

Brookhaven National Laboratory

Groundwater Recharge Study

**Community Advisory Council
Presentation**

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NATIONAL LABORATORY

a passion for discovery



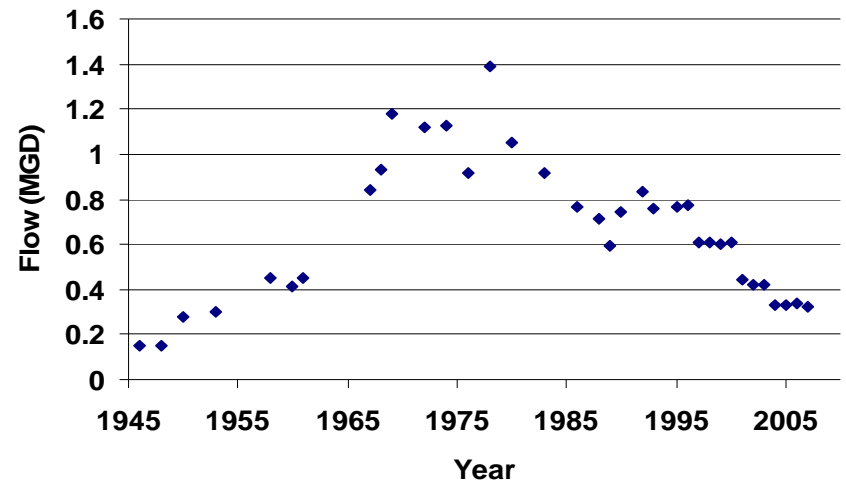
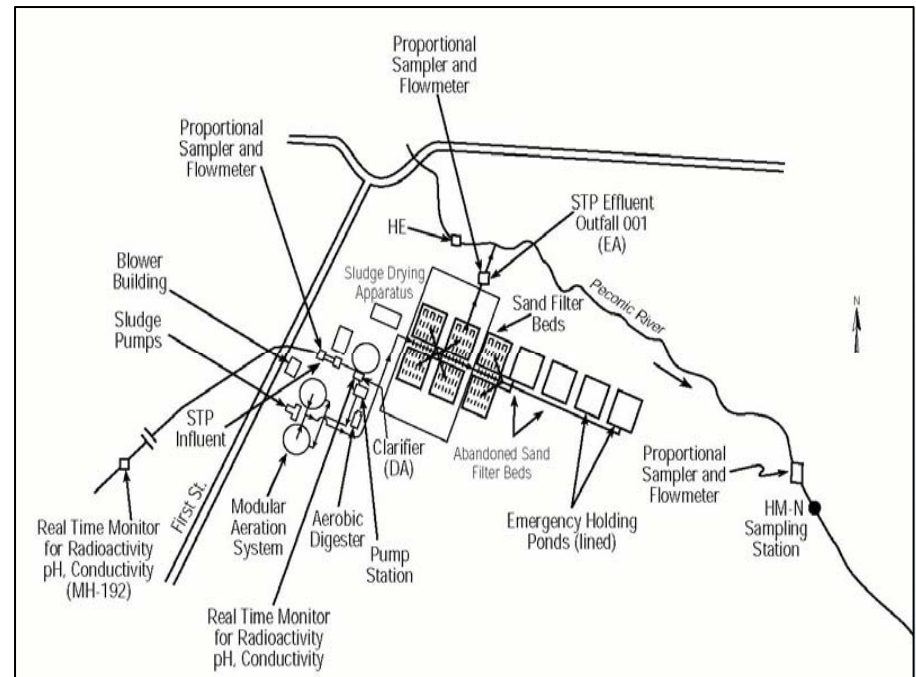
Groundwater Recharge Study

- Evaluated the impacts of redirecting treated effluent from the Peconic River
 - Historical river flow (pre-Camp Upton)
 - Modifications to on-site river flow (Camp Upton and BNL)
 - Current on-site river flow conditions
 - Model predictions for recharging the effluent at three upland recharge areas
 - Preliminary assessment of possible impacts to aquatic organisms

Groundwater Recharge Options report presented as an appendix in the Q&R Study

Waste Water Treatment Facility

- Operations started with construction of Camp Upton in 1917
- Currently processes about 300,000 gpd (non-summer months) to 500,000 gpd (summer)
- Approximately 20% of the treated water recharges directly to groundwater below the filter beds and some is lost to evaporation
- 80% is collected by filter bed drainage system and is discharged to the Peconic River. Discharge is regulated by a SPDES permit



