

State Street Creek & 7th Avenue Creek Watershed Plan

Addendum to Ferson-Otter Creek Plan

Prepared By:

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Agenda

- Review of last meeting and follow-up
- Water Quality
- Pollutant Loading Model
- Causes & Sources of Impairments
- Critical Areas
- Action Plan
 - Programmatic
 - Site Specific



Last Meeting Follow-up

- Last meeting: Watershed Inventory and Assessment
- Followed up on possible water quality data available through Fox River Study Group database or EPA STORET – no other data available
- Changed Hunt Club wetland from wetland to detention in the data
- Received groundwater well data from the City and incorporated into groundwater section
- Addressed coal tar sealants in Programmatic Recommendations
- Received water quality data at WWTP from the City



Water Quality

Neither stream assessed by IEPA

No pre-existing sampling data found

AES conducted water quality sampling twice:

- October 7th, 2016 after a 0.5” rain event
- October 26th, 2016 after a 1+” rain event

Both streams are very flashy!



Water Quality

Water quality sampling results:

State Street & 7th Avenue Creek

- Impaired for **nitrogen**, **phosphorus**, and **total suspended solids**

State Street Creek

- Buried streams result in higher nitrogen levels



Water Quality

Parameter	Statistical, Numerical, or General Use Guidelines	Location & Date			
		State St Oct 7 th , 2016	State St Oct 26 th , 2016	7 th Ave Oct 7 th , 2016	7 th Ave Oct 26 th , 2016
pH	>6.5 or <9.0*	7.61	7.5	8.11	7.54
Chloride	<500 mg/l*	294 mg/L	39.6 mg/L	51 mg/L	26.7 mg/L
Total Phosphorus	<0.0725 mg/l**	0.12 mg/L	0.27 mg/L	0.12 mg/L	0.14 mg/L
Total Nitrogen	<2.461 mg/l**	5.965 mg/L	5.817 mg/L	2.475 mg/L	5.33 mg/L
Ammonia-Nitrogen	<15 mg/l*	0.1 mg/L	0.18 mg/L	<0.1 mg/L	0.25 mg/L
Total Suspended Solids	<19 mg/l***	6 mg/L	28 mg/L	122 mg/L	18 mg/L
Bio. Oxygen Demand	<5.0 mg/l*	<7 mg/L	9 mg/L	<6 mg/L	6 mg/L
Conductivity	<1,667 µmhos/cm	1,343 µmhos/cm	225 µmhos/cm	554 µmhos/cm	155.4 µmhos/cm



Pollutant Loading Model

USEPA's Spreadsheet Tool to Estimate Pollutant Loads
(STEPL)

Inputs by Subwatershed Management Unit:

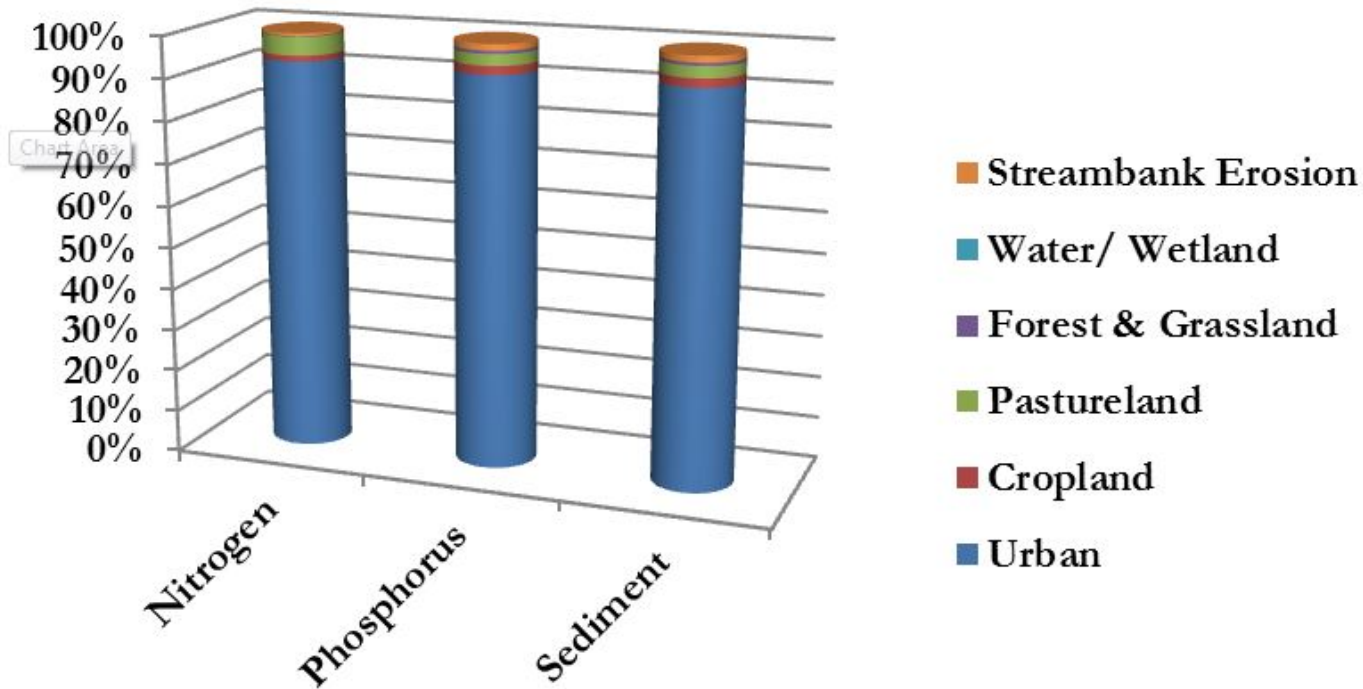
- Land Use/Land Cover Categories
- Precipitation
- Soils Information
- Existing Streambank Conditions
- Existing best management practices
- Other data



