NATURAL SYSTEMS UTILITIES

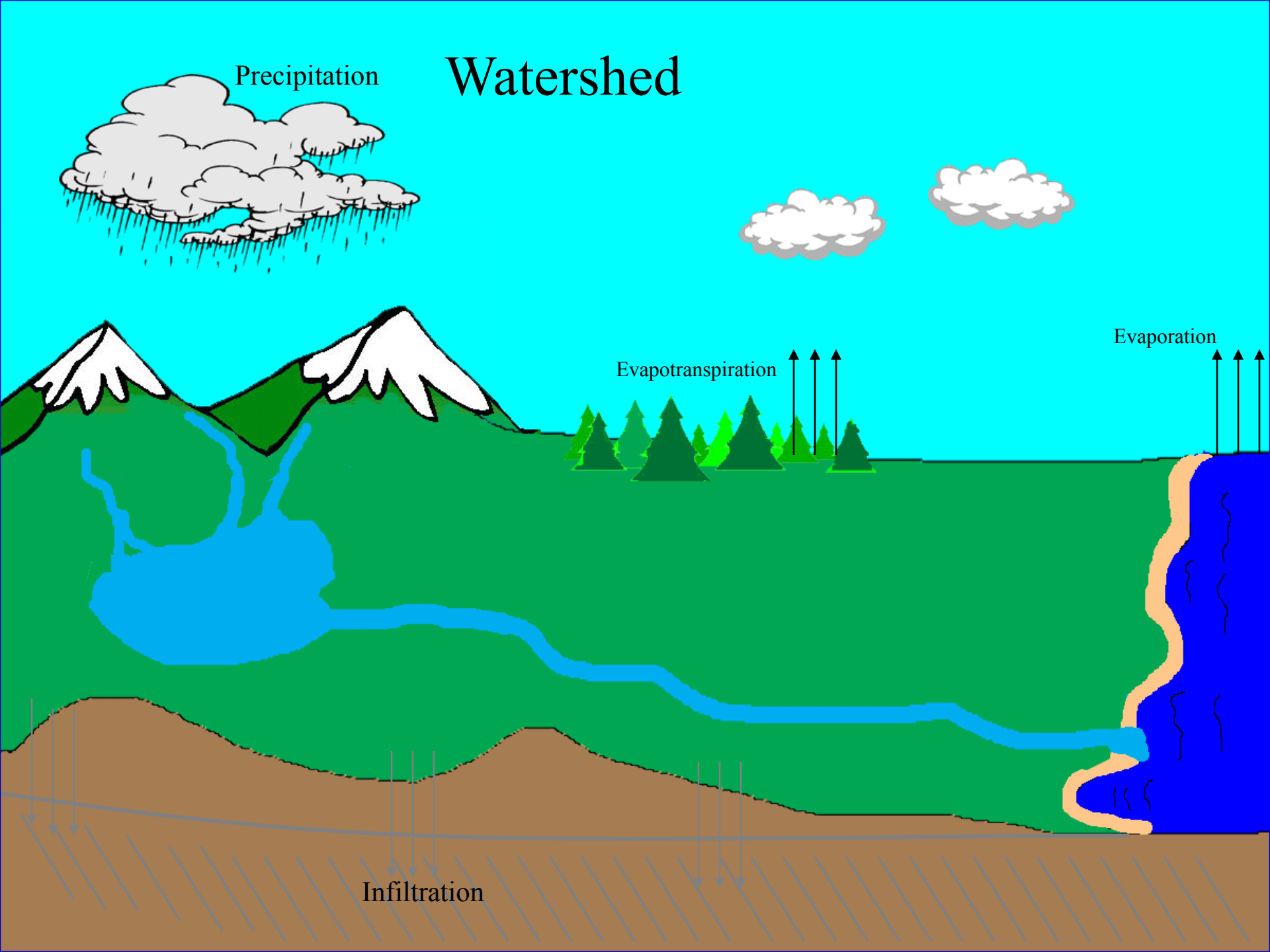
A Sustainable