Neighborhood Solutions to Wetter Weather

Approaches to Green Infrastructure Planning at the Neighborhood Level

Presented by:

Jeff Wickenkamp, PE, CFM, D.WRE

Hey and Associates, Inc.

Engineering, Ecology and Landscape Architecture

Metropolitan Planning Commission and Openlands

Roundtable Session
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How is Green Infrastructure Typically Get Implemented?

- Municipal Projects
- Stormwater or Environmental Planning and Visioning
- Community Outreach, Programs or Incentives
- New or Modified Regulations

Specified locations or ROW based projects

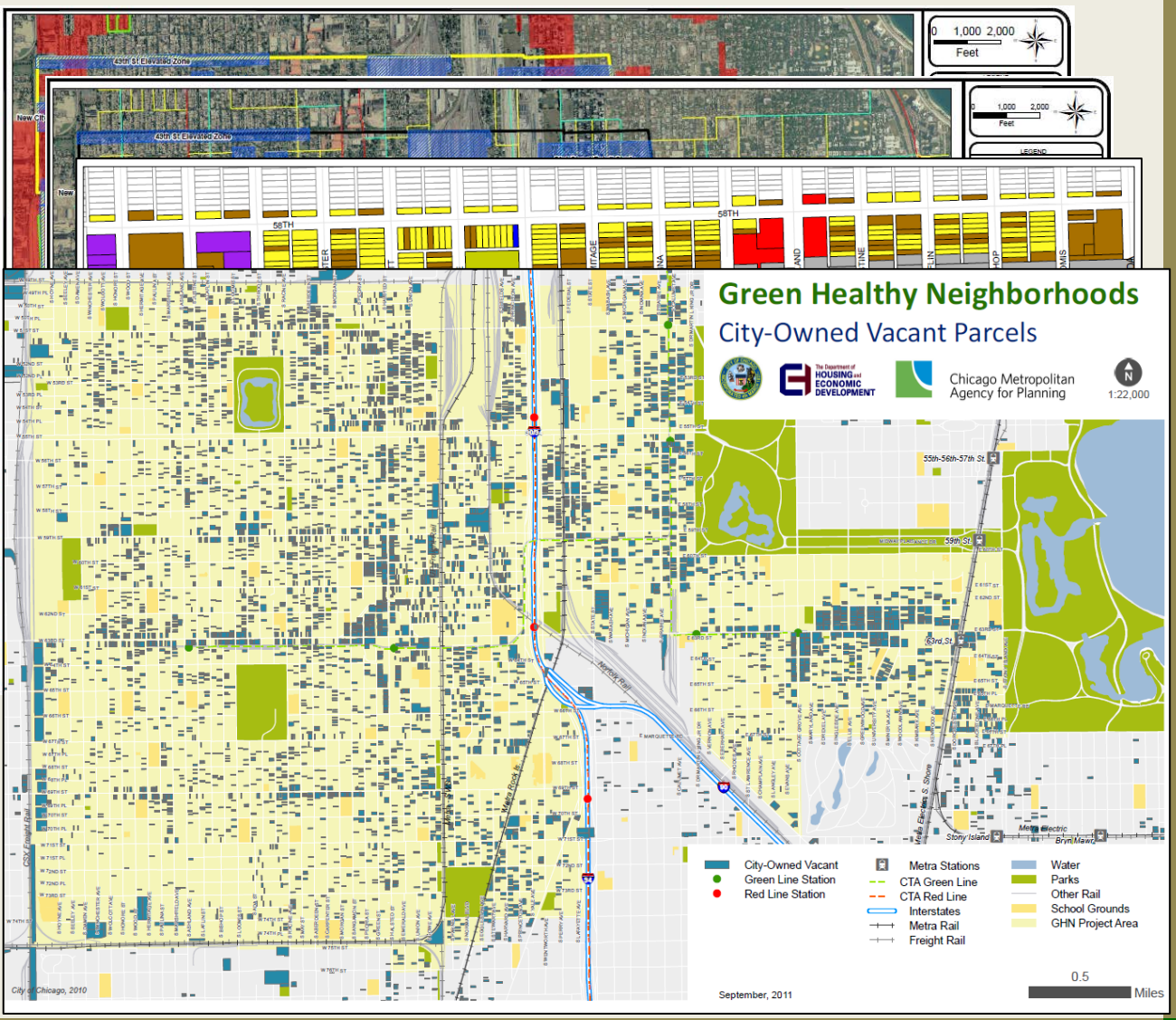
Distributed facilities to be implemented by others or as part of future projects

