

Rock Hill, SC

Proactive Stormwater Program

David Dickson, PE, CFM, CSM, CMS4S
davidf.dickson@cityofrockhill.com

Stephen Sands, PE, CFM
ssands@hazenandsawyer.com



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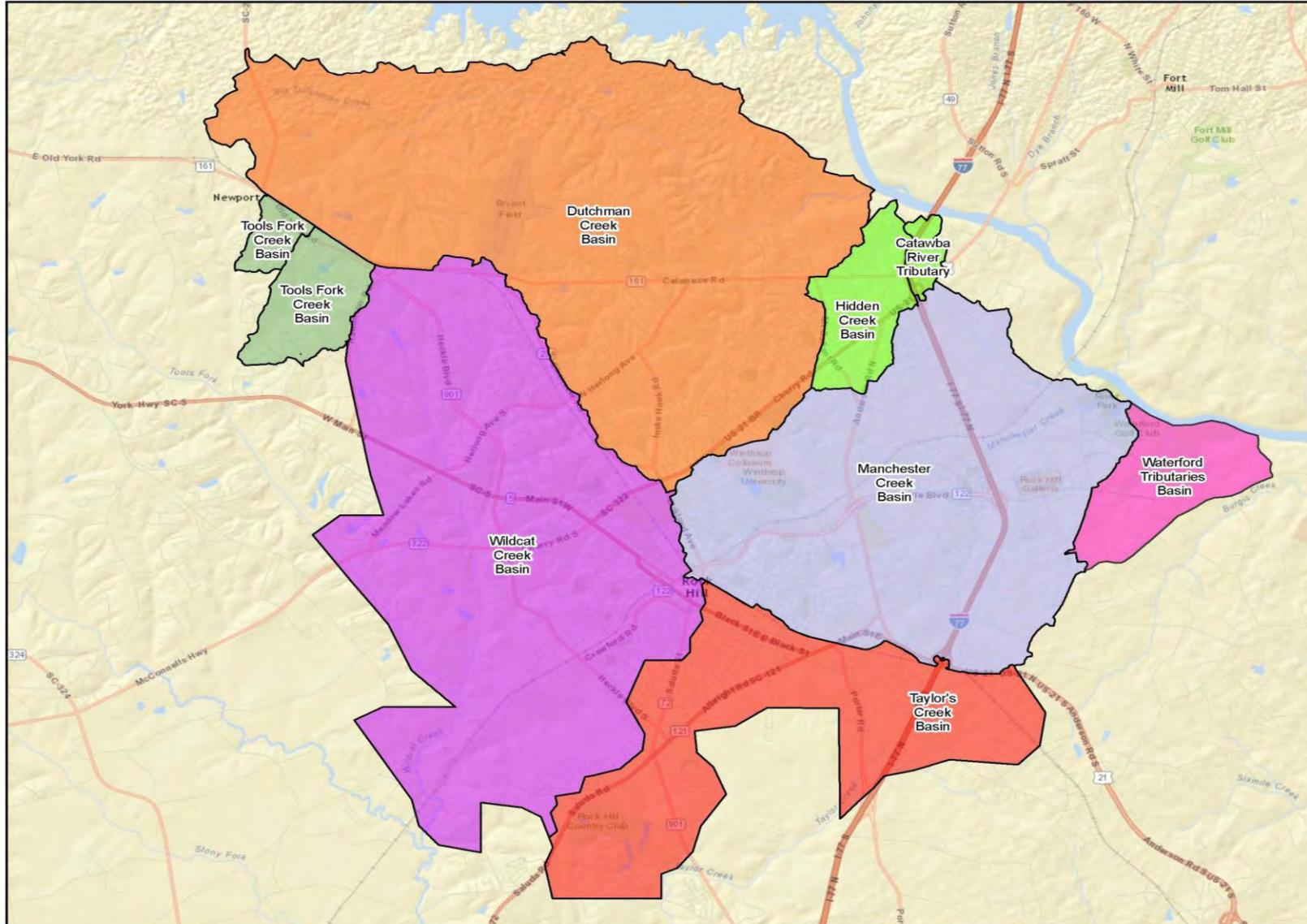
SESWA 2020 Annual Conference
October 8, 2020

Rock Hill, SC
Proactive Stormwater Program
Presentation Outline

- **Rock Hill City-Wide Modeling**
- **Modeling Results - CIP**
- **Land Development Support**
- **Project Support**



Rock Hill, SC Proactive Stormwater Program Streams Studied



Rock Hill, SC
Proactive Stormwater Program
Limits of Study

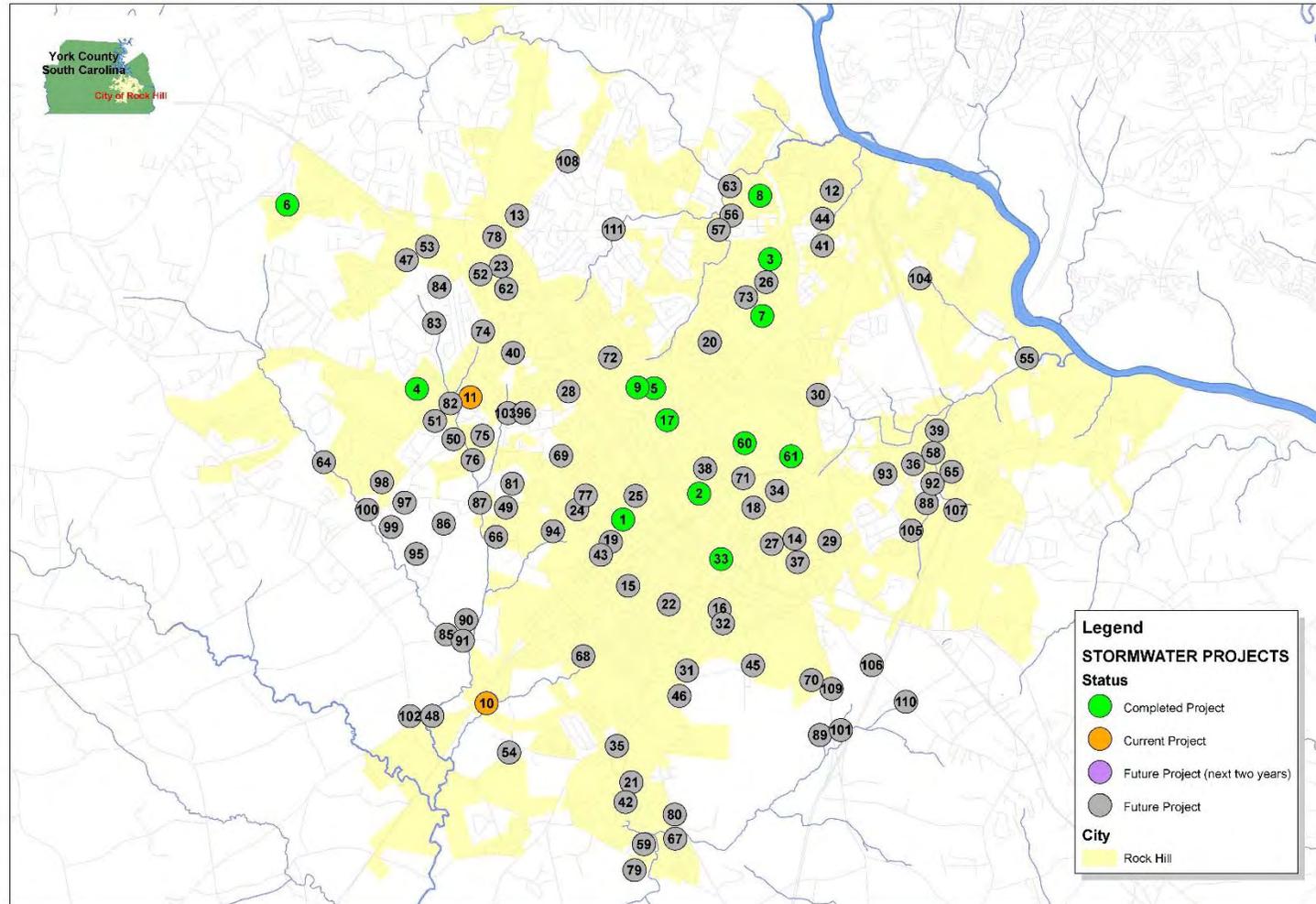
- **Study of flooding upstream from FEMA study limits - 1.0 square miles (640 acres).**
- **Rock Hill studied to 0.1 square miles (64 acres).**
- **Streams that convey runoff from neighborhoods to the larger streams.**
- **FEMA studied areas were not duplicated.**
- **Did not model closed drainage systems.**
- **HEC-RAS – one dimensional, steady state.**
- **PondPack – NRCS hydrology.**