Water Company

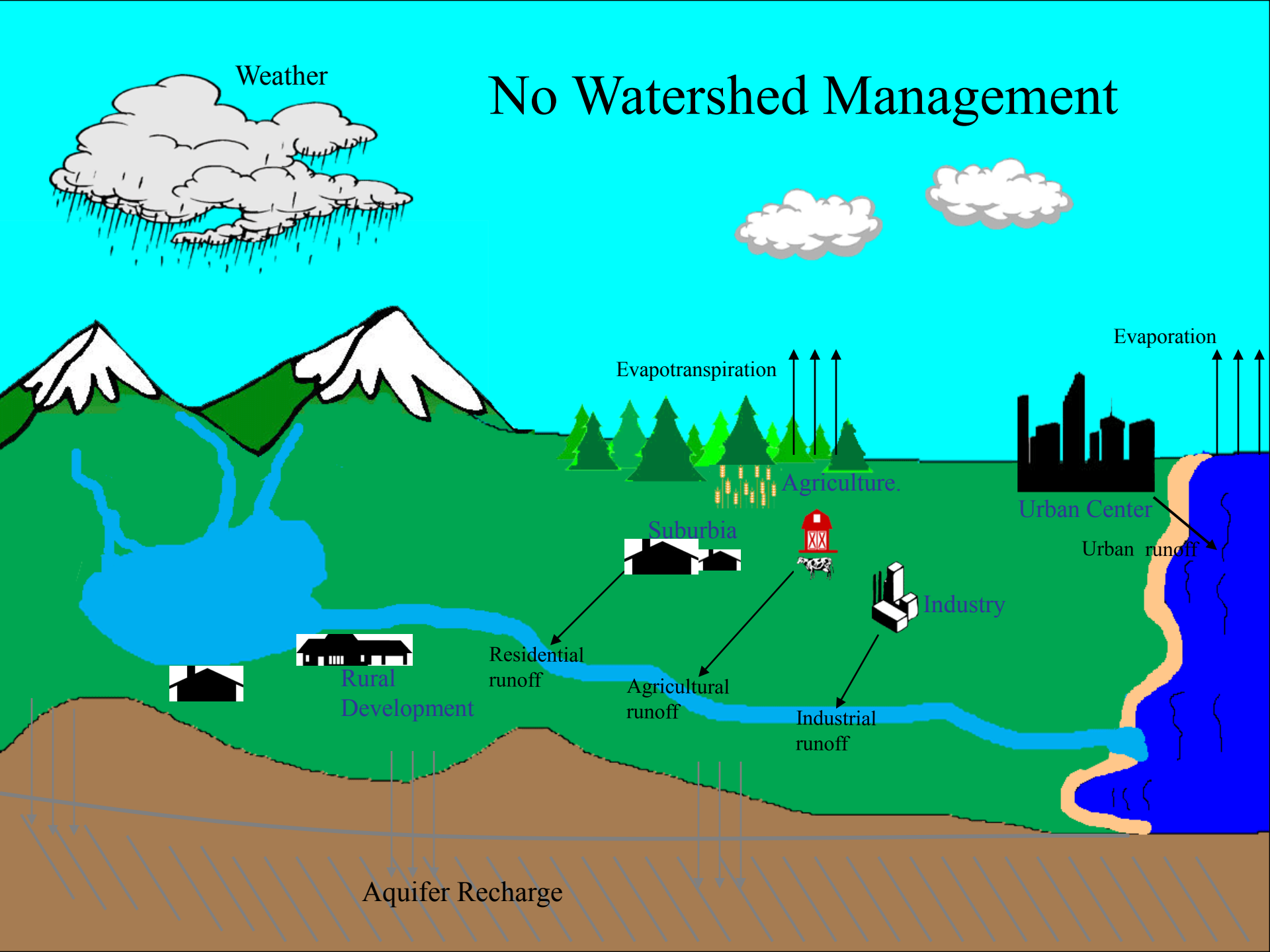
Hopewell Presentation

