Trinity Well Field and Production Facilities Project Management Using CMAR

Ian Taylor, P.E., PMP – *New Braunfels Utilities*

David Bennett, P.E. – *Freese and Nichols*

Kirby Anderson – *MGC Contractors*

February 27, 2015

NBU

MGC QUALITY PERFORMANCE VALUE

FREESE AND NICHOLS

Agenda

- Presentation
  - Project Background
  - CMAR Process
  - CMAR Selection
  - Project Management
  - Current Project Status
- Panel Discussion

Project Background

Project Background

- Trinity Aquifer Investigation
  - Supply diversification
  - Growing system demand
  - Test Well: 400 - 500 gpm
  - Land purchased – Spring 2013

Project Background

- Preliminary Design – March 2013
  - Design and drilling of 2 wells
  - Hydraulic modeling
  - Survey and Geotechnical
  - Environmental, Archeological, Permitting
  - Preliminary Design Report issued October 2013

Project Background

Project Schedule Criticality

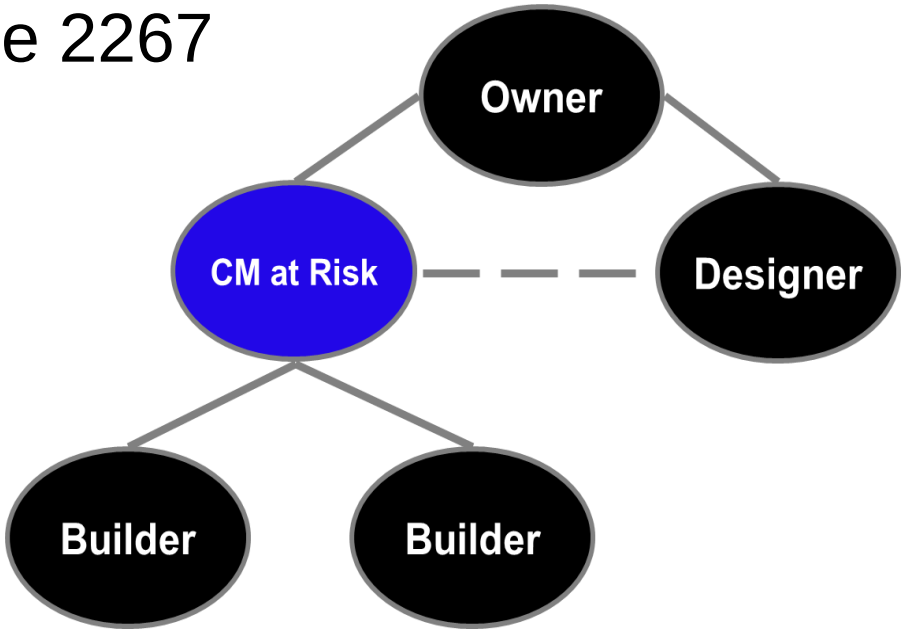
- Goal to finish one year early (Spring 2015 vs. Spring 2016)
- Design dependent on well field data
- Well Field Capacity Study completed Spring 2014
- Alternative delivery options
  - **CMAR**
  - Design-Build (population precluded this option)
  - Accelerated Design-Bid-Build

CMAR Process

CMAR Process

What and Why?

- Definition (AGC)
  - Separate design and construction contracts
  - Contractor final selection criteria
- Texas Government Code 2267



CMAR Process

What and Why?

- Why Use CMAR?
  - Designer is advocate for Owner
  - Owner is aware of budget during design and can make design decisions based on cost impact
  - Constructability Reviews
  - Long lead equipment and scope items can be procured prior to final design
  - CMAR selection is based on qualifications
  - CMAR can provide their experience and expertise during design
  - Project members become a TEAM

CMAR Process

PM Considerations

- PM Results of Using CMAR
  - Schedule
    - Realistic
    - Ability to accelerate delivery
  - Budget
    - CMAR's experience helps design to budget
    - Construction can competitively bid
  - Risk Management
    - More control over selection of products and subcontractors

CMAR Process

Benefits

- Egos and Titles are left at the door
- Diversity of Team can lead to unique
- Each organization needs a decision maker at each meeting
- Ability to reduce the unknowns
- Open Book Process
- Change Flexibility
- Allocation of risk where it belongs
- Eliminates Pre-Purchase Risk
- Reduced Potential for Claims
- Increased Potential for Innovation
- Process was similar to what was used prior to 1900s