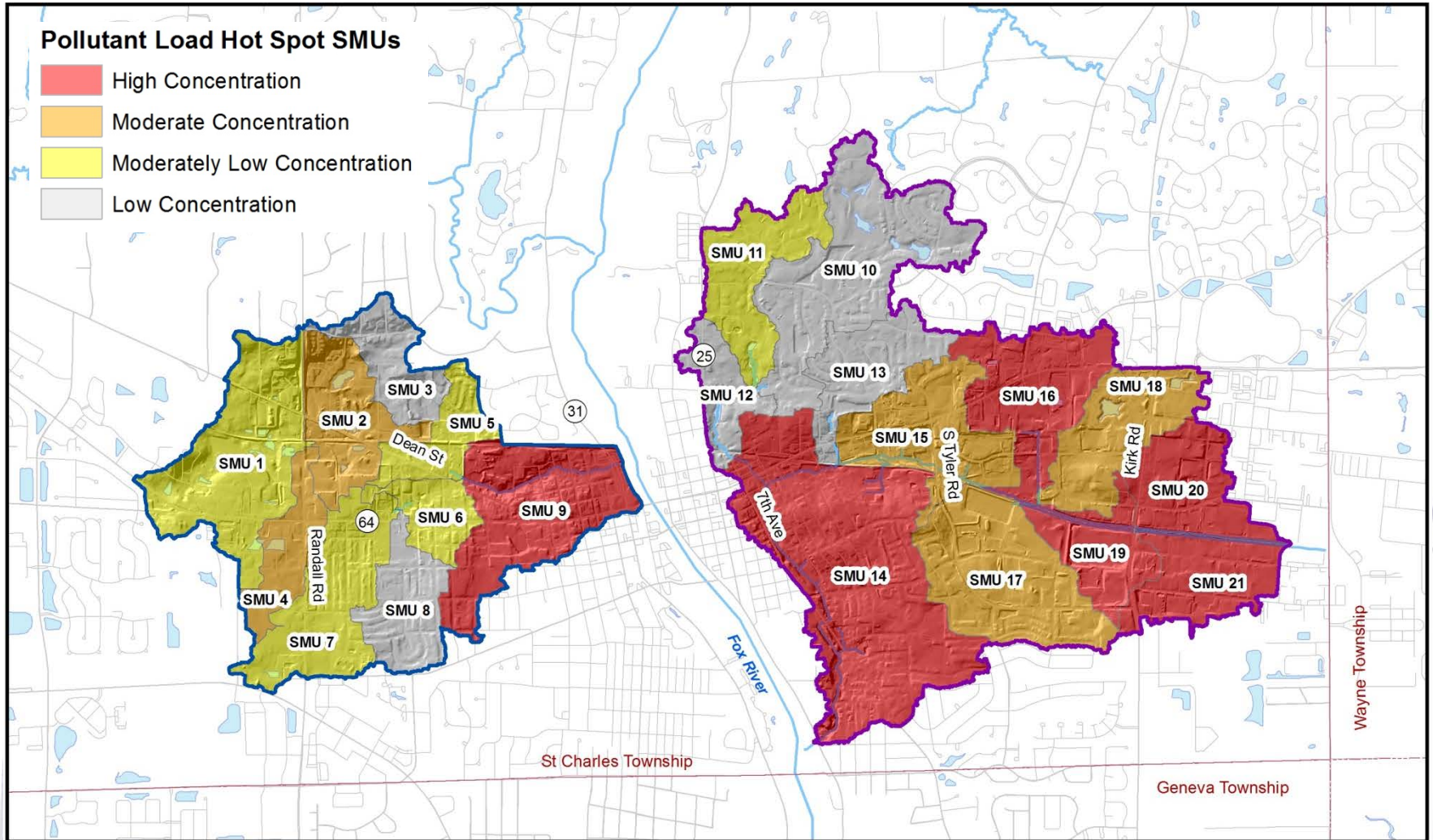
Pollutant Loading Model

Modeling results:

- 93% of all pollutants stem from Urban sources
- All remaining sources less than 5%



Hot Spot SMUs



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Reduction Targets

Impairment: Cause of Impairment	Basis for Impairment	Reduction Target	Target Attainable?
Watershed-Wide Reduction Targets			
Water Quality/Aquatic Life: Nitrogen in State Street Creek and 7 th Avenue Creek	17,019 <u>lbs/yr</u> of total nitrogen loading based on STEPL model; 5.965 mg/1 total nitrogen in stream water quality samples	>59% or 10,041 <u>lbs/yr</u> reduction in nitrogen loading to achieve 2.461 mg/1 total nitrogen USEPA numeric criteria for streams in Ecoregion VI	
TOTAL			Yes
Water Quality/Aquatic Life: Phosphorus in State Street Creek and 7 th Avenue Creek	2,581 <u>lbs/yr</u> of phosphorus loading based on STEPL model; 0.27 mg/1 total phosphorus in stream water quality samples	>73% or 1,884 <u>lbs/yr</u> reduction in phosphorus loading to achieve 0.0725 mg/1 total phosphorus USEPA numeric criteria for streams in Ecoregion VI	
TOTAL			Yes
Water Quality/Aquatic Life: Total suspended solids in State Street Creek and 7 th Avenue Creek	460 tons/ <u>yr</u> of sediment loading based on STEPL model; 122 mg/1 total suspended solids in stream water quality samples	>85% or 391 tons/<u>yr</u> reduction in sediment loading to achieve 19 mg/1 total suspended solids based on USGS numeric criteria in Great Lakes Region	
TOTAL			Yes



