



Hunter's Point South Waterfront Park, Phase 1 Methods

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This investigation was conducted as part of the Landscape Architecture Foundation's 2018 *Case Study Investigation* (CSI) program. CSI matches faculty-student research teams with design practitioners to document the benefits of exemplary high-performing landscape projects. Teams develop methods to quantify environmental, economic and social benefits and produce Case Study Briefs for LAF's *Landscape Performance Series*.

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The full case study can be found at: <https://landscapeperformance.org/case-study-briefs/hunters-point-south>

Environmental Benefits

- ***Water / Stormwater Management: Intercepts, infiltrates, and evaporates 73% of average annual rainfall in permeable pavers and a biofiltration swale.***

Methods:

The site uses has a 760-ft biofiltration swale and gabion wall along the length of the park and permeable paving throughout the site, which helps detain and infiltrate stormwater runoff on the site. It also slows the entry of stormwater runoff into the city's combined sewer system.¹

By consulting the construction documents provided by SWA, a hydrological model for the site was created using the National Stormwater Calculator (the US EPA's Stormwater Management Tool) and the results from the report were used to report this benefit. From the final SWC results, it was estimated that the site infiltrates **58.61%** and evaporates **14.16%** of annual rainfall. This results in a total of **72.77%** of annual rainfall that is intercepted, infiltrated and evaporated. Following is a screenshot from the final report (Refer to Appendix I for detailed report) that shows the criteria entered for the site to calculate the final results:²

Site Description	
Parameter	Current Scenario
Site Characteristics	
Site Area (acres)	5.25
Hydrologic Soil Group	C
Hydraulic Conductivity (in/hr)	0.02
Surface Slope (%)	2
Precip. Data Source	NY CITY CENTRAL PARK
Evap. Data Source	NY CITY CENTRAL PARK
Climate Change Scenario	None
Land Cover	
% Forest	0
% Meadow	0
% Lawn	35
% Desert	0
% Impervious	65
LID Controls	
Disconnection	0
Rain Harvesting	0
Rain Gardens	0
Green Roofs	0
Street Planters	0
Infiltration Basins	22.7
Porous Pavement	73
Analysis Options	
Years Analyzed	10
Ignore Consecutive Wet Days	False
Wet Day Threshold (inches)	0.01

Figure 1: Screenshot of the Site Description that was entered into the SWC model for the National Stormwater Calculator.²

Calculations:

The pie chart from the National Stormwater Calculator Report was used to determine the overall percentage of the annual rainfall that is intercepted and infiltrated.

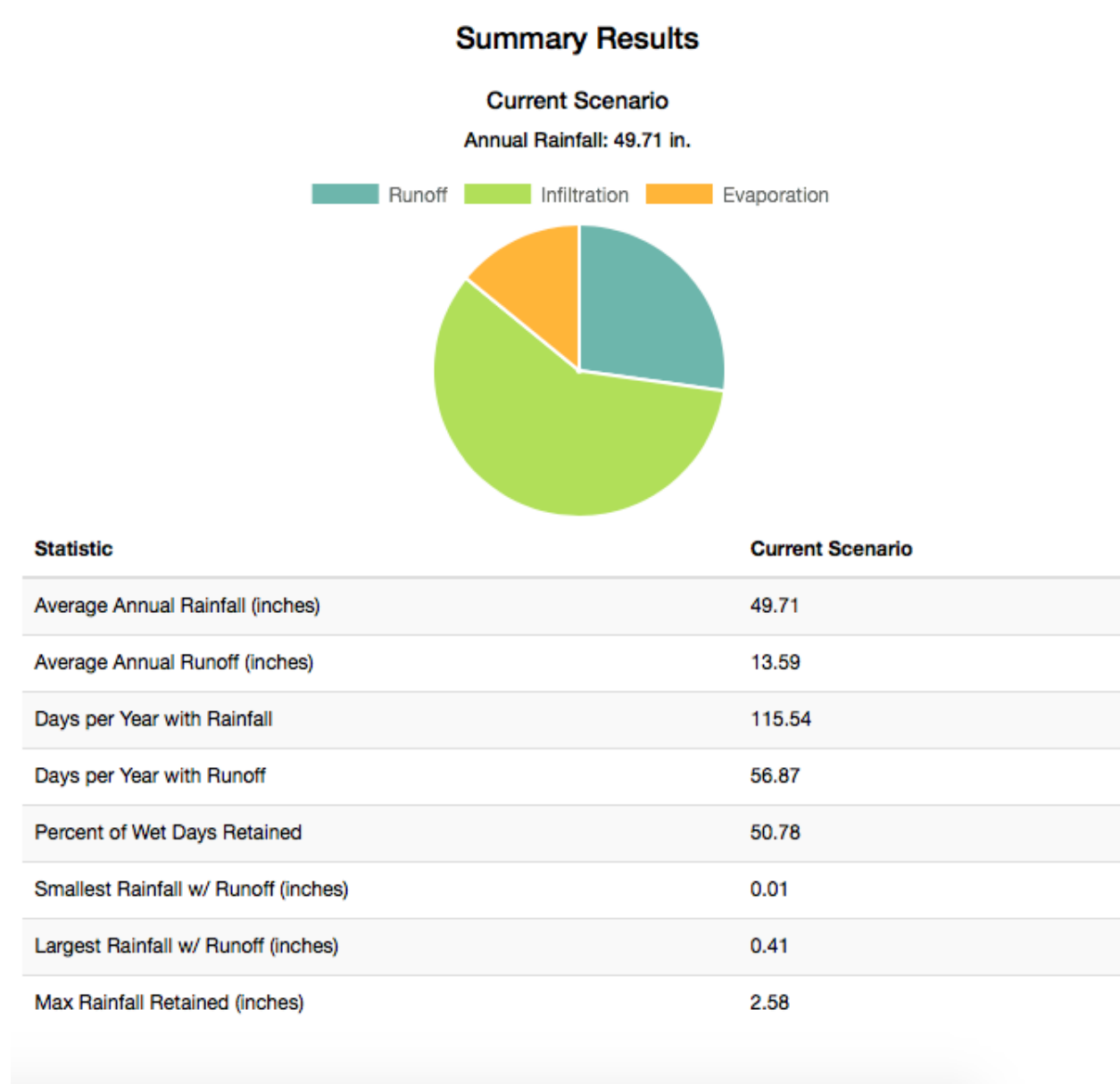


Figure 2: Screenshot of the Summary Results from the National Stormwater Calculator.²

- Annual Rainfall = 49.71 in
- Runoff = 13.59 in
 = $(13.59/49.71) \times 100$
 = **27.23%**
- Infiltration = 29.31 in

$$= (29.31/49.71)*100$$

$$= \mathbf{58.61\%}$$

- Evaporation = 7.04 in
= (7.04/49.71)*100
= **14.16%**

$$58.61\% + 14.16\% = \mathbf{72.77\%}$$

Sources:

¹ Construction documents and secondary data provided by the consulting firm, SWA group.

² "National Stormwater Calculator." EPA. May 24, 2018. Accessed May 27, 2018.

<https://www.epa.gov/water-research/national-stormwater-calculator>.

Limitations:

- The National Stormwater Calculator does not take into account tree canopy interception of rainfall for the site.
- The SWC tool uses rainfall data (available through the National Weather Service) from the year 2006, which is not the most recent data available for the site. It would be ideal if the most recent data from 2007-18 could be entered into the SWC to more accurately calculate stormwater benefits.

- ***Water / Flood Protection: Increases flood storage capacity by approximately 557,800 gallons, accommodating up to a 6-ft storm-surge flood event.***

Methods:

Since it is a waterfront site, one of the primary goals of the project was flood resiliency. The 29,825-sf central oval lawn was designed to provide temporary water storage in the case of storm-surge or large tidally influenced flood events.¹ It is surrounded by a sloping retaining wall, reaching 30 inches in height on its highest side. It can detain up to **74,562.50 cf (557,766 gallons)** of stormwater during a flood event and because it is graded to slope down to the East River, it allows the collected water to recede back into the river.³

