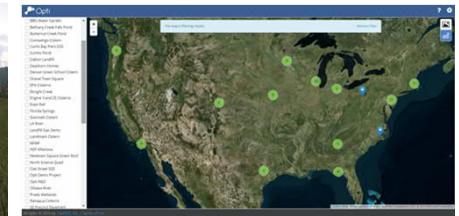




Addressing Howard County's Stormwater Management Challenges with Forecast-Based Controls

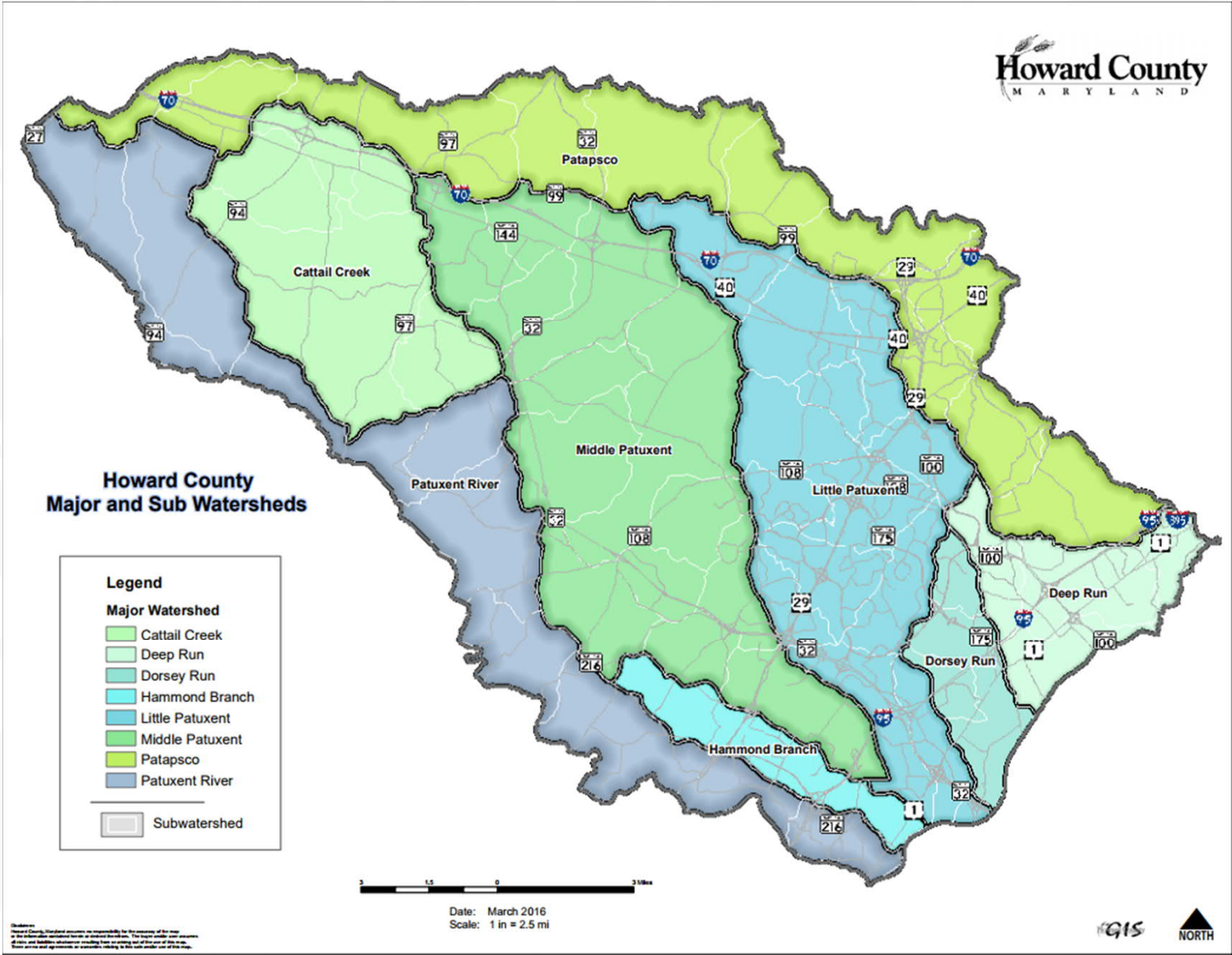
MAFSM - Annual Conference
October 12, 2017



Lindsay DeMarzo - Howard County

Viktor Hlas - OptiRTC

Howard County's watersheds



Stormwater management in Howard County

Flooding



Ellicott City – July 30, 2016

Storm total rainfall: 6.50 inches

\$22.4M in damages

Water Quality



MS4 Permit requirements

Treat stormwater runoff from over 2,000 acres of impervious surfaces by the end of 2019.