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Proactive Stormwater Program
CIP Results - Criteria

- **Road ownership**
- **Number of flooded buildings**
- **Severity of roadway flooding**
- **Construction cost**



Rock Hill, SC Proactive Stormwater Program CIP Results



- **2, 10, 25, and 100-year, 6-hour flood control**
- **Local floodplain compliance**
- **Downstream impacts analysis – hydrologic and hydraulic timing**
- **Downstream 25-year capacity**
- **Detention waiver**
- **Regional approach**

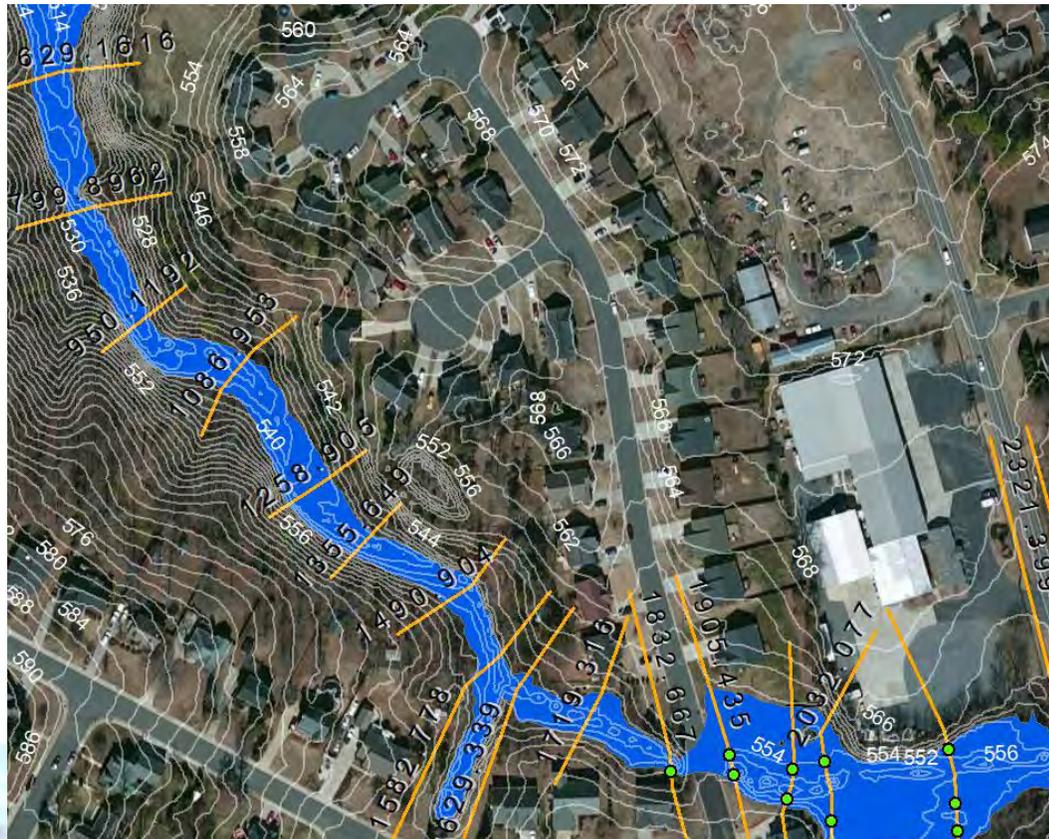


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Proactive Stormwater Program