Causes & Sources of Impairment

Impairment	Cause of Impairment	Known or Potential Source of Impairment
Water Quality: Aquatic Life	Nutrients- <i>known impairment</i> . (Phosphorus & Nitrogen)	Streambank erosion; Buried streams; Residential, Ag, and commercial lawn fertilizer; Inadequate policy; Lack of landowner education; Agricultural row crop runoff
Water Quality: Aquatic Life	Sediment- <i>known impairment</i> (Total Suspended Solids/turbidity)	Streambank erosion; Construction sites; Existing & future urban runoff;
Water Quality: Aquatic Life	Low dissolved oxygen- <i>known impairment</i>	Heated stormwater runoff from urban areas; Lack of natural riffles in stream reaches
Habitat Degradation	Invasive/non-native plant species in riparian and other natural areas- <i>known impairment</i>	Spread from existing and introduced populations; Level of public education
Habitat Degradation	Loss and fragmentation of open space/natural habitat due to development <i>known impairment</i>	Traditional development design; Streambank, channel, and riparian area modification; Inadequate protection policy; Lack of appropriate land management; Lack of restoration and maintenance funds; Wetland loss

Impairment	Cause of Impairment	Known or Potential Source of Impairment
Hydromodification & Habitat Degradation	Alteration of natural drainage channels; buried streams; impervious surfaces- <i>known impairment</i>	Alteration of natural drainage patterns; Buried or piped streams; Existing & future urban runoff; Wetland loss
Aquifer Drawdown	Reduced infiltration & human use- <i>known impairment</i>	Wells; Existing and future urban impervious surfaces; Inadequate protection policy; Level of public education; Wetland loss
Structural Flood Damage	Encroachment in 100-year floodplain- <i>known impairment</i>	Poor detention basin design & function; Existing and future urban impervious surfaces; Channelized streams; Wetland loss; Debris jams in streams



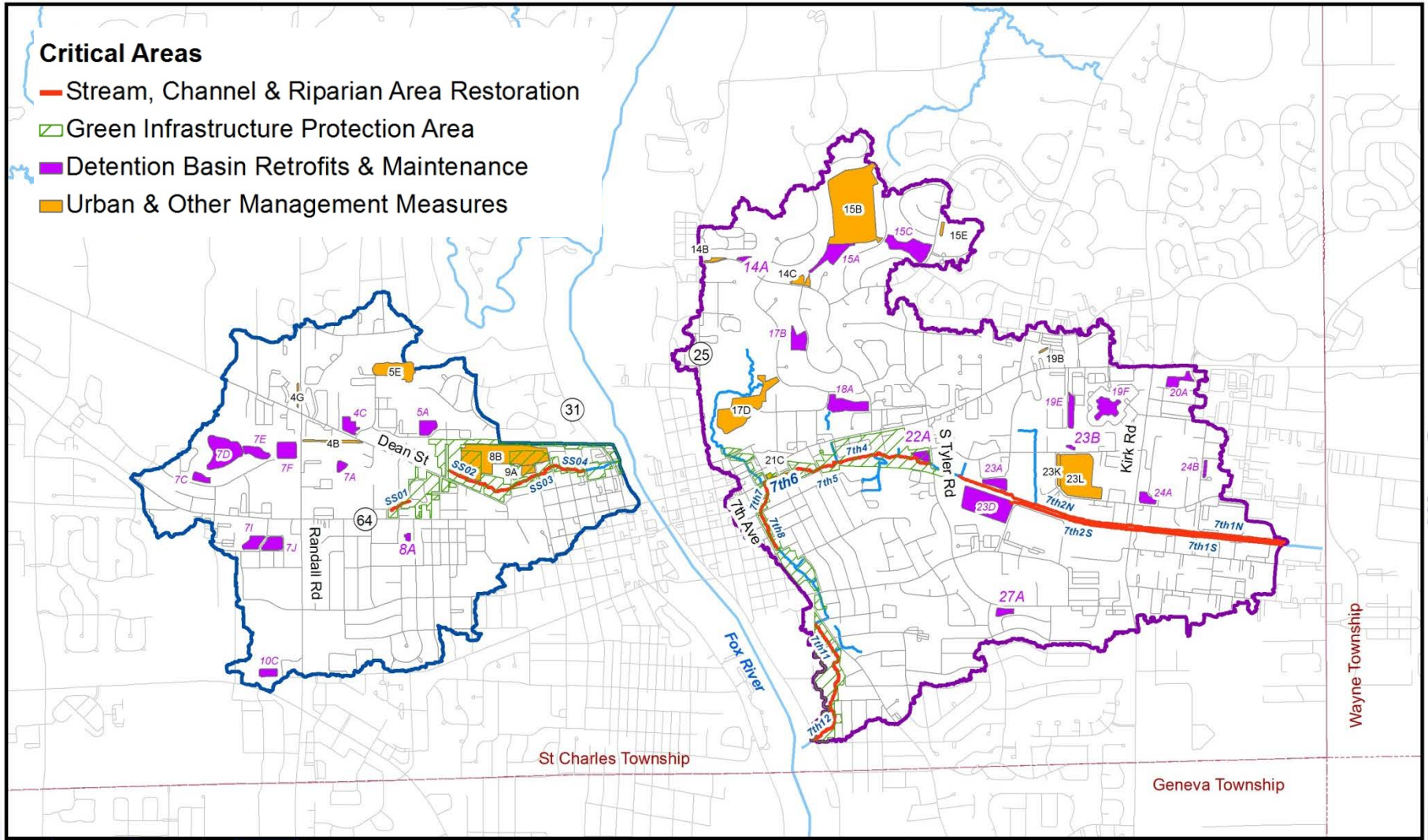
Critical Areas

Four critical area types:

- 15 Highly degraded stream reaches and riparian areas
- 27 Detention basin retrofits
- 13 Urban and other management measures
 - 4 Swale retrofits
 - 5 Turf/park retrofits
 - 3 Woodland restoration/management
 - 1 Parking lot retrofit
 - 1 Brownfield redevelopment
- 131 acres of green infrastructure protection areas



Critical Areas



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Action Plan Components

Programmatic Measures: general remedial, preventive, and policy watershed-wide Management Measures that can be applied across the watershed by various stakeholders.