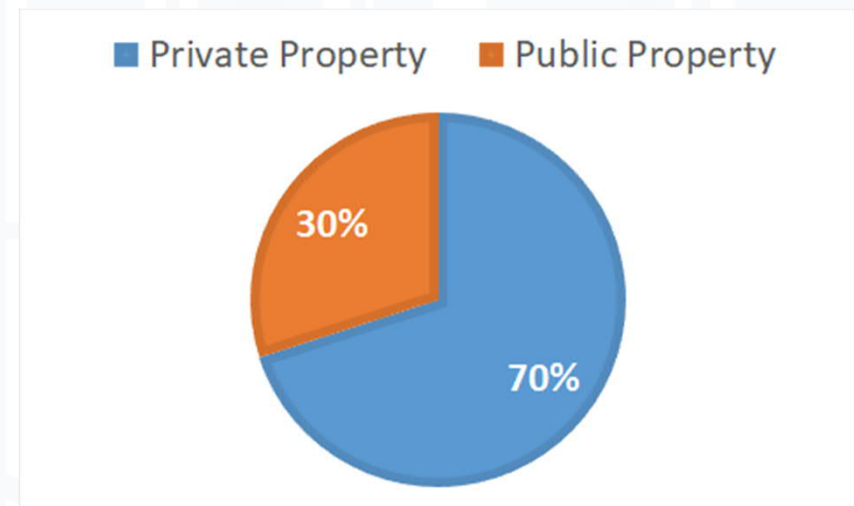
Clean Water Howard



Engaging commercial property owners to meet MS4 Permit Targets (>2,044 acres of impervious surfaces) by 2019

Commercial Stormwater Work Group Recommendations

1. Focus on high-priority properties
2. Conduct effective outreach and education
3. Develop standard access and maintenance agreements
4. Streamline permitting process for stormwater management under MS4 permit
5. Provide County funding and incentives
6. Create a 'Commercial Stormwater Program'
7. Ensure financial integrity of the Program



Walmart partnership with Howard County

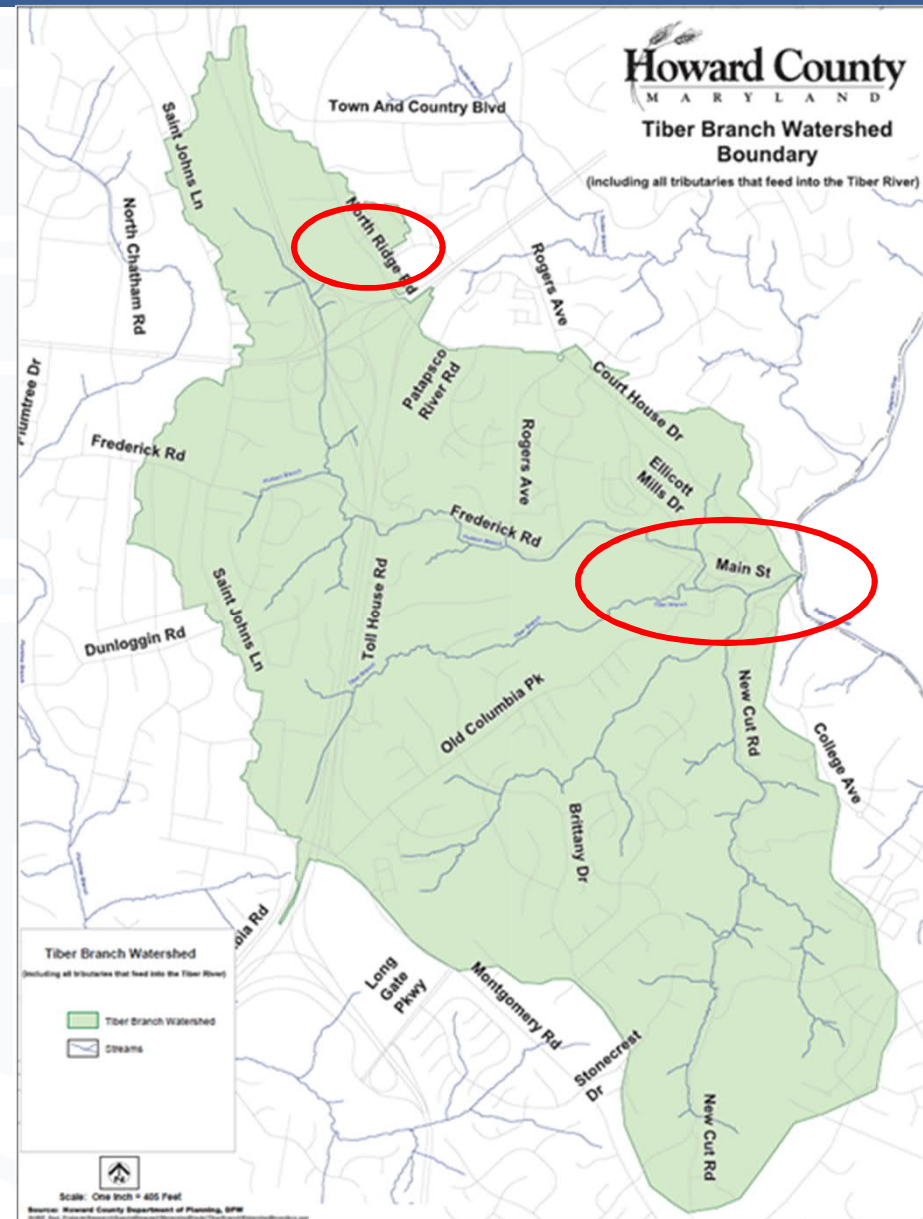
- Valuable Collaboration
- Community Engagement
- Beneficial Use of Assets
- Operational Cost Savings



