

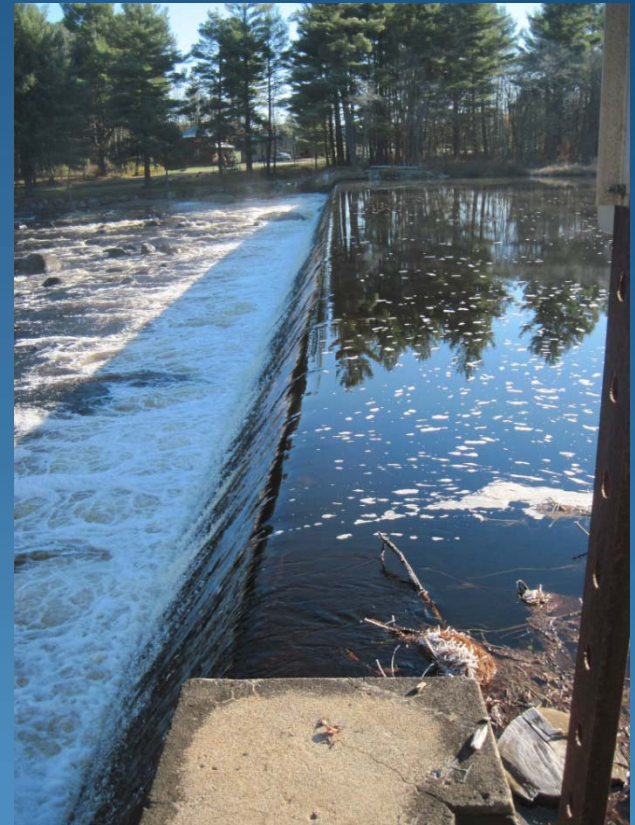
# HAWKINSVILLE DAM PROJECT

HUDSON RIVER-BLACK RIVER REGULATING DISTRICT  
BOARD MEETING  
JUNE 10, 2014



# PRESENTATION TOPICS

- Analysis Objectives
- Analysis
- Dam Removal Plan
- Dam Remediation Plan
- Effects Analysis
- Permit Requirements
- Decision Matrix
- Next Steps



# ANALYSIS OBJECTIVES

- Kleinschmidt Associates was hired to evaluate two alternatives to bring the Hawkinsville Dam into compliance with regulations
  - As a Class B hazard, NYSDEC regulations required the dam to pass the SDF—150% 100-Year-Flood (21,450 cfs).
- Two alternatives proposed by previous work
  - Dam remediation involving installation of a rubber dam to pass the spillway design flood
  - Dam removal

# ANALYSIS – HYDRAULIC MODELING

- Develop a detailed hydraulic model using HEC-RAS
- Proximity of the Hawkinsville Road Bridge to Hawkinsville Dam causes backwater effects at the dam during high flow events
- The previous model did not account for backwater effects due to channel contraction nor was it developed using surveyed data



# ANALYSIS – HYDRAULIC MODELING

## Normal Flow Conditions



## Flood Flow Conditions



\*Note the increased tailwater elevations during the high flow event—if the tailwater elevation increases above the dam crest, the dam has decreased hydraulic capacity

# ANALYSIS – HYDRAULIC MODELING

- Hydrology and hydraulic analysis revealed:
  - Tailwater at dam is major factor affecting discharge
  - In-depth modeling using site specific data indicated the tailwater will submerge the spillway, greatly reducing downstream effects during failure
  - KA prepared a revised breach analysis report to reclassify the dam
  - Received NYSDEC concurrence on April 16, 2014
    - Hazard classification reduced to Class A, and reduced design flood flow from 21,450 cfs to 14,300 cfs

# ANALYSIS – STABILITY

| Case         | Overturning Safety Factor | Sliding Safety Factor |
|--------------|---------------------------|-----------------------|
| Normal Pond  | 2.0                       | 3.6                   |
| Ice Load     | 0.9                       | 1.5                   |
| Design Flood | 1.4                       | 2.9                   |
| Earthquake   | 1.7                       | 2.6                   |

\* Ice load condition does not meet stability requirements. However, the run-of-river dam is likely to have experienced annual ice load conditions during its lifespan and, in KA's opinion, inspection should be sufficient to deem the dam stable under these conditions.

