

# Remote Sensing Myrtle Street Permeable Pavers



# Agenda

- Project background
- Shared stormwater facilities and credits
- Remote Sensing Myrtle/Zion Paver Project
- Lessons learned
- Questions



# Roswell Background

- Northern Suburb of Atlanta, population of ~95,000
- Historic downtown area
- Vibrant community with cultural events, festivals, and business community
- Located on the Chattahoochee River



# Project Background Drivers

- Strong development pressure
- Land is at a premium
- Historic areas lack stormwater infrastructure
- Nuisance flooding and water quality issues
- City looking for creative stormwater solutions



# Myrtle / Zion Street Permeable Paver Project

- Received 319 grant to demonstrate GI and funding / policy tools
- Project selection criteria
  - Install project in City ROW
  - Impaired watershed
  - Area with development pressure
  - High infiltration rates
- Project design
  - Underground gravel reservoir to hold and treat stormwater





# Myrtle Street/Zion Circle



# Stormwater Credits

- Recognized need for creative solutions to stormwater management
- Around 2015
  - Shared Stormwater Facilities policy established
  - Myrtle Street project with “BMP Revolving Fund”



# Shared Stormwater Facilities Policy

## Established policy that allows

- Private entities and/or the city may share in establishment and/or maintenance of stormwater management facility
- The city may provide credits for private community to voluntarily purchase





# Credit Process Set Up

- Modify ordinance to allow purchase of credits in lieu of on-site stormwater treatment
- Set up separate fund to receive payments and build new projects
- Sell and track credits – credit unit, value, use, tracking, approved sub-basin



# Myrtle Street / Zion Circle





# Myrtle/Zion Shared Stormwater Quality Facility Credit Tracking

Parcel ID*	Total Parcel Acreage	Parcel Acreage In Basin	Detention Impervious Acreage Credits Purchased	Water Quality Impervious Acreage Credits Purchased	Parcel Address	Purchaser	Date Credits Purchase
190404130027	3.76	1.04		0.266	115 Norcross Street	Fulton County (Robert L. Pitts)	10/2/2019
200104251583	1.16	1.16			125 Norcross Street		
200104250874	1.27	1.14			Zion Circle		
200104250387	0.93	0.82			183 Norcross Street		
200104250361	0.68	0.68			955 Myrtle Street		
200104250080	0.62	0.62			941 Forrest Street		
200104250502	0.61	0.61			927 Myrtle Street		
200104250064	0.57	0.57			953 Forrest Street		
200104250775	0.55	0.55			966 Myrtle Street		
200104250114	0.52	0.52			922 Myrtle Street		
200104250399	0.50	0.50			924 Myrtle Street		
200104250312	0.49	0.49			913 Myrtle Street		
190404130191	28.94	0.47			38 Hill Street		
200104250106	0.47	0.47			923 Forrest Street		
200104250734	0.45	0.45			946 Zion Circle		
200104250940	0.69	0.45			205 Norcross Street		
200104251005	0.45	0.45			935 Forrest Street		
200104250866	0.40	0.40			944 Myrtle Street		
200104250858	0.38	0.38			954 Myrtle Street		
200104250841	0.38	0.38			964 Myrtle Street		
200104250353	0.38	0.38			943 Myrtle Street		
200104250510	0.35	0.35			960 Zion Circle		
200104250486	0.34	0.34			937 Myrtle Street		
200104250122	0.44	0.33			913 Forrest Street		
200104251138	0.32	0.32			930 Zion Circle		
200104250338	0.32	0.32			932 Zion Circle		
200104250601	2.30	0.31			888 Zion Circle		
200104251120	0.31	0.31			934 Zion Circle		
200104250130	0.33	0.31			914 Myrtle Street		
200104250726	0.30	0.30			956 Zion Circle		
200104250718	0.29	0.29			169 Norcross Street		
200104250320	0.26	0.26			916 Zion Circle		
200104250890	0.23	0.23			161 Norcross Street		
200104250916	0.22	0.22			974 Myrtle Street		
200104250528	0.20	0.20			914 Zion Circle		
200104251021	1.02	0.10			935 Zion Circle		
200804250018	1.73	0.10			Courtyard Terrace		
200104250155	0.38	0.08			908 Myrtle Street		
200104250411	0.52	0.07			961 Zion Circle		
<b>Totals</b>		<b>16.97</b>	<b>0</b>	<b>0.266</b>			
<b>Stormwater Detention</b>							
<b>Total Stormwater Detention Capacity (impervious acre)</b>				<b>3.00</b>			
<b>Stormwater Detention Credits Purchased (impervious acre)</b>				<b>0.00</b>			
<b>Total Stormwater Detention Credits Available (impervious acre)</b>				<b>3.00</b>			
<b>Water Quality Treatment</b>							
<b>Total Water Quality Capacity (impervious acre)</b>				<b>5.99</b>			
<b>Water Quality Credits Purchased (impervious acre)</b>				<b>0.266</b>			
<b>Total W. Q. Credits Available (impervious acre)</b>				<b>5.724</b>			



