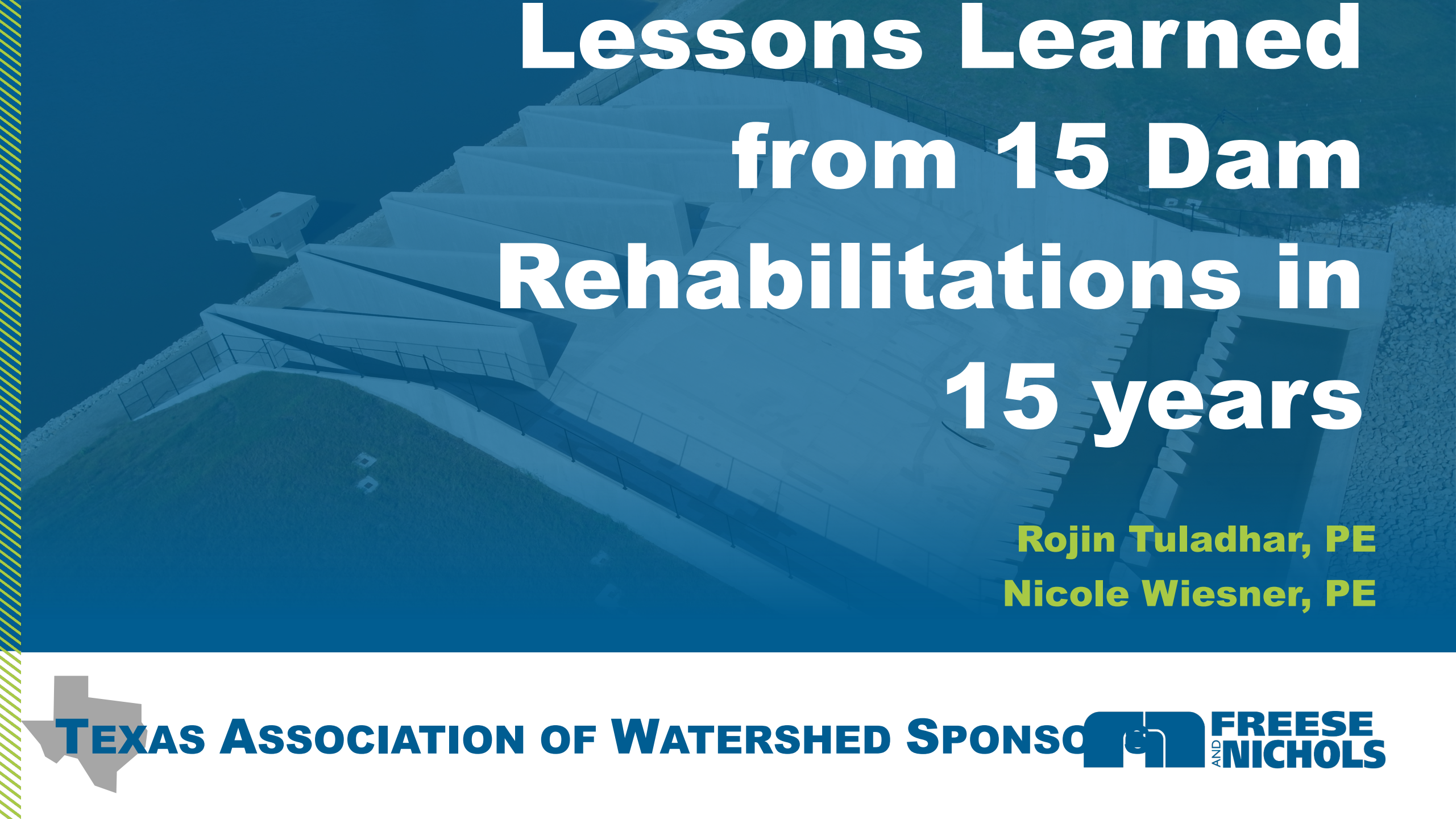




Lessons Learned from 15 Dam Rehabilitations in 15 years

Rojin Tuladhar, PE
Nicole Wiesner, PE



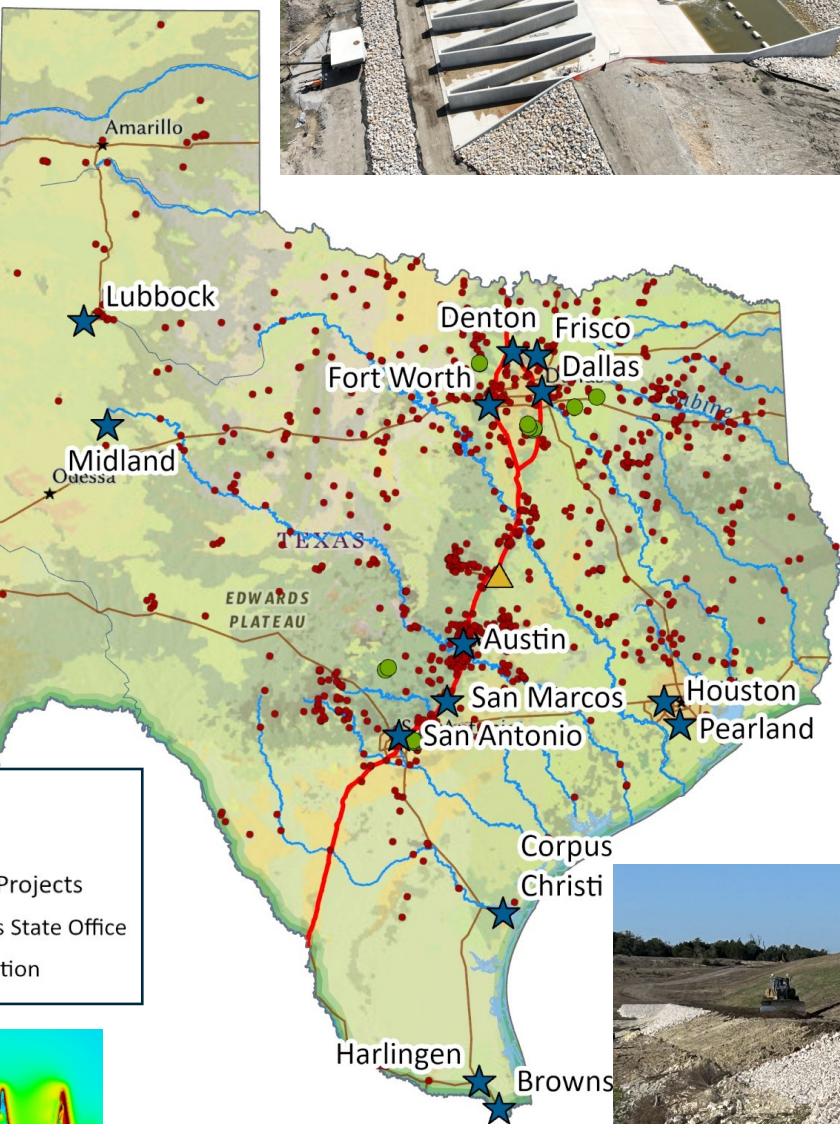