Modifications to Peconic River Drainage System

- Peconic River tributaries were trenched by the Army for improved:
 - Drainage of waste water
 - Drainage of wetland areas for mosquito control
- Some segments of the river downstream of the treatment facility were excavated/deepened during Peconic River restoration project (OU V)



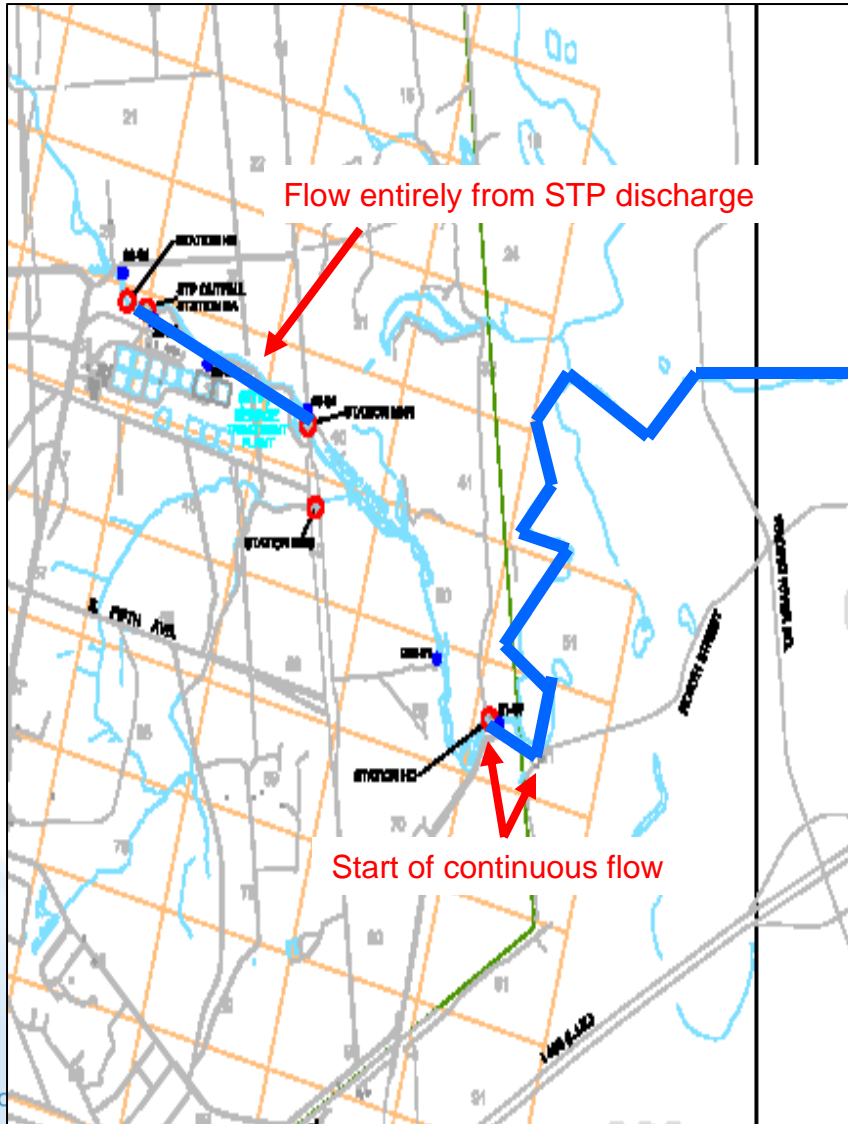
Trench Digger at Camp Upton During WWI

Current Conditions

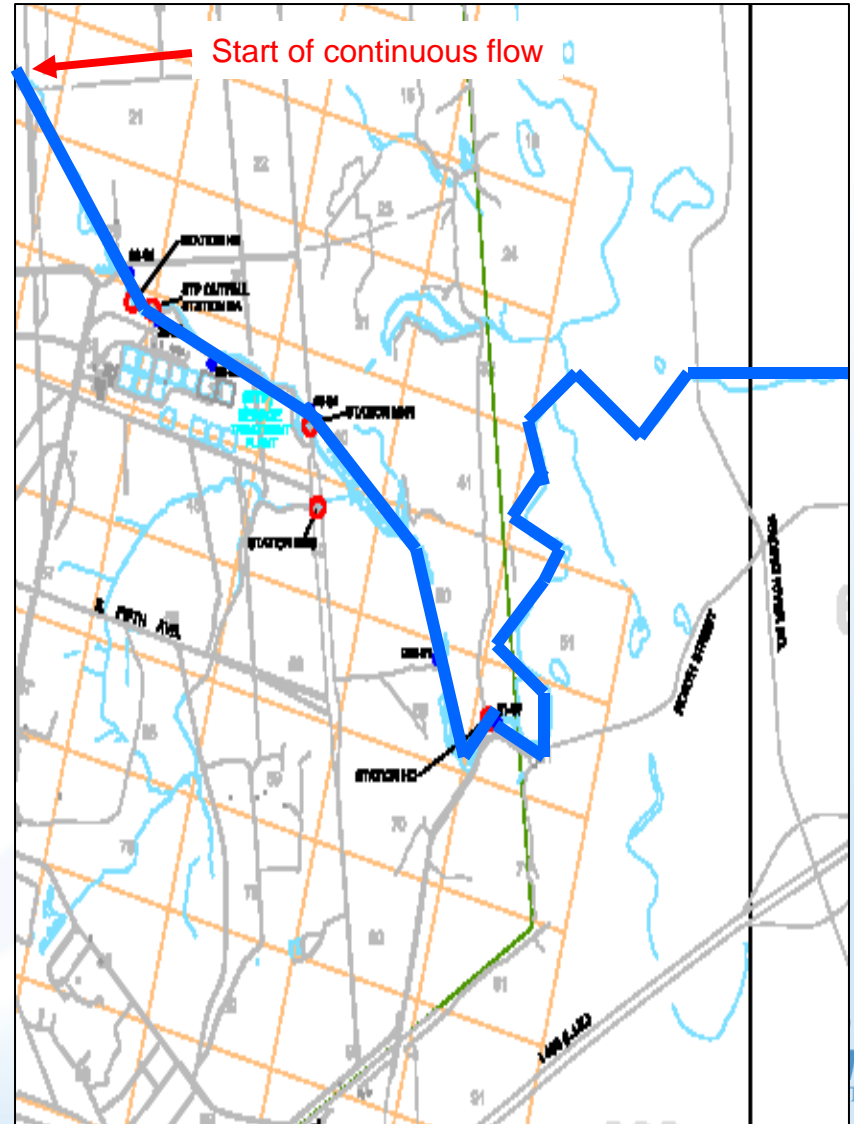
- Peconic River in the BNL area is an intermittent (seasonal) stream
- Most of the water in the river is from groundwater
