Brazos River Authority

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

Brazos River Authority

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*

Table 1: Project Experience Summary

						Meets RFP Item Number:								Scope of Services Provided			
Project	Client	Location	Year Complete	Type of Gate	Number of Gates	Stantec Staff on Project	(2) Item 2: Gate Repairs or Replacement	(3) Item 3: Access Improvements	(4) Item 4: Pier-nose Coverage	(5) Item 5: Cathodic Protection	(6) Item 6: Gate Seal Replacement	(7) Item 7: Stop Logs	(8) Item 8: Spillway Condition Reports	(9) Item 9: LiDAR Laser Survey	Preliminary Engineering Design	Final Engineering Design	Bidding Support Services	Construction Phase Services
Powell Lake Dam Spillway Upgrade	Brookfield Renewable Energy	Powell River, British Columbia, Canada	2017	Radial Tainter	19	Mike Morgan, Munir Bector, Vik Negi	●	●	●		●		●			●	●	●
Stave Falls Spillway Gate System Improvements – Blind Slough Dam	BC Hydro / PCL Construction Inc.	British Columbia, Canada	2013	Radial Tainter	4	Ken Genj, Munir Bector, Vik Negi	●	●	●		●					●	●	●
Post Falls Sector Gate Rehabilitation	Avista Corp.	Post Falls, ID	2004	Radial Tainter (sector)	1	Mike Morgan, Vik Negi	●		●		●		●			●	●	●
Bagnell Dam Gate Rehabilitation Project	Ameren	Missouri	2004	Radial Tainter	12	Mike Morgan, Vik Negi	●		●		●						●	●
LL Anderson Dam Spillway Modifications	Placer County Water Agency	Placer County, CA	2011	Radial Tainter	1	Mike Morgan, Ken Genj, Munir Bector, Vik Negi	●	●	●		●		●				●	
Forest Kerr Hydroelectric Project – Skiloaway Radial Gate Design	Andritz Hydro ATI Inc.	British Columbia, Canada	2014	Radial Tainter	1	Mike Morgan, Ken Genj, Munir Bector, Vik Negi	●		●		●						●	●
Carraizo Spillway Radial Gate Replacement	Oregon Ironworks	Puerto Rico	2000	Radial Tainter	8	Mike Morgan, Vik Negi, Rick Lux	●		●		●						●	●
Pinopolis Lock Emergency Gate Replacement	Santee Cooper/Oregon Ironworks	South Carolina	2002	Radial Tainter	1	Mike Morgan, Ken Genj	●		●		●						●	
Alwerdale Generating Station Fall Protection Upgrade Project	ATI Hydro (Fabricator)	British Columbia, Canada	2016	N/A	N/A	Mike Morgan, Munir Bector		●									●	
San Vicente Dam Raise	San Diego County Water Authority	San Diego, CA	2016	Wheeled Intake and Low Level Outlets	3	Mike Morgan, Vik Negi, Jose Villalobos, Ron Emme		●	●	●		●				●	●	●
Pump Station and Canal Gate Cathodic Protection System Testing	Town of Porto Madera	Porto Madera, CA	2017	Bona Gates Stoplogs	4	Jose Villalobos			●	●						●		
Oroville Dam Spillway Emergency Engineering Support	California Department of Water Resources	Oroville, CA	Ongoing	N/A	N/A	Wade Moore							●			●		●
Exelon Conowingo Dam Hydro Electric Station Fish Passages	Exelon Corporation	Conowingo, MD	2017	N/A	N/A	Ivan Sukovnik								●		●		
Lake Houston Dam Improvements Project	Coastal Water Authority	Houston, TX	Ongoing	Fixed (Permanent) Bulkhead	1	Ken Genj, Chander Sehgal, Wade Moore, Martin Ellis					●	●				●	●	●
Springbank Off-Stream Storage Project (SR1)	Alberta Transportation	Alberta, Canada	Ongoing	Spillway Crest and Vertical Lift	2 each structure	Ken Genj, Chander Sehgal, Rick Lux			●		●					●		
Ruskin Powerhouse Improvement	BC Hydro	British Columbia, Canada	Ongoing	N/A	N/A	Mike Morgan, Ken Genj, Munir Bector, Vik Negi	●	●	●		●	●		●		●	●	●
Spillway Tainter Gate Assessment for Dexter No. 3 Project	Tennessee Valley Authority	Hackleton, TN	2017	Radial Tainter and Retaining Bulkhead	7	Rick Lux	●	●			●	●				●		
Alvarado Water Treatment Plant Expansion	City of San Diego	San Diego, CA	2011	Slide	4	Jose Villalobos			●	●						●	●	
Meldahl Spillway Tainter Gates Rehabilitation	USACE Huntington District	Felicity, OH	2016	Radial Tainter	12	Rick Lux	●	●	●		●		●			●	●	
Norway and Oakdale Hydroelectric Project	Northern Indiana Public Service Company	Monticello, IN	2016	Spillway (vertical lift)	5	Ken Genj, Vik Negi							●			●	●	●
Warragamba Dam Gates Upgrade Project	Seaboth Pty Ltd	New South Wales, Australia	2010	Radial Tainter	4	Chander Sehgal	●		●		●					●	●	●
Montgomery Point Lock and Dam	USACE Little Rock District	White River, AR	2010	Tongue Tube-Type Hinged Crest Gates and Stop Logs	10	Mike Morgan, Ken Genj, Vik Negi, Chander Sehgal			●	●		●				●	●	●
Ross River Dam Upgrade	North Queensland Water	Townsville, Queensland, Australia	2016	Radial Tainter and Stop Logs	3	Ken Genj, Chander Sehgal	●		●		●	●	●			●	●	
Tainter Gate Replacement for Mead Dam	Clark County	Wisconsin	2010	Radial Tainter	6	Rick Lux	●		●		●					●	●	●
Braddock Lock Rehabilitation	USACE, Pittsburgh District	Monongahela River, PA	2004	Radial Tainter	2	Mike Morgan, Ken Genj	●	●	●		●					●	●	●