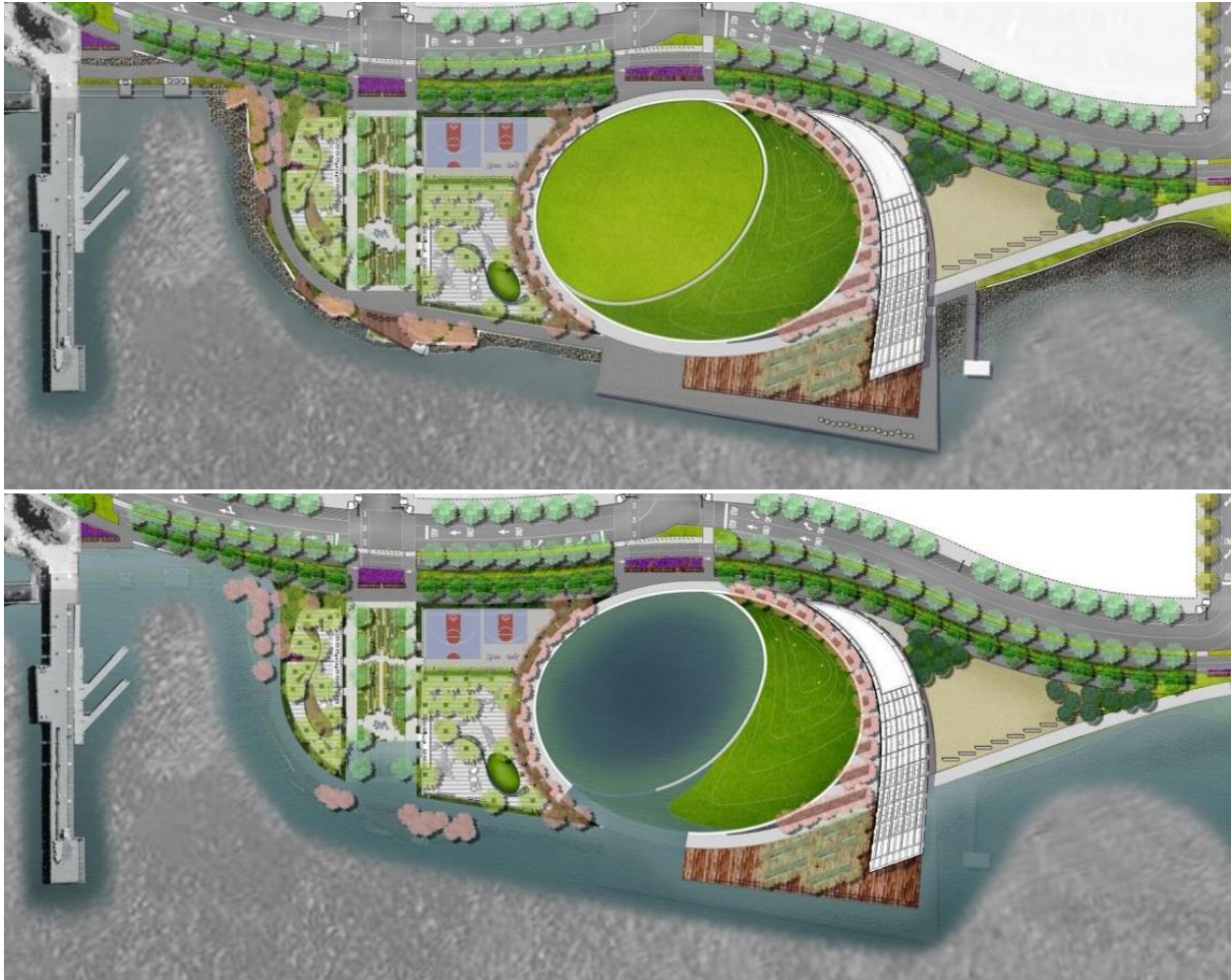


Figure 3: Site Plan showing the overflow retention strategy for the Oval Lawn.¹

The NOAA Sea Level Rise Viewer⁴ was used to simulate a major 6-ft flood event for New York City (Fig.4). It was observed that for the Hunter's Point South Waterfront Park, the oval lawn contains and prevents the stormwater from this flood event from entering the rest of the site.



Figure 4: Screenshot from NOAA's Sea Level Rise Viewer for the site for a 6-ft flood event.⁴

Calculations:

Oval Lawn Area	= 29,825 sf ¹
Height of retaining wall	= 30 in ¹
	= 2.5 ft
Volume of the oval lawn	= 29,825 x 2.5 cf
	= 74,562.50 cf
	= 557,766 gallons

Sources:

³ "Hunter's Point South Waterfront Park." MCA Chicago. Accessed May 27, 2018.

<http://www.swagroup.com/projects/hunters-point-south-waterfront-park/>.

⁴ "NOAA Logo Sea Level Rise Viewer." NOAA Office for Coastal Management | States and Territories Working on Ocean and Coastal Management. Accessed June 04, 2018.

<https://coast.noaa.gov/slr/#/layer/slr/6/-8231077.80833016/4975642.320305377/15/dark/none/1/2050/interHigh/midAccretion>.

Limitations:

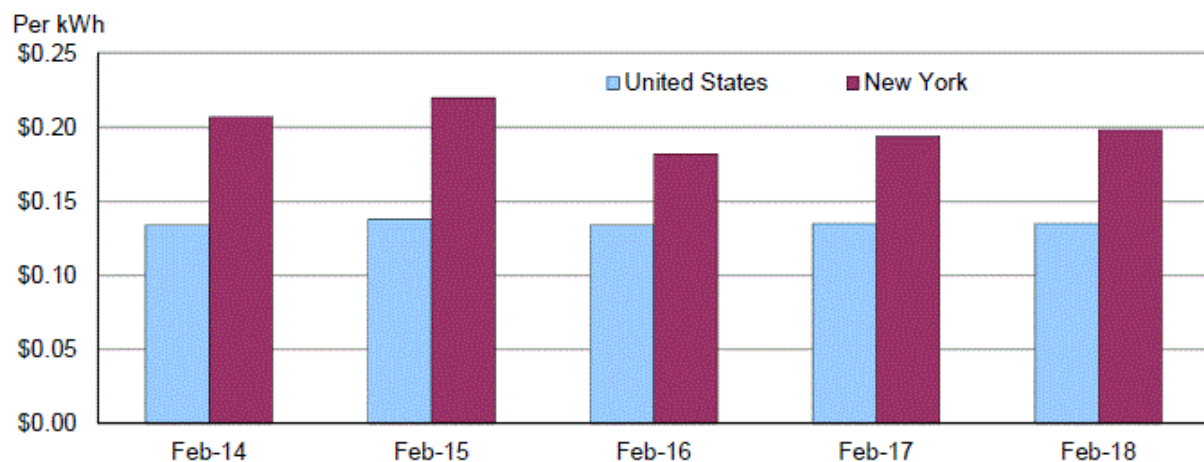
- Based on the shape of the oval lawn, which is not perfectly level and is not surrounded entirely by the 30-in wall since the wall is sloping towards the East River, the volume for the Oval Lawn is likely overestimated.

- Carbon, Energy and Air Quality | Energy Use: Generates 37,000 kWh of energy annually using photovoltaic solar cells, saving a total of \$29,600 from 2014 to 2017.**

Methods:

The documentation provided by the landscape architect was used to establish energy produced by the solar panels and the resulting energy savings. The research team referred to the US Bureau of Labor Statistics⁵ to obtain energy prices for Queens, NY. Since the park opened in 2013, energy savings for each year since 2014 were determined and added to quantify the savings for 4 years (2014-2017).

Chart 2. Average prices for electricity, the United States and New York-Newark-Jersey City, 2014-2018 (as of February)



Source: U.S. Bureau of Labor Statistics.

Figure 5: Graph showing the electricity prices for New York- Newark- Jersey City, 2014-2018.⁵

Calculations:

Energy produced by the solar panels

= **37,000 kwh¹**

Unit price for electricity in 2014

= \$0.21/kwh⁵

Energy savings for 2014

= unit price x energy produced

= \$0.21/kwh x 37000 kwh

= **\$7,770**

Unit price for electricity in 2015

= \$0.22/kwh⁵

Energy savings for 2015

= unit price x energy produced

= \$0.22/kwh x 37000 kwh

= **\$8,140**

Unit price for electricity in 2016	= \$0.18/kwh ⁵
Energy savings for 2016	= unit price x energy produced = \$0.18/kwh x 37000 kwh = \$6,660
Unit price for electricity in 2017	= \$0.19/kwh ⁵
Energy savings for 2017	= unit price x energy produced = \$0.19/kwh x 37000 kwh = \$7,030
Total savings from 2014- 2017	= \$(7770 + 8140 + 6660 + 7030) = \$29,600

Sources:

⁵ "Average Energy Prices, New York-Newark-Jersey City–February 2018 : New York–New Jersey Information Office." U.S. Bureau of Labor Statistics. March 14, 2018. Accessed June 01, 2018. https://www.bls.gov/regions/new-york-new-jersey/news-release/averageenergyprices_newyorkarea.htm.

Limitations:

- The data used for the energy produced by the solar panels is secondary data, as provided by the landscape architects.
- This benefit assumes that all energy generated on-site is used and would otherwise need to be purchased.

Social Benefits

- ***Recreational and Social Value: Attracts an estimated 1,170 daily visitors on a typical June weekday.***
- ***Health and Well-Being: Promotes physical activity for 465 users who engage in active recreation activities on a typical June weekday.***

Methods:

The number of visitors to the site and their activities were observed for one day, Tuesday June 5, 2018, using the *People Moving Count* ⁶ Public Life Tool and *Stationary Activity Mapping* ⁷ Public Life Tool as developed by the Gehl Institute. One observer from the research team was stationed at the site at the location marked in the figure below (Fig.6), while the other observer walked through the park to make their observations. They performed four 30-minute counts at 3-hour intervals (9am, 12pm, 3pm, 6pm). The observers also took videos during the 30-minute periods and reviewed them later to minimize human error. The number of people observed from

both counts were combined to estimate the overall number of visitors to the site. The number of visitors was also cross-checked via drone imagery on the same day. An aerial still was taken by the drone at the same location showing one section of the park at half-hour intervals from 6am-10am and 5pm-9pm, resulting in 18 stills. The team also took a drone video fly-through of the park from end to end, along with three 5-minute drone “hover” video shots at a 30-ft height (one top-down and two oblique).

The *Stationary Activity Mapping*⁷ Public Life Tool was used to assess the number and extent of facilities that directly support active and passive recreation. The facilities included the play areas, basketball courts, the oval lawn, the jogging track, and the urban beach area. The observed numbers were combined with the observations from ‘*People Moving Count*⁶, which determined the number of visitors engaging in passive and active recreation activities such as running/ jogging, walking, dog walking, biking, skating, pushing strollers, etc. (Fig.7).

