United States Environmental Protection Agency

WEFTEC 2017
Stormwater Pavilion
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U.S. EPA National Stormwater Calculator Mobile Web Application

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U.S. EPA's Office of Research and Development

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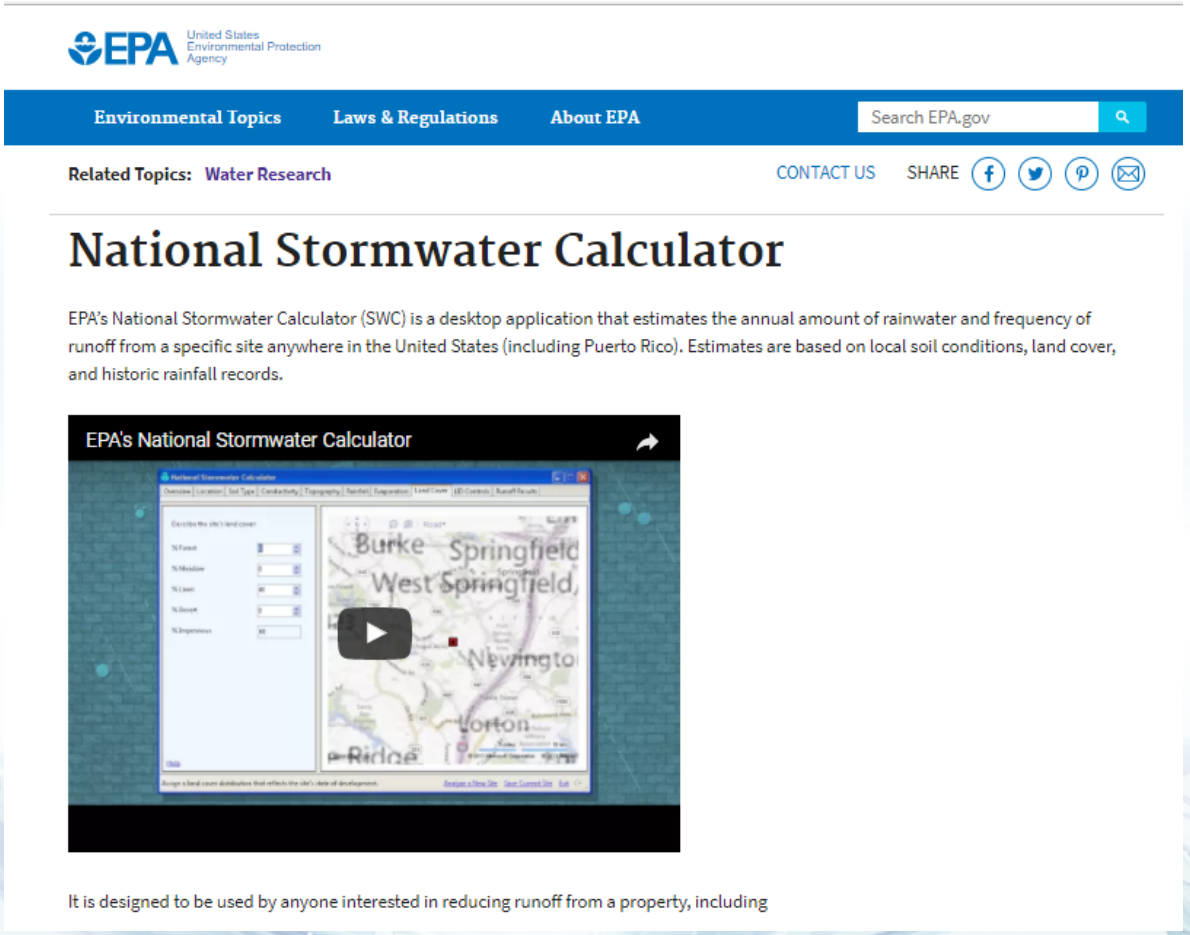
Outline

U.S. EPA National Stormwater Calculator Mobile Web App

- Stormwater Calculator Background Information
- Development of Mobile Web Application
- Example Application: Chicago, IL
- Interpreting Results
- Next Steps
- Discussion & Questions

National Stormwater Calculator Website



http://www2.epa.gov/water-research/national-stormwater-calculator

What Have We Created and Why?

- **A Stormwater Management (Green Infrastructure/Low Impact Development (LID)) Design and Planning Tool**
  - To model post-construction urban stormwater runoff discharges
  - Screening-level stormwater runoff reduction and cost analyses of various green infrastructure/low impact development (LID) practices, including:
    - Green roofs, rain gardens, cisterns, etc. throughout the U.S.
  - Allow non-technical professionals to conduct screening level stormwater runoff for small to medium sized (less than 1 - 12 acres) sites

Potential Applications

- State or MS4 (Municipal Separate Storm Sewer System) Post Construction Stormwater Design Standards
- Voluntary Stormwater Retrofits for private property owners
- Voluntary Programs: LEED (U.S. Green Building Council) and Sustainable Sites Initiative stormwater credits
- Climate Resiliency Planning: Rockefeller Foundation's 100 Resilient Cities
- LID/Green Infrastructure Design Competitions: Campus RainWorks Challenge, DC Water Green Infrastructure Challenge, etc.

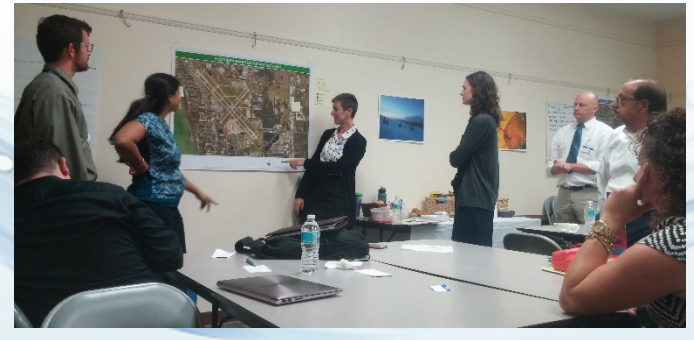
Communities using the SWC

- Northeastern Regional Ohio Sewer District (Cleveland, OH):

https://www.neorsd.org/stormwater-2/green-infrastructure-grant-program

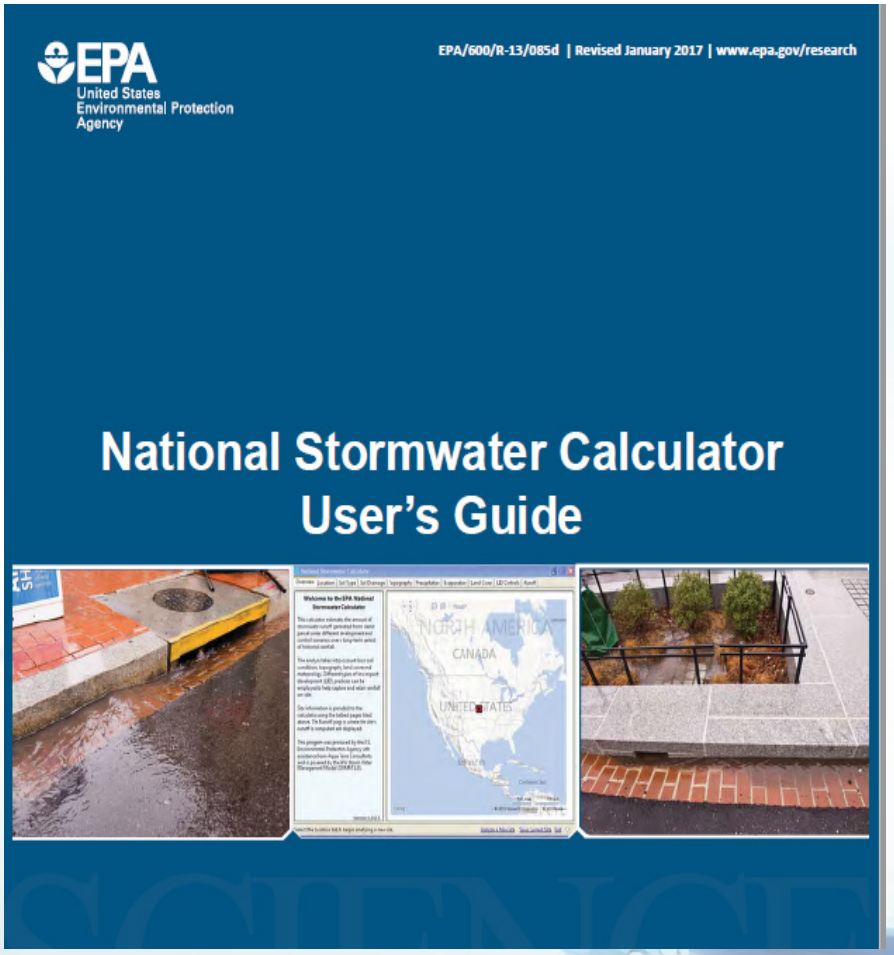
/

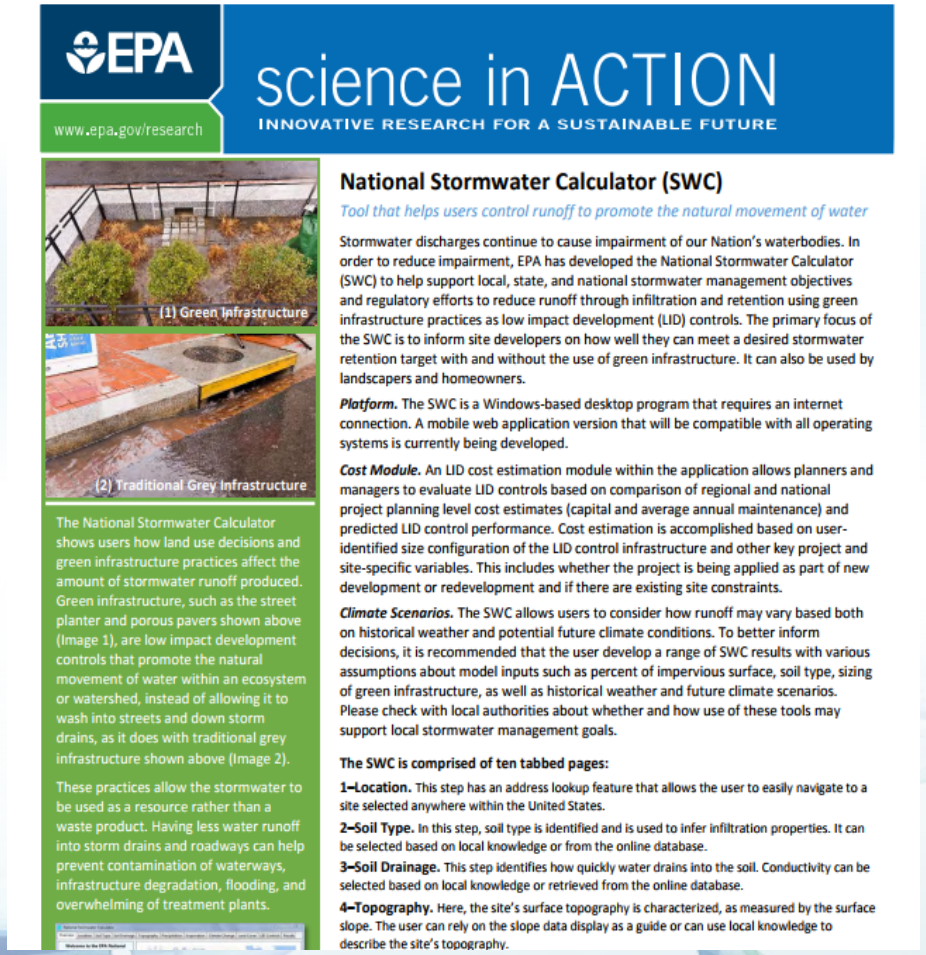
- EPA's Green & Complete Streets Building Blocks Program Recipients (2016- 2017):
  - Manatee County, FL
  - Baltimore, MD
  - Central Falls, RI



