

**STATE OF NEVADA**  
**DEPARTMENT OF TRANSPORTATION**

**Construction Manager at Risk  
Program Report**



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## 1.0 PURPOSE AND INTRODUCTION

The purpose of the Construction Manager at Risk (CMAR) Program Report (Report) is to document progress made on the Nevada Department of Transportation's (Department) CMAR Program. Covering CMAR Program activity from September 2011 through December 2012, this Report provides an overview of the Program and a summary of Department's CMAR projects. This Report also presents the required information pursuant to Section 4.2 of the Department's Special Experimental Project Number 14 (SEP-14) approved work plan.

## 2.0 PROGRAM OVERVIEW

In the spring of 2008, the Nevada Transportation Board of Directors (Board) passed a series of resolutions supporting the Department's Pioneer Program as a means to identify, encourage, and implement alternative financing and delivery for Department projects. The Pioneer Program Guidelines were prepared to outline relevant Department policies and procedures for alternative project delivery methods. The CMAR delivery method was one of the alternative delivery method considered for inclusion in these guidelines. The 2011 Legislative Session incorporated amendments to the existing local public works CMAR provisions in Nevada Revised Statutes (NRS) Chapter 338. These amendments authorized the Department to use the CMAR delivery method until June 30, 2013 (CMAR Sunset).

Based on the Board's approval, the Department and the Federal Highway Administration (FHWA) developed a SEP-14 application and work plan to use the CMAR delivery method for transportation projects prior to this CMAR Sunset. This SEP-14 work plan was also consistent with the following statutes and regulations:

- Title 23, United States Code (USC) 112;
- Title 23, USC 502;
- 23 Code of Federal Regulations (CFR) 635.413 (guaranty and warranty clauses);
- 23 CFR 636 (design-build contracting);
- NRS Chapter 338; and
- NRS Chapter 408.

On September 16, 2011, FHWA approved the Department's SEP-14 application, and the Board approved the Department's use of the CMAR delivery method on December 12, 2011.

Within the last year, the Department has drafted various CMAR solicitation and contracting documents for use in executing CMAR projects. Additionally, the Department has analyzed CMAR (or Construction Manager/General Contractor [CMGC]) best practices used by other states and various Nevada local agencies regarding industry outreach, project selection, project solicitation, CMAR evaluation and selection, negotiations, and pre-construction and construction approaches. The Department has also documented lessons learned during the past year, which are discussed in Section 5 and included as Attachment A and B.

With the signing into law of the Moving Ahead with Progress for the 21<sup>st</sup> Century Act (MAP-21) on July 6, 2012, the use of the CMAR delivery method for federally-funded projects no longer requires separate approval of programmatic or project-level SEP-14 applications. However, as the federal rulemaking process evolves, it is anticipated that CMAR annual reports will continue to be valuable for rulemaking and for other public agencies considering the CMAR delivery method.

## **3.0 PROGRAM ELEMENTS**

### **3.1 GUIDING PRINCIPLES**

The Department's CMAR Program was developed with the following guiding principles in mind.

- The Department has authority to enter into CMAR contracts under NRS Chapter 338.
- Those statutes are generally consistent with other statutes across the country.
- All general contractor proposers must be treated equally and fairly under the process.
- The procurement, evaluation, and selection processes are designed to ensure that the Department receives the most qualified CMAR contractor.
- The procurement process requires confidentiality. CMAR proposers do not want their creativity, costs, and approach to be made known to other proposers.
- Confidentiality also serves the public interest of maximizing competition so that the State of Nevada procures the most qualified CMAR contractor.
- The NRS Chapter 338 prescribes the process for proposal evaluation.
- Proposals are evaluated by experienced teams of Department staff and consultants. These teams may also be supplemented by representatives of local public agencies and construction industry representatives (subject to execution of appropriate confidentiality agreements).
- The award of pre-construction and construction phase contracts to the selected CMAR contractor is made public by the Department through a Board action.

### **3.2 PROJECT SELECTION**

A joint Department/FHWA selection process was used to determine which projects would move forward for CMAR delivery. Project selection followed a five-step process that included a Department project delivery selection committee recommendation, project screening, project evaluation, a Department recommendation, and FHWA approval.

The Department, in cooperation with FHWA, developed a tool for selecting the preferred project delivery method. This tool, the Project Delivery Selection Approach (PDSA), is attached as Attachment C. The Department and FHWA have used the PDSA to evaluate the following projects over the last year.

- Moana Interchange Improvements Project (advanced for CMAR delivery)
- I-15 Project Neon Demolitions
- US 95 NW Phase 3
- SR 593 Tropicana Avenue (Dean Martin Drive to Boulder Highway)
- Nevada Stateline to Stateline Bikeway Phase 1C (advanced for CMAR delivery)
- Carlin Tunnels (advanced for CMAR delivery)
- I-15 at F Street Grade Separation

Of these seven projects, the three that have been advanced beyond this initial step are detailed further in Section 4.

Many characteristics were considered in determining whether the CMAR delivery method adds value to a project. The Department considered:

- Benefits from accelerated completion,
- Complexity of construction,
- Benefits from CMAR contractor innovation or creativity,
- Status of the design phase (early CMAR contractor input on early design may be beneficial to the project), and
- Benefits from earlier cost certainty through a guaranteed maximum price (GMP).

In light of the CMAR Sunset, the Department and FHWA used the PDSA to select projects for CMAR delivery in successive rounds over a two-year period. The first round of project selections was finalized in December 2011, and a second round was completed in May 2012. If the CMAR Sunset is lifted and/or extended in 2013, the CMAR work plan will include a third round of project selection in July 2013.

### 3.3 SOLICITATION AND PROCUREMENT

Numerous activities must be accomplished to procure a CMAR contractor, which include:

- The preparation of a Request for Proposal (RFP) for the CMAR contractor, the Independent Cost Estimator (ICE), and the designer (if the Department requires consultant design support);
- The selection of Evaluation Panel members;
- The development of the evaluation criteria and an evaluation and selection plan for the RFP (proposal and interview);
- CMAR proposal reviews (pass/fail, scoring, and shortlisting);
- CMAR interviews, scoring, and final selection;
- The development of a draft CMAR Pre-Construction Services Agreement;
- Negotiation of a GMP; and
- The development of a draft CMAR Construction Contract.

An RFP, including the qualifications and any fee criterion by which proposals and interviews are evaluated, is prepared and issued to general contractors as required by NRS Chapter 338. This NRS allows for both qualifications and fee to be considered in selection of a CMAR.

The fee that may be considered during the interview portion of selection is the amount of the CMAR contractor's compensation to manage the project's pre-construction and construction phases. This fee may have a value of up to 20 percent of the total interview evaluation score. The Department has defined fee to represent the home office overhead plus profit of the CMAR contractor (as a percentage of the cost of the work inclusive of direct and indirect project costs). This approach is consistent with other Nevada public agency interpretations of how to manage fee in the construction phase. As discussed in Section 4, the Department has used both *qualifications only* and *qualifications+fee* approaches when selecting a CMAR contractor for the three advanced projects. Furthermore, the Department has elected to consider only the fee to manage the construction phase, as it prefers to negotiate the pre-construction services fee for a defined scope directly with the selected CMAR contractor after selection. The Department has required that the construction phase fee be provided with the proposal submittal in a separately sealed envelope to be evaluated separately following interview scoring.

The Department conducts interviews as required by NRS Chapter 338 to make the final CMAR contractor selection. Proposer scores from the proposal (shortlist evaluation process) do not carry over to the interview (final evaluation). This is consistent with the NRS, which requires a separate ranking process to

be used for final versus shortlisted selection. The Department may also issue a Request for Letters of Interest to solicit general contractor interest in advance of RFP issuance.

Following an initial Pass/Fail evaluation by the Department, a seven member Evaluation Panel, composed of Department staff and local public agency representatives (if appropriate), evaluates, scores, and ranks proposals consistent with the criteria included in the RFP and as required by NRS. This Evaluation Panel must include a minimum of three evaluators, two of whom must possess construction experience. For projects that do not include federal funding, five points (or 5 percent of the total evaluation score) are added to eligible proposer scores consistent with the bidder's preference requirements of the NRS.

A Procurement Administration Team (PAT), composed of representatives of the Department's Administrative Services, Project Management divisions, and the Attorney General's Office, conducts the Pass/Fail evaluation and oversees the entire evaluation process to ensure compliance with NRS requirements. Additional observers are permitted to observe the procurement process, including proposal evaluation, interviews, Evaluation Panel deliberations, and recommendation meetings with the Department's Director or representative. Invited observers have included FHWA staff and construction industry representatives that did not have conflicts of interest and had fully executed confidentiality agreements.

The Department employs an adjectival and numerical scoring approach that includes individual and consensus scoring. Each proposal is reviewed and fully scored prior to the review of a subsequent proposal. Proposals are reviewed and evaluated individually by each Evaluation Panel member, who then assigns an adjectival score (i.e., Excellent, Good, Acceptable, Marginal, and Unacceptable) for each evaluation criterion stated in the RFP. Preference is given to responses that advance the goals of the specific project as stated in the RFP. Following individual adjectival scoring, all Evaluation Panel members openly discuss the strengths and weaknesses of each proposal with respect to each criterion. The PAT documents the consensus strengths and weaknesses discussed by the Evaluation Panel, which is also shared with each proposer via debriefs. The Evaluation Panel then assigns a final adjectival score to each criterion by consensus. Following assignment of a consensus adjectival score, the Evaluation Panel assigns a final numerical score to each criterion by consensus in accordance with numerical ranges established by the PAT for each adjectival score.

Following the final scoring and ranking of proposals and the approval of a ranked shortlist of proposers within the competitive range by the Department's Director or representative, shortlisted proposers are notified and invited to an interview as described in the RFP and pursuant to the NRS. No less than two and no more than five proposers may be shortlisted per NRS requirements.

The interview process includes a presentation component, a question and answer session, and a team challenge. The team challenge presents each shortlisted proposer with a problem statement in written form that describes a situation or event in which the CMAR contractor is required to provide input to the Department and other members of the Project Team. The shortlisted proposer is given an opportunity to review the problem statement and to deliberate with their team members in attendance at the interview. Following deliberations, the shortlisted proposer presents their solution to the team challenge for evaluation by the Evaluation Panel. Shortlisted proposers are advised that their deliberations and solutions are being evaluated. It is the intent of the team challenge to provide the Evaluation Panel with an opportunity to evaluate the shortlisted proposer qualifications in dealing with issues that are likely to occur during the pre-construction and/or construction phases. To date, both the Evaluation Panel members and the construction industry have responded positively to this approach.

The Evaluation Panel next scores the shortlisted proposers based on the criteria stated in the RFP, applying the same approach (adjectival + numerical) described above. If applicable, the 5 percent

bidder's preference is applied to develop a total score for each shortlisted/interviewed proposer. All shortlisted proposers are notified of the Department's intent to commence negotiations for a Pre-Construction Services Agreement with the shortlisted proposer having the highest interview score.

Following the notification above, the Department commences negotiation with the selected proposer for a Pre-Construction Services Agreement. Should the Department be unsuccessful in negotiating a Pre-Construction Services Agreement with the selected proposer, the Department ceases negotiations with that proposer and commences negotiations with the proposer having the next highest interview score (and so on continuing through all shortlisted proposers) until 1) an agreement is reached for pre-construction services, 2) the Department is unsuccessful in reaching agreement with any shortlisted proposer, or 3) the Department's Director elects to cease negotiations. Once a proposer is selected and an agreement is negotiated, the Department seeks FHWA's concurrence prior to its presentation to the Board for projects with federal participation.