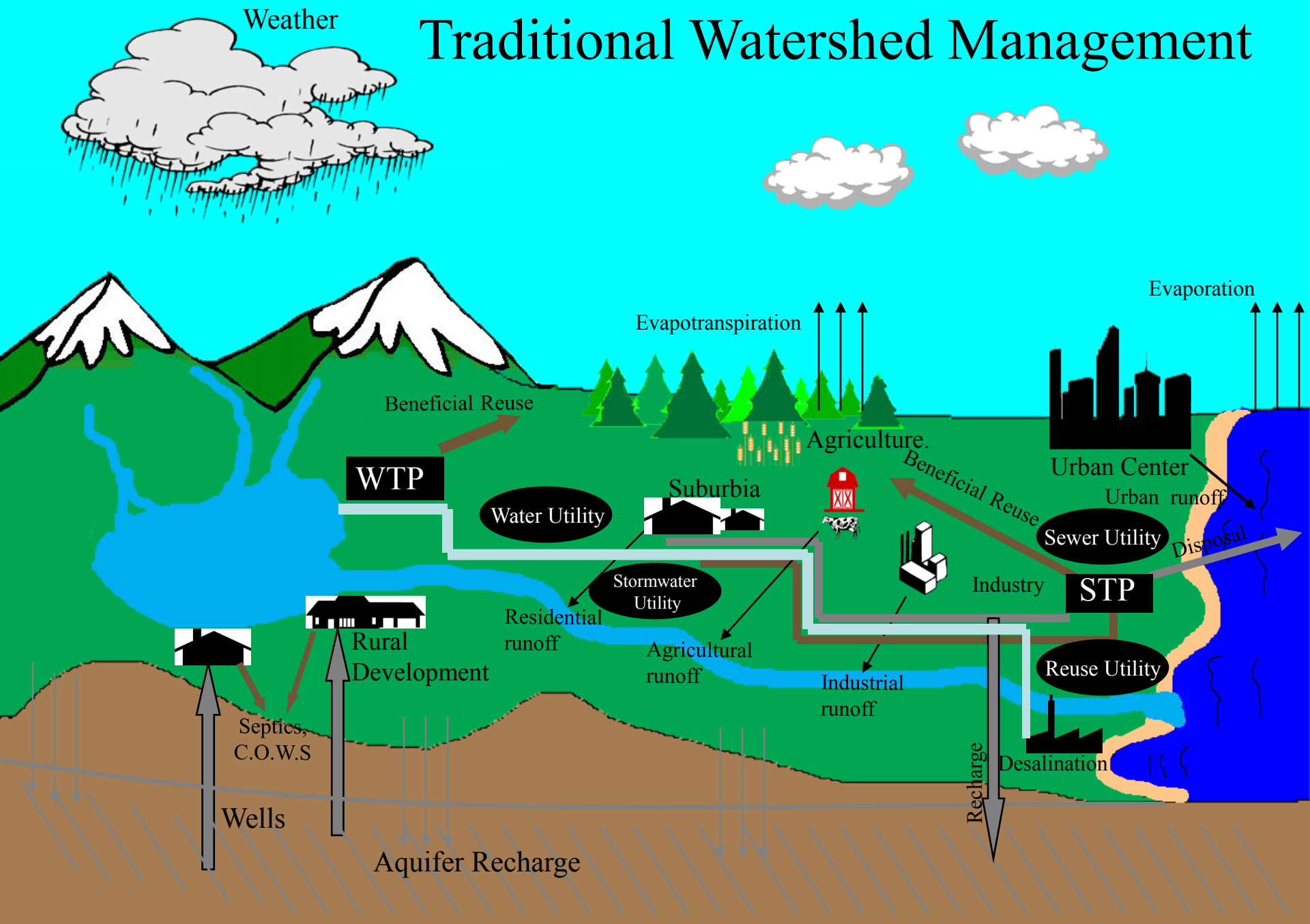
Ed, Clerico, PE, LEED AP – President/COO