- Start of continuous stream flow occurs where the water table intersects the river bed
 - During periods of above average seasonal precipitation, the start of stream flow occurs upstream of the STP (Present Conditions)
 - During periods of below average seasonal precipitation, the start of continuous stream flow occurs near the BNL eastern site boundary
 - Flow along a 2,600 foot on-site, channeled section of the river is due to STP discharges. Discharged water infiltrates along stream bed before reaching site boundary

Current Conditions

Dry Periods



Wet Periods

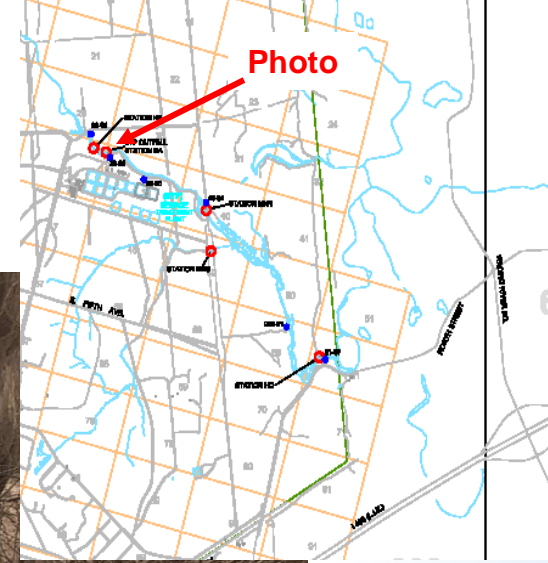


Current Conditions:

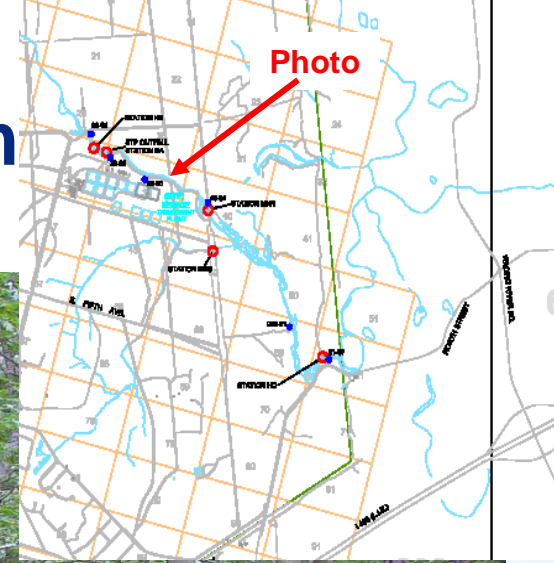
Wet Scenario – Video from April 2010



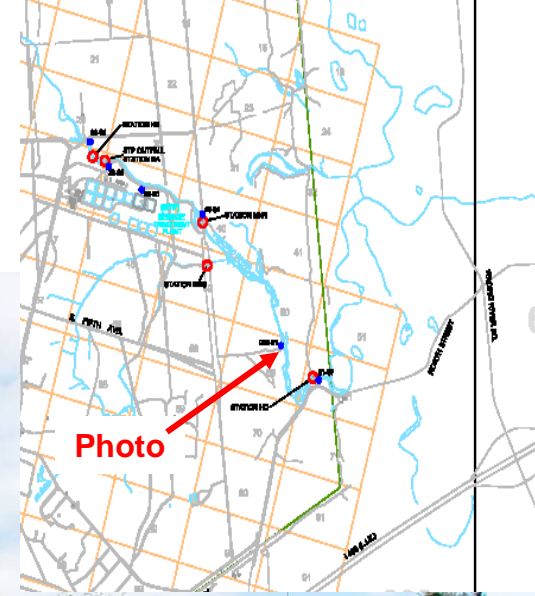
Peconic River at STP Outfall – Wet and Dry Periods



Peconic River ~1,000 ft Downstream of STP Outfall – Wet and Dry Periods



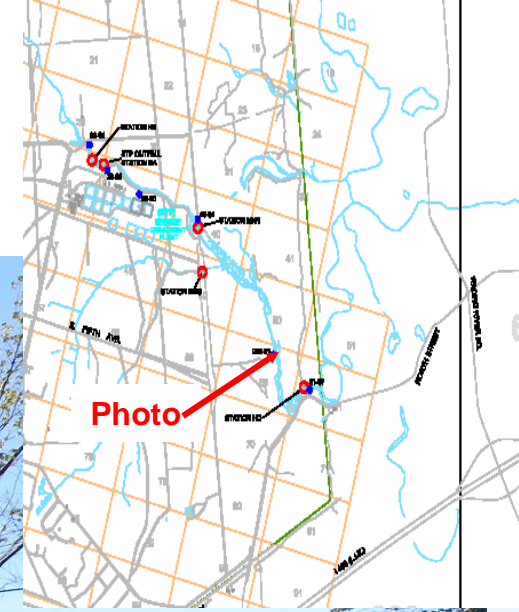
Peconic River ~5,000 ft Downstream of STP Outfall – Wet Period



October 2007

Photo Point Area 27

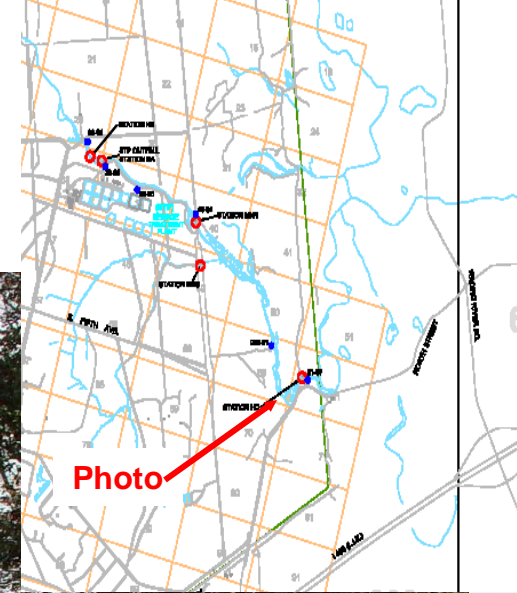
Peconic River ~5,000 ft Downstream of STP Outfall – Dry Period



