CMAR as Alternative Procurement

Village Creek Water Reclamation Facility
Peak Flow Management Project

David R. Townsend, P.E., Facilities Engineering Manager, Fort Worth Water Department

Village Creek Water Reclamation Facility

Rated Capacity – 166 MGD Daily Average Flow

369 MGD 2 Hour Peak Flow

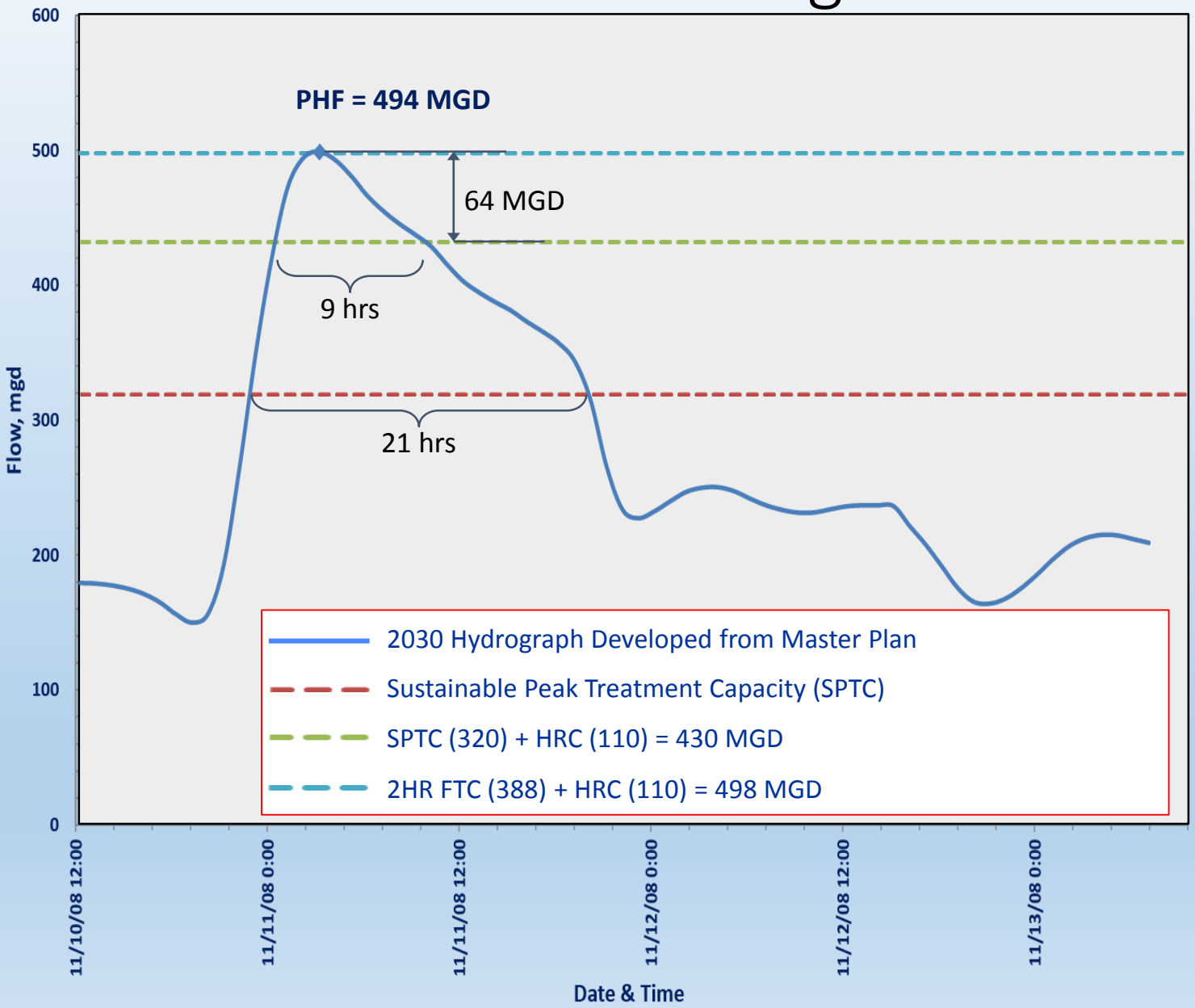
Plant Type - Activated Sludge Process Plant with Tertiary Treatment with Wet Weather High Rate Clarification over 255 MGD.