Zach F. Gallagher, P.E., LEED AP – VP

Angela Clerico, PP/AICP, LEED AP – Sen. Planner

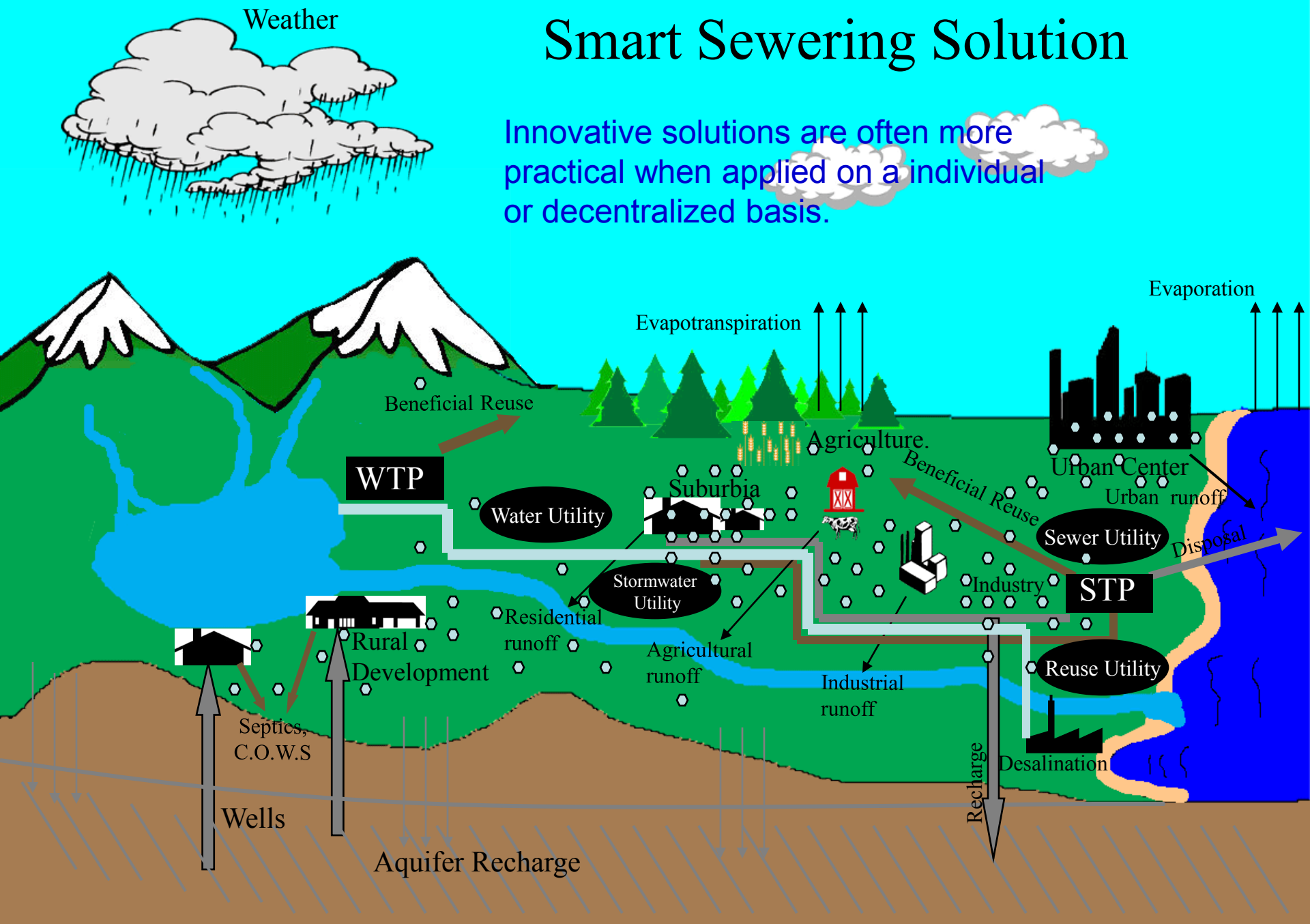

Watershed
Precipitation
Evapotranspiration
Evaporation
Infiltration


Weather
No Watershed Management
Evapotranspiration
Evaporation
Agriculture.
Urban Center
Suburbia
Urban runoff
Industry
Residential
runoff
Rural
Development
Agricultural
runoff
Industrial
runoff
Aquifer Recharge


Weather
Traditional Watershed Management
Evapotranspiration
Evaporation
Beneficial Reuse
Agriculture.
Urban Center
WTP
Suburbia
Water Utility
Beneficial Reuse
Urban runoff
Sewer Utility
Disposal
Stormwater Utility
Industry
STP
Residential runoff
Agricultural runoff
Industrial runoff
Reuse Utility
Rural Development
Septics, C.O.W.S
Desalination
Recharge
Wells
Aquifer Recharge

Smart Sewering Solution

Innovative solutions are often more practical when applied on a individual or decentralized basis.



Water Balance Based Approach

Potable Water Supply
55-90% Reduction

Site Precipitation

Water Reuse (non-potable)

Irrigation

Evapotranspiration & Infiltration

Stormwater Discharge

Wastewater Discharge/Disp
55-100% Reduction

Reuse (Wastewater / Building Stormwater Capture)

Water Reuse Performance Standards

NJDEP Category 1 RWBR
Public Access Systems

Parameter	RWBR Requirement	Sample Type
Flow Rate		Continuous
Total Nitrogen	<10 mg/L*	Grab
Total Suspended Solids (TSS)	5 mg/L	Grab
Fecal Coliform	14 col/100 mL (2.2 weekly avg.)	Grab
Turbidity	2 NTU**	Continuous
Disinfection	100 mJ/cm^2 (UV) / 1 mg/L (CPO)	Continuous

Notes:

* The NJDEP may impose a total nitrogen concentration limitation greater than 10 mg/L if the permittee can demonstrate that a concentration greater than 10 mg/L is protective of the environment.