Site Specific Measures: actual locations where Management Measure projects can be implemented to improve surface and groundwater quality, green infrastructure, and flooding.



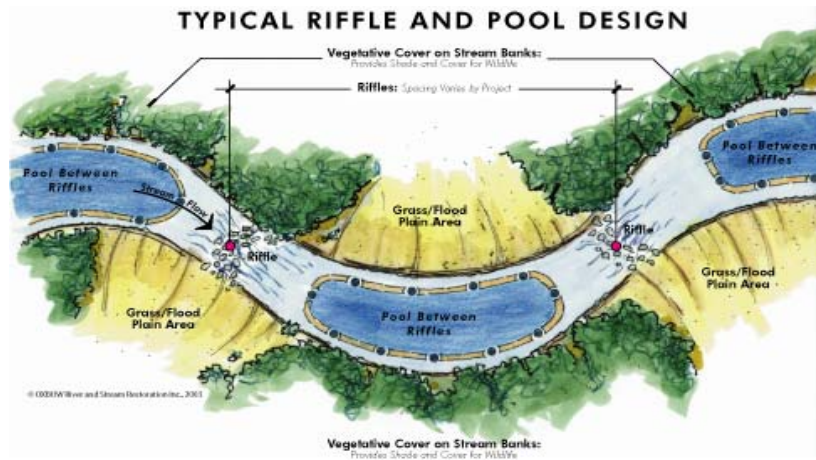
Policy Recommendations

- Plan Adoption & Implementation
- Green Infrastructure Network
- Groundwater Protections
- Sensible (Road) Salting Recommendations
- Lawn Fertilizer
- Stormwater Management
- Native Landscaping/Natural Area Restoration
- Pavement Alternatives



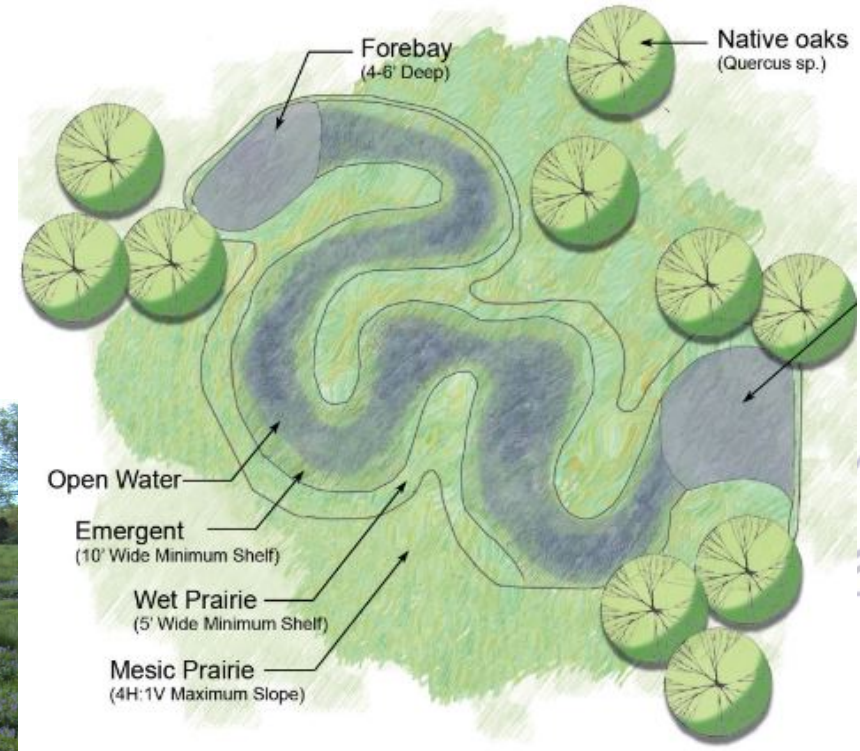
Stream & Riparian Area Restoration

Restoration: Improve stream channel using artificial pool-riffle complexes, streambank stabilization using a combination of bioengineering with native vegetation and hard armoring with rock if need



