

Height Elevated: *0.3 ft*

Structural Integrity: *Good*

Hydraulic Rating

A (good)

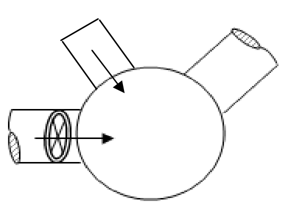
slight ripples

Recommended Equipment

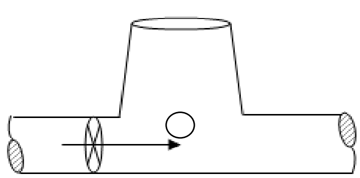
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*1.00 U/S*

PART B - SITE INSTALLATION

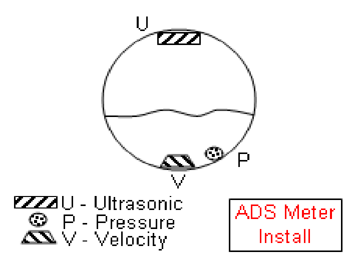
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

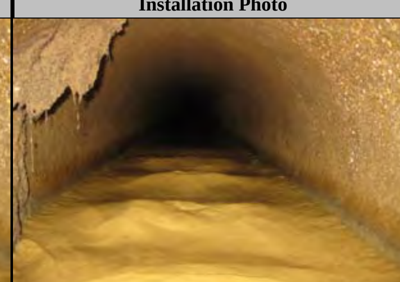
Standard

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

rjngroup Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR062

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/25/09 10:20*	*14L002*	*D1*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*JC/BE*	*14.81*	*4.00*	*12.12*	*12.18*

Site Address: *Under Intersection of 440 and Springer*

MH Type: *Concrete* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	
Industrial	*Yes*

Measurements

Flow Depth:	*4.50*	inches
Instant Velocity:	*1.52*	fps
Surcharge Evidence:	*10.00*	feet

Debris

Silt Type:	*Soft*
Silt (in):	*11.0*
Needs Cleaning:	*Yes*

Hydraulic Influences

Backwater:		Straight:	
Pump Station:		Bend:	*Yes*
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

directly under bridge

Safety Considerations

LEL %	*0.0*	O_2	*19.6*
CO	*0.0*	H_2S	*0*

Elevated MH: *Yes*

Height Elevated: *0.3 ft*

Structural Integrity: *Good*

Hydraulic Rating

A (good)

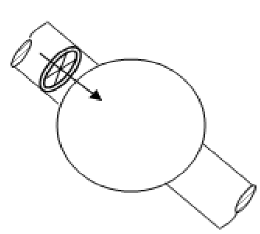
smooth flow

Recommended Equipment

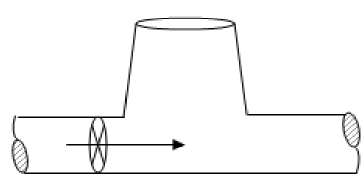
Meter Type:	*ADS FlowShark*
Redundant Depth:	Yes
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*1.00 U/S*

PART B - SITE INSTALLATION

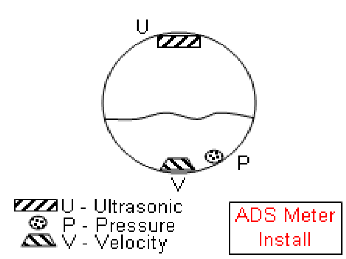
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

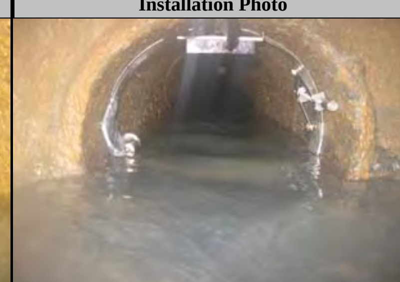
Standard

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

rjngroup
Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR063

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/24/09 11:17	13I049	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	JC/BE	6.20	3.92	18.36	18.36

Site Address: 722 Frontage Rd. (Rockefeller Elem. School)

MH Type: Partial Brick & Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential

Commercial Yes

Industrial

Measurements			Debris		Hydraulic Influences			
Flow Depth:	3.50	inches	Silt Type:	None	Backwater:		Straight:	
Instant Velocity:	2.44	fps	Silt (in):	0.0	Pump Station:		Bend:	Yes
Surcharge Evidence:	0.00	feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

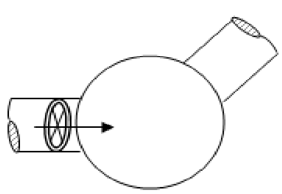
Site Access	Safety Considerations	Hydraulic Rating
FAIR (minor traffic, off-road)	LEL % 0.0 O_2 20.9	A (good)
on side of Frontage Rd	CO 0.0 H_2S 0	ripples
	Elevated MH: No	
	Height Elevated: 0.0 ft	
	Structural Integrity: Good	

Recommended Equipment

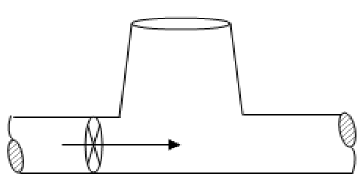
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.00 U/S

PART B - SITE INSTALLATION

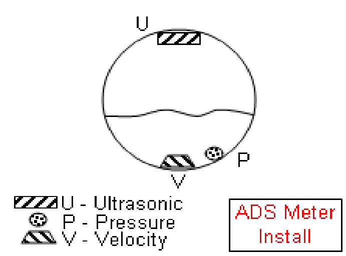
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

rjngroup — Excellence through Ownership	Little Rock, AR Flow Monitoring Services for Sanitary Sewer System	Site Name LR100

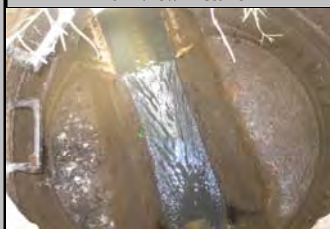
Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/25/09 11:58	7K092	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	JC/BE				
Site Address: 3200 Washington		8.09	6.00	35.50	35.37

MH Type: Concrete **Pipe Type:** PVC **Pipe Shape:** Circular

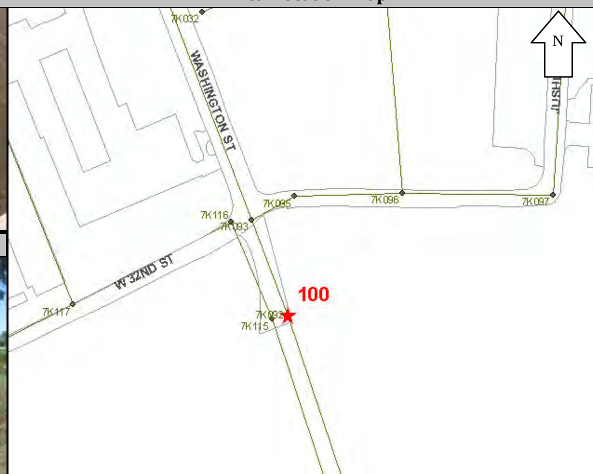
PART A - SITE INVESTIGATION

Plan View Picture



Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	4.36	inches	Silt Type:	None	Backwater:		Straight:	Yes
Instant Velocity:	1.78	fps	Silt (in):	0.0	Pump Station:		Bend:	
Surcharge Evidence:	8.09	feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

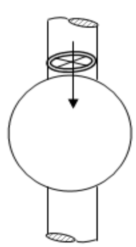
Site Access	Safety Considerations	Hydraulic Rating
GOOD (no problems accessing site)	LEL % 0.0 O_2 20.9	A (good)
-	CO 0.0 H_2S 0	slight ripples
	Elevated MH: No	
	Height Elevated: 0.0 ft	
	Structural Integrity: Good	

Recommended Equipment

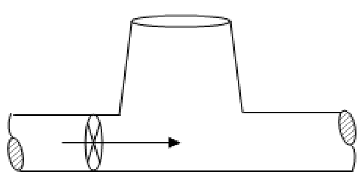
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	2.00 U/S

PART B - SITE INSTALLATION

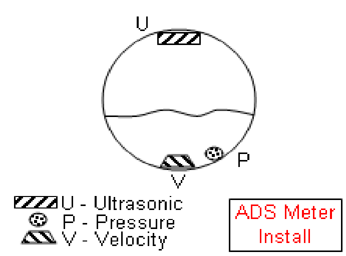
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

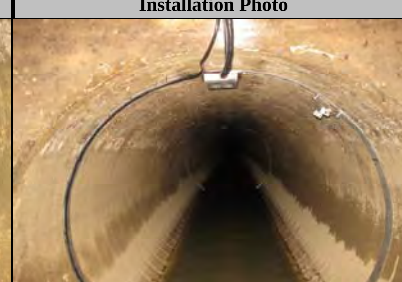
Standard

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

rjngroup Excellence through Ownership	Little Rock, AR Flow Monitoring Services for Sanitary Sewer System	Site Name: LR101

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/29/09 14:52*	*-8G007*	*D1*

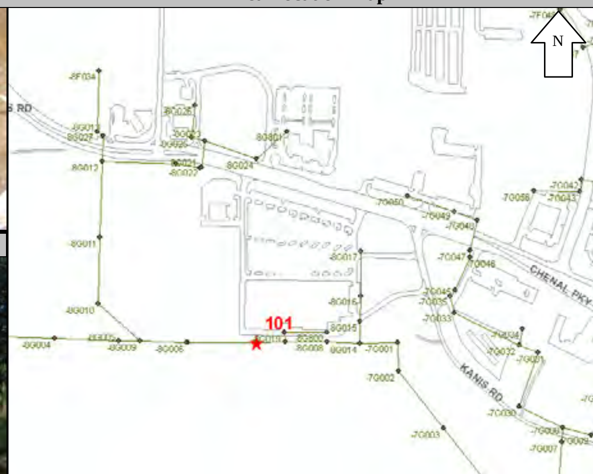
Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*JC/BE*				
Site Address: *16105 Chenal*		*15.40*	*3.75*	*24.88*	*24.56*

MH Type: *Concrete* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	*Yes*
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	*5.18*	inches	Silt Type:	*None*	Backwater:		Straight:	*Yes*
Instant Velocity:	*1.87*	fps	Silt (in):	*0.0*	Pump Station:		Bend:	
Surcharge Evidence:	*6.00*	feet	Needs Cleaning:	*No*	*WWTP:*		Drop Inlet:	*Yes*

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

behind Kroger and behind privacy fence at corner of Kanis and Chenal. Look for green paint on ground at far southwest corner of building.

Safety Considerations

LEL %	*0.0*	O_2	*20.9*
CO	*0.0*	H_2S	*0*
Elevated MH:	*Yes*		
Height Elevated:	*1.5 ft*		
Structural Integrity:	*Good*		

Hydraulic Rating

A (good)

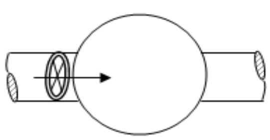
moderate ripples

Recommended Equipment

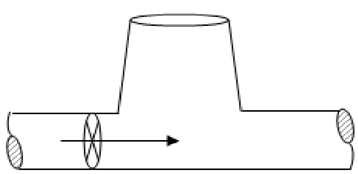
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*1.50 U/S*

PART B - SITE INSTALLATION

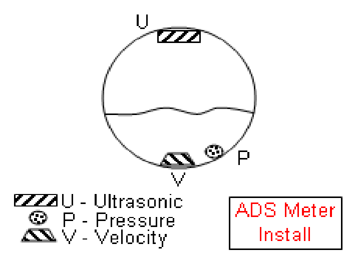
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: *Alternate*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

rjngroup Excellence through Ownership	**Little Rock, AR** **Flow Monitoring Services for Sanitary Sewer System**	**Site Name** LR102

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/29/09 11:05*	*-1L003*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*JC/BE*	*10.00*	*4.00*	*23.36*	*24.25*

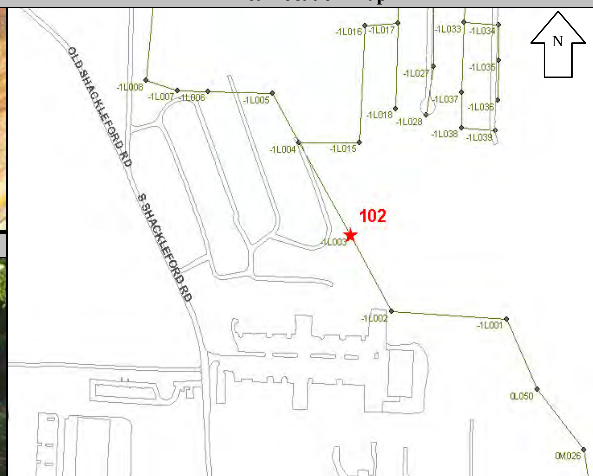
Site Address: *4023 Shackleford Rd*

MH Type: *Concrete* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	*Yes*
Commercial	
Industrial	

Measurements		**Debris**		**Hydraulic Influences**			
Flow Depth:	*8.50* inches	Silt Type:	*None*	Backwater:		Straight:	*Yes*
Instant Velocity:	*4.90* fps	Silt (in):	*0.0*	Pump Station:		Bend:	
Surcharge Evidence:	*10.00* feet	Needs Cleaning:	*No*	*WWTP:*		Drop Inlet:	