# EXISTING CONDITIONS

- New SDF is a game changer
- Model predicted 100 yr flood level will be 1,049.4'
  - Overtops the embankment by 4 feet
- Even with reduced hazard class, the dam currently does not meet NYSDEC regulations
- Must pass 100-Year-Flood with 1 foot of freeboard
- Remediation or removal still needed
  - New remediation alternative needed




# DAM REMOVAL PLAN

- Removal will demolish entire spillway length
- Proposed Construction Sequence:
  - Phase I - Breach the spillway, accessing from the left dam abutment to draw down impoundment
  - Phase II – Install cofferdam upstream of the dam and excavate sediment directly upstream of dam
  - Remove remaining spillway concrete and retreat to river right



# DAM REMOVAL PLAN – OPINION OF PROBABLE COST

- OPC was developed primarily using standard regional cost indices
- Some vendor quotes were obtained
- Assumed off-site disposal of demolished concrete and excavated sediment
- Estimated cost to remove the dam is \$893,000

|  |   |          |                        |            | Project: 0650-011<br>By: MPH<br>Date: 5/30/2014 |                  |
|---|---|----------|------------------------|------------|---|------------------|
| Pittsfield, Maine 04967<br>(207) 487-3328   |   |          | <b>OPINION OF COST</b> |            |   |                  |
| Project: <b>Hawkinsville Dam Removal Alternative</b>                                |   |          |                        |            |   |                  |
| Item  | Description   | Quantity | Unit                   | Unit Price | Extension                                       | Total            |
| 1.0   | General Requirements                                      |          |                        |            |   |                  |
|   | General contractor conditions                             | 10%      | %                      | \$547,100  | \$54,710  |                  |
|   | Mobilization & demobilization                             | 15%      | %                      | \$547,100  | \$82,065  | \$136,800        |
| 2.0   | Equipment   |          |                        |            |   |                  |
|   | Excavator with bucket                                     | 2        | MONTH                  | \$9,279    | \$18,557  |                  |
|   | Excavator with hydraulic hammer attachment                | 2        | MONTH                  | \$13,648   | \$27,297  |                  |
|   | 6" Centrifugal dewatering pump                            | 45       | DAY                    | \$1,308    | \$58,843  |                  |
|   | Dump truck (12 CY, 3 axle, 16 ton, 400 HP)                | 4        | MONTH                  | \$3,292    | \$13,166  | \$117,900        |
| 3.0   | Labor   |          |                        |            |   |                  |
|   | Excavator operator (2 operators, 2 months)                | 640      | HR                     | \$48.90    | \$31,296  |                  |
|   | Dump truck driver (2 drivers, 2 months)                   | 640      | HR                     | \$37.55    | \$24,032  |                  |
|   | Labor crew (4 laborers, 2 months)                         | 1,280    | HR                     | \$36.65    | \$46,912  |                  |
|   | Hauling (12 CY truck, cycle 20 miles)                     | 2,520    | LCY                    | \$11.19    | \$28,199  |                  |
|   | Reinforced concrete disposal (landfill)                   | 3,866    | TON                    | \$58.00    | \$224,238                                       |                  |
|   | Sediment Disposal (landfill)                              | 825      | TON                    | \$25.00    | \$20,625  | \$375,300        |
| 4.0   | Materials   |          |                        |            |   |                  |
|   | Bulk sandbags (40" x 40" x 48", 3,000 lbs)                | 100      | EA                     | \$14       | \$1,400   |                  |
|   | Sand for bulk sandbags                                    | 97.5     | TONS                   | \$17       | \$1,699   | \$3,100          |
| 5.0   | Erosion & Sediment Management Plan                        |          |                        |            |   |                  |
|   | Silt fence  | 500      | LF                     | \$0.75     | \$375   |                  |
|   | Tire cleaner  | 1        | LS                     | \$1,000.00 | \$1,000   |                  |
|   | Turbidity curtain   | 200      | LF                     | \$90       | \$18,000  |                  |
|   | Geotextile  | 500      | SY                     | \$1.65     | \$825   |                  |
|   | Hay bales, Staked   | 500      | LF                     | \$7.23     | \$3,615   | \$23,900         |
| 6.0   | Site Preparation  |          |                        |            |   |                  |
|   | Riprap behind intake (18" min. thickness, not grouted)    | 136.5    | SY                     | \$98       | \$13,366  |                  |
|   | Grade right bank road (rough grade 1,100 - 3,000 SF)      | 1        | EA                     | \$1,094    | \$1,094   |                  |
|   | Grade left bank and road (rough grade 3,100 - 5,000 SF)   | 1        | EA                     | \$1,639    | \$1,639   |                  |
|   | Clear and grub trees for access                           | 0.17     | AC                     | \$15,402   | \$2,618   | \$18,800         |
| 7.0   | Site Restoration  |          |                        |            |   |                  |
|   | Grading (rough grading sites, open, 45.1k-50k SF, grader) | 1        | EA.                    | \$2,730    | \$2,730   |                  |
|   | Seeding (mechanical seeding, 215 lb/acre)                 | 1        | AC.                    | \$1,252    | \$1,300   |                  |
|   | Replanting trees (red maple, balled & burlapped, 8-10')   | 10       | EA.                    | \$398      | \$3,984   | \$8,100          |
| 8.0   | Permitting  | 1        | LS                     | \$20,000   | \$20,000  | \$20,000         |
| 9.0   | Final Design  | 1        | LS                     | \$25,000   | \$25,000  | \$25,000         |
| 9.0   | Bid Documents and Construction Monitoring                 | 1        | LS                     | \$15,000   | \$15,000  | \$15,000         |
|   |   |          |                        |            |   | \$744,000        |
| Contingency 20%   |   |          |                        |            |   | \$149,000        |
|   |   |          |                        |            |   | <b>\$893,000</b> |

