



ARIZONA COUNCIL FOR TRANSPORTATION INNOVATION PRACTICAL TOOLS TO MANAGE SCHEDULE DRIVEN PROJECTS

STREAMLINED DESIGN BUILD FOR SMALLER PROJECTS

Mark M. Scholfield, PE, DBIA

discipline | intensity | collaboration | shared ownership |
solutions

WILSON
& COMPANY

AGENDA

- ❑ Streamlined Design-Build: CDOT and UDOT Approach
- ❑ Streamlined Design Build Program: Kansas City, Missouri Approach

WHAT IS STREAMLINED DESIGN BUILD

- ❑ A fast-track single-step design build procurement
- ❑ Incorporates the Alternative Technical Concept (ATC) process
- ❑ Most typically Price + Time selection
- ❑ Most often used for projects less than \$20 million

IT'S FASTER AND EASIER

HISTORY OF STREAMLINED DESIGN BUILD

- ❑ UDOT from 2007 to Present
 - Approximately 15 projects
 - Focus on accelerated projects to minimize MOT impact
 - Accelerated Bridge Construction (ABC)
- ❑ CDOT from 2005 to present
 - Approximately 15 projects
 - Mostly small transportation projects less than \$15 million



3300 SOUTH OVER I-215, ABC SPMT PROJECT UDOT, SINGLE-STEP DESIGN BUILD

- 8 Week Procurement (including ATC process)
- Pass/Fail Qualifications and Technical Approach
- Low Bid Selection
- I-215 closed for a weekend, 3300 South closed for 2 weeks



I-80, ECHO JUNCTION, ABC SLIDE-IN, UDOT, SINGLE STEP DESIGN BUILD

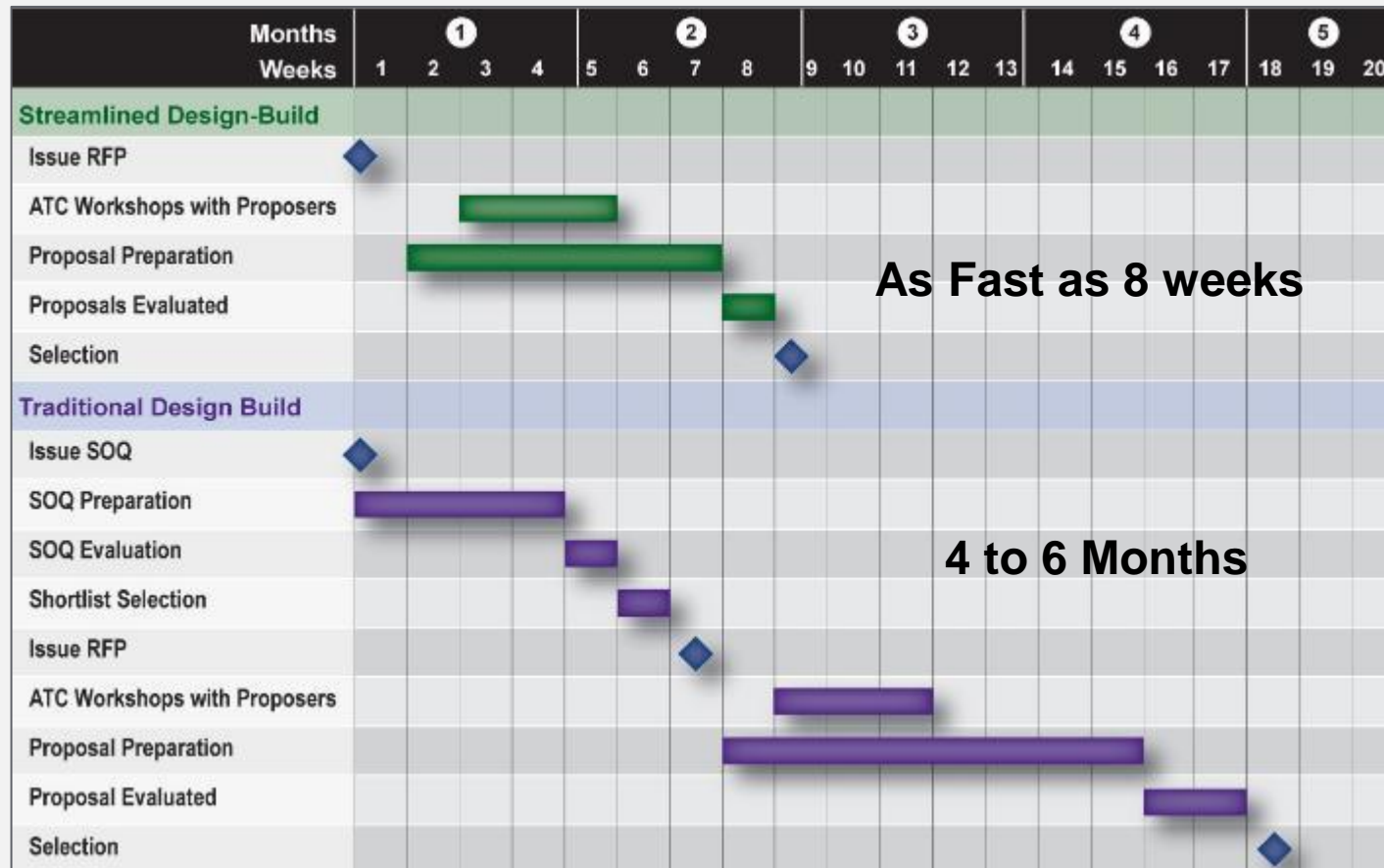
- 12 Week Procurement, including ATC Process
- Selection: Price + Time + Lane Rental
- 16 hour closure times on I-80



