I-215/Barton Rd IC Improvement Project
Construction Manager/General Contractor (CM/GC)
Construction Manager/General Contractor (CM/GC)

- 1990, SEP-14 allows to evaluate non-traditional contracting
- July 2012, Section 1301 of MAP-21
- September 2012, California Legislative passed Assembly Bill 2498
- September 2018, SB 1262 Authorize to use CM/GC
Existing Geometry

- Barton Rd
- Barton Ave
- OC NB
- Onramp
- SB Offramp/La Cross Ave
- SB Onramp
- La Crosse Ave
- Barton Ave OC
- NB Offramp
- NB Onramp
- I-215
- Barton Rd
More than 10 configurations were considered for the Barton Road Interchange project. Four design alternatives, including a no-build alternative, are being evaluated.

**PROJECT ALTERNATIVES**

**ALTERNATIVE 3: PARTIAL CLOVERLEAF**
- Eliminates La Crosse Avenue and Barton Road Interchange
- Provides direct access between Barton Road and Interstate 215
- Greatest right-of-way impact
- Estimated cost: $104.9 million

**ALTERNATIVE 6: HOOK RAMPS & PARTIAL CLOVERLEAF**
- Exit on Commerce Way
- Preserves some access to La Crosse Avenue
- Moderate business right-of-way impact
- Estimated cost: $63.3 million

**MODIFIED ALTERNATIVE 7: ROUND-ABOUT (LOCALLY PREFERRED ALTERNATIVE)**
- Preserves access to La Crosse Avenue
- Provides direct access between Barton Road and Interstate 215
- Preserves much of existing footprint on Barton Road – least right-of-way impact
- Estimated cost: $62.5 million
Landscape & Aesthetics Features

MAINLINE I-215

Barton Rd Overcrossing Bridge
RTE 215 Roundabout Safety Treatment Concept
Right of Way Acquisition
Issues and Challenges

Right of Way Impacts:

• Total of 56 parcels were impacted by the project
• 7 of those parcels were full takes

1- Contaminated Property:
   ▪ Require clean up and remediation
   ▪ Monitoring wells to sample the level of concentration
   ▪ Potential impact the schedule for 1st stage of construction

2- 24/7 Emergency Veterinarian Animal Hospital
   • Risk finding a suitable location within the city limit
   • Owner doesn’t want to relocate far from existing location
   • Potential impact the construction schedule

* 3W Certification was issued because of the long process for remediation and relocation of animal hospital
Utility Conflicts
Issues and Challenges

Utility Impacts:

1. (3) Fiber Optic Telecommunications (AT&T, Sunesys & TW)
2. (2) Edison & Colton Electrics
3. (1) AT&T & Telephone Cable
4. (1) Time Warner
5. (4) Water Lines
6. (1) Sewer Line
**Unique Design Issues and Challenges**

**Stage Construction:**
- Limited vertical clearance for falsework
- Existing bridge barely fit 10.5’ lanes to provide enough space to construct bridge footing in median
- Total of 4 stages were anticipated to complete the project

**Maintenance of Traffic (MOT)**
- Barton Rd is the only interchange in City of Grand Terrace and the gateway for the city
- Daily traffic is about 22,400 vehicles per day

**Community Impacts:**
- Grand Terrace Elementary School
- 24/7 Clinical Laboratory of San Bernardino
- Terrace Village RV Park
- Grand Terrace Mobile Home Park
- 24/7 Emergency Veterinarian Animal Hospital
- Local businesses
CM/GC Delivery Method Overview

What is CM/GC? - Two-Phase Contracting Method

**PRE-CONSTRUCTION**
- Construction Manager
- Professional Services
- Early Work Contract

**CONSTRUCTION**
- General Contractor
- Price Agreement: TMP or GMP
- Construction Contract
Why do we use CM/GC?

- Because of inherent project risk
- Opportunities for innovation
- Need for specialized qualifications
- Benefits from early procurement
- Limited or fixed budget