** A statistically significant correlation between turbidity and TSS shall be established prior to commencement of the RWBR program. For UV disinfection, in no case shall the level of turbidity exceed 2 NTU while still maintaining the 5 mg/L maximum level for TSS.

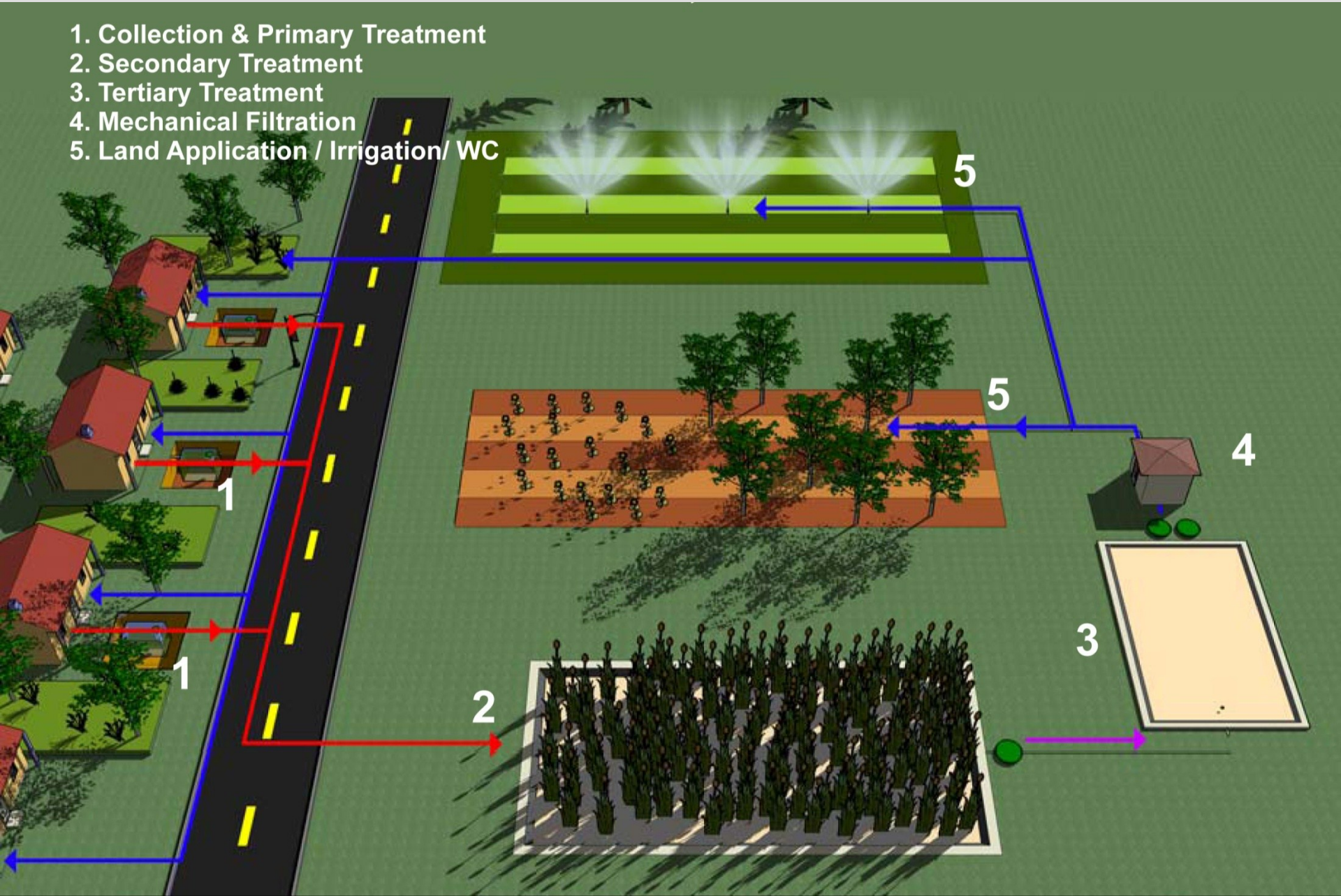
NYC Department of Buildings
Performance Standards for Reuse

Parameter	Standard
pH	6.5-8
BOD	<10 mg/L
Total Suspended Solids (TSS)	<10 mg/L
Total Coliform	<100 / 100 mL
Turbidity	<2 NTU (95%) / <5 NTU (Max)

- No federal regulations governing water reclamation & reuse, regulated at the state level.
- 26 states with adopted regulations
- 16 states have guidelines
- 9 states without regulations or guidelines
- No states with regulations that cover all potential uses of reclaimed water.