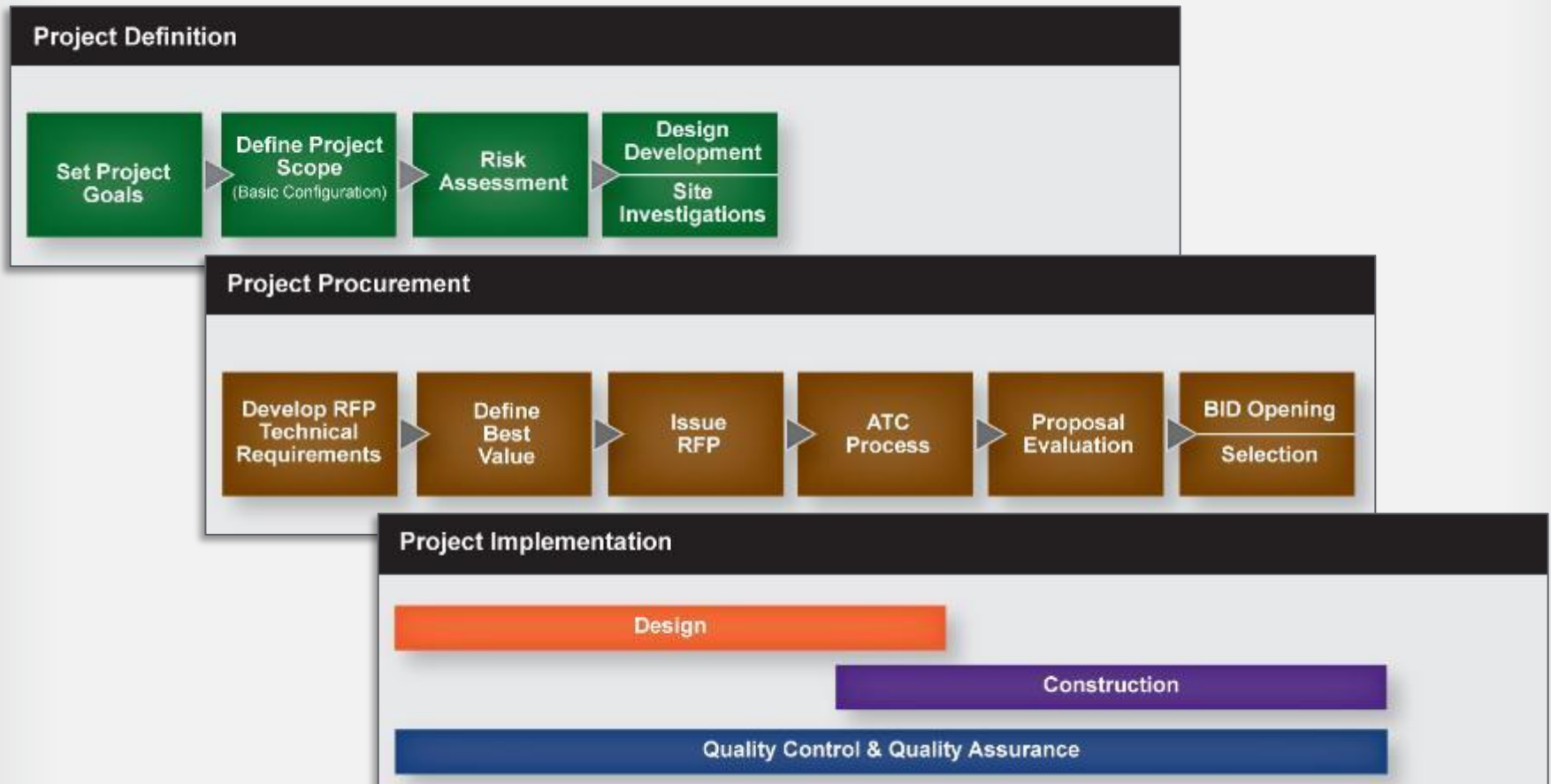
POWERS BLVD BRIDGES, CDOT, STREAMLINED DESIGN BUILD

- 6 Bridges and 2 miles of urban freeway paving
- 8 Week Procurement, including ATC Process
- Selection: Price + Time + Pavement Life Cycle Cost

SCHEDULE COMPARISON STREAMLINED DB VERSUS TRADITIONAL DB



STREAMLINED DESIGN BUILD PROCESS



Project Definition



Project Goals Worksheet

An understanding of the project goals is essential to obtaining best value. Typically project goals can be limited to three to five key prioritized goals that remain consistent over the life of the project.