Implemented as part of future development

Green Infrastructure Site Selection: Chicago Green Healthy Neighborhoods

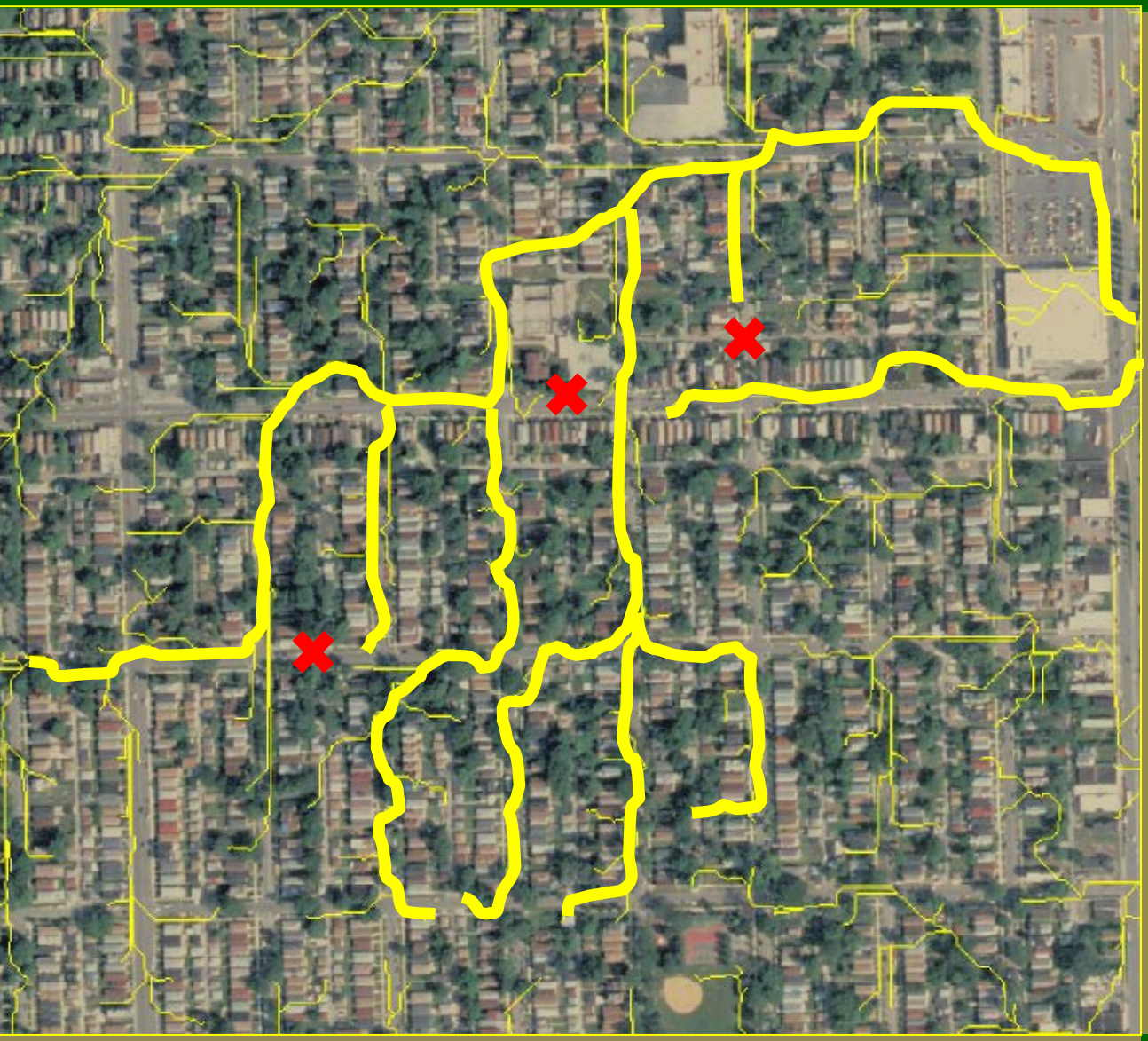
- Identify locations and opportunities for green infrastructure
- Objectives:
  - Improve sewer performance
  - Reduce on-street flooding
  - Enhance urban landscape