The Department presents the results and scores from the RFP evaluation process (including proposal and interview) and a negotiated Pre-Construction Services Agreement to the Board for their review and approval. Should the Board approve the Department's recommendation of the CMAR and the Pre-Construction Services Agreement, the Pre-Construction Services Agreement is executed, and pre-construction work commences. Should the Board reject this approval, the Department may elect to advance the project via a different delivery method (e.g., design-build or design-bid-build [DBB]). *Stipends are not offered to Contractors in the CMAR process.*

### **3.4 INDEPENDENT COST ESTIMATING**

To support the Department's goal of awarding a final Construction Contract amount that represents a good value for taxpayers, the Department also procures an ICE to assist with each project. The CMAR contractor produces construction cost estimates from a contractor's perspective through a production-based approach. The Department's typical cost estimating approach relies on a review of historical bid amounts for similar items of work. Given this difference, the Department engages an ICE to produce construction cost estimates at project milestones using the same production-based approach as the CMAR contractor. From these parallel estimates, the Department can be assured that the final Construction Contract amount is fair and reasonable, given both historical and production-based cost estimating approaches.

The Department's approach to engaging the ICE recognizes that for the ICE's estimate to be an accurate representation of costs, the ICE must be privy to the same degree of project information as the CMAR contractor. Therefore, the Department includes the ICE in kick-off and partnering meetings, regular design progress meetings, and risk workshops. The Department is present at any meeting between the ICE and the CMAR contractor. The ICE, CMAR contractor, and Department also participate in an initial approach to cost meeting, at which time the approach to estimation and elements of each item of work are discussed and agreed upon prior to production of the first Opinion of Probable Construction Cost (OPCC). No discussion of price occurs at meetings between the Department, ICE, and CMAR contractor. Maintaining an independent pricing opinion is the key to the effectiveness of the ICE. The focus in these meetings is to obtain a common understanding of the items of work and approach to estimating, including how direct and indirect costs and profit are to be reflected in OPCCs and any future GMP. The ICE provides an independent opinion of project cost for each OPCC and GMP, using the same bid item structure provided to the CMAR contractor and Department Engineer.

The ICE also provides assistance in developing and evaluating direct and indirect project construction costs. Although the ICE offers input regarding a fair market value for a CMAR's home office overhead and profit fees for the construction phase, the final negotiation of these items is between the Department and

CMAR contractor only. The exception to this approach occurs in the event that home office overhead and profit fees are provided by the CMAR contractor as part of its proposal as the fee, in which case those fees remain as proposed.

The local construction industry has supported the Department's use of the ICE for CMAR projects. However, they have expressed concerns in the event the Department would rely on the ICE for establishment of a fair profit. Exclusion of the ICE from these final negotiations addresses those concerns.

The Department procures an ICE, as a service provider, concurrently with the procurement of a CMAR contractor through an initial prequalification ("On-Call") process and final Request for Approach (RFA). The intent behind concurrent CMAR and ICE procurement is to have both entities support the project at the commencement of pre-construction services.

### **3.5 RISK MANAGEMENT**

A key feature of the CMAR delivery method is the opportunity to have the CMAR contractor, ICE, design engineer, and Department engaged as a Project Team during the pre-construction phase to accomplish a comprehensive and active approach to risk management. This approach involves the identification, categorization, probabilistic assessment, and pricing of project risks. The Department's approach to risk management for CMAR projects engages the services of a risk management consultant, under contract to the Department, to facilitate this process and assist in the development of a risk reserve sum (risk reserve). The risk reserve represents an aggregate, probabilistic sum included with the CMAR's GMP Construction Contract that may be leveraged to mitigate the occurrence of identified risks during construction.

This approach has a number of benefits. During the OPCC and GMP bid process, it permits the CMAR contractor, ICE, and Engineer to estimate costs independent of identified risks. This enhances the ability to make more accurate cost comparisons at a best price. This approach also permits the Project Team to address risk transfer, mitigation, and retirement during the pre-construction phase, including advancing early procurement and additional field investigations if deemed appropriate.

Once a GMP is awarded that includes a risk reserve, the CMAR contractor commences construction. The CMAR contractor is responsible to bring to the Department's attention any risk events as they occur. This notification includes a summary of the event, projected impact upon cost and schedule, and justification of eligibility under the risk reserve. The Department's Project Manager and Resident (Construction) Engineer review the request. If the Department's review of the request finds: 1) the event to be eligible under the definition of the risk reserve contained within the project specifications, and 2) the CMAR contractor to be in the best position to mitigate the risk, then the CMAR contractor and Department will negotiate a sum to be drawn from the risk reserve to be paid to the CMAR to mitigate the risk event. The costs estimated to mitigate the risk during pre-construction guide these negotiations. Upon final completion and acceptance of construction by the Department, any balance of the risk reserve is retained by the Department. Should an event occur that was not anticipated within the risk reserve, the Department and CMAR contractor negotiate a formal change order. This risk reserve approach improves project construction cost certainty, protects the CMAR contractor in the event of unanticipated changes in the scope, and assures the Department that the awarded GMP is not inflated to include unidentified risks.

It is important to note the difference between the risk reserve approach and the approach to change management typically employed for Department DBB projects. For DBB projects, the Department includes a modest contingency percentage within the total sum programmed for construction. The intent of this contingency is to fund risk events that may occur in DBB projects and be managed through execution of change orders. Given that the risk reserve is within the GMP, there is no additional

contingency sum programmed for construction of CMAR projects. Although the approach to managing risk is different between the two delivery methods, the Department approaches construction fund programming by recognizing project risks.

### **3.6 PRE-CONSTRUCTION PHASE**

During the development of the final design, the awarded CMAR contractor participates in all design and risk discussions, offers suggestions as to product options, provides comparative estimates, researches performance and availability of materials, and advises as to the time impacts of various construction methods. The CMAR contractor prepares periodic cost estimates that include breakdowns of each project element to ensure that the project is within the Department's budget and to establish a GMP. The CMAR contractor develops the phasing of the bid packages and the work sequence, and ultimately develops a GMP for the Department's review and negotiation.

There can be multiple Construction Contracts on a CMAR project as distinct phases or events are identified (such as early acquisition of long lead items). For example, a large roadway project may have an earthwork and drainage construction phase that runs concurrently with the design phase, and a second construction phase once the remainder of the design is completed.

The Department, using the ICE and designer's cost estimates, negotiates the GMP for each Construction Contract with the CMAR contractor. If a negotiated GMP is not achieved, the Department may advertise the project as a DBB. Each construction or procurement package is to consist of a complete set of plans, specifications, and estimates such that each package could be advertised separately by a different delivery method if a GMP is not accepted.

Periodic costs estimates are provided as OPCCs. The OPCC process immediately follows the initial approach to cost meeting and a review of the preliminary project drawings. The design engineer provides the Department with a list of initial bid items and estimated quantities. The Department enters this information into a spreadsheet, which is distributed to the CMAR contractor, ICE, and Engineer. Each party enters its independent opinion of cost to construct each item of work on a line item basis. This pricing information remains confidential within the Department throughout the process.

Following receipt of independent pricing, the Department conducts an analysis of the pricing and develops a spreadsheet assessing the variances among the three differing cost opinions for each line item of work based on a confidential tolerance (percentage) for each item. A summary spreadsheet is prepared by the Department for OPCC discussions that indicates if the variance among the three differing cost opinions is within tolerance (green) or outside of tolerance (red). The Department then conducts a meeting between the Engineer, CMAR contractor, and ICE to understand the CMAR contractor's approach to price "key" items of work. This meeting includes a discussion on items with a significant variance in cost opinion, in addition to items with significant relative cost.

The OPCC process continues concurrently with design progress and the risk management process until 1) the project design achieves a level of completion such that a "provable construction cost" may be established in accordance with NRS, and 2) the cost opinion provided by the CMAR contractor is within an acceptable tolerance in comparison with the independent cost opinions of the Engineer and ICE as well as within the project's construction budget.

The Department's approach to manage quantity risk is another key feature within the CMAR Program. Under typical Department DBB projects, quantities are paid on a periodic (bi-weekly) basis based on installed and measured quantities and the unit pricing included within the DBB contract. Under CMAR projects, the Department has elected to transfer the quantity risk to the CMAR contractor. During construction of a CMAR project, quantities are measured and paid on a bi-weekly basis up to the estimated quantity in the GMP contract. Any quantities in excess of those in the contract that may be

required for the CMAR contractor to complete its contracted scope of work are the responsibility of the CMAR contractor. Upon final completion and acceptance of construction by the Department, the CMAR contractor is paid 100 percent of the quantities estimated in the GMP contract, regardless of measurement. The CMAR contractor, ICE, Engineer, and Department are all engaged in independently verifying quantities throughout the pre-construction phase. This approach significantly improves project cost certainty for the Department.

Once a negotiated GMP is reached, the Department seeks FHWA's written concurrence on a Construction Contract prior to its approval by the Board. The Department presents each negotiated GMP to the Board for their consideration of award. Should the Board approve the Construction Contract, the Construction Contract is executed, and construction commences. Should the Board reject the recommendation to award, the Department may advertise the work via a different delivery method (i.e., DBB).

### **3.7 CONSTRUCTION PHASE**

Following the Board's approval and execution of the Construction Contract, the Department oversees and administers construction of the CMAR project pursuant to the Construction Contract. Should the Construction Contract stipulate construction of only a portion of the project, the Department continues to advance the design and GMP negotiations for other portions of the project and presents each negotiated Construction Contract to the Board for its approval of award. This process continues until all construction work is under contract. (Unless the Department is unable to successfully negotiate contracts for future construction work.)

The awarded Construction Contract includes the accepted GMP bid, the contract drawings, specifications, and general conditions. Liquidated damage provisions may also be included based on milestone and substantial and final completion dates provided by the CMAR contractor during the pre-construction phase. Payment for items of work, including risk reserve sums, follows the processes discussed above.

As an alternative to GMP Construction Contracts, the Department may also elect to negotiate a fixed-price Construction Contract for smaller projects that do not require measurement for discrete items of work.

### **3.8 INDUSTRY OUTREACH EFFORTS**

Extensive outreach efforts for the CMAR Program have been conducted beginning in 2009 and have continued until the present day. For the past year, the Department has conducted seven industry meetings that have included workshops with contractors, FHWA, and Department staff. This outreach effort was also supplemented by individual stakeholder meetings. The focus of these workshops and individual meetings has been to build transparent, industry-supported, CMAR contractor procurement and evaluation and selection processes. These meetings have also resulted in the continual refinement of these processes. Attachment A provides a complete list of lessons learned that have been incorporated from industry feedback since release of the first RFP for the Moana Interchange Improvements Project (Moana).

### **3.9 PROJECT DOCUMENTATION DEVELOPMENT**

Over the last year, the CMAR program has progressed numerous activities related to establishing standard procurement, evaluation and selection, and pre-construction processes with project-specific elements. The details of each process have been described in the draft CMAR Guidelines, which is being incorporated into the Department's Pioneer Program Guidelines. These guidelines present the roles and

responsibilities of Department staff and outside agencies, as well as the procedures to progress a CMAR project from selection through procurement and into the construction phase.

These guidelines also explain the functions of the various templates and documents that have been established in support of the CMAR Program, which include the:

- CMAR Request for Letter of Interest (RLOI),
- CMAR RFP,
- CMAR Evaluation and Selection Plan,
- CMAR Pre-Construction Services Agreement,
- CMAR Construction Contract template,
- ICE Request for Qualifications (RFQ),
- ICE Invitation to Interview (ITI),
- ICE RFA, and
- CMAR program and project schedules.

In developing its CMAR RFP and ICE RFA templates, the Department also created project-specific evaluation criteria, factors, and weightings for both the proposal submittals and shortlisted proposer interviews. Certain documents remain confidential within the Department.

During the pre-construction phase, the Department developed project-specific cost comparison definitions, OPCC spreadsheets, risk and innovation management approaches, and special provisions that address the potential cost increase related to the occurrence of certain risk factors identified during price negotiations.

### **3.10 PERFORMANCE MEASUREMENT**

Section 4.2 of the Department's SEP-14 Application requires the following performance measures to be analyzed in this Report. To facilitate this analysis, available data from the Department's CMAR projects has been compared against predicted results had these projects been delivered by conventional means (i.e., the DBB delivery method). Predicted results were extrapolated based on actual outcomes for Department projects delivered by this method.