Project Specific Goals

Goal #1:

Goal #2:

Goal #3:

Goal #4:

Sample Goals

Functional and Operational

- Maximize operations of the facility improvements
- Maximize the capacity of the facility
- Maximize mobility
- Maximize life cycle performance of the project
- Maximize operational safety of the facility

Cost and Scope

- Minimize project cost
- Maximize project scope within the budget

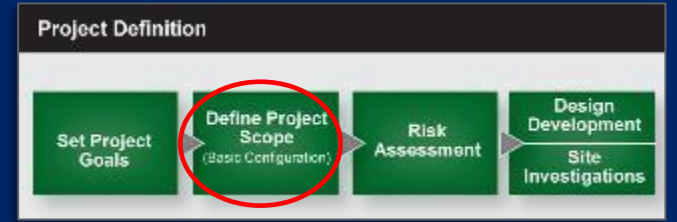
Constructability

- Minimize inconvenience to the traveling public during construction
- Maximize safety of workers and the traveling public during construction
- Complete the project construction ahead of schedule
- Minimize the duration of the construction impacts
- Minimize the delivery time

Quality

- Provide a high quality finished project
- Meet and exceed the project technical design requirements
- Provide a high quality construction process

DESIGN BUILD: BASIC CONFIGURATION (NARRATIVELY DEFINES THE SCOPE OF WORK)



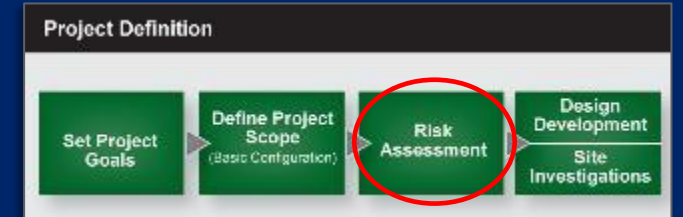
Basic Configuration for Powers Blvd SDB Project

1. Construct four lanes and shoulders of SH21, Powers Blvd from milepost 150.8 to 152.6
2. Construct structures 1-17-KG and 1-17-KH over Briargate Parkway
3. Construct structures 1-17-KV and 1-17-KW over Union Blvd
4. Construct structures 1-17-KX and 1-17-KY over Pine Creek
5. Signing, Lighting and Pavement Marking

The Basic Configuration is supported by Reference Plans that define the character and limits of the project.

The Basic Configuration is supported by the Technical Requirements that define the design requirements of the project

RISK ASSESSMENT



Project Definition is about Risk Management

- ❑ Risk Assessment determines design investigations
- ❑ Risk Assessment determines design development
- ❑ Risk Assessment determines third party relationships and processes

General Approach:

Risk is allocated to the party that can best manage it

Risk Allocation in Design Build Delivery

Environmental Clearances and Permitting

- Most often the Owner is in a better position to obtain environmental clearances and permits
- Permitting and clearance processes that can be well defined can be assigned to the design builder
- Environmental MOUs can minimize risks

Utilities

- Utilities responsibilities must be clearly defined
- Private utilities – Owner can accept cost risk, design builder can accept schedule risk
- Public utilities – Design and construction risk can be assigned to design builder if well defined
- Advance utility agreements significantly reduce risk

Right of Way

- ROW clearance commitments and dates can be defined to allow project to start prior to obtaining all ROW
- ROW acquisition responsibilities can be shared if well defined

Third Party Involvement

- Third party approvals and processes that can be well defined can be assigned to the design builder
- Third party MOUs significantly reduce risk

Site Investigations



General Approach

- Site investigations to minimize risk
- Site investigations to by the Owner to reduce redundant investigations by proposers

Site Survey

- Provide surveys as necessary for design builder proposer to advance the project design for the proposal

Utilities Investigations

- Provide utilities investigation as necessary for proposers to understand potential conflicts and relocations

Geotechnical Investigations

- Provide geotechnical investigations as necessary for proposers to advance structures foundations designs, retaining wall designs and pavement designs