Aldersgate Culvert Improvement

- **Undersized Culvert**
- **Isolated Homes**

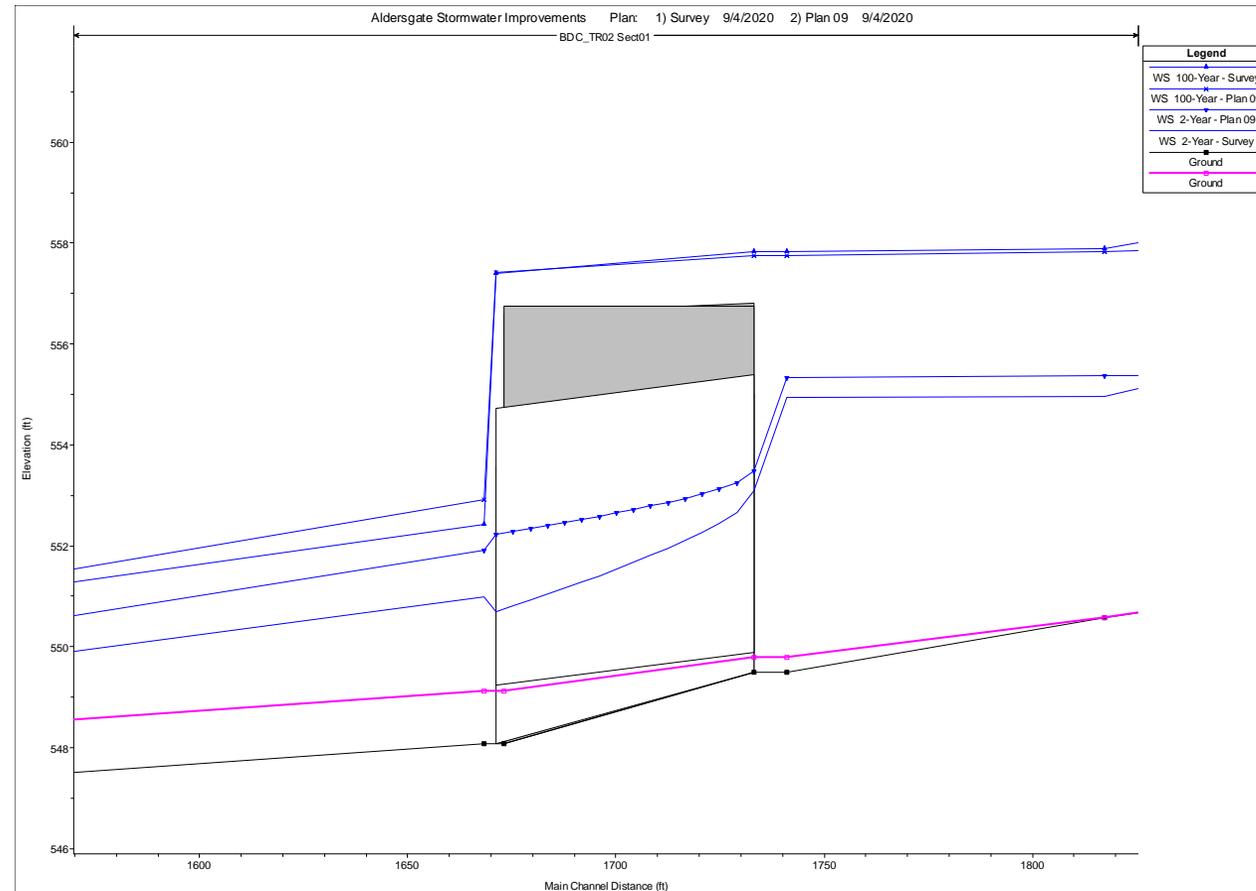


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Aldersgate Culvert Improvement

- City-wide Model
 - Upstream invert – 549.89
 - Downstream invert – 549.23
 - Slope – 0.011 foot/foot
- Project Design
 - Upstream invert – 549.5
 - Downstream invert – 548.07
 - Slope – 0.023 foot/foot



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Proactive Stormwater Program

Aldersgate Culvert Improvement



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Cavendale Culvert Improvement and Stream Restoration

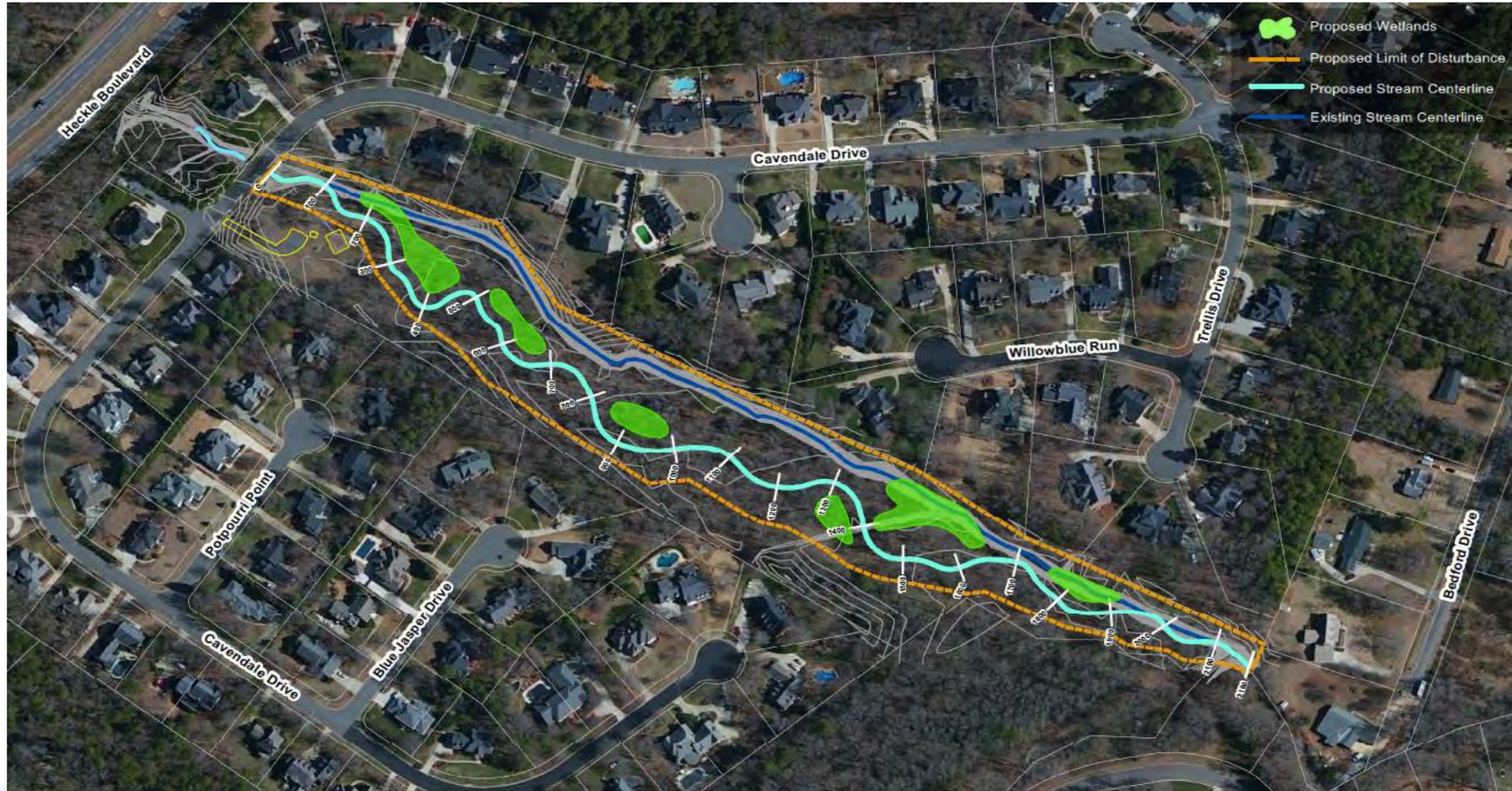
- Roadway overtopping (10-year – 1.3 feet)
- Primary access for 53 homes
- Channel bank erosion



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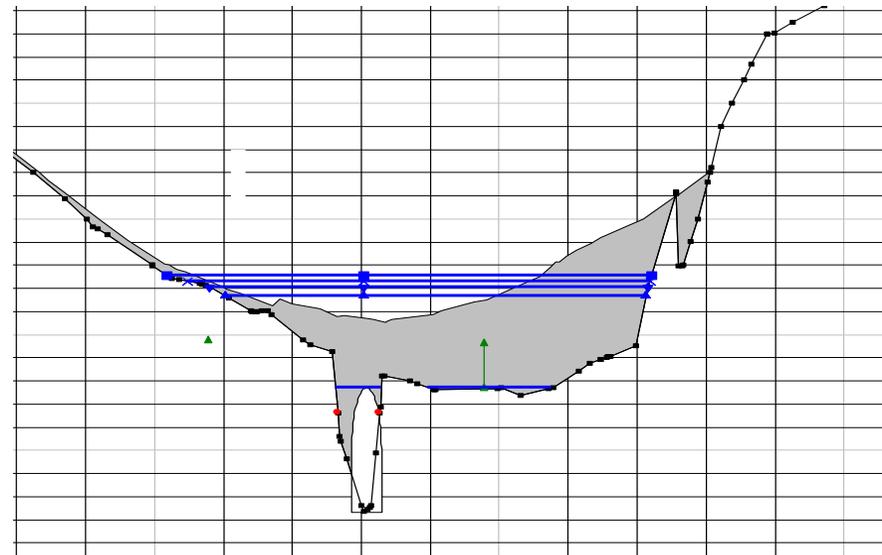
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Cavendale Culvert Improvement and Stream Restoration