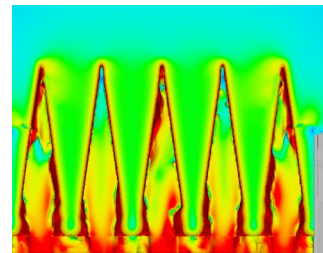
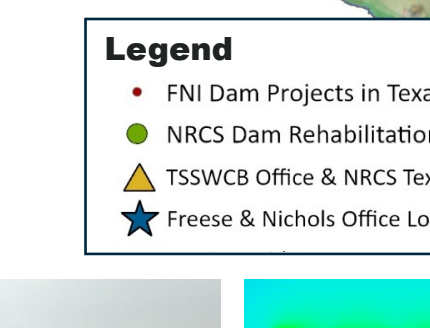
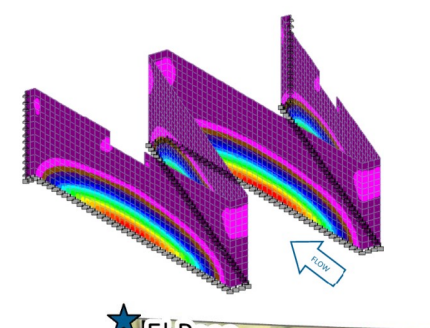
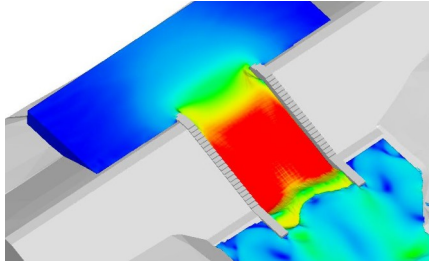
TEXAS ASSOCIATION OF WATERSHED SPONSORS