Hazardous Materials

- As necessary to develop any necessary mitigation plans

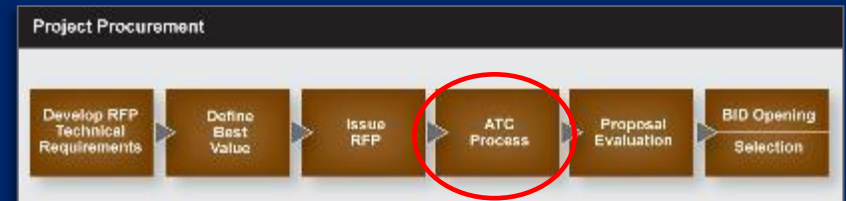
PROCUREMENT PROCESS SCHEDULE

Project Procurement



ID	Task Name	Duration	Dec	Jan	Feb	Mar	Apr	May	June
1	Develop Procurement Documents	8 weeks							
2	Request Letters of Interest								
3	RFP Advertisement								
4	Proposal Preparation	8 weeks							
5	Informational Meeting								
6	Confidential 1 on 1 ATC Meetings	3 weeks							
7	Final Responses to ATC's								
8	Proposal Submittals								
9	Technical Proposal Evaluation	1 week							
10	Price Proposals opened and Selected								
11	Notice to Proceed								

ALTERNATIVE TECHNICAL CONCEPTS (ATCS)



“ATCs propose revisions to the contract requirements that are equal or better in quality or effect.”

- ❑ Approved for a proposer on a confidential and proprietary basis
- ❑ Proposed and discussed in confidential 1 on 1 meetings during the procurement phase
- ❑ **Pivotal Approach to Innovation in Design-Build**

ALTERNATIVE TECHNICAL CONCEPTS (ATCS)

Project Procurement

Develop RFP
Technical
Requirements

Define
Best
Value

Issue
RFP

ATC
Process

Proposal
Evaluation

BID Opening
Selection

Pioneer Crossing Winning ATC

SPUI

Replace \$195 million



DDI

\$175 million + Better
Performance



DEFINING BEST VALUE



Selection Methodologies

- ❑ Low Bid
- ❑ Price + Time (Schedule Incentive)
- ❑ Price/Technical Score

DESIGN BUILD PROPOSAL EVALUATION

Pass/Fail Evaluation

- ❑ Similar Construction Experience
- ❑ Design Firms Qualifications
- ❑ Key Personnel

Technical Score – if Applicable

- ❑ Design and Construction Approach
- ❑ Contractual Commitments that provide Added Value
- ❑ Meeting and Exceeding the Project Goals

Keep the Proposals Brief

IMPLEMENTATION (DESIGN AND CONSTRUCTION)



- ❑ Owner/Engineer Relationship
 - Acceptance versus Approval
- ❑ Owner Reviews and Approvals (commit to processes and schedules)
- ❑ Construction Quality Responsibilities (who does construction QA?)

STREAMLINED DESIGN-BUILD KANSAS CITY, MISSOURI STREET REHABILITATION PROGRAM



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PROJECT BACKGROUND

- June 2010, KCMO City Council passed a resolution to fund \$33 million of street reconstruction with waterline replacements
- The resolution identified 12 arterial streets
- Streets to be reconstructed were ½ to 1 ½ mile in length
- Two programs



Project	Length (miles)	Pavement Reconstruction	Curb & Gutter and Sidewalks	Waterline Replacement	Sewer Rehabs	Intersection ADA
39th Street	1.5	✓	✓		✓	✓
North Brighton Avenue	0.5	✓	✓	✓	✓	✓
Belvidere Parkway	1.0	✓	✓		✓	✓
Wornall Road (79th to 85th)	0.5	✓	✓	✓	✓	✓
Wornall Road (89th to Ward)	0.5	✓	✓	✓	✓	✓

5 PROJECTS
5 SELECTIONS
ONE PROCUREMENT

The 1st Program
2010-2011



THE CITY NEEDED TO
GET THE PROGRAM
UNDERWAY FAST

Procurement documents prepared in 6 weeks
7 week advertisement
Issued 8 addenda
Provided answers to 104 questions
Received 23 proposals (from 3 to 6 proposals
for each project)

PROCUREMENT PHASE - METHOD OF DELIVERY

- ❑ Streamlined design build
- ❑ Single Step, without SOQ shortlisting
- ❑ Best Value Selection
 - Price
 - Technical Proposal Score

PROCUREMENT PHASE – SELECTION AND SCORING CRITERIA

Proposal Evaluation Criteria	Points	Scoring Detail
Qualifications and Experience	15	organization & personnel, performance history
Project Approach & Commitments	15	design & construction approach, solutions, commitments exceeding requirements, quality
Maintenance of Traffic	15	MOT plan, commitments exceeding requirements
Schedule	15	commitments to complete the project sooner than required, schedule methodology
Bid Price	40	by formula

PROCUREMENT PHASE – SELECTION AND SCORING CRITERIA

Bid price scoring formula

(40 points maximum)

$$\text{Score} = 40 - \left[\frac{(\text{Bid} - \text{Low Bid})}{\text{Low Bid}} \times 100 \right]$$

