



Using Green Infrastructure To Protect Water Quality

Woodlawn - Chicago



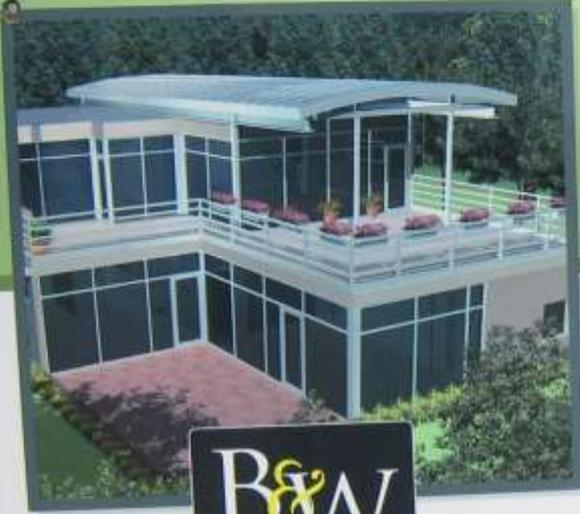












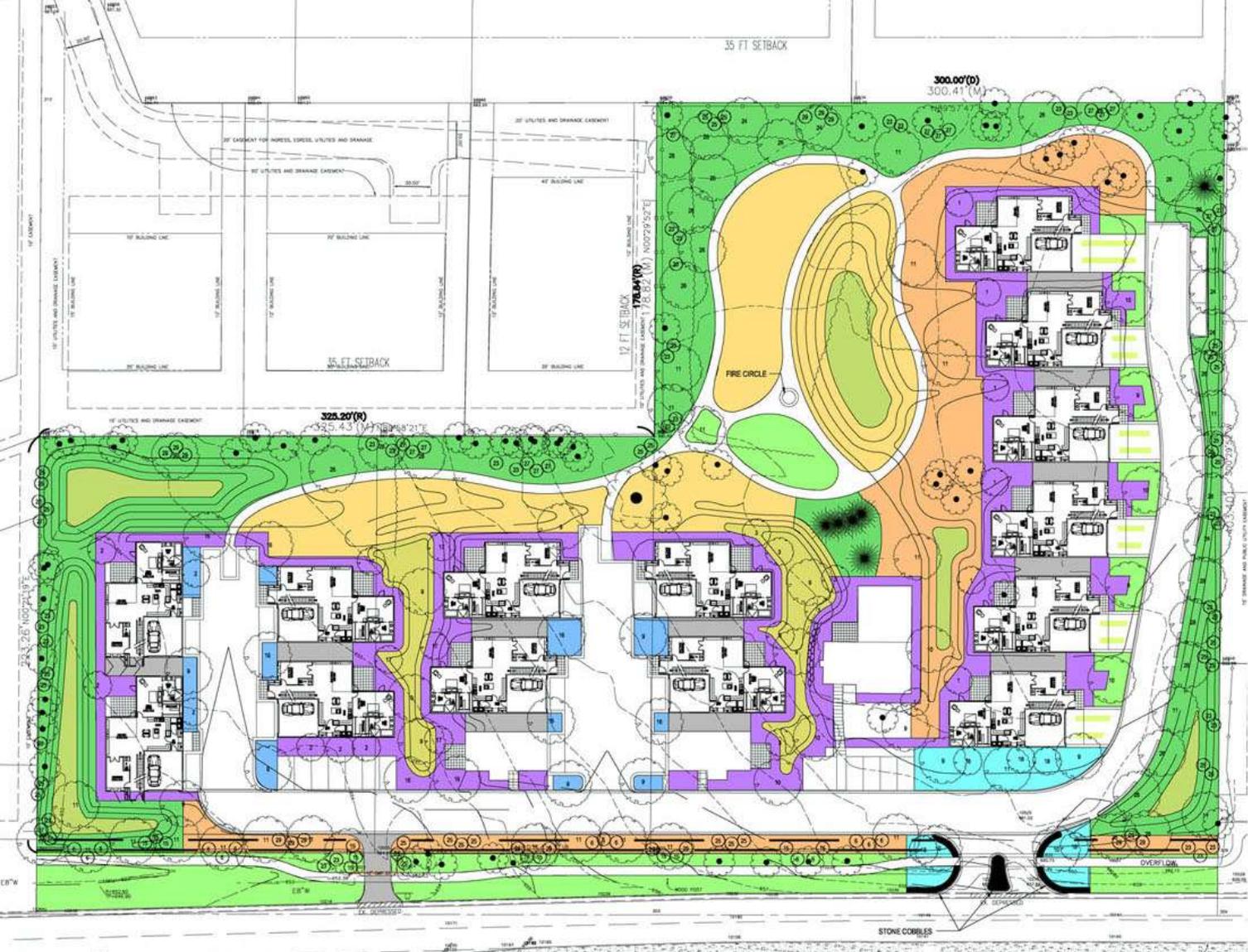
THE POINTE

IN HIGHLAND PARK

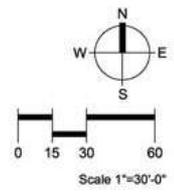
17 Maintenance-Free
Single-Family Homes

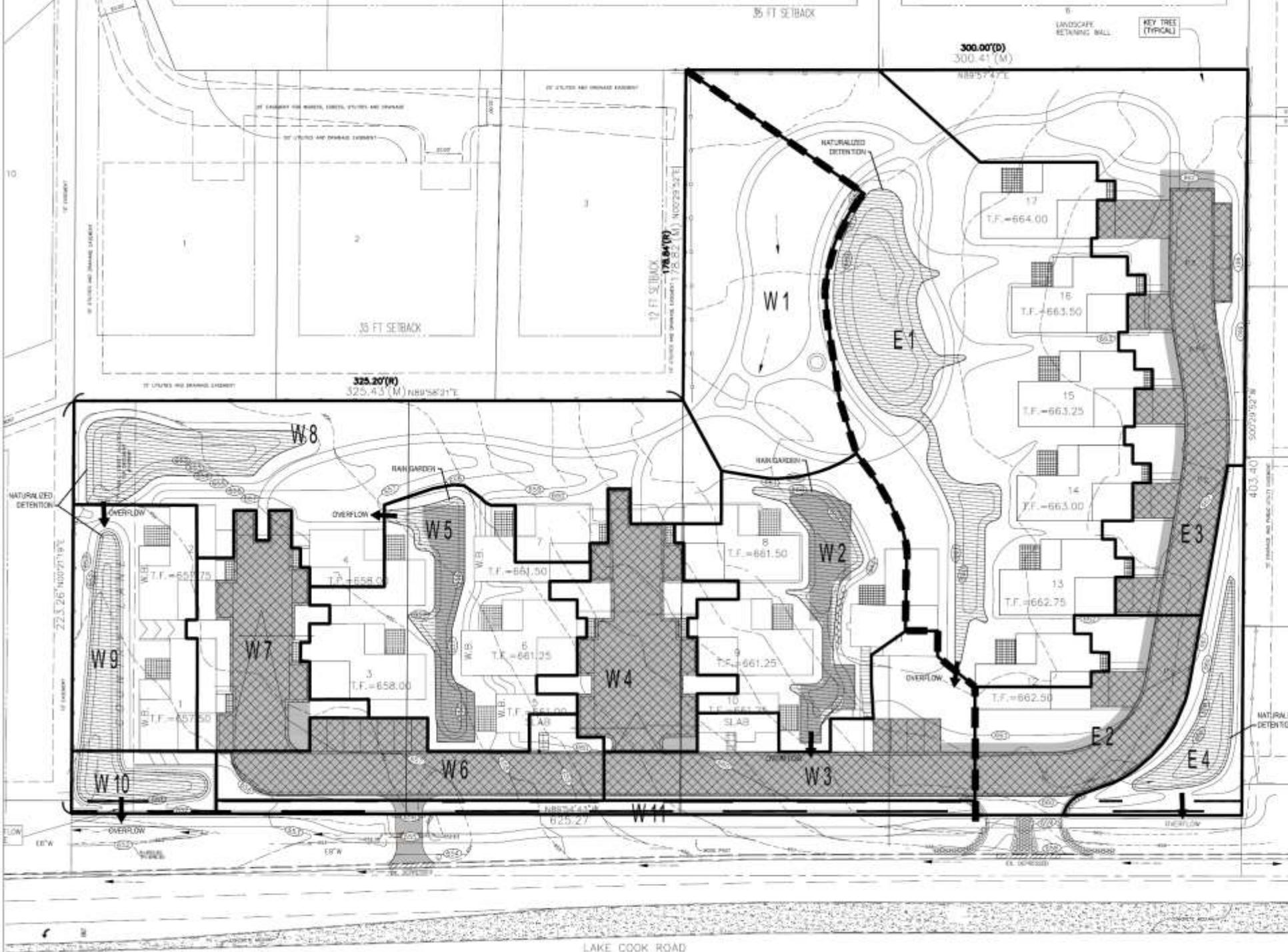
Model Open
Spring 2008 Occupancy

847.432.0500 • Geri Katz-Emalfarb 847.266.4717 • Mergie Brooks 847.266.4708



LEGEND	
SYMBOL	DESCRIPTION
	LARGE CANOPY TREE
	MEDIUM-SIZED CANOPY TREE
	LARGE SHRUB
	SMALL SHRUB
	ENTRANCE PLANTINGS
	ORNAMENTAL PLANTINGS
	COURTYARD PLANTINGS
	SIDEYARD PLANTINGS
	DRIVEWAY PLANTINGS
	TURF
	DRY RAIN GARDEN
	RAIN GARDEN
	PRAIRIE GARDEN
	PRAIRIE RESTORATION
	WOODLANDS
	STONE COBBLES





