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Proactive Stormwater Program
Cavendale Culvert Improvement and Stream Restoration on

- **April 13, 2019 flood event**
- **3.1 inches rainfall**
- **Antecedent moisture - III**
- **Model flood elevation – 637.3**
- **Observed flood elevation – 637.0**

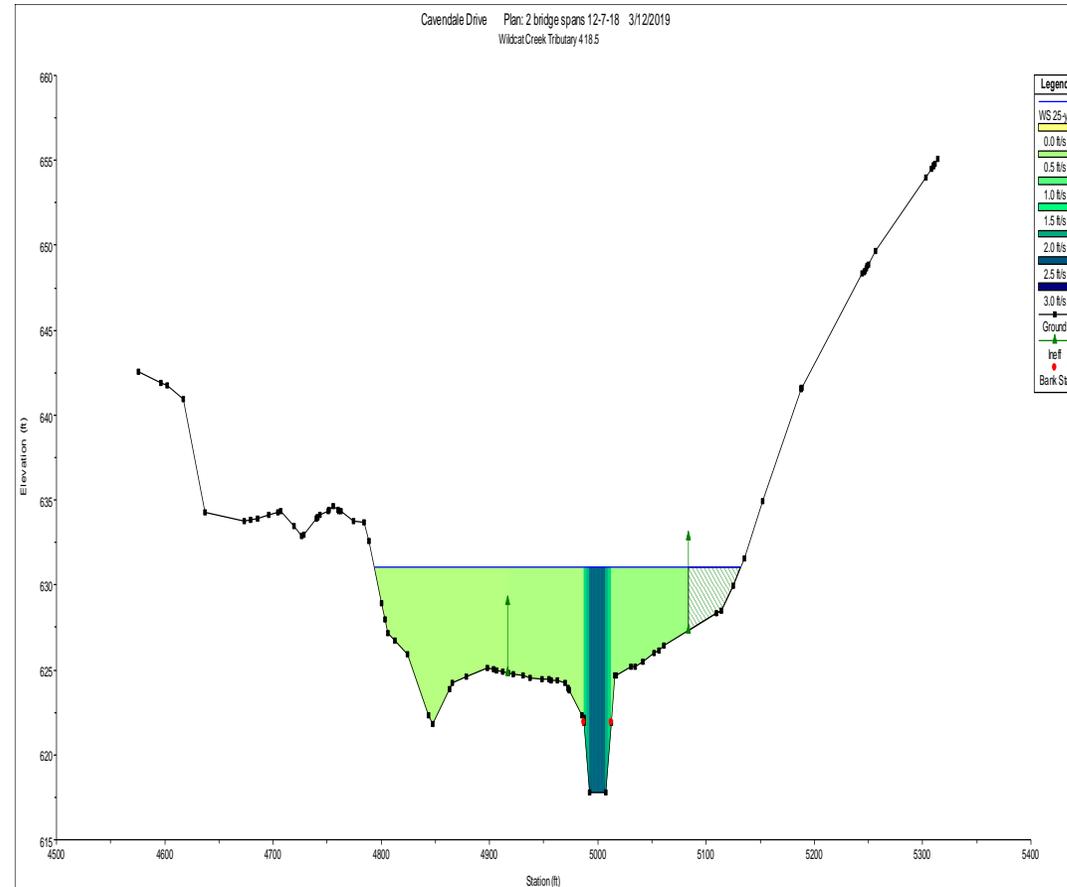


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Cavendale Culvert Improvement and Stream Restoration

- Sediment transport
- Scour depth
- Lining design
- Scour pool dimensions
- Bankfull validation
- Bridge scour



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Cotton Mill Stream Enhancement

- **Degraded Stream Reach**
- **Exposed Sanitary Sewer Infrastructure**
- **Stream Enhancement Design**
- **Construction by City Crews**
- **Leverage Duke Power Water Quality Grant**



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Proactive Stormwater Program
Cotton Mill Stream Enhancement