- Low bidder earned 40 points
- 1% in price difference = 1 point reduction

PROCUREMENT PHASE – PUBLIC BID OPENING

- ❑ Team technical scores were revealed
- ❑ Bids opened and read
- ❑ Total scores calculated
- ❑ **Apparent Winners were Immediately Determined**

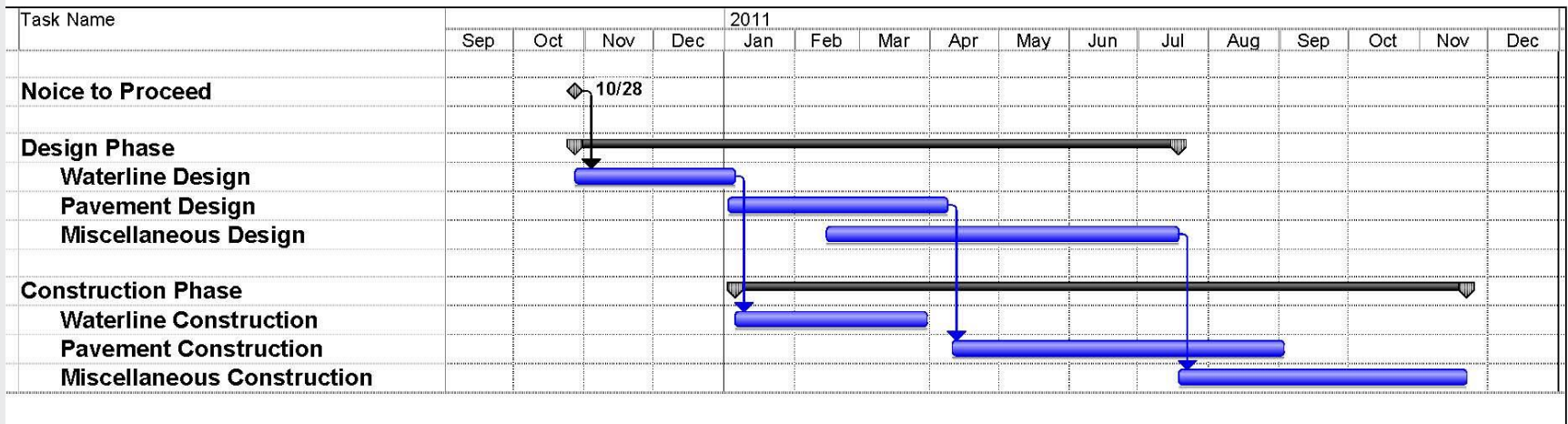
Transparency

PROCUREMENT PHASE – BID RESULTS

Best Value Results

Project	Technical Score	Bid Amount
1	Highest	Lowest
2	Highest	Lowest
3	Highest	Lowest
4	Highest	2 nd Lowest
5	2 nd Highest	2.8% Above Low Bid

DESIGN AND CONSTRUCTION



- Design and construction completed in about one year

DESIGN BUILD PACKAGE 2: 2011-2012

4 more street reconstruction projects

63rd Street – 1 mile

Full reconstruction

N. Oak – ½ mile

full reconstruction

Wornall Road - ½ mile

pavement reconstruction

Troost Avenue – ½ mile

pavement reconstruction



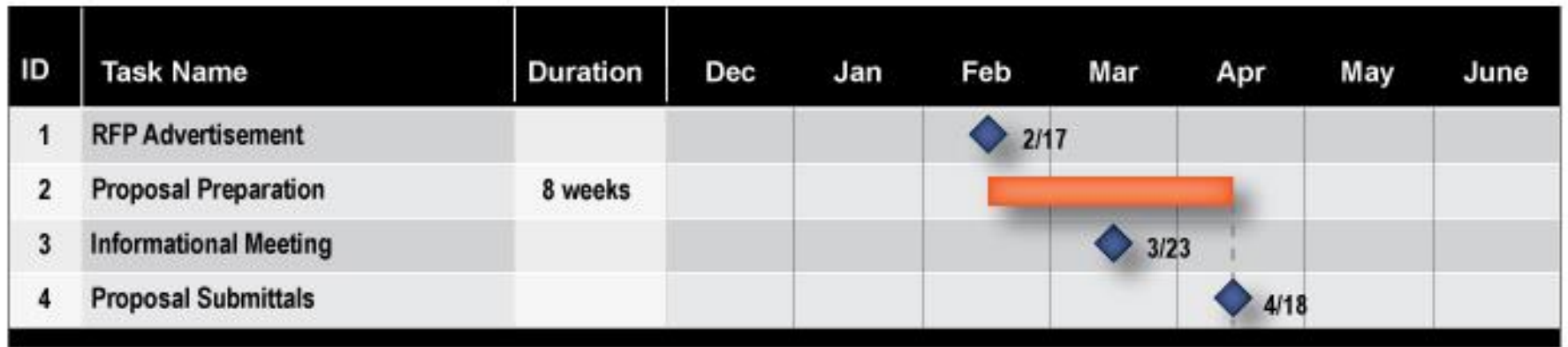
DESIGN BUILD PACKAGE 2

Scoring Changes

Proposal Evaluation Criteria	Package 1 Points	Package 2 Points
Qualifications and Experience	15	10
Project Approach & Commitments	15	35
Maintenance of Traffic	15	10
Schedule	15	5
Bid Price	40	40
Total Points	100	100