# Lesson Learned: Shared Facilities Policy

- Benefits
  - Flexibility for developers and city to meet stormwater requirements
  - Option for re-development, difficult urban sites
  - Ease of permitting
- Challenges
  - City staff time, policy, and fund set up
  - Negotiations, each site unique
  - Developers and city work on different time frames
- Moving forward
  - WQ credits, runoff reduction

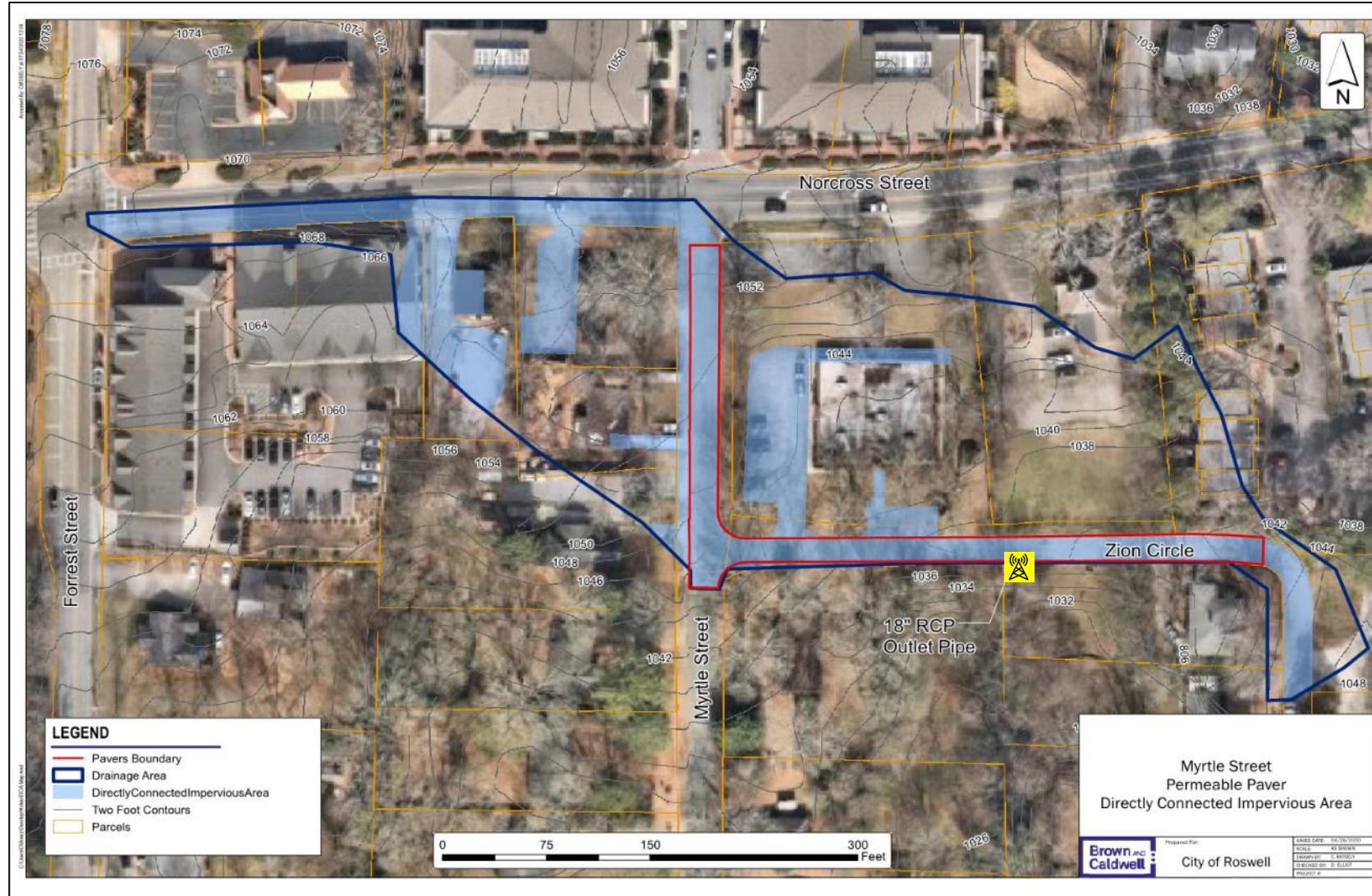


# Remote Sensing

- City has invested in installation of three Paver Projects - how effective are they?
  - Myrtle Street
  - Goulding Place
  - East Alley
- Substantiate the sale of stormwater credits
- Justify additional projects