Detention Design, Retrofits, Establishment, & Maintenance

- Location
- Design
- Short & Long Term Native Vegetation Establishment

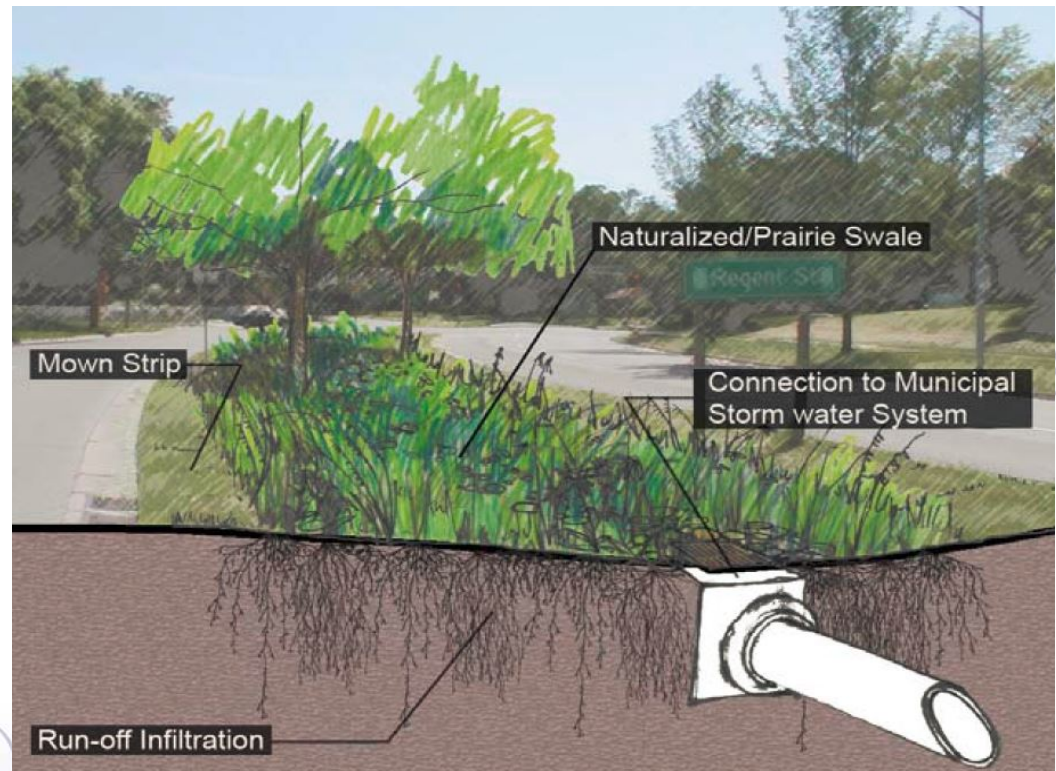


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Vegetated Swales (Bioswales)

- Designed to infiltrate stormwater and remove pollutants
- Aesthetically pleasing
- Used to replace pipes



Natural Area Restoration & Native Landscaping

- Transforming large scale open areas into ones that exhibits better ecological health
- Using native plants at a smaller scale around homes and businesses
- National Wildlife Federation's Certified Wildlife Habitat Program; Conservation Foundation's Conservation@Home Program; Audubon Cooperative Sanctuary Program



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Pavement Alternatives

- Allows for increased infiltration to groundwater
- Can be used for parking lots, parking aprons, private roads, fire lanes, residential driveways, and bike paths
- All are suitable alternatives to coal-tar sealants
- Additionally, can ban the sale or use of coal-tar sealants

- Pervious concrete
- Permeable asphalt
- Paver systems



Rainwater Harvesting & Re-use

- Downspout disconnection
- Reduction in stormwater runoff
- Utilizes rain barrels or cisterns
- Most commonly used for irrigation



Rain Gardens

Small shallow depression planted with deep rooted native wetland vegetation



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Street Sweeping

- Removes pollutants from roadways before they can enter streams
- Bi-weekly street sweeping is shown to provide sufficient results



Green Infrastructure Planning

- * Green Infrastructure preservation and planning is the key to achieving watershed health
- Protect specific unprotected green infrastructure parcels through acquisition, regulation, and/or incentives.
- Incorporate conservation or low impact design standards on green infrastructure parcels where development is planned.
- Limit future subdivision of green infrastructure parcels.
- Implement long term management of green infrastructure.



Site Specific Management Measures

- Streambank, Channel, & Riparian Area Restoration
- Detention Basin Retrofits & Maintenance
- Urban and Other Management Measures
- Green Infrastructure Protection Areas



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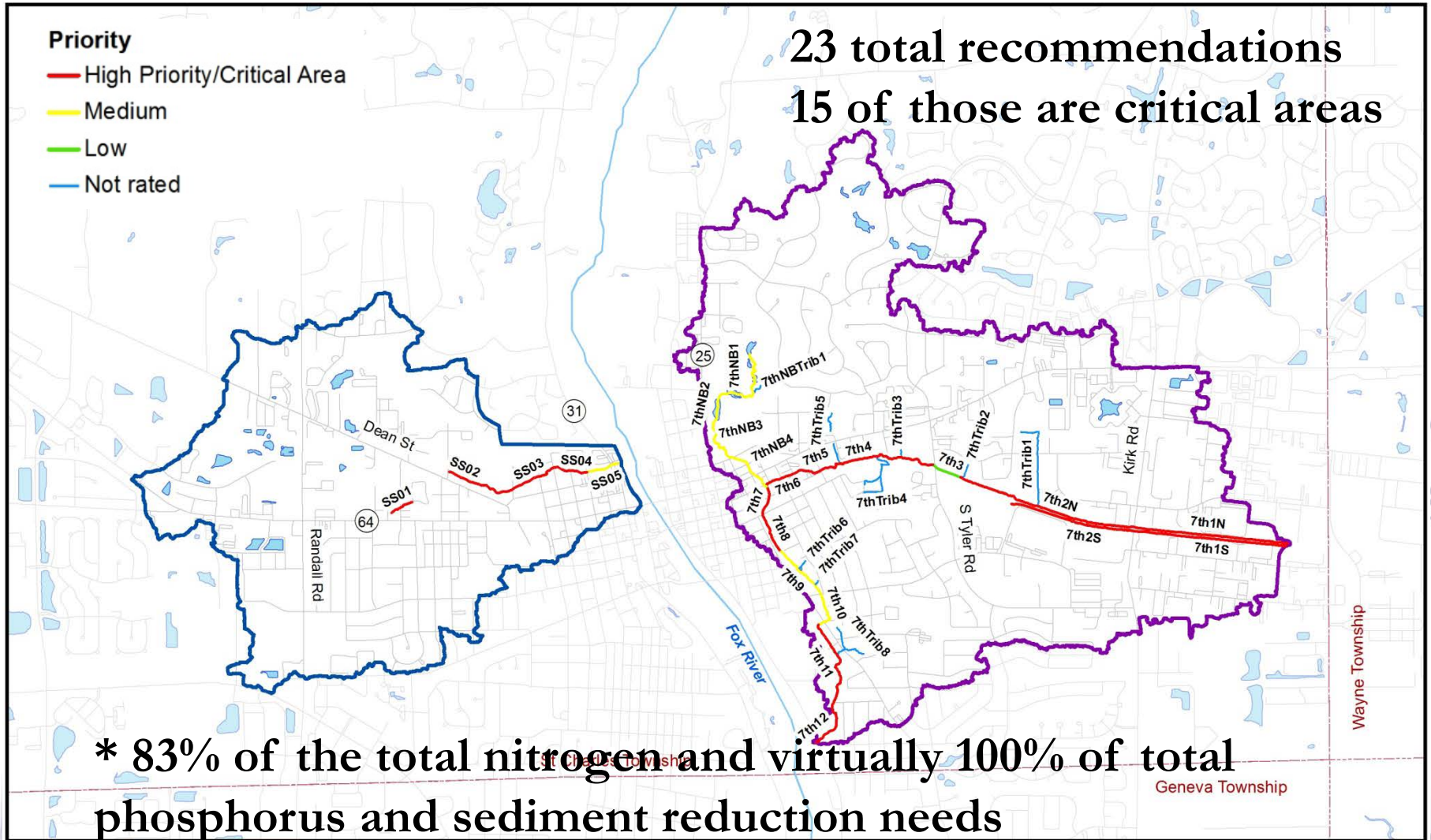


