
Caltrans
sb
cta
San Bernardino County Transportation Authority
I-215/Barton Rd IC Improvement Project
Construction Manager/ General Contractor (CM/GC)
INCORPORATED
CITY OF GRAND TERRACE
NOVEMBER 1978
MYERS
Steve P. Rados, Inc.
MYERS-RADOS, A JOINT VENTURE

Construction Manager/ General Contractor (CM/GC)

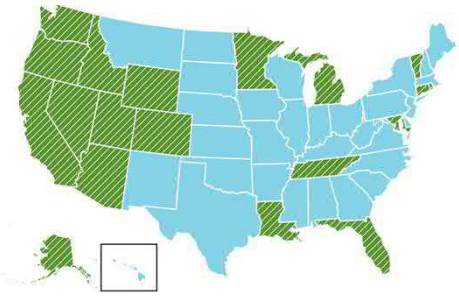
- 1990, SEP-14 allows to evaluate non-traditional contracting
- July 2012, Section 1301 of MAP-21
- September 2012, California Legislative passed Assembly Bill 2498
- September 2018, SB 1262 Authorize to use CM/GC

U.S. Department of Transportation
Federal Highway Administration

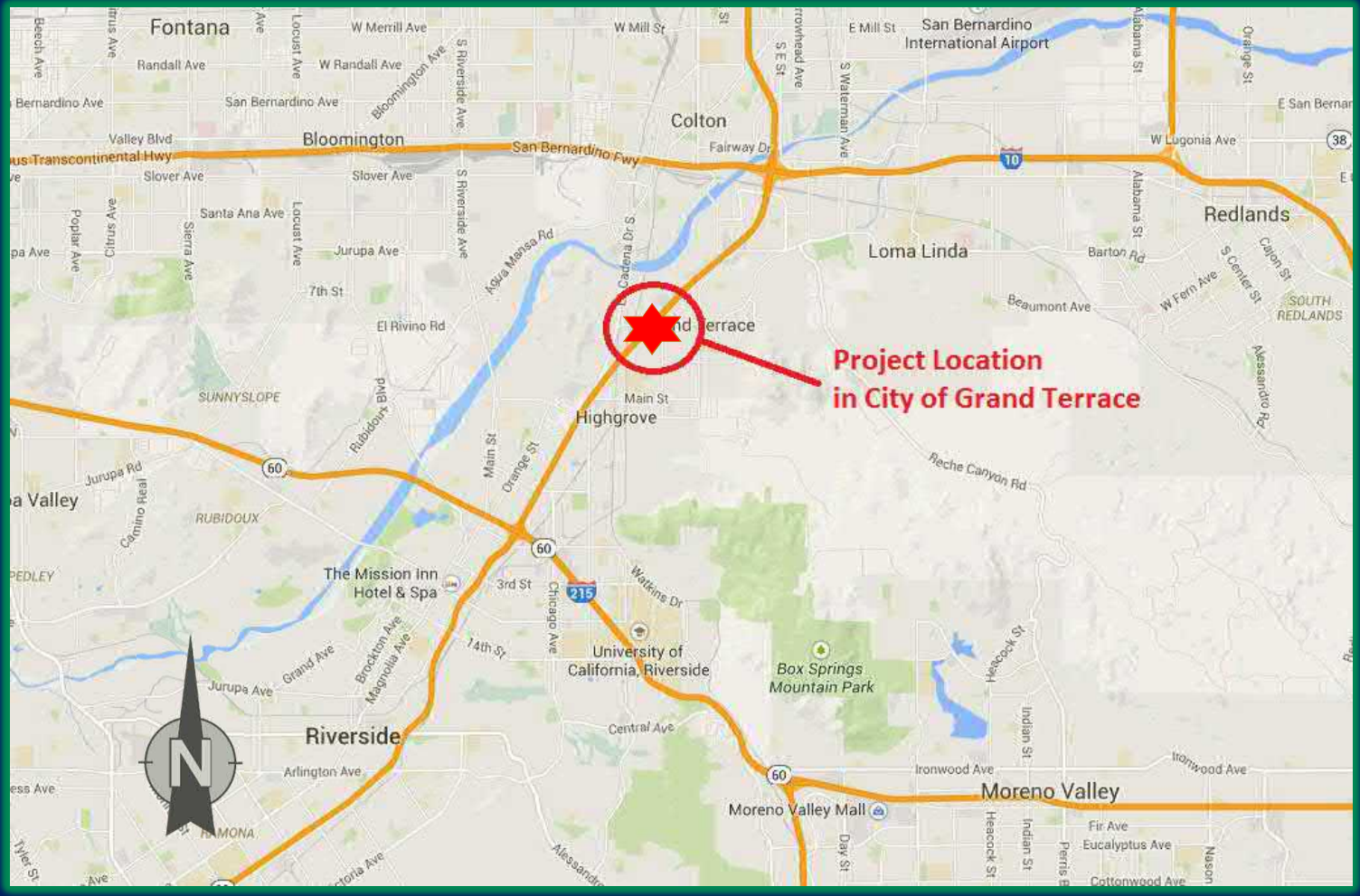
innovation ingenuity imagination invention
Every Day Counts

Caltrans

sbcta San Bernardino County Transportation Authority



I-215/Barton Rd IC Improvement Project



Existing Geometry

PROJECT ALTERNATIVES

More than 10 configurations were considered for the Barton Road Interchange project. Four design alternatives, including a no-build alternative, are being evaluated.

ALTERNATIVE 3: PARTIAL CLOVERLEAF

- Eliminates La Crosse Avenue and Barton Road Intersection
- Provides direct access between Barton Road and Interstate 215
- Greatest right-of-way impact
- Estimated cost: $104.9 million

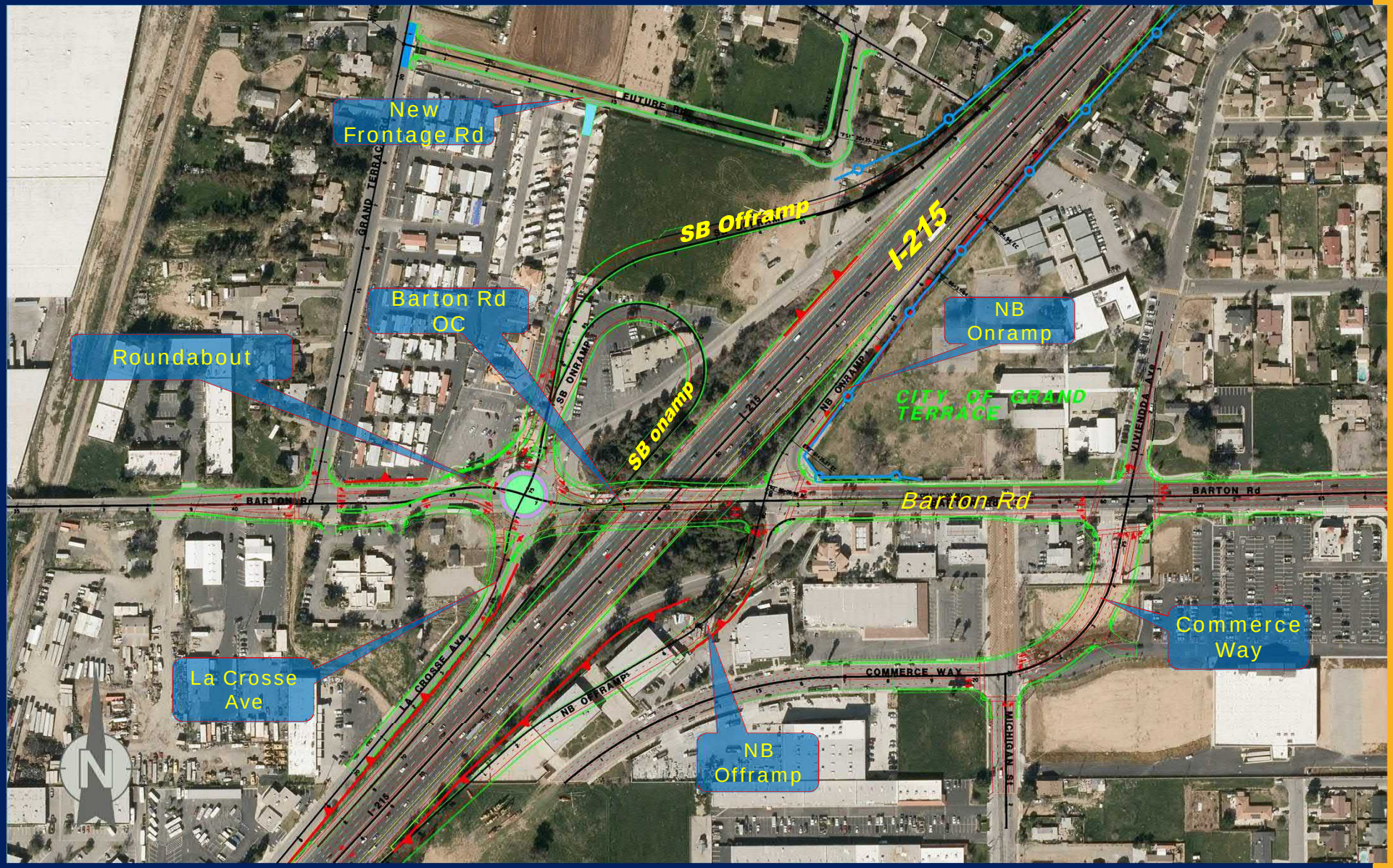
ALTERNATIVE 6: HOOK RAMPS & PARTIAL CLOVERLEAF

- Exit on Commerce Way
- Preserves some access to La Crosse Avenue
- Moderate business right-of-way impact
- Estimated cost: $63.3 million