https://www.epa.gov/smartgrowth/building-blocks-sustainable-communities

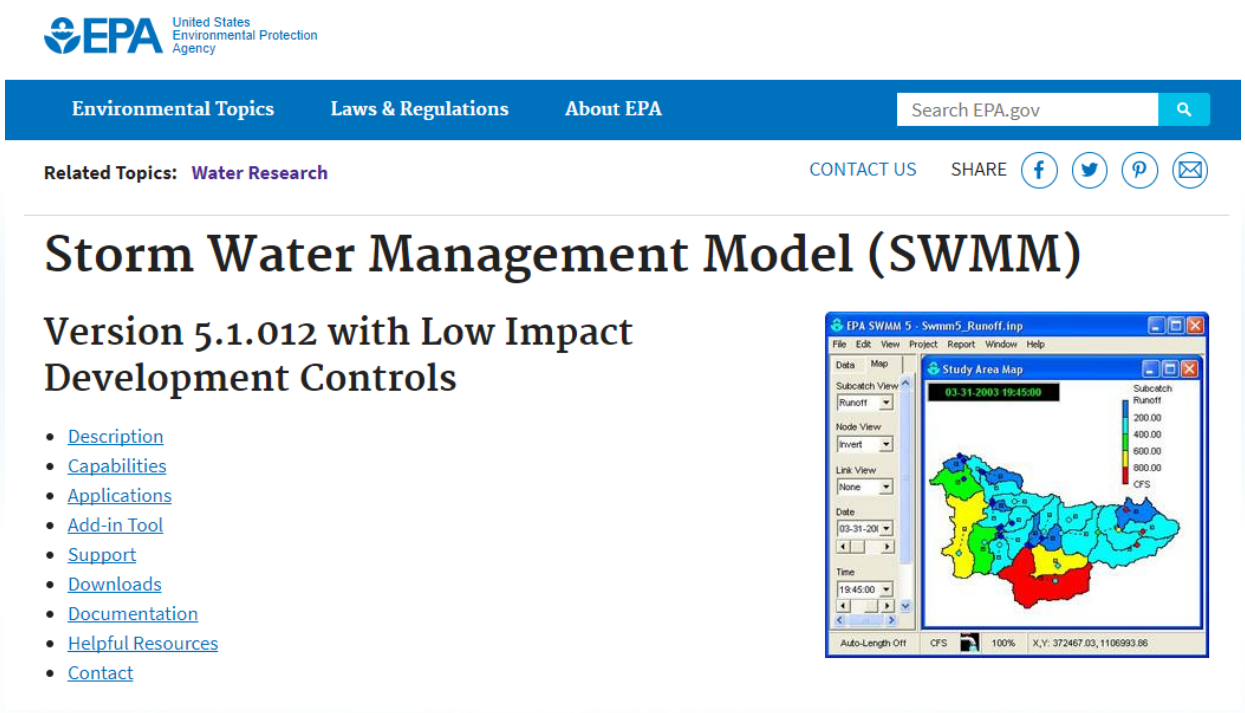
Training and Outreach Materials:
User's Guide & Fact Sheet





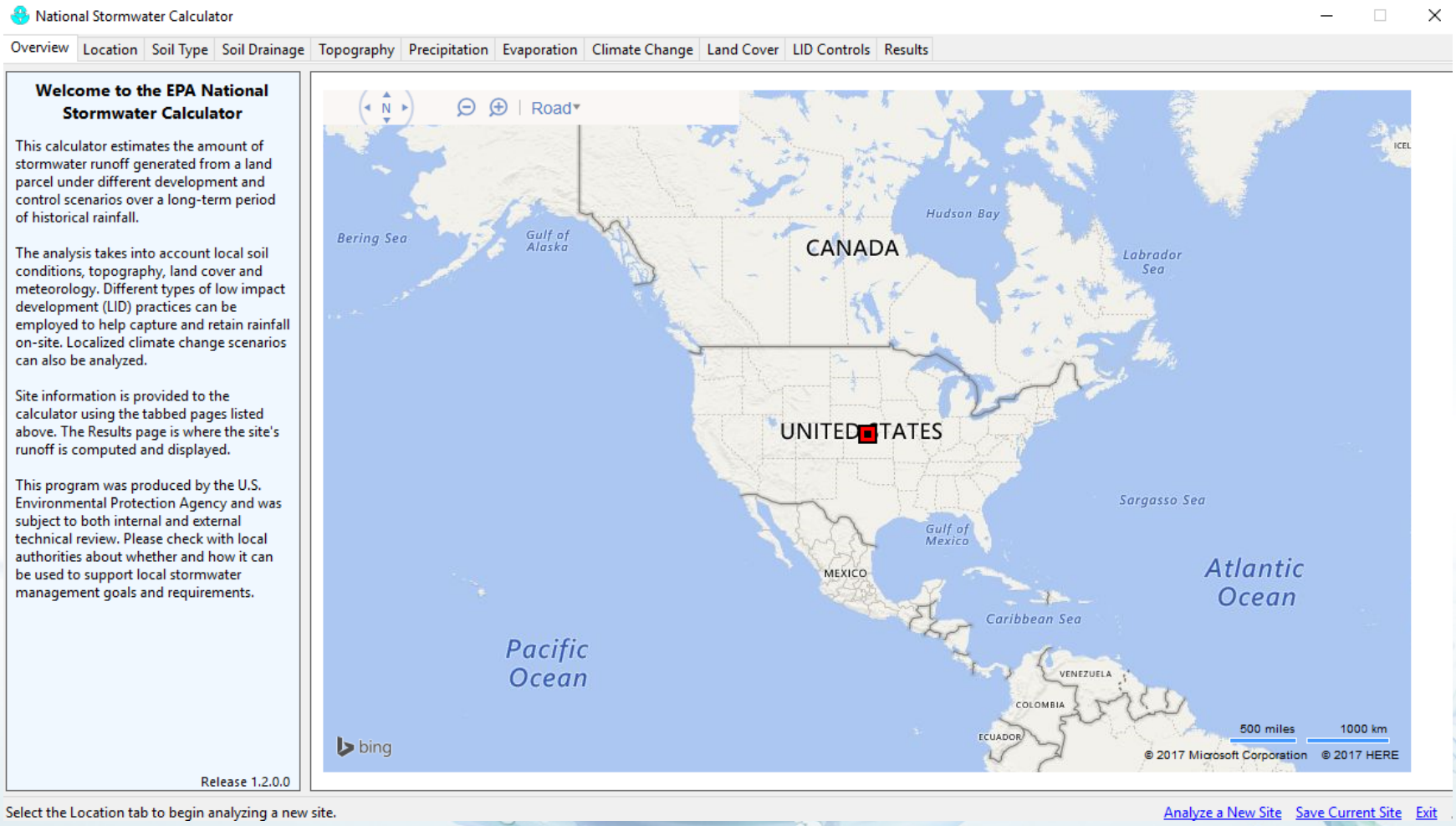
http://www2.epa.gov/water-research/national-stormwater-calculator

Storm Water Management Model (SWMM)

