

Or...A Tale of Two Cities



- Carbon Cliff, IL
- West Union, IA





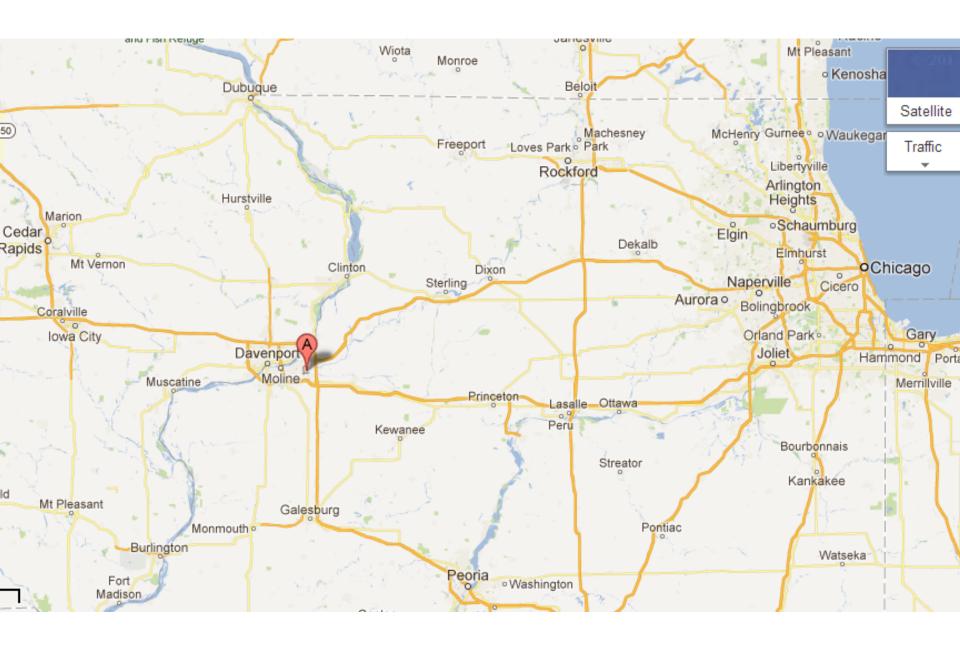
Carbon Cliff, Illinois

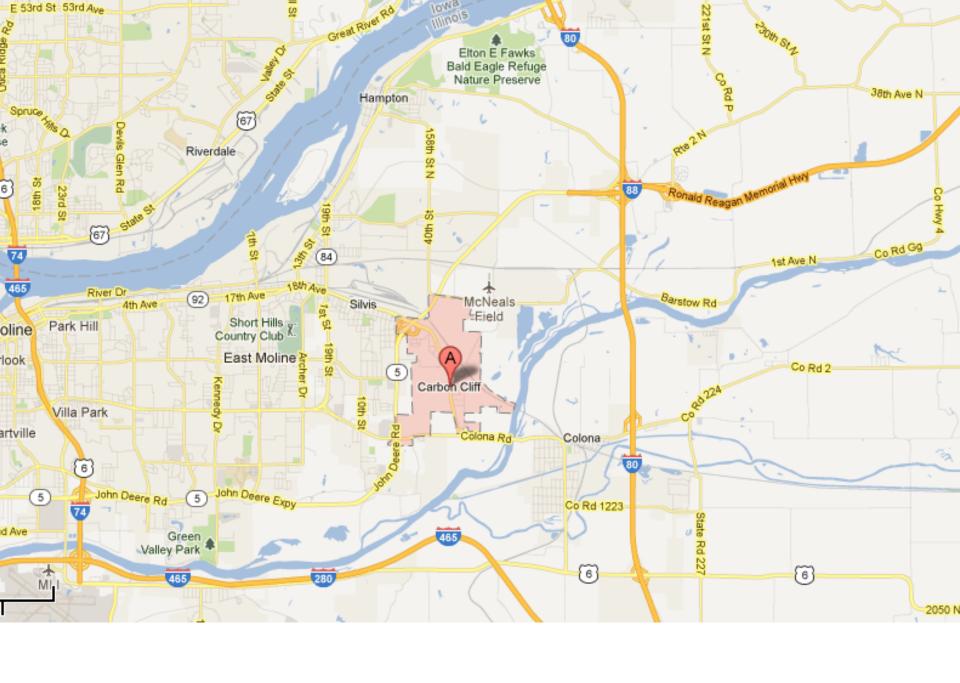
West Union, Iowa

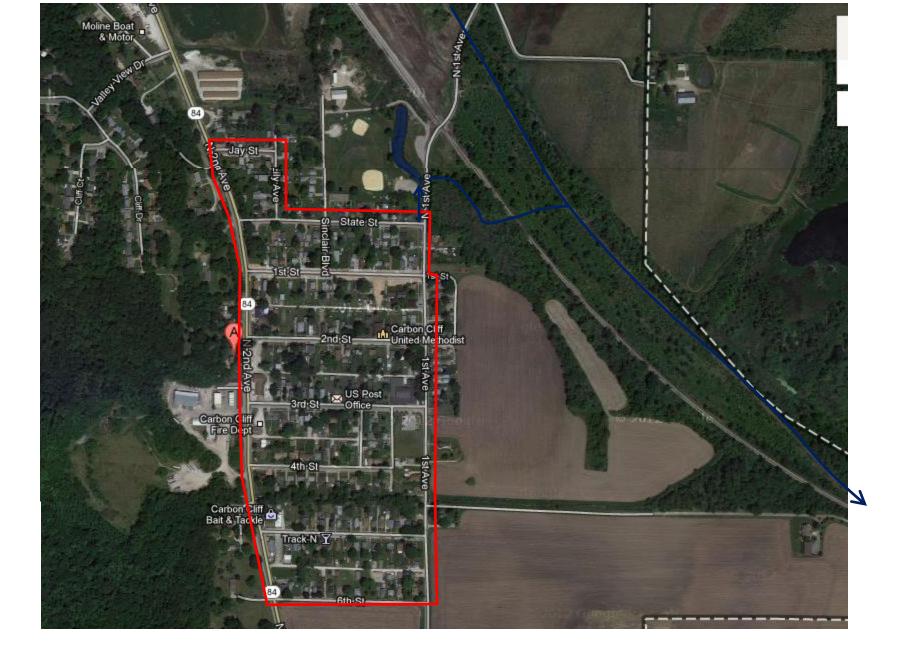




Carbon Cliff Permeable Streets

















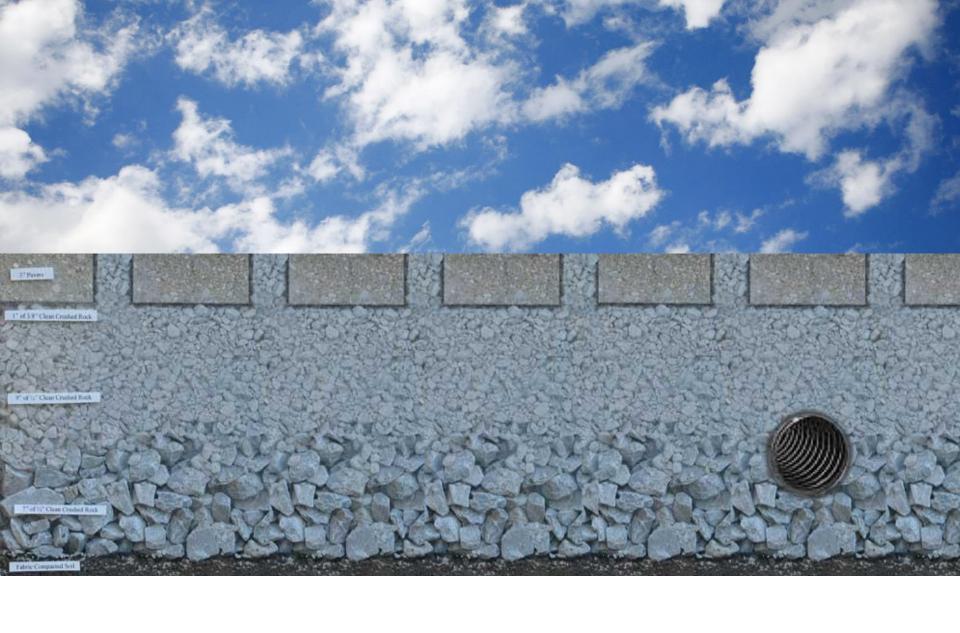


