

**APPENDIX 5. Lower Don Lands Framework Plan. Powerpoint Presentation by
Michael Van Valkenburgh and Steve Apfelbaum**

PORT LANDS ESTUARY

Toronto Waterfront Revitalization Corporation

MVVA TEAM

Team Leader

Michael Van Valkenburgh Associates, Inc.
Landscape Architects
New York, NY + Cambridge, MA

Urban Design

Greenberg Consultants, Inc.
Toronto, ON

Consulting Landscape Architect

Phillips Farevaag Smallerberg
Vancouver, BC

Architect

Behnisch Architects
Venice, CA

River Hydrologist

Limno-Tech, Inc.
Ann Arbor, MI

Regional Ecologist

Applied Ecological Services
Brodhead, WI

Microecologist

Great Eastern Ecology
New York, NY

Climate Engineer

Transsolar
New York, NY

Bridge Engineer

RFR Engineering
Paris, FR

Traffic & Transportation

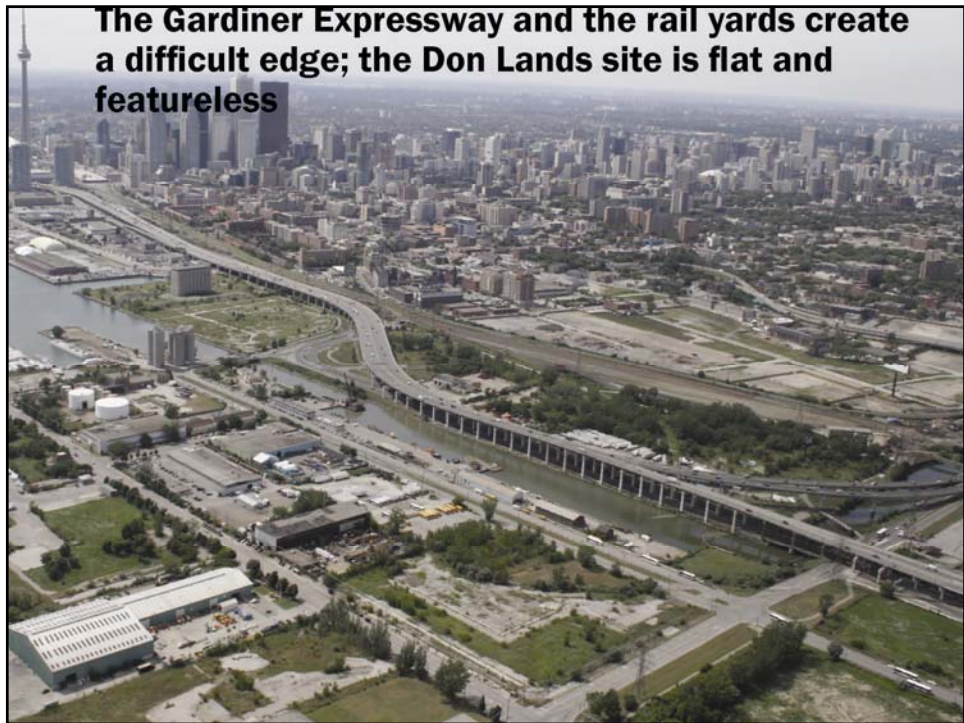
Engineer
Arup
Toronto, ON

Civil & Marine

Engineer
TSH

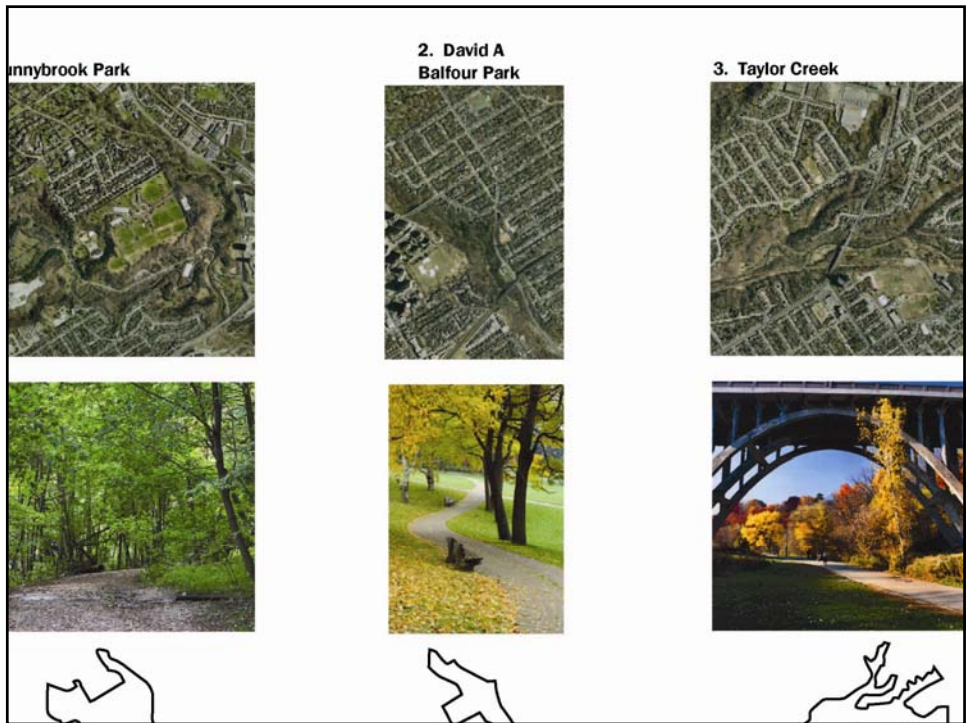
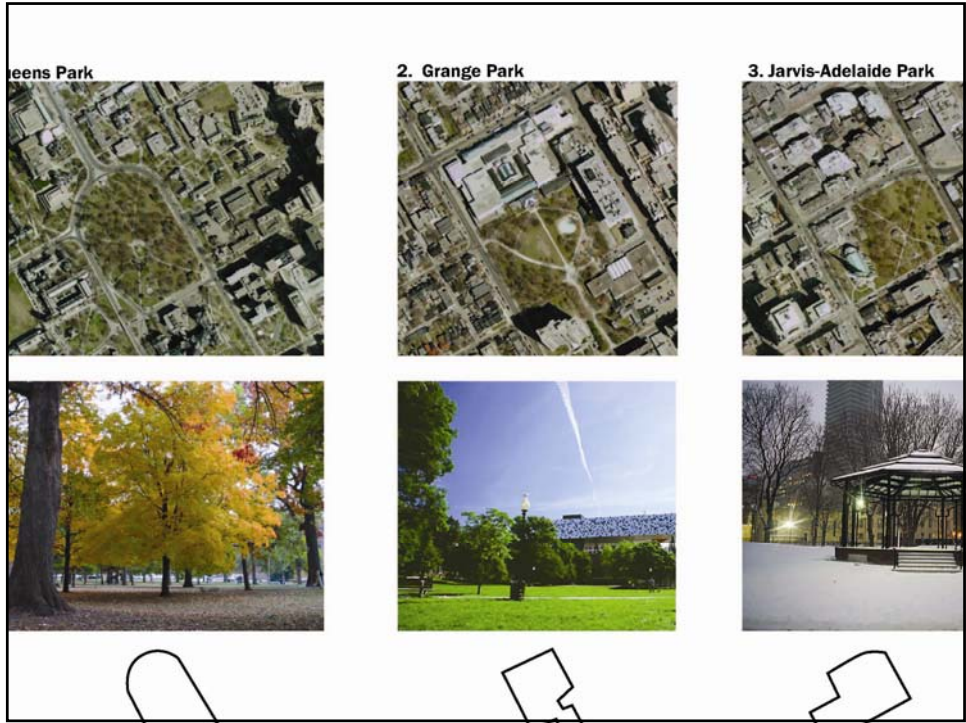