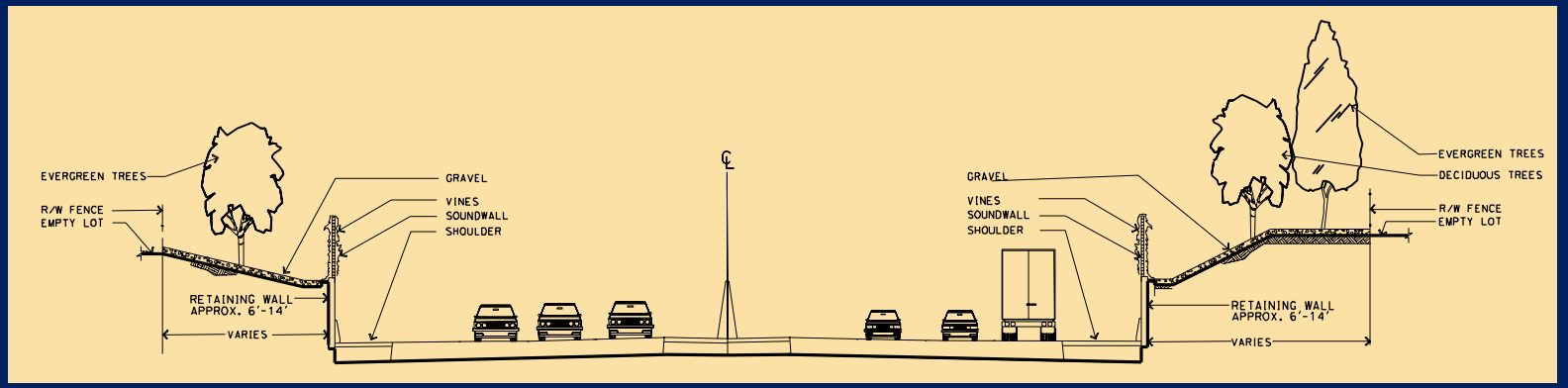
MODIFIED ALTERNATIVE 7: ROUND-ABOUT (LOCALLY PREFERRED ALTERNATIVE)

- 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

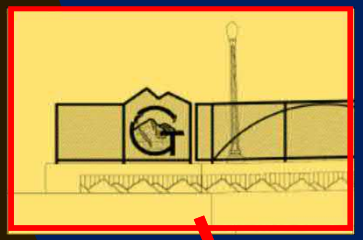
Proposed Barton Rd Interchange

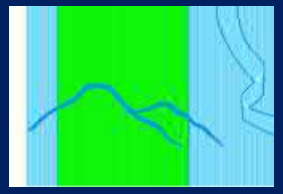


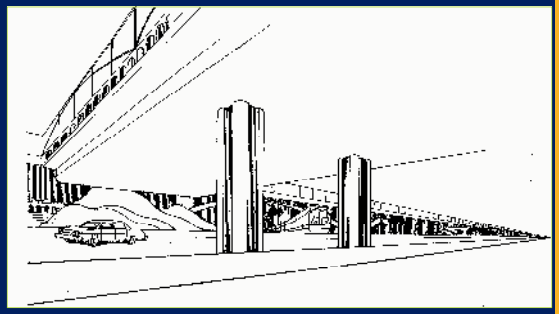
Landscape & Aesthetics Features

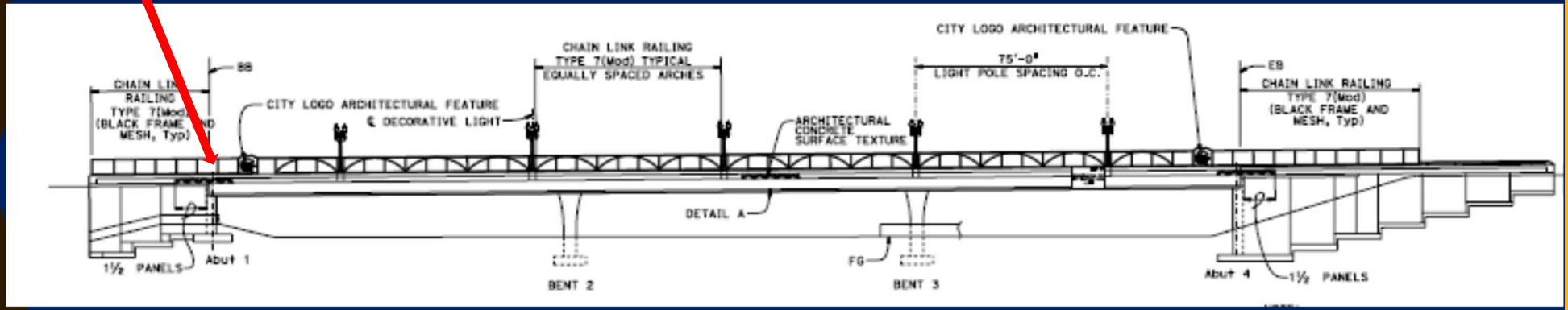


MAINLINE I-215



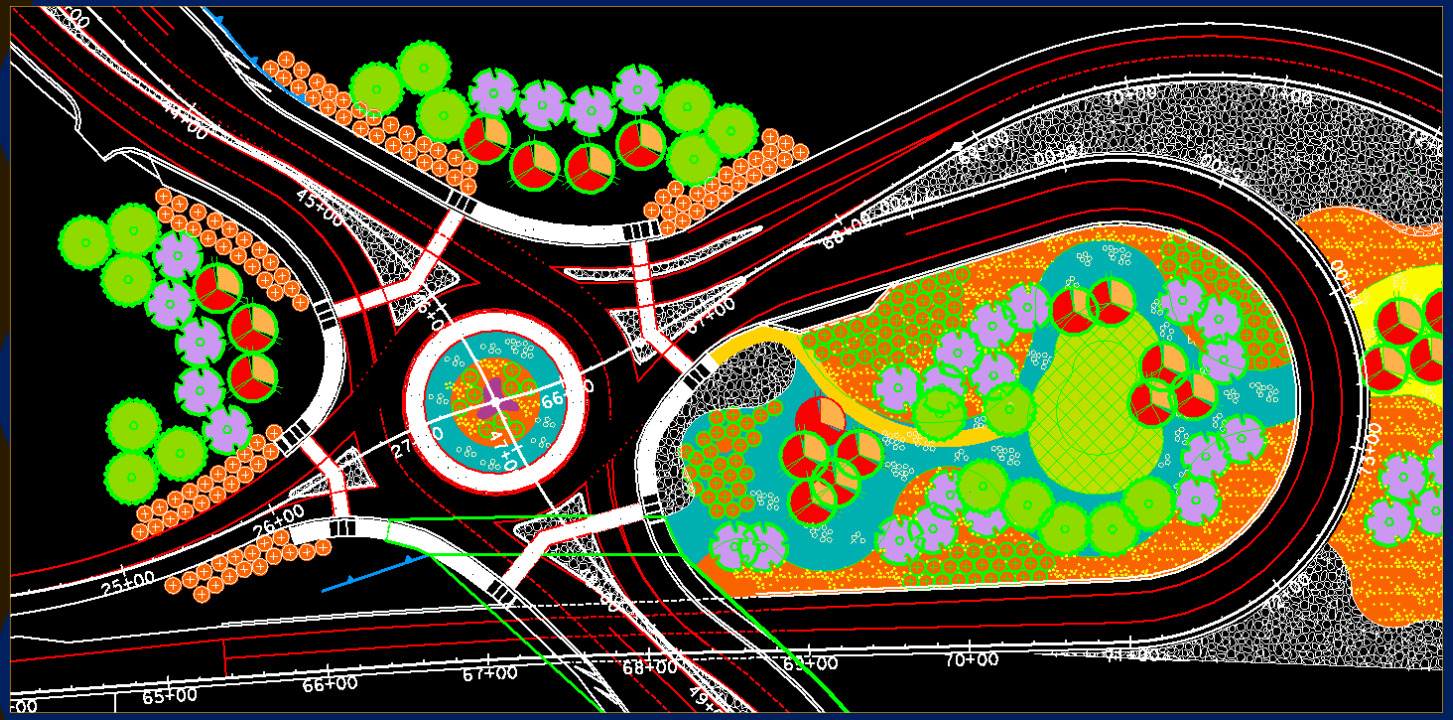


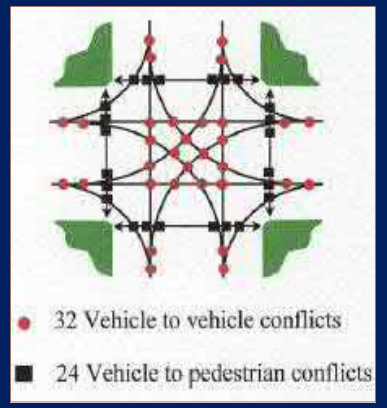


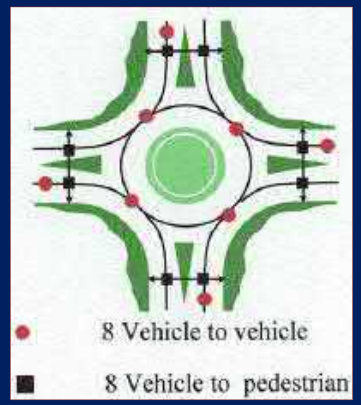


Barton Rd Overcrossing Bridge

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:

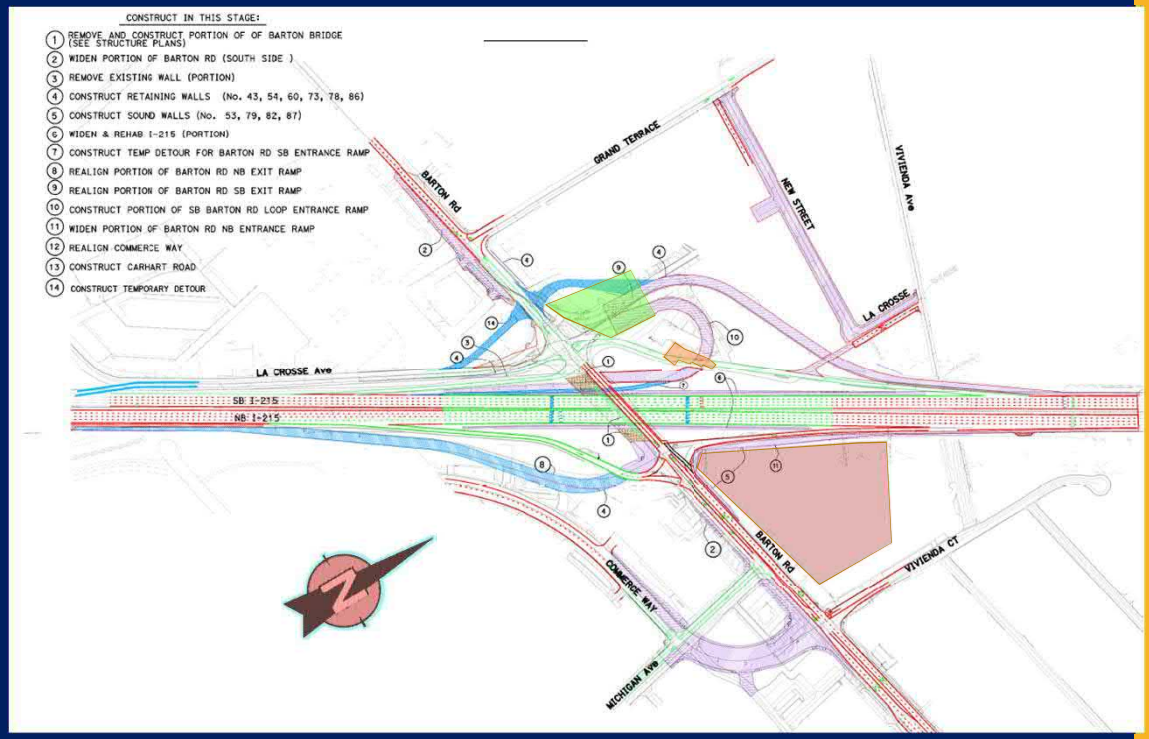
- Limited vertical clearance for falsework
- Existing bridge barely fit 10.5’ lanes to provide enough space to construct bridge footing in median
- Total of 4 stages were anticipated to complete the project

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

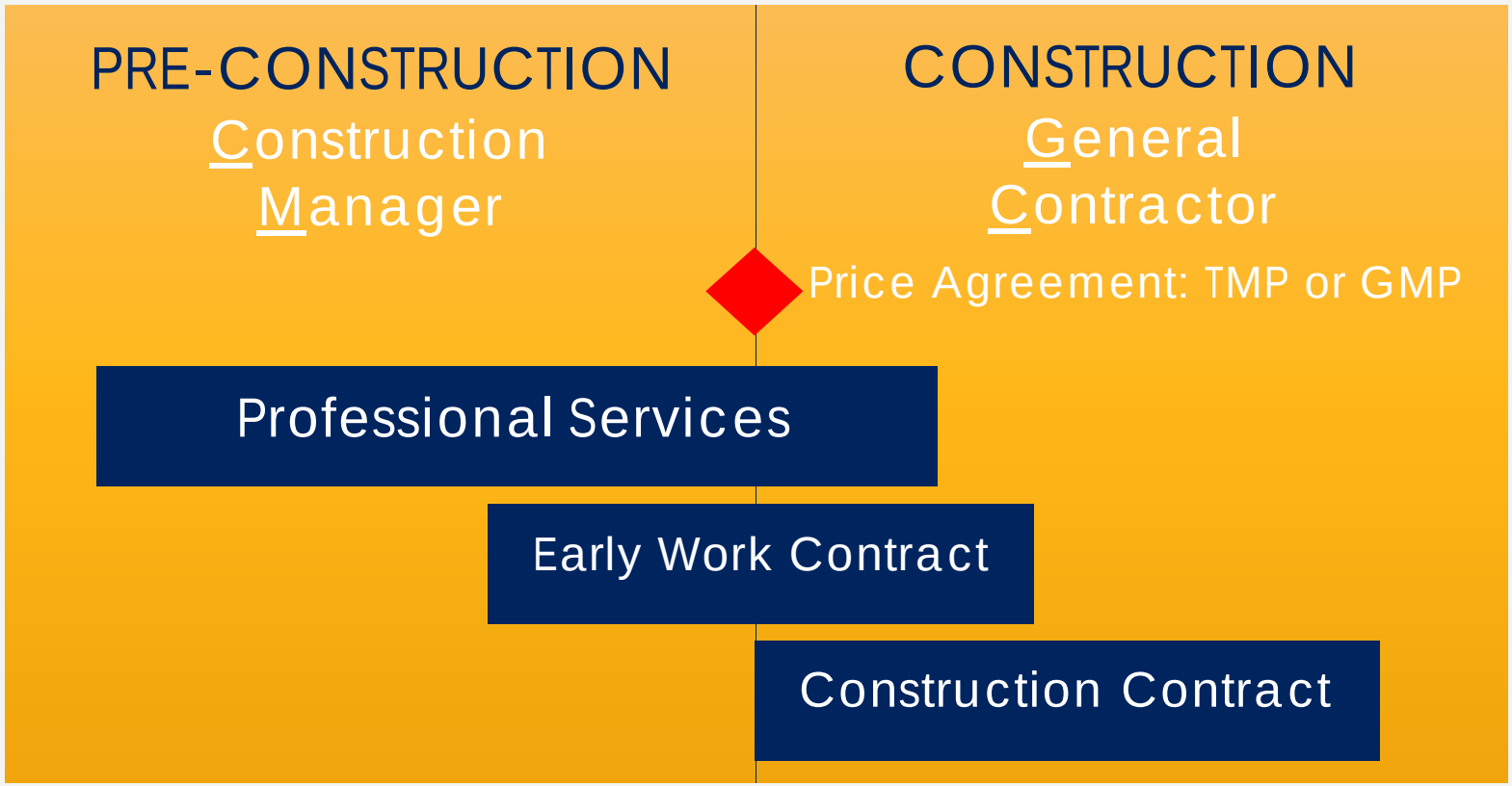
Community Impacts:

- 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

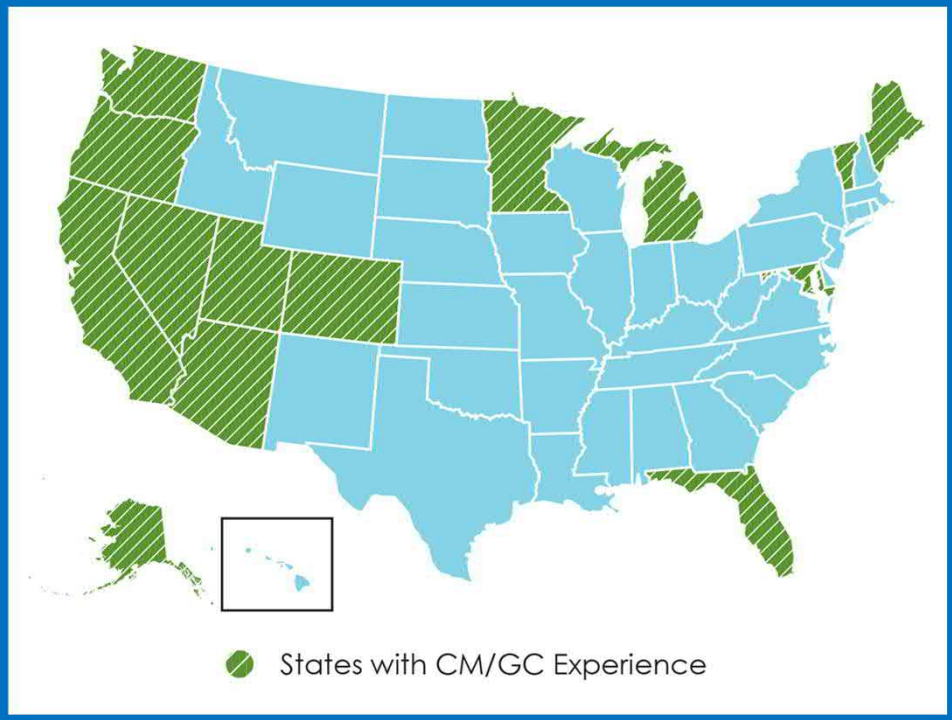


Why do we use CM/GC?