CMAR Process

Best Project Fits

- Projects Best Suited for CMAR
  - Expansion or remodel of existing facility
  - Complex project with a lot of public interest
  - Owner wants to maintain control of design
  - Multi-discipline
  - Tight budgets
  - Early delivery required
  - Desire for control
  - High risk profile
  - Interaction during design desirable

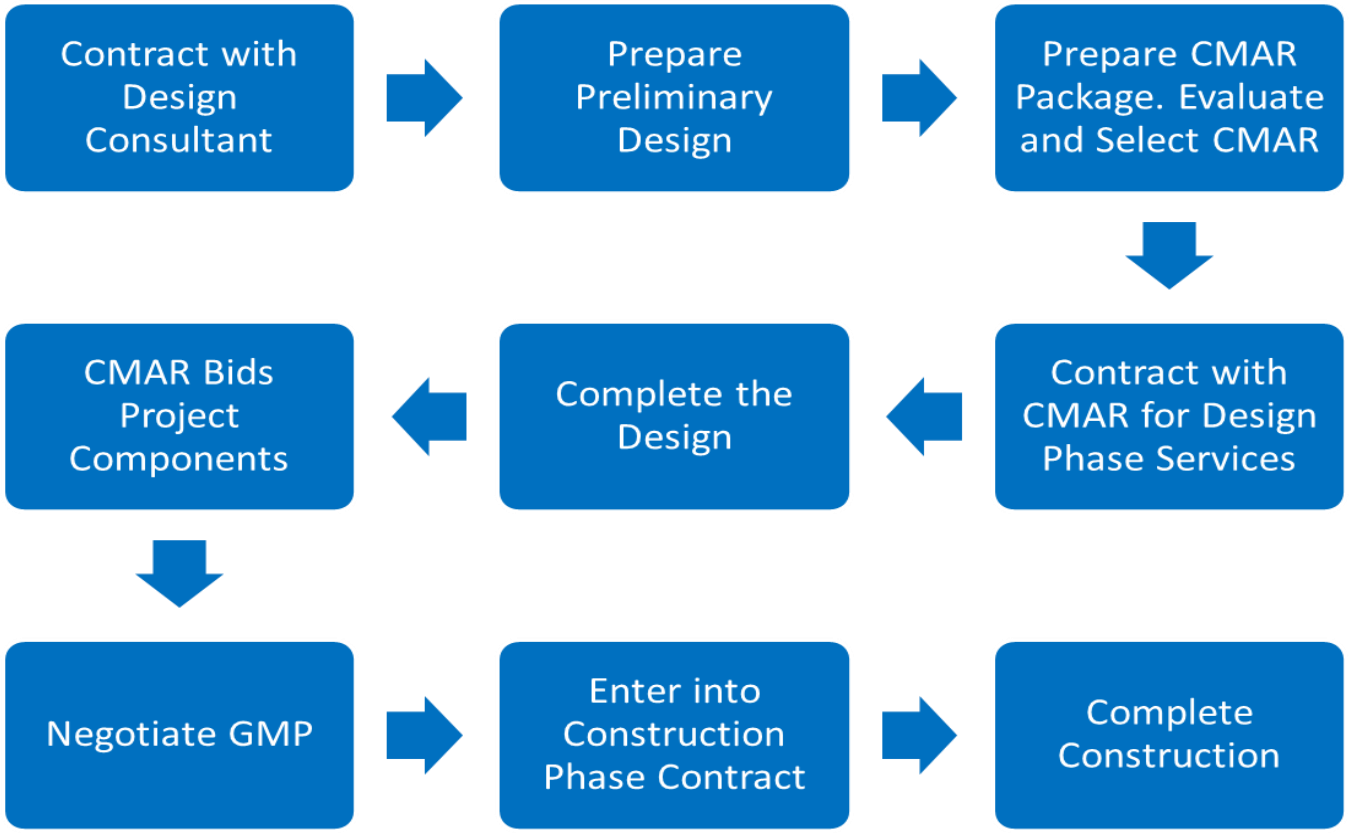
CMAR Process

Best Project Fits

- Reasons NOT to Use CMAR
  - Complex procurement process
  - More Owner involvement
  - More expertise required to manage CMAR
  - If project needs can be met by RFCSP
  - Not ideal for simple projects
  - Not ideal for projects without accelerated schedule