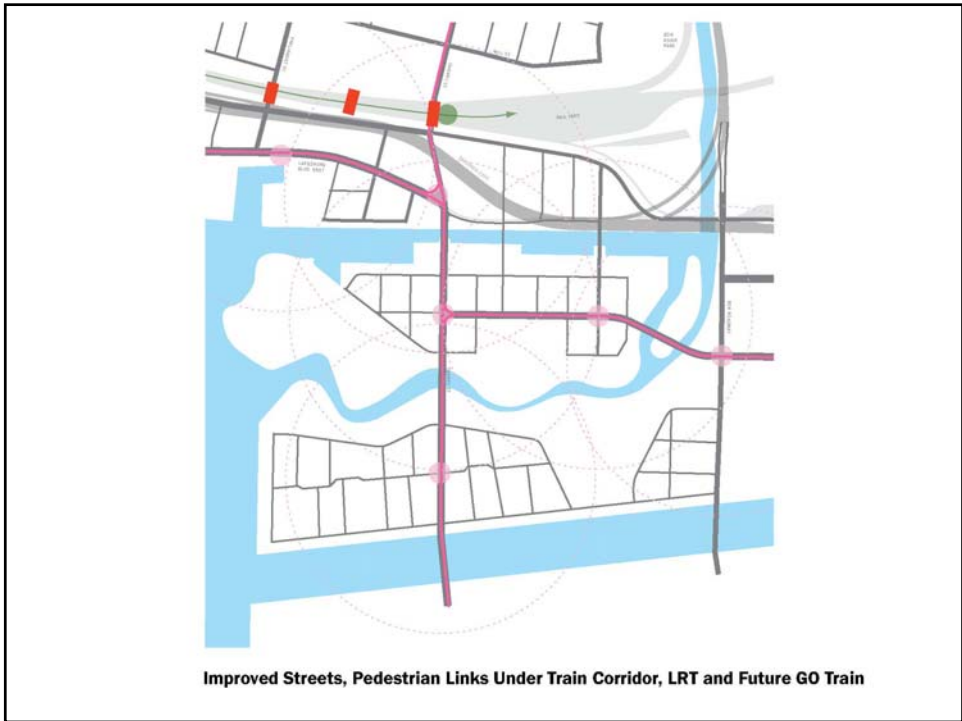




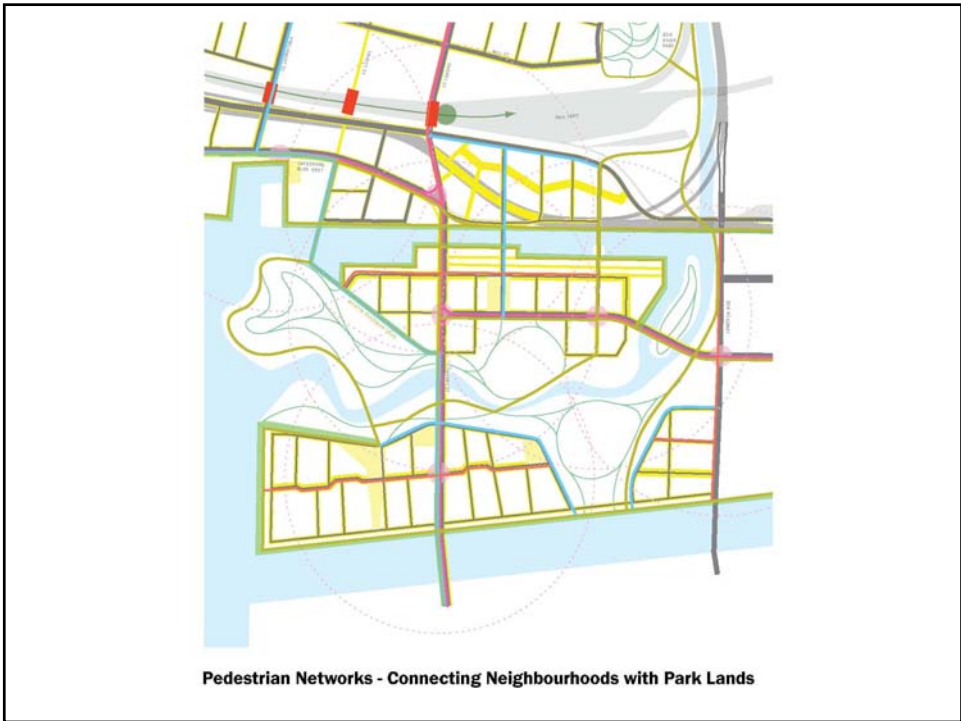
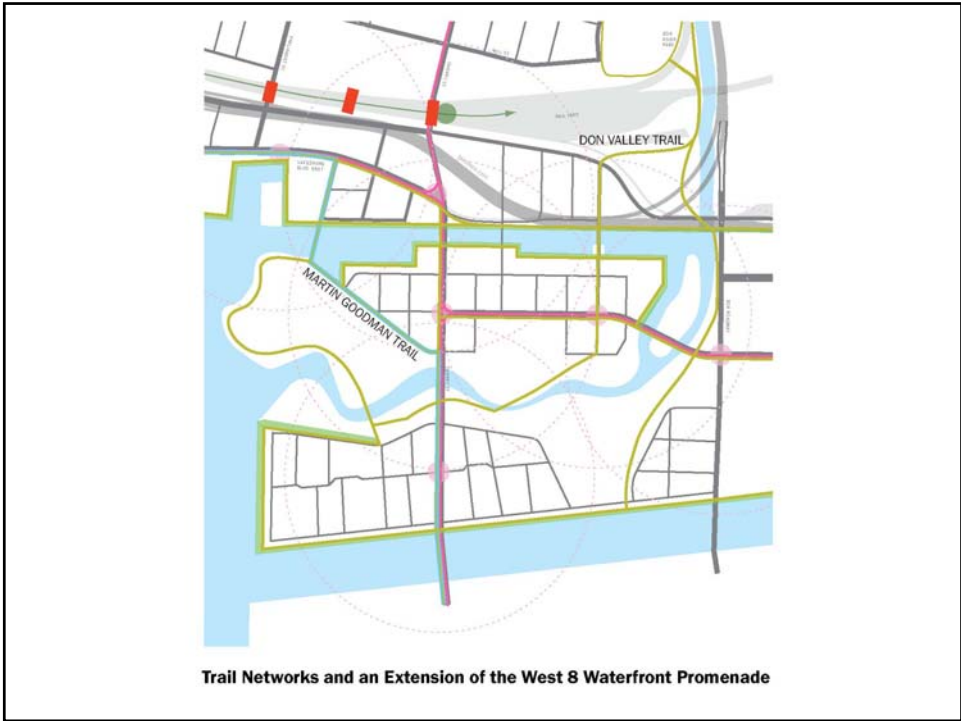
Rectangular	VS.	Organic
Withrow Park		Glen Stewart Park
Formed by City		Formed by Nature