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

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View Across Top of Dam

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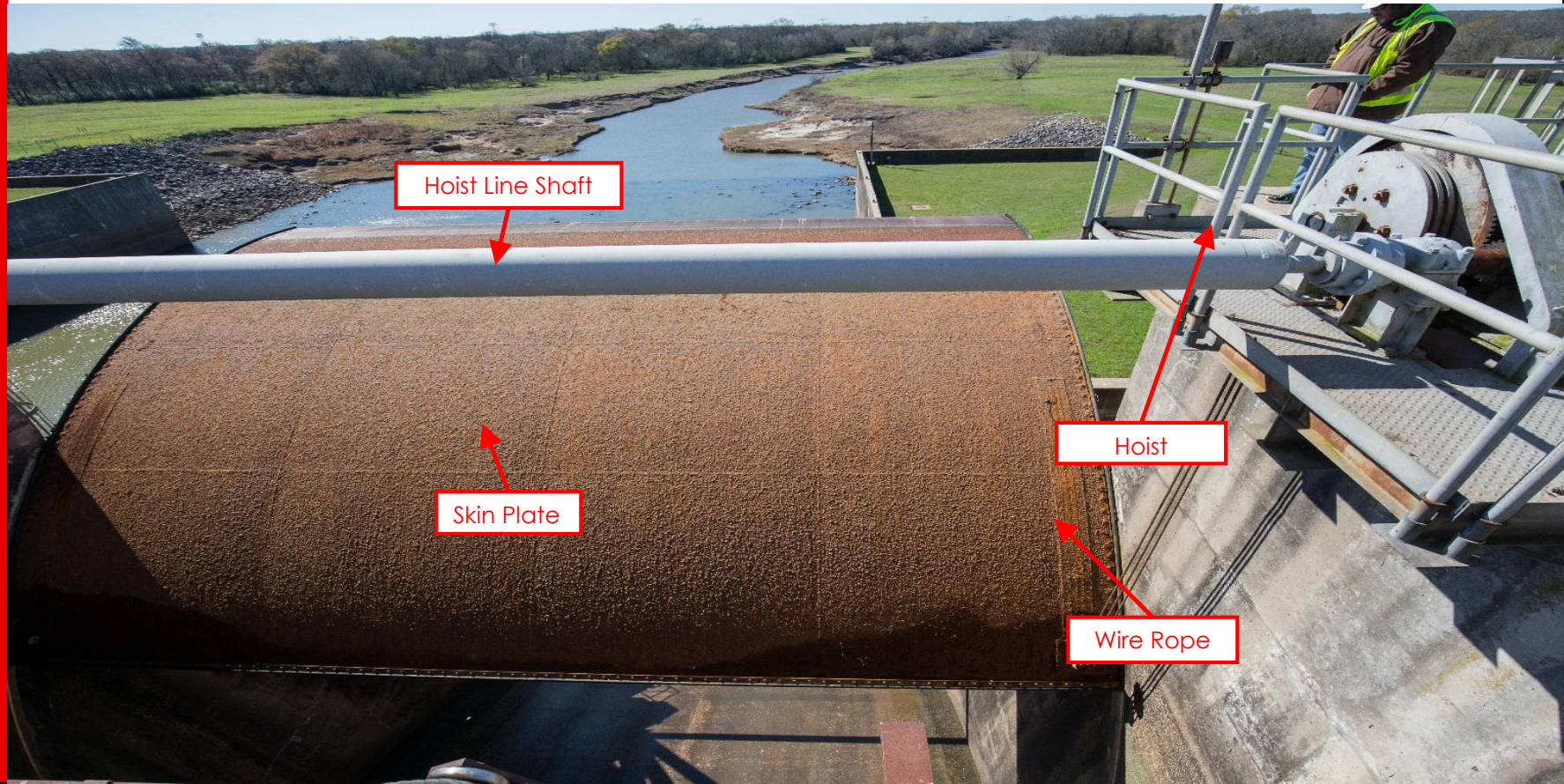
Typical Gate