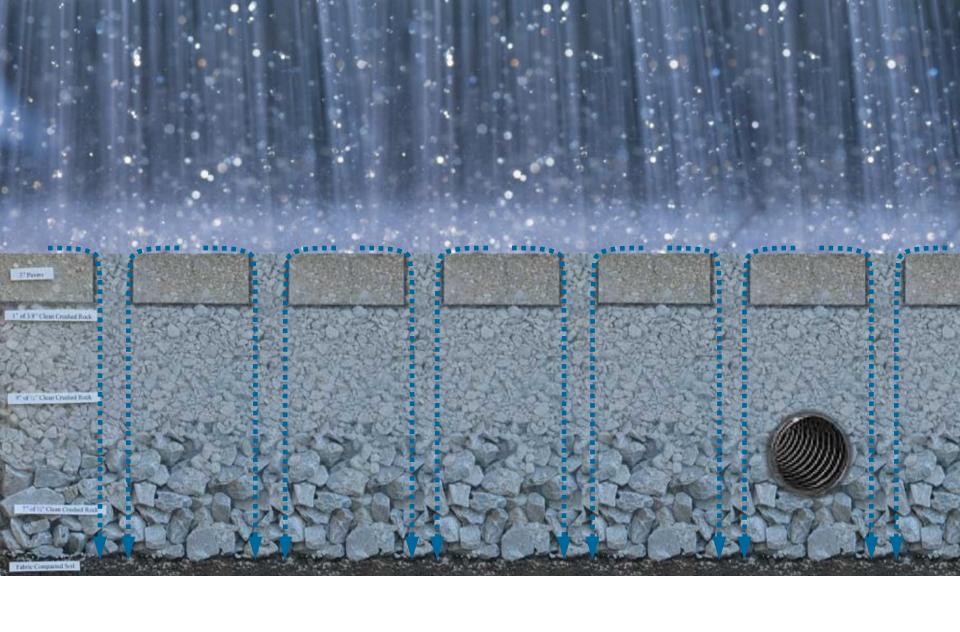


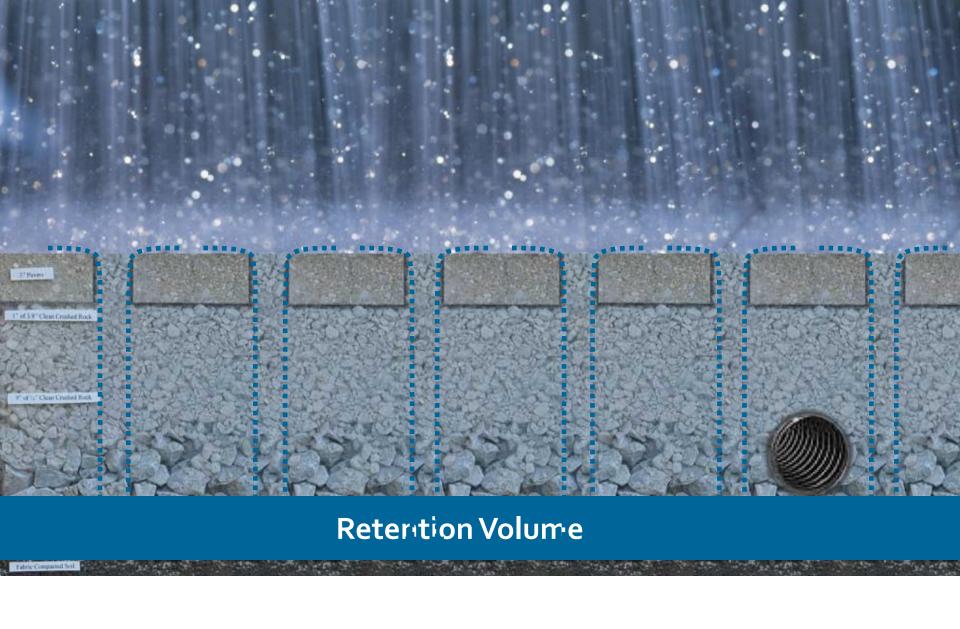


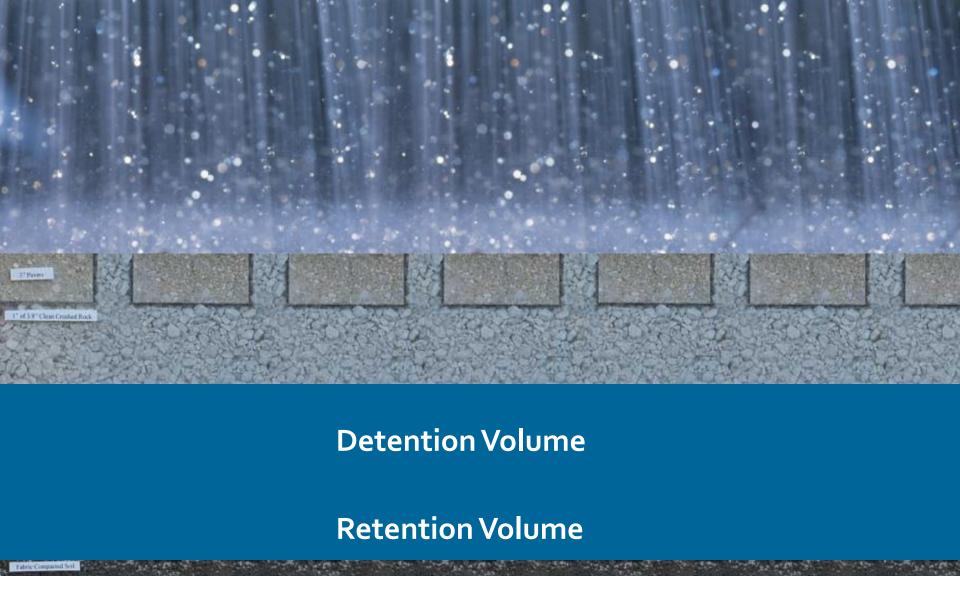
Permeable pavement

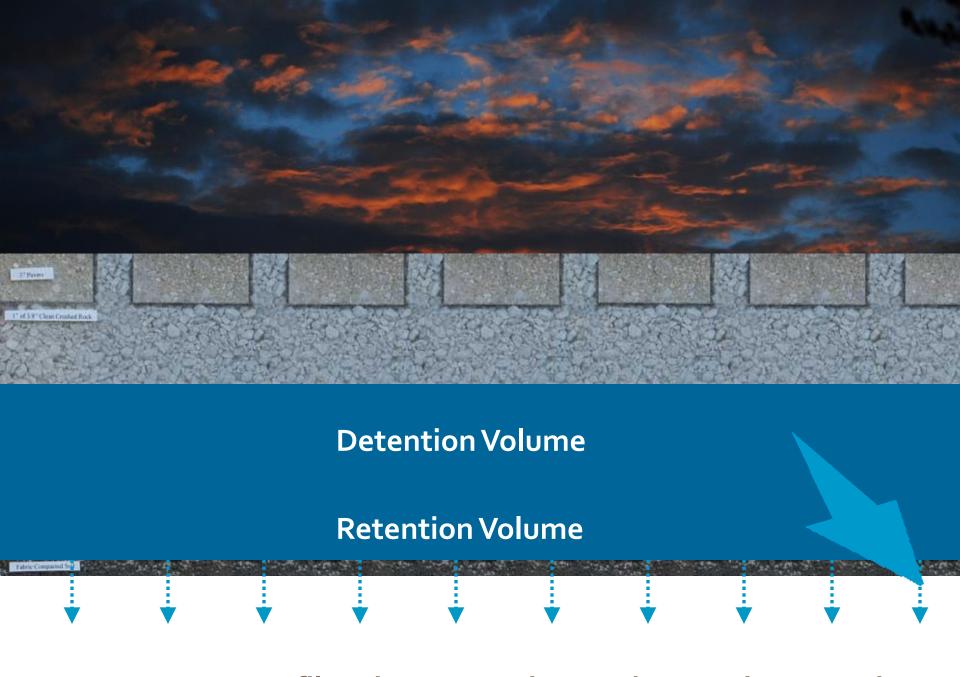




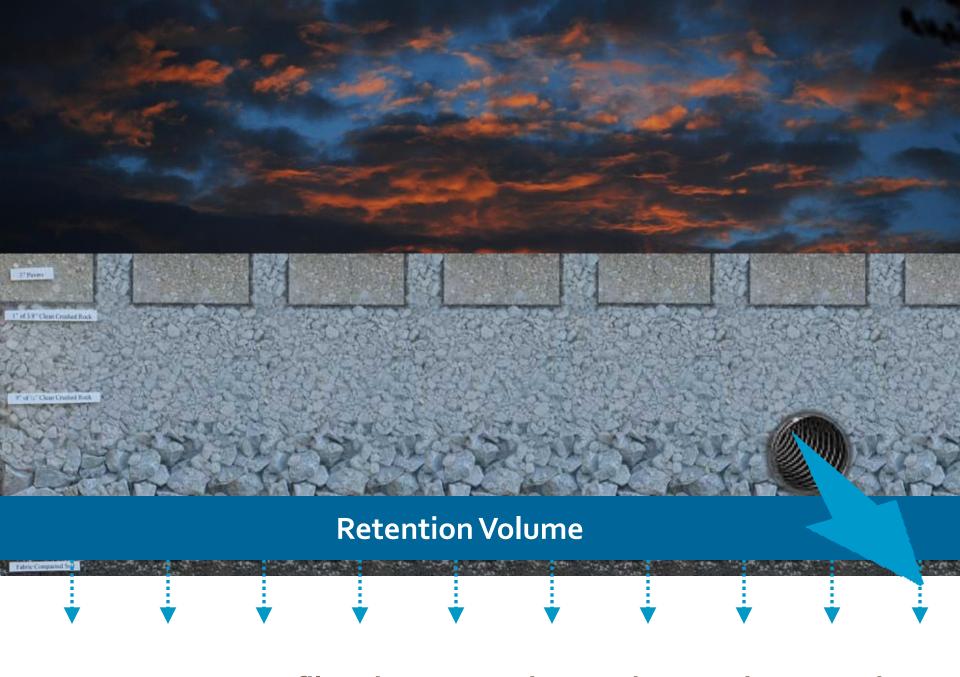




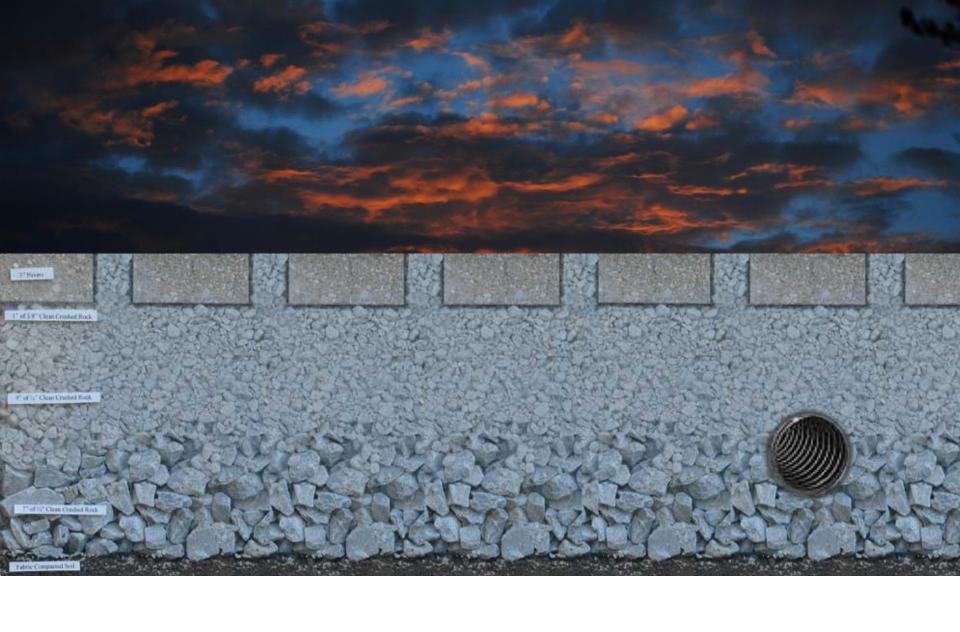