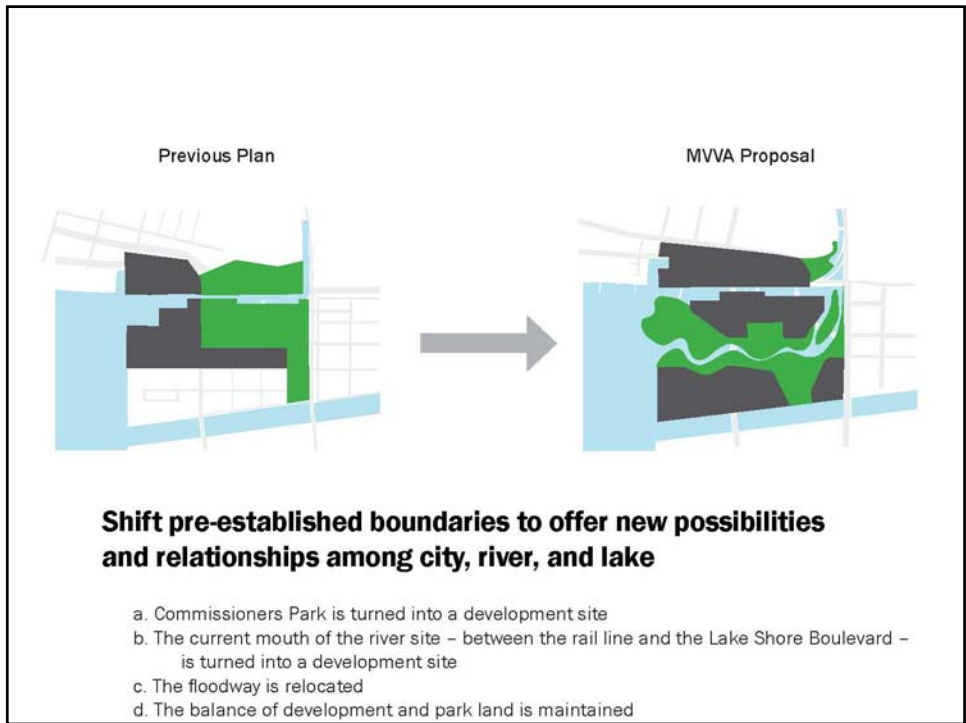


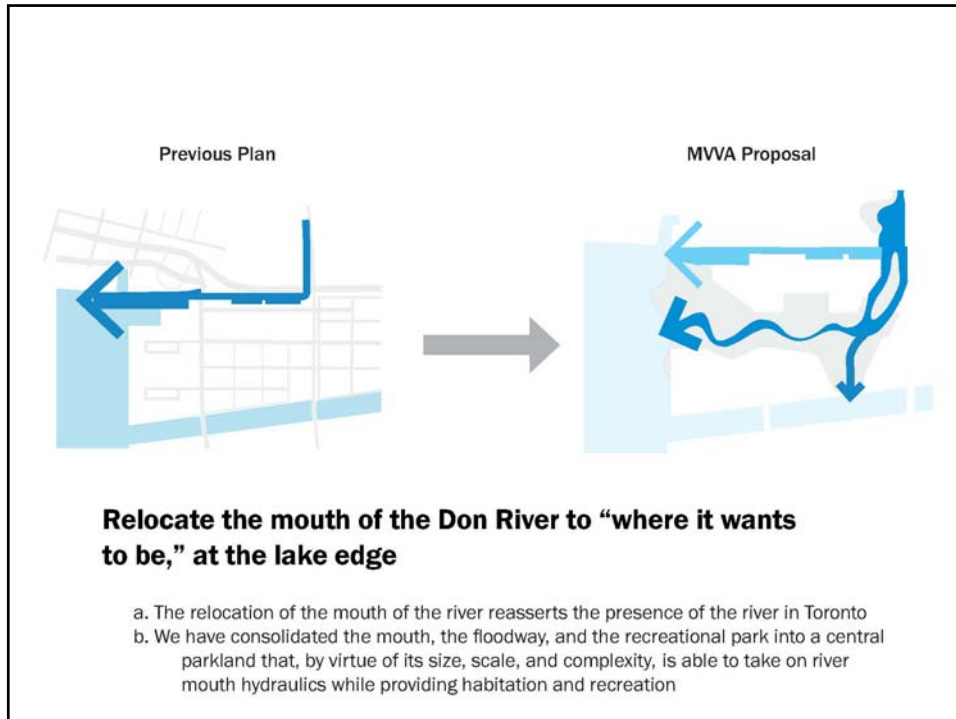


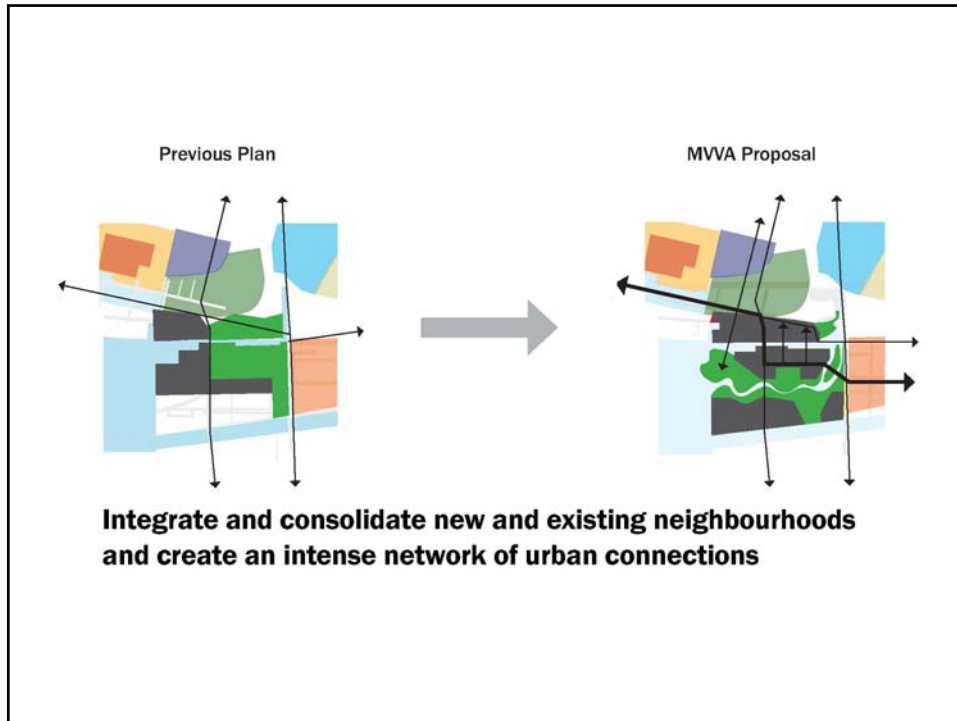


Improved Streets, Pedestrian Links Under Train Corridor, LRT and Future GO Train





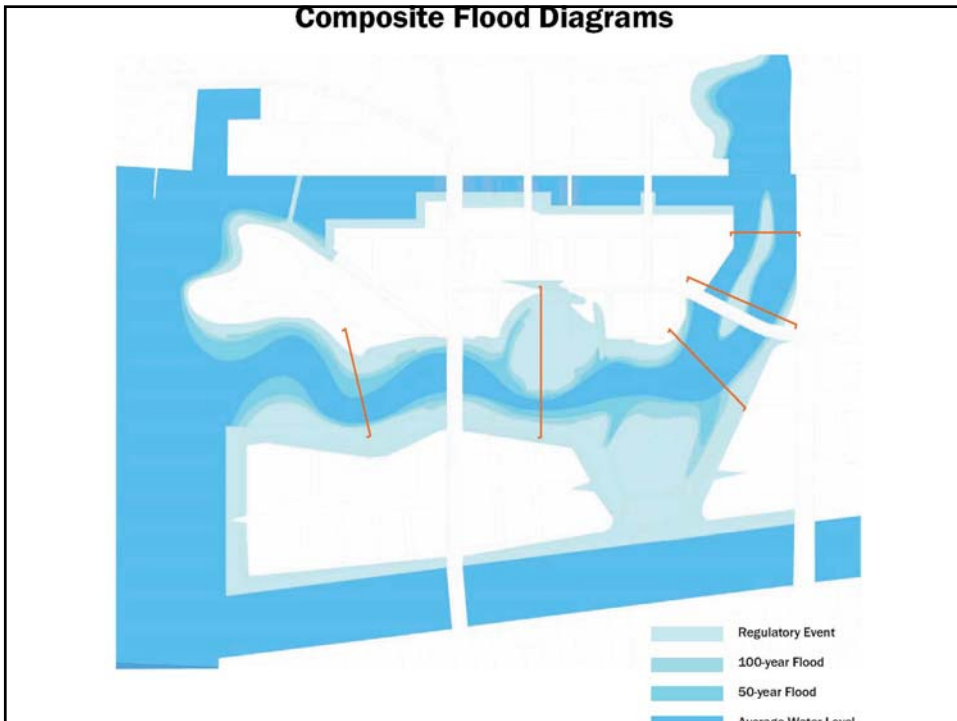




Urban Hydrology & Flood Control



Composite Flood Diagrams



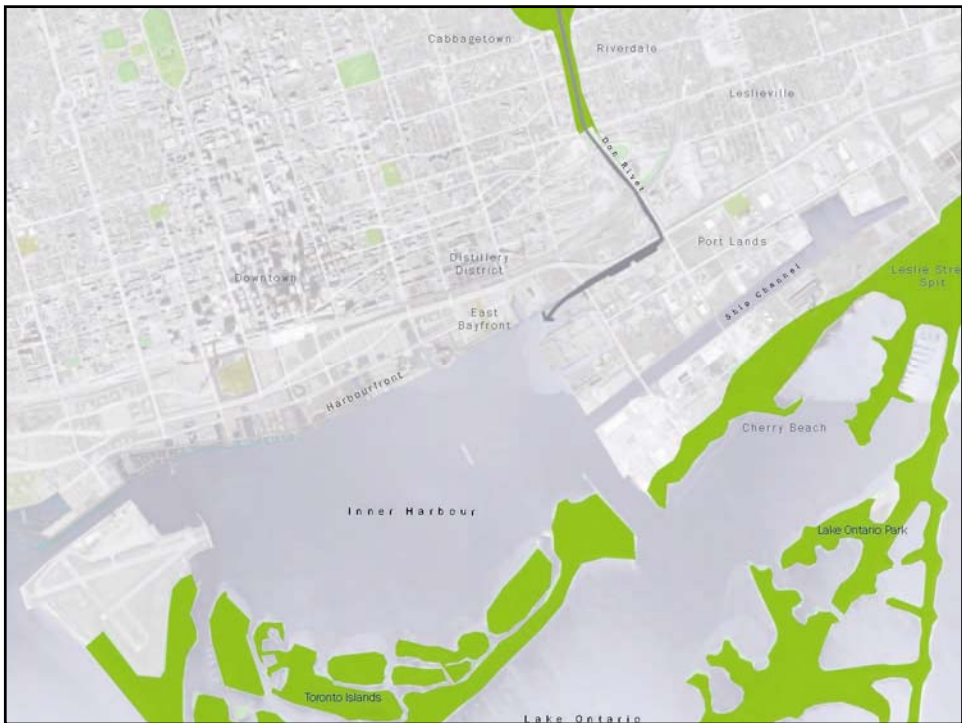


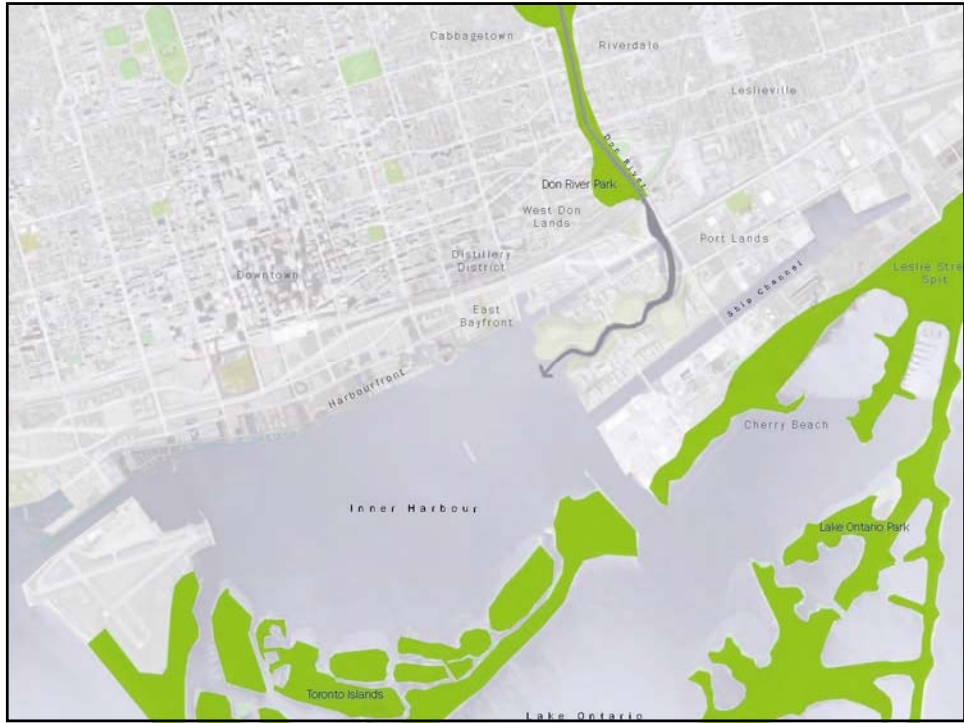
A Naturalized Don River Mouth with Diverse Ecologies



Stormwater Management







Applied Ecological Services, Inc.



Ecological Considerations at Don River Mouth

Ecological Considerations

[Our Team](#) [Our Relationships](#) [Our Projects](#) [Our Proposal](#) [Our Conclusion](#)



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ORGANIZATIONS

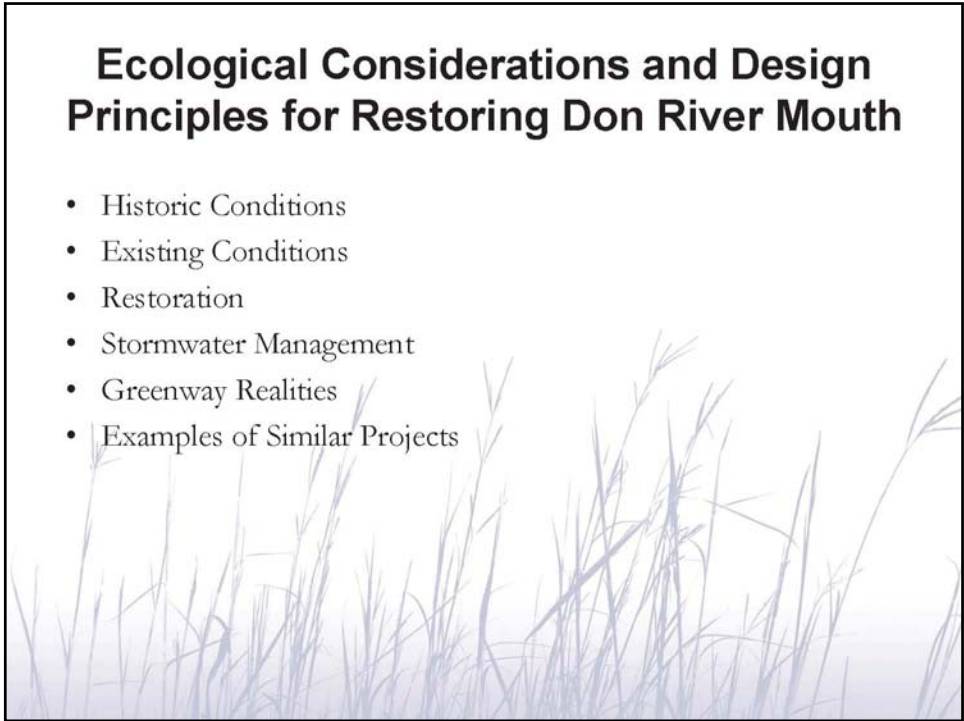
- AES consulting
- AES contracting
- Taylor Creek Restoration Nurseries

OFFICES

Brodhead, WI (MAIN)
East Dundee, IL
Prior Lake, MN