# DAM REMOVAL – BEFORE AND AFTER

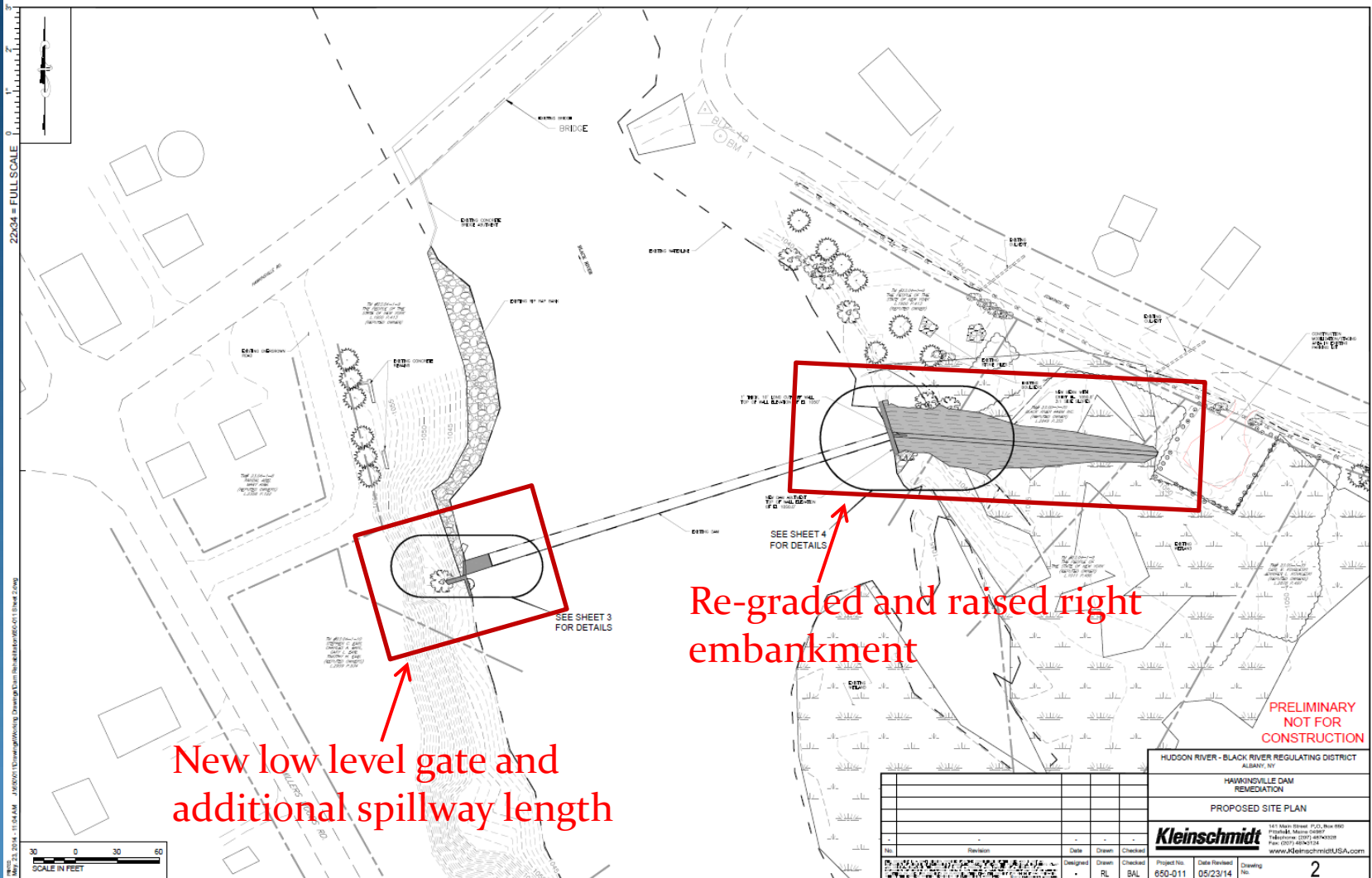
- Below is a comparison of the existing view of the dam with an artist's rendition of the Black River after removal