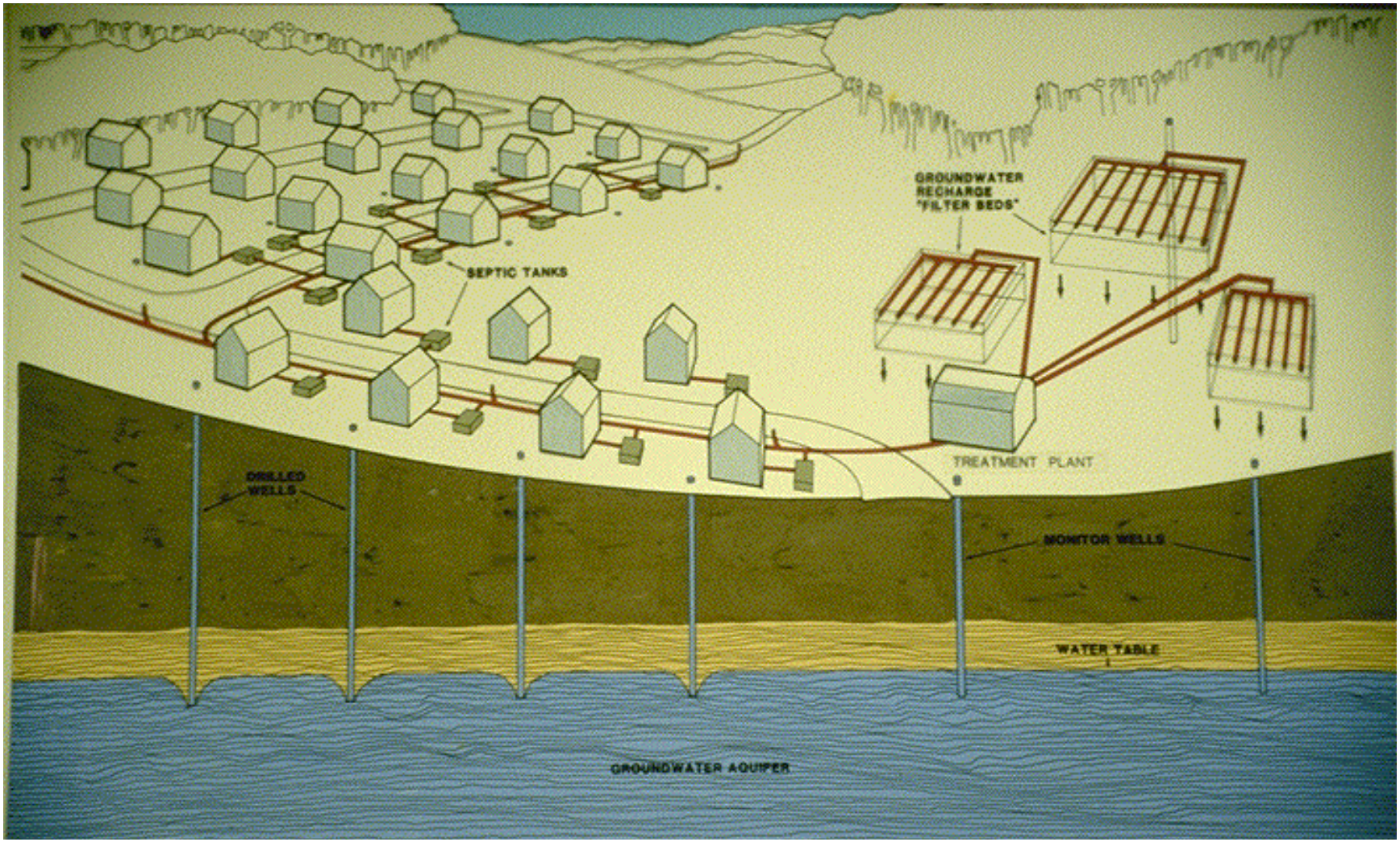
WateReuse Association estimates that 2.6×10^3 Mgal/day of municipal wastewater are reclaimed and reused currently and reclaimed water on a volume basis is growing at an estimated 15% per year.

