Sterling C. Robertson Dam Tainter Gate Replacement Project Professional Services Contract with Stantec Consulting Services, Inc.

Presented by
Brad Brunett, Central and Lower Basin Regional Manager and Bill Swanson of Stantec Consulting Services, Inc.

Meeting Date: April 30, 2018
Sterling C. Robertson Dam
Why Stantec?

Experience & Expertise:

- 25 similar projects in last 17 years
- 14 Tainter gate projects
- Commitment & involvement of experts for our project
Discussion Topics

• Comparison of Rehabilitation Options
  – In-situ skin plate rehabilitation
  – Replacement gates

• Recommended Approach for Gate Replacement
Overview of Gate Concerns

• Constructed in 1978
  – 40 years old

• 5 Radial Tainter Gates
  – 40 feet wide by 29 feet high
  – “Weathering steel” has performed poorly in a submerged application

• Gate Hoists
  – Also 40 years old
  – Previous study recommended rehabilitation
  – Could be affected by gate modifications
View Across Top of Dam
Typical Gate

- Hoist Line Shaft
- Skin Plate
- Hoist
- Wire Rope
Upstream Face of Gate
Gate Bay Components

- Guide
- Pier
- Tainter Gate
- Trunnion
Tainter Gate Components

- Gate Arms
- Rib
- Weld
- Skin Plate
- Horizontal Girder
Trunnion Components

- Trunnion Girder
- Trunnion Bearing
- Gate Arms
- Trunnion Yoke
- Trunnion Pin
- Trunnion Tie Beam
## Gate Options Considered

<table>
<thead>
<tr>
<th>IN-SITU REHABILITATION</th>
<th>REPLACEMENT</th>
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</thead>
<tbody>
<tr>
<td>Remove and replace skin plates and vertical ribs on existing arms and girders</td>
<td>Remove and replace entire gates</td>
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<tr>
<td>Replace side and bottom seals</td>
<td></td>
</tr>
<tr>
<td>Reuse trunnions</td>
<td>Replace trunnions</td>
</tr>
<tr>
<td>Reuse hoists and wire ropes</td>
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### Comparison Criteria
- Constructability
- Schedule & Cost
- Quality & Warranty
<table>
<thead>
<tr>
<th><strong>IN-SITU REHABILITATION</strong></th>
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<tbody>
<tr>
<td>In-situ painting requires isolation of the portion of the structure to be painted for controlled environment.</td>
<td>Fabrication and painting in a controlled shop environment provides high quality application.</td>
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<td>Risk of reduced paint coating quality and life on weathering steel.</td>
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<tr>
<td>Significant interface with existing structures could result in fit-up problems. Risk of schedule delay.</td>
<td>Minimal interface with existing equipment reduces risks of fit-up problems. Shop pre-assembly reduces risk of incorrect fit in field.</td>
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<tr>
<td>Significant vertical and overhead field welding and weld testing.</td>
<td>Can be customized for most convenient installation method with bolted connections and minimal field welding and painting.</td>
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<td>Tight workspace for skin plate-related work activities.</td>
<td></td>
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<tr>
<td>Smaller sections can be handled with lighter equipment.</td>
<td>Heavy skin plate/girder assembly requires large crane and calm weather conditions.</td>
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## Schedule and Cost

<table>
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<tr>
<th>ITEM</th>
<th>IN-SITU REHABILITATION</th>
<th>REPLACEMENT</th>
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<tbody>
<tr>
<td>Total Duration</td>
<td>29 months (excludes design and bidding)</td>
<td>36 months</td>
</tr>
<tr>
<td>Shop Fabrication</td>
<td>Not applicable</td>
<td>First gate in 10 months</td>
</tr>
<tr>
<td>On-site Construction</td>
<td>29 months</td>
<td>9 months</td>
</tr>
<tr>
<td>Individual Bay Outage</td>
<td>4 – 5 months</td>
<td>1 – 1.5 months</td>
</tr>
<tr>
<td>Total Duration of Bay Outages</td>
<td>21 – 25 months</td>
<td>5 – 7.5 months</td>
</tr>
<tr>
<td>Present Value of 40-year Life Cycle Cost</td>
<td>$12.7 – $18.6 Million</td>
<td>$9.9 – $14.3 Million</td>
</tr>
</tbody>
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## Quality and Warranty

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<tr>
<td>Unknown quality of existing 40-year old gate equipment and structures (i.e., trunnion bearing). Coating reliability risk from field application.</td>
<td>High reliability of gate and coating.</td>
</tr>
<tr>
<td>Retained materials and equipment will not be subject to warranty.</td>
<td>Full warranty on new gate, including paint coating from gate supplier.</td>
</tr>
<tr>
<td>Unknown service life of retained portions of gates.</td>
<td>Forty-year service life of new gates.</td>
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</table>
Recommendations

• Replace all Tainter gates

• During design, consider adding
  – Cathodic protection system
  – Access platforms

• Evaluate condition of hoists to lift
  – Replacement gates
  – Gates with optional additions
Design Process

Investigate
- Survey
- Inspections

Evaluate Options
- New gates
- Cathodic protection
- Walkways
- Laydown areas
- Launch sites
- Hoist modifications

30% Design
- Design Basis Memo
- Select options to be included in design
- USACE Permit

Design Development
- 60% Design
- 95% Design
- Final Design
- TCEQ Permit

Bidding
- Industry outreach
- Bid documents
- Respond to RFIs
- Select contractor

7 Months | 15 Months
“BE IT RESOLVED that the Board of Directors of the Brazos River Authority hereby authorizes the General Manager/CEO to negotiate and execute a professional services contract with Stantec Consulting Services, Inc., for all activities associated with the permitting, engineering, design services, and construction oversight services of replacing the Tainter gates and rehabilitating the Tainter gate hoist systems for the long-term protection and enhancement of the Sterling C. Robertson Dam in an amount not to exceed $4,237,655.”