The Growth of Walmart



Year: 1962
Openings: 1
Total Stores: 1



Walmart's stormwater management program

Walmart Stormwater Operation Compliance Program

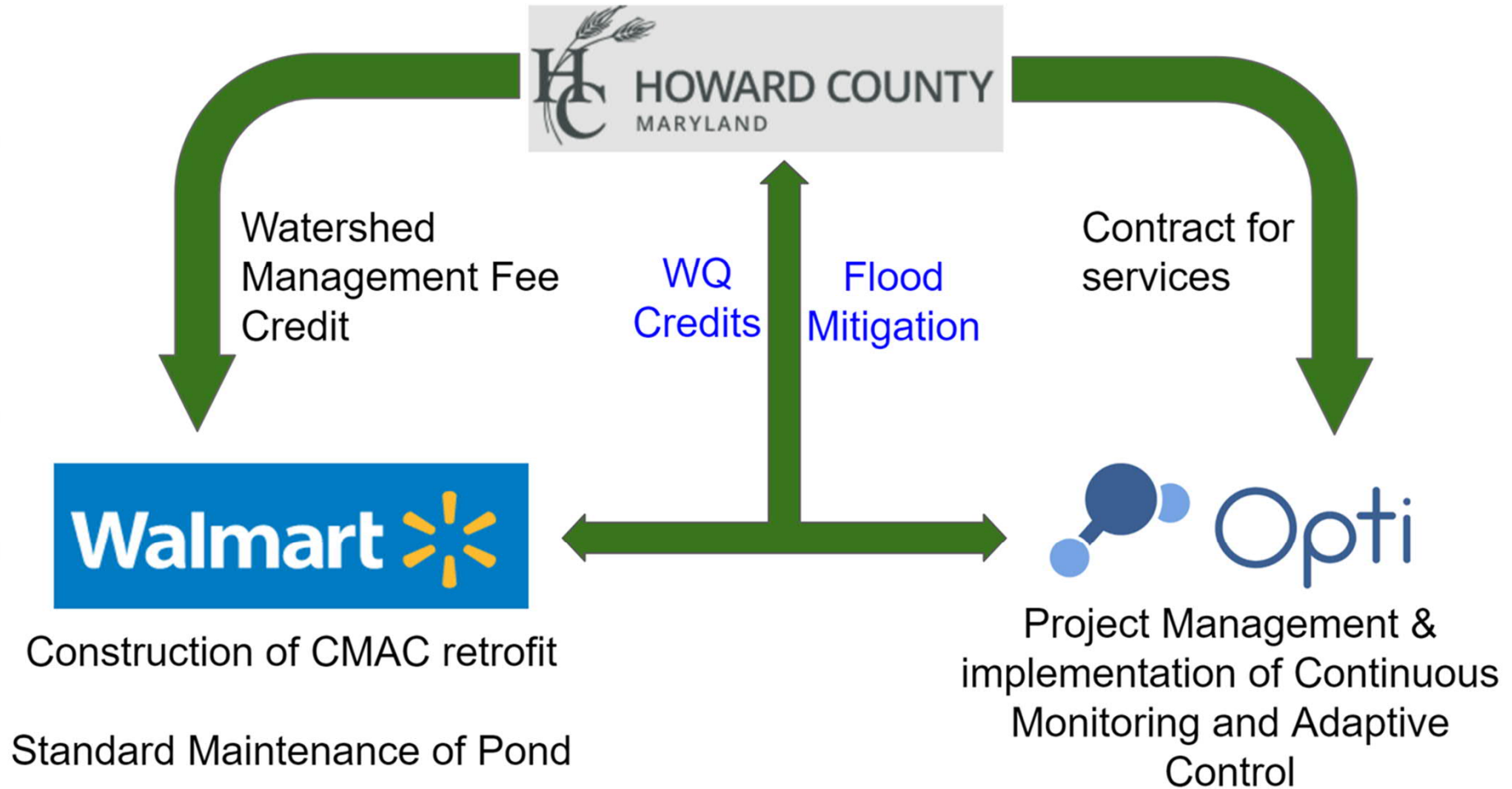
- National performance based maintenance contract
- Compliance inspections, reports, permits, etc.
- Stormwater system operation and maintenance, repairs, retrofits, etc.
- Regulatory requirements