Service Population – Plant serves over 1,000,000 in Fort Worth and 22 wholesale customers/cities.

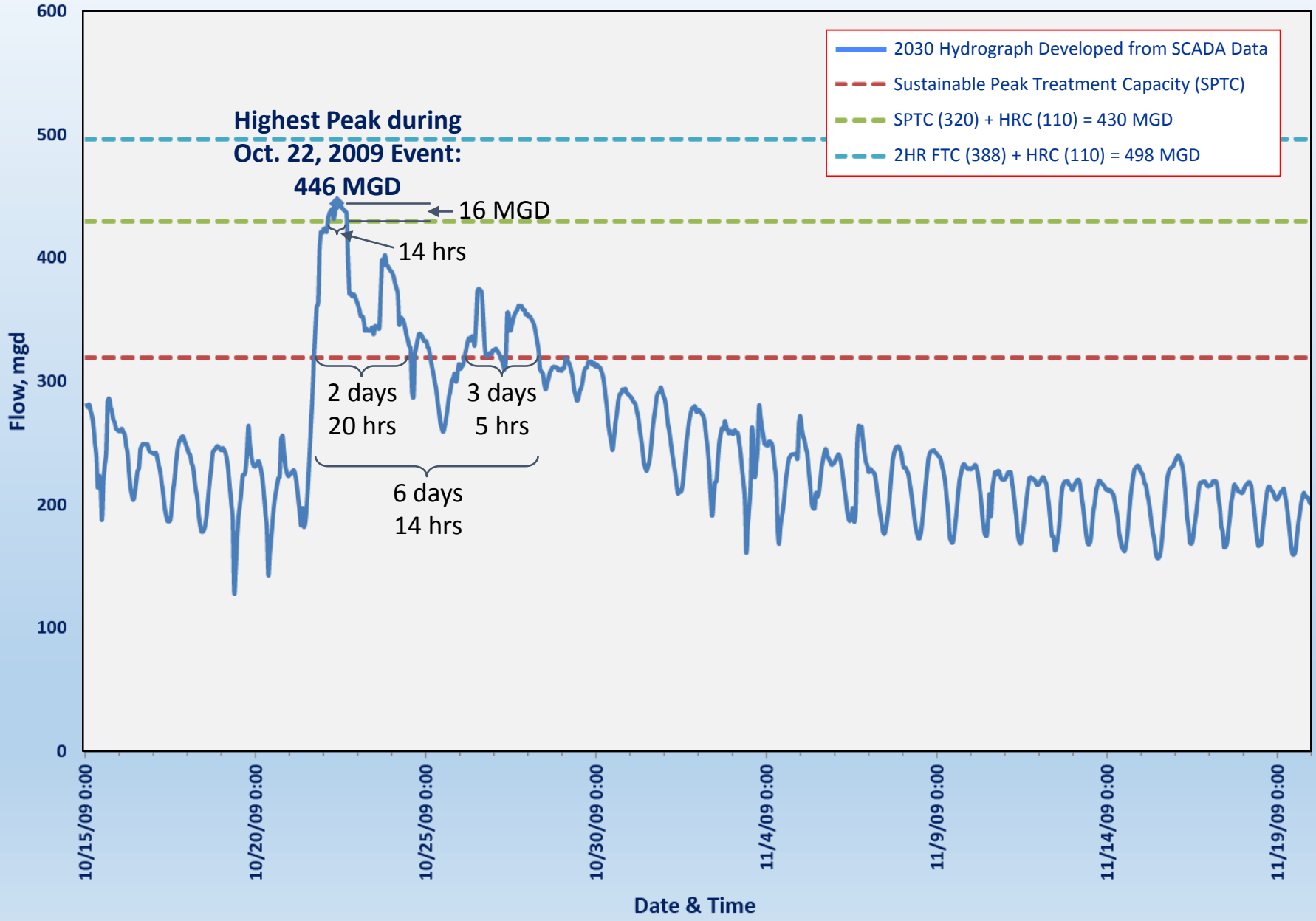
VCWRF Peak Flow

- Projected 2030 2-Hr Peak Flow (PHF) - 494 MGD
- Sustainable Peak Treatment Capacity (SPTC) - historical 3-day peak flow capable of being treated by VCWRF
  - Current – 250 MGD
  - Projected – 320 MGD
- 2-Hr Functional Treatment Capacity (2HR FTC) – peak operating capacity of the functional unit processes at VCWRF - 303 MGD

