Overview of Proposed Commonwealth Interceptor Upgrade Project

Briefing for Ad Hoc Stormwater Utility and Flood Mitigation Advisory Group

December 15, 2022

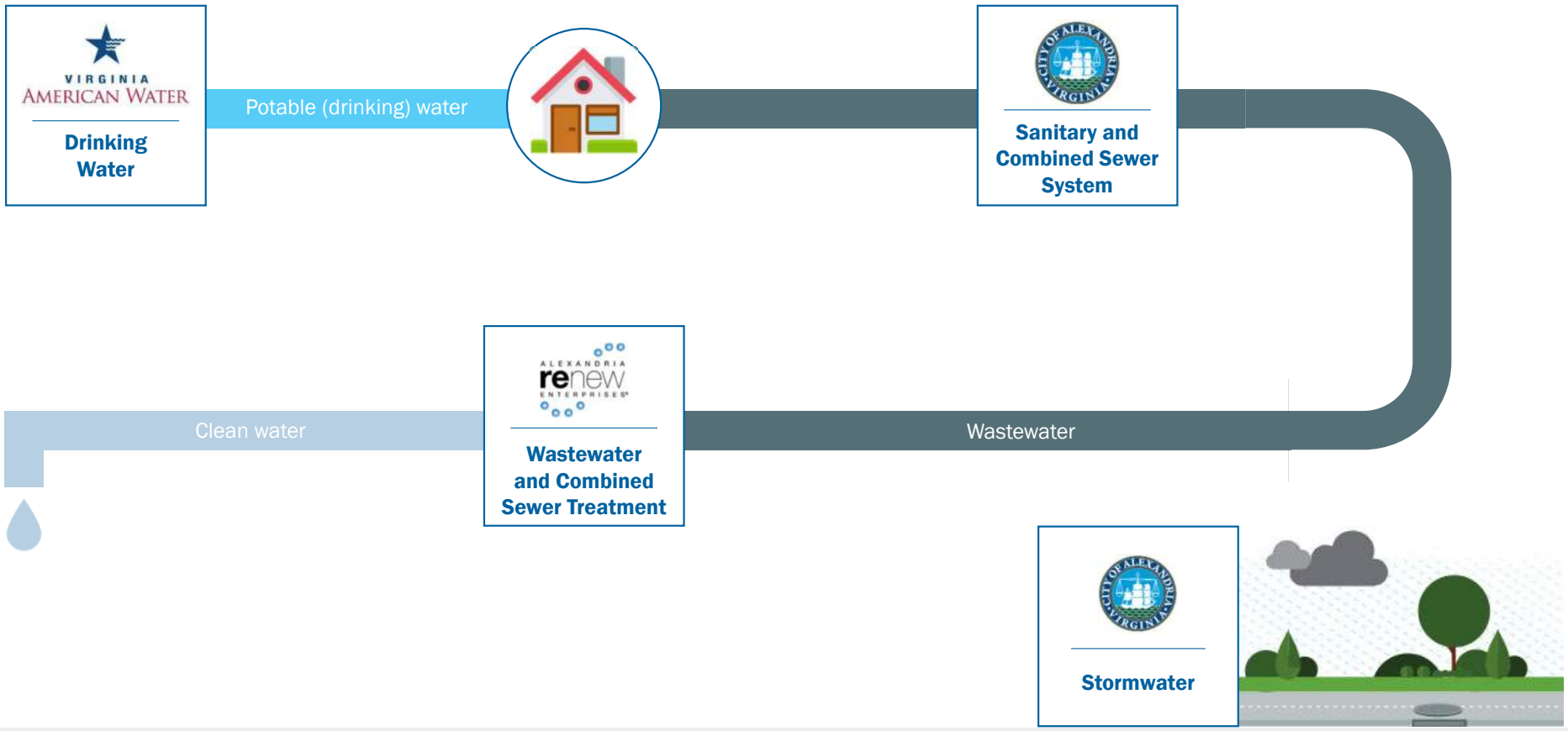
ALEXANDRIA renew ENTERPRISES®

Presentation outline.

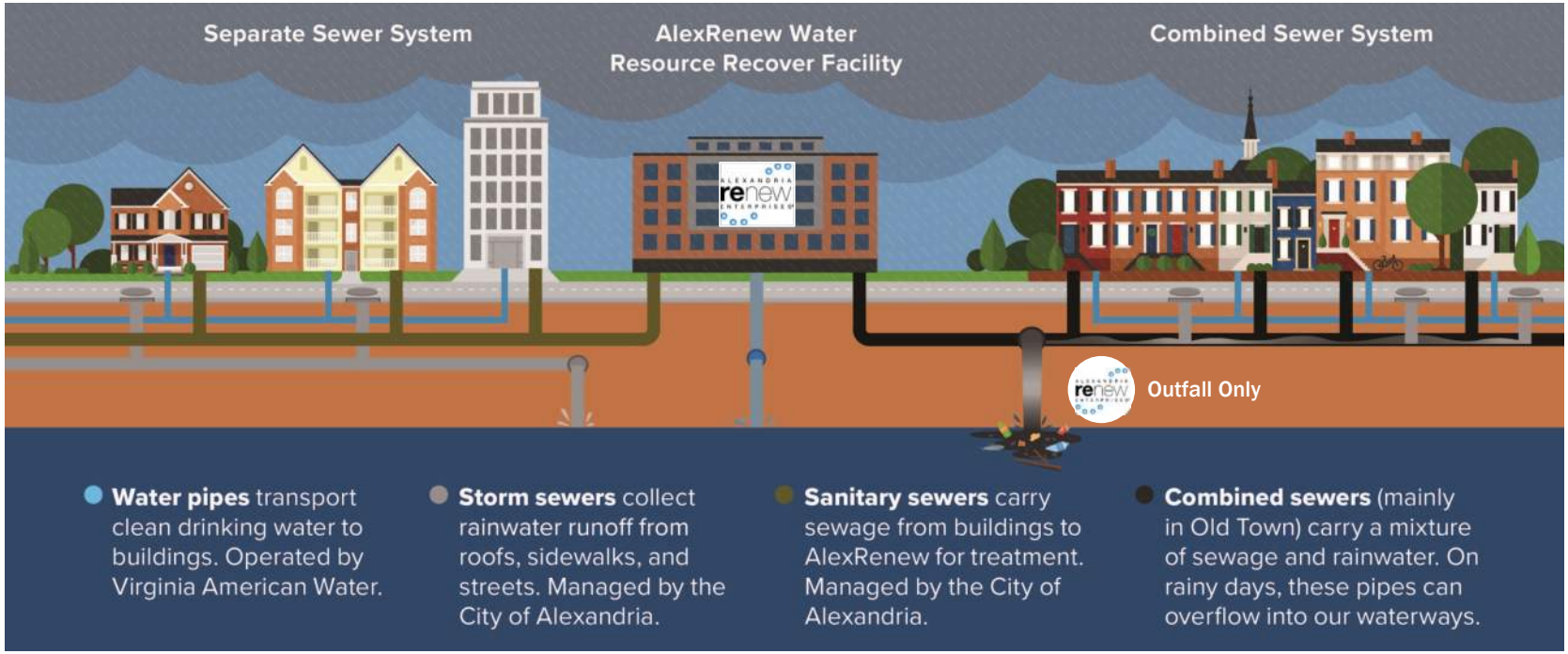
- Background on Alexandria's Sewer System and AlexRenew
- Background on excess infiltration and inflow into the Commonwealth Separate Sanitary Sewer System
- Impacts of excess infiltration and inflow on AlexRenew's Commonwealth Interceptor
- Does RiverRenew address excess infiltration and inflow into the Commonwealth Interceptor?
- Mitigating Commonwealth Interceptor risks associated with excess infiltration and inflow