The following sections provide the methodology for each performance measure that will continue to be used by the Project Team for future reports (e.g., how the Project Manager will gather data for future reporting purposes).

**Disclaimer:** It should be noted that as the Department's CMAR Program is in its infancy, there is insufficient CMAR project data to complete a detailed analysis of all measures. An analysis using projected CMAR project data, where appropriate, is discussed in the absence of final data. Where the use of projected CMAR project data is not appropriate for analysis, only the methodology is provided. Additionally, where a more meaningful performance measure may be presented in lieu of a measure discussed in the SEP-14 application, a discussion is included on a preferred approach.

One additional measure under consideration by the Department relates to assessing the value of its investments in preliminary engineering on a CMAR versus DBB project. These initial investments, which to date have accounted for an average of 5 percent of construction cost, include contracting for pre-construction services with the CMAR contractor and the ICE, as well as the additional effort required from the designer to evaluate the CMAR contractor's suggestions and innovations. The Department anticipates

that these initial costs will reap measureable benefits to final project cost and schedule beyond what was initially invested during the pre-construction phase.

The Department is committed to measure performance on its CMAR projects and other projects delivered by different methods on an on-going basis using the approaches discussed in the following sections, which may also be supplemented by additional performance measures.

### 3.10.1 Cost Performance: Number of Contract Change Orders

The Department compared the number of contract change orders issued for CMAR projects with the average number of change orders that would occur if the project was delivered as a DBB project. This metric is important in gauging the effectiveness of CMAR in managing the risk of project scope change versus traditional delivery. Under DBB, a change order is defined as an adjustment (increase or decrease) in the construction contract sum resulting from a contractor or owner-initiated change in the scope of work. For a CMAR project, a change order would also adjust the construction contract GMP sum (increase or decrease) as a result of a change in the scope of work. The Department's current approach to development of a CMAR GMP includes a risk reserve developed through a collaborative risk identification effort during the CMAR pre-construction phase. A change order in the context of a Department CMAR project would involve an adjustment in contract sum beyond the negotiated GMP sum, inclusive of this risk reserve.

**Methodology:** The Project Team quantified and reported the number of change orders from each CMAR project, and compared this amount to the average number of change orders experienced by the Department during the prior calendar year on DBB projects.

**Analysis:** Figure 1 depicts the average number of change orders for CMAR projects compared to DBB projects. It is important to note that only a single data point (Moana) is available for a Department CMAR project.

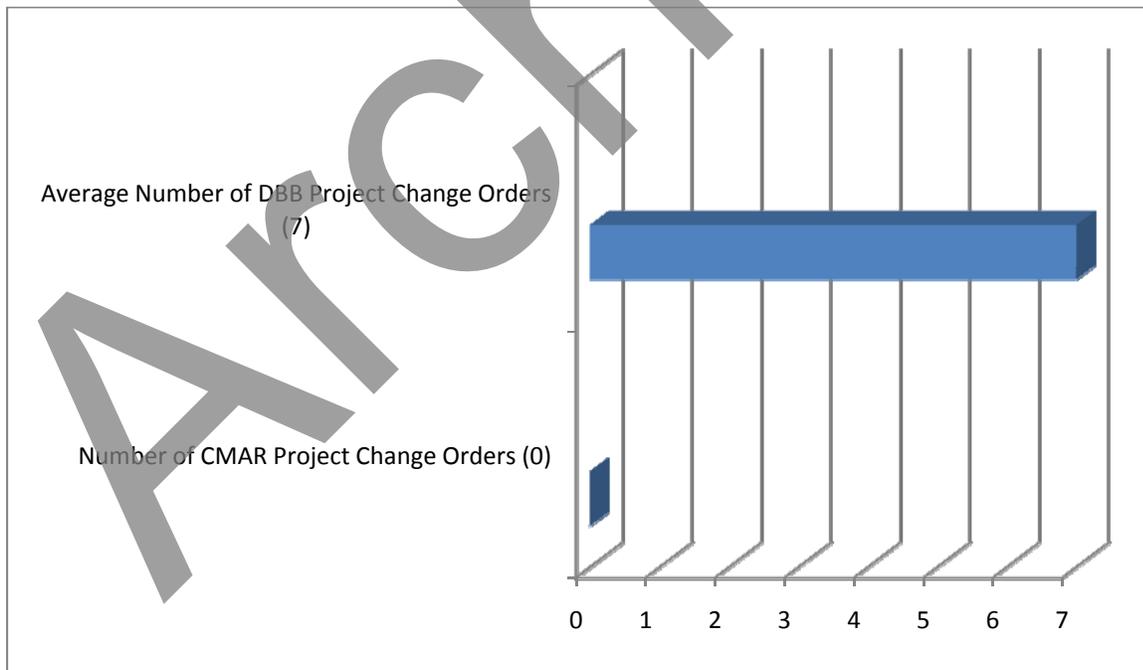


Figure 1. Number of Contract Change Orders

**Conclusion:** There is insufficient data on CMAR projects to make a firm conclusion. Initial results indicate the Department’s approach to risk management as part of its CMAR Program is effective in reducing the instance of change orders.

### 3.10.2 Cost Performance: Change Order Percentage

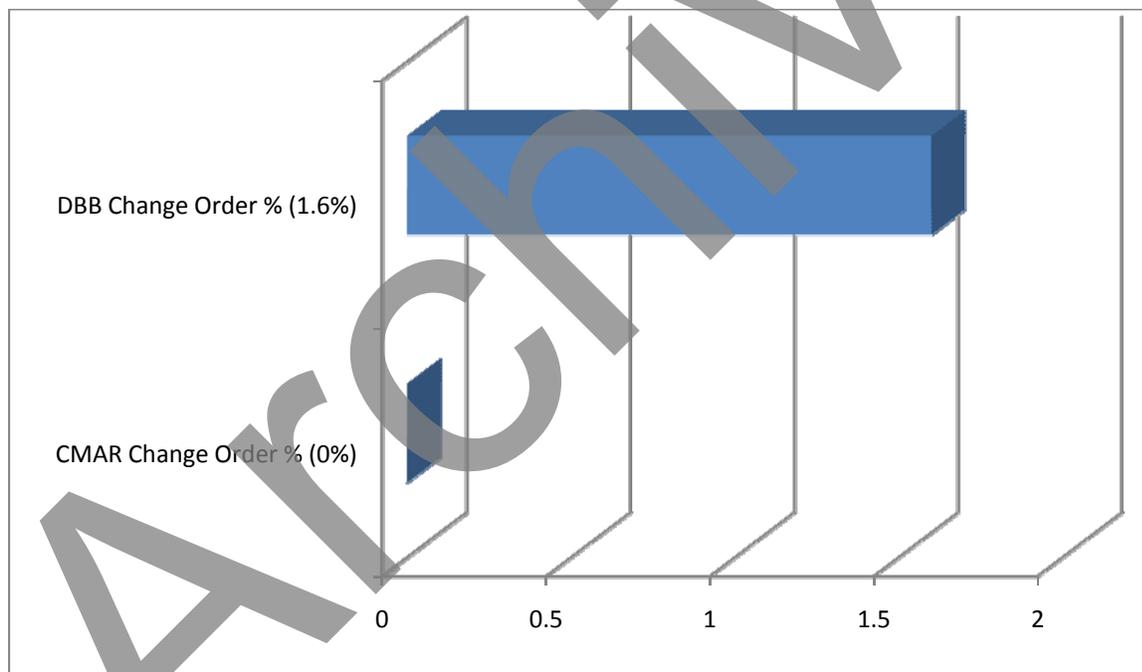
The Department next compared the total average contract change order sum for both CMAR and DBB projects as a percentage of the total construction contract award amounts. This metric is important to compare the relative construction cost certainty of the two delivery methods.

**Methodology:** By applying the following formulas, the Project Team calculated each percentage from the same information gathered for Section 3.10.1 and with the same definition of change order. Data was collected for projects awarded within the prior calendar year.

$$\text{CMAR Change Order \%} = \frac{\text{Total CMAR Change Order}}{\text{Total CMAR Construction Contract Amount}}$$

$$\text{DBB Change Order \%} = \frac{\text{Total DBB Change Order}}{\text{Total DBB Construction Contract Amount}}$$

**Analysis:** Figure 2 depicts change order amounts represented as a percentage of the total construction contract amount for both CMAR and DBB-delivered projects.



**Figure 2. Change Order Percentage**

**Conclusion:** Again, there is insufficient data on CMAR projects to make a firm conclusion. Initial results indicate the Department’s approach to risk management as part of its CMAR program is also effective in reducing the growth of a project’s construction cost.

### 3.10.3 Cost Performance: Overruns/Underruns

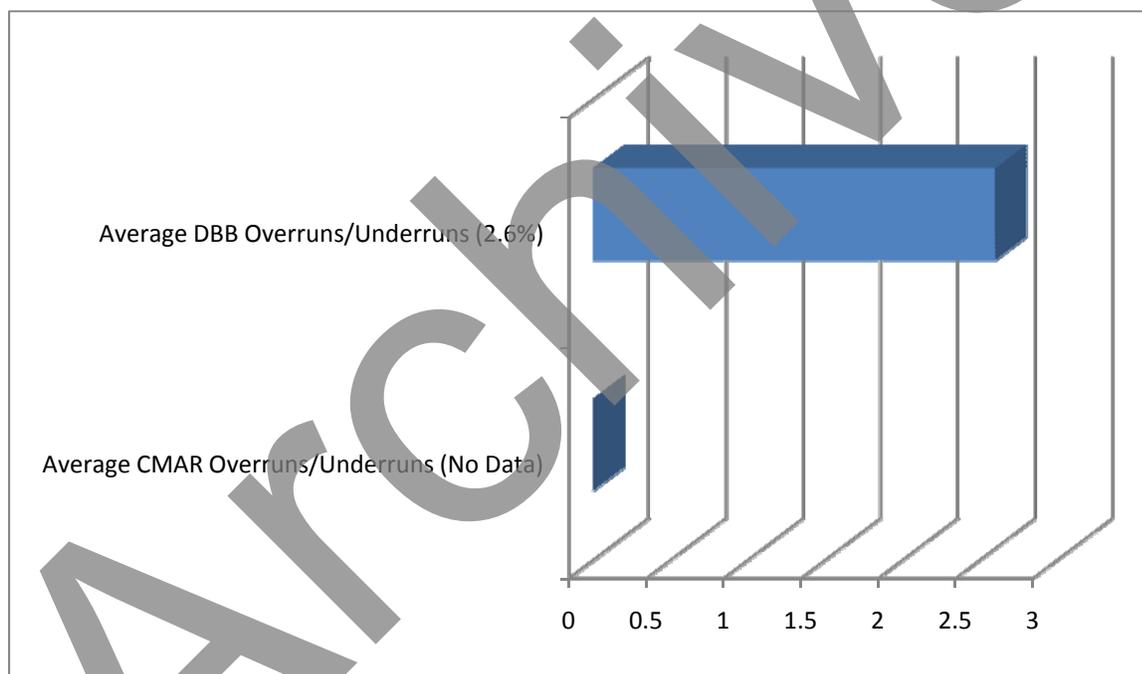
The Department next compared CMAR Construction Contract item overruns/underruns against the average contract item overruns/underruns that would occur if the project was delivered as a DBB project.

It is important to note that due to the Department’s fixed-price GMP approach to CMAR contracting, overruns/underruns do not affect the Department’s “cost” unless a change order is required to address a change in scope. In the absence of a change order, overruns in quantities beyond the contracted estimates become the responsibility of the CMAR contractor. Overruns/underruns do impact cost in DBB projects, as final payment is based on measured quantities.