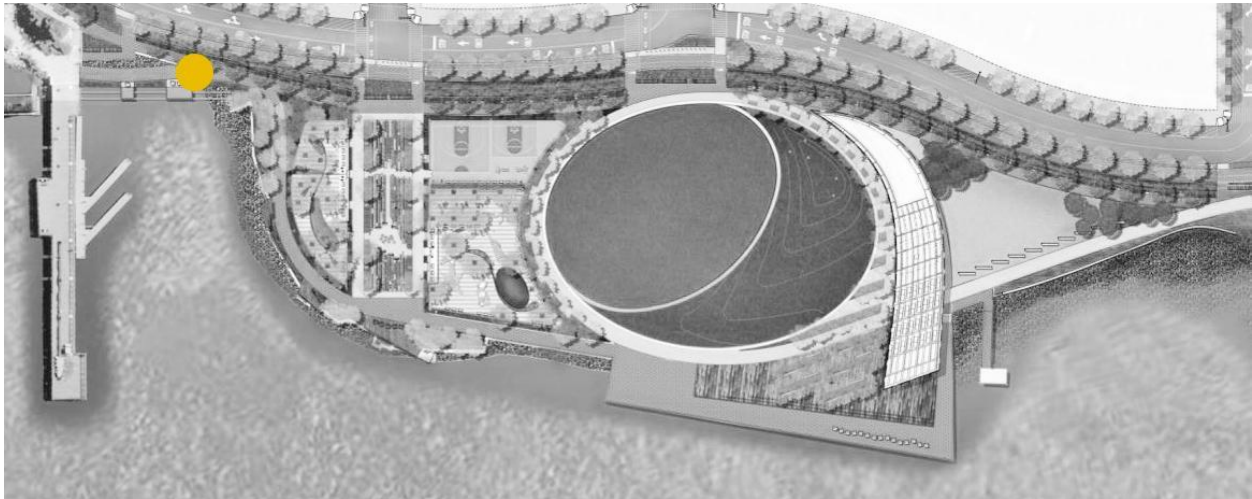


Figure 6: Site Plan showing the stationary survey location for ‘People Moving Count’ survey.¹

Calculations:

COMBINED RESULTS OF 'PEOPLE MOVING COUNT' AND 'STATIONARY ACTIVITY MAPPING'					
TYPES OF ACTIVITY (By Intensity)	TIME				
TYPE	09:00	12:00	15:00	18:00	TOTAL
STANDING	6	23	12	24	65
SITTING	20	30	26	45	121
SAND PLAY	0	3	8	3	14
WALKING/STROLLING/ROLLING	76	94	118	219	507
DOG RUN/DOG WALKING	39	21	20	51	131
BIKING	5	3	5	11	24
CHILDRENS PLAY AREA	12	24	15	56	107
ADULT FITNESS AREA	0	1	1	3	5
BASEBALL	0	0	0	3	3
FOOTBALL	0	2	0	0	2
VOLLEYBALL	0	0	0	23	23
BASKETBALL	0	1	3	9	13
SOCCER	53	0	0	15	68
RUNNING/ JOGGING	16	17	5	51	89
TOTAL 'PASSIVE'	102	150	164	291	707
TOTAL 'ACTIVE'	125	69	49	222	465
TOTAL NUMBER OF VISITORS TO THE SITE					1172

Figure 7: Screenshot of overall count for the number of site visitors and types of activity by intensity.

Sources:

⁶ Gehl Institute. People Moving Count. Accessed May 29, 2018.

<https://gehl.institute.org/tool/people-moving-count/>.

⁷ Gehl Institute. Stationary Activity Mapping. Accessed May 29, 2018.

<https://gehl.institute.org/tool/stationary-activity-mapping/>.

Limitations:

- Users were observed for a single day during the month of June, which does not capture the variation in the number of users (weekend, seasonal, annual, special events, holidays, etc.).
- **Scenic Quality and Views: Creates iconic views of Manhattan as demonstrated by 11,037 social media posts from 2013 to 2018 referring to the Manhattan skyline and the site.**

Methods:

The site has multiple overlook points, along with seating and loungers along the waterfront. This design provides space for the users to engage and absorb the scenic view of the Manhattan skyline from their side of the East River. The research team chose to use social media to

quantify this aspect of the project by scanning the following platforms for images of the Manhattan and/or its skyline taken from Hunter's Point South.

Tagboard is an online tool that helps find all posts across **Flickr, Instagram, Facebook, and Twitter** that have used a specified hashtag or geotag. Using Tagboard⁸, we found the number of posts on social media for the following hashtags and geotags:

#licwaterfront

#hunterspointsouthpark

#hunterspointpark

#hunterspointsouth

#LICLanding

#liclandingbycoffeed

Geotag: LIC Landing

The search results of these hashtags were then shortlisted for views of the Manhattan skyline, and were cross-referenced with the hashtag #manhattan.

Calculations:

Hashtags

1. Facebook : $63 + 81 + 19 + 72 + 84 + 13 + [81] = 413$ ⁹
2. Twitter : $13 + 20 + 5 + 16 + 20 + 0 + [19] = 93$ ¹⁰
3. Instagram : $1344 + 2443 + 663 + 1324 + 2113 + 253 + [1205] = 9345$ ¹¹
4. Flickr : $2 + 422 + 7 + 231 + 348 + 176 + [N.A.] = 1186$ ¹²

$$413 + 93 + 9345 + 1186 = \mathbf{11,037}$$

Sources:

⁸ <https://tagboard.com/>,

⁹ <https://www.facebook.com>,

¹⁰ <https://www.instagram.com>,

¹¹ <https://twitter.com>,

¹² <https://www.flickr.com>.

Limitations:

- Social media posts that use more than one hashtag mentioned above for the same post may have been counted multiple times, thus overestimating the total number of social media posts.
- Some users also share the same images across multiple social media platforms, which would also result in overestimating the overall tally.
- There is potential for human error since there is no algorithm to filter through the posts for the criteria required for this method.

- **Transportation: Contributes to an increase in ridership for the East River route of the New York City Ferry. Annual ridership was roughly estimated to be around 200,000 in 2018, up from 19,055 in 2010.**

Methods:

The current East River route of the NYC Ferry, run and operated by Hornblower, connects the growing residential and business communities along the East River to communities in Midtown and the Financial District,¹³ and Hunter's Point South Waterfront Park connects the ferry landing and the neighborhood. The *Citywide Ferry Study 2013*,¹⁴ performed by New York City Economic Development Corporation, was used to obtain the number of riders in 2010.

To estimate the number of riders for 2018, the research team performed the *People Moving Count*⁶ Public Life Tool as developed by the Gehl Institute. An observer from the research team was stationed at the ferry stop at the park (Fig. 8). The number of riders were observed for one day, June 5, 2018. The observer performed four 30 minute counts at 3-hour intervals (9am, 12pm, 3pm, 6pm). The observers also took videos during the 30-minute periods and reviewed them later to reduce human error. The final number for this day was used to estimate the number of riders for 2018.

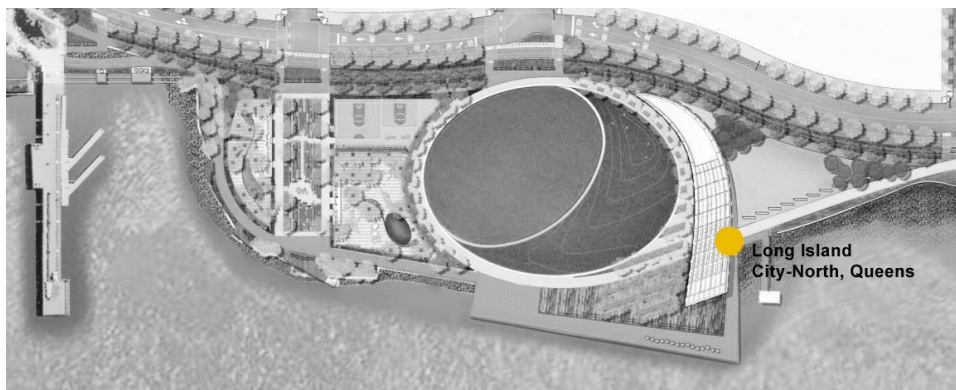


Figure 8: Site plan showing the location of the ferry stop at the site.¹

In order to predict the annual ridership figure based on just a single day of data, the graphs for hourly ridership, which are available on Google's open source platform, were used. The ridership figures from site observation were substituted in the graphs. Based on this substitution, the values for all the graph heights were calculated, resulting in a weekly ridership figure, which was then used to estimate the yearly figure.

Demographics

Table 91: Demographic data for the Long Island City - North market areas 2000 and 2010

Population	2000	2010	2000-2010 Compound Annual Growth Rate
Primary Market Area	1,146	2,271	7.08%
Secondary Market Area	2,133	4,578	7.94%
Total	3,279	6,849	7.64%
New York City	-	-	0.21%
Average East River Ferry Stop Total	16,259	19,055	1.60%

Figure 9: Screenshot from the Citywide Ferry Study showing the average number of riders for the year 2010 at 'Long Island City- North, Queens' ferry stop.¹⁴

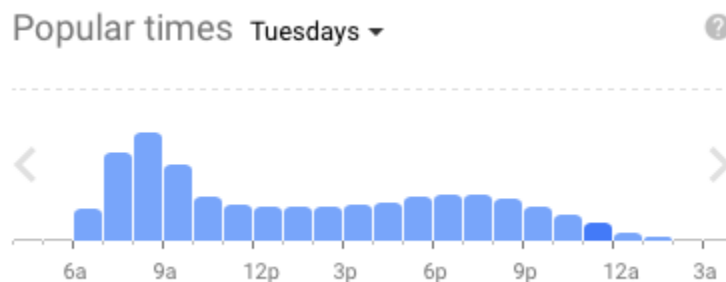


Figure 10: Ridership graph for Hunter's Point South Ferry stop. Google provides such graphs for all seven days of the week.

Calculations:

PEOPLE MOVING COUNT SITE: path in front of ferry terminal Survey performed by Anya Domlesky						
CATEGORY		COUNT				TOTAL COUNT
		9:00AM - 9:30AM	12:00PM - 12:30PM	3:00PM - 3:30PM	6:00PM - 6:30PM	
PEDEST	Walkers	25	32	9	50	116
	Runners	0	8	1	25	34
BIKE	bicyclists	0	2	2	5	9
FERRY	on-walkers	31	3	18	22	74
	off-walkers	5	12	16	52	85
	on-walkers with bikes	0	0	0	0	0
	off-walkers with bikes	2	0	0	0	2
TOTAL NUMBER OF VISITORS ON SITE FOR ferry terminal						320
total ridership ferry						161

Figure 11: Screenshot of the overall tally from the site observation.