Analyze Study Area through compilation of available GIS layers



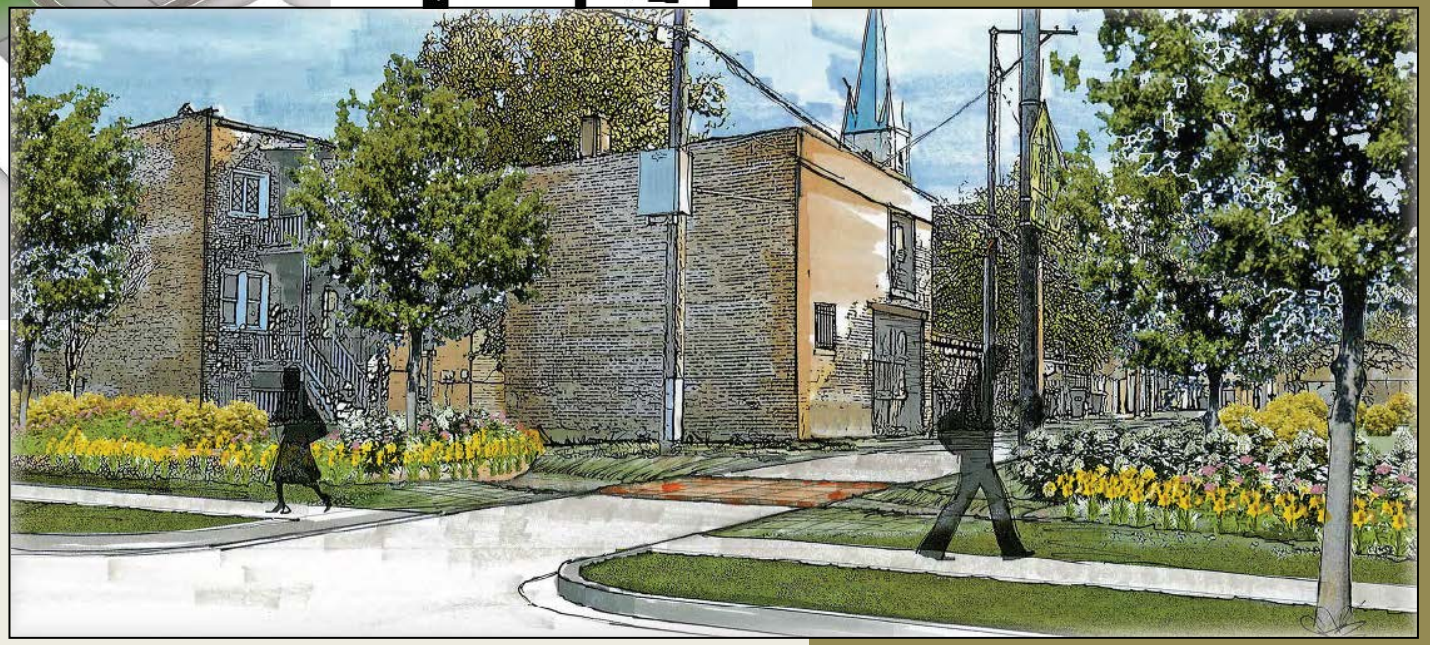
1. Flooding complaints
2. Sewer diameter or capacity
3. Catch basins
4. Soil types/ infiltration rates
5. Environmental hazards
6. Vacant lots/ municipal property