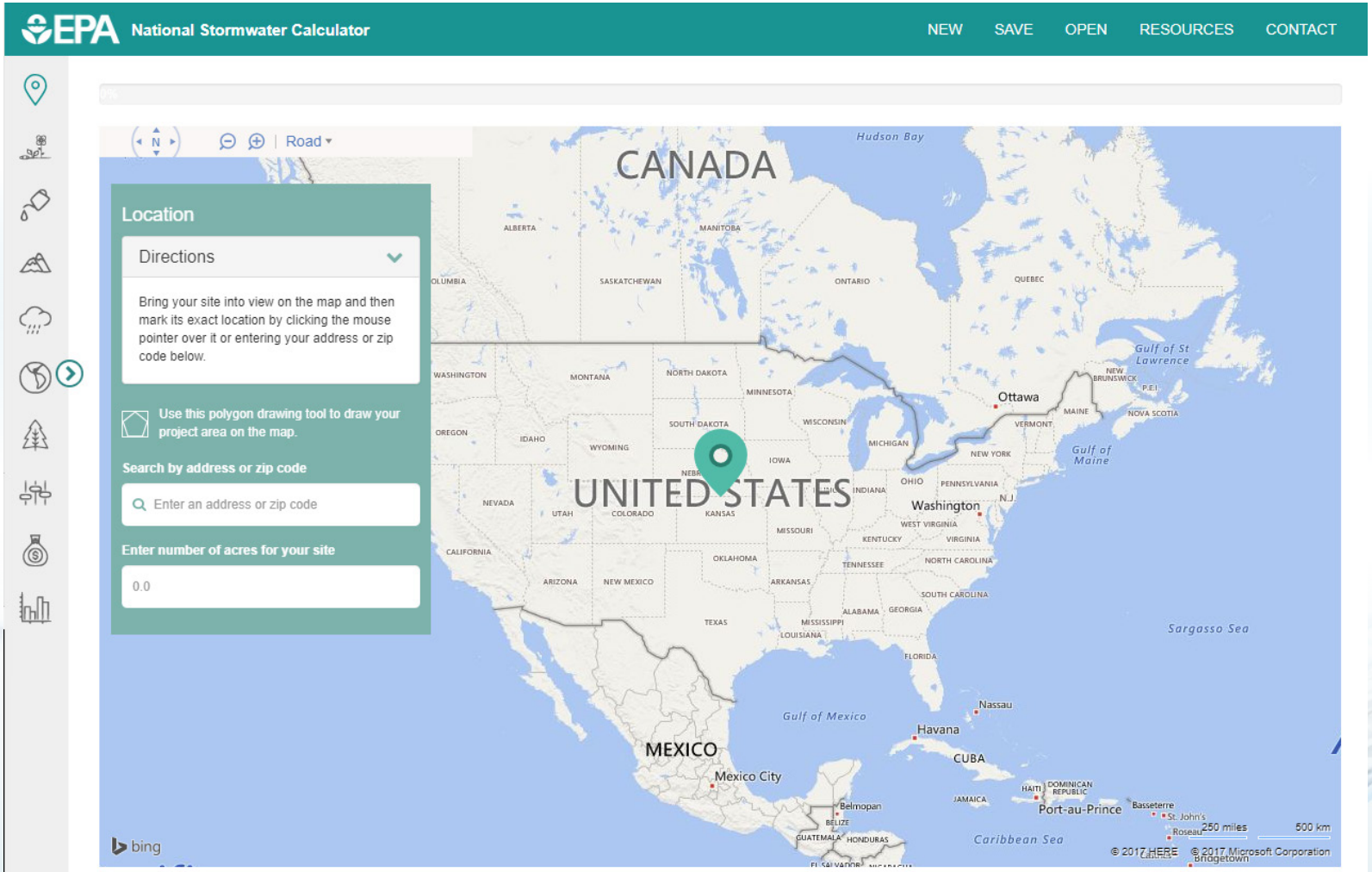


- Calculator is based on SWMM: Dynamic rainfall-runoff simulation model for long-term simulation of runoff quantity
- SWMM produces stormwater runoff estimates in the background of the Stormwater Calculator

National Stormwater Calculator (SWC) Desktop Application

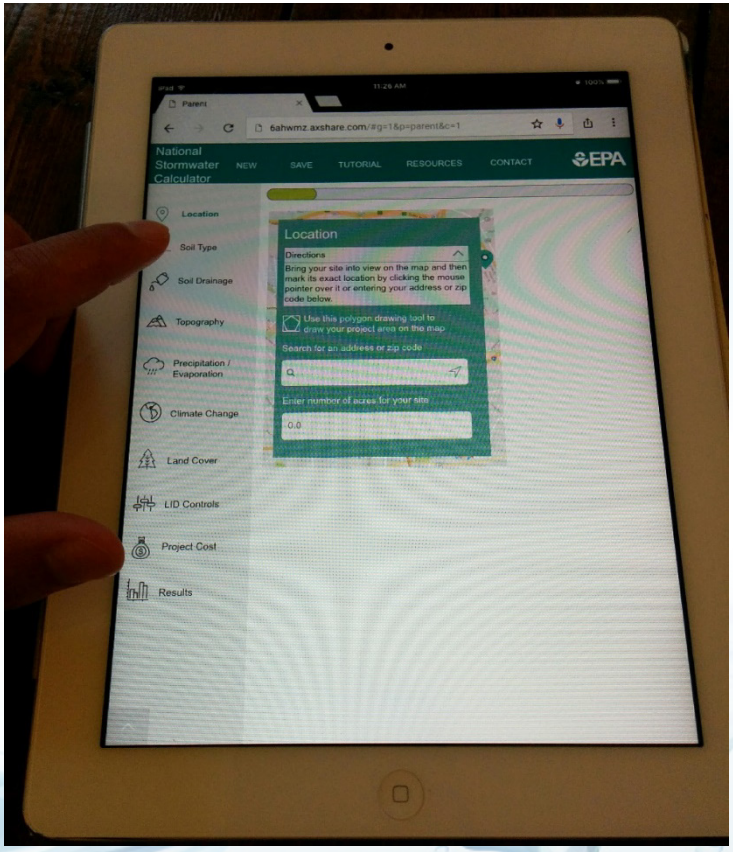


SWC Mobile Web App



Mobile Web App Development: 2016 - 2017

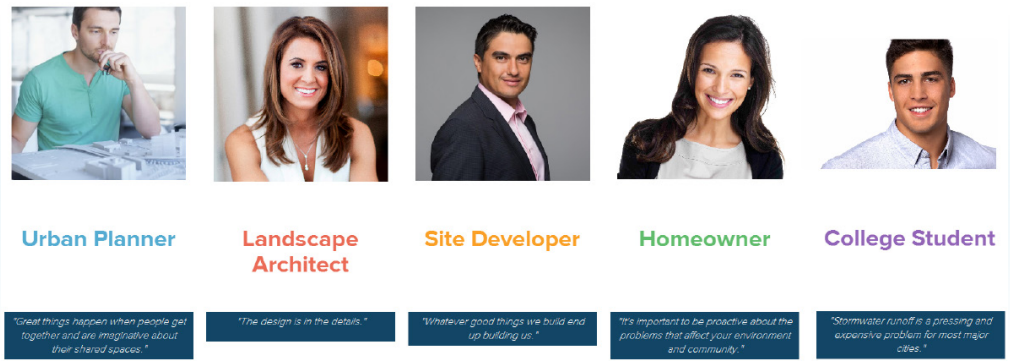
- **Ability to function on any web browser**
- **Mobile friendly design (tablets and smartphones)**
- **Platform neutral: functions on Windows, Apple, and Linux computers**
- **Not found in an "app store" (Google Play or Apple Store)**
  - **Save it as a "favorite" website**
- ***Requires a live Internet connection***



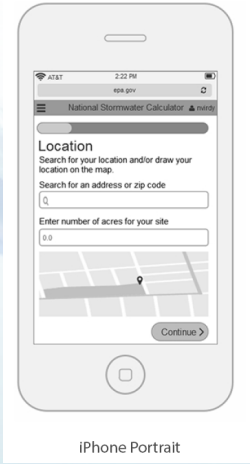
Mobile Web App Development: 2016 - 2017

- **Gathered user information on existing desktop application of the SWC (Spring 2016)**