Kansas City, KS
Philadelphia, PA
Bucharest, Romania

Ecological Considerations and Design Principles for Restoring Don River Mouth

- Historic Conditions
- Existing Conditions
- Restoration
- Stormwater Management
- Greenway Realities
- Examples of Similar Projects



Ecological Considerations

Our Team | Our Relationships | Our Projects | Our Proposal | Our Conclusion

Restoring the Physiochemical and Biological Systems of a Great Lakes River Mouth



Historic Physical Systems of the Don River

- I. Long Shore Currents**
 - Deposited coarse sand materials to Barrier Islands
 - Maintained lakeward contact and alignment of marsh
- II. Growing Season Winds**
 - Cried sand shoals annually
 - Moved floatable organic materials back into marsh
 - Soiled sediments
- III. River and Seasonal Runoff**
 - Delivered sediment
 - Provided foramen to harbor and marsh
 - Buffered hydrologic/hydraulic/chemistry from watershed
- IV. Lake Level Variation**
 - Redistributed sediments and accumulated organic materials in harbor and marsh
 - Re-worked beach strands and shoals
 - Re-defined geometry of ice thrust ridge and river mouth
- V. Ice Vaulting and Thrusting**
 - Formed and stabilized beach zones and downwind locations in harbor
 - During break up, winds forced ice masses against shoreline, formed steep ridges
- VI. Thermal and Nutrient Gradients**
 - High levels of macrobenthos burrows in marsh and shallow waters over fine sediments
 - Harbor was buffered by shoals creating warmer temperatures
 - Low albedo of the marsh created temperature gradient of 25-36° C
- VII. Biodiversity**
 - Fish spawned in river, wetlands, marsh and sandy shoals
 - Fish brooding/nursery in protected marsh and harbor
 - Large populations of macroinvertebrates in harbor and marsh
 - Year round and migratory bird populations
 - Prairie and swards created unique rume and shrub communities