CM/GC provides key attributes:

- Collaboration
- Risk reduction & allocation
- Improved cost control
- Improved design quality
- Schedule optimization
CM/GC Preconstruction Phase

Risk Management

CM/GC allows us to:

- Analyze risk impacts and cost **before** the final schedule and cost of the project is determined.
- **Jointly** analyze, allocate, and mitigate risk
- **Manage** risk that can adversely impact schedule and budget
CM/GC Preconstruction Phase

Risk Management: Procuring long lead items

Analyze risk impacts and cost **before** the final schedule and cost of the project is determined such as materials sourcing and logistics:

1. Secure long lead items – Special falsework beams
2. Owner procured materials
3. Stockpiled materials
4. Roundabout Stone Monuments (Schist) from Oklahoma
5. Perforated Bronze Lettering for City Logo
Jointly analyze, allocate, and mitigate risk:

Right of Way Contract:
1. Contractor’s activities must occur outside of school drop off/pick up hour 7:00 - 8:30am and 1:30 - 3:00pm
2. Construction activities surround school property only allowed during school is off
3. No pile driving or demolition activities during school session
4. Remove and reconstruction +800 feet of walls (wall 82 & 53) must be completed within 95 days
5. Work on Vivienda Avenue must be completed on weekend
6. New signalize intersection at Vivienda/Commerce Way must be full operational, before school in session
Manage risk that can adversely impact schedule and budget:

1. **Conflict:**
   - Two ATT Fiber Optic Cabinets
   - 6 months for splicing and testing

2. **Mitigation:**
   - ATT Horizontal Directional Bore - 1000’x 28” Casing
   - Coordinating with Contractor to allow splicing and testing during construction
Opportunity for Innovations

CM/GC Roles: Intentionally Collaborative

Engineer: “What kind of retaining walls do you prefer for the soil conditions and right of way? What other risks do you see?”

Contractor: “Soldier pile walls are best here. I can save time and money with timber lagging. Let’s take this for consideration”
CM/GC Preconstruction
Opportunity for Innovations

Innovation #76 delete left directional motif treatment

Innovation #76 one directional architectural treatment
Innovation #76 one directional Ribbon Motif treatment

Replaced with one directional ribbon
## CM/GC Preconstruction
### List of Innovations

<table>
<thead>
<tr>
<th>Innovation</th>
<th>Construction Element</th>
<th>Total</th>
<th>CM/GC Preconstruction</th>
<th>Saving</th>
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**Total saving = $3,692,200**
**Pricing Milestones: Cost Estimate**

- **Open Book**: Transparency, seeing the full estimate detail in base estimate format

- **Cost Based or Production Based Estimating**: Bottom up estimate (defined later)

- **Incremental Cost Estimates**: Cost estimates at key milestones, commonly termed Opinion of Probable Construction Cost (OPCC)

- **Independent Cost Estimate**
  - **Cost Based Estimate**
    - **Direct**
      - Actual Construction Costs
        - Labor
        - Equipment
        - Permanent materials
        - Subcontract work
    - **Indirect**
      - Schedule Based Cost
      - Temporary Construction
      - Escalation and Contingency
      - Variable Indirect
      - Fixed Business
      - Other
  - **Mark-Up**
    - G&A (Home Office Overhead)
    - Profit
  - **Bond**
**Pricing Milestones: Cost Estimate**

**Quantity Reconciliation**

- Unit price and quantity take-offs using Department’s standard pay items
- Material costs, equipment costs and labor cost
- Production rates, details for all allowances and unit price work
- Each Cost Model submitted with backup documentation

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<tr>
<th>Bid #</th>
<th>Item #</th>
<th>Description</th>
<th>Unit of Measure</th>
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Project Name: I-215 Barton Road Interchange
Preconstruction Services Contract No.: 08-0J07CM
Construction Contract No.: 08-0J0704
Estimate Name: GMP (12/9/2016)
Cost and Pricing Models: Cost Estimate