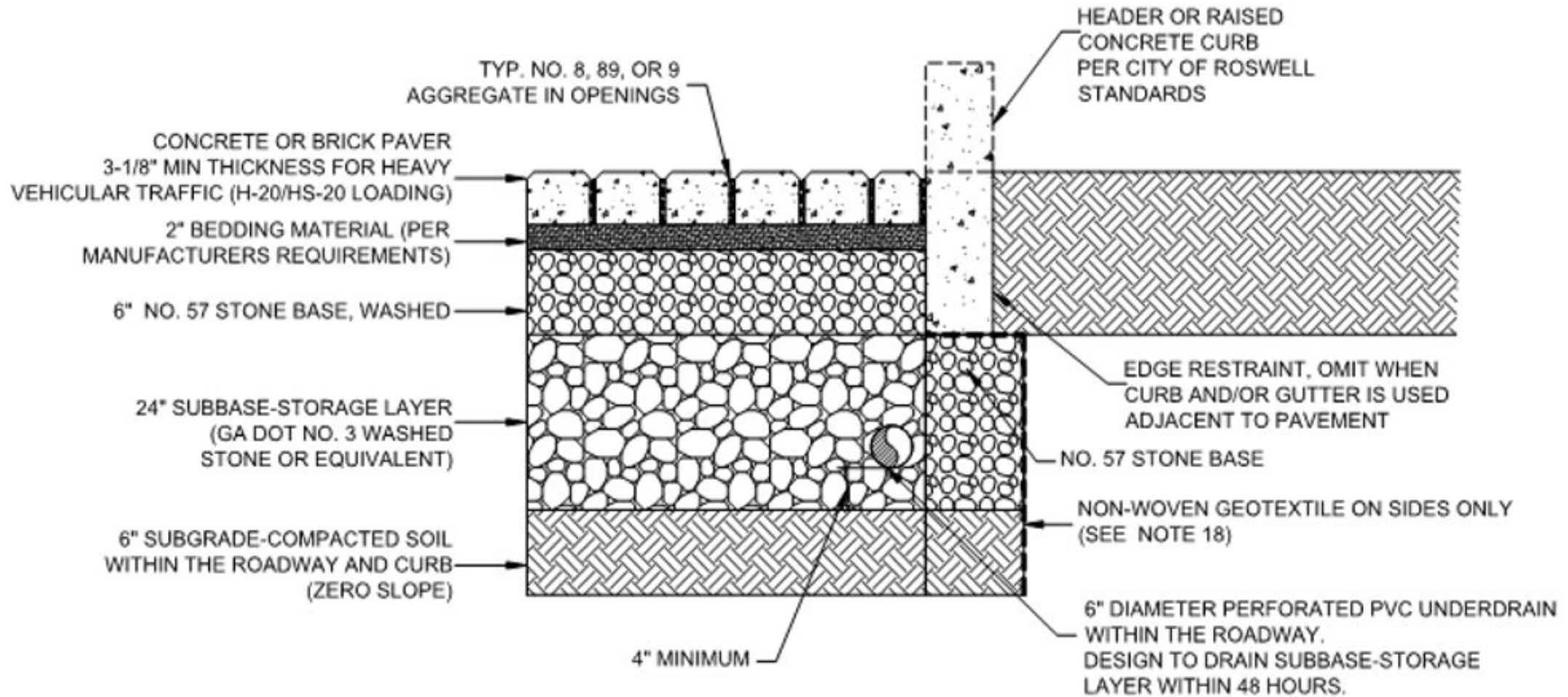
# Watershed Details



- 3 acre drainage area
- 76% impervious
- 0.9 acres of directly connected impervious
- 2.1 acres residential