Stream & Riparian Recommendations

Priority

- High Priority/Critical Area
- Medium
- Low
- Not rated

23 total recommendations
15 of those are critical areas



* 83% of the total nitrogen and virtually 100% of total phosphorus and sediment reduction needs



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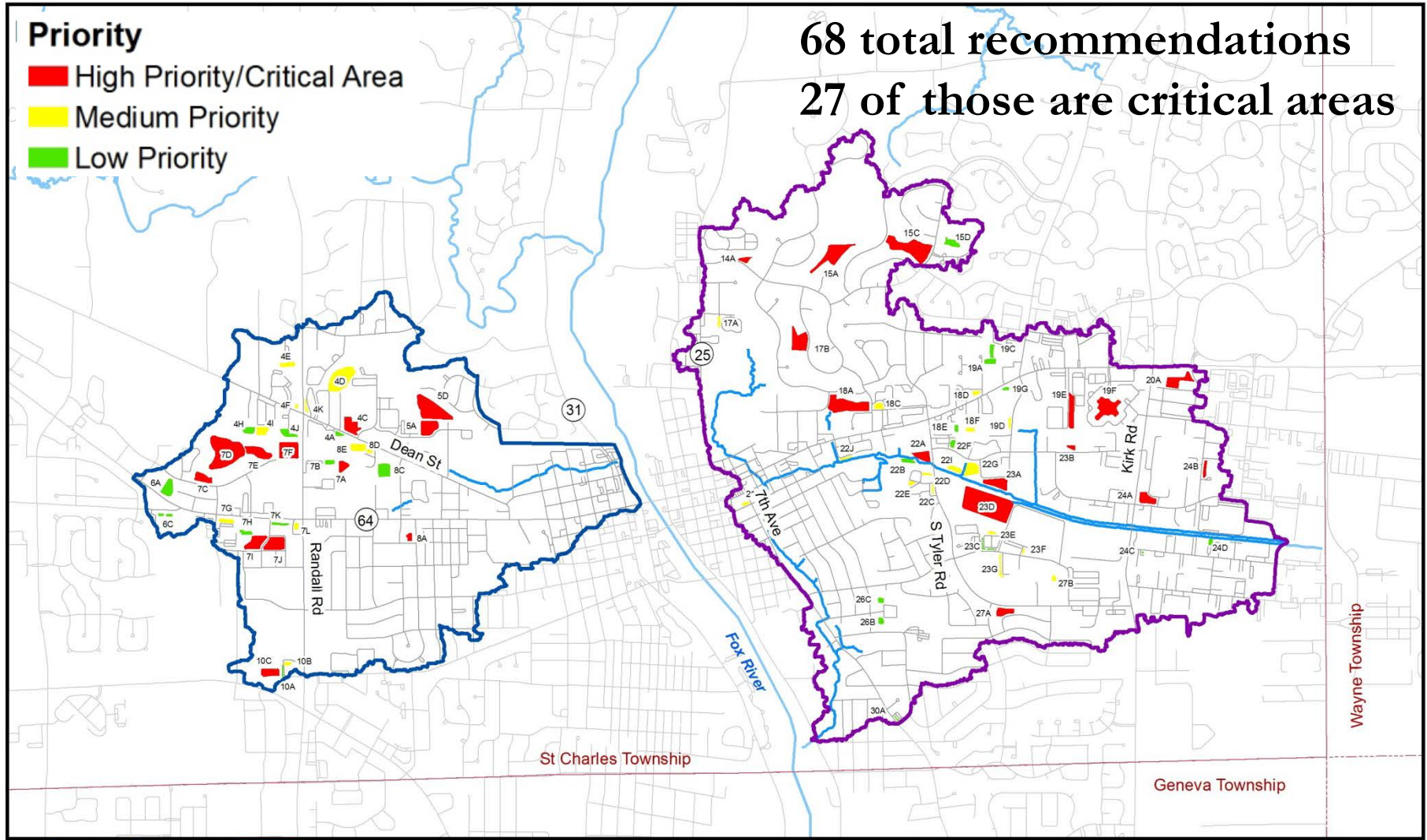