Porous Pavement: Infiltration (Retention) and Detention Capacity



Porous Pavement: Infiltration (Retention) and Detention Capacity





Overbank flooding? – probably not



Nuisance Pond? – definitely yes



Under Capacity Storm Sewers? – probably yes



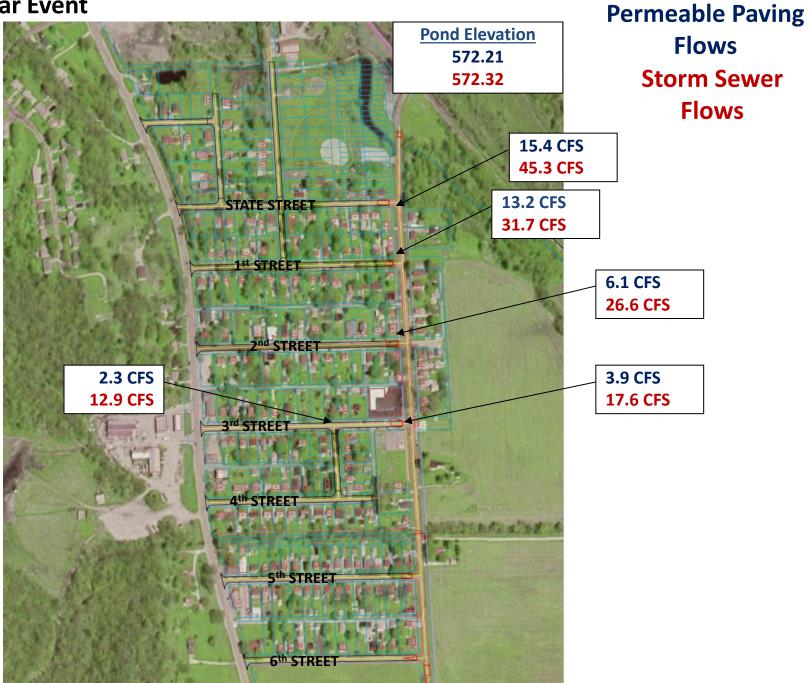
Urban Pollutants? – definitely yes