# Paver System Detail



# Construction

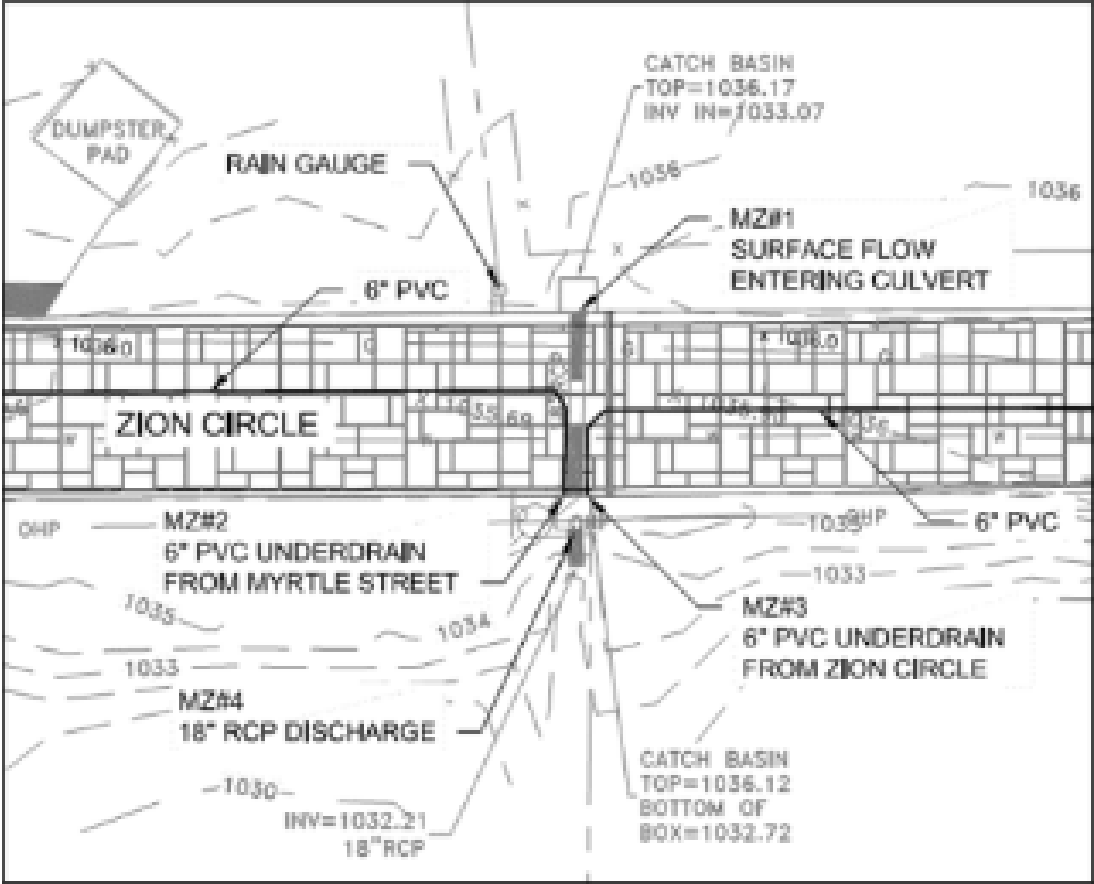




# Remote Sensing Equipment



# Equipment Layout

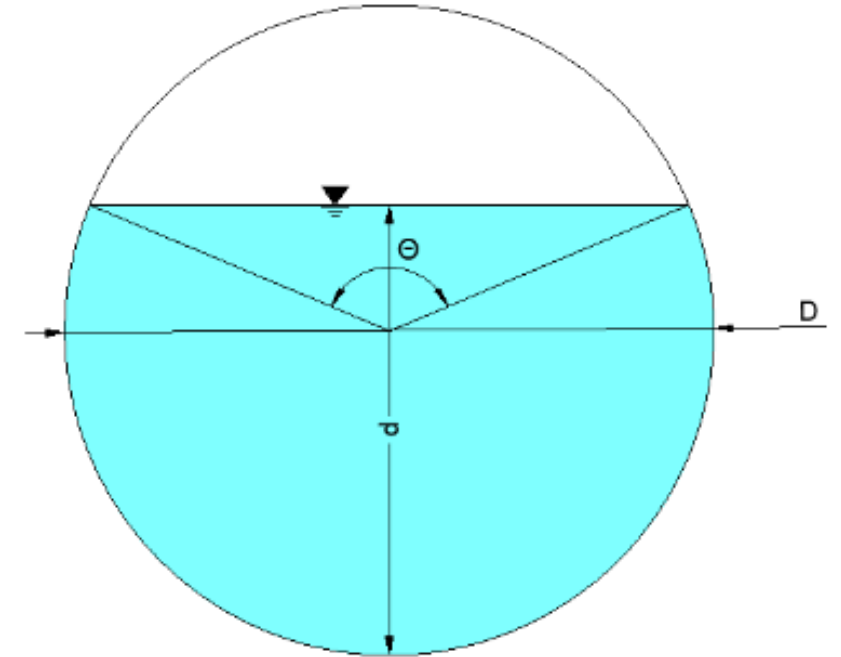






# Modeling

- 3 acre drainage area
- 0.9 acres of directly connected impervious (DCIA)
- 2.1 acres high density residential (HDR)
- Used Rational Method for DCIA
- Used Soil Conservation Service Method for (N-DCIA)