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Upstream Face of Gate

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Gate Bay Components

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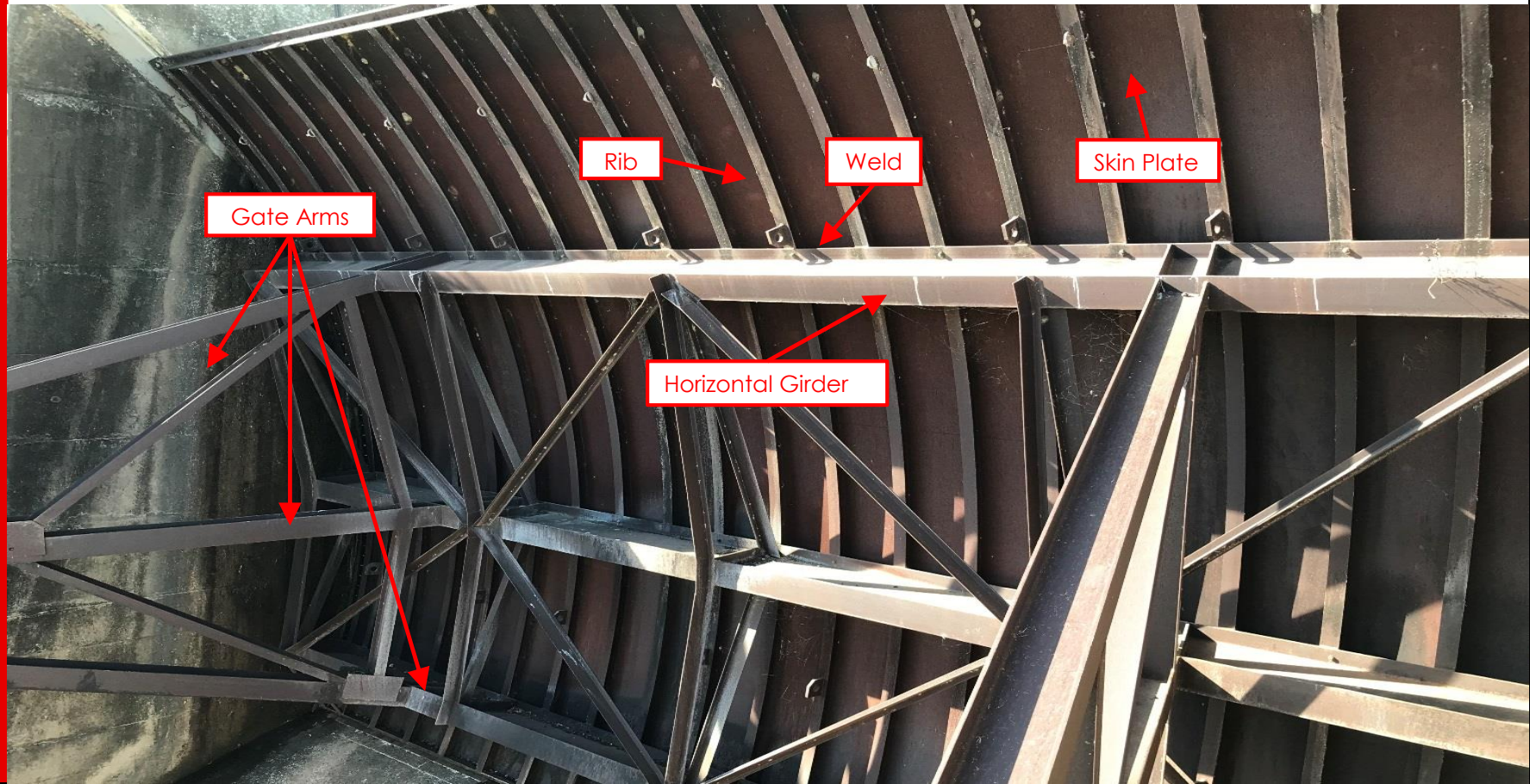
Tainter Gate Components



