

Design-Build Program

Mississippi Department of Transportation



August 23, 2011



Design-Build

- ▶ Many states are taking a variety of approaches to FHWA's Every Day Counts Program
- ▶ Design-Build can be a useful tool to:
 - ▶ Expedite schedules
 - ▶ Gain Synergy from Designer/Contractor partnership
 - ▶ Transfer Appropriate Risk to Design/Builders
 - ▶ Avoid "Triangulation" Problem
 - ▶ Early Obligation of Funds
 - ▶ Early Identification of Cost

Introduction

- ▶ Mississippi has developed a robust design-build program and continues to employ design-build as a method of procurement.

Introduction

- ▶ The program initiated with the enactment of enabling legislation (2004):
 - Mississippi Code, Section 65-1-85
 - Allows design-build as alternative procurement and contracting method
 - Projects with Mississippi Development Authority
 - Limit 2 projects less than \$10M per fiscal year
 - Limit 1 project over \$50M per fiscal year
 - Must combine both design and construction into one contract

Initial Program

- ▶ 2004 MDOT began development of design-build procurement and contract documents
- ▶ Identified SR 21 in Scott County as potential candidate Project
- ▶ Replacement of two 100ft. span curved bridges
- ▶ Associated roadway tie-ins
- ▶ Estimated cost between \$2-4 M.

Hurricane Katrina (August 2005)

- ▶ The Costliest (\$81.2B)
- ▶ One of the Deadliest (1,836)
- ▶ Destruction 100 Miles from Center



Shift Priority to US 90 Bridge Replacement

- ▶ August 2005 – Assessment of Hurricane Katrina Damage
- ▶ Numerous coast projects to address including:
 - Debris Removal
 - Supply chain, fuel, communications
 - Damage Assessment Teams
 - I-10
 - I-110
 - Henderson Point
 - US 90 Roadway
 - Utility Repair
 - Signs, Guardrail, Traffic Signals

Debris Removal



Debris Removal



Emergency Bridge Repair I-10 at Pascagoula River



Emergency Bridge Repair I-10 at Pascagoula River



Emergency Bridge Repair I-110 at Back Bay of Biloxi



US 90 Bridge @ Henderson Point



US 90 Grand Casino @ Gulfport



US 90 Grand Casino @ Gulfport



US 90 Harrison County



Storm Drain Cleanout



Storm Drain Cleanout



Destruction of the Bridges

- ▶ Combination of Destruction
- ▶ Storm-Surge raised water level
 - OEA Report
 - 28' at Bay St. Louis
 - 24' at Biloxi Bay
- ▶ Bridge Panels became buoyant
- ▶ Wave Action knocked down panels

How to Fix It?

- ▶ Bridges Could Not Be Repaired
 - Prior Problems with Movable Spans
- ▶ Bridges Needed to Replaced
 - Realignment Needed to Miss Debris Field
- ▶ Look at Alternative Procurement

Conventional Design-Bid-Build

- ▶ Design
 - 9 months to one year
- ▶ Bidding
 - 3 month
- ▶ Construction
 - 2 to 3 years
- ▶ Total 3 to 4 years