Regardless of impact to cost, this metric is important in understanding the accuracy of the estimating process employed for CMAR versus DBB projects and to verify taxpayer value. Under CMAR projects, the Department, CMAR contractor, and ICE are all involved in validating project quantities. As the GMP compensates the CMAR for 100 percent of estimated quantities, this metric provides assurance that the Department has not over-estimated the required quantities and compromised taxpayer value by allowing the CMAR contractor to receive a windfall at the completion of project construction.

**Methodology:** The Project Team identified key items of work within each CMAR project and compared the measured quantities for these items against the contracted quantities in the GMP. This data was then compared to the average overruns/underruns experienced by the Department on DBB projects within the prior calendar year.

**Analysis:** Figure 3 depicts the overruns/underruns for key items on CMAR projects compared to the average item overrun/underrun experience on DBB projects.



**Figure 3. Overruns/Underruns**

**Conclusion:** There is no final overrun/underrun data presently available on the Department’s first CMAR project. The Department will monitor this performance measure as future data becomes available.

### 3.10.4 Cost Performance: ICE versus GMP at Letting and versus Final Construction Costs

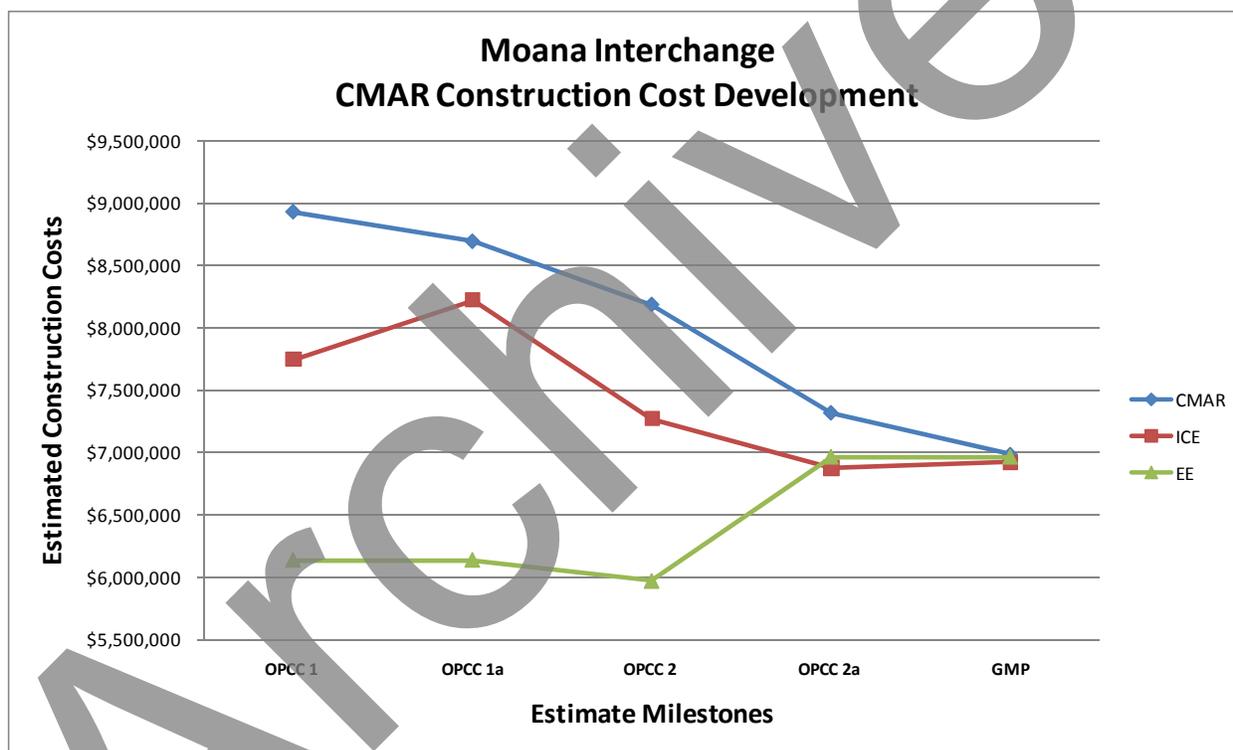
The Department compared the Engineer’s Estimate (EE) and the ICE and CMAR contractor’s OPCCs against both the GMP at letting and the “final” construction sum paid to the CMAR contractor. This final sum was reflective of the GMP less any unused risk reserve. This metric was important to track the

evolution of the OPCC process and intermediate and final GMP contracted sums so that the Department could compare the accuracy of their estimating process versus the ICE to ensure that the final GMP was reflective of a fair negotiated sum versus an arbitrary convergence towards the CMAR contractor's OPCC and GMP bid. It was important to consider the impact of any agreements on approach to the work and changes in scope when making conclusions regarding the evolution of project cost under the CMAR delivery method.

**Methodology:** The Project Team gathered cost information from the following sources for comparison:

- Engineer Estimate and ICE and CMAR contractor's independent OPCCs,
- GMP at letting, and
- Final construction sum paid to the CMAR contractor.

**Analysis:** As the final construction sum for the Department's first CMAR project is not known, this comparison cannot be currently made. However, Figure 4 provides the data presently available for Moana.



**Figure 4. ICE versus GMP at Letting and versus Final Construction Costs**

**Conclusion:** While there is no final construction cost data available for the Department's first CMAR project, the reduction experienced in the CMAR contractor and ICE OPCCs were consistent with the Department's expectations that project costs would decrease as project risks are identified, mitigated, and/or retired.

The relatively sharp increase in the Engineer's Estimate and the convergence of all three estimates require further explanation. For Moana, the CMAR contractor's construction approach and schedule changed significantly during the course of the OPCC process. A detailed discussion of these items is included in Section 4.1.1. The initial Engineer's estimates did not fully account for these modifications. As the Department Engineer became more aware of the cost impacts of the agreed construction approach,

their independent cost opinion was adjusted. Related, the CMAR Project Team further refined project details in parallel with the development of the project's design. This, in turn, allowed the CMAR Project Team to independently refine each respective estimate. Critical to the Department's consent with this adjustment were the many public benefits that accrued with a more aggressive construction schedule.

The Department will monitor this performance measure as future data becomes available.

### 3.10.5 Innovation Performance

The Department described and quantified estimated savings for each innovation applied on its CMAR project. Project innovations often take many forms, and innovations to date have included alternative construction means and methods, early procurement, supplementary field investigations, materials and fabrication, schedule compression, and traffic control measures.

**Methodology:** During the procurement phase, the Department considered past innovation successfully implemented by proposers, as well as potential innovation believed to be beneficial for the project. Following CMAR selection, the CMAR tracked innovations as part of its pre-construction scope of work. These innovations were developed and documented by the CMAR and other Project Team members during partnering and design meetings, risk workshops, and OPCC meetings.

**Analysis:** The following list summarizes the innovations considered and/or employed on the only CMAR project that has advanced beyond the pre-construction phase (Moana).

- Constructing cast-in-place concrete retaining walls in lieu of soil nail walls (considered)
- Reducing over-excavation to mitigate risk of unstable sub-grade during construction (implemented)
- Constructing the entire roadway surface with asphalt in lieu of Portland cement concrete pavement (considered)
- Increasing the roadway's width under the highway overpass (considered)
- Closing the Project intersection in lieu of having a six phase construction schedule (implemented)
- Procuring long-lead items, such as electrical equipment/poles, soil nails, sign structures, and decorative form liner early in the pre-construction phase (implemented)
- Use of high-density polyethylene (HDPE) storm drain pipe in lieu of a reinforced concrete pipe (implemented)
- Preserving existing curb and gutter runs along on-ramps and off-ramps (Implemented)
- Retained existing barrier rail along off-ramp (implemented)
- Eliminating one tier of a soil nail retaining wall (implemented)
- Eliminating a cantilevered retaining wall and incorporating a single-tiered soil nail wall along the on-ramps and off-ramps (implemented)
- Substituting Topien S for MC 70 as the prime coat on the aggregate base coarse (implemented)
- Replacing polymer oil with a non-polymer oil mix for use under the Portland cement concrete pavement paving section (implemented)
- Substituting a five day for a seven day concrete cure requirement while maintaining the flexible strength requirement of 550 psi (considered)
- Replacing existing slope paving areas with rip rap in lieu of concrete slope paving (implemented)

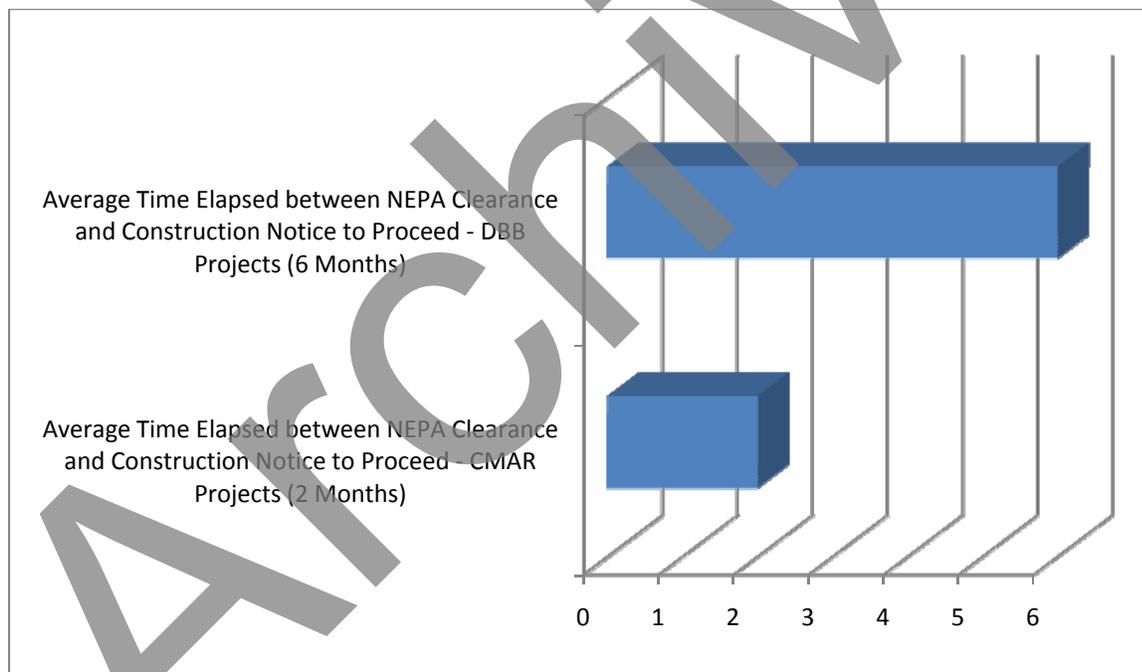
In total, 16 innovations were analyzed by the CMAR Project Team, and 11 innovations were incorporated into the final design.

### 3.10.6 Schedule Performance

The Department compared the estimated notice to proceed dates associated with DBB delivery to the actual notice to proceed dates initiated through CMAR delivery. There are several approaches for measuring schedule performance of different project delivery methods, and all Department projects (regardless of scope, complexity, or delivery method) require a documented environmental approval prior to release for construction. It is important to note that the Department's decision to use the CMAR delivery method considers impact to overall delivery schedule (e.g., how will engaging a CMAR delay the completion of design).

**Methodology:** The Project Team considered the average time elapsed between environmental approval (i.e., Categorical Exclusion, Finding of No Significant Impact, or Record of Decision) and issuance of a construction notice to proceed to measure schedule performance. This measure considers the time by which the Department can initiate construction recognizing its National Environmental Policy Act (NEPA) compliance obligations.

**Analysis:** Figure 5 depicts the average time elapsed between environmental approval and construction notice to proceed for projects delivered under the CMAR delivery method compared to time elapsed time for DBB projects.



**Figure 5. Schedule Performance**

**Conclusion:** As there is only a single data point for CMAR (Moana), there is insufficient data to make a firm conclusion on this performance measure. The Department will monitor this performance measure as future data becomes available.