EDLC – Every Day Low Cost

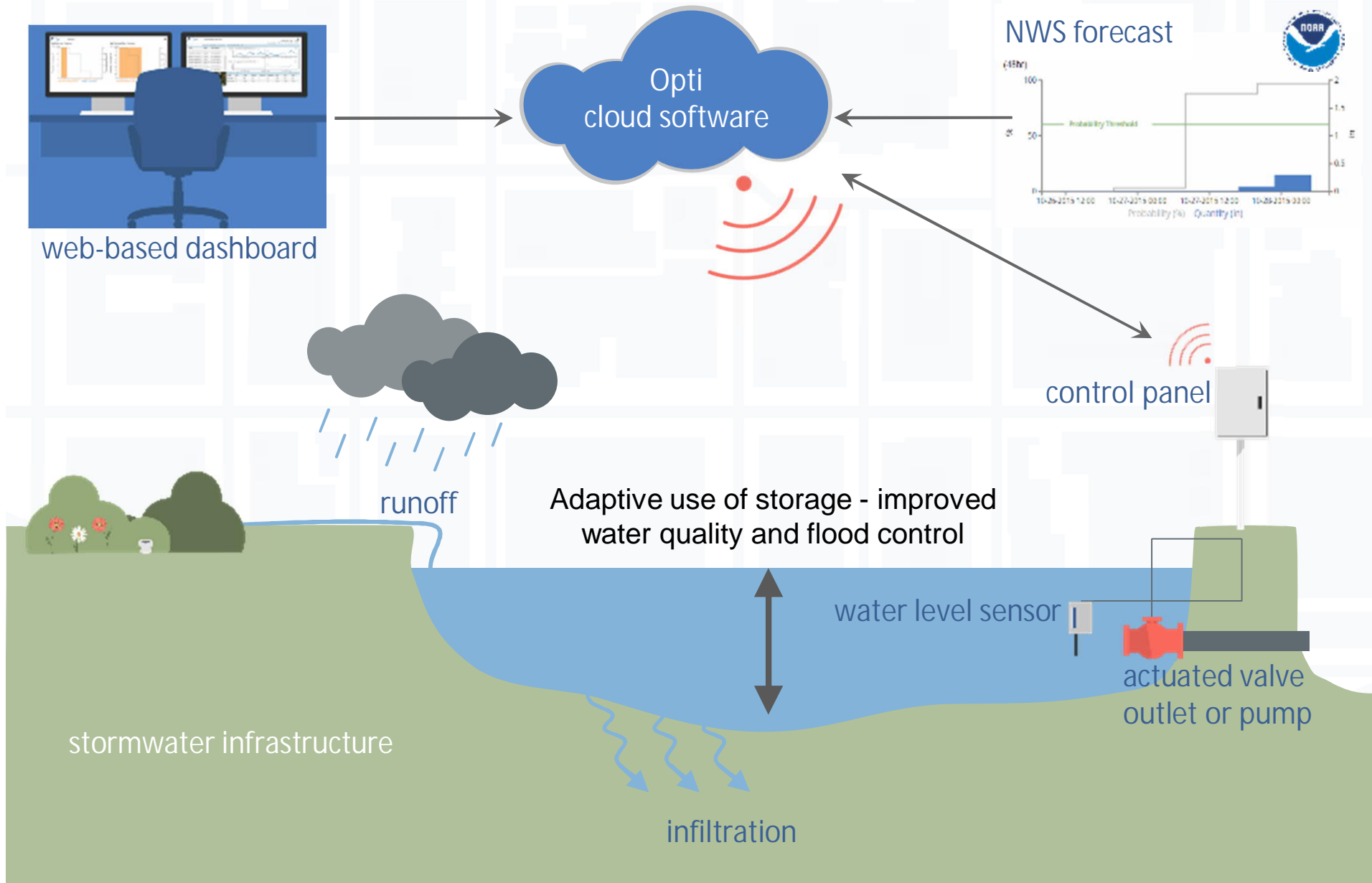
EDLP – Every Day Low Price



