

Teardrop Park Methodology for Landscape Performance Benefits

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Environmental

- ***Eliminated 60 tons of stone waste, 80 gallons of diesel, and 1,776 lbs of carbon by constructing a full scale mock-up of the Ice-Water Wall at the quarry, ensuring that no extra stone was shipped to the job.***

As reported by the owner of Alcove Quarry. Overage estimated based on the unique design of the wall, all of which would typically end up as waste. By constructing a mock up from the full selection of the quarry, excess stone was able to be used in other projects and any cut-offs were able to be recycled into crushed products. Additionally, the concrete backup wall built for the project was planned for a future building and was reused after the stones were tagged and shipped.

Deliveries are capable of transporting 20 tons of stone at a time. Carbon savings calculated from EPA Emission Facts based on an estimated 22.2 lbs of carbon/gallon.

Total Miles: 160 x 2 x 3 trips	960 miles
Total Diesel: 960/12 miles/gallon	80 gallons of diesel
Total Carbon: 80 x 22.2 lbs of carbon	1776 lbs of carbon

- ***Achieved 99.5% establishment of the 3,260 woody trees and shrubs planted at Teardrop by calibrating manufactured soils in factors such as load bearing capacity, water retention, drainage and nutrient levels.***

Benefit calculated by comparing Battery Park City Parks Conservancy accounts of plant mortality against the MVVA Plant Schedule. Less than 10 woody plants have been lost since installation. Soils were blended by contractors to specifications and tested to ensure proper nutrient levels, ph balance, organic matter, and microorganism biomass.

- ***Maintains healthy levels of nitrogen without the addition of any nitrogen fertilizer and encourages 30-50% greater root development by performing regularly biological soil tests and balancing soil microorganisms through compost tea application.***

Based on Battery Park City Parks Conservancy accounts and confirmed through the 2008 Harvard Yard Soil Restoration Project, an 8 month, 1 acre test led by BPCPC Director of Horticulture, Eric T Fleisher. After soil analysis revealed an imbalance of predator (nematodes, protozoa) and prey (fungi, bacteria), compost tea was brewed to specifically supplement those microorganisms with low populations. Subsequent testing confirmed stable nitrogen levels by properly balancing soil microbial population for optimal nutrient cycling. A link to the Harvard Yard Soil Restoration Project is included in the references section.



LANDSCAPE PERFORMANCE SERIES

- **Eliminates potable water use for lawn irrigation, saving an estimated 90,000 gallons of water and \$385 annually by recycling greywater from the adjacent Solaire Building.**

Estimated monthly irrigation rates provided by Irrigation Consultant on project. Estimated savings assumes adequate rainfall maintains capacity of the 6000 gallon stormwater storage at the adjacent Solaire Building. enough to supply required weekly irrigation. Water and Sewer Rates calculated at the 2012 Fiscal Year rates of the New York City Water Board. Every 100 cubic foot (748 gallons) of stormwater recycled saves \$3.17 in potable water.

<u>Estimated Weekly Irrigation Rates</u>	<u>Estimated Monthly Irrigation Rates (X * 4.33)</u>
April: 2,000 gal	8,660 gal
May: 3,000 gal	12,990 gal
June: 4,000 gal	17,320 gal
July: 5,000 gal	21,650 gal
August: 4,000 gal	17,320 gal
September: 2,000 gal	8,660 gal
October: 1,000 gal	4,330 gal
Annual Total:	90,930 gal
Annual Cubic Feet: 90930/748	121.5 cubic feet
Annual \$ Savings: 121.5 * \$3.17	\$385

Social

- ***Counters nature-deficit disorder by providing open-ended nature play for an estimated 200,000 children a year, with 72% of those observed engaged in physical activity and 69% enjoying constructive, dramatic, and functional play.***

Although Battery Park City has an abundance of parks, totalling over 36 acres, the vast majority have been design for adult visitors. Of the 13 parks in this district, only two provide play space specifically for children, providing conventional play structures, while another two have athletic courts/fields. Within this context, Teardrop is the only opportunity for exploration and un-prescribed play.

A 2007 post-occupancy evaluation conducted by the Natural Learning Initiative reported high levels of physically active play among children at the park, focused on water, sand, slide, pathways, and the steps, lookouts, decks and rocks linking them. Two researchers moved through 12 pre-identified observation zones, starting on opposite sides of the Park. Each observation zone was scanned from a pre-identified observation point recording the location of visitors, their age and gender. On average, 115 users during each observation round was recorded (1380 data points in total).

A follow up POE conducted in 2011 by LAF research assistant, Michael Geffel, indicates sustained popularity of the park, and continued prevalence of active play among children. Two further rounds of observation took place in mid-July using similar methods as the previous POE, but also recording variables such as physical activity, type of play, group size and presence of shade. Physical activity was defined as translocation (low, medium and high movement); infants in strollers were not included. The relatively low rates of children playing games reflects their engagement and interaction with specific park features over prescribed activities.

To estimate annual visitorship, the methodology established by the National Bicycle and Pedestrian Documentation Project was used to extrapolate daily, monthly, and annual users based on counts taken during any period of a day, month, or year. The NBPD establishes adjustment factors to weight counts based on hour, day, month and local climate and is designed to be used by (a) multi- use pathways (PATH) and (b) higher density pedestrian and entertainment areas (PED).

An average hourly count was obtained through the 2007 post occupancy evaluation conducted by the Natural Learning Initiative and was consistent with counts taken during the 2011 POE. An adjustment factor of 1.05 was applied to reflect those who use the facility after hours. The weekday count was calculated by applying an adjustment factor of 8% based on a 4pm average visitor count, classifying Teardrop Park as a “pedestrian entertainment area.” An average weekly volume was reached based on a daily adjustment factor of 18% for Saturday counts, and the result was multiplied by 4.33 to calculate the monthly volume. The climate of New York was classified as “Long Winter/Short Summer” and “Very Hot Summer/Mild Winter” and the annual total was reached by applying the monthly adjustment factors of both climate types and averaging both calculations.

Average Hourly Count:	115 Visitors
Adjustment Factor: 115 x 1.05	120.75 Visitors
Adjusted Weekday Hourly Count: 120.75/.08	1,509 Daily Visitors
Average Weekly Volume: 1509/.18	8,385 Weekly Visitors
Average Monthly Volume: 8385 x 4.33	36,309 Monthly Visitors
Annual Total: ((36309/.13)+((36309))/2	39,8998 Annual Visitors

Cost Comparison Methodology

- ***By drawing construction documents after the Ice-Water Wall mock-up was completed, \$51,600 was avoided in surplus material and delivery costs alone. Additionally, to fit, shape and install on site, it is estimated that construction would have taken 4 times as much machining and labor. Instead, the 1st half of the Ice-Water Wall was completed at Teardrop in 5 days after 5 months of planning. The stone masons were allowed 4 months to complete all work and instead finished in 1 month, a quarter of the allotted time.***

As reported by the owner of Alcove Quarry. The stone used for the Ice-Water Wall cost \$800/ton, with each delivery transporting 20 tons/trip at a rate of \$1,200 each. For such a unique feature it is difficult to calculate the full financial benefits of planning, but the reduction in New York labor, ability to coordinate other contractors on the site as need, and the speed at which the contract was completed represents is significant reduction in costs.

Material Cost Avoided: 60 tons x \$800	\$48,000
Delivery Cost Avoided: 3 trips x \$1,200	\$3,600
	\$51,600

- **Using greywater from the adjacent Solaire building to irrigate lawn areas saves an estimated \$385 annually in potable water costs.**

Methodology described under Landscape Performance Benefits and Methods.