September 2008

Photo Point Area 27

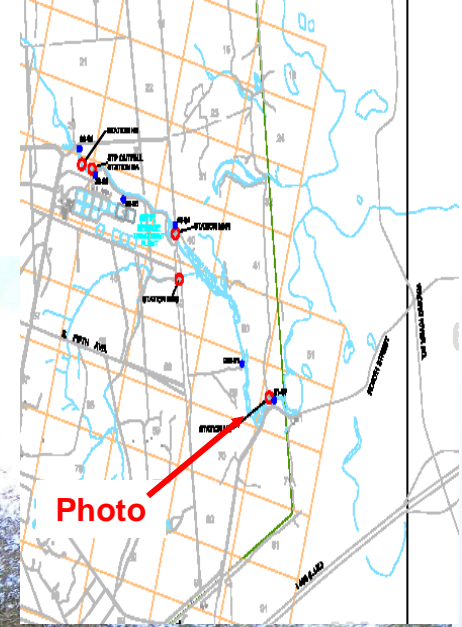
Peconic River ~6,000 ft Downstream of STP Outfall – Wet Period



October 2007

Photo Point Area 28

Peconic River ~6,000 ft Downstream of STP Outfall – Dry Period

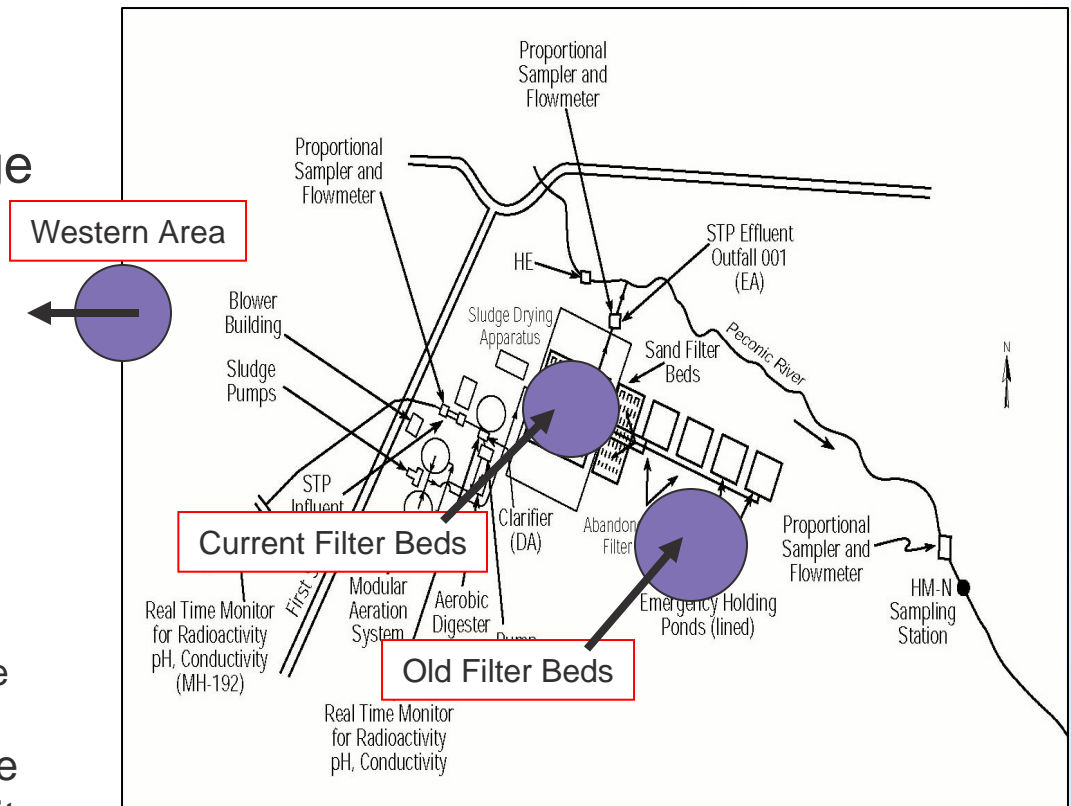


September 2008

Photo Point Area 28

Groundwater Recharge Option

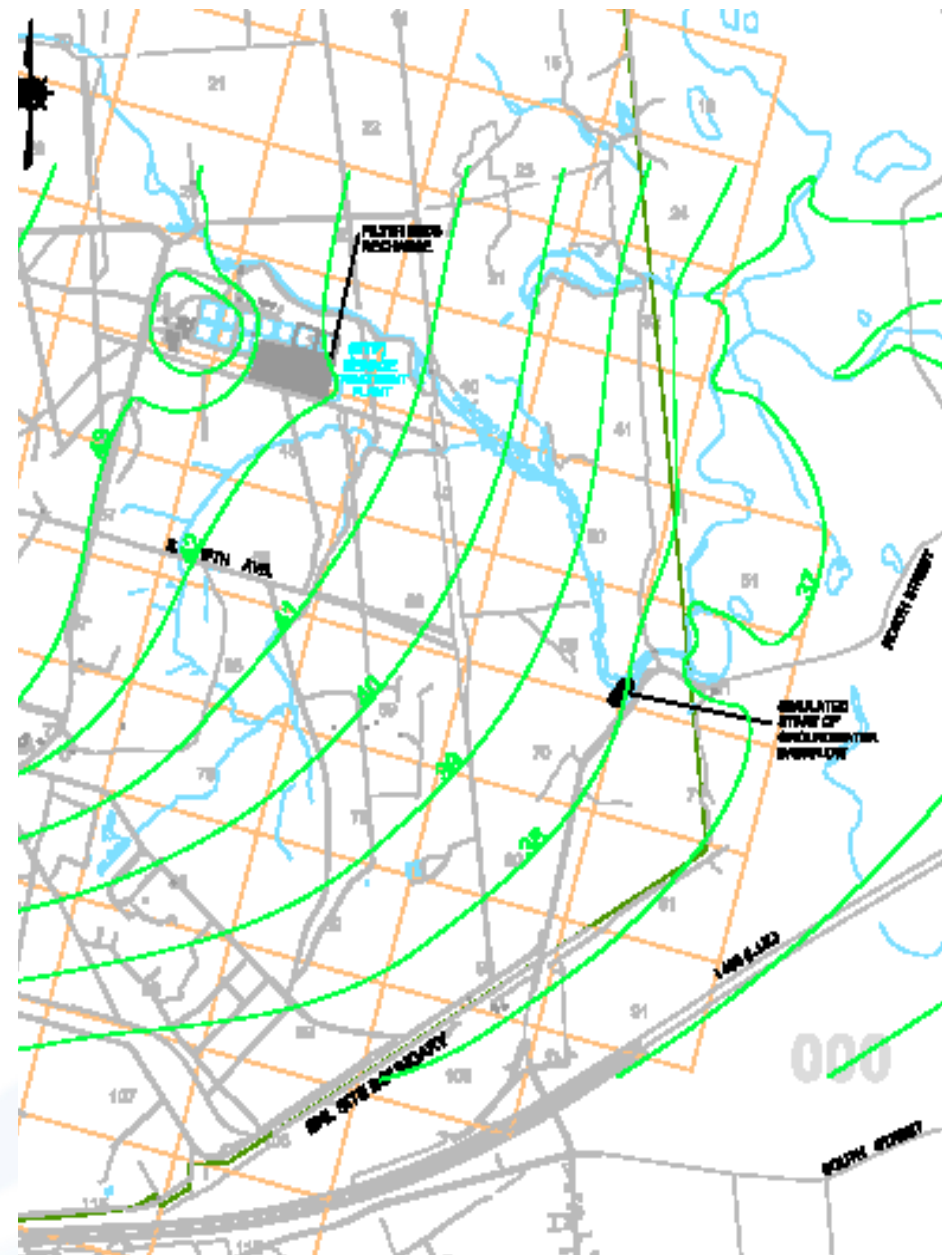
- Evaluated impacts to on-site river flow if all treated waste water is re-directed to a nearby groundwater recharge area
- Groundwater model simulations:
 - Current conditions
 - Three upland recharge areas
 - Current filter beds
 - Old (inactive Army era) filter beds
 - An area ~2,700 feet west of the treatment plant
 - Under all three upland recharge scenarios there will be no on-site flow during periods of low precipitation.