Conduct Overland Flowpath Analysis

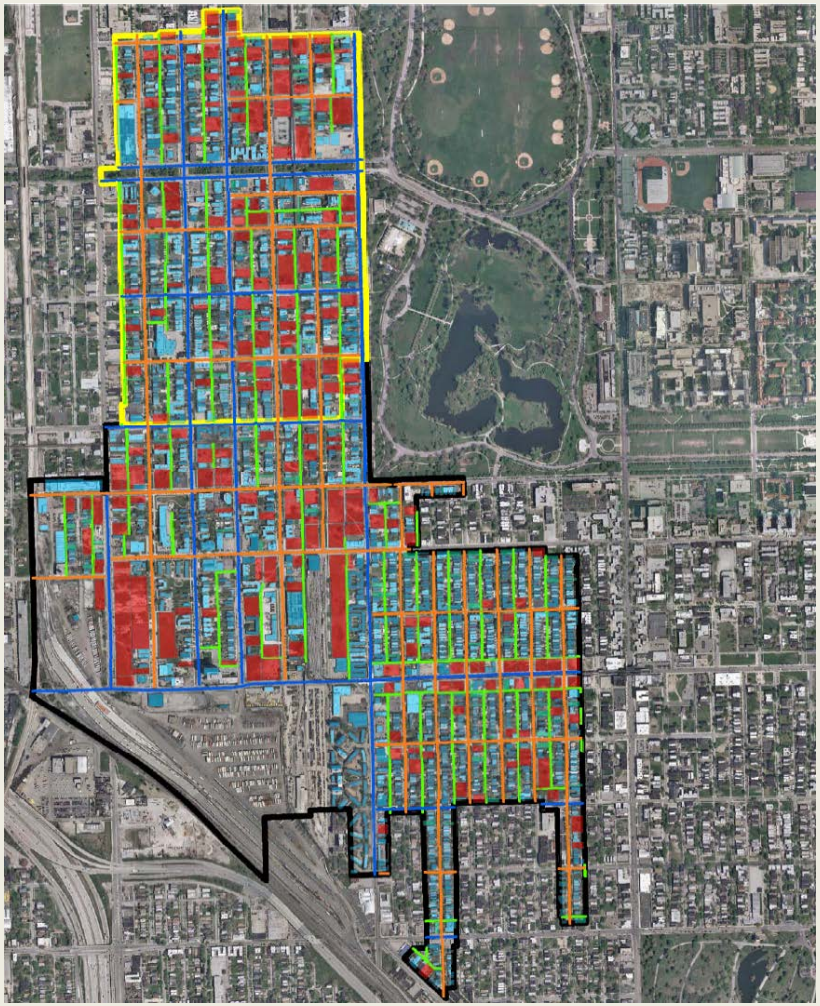


Prepare flowpath analysis using Arc Hydro tools in GIS.