**FREESE
AND
NICHOLS**

Agenda

- 15 NRCS Dam Rehabilitations
- Lessons learned/Takeaways
 - ✓ Design Considerations
 - ✓ Landowner Considerations
 - ✓ Bidding Considerations
 - ✓ Construction Considerations



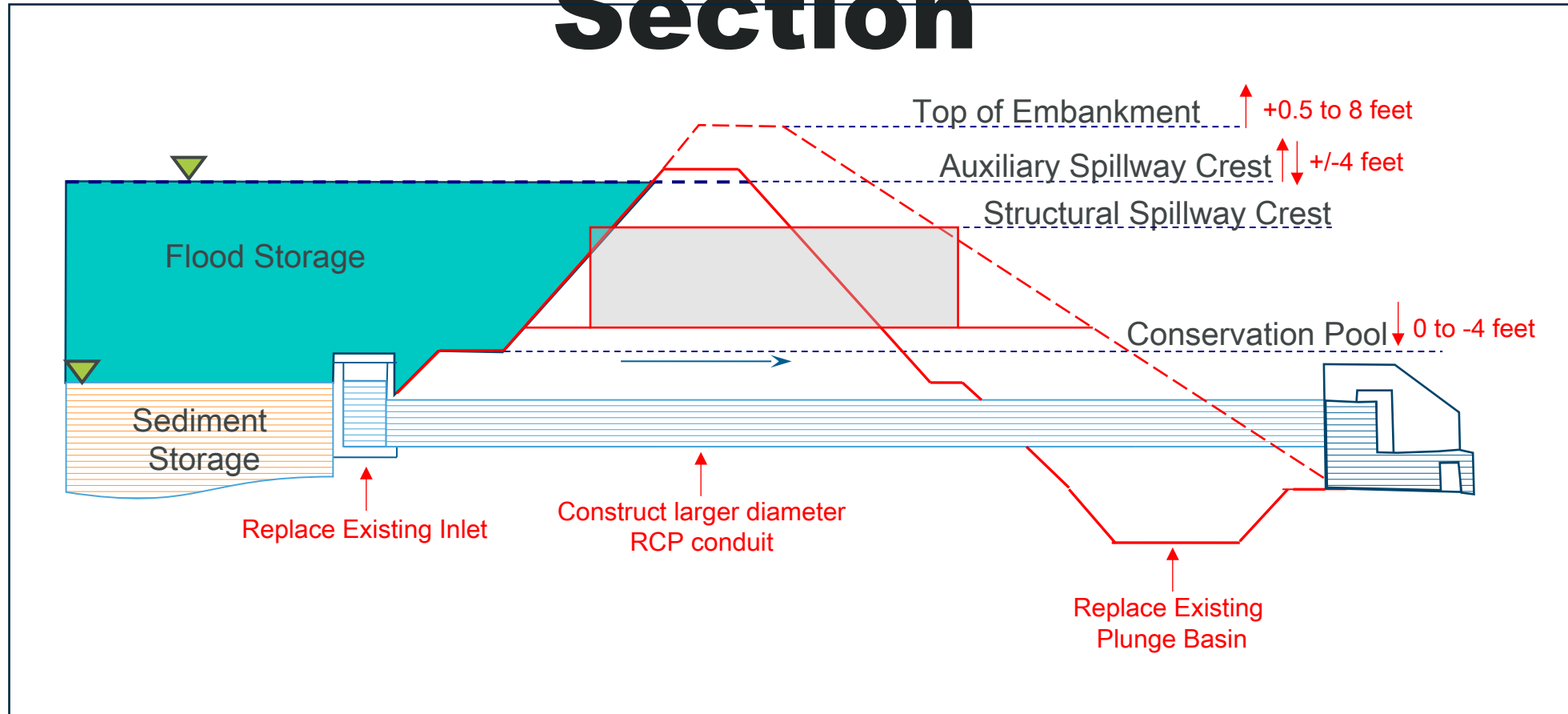


Legend

- FNI Dam Projects in Texas
- NRCS Dam Rehabilitation Projects
- ▲ TSSWCB Office & NRCS Texas State Office
- ★ Freese & Nichols Office Location