ST. CHARLES
SINCE 1834



HRGreen

Detention Basin Retrofit Recommendations



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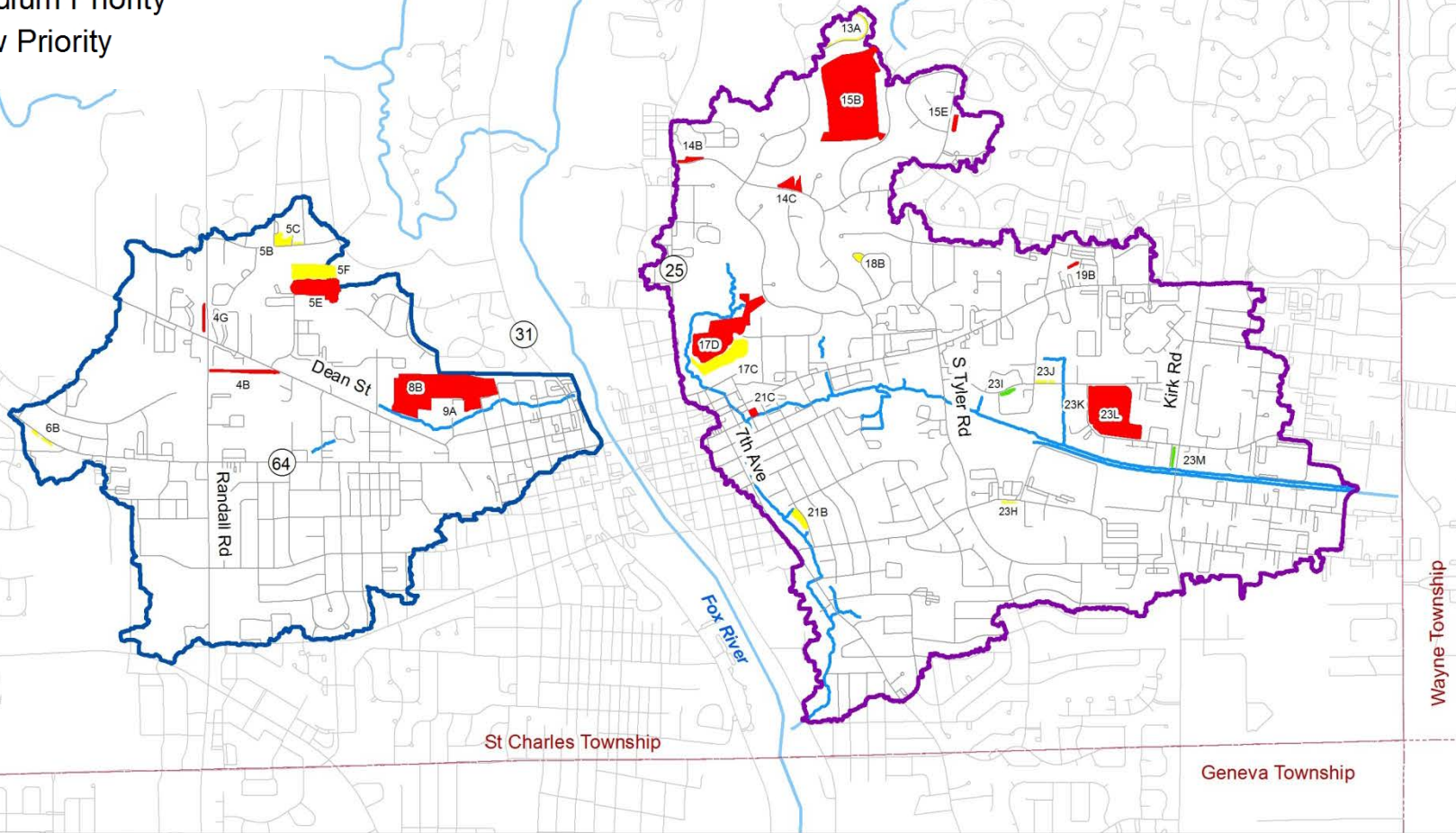