End of Alley Rain Gardens

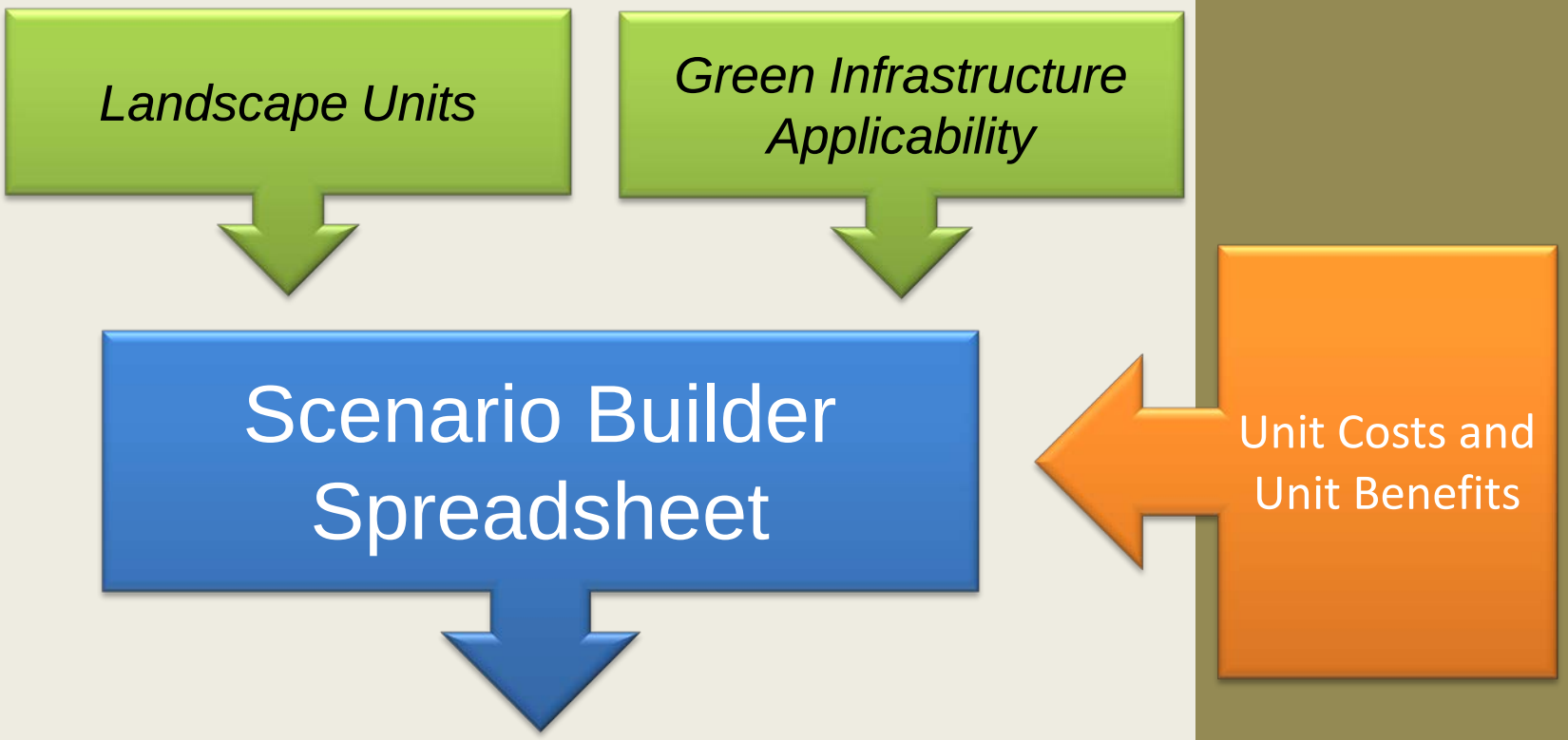


Green Infrastructure Planning Tool: Chicago Woodlawn / Washington Park



Prepare concepts for neighborhood level green infrastructure implementation.

Green Infrastructure Scenario Builder



Landscape Units

Landscape Unit	Percent
Private Property	68%
Alleys	2%
Local Streets	7%
Vacant Lots < 7,500 SF	1%
Vacant Lots > 7,500 SF	15%
Arterial/ Collector Streets	7%
Total	**100%**

