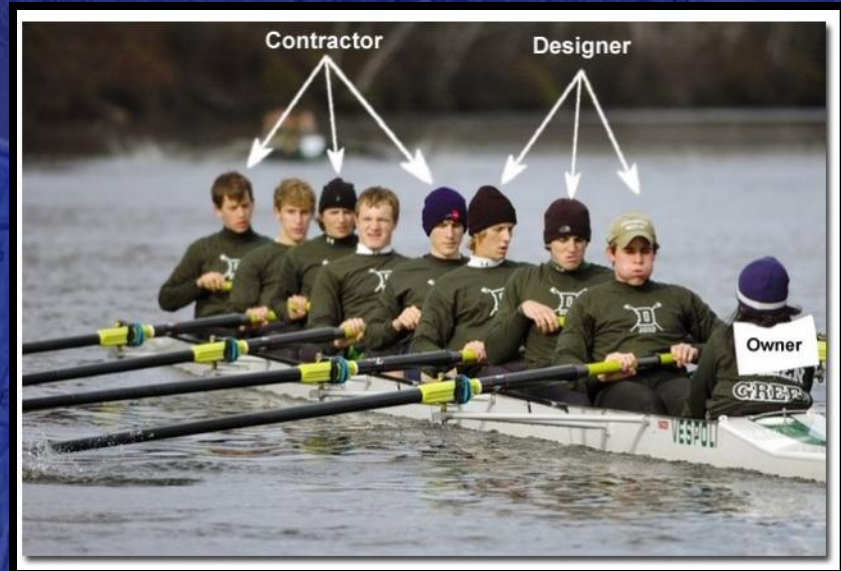
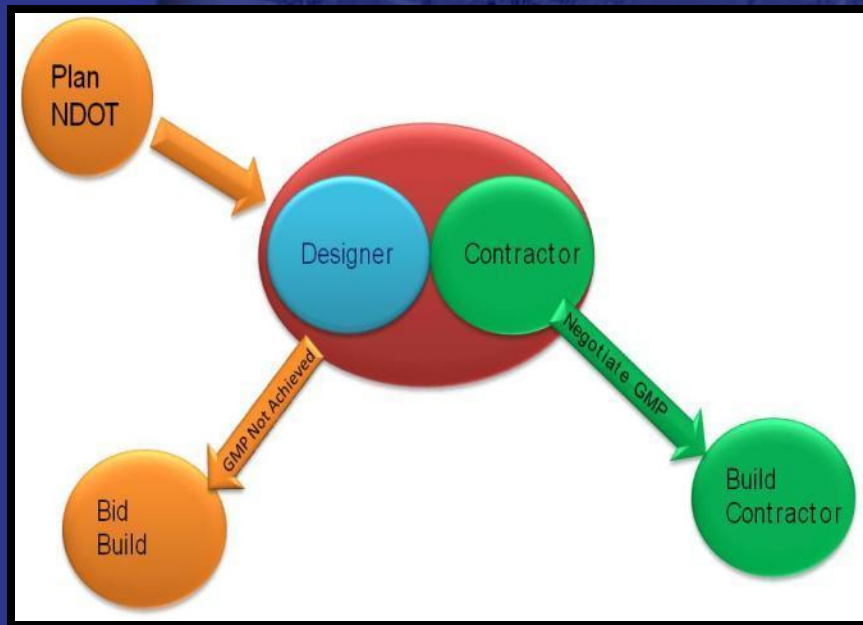


Construction Manager at Risk Project Overview and Performance

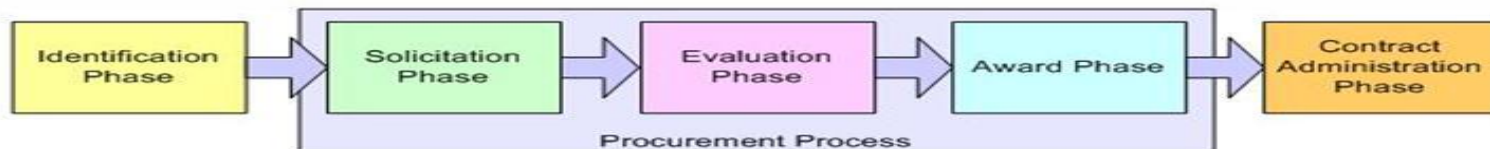
Dale Keller, P.E.
Project Manager
Nevada Department of Transportation

What is CMAR?