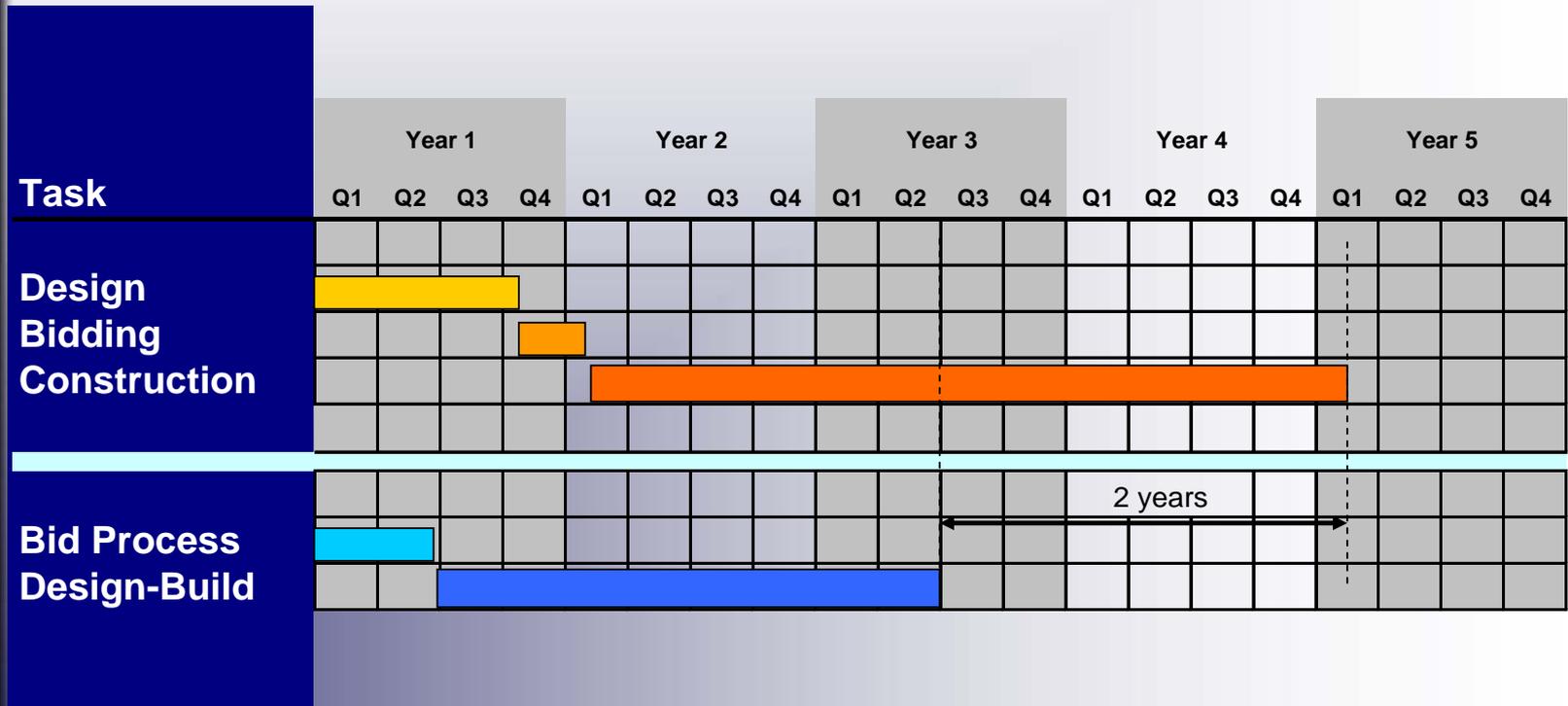
Consider User Costs

- ▶ Economic Impact of additional travel time
- ▶ Up to 45 minutes reroute
- ▶ Vehicle Travel Cost - \$100,000 / day

Design-Build

- ▶ Bid Process Upfront
 - 6 months from start to selection
 - Concurrent design
- ▶ Design-Build
 - Less than 2 years
- ▶ Total Time to Operation
 - 2.5 years
 - Savings of over 6 months to 1.5 years!