Aurora Middle School























Charles City Permeable Streets



204 North Main Street, Charles City, Iowa, United States
Address is approximate

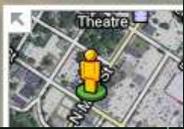
« Photos



KCHA

TJ SERVICE
INC. AND

N Main St





Main Street, Charles City, Iowa, United States
Address is approximate

Photos

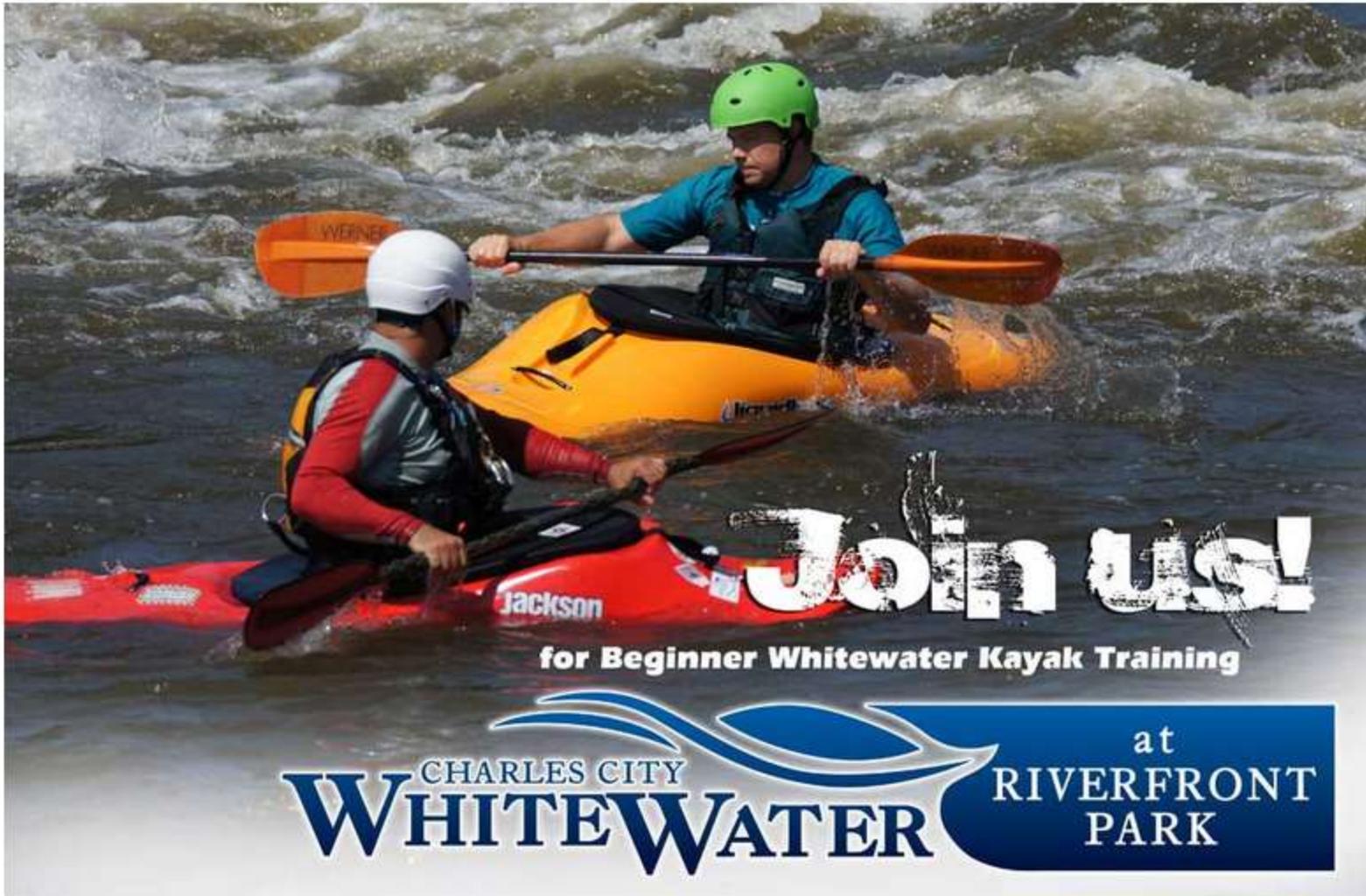


Riverside Park

Riverside Dr



You've been wanting to learn how to get on the Charles City WhiteWater course and really know WHAT you are doing. Now here's your chance.

A photograph of two kayakers navigating white water rapids. The kayaker in the foreground is wearing a white helmet and a red and grey wetsuit, paddling a red kayak with the name 'Jackson' on the side. The kayaker in the background is wearing a green helmet and a blue shirt, paddling a yellow kayak. The water is turbulent with white foam. The text 'Join us!' is overlaid in a large, white, distressed font. Below it, the text 'for Beginner Whitewater Kayak Training' is in a smaller, white, sans-serif font. At the bottom, there is a blue banner with white text and a stylized wave logo. The banner contains the text 'CHARLES CITY WHITEWATER' in a large, serif font, and 'at RIVERFRONT PARK' in a smaller, sans-serif font to the right.