Background on Alexandria's Sewer System

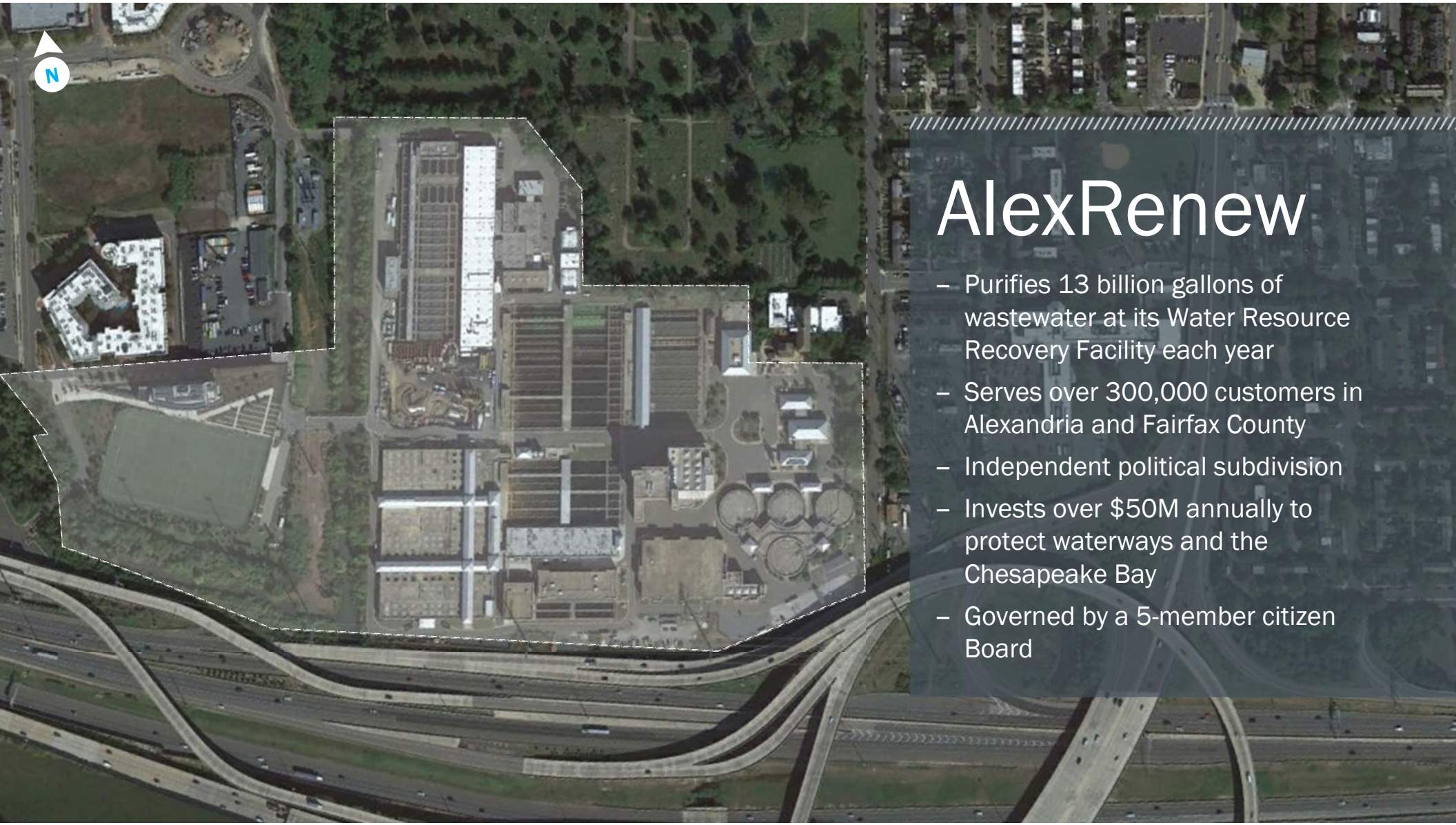
How water works in Alexandria, VA.



Alexandria is served by both separate and combined sewer systems.

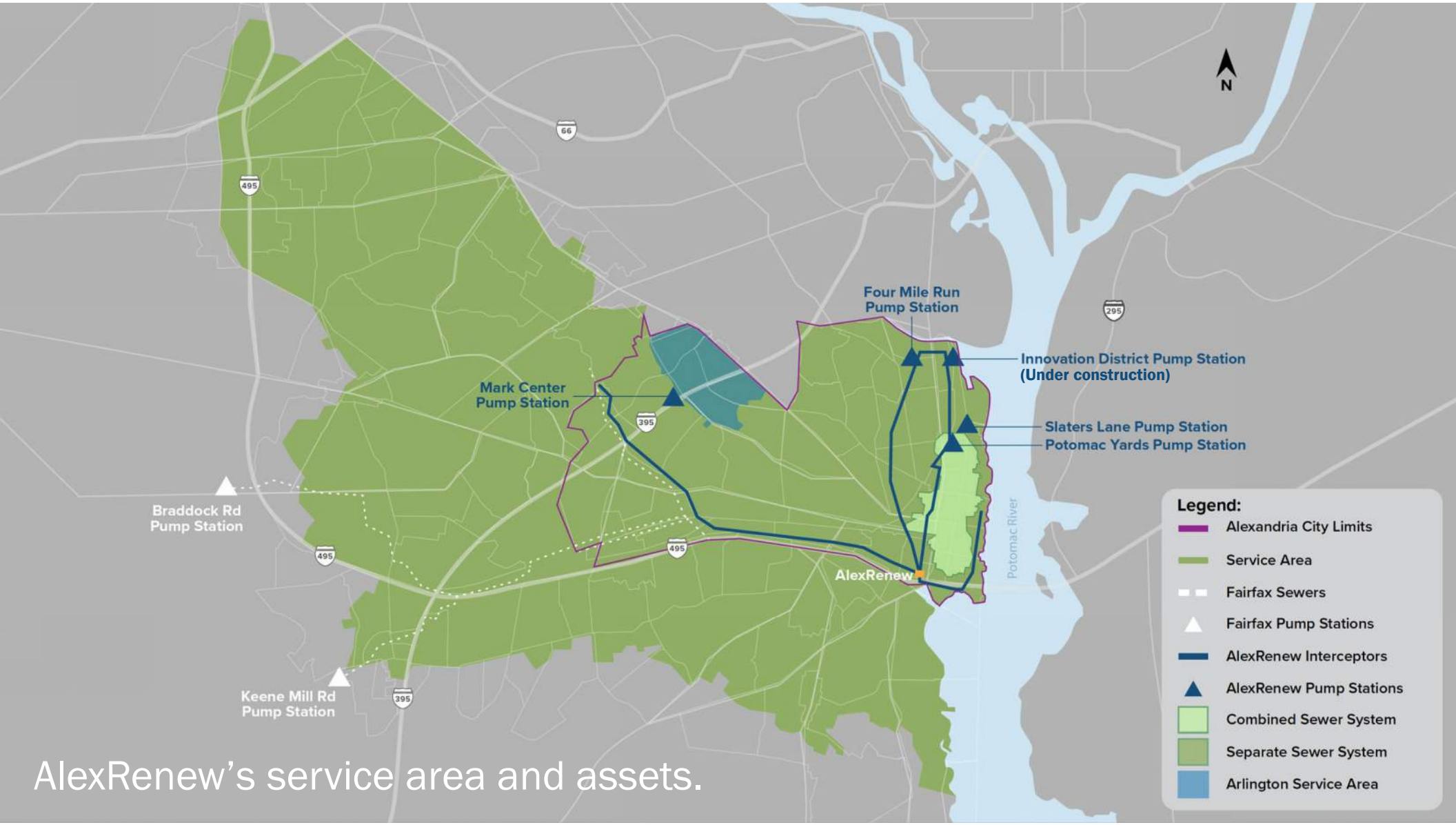


VIRGINIA AMERICAN WATER



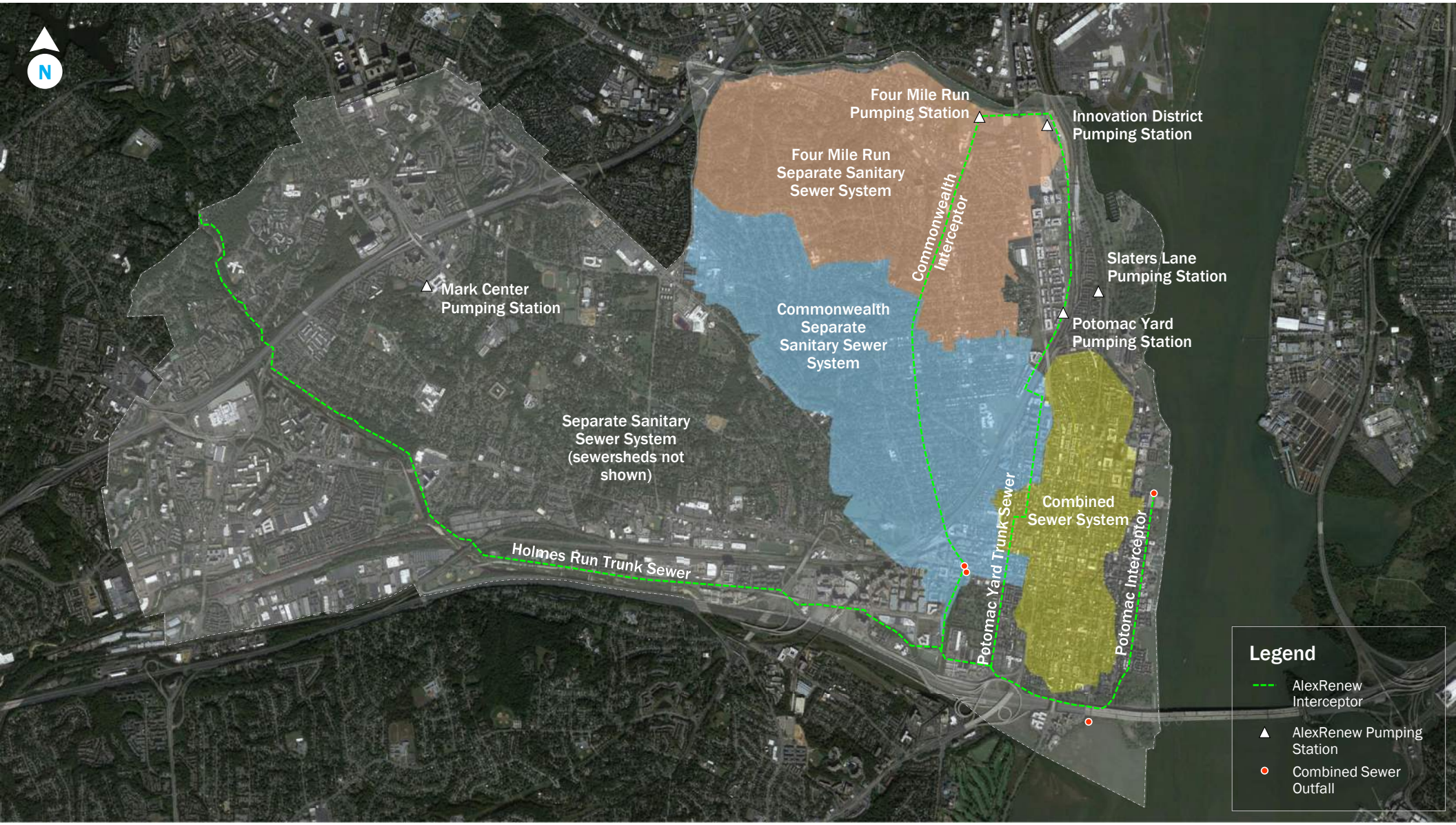
AlexRenew

- Purifies 13 billion gallons of wastewater at its Water Resource Recovery Facility each year
- Serves over 300,000 customers in Alexandria and Fairfax County
- Independent political subdivision
- Invests over $50M annually to protect waterways and the Chesapeake Bay
- Governed by a 5-member citizen Board