Green Infrastructure Applicability

Type	Green Infrastructure Technique	Recommended Implementation of Techniques on Landscape Units					
		Private Property Retrofits	Alleys	Local Streets	Vacant Property not subject to Stormwater Ordinance (<7,500 SF)	Vacant Property potentially subject to Stormwater Ordinance (>7,500 SF)	Arterial/ Collector Streets
Source Control	Green Roofs	✓				✓	
	Naturalized Landscaping	✓			✓	✓	
	Trees	✓		✓	✓	✓	TBD
	Downspout Disconnection	✓				✓	
Capture and Reuse	Rain Barrels	✓					
	Cisterns					✓	
Storage (infiltration or Controlled Release)	Rain Garden	✓			✓		
	Stormwater Planter/Tree Pit						TBD
	Bioinfiltration Facility				✓	✓	
	Bioinfiltration Swale (parkway implementation)			✓			TBD
	Stormwater Bumpout			✓			TBD
	Permeable Pavement		✓	✓		✓	TBD
	Detention Basin					✓	

SCENARIO BUILDER

Neigborhood:	Woodlawn/Washington Park
Area of Study (acres)	680.8

Performance:		
Detention Created	3.18	acre-feet
Retention/Infiltration Created	5.23	acre-feet
Total Runoff Reduction (inches over watershed)	0.15	inches
Percent Reduction of 2-year Runoff Volume:	7.4%	
Annual Reduction in Runoff Volume:	0.0%	

Cost:	
Total Cost:	$ 2,406,043
Cost to private developers:	$ 327,166
Cost to existing property owners:	$ 236,031
Cost of public improvements:	$ 1,842,846

Value	
Cost per CF of Storage	$ 6.566

Landscape Unit	Percent of Total Area	Quantity	Units	Green Roofs		Naturalized Landscaping		Trees		Downspout Disconnection		Rain Barrels		Rain Ga	
Private Property Retrofits	68.3%	1,773	properties	0%	Percent of existing private properties to install a green roof.	10%	Percent of existing private properties to convert 10% of property to naturalized landscaping	10%	Percent of existing private properties to plant one tree.	25%	Percent of existing private properties to disconnect downspouts.	10%	Percent of existing private properties to install one rain barrel.	10%	Perc prop a 10 rain
Alleys	2.0%	49,975	linear feet												
Local Streets	6.9%	56,662	linear feet					2	How many new trees per block will be planted?						
Vacant Property not subject to Stormwater Ordinance (<7,500 SF)	1.4%	9.3	acres			10%	Percent of vacant land converted from gravel/bare soil to to naturalized landscaping	1	How many new trees per vacant lot will be planted?					10%	Perc vaca a 10 gard
Vacant Property potentially subject to Stormwater Ordinance (>7,500 SF)	14.7%	100.1	acres												
Arterial/ Collector Streets	6.8%	40,931	linear feet					-	TBD						

Scenario Comparison

	Scenario				
Performance:	**Existing Private Property**	**Private Development**	**Public Right-of-Way**	**Public Vacant Land**	**All**
Detention Created (acre-feet)	0.00	1.80	2.31	0.00	3.18
Retention/Infiltration Created (acre-feet)	1.31	0.38	2.75	1.25	5.23
Total Runoff Reduction (inches over watershed)	0.02	0.04	0.09	0.02	0.15
Percent Reduction of 2-year Runoff Volume:	1%	1.9%	4.5%	1.1%	7.4%
Annual Reduction in Runoff Volume:	0%	0.0%	0.0%	0.0%	0%
Cost:					
Total Cost:	$236,031	$327,166	$1,645,667	$197,179	$2,406,043
Value					
Cost per CF of Storage	$4.12	$3.44	$10.36	$3.61	$6.57