Typical Rehabilitation Cross-Section





Design Considerations

Early Planning Documents



- Select the right alternative
 - Supplemental Watershed Plan
 - Initial Cost Estimates are critical to set budgets appropriately
- Perform necessary field investigations that impact design concepts
 - Geotechnical investigations
 - (Subsurface Utility Engineering) SUE survey
 - Topographical survey

Technical Challenges



- Include local drainage improvements in design; engage local sponsors on known issues during design
- Non-standard structures
 - Complexities with water rights

Technical Challenges



- Existing road just downstream of the stilling basin
- Check the reservoir for need for saddle dams



Regulatory / Permitting Challenges



- USACE
 - Wetlands
 - Mitigation
- Early consideration and regulatory involvement
- Texas Parks and Wildlife (TPWD)
 - Mussel Investigation
 - Fish Relocation
- Texas Historical Commission for older Dams
- Trees in Construction Easement
 - Removal permit

Construction Costs



- Include contingency to account for inherent unknowns
- Escalate cost estimates to planned construction year
 - Adjust for inflation
 - Check historic CCI





Landowner Considerations

Land Rights / Landowner Coordination

- Meet early and often with landowner to familiarize them with project, schedule, timing, duration, scope of work, etc.
- Discuss access and staging coordination requirements



Land Rights / Landowner Coordination

- Possible temporary utilities
 - Power, water, etc.
- Look for win-win situations, e.g.
 - Access improvements
 - Fencing/gate improvements
 - Depending on funding



Land Rights / Landowner Coordination



- Farming practices may be interrupted. Important to notify.
- Fishing may be interrupted. Important to notify.

Land Rights / Landowner Coordination



- Review Easements:
 - check limits, access, space for rehab/repairs
- Secure required land rights before bidding or construction



Bidding Considerations

Bidding Considerations

- **Consider project delivery method**
 - Competitive Sealed Proposals provides Best Value Contractor
- **If Low Bid, require prequalification for specialty work:**
 - Dam work especially RCC, Grouting, Anchors, etc. warrants a qualified contractor



Bidding Considerations

- **Generate Interest:**
 - Reach out to Contractor network
- **Site Visit during Pre-bid Meeting**



Bidding Considerations

- **Contractor Reference Checks:**
 - Look for red flags
- **Lowest responsive bidder:**
 - Check details on bid documents
 - Look for outlier bid items