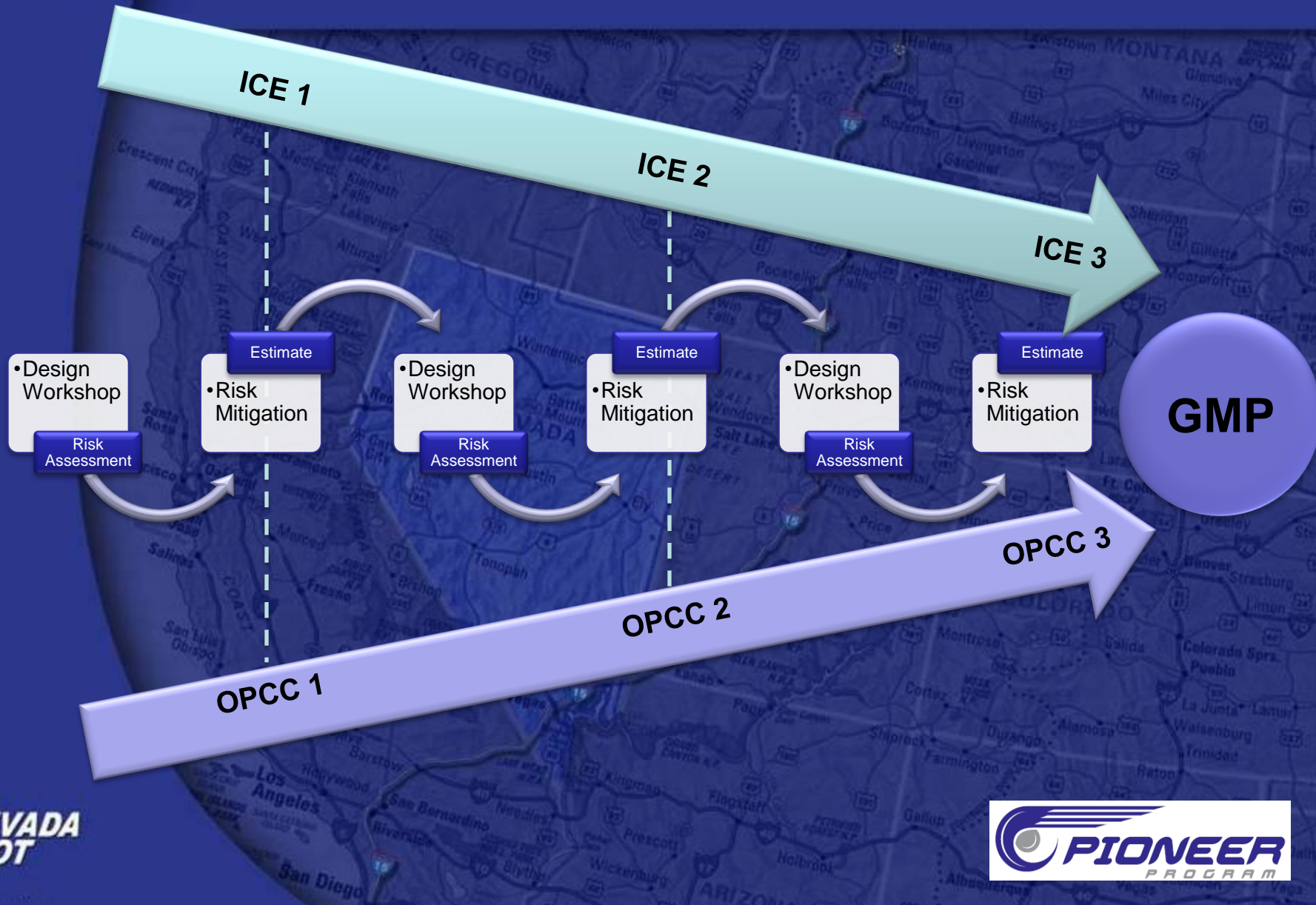
Procurement Strategy

- Solicitation: RFP and Interview
- Evaluation and Selection Process:
 - Qualification Base
 - Best Value (Qualification + Fee)



CMAR Process

Partnering



NDOT's Experience










- *5 Projects*
 - Moana Lane DDI (Reno, NV)
 - Stateline to Stateline Bikeway (Lake Tahoe)
 - I-80 Carlin Tunnels Project (Elko, NV)
 - Kingsbury Grade, SR-207 (Lake Tahoe)
 - Tropicana Escalators (Las Vegas, NV)
- \$1.5 M to \$31 M
- *Other Projects under considerations*