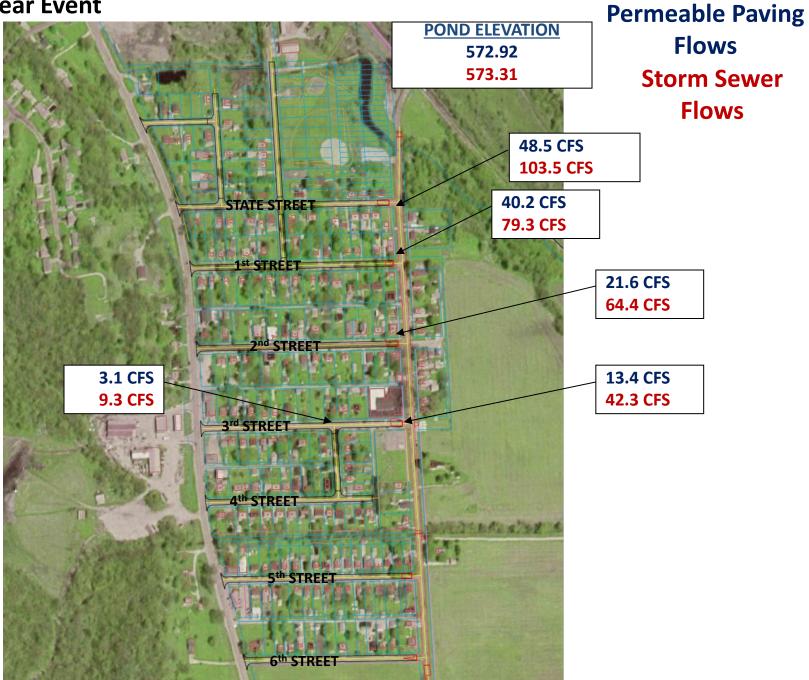
Streambank Erosion? – probably yes

2-Year Event **Permeable Paving Pond Elevation Flows** 571.12 571.48 **Storm Sewer Flows** 3.1 CFS **17.1 CFS 2.9 CFS** STATE STREET **13.0 CFS** 1st STREET 0.97 CFS 11.1 CFS 2nd STREET 0.31 CFS 0.64 CFS **5.4 CFS 7.4 CFS** 4th STREET design along