- 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

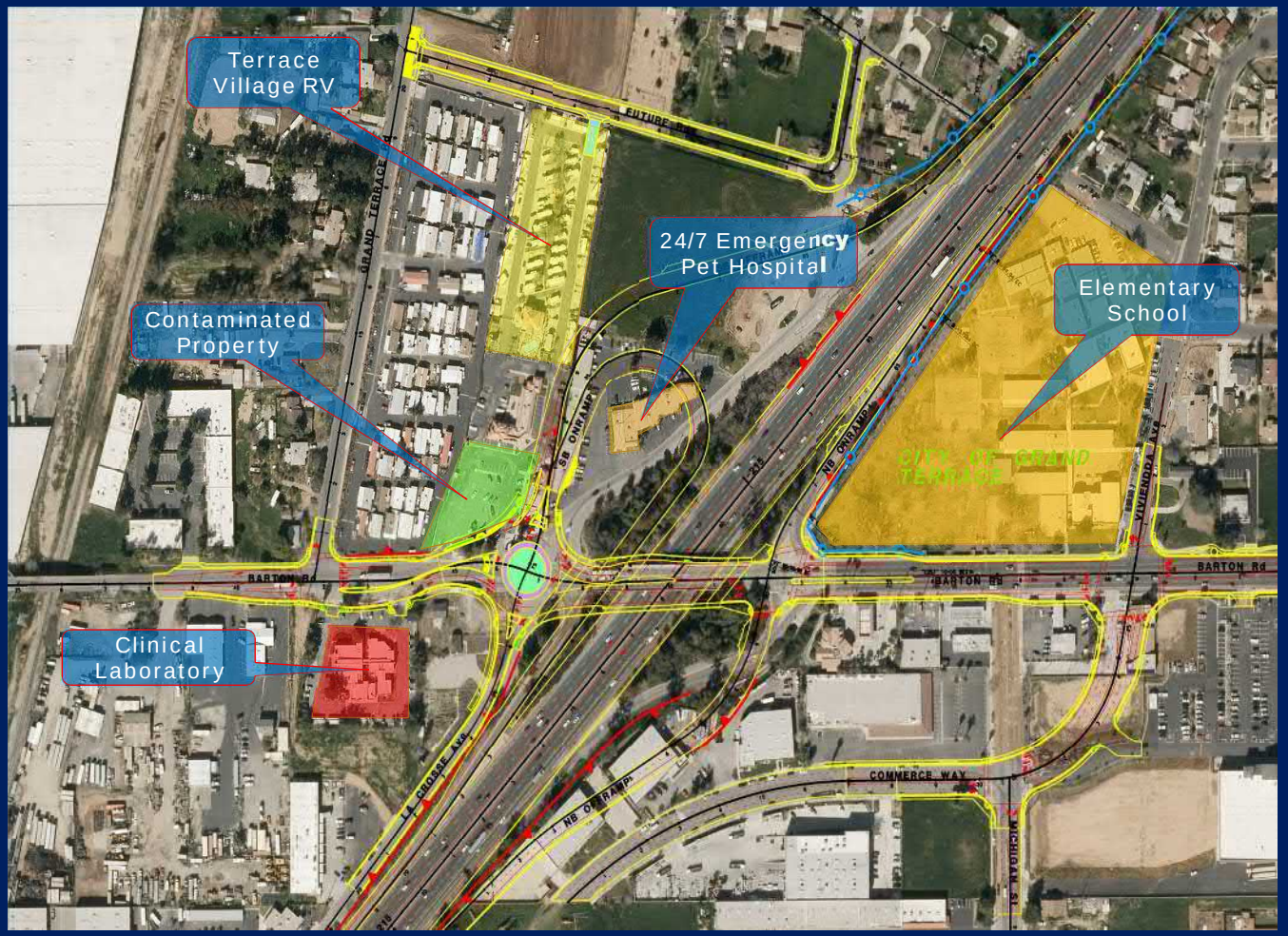


CM/GC Preconstruction Phase

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

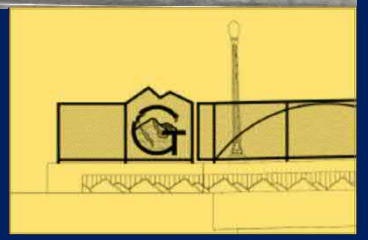


CM/GC Preconstruction Phase

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



ROW Negotiation with School District

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

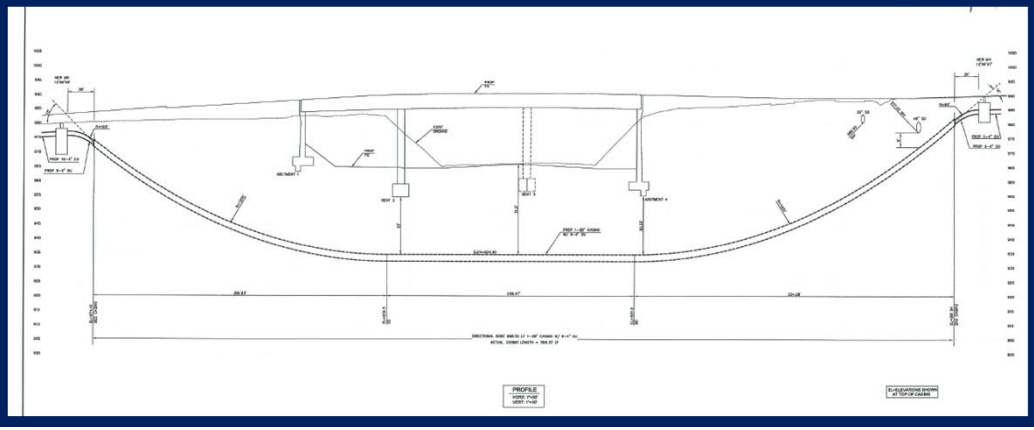
CM/GC Preconstruction Phase

Risk Management : Utility Relocation

Manage risk that can adversely impact schedule and budget:

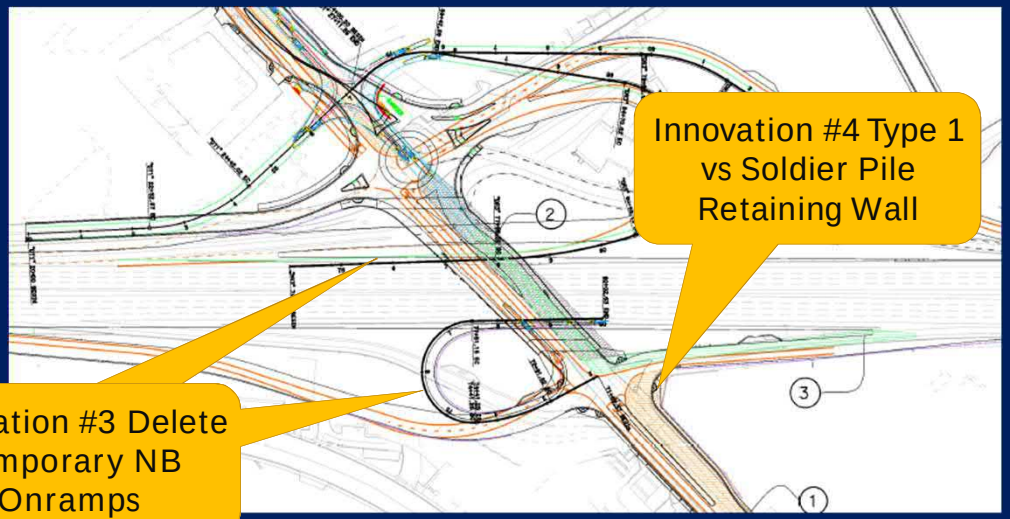
1. Conflict:
   - Two ATT Fiber Optic Cabinets
   - 6 months for splicing and testing