## 4.0 PROJECT SUMMARIES

The following sections discuss the three CMAR projects that have advanced to date.

#### **4.1.1 Moana Interchange Improvements Project (Moana)**

The Department has achieved substantial completion of construction on its first CMAR project. The following summarizes the delivery process employed for Moana.

##### **Procurement**

On December 21, 2011, the Department released RFP No. 534-11-015 to solicit written proposals from qualified general contractors to provide CMAR services for Moana. A qualifications-based proposal score determined the initial shortlist ranking of each proposer. Five proposals were submitted on January 19, 2012, in response to the RFP. A competitive shortlist was established of the most highly-ranked proposers within the competitive range. Two shortlisted firms were invited to interview on February 8 and 9, 2012. The final ranking was determined by the highest qualifications-based interview score, and the proposer with the highest interview score was the apparent most-qualified proposer. The Board approved the Pre-Construction Services Agreement with the selected a contractor for CMAR services on March 12, 2012.

On January 17, 2012, the Department released ITI No. 555-11-015 to the prequalified firms from the ICE discipline list developed by the Department in response to an RFQ for ICE services for the CMAR Program issued by the Department on December 15, 2011. The ITI established a qualifications-based interview process, which was used to select a firm with whom the Department intended to negotiate a professional services agreement to provide ICE services for the project. Five firms were invited to interview on January 30, 2012. The Department selected one firm as the most qualified firm based on the interview scores.

##### **Pre-Construction Phase**

Through Moana's pre-construction phase, the following developments resulted from using the CMAR process.

- 11 CMAR innovations were incorporated into the final design that resulted in a cost savings of over \$1.5 million for the project.
- A risk reserve representing approximately 3 percent of the assumed base construction costs was allocated and documented to address the potential cost increase related to the occurrence of remaining project risk factors. This represented a 2 percent reduction from the internal contingency normally programmed by the Department in DBB projects.
- There was a greater detailed understanding of the most critical and/or impactful project issues through execution of the open-book, cost-estimating process with the OPCC reviews and resolution meetings. This allowed the Moana CMAR Project Team to focus efforts to reduce cost and schedule impacts of those issues.
- There was a significant decrease in the construction schedule to reach substantial completion from July 1, 2013 (project goal opening date in the RFP) or April 12, 2013 (baseline OPCC schedule opening date) to November 22, 2012 (final opening date to the public). This occurred due to the focus on improving efficiencies during construction through design refinement, well-planned phasing, multiple work shifting, in-depth understanding of design details and risks, and the early procurement of long-lead items. The CMAR contractor provided significant value in educating the Department on the potential for schedule acceleration and the costs associated with such acceleration.
- The Moana CMAR Project Team (including the CMAR contractor) jointly engaged in a public involvement and outreach effort. The result of these efforts garnered acceptance and approval

from the public, area businesses, and Department management, ultimately reducing construction phasing from five to two phases.

- Extensive communication occurred among the Department (as project owner and designer), ICE, and CMAR contractor with respect to understanding the elements of the project impacting cost and, specifically, project risks. The Department, ICE, and CMAR contractor prepared multiple independent cost estimates for the Department's review as the final design progressed from a 60 percent to a 100 percent level of completion. Through this active risk management/communication and independent cost estimating approach, the three independent opinions of project cost converged from 31 percent to within 1 percent of each other, permitting the Department and Board to accept the CMAR contractor's final GMP bid with confidence.
- It should be noted that a significant action through the risk approach was the decision to procure certain long-lead project materials in advance of a final agreement on a GMP. Traffic signal poles, soil nails, and other items in the amount of \$499,966 were acquired by the Department early to mitigate construction schedule risk and incidental cost. These materials were to be considered state-furnished to the CMAR contractor or a potential future bid-build contractor in the event the Department was unable to reach an agreeable GMP.

In addition, the Moana CMAR Project Team reduced ambiguities and improved project understanding within the areas of:

- Terms of substantial completion,
- Potential impacts with adjacent work,
- Work item clarifications,
- Cost estimating,
- Constructability,
- Maintenance of traffic requirements, and
- Quantity and acceleration of risk avoidance and mitigation.

### **Construction Phase**

On September 12, 2012, two days following approval of a GMP contract by the Board, the CMAR contractor began construction at the interchange of Moana Lane and I-580 in Reno, Nevada. Construction on the project was substantially complete, and the project opened for full public use on November 22, 2012. The relationship between the CMAR contractor and Department has been excellent to date. The CMAR contractor has been successful in implementing efficiencies in construction that have abated its need for certain nighttime and weekend work without sacrifice to the overall construction schedule. Approximately \$200,000 of the \$280,000 risk reserve budget established as part of the GMP was used to address the unsuitability of a limited quantity of subsurface materials and unidentified utilities. Each of these items was considered as potential risks that formed the basis of the risk reserve sum developed during the pre-construction phase. It is important to also note that the decision to use the risk reserve is retained by the Department, whereby both the Department's Resident (Construction) Engineer and Project Manager (Design) are required to approve the use of any reserve sum, regardless of dollar amount, before it may be used.

#### **4.1.2 Nevada Stateline to Stateline Bikeway Phase 1C (Stateline)**

The Department completed the procurement and negotiation process for the Nevada Stateline to Stateline Bikeway Phase 1C Project (Stateline), and approval a Pre-Construction Services Agreement for the Stateline project on November 6, 2012.

##### **Procurement**

On July 12, 2012, the Department released RFP No. 072-12-015 to solicit written proposals from qualified general contractors to provide CMAR services for Stateline following an initial prequalification process, wherein the Department evaluated the qualifications of contractors to work in the Lake Tahoe basin. A qualifications-based proposal score determined the initial shortlist ranking of each proposer. Two proposals were submitted on August 2, 2012, in response to the RFP. A competitive shortlist was established of the most highly-ranked proposers within the competitive range. Two shortlisted firms were invited to interview on August 27, 2012. The final ranking was determined by the highest qualifications-based interview score, and the proposer with the highest interview score was the apparent most-qualified proposer.

On June 25, 2012, the Department released RFA No. 226-12-015 to the prequalified firms from the ICE discipline list developed by the Department in response to an RFQ for ICE services for the CMAR Program issued by the Department on December 15, 2011. The RFA required the proposer to submit a project-specific approach, which was evaluated to select a firm with whom the Department intended to negotiate a professional services agreement to provide ICE services for the project. Four firms submitted their approaches on July 10, 2012. The Department selected one firm as the most qualified firm based on the approach scores.

##### **Pre-Construction and Construction Phase**

As noted above, Board approval of the Pre-Construction Services Agreement with the selected CMAR contractor was secured on November 6, 2012. Initial partnering and risk assessments have been completed, and constructability reviews and the OPCC process are underway. The anticipated notice to proceed for the construction phase is June 2013, with construction completion anticipated by October 2013.

#### **4.1.3 Carlin Tunnels (Carlin)**

The Department has completed the selection process for the Carlin Tunnels Project (Carlin), and is presently engaged in pre-construction services with the selected CMAR contractor.

##### **Procurement**

On August 28, 2012, the Department released RFP No. 309-12-015 to solicit written proposals from qualified general contractors to provide CMAR services for Carlin. A qualifications-based proposal score determined the initial shortlist ranking of each proposer. Five proposals were submitted on September 20, 2012, in response to the RFP. A competitive shortlist was established of the three most highly-ranked proposers within the competitive range, and those shortlisted firms were invited to interview on October 9 and 10, 2012. The final ranking was determined by the highest interview score, which considered qualifications-based factors for 85 percent of the score and the construction management fee for the remaining 15 percent of the score. The proposer with the highest total interview score (qualifications and fee) was the apparent most-qualified proposer.

On September 11, 2012, the Department released RFA No. 308-12-015 to the prequalified firms from the ICE discipline list developed by the Department in response to an RFQ for ICE services for the CMAR

Program issued by the Department on December 15, 2011. The RFA required the proposer to submit a project-specific approach, which was evaluated to select a firm with whom the Department intended to negotiate a professional services agreement to provide ICE services for the project. Five firms submitted their approaches on September 28, 2012. The Department selected one firm as the most qualified firm based on the approach scores.

### **Pre-Construction and Construction Phase**

Pre-construction services commenced in December 2012 with construction anticipated to begin in May 2013 and be complete by October 2014.

## **5.0 PROGRAM LEVEL LESSONS-LEARNED**

In September 2012, the Moana Project Team (including the CMAR contractor, ICE, and the Department designer) and other internal Department staff conducted a programmatic and project-level lessons learned meeting. Upon completing the pre-construction phase of its first CMAR project, the Department met to identify issues related to the various phases of CMAR implementation. This meeting also explored potential solutions to the identified issues to incorporate into the CMAR Program, and classified best practices and practices to avoid. From this meeting and other discussions by the program management team, a number of significant items were discussed. These issues and potential resolutions (where applicable) are elaborated further in the following sections and in Attachment A and B.

### **5.1 STATUTORY REQUIREMENTS**

The Department traditionally operates under its own set of statutes (NRS Chapter 408) for delivery of its projects. However, the State of Nevada authorized the Department to move forward with its CMAR Program under the statutory language of NRS Chapter 338. NRS Chapter 338 was originally developed for vertical construction and is primarily used by the State Public Works Division (SPWD) and local government agencies. In having to apply a statute focused on vertical construction when compared to horizontal construction that has distinct variations (e.g., multiple land owners, utilities, agencies, and jurisdictional boundaries), the Department had to apply the rules of a different agency that are often not applicable to horizontal construction projects. Because the Department predominately delivers horizontal construction projects, it was suggested that modifications be made to various statutes to resolve those issues. The following issues are representative of this larger statutory concern.

**Issue:** The time requirements outlined in NRS Chapter 338 for the subcontracting qualification and selection process are illustrated on Figure 6. These prescriptive timeframes are lengthy and place the project at risk by creating a constraint on either the schedule or a determination of cost certainty for the work to be subcontracted.

**Lessons Learned/Recommendation:** A change to the statutory requirements may be necessary to seek more flexibility by eliminating the mandatory minimum 10-day requirement for evaluation and selection of subcontractor proposals.

### **5.2 PHASING OF CONSTRUCTION ACTIVITIES PRIOR TO FINAL DESIGN**

**Issue:** One desired outcome of the CMAR Program was the potential start of construction earlier than what would be the standard under the DBB delivery method. The most common application of this approach is the early acquisition of long-lead materials and/or site preparation activities, such as utility relocations and grading. It was anticipated that this work would be done under a Construction Contract; however, statute limited this opportunity as “physical” site work would not be considered as allowable under the scope of a Pre-Construction Services Agreement.