Site Feasibility

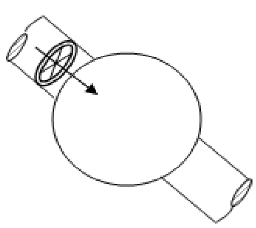
Site Access	Safety Considerations				Hydraulic Rating
FAIR (minor traffic, off-road)	LEL %	*0.0*	O_2	*20.9*	*B (questionable)*
at back of trailer park in playground area near swing set and basketball court	CO	*0.0*	H_2S	*0*	*choppy flow because of high rate of flow*
	Elevated MH:	*Yes*			
	Height Elevated:	*0.3 ft*			
	Structural Integrity:	*Good*			

Recommended Equipment

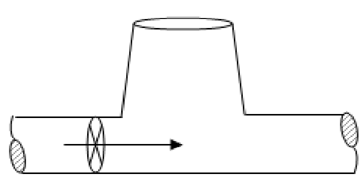
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*1.00 U/S*

PART B - SITE INSTALLATION

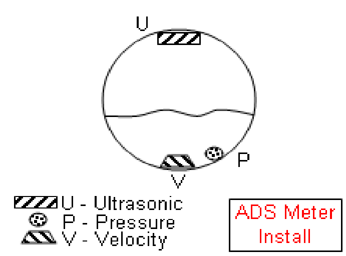
Installation Top View



Installation Side View



Installation Profile Sketch



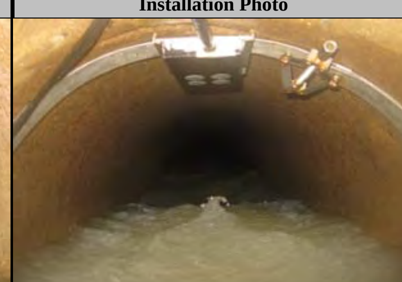
Installation Notes

Standard

Targeted Site:	*Yes*
Recommended by FSP:	*Yes*

Investigation Photo

Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

rjn group Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR103

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/25/09 8:35*	*2O008*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BO*	*10.72*	*5.00*	*41.75*	*41.75*

Site Address: *Hindman Park Golf Course*

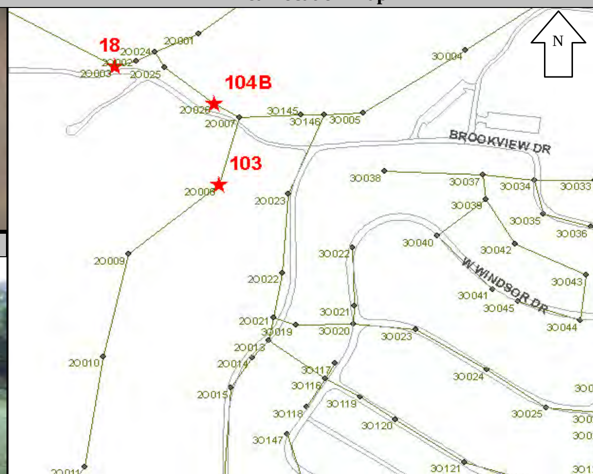
MH Type: *Concrete* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	*Yes*
Industrial	

Measurements

Flow Depth:	*9.00*	inches
Instant Velocity:	*2.28*	fps
Surcharge Evidence:	*none*	feet

Debris

Silt Type:	*None*
Silt (in):	*0.0*
Needs Cleaning:	*No*

Hydraulic Influences

Backwater:		Straight:	
Pump Station:		Bend:	*Yes*
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

turn on to golf cart path south/MH located west of path approx. 50'

Safety Considerations

LEL % *0.0* O_2 *19.1*

CO *0.0* H_2S *0*

Elevated MH: *Yes*

Height Elevated: *0.3 ft*

Structural Integrity: *Good*

Hydraulic Rating

A (good)

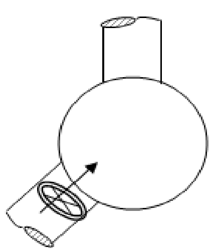
slight bend @ invert…Good site for installation

Recommended Equipment

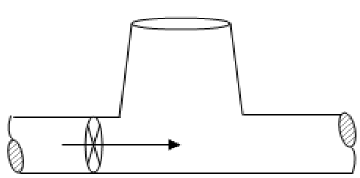
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*2.00 U/S*

PART B - SITE INSTALLATION

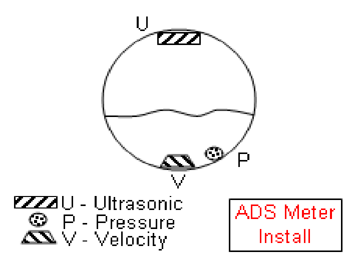
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

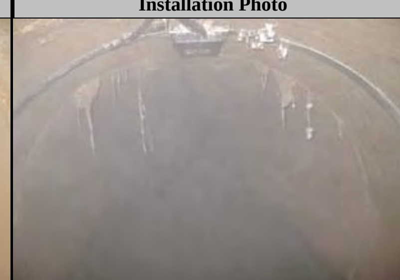
Install 1.5 to 2' in upstream pipe

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

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Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR104 B

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/24/09 14:42*	*20026*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB/BO*	*10.50*	*4.00*	*24.50*	*24.75*

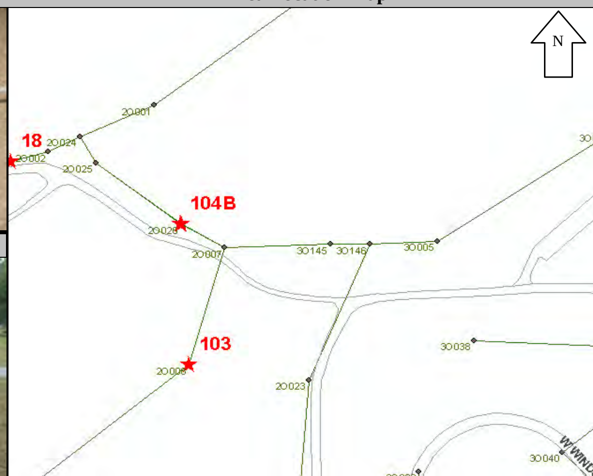
Site Address: *HINDMAN PARK GOLF COURSE*

MH Type: *Concrete* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential

Commercial *Yes*

Industrial

Measurements			Debris		Hydraulic Influences			
Flow Depth:	*3.50*	inches	Silt Type:	*None*	Backwater:		Straight:	
Instant Velocity:	*1.10*	fps	Silt (in):	*0.0*	Pump Station:		Bend:	*Yes*
Surcharge Evidence:	*10.50*	feet	Needs Cleaning:	*No*	*WWTP:*		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

MH LOCATED ON NORTH EDGE OF ROAD @ SIDEWALK

Safety Considerations

LEL % *0.0* O_2 *19.6*

CO *0.0* H_2S *0*

Elevated MH: *No*

Height Elevated: *0.0 ft*

Structural Integrity: *Good*

Hydraulic Rating

A (good)

SLIGHT BEND

Recommended Equipment

Meter Type: *ADS FlowShark*

Redundant Depth: *Yes*

Ultrasonic Depth: *Yes*

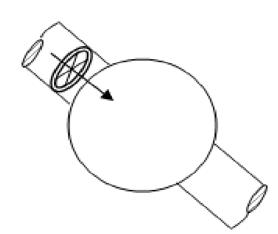
Pressure Depth: *Yes*

Velocity: *Yes*

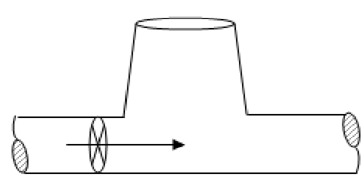
Location (ft): *1.00 U/S*

PART A - SITE INVESTIGATION

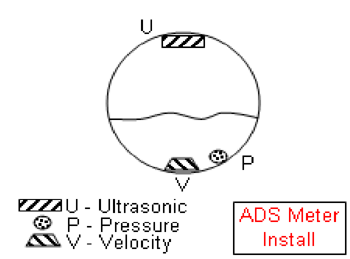
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

INSTALL 6"-1' UP PIPE

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo

PART B - SITE INSTALLATION

Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

rjn group — Excellence through Ownership	Little Rock, AR Flow Monitoring Services for Sanitary Sewer System	Site Name LR105

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/29/09 12:26*	*4N014*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*JC/BE*	*10.06*	*6.00*	*41.44*	*41.88*

Site Address: *Yellow city gate behind old Crane Ford Dealership on University.*

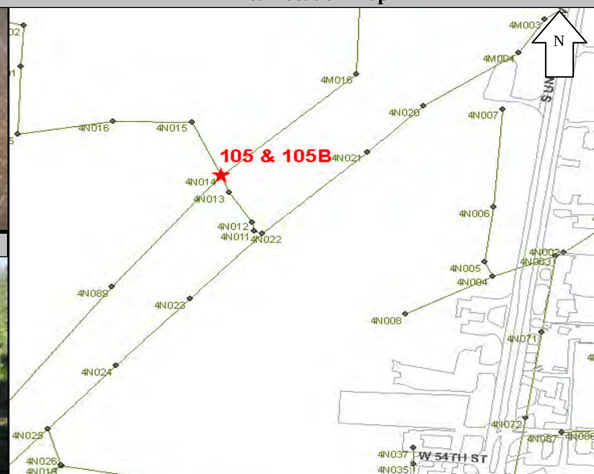
MH Type: *Concrete* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential	
Commercial	
Industrial	*Yes*

Measurements			Debris		Hydraulic Influences			
Flow Depth:	*12.00*	inches	Silt Type:	*Soft*	Backwater:		Straight:	*Yes*
Instant Velocity:	*1.04*	fps	Silt (in):	*4.0*	Pump Station:		Bend:	
Surcharge Evidence:	*10.06*	feet	Needs Cleaning:	*Yes*	*WWTP:*		Drop Inlet:	*Yes*

Site Feasibility

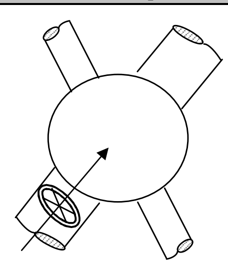
Site Access	Safety Considerations	Hydraulic Rating
POOR (remote, steep bank, parking	LEL % *0.0* O_2 *20.9*	*A (good)*
go through gate and follow chain link fence. Go all the way down to the creek. Turn southwest down right of way to target MH.	CO *0.0* H_2S *2* Elevated MH: *Yes* Height Elevated: *2.4 ft* Structural Integrity: *Good*	*mostly smooth*

Recommended Equipment

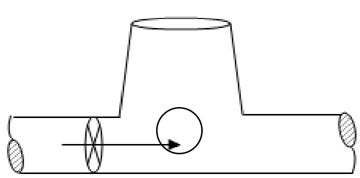
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*2.00 U/S*

PART B - SITE INSTALLATION

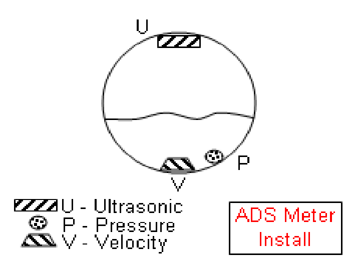
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

need 9' tripod

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo

Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

PART A - SITE INVESTIGATION

rjngroup Excellence through Ownership	**Little Rock, AR** Flow Monitoring Services for Sanitary Sewer System	**Site Name** LR105 B

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/29/09 12:33	4N014	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	JC/BE	10.06	6.00	23.62	23.81

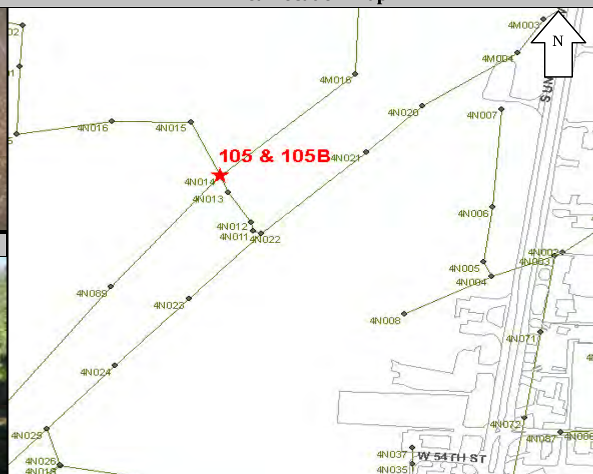
Site Address: Yellow gate behind old Crane Ford auto on University

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential

Commercial

Industrial Yes

Measurements		Debris		Hydraulic Influences	
Flow Depth:	2.25 inches	Silt Type:	Soft	Backwater:	Straight: Yes
Instant Velocity:	2.20 fps	Silt (in):	0.3	Pump Station:	Bend:
Surcharge Evidence:	10.06 feet	Needs Cleaning:	No	WWTP:	Drop Inlet: Yes

Site Feasibility

Site Access

POOR (remote, steep bank, parking

go through yellow gate and follow chain link fence all the way down to creek. Follow right of way southwest to target MH.