10-Year Event



100-Year Event

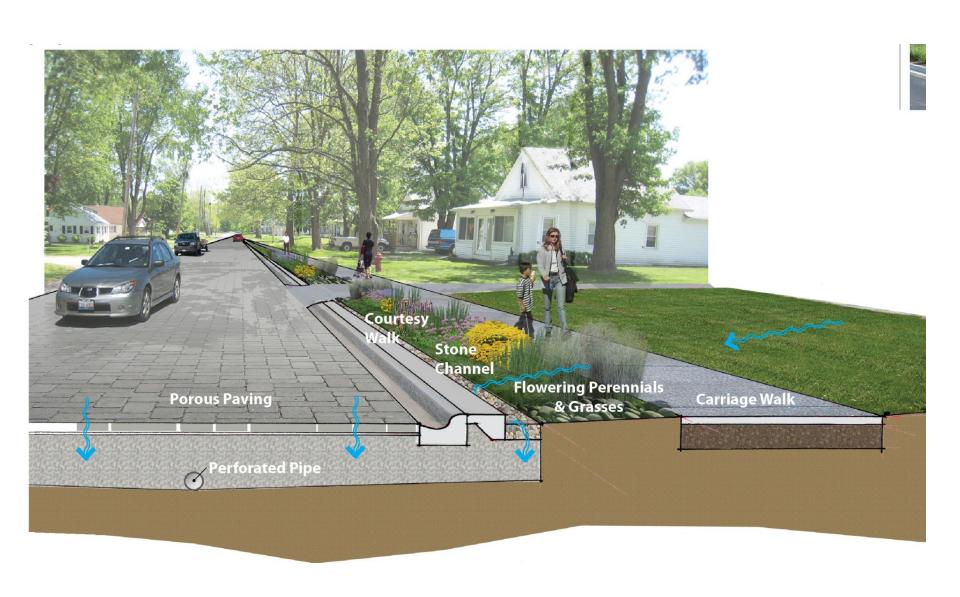




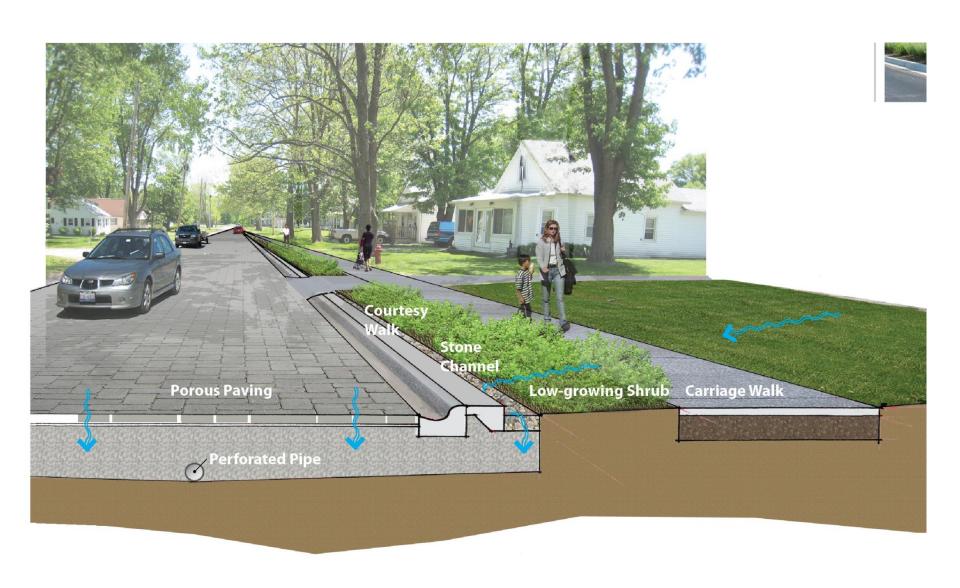
Existing Conditions



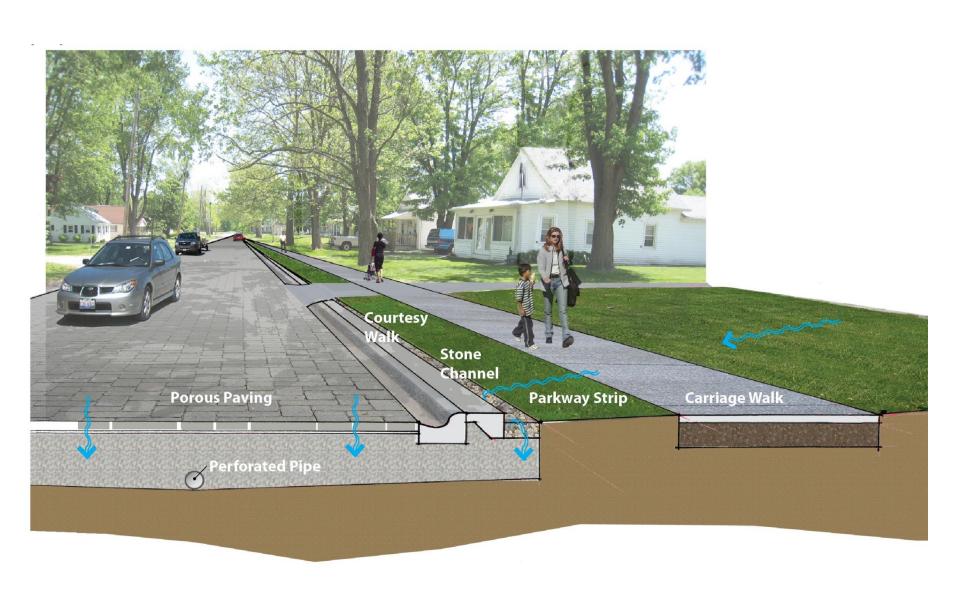
Proposed Alternate 1



Proposed Alternate 2: perennial edge



Proposed Alternate 2: shrub edge



Proposed Alternate 2: turf edge



Phase 1

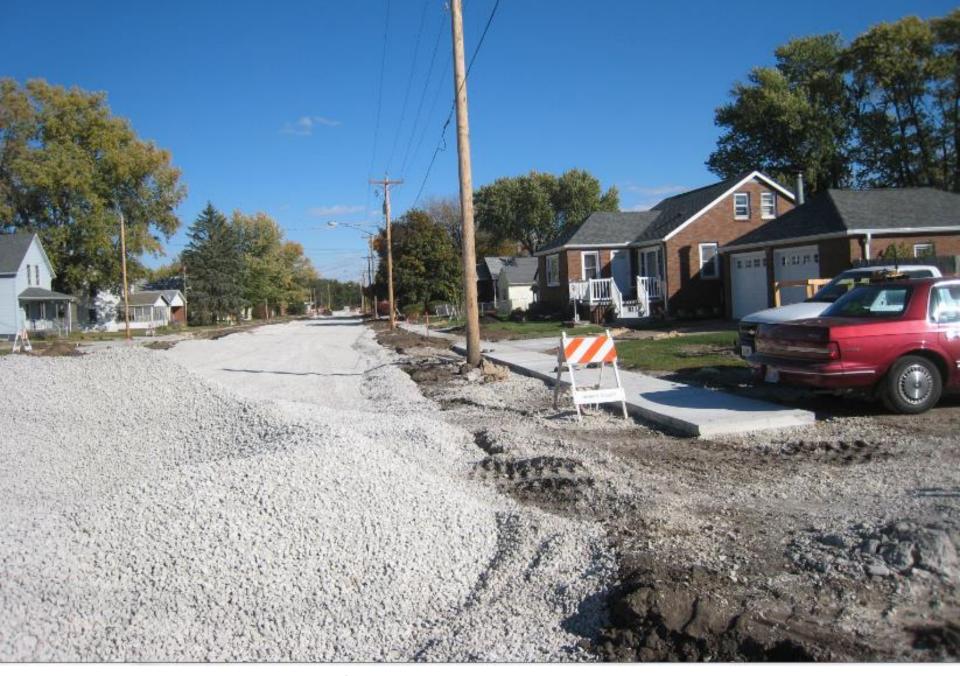
Phase 2



Construction Begins



Removal of the impervious streets



Laying down the subsurface gravel