Project flow chart



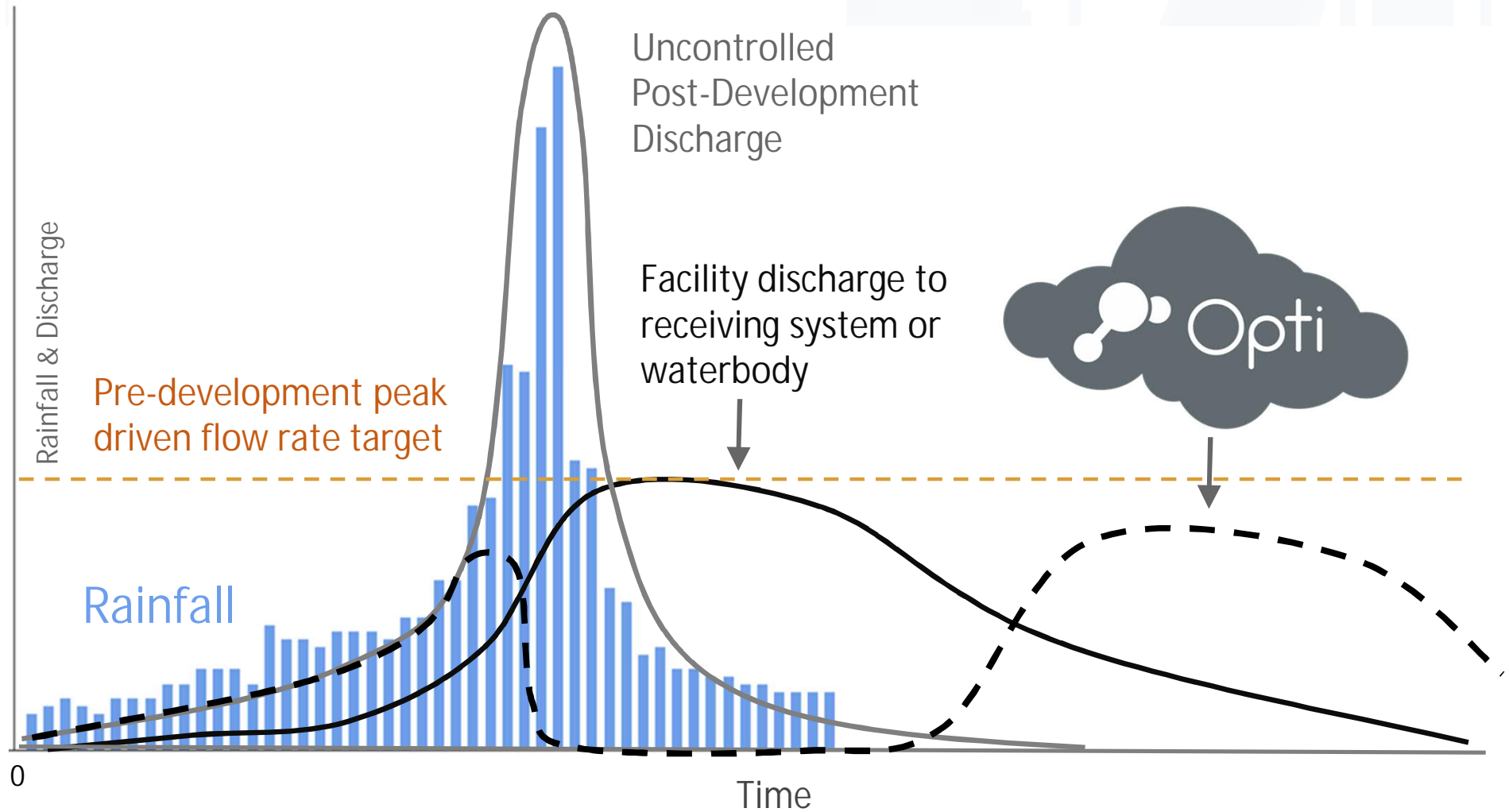
Continuous Monitoring and Adaptive Control (CMAC)