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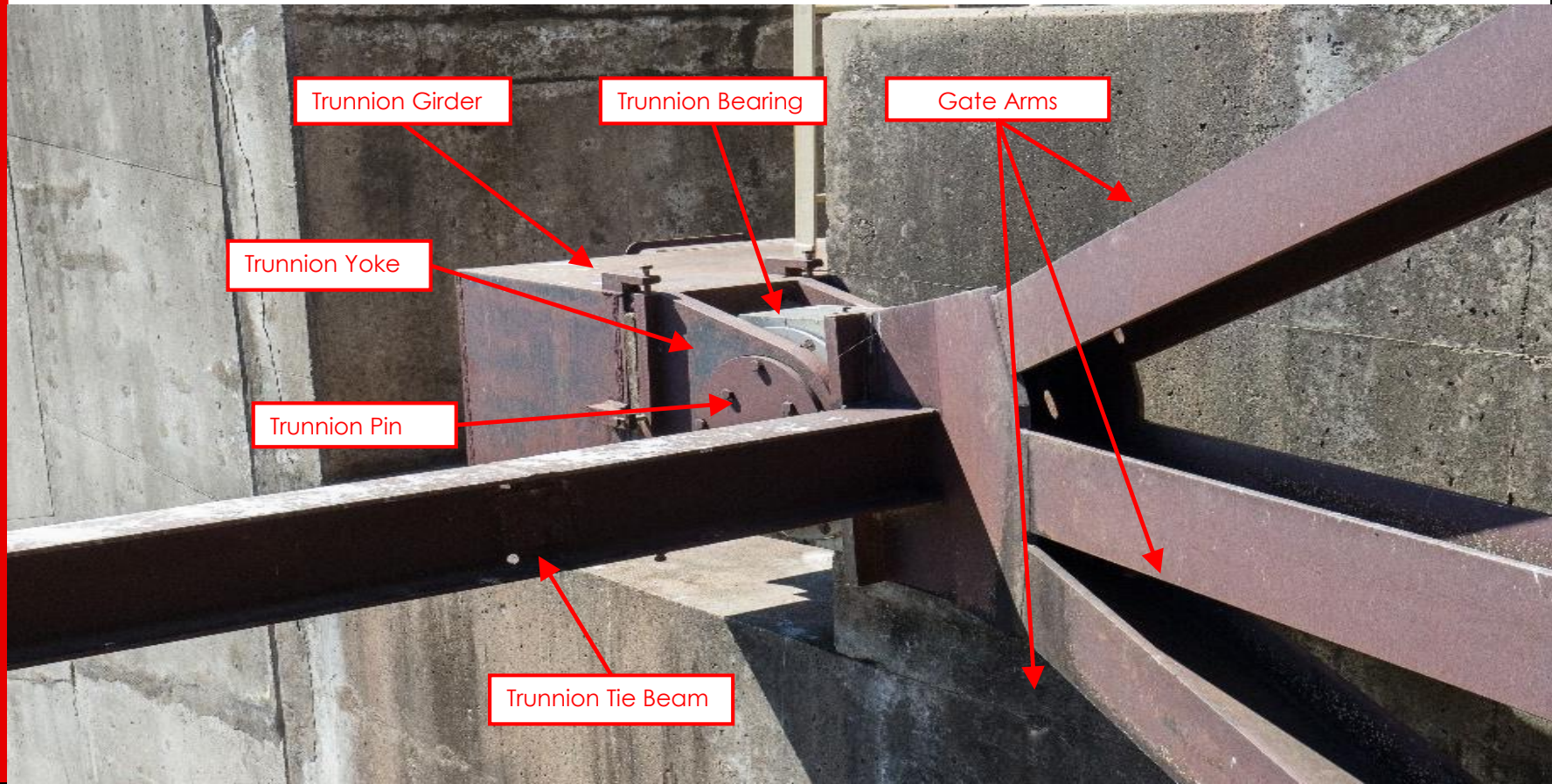
Trunnion Components



Gate Options Considered

IN-SITU REHABILITATION	REPLACEMENT
Remove and replace skin plates and vertical ribs on existing arms and girders Replace side and bottom seals	Remove and replace entire gates
Reuse trunnions	Replace trunnions
Reuse hoists and wire ropes	Reuse hoists and wire ropes