Ferry Ridership Estimate for Hunter's Point South							
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
19	21	8	27	14	3		
33	61	33	43	30	5		
52	76	80	55	46	14	3	
63	53	81	63	52	27	10	
64	30	43	56	46	46	23	
56	24	24	41	33	64	27	
43	23	20	26	26	81	27	
35	23	18	14	26	92	30	
33	23	15	5	27	100	35	
37	24	15	8	33	101	40	
43	25	18	14	37	96	35	
46	30	24	24	41	83	27	
42	32	30	33	42	69	18	
33	32	33	40	40	51	14	
23	29	33	40	37	35	12	
12	23	30	36	31	25	10	
4	17	24	26	26	23	10	
638	546	529	551	587	915	321	
Total users in a week		4087					
Total users in an year		212524					

Figure 12: Tables were used to estimate the weekly ridership figures.

Sources:

¹³ "East River Ferry Route & Schedule | NYC Ferry Service." New York City Ferry Service. Accessed June 04, 2018. <https://www.ferry.nyc/routes-and-schedules/route/east-river/>.

¹⁴ "Citywide Ferry Study 2013." NYCEDC. Accessed July 02, 2018.

https://www.nycedc.com/sites/default/files/filemanager/Resources/Studies/2013_Citywide_Ferry_Study/Citywide_Ferry_Study_-_Final_Report_-_Appendix_3A_Site_Profiles.pdf.

Limitations:

- Since the calculations for the ferry ridership were based on users observed only for a single day in the month of June, the final ridership figures do not capture the variation in the number of users (seasonal, annual, special events, holidays etc.). It is likely that the ferry ridership is reduced during extreme weather such as heavy rainfall/snowfall and overall during the winter season.

Economic Benefits

- **Property Value: Contributed to a 49% average increase in assessed property value for 8 randomly selected parcels within a 3-block radius from 2012 to 2017.**

Methods:

Within a 3-block radius of Hunter's Point South Waterfront Park, 10 plots (Fig.13) were selected at random and were analyzed to understand the impact of the park on neighboring property values. The Digital Tax Map published by the New York City Dept. of Finance¹⁵ was used to obtain plot numbers, which were then cross-referenced with property values published by the City of New York Dept of IT and Telecommunications¹⁶ for the year 2011-12, which is right before the site opened in August 2013, and for the year 2017-18. The percentage increase in property value for each plot was calculated, the upper and lower outliers removed, and then the average for these eight plots was used as a final estimate for the change in property values from 2012 to 2017.

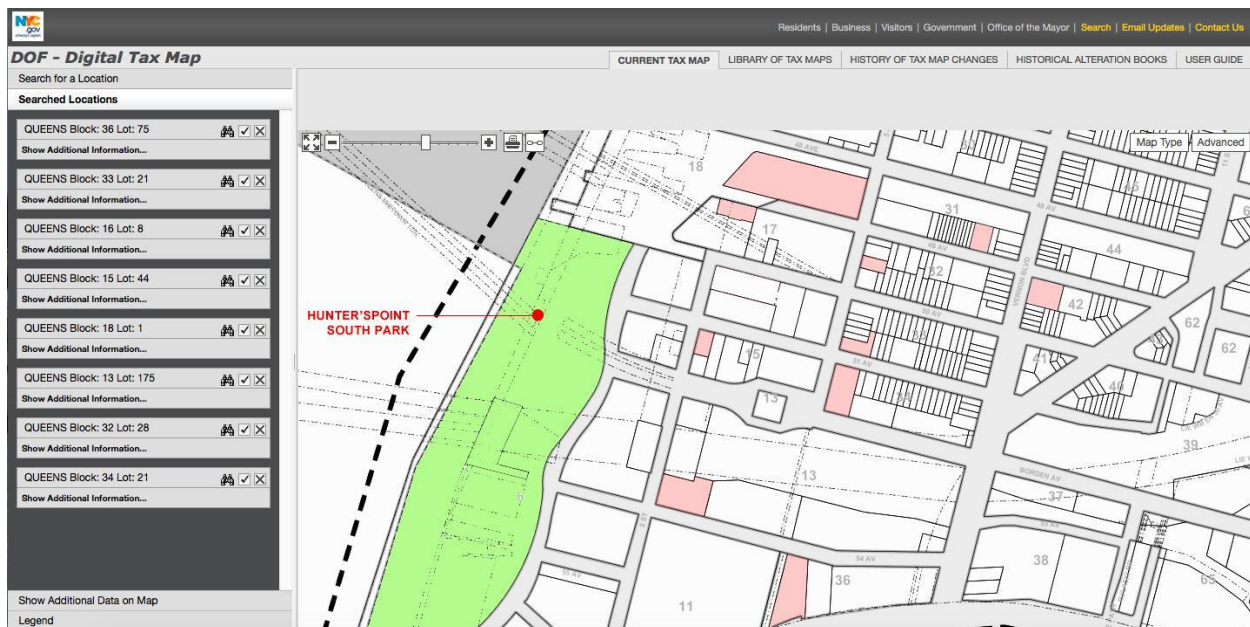


Figure 13: The plots for which the property value rates were observed and compared.¹⁵

Calculations:

PROPERTY VALUES FOR PLOTS WITHIN A 3-BLOCK RADIUS OF HUNTER'S POINT SOUTH WATERFRONT PARK						
BLOCK NO.	LOT NO.	2011-12	2017-18	INCREASE	RATIO	PERCENTAGE INCREASE
34	21	2,336,000	2497000	161,000	0.068921233	6.892123288
32	28	240000	307000	67,000	0.279166667	27.91666667
31	6	399000	528000	129,000	0.323308271	32.33082707
42	6	2101000	2578000	477,000	0.227034745	22.70347454
13	175	1591000	2525000	934,000	0.587052168	58.70521684
18	1	34956000	96890000	61,934,000	1.771770225	177.1770225
15	44	185000	233000	48,000	0.259459459	25.94594595
17	29	1250000	2151000	901,000	0.7208	72.08
33	21	663000	933000	270,000	0.407239819	40.7239819
36	75	1412000	2979000	1,567,000	1.109773371	110.9773371
AVERAGE PERCENTAGE INCREASE IN PROPERTY VALUES FROM 2012 TO 2017						57.54525959

After removing the upper and lower outliers, 177.1770225% and 6.892123288%, the average percentage increase in property values for 8 randomly-selected properties within 3 blocks of the park is: $391.38345/8 = 48.9229312\%$

Sources:

¹⁵ "New York City Dept. of Finance Digital Tax Map." #ReimagineZoLa. Accessed July 02, 2018. <http://gis.nyc.gov/taxmap/map.htm>.

¹⁶ "NYCProperty Select a BBL." City of New York, Dept of IT and Telecommunications. Accessed July 02, 2018. <https://nycprop.nyc.gov/nycproperty/nynav/jsp/selectbbl.jsp>.

Limitations:

- There are several factors that affect the real estate prices. While there is a positive increase in the property values in the Queens borough for the ten plots, there is no way to verify the extent to which the Hunter's Point South Waterfront Park contributed to the said increase in property value, particularly since property value increases varied so widely.

Cost Comparison Methods

The synthetic turf in the oval lawn had a higher installation cost of \$31.25 per sf, compared to \$3.75 per sf for natural turf installation. However, the maintenance cost for synthetic turf is projected to be \$3,500 total annually, compared to \$40,300 total for natural turf. Based on these projected annual costs, 7 years is the break-even point at which the synthetic turf will begin saving in maintenance costs, well before it needs to be replaced at 10 years.

Calculations:

Breakeven analysis (Assuming breakeven after Z years)

- Area of the oval lawn = 29,825 sf¹

Natural Turf:

- Unit price for the installation of natural turf = \$3.75/sf¹⁷
- Total installation cost for installing natural turf = \$3.75/sf x 29,825 sf
= \$195,000 (111,843.75)
- Annual maintenance cost for natural turf = \$40,300¹⁸
- Cost of resodding every two years = \$195,000
- Cost of resodding over Z years = \$195,000 x Z/2
= \$97,500 x Z

Synthetic Turf:

- Unit Price for the installation of synthetic turf = \$31.25/sf¹⁷
- Total installation cost for installing synthetic turf = \$31.25/sf x 29,825 sf
= \$1,625,000 (932,031.25)
- Annual maintenance Cost for synthetic turf = \$3,500¹⁸
- Replacement duration for synthetic turf = 10 years¹⁹
- Turf fabric replacement after Z years = \$5/sf¹⁹ x 29,825 sf x Z/10¹⁹
= \$26,000 (14,912.5) x Z

For Synthetic Turf:

Cost of initial installation + [Cost of annual maintenance X Z years] + Cost of turf replacement
Life Cycle Cost = 932,031.25 + [3500 x Z] + [14,912.5 x Z]

For Natural Turf:

Cost of initial installation + [Cost of annual maintenance X 20 years] + Cost of resodding
Life Cycle Cost = 111,843.75 + [40,300 x Z] + [97,500 x Z]

Since they break even, the calculated 'Life Cycle Cost' values will be the same for Synthetic Turf and Natural Turf after Z years. To calculate Z,
 $3,500Z + 14,912.5Z + 932,031.25 = 40,300Z + 97,500Z + 111,843.75$
or, $932,031.25 - 111,843.75 = 137,800Z - 18,412.5Z$
or, $820,187.5 = 119,387.5Z$
or, $Z = 820,187.5 / 119,387.5$
or, $Z = 6.97$ years (6 years 10 months)

Sources:

¹⁷ 2018 Engineer's Estimate for Bid Pricing, New York City Department of Parks and Recreation.
¹⁸ "Township of Denville Official Website." City Department. Accessed May 31, 2018. http://www.denvillenj.org/docs/Misc/Artificial_Turf_LifeCycle_Costs.pdf.