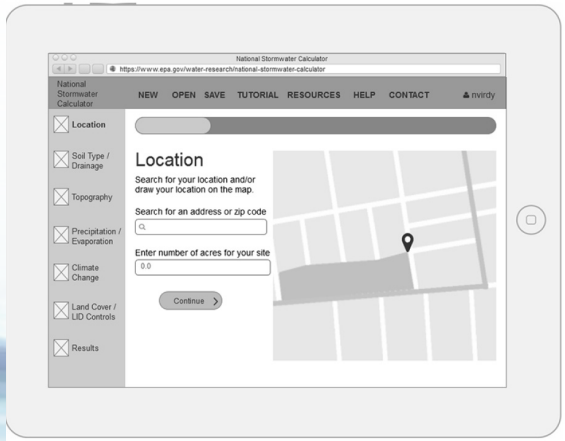
User Persona Comparison



- **Wireframe Development of web app user interface (Spring – Summer 2016)**



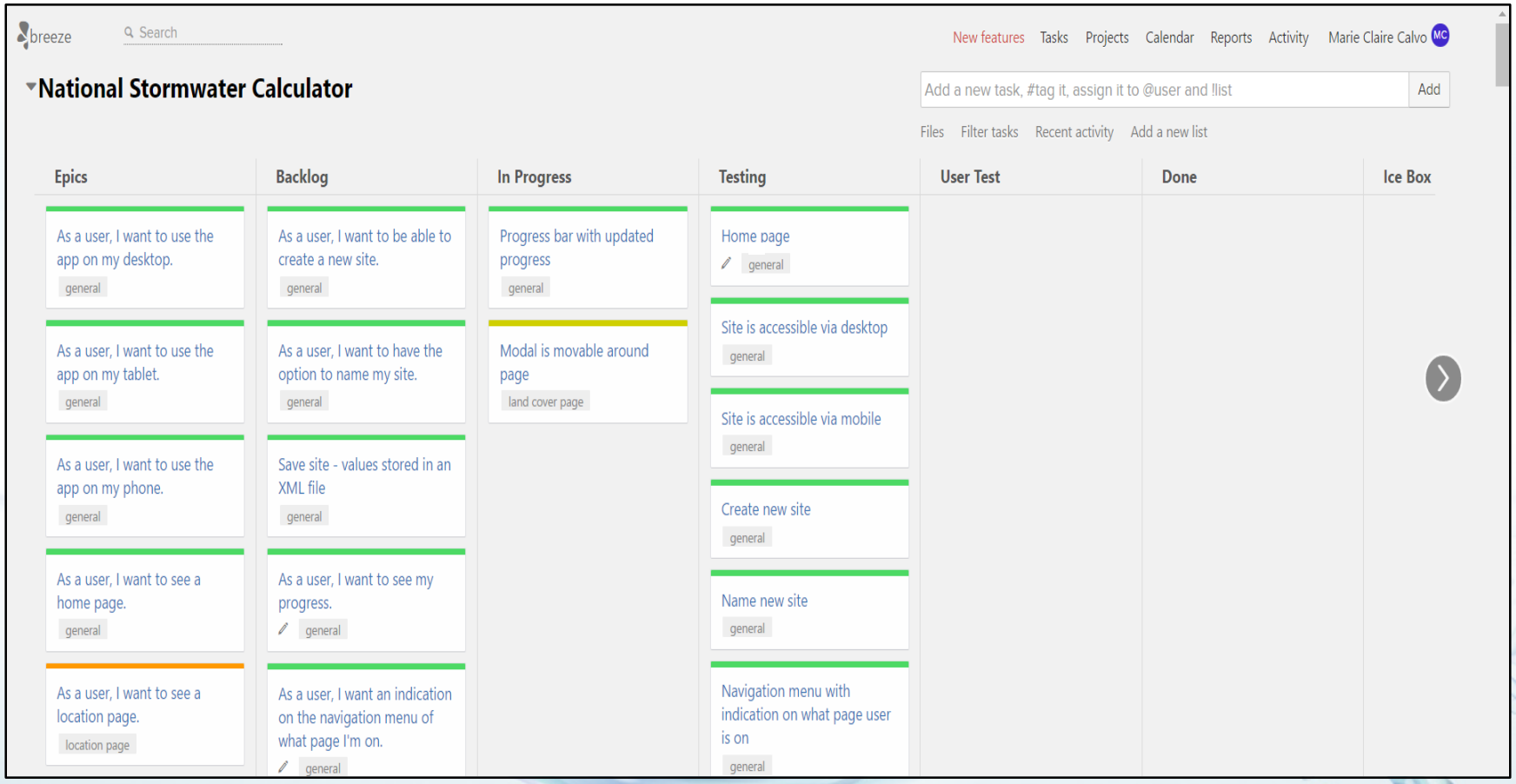
iPhone Portrait



iPad Landscape

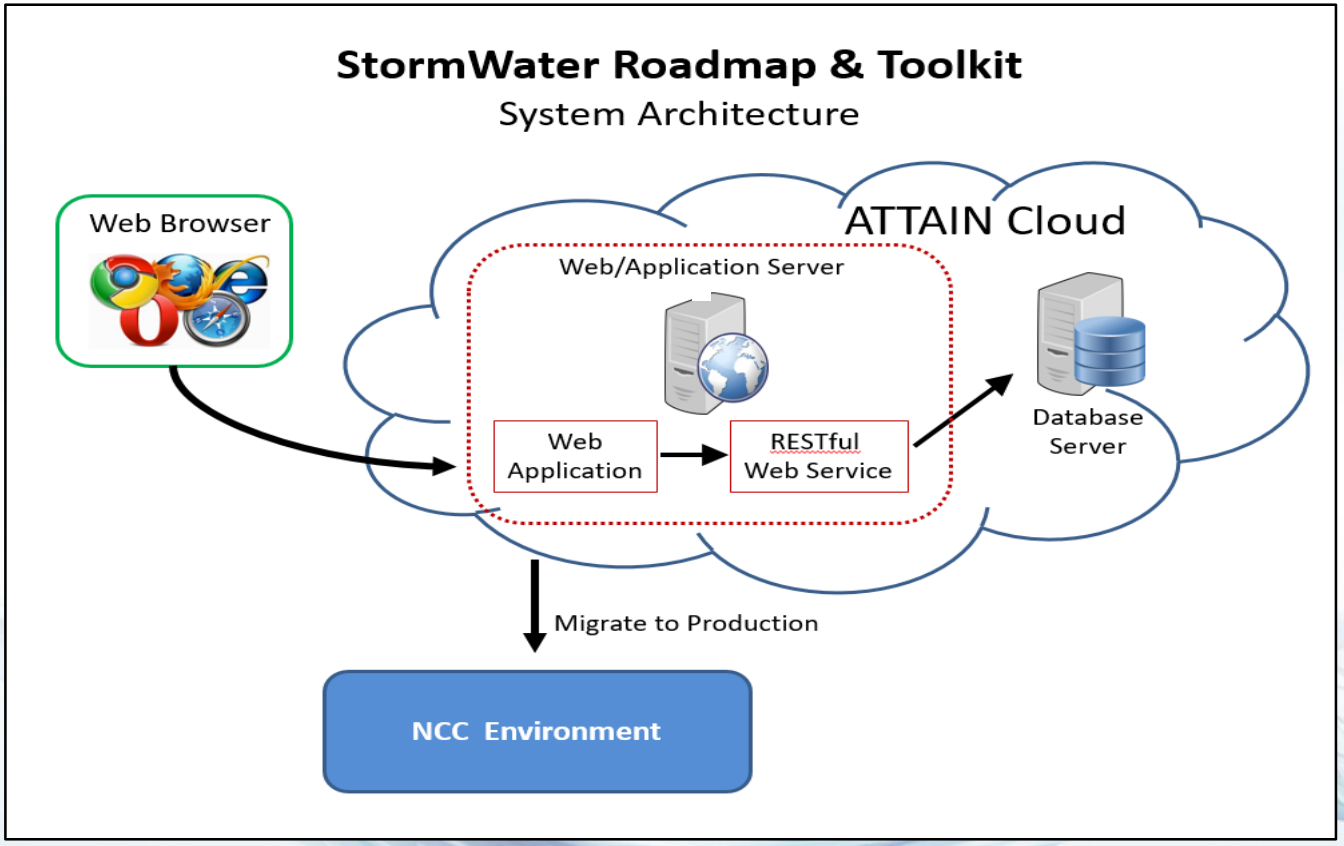
Mobile Web App Development: 2016 - 2017

- **Agile Development internal user testing (Winter – Spring 2017)**



Mobile Web App Development: 2016 - 2017

- **Public Server staging and production testing (Summer 2017)**

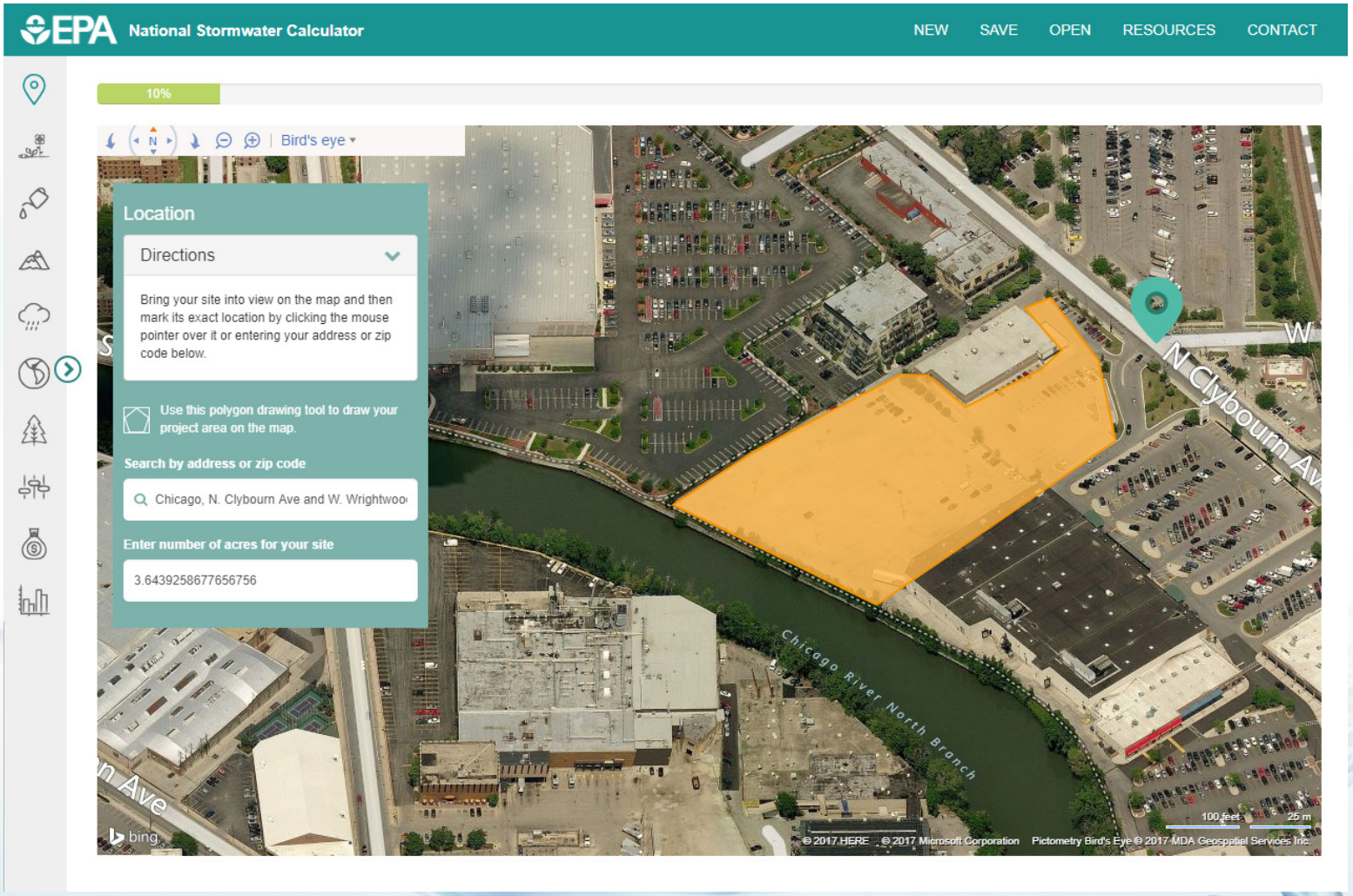


SWC:
Site Parameters and Embedded GIS Data-sets

- **Location:** Bing Maps
- **Soils:** NRCS SSURGO *(web service)*
- **Slope:** NRCS SSURGO
- **Hydraulic Conductivity:** NRCS SSURGO
- **Precipitation and Temperature:** National Climate Center (NCDC)-NOAA *(EPA's BASINS Model)*
- **Evaporation:** Calculation based on meteorological data
- **Climate Change Future Scenarios:** Precipitation & evaporation *(EPA's CREAT 2.0)*
- **Land-Cover/Use:** User provided
- **LID Practices (*new costing module available*):** User provided

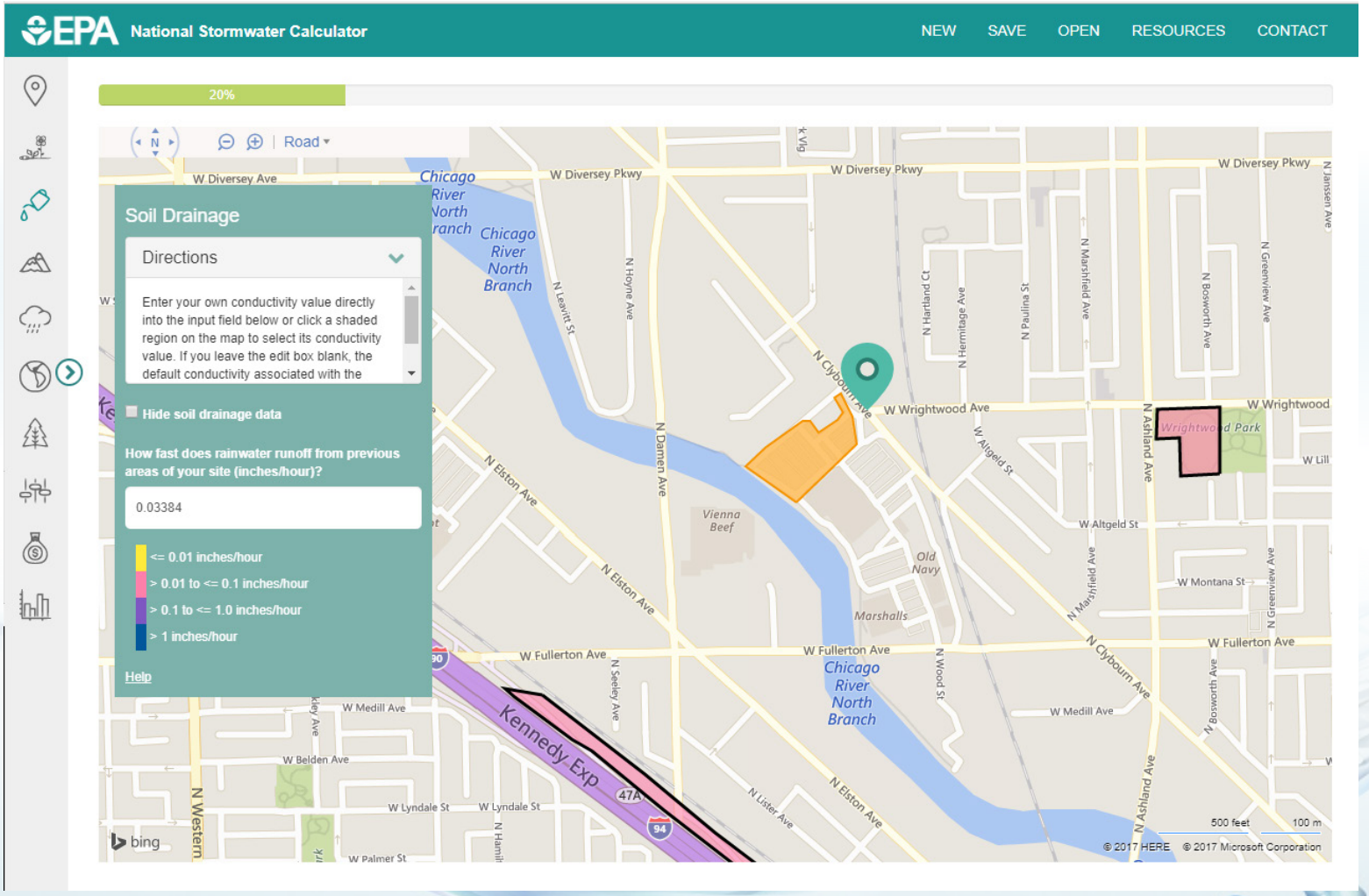
SWC Mobile Web App Tour (Chicago, IL)