Join us!
for Beginner Whitewater Kayak Training

CHARLES CITY
WHITEWATER at
RIVERFRONT
PARK









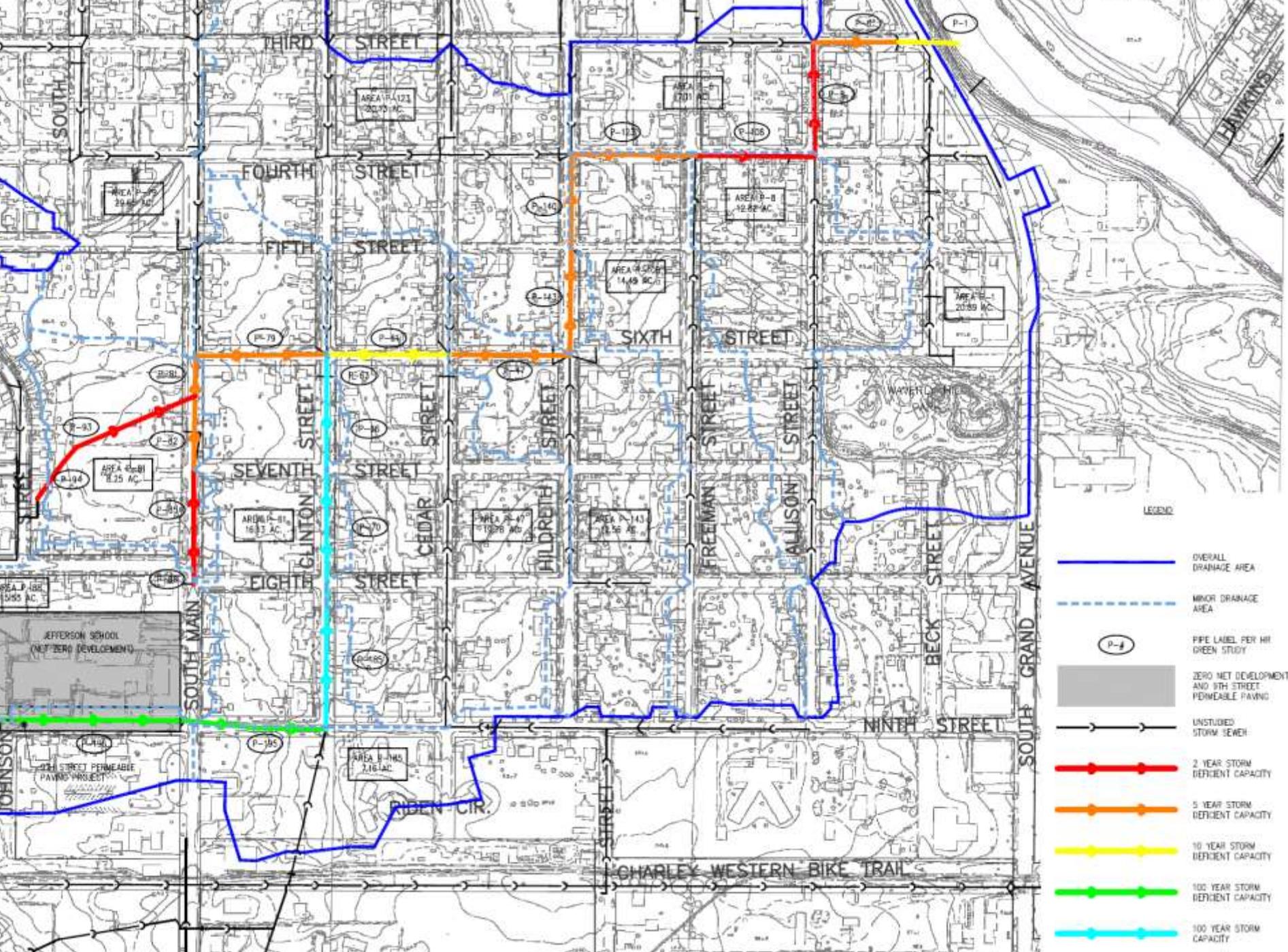
TABLE 1: EXISTING CONDITIONS MODELING RESULTS

	Storm Sewer		2-year Event		10-year Event		100-year Event	
	Size	Capacity*	Peak Flow	Critical Duration	Peak Flow	Critical Duration	Peak Flow	Critical Duration
	(in)	(cfs)	(cfs)	(hrs)	(cfs)	(hrs)	(cfs)	(hrs)
Howard & Hulin	8.00	0.42	1.68	2.00	5.00	1.00	12.12	1.00
Howard & Ferguson	12.00	2.5	3.37	2.00	9.60	1.00	27.14	1.00
Joslin & Spriggs	18.00	5.4	1.00	2.00	2.70	1.00	16.91	1.00
Joslin & Hulin	18.00	8.5	2.35	2.00	6.62	1.00	22.91	1.00
Joslin & Ferguson	24.00	16.0	2.94	2.00	8.27	1.00	23.91	1.00
Johnson & Spriggs	27.00	18.6	10.44	2.00	24.96	2.00	77.32	1.00
Johnson & Hulin	27.00	17.0	12.35	2.00	33.35	2.00	80.42	1.00
Iowa & Ferguson	12.00	2.5	0.70	2.00	1.92	1.00	5.79	1.00