¹⁹ Dave Wheaton, AstroTurf Representative

Appendix I: National Stormwater Calculator Results for Hunter's Point South Waterfront Park- Phase 1

Site Description	
Parameter	Current Scenario
Site Characteristics	
Site Area (acres)	5.25
Hydrologic Soil Group	C
Hydraulic Conductivity (in/hr)	0.02
Surface Slope (%)	2
Precip. Data Source	NY CITY CENTRAL PARK
Evap. Data Source	NY CITY CENTRAL PARK
Climate Change Scenario	None
Land Cover	
% Forest	0
% Meadow	0
% Lawn	35
% Desert	0
% Impervious	65
LID Controls	
Disconnection	0
Rain Harvesting	0
Rain Gardens	0
Green Roofs	0
Street Planters	0
Infiltration Basins	22.7
Porous Pavement	73
Analysis Options	
Years Analyzed	10
Ignore Consecutive Wet Days	False
Wet Day Threshold (inches)	0.01



Location

Directions

Bring your site into view on the map and then mark its exact location by clicking the mouse pointer over it or entering your address or zip code below.

Press the  icon to have the map locate

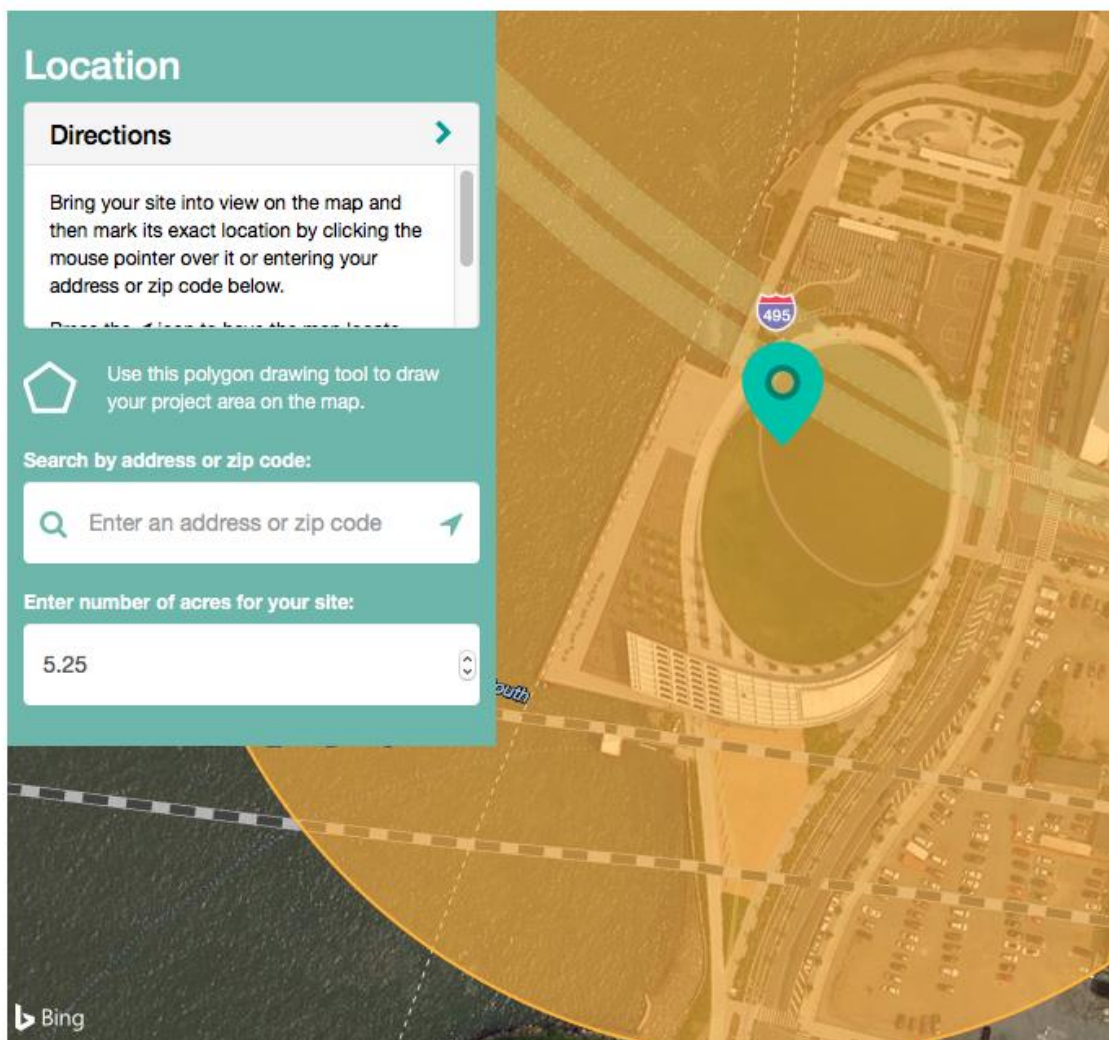


Use this polygon drawing tool to draw your project area on the map.

Search by address or zip code:



Enter number of acres for your site:









Soil Type

Directions

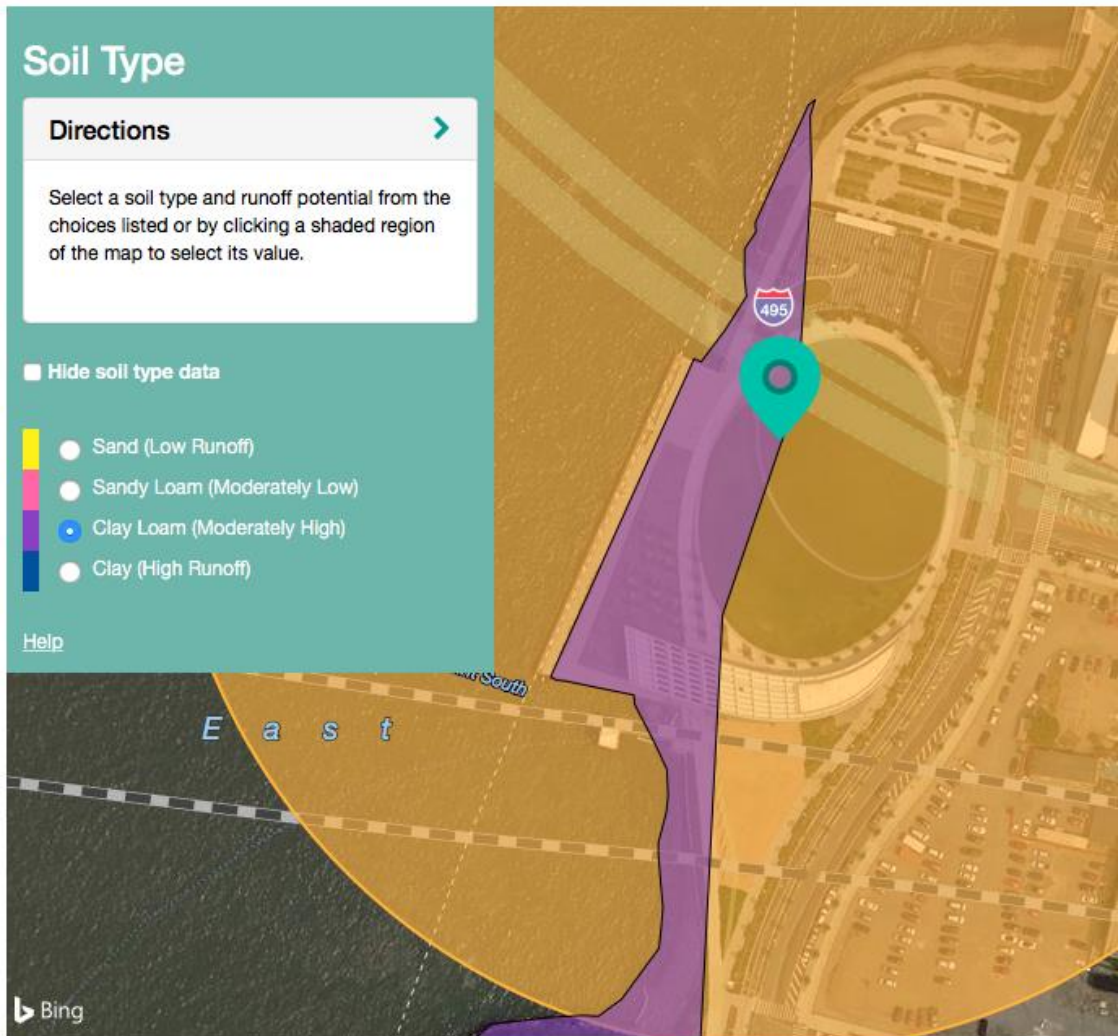


Select a soil type and runoff potential from the choices listed or by clicking a shaded region of the map to select its value.