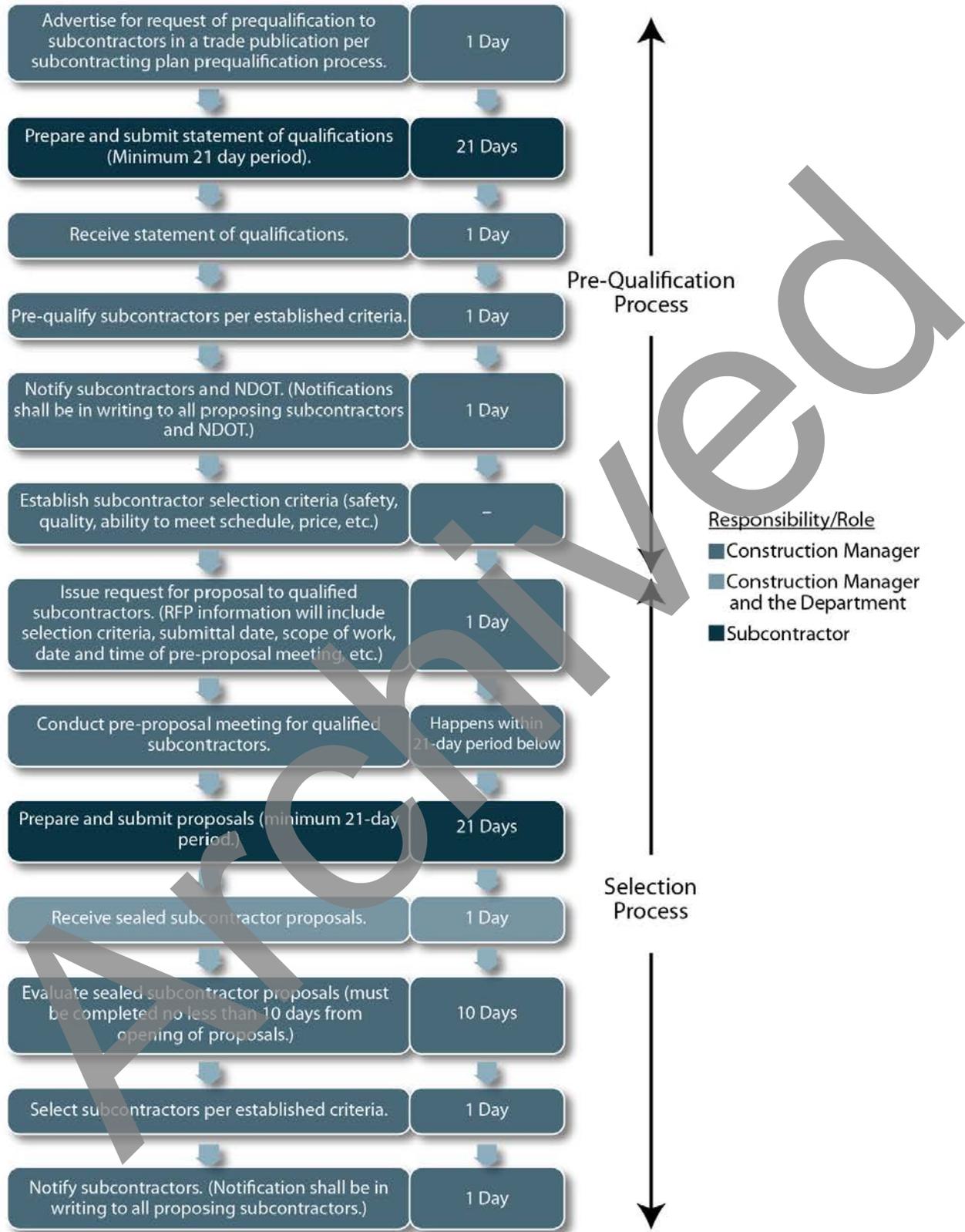


Figure 6. Subcontracting Qualification and Selection Process

**Lessons Learned/Recommendation:** It is recommend that the Project Team limit the project's construction activities to early acquisitions of long-lead items and use the Pre-Construction Services Agreement as the contract mechanism to accomplish this. Early phasing of construction work, such as grading and other construction activities, could be performed under a construction agreement upon completion of applicable plans.

## 6.0 CONCLUSIONS

With the approval of MAP-21, the use of CMAR delivery method on federally-funded projects no longer requires separate approval of a programmatic or project-level SEP-14 application. However, as the federal rulemaking process evolves, it is anticipated that CMAR annual reports will continue to be valuable for rulemaking and for other public agencies considering the CMAR delivery method.

Use of the CMAR delivery method by local agencies in Nevada continues to grow, as does the support of the CMAR method by the Nevada construction industry. Thus far, the Department considers its overall experience with its CMAR Program as a success, and is actively exploring use of the CMAR delivery method on appropriate projects in the future. It is the sincere hope of the Department that readers of this Report will find the discussion of process, projects, challenges, and lessons-learned informative and useful.

Attachment A: Procurement  
Lessons Learned from Industry Outreach

Archived

The following bulleted items are the documented lessons learned and improvements pertaining to the CMAR procurement phase that the Nevada Department of Transportation (NDOT) has incorporated since the first CMAR Project (Moana Interchange Improvements).

## I. Proposal: Evaluation Factors Concerns and Lessons Learned

- **Availability and Capacity:** The Industry noted concerns over the subjectivity of the “Availability and Capacity” Evaluation Factor and the fact that points should not be deducted for availability or capacity to do work (AGC Working Group Meeting #6).
  - **Response in the Carlin RFP:** NDOT has eliminated this Evaluation Factor based on Industry and Evaluation Panel feedback.
- **Past and Current Innovation:** While the Industry was in agreement that past innovation should remain as an Evaluation Factor, the Industry does not believe it is fair to evaluate current innovation in the Proposal section as some innovations may be appealing, but not feasible (AGC Working Group Meeting #6).
  - **Response in the Carlin RFP:** NDOT eliminated current project innovation from the Proposal Evaluation Factor requirements and moved this consideration to the Interview phase, where the validity of proposed current innovations would receive more scrutiny.
- **Qualifications and experience of the Proposer firm vs. Key Personnel:** The Industry stated concerns that the “Qualifications and experience of the Proposer firm” and “the “Qualifications and experience of the Proposer Key Personnel” Evaluation Factor overlapped, which confused some of the proposers (AGC Working Group Meeting #6).
  - **Response in the Carlin RFP:** NDOT clarified both evaluation factors to more clearly define qualifications related to Key Personnel experience versus overall firm experience. NDOT also eliminated the overlap between the two evaluation factors by simplifying the proposers response to note the experience of their Key Personnel under one evaluation factor and the overall experience of the firm under the other. It was important to distinguish these two factors because the levels of experience are often different, and NDOT desired to distinctly evaluate the qualifications of both the larger firm and the individual team members proposed on the project.
- **Reference Checks:** The Industry noted concerns about the Department’s process regarding reference checks (AGC Working Group Meeting #6).
  - **Response in the Carlin RFP:** NDOT has softened its language and added further descriptors in the RFP regarding the reference checking process.
- **Qualifications and experience of the Proposer firm information:** There was a concern that the “Qualifications and experience of the Proposer firm” Evaluation Factor was not asking for information that distinguished one Proposer from the next.
  - **Response in the Carlin RFP:** NDOT modified and added a number of items under this Evaluation Factor (e.g., List of major risks on the project, Schedule performance, List of Proposer awards/recognition related to the project, Subcontract disciplines managed on the project) that will help better differentiate between Proposer submittals.
- **Interview Attendees:** The Industry asked how the Department would ensure that the Key Personnel listed in the Proposal are in fact the same individuals interviewed.

- **Response for the Carlin RFP:** NDOT has added clarifying language to the both the RFP and its Evaluation and Selection Plan to address this concern. The language stated, “The Proposer’s Project Manager and up to *four (4)* additional members, which must be Key Personnel or other personnel identified pursuant to the RFP requirements, must be present at the interview.”
- **Constructability Review:** There was a concern over the common understanding of the term “constructability review” in response to how Proposer’s interpreted this term.
  - **Response for the Carlin RFP:** NDOT has added a clarifying definition of this term in the RFP.
- **Clarification of Project Specific information:** There was a concern over the project-specific nature of the “Proposer Firm,” “Key Personnel,” and “Project Approach” evaluation factors.
  - **Response for the Carlin RFP:** NDOT has included project-specific language under each of these evaluation factors, which will allow the Proposers to better tailor their experiences and approaches to the specific project.
- **Project Approach:** There was a concern that the “Project Approach” Evaluation Factor was too general.
  - **Response for the Carlin RFP:** NDOT has divided this Evaluation Factor into two sub-factors (Pre-Construction and Construction) so that the Proposer can more clearly delineate their approach for each phase.
- **Approach to Project vs. Approach to Risk Management:** Proposers were confused over the “Project Approach” Evaluation Factor and specifically its “Approach to risk management” section.
  - **Response for the Carlin RFP:** NDOT clarified this Evaluation Factor and the submittal requirements by clearly spelling out how it would like the Proposer to respond to these sections (e.g., formatting requirements, submittal instructions, and content suggestions).
- **Project Approach Clarification:** The “contracting plan” section under the “Project Approach” Evaluation Factor was not clearly defined as to how to discern between subcontracted and self-performed work.
  - **Response for the Carlin RFP:** NDOT added language that directs the Proposer on what it is asking for regarding both elements of this Evaluation Factor.
- **Approach to Schedule:** The Industry does not believe it is fair to evaluate current innovation under “Approach to Schedule” of the proposal section of the process (AGC Working Group Meeting #6).
  - **Response for the Carlin RFP:** NDOT has completely revamped the “Approach to Schedule” evaluation factor to focus more on a practical and implementable schedule approach.
- **Cost/Pricing Consideration:** The Industry would like the evaluation process to include a fixed profit limit or percentage related to cost (i.e., a pricing evaluation factor) (AGC Working Group Meeting #4, #5, and #6).

- **Response for the Carlin RFP:** NDOT has added a “Construction Management Fee” Evaluation Factor in response to this concern.

## II. Interview: Evaluation Factors Concerns and Lessons Learned

- **Interview Packet:** The industry was concerned about the turnaround time and fairness of the interview packet (approach to cost estimating) in light of this being a “one proposal” process (AGC Working Group Meeting #6).
  - **Response for the Carlin RFP:** NDOT has eliminated the Interview Packet from the RFP.
- **Consistency in Interview Questioning:** The Industry was concerned about the process regarding how interview questions are created and consistently asked from one Proposer to the next (AGC Working Group Meeting #6).
  - **Response for the Carlin RFP:** NDOT has clarified its approach and will apply this approach when interviewing shortlisted Proposers. As stated in the RFP, “The questions asked in this session will be the same for all shortlisted Proposers and provided at the interview. The Proposers will be asked to respond to questions of approach related to the Project goals and the CMAR project delivery method. The topics of these questions, though not the specific questions, will be provided with the invitation to interview the shortlisted Proposers received from the Department.”
- **Interview Presentation:** The Industry was concerned that too much emphasis was placed on the presentation portion of the interview (various AGC Working Group Meetings).
  - **Response for the Carlin RFP:** NDOT made a conscious effort to appropriately weight the interview portion so that a majority of the weightings were placed on matters of substance (e.g., team challenge, construction management fee, interview questions). NDOT also added elements to the presentation that would encourage a more substantive response by the shortlisted Proposers (e.g., current project innovation).
- **Team Challenge Clarification:** The Industry did not feel educated enough on the overall direction and value of the team challenge (AGC Working Group Meeting #6).
  - **Response for the Carlin RFP:** NDOT has included more description concerning the why, how, and what that is behind the use and application of the team challenge.

## III. Proposal Submittal Requirements: Concerns and Lessons Learned

- **Formatting Adjustment:** The Industry would like to use headers instead of tabs so that page space is not wasted from one section to the next (AGC Working Group Meeting #6).
  - **Response for the Carlin RFP:** NDOT has modified this requirement from tabs to headers.
- **Page Limit Adjustment:** The Industry would like an increased Proposal page limit.
  - **Response for the Carlin RFP:** NDOT will adjust the page limits based on the size and complexity of the project. For Carlin (as compared to Moana), NDOT increased the Proposal page limit from 15 pages (Moana) to 25 pages (Carlin).
- **Format/Page Limit Requirements:** The Industry was a concerned that the project blurbs under the “Qualifications and experience of the Proposer firm” Evaluation Factor took up too much space in light of the page limit requirements (AGC Working Group Meeting #6).

- **Response in the Carlin RFP:** NDOT retooled the Evaluation Factor's requirements to include only a table of necessary information on past project experience and information. This limited the amount of space required to answer this question.