* Full flow capacity with no surcharging

Flow rates that exceed storm sewer capacity





THIRD STREET

FOURTH STREET

FIFTH STREET

SIXTH STREET

SEVENTH STREET

EIGHTH STREET

NINTH STREET

CHARLEY WESTERN BIKE TRAIL

AREA P-121
20.13 AC

AREA P-201

AREA P-8
12.82 AC

AREA P-206
14.49 AC

AREA P-1
20.89 AC

AREA P-75
29.66 AC

AREA P-81
8.25 AC

AREA P-81
16.12 AC

AREA P-47
11.76 AC

AREA P-143
11.36 AC

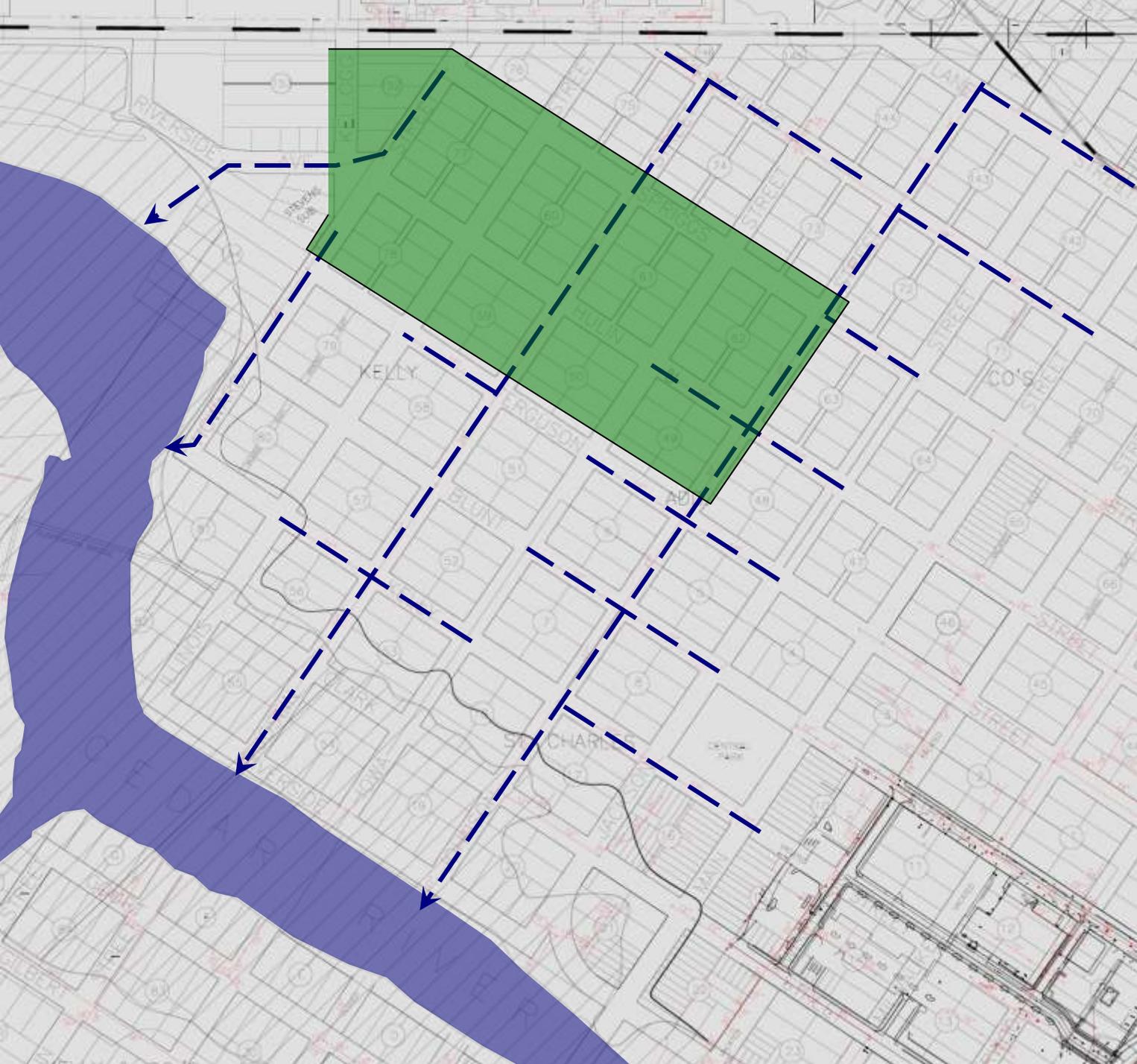
AREA P-145