Location:



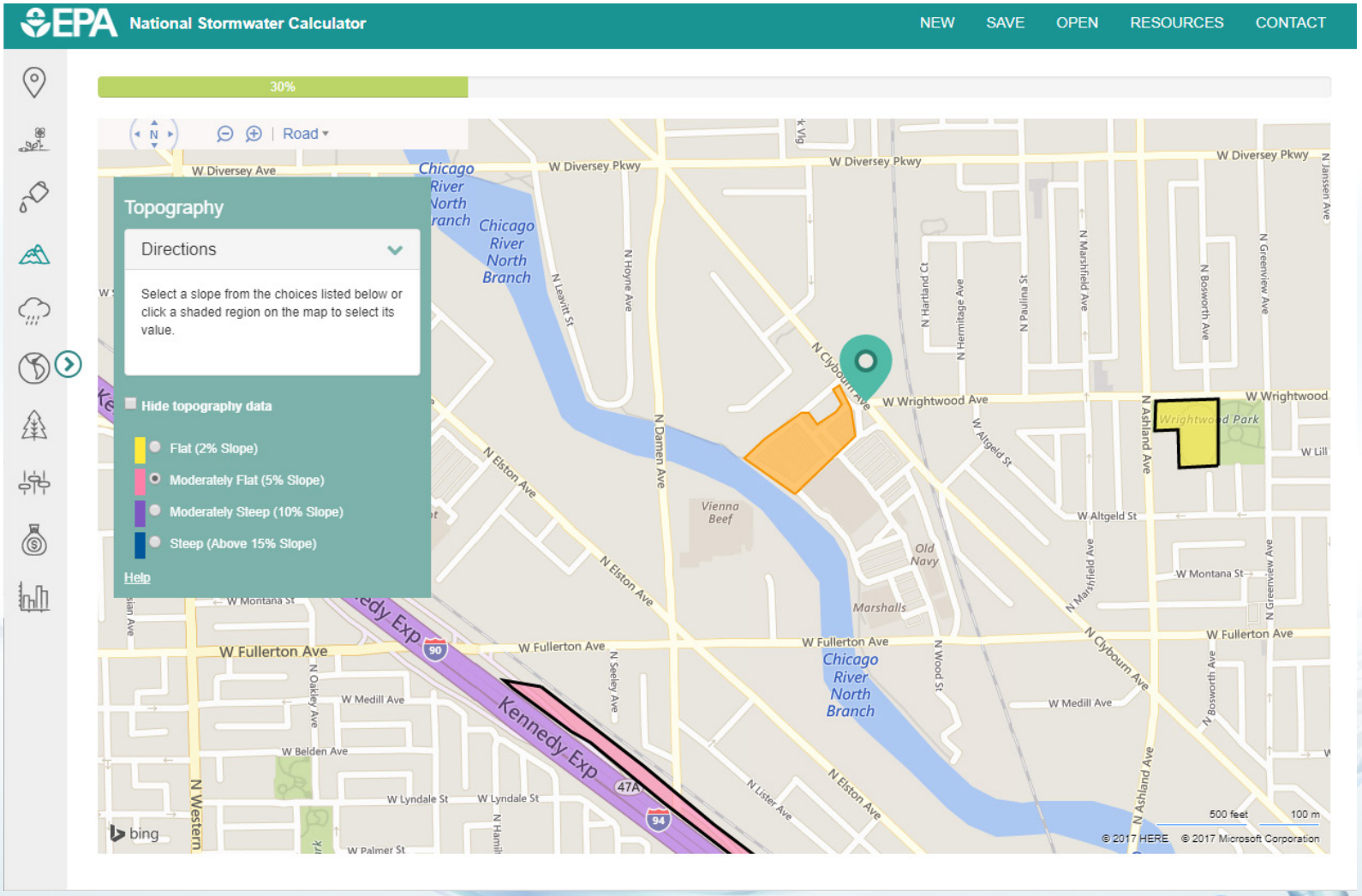
SWC Mobile Web App Tour (Chicago, IL)

Soil Drainage:



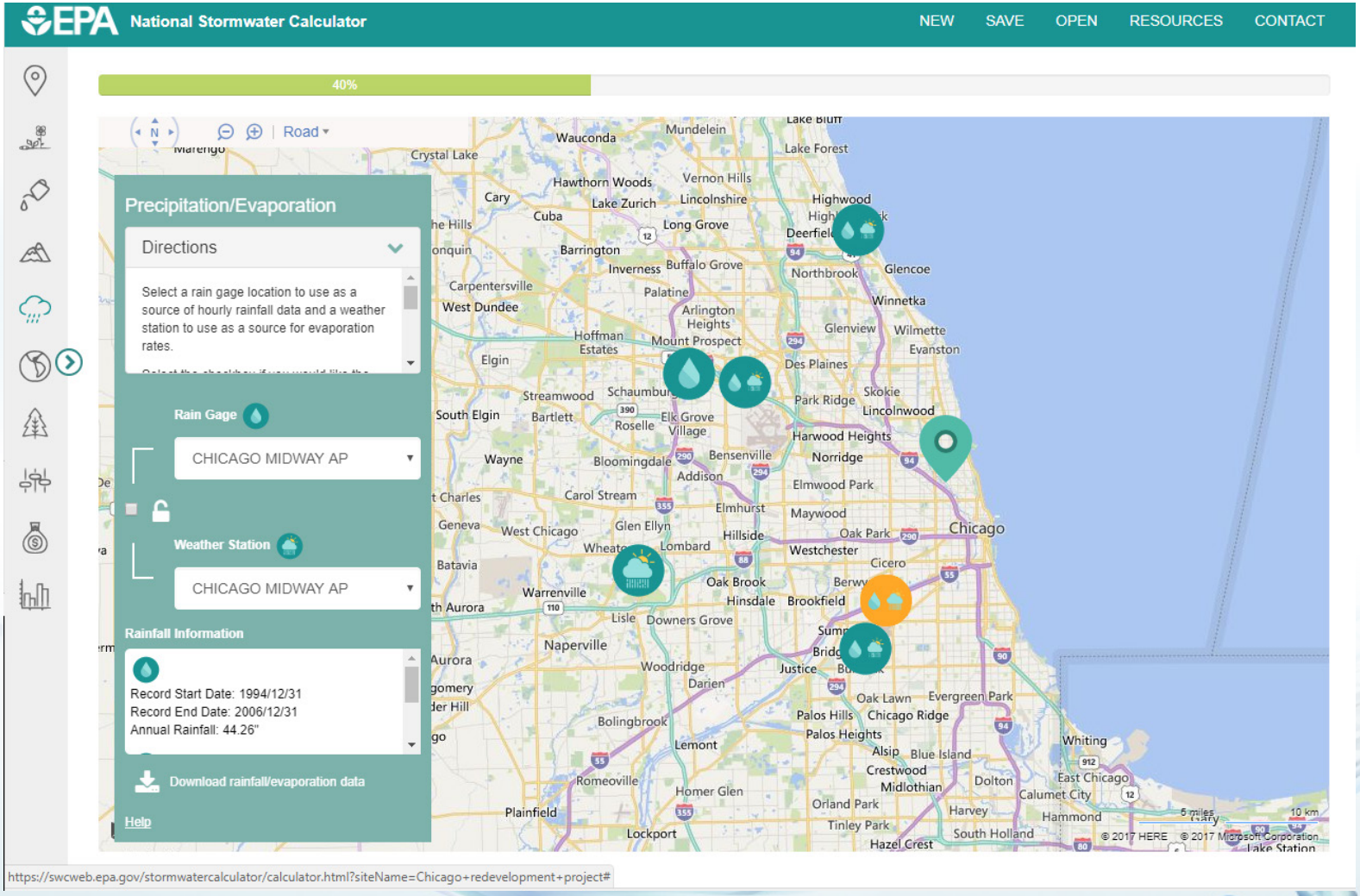
SWC Mobile Web App Tour (Chicago, IL)

Topography:



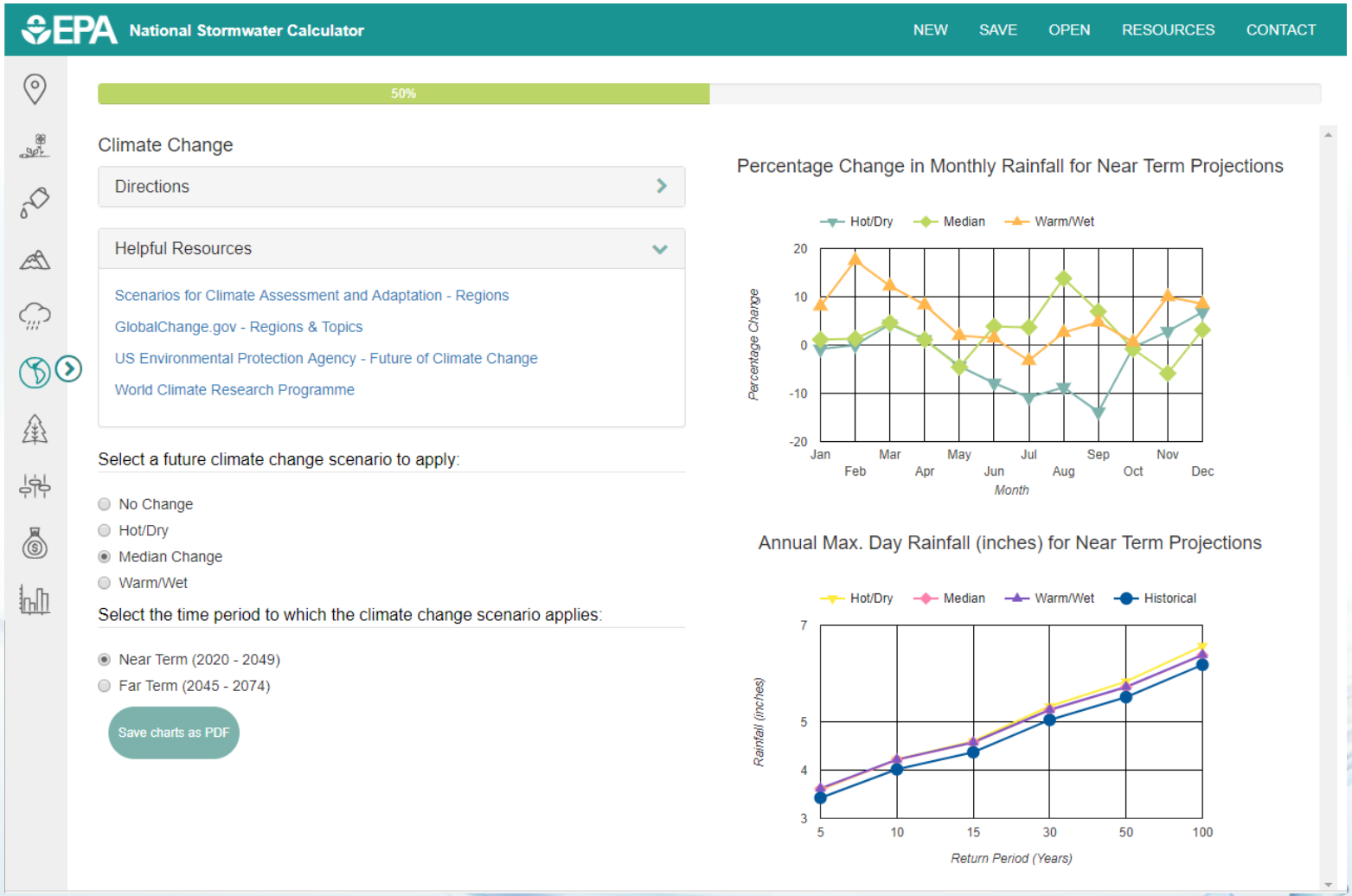
SWC Mobile Web App Tour (Chicago, IL)

Historical Weather:



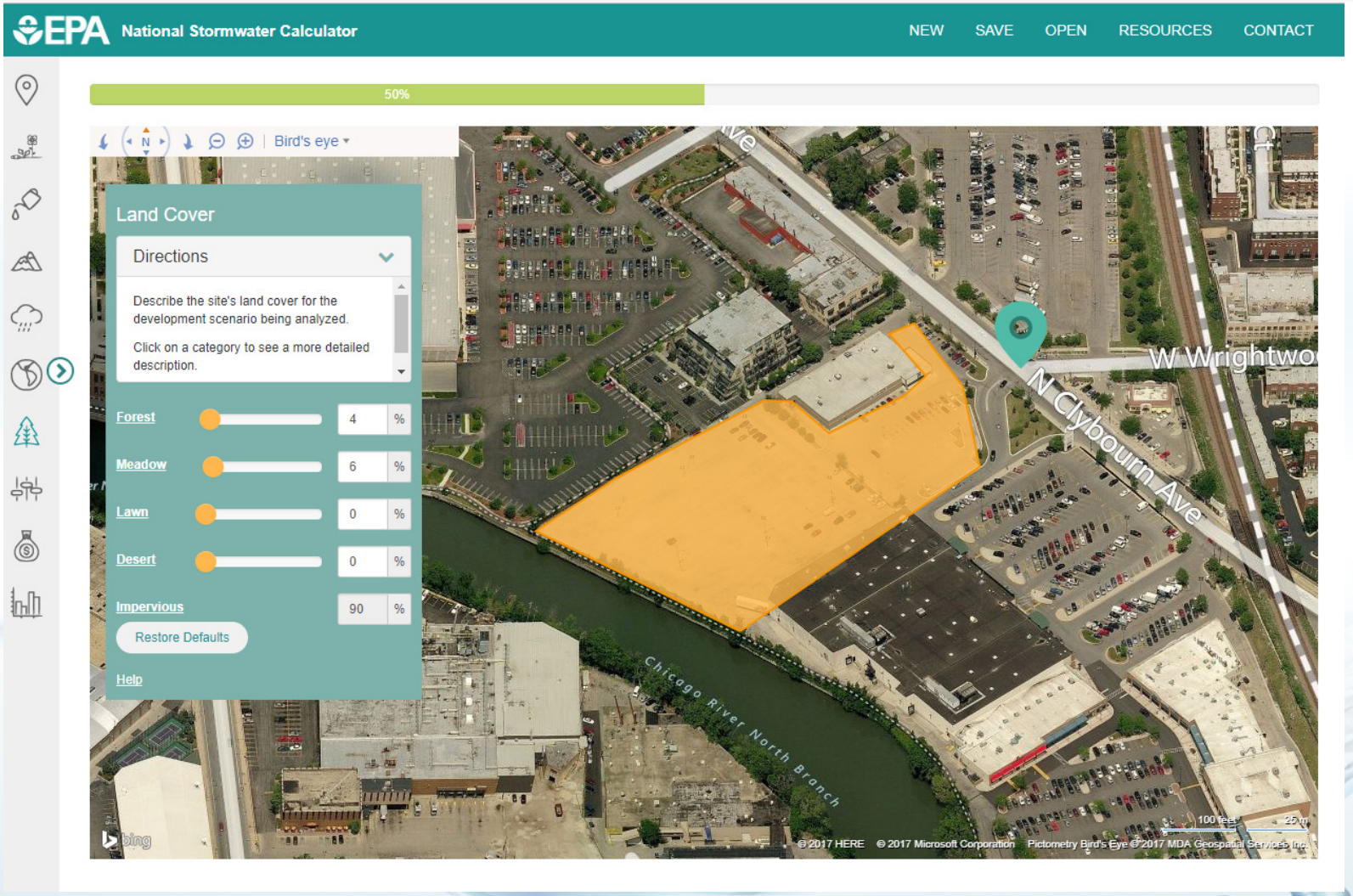
SWC Mobile Web App Tour (Chicago, IL)

Climate Change Scenarios & Extreme Storm Events:



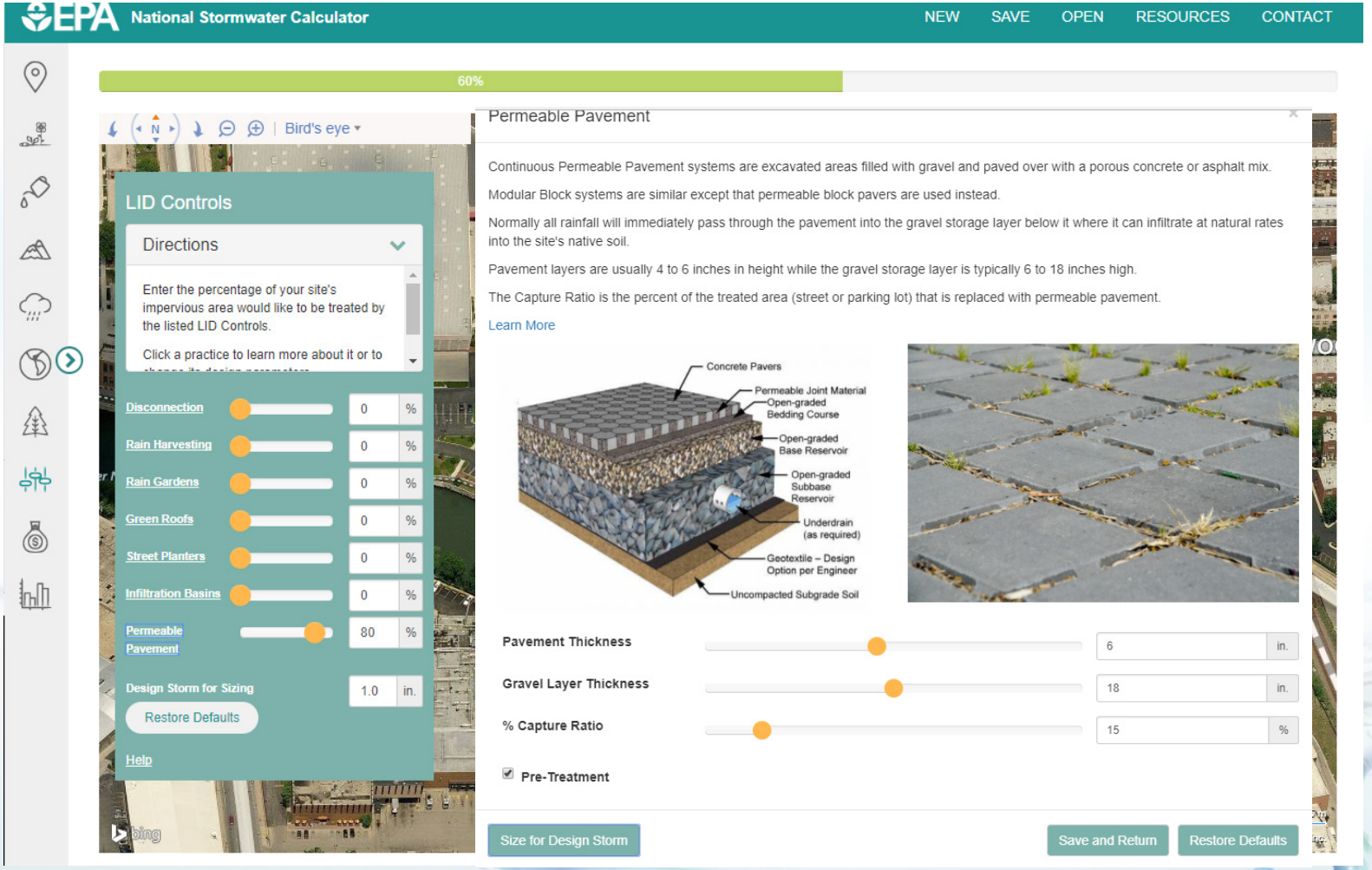
SWC Mobile Web App Tour (Chicago, IL)