CMAR Process

Typical Flowchart



CMAR Selection

- Two-Step Process
  - RFQ
  - Proposal
- Owner's Role
  - Develop RFQ and Proposal requirements
  - Evaluate SOQ's and select a CMAR
  - Manage the contract
- Engineer's Role – to assist Owner with:
  - Developing selection criteria for CMAR
  - Evaluating SOQs
  - Cost and Scope negotiations

CMAR Selection

Process

- Evaluation and scoring criteria
- Received SOQs from seven firms
- Shortlisted four firms
- RFP sent to the four shortlisted firms
- Review and interviews with proposers

CMAR Selection

Request for Qualifications

RFQ Scoring Criteria

Description		Point Value
Experience/past performance; ability to perform the work		20
Experience and qualifications of proposed key personnel		20
Experience as a Construction Manager at Risk		15
Ability to complete projects on time		20
Ability to complete projects within budget		15
Other factors		10
	Total	100

CMAR Selection

Request for Proposals

RFP Scoring Criteria

Description	Point Value
Proposed Fee and Financial Factors	40
Project Management Plan	30
Statement of Qualification information, ranking and other factors	30
Total	100

MGC Contractors selected as CMAR

Project Management

Project Management

Final Design Phase

- CMAR contract executed January 2014
- Final Design began May 2014
- Communication
  - Bi-weekly review meetings with all stakeholders (Owner, Engineer and CMAR)
  - Allowed for quick decision-making

Project Management

Final Design Phase

- Owner's Role
  - Active involvement in design process
  - Make critical design and cost impact decisions
  - Negotiate scope and price with CMAR for GMP
  - Manage Engineer and CMAR contracts
  - Include and involve all staff and other team members
- Engineer's Role
  - Design with input from Owner and CMAR
  - Assist Owner with monitoring overall project budget and schedule

Project Management

Final Design Phase

- CMAR's Role
  - Provide input during design process
    - Cost modeling
    - Budget and scope monitoring
    - Schedule development and monitoring
  - Assist Engineer with designing within the budget
    - Design based on NBU's preferences/goals
    - Review design submittals
      - Ensured scope consistent with estimate
      - Recommended budget efficiencies
      - Performed Constructability Reviews

Project Management

Final Design Phase

- Final Design Scope
  - Bid Package 1A – Pre-purchase of Booster Pumps
  - Bid Package 1B – Pre-purchase of Well Pumps
  - Bid Package 2 – Construction of 1.5 MG Prestressed Concrete Ground Storage Tank

Project Management

Final Design Phase

- Final Design Scope
  - Bid Package 3 – Construction of Pump Station and Site Development
    - Installation of well pumps and booster pumps
    - Construction of well pump site and booster pump station
    - Chemical feed systems, mechanical, and yard piping
    - Chemical building
    - Well collection and distribution piping
    - Site roads and parking
    - Electrical and instrumentation
  - Bid Package 4 – Flow Control Improvements (Four Locations Off-Site)

Project Management

Bid Phase

- Owner's Role
  - Bid and award construction contracts
  - Contractor selection
- Engineer's Role
  - If CMAR chooses to bid
    - Issue Bid documents
    - Manage Bid process
  - If CMAR does not bid
    - Assist with Bid process
  - Electronic Advertising and Bidding
  - Bid Evaluation and Recommendation

Project Management

Bid Phase

- CMAR's Role
  - Develop Guaranteed Maximum Price (GMP)
  - Notify Owner/Engineer if CMAR plans to bid
  - If not bidding
    - Issue Bid documents
    - Manage Bid process
    - Assist Owner/Engineer with Bid evaluation and recommendation
  - If Bidding
    - Submit bid like all other contractors
    - Not involved in bid evaluation or selection until recommendation made to CMAR

Project Management

Construction Phase

- Construction Contracts

Construction Contract Amounts

Contract	Contract Amount
Bid Package #1	$ 669,064
Bid Package #2	$ 1,140,925
Bid Package #3	$ 4,479,645
Bid Package #4	$ 1,662,810
Preconstruction Services & General Conditions	$ 208,922
Total Contract Amount	**$ 8,161,366**
Contingency	$ 448,602