August 2018



Rock Hill, SC
Proactive Stormwater Program
Cotton Mill Stream Enhancement

September 2019

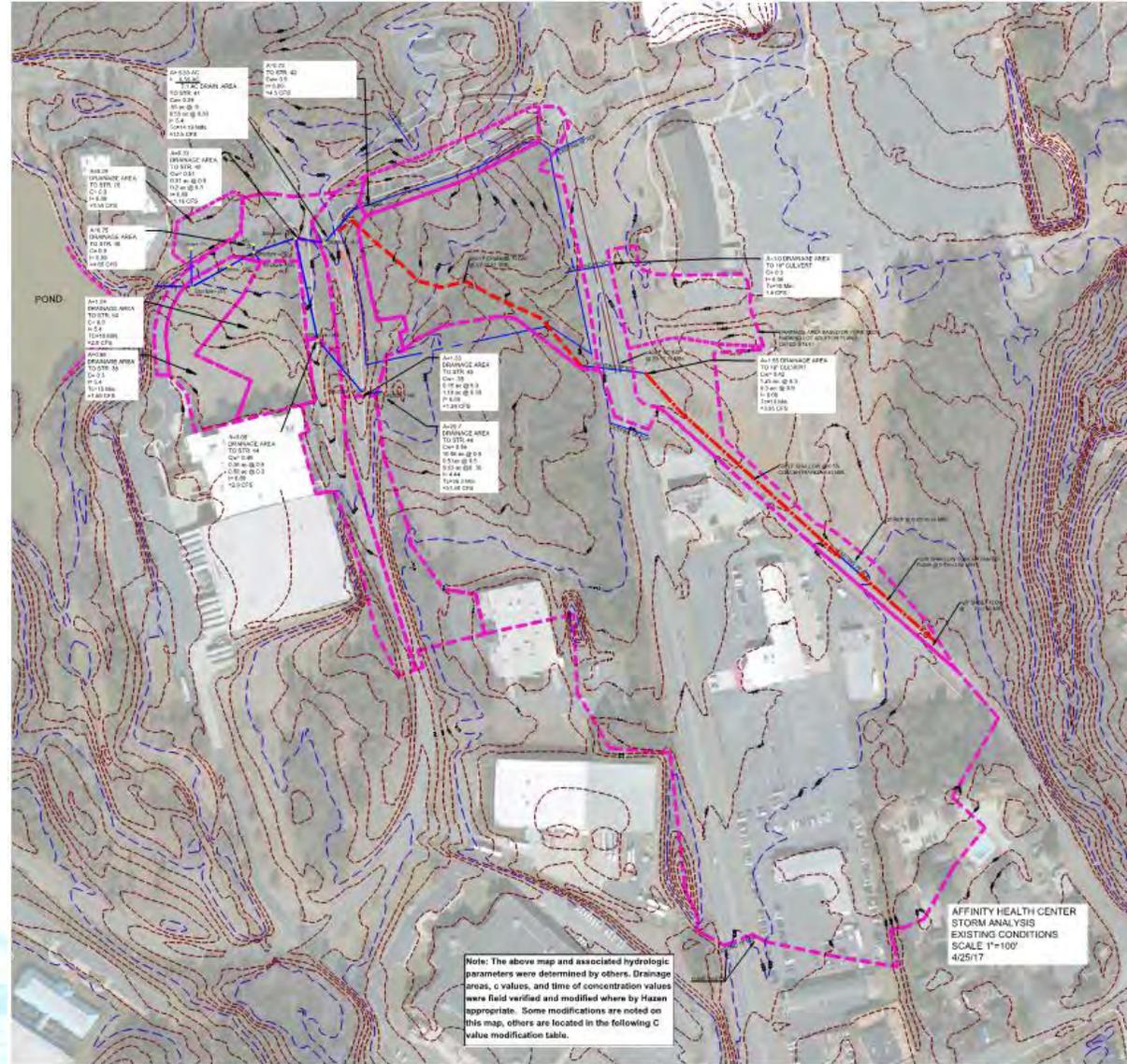


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Proactive Stormwater Program
Cotton Mill Stream Enhancement

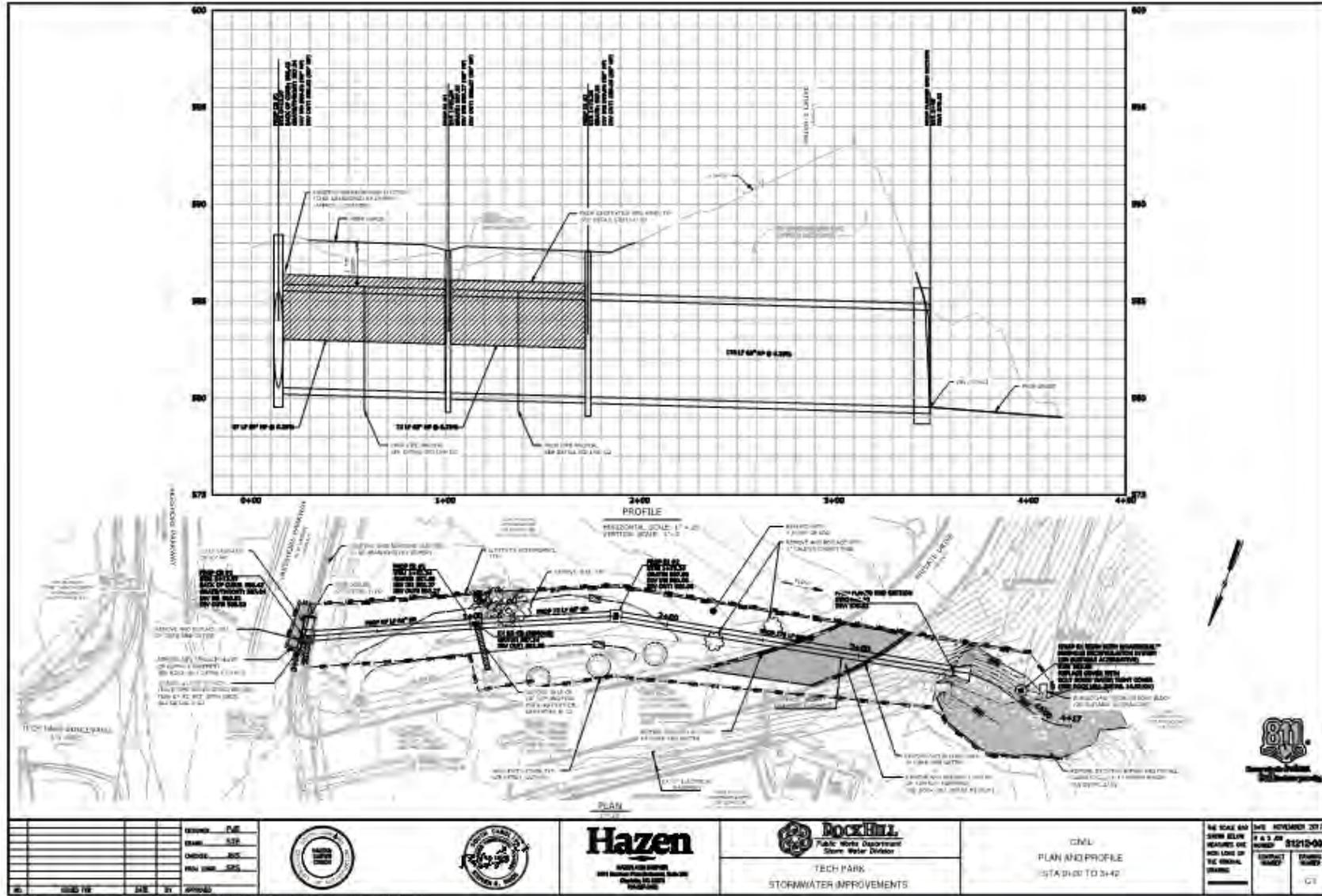
June 2020



Rock Hill, SC Proactive Stormwater Program Tech Park Pipe Improvements



Rock Hill, SC Proactive Stormwater Program Tech Park Pipe Improvements



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Proactive Stormwater Program
Tech Park Pipe Improvements