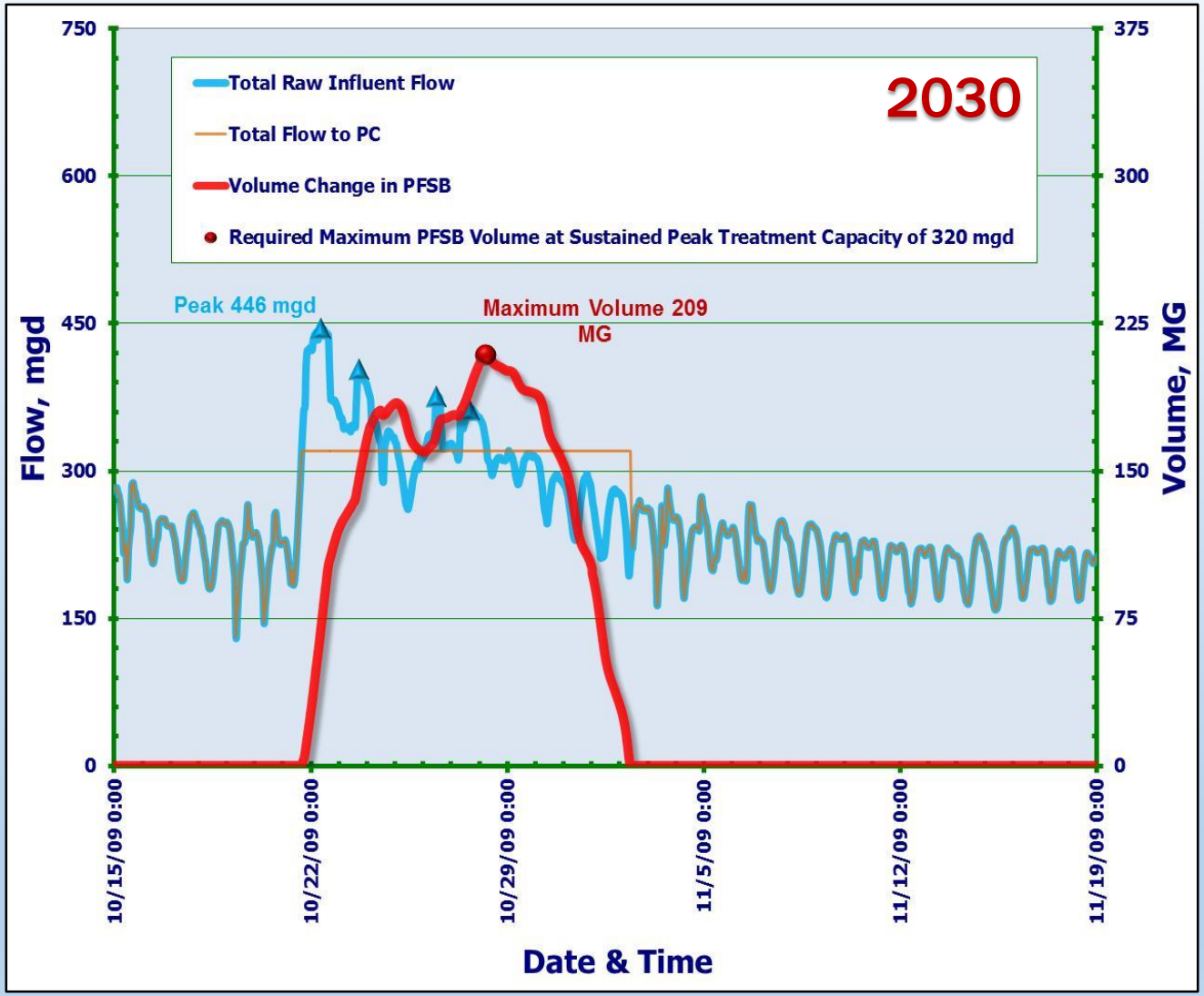
2030 Master Plan Single Event



2030 SCADA Multiple Event



Volume Validation



Volume Requirement vs. SPTC in 2030

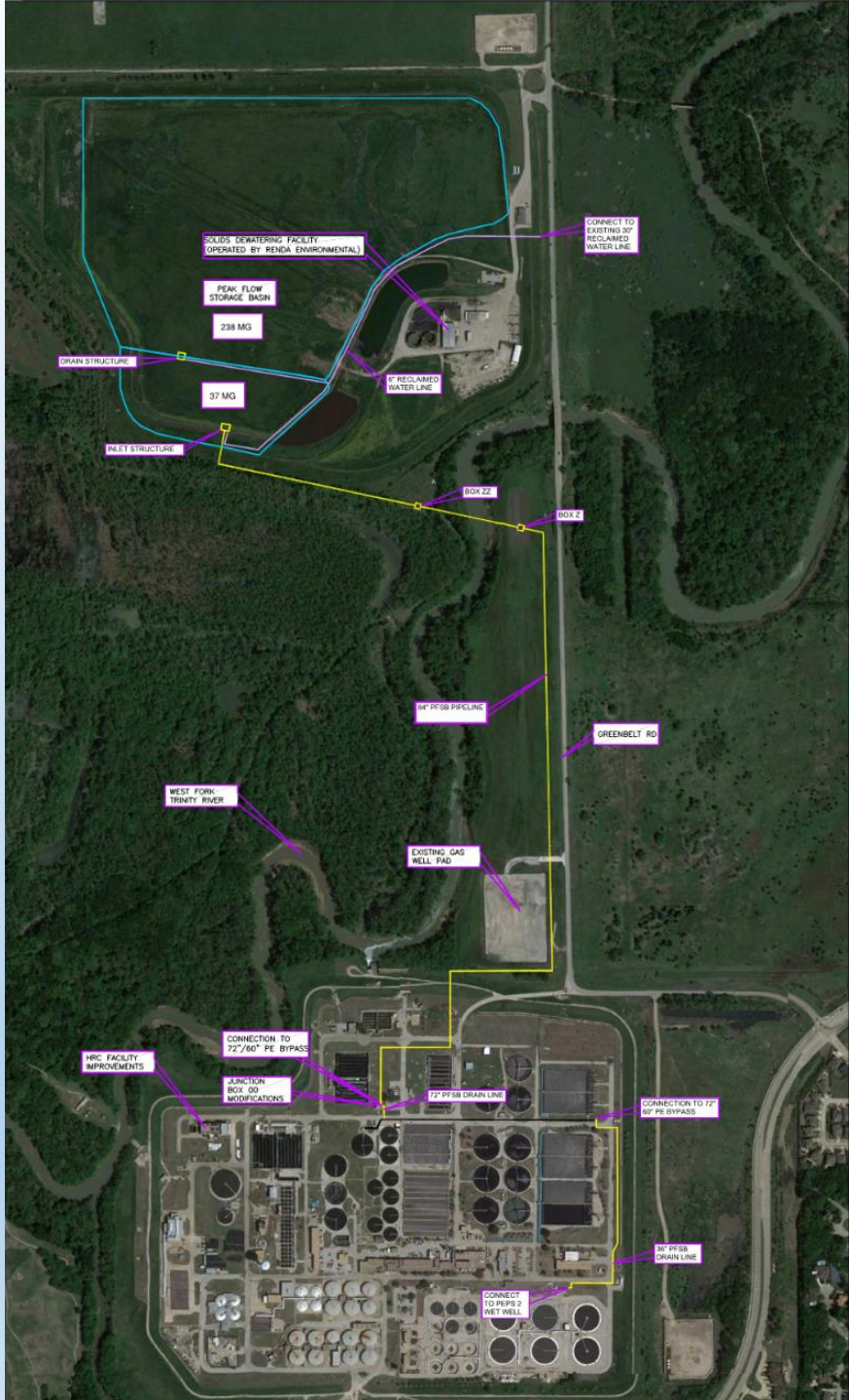
SPTC	2030 Hydrograph Developed from SCADA Data		2030 Hydrograph in Master Plan	
	Maximum PFSB Volume Required	Maximum Duration of Use	Maximum PFSB Volume Required	Maximum Duration of Use
MGD	MG	Day	MG	Day
250	1,401	120	150	2.4
260	1,038	97	140	2.4
270	816	66	131	2.4
275	709	46	126	2.4
280	602	36	121	2.4
290	444	30	112	2.4
300	358	16	103	2.1
310	276	14	94	2.0
320	209	12	85	1.8
330	152	10	76	1.7
340	125	8.7	68	1.5
350	99	6.8	60	1.4