Safety Considerations

LEL % 0.0 O_2 20.2

CO 0.0 H_2S 0

Elevated MH: Yes

Height Elevated: 2.6 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

slight ripples

Recommended Equipment

Meter Type: ADS FlowShark

Redundant Depth: Yes

Ultrasonic Depth: Yes

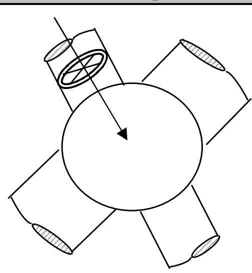
Pressure Depth: Yes

Velocity: Yes

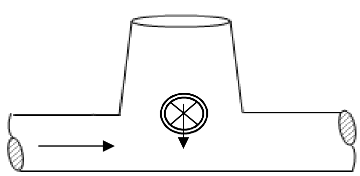
Location (ft): 1' U/S

PART B - SITE INSTALLATION

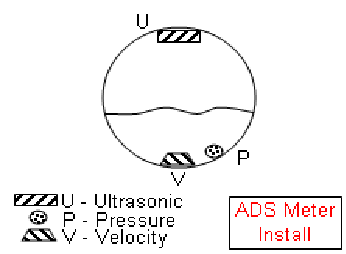
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

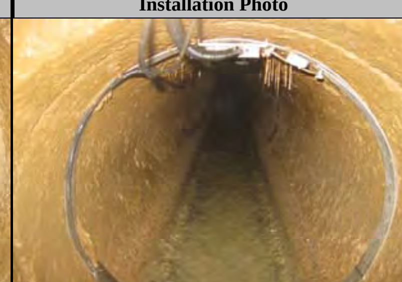
need 9' tripod

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR106

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/25/09 11:20*	*11L092*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*JC/BE*	*29.60*	*5.08*	*42.75*	*42.50*

Site Address: *Little Rock Animal Services off of Arch St.*

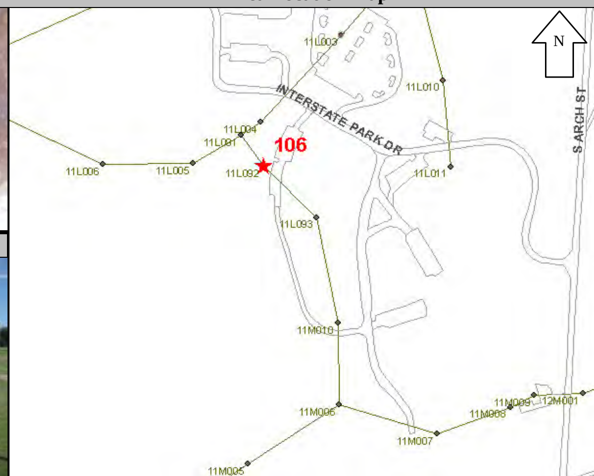
MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential

Commercial

Industrial Yes

Measurements			Debris		Hydraulic Influences			
Flow Depth:	16.62	inches	Silt Type:	None	Backwater:		Straight:	Yes
Instant Velocity:	3.19	fps	Silt (in):	0.0	Pump Station:		Bend:	
Surcharge Evidence:	15.00	feet	Needs Cleaning:	No	*WWTP:*		Drop Inlet:	

Site Feasibility

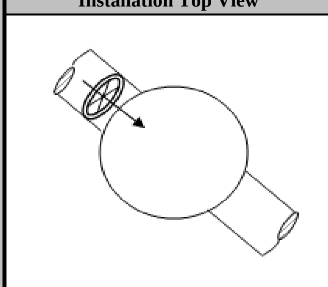
Site Access	Safety Considerations	Hydraulic Rating
GOOD (no problems accessing site)	LEL % 6.0 O_2 19.8	*A (good)*
between bathrooms and parking lot	CO 0.0 H_2S 0	*slight ripples*
	Elevated MH: *No*	
	Height Elevated: *0.0 ft*	
	Structural Integrity: *Good*	

Recommended Equipment

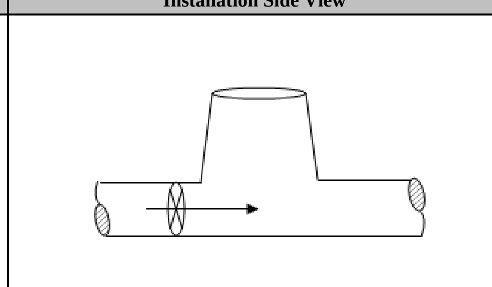
Meter Type:	*ADS FlowShark*
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	*2.00 U/S*

PART B - SITE INSTALLATION

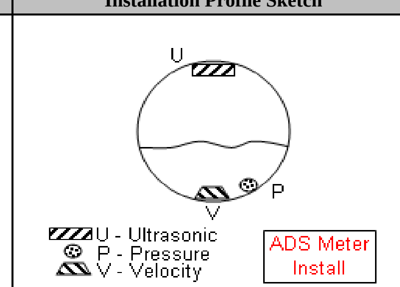
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

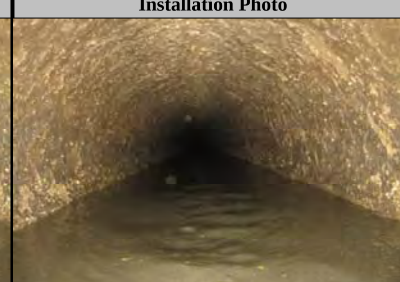
Standard

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo



Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

Little Rock, AR	Site Name
Flow Monitoring Services for Sanitary Sewer System	LR107

Excellence through Ownership

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/28/09 8:52	8Q015	T

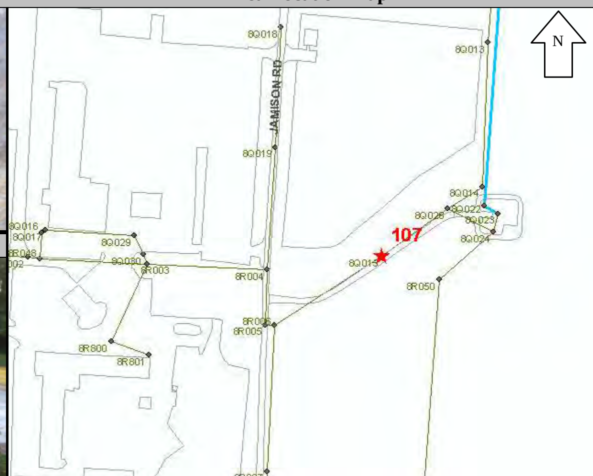
Muncipality	Inspected By	Manhole		Pipe	
		Depth (ft)	Width (ft)	Width (in)	Height (in)
Little Rock	JC/BE				
Site Address: 8001 Jamison Road		15.02	3.99	24.00	25.00

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	Yes

Measurements			Debris		Hydraulic Influences			
Flow Depth:	8.06	inches	Silt Type:	Soft	Backwater:		Straight:	Yes
Instant Velocity:	1.21	fps	Silt (in):	1.5	Pump Station:		Bend:	
Surcharge Evidence:	8.00	feet	Needs Cleaning:	Yes	*WWTP:*		Drop Inlet:	

Site Feasibility

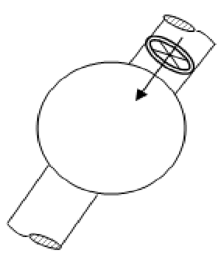
Site Access	Safety Considerations	Hydraulic Rating
GOOD (no problems accessing site)	LEL % 0.0; O_2 20.9	A (good)
a yellow metal gate blocks road, city has key. Easier acess if we had key.	CO 0.0; H_2S 0	looks pretty smooth.
	Elevated MH: Yes	
	Height Elevated: 2.0 ft	
	Structural Integrity: Good	

Recommended Equipment

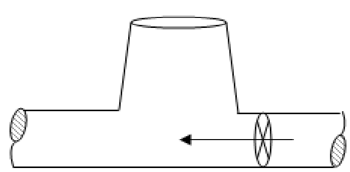
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	2.00 U/S

PART A - SITE INVESTIGATION

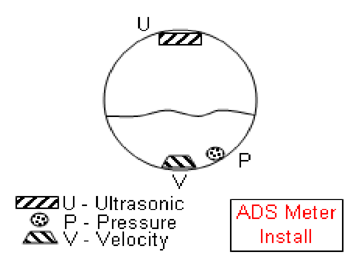
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

good

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

PART B - SITE INSTALLATION

Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

PART A - SITE INVESTIGATION

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR108

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	10/30/09 8:55	6T059	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/RB	72.00	6.00	29.44	29.50

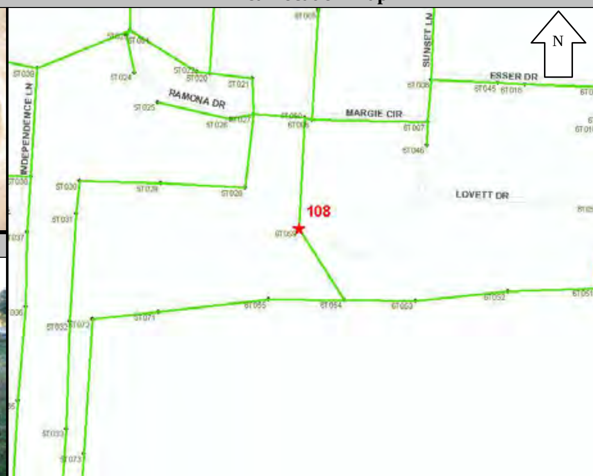
Site Address: End of Sunset Ln. Farm field to right. Site behind barn

MH Type: Concrete **Pipe Type:** PVC **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	Yes
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	2.88	inches	Silt Type:	None	Backwater:		Straight:	
Instant Velocity:	2.18	fps	Silt (in):	0.0	Pump Station:		Bend:	Yes
Surcharge Evidence:	4.00	feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

End of Sunset Ln gate to right into farm field to right. Site behind barn and through a second gate meter is in left side of field.

Safety Considerations

LEL %	0.0	O_2	20.9
CO	0.0	H_2S	0

Elevated MH: No

Height Elevated: 0.0 ft

Structural Integrity: Good

Hydraulic Rating

B (questionable)

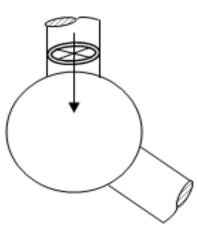
A little choppy

Recommended Equipment

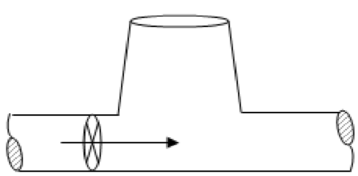
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.00 U/S

PART B - SITE INSTALLATION

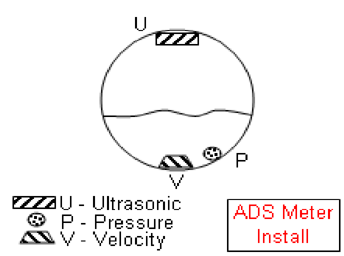
Installation Top View



Installation Side View



Installation Profile Sketch



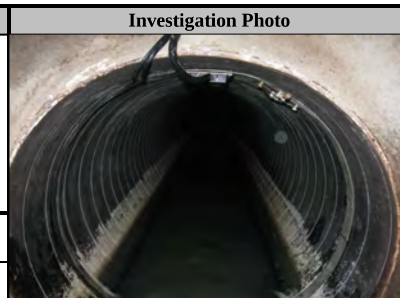
Installation Notes

None

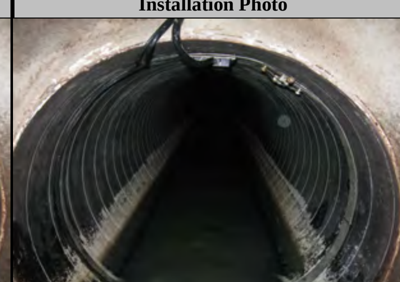
Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo



Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Excellence through Ownership

Site Name
LR109

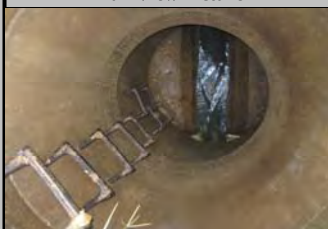
Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/28/09 9:41	6T057	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	JC/BE	15.29	6.00	30.25	28.62

Site Address: 9526 Reck Rd

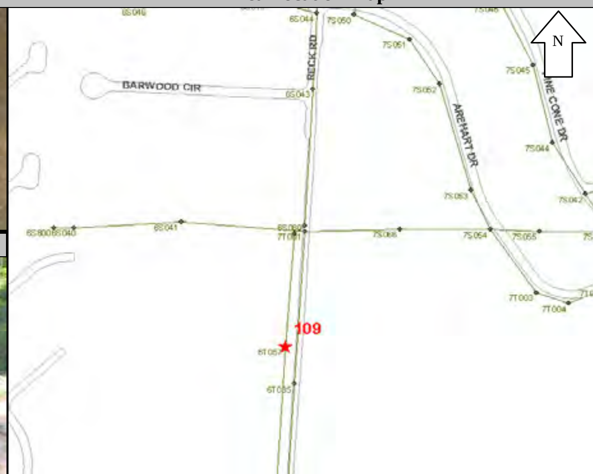
MH Type: Concrete **Pipe Type:** PVC **Pipe Shape:** Circular

Plan View Picture



Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential

Commercial Yes

Industrial

Measurements			Debris		Hydraulic Influences			
Flow Depth:	2.88	inches	Silt Type:	Soft	Backwater:		Straight:	Yes
Instant Velocity:	1.55	fps	Silt (in):	0.5	Pump Station:		Bend:	
Surcharge Evidence:	2.00	feet	Needs Cleaning:	No	*WWTP:*		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

Across street from telephone pole #12. Look for green paint.