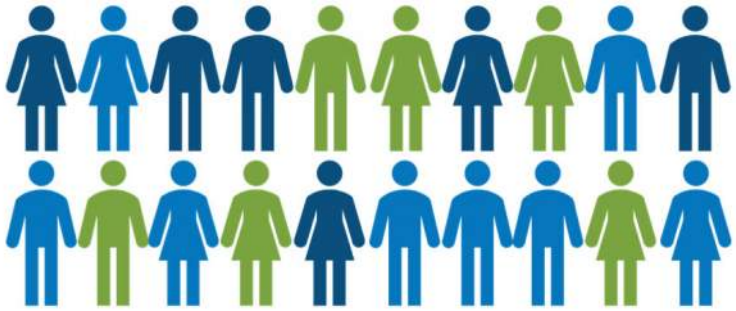
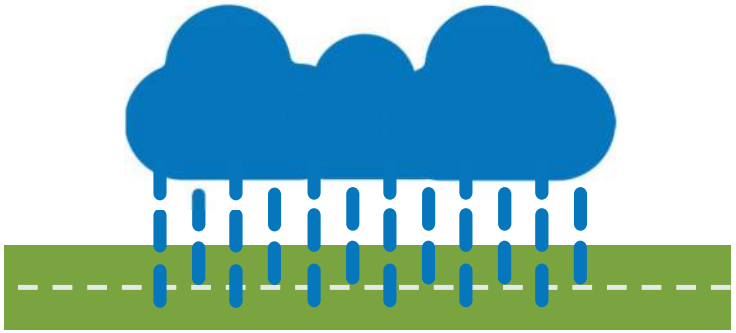


AlexRenew's service area and assets.

Background on excess infiltration and inflow into the Commonwealth Separate Sanitary Sewer System


N
Four Mile Run Pumping Station
Innovation District Pumping Station
Four Mile Run Separate Sanitary Sewer System
Commonwealth Interceptor
Slaters Lane Pumping Station
Mark Center Pumping Station
Commonwealth Separate Sanitary Sewer System
Potomac Yard Pumping Station
Separate Sanitary Sewer System (sewersheds not shown)
Combined Sewer System
Holmes Run Trunk Sewer
Potomac Yard Trunk Sewer
Potomac Interceptor
Legend
AlexRenew Interceptor
AlexRenew Pumping Station
Combined Sewer Outfall

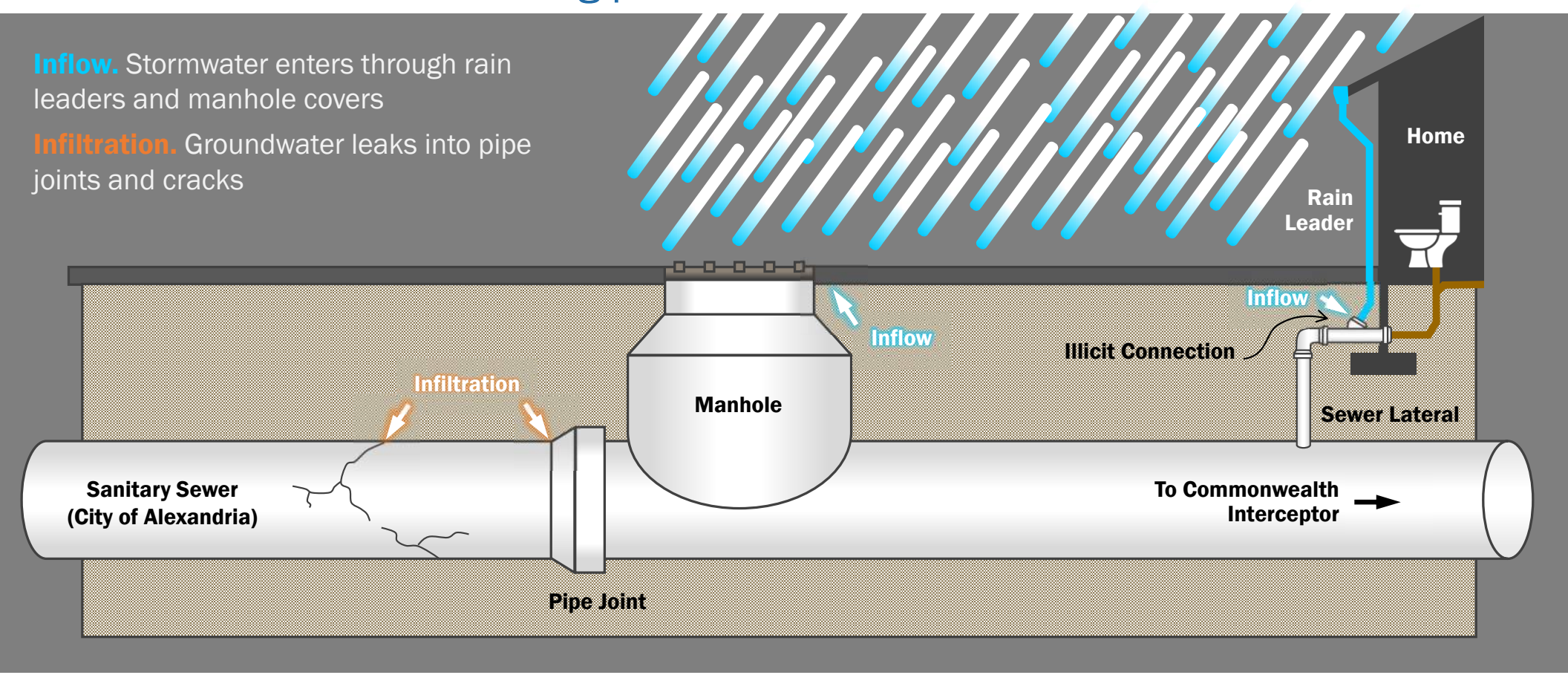
AlexRenew's separate sanitary interceptors are designed to carry 2.5 × dry weather flow per Virginia SCAT regulations.

	Separate Sanitary Interceptors	Storm Sewers
Governance	State Water Control Board through Virginia Department of Environmental Quality	City of Alexandria, Virginia
Regulation	Virginia Code (9VAC25-790) Sewage Collection and Treatment Regulations	Design and Construction Standards
Design Requirements	**People:** 250% of the average daily sewage flow per person 	**Precipitation:** 10-year, 24-hour storm 

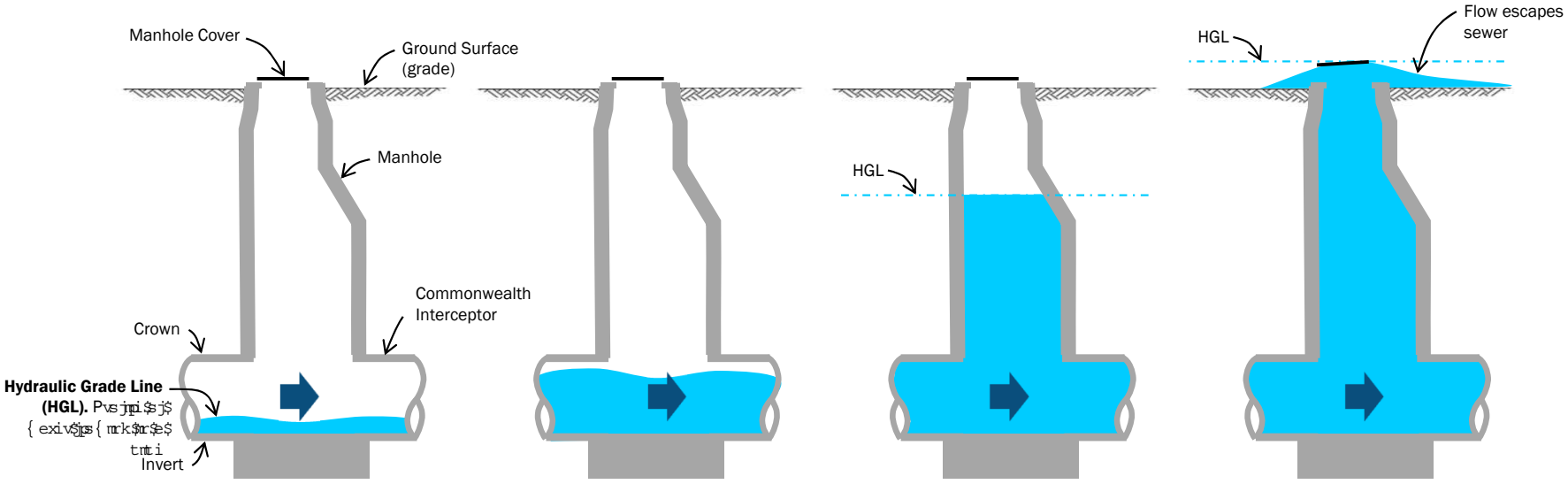
The Commonwealth Separate Sanitary Sewer System is affected by excess infiltration and inflow during periods of intense rainfall.