Groundwater Recharge

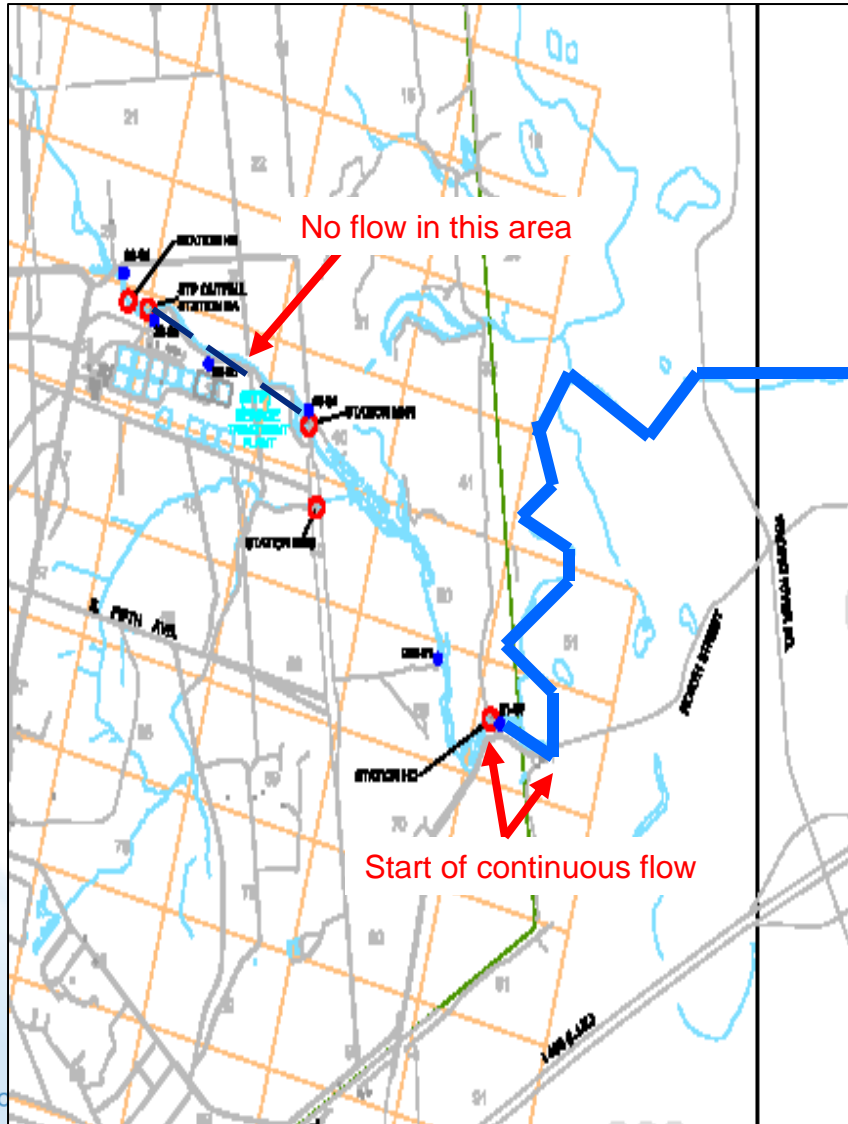
Old Filter Bed Area Scenario

- Old filter bed area was determined to be best location
 - Recharged water will not enter river as baseflow
 - No impact on domestic water wells or remediation systems
 - Flow from STP outfall to east firebreak will be intermittent, with continuous flow only during periods of high seasonal rainfall