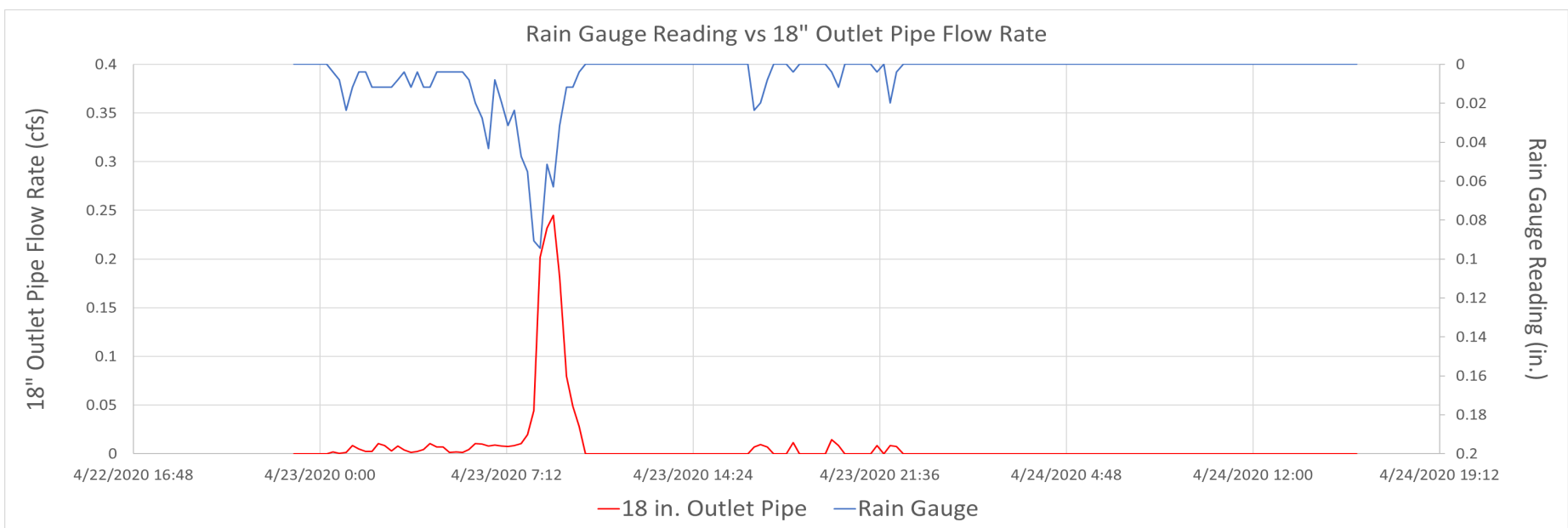
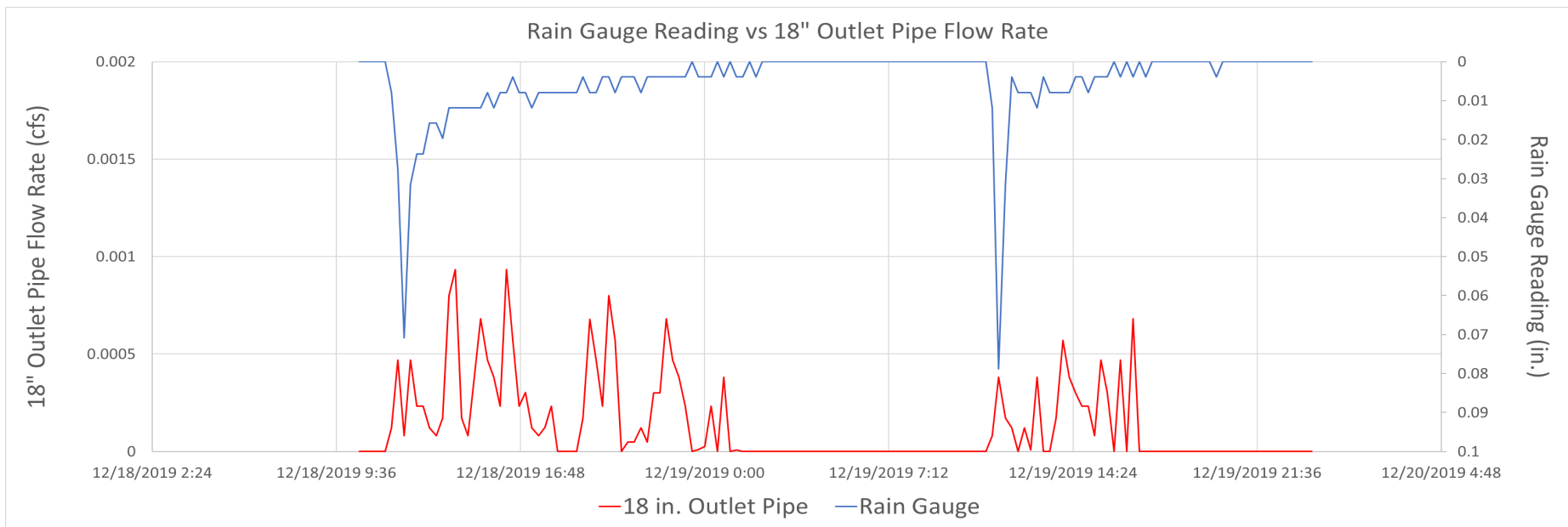