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

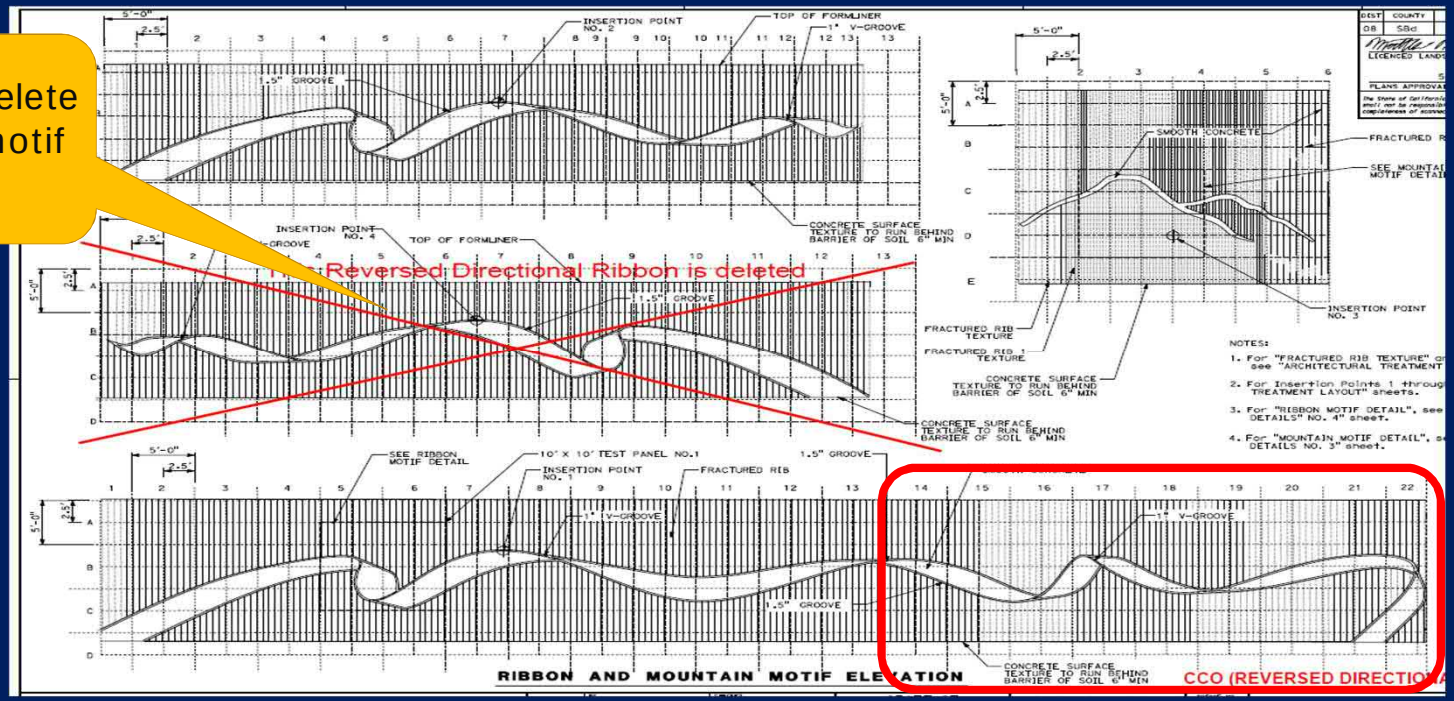


Engineer: "What kind of retaining walls do you prefer for the soil conditions and right of way? What other risks do you see?"

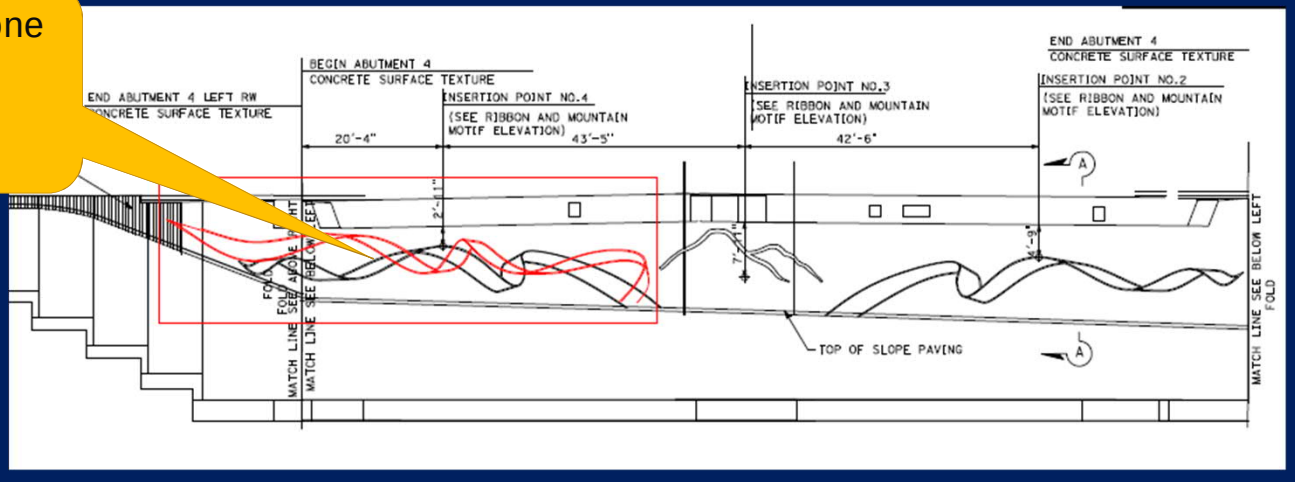
Contractor: "Soldier pile walls are best here. I can save time and money with timber lagging. Let's take this for consideration"

CM/GC Preconstruction
Opportunity for Innovations

Innovation #76 delete left directional motif treatment

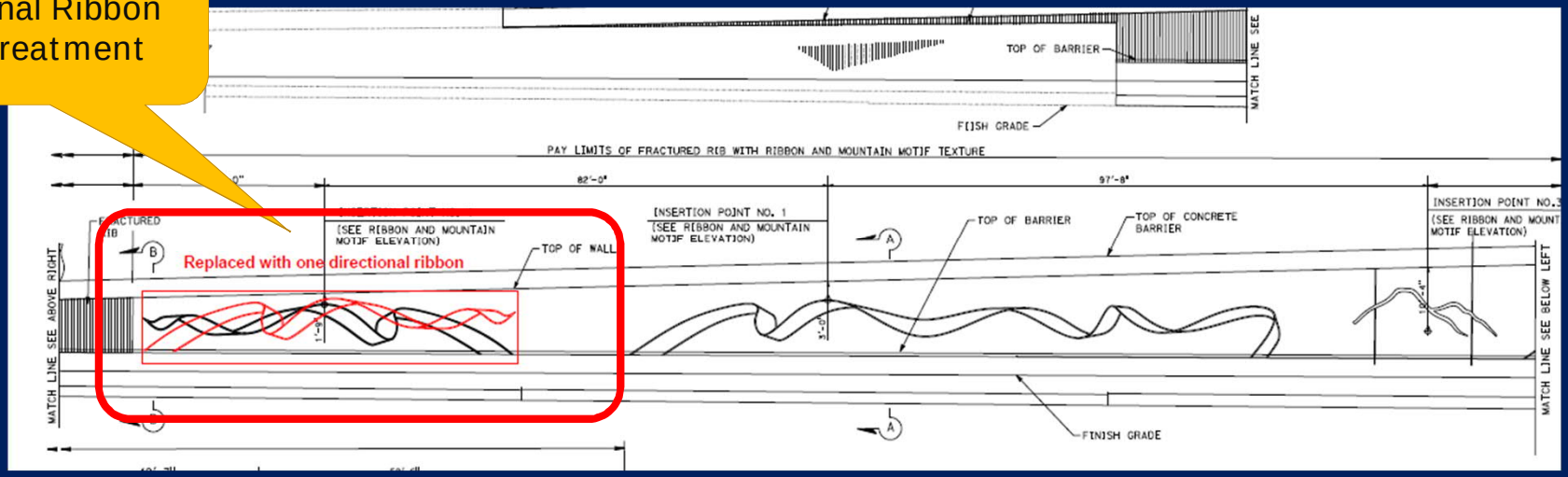


Innovation #76 one directional architectural treatment



CM/GC Preconstruction
Opportunity for Innovations

Innovation #76 one directional Ribbon Motif treatment

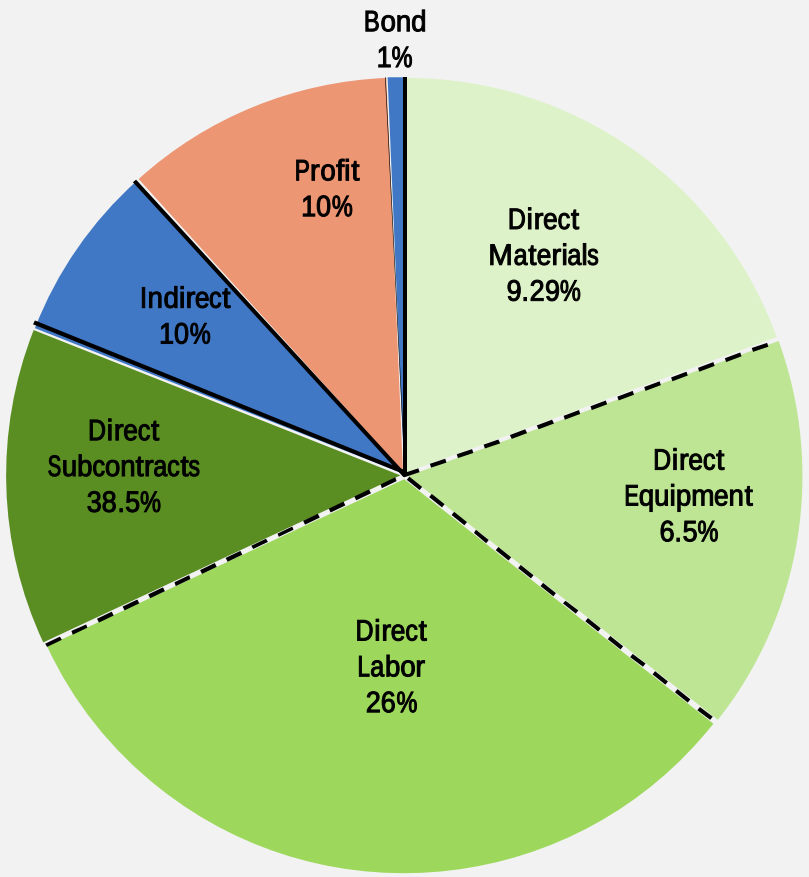


CM/GC Preconstruction
List of Innovations

Innovation	Construction Element	Total	Total	Saving
3	Temp Ramp Detour	$1,082,610	**$580,555**	**$ 502,055**
4	Type 1 vs Soldier Pile RW	$431,385	$369,653	$ 61,732
11	Lane Closure	$720,000	**$504,000**	**$ 216,000**
12	Structural Concrete	$2,873,685	$2,865,520	$ 8,166
14	Retaining Wall with Haunch vs no Haunch	$191,016	$159,180	$ 31,836
17	Expansion and Control Joints	$162,000	$90,000	$ 72,000
19	Stone Mountain Monument	$334,841	**$134,841**	**$ 200,000**
27	Portable Changeable Message Signs	$175,000	$126,000	$ 49,000
32	Hauling Cost vs Dumping Fee	$501,500	**$187,000**	**$ 314,500**
37	Retaining Wall #82 stay in place	$280,858	$260,361	$ 20,497
39	Temporary Fiber Optic (not need)	$690,000	**$0**	**$ 690,000**
40, 50	Street Light (deleted)	$191,888	**$0**	**$ 191,888**
54	Pavers vs JPCP	$117,500	$49,373	$ 68,128
68	Video Detection (SB Stage 1 & 2)	$50,000	$0	$ 50,000
69, 70, 71	Video Detection (NB Stage 1, 2, & 3)	$150,000	**$0**	**$ 150,000**
73	Non-potable Water vs Potable Water	$419,247	**$34,047**	**$ 385,200**
74	Biologist	$220,000	**$0**	**$ 220,000**
75	Reduce local road thickness	$990,270	**$629,155**	**$ 361,114**
76	Architectural Texture -one directiona	$433,095	**$333,036**	**$ 100,059**
			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

