Village of Paw Paw
Briggs Dam

Spillway Alternatives Analysis
December 9, 2019
Briggs Dam Overview/Nomenclature

- Earthen dam (repaired 2018)
- Auxiliary spillway (pipes)
- Control structure (gated)
- Emergency spillway (constructed 2018)
Site Overview – Dam Profile

All elevations in NAVD88
Spillway Alternatives Analysis – Design Objectives

- Safely pass inflow design flood (IDF) through existing control structure & proposed auxiliary spillway
- Maintain current normal water level
- Passive system – no added gates
- Maintain recreational uses (pedestrian access, aesthetics, historical references)
- Long term solution
Alternative 1 – Replace Spillway with Labyrinth Weir
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Labyrinth Weir Examples

cast-in-place concrete
Alternative 2 – Replace Spillway with Arched Weir
Alternative 2 – Replace Spillway with Arched Weir
Alternative 2 – Replace Spillway with Arched Weir
Arch Weir Examples

steel sheet pile with steel cap* or concrete overlay

* assumed
Pedestrian Bridge Examples
## Alternative Construction Cost Comparison

<table>
<thead>
<tr>
<th></th>
<th>Alt 1 – Labyrinth Weir</th>
<th>Alt 2 – Arch Weir</th>
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</thead>
<tbody>
<tr>
<td>Spillway Construction</td>
<td>$150,000 - $240,000</td>
<td>$170,000 - $270,000</td>
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<tr>
<td>Mobilization, water mgt., demolition</td>
<td>$160,000 - $260,000</td>
<td>$150,000 - $250,000</td>
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<tr>
<td>Retaining walls, restoration</td>
<td>$60,000 - $100,000</td>
<td>$150,000 - $240,000</td>
</tr>
<tr>
<td>Pedestrian bridge</td>
<td>$40,000 - $70,000</td>
<td>$40,000 - $60,000</td>
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<tr>
<td>Emergency spillway raise</td>
<td>$40,000 - $70,000</td>
<td>$40,000 - $70,000</td>
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<tr>
<td>Contingency</td>
<td>$100,000 - $150,000</td>
<td>$110,000 - $190,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$550,000 - $890,000</strong></td>
<td><strong>$660,000 - $1,070,000</strong></td>
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**Significant assumptions**
- Both alternatives preliminarily designed for IDF (200-yr flood)
- Emergency spillway raised ~1’ in both alternatives, reuse existing Flexamat surfacing
- Arch weir assumed to be steel sheet pile with steel cap (concrete facing adds $50,000 - $100,000)
## Alternative 1 – Labyrinth Weir – Pro/Con

### Advantages
- Smaller footprint (smaller area to manage in construction)
- Falling water more visible
- Visually unique, can be colored/stamped
- Integral erosion protection
- Labyrinth retaining walls can be used to stabilize shorelines
- Can be optimized (adding capacity) with small added width (at additional cost)
- Lower risk of construction modifications
- Fewer investigations needed

### Disadvantages
- More potential for plugging
- Long-term maintenance of concrete
- Increasing size increases bridge length requirements
- Lower capacity for extreme events (above IDF)
Alternative 2 – Arch Weir – Pro/Con

**Advantages**
- Less potential for plugging
- Could add concrete cap & aesthetic features (at additional cost)
- Larger capacity for extreme events (above IDF)
- Minimal long-term maintenance for steel sheet piles
- Could add riffles downstream, potentially fish passage (at additional cost)
- Shapes other than horseshoe are possible

**Disadvantages**
- Larger footprint (to manage in construction)
- More extensive investigations for pile driving
- Difficult construction tolerances with sheet pile driving (potential imperfect arch)
- Large interior area for erosion protection
- Reduces pond area, could impact flows to control structure
- Potential leaking during low flows
- Flowing water less visible during low flows
- Greater safety risk due to larger approach length & downstream roller
Requested Feedback from Village

- Preferred alternative to advance to 30% design
- Architectural/landscape requirements
  - Aesthetic considerations
  - Pedestrian bridge accessibility/use
  - Landscape/parks features to include