Urban & Other Management Measures

Priority

- High Priority/Critical Area
- Medium Priority
- Low Priority

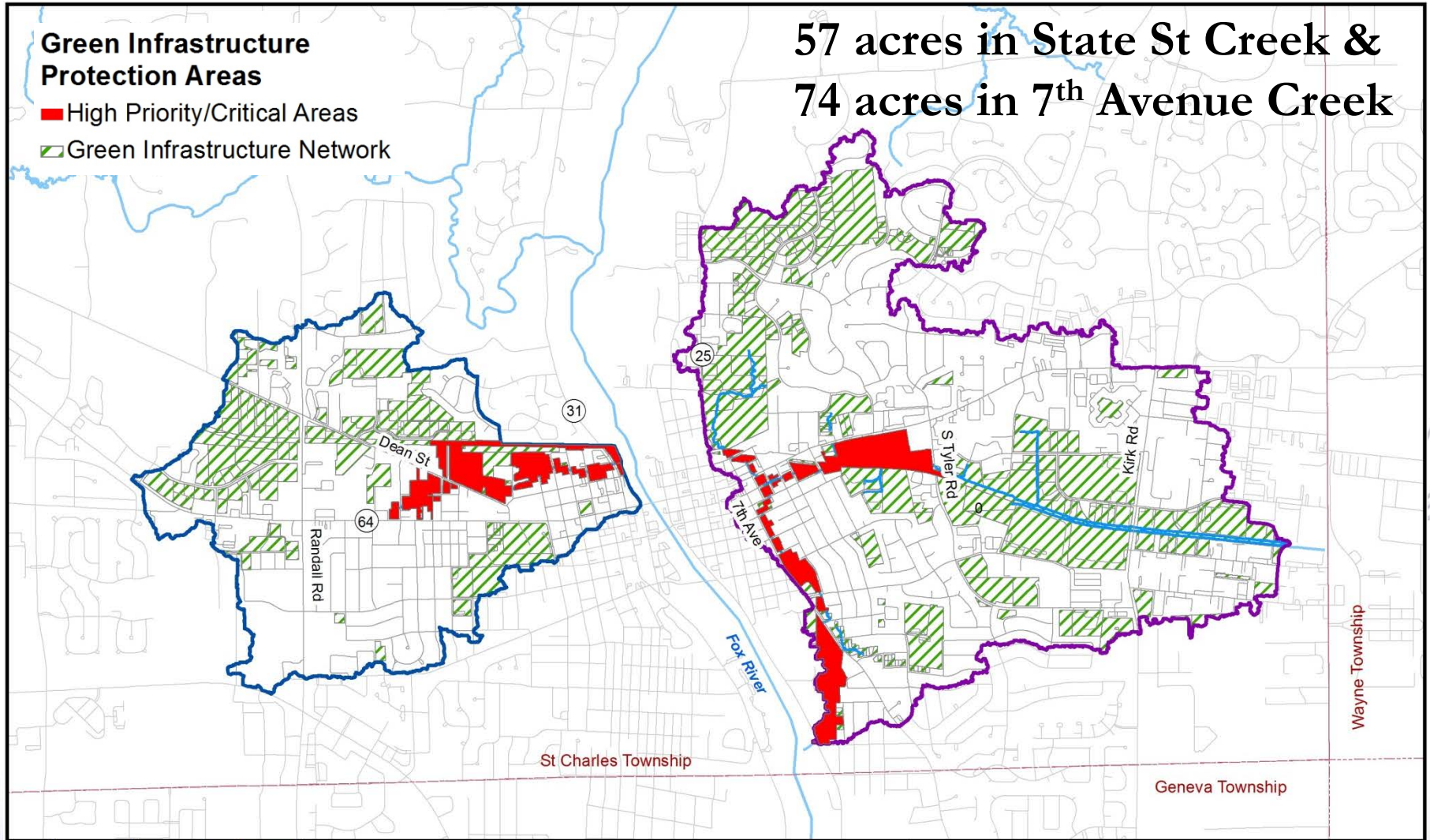
26 total recommendations
13 of those are critical areas



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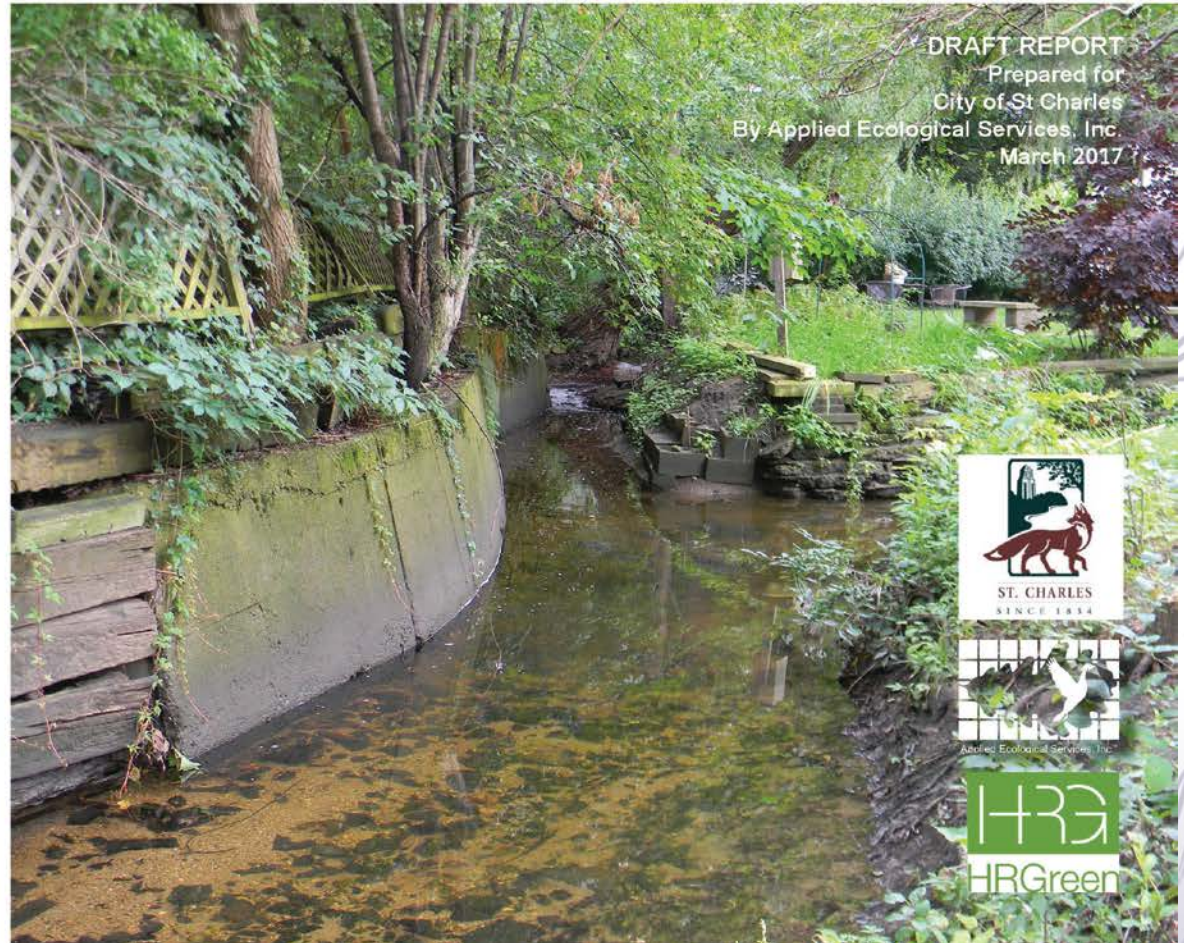


Green Infrastructure Protection Areas



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Questions?



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