Safety Considerations

LEL %	0.0	O_2	20.9
CO	0.0	H_2S	0

Elevated MH: Yes

Height Elevated: 0.8 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

good, smooth.

Recommended Equipment

Meter Type: ADS FlowShark

Redundant Depth: Yes

Ultrasonic Depth: Yes

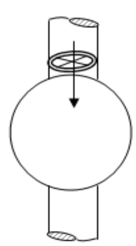
Pressure Depth: Yes

Velocity: Yes

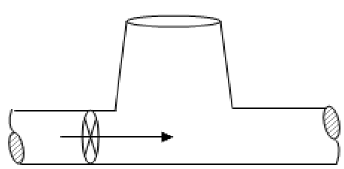
Location (ft): 2.00 U/S

PART B - SITE INSTALLATION

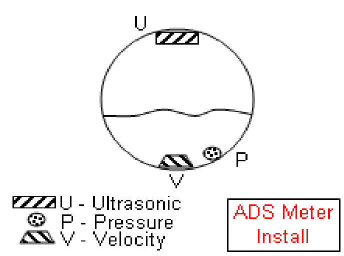
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

rjngroup Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR110

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/28/09 10:59	4U014	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	JC/BE	5.30	4.08	15.12	15.06

Site Address: 6201 Mabelvale CTF (cut off)

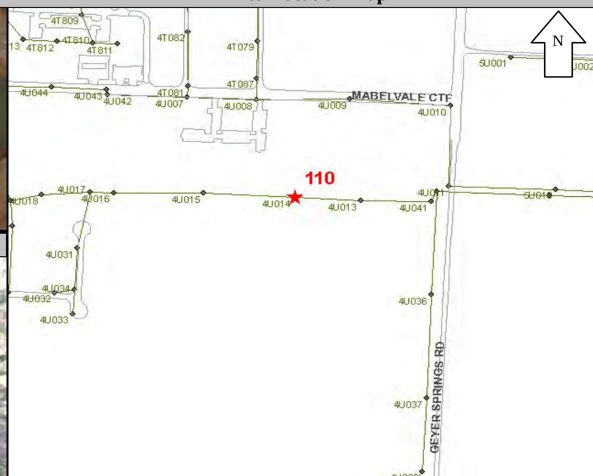
MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential

Commercial Yes

Industrial

Measurements			Debris		Hydraulic Influences			
Flow Depth:	5.06	inches	Silt Type:	Soft	Backwater:		Straight:	Yes
Instant Velocity:	1.23	fps	Silt (in):	0.4	Pump Station:		Bend:	
Surcharge Evidence:	2.00	feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

Turn into Oak Ridge Apartments Travel southeast behind building 5 you'll come to a clear the MH is on the trail.

Safety Considerations

LEL % 0.0 O_2 20.9

CO 0.0 H_2S 0

Elevated MH: Yes

Height Elevated: 1.8 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

good and smooth

Recommended Equipment

Meter Type: ADS FlowShark

Redundant Depth: Yes

Ultrasonic Depth: Yes

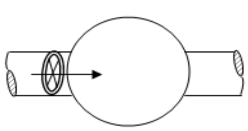
Pressure Depth: Yes

Velocity: Yes

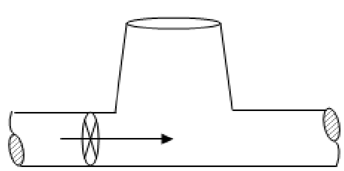
Location (ft): 1.00 U/S

PART B - SITE INSTALLATION

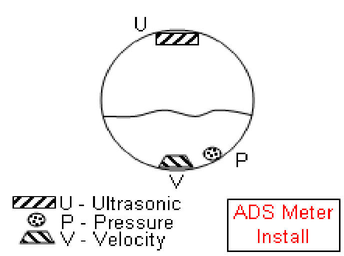
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR111

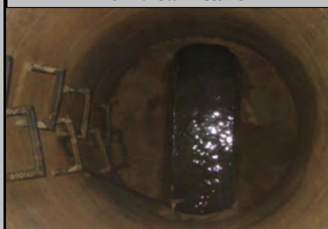
Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/28/09 11:41	4V001	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	JC/BE	18.06	4.00	18.00	18.25

Site Address: 11301 Gyer Springs Rd

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture



Area View Picture

Area Location Map

Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements

Flow Depth:	4.00	inches
Instant Velocity:	1.13	fps
Surcharge Evidence:	0.00	feet

Debris

Silt Type:	Soft
Silt (in):	1.0
Needs Cleaning:	No

Hydraulic Influences

Backwater:		Straight:	Yes
Pump Station:		Bend:	
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

diagonal from SouthWest Christian Academy. look for green spray paint on road and trees. There will be a buried cable sign ten feet from it.

Safety Considerations

LEL %	0.0	O_2	20.9
CO	0.0	H_2S	0

Elevated MH: No

Height Elevated: 0.0 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

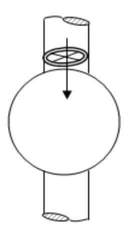
slight ripples

Recommended Equipment

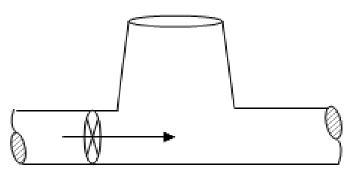
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.00 U/S

PART B - SITE INSTALLATION

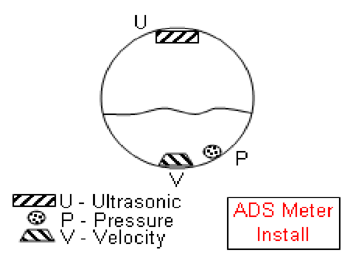
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

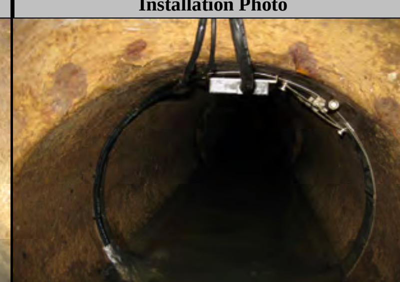
another galvenized pvc pipe is coming in above U/S

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo



Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

rjngroup
Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR112

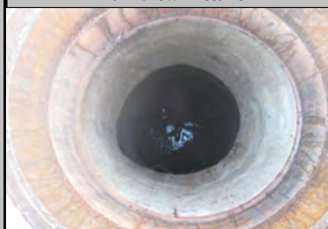
Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/25/09 8:17*	*10G066*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*JC/BE*	*18.30*	*4.25*	*35.50*	*36.60*

Site Address: *1600 Cantrell (inside Episcopal school enclosure)*

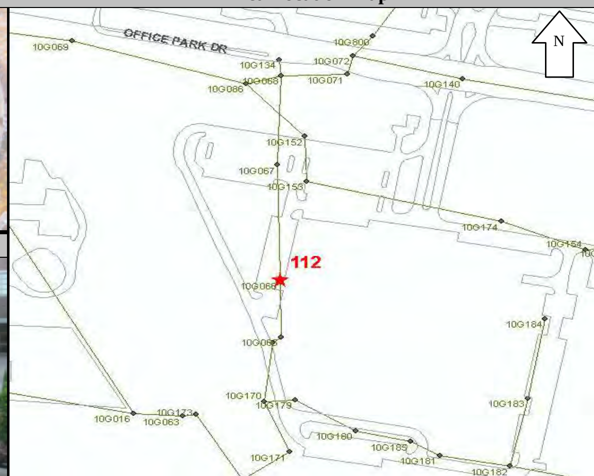
MH Type: *Partial Brick & Concrete* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

Plan View Picture



Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	*Yes*
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	*15.25*	inches	Silt Type:	*None*	Backwater:		Straight:	*Yes*
Instant Velocity:	*2.20*	fps	Silt (in):	*0.0*	Pump Station:		Bend:	
Surcharge Evidence:	*0.00*	feet	Needs Cleaning:	*No*	*WWTP:*		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

0

Safety Considerations

LEL %	*0.0*	O_2	*20.1*
CO	*0.0*	H_2S	*0*
Elevated MH:	*No*		
Height Elevated:	*0.0 ft*		
Structural Integrity:	*Good*		

Hydraulic Rating

A (good)

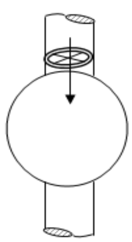
slight ripples and drop service line could affect flow

Recommended Equipment

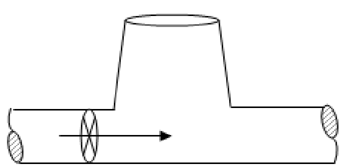
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*1.00 U/S*

PART B - SITE INSTALLATION

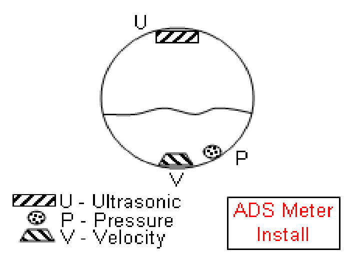
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

0

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo

Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

rjn group Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR113

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/30/09 8:53	-7-A005	U1

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB \ BO	15.45	4.08	18.00	18.00

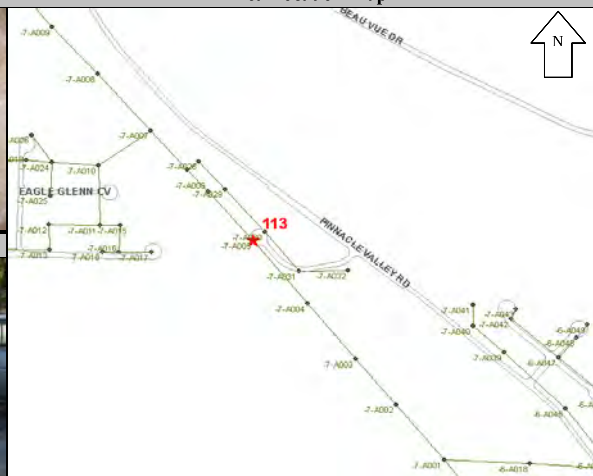
Site Address: #18 PINNACLE CIRCLE

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	
Industrial	

Measurements

Flow Depth:	4.50	inches
Instant Velocity:	3.52	fps
Surcharge Evidence:	5.00	feet

Debris

Silt Type:	None
Silt (in):	0.0
Needs Cleaning:	No

Hydraulic Influences

Backwater:		Straight:	Yes
Pump Station:		Bend:	
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

MOVED 1 MH UPSTREAM DUE TO ACCESS

Safety Considerations

LEL %	0.0	O_2	20.3
CO	0.0	H_2S	0

Elevated MH: No

Height Elevated: 0.0 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

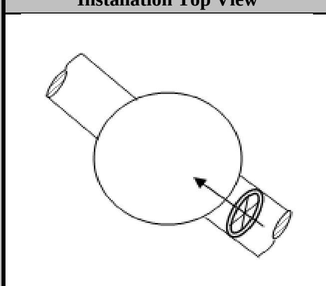
SMOOTH FLOW

Recommended Equipment

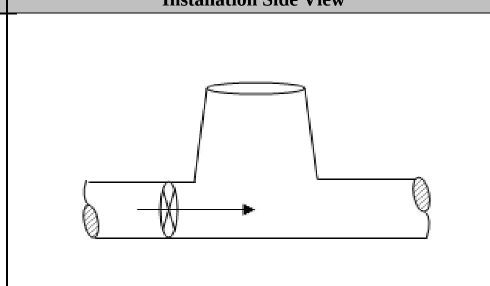
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	0.50 U/S

PART A - SITE INVESTIGATION

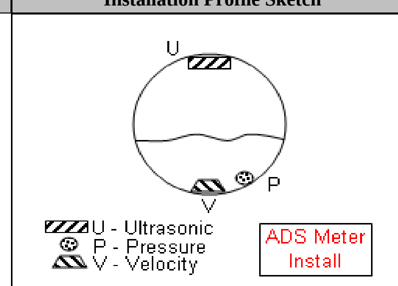
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

PART B - SITE INSTALLATION

Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

rjngroup Excellence through Ownership	**Little Rock, AR** **Flow Monitoring Services for Sanitary Sewer System**	**Site Name** LR114

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/30/09 8:20*	*-8-A002*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*TB \ BO*				
Site Address: *7820 CANTRELL ROAD*		*14.45*	*4.00*	*20.50*	*21.06*

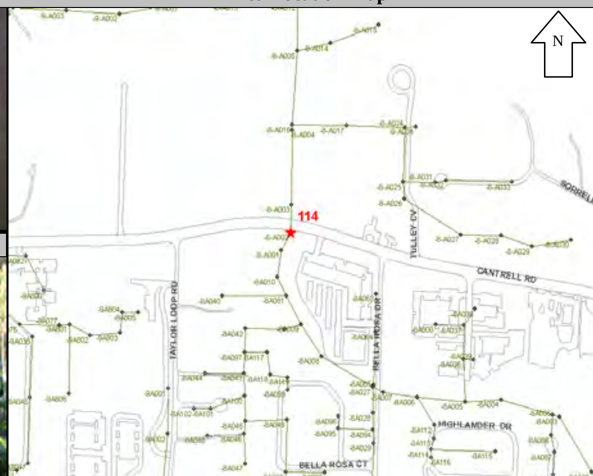
MH Type: *Concrete* **Pipe Type:** *Concrete* **Pipe Shape:** *Circular*