7.16 AC

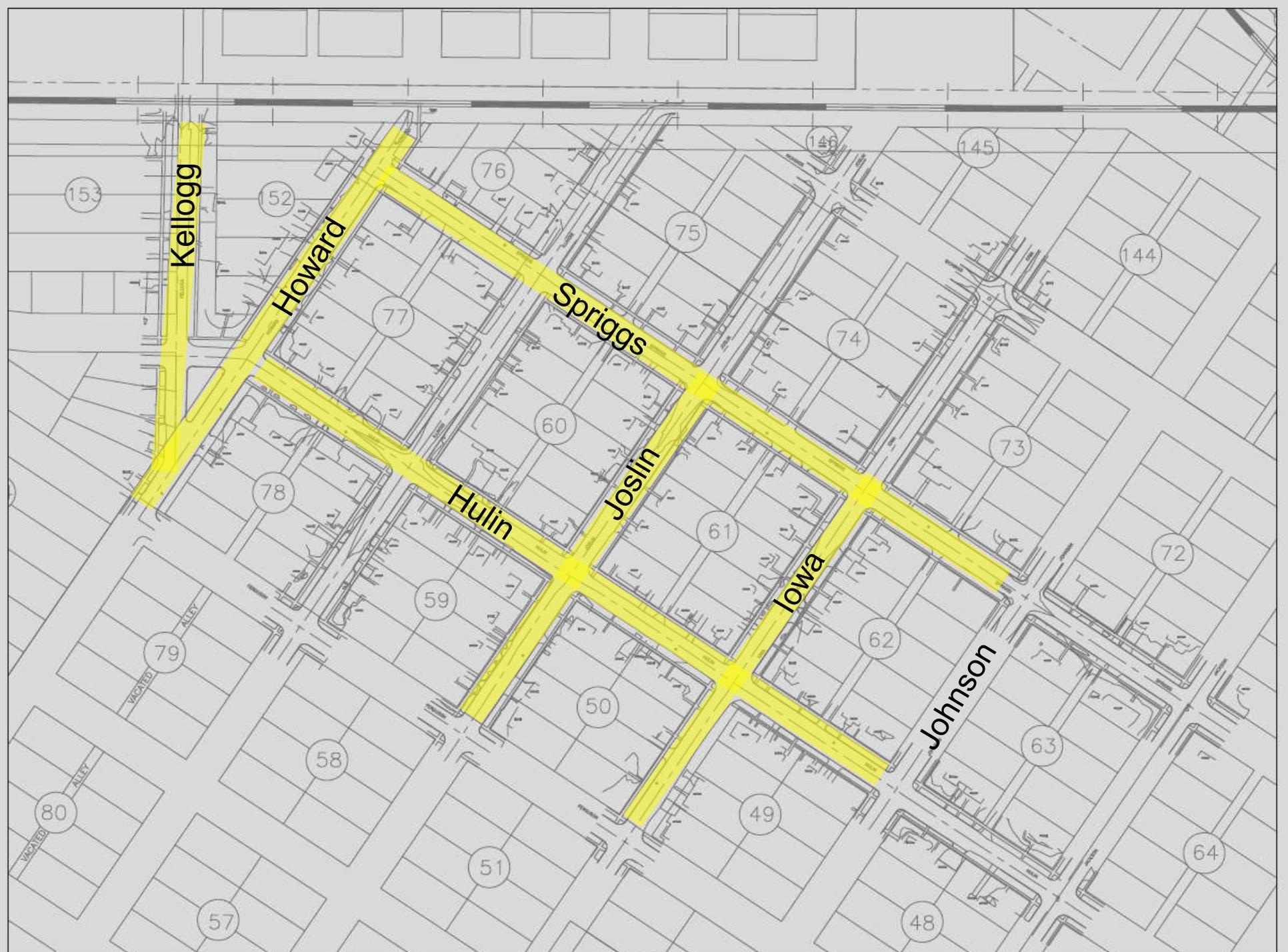
JEFFERSON SCHOOL
(NET ZERO DEVELOPMENT)

SEVENTH STREET PERMEABLE
PAVING PROJECT

LEGEND

-  OVERALL DRAINAGE AREA
-  MINOR DRAINAGE AREA
-  PIPE LABEL PER HI GREEN STUDY
-  ZERO NET DEVELOPMENT AND 8TH STREET PERMEABLE PAVING
-  UNSTUDIED STORM SEWER
-  2 YEAR STORM DEFICIT CAPACITY
-  5 YEAR STORM DEFICIT CAPACITY
-  10 YEAR STORM DEFICIT CAPACITY
-  100 YEAR STORM DEFICIT CAPACITY
-  100 YEAR STORM CAPACITY