☐ Hide soil type data

-  Sand (Low Runoff)
-  Sandy Loam (Moderately Low)
-  Clay Loam (Moderately High)
-  Clay (High Runoff)

[Help](#)





Soil Drainage

Directions



Enter your own conductivity value directly into the input field below or click a shaded region on the map to select its conductivity value. If you leave the edit box blank, the default conductivity associated with the

☐ Hide soil type data

-  ≤ 0.01 inches/hour
-  > 0.01 to ≤ 0.1 inches/hour
-  > 0.1 to ≤ 1.0 inches/hour
-  > 1 inches/hour

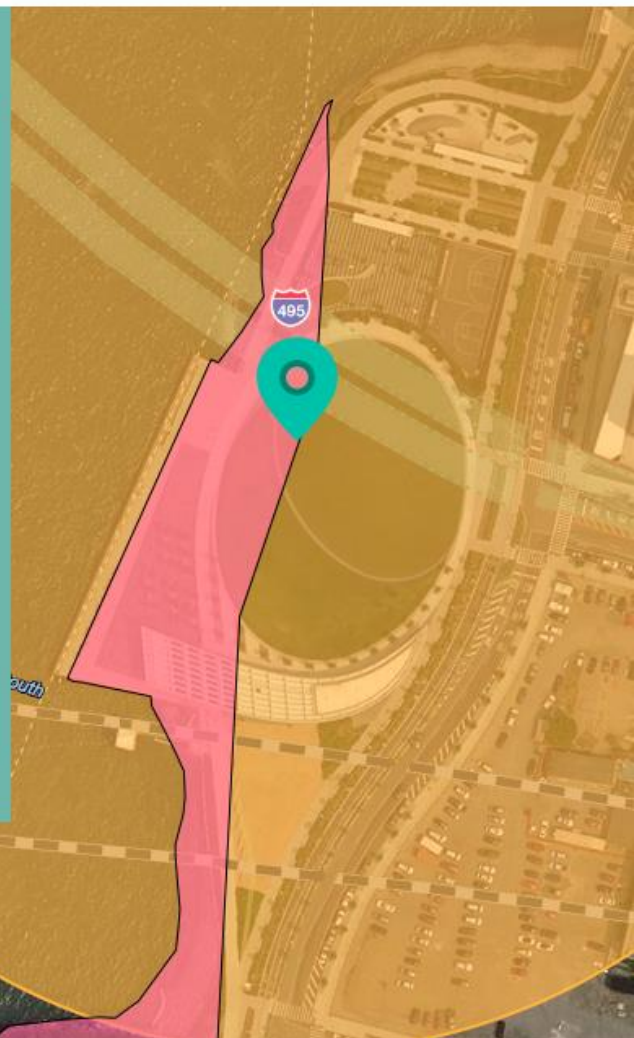
How fast does rainwater runoff from pervious areas of your site (inches/hour)?

0.02



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Topography

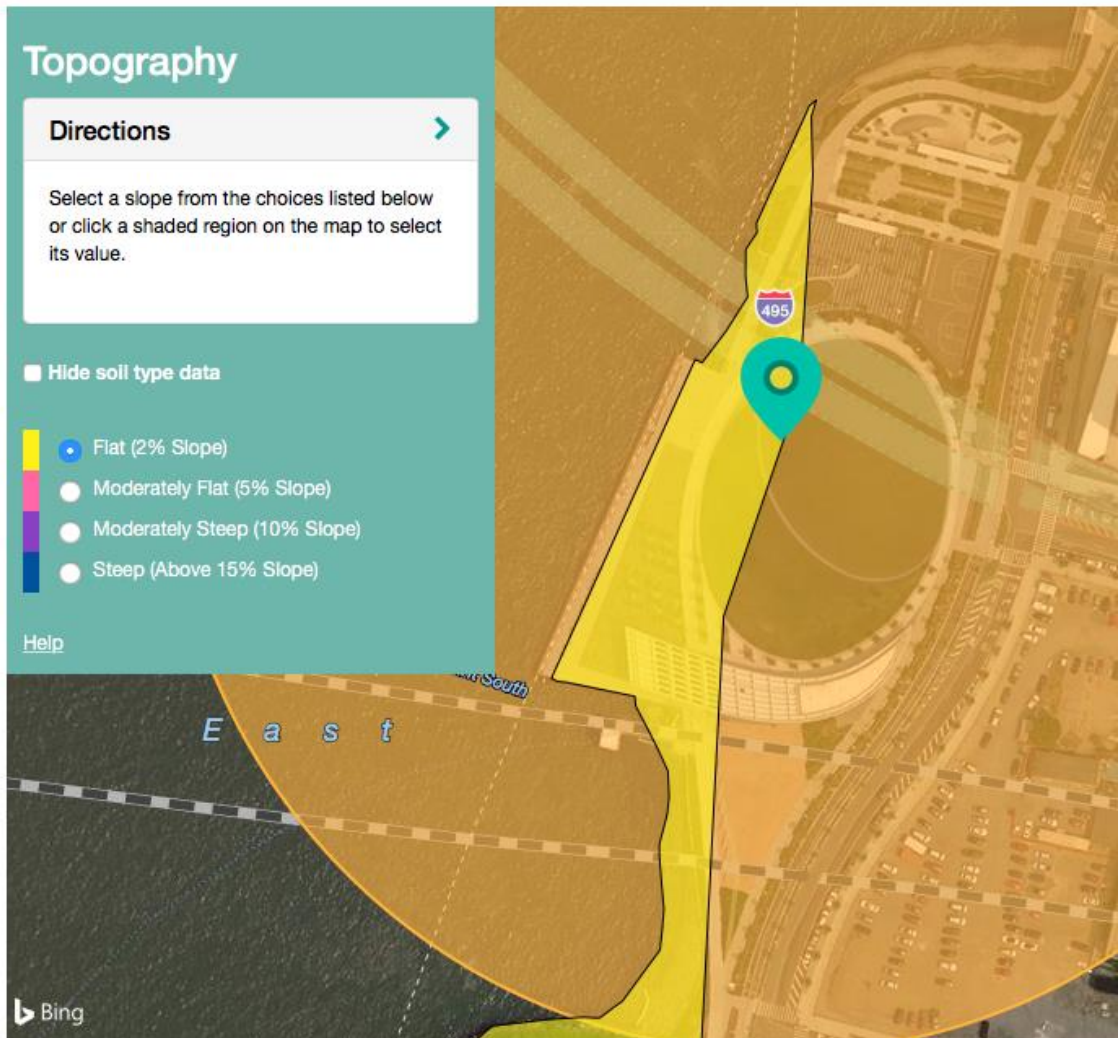
Directions

Select a slope from the choices listed below or click a shaded region on the map to select its value.

☐ Hide soil type data

-  Flat (2% Slope)
-  Moderately Flat (5% Slope)
-  Moderately Steep (10% Slope)
-  Steep (Above 15% Slope)

[Help](#)





Precipitation/Evaporation

Directions



Select a rain gage location to use as a source of hourly rainfall data and a weather station to use as a source for evaporation rates.

Select the checkbox if you would like the

Rain Gage:



NY CITY CENTRAL PARK

Weather Station:



NY CITY CENTRAL PARK

Rainfall Information:

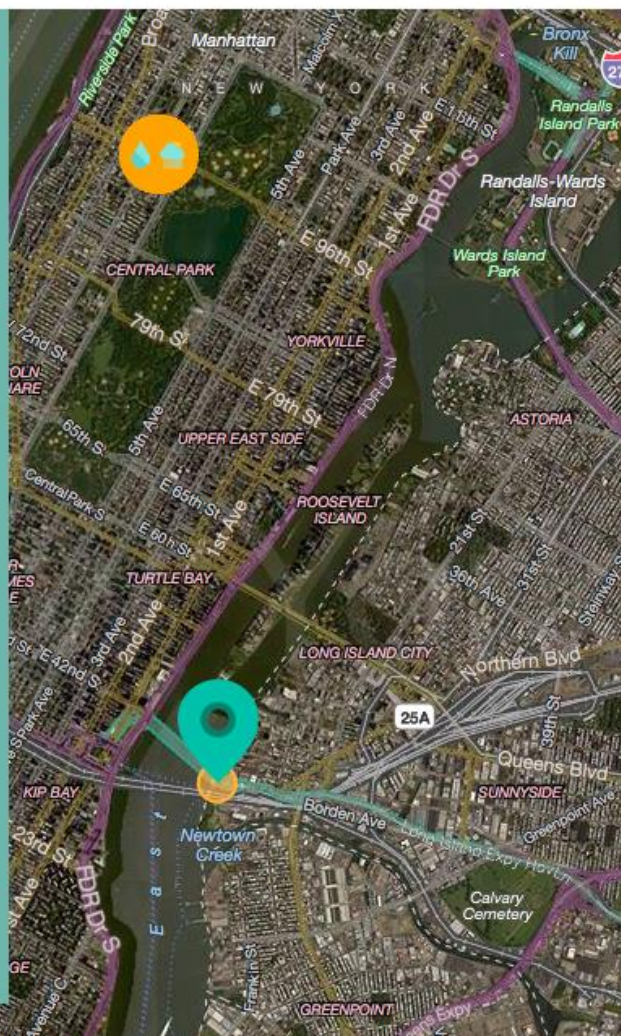


Record Start Date: 1970/01/01
Record End Date: 2006/12/31
Annual Rainfall: 49.36

[Download rainfall/evaporation data](#)

[Help](#)

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Climate Change

Directions

Helpful Resources

Select a future climate change scenario to apply:

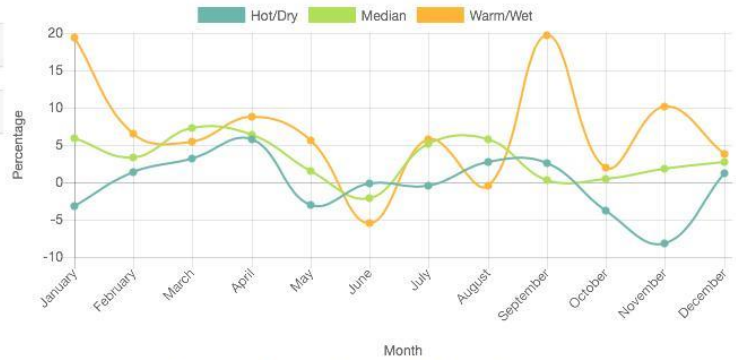
- ☐ No Change
- ☐ Hot/Dry
- ☒ Median Change
- ☐ Warm/Wet

Select the time period to which the climate change scenario applies:

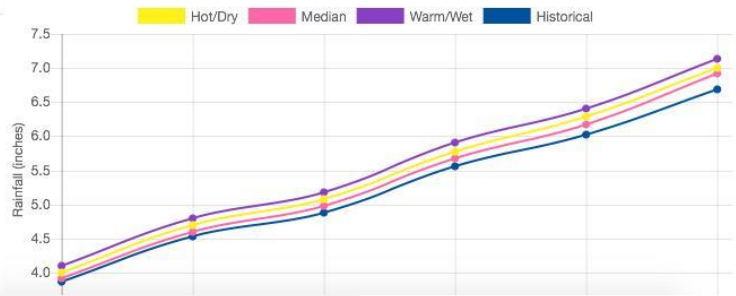
- ☐ Near Term (2020 - 2049)
- ☒ Far Term (2045 - 2074)

Print Charts to PDF
File

Percentage Change in Monthly Rainfall for Far Term Projections



Annual Max. Day Rainfall (inches) for Far Term Projections





Land Cover

Directions



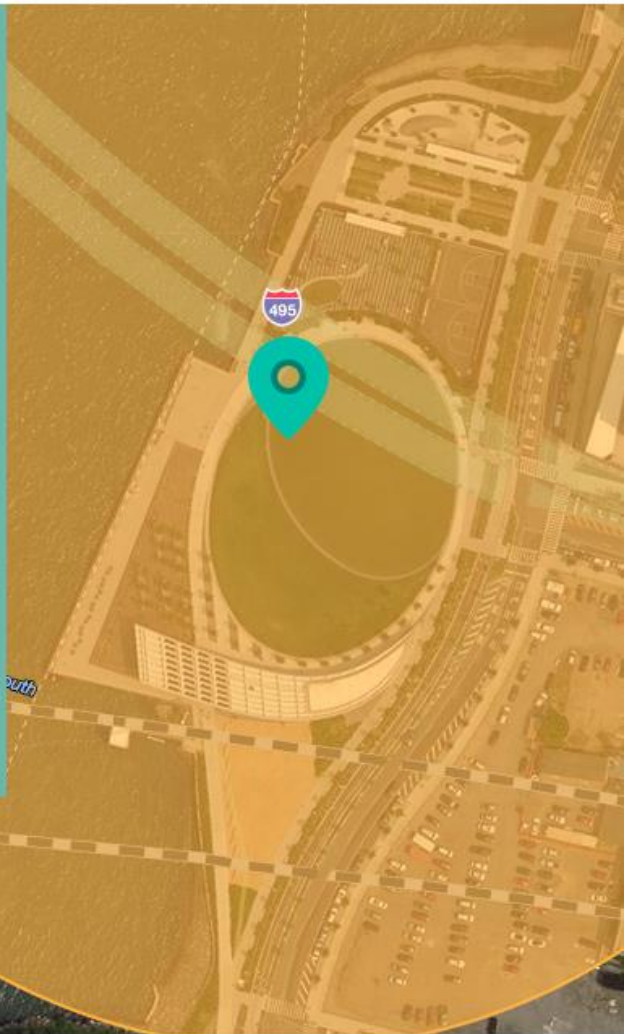
Describe the site's land cover for the development scenario being analyzed.

Click on a category to see a more detailed description.

Forest:	<input type="range"/>	0	%
Meadow:	<input type="range"/>	0	%
Lawn:	<input type="range"/>	35	%
Desert:	<input type="range"/>	0	%
Impervious:		65	%

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LID Controls

Directions

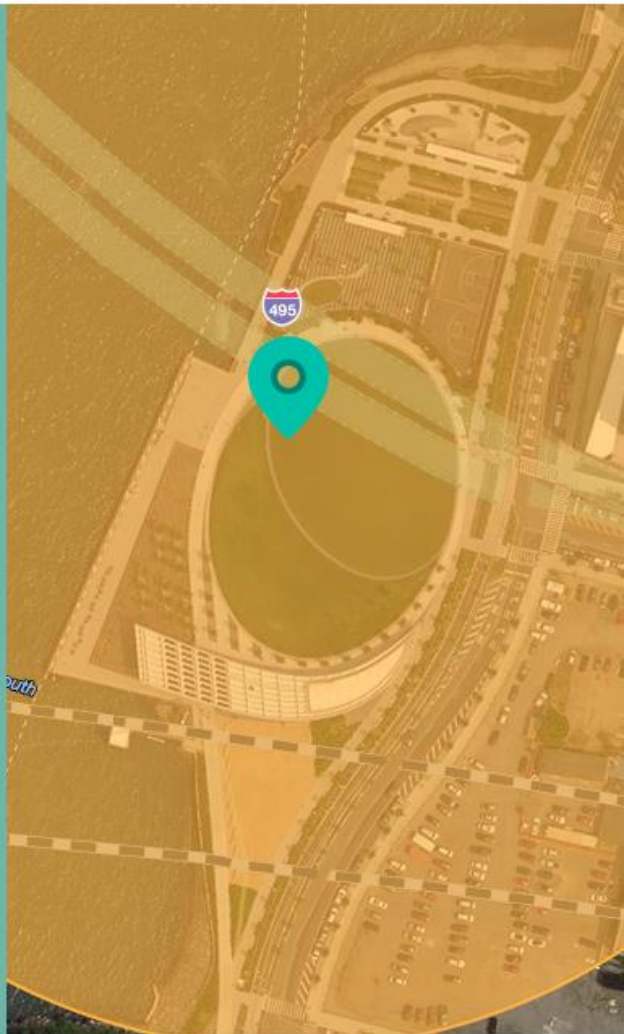
Enter the percentage of your site's impervious area would like to be treated by the listed LID Controls.

Click a practice to learn more about it or to change its design parameters.

<u>Disconnection:</u>	<input type="range"/>	0	%
<u>Rain Harvesting:</u>	<input type="range"/>	0	%
<u>Rain Gardens:</u>	<input type="range"/>	0	%
<u>Green Roofs:</u>	<input type="range"/>	0	%
<u>Street Planters:</u>	<input type="range"/>	0	%
<u>Infiltration Basins:</u>	<input type="range"/>	22	%
<u>Permeable Pavement:</u>	<input type="range"/>	73	%

Design Storm for Sizing: 6 in.

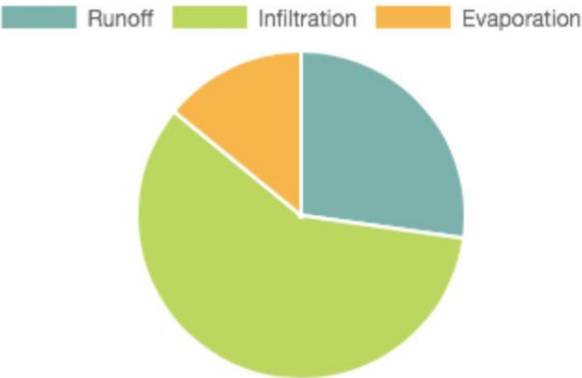
[Help](#)



Summary Results

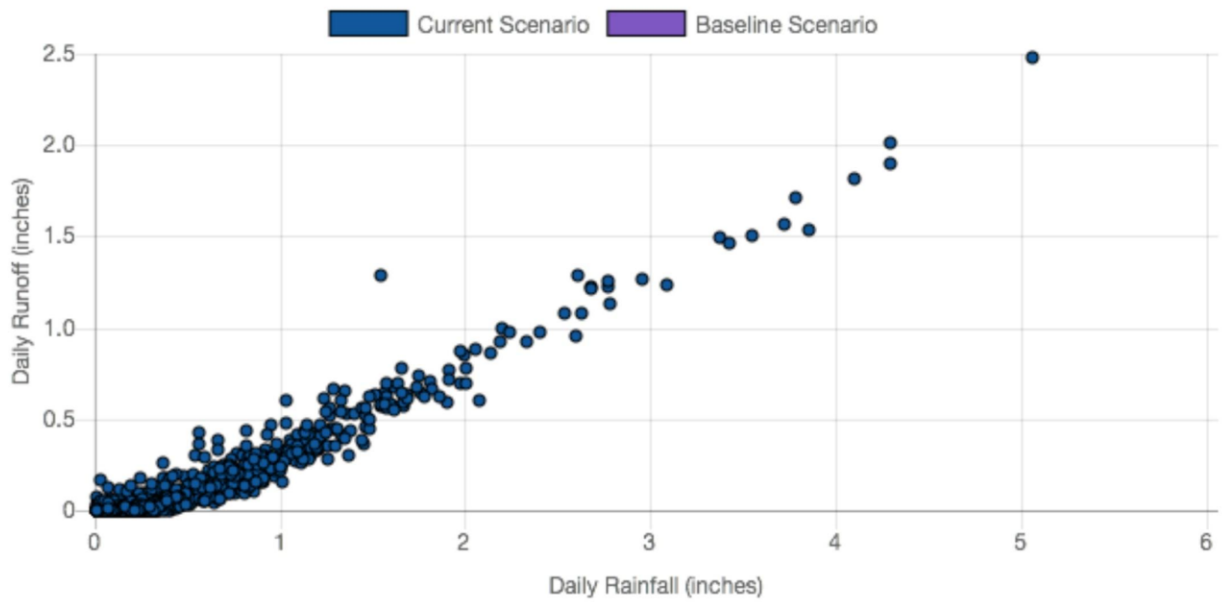
Current Scenario

Annual Rainfall: 49.71 in.