# DAM REMEDIATION PLAN


- Design to pass 100-Year-Flood flow with 1 foot of freeboard
- Remediation of the spillway will reduce the peak flood elevation to 1,049 feet
- Phase I - Remove and replace existing outlet structure with new gate
- Add 20 feet of additional spillway length adjacent to outlet structure
- Raise left abutment to elevation 1,050 feet
- Phase II – Re-grade and raise right embankment section to elevation 1,050 feet
- Raise right abutment to elevation 1,050 feet
- Stabilize embankment and restore area

# DAM REMEDIATION PLAN



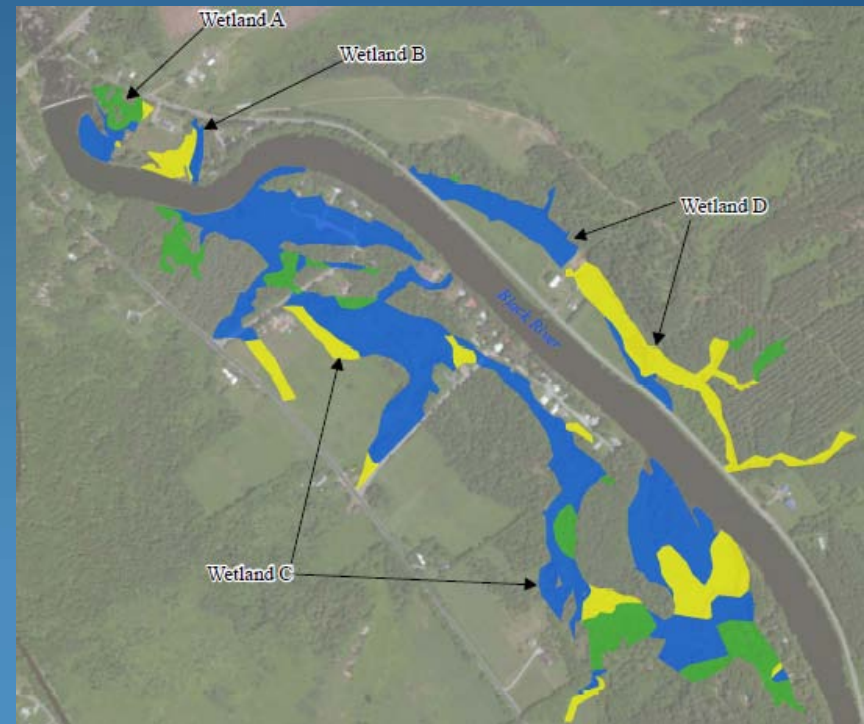
# DAM REMEDIATION PLAN – OPINION OF PROBABLE COST

- OPC was developed primarily using standard regional cost indices
- Some vendor quotes were obtained
- Estimated cost to remediate the dam is \$694,000