DESIGN BUILD PACKAGE 2

Package 2 Procurement



- ❑ 8 week advertisement
- ❑ Mandatory pre-bid meeting
- ❑ Received from 3 to 7 proposals on each project

DESIGN BUILD PACKAGE 2

Project	Technical Score	Bid Amount
1	Highest	4 th Lowest (7.6% higher)
2	Highest	2 nd Lowest (8.6% higher)
3	Highest	Lowest
4	Highest	3 rd Lowest (16.6% higher)

STREAMLINED DESIGN BUILD

Keys to Success

“Keep it Simple”

- Concise Basic Configuration
- Develop Reference Plans only as necessary to define the character of the work and to manage the risk
- Strong Technical Requirements
- Concise Proposals
- Clearly defined Scoring
- ❑ Provide DB teams with as much information as possible to reduce their risk and improve their bids

THANK YOU

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PROCUREMENT PHASE – DEFINING THE BASIC CONFIGURATION

- ❑ Narrative definition
- ❑ Identified the project limits
- ❑ Described the work
 - Pavement reconstruct,
 - Curb & gutter
 - Waterlines
 - Miscellaneous work items

PROCUREMENT PHASE – DEFINING THE TECHNICAL REQUIREMENTS

1. General
2. Utilities
3. Roadway Pavements
4. Roadways
5. Drainage
6. Signing, Pavement Marking, Signalization, Lighting
7. Maintenance of Traffic
8. Waterlines

TECHNICAL REQUIREMENTS

General Section (1 of 2)

1.0 GENERAL

1.1 Project Description

These Technical Requirements govern the design and construction of five separate projects:

- a. 89008208 – Wornall Road – 89th Street to Ward Parkway
- b. 89008210 – Wornall Road – 79th Street to 85th Street
- c. 89008212 – N. Brighton Avenue – NE 49th Street to NE 52nd Street
- d. 89008215 – Belvidere Parkway – Congress Avenue to Highway 9
- e. 89008216 – 39th Street – Cleveland Avenue to Elmwood Avenue

The purpose of the projects is to perform roadway reconstruction and upgrades on City streets. The Work generally consists of removing and replacing pavement, curb and gutter, storm inlets, select water lines, upgrading intersections to meet current Americans with Disabilities Act (ADA) requirements and upgrading intersection traffic signal detection equipment to new video detection.

1.2 Technical Requirements

The Technical Requirements are an essential part of the Contract, and a part of the Contract Documents and are binding requirements.

1.3 Project Descriptions, Project Limits and Basic Configurations

Project descriptions, project limits and the Basic Configurations are provided for each project under a separate cover. The Basic Configuration defines the Work required for each project within its project limits. The Basic Configuration and project limits for each Project are an essential part of the Contract and a part of the Contract Documents, and their requirements are binding requirements of the Contract.

1.4 Proposal Documents

The Proposal Documents are an essential part of the Contract, to the extent that they meet or exceed the requirements of the other Contract Documents. Specifically, if the Proposal Documents include statements that can reasonably be interpreted as offers to provide higher quality items than otherwise required by the Contract Documents, or to perform services in addition to those otherwise required or otherwise contain terms which are more advantageous to the City than the requirements of the other Contract Documents, the Design-Builder's obligations hereunder shall include compliance with all such statements, offers, and terms.

Notwithstanding the foregoing, in the event of conflicting requirements involving any Contract requirements, the City shall have the right to determine, in its sole discretion, which requirement(s) apply. The Design-Builder shall request the City's determination respecting the order of precedence among conflicting provisions promptly upon becoming aware of any such conflict.

TECHNICAL REQUIREMENTS

General Section (2 of 2)

documented through the use of a formal Comment Resolution Form. The following interim submittals will be required:

1. Street improvement plans – 100%
2. Waterline plans – 30%, 100%

- b. **Construction Documents:** Construction Documents allows the Design-Builder to initiate construction of the Project, or portions thereof. Construction Documents shall be submitted to the City subsequent to the 100% review meeting. The submittal of the Construction Documents shall include a completed Comment Resolution Form identifying all of the comments received during the design development and review processes and identifying the resolution of all comments to the satisfaction of the City. The City will respond to the submittal of the Construction Documents within 14 Days with the issuance of a Construction Notice to Proceed, or identification of Contract requirements that the submitted Construction Documents are out of compliance with.