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential	
Commercial	*Yes*
Industrial	

Measurements

Flow Depth:	*6.00*	inches
Instant Velocity:	*5.10*	fps
Surcharge Evidence:	*4.00*	feet

Debris

Silt Type:	*None*
Silt (in):	*0.0*
Needs Cleaning:	*No*

Hydraulic Influences

Backwater:		Straight:	*Yes*
Pump Station:		Bend:	
WWTP:		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

50 YARDS WEST OF STRIP CENTER BY COLDWELL BANKER

Safety Considerations

LEL %	*0.0*	O_2	*20.4*
CO	*0.0*	H_2S	*0*

Elevated MH: *Yes*

Height Elevated: *4.0 ft*

Structural Integrity: *Good*

Hydraulic Rating

A (good)

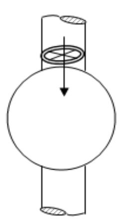
SMOOTH FLOW

Recommended Equipment

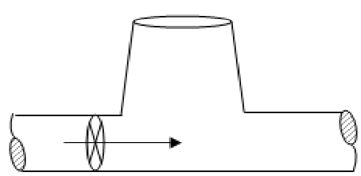
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*0.50 U/S*

PART B - SITE INSTALLATION

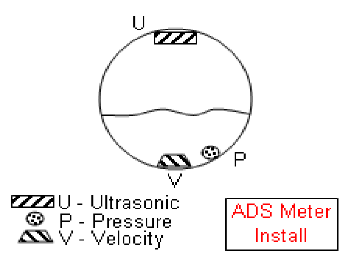
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR116

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/29/09 14:55	-10-B008	U1

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	TB/BO	6.00	4.00	18.00	18.00

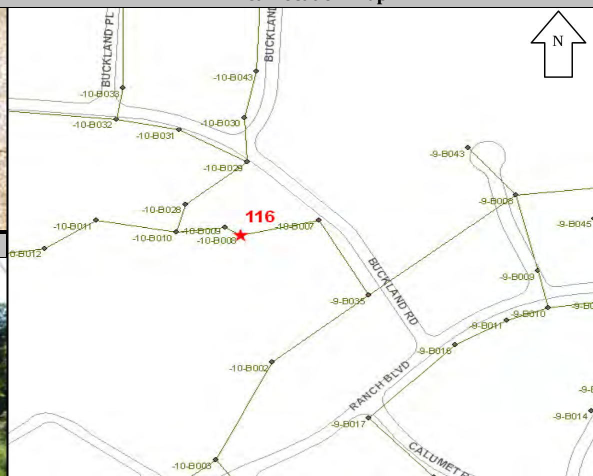
Site Address: 3 BUCKLAND DR

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	3.75	inches	Silt Type:	None	Backwater:		Straight:	
Instant Velocity:	1.75	fps	Silt (in):	0.0	Pump Station:		Bend:	Yes
Surcharge Evidence:	6.00	feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

DRIVE OVER CURB TO EDGE OF TREELINE

Safety Considerations

LEL % 0.0 O_2 20.9

CO 0.0 H_2S 0

Elevated MH: Yes

Height Elevated: 2.3 ft

Structural Integrity: Good

Hydraulic Rating

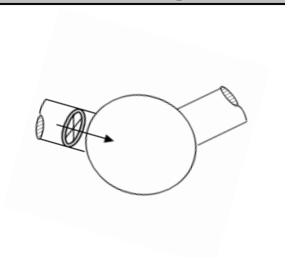
A (good)

SMOOTH

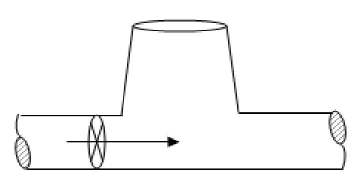
Recommended Equipment

Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	0.50 U/S

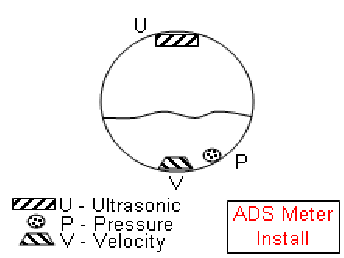
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

INSTALL SENSORS/BAND 6-8" IN UPSTREAM PIPE

Targeted Site: Alternate

Recommended by FSP: Yes

Investigation Photo

Installation Photo

PART A - SITE INVESTIGATION

PART B - SITE INSTALLATION

Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

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Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR117

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/29/09 9:44	-4T008	D2

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	JC/BE	25.84	5.91	42.12	41.81

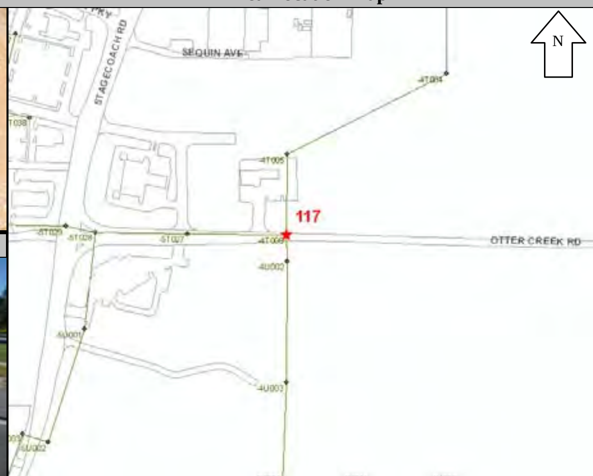
Site Address: 13100 Otter Creek Rd (In front of Cruizzers Car Wash)

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	4.32	inches	Silt Type:	Soft	Backwater:		Straight:	Yes
Instant Velocity:	3.52	fps	Silt (in):	0.3	Pump Station:		Bend:	
Surcharge Evidence:	0.00	feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

Site Access

GOOD (no problems accessing site)

Downstream 2 manholes from target…in center street

Safety Considerations

LEL % 0.0 O_2 20.1

CO 0.0 H_2S 0

Elevated MH: No

Height Elevated: 0.0 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

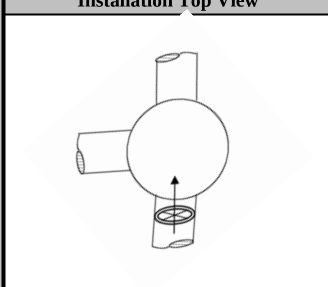
moderate ripples

Recommended Equipment

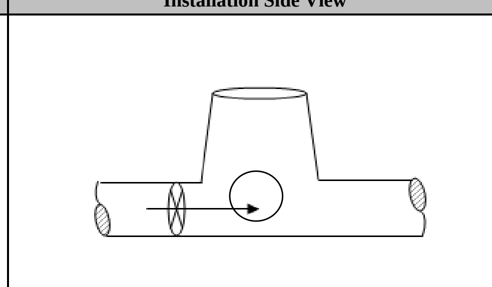
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	3.00 U/S

PART A - SITE INVESTIGATION

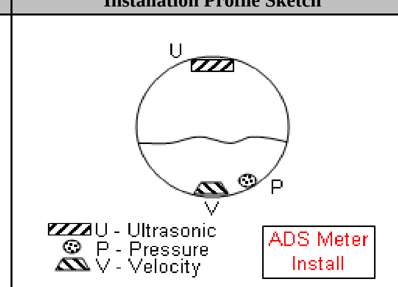
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

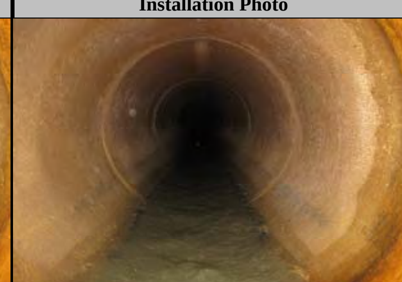
Standard

Targeted Site: Alternate

Recommended by FSP: Yes

Investigation Photo

Installation Photo



PART B - SITE INSTALLATION

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

rjngroup
Excellence through Ownership

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR118

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/28/09 13:47	-1Q006	D1

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	JC/BE	11.70	4.01	24.00	24.25

Site Address: 8804 Mabelvale Pike

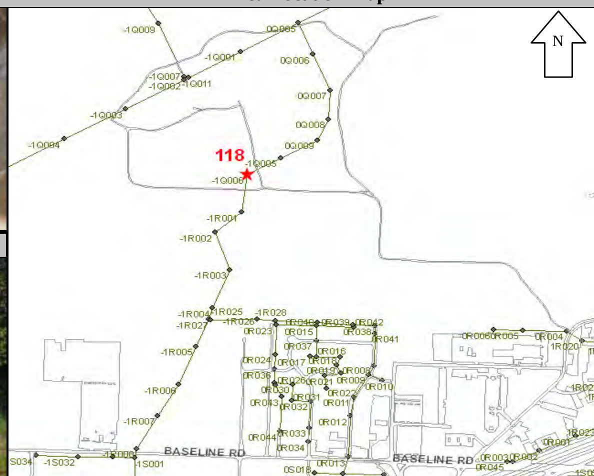
MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential

Commercial Yes

Industrial

Measurements			Debris		Hydraulic Influences			
Flow Depth:	3.12	inches	Silt Type:	Soft	Backwater:		Straight:	
Instant Velocity:	1.75	fps	Silt (in):	0.3	Pump Station:		Bend:	Yes
Surcharge Evidence:	0.00	feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

turn down gravel road, follow road till you come to a fork in the road. Turn left, go over drainage ditch and on the right look for green paint on the road out in the field you'll see elevated MH.

Safety Considerations

LEL % 0.0 O_2 20.9

CO 0.0 H_2S 0

Elevated MH: Yes

Height Elevated: 2.6 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

moderate ripples

Recommended Equipment

Meter Type: ADS FlowShark

Redundant Depth: Yes

Ultrasonic Depth: Yes

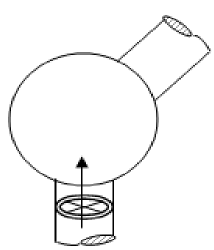
Pressure Depth: Yes

Velocity: Yes

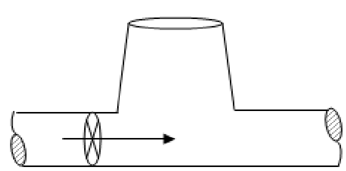
Location (ft): 1.00 U/S

PART B - SITE INSTALLATION

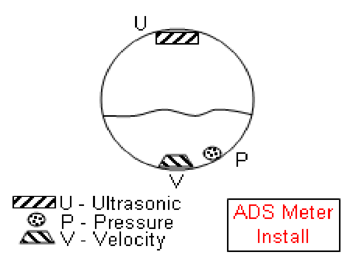
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: Alternate

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

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Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

PART A - SITE INVESTIGATION

Site Name
LR119

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/28/09 15:14	-3R004	T

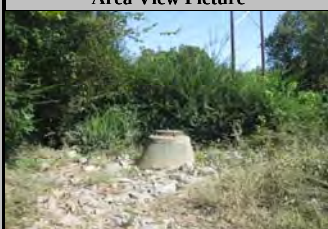
Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	JC/BE	15.89	6.00	11.94	11.88

Site Address: look for a right away with power lines on the right side of W. Baseline.

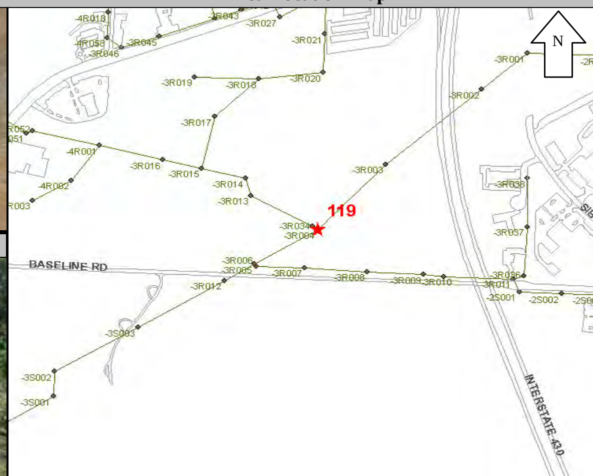
MH Type: Concrete **Pipe Type:** VCP **Pipe Shape:** Circular

Plan View Picture

Area View Picture



Area Location Map



Manhole Coordinates

0.00
0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	

Measurements

Flow Depth:	2.50	inches
Instant Velocity:	2.17	fps
Surcharge Evidence:	0.00	feet

Debris

Silt Type:	Soft
Silt (in):	0.2
Needs Cleaning:	No

Hydraulic Influences

Backwater:		Straight:	Yes
Pump Station:		Bend:	
WWTP:		Drop Inlet:	Yes

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

No address to go off of, drive down W. Baseline towards Stagecoach, you'll go over a bridge and on the right you'll see a clearing with two MH about ten feet apart follow the clearing back until you see two more

Safety Considerations

LEL %	0.0	O_2	20.9
CO	0.0	H_2S	0
Elevated MH:	Yes		
Height Elevated:	3.0 ft		
Structural Integrity:	Good		

Hydraulic Rating

A (good)

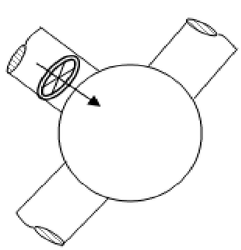
smooth

Recommended Equipment

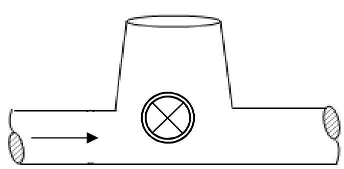
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	0.75 U/S

PART B - SITE INSTALLATION

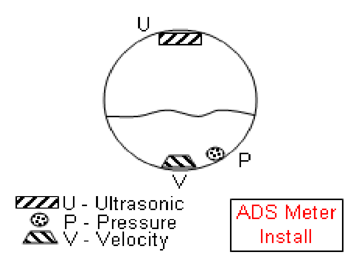
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site:	Yes
Recommended by FSP:	Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR120

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/29/09 8:36	-4T002	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	JC/BE	20.88	4.00	23.94	23.50

Site Address: 10100 block of Stagecoach Rd.