Inflow. Stormwater enters through rain leaders and manhole covers

Infiltration. Groundwater leaks into pipe joints and cracks



Excess infiltration and inflow from Commonwealth Separate Sanitary Sewer System causes a surcharged condition in the Commonwealth Interceptor.



Dry Weather Flow

Normal Infiltration and Inflow

Sewer at design capacity

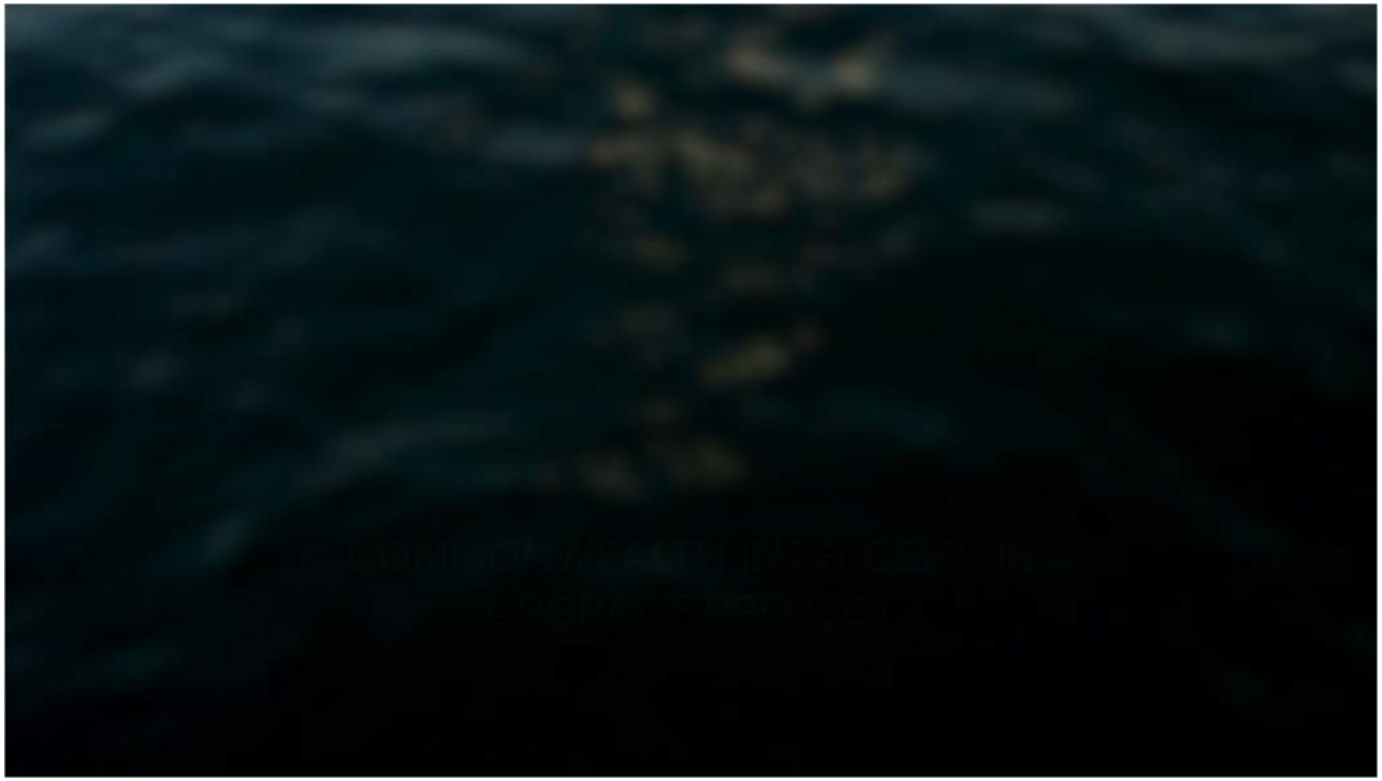
Excess Infiltration and Inflow

Sewer beyond capacity and surcharged

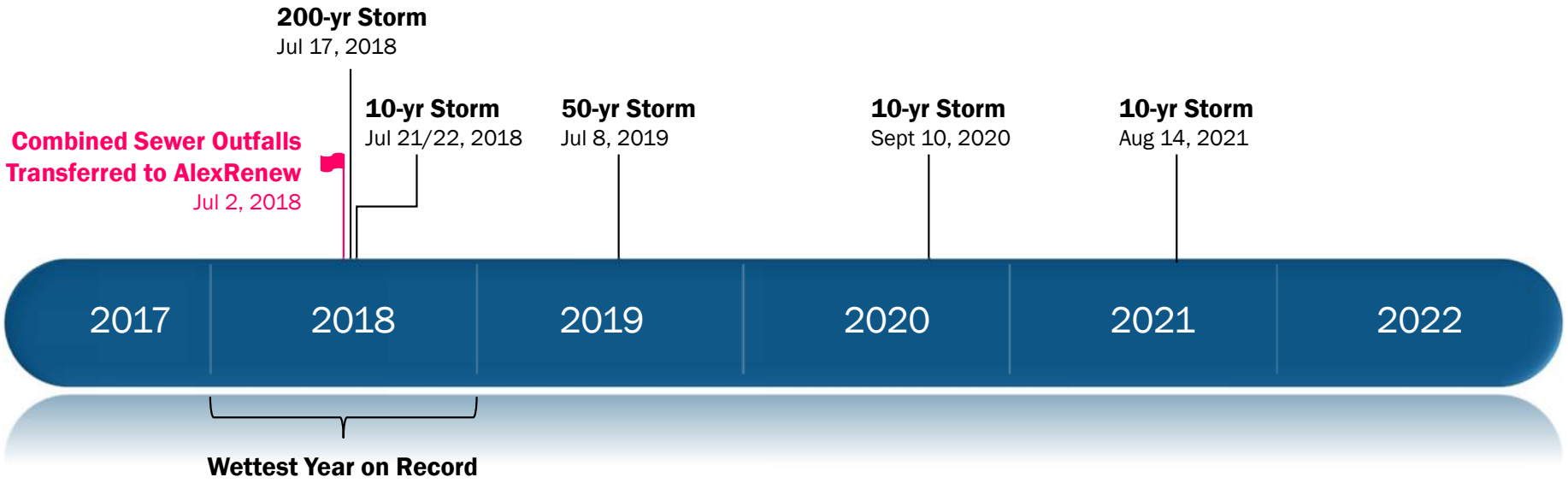
Extreme Infiltration and Inflow

Sewer beyond capacity, surcharged, and flooding to the ground surface

Excess infiltration and inflow from the Commonwealth Separate Sanitary Sewer System overwhelms the Commonwealth Interceptor and can lead to basement backups.