Historic Conditions

Ecological Considerations

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Restoring the Physiochemical and Biological Systems of a Great Lakes River Mouth



Existing Physical Systems of the Don River

- I. Long Shore Currents**
 - Currents observed take shape by tide
 - Coarse material delivery attenuated
- II. Growing Season Winds**
 - Erodes Barrier Island and sand shoals
 - Blows floatables and fines downstream into Keating's Channel and bay
 - Organic material build up in inner harbor
- III. River and Seasonal Runoff**
 - Flows, debris, sediments increasing with watershed development
 - Hydraulic variability, predictably unpredictable
 - As watershed stabilizes, increased runoff will erode river banks and channel
 - Increased fine sediments and floatables
 - Turbidity increases, reducing water quality and affecting aquatic life
- IV. Thermal/Nutrient/Contaminants**
 - Warmer runoff from developed watershed
 - Shallows poorly flushed, contaminants and nutrient loading restrict vegetation establishment and maintenance
- V. Biodiversity**
 - Loss/reducing presence of rare habitats and species
 - Species skewed towards those able to tolerate enriched and unpredictable hydrology
 - Disinverted rooted aquatic macrophyte populations collapsed
 - Turbidity restricts life systems
 - Fish spawning declines/depleted/eliminated in harbor

Existing Conditions

Restoration

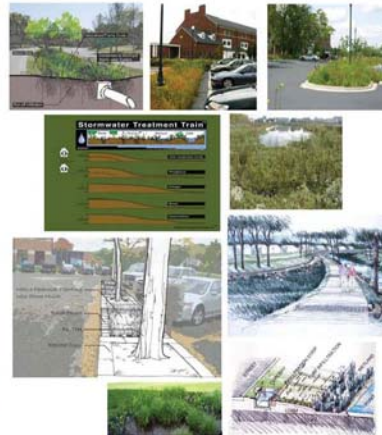


Stormwater Management

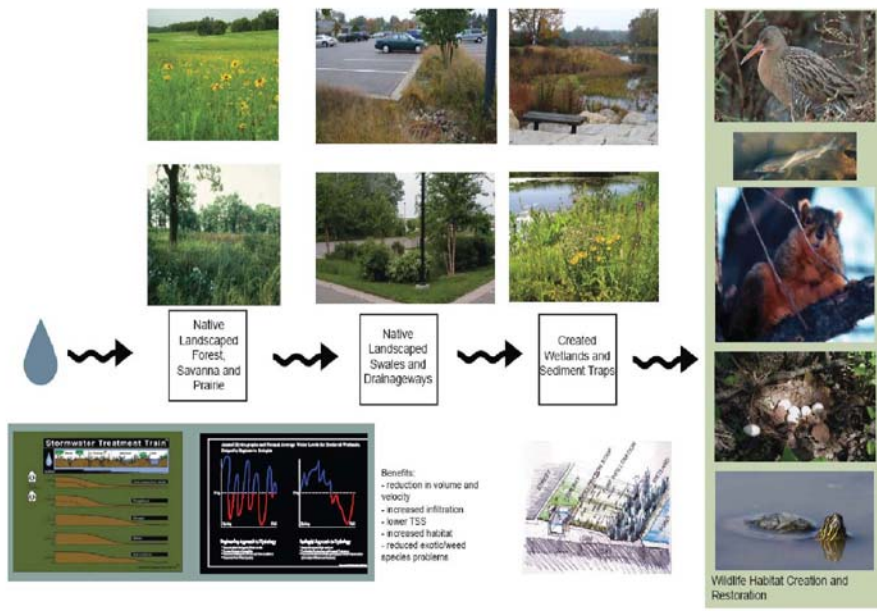
Conventional Design



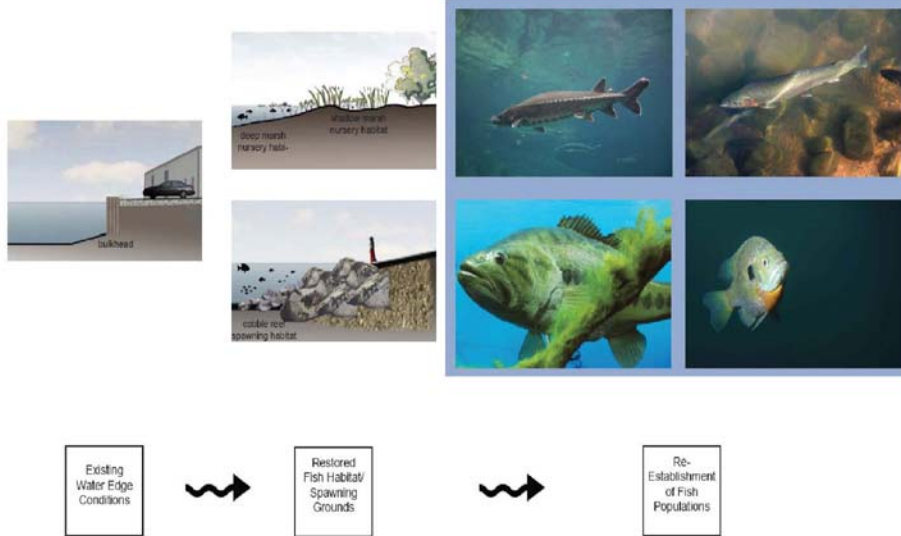
Alternative Stormwater Management



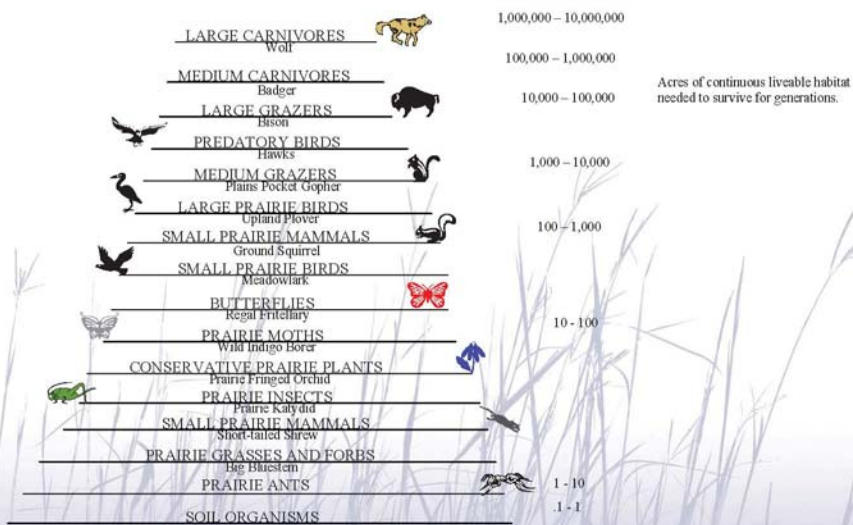
Water Quality Quantity and Volume Management: Stormwater Treatment Train