Note: Validated Range for Operation.

VCWRF Peak Flow Management Project

Peak Flow Management Project

- Project Components
  - Increase High Rate Clarification Facility Firm Pumping Capacity to 110 MGD
  - Install Redundant HRC Chemical Equipment
  - Use Existing Sludge Only Landfill to Construct two Wet Weather Storage Basins (270 MGD)
  - New 6,300 LF of 84-inch pipeline
  - New 1,400 LF of 36-inch pipeline
  - Use Existing Infrastructure (No New Pump Stations Required)



CMAR Process
Peak Flow Management Project

- CMAR Process
  - Solicited RFP for CMAR
    - Qualifications Only during Initial Selection (to 5 Finalists)
    - Ability to Self-Perform was Major Factor in Final Decision
  - CMAR Selected at 30% Design Stage
  - CMAR Provided Constructability Review at 30%, 60%, 75% & 90% Milestones
  - CMAR Developed Cost Model at 30%, 60%, and 75%
    - Major Cost Reduction was required at 60% to keep Project within Budget.
  - Project was Bid in Multiple (6) Work Packages, combined into GMP1 & GMP2
  - Guaranteed Maximum Price (GMAX) Established at 100% Design
- Project Submitted for Clean Water SRF Funding after CMAR Selection


Village Creek Water Reclamation Facility Peak Flow Management Facilities
Project of the City of Fort Worth
Est. Cost: $28,184,000
Financial and Technical Support provided by:
EPA
U.S. Environmental Protection Agency
Texas Water Development Board
Texas Water Development Board

CMAR Advantages & Disadvantages

ADVANTAGES (Chapter 2269 – Texas Government Code)

- Qualification Based Selection
  - One or Two Step Selection Process (If 2 step, 1st step can not include costs) using RFP/RFQ Process
  - Selection based on Best Value using published selection/ranking criteria
  - Move to 2nd Selection if Negotiations fail
  - CMAR can self-Perform
- Accelerated Schedule
  - Start on portion of project/Early Work Package (EWP)
  - Can Include Site Utility Investigation as EWP
  - Start construction on less than 100% plans/Specifications
  - Open Items can be delayed for further design/cost analysis