Laying down the permeable paver units



Construction complete

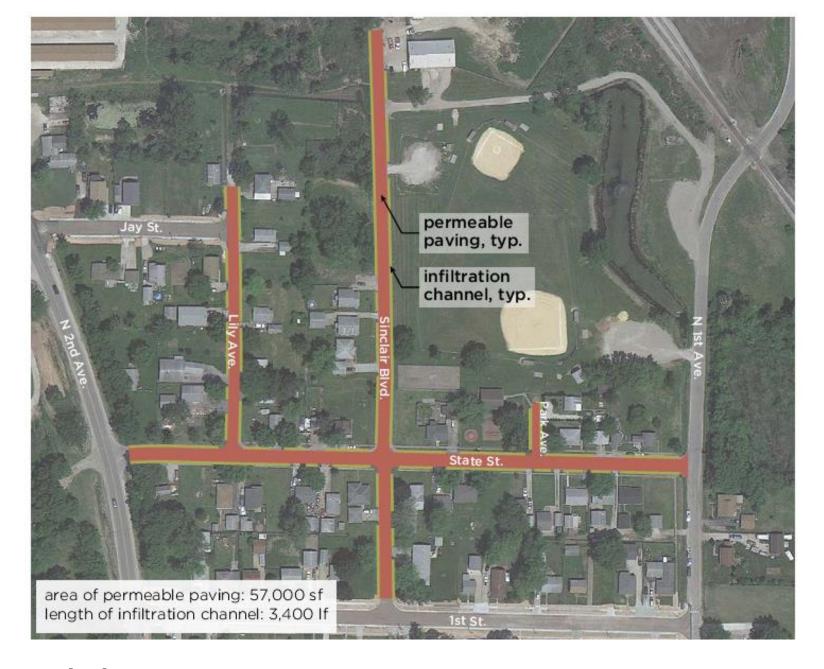


Carbon Cliff streetscape - **before** and **after**

	Pre-Project	Post-Project	% Reduction
Threshold Event	0.05"	1.10"	-
2-Year Event (2.91" rain)			
Runoff Volume (inches)	1.09	0.22	80%
Peak Flow (cfs)	5.4	0.3	94%
10-Year Event (4.31" rain)			
Runoff Volume (inches)	2.18	1.24	43%
Peak Flow (cfs)	8.8	2.0	77%
100-Year Event (6.36" rain)			
Runoff Volume (inches)	4.43	3.44	22%
Peak Flow (cfs)	21.9	6.0	73%