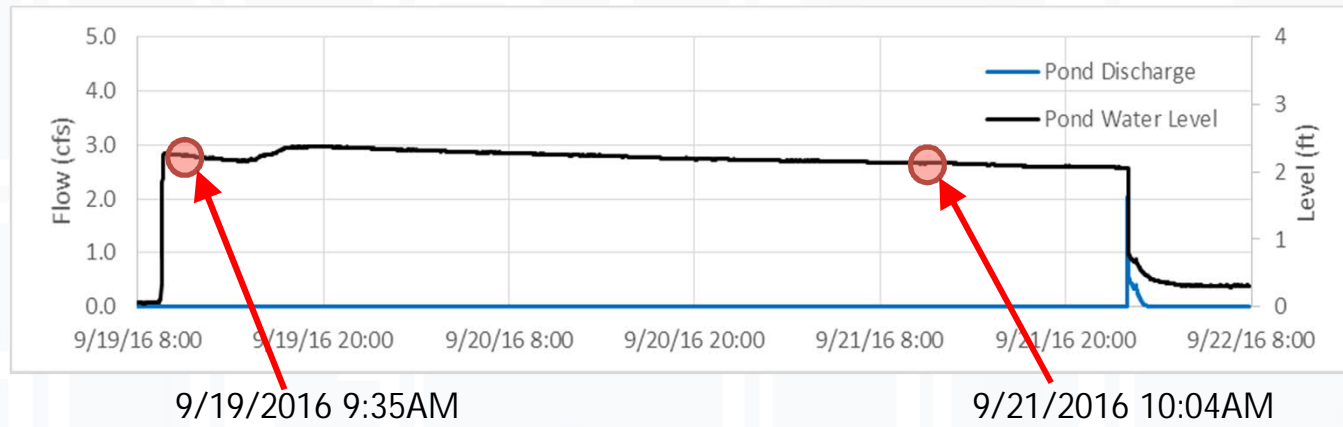
CMAC Hardware Components



CMAC for flood control



CMAC for water quality



Site overview



Contributing drainage area:	24
impervious acres	
Expected incremental WQ credit:	~15 acres
Estimated Project Cost per acre:	~\$12,000/acre