Comparison Criteria

- Constructability
- Schedule & Cost
- Quality & Warranty

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Constructability

IN-SITU REHABILITATION	REPLACEMENT
↓ In-situ painting requires isolation of the portion of the structure to be painted for controlled environment. Risk of reduced paint coating quality and life on weathering steel.	↑ Fabrication and painting in a controlled shop environment provides high quality application.
↓ Significant interface with existing structures could result in fit-up problems. Risk of schedule delay.	↑ Minimal interface with existing equipment reduces risks of fit-up problems. Shop pre-assembly reduces risk of incorrect fit in field.
↓ Significant vertical and overhead field welding and weld testing. Tight workspace for skin plate-related work activities.	↑ Can be customized for most convenient installation method with bolted connections and minimal field welding and painting.
↑ Smaller sections can be handled with lighter equipment.	↓ Heavy skin plate/girder assembly requires large crane and calm weather conditions.

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Schedule and Cost

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

Quality and Warranty

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

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

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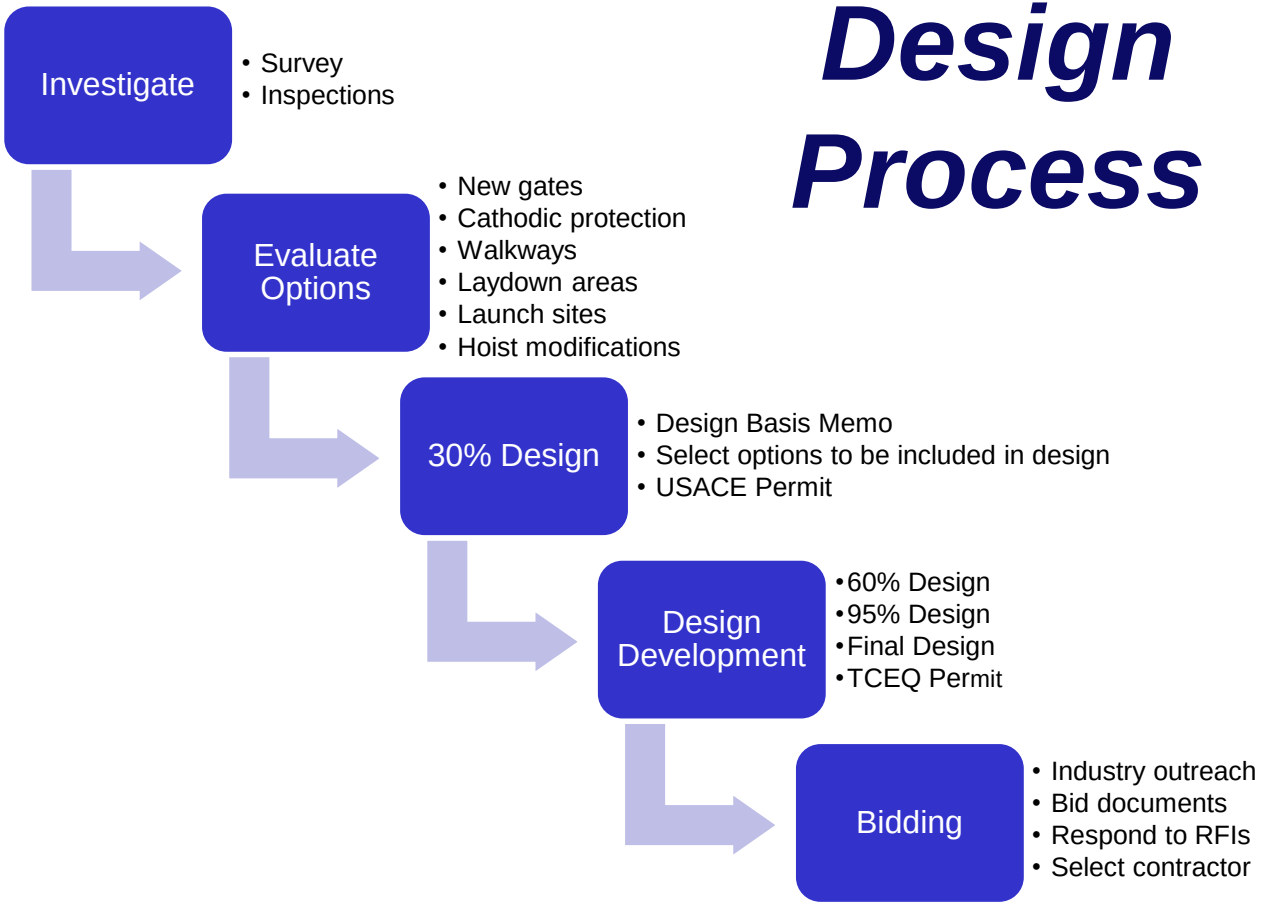
Design Process



"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."

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