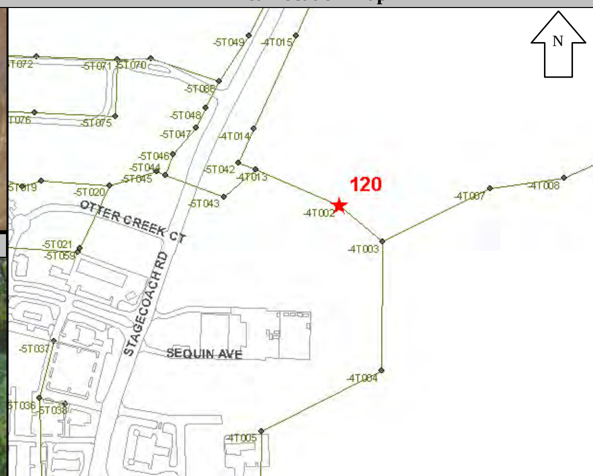
MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

PART A - SITE INVESTIGATION

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential

Commercial

Industrial Yes

Measurements			Debris		Hydraulic Influences			
Flow Depth:	5.12	inches	Silt Type:	None	Backwater:		Straight:	
Instant Velocity:	2.53	fps	Silt (in):	0.0	Pump Station:		Bend:	Yes
Surcharge Evidence:	5.00	feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

east side of Stagecoach…path through the woods…look for green paint markings.

Safety Considerations

LEL % 0.0 O_2 20.9

CO 0.0 H_2S 0

Elevated MH: Yes

Height Elevated: 3.8 ft

Structural Integrity: Good

Hydraulic Rating

A (good)

moderate ripples

Recommended Equipment

Meter Type: ADS FlowShark

Redundant Depth: Yes

Ultrasonic Depth: Yes

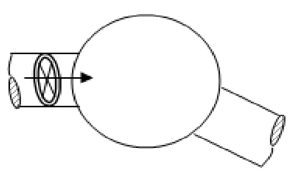
Pressure Depth: Yes

Velocity: Yes

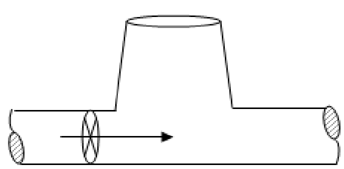
Location (ft): 2.00 U/S

PART B - SITE INSTALLATION

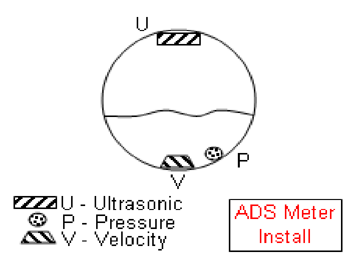
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

slightly narrow at entrance of pipe. Band will have to be 2 feet back to be unaffected by this.

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

PART A - SITE INVESTIGATION

Site Name
LR122

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/25/09 14:57	16K009	T

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	JC/BE	20.60	5.04	60.25	ɔcking bo

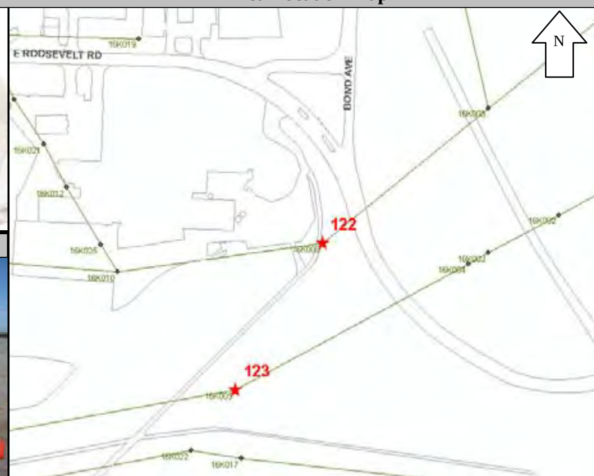
Site Address: 2900 Bond (Bond and Roosevelt)

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential

Commercial

Industrial: Yes

Measurements		Debris		Hydraulic Influences			
Flow Depth:	8.50 inches	Silt Type:	Hard Packed	Backwater:		Straight:	
Instant Velocity:	1.50 fps	Silt (in):	2.5	Pump Station:		Bend:	Yes
Surcharge Evidence:	5.90 feet	Needs Cleaning:	Yes	WWTP:		Drop Inlet:	

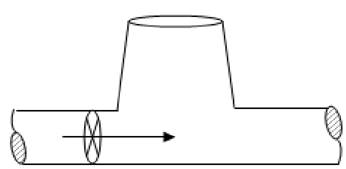
Site Feasibility

Site Access	Safety Considerations	Hydraulic Rating	Recommended Equipment
GOOD (no problems accessing site)	LEL % 0.0; O_2 20.9	A (good)	Meter Type: ADS FlowShark
-	CO 0.0; H_2S 0	smooth flow	Redundant Depth: Yes
	Elevated MH: No		Ultrasonic Depth: Yes
	Height Elevated: 0.0 ft		Pressure Depth: Yes
	Structural Integrity: Good		Velocity: Yes
			Location (ft): 4.00 U/S

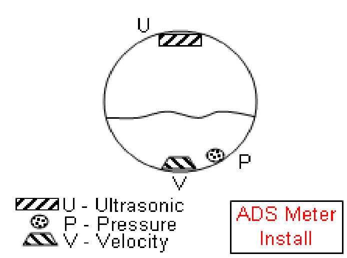
PART B - SITE INSTALLATION

Installation Top View

Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

rjn group – Excellence through Ownership	Little Rock, AR Flow Monitoring Services for Sanitary Sewer System	Site Name: LR123

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/25/09 9:32*	*16K005*	*T*

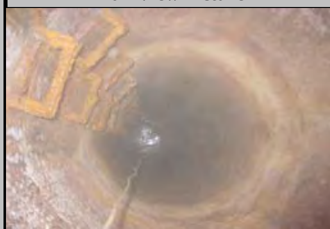
Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*JC/BE*	*29.50*	*4.16*	*59.88*	*59.94*

Site Address: *2900 Bond St.*

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

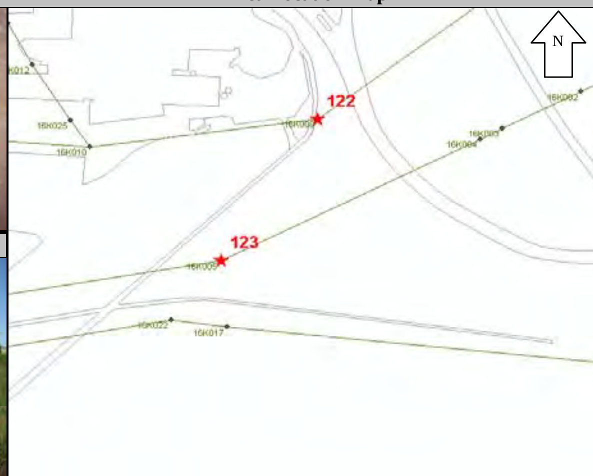
PART A - SITE INVESTIGATION

Plan View Picture



Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	Yes
Industrial	Yes

Measurements			Debris		Hydraulic Influences			
Flow Depth:	22.00	inches	Silt Type:	Hard Packed	Backwater:		Straight:	
Instant Velocity:	19.70	fps	Silt (in):	5.0	Pump Station:		Bend:	Yes
Surcharge Evidence:	16.00	feet	Needs Cleaning:	Yes	*WWTP:*		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

just before the stop light and RR pull off to right on gravel road go trough right side of gate. Countinue on gravel road just passed second set of RRT (Rail Road Tracks) stop next to tall orange runway light MH

Safety Considerations

LEL %	3.0	O_2	19.6
CO	0.0	H_2S	0
Elevated MH:	Yes		
Height Elevated:	2.8 ft		
Structural Integrity:	Good		

Hydraulic Rating

A (good)

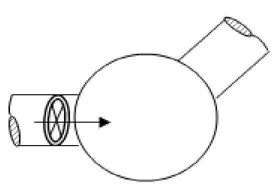
Smooth

Recommended Equipment

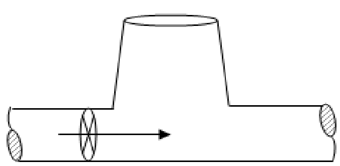
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	3.00 U/S

PART B - SITE INSTALLATION

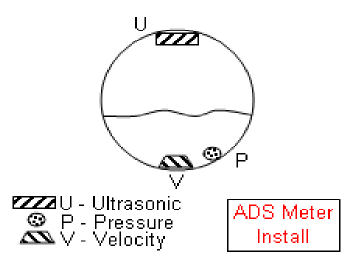
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

used measuring tape to get MH depth

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

PART A - SITE INVESTIGATION

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

rjn group — Excellence through Ownership

Site Name
LR124

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/28/09 8:20*	*8R051*	*T*

Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	*JC/BE*	*20.40*	*6.00*	*35.25*	*34.06*

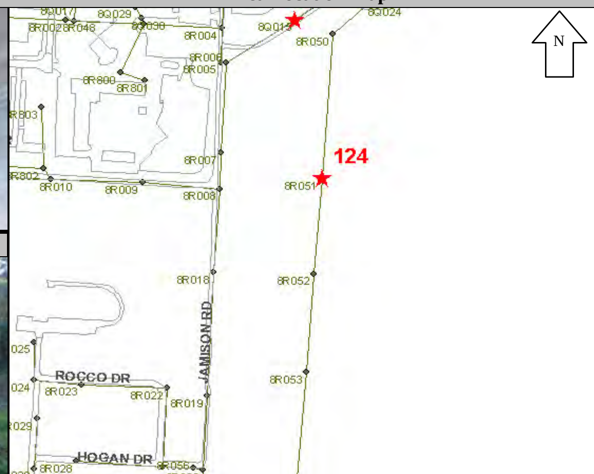
Site Address: *8223 Jamison Rd*

MH Type: *Concrete* **Pipe Type:** *PVC* **Pipe Shape:** *Circular*

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	
Commercial	*Yes*
Industrial	*Yes*

Measurements			Debris		Hydraulic Influences			
Flow Depth:	*10.60*	inches	Silt Type:	*Soft*	Backwater:		Straight:	*Yes*
Instant Velocity:	*1.14*	fps	Silt (in):	*2.0*	Pump Station:		Bend:	
Surcharge Evidence:	*15.00*	feet	Needs Cleaning:	*Yes*	WWTP:		Drop Inlet:	

Site Feasibility

Site Access

FAIR (minor traffic, off-road)

there is a cut out trail leading to clear out MH is to the left as soon as you get to opening. You can drive back there if you can get a key from the city.

Safety Considerations

LEL % *0.0* O_2 *20*

CO *0.0* H_2S *0*

Elevated MH: *Yes*

Height Elevated: *2.5 ft*

Structural Integrity: *Good*

Hydraulic Rating

A (good)

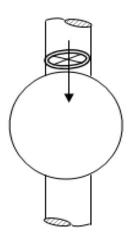
very slight ripples mostly smooth

Recommended Equipment

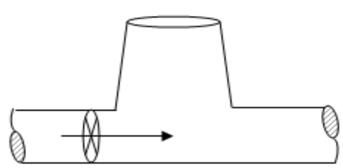
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*2.00 U/S*

PART B - SITE INSTALLATION

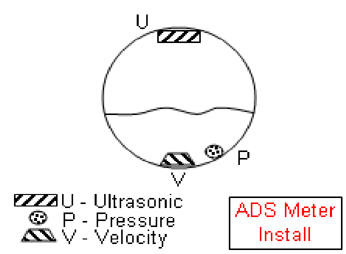
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

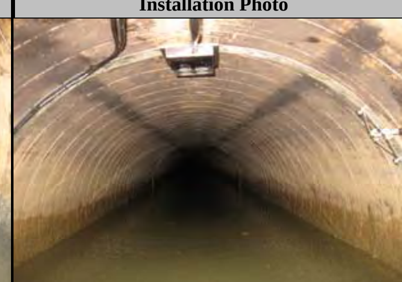
Standard

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo



Approved		Not Approved		Recommended Alternate Site Name
.	.	.	.	.