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Project Name: I-215 Barton Road Interchange
Preconstruction Services Contract No.: 08-0J07CM
Construction Contract No.: 08-0J0704
Estimate Name: GMP (12/9/2016)

Bid #	Item #	P/F	Item Description	Unit of Measure	Quantities	CMGC	ICE	AGREED
67	180107A		Dust Palliative	SQ YD	178,000	178,000		178,000
68	190101		Roadway Excavation	CY	209,200	222,529	206,662	
69	192003	F	Structure Excavation (Bridge)	CY	6,700	4,967	4,729	5,000
70	192037	F	Structure Excavation (Retaining Wall)	CY	10,900	8,542	9,800	10,000
71	192049	F	Structure Excavation (Soldier Pile Wall)	CY	680	536	822	680
72	193003	F	Structure Backfill (Bridge)	CY	3,390	3,435	5,400	3,500
73	193013	F	Structure Backfill (Retaining Wall)	CY	8,090	7,444	6,361	7,500
74	193029	F	Structure Backfill (Soldier Pile Wall)	CY	160	61	141	160
75	193031	F	Pervious Backfill Material (Retaining Wall)	CY	372	295	111	300
76	193116	F	Concrete Backfill (Soldier Pile Wall)	CY	660	668	643	660
77	193119	F	Lean Concrete Backfill	CY	90	89	119	90

- 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

Cost and Pricing Models: Cost Estimate

Cost models is very importance 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 low cost

Typical Engineer Eestimate

10/25/2016 Contract Cost Data: Search Results

Contract Cost Data

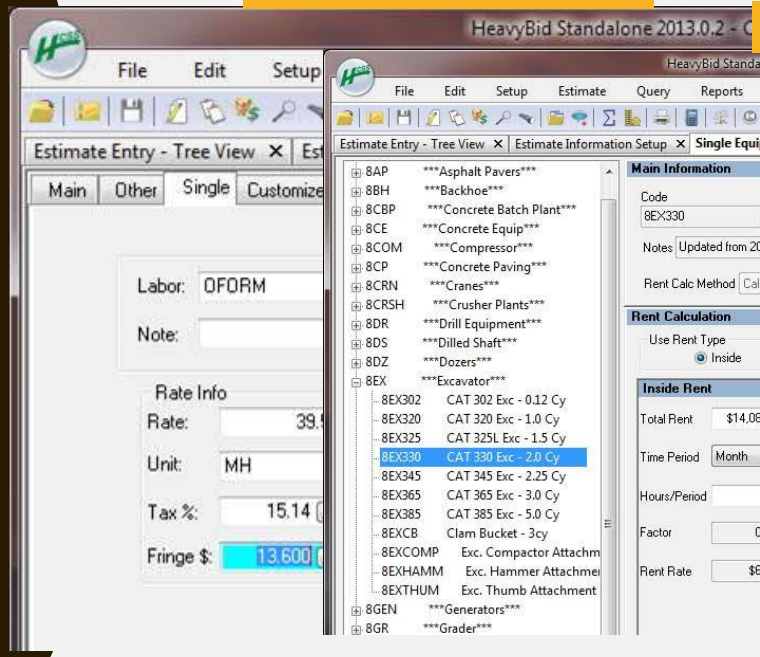
CALIFORNIA DEPARTMENT OF TRANSPORTATION

	Item No. / Description (3)	Unit	Qty	Unit Price	Esc Price	Total	Bid Open Date	Cty	Contract No. (2)	Bid	WD (4)	Total Bid	Eng. Est.	M	TRO
☑	150605 - REMOVE FENCE	LF	9,360	$5.00	$5.90	$46,800.00	06-19-2014	SD	11-257154	1	825	$75,213,841.50	$89,730,954.35	M	TRO
☑	150605 - REMOVE FENCE	LF	9,360	$6.50	$7.67	$60,840.00	06-19-2014	SD	11-257154	2	825	$77,689,053.50	$89,730,954.35	M	TRO
☐	150605 - REMOVE FENCE	LF	9,360	$7.00	$8.26	$65,520.00	06-19-2014	SD	11-257154	3	825	$83,791,370.10	$89,730,954.35	M	TRO
☑	150605 - REMOVE FENCE	LF	1,650	$5.00	$4.92	$8,250.00	01-13-2016	SD	11-414904	1	510	$3,664,645.00	$4,995,778.90	M	TRO
☑	150605 - REMOVE FENCE	LF	1,650	$3.00	$2.95	$4,950.00	01-13-2016	SD	11-414904	2	510	$3,990,559.50	$4,995,778.90	M	TRO
☑	150605 - REMOVE FENCE	LF	1,650	$6.15	$6.05	$10,147.50	01-13-2016	SD	11-414904	3	510	$4,471,100.00	$4,995,778.90	M	TRO
☑	150605 - REMOVE FENCE	LF	8,720	$3.00	$2.95	$26,160.00	02-09-2016	SBD	08-0N5504	1	315	$7,532,522.00	$8,332,653.24	M	TRO
☑	150605 - REMOVE FENCE	LF	8,720	$2.30	$2.26	$20,056.00	02-09-2016	SBD	08-0N5504	2	315	$7,584,950.90	$8,332,653.24	M	TRO
☐	150605 - REMOVE FENCE	LF	8,720	$1.35	$1.33	$11,772.00	02-09-2016	SBD	08-0N5504	3	315	$8,196,196.00	$8,332,653.24	M	TRO
☑	150605 - REMOVE FENCE	LF	3,240	$2.30	$2.30	$7,452.00	08-03-2016	SD	11-295204	1	490	$3,496,193.04	$3,083,308.50	M	
☑	150605 - REMOVE FENCE	LF	3,240	$3.00	$3.00	$9,720.00	08-03-2016	SD	11-295204	2	490	$3,662,028.00	$3,083,308.50	M	
☑	150605 - REMOVE FENCE	LF	3,240	$5.75	$5.75	$18,630.00	08-03-2016	SD	11-295204	3	490	$3,665,000.00	$3,083,308.50	M	

SUMMARY	Unmodified	Escalated		
Average Price/Unit: $	4.20	4.37	Avg No. of Units:	5083
Std Dev. (of Unit Price): ±$	1.55	1.81	Rows Selected:	10
Weighted Avg.: $	4.19	4.54	Rows Returned:	12
Minimum Price/Unit: $	2.29	2.25	<- bordered in green	
Maximum Price/Unit: $	6.50	7.67	<- bordered in red	

Direct Cost – Labor

Direct Cost – Equipment



Indirect Cost – Schedule, Escalation, Contingency

Pricing Milestones: Cost Estimate
ICE vs CM

Caltrans
CALIFORNIA DEPARTMENT OF TRANSPORTATION

Project Name: I-215 Barton Road Interchange Reconstruction
Preconstruction Services Contract No.: 08-0J07CM
Construction Contract No.: 08-0J0704
Estimate Name: GMP (12/9/2016)