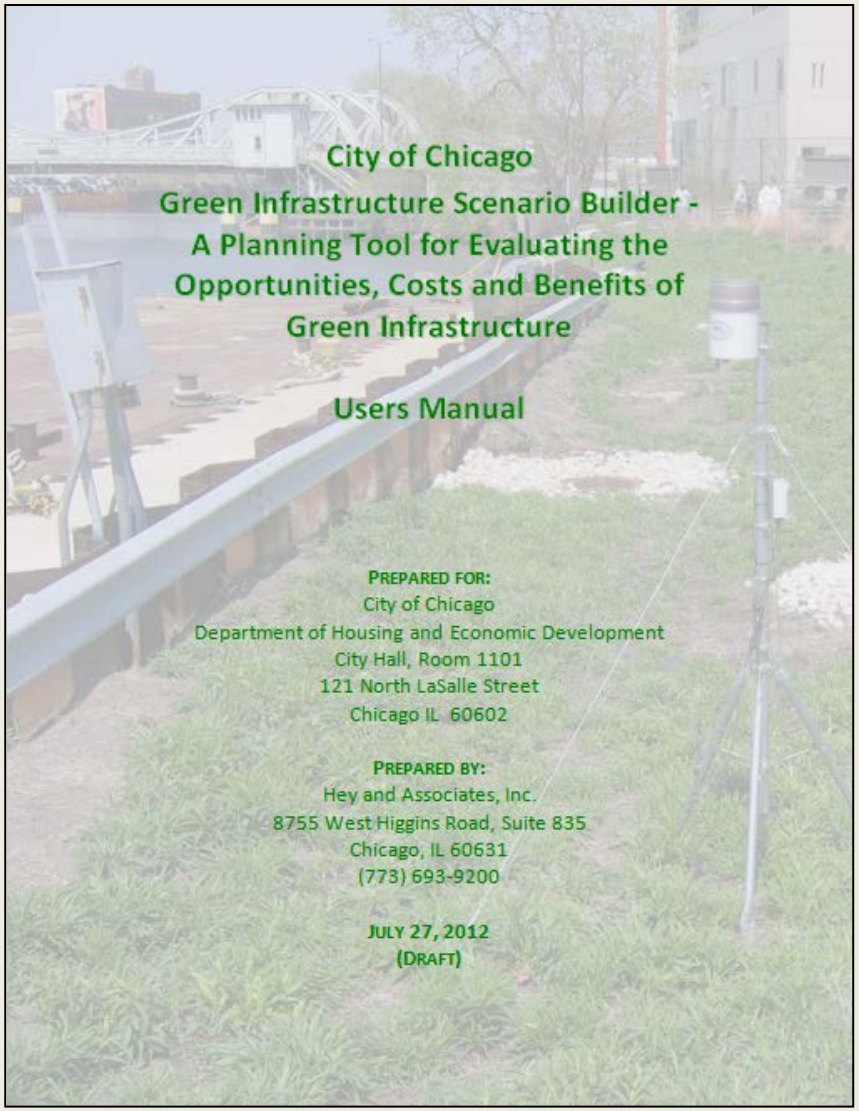
$14 to $15 per cubic foot of storage in grey infrastructure.

Green versus Grey

(for equivalent benefits)

	Green	Grey
Cost	$2,406,000	$5,490,000
Components	• 95,828 SF of naturalized plantings • 394 trees planted • 443 properties disconnect downspouts • 177 rain barrels installed • 19,024 SF of rain gardens installed • 20,211 SF of bioinfiltration facilities • 67,995 SF of bioinfiltration swales installed in parkways • 1,417 SF of bumpouts installed. • 59,970 SF converted to permeable pavement • 436,221 SF of land to be privately developed	• 12,800 feet of 7-foot wide concrete vaults

Green Infrastructure Scenario Builder



Hey and Associates, Inc.

Engineering, Ecology and Landscape Architecture
8755 W. Higgins Road, Suite 835
Chicago, Illinois 60631

Ph: 773.693.9200
Fax: 773.693.9202
chicago@heyassoc.com

Jeff Wickenkamp

773.693.9200, x11
jwickenkamp@heyassoc.com

Additional Locations

Volo

26575 W. Commerce Drive
Suite 601
Volo, IL 60073
847.740.0888
847.740.0892, fax
volo@heyassoc.com

Aurora

1444 N. Farnsworth Ave.
Suite 407
Aurora, IL 60505
630.585.8020
630.585.8022, fax
aurora@heyassoc.com

Milwaukee

9401 W. Beloit Rd, Suite 210
Milwaukee WI 53227
414.327.0440
414.327.0441, fax
milwaukee@heyassoc.com