The Construction Documents may cover only a portion of the Work to allow that Work to proceed prior to completion of Construction Documents for the entire Project. If multiple Construction Document packages are used then the Design-Builder shall, at the completion of the design process, provide the City with Consolidated Design and Construction Documents that define the design and construction of the entire Project. If the City review of the Consolidated Design and Construction Documents results in identification of Contract requirements that previously submitted Construction Documents are out of compliance with, then the Design-Builder shall have full responsibility to correct any nonconforming Work in the field that was constructed out of compliance with the Contract requirements.

- c. **Waterline Design Process:** Waterline design processes and procedures and design and plan requirements shall conform to:
 1. Kansas City Water Services Department Rules and Regulations for Water Main Extensions and Relocations

1.10 As-Built Documents

The Design-Builder shall be required to provide As-Built Documents. As-Built Documents shall be stamped by the DOR and submitted to the City for approval. The As-Built Documents submittal shall include:

- a. All plans reflecting changes occurring after the Construction Documents were completed
- b. Design calculations
- c. Design reports
- d. Specifications

RFP REQUIREMENTS

I. Instructions to Proposers (ITP)

- Sets procurement schedule
- Defines proposal requirements
- Defines evaluation criteria
- Identifies stipend – if provided

RFP REQUIREMENTS

II. Technical Requirements

2.0 Project Management

- Provides Work Breakdown requirements
- Billing requirements
- Facilities requirements

RFP REQUIREMENTS

II. Technical Requirements

1.0 General

- Identifies Basic Configuration
- Defines Commencement and Completion
- Modifies traditional design-bid-build general provisions

RFP REQUIREMENTS

II. Technical Requirements

Typical Discipline Requirements (Roadway, Structures, Pavement, etc.)

- Provides design requirements
- Identifies design deliverables
- Identifies supplemental construction requirements

DEFINING BEST VALUE



KCMO Street Maintenance

Bid price scoring formula (40 points maximum)

$$\text{Score} = 40 - \left[\frac{(\text{Bid} - \text{Low Bid})}{\text{Low Bid}} \times 100 \right]$$

- Low bidder earned 40 points
- 40% or more over low bid earned 0 points
- 1% in price difference = 1 point reduction

DESIGN BUILD REHABILITATION OF ARTERIAL ROADWAYS IN KANSAS CITY, MISSOURI

- ❑ Introduction and Background
- ❑ Procurement Phase - RFP Documents
- ❑ Procurement Phase – Selection
- ❑ Implementation Phase
- ❑ Package 2 Refinements

KANSAS CITY, MO CASE STUDY



- Annual street maintenance budget \$60 million
- Much of the infrastructure is 50 – 100 years old
- Historically only reconstruct streets if capacity or geometric upgrades are needed

DESIGN-BUILD PROGRAM POST-BID FORUM

- ❑ Held a contractor forum for all design build teams who submitted proposals after contracts were awarded
 - ❑ Need more clarity on the scoring
 - ❑ Preferred more technical emphasis
 - ❑ Provide more project information (mapping, utilities, subgrade information)



4500 SOUTH - UDOT'S FIRST ABC SPMT PROJECT - CMGC DELIVERY

PROCUREMENT PROCESS SCHEDULE

Project Procurement



ID	Task Name	Duration	Dec	Jan	Feb	Mar	Apr	May	June
1	Develop Procurement Documents	8 weeks							
2	Request Letters of Interest								
3	RFP Advertisement								
4	Proposal Preparation	8 weeks							
5	Informational Meeting								
6	Confidential 1 on 1 ATC Meetings	3 weeks							
7	Final Responses to ATC's								
8	Proposal Submittals								
9	Technical Proposal Evaluation	1 week							
10	Price Proposals opened and Selected								
11	Notice to Proceed								

KANSAS CITY, MO CASE STUDY



- Population approx. 450,000, 2 million in metro area
- Approx. 320 square miles
- 6,200 lane miles of roadways to maintain
- Much of the infrastructure is 50 – 100 years old
- Annual street maintenance budget \$60 million

TECHNICAL REQUIREMENTS

Roadway Pavement (1 of 2)

3.0 ROADWAY PAVEMENTS

The Design-Builder shall construct all the Work necessary to meet the requirements of the Contract Documents for the removal and replacement of roadway pavements within the project limits.

3.1 Design

3.1.1 Design Requirements

The City has determined the pavement types and pavement section requirements and subgrade stabilization requirements for the Project, which are provided in the Construction Requirements sub-section of this Roadway Pavements section of the Technical Requirements. The Design-Builder shall be responsible for all other aspects of pavement design (including any required subgrade stabilization), except as otherwise provided for in the Contract Documents.