Little Rock, AR

Flow Monitoring Services for Sanitary Sewer System

Site Name
LR125

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	*18-2383-00*	*9/24/09 9:01*	*8E013*	*T*

Muncipality	Inspected By	Manhole		Pipe	
		Depth (ft)	Width (ft)	Width (in)	Height (in)
Little Rock	*JC/BE*	*7.90*	*3.58*	*12.75*	*12.00*

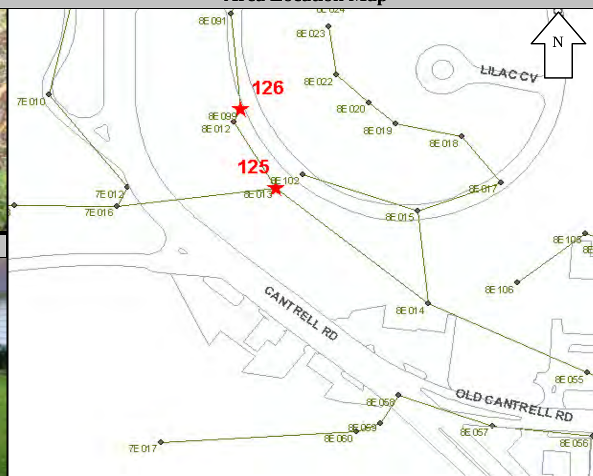
Site Address: *1710 Lilac Circle*

MH Type: *Concrete* **Pipe Type:** *PVC* **Pipe Shape:** *Circular*

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

Signal Strength

Modem / Phone #

-

System Characteristics

Residential	*Yes*
Commercial	
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	*3.50*	inches	Silt Type:	*None*	Backwater:		Straight:	*Yes*
Instant Velocity:	*5.75*	fps	Silt (in):	*0.0*	Pump Station:		Bend:	
Surcharge Evidence:	*0.00*	feet	Needs Cleaning:	*No*	*WWTP:*		Drop Inlet:	

Site Feasibility

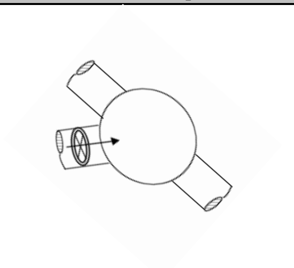
Site Access	Safety Considerations	Hydraulic Rating
GOOD (no problems accessing site)	LEL % *0.0* O_2 *20.9*	*A (good)*
-	CO *0.0* H_2S *0*	*Smooth*
	Elevated MH: *No*	
	Height Elevated: *0.0 ft*	
	Structural Integrity: *Good*	

Recommended Equipment

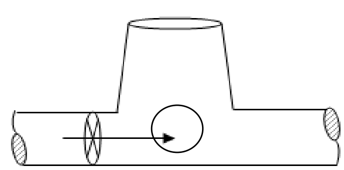
Meter Type:	*ADS FlowShark*
Redundant Depth:	*Yes*
Ultrasonic Depth:	*Yes*
Pressure Depth:	*Yes*
Velocity:	*Yes*
Location (ft):	*1.00 U/S*

PART A - SITE INVESTIGATION

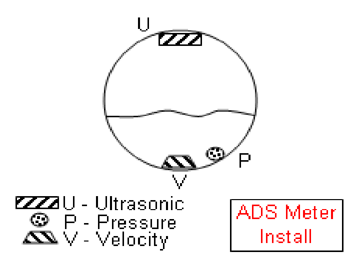
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: *Yes*

Recommended by FSP: *Yes*

Investigation Photo

Installation Photo

PART B - SITE INSTALLATION

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

PART A - SITE INVESTIGATION

rjn group — Excellence through Ownership	Little Rock, AR Flow Monitoring Services for Sanitary Sewer System	Site Name LR126

Planning Basin	Project No.	Inspection Date/Time	MH #	Site Code
.	18-2383-00	9/24/09 9:34	8E099	T

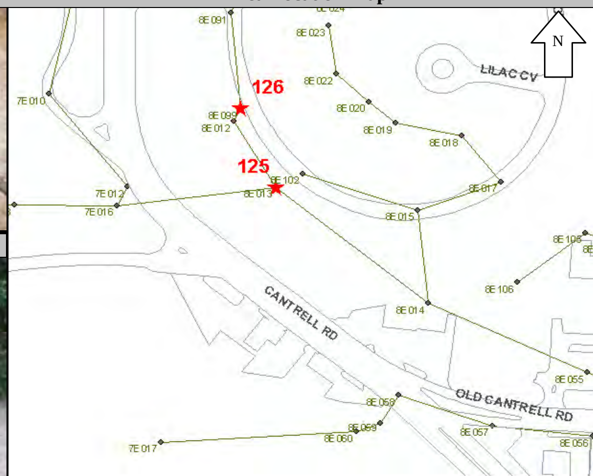
Muncipality	Inspected By	Manhole Depth (ft)	Manhole Width (ft)	Pipe Width (in)	Pipe Height (in)
Little Rock	JC/BE				
Site Address: 1704 Lilac Circle		7.20	4.00	18.50	18.12

MH Type: Concrete **Pipe Type:** Concrete **Pipe Shape:** Circular

Plan View Picture

Area View Picture

Area Location Map



Manhole Coordinates

0.00

0.00

Antenna Installation

▼

Signal Strength ▼

Modem / Phone #

-

System Characteristics

Residential	Yes
Commercial	
Industrial	

Measurements			Debris		Hydraulic Influences			
Flow Depth:	2.50	inches	Silt Type:	None	Backwater:		Straight:	
Instant Velocity:	4.80	fps	Silt (in):	0.0	Pump Station:		Bend:	Yes
Surcharge Evidence:	0.00	feet	Needs Cleaning:	No	WWTP:		Drop Inlet:	

Site Feasibility

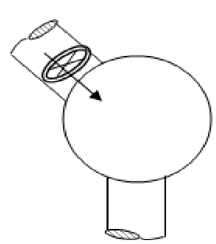
Site Access	Safety Considerations	Hydraulic Rating
GOOD (no problems accessing site)	LEL % 0.0 O_2 20.9	A (good)
-	CO 0.0 H_2S 0	slight ripples
	Elevated MH: Yes	
	Height Elevated: 1.0 ft	
	Structural Integrity: Good	

Recommended Equipment

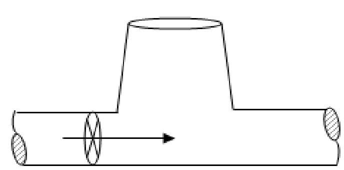
Meter Type:	ADS FlowShark
Redundant Depth:	Yes
Ultrasonic Depth:	Yes
Pressure Depth:	Yes
Velocity:	Yes
Location (ft):	1.00 U/S

PART B - SITE INSTALLATION

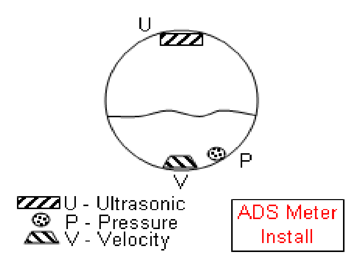
Installation Top View



Installation Side View



Installation Profile Sketch



Installation Notes

Standard

Targeted Site: Yes

Recommended by FSP: Yes

Investigation Photo

Installation Photo

Approved	Not Approved	Recommended Alternate Site Name
. .	. .	.

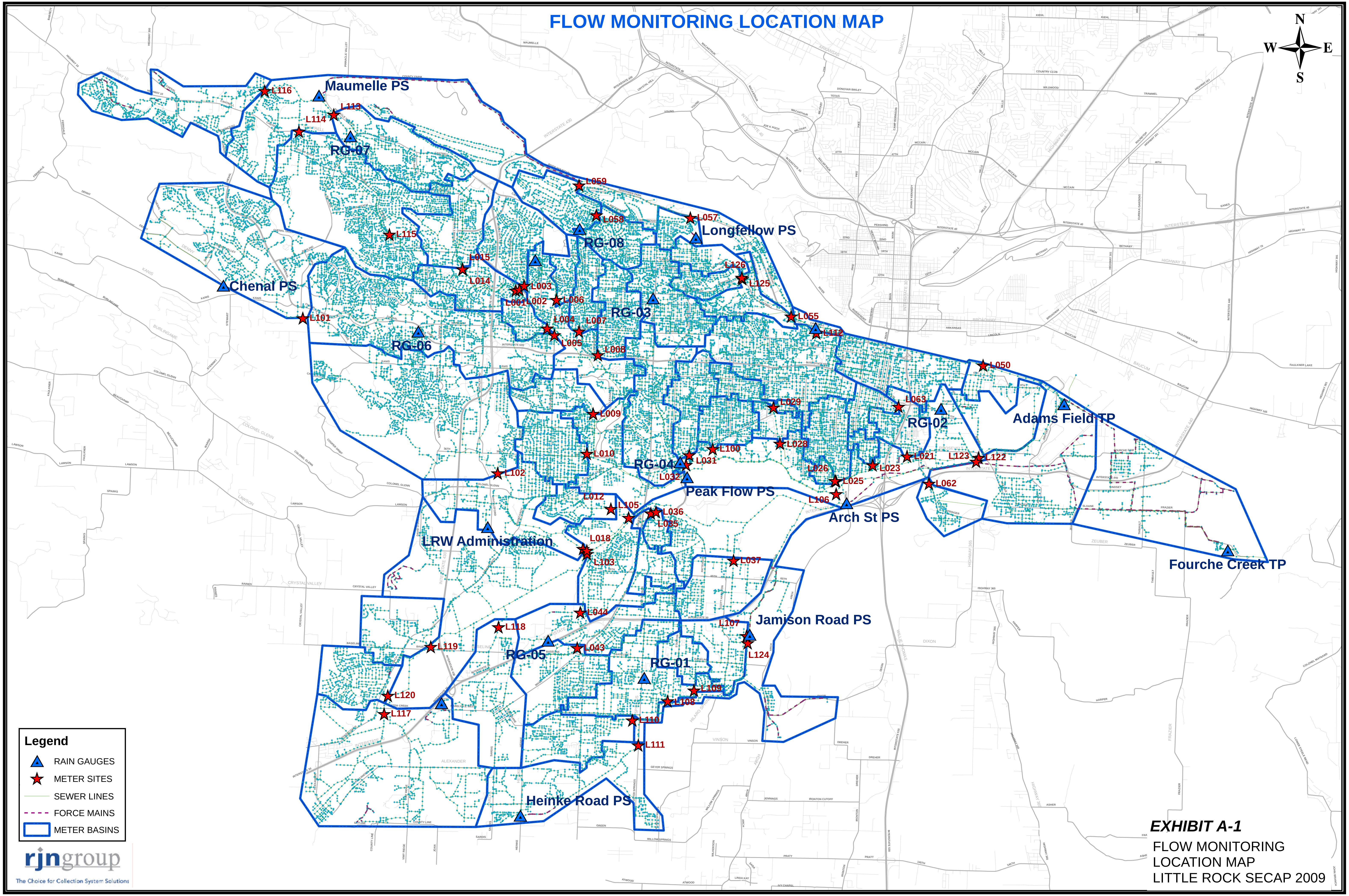

FLOW MONITORING LOCATION MAP
N
S
E
W
Maumelle PS
RG-07
Chenal PS
RG-06
RG-08
Longfellow PS
RG-03
RG-04
Peak Flow PS
Arch St PS
RG-02
Adams Field TP
Fourche Creek TP
LRW Administration
Jamison Road PS
RG-05
RG-01
Heinke Road PS
L116
L113
L114
L115
L101
L015
L014
L003
L001
L002
L006
L004
L007
L005
L008
L059
L058
L057
L126
L125
L055
L112
L050
L063
L029
L009
L010
L102
L100
L031
L032
L028
L026
L025
L106
L023
L021
L123
L122
L062
L012
L105
L036
L035
L018
L103
L037
L044
L118
L119
L043
L107
L124
L109
L108
L110
L111
L120
L117
Legend
RAIN GAUGES
METER SITES
SEWER LINES
FORCE MAINS
METER BASINS
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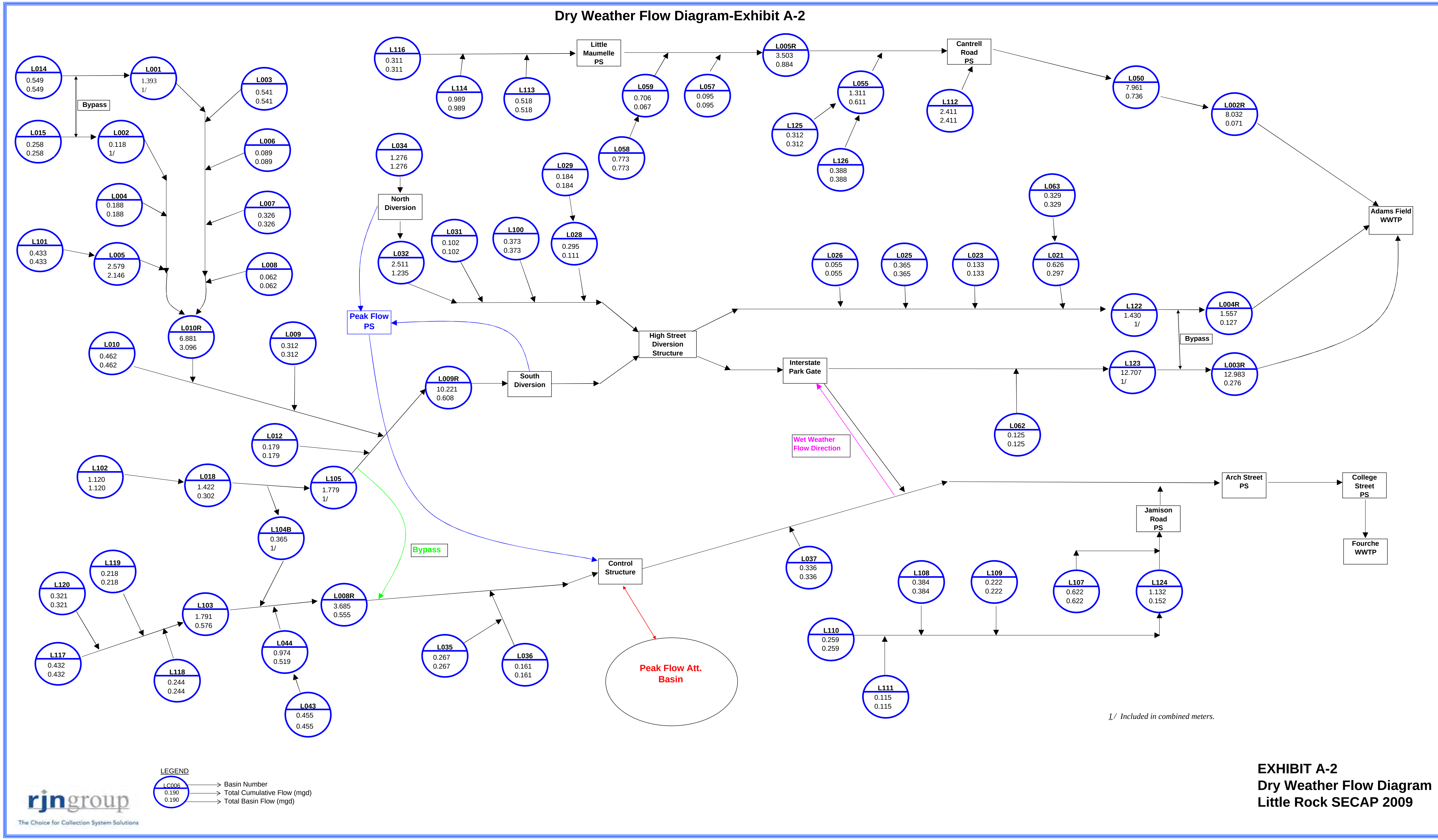
EXHIBIT A-1
FLOW MONITORING
LOCATION MAP
LITTLE ROCK SECAP 2009