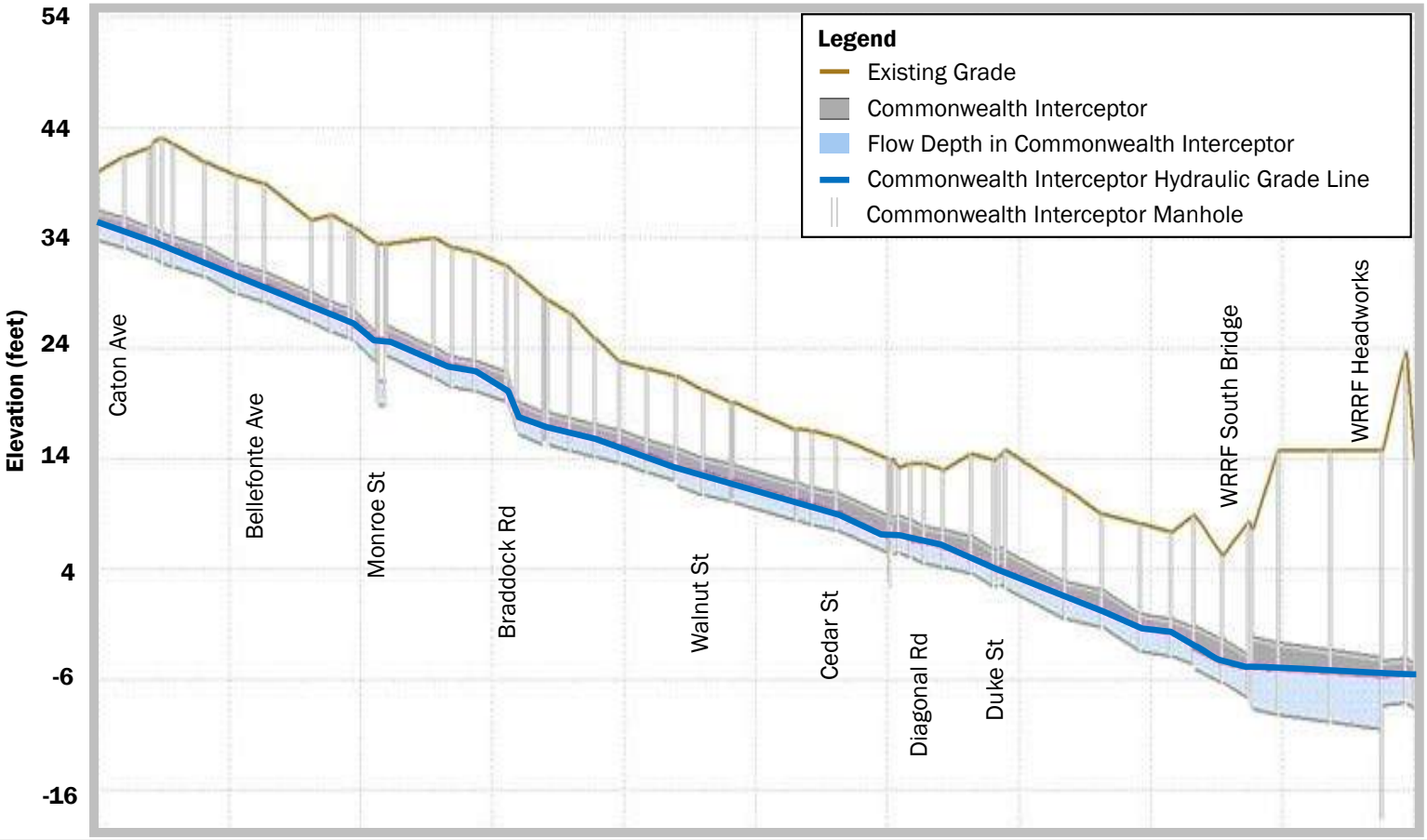


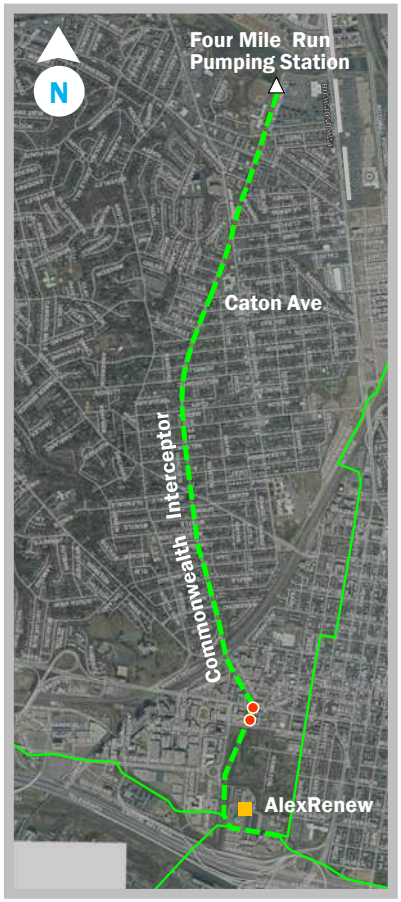
Alexandria has seen a series of intense rainfall events since 2017.



Impacts of excess infiltration and inflow on AlexRenew's Commonwealth Interceptor

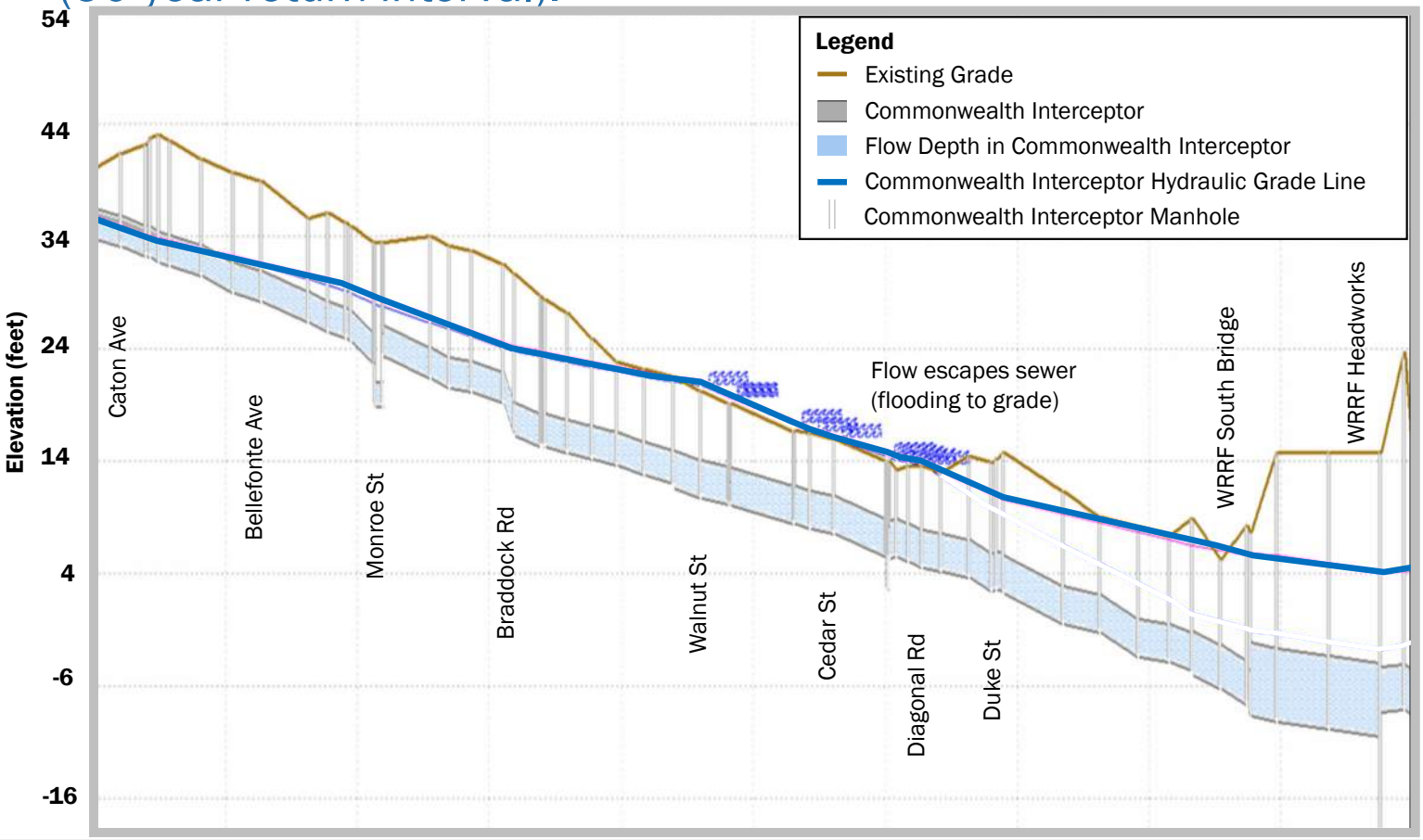
The Commonwealth Interceptor, as designed, has sufficient capacity to deliver 2.5 × dry weather flow to AlexRenew.*

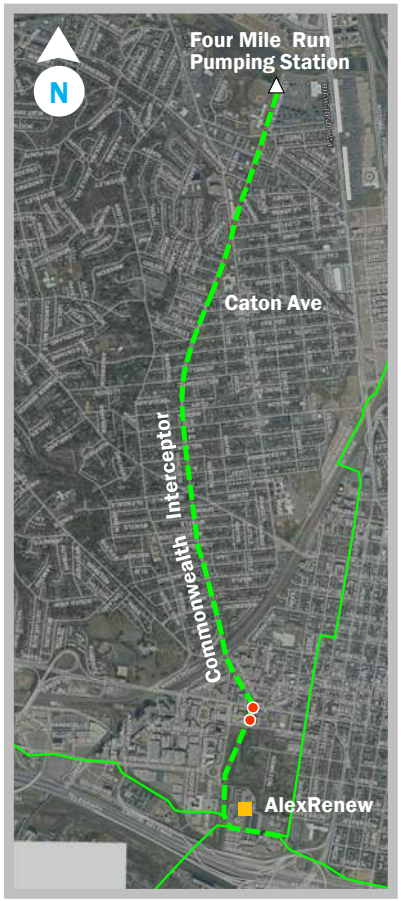




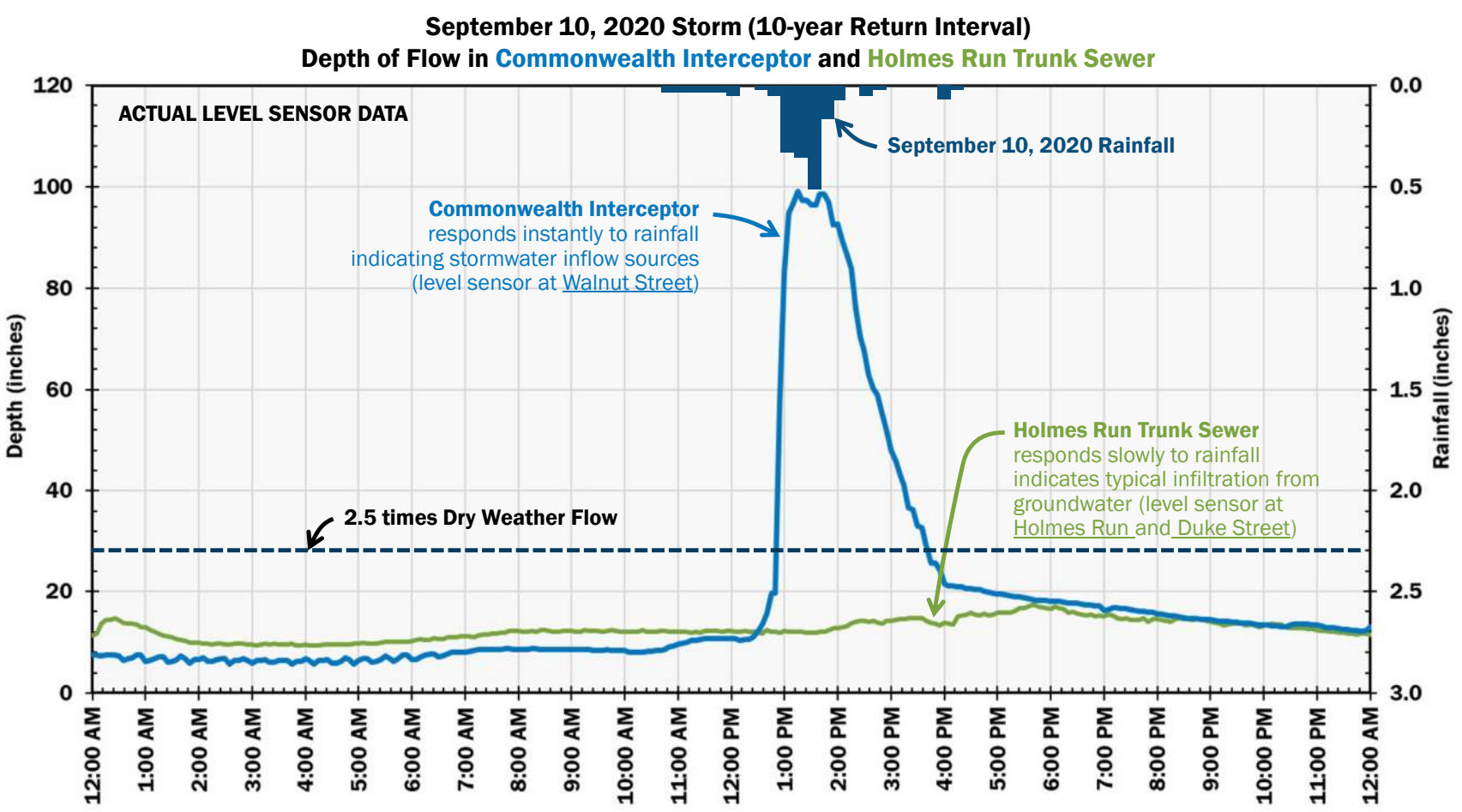
*As required per Virginia's Sewage Collection and Treatment Regulations