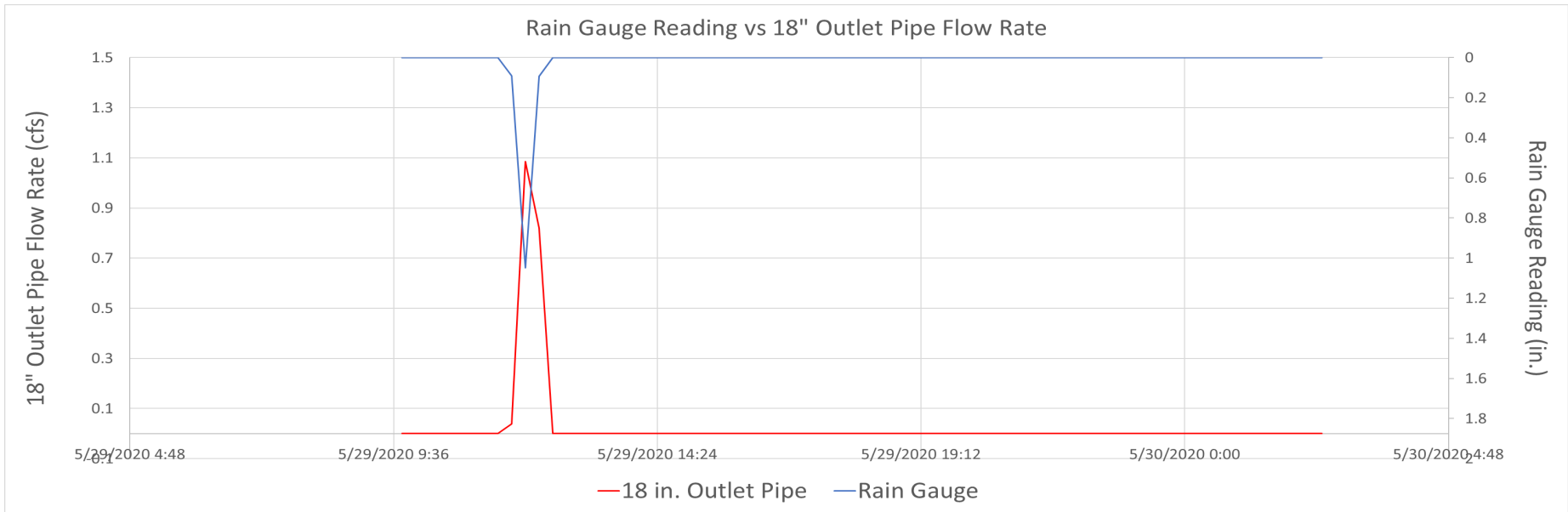
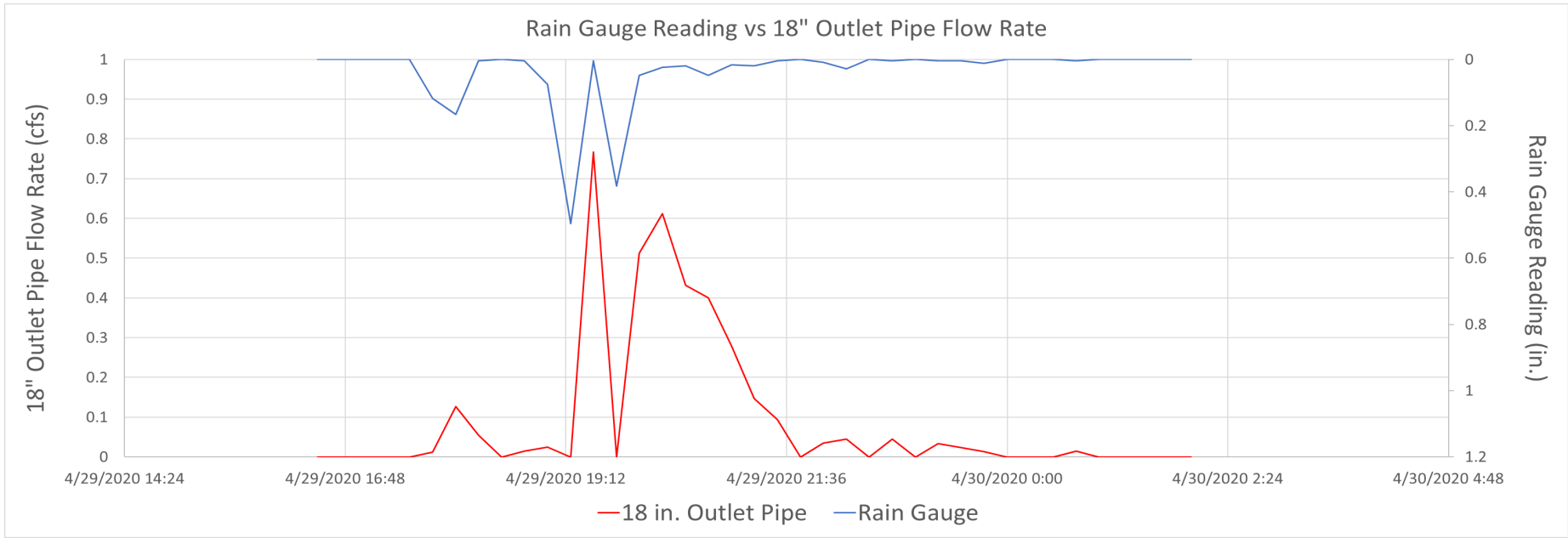