CMAR Advantages & Disadvantages

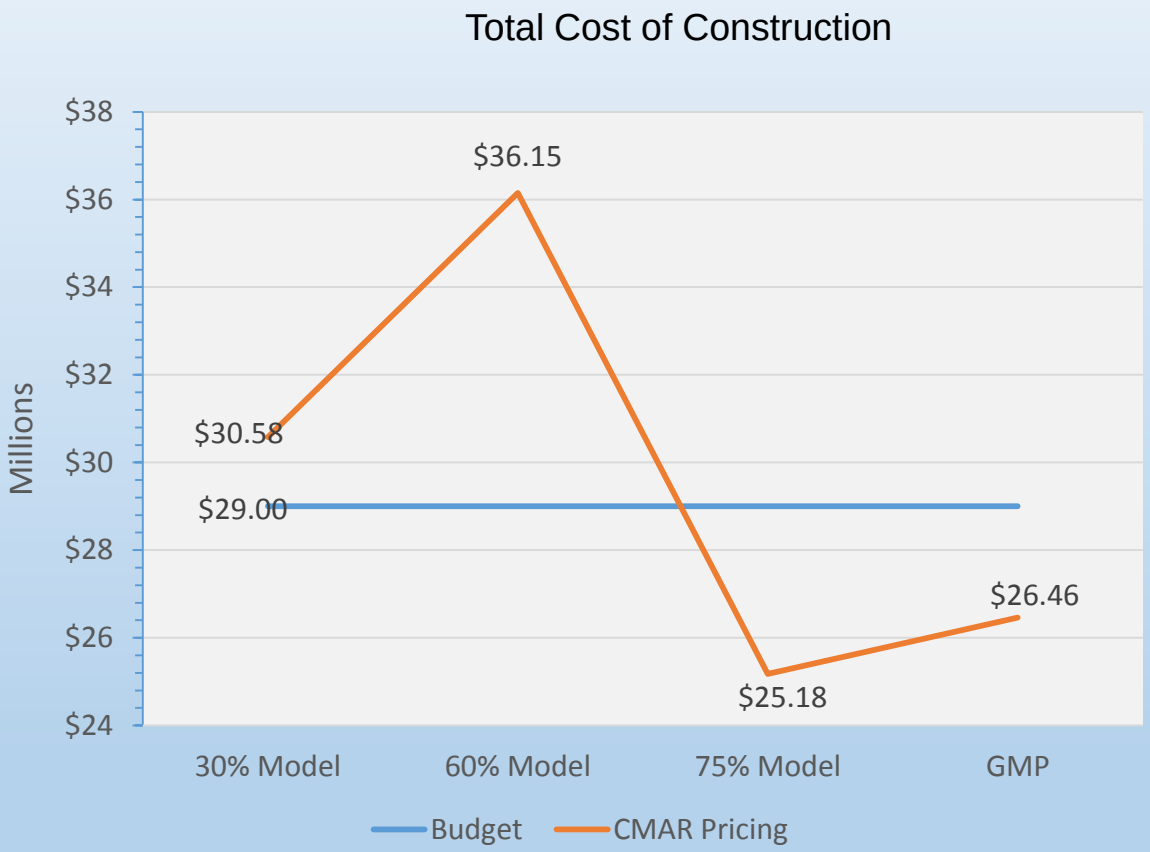
ADVANTAGES (Continued)

- Contractor works with Design Engineer
  - Continuous interaction dealing with issues
  - Design Assistance for Complex Projects
  - Early Contractor Involvement in Design
  - Collaborative Effort to Solve Problems within Budget
- Constructability
  - Market Input throughout Design Process
  - Specialized Subcontractors Engaged Early on for Success
  - Continual Planning with Operations to Minimize Plant Impact
- Transparency & Control over subcontractors
  - All subcontracts must be “publicly advertised”
  - CMAR can self-preform only by submitted bid
  - Subcontractor can be selected based on “best value” if criteria is published
  - Owner select another subcontractor at additional cost.