Rock Hill, SC

Proactive Stormwater Program

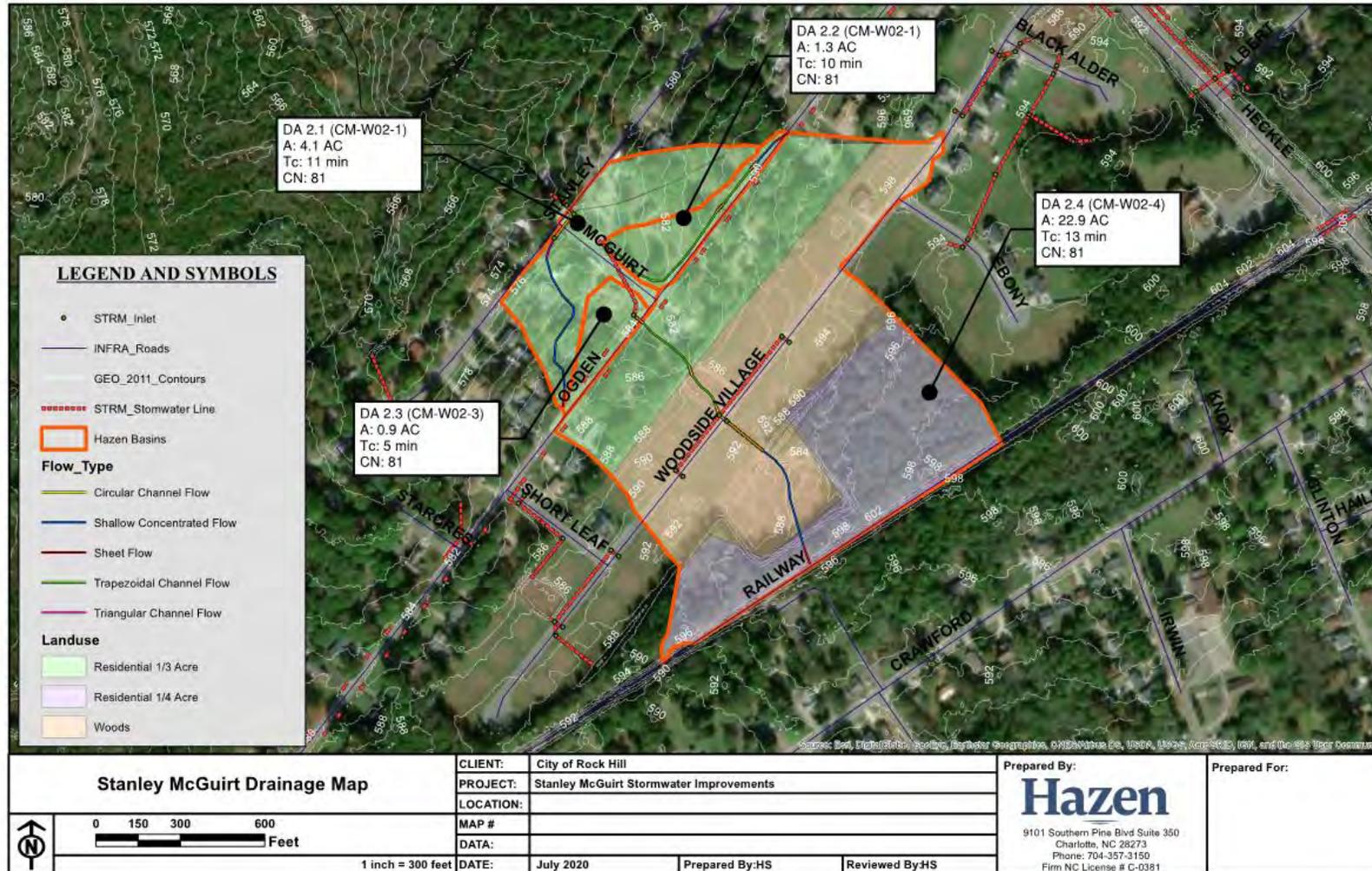
Tech Park Pipe Improvements



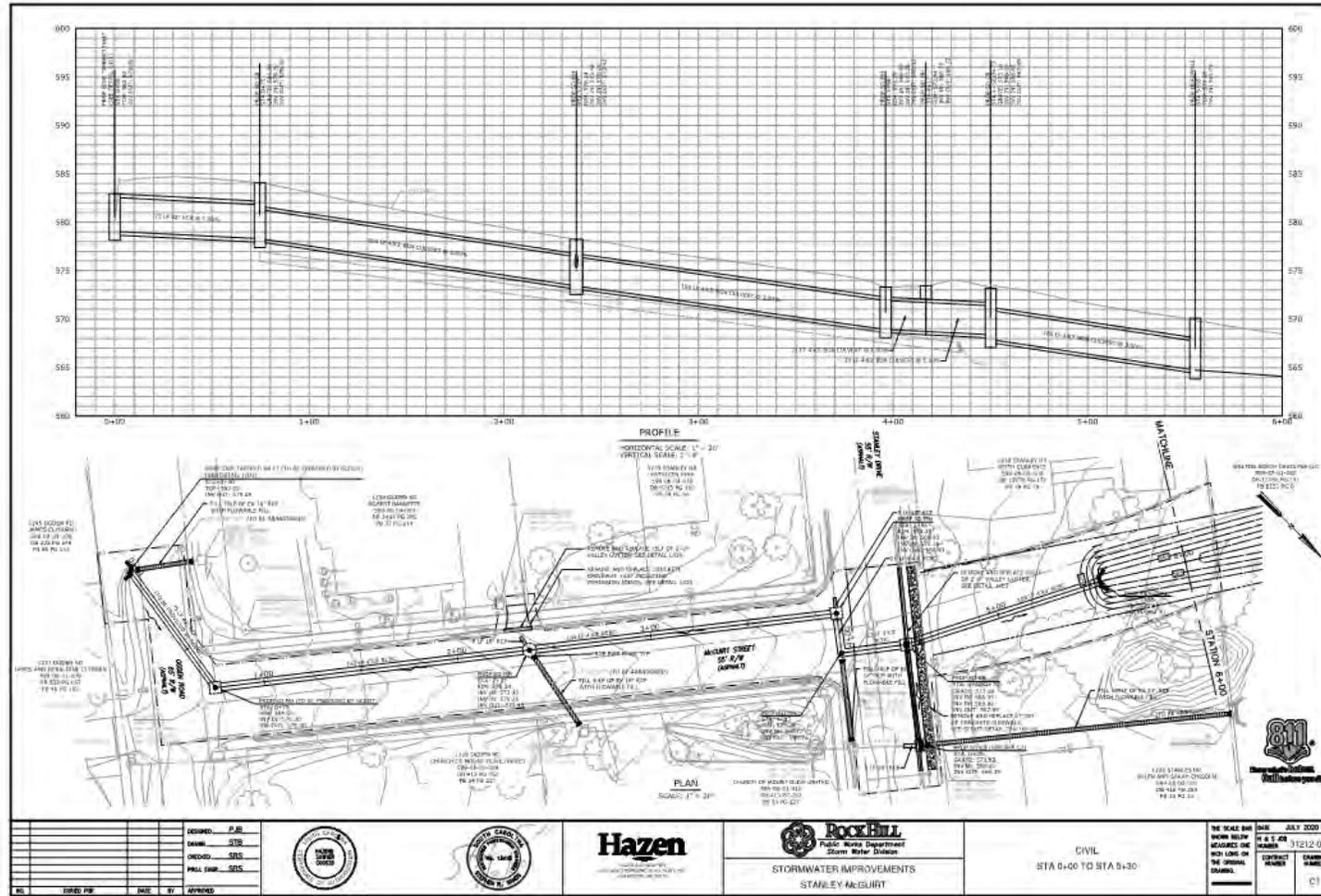
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Stanley-McGuirt Pipe Improvements



Rock Hill, SC Proactive Stormwater Program Stanley-McGuirt Pipe Improvements



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College Downs Floodplain Improvements

- Flood damage since early 1970s.
- Primary community access
- No FEMA insurance policies or claims
- Asbestos



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Proactive Stormwater Program

College Downs Floodplain Improvements



Flood Control	
Real Estate	\$1,033,063.00
Total	\$1,033,063.00
Alternative Access	
Real Estate	\$149,875.00
Roadway	\$123,650.00
Total	\$273,525.00

Storm Event	Property Flooding Table			
	Existing Conditions		Building removal	
	Number of properties	LAG	Number of properties	FFE
10-year	8	0	0	0
25-year	9	0	0	0
100-year	11	2	2	0

LAG= LOWEST ADJACENT GRADE TO HOME

Roadway Flooding Table	
Storm Event	Length of road (ft)
10-year	760
25-year	880
100-year	1140