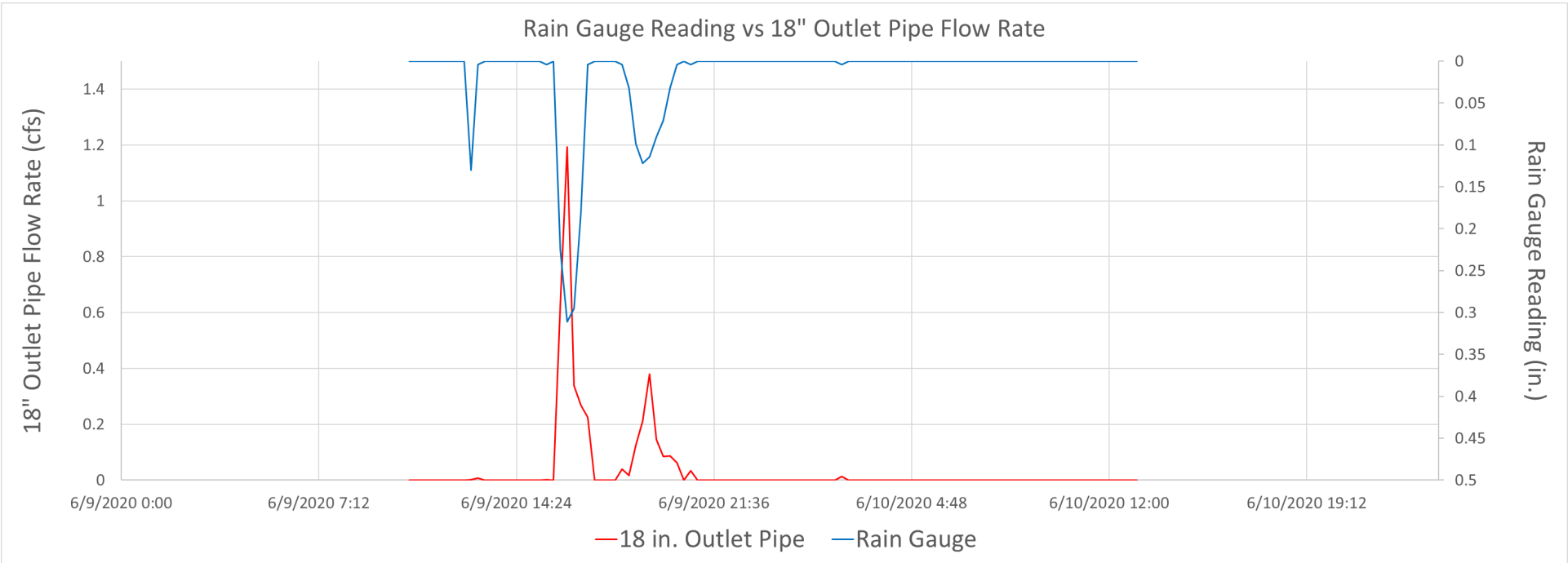
# Storm Event Criteria

- Small events are difficult to analyze
- Minimum 0.5" over 12-hour period used for study
- Events were considered distinct if separated by six hours or more of no rainfall