|  |   |                        |       | Project: 0650-011<br>By: NMC & MPH<br>Date: 5/30/2014 |                  |           |
|---|---|------------------------|-------|---|------------------|-----------|
| Pittsfield, Maine 04967<br>(207) 487-3328   |   | <b>OPINION OF COST</b> |       |   |                  |           |
| Project: <b>Hawkinsville Dam Remediation Alternative</b>                            |   |                        |       |   |                  |           |
| Item  | Description   | Quantity               | Unit  | Unit Price  | Extension        | Total     |
| 1.0   | General Requirements                                      |                        |       |   |                  |           |
|   | General contractor conditions                             | 10%                    | %     | \$403,200   | \$40,320         |           |
|   | Mobilization & demobilization                             | 15%                    | %     | \$403,200   | \$60,480         | \$100,800 |
| 2.0   | Equipment   |                        |       |   |                  |           |
|   | Excavator with bucket                                     | 2                      | MONTH | \$9,279   | \$18,557         |           |
|   | Excavator with hydraulic hammer attachment                | 1                      | MONTH | \$13,648  | \$13,648         |           |
|   | 6" Centrifugal dewatering pump                            | 60                     | DAY   | \$1,308   | \$78,457         |           |
|   | Dump truck (12 CY, 3 axle, 16 ton, 400 HP)                | 2                      | MONTH | \$3,292   | \$6,583          | \$117,300 |
| 3.0   | Labor   |                        |       |   |                  |           |
|   | Excavator operator (2 operators, 2 months)                | 640                    | HR    | \$48.90   | \$31,296         |           |
|   | Dump truck driver (1 driver, 2 months)                    | 320                    | HR    | \$37.55   | \$12,016         |           |
|   | Labor crew (4 laborers, 1 month)                          | 640                    | HR    | \$36.65   | \$23,456         |           |
|   | Labor crew (7 laborers, 1 month)                          | 1,120                  | HR    | \$37.99   | \$42,549         |           |
|   | Concrete hauling (12 CY truck, cycle 20 miles)            | 165                    | LCY   | \$11.19   | \$1,849          |           |
|   | Concrete disposal at landfill                             | 335                    | TON   | \$58.00   | \$19,430         | \$111,200 |
| 4.0   | Materials   |                        |       |   |                  |           |
|   | Phase 1 downstream cofferdam - sandbags                   | 375                    | EA    | \$5   | \$1,875          |           |
|   | Phase I upstream cofferdam - timber                       | 1000                   | SF    | \$15  | \$14,870         |           |
|   | 4' X 4' Aluminum slide gate                               | 1                      | EA    | \$9,500   | \$9,500          |           |
|   | Debris rack   | 110                    | SF    | \$75  | \$8,290          |           |
|   | 4' Diameter smooth steel pipe                             | 38                     | LF    | \$302   | \$11,463         |           |
|   | Reinforced concrete                                       | 145                    | CY    | \$600   | \$87,000         |           |
|   | Compacted fill  | 504                    | CY    | \$4   | \$1,865          |           |
|   | Geotextile  | 500                    | SY    | \$1.65  | \$825            | \$135,700 |
| 5.0   | Erosion & Sediment Management Plan                        |                        |       |   |                  |           |
|   | Silt fence  | 500                    | LF    | \$0.75  | \$375            |           |
|   | Turbidity curtain   | 100                    | LF    | \$90  | \$9,000          |           |
|   | Hay bales, Staked   | 500                    | LF    | \$7.23  | \$3,615          | \$13,000  |
| 6.0   | Site Preparation  |                        |       |   |                  |           |
|   | Riprap behind intake (18" min. thickness, not grouted)    | 136.5                  | SY    | \$98  | \$13,366         |           |
|   | Grade right bank road (rough grade 5,100 - 8,000 SF)      | 1                      | EA    | \$2,690   | \$2,690          |           |
|   | Grade left bank and road (rough grade 1,100 - 3,000 SF)   | 1                      | EA    | \$1,171   | \$1,171          |           |
|   | Clear and grub trees for access                           | 0.17                   | AC    | \$15,402  | \$2,618          | \$19,900  |
| 7.0   | Site Restoration  |                        |       |   |                  |           |
|   | Grading (rough grading sites, open, 45.1k-50k SF, grader) | 1                      | EA    | \$2,730   | \$2,730          |           |
|   | Seeding (mechanical seeding, 215 lb/acre)                 | 1                      | AC    | \$1,252   | \$1,300          |           |
|   | Replanting trees: (red maple, balled & burlapped, 8-10')  | 5                      | EA    | \$398   | \$1,992          | \$6,100   |
| 8.0   | Property Acquisition                                      | 1                      | LS    | \$9,375   | \$9,375          | \$9,375   |
| 9.0   | Permitting  | 1                      | LS    | \$15,000  | \$15,000         | \$15,000  |
| 10.0  | Final Design  | 1                      | LS    | \$35,000  | \$35,000         | \$35,000  |
| 11.0  | Bid Documents and Construction Monitoring                 | 1                      | LS    | \$15,000  | \$15,000         | \$15,000  |
|   |   |                        |       |   | \$578,000        |           |
| Contingency 20%   |   |                        |       |   | \$116,000        |           |
|   |   |                        |       |   | <b>\$694,000</b> |           |