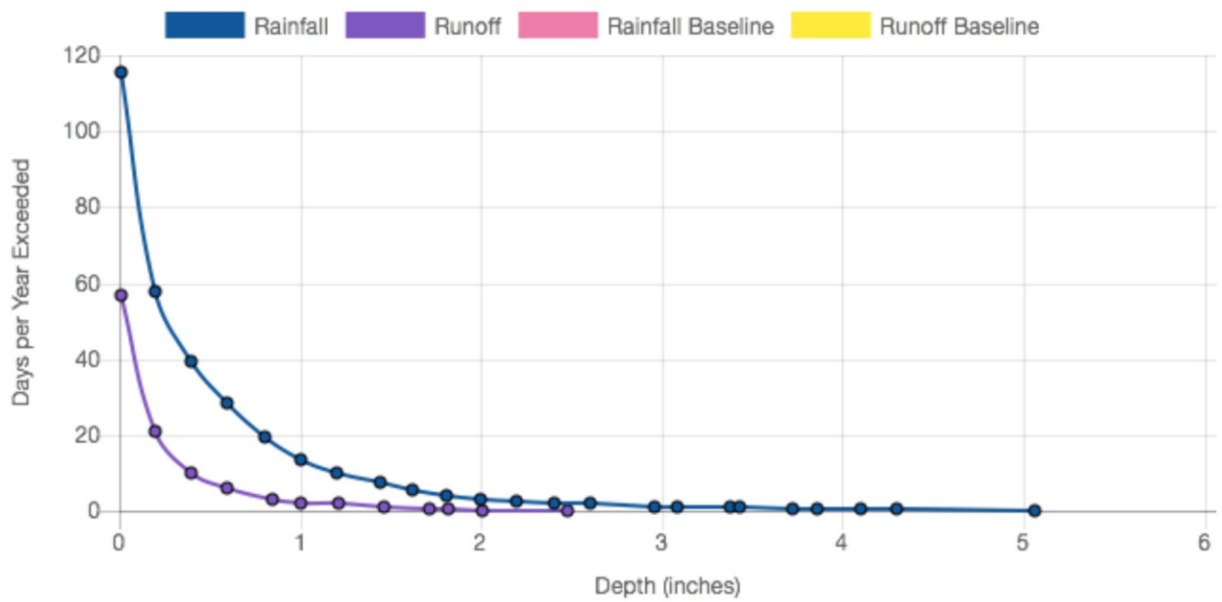


Statistic	Current Scenario
Average Annual Rainfall (inches)	49.71
Average Annual Runoff (inches)	13.59
Days per Year with Rainfall	115.54
Days per Year with Runoff	56.87
Percent of Wet Days Retained	50.78
Smallest Rainfall w/ Runoff (inches)	0.01
Largest Rainfall w/ Runoff (inches)	0.41
Max Rainfall Retained (inches)	2.58

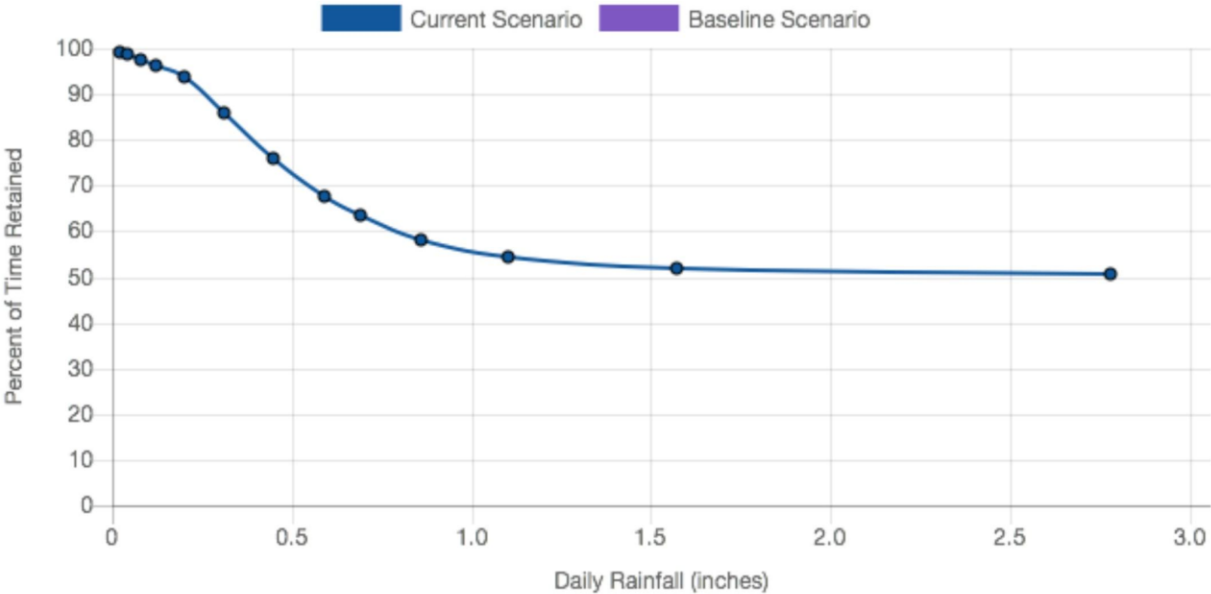
Rainfall / Runoff Events



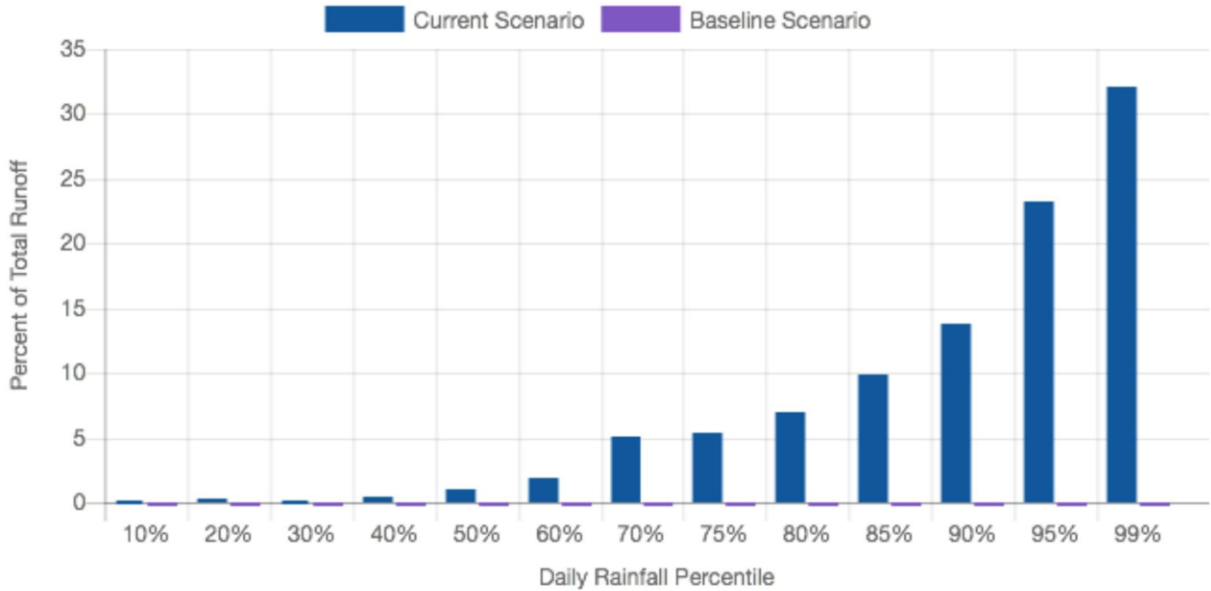
Rainfall / Runoff Exceedance Frequency



Rainfall Retention Frequency

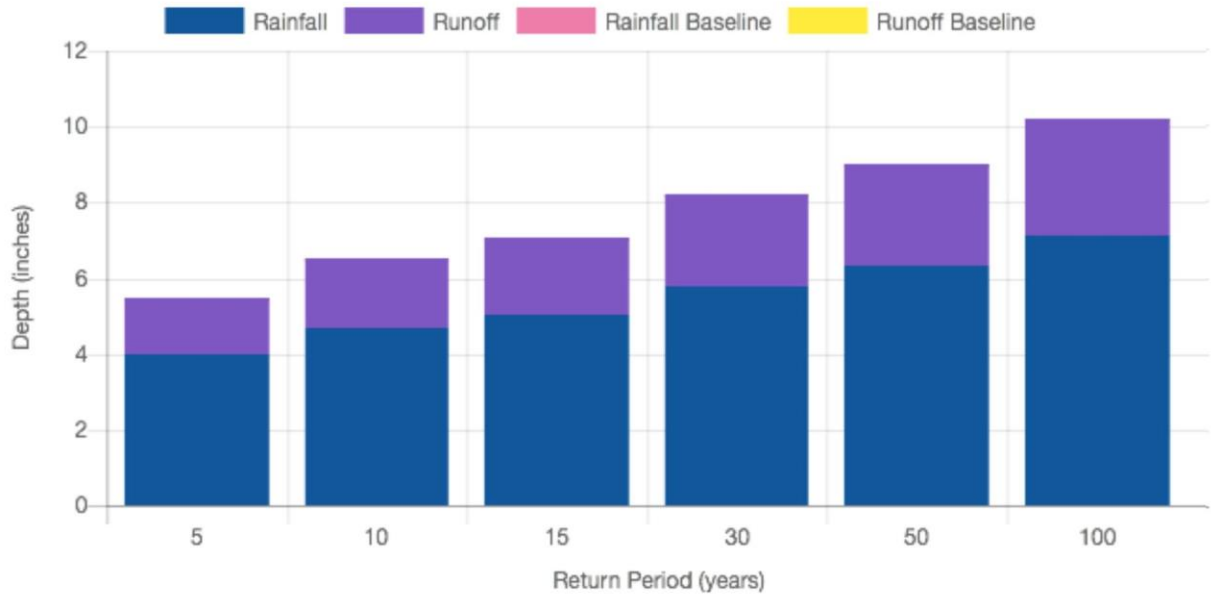


Runoff Contribution by Rainfall Percentile



Extreme Event Rainfall / Runoff

Extreme Event Rainfall / Runoff Depth



Extreme Event Peak Rainfall / Runoff