NDOT's Experience

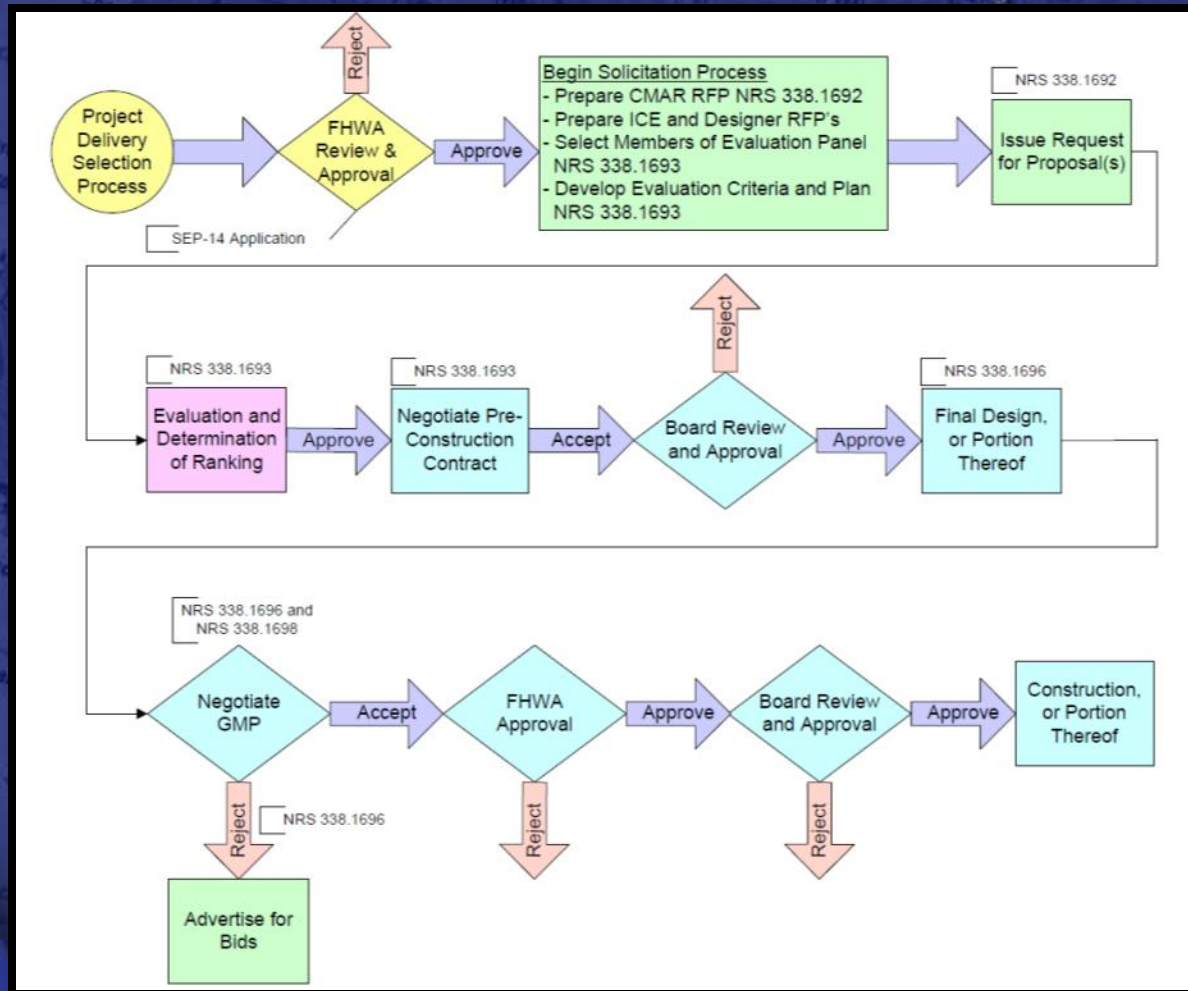


Delivery Method Selection Process

| Criterion | Delivery Method Preference | | |
|--|----------------------------|--------|--------|
| | DBB | DB | CMAR |
| Criterion 1: Cost Impacts | Orange | Yellow | Green |
| Criterion 2: Schedule Impacts | Orange | Green | Yellow |
| Criterion 3: Opportunity to Manage Risk | Orange | Yellow | Green |
| Criterion 4: Complexity of Design and Construction Phasing | Yellow | Orange | Green |
| Criterion 5: Opportunity for Innovation | Orange | Yellow | Green |