# NATURAL RESOURCE EFFECTS

- Bank Stability
- Water/Sediment Quality
- Fisheries and wildlife
- Wetlands



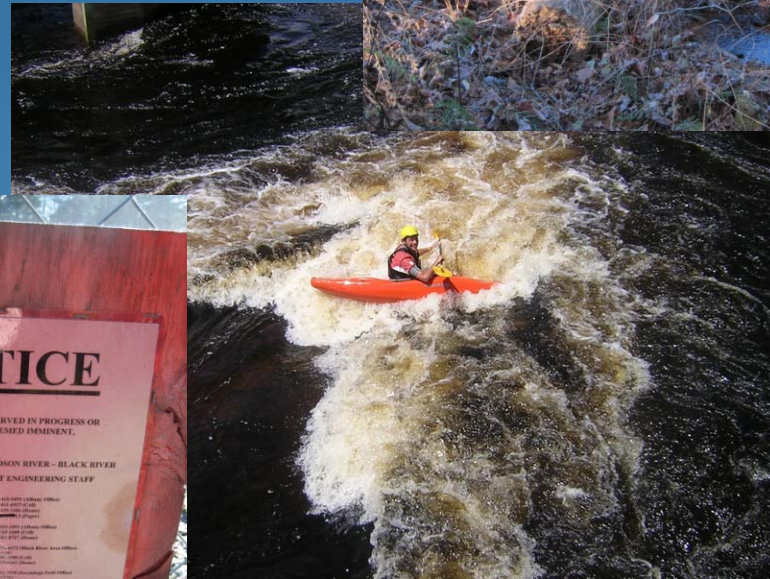
# CULTURAL RESOURCES EFFECTS

- No historical significance to the dam
- Potential for subsurface cultural resources
  - Both alternatives require a Phase 1b



# SOCIOECONOMIC EFFECTS

- Aesthetics
- Infrastructure
- Recreation
  - Boating
  - Fishing
- Public Safety



# PERMIT REQUIREMENTS

## Removal

- *Local:*
  - Local Floodplain Development Permit
- *State:*
  - 6 NYCRR Part 608.2(a) (changing a protected stream and disturbing stream bank)
  - 6 NYCRR 608 Dam Safety Permit
  - 6 NYCRR 633 Freshwater Wetland Permit
  - Wild, Scenic and Recreational Rivers Act Permit (potentially)
- *Federal:*
  - CWA Section 404 Dredge and Fill Permit
  - National Environmental Policy Act (NEPA) Review
  - Confirmation with FEMA 100-year flood damages are not increased

## Remediation

- *Local:*
  - Local Floodplain Development Permit
- *State:*
  - 6 NYCRR Part 608.5 (filling adjacent to wetland)
  - Wild, Scenic and Recreational Rivers Act Permit (potentially)
- *Federal:*
  - CWA Section 404 Dredge and Fill Permit
  - National Environmental Policy Act (NEPA) Review
  - Confirmation with FEMA 100-year flood damages are not increased

# DECISION MATRIX

| Alternative | Pros  | Cons   |
|-------------|---|--|
| Removal     | <ul style="list-style-type: none"> <li>•Complies with regulations</li> <li>•Restores fish passage</li> <li>•Restores habitat diversity</li> <li>•Restores geomorphology</li> <li>•Minimizes flooding</li> <li>•Improves whitewater boating</li> <li>•No public safety concerns</li> </ul>     | <ul style="list-style-type: none"> <li>•Sediment management</li> <li>•Bank stability concerns</li> <li>•Loss of impoundment recreation</li> <li>•May effect stormwater outfalls/drinking wells</li> <li>•More regulatory permissions required</li> <li>•Higher cost</li> </ul>     |
| Remediation | <ul style="list-style-type: none"> <li>•Complies with regulations</li> <li>•No sediment management</li> <li>•More aesthetically pleasing dam structure</li> <li>•Reduced flooding on Edmonds Road near bridge</li> <li>•Fewer regulatory permissions required</li> <li>•Lower cost</li> </ul> | <ul style="list-style-type: none"> <li>•No fish passage</li> <li>•Slightly higher flood elevations</li> <li>•May effect stormwater outfalls</li> <li>•Public safety concerns remain</li> <li>•Additional life cycle costs</li> <li>•Long-term operation and maintenance</li> </ul> |

# NEXT STEPS

- Select Engineering Alternative
- Complete Phase II – design
- Obtain permits and construct