Land Cover:



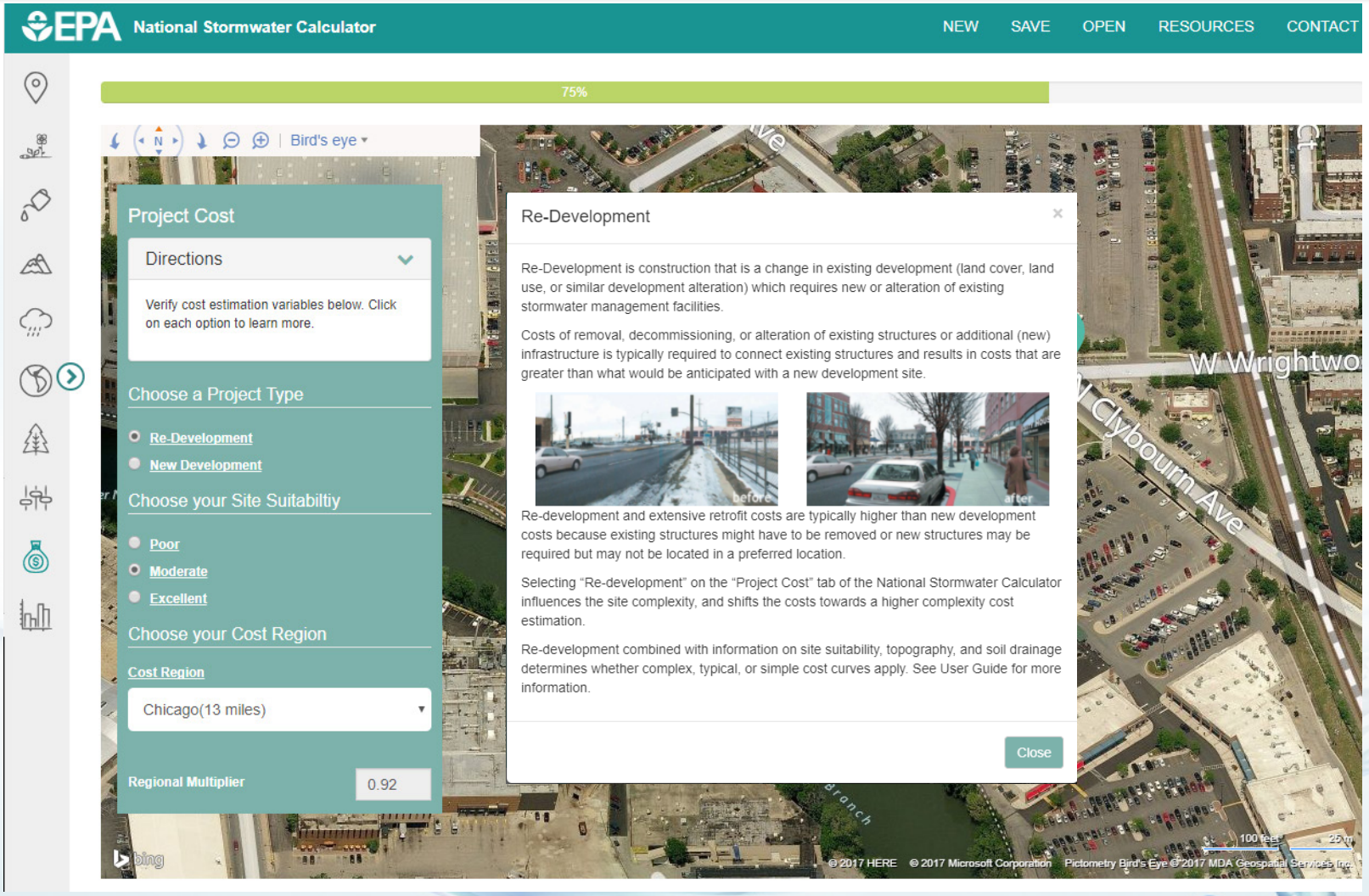
SWC Mobile Web App Tour (Chicago, IL)

LID Controls:



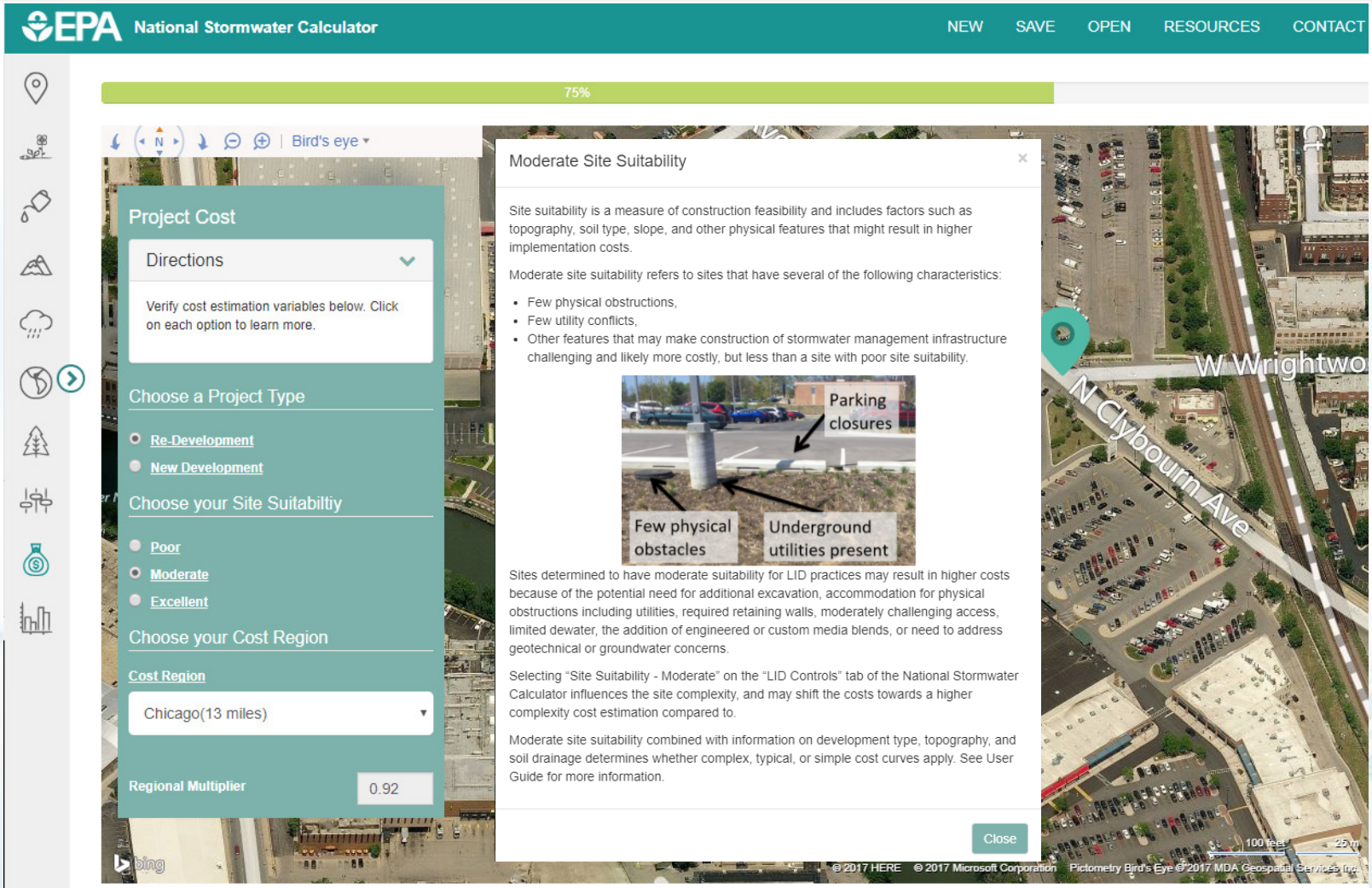
SWC Mobile Web App Tour (Chicago, IL)

Project Cost (Development Type):



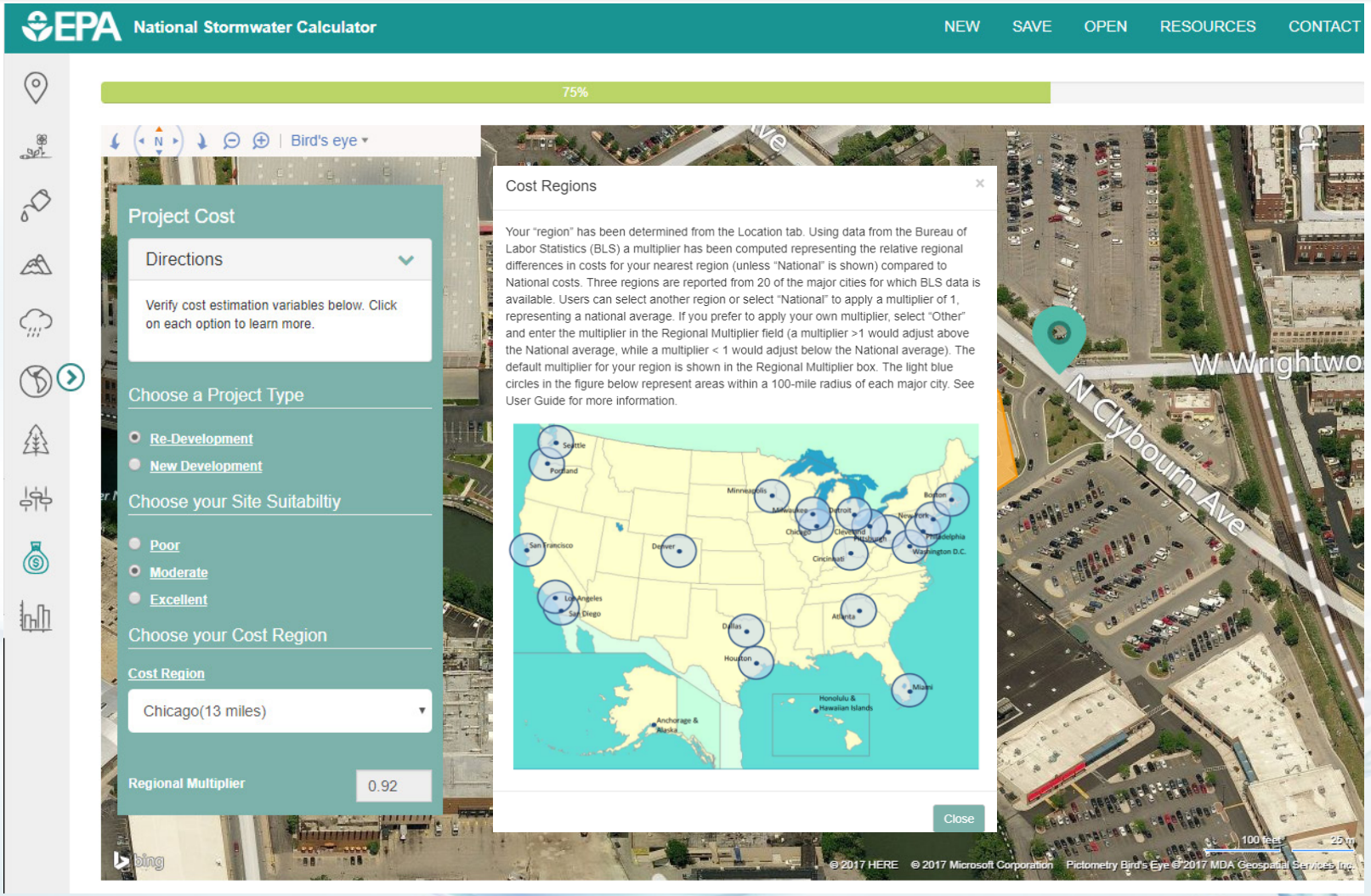
SWC Mobile Web App Tour (Chicago, IL)