| Delivery Method | Potential Advantages | Potential Disadvantages | Preference (Circle One ⁵) |
|-----------------|--|---|---|
| DBB | <ul style="list-style-type: none"> NDOT has more time to develop design solutions. | <ul style="list-style-type: none"> NDOT would not gain constructability value from a contractor until after award, thereby potentially losing the benefit of cost savings. NDOT could experience a limitation for potential innovative constructability concepts. NDOT may incur a higher number of change orders from an inexperienced, low-bid contractor. |    |
| DB | <ul style="list-style-type: none"> NDOT can transfer risk that could be better managed by the contractor, potentially improving constructability and reducing errors and change orders. NDOT gains the benefit of innovative ideas being integrated early in the design process. | <ul style="list-style-type: none"> NDOT has less control of the design and implementation. NDOT may incur unexpected project results due to the difficulty in scoping the unique issues and complexities of a project. |    |
| CMAR | <ul style="list-style-type: none"> NDOT gains the benefit of innovative ideas being integrated early in the design process. NDOT may potentially reduce and mitigate project complexity through design, thereby gaining more certainty to cost, quality, and schedule delivery and construction. | <ul style="list-style-type: none"> NDOT may be in an undesirable negotiating position having to retain the contractor for subsequent construction project phases. |    |

NDOT CMAR Process



I-80 Carlin Tunnels Project



Overview

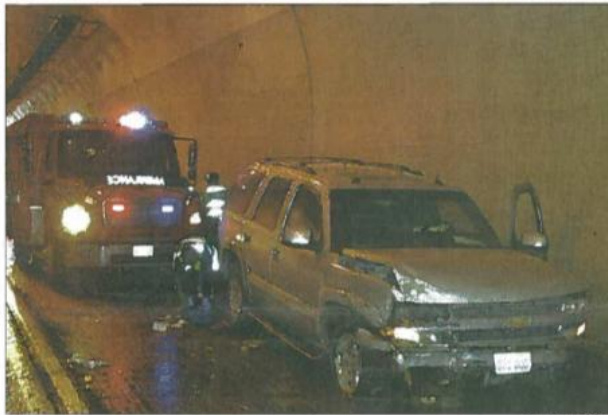


Project Background



Project Background

Crash closes Carlin tunnel



Nevada Highway Patrol

Carlin Fire Rescue crews respond to an accident Wednesday in the eastbound lanes of the Carlin tunnels along Interstate 80.

Second collision caused by ice in past month

By CALEY COOK
Free Press Staff Writer

CARLIN — A one-vehicle crash closed the eastbound lanes of the Carlin tunnels Wednesday morning, backing up traffic for miles, according to Nevada Highway Patrol trooper Jim Stewart.

The NHP reopened the lanes just before noon, after an hour and a half closure.

The Chevy Tahoe involved in the crash hit a patch of ice, collided with the right side of the tunnel and then ricocheted off the left side before coming to rest on its wheels, according to the NHP report.

The driver sustained minor injuries, Stewart said, and was not transported to the hospital.

After a brief period of investigation, NHP pinned the cause of the crash on a strip of ice just before the tunnel entrance.

"There is a slight bump in the road there and when cars hit it, the snow falls off their tops and onto the



Nevada Highway Patrol

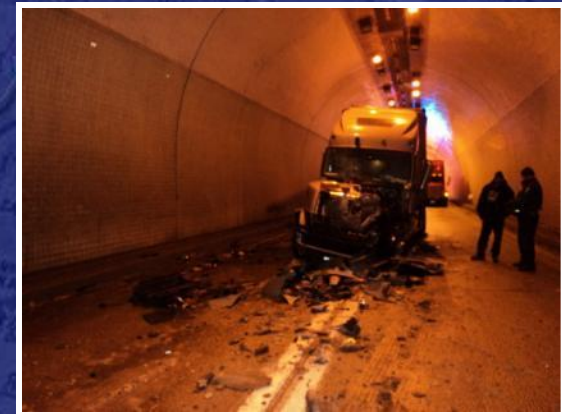
Traffic stops on the eastbound lane of the Carlin tunnels along Interstate 80 as emergency services respond to an accident Wednesday morning.

roadway in this spot," Stewart said. "After cars go over it, it produces a very icy area."