Cost models are very important as the selection criteria during procurement:

- Quantities and Standard Bid Items utilized
- A portion of the project is estimated
- Contractor demonstrates how a cost based estimate is linked to standard bid items
- The amount that is bid is not scored, but the contractors estimate and cost model are
- Points are determined based on the average cost not the low cost

**Direct Cost - Labor**

**Direct Cost - Equipment**

**Indirect Cost - Schedule, Escalation, Contingency**
## Pricing Milestones: Cost Estimate

### ICE vs CM

**Project Name:** I-215 Barton Road Interchange Reconstruction  
**Preconstruction Services Contract No.: 08-0107CM**  
**Construction Contract No.: 08-010704**

### Estimate Name: GMP (12/9/2016)

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### Pricing Milestones: Cost Estimate

**ICE vs CM**

**Delta Report**

---

**Project Name:** I-215 Barton Road Interchange Reconstruction  
**Preconstruction Services Contract No.: 08-0107CM**  
**Construction Contract No.: 08-010704**  
**Estimate Name:** OPCC #1

---

<table>
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<th>Bid No</th>
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<th>Description</th>
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<th>Unit Price CM #1</th>
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<th>Total Price CM #1</th>
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</table>

- Quantity and Estimate Reconciliation for items >10%
Challenges during OPPCs and GMP

i. Total Number of Working days
   • 450wkds vs 550wkds (due mini sub-stages within local businesses)
   • TRO based on total working days

ii. Traffic Control
   • Modify lane closure charts and increase the closure from 6hrs to 8hrs
   • Increase the 30% productivity, results reducing number of nights needed
   • 120 Lane Closure reduced to 84 needed

iii. Lump sum vs unit price
   i. Any risk item can be a cost sharing
   ii. Street Sweeping

iv. Bridge Type Selection
   • CIP vs Precast

V. Pavement Sections
   • RHMA vs JPCP within ramps and roundabout
   • LCCA: $350,000 saving in 40yrs initial construction cost for RHMA

vi. Portable Changeable Message Signs (PCMS)
   • 25 units vs 13 units, own vs rent

vii. AB219 Prevailing Wage for delivery truck driver
   • $500,000 increase in labor cost
Pricing Milestones: Contract Award

Barton Rd
Cost Estimate Progression
OPCC1 thru Contract Award

OPCC1  thru  Contract Award
CM
ICE
EE

$46,941,103
$51,059,910
$52,040,400
$47,732,175
$47,400,750
$37,214,988
$47,004,058
$47,503,392
$45,749,553
$45,749,553
$34,618,585
$41,037,311
$42,641,252
$42,641,252
$27,000,000
$32,000,000
$37,000,000
$42,000,000
$47,000,000
$52,000,000
$57,000,000
CM/GC Construction Phase
Ground Breaking Ceremony
I-215/Barton Rd IC Improvement Project
CONSTRUCTION

Roadway Excavation

Structure Excavation

Roadway Excavation

Structure Backfill
CM/GC Preconstruction
Challenges during construction
CM/GC Construction Phase

Current Status

• 85% completion

• Completion date is June 9, 2020
### CM/GC Myths

- Not to shift the risk to contractor, but to share the risk between Owner and Contractor
- Not to eliminate CCOs, but to minimize CCOs
- Not to eliminate RFI, but to reduce RFIs

<table>
<thead>
<tr>
<th>CCO#</th>
<th>Description</th>
<th>CCO Amounts</th>
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<td>1</td>
<td>Additional Traffic Control</td>
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<tr>
<td>1</td>
<td>Additional Traffic Control</td>
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**Total =** $831,200.04
Summary:

• Foster innovation
  • Encourages to all options during design & constructability review to reduce time and cost.

• Mitigative risk:
  • Identify, reduce and explore mitigation options as project evolves

• Improve cost control
  • Value engineering where limited or fixed budget shapes the design approaches with the informed decisions on the project cost

• Collaboration/partnering

• Issue resolution and decision-making
Questions?