Kellogg

Howard

Spriggs

Joslin

Hulin

Iowa

Johnson

153

152

76

75

146

145

144

77

60

74

73

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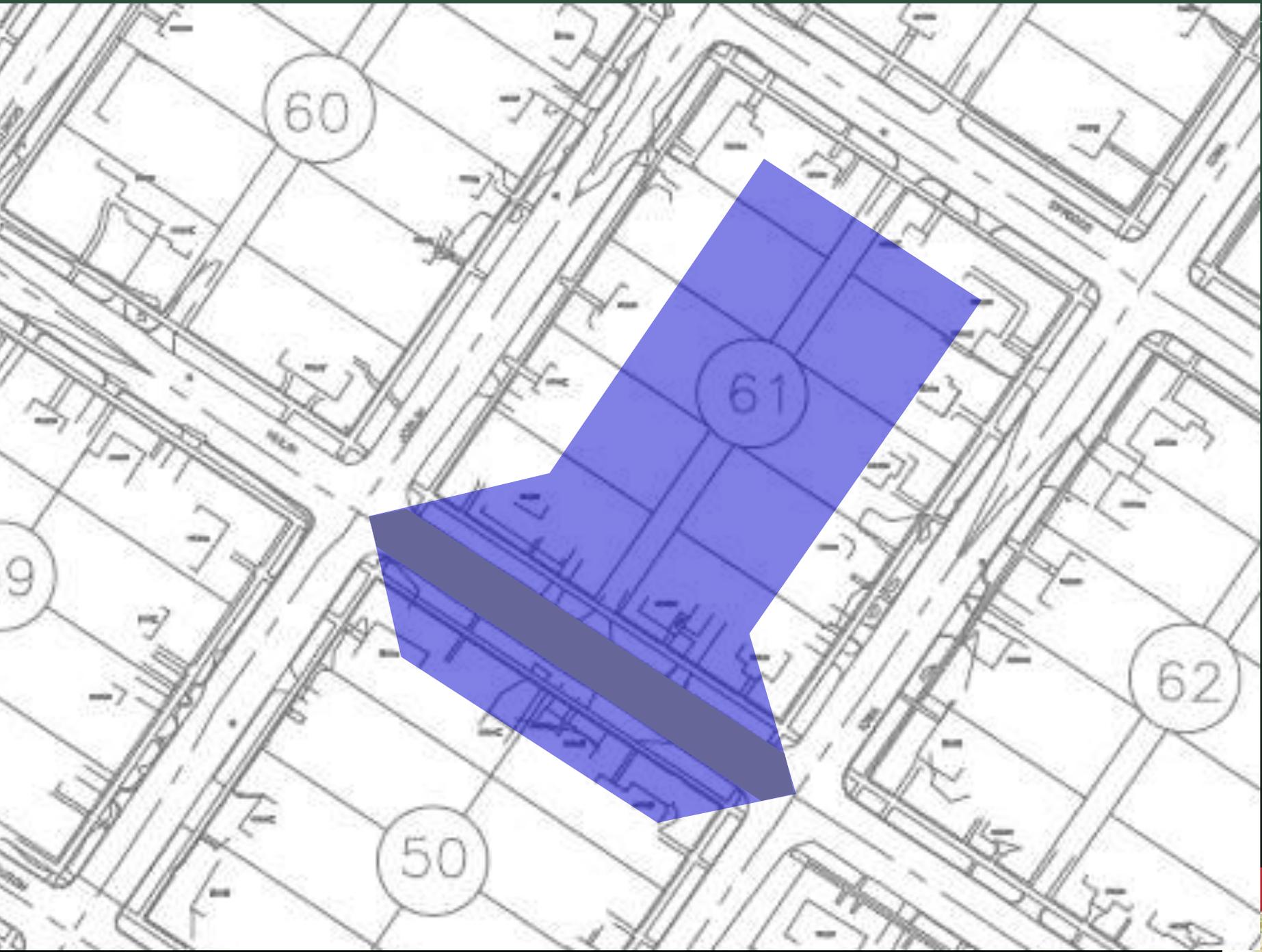
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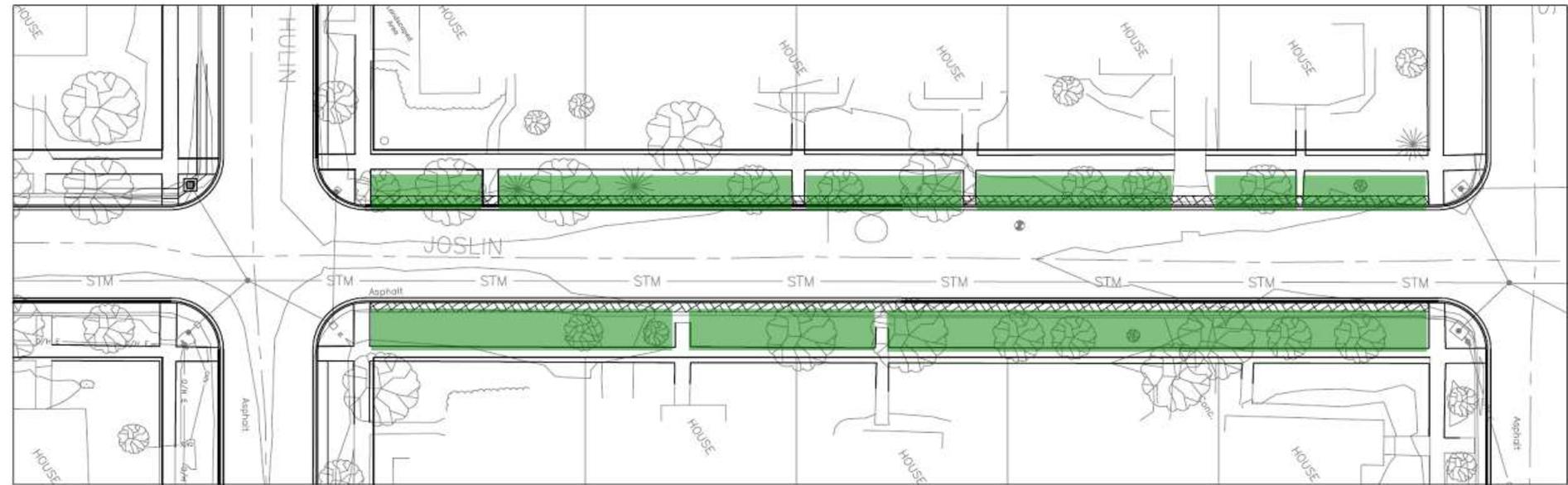


60

61

62

50




 Civil Engineer:
Conservation Design Forum
 375 West First Street
 Starkville, Illinois 60726
 630.557.2000 Phone
 630.557.2070 Fax
 www.cdfdf.com