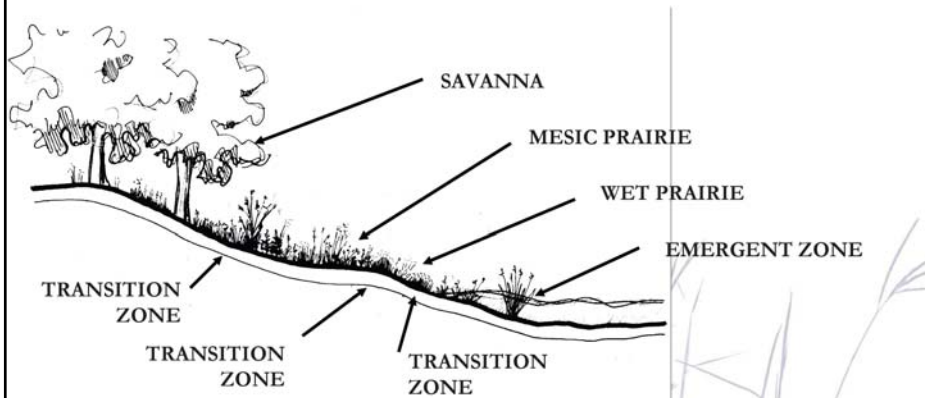
Fisheries System Restoration



Pyramid of Life—Scale Matters for Resident and Migratory Wildlife



Effective Greenways Establish Gradients of Life



In nature, a wetland community doesn't change to an upland prairie at a distinct edge. Wetlands overlap into wet prairies, which overlap into mesic prairies. Woodlands overlap into savannas, which overlap into prairies. These transition zones between communities are called ecotones, and they are among the most diverse areas of the natural world.

Scale and Gradients for Plants, Populations and Habitats



Prairie blazing star
Liatris pycnostachya
2-4' High, Blooms July-Sept

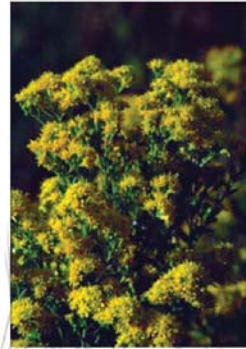


River bulrush
Scirpus fluviatilis
3-5' High, Blooms June-Aug

Appropriate Plants



Spotted Joe-pye weed
Eupatorium maculatum
2-5' High, Blooms July-Sept



Stiff goldenrod
Solidago rigida
1-4' High, Blooms July-Oct

Scale, Appropriate Habitat to Address Pests in Design



The mosquito

- Produce a new generation in about 2 weeks
- Generally need stagnant shady water to breed
- Prime breeding habit includes storm sewers, bird baths, old tires, and anywhere water pools and sits protected from wind
- Freshened Water supply

Natural Enemies of Mosquitoes

Bt (*Bacillus thuringiensis*
subsp. *israelensis*)

- Naturally occurring bacterial disease of insects
- Commercial products include Mosquito Dunks and Mosquito Bits

- Are encouraged by maintaining diverse plant species
- Can be attracted by building houses for them



Bat



Dragonfly

- Nymphs are voracious aquatic predators
- Feed mainly on aquatic insects like mosquito larvae



Purple Martin
and Feeding Swallows