The bump in the road actually isn't a bump at all, said Nevada Department of Transportation District Engineer Kevin Lee.

"It's part of the way the bridge is constructed there before the tunnel," Lee said. "It's just a different surface than other open roads."

See CRASH, A3



Project Background

- *Bike Path and Crossing:*

- Eliminates cyclist crossing I-80
- Prohibits cyclist in the Tunnels
- Wayfaring Signage



Project Goals

- *Successfully coordinate, design, and construct a complex, multi-disciplinary Project*
- *Minimize impacts to traffic while considering sequencing, duration, and limits of roadway and tunnel detours and closures.*
- *Complete the Project with zero (0) environmental compliance incidents or issues.*
- *Maximize the service life of Project improvements by applying innovation in construction materials, means, and methods.*
- *Strive to achieve zero (0) change orders resulting from the Project's Team's failure to identify and manage Project Risks.*

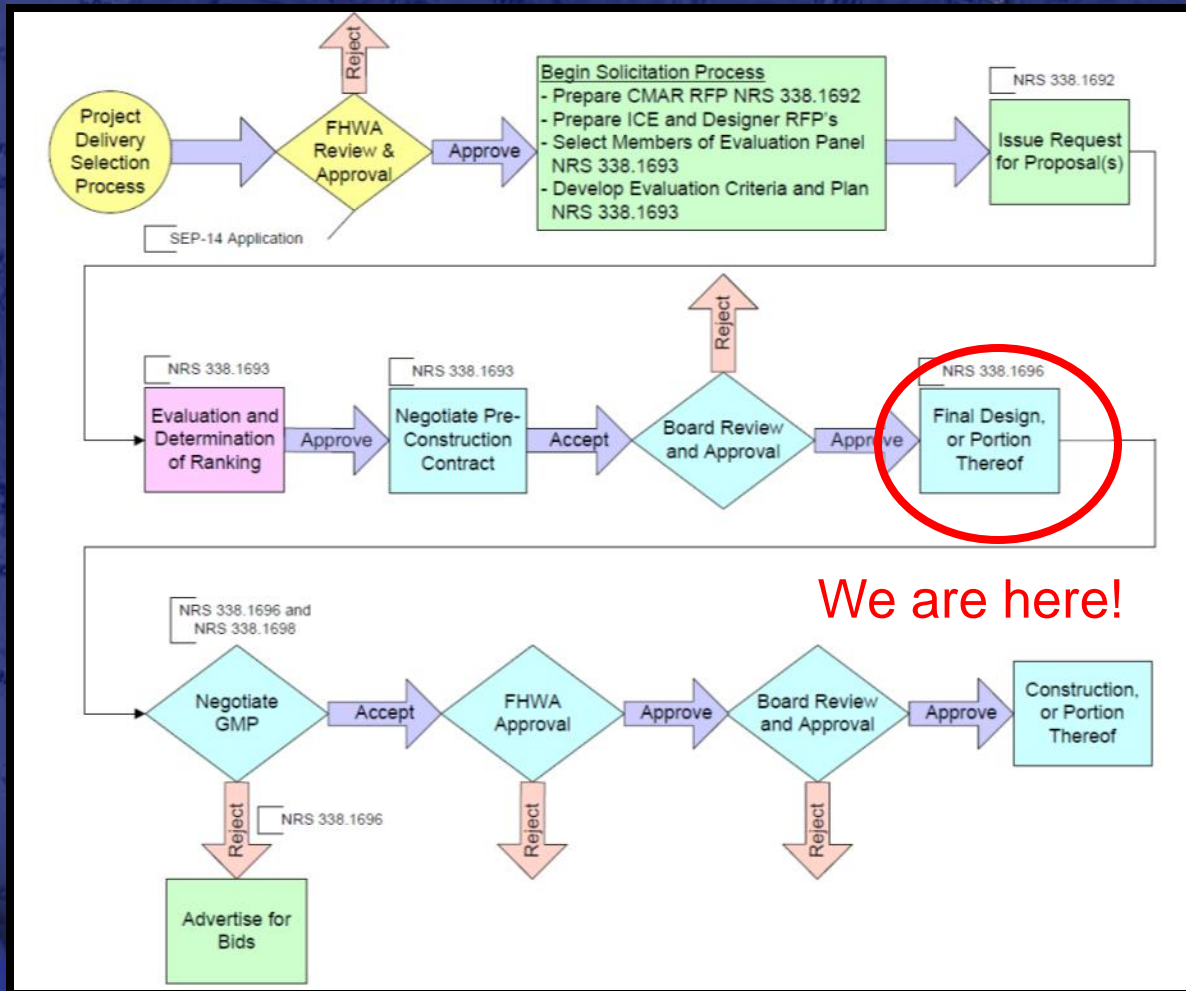
CMAR Procurement

- *A Request for Proposals (RFP) was issued on August 2012*
- *Five (5) Firms Responded:*
 - Granite Construction
 - Las Vegas Paving
 - Q&D Construction