Excess infiltration and inflow from the Commonwealth Separate Sanitary Sewer System caused surcharging in the Commonwealth Interceptor during the July 8, 2019 storm (50-year return interval).

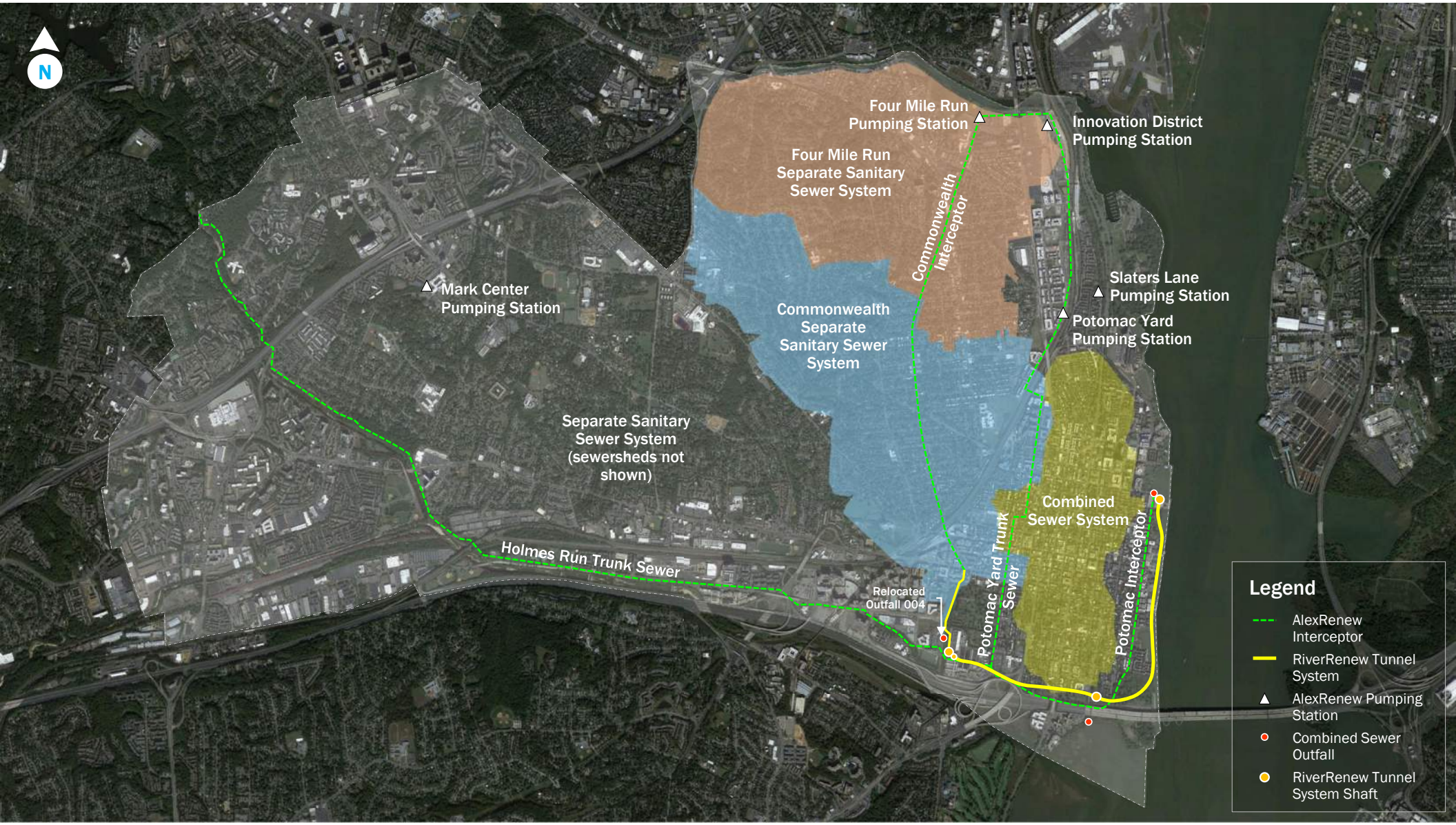




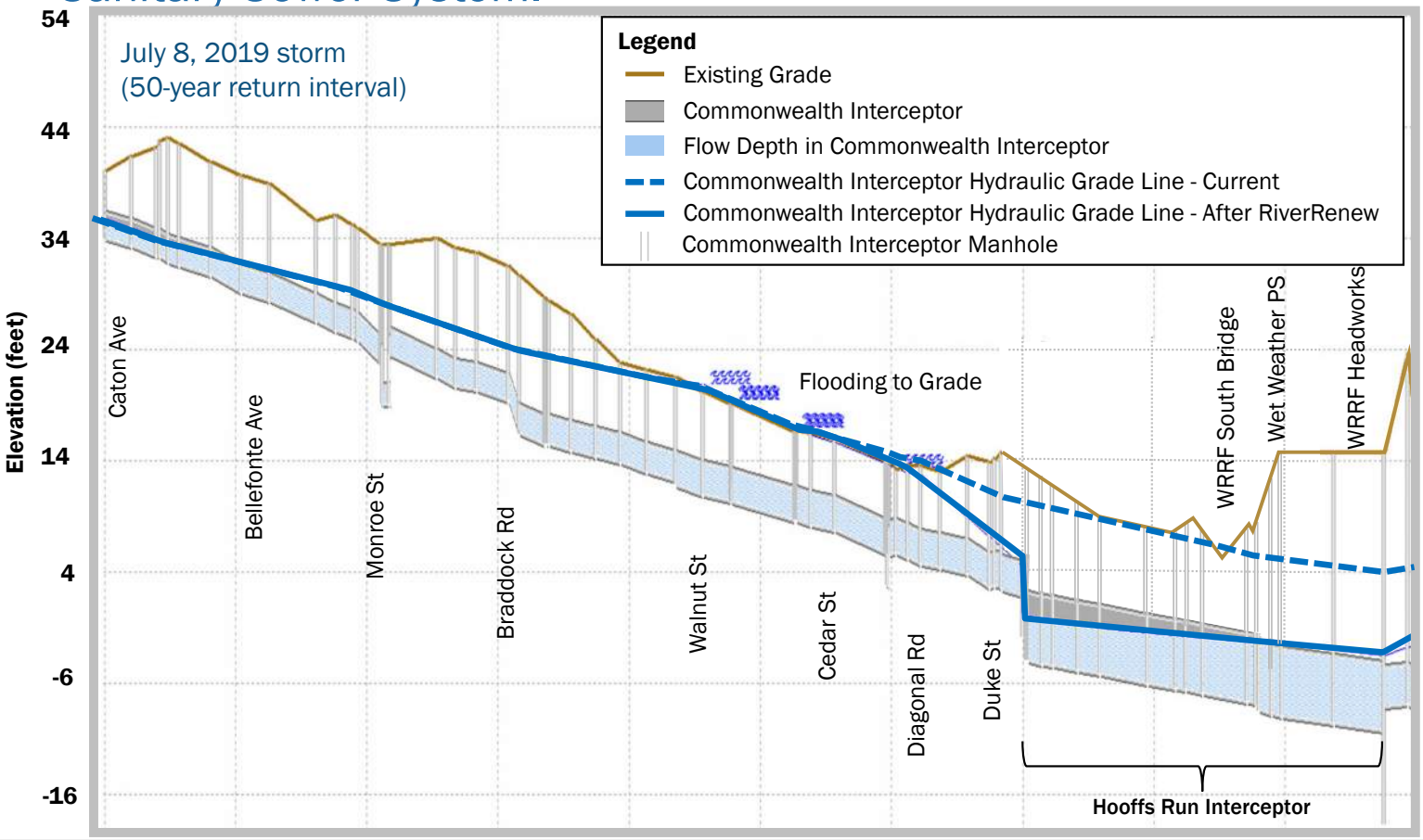
During storm events, the Commonwealth Interceptor responds like a combined sewer, not a separate sanitary sewer due to excess infiltration and inflow from the Commonwealth Separate Sanitary Sewer System.