Case Study: Flood Prevention in Ormond Beach, FL

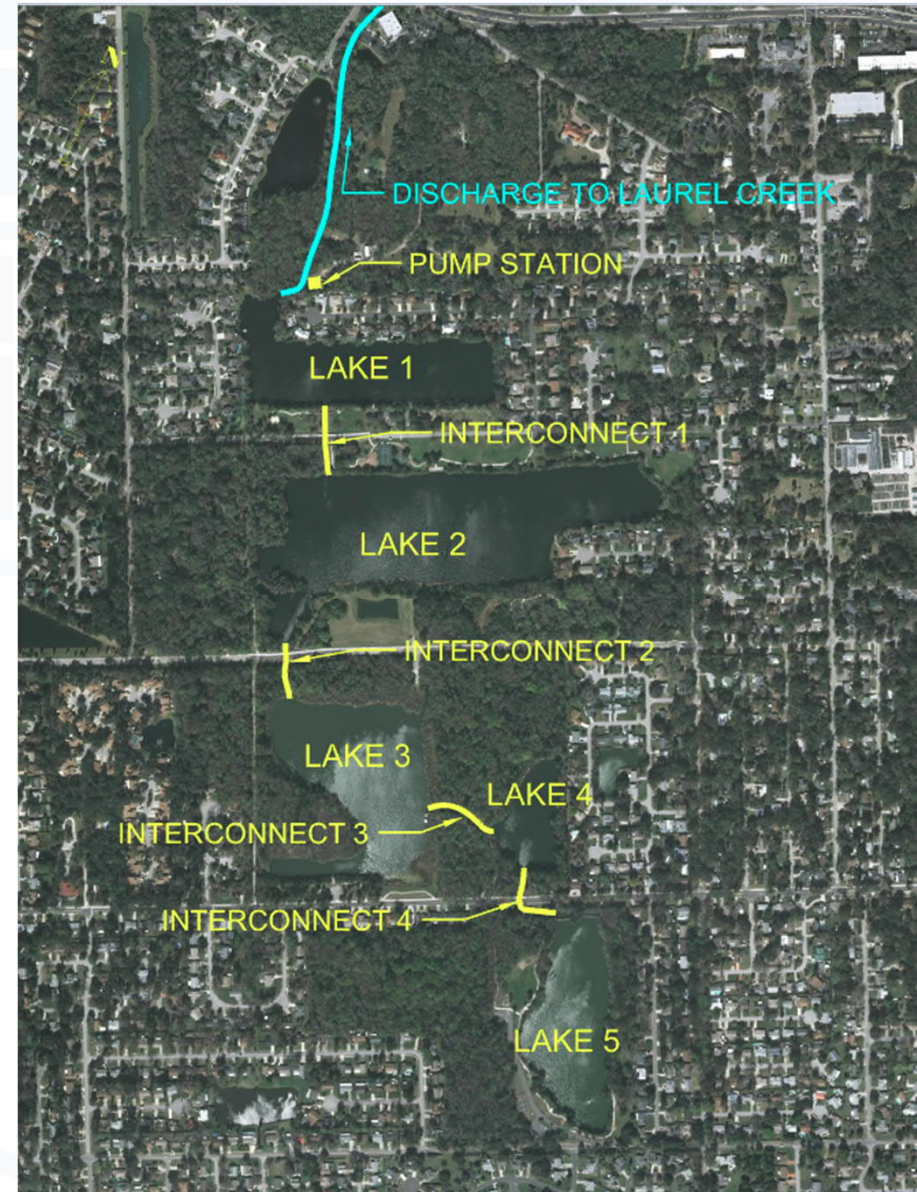
Laurel Creek Basin project background

550-acre drainage basin

5 existing lakes (low lying area)

Single family developments

Existing pumps at Lake 1



Hurricane Irma – Site view from Opti dashboard

The screenshot displays the Opti dashboard interface. At the top left is the Opti logo. Below it, a 'Reset' button is visible. A 'Projects' dropdown menu is open, showing a checked item 'Ormond Beach CMAC'. Two image thumbnails are shown: 'Central Park Lakes' and 'Central Park Lakes (View Only)'. On the right, a weather map displays a large hurricane system over the Caribbean and Florida. A notification box says 'The map is filtering results.' with a 'Remove Filter' button. The map includes zoom controls (+/-) and a location pin icon. At the bottom right of the map, the text reads 'Leaflet | Bing, nowCOAST, Earthstar Geographics SIO, © 2017 Microsoft Corporation'. The footer of the dashboard contains the text 'All rights © 2017 by OptiRTC, Inc. | Terms of Use'.

System performance analysis during Irma

Central Park Lakes

System Control
VFD Pumps

Opti Operation Mode
Current State: Automatic Control

Automatic Control
 Manual Control

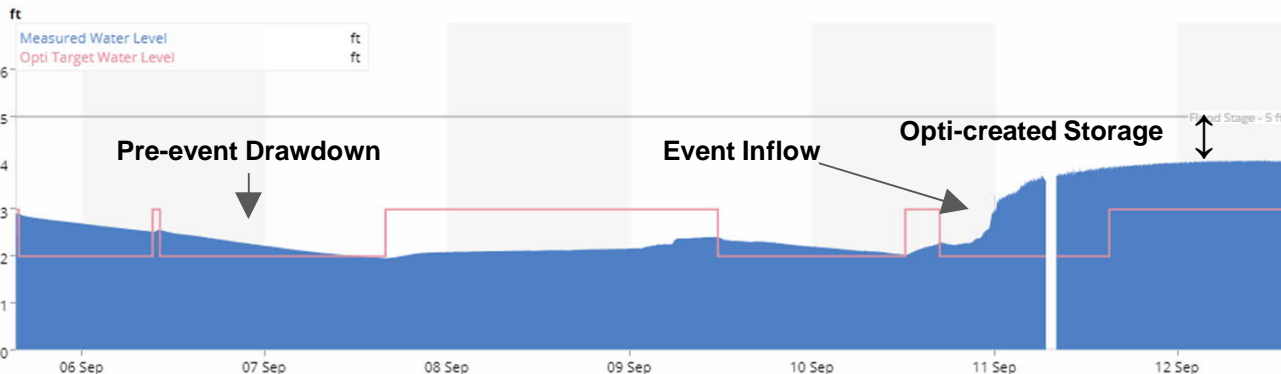
[Change](#)

Manual Pump Setpoint
Current State: 36% Open
Not available for control.