If Portland Cement Concrete Pavement (PCCP) is designated in the Construction Requirements as an allowable or required pavement type for this Project and the Design-Builder incorporates into the Project, then the Design-Builder will be required to provide a concrete pavement joint design. The plans and supporting details will be submitted in accordance with the process identified in the Technical Requirements PCCP, joint design shall comply with the requirements and standard details of The American Concrete Pavement Association.

3.1.2 Reference Documents

The Reference Documents include data depicting the results of existing pavement cores obtained by the City within the project limits. The Design-Builder is responsible for any supplemental investigations required to complete the Work.

3.2 Construction Requirements

The Design-Builder shall construct the Portland Cement Concrete Pavement (PCCP) and, or Asphaltic Concrete Pavement (ACP) in accordance with the requirements of the Contract Documents.

3.2.1 Roadway Pavement Types and Thickness Requirements

3.2.1.1 Asphaltic Concrete Pavement

For Asphalt Concrete Pavement, the Design-Builder shall use:

Asphaltic Concrete Pavement

2" Type 5-01 Asphaltic Concrete Surface Course
10" Type 1-01 or RC Type 1-01 Asphaltic Concrete Base Course
6" MoDOT Type 5 Compacted Aggregate Base

3.2.1.2 Portland Cement Concrete Pavement

For Portland Cement Concrete Pavement, the Design-Builder shall use:

PROCUREMENT PHASE – DEFINING THE TECHNICAL REQUIREMENTS

General Format of Technical Requirements

1. Basic Configuration
2. Design Requirements
3. Construction Requirements
4. Project Specific Requirements

TECHNICAL REQUIREMENTS

Roadway Pavement (2 of 2)

Portland Cement Concrete Pavement
9" Portland Cement Concrete Pavement
6" MoDOT Type 5 Compacted Aggregate Base

3.2.2 Subgrade Preparation

The Design-Builder shall be responsible for any stabilization that may be required to the subgrade prior to construction of the Compacted Aggregate Base and pavement section. The roadway subgrade will be roll tested prior to construction of the Compacted Aggregate Base. A City representative will be present for the roll testing and City approval the subgrade condition shall be required prior to proceeding with the subsequent construction. If the roll testing indicates an inadequate subgrade condition then the Design-Builder shall rework the subgrade. The reworked subgrade will then be roll tested again, subject to the same procedures and approvals. The process shall be repeated until the subgrade condition is approved by the City.

3.3 Project Specific Requirements

This section identifies any Project specific pavement requirements.

3.3.1 89008208 – Wornall Road – 89th Street to Ward Parkway

The Design-Builder shall use Portland Cement Concrete Pavement for the pavement type.

3.3.2 89008210 – Wornall Road – 79th Street to 85th Street

The Design-Builder shall use Portland Cement Concrete Pavement for the pavement type.

3.3.3 89008212 – N. Brighton Avenue – NE 49th Street to NE 52nd Street

The Design-Builder can use either Asphaltic Concrete Pavement or Portland Cement Concrete Pavement for the pavement type.

3.3.4 89008215 – N. Belvidere Parkway – Congress Avenue to Highway 9

The Design-Builder can use either Asphaltic Concrete Pavement or Portland Cement Concrete Pavement for the pavement type.

3.3.5 89008216 – 39th Street – Cleveland Avenue to Elmwood Avenue

The Design-Builder can use either Asphaltic Concrete Pavement or Portland Cement Concrete Pavement for the pavement type.

IMPLEMENTATION (DESIGN AND CONSTRUCTION)



- ❑ Owner/Designer Relationship
 - Acceptance versus Approval
- ❑ Owner Reviews and Approvals (commit to processes and schedules)
- ❑ Construction Quality Responsibilities (who does construction QA?)

APPROVAL AND ACCEPTANCE

- ❑ **Acceptance:** A design or construction is in compliance with stated requirements of the project.

Technical Requirements define Acceptance

- ❑ **Approval:** A design or construction must meet a broader “Approval” authority than the stated requirements of the project.

Approval authority creates risk

RFP CONTENTS



I. Instructions to Proposers (ITP)

(Proposal Requirements and Evaluation Criteria)

II. Technical Requirements (Design Requirements)

- | | | |
|-------------------------------|--------------------------------|-------------------------------------|
| 1. General | 7. Utilities | 13. Roadway Design |
| 2. Project Management | 8. Right-of-Way | 14. Signing, Striping |
| 3. Quality Management | 9. Survey | 15. Structures |
| 4. Public Information | 10. Geotechnical and Pavements | 16. Maintenance of Traffic |
| 5. Environmental Requirements | 11. Earthwork | 17. Landscaping |
| 6. Third Party Requirements | 12. Hydraulics | 18. Maintenance During Construction |
| | | 19. Modifications to Standard Specs |

III. Standard Specifications

IV. Owner's Reference Drawings