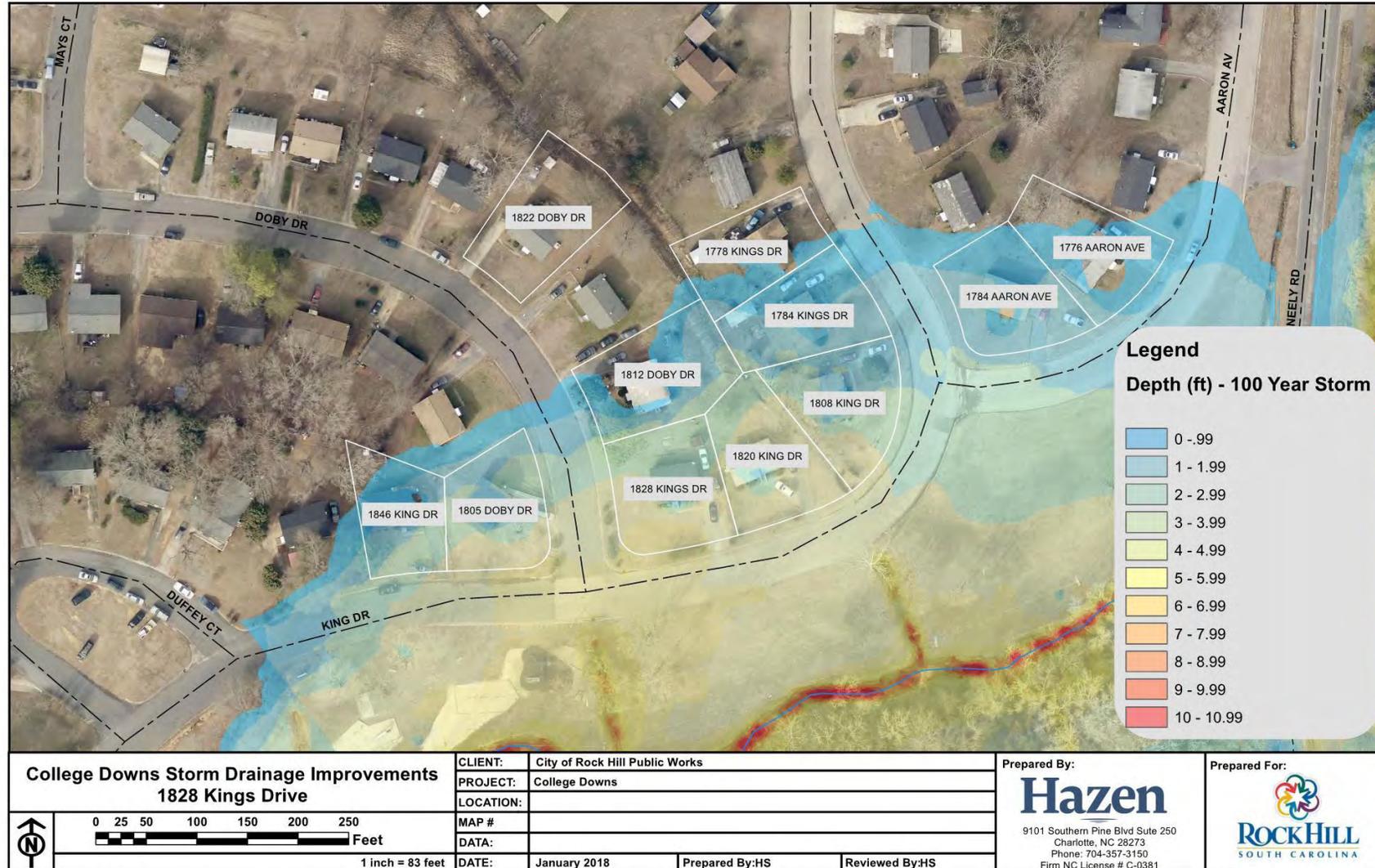
LEGEND

- RECOMMEND FOR REMOVAL
- UNDER CONTRACT/PURCHASED
- EXISTING FLOODPLAIN

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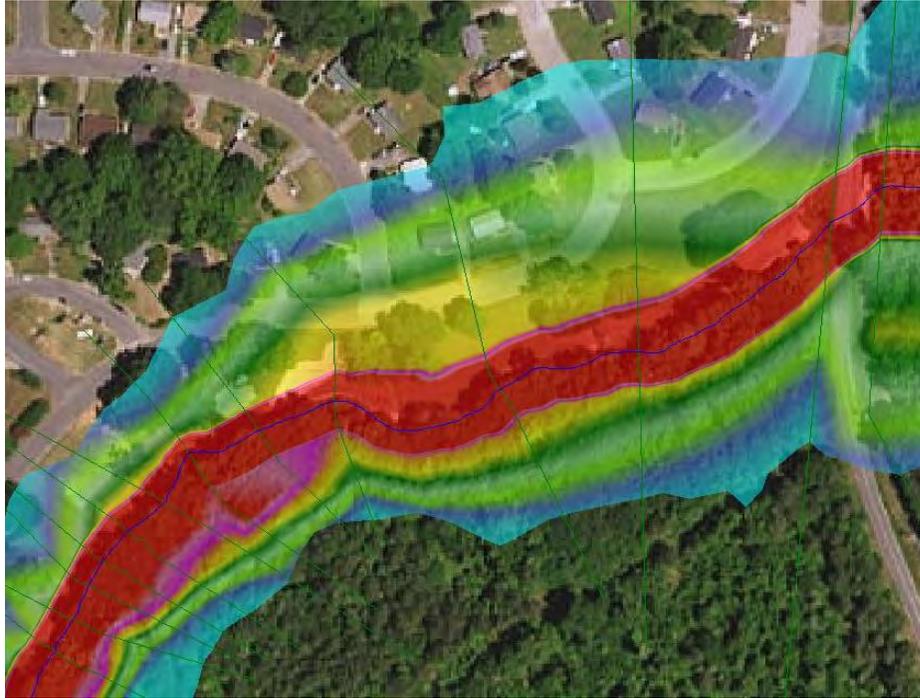
College Downs Floodplain Improvements



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College Downs Floodplain Improvements



Surface Symbol Settings

Color Ramp: Hazard Keep user values with color ramp change

Surface Symbol

Max: 10.00 Interval Type: Linear

Min: 0.00 No. Values: 10

Value	Color	Red (0-255)	Green (0-255)	Blue (0-255)
0.00		0	255	255
1.11		65	105	225
2.22		124	252	0
3.33		144	238	144
4.44		0	128	0
5.56		255	255	0
6.67		255	165	0
7.78		255	0	255
8.89		255	105	180
10.00		255	0	0

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College Downs Floodplain Improvements