Summary of Results

Phase 2 (10.4 acres)



Proposed Phase 3



Iowa Green Streets Pilot Project

West Union, Iowa

Population: 2,500

Client: Iowa Economic Development Authority & City of West Union

Agency Partnerships: IDALS, USDA, DCA, IDPH, DOT, DNR, DOE, SWCD, EPA,

IEC, UIU,

Completion: 2013

Awards: Iowa ASLA Merit Award, 2015

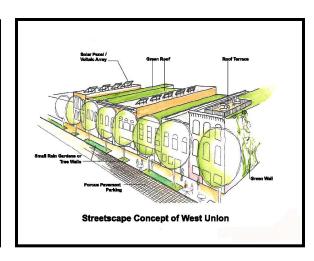
1000 Friends of Iowa Best Development Award, 2014

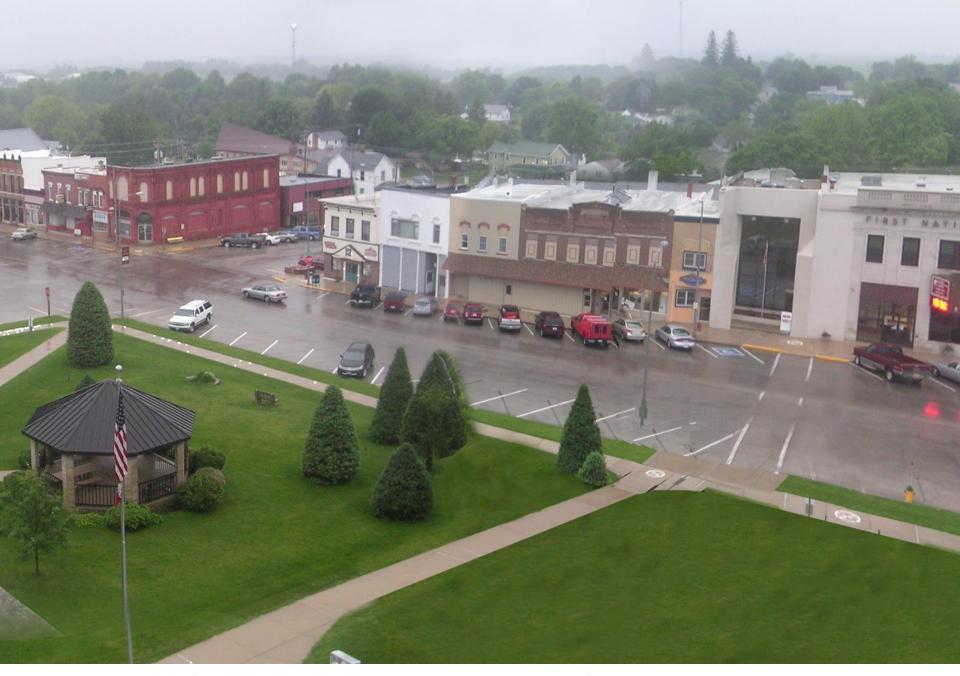
Unilock Award of Excellence, Best Permeable Streetscape, 2014