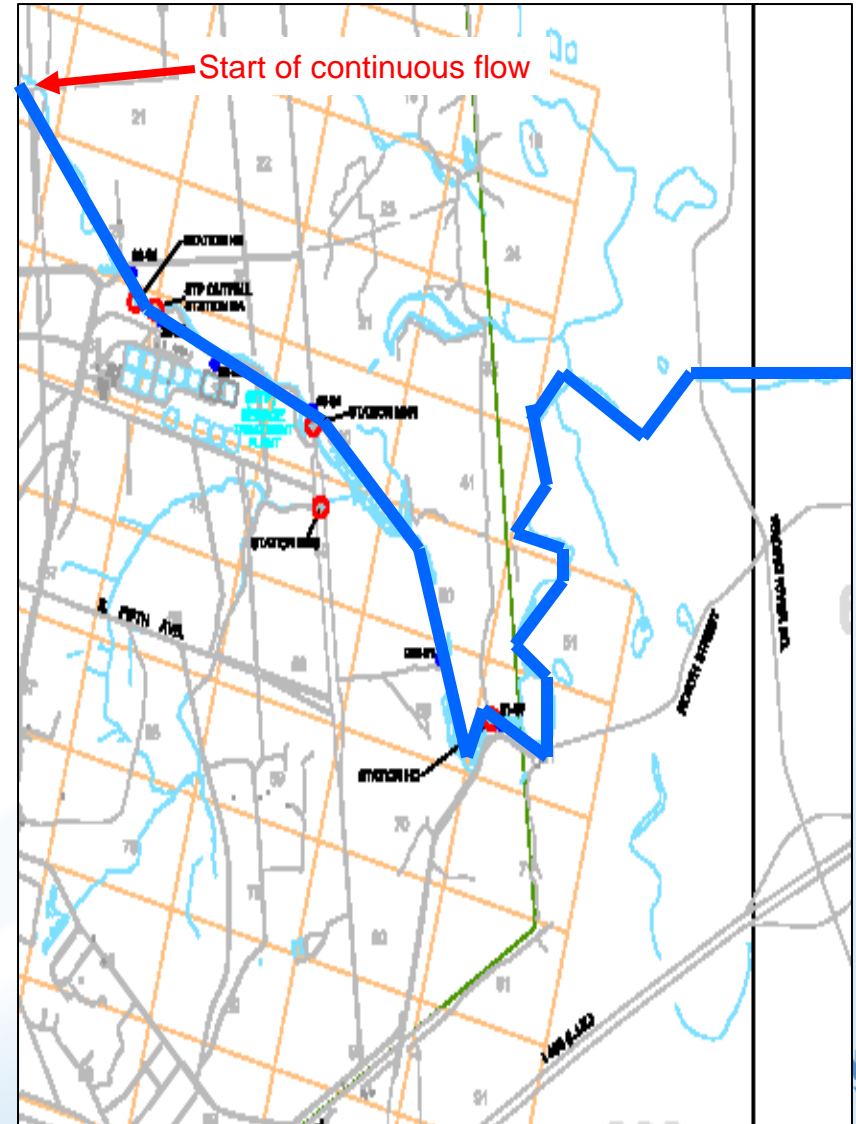


Predicted Conditions

Dry Periods



Wet Periods



Potential Impacts to Flora and Fauna On-site

- Impact likely to be minimal to many wetland species

Positive

- Some emergent and submergent plant species may develop more along the banks of the river
- May result in improved habitat for banded sunfish
- Mixed habitats would be beneficial to migratory shorebirds

Negative

- Loss of continuous flows from STP may impact large predatory fish (e.g., large mouth bass and chain pickerel)

Conclusions

Groundwater Recharge Option

- Even under current conditions (with BNL discharges), on-site portions of the river are an intermittent stream, dependent on groundwater base flow.
- Removal of the discharge would:
 - Have no impact on continuous stream flow during wet periods
 - Flow will no longer be continuous along ~2,600 foot channeled on-site segment of river during dry periods
 - No impact to off-site segments of the river
- Stop additional discharge of low levels of metals to river
- Impact on many wetland species expected to be minimal – any impact would be restricted to 2,600 foot section of the river during dry periods
 - May improve habitat for banded sunfish
 - Impact will be fully evaluated with the regulatory agencies
 - A National Environmental Policy Act review will be required if groundwater recharge is the selected option.

Next Steps

- Finalize SPDES studies
 - Incorporate BNL and other comments and finalize draft by 5/21
 - Review final draft, comments to D&B by 5/31
 - Final report due 6/15
 - Report to regulators by 7/1
- NYSDEC review of recommendations
 - SPDES permit will be revised if:
 - Effluent limits are changed
 - Discharge is diverted to groundwater
 - Revised permit will be subject to Public Notice
- Implement the chosen alternative