Storm Status

Water Level in Storage

12hr | 24hr | 48hr | [1wk](#)



Weather Radar

NOAA

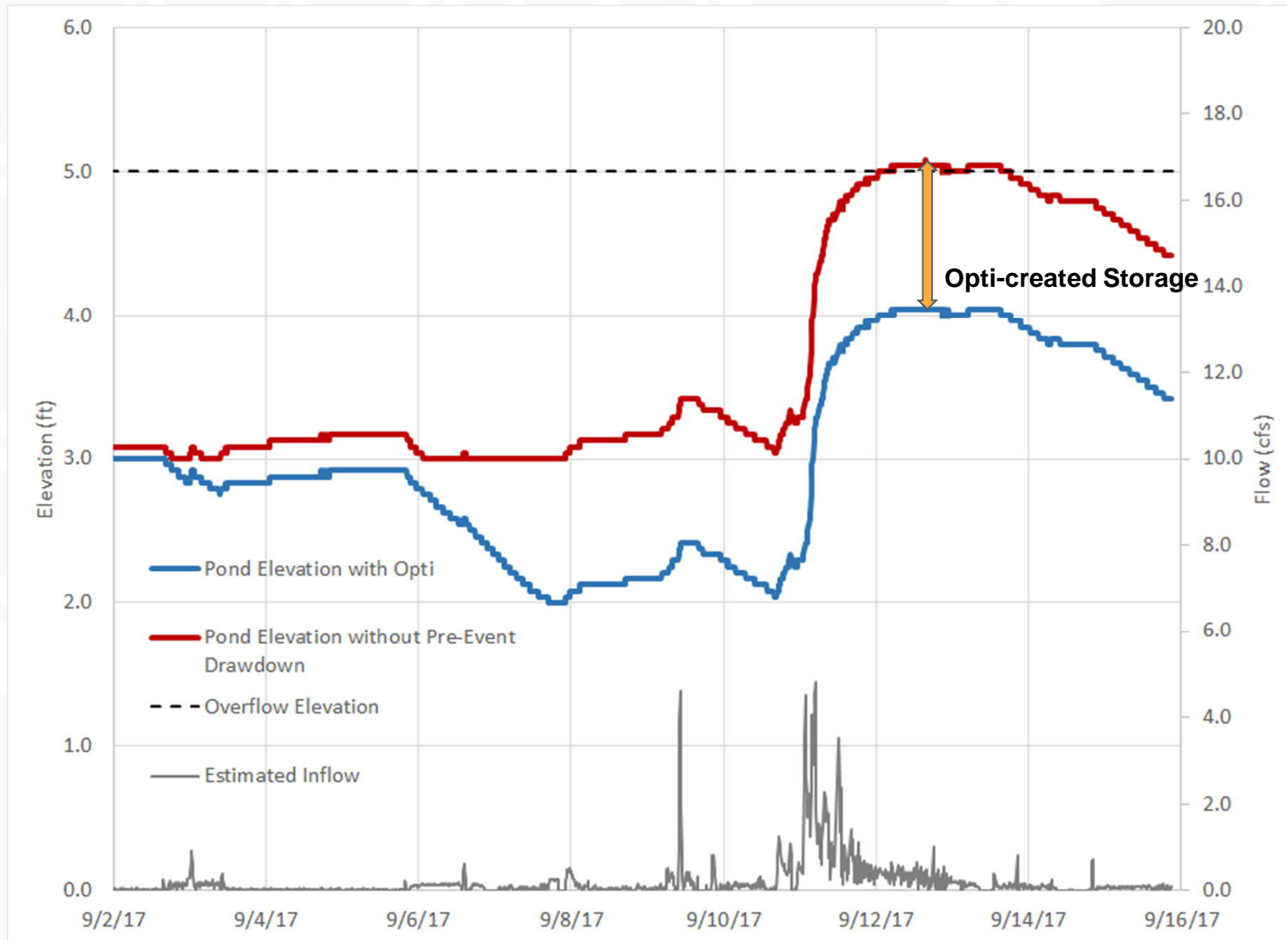
[Latest Image](#) | 12hr | 24hr



Summary Statistics

Total Precipitation (NOAA)	8.4 in
Total Estimated Inflow (9/6 - 9/14)	13.5 MM ft ³ or 300 ac-ft
Total Discharge (9/6-9/14)	8.5 MM ft ³ or 200 ac-ft

Benefits of pre-event drawdown



Questions & Contact

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