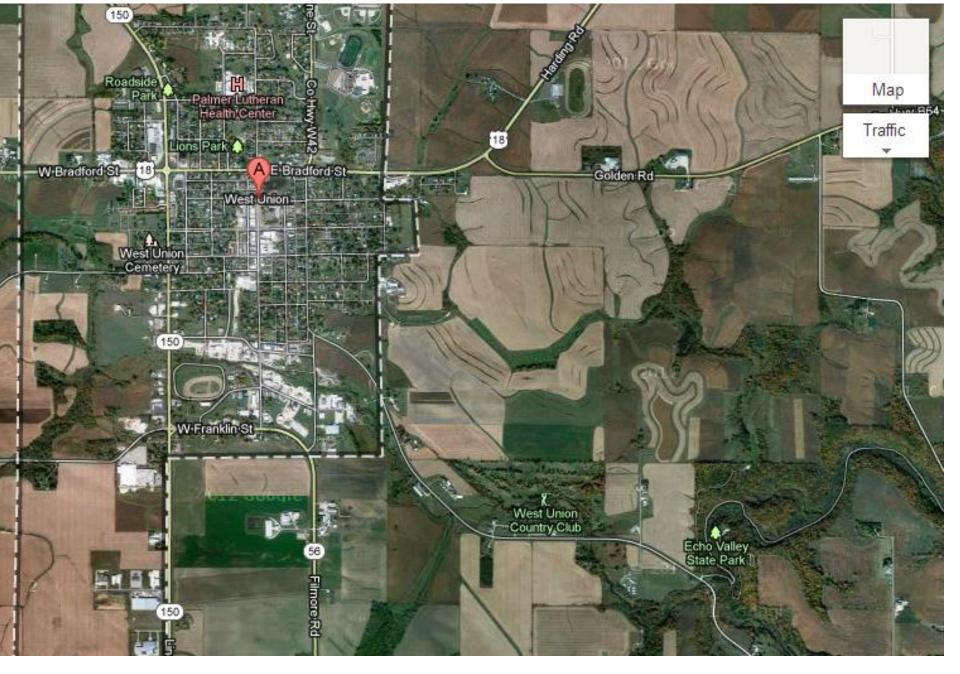




Aerial view of Downtown West Union - Before

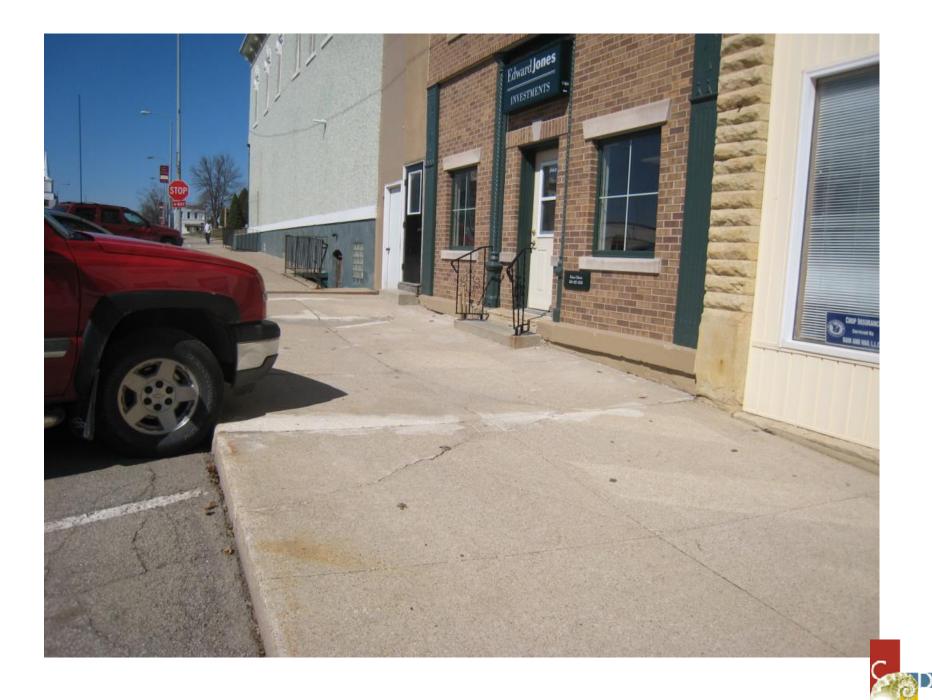


Community workshops



West Union – the headwaters of Otter Creek













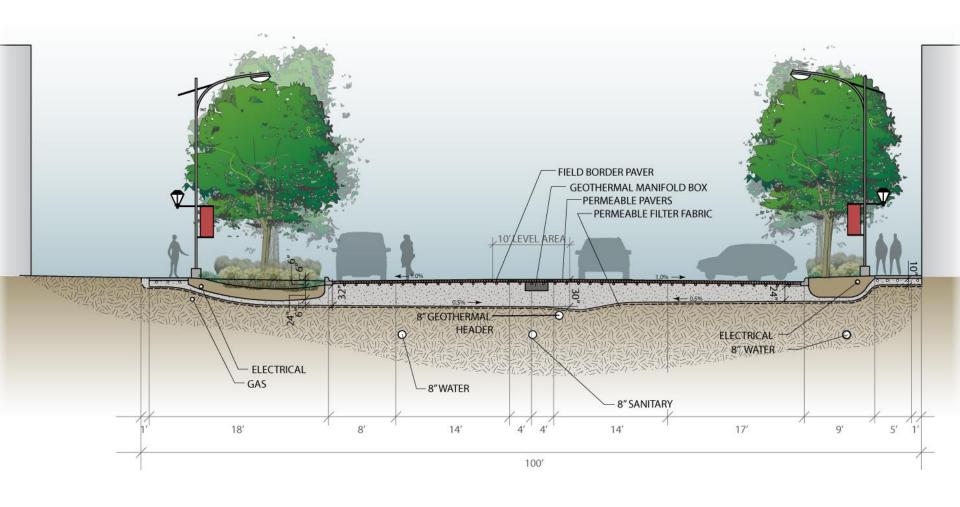








Downtown Streetscape Master Plan



Street Section



Street Permeable Paver: *Eco-Optilock*



Sidewalk Permeable Paver: *Eco-Prioria*



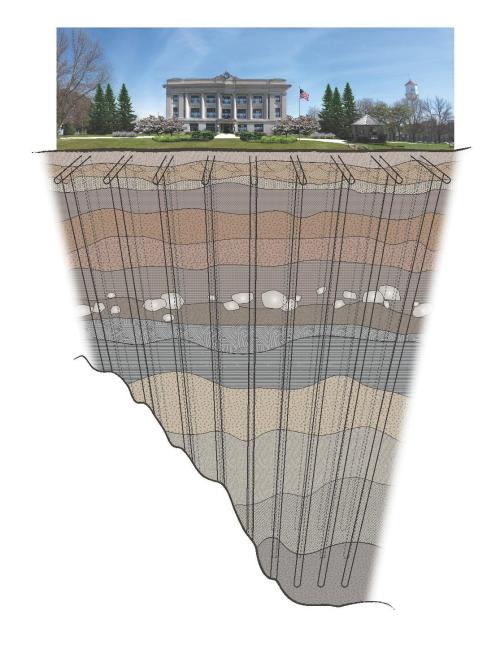
Bioretention Areas



Stormwater Materials



Rain gardens and permeable pavement to collect, infiltrate, and cool stormwater



District-Wide Geothermal System





West Union Streetscape - Under Construction -> Complete



West Union streetscape - before and after





West Union streetscape - before and after



Plantings along the street for bioretention

	Pre-Project	Post-Project	% Reduction
Threshold Event	0.05"	1"	-
2-Year Event (2.91" rain)			
Runoff Volume (inches)	2.2	1.38	37%
Peak Flow (cfs)	19.2	3.8	80%
10-Year Event (4.31" rain)			
Runoff Volume (inches)	3.49	2.53	28%
Peak Flow (cfs)	29.8	5.8	81%
100-Year Event (6.36" rain)			
Runoff Volume (inches)	5.44	4.35	20%
Peak Flow (cfs)	45.8	8.3	82%

Summary of Results





The revitalized downtown is now regularly utilized by the community for all sorts of events and celebrations.



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