17.4 % of major Items making 79.9% of the cost

Partial Plug Items
Full Plug Items

					Hide	Hide	Hide	Hide	Hide			
					CM'S ESTIMATE			ICE'S ESTIMATE				
			Engineer's Quantity		UNIT PRICE	UNIT PRICE W/	TOTAL COST	UNIT PRICE	UNIT PRICE W/	TOTAL COST	CM-ICE	CM/ICE Δ%
Bid No.	Item No.	Description	Units	Quantity	GMP	MARKUP	GMP	GMP	MARKUP	GMP	GMP	GMP
1	070030	Lead Compliance Plan	LS	1	$ 2,000.00	$ 2,240.00	$ 2,000.00	$ 2,020.00	$ 2,222.00	$ 2,020.00	(20.00)	1%
2	080050	Progress schedule (Critical Path Metho	LS	1	$ 30,450.00	$ 34,104.00	$ 30,450.00	$ 18,722.24	$ 20,594.46	$ 18,722.24	11,727.76	39%
3	090105	Time-Related Overhead	WD	550	$ 7,593.54	$ 8,504.76	$ 4,176,444.52	$ 8,351.12	$ 9,186.23	$ 4,593,116.98	(416,672.46)	10%
4	120090	Construction Area Signs	LS	1	$ 100,000.00	$ 112,000.00	$ 100,000.00	$ 25,250.00	$ 27,775.00	$ 25,250.00	74,750.00	75%
5	120100	Traffic Control System	LS	1	$ 771,489.77	$ 864,068.54	$ 771,489.77	$ 744,264.03	$ 818,690.43	$ 744,264.03	27,225.74	4%
6	120116	Type II Barricade	EA	71	$ 75.00	$ 84.00	$ 5,325.00	$ 75.75	$ 83.33	$ 5,378.25	(53.25)	1%
7	120149	Temporary Pavement Marking (Paint)	SQFT	3,620	$ 2.50	$ 2.80	$ 9,050.00	$ 2.53	$ 2.78	$ 9,140.50	(90.50)	1%
8	120159	Temporary Traffic Stripe (Paint)	LF	105,000	$ 0.25	$ 0.28	$ 26,250.00	$ 0.25	$ 0.28	$ 26,512.50	(262.50)	1%
9	120165	Channelizer (Surface Mounted)	EA	431	$ 35.00	$ 39.20	$ 15,085.00	$ 35.35	$ 38.89	$ 15,235.85	(150.85)	1%
10	120200	Flashing Beacon (Portable)	EA	13	$ 650.00	$ 728.00	$ 8,450.00	$ 656.50	$ 722.15	$ 8,534.50	(84.50)	1%
11	121161	Temporary Terminal Section (Type K)	EA	2	$ 1,536.44	$ 1,720.81	$ 3,072.87	$ 1,515.00	$ 1,666.50	$ 3,030.00	42.87	1%
12	128651	Portable Changeable Message Sign	EA	18	$ 15,000.00	$ 16,800.00	$ 270,000.00	$ 12,111.11	$ 13,322.22	$ 218,000.00	52,000.00	19%
13	129000	Temporary Railing (Type K)	LF	29,300	$ 21.75	$ 24.36	$ 637,347.66	$ 24.38	$ 26.81	$ 714,218.48	(76,870.82)	12%
14	129100	Temporary Crash Cushion Module	EA	420	$ 350.00	$ 392.00	$ 147,000.00	$ 242.40	$ 266.64	$ 101,808.00	45,192.00	31%
15	129102A	Temporary Crash Cushion Absorb-350	EA	34	$ 4,500.00	$ 5,040.00	$ 153,000.00	$ 5,795.64	$ 6,375.21	$ 197,051.81	(44,051.81)	29%
16	130100	Job Site Management	LS	1	$ 21,000.00	$ 23,520.00	$ 21,000.00	$ 88,573.05	$ 97,430.36	$ 88,573.05	(67,573.05)	322%
17	130300	Prepare Storm Water Pollution Prevent	LS	1	$ 5,000.00	$ 5,600.00	$ 5,000.00	$ 5,050.00	$ 5,555.00	$ 5,050.00	(50.00)	1%
18	130310	Rain Event Action Plan	EA	44	$ 500.00	$ 560.00	$ 22,000.00	$ 505.00	$ 555.50	$ 22,220.00	(220.00)	1%
19	130320	Storm Water Sampling and Anaylsis Da	EA	31	$ 650.00	$ 728.00	$ 20,150.00	$ 252.50	$ 277.75	$ 7,827.50	12,322.50	61%
20	130330	Storm Water Annual Report	EA	3	$ 2,000.00	$ 2,240.00	$ 6,000.00	$ 2,020.00	$ 2,222.00	$ 6,060.00	(60.00)	1%

Pricing Milestones: Cost Estimate
ICE vs CM
Delta Report

Caltrans
CALIFORNIA DEPARTMENT OF TRANSPORTATION

Project Name: I-215 Barton Road Interchange Reconstruction
Preconstruction Services Contract No.: 08-0J07CM
Construction Contract No.: 08-0J0704
Estimate Name: OPCC # 1

			Engineer's Quantity		CM'S ESTIMATE			
					UNIT PRICE	UNIT PRICE W/	TOTAL PRICE	CM-ICE Δ$
Bid No.	Item Code	Description	Units	Quantity	OPCC # 1	MARKUP	OPCC # 1	OPCC # 1
95	510088(F)	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE N MOD)	CY	255	$ 796.12	$ 916.89	$ 233,807.77	
96	510090(F)	STRUCTURAL CONCRETE, BOX CULVERT	CY	3	$ 4,048.17	$ 4,662.29	$ 13,986.87	
97	510502(F)	MINOR CONCRETE (MINOR STRUCTURE)	CY	86	$ 2,052.79	$ 2,364.20	$ 203,321.42	
98	510524	MINOR CONCRETE (SOUND WALL)	CY	40	$ 453.67	$ 522.50	$ 20,899.83	
99	510526(F)	MINOR CONCRETE (BACKFILL)	CY	4	$ 211.14	$ 243.17	$ 972.68	
100	511066A(F)	ARCHITECTURAL SURFACE (FRACTURED RIB)	SQFT	7,500	$ 28.67	$ 33.02	$ 247,653.04	
101	511067A(F)	ARCHITECTURAL SURFACE (FRACTURED RIB AND RIBBON)	SQFT	1,500	$ 86.28	$ 99.37	$ 149,054.49	
102	511068A(F)	ARCHITECTURAL SURFACE (BI-COUNTY MURAL)	SQFT	8,500	$ 72.28	$ 83.24	$ 707,535.28	
103	511069A(F)	ARCHITECTURAL SURFACE (SPLIT RUNNING BOND)	SQFT	500	$ 36.79	$ 42.37	$ 21,186.14	
104	519100(P)	JOINT SEAL (MR 2")	LF	307	$ 94.43	$ 108.75	$ 33,386.59	
105	520102(F)	BAR REINFORCING STEEL (BRIDGE)	LB	870,000	$ 1.07	$ 1.23	$ 1,069,217.21	
106	520103(F)	BAR REINFORCING STEEL (RETAINING WALL)	LB	340,000	$ 1.10	$ 1.27	$ 430,736.74	
107	520107(F)	BAR REINFORCING STEEL (BOX CULVERT)	LB	1,000	$ 1.50	$ 1.73	$ 1,727.55	
108	560218(F)	FURNISH SIGN STRUCTURE (TRUSS)	LB	154,000	$ 3.50	$ 4.03	$ 620,767.65	
109	560219(F)	INSTALL SIGN STRUCTURE (TRUSS)	LB	154,000	$ 0.35	$ 0.40	$ 62,076.77	
110	560232	FURNISH FORMED PANEL SIGN (ROADSIDE)	SQFT	100	$ 15.00	$ 17.28	$ 1,727.55	
111	560235	FURNISH LAMINATED PANEL SIGN (1"-TYPE B)	SQFT	100	$ 25.00	$ 28.79	$ 2,879.26	
112	560244	FURNISH LAMINATED PANEL SIGN (1"-TYPE A)	SQFT	1,200	$ 15.00	$ 17.28	$ 20,730.65	

- Quantity and Estimate Reconciliation for items >10%

Cost and Pricing Model
Quantities and Estimate

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 sump vs unit price**
   i. **Any risk item can be a cost sharing**
   ii. **Street Sweeping**

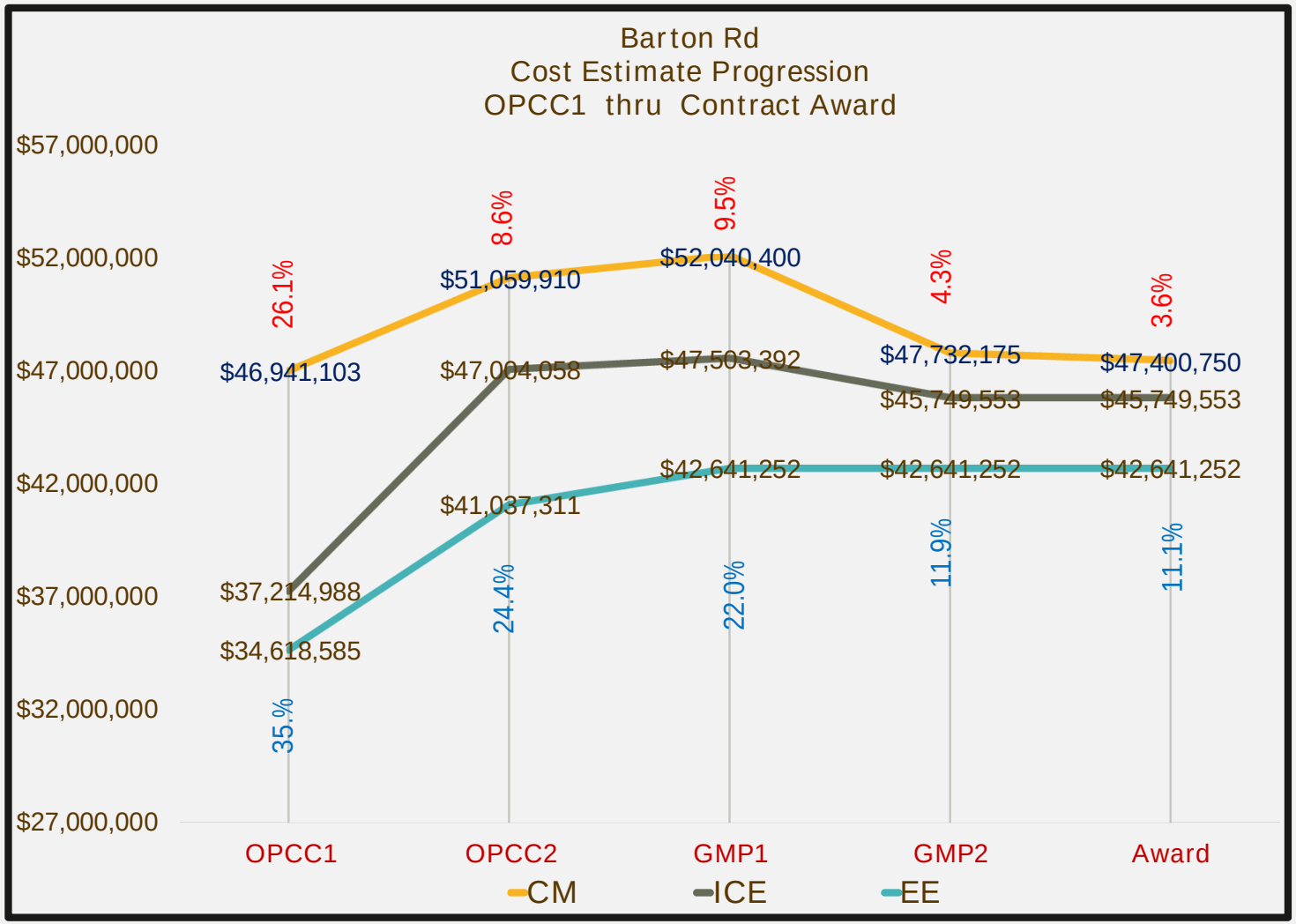
iv. **Bridge Type Selection**
   - **CIP vs Precast**