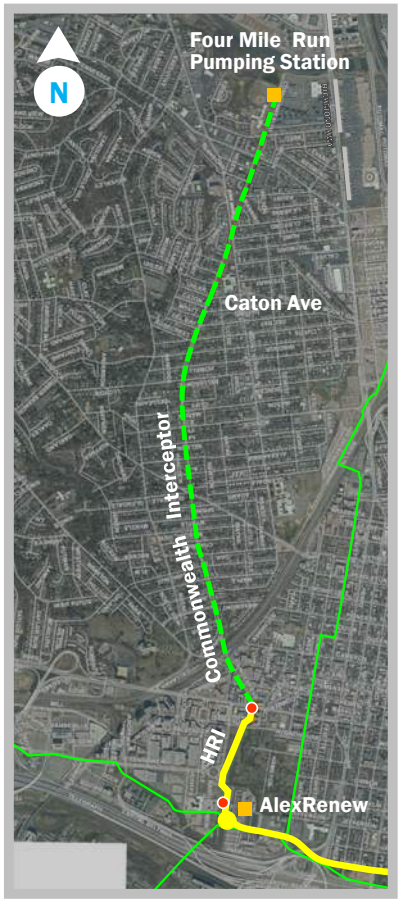


Does RiverRenew address excess infiltration and inflow into the Commonwealth Interceptor?


N
Four Mile Run Pumping Station
Innovation District Pumping Station
Four Mile Run Separate Sanitary Sewer System
Commonwealth Interceptor
Mark Center Pumping Station
Slaters Lane Pumping Station
Potomac Yard Pumping Station
Commonwealth Separate Sanitary Sewer System
Separate Sanitary Sewer System (sewersheds not shown)
Combined Sewer System
Holmes Run Trunk Sewer
Relocated Outfall 004
Potomac Yard Trunk Sewer
Potomac Interceptor
Legend
AlexRenew Interceptor
RiverRenew Tunnel System
AlexRenew Pumping Station
Combined Sewer Outfall
RiverRenew Tunnel System Shaft

RiverRenew is a water quality project and not designed to relieve the Commonwealth Interceptor due to excess infiltration and inflow from the Commonwealth Separate Sanitary Sewer System.





Mitigating Commonwealth Interceptor Risks Associated with Excess Infiltration and Inflow

Major risks due to ongoing excess infiltration and inflow from the Commonwealth Separate Sanitary Sewer System:

AlexRenew Permit non-compliance

Damage to Commonwealth Interceptor

Human health impacts

Property damage

Approaches to minimize the risk of surcharging the Commonwealth Interceptor due to excess infiltration and inflow from the Commonwealth Separate Sanitary Sewer System:

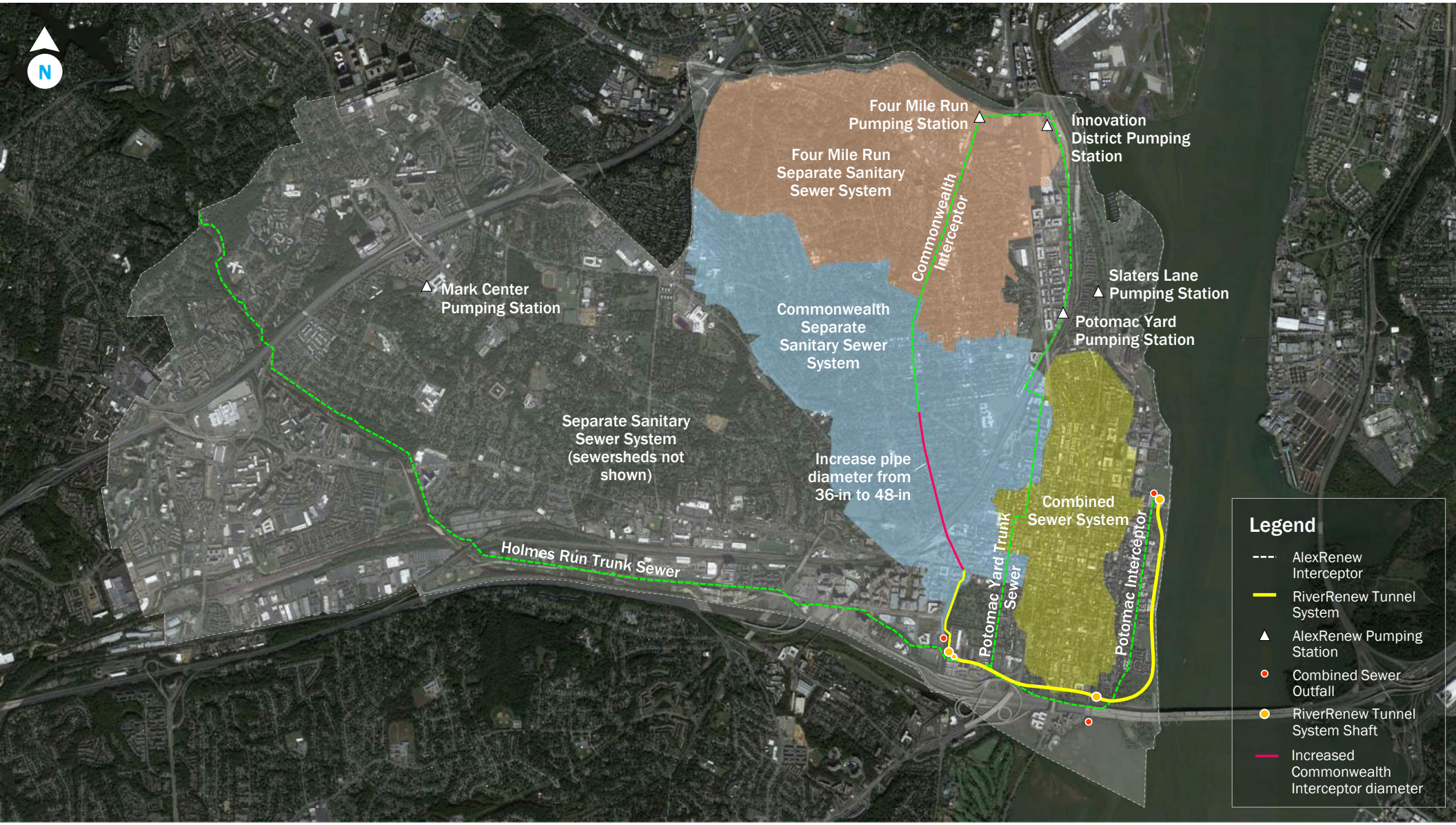
Inflow

- **Improve existing stormwater system capacity** to minimize flooding (City)
- **Disconnect rain leaders** from separate sanitary sewer system (City/homeowner)
- **Eliminate discharges** from foundation drains and sump pumps into the separate sanitary sewer system (City)
- **Remove cross-connections** (City)
- **Seal manhole covers** on separate sanitary sewers in low-lying areas (City)
- **Increase capacity** of Commonwealth Interceptor (AlexRenew)*