Dry Weather Flow Diagram-Exhibit A-2
L014 0.549 0.549
L015 0.258 0.258
Bypass
L001 1.393 1/
L002 0.118 1/
L003 0.541 0.541
L006 0.089 0.089
L004 0.188 0.188
L007 0.326 0.326
L101 0.433 0.433
L005 2.579 2.146
L008 0.062 0.062
L010R 6.881 3.096
L010 0.462 0.462
L009 0.312 0.312
L012 0.179 0.179
L102 1.120 1.120
L018 1.422 0.302
L105 1.779 1/
L104B 0.365 1/
L119 0.218 0.218
L120 0.321 0.321
L103 1.791 0.576
L117 0.432 0.432
L118 0.244 0.244
L044 0.974 0.519
L043 0.455 0.455
L008R 3.685 0.555
Bypass
L116 0.311 0.311
L114 0.989 0.989
L113 0.518 0.518
Little Maumelle PS
L034 1.276 1.276
North Diversion
L032 2.511 1.235
L031 0.102 0.102
L100 0.373 0.373
L029 0.184 0.184
L028 0.295 0.111
Peak Flow PS
L009R 10.221 0.608
South Diversion
High Street Diversion Structure
L035 0.267 0.267
L036 0.161 0.161
Control Structure
Peak Flow Att. Basin
L059 0.706 0.067
L057 0.095 0.095
L058 0.773 0.773
L005R 3.503 0.884
L055 1.311 0.611
L125 0.312 0.312
L126 0.388 0.388
Cantrell Road PS
L112 2.411 2.411
L050 7.961 0.736
L002R 8.032 0.071
Adams Field WWTP
L063 0.329 0.329
L026 0.055 0.055
L025 0.365 0.365
L023 0.133 0.133
L021 0.626 0.297
L122 1.430 1/
L004R 1.557 0.127
Bypass
Interstate Park Gate
L123 12.707 1/
L003R 12.983 0.276
L062 0.125 0.125
Wet Weather Flow Direction
Arch Street PS
College Street PS
Jamison Road PS
Fourche WWTP
L037 0.336 0.336
L108 0.384 0.384
L109 0.222 0.222
L107 0.622 0.622
L124 1.132 0.152
L110 0.259 0.259
L111 0.115 0.115
1/ Included in combined meters.
LEGEND
LC006 0.190 0.190
Basin Number
Total Cumulative Flow (mgd)
Total Basin Flow (mgd)
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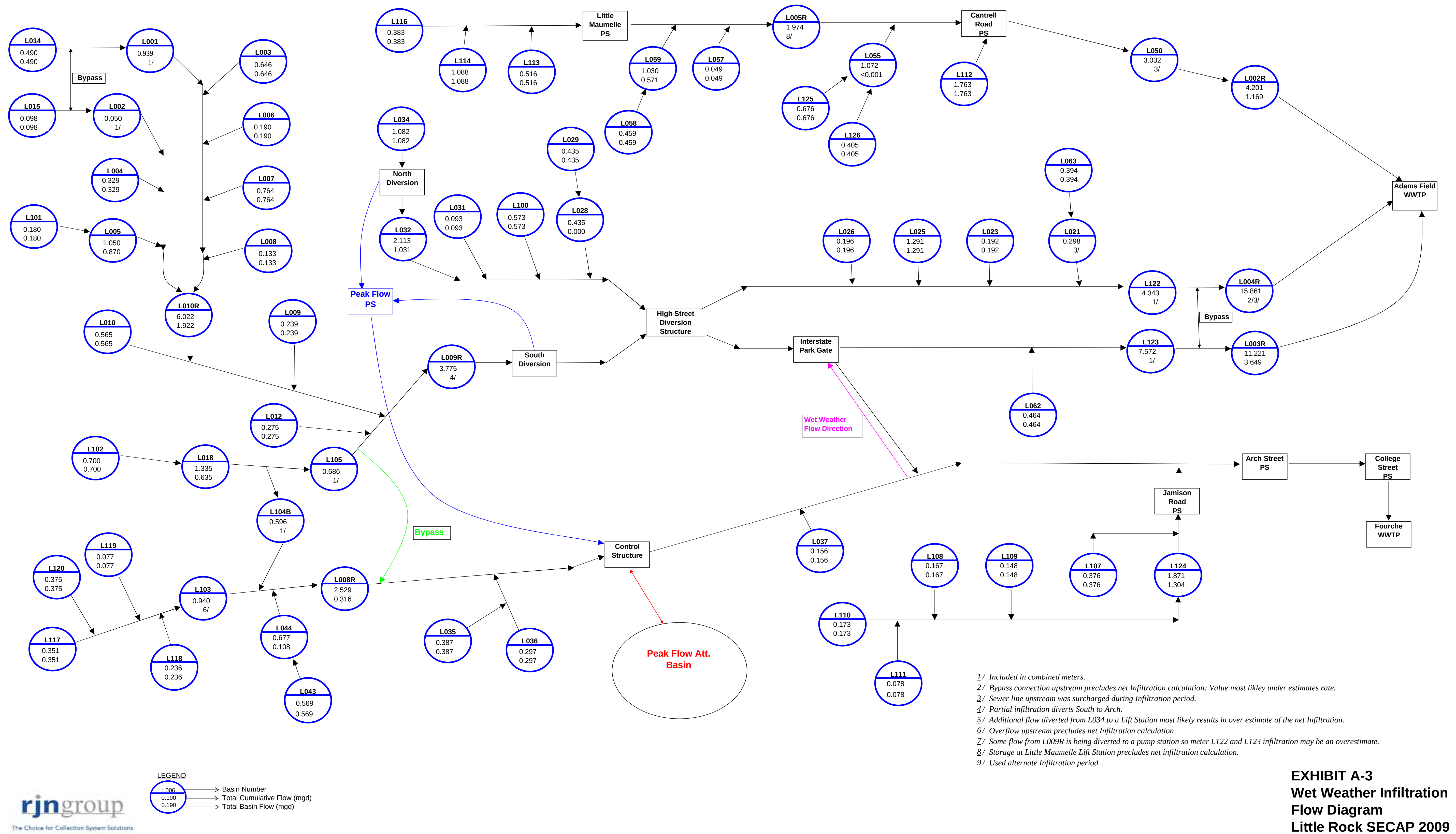
EXHIBIT A-2
Dry Weather Flow Diagram
Little Rock SECAP 2009

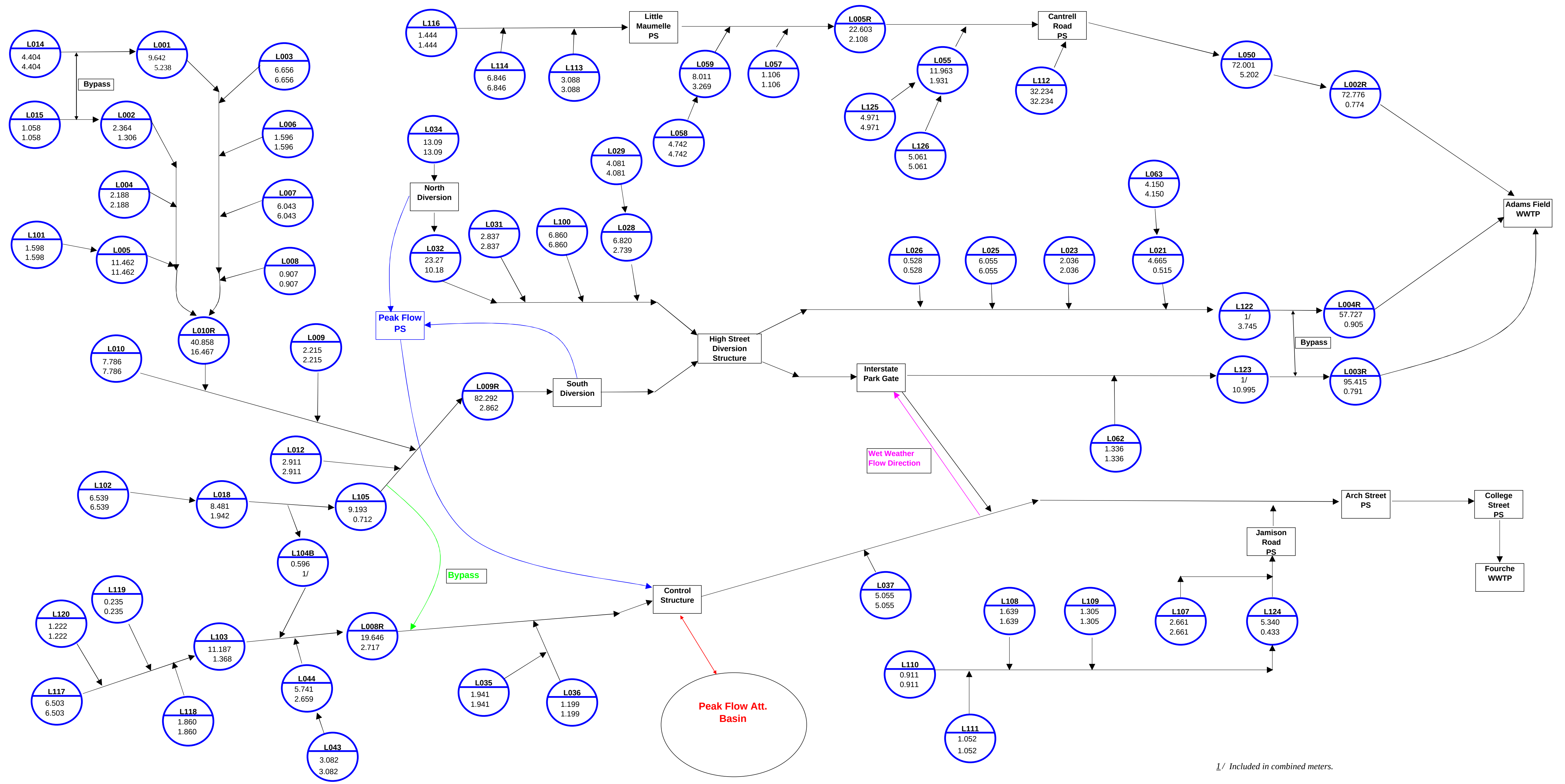
Infiltration Wet Weather Flow Diagram-Exhibit A-3



1/ Included in combined meters.
2/ Bypass connection upstream precludes net Infiltration calculation; Value most likley under estimates rate.
3/ Sewer line upstream was surcharged during Infiltration period.
4/ Partial infiltration diverts South to Arch.
5/ Additional flow diverted from L034 to a Lift Station most likely results in over estimate of the net Infiltration.
6/ Overflow upstream precludes net Infiltration calculation
7/ Some flow from L009R is being diverted to a pump station so meter L122 and L123 infiltration may be an overestimate.
8/ Storage at Little Maumelle Lift Station precludes net infiltration calculation.
9/ Used alternate Infiltration period

EXHIBIT A-3
Wet Weather Infiltration Flow Diagram
Little Rock SECAP 2009

Inflow 1-Year Flow Diagram-Exhibit A-4



1/ Included in combined meters.

LEGEND
L006 → Basin Number
0.190 → Total Cumulative Flow (mgd)
0.190 → Total Basin Flow (mgd)

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EXHIBIT A-4
1-Year Inflow
Flow Diagram
Little Rock SECAP 2009