#### IV. General and Miscellaneous Items: Concerns and Lessons Learned

- **Mandatory Pre-Proposal Meeting:** The Industry would prefer that subsequent RFPs include a mandatory Pre-Proposal meeting.
  - **Response for the Carlin RFP:** A mandatory pre-proposal meeting is required for the Carlin RFP.
- **Industry Observers Involvement:** The Industry wanted Industry Observers to be involved in viewing the process, but also voiced concerns over confidentiality.
  - **Response for the Carlin RFP:** NDOT successfully worked with the Industry to include an Industry Observer for the Tahoe and Carlin Projects, ensuring that confidentiality was documented and observed throughout the process.
- **Duplicative Pre-qualification Process:** The Industry would like a less burdensome pre-qualification process.
  - **Response for the Carlin RFP:** NDOT has worked with the SPWD to eliminate SPWD pre-qualification requirements for roadway projects through an SPWD-adopted regulation waiving the prequalification requirements for contractors prequalified by NDOT.
- **Debrief Improvements:** The Industry would prefer that the debriefs be more constructive and relevant so that they can learn from past Proposals.
  - **Response for the Carlin RFP:** NDOT has altered its Evaluation and Selection approach in an attempt to better capture and communicate Proposer strengths and weaknesses to each Proposer.
- **Consensus Scoring Process:** The Industry asked for the Department to explain its scoring process more clearly.
  - **Response for the Carlin RFP:** NDOT explained and further described its concept and approach to consensus scoring during the Evaluation and Selection process. An Industry representative was in attendance during the Tahoe process to observe how this process worked, and additional Industry representatives were invited to participate similarly during the Carlin Tunnels processes.

Attachment B: Department Lessons Learned from  
the Moana Interchange Improvements Project

Archived

# CMAR Lessons Learned

## Moana Interchange Improvements

Project Selection, Procurement, Negotiation, & Board Approval		
No.	Issue	Recommendation
1	Lack of time could impact completion of adequate process (including quality control). This can occur with schedule acceleration and design impacts to the design schedule when early procurement of materials are considered.	Consideration should be given to this item during the PDSA process based on schedule, innovation, project complexity, and opportunities to meet or exceed project goals. Consider having a project schedule for design and early procurement available to the PDSC and PM during the PDSA.
2	Could we retain contractor services for supporting construction effort (e.g., public involvement, electrical subcontractor, tunnel subcontractor )?	Craft preconstruction agreement scope carefully to allow latitude for contractor services during the construction phase if needed.
3	Can we clearly state the possibility for early procurement of materials in the pre-construction scope?	Add a provision to explicitly allow for early procurement in the pre-construction services agreement.
4	Do we have the ability to task the contractor with site exploration work (e.g., surveying, potholing, testing) given the requirement of 100% self-performance?	Clarify the capability in the RFP and scope of services for pre-construction.
5	Could we retain ICE support during the construction phase for estimation and scheduling issues? We would not use them necessarily for day-to-day support but for complex changes on the project.	Provide for language in the ICE scope of services to allow for the ICE to be retained during the construction phase.
6	Could we engage FHWA sooner regarding RFP issues and reviews (e.g., environmental, interstate access, right-of-way certification)?	Allow FHWA an over-the-shoulder review at the time we are preparing the RFP (e.g., during internal review). Also share the project schedule with FHWA and include documents that require approval by FHWA (e.g., right-of-way certs, environmental, DBE)
7	Can we streamline the ICE RFQ and ITI process?	Include the standard RFA only process when procuring the ICE from the established on-call list. Interviews are at the sole discretion of the Department.

# CMAR Lessons Learned

## Moana Interchange Improvements

Preconstruction Engineering & Early Procurement		
No.	Issue/Observations	Recommendation
1	Lack of time may not provide for completion of an adequate process to complete design (including quality control). This can occur with schedule acceleration and consideration of early procurement of materials.	Define design timeframes and milestones clearly at the beginning and throughout project development. Obtain buyoff of the schedule with the Project Team. Establish a schedule change management procedure with appropriate approval sign-off from Project Team members for any changes that occur to the delivery schedule during project development, and be prepared to provide additional resources to design if schedule is accelerated.
2	Who is responsible for payment of the partnering facilitator?	Prior to solicitation of any support (contractor, designer, ICE, etc.), define clearly the entity responsible for procuring the facilities and facilitator for partnering.
3	Confirm that the day-to-day team is more active in the partnering process.	Have the actual Project Team in attendance at the project kickoff meeting, while the partnering session would include the higher level participants.
4	Consider the effect of the CMAR process on contract services, civil rights, programming, and project accounting.	Involve contract services and other internal Department participants (e.g., civil rights, programming, accounting) in the project kickoff meeting and during discrete milestones throughout. Identify in the Pioneer Program Guidelines the minimum milestones for inclusion of these divisions in the CMAR delivery process.
5	What is considered realistic regarding schedule and timing around overall design and design decisions?	It should <b>not</b> be inferred that the CMAR process will always have an accelerated schedule. We should communicate realistic timeframes with the whole team. Make and confirm decisions as soon as possible (e.g., material decisions). Refer to Item No. 1 Recommendation for development and implementation of schedule change management procedures.
6	Value in CMAR is earned during the pre-construction phase and realized during the construction phase. What is the balance of the full development of design versus accelerating schedule so as not to compromise design and the input from a number of informed parties during the pre-construction phase?	Educate and refrain from considering CMAR as an accelerated deliver method (especially in the design stage).
7	Recognition of all requirements of the various parties responsible for moving the project from final design to transitioning into construction. These parties include contract services, civil rights, programming, contractor pay, and accounting.	Finalize a written process for inclusion of all support divisions and communicate this process to the entire project team at the onset of the pre-construction phase. The process should include communication early and often (no less than at the time of approval of the project as a CMAR and upon development of the schedule(s) for procurement, pre-construction, and construction) to onboard all relevant parties (e.g., contract services, civil rights, programming, contractor pay, and accounting) to the CMAR process. Also refer to Item No. 4.
8	Not a clear understanding of the relationship (interrelationship) among the DBE, subcontractor procurement, material procurement, and starting construction.	Outline/document the timelines and when certain items (e.g., DBE, subcontracting procurement, etc.) need to occur over the entire process. Include in Pioneer Program Guidelines.
9	Failed to realize schedule impacts early in the process of the subcontracting procurement processes as required by NRS 338.	Require that the Project Team attend and participate in a pre-construction scheduling meeting to incorporate subcontracting elements upon initial design review or submittal of the subcontracting plan, whichever comes first.
10	Do all subcontractors need to be procured prior to the GMP bid? How would you manage the FHWA and DBE compliance and approvals?	Evaluate with Contract Compliance division, FHWA, and Legal the feasibility of reaching a GMP prior to selection of all subcontractors for the Project. Schedule the GMP to occur after selection of all subcontracting proposals until an alternative approach is developed.

# CMAR Lessons Learned

## Moana Interchange Improvements

### Preconstruction Engineering & Early Procurement

No.	Issue/Observations	Recommendation
11	SharePoint proved to be effective. However, what is the SharePoint protocol regarding communication and information sharing?	Add an easier way to reset your password. Include instructions and procedures for using the SharePoint site within the PMP.
12	Bi-monthly meetings may not have fully addressed design changes and dissemination of information.	Consider having more frequent meetings during periods of accelerated design and decision making. Where possible, ICE should attend these meetings in order to be informed of changes. Consider WebEx and a remote call-in for those that cannot attend these meetings.
13	Find a balance with the amount of meetings and allowing time to accomplish design.	Determine the number and frequency of meetings based on complexity (e.g., accelerated schedule, projects with changes, projects with a number of risks, multiple disciplines), schedule constraints, project size, etc. Consider amount of work to occur in the time period. Consider breaking out meeting times by discipline or division-specific issues (discipline based working groups). Include all meeting action items and applicable changes in SharePoint.
14	Specification issues/changes were needed, and it was too late in the process to do anything about it.	Development and review of specifications should begin earlier in the process (if possible), account for adequate time to develop, review, and revise specifications; and occur more frequently than the 90% or 100% design.
15	OPCC and design review meetings were scheduled too close to one another to allow for a thorough and documented design review process (e.g., more time between the meetings may result in a better tracked log, more substantial comments, and easier to decipher and document design notes).	Lengthen time between meetings in order to track design changes more accurately. The PM should assign a Project Team member to track what the changes were and their respective values between the OPCC meetings/milestones.
16	Is there a preferred order to execute the OPCC versus the design review?	There was no consensus regarding the order. However, it was observed that there are positives and negatives to both and perhaps the process of developing an OPCC seems to be more insightful than just the review of design due to the nature of details associated with producing the estimate.
17	Was the OPCC reconciliation process helpful when it occurred within the week of the initial comparison?	Extremely helpful for clarification of risk issues and schedule. It also added benefits for others not involved. Lessons learned would be to limit the active participants to a small group, but allow Department staff to observe with only limited participation in order to become more informed (e.g., bid items, pricing issues, developing engineer's estimate).
18	What is the appropriate use and usefulness of Exhibit 1?	Exhibit 1 defines the guidelines for how to develop the OPCC estimate (including terms, definitions, and expectations). Exhibit 1 should be considered a dynamic tool (not a fixed set of guidelines). We should determine the terms/definitions early in the process and periodically revisit these terms and definitions prior to each OPCC.  Consider having Contract Administration: Contract Services oversee the OPCC cost comparison spreadsheets. Consider having the ICE as the overseer of Exhibit 1 (e.g., log changes and modify terms/definitions).

# CMAR Lessons Learned

## Moana Interchange Improvements

Preconstruction Engineering & Early Procurement		
No.	Issue/Observations	Recommendation
19	The application of the Engineer's Estimate in the OPCC reviews is problematic due to its different estimating approach when compared to the ICE and the contractor. Does the Engineer's Estimate have value when one is comparing with production-based estimating processes?	The aggregate total of the Engineer's Estimate has applicability in establishing another data point for comparison of reasonableness in the project costs. Suggest comparing the "all in" item costs as well as breaking out directs for CMAR and ICE comparison and discussion.
20	How do we get the benefit of the Engineer's Estimate into the discussion during the OPCCs and GMP bid?	We recommend that the OPCC comparison will evaluate the ICE and CMAR estimates broken down by direct costs, overhead, and profit for each contract item. Additionally, the ICE, CMAR, and Engineer's Estimate will be compared by unit and total price for each contract item. Consider sharing with CMAR and ICE the comparison parameters (green and red ranges) for the subtotals of the work breakdown for each discipline (e.g., roadway, bridge, landscape).
21	Was the OPCC excel spreadsheet usable regarding format and structure?	As noted, we suggest including sub totals of the work breakdown for each discipline (e.g., roadway, bridge, landscape). The OPCC format evolved through the process, and we recommend keeping the final format that was used for the OPCC 2a for future OPCCs.
22	What value did the team see in the comparison of the Engineer's Estimate with the ICE and contractor?	Currently, the Engineer's Estimate subtotals of the work breakdown for each discipline (e.g., roadway, bridge, landscape) and the aggregate total appear useful for comparison with the same items under the ICE and contractor's estimates.
23	How might the Engineer's Estimate be improved to account for knowledge acquired (e.g., site conditions, material to be used, equipment, labor, approach to construction) during OPCC discussions to adjust the unit pricing of individual contract item so that these items may be relied upon for comparison with the ICE and contractor's unit item totals?	We desire the Engineer's Estimate to reflect the knowledge gained during the OPCCs. We suggest that the lead designer and the bid tab evaluator attend the initial approach to cost meeting and each OPCC meeting to understand project specifics that may affect pricing of the project. From this, the lead designer and bid tab evaluator should reconcile the Engineer's Estimate after each OPCC meeting, similar to that of the ICE and contractor. Disagreements and discussion regarding conflicting opinions are necessary to aid understanding.
24	How do we keep all parties informed of project decisions that may affect pricing? Example: the Department agreement with adjacent contractor to allow 24-hour access to close ramps.	One of the purposes of the OPCC meeting is to gain a common understanding of the work, discuss approaches to accomplish that work, and seek ideas to reduce cost and schedule in accomplishing that work. Per the example, the 24-hour access of the adjacent contractor to the Moana ramp closures was discovered through discussions of the traffic control cost unit item during the OPCC reconciliation meeting. This allowed for a discussion and greater understanding of the assumptions in the traffic control unit pricing, and it was determined that there was no need for increase price to the project to fulfill this requirement. Subsequently, all parties arrived at a common understanding of how to mitigate this issue without an increased cost to the project by reviewing the adjacent contractor's schedule of work and recognizing that its operations would not require access during construction of the Moana project.
25	The Project Team was able to eliminate some unnecessary elements (joint layout, traffic control plans) with contractor input earlier on.	The designers gained insight into constructability of the joint layout that affected their development of plans that they otherwise would not have considered without contractor input. Consider and encourage frequent and ongoing communication and interaction of contractor and designer. Consider ways to incentivize and celebrate when solutions are arrived at by this teamed approach.