Design-Bid-Build versus Design-Build

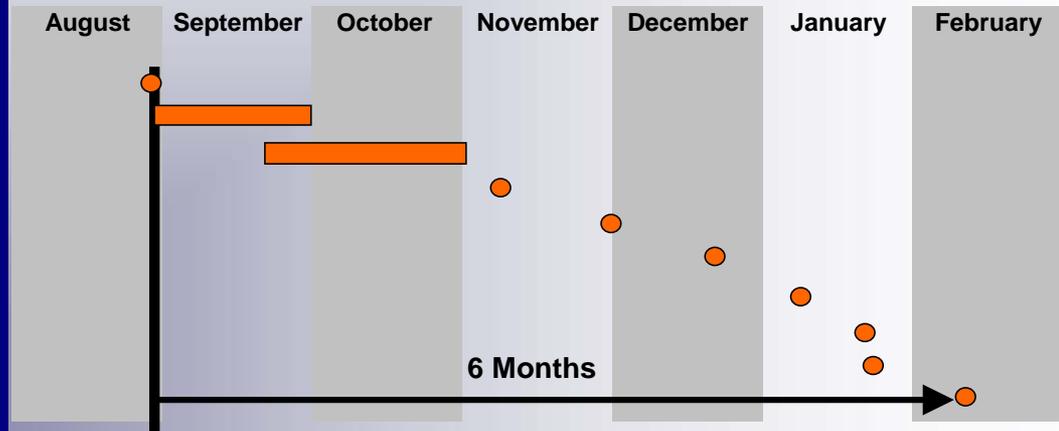


Dedication of MDOT/FHWA

- ▶ The speed at which the bid documents were prepared was amazing.
- ▶ Complete Teamwork by MDOT – HQ, District
- ▶ FHWA expertise – participation
- ▶ URS support role – additional manpower and expertise in design-build

Development of RFQ / RFP

Hurricane Katrina
Impact Assessment
Issue RFP Nov 3
Pre-Proposal Meeting Nov 10
RFP Addendum 1 Nov 30
RFP Addendum 2 Dec 22
Submit Volume 1 Jan 13
Submit Volume 2 Jan 23
Award - Jan 24
Notice to Proceed Feb 17



RFP Price Evaluation

- ▶ A = Bid Price
- ▶ B = Days to Milestone 1
- ▶ C = Days from Milestone 1 to Milestone 2
- ▶ D = Technical Score (1 – 100)