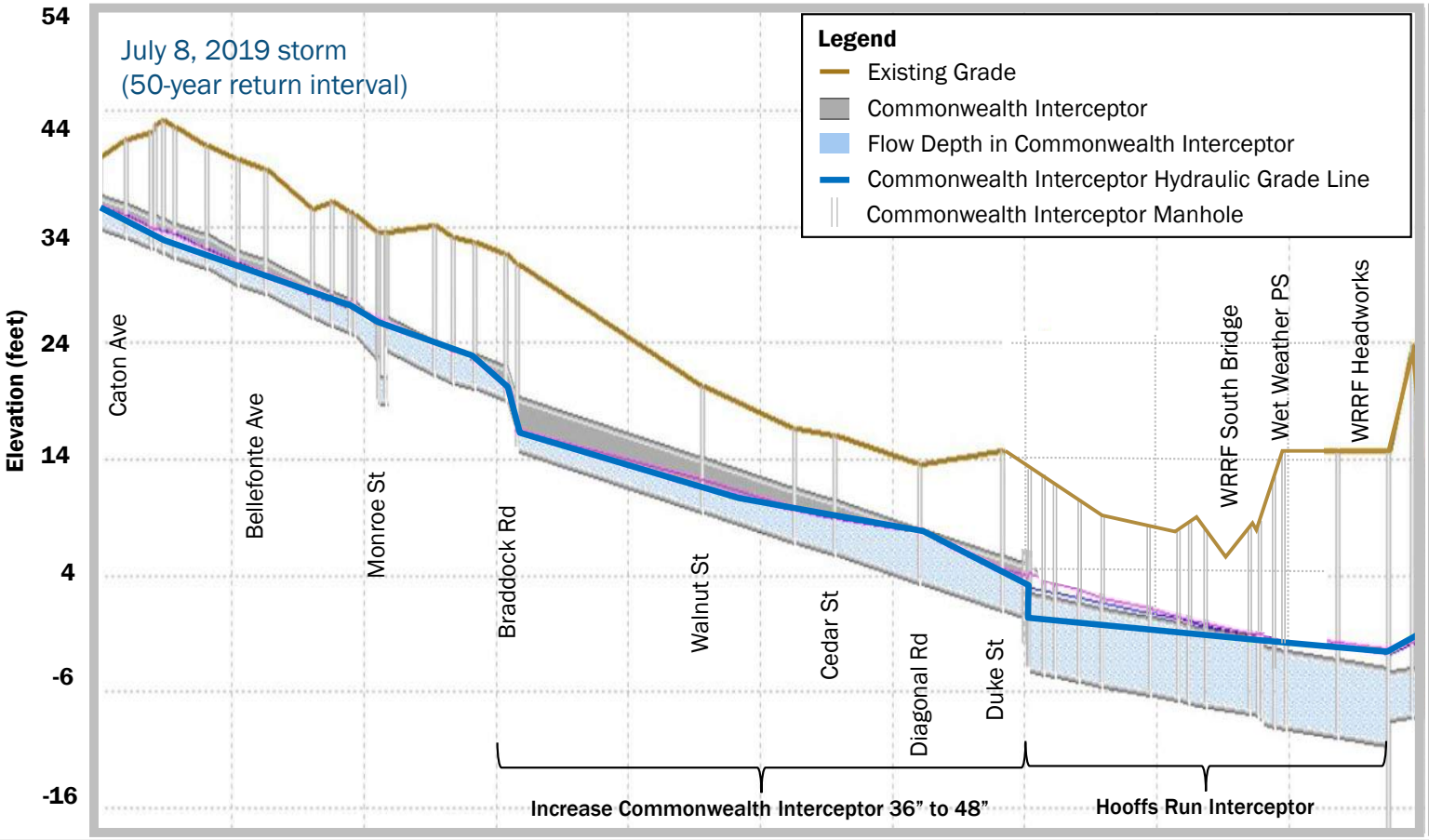
Infiltration

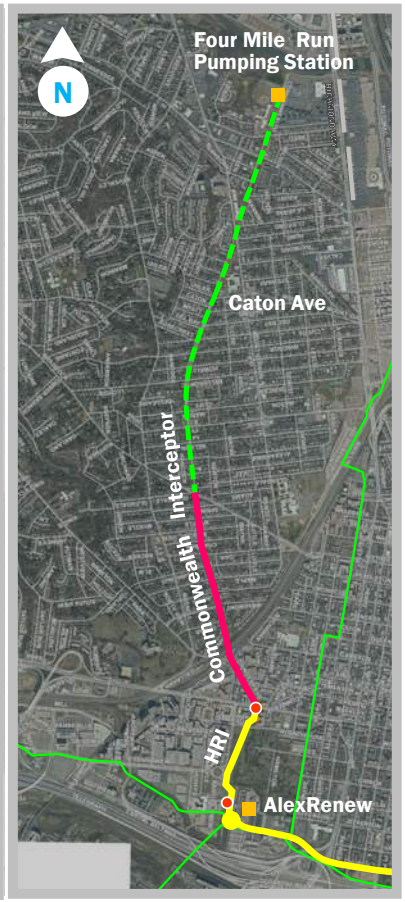
- **Rehabilitate** existing separate sanitary sewers, manholes, and laterals (City)

The Commonwealth Interceptor is a **separate sanitary sewer that meets design requirements per Virginia's Sewage Collection and Treatment Regulations to convey dry weather flow and 2.5 × dry weather flow to AlexRenew for treatment.*


N
Four Mile Run Pumping Station
Innovation District Pumping Station
Four Mile Run Separate Sanitary Sewer System
Commonwealth Interceptor
Mark Center Pumping Station
Slaters Lane Pumping Station
Potomac Yard Pumping Station
Commonwealth Separate Sanitary Sewer System
Separate Sanitary Sewer System (sewersheds not shown)
Increase pipe diameter from 36-in to 48-in
Combined Sewer System
Holmes Run Trunk Sewer
Potomac Yard Trunk Sewer
Potomac Interceptor
Legend
AlexRenew Interceptor
RiverRenew Tunnel System
AlexRenew Pumping Station
Combined Sewer Outfall
RiverRenew Tunnel System Shaft
Increased Commonwealth Interceptor diameter

Increasing the diameter of the Commonwealth Interceptor has the potential to lower the hydraulic profile.

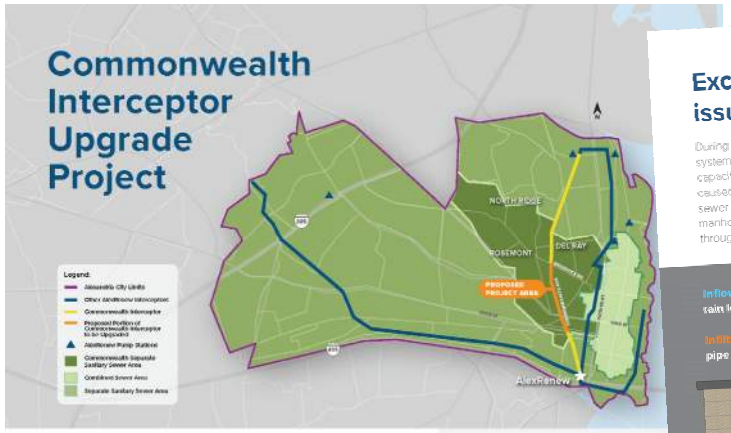




Benefits associated with increasing the capacity of the Commonwealth Interceptor.

- Reduces AlexRenew risk of permit non-compliance
- Protects AlexRenew infrastructure
- Helps address human health issue associated with basement backups
- Helps address damage associated with basement backups
- Synergistic with City's Flood Action Alexandria Program

Commonwealth Interceptor Upgrade Project Informational Flyers



Project Overview

The Commonwealth Interceptor is a separate sanitary sewer — owned and operated by AlexRenew — that collects sanitary sewage from the City of Alexandria's separate sanitary sewer system within the neighborhoods of Del Ray, Rosemont, and North Ridge (known as the Commonwealth Separate Sanitary Sewer Area).

Sewage collected by the Commonwealth Interceptor is directed to AlexRenew's wastewater treatment plant in Alexandria's Southwest Quadrant for purification before being returned to the Potomac River. The Commonwealth Interceptor has sufficient capacity to convey these sanitary sewer flows to AlexRenew. However, during periods of intense rain, the Commonwealth Separate Sanitary Sewer Area (owned by the City) is overwhelmed by **excess infiltration and inflow** (see back for definition), which exceeds the Commonwealth Interceptor's capacity, causing separate sanitary sewer overflows (SSO's).

The Commonwealth Interceptor Upgrade Project will address this problem by increasing the diameter of the Commonwealth Interceptor to 48 inches between Duke Street and Braddock Road.

How it will help:

- Ensure AlexRenew permit compliance by minimizing SSO's
- Minimize potential for damage to the Commonwealth Interceptor
- Support a resilient system to manage the effects of climate change
- Minimize potential for human health impacts due to basement backups
- Minimize potential for property damage due to basement backups

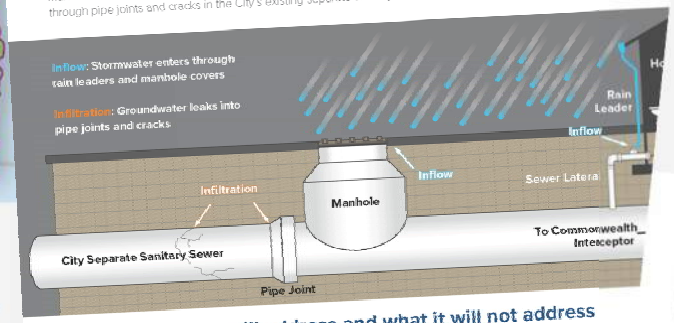
For more information call (703) 721-3500 or visit AlexRenew.com/contact-us

AlexRenew.com

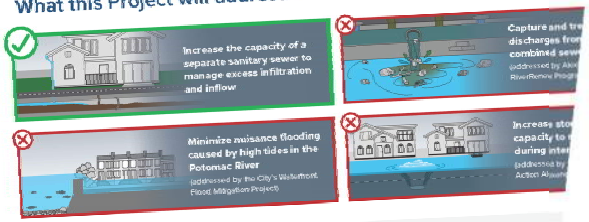
Excess infiltration and inflow causes capacity issues in the Commonwealth Interceptor.

During periods of intense rain in Alexandria, the City's separate sanitary sewer system is overcome with **excess infiltration and inflow**, which causes the capacity of the Commonwealth Interceptor to be exceeded. **Excess inflow** is caused by unauthorized stormwater connections to the City's separate sanitary sewer system (primarily through rain leaders) and stormwater inflow through manhole covers. **Excess infiltration** is caused by groundwater leaking in through pipe joints and cracks in the City's existing separate sanitary sewers.

Watch how excess infiltration and inflow affects the Commonwealth Interceptor.



What this Project will address and what it will not address



About AlexRenew

Alexandria Renew Enterprises, or AlexRenew, fulfills the vital mission of keeping our community healthy through healthier waterways. As an independent public authority established in 1952, we work 24/7/365 to purify wastewater and improve the health and quality of our waterways.

Each year, AlexRenew's wastewater transforms about 13 billion gallons clean water that we safely return

To learn more, visit AlexRenew.c

Heads Up: Field Surveying

AlexRenew is conducting survey work from now through January 2023 to support the Commonwealth Interceptor Upgrade Project.

When:

Through January 2023, between 7:00 a.m.-6:00 p.m

What:

This initial work will include marking locations of underground utilities, recording topographic information, taking measurements, and opening manhole covers. Two- to three-member teams will move from site to site, with stops lasting about 30 minutes.

Disruption to vehicular or pedestrian traffic is not anticipated during this period.

Why:

These teams are gathering important information to inform the design of the Commonwealth Interceptor Upgrade Project.

Scan to learn more about the Commonwealth Interceptor Upgrade Project

Crews conducting survey work in Alexandria

Questions about our survey process? Email us at: communications@alexrenew.com

AlexRenew.com

To learn more, visit www.alexrenew.com