 - Road and Highway Builder
 - W.W. Clyde
- *Proposals were evaluated by a panel of Department staff*

CMAR Procurement

- *Three (3) or the five (5) proposers were short listed based on their qualifications:*
 - Granite Construction
 - Las Vegas Paving
 - Q&D Construction
- *Short listed firms were interviewed:*
 - Team Challenge
- *FHWA issued their concurrence on November 16th*

NDOT CMAR Process



CMAR Final Design

- *Minimize Overall Project Risk*
- *Improve Delivery Schedule*
- *Apply Potential Innovation*
- *Identify Long Lead Items*
- *Perform Early Work*

Risk Events

- *Portal Wall Face Chip/Patch*
- *Slope Scaling*
- *Chemical Wash Required – Tunnels*
- *Tunnel – Cross Drains*
- *Restriping*
- *Repaving of Detour Road (Old US-40)*
- *Luminaires shipment delays*
- *Bridge Deck Repair*
- *Partnering*
- *Fuel / Asphalt Escalation*

Early Work / Long Lead Items

- *Coldmilling and Paving Detour Road (Old US-40)*
- *Build Interstate Crossovers*
- *Purchase Lighting Fixtures*



Guaranteed Maximum Price (GMP) #1

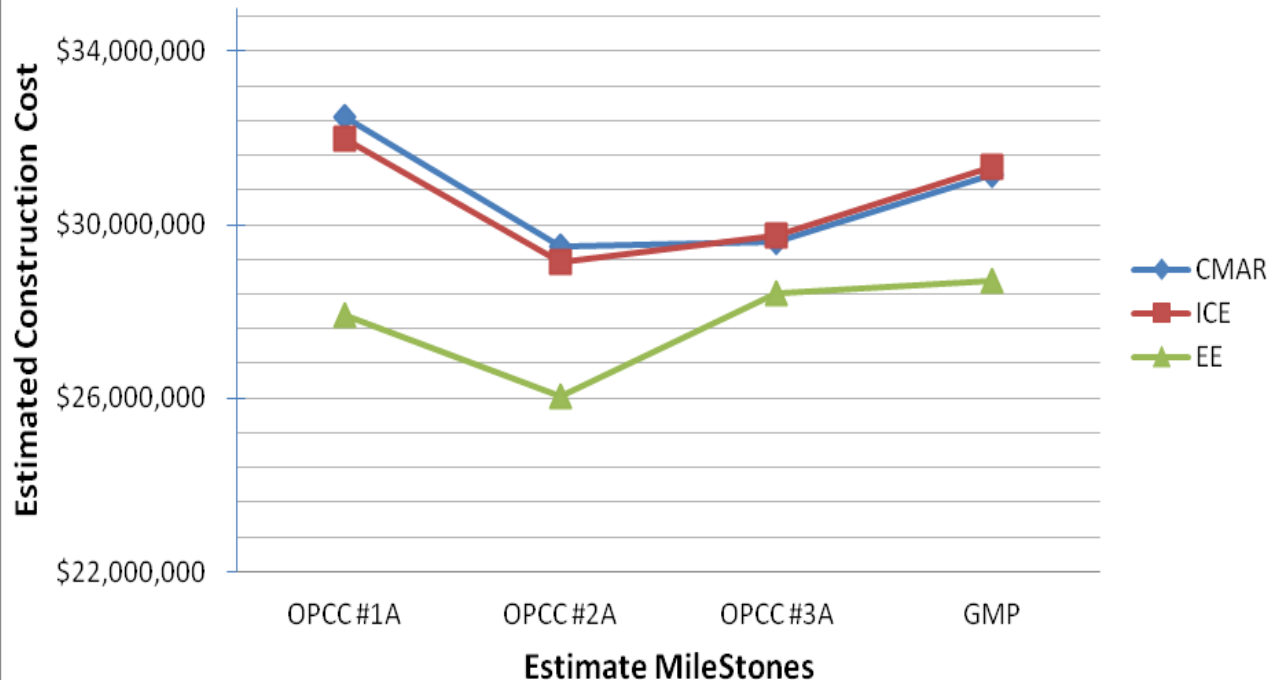
- *Negotiated GMP bid: \$2,818,944*
- *LUMINAIRE, TYPE A / B*
 - *Supplier's Quote*
- *Risk Reserve: \$25,000*