- ▶ Best Value Proposal =
$$\frac{A + B*100,000 + C*50,000}{[1 + (D/100)]}$$

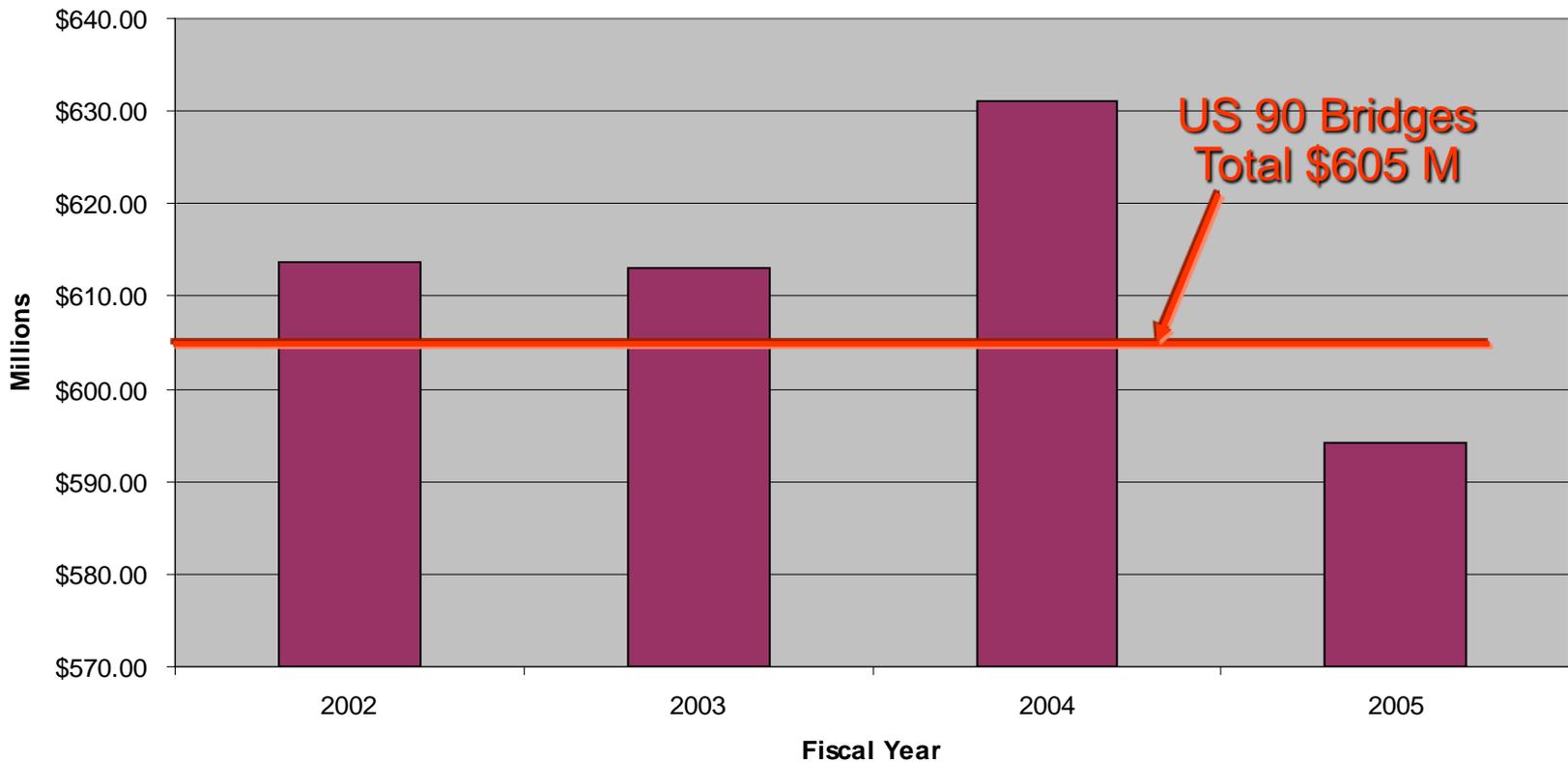
Bid Results

- ▶ St. Louis Bay Bridge
 - Best Value - \$266,782,833
 - Granite/Archer-Western (GAW) -Contractor
 - HNTB - Designer and CEI
- ▶ Biloxi Bay Bridge
 - Best Value - \$338,631,734
 - Massman/Traylor/Kiewit (GCC) – Contractor
 - Parsons Transportation Group – Designer
 - Volkert - CEI

Bid Results



Annual Construction Budgets



Project Results

- ▶ Both Projects were completed in record time.
- ▶ Both Teams were awarded \$5M bonus for schedule completion. (Open to public)

Project Awards – US 90 Bridges

2008 Design-Build Institute of America

- Owner of the Year Award for Infrastructure Recovery

2008 Construction Management Association of America

- URS for Large Structures

2008 AASHTO National Peoples Choice Award

- Bay St. Louis Bridge received highest votes

2008 FHWA Biennial Awards

- Biloxi Bay for Excellence in Program Management

2009 ACEC National Award for Design

- Biloxi Bay Bridge

Melinda McGrath
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October 14, 2008

William E. Van Wagenen, Jr., CCM, CPC
Chairman- CMAA Executive Committee
Construction Management Association of
7926 Jones Branch Drive, Suite 800
McLean, Virginia 22102-3303

Mr. Van Wagenen:

On behalf of the Mississippi Department of Transportation, I am pleased to announce the membership of CMAA for this award recognition. The Biloxi Bay Bridge crosses both the St. Louis Bay and the Biloxi Bay, which were destroyed by Hurricane Katrina – a storm that hit the coast. MDOT, in partnership with FHWA and the CMAA Commission, recognized the need to get the bridge back up as quickly as possible, and so we embarked on our first design-build project.

With the assistance of our partner, URS Construction, we completed build services within 6 months following the design-build contract. Archer Western / HNTB Corporation opened the bridge in less than 15 months. The design-build project was completed in less than 15 months. The success of these projects and the collaborative effort between the contractor and MDOT is a testament to the success of design-build.

We sincerely appreciate this award and thank all of those who contributed to the recovery of the bridge, as the area is recovering, and the completion of these projects is a testament to the success of design-build.