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



CM/GC Construction Phase

Ground Breaking Ceremony

Caltrans

sbcta San Bernardino County Transportation Authority

CITY OF GRAND TERRACE

MYERS Steve P. Rados, Inc.

MYERS-RADOS, A JOINT VENTURE

I-215/Barton Rd IC Improvement Project

CONSTRUCTION

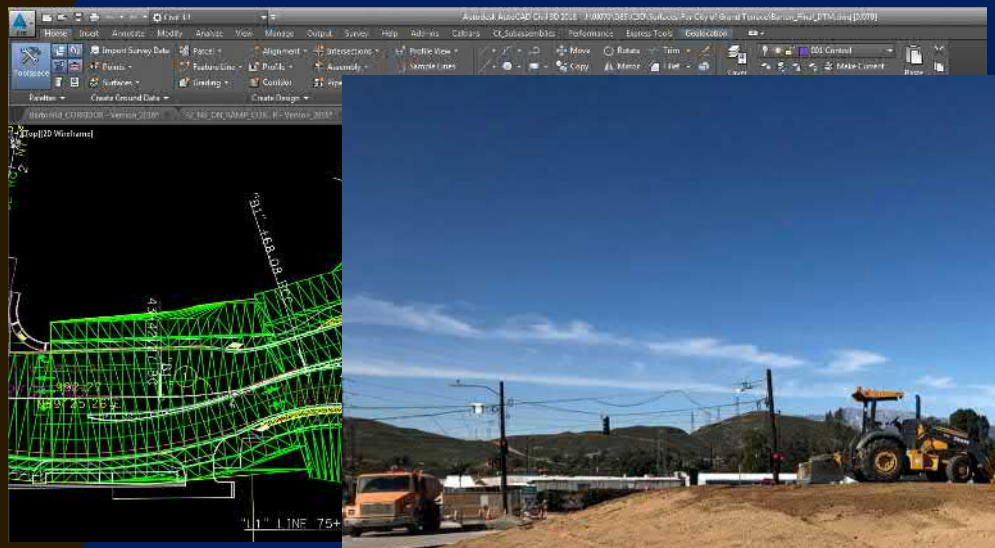

Roadway Excavation

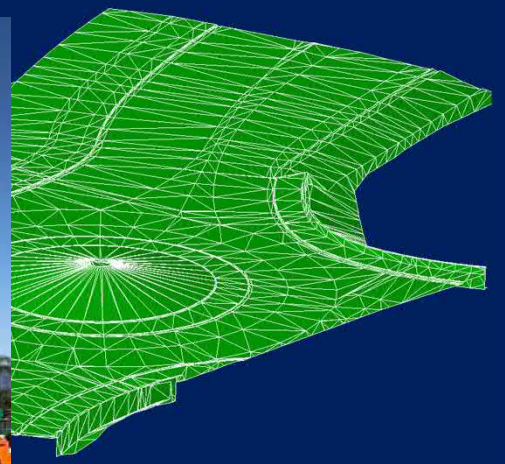

Roadway Excavation


Structure Excavation


Structure Backfill

CM/GC Preconstruction
Challenges during construction





CM/GC Construction Phase

Current Status

- 85% completion

- Completion date is June 9, 2020

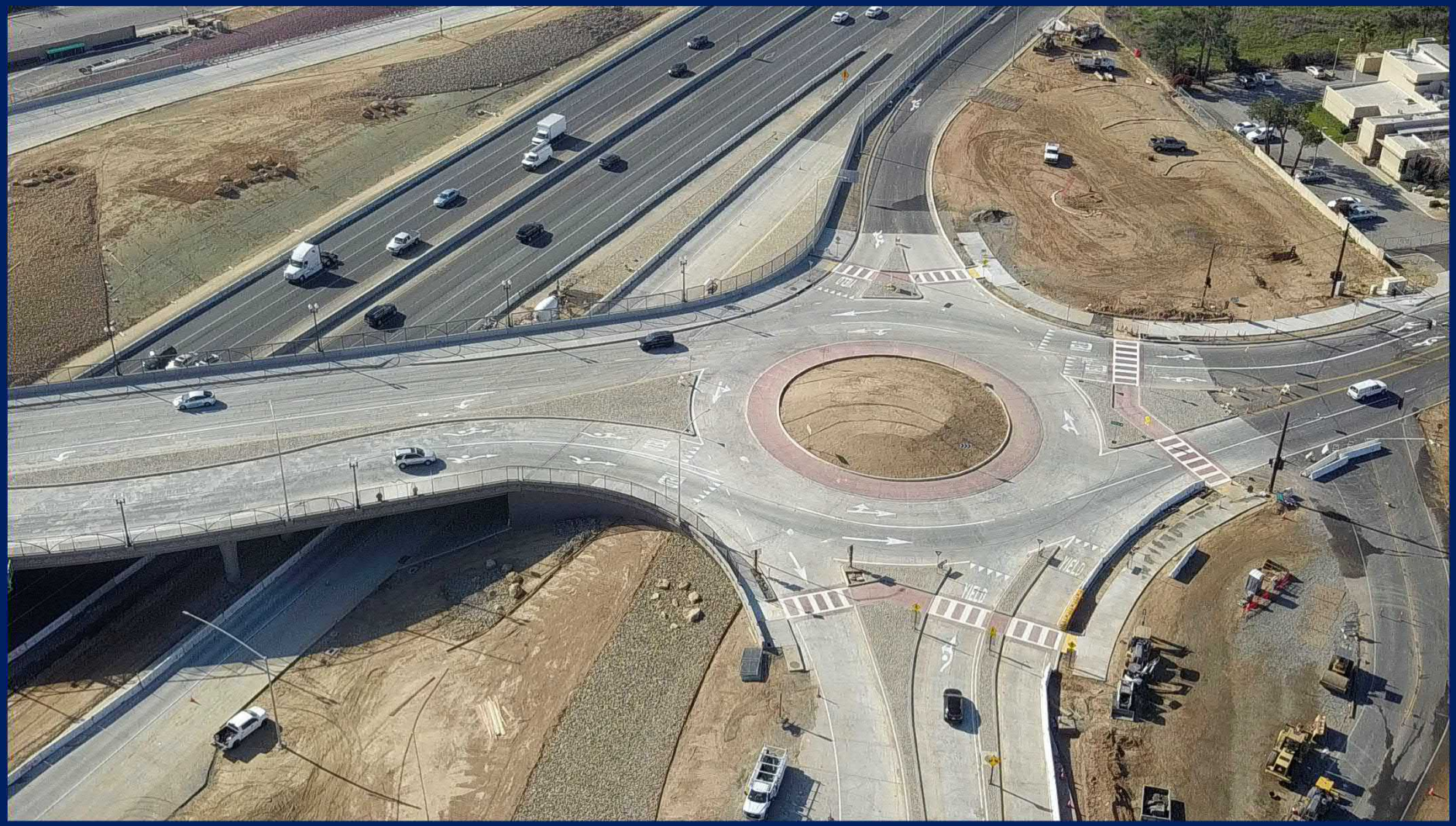
CM/GC Myths

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

CCO#	Description	CCO Amounts
1	Additional Traffic Control	$72,400.00
1	Additional Traffic Control	$40,000.00
2	Federal Apprentice Program	$22,400.00
3	Partnering Resolution Review	$70,000.00
4	Dispute Review Board	$22,500.00
5	Maintain Existing Electrical System	$50,000.00
6	Water Pollution Control Maintenance Sharing	$20,700.00
7	BMMO	$50,000.00
8	Modifications of Wall 14, 15, 54 & 82	($364,294.06)
9	AB219	$381,012.93
10	15% RAP	$124,385.00
11	Export of Surplus Material	$100,000.00
12	Scope Changes and Alternatives	$0.00
13	Adjustment of Item 252	($213,197.00)
14	Miscellaneous Sewer and Drainaige	$100,000.00
15	Wall 60 & 78	$75,000.00
16	Utility	$90,000.00
17	Payment Adjustment for Oil Index Fluctuations	$44,000.00
18	Additional Cost of Terminal Blend	$71,517.67
19	Additional Cost Rapid Set Concrete	$29,775.50
20	Speed Limit Reductions	$45,000.00
	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?