Engineered Wetland Reuse System

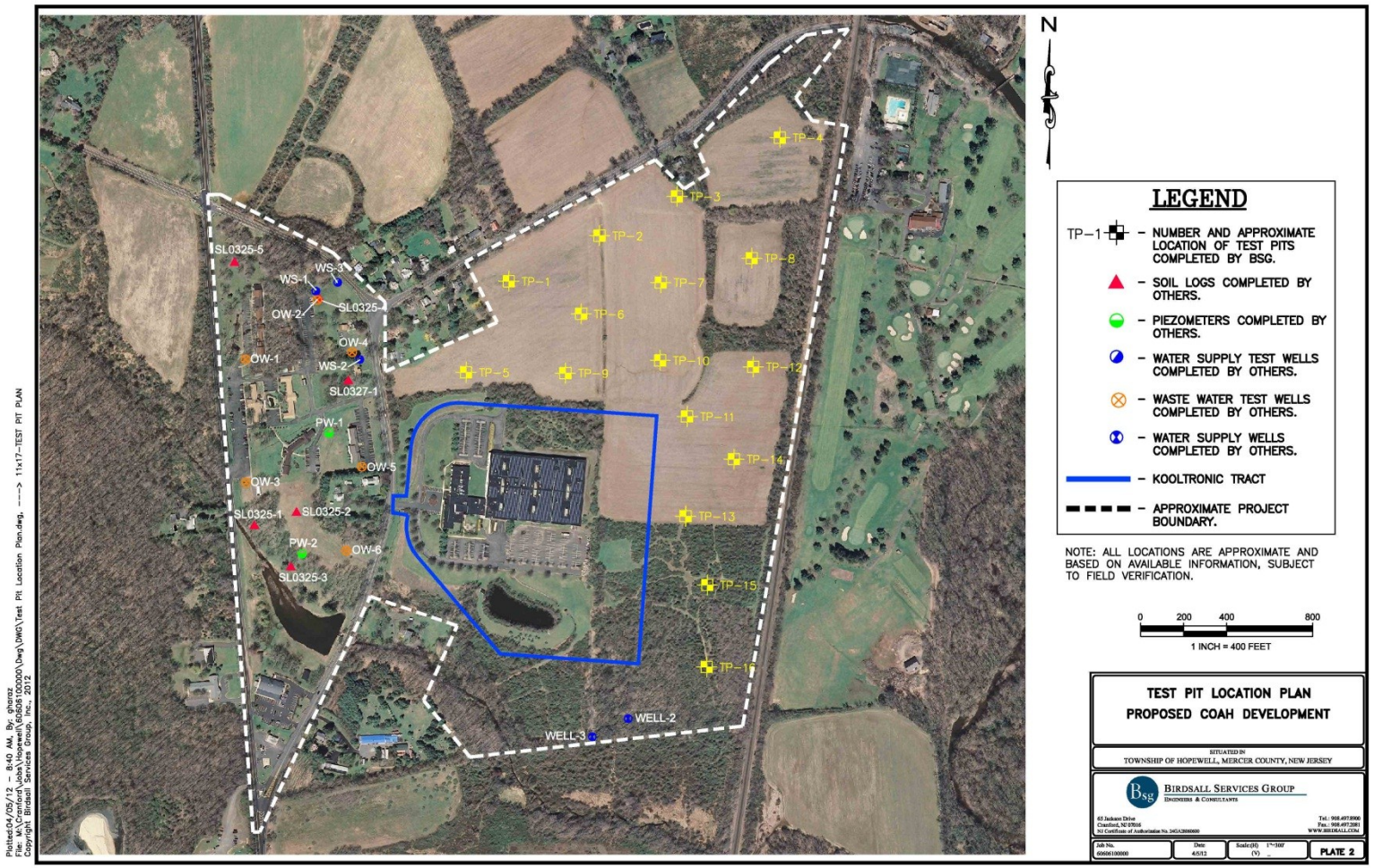


Natural Treatment Systems

Typical Smart Sewering System with Subsurface Recharge



Building on Birdsalls Initial Findings / NSU Scope of Work



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