Sincerely,

Larry L. "Butch" Brown
Executive Director
Mississippi Department of Transportation

2008 EXCELLENCE IN HIGHWAY DESIGN | BIENNIAL AWARDS

Award of Excellence

Project Management

U.S. Route 90, Biloxi Bay Bridge
Biloxi, Mississippi



Hurricane Katrina destroyed the Biloxi Bay Bridge linking Ocean Springs, MS, with Biloxi in August 2005. Rapid reconstruction for the 1.6-mile long bridge was critical to support reconstruction of the area and eliminate lengthy detours, so the Mississippi DOT (MDOT) used a design-build contract—one of the first such projects in the State. The project management was characterized by rapid and effective decision-making, continuous communication, and "doing it right" the first time. MDOT committed time and attention of its executive staff to the emergency bridge reconstruction, who communicated by both words and actions the importance of the project. And, the contractor anticipated potential issues and went the extra measure to avoid delays.

Owner: Mississippi Department of Transportation, Jackson, MS

It's almost time...

America's Transportation Awards Competition Begins in March



Ready, set, go! In March, The American Association of State Highway Transportation Officials (AASHTO), AAA, and the U.S. Chamber of Commerce will begin accepting new applications for the America's Transportation Awards competition. Deadlines and updated information will soon be posted on the competition's website: www.americastransportationaward.org

The projects are judged by a panel of experts and compete in three categories: on time, on budget, and innovative management. Regional winners are eligible for the final round of the competition, in which the top ten projects vie for the People's Choice Award and the Grand Prize.

The America's Transportation Awards competition is designed to identify and promote transportation improvements that have made a real difference to the people and businesses in their communities. Transportation is one of the fundamental building blocks on which our society rests, and America's Transportation Awards competition recognizes the best of the best.

Stay tuned for more information and a chance to win. After all, your project could take home the People's Choice Award or the Grand Prize!

2008 Winners



Grand Prize Winner
Woodrow Wilson Bridge
Maryland and Virginia Transportation Departments



People's Choice Award
St. Louis Bay Bridge
Mississippi Department of Transportation

All entries will be featured on the America's Transportation Award website to highlight outstanding transportation projects around the nation.



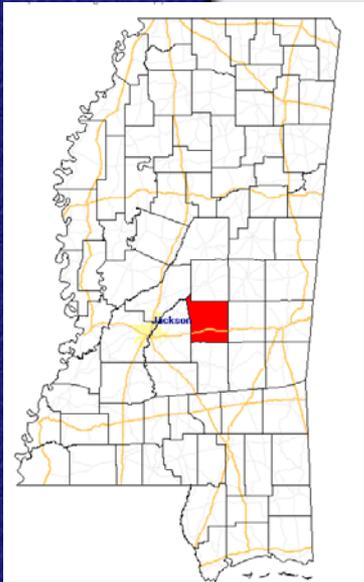
For more information, please visit
www.americastransportationaward.org



Program Summary

Project Number	Project	Project Description	Award Date	Completion Date
BR-0045-01(014) /100620	Bridge Replacement in Scott County	Replace 2 bridges along SR 21.	May 9, 2006	December 11, 2006
ER/BR-0003-01(098) /104555	US 90 St. Louis Bay Bridge Replacement Hancock and Harrison Counties	Remove old bridge destroyed by Hurricane Katrina and build replacement bridge	January 24, 2006	February 16, 2008
ER/BR-0003-01(099) /104556	Bridge Replacement on US 90 over Biloxi Bay Jackson and Harrison Counties	Remove old bridge destroyed by Hurricane Katrina and build replacement bridge	April 5, 2006	April 16, 2008
IM-0059-01(105) /105447 ARRA	I-59 Bridge Widening Pearl River County	Widen up to 7 interstate bridges to provide shoulders on I-59 in Pearl River County (6)	May 12, 2009	September 2010
IM-0059-03(090) /105448 ARRA	Extension of I-59/I-20 Merge Lanes and I-20 Bridge Widening Lauderdale and Newton Counties	Extend merge lane at I-59/ I-20 and widen up to 7 bridges on I-20 (4)	July 28, 2009	January 2011
IM-0055-01(097) /105877	I-55 Bridge Widening Lincoln County	Widen up to 7 interstate bridges to provide shoulders on I-55 in Lincoln County (6)	June 22, 2010	On-going (October 2012)
STP-2833-00(004) /105094	SR 9 Construction	Realignment of 10 miles of roadway and bridge	April, 2011	December 2012 (Desired)