Project Management

Construction Phase

- Owner's Role
  - Provide input during submittal review and construction
  - Monitor construction (Inspector)
- Engineer's Role
  - Monitor construction (part-time Resident Project Rep)
  - Submittal review
  - Progress meetings
  - Site visits
  - Monitor contract
  - Address technical needs

Project Management

Construction Phase

- CMAR's Role
  - Contract with selected contractor or supplier
  - MGC selected as contractor for Package 3
  - All other Packages awarded to different contractors or suppliers
  - Coordinate/manage all construction contracts
  - Monitor and manage construction contract by providing inspectors and administering contract

Project Status

Project Status

- All Bid packages awarded and in construction
- Estimated completion date – May 2015

$8.5 M design and construction project from "napkin" to distribution in less than 12 months

Project Photos

18” Transmission Line

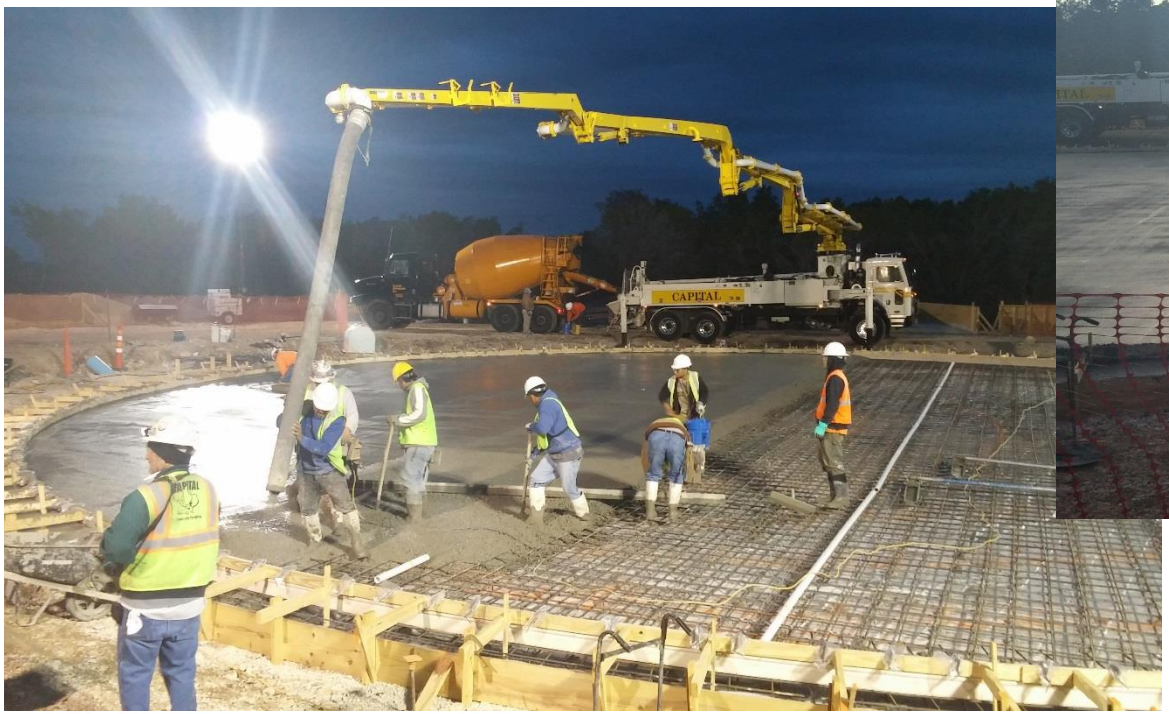
Project Photos

Electrical Conduit

Rock Trenching

Project Photos

Ground Storage Tank – Foundation Slab Concrete Pour



Project Photos

Ground Storage Tank – Wall Panel Construction

Project Photos

Ground Storage Tank –
Erecting Wall & Roof Panels

Project Photos

Ground Storage Tank – Wire Wrap & Shotcrete

Closing Remarks

Panel Discussion

Panel Discussion

- Panel Questions
- Owner's Perspective
- CMAR's Perspective
- Engineer's Perspective

Questions

Ian Taylor, P.E., PMP

New Braunfels Utilities
itaylor@nbutexas.com
830-629-8400

David Bennett, P.E.

Freese and Nichols, Inc.
dtb@freese.com
210-298-3829

Kirby Anderson

MGC Contractors
kirby@mgccontractors.com
210-694-0565