Guaranteed Maximum Price (GMP) #2

- Negotiated GMP #2 bid: **\$28,340,000.13**
- GMP #1: **\$2,818,944.00**
- Total Risk Reserve: **\$625,000**
- Total Construction Cost: **\$31,158,944.13**

Summary of Cost Estimate

Carlin Tunnels CMAR Construction Cost Development

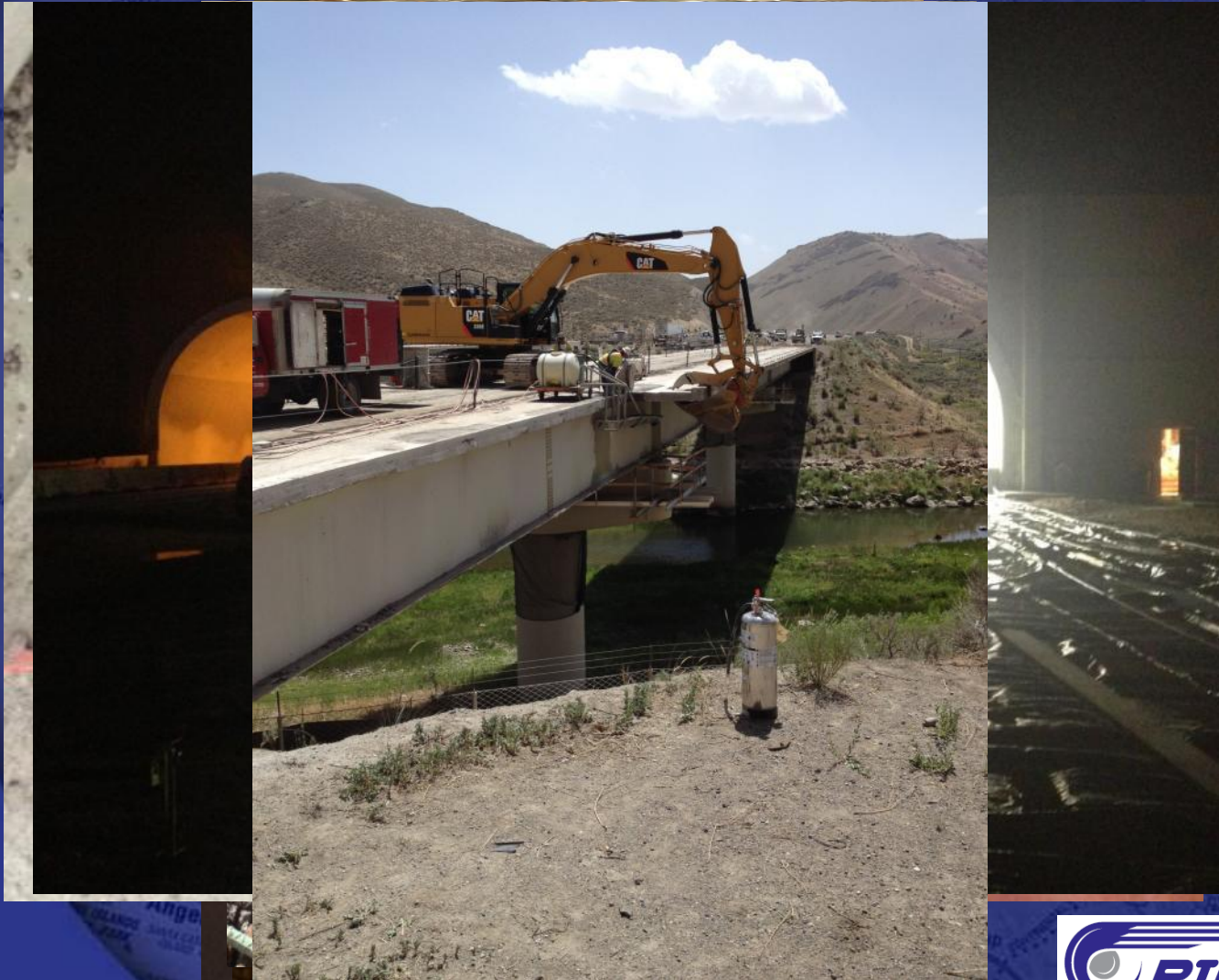


Construction

- Began Construction: **May 2013**
- Complete Construction: ***September 2014***



Design to Construction Challenges



How is NDOT doing?

- *Innovation*
- *Budget*
- *Schedule*
- *Risk*

Program Performance - Innovation

- *Multiple GMPs*
- *More scope with the same budget*
- *Aggressive construction schedule / sequence*
- *More efficient methods*

Program Performance - Innovation

| Project | Construction Cost | Estimated Direct Savings ¹ |
|---|------------------------|---------------------------------------|
| <i>Moana DDI</i> | \$6,978,978.00 | \$1,544,498.00 |
| <i>Tahoe Bike Path</i> | \$1,424,013.00 | \$275,000.00 |
| <i>Carlin Tunnels</i> | \$31,158,944.13 | \$2,790,000.00 |
| Total | \$39,561,935.13 | \$4,609,498.00 |
| Total Savings as Percent of Construction Price | | 11.65% |

1 – Based on proposed innovations and savings recognized during design

Program Performance - Cost

Final Bid Prices

| Final Bid | CMAR Contractor's Bid | Independent Cost Estimate (ICE) | Engineer's Cost Estimate (EE) | % Diff. between Bid/ICE | % Diff between Bid/EE |
|-----------------|-----------------------|---------------------------------|-------------------------------|-------------------------|-----------------------|
| Moana DDI | \$6,978,978.00 | \$6,921,047.31 | \$6,962,832.29 | 0.83% | 0.23% |
| Tahoe Bike Path | \$1,424,013.00 | \$1,470,128.18 | \$1,520,491.14 | -3.24% | -6.78% |
| Carlin Tunnels | \$31,158,944.13 | \$31,276,349.29 | \$28,606,559.54 | -0.38% | 8.19% |