SR 21 – Scott County



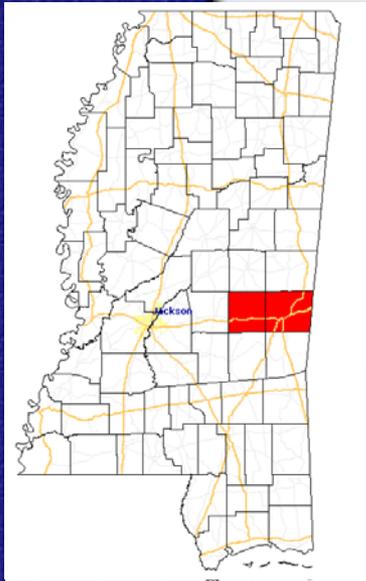
- ▶ Replace 2 Bridges along SR 21
- ▶ Award Date – May 9, 2006
- ▶ Completion – December 15, 2006 (desired)
- ▶ \$3,020,000 – 211 days
- ▶ Best Value =
$$\frac{\text{Cost} + (\text{Schedule} * \$15\text{k})}{(1 + \text{TS}/100)}$$
- ▶ MDOT Administered

I-59 – Pearl River County



- ▶ Widen up to 7 Bridges along I-59 (6 selected)
- ▶ ARRA Project
- ▶ Award Date – May 12, 2009
- ▶ Completion – September 2010
- ▶ \$9,988,751 – 387 days
- ▶ Best Value =
$$\frac{\text{Cost} - (\text{B}-5) * \$4\text{M} + (\text{days} * \$3.5\text{k})}{(1 + \text{TS}/100)}$$
- ▶ MDOT/URS Administered

I-20/I-59 – Lauderdale/Newton County



- ▶ Widen 3 + up to 4 more Bridges along I-20 (4 more selected)
- ▶ I-20/I-59 Interchange Merge lane
- ▶ ARRA Project
- ▶ Award Date – July 28, 2009
- ▶ Completion – January 2011
- ▶ \$9,999,999 – 421 days
- ▶ Best Value = $\frac{\text{Cost} + (\text{B}-2) * \$4\text{M} + (\text{days} * \$3.5\text{k})}{(1 + \text{TS}/100)}$
- ▶ MDOT/URS Administered

I-55 – Lincoln County



- ▶ Widen up to 7 Bridges along I-55 (6 selected)
- ▶ Award Date – June 22, 2010
- ▶ Completion – October 2012 (on going)
- ▶ \$9,999,922 – 732 days
- ▶ Best Value =
$$\frac{\text{Cost} - (\text{B}-3) * \$2\text{M} + (\text{days} * \$3.5\text{k})}{(1 + \text{TS}/100)}$$
- ▶ MDOT/URS Administered

SR 9 – Pontotoc County



- ▶ 10 Miles on New Alignment
- ▶ Economic Development – Toyota Plant
- ▶ RFQ Issued – 9 submittals
- ▶ Shortlist Announcement
- ▶ Completion – December 2012 (Desired)
- ▶ Estimated Cost \$75 to \$100M
- ▶ Best Value Selection
- ▶ URS Procurement Assistance
- ▶ URS Construction, Design Review and Schedule Support (with Neel-Schaffer)

Lessons Learned



Concept

- Selection of Projects
- Risk Identification
- Scope / Budget
- Approach
- Resistance to DB
- Use available Resources (AASHTO, DBIA, etc)

Procurement

- Document Standardization
- TAMs / ATCs
- Incentives
- RFP Requirements
- Claims Mitigation
- Flexibility in Best Value Formula

Construction

- Partnership
- Communication
- Decisions / Actions
- Auditing – NCRs
- Document Control
- Scheduling
- Role of QC
- Warranties