Project		Dam ABC Rehabilitation				Contractor Big Dog		Construction LLC		Dams are Us	
Item No.	Description	Quantity	Units	Unit Cost	Extended Amount	Unit Cost	Extended Amount	Unit Cost	Extended Amount		
Items in Base Offer per Section 01 29 01 "Measurement and Basis for Payment"											
BB-01	Mobilization	1	LS	222,875.00	222,875.00	149,000.00	149,000.00	100,000.00	100,000.00		
BB-02	Temporary Erosion and Sediment Control	1	LS	72,350.00	72,350.00	5,000.00	5,000.00	10,000.00	10,000.00		
BB-03	Site Preparation and Site Maintenance	1	LS	212,500.00	212,500.00	100,000.00	100,000.00	150,000.00	150,000.00		
BB-04	Quality Control Testing	1	LS	87,500.00	87,500.00	180,000.00	180,000.00	50,000.00	50,000.00		
BB-05	Care of Water	1	LS	57,650.00	57,650.00	75,000.00	75,000.00	1,060,000.00	1,060,000.00		
BB-06	Construction Surveys	1	LS	33,600.00	33,600.00	25,000.00	25,000.00	15,000.00	15,000.00		
BB-07	Structure Removal, Existing Fences	1	LS	10,300.00	10,300.00	15,000.00	15,000.00	5,000.00	5,000.00		
BB-08	Structure Removal, Existing Concrete Parapet Wall	1	LS	51,300.00	51,300.00	25,000.00	25,000.00	20,000.00	20,000.00		
BB-09	Structure Removal, Existing Abandoned Flood Monitoring System	1	LS	3,400.00	3,400.00	5,000.00	5,000.00	10,000.00	10,000.00		
BB-10	Structure Removal, Existing Principal Spillway System	1	LS	27,900.00	27,900.00	50,000.00	50,000.00	50,000.00	50,000.00		
BB-11	Strip Vegetation on Downstream Slope and Toe	2,230	SY	8.50	18,955.00	3.00	6,690.00	5.00	11,150.00		
BB-12	Remove and Replace Existing Rock Riprap (Downstream Slope)	5,577	TON	19.30	107,636.10	150.00	836,550.00	20.00	111,540.00		
BB-13	Drainfill, Fine Filter, Toe Drain, Diaphragm and Impact Basin Drain System	402	CY	91.00	36,582.00	65.00	26,130.00	150.00	60,300.00		
BB-14	Drainfill, Coarse Filter, Toe Drain and Impact Basin Drain Systems	35	CY	354.00	12,390.00	250.00	8,750.00	250.00	8,750.00		
BB-15	6" Diameter PVC Drain Pipe for Drain Systems, Solid and Slotted	590	LF	53.40	31,506.00	150.00	88,500.00	100.00	59,000.00		
BB-16	Excavation, Common	8,100	CY	18.25	147,825.00	20.00	162,000.00	15.00	121,500.00		
BB-17	Earthfill, Embankment	8,600	CY	27.75	238,650.00	20.00	172,000.00	15.00	129,000.00		
BB-18	Unreinforced Concrete, Class 4000, Pipe Cradle	66	CY	725.00	47,850.00	750.00	49,500.00	550.00	36,300.00		
BB-19	Reinforced Concrete, Class 4000, Intake Tower	16	CY	4,000.00	64,000.00	1,200.00	19,200.00	5,000.00	80,000.00		
BB-20	Reinforced Concrete, Class 4000, Impact Basin	36	CY	2,900.00	104,400.00	1,200.00	43,200.00	3,500.00	126,000.00		
BB-21	Concrete Pressure Pipe, AWWA C301, 30" ID	170	LF	805.00	136,850.00	750.00	127,500.00	600.00	102,000.00		
BB-22	Water Control Slide Gate, 18" x 18"	1	EA	29,900.00	29,900.00	25,000.00	25,000.00	15,000.00	15,000.00		
BB-23	Metal Fabrications	1	LS	15,000.00	15,000.00	20,000.00	20,000.00	20,000.00	20,000.00		
BB-24	Fine Filter, Downstream Slope	740	CY	124.00	91,760.00	65.00	48,100.00	100.00	74,000.00		
BB-25	Gravel Bedding, Downstream Slope	740	CY	112.00	82,880.00	65.00	48,100.00	100.00	74,000.00		
BB-26	Rock Riprap (12" D50, Downstream of Impact Basin)	158	SY	205.00	32,390.00	50.00	7,900.00	150.00	23,700.00		
BB-27	Crest Road and Access Road, Flexbase	1,975	SY	32.00	63,200.00	14.00	27,650.00	35.00	69,125.00		
BB-28	Grass for Erosion Control (Spring Sprigging)	11,400	SY	1.00	11,400.00	3.00	34,200.00	1.00	11,400.00		
BB-29	Temporary Irrigation System	1	LS	30,500.00	30,500.00	25,000.00	25,000.00	20,000.00	20,000.00		
BB-30	Irrigation Water	2,000	1000 GAL	12.00	24,000.00	10.00	20,000.00	10.00	20,000.00		
A	Total Base Offer (Sum of Extended Amounts for each Base Offer Line Item)				\$2,235,921.10		\$2,544,320.00		\$2,726,015.00		

A blue-tinted photograph of a construction site. In the background, a large lattice boom crane is visible against a clear sky. Several large, rectangular concrete structures are being positioned or are already in place. In the foreground, a series of concrete blocks are laid out in a row on a prepared surface. The overall scene depicts a large-scale infrastructure project.

Construction Considerations

Land Rights / Landowner Coordination



- Establish good communication lines with RPR and Contractor
- Possible coordination for win-win opportunities
- Notify of unusual work
 - night work
 - weekend work
 - Pumps
 - RCC work
 - etc.

- **Documentation!!!**



Construction Considerations

- **Removal of Water / Care of Water**
 - Routine inspection
 - Enforcement of Submittal
 - Preparation for weather



Construction Considerations

- **Weather Days:**
 - How to define
 - How to document



Construction Considerations



- **Delay Damages:**
 - Actual vs. Liquidated
 - Calculation needs to be defensible
 - How to enforce

Acknowledgements



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Sponsors**

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Thank you

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