Program Performance - Cost

Additional Preconstruction Cost

| | CMAR Design Fee | ICE Services Fee | Construction Cost | CMAR Fee as % of Const. Cost | ICE Fee as % of Const. Cost |
|----------------------------|----------------------------|-----------------------------|--------------------------|---|--|
| Moana DDI | \$335,160.49 | \$193,100.00 | \$6,978,978.00 | 4.80% | 2.77% |
| Tahoe Bike Path | \$97,457.91 | \$120,704.70 | \$1,424,013.00 | 6.84% | 8.48% |
| Carlin Tunnels | \$265,500.00 | \$271,700.00 | \$31,158,944.13 | 0.85% | 0.87% |
| Total | \$698,118.40 | \$585,504.70 | \$39,561,935.13 | 1.76% | 1.48% |

Program Performance - Schedule

- Contractor's input improved the schedule by identifying multiple shifts, increased production rates, etc. This resulted in reducing overall construction duration.

Program Performance - Risk

| Projects | Construction Cost | Risk Reserve | | Risk Reserve % | | DBB Contingency ¹ |
|-----------------|-------------------|--------------|--------------|----------------|---------|------------------------------|
| | | Proposed | Applied | Proposed | Applied | |
| Moana DDI | \$6,978,978.00 | \$280,000.00 | \$227,230.52 | 4.01% | 3.26% | 5.00% |
| Tahoe Bike Path | \$1,424,013.00 | \$66,000 | TBD | 4.63% | TBD | 7.00% |
| Carlin Tunnels | \$31,158,944.13 | \$630,000 | TBD | 2.02% | TBD | 3.00% |
| Average | \$39,561,935.13 | \$976,000.00 | \$227,230.52 | 2.47% | TBD | |

1 – NDOT Project Estimation Manual, Oct. 2012

Lessons Learned

- *Communicate Project goals and evaluation criteria*
- *Evaluation and Selection: multi-disciplinary team; E&S plan; orientation/training*
- *Ensure industry support (Allow industry/FHWA to observe)*
- *Known, fair, and followed!*

Questions?