Closeout

Lessons Learned

← Concept

Procurement

Construction

Closeout →

- Selection of Projects
- Risk Identification
- Scope / Budget
- Approach
- Resistance to DB
- Use available Resources (AASHTO, DBIA, etc)
- Select projects that are good candidates for DB
 - Public Benefit through DB
- Identify Risk and allocate to appropriate party
- Define the scope and budget for the Project
 - Decide on Stipend
- Develop overall approach to DB
- Recognize Potential Resistance to DB
 - Contractors / AGC
 - In-House Personnel (this is different!)
 - Requires new paradigm!
- Use Resources that share experience
 - AASHTO website for DB and Lessons Learned
 - DBIA Transportation Conference

Approach Principles

- ▶ Staff with experienced Design-Build Personnel
- ▶ Expedite Design Review Process
- ▶ Recognize Collaborative Nature of Design-Build
- ▶ Accept Design-Build is Paced by Contractor Schedule
- ▶ Institute Risk Management Practices to achieve desired Quality and Limit Costs

Program Roles and Responsibilities

Program Administrator

- Define Roles
- Establish Document Control
- Decision Process
- Project Scheduling
- Key Stakeholders
- Track and Report Progress
- Public Relations

Technical Services

- Identify Risks
- Develop Risk Management
- Prioritize Design Requirements
- Scope and Budget
- Preliminary Design
- Funds Availability and Cash Flow
- Design Reviews

Procurement Services

- Milestones and Deliverables
- Schedule Control Process
- Monitor Progress
- Design Requirements
- Construction Controls
- Special Provisions
- "Lessons Learned"
- Evaluation Manuals
- Legal Review of Documents

Construction Services

- Construction Management
- Resident Inspection
- Claims Resolution
- Plant Inspection
- Construction Pay Requests
- Materials Testing

Lessons Learned

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Procurement

Construction

Closeout



- Document Standardization
- TAMs / ATCs
- Incentives
- RFP Requirements
- Claims Mitigation
- Flexibility in Best Value Formula
- Improve Documents with each Procurement
 - Document what went well and what did not
- Alternative Technical Concepts
 - Provide added creativity
 - Be prepared for the amount of effort!
- Use incentives to get what you want!
 - Decide what is most important
 - Be willing to pay for that performance
- Make sure you spell out what you want (or don't want) in the RFP. If it is not there, you won't get it.
- Use Best Value Formula to decide on "Best Value"

Claims Mitigation

- ▶ Document Preparation
 - ▶ Clearly State Requirements
 - ▶ Eliminate Ambiguities
- ▶ Require Partnering
- ▶ Proactively Monitor Contractor's Progress
- ▶ Identify Potential Problems
- ▶ Create "Win-Win" Situation
- ▶ Good Documentation Helps Prevent Claims
- ▶ Experienced Design-Build Personnel

Lessons Learned

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Construction

Closeout

- Partnership
- Communication
- Decisions / Actions
- Auditing – NCRs
- Document Control
- Scheduling
- Role of QC
- Warranties
- Partnership and Communication go hand-in-hand
 - Consider Facilitator for Partnership
- Recognize that decisions are time critical and there are actions that will follow
- Schedule requirements are critical
 - This is new to many Contractors
 - Delays can only be approved based on critical path analysis
- Roles of QC and QA need to be defined upfront
 - Have used Contractor to provide QC in past
 - Moving to Owner provided QC to avoid duplication of services
- Warranty – look at requirements and cost (bonding)

Document Control

- ▶ Benefits of Internet, database driven system
 - ▶ Rapid Retrieval of Documents
 - ▶ Provide Tracking for Open Documents
 - ▶ Provide Time Notices of Required Responses (Action Item Reports)
 - ▶ Organized Controlled Filing System
 - ▶ Remote Storage of Electronic Files off-site protects against disasters
- ▶ Maintain Documents in both the QC office and District Office (QA).

Approach to Auditing

- ▶ Ensure that Contractor performs all commitments provided in Proposal

Plan	Who	When
Design Quality Plan	Technical Lead	Acceptance Prior to Design Routine checks at critical design points
Construction Quality Plan	Construction Lead	Basic Acceptance Prior to Construction, Allowable Updates (Specific Items) Checks according to Plan
Non-Conformance Reports	Contractor, Owner, QA/QC	Continuous Review and Resolution during Construction

- ▶ NCRs are not bad! – Record of what is going on!

Thank You!

Questions?