CMAR Advantages & Disadvantages

ADVANTAGES (Continued)

- **Cost Evaluation**
  - Provides Proposed GMP at various stages of design
  - Provide recommendation for cost reductions if budget exceeded
- **Cost Certainty**
  - Budgeting Trends
  - No Change Orders
  - All major work hard bid



CMAR Advantages & Disadvantages

ADVANTAGES (Continued)

- Accelerated Schedule
  - Start construction with less than 100% plans/Specifications
  - Start on portion of project as Early Work Package
  - Site Utility Investigation as Early Work Package
  - Open Items can be delayed for further design/cost analysis
    - HRC Cracks Repair
    - Polymer System
    - Dewatering System
    - Basin Electrical
    - 36” Alternate Route – Tie in to existing PEPS2

CMAR Advantages & Disadvantages

DISADVANTAGES

- GMP established before design complete. Question of Best Value & May cost more that Competitive Bid Project.
- (Initial) Develop New CMAR Contract & General Contract Documents
- (Initial) Requirements and Procedures are different for each state and different from standard Design-Bid-Build Process.
- (TWDB) SRF Requirement are designed for a standard Design-Bid-Build project.

TWDB (SRF) Requirements & CMAR

ADVERTISEMENT

- CMAR – Public Advertisement of Subcontracts
- TWDB – Public Advertisement with TWDB/SRF Wording
- Actual – Public Advertisement of all Subcontracts with TWDB Wording

FINAL SEALED DOCUMENTS/EARLY NTP

- CMAR – Early GMP Notice to Proceed on less than 100% Plans
- TWDB – Sealed Final Plans/Specifications for Approval
- Actual – Allow issuance of early NTP with TWDB approval at Owner's Risk

TWDB (SRF) Requirements & CMAR

FINAL SEALED DOCUMENTS/MORE THAN 1 GMP

- CMAR - 1 or More GMPs (Multi-Phase Construction)
- TWDB – Sealed Final Plans/Specifications for Approval
- Actual – Approval of Final Documents for each GMP (as a “separate” contract)

FINAL SEALED DOCUMENTS/ALLOWANCES

- CMAR – Provide allowance for unfinished design work
- TWDB - Sealed Final Plans/Specifications for Approval/Funding Authorization
- Actual – Total Amount (with Allowance would be approved). Funding authorized without allowances. Change Document (Change Order) for Funding Authorization of Allowances (and removal of Excess funds)

TWDB (SRF) Requirements & CMAR

CONSTRUCTION PAYMENT REIMBURSEMENT

- CMAR – Timely payment to Contractor by Contract
- TWDB – Reimbursement after submission of payment request & all requirement met/funding authorized
- Actual – FWWD pays Contractor by using City Cash Reserves (internal loan) pending reimbursement by TWDB which could be a long period if requirements

Lessons Learned

- Selection Process – For best value, Use clear published selection criteria
- Get CMAR on board as soon as possible (30% Design)
- Start early on CMAR Contract & General Construction Documents, otherwise schedule issues
- Before any SRF/TWDB Construction Advertisement – Meet with TWDB Project Manager (As early as possible). Need someone who is familiar with SRF/TWDB requirements to make sure everything is covered.
- Decide if CMAR should be Engineer or Contractor (Self-Perform Issue)
- Subcontracting Work – If using “best value”, need clear concise objective selection criteria (Justify Decision)

Questions

David R. Townsend, P.E.

Facilities Engineering Manager

Fort Worth Water Department

David.townsend@fortworthtexas.gov

817-392-8430