# Results

MYRTLE STREET STORM EVENT MONITORING RESULTS								
Storm Events	SCS		Rational Method	SCS + RM	Level Sensor			
Dates	P (in.)	Q (in.)	Volume of Runoff (cf)	Volume of Runoff (cf)	Volume of Runoff (cf)	Volume of Runoff (cf)	Difference, Volume Retained (cf)	Percent Retained
12/18/19 - 12/19/19	0.78	0.19	1,421	2,316	3,737	18	3,719	100
4/22/20 - 4/24/20	0.91	0.27	2,023	2,625	4,648	1,195	3,453	74
4/29/20 - 4/30/20	1.49	0.67	5,140	4,232	9,372	3,314	6,058	65
5/29/20 - 5/30/20	1.23	0.48	3,666	1,893	5,559	1,748	3,811	69
6/9/20 - 6/10/20	1.73	0.87	6,606	4,489	11,095	3,476	7,619	69
Totals	6.14	2.48	18,856	15,555	34,411	9,751	24,660	72

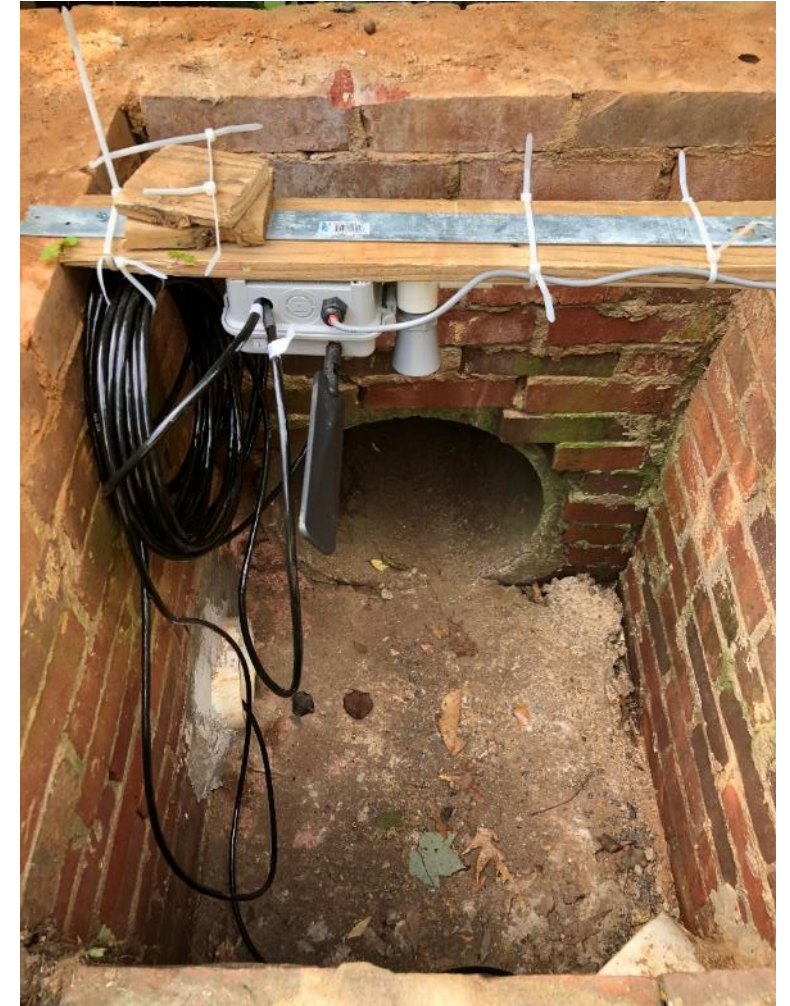
# Design Lessons Learned - Retrofit Project

- Retrofitting a remote sensing system is more difficult
- Use monitoring wells - the more, the better
- Beware of using recycled concrete products
- Install new structures
- Control of underdrain slopes
- Detailed as-builts will help with analysis
  - Depth or Reservoir
  - Location of utility trenches



# Lessons Learned – Remote Sensing

- Install level sensor in pipe, not structure
- Small events are difficult to analyze
- Have a regular maintenance plan for sensing equipment
  - Power / battery approach
  - Cleaning of rain gauge
- Emphasize on Perc Test Data





# Conclusion

- From Historic Atlanta Rainfall
  - During the monitoring periods we observed 72% infiltration
  - 81% are 1" or less
  - 90% are 1.5" or less
  - Smaller storms are believed to infiltrate at a percentage higher than 72%
  - More capacity than initially thought / designed
  - Perc test data likely accurate





Thank you.  
**Questions?**