Project Cost (Site Suitability):



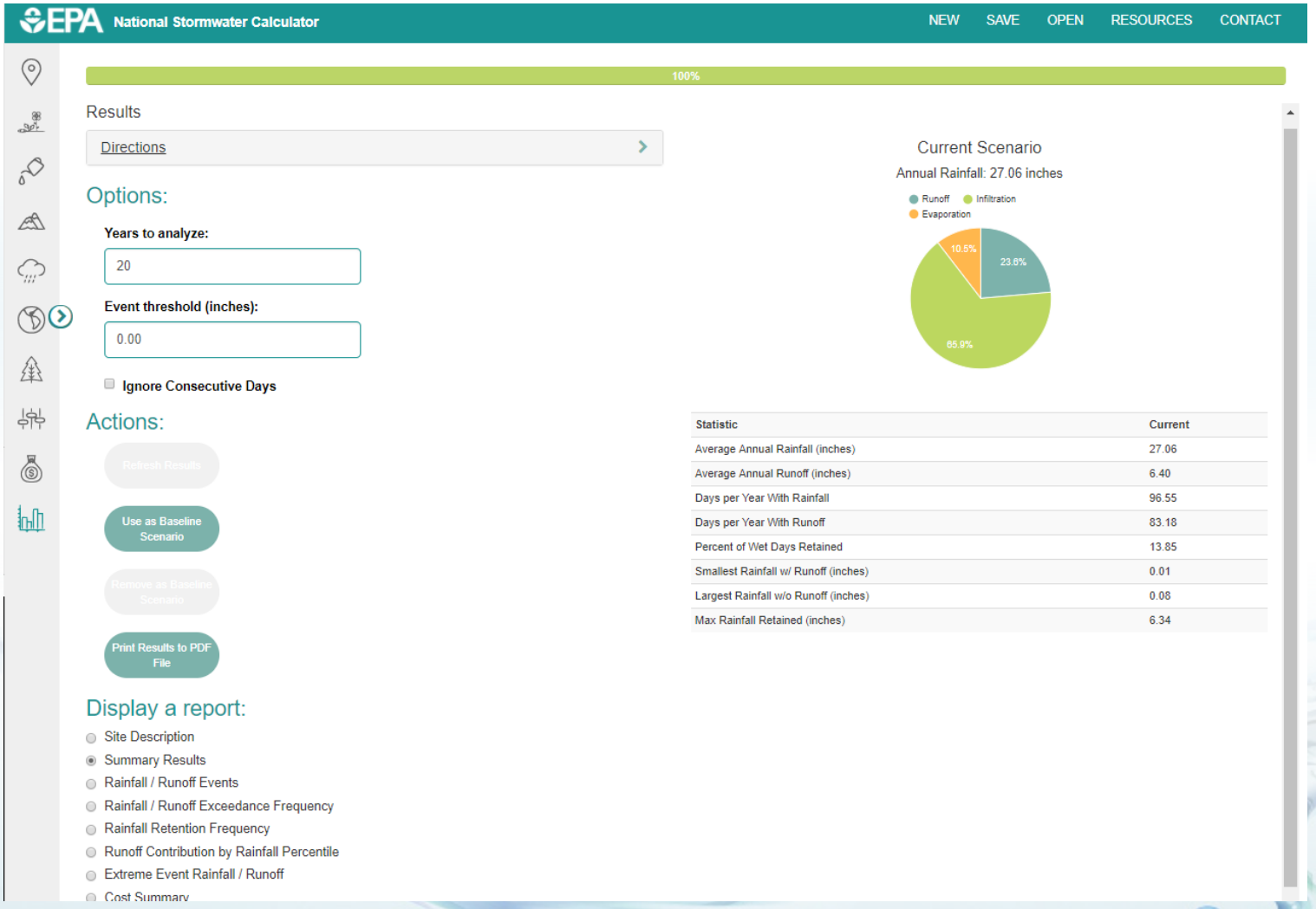
SWC Mobile Web App Tour (Chicago, IL)

Project Cost (Bureau of Labor Statistics Cost Region):



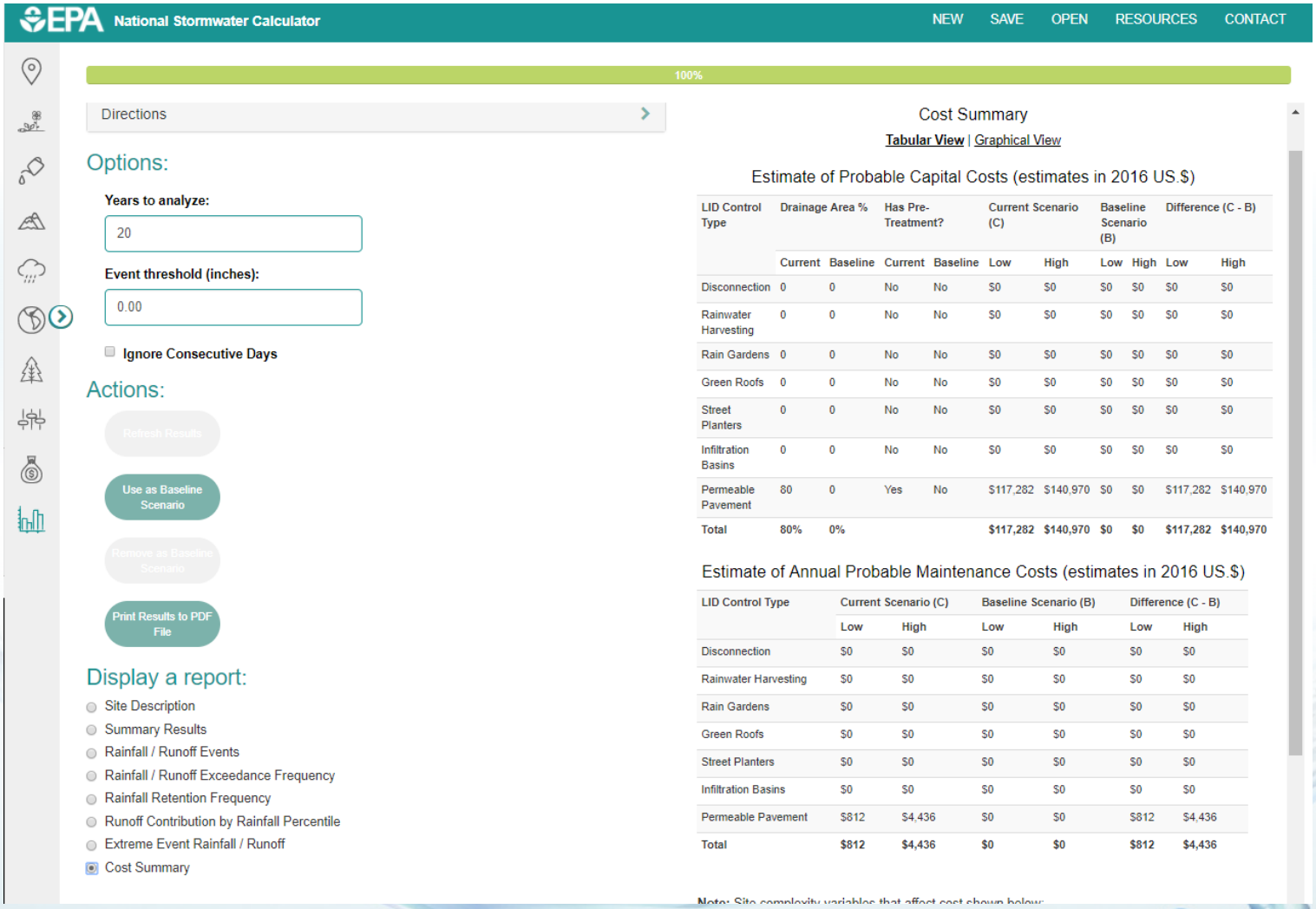
SWC Mobile Web App Tour (Chicago, IL)

Results (Summary):



SWC Mobile Web App Tour (Chicago, IL)

Results (Cost Summary):



Interpreting the Results

- Informing next steps for finalizing costs of stormwater projects and construction plans/designs

- Comparing the relative magnitude of planning level costs for different stormwater management solutions
  - Finding least cost option(s) while meeting performance goals

- Comparisons may be made between national and regional cost estimates:
  - Using local knowledge in selection of regional BLS cost multipliers

SWC Analysis: Potential Next Steps

- Sharing planning results with decision-makers
- Applying for funding
- Developing construction plans/designs
- Final construction costs
- Construction

http://news.maryland.gov/dnr/2017/06/29/over-800000-announced-to-support-local-green-infrastructure-projects-to-improve-communities-and-provide-jobs/

SWC Next Steps

- Training on using the mobile web app
- Updating historical weather data (web services)
- Improving mobile web app based on user feedback
- Phasing out of the SWC desktop application

Discussion and Questions

Thank You!

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National Stormwater Calculator Website:
https://www.epa.gov/water-research/national-stormwater-calculator
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