	Address	Depth Above Ground Elevation	Velocity	Depth Times Velocity
	<u>1846 King Dr</u>	1.5	0.9	1.3
	<u>1852 King Dr</u>	0.0	0.0	0.0
	<u>1828 King Dr</u>	3.6	1.4	4.0
	<u>1805 Doby Dr</u>	2.9	1.4	3.0
	<u>1812 Doby Dr</u>	1.5	0.7	0.9
	<u>1813 Doby Dr</u>	0.0	0.0	0.0
	<u>1818 Doby Dr</u>	0.0	0.0	0.0
	<u>1822 Doby Dr</u>	0.0	0.0	0.0
	<u>1773 King Dr</u>	0.0	0.0	0.0
	<u>1774 King Dr</u>	0.0	0.0	0.0
	<u>1778 King Dr</u>	0.8	0.2	0.1
	<u>1779 King Dr</u>	0.1	0.5	0.3
	<u>1784 King Dr</u>	1.7	0.8	1.0
	<u>1808 King Dr</u>	3.0	1.2	2.6
	<u>1820 King Dr</u>	3.8	1.4	4.0
	<u>1764 Aaron Ave</u>	0.0	0.0	0.0
	<u>1768 Aaron Ave</u>	0.0	0.0	0.0
	<u>1776 Aaron Ave</u>	1.5	0.7	1.2
	<u>1784 Aaron Ave</u>	1.4	0.9	1.7

Purchased
 Not interested

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College Downs Floodplain Improvements



Purchased - Removed

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College Downs Floodplain Improvements



Purchased - Removed

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College Downs Floodplain Improvements



Purchased - Removed

Rock Hill, SC Proactive Stormwater Program College Downs



Purchased - Removed

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College Downs Floodplain Improvements



Not Purchased

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College Downs Floodplain Improvements

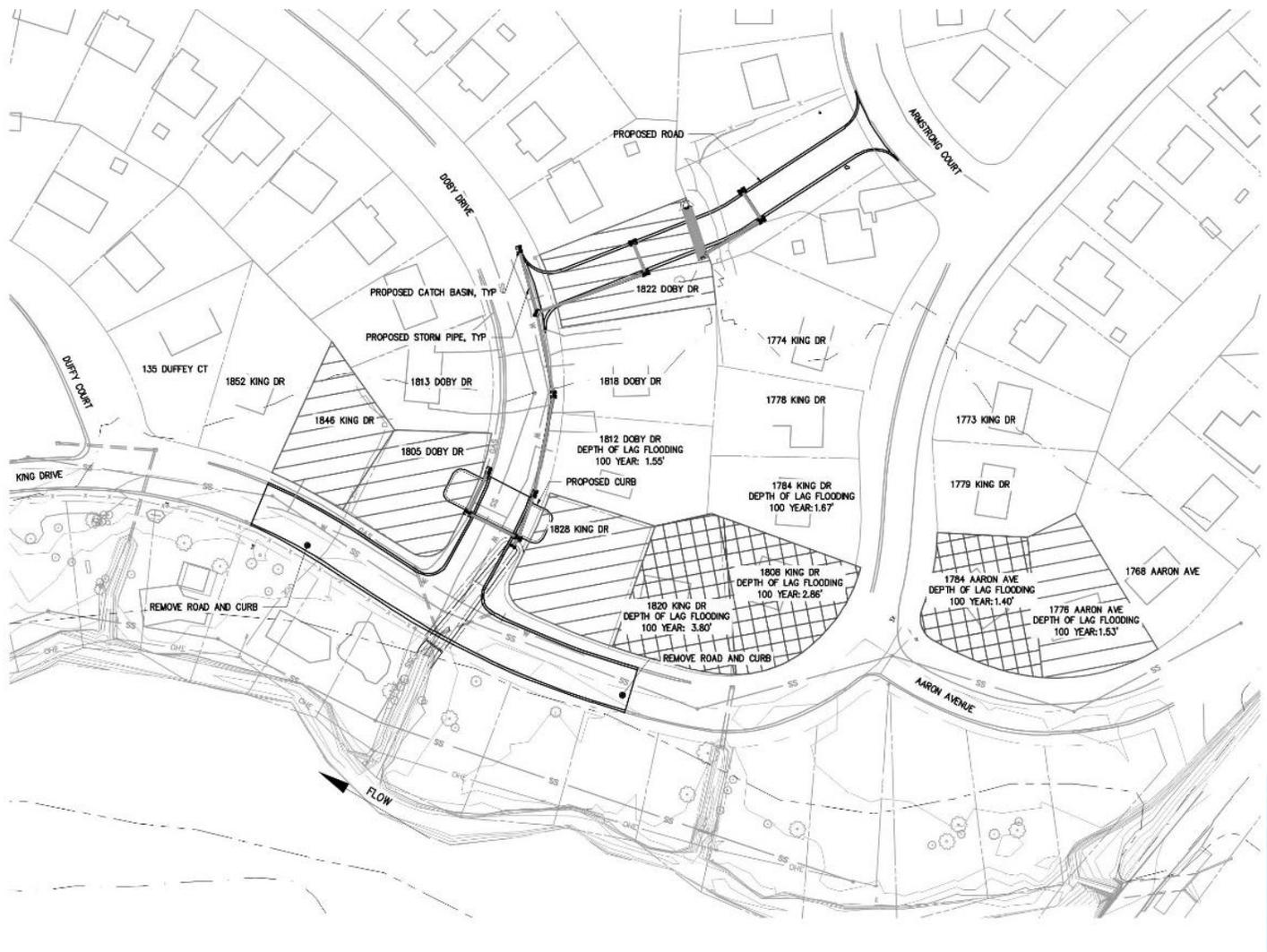


Not Purchased

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College Downs Floodplain Improvements



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College Downs Floodplain Improvements

- Calibration and design support
- Floodplain buyout prioritization
- Human factor



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Presentation Outline

- **Rock Hill City-Wide Modeling**
- **CIP Results**
- **Land Development Support**
- **Design Support**
- **Floodplain Buy-Out Support**



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Rock Hill, SC Proactive Stormwater Program College Downs

Address	Appraisal (\$)	Moving Cost (\$)	Replacement housing - 180 day	Replacement housing -90- day	Total (\$)	Actual Paid
109 Armstrong (vacant lot)	\$ 7,000.00	\$ -			\$ 7,000.00	\$ 8,200.00
1776 Aaron	\$ 56,000.00	\$ 1,890.00			\$ 57,890.00	\$ 60,890.00
1778 King	\$ 62,000.00	\$ 2,075.00			\$ 64,075.00	n/a
1784 Aaron	\$ 48,000.00	\$ 1,735.00			\$ 49,735.00	
1784 King	\$ 56,000.00	\$ 1,890.00			\$ 57,890.00	n/a
1812 Doby	\$ 52,000.00	\$ 1,890.00			\$ 53,890.00	n/a
1822 Doby	\$ 30,000.00	\$ 1,735.00	\$ 31,000.00	\$ 7,200.00	\$ 69,935.00	\$65,000
1846 King	\$ 70,000.00	\$ 2,075.00			\$ 72,075.00	\$72,075
1805 Doby	\$ 30,000.00	\$ 1,735.00		\$ 7,200.00	\$ 38,935.00	\$65,000
1808 King	\$ 35,000.00	\$ 1,735.00			\$ 36,735.00	
1820 King	\$ 30,000.00	\$ 1,735.00			\$ 31,735.00	
1828 King	\$ 35,000.00	\$ 1,890.00		\$ 7,200.00	\$ 44,090.00	\$55,000
Total	\$ 511,000.00	\$ 20,385.00	\$ 31,000.00	\$ 21,600.00	\$ 583,985.00	