Client:
 Charles City
 105 Midwestern Mall
 Charles City, IA 50616

Exhibit 4 - Bioswale (Plan View)
Charles City - Green Streets

DATE	REVISIONS

DATE	06/20/09
PROJECT NO.	0903.01
DRAWN BY	A7H
CHECKED BY	XXX







**Bioinfiltration
Planting Area**

Curb Cut

Stone Channel

Bridge Pavers

Cobble Apron

Storm Inlet

Turf or Gravel Strip

Porous Unit Paving





Option 1: Turf



Option 2: Low Shrub



Gro-Low Sumac



Meadowsweet/Snowberry



**Option 3:
2-4 Perennials**



Little Bluestem



Sideoats Grama



Sand Coreopsis



Prairie Dropseed

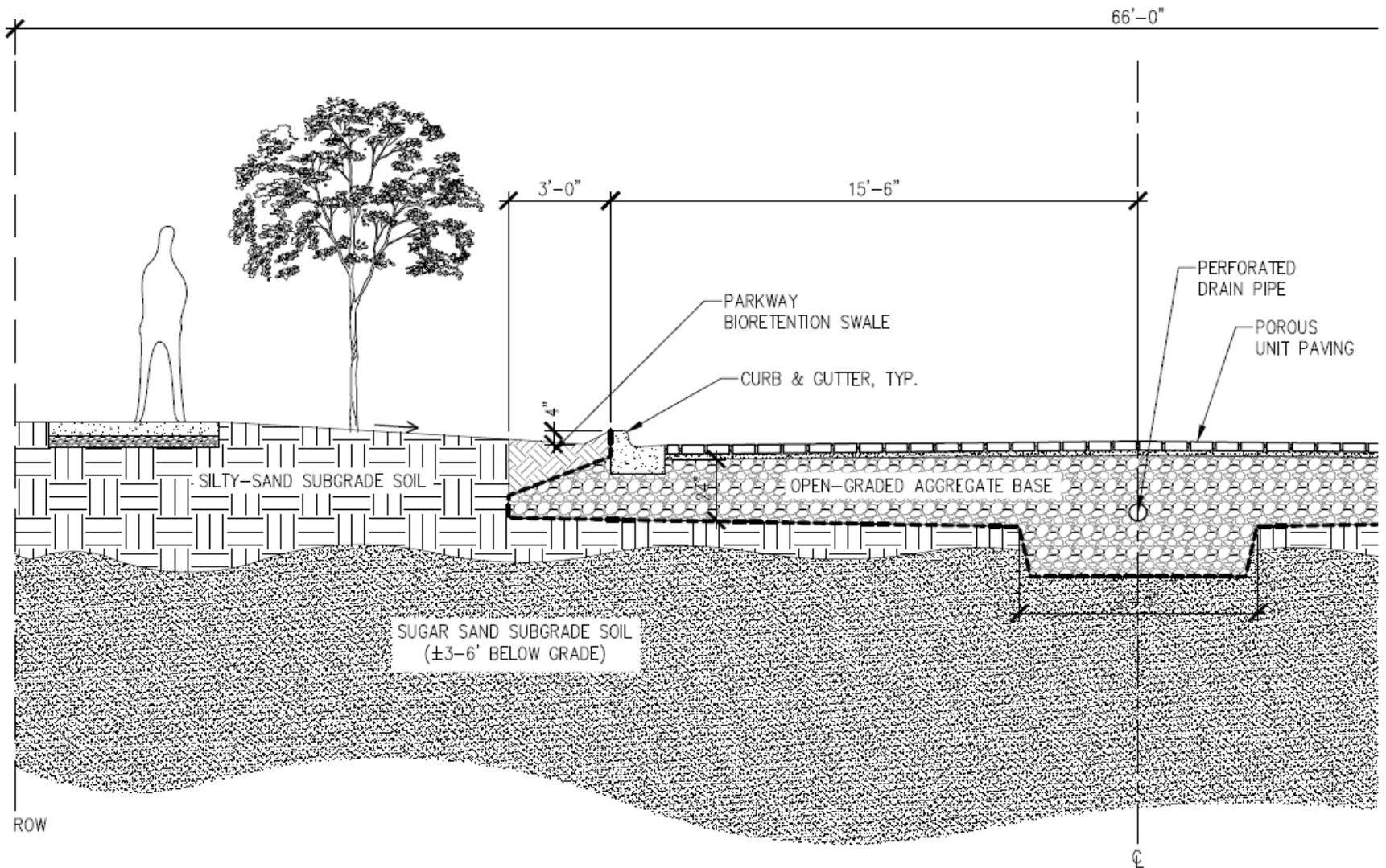


Heuchera



Meadow Anemone





SOURCE: CHARLES CITY GREEN INFRASTRUCTURE ENGINEERING PLANS



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Conservation Design Forum
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Charles City, IA 50616
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PROTOTYPE STREET CROSS SECTION
CHARLES CITY GREEN INFRASTRUCTURE

DATE	REVISIONS

DATE	11/10/09
PROJECT NO.	08001.01
DRAWN BY	ATB
CHECKED BY	TP











TABLE 2: PROTOTYPE MODEL RESULTS

	Rainfall*	Existing	Proposed	% Reduction
6-Month Event				
Runoff volume (inches)*	1.91	0.28	0	100%
Runoff Rate (cfs)**	-	0.59	0	100%
1-Year Event				
Runoff volume (inches)*	2.36	0.45	0	100%
Runoff Rate (cfs)**	-	0.79	0	100%
2-Year Event				
Runoff volume (inches)*	2.98	0.75	0	100%
Runoff Rate (cfs)**	-	1.1	0	100%
10-Year Event				
Runoff volume (inches)*	4.38	1.59	0.59	63%
Runoff Rate (cfs)**	-	1.7	0.12	93%
100-Year Event				
Runoff volume (inches)*	7.07	3.6	2.46	32%
Runoff Rate (cfs)**	-	3.3	2.2	33%

* Based on 24-hour rainfall

** Based on critical duration storm



Project Costs

- Remove & replace existing pavement & curbs
 - 17 City Blocks
 - 112,000 square feet
- Excavation
- Gravel Base
- Permeable Paving
- Water main & services
- Sanitary sewer services
- \$3.7M construction cost
- \$3.9M construction, engineering, fees



Ann Arbor Municipal Center





Site Plan