# CMAR Lessons Learned

## Moana Interchange Improvements

### Preconstruction Engineering & Early Procurement

No.	Issue/Observations	Recommendation
26	The Project Team believes there is value in continual engagement with the designer into and through the construction phase.	Encourage and allow the designers to interface with the contractor during construction to validate or gain additional insight into the constructability issues previously discussed during pre-construction. This allows the designer to incorporate the vantage point of constructability into future designs.
27	Open book negotiating was very successful on this project.	Continue to use this process on future CMAR projects. In the case of Moana, it was observed that the ICE and the contractor approached negotiations from a constructive collaboration versus a defensive position.
28	Schedule development was successful because the ICE and the contractor worked together.	We recommend that the ICE develop the schedule to the 60% level, and then the contractor owns the schedule from 60% on. Consideration for subcontract qualification, solicitation, and selection should be included in the schedule as early in the project development as possible.
29	Risk management went well. The process helped flesh out some issues that were incorporated into the design and ultimately saved the project money and time (subgrade prep for example). The Project Team felt Risk Meeting #1 was the first time the entire Project Team was working toward a common goal. This process seemed to set the tone for the remainder of the pre-construction phase. The Decision Analysis Resolution Tool (DART) process was perceived as added value.	Continue to use this risk management process on future CMAR projects. Incorporate risk discussions during the bi-monthly progress meetings. There must be a willingness of all parties to consider approaches to mitigating risks in a nontraditional manner. Suggest that the Project Manager gain buy off and seek support from leadership to encourage the Project Team in implementing the non-traditional solutions.
30	Interjection of the Department's view of a subcontractor's past performance in connection with the contractor's selection of a subcontractor.	Consider including design discipline specific oversight within the subcontractor procurement and selection process so as to provide the most relevant history and feedback regarding the subcontractors proposing and their past performance.

# CMAR Lessons Learned

## Moana Interchange Improvements

Contract Development		
No.	Issue	Recommendation
1	<p>Functional staff were not given enough time to follow their "normal" processes, nor given enough time to develop CMAR-specific processes. Where CMAR projects require FHWA full oversight, these projects require more "normal" processing time than those without full oversight.</p>	<p>Document the FHWA oversight activities and their related timeframes. Obtain confirmation from relevant functional staff of it's accuracy. Schedule enough time at each activity to allow for "normal" processes. Offer as much advance warning as possible of exactly when the functional staff will be required to expedite processes (also see "Communication" below). Allow enough time to procure the project via design-bid-build should a GMP not be reached.</p>
2	<p>Subcontracting Plan did not adequately address procurement of DBEs.</p>	<p>Require in the Pre-Construction Services Agreement that the contractor's subcontracting plan include the Department's DBE goal (or percentage range) as early in the project development process as possible. This subcontracting plan should account for the specific requirements under NRS 338 and the SPWD rule making for subcontracting under CMAR. Additionally, the contractor should work with the Department (Contract Administration: Contract Compliance Group) and FHWA to document what is acceptable to the Department and FHWA when substantiating what "the good faith efforts" are and how each can be satisfied on the project. The subcontracting plan should include a description of the outreach efforts that the contractor will do (e.g., phone calls, meetings, pre-solicitation, workshops, methods of advertisement). The Department's Contract Administration: Contract Compliance Group and FHWA should periodically review this subcontracting plan and provide direction and suggestion for improvements. The contractor shall include updates to the plan reflecting this direction as documentation of their "good faith efforts." In this way, we are effectively meeting the CMAR intent of collaborative teamwork to accomplish a project goal. Note: when developing the subcontracting plan, the Project Team should recognize that DBE involvement is not exclusively subcontracted.</p>

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# CMAR Lessons Learned

## Moana Interchange Improvements

Contract Development		
No.	Issue	Recommendation
3	Contractor did not design or implement Subcontracting Plan with DBE Goal in mind, nor perform or track adequate Good Faith Efforts.	Contract Administration: Contract Compliance Group is to set a DBE goal range (e.g., 6% to 8%) at 60% design and a final goal before GMP. Contract Administration: Contract Compliance Group would review the contractor's subcontracting plan for the potential to attain the DBE goal and the documented "good faith efforts."
4	GMP was due within 10 days of the contractor receiving subcontractor bids. NRS 338 requires no less than 10 days of receipt of subcontractor proposals before notifying subcontractors of their selection. This circumstance put the contractor at risk for the subcontractor's prices for which the contractor's used in the GMP bid.	Schedule CMAR subcontractor bids at least 10 business days prior to GMP or have the Project Team discuss the implications of the risk to the project of having the contractor take on this risk.
5	Contract Services is unclear on what is confidential, when & why. Engineer's Estimate is "confidential" - do we have to leave it off the Processing Memo and advertised Contract Documents? Is it OK to publish the ICE bid (it's on the Bid Tab which is part of the Board packet)?	<p>Engineer's Estimate and ICE's estimate remain confidential and blind from the contractor until the GMP is negotiated and accepted. Should the GMP #2 not be accepted, these estimates should not be discoverable by the public. The project would proceed to a "low bid" contract execution process. After the Board approves award, all of this information becomes public.</p> <p>The processing memo and advertised contract documents proceed after acceptance of the GMP bid. Therefore, the Engineer's Estimate may be released for public view.</p> <p>Yes, it is okay to publish the ICE's estimate in the Board packet, which is also available for public view.</p> <p>Document the contract administration activities and their related timeframes necessary to publish the preliminary estimates, plans &amp; specs, bid tab, Notice of Intent to Award, Notice of Award, processing memo, Board packet, etc. Obtain confirmation from relevant functional staff of it's accuracy.</p>
6	Terms of the Construction Contract were outlined in their anticipated or probable format in the Pre-Construction Services Agreement without coordination with Contract Services and/or the Contract Form.	Involve Contract Administration: Contract Services in finalizing the form of the Construction Contract to be referenced in the Pre-Construction Services Agreement to define terms and conditions. Verify updates to Federal Required Contract Provisions and avoid foreseeable conflicts in terms.
7	The requirements of the CMAR project caused several elements of the contract documents (Standard Specifications, Special Provisions, Invitation to Bid, & Contract Form) to either not apply or no longer make sense. In addition, there was a goal to be able to "immediately convert" to Design-Bid-Build if necessary, which prevented documents being clear and accurate as a whole.	Involve Design, Specifications, and Contract Administration: Contract Services early in the process, detailing specific differences between the CMAR project and a regular design-bid-build, allowing adequate time for review and revision of contract documents. Finalize the form of the Construction Contract to ensure consistency among the various contract documents (e.g., the Silver Book, special provisions). As a part of finalization of the Construction Contract for CMAR delivery, identify the modifications to the Construction Contract that may be needed if the project reverts to design-bid-build.

# CMAR Lessons Learned

## Moana Interchange Improvements

Contract Development		
No.	Issue	Recommendation
8	Notice of Intent to Award vs. Notice of Award caused confusion about processes. Contract Services treated them as one & the same as much as possible, Contract Compliance was unsure about when to send Subcontractor Packets, and Financial Management is waiting until Board approval to award before requesting Funding approval.	<p>Document the activities starting at Notice of Intent to Award through Notice to Proceed, the associated Department parties involved, and the associated timeframes so that all Divisions are treating the process from the same vantage point. Obtain confirmation from relevant functional staff of it's accuracy. Consideration may be allowed to allow enough time for routine Board approval to award and then execute Notice to Proceed at least 30 days later, or have all Divisions treating the Notice of Intent to Award as the Notice of Award.</p> <p>Note: Consider the steps required by financial management, FHWA, and the construction office when identifying these activities.</p>
9	Needed clarification on how to pay the Risk Reserve bid item.	Follow the existing change order process currently in use with relevant checks and balances to ensure FHWA reimbursement. The actual document will not be a change order; it will be a Risk Reserve payment, but it will follow the change order process (and does not require Board approval as long as the Risk Reserve is not exhausted).
10	There was a small "test" landscape area that required a sole source procurement. Fortunately it was very small, but if it was larger it would have caused problems with Funding/FHWA approval.	Avoid sole source procurements on CMAR projects.
11	Communication as to the project schedule was disjointed and did not always reach all the relevant parties.	<p>Develop a contact list for each CMAR project to include a core group of functional staff and some project-specific staff who will need to know the project schedule and any changes to it. This will help with planning, scheduling, and anticipating those "rush" processes as needed. Communication of the anticipated schedule should begin before issuing the RFP for Pre-Construction Services.</p> <p>Consider including the following individual (and position): Jeff Shapiro, Cecelia Whited, Sharon Foerschler (Dist II and III), Todd Montgomery (Dist I), Karen Liebherr, Jenni Eyerly, Melissa Costa, Dana Olivera, April Pogue, Kathy Souza, Designer, &amp; Spec Writer.</p>
12	How do you account for DBE compliance within the EBS system under CMAR?	Confirm with Contract Administration: Contract Compliance Group and FHWA that the efforts documented in accordance with the subcontracting plan (having received input and direction from both Contract Administration: Contract Compliance Group and FHWA) will suffice to meet the "good faith efforts" requirements. As such, this will alleviate the need to replicate this information into the EBS system. Seek to do this prior to GMP bid.
13	Dissemination of project information in the bid room was cause of confusion for the contracting community regarding solicitation.	Modify the description of the external bid room documents for CMAR projects to alert outside parties that it is a CMAR project.

# CMAR Lessons Learned

## Moana Interchange Improvements

Construction		
No.	Issue	Recommendation
1	How do we manage the pre-ordering of materials at-risk by the contractor prior to contract execution and Notice to Proceed? This can occur because of a compressed project schedule. On Moana, the project carried up to \$500,000 in material procurement risk (e.g., steel dowels).	<p>Mitigate these issues through the consideration of three options:</p> <p><b>Option 1:</b> Execute the contract documents and approvals resulting in a Notice to Proceed in accordance with the standard design-bid-build delivery. Account for needed processing time within the CMAR delivery schedule (e.g., 45 to 60 days after GMP bid).</p> <p><b>Option 2:</b> Execute multiple Notices to Proceed to allow non-field work items (e.g., early material procurement, mix design, and shop drawing approvals) to occur prior to execution of the primary construction contract.</p> <p><b>Option 3:</b> Use a pre-construction services agreement as the vehicle to allow payment for otherwise at-risk early procurement of project materials.</p>
2	How do we enhance relationship building and project understanding of field personnel prior to construction? This applies to Department staff, the CMAR Project Team in general, and contractor staff not involved in the pre-construction development process and/or partnering sessions on a regular basis.	Capitalize on partnership established during pre-construction. Invite and incorporate Department construction crew and contractor field personnel in the pre-construction partnering sessions. Provide opportunities to bring these individuals together to understand commitments, risks, and approaches discussed during the pre-construction development meetings.
3	There is a potential loss of project continuity through the replacement of CMAR Project Team members that were engaged during the pre-construction phase but who transitioned out before substantial completion of construction activities.	<p>Consider contractual requirements with consequences for the failure of the contractor or ICE to continue to provide Key Personnel involved in project development through to project delivery. Consider communicating involvement activities of each CMAR Project Team personnel to help the Department understand the value of maintaining staff continuity.</p> <p>Recommend including change management procedures in a project management plan for the construction phase to account for changes in Department personnel during construction. These procedures would include how to transfer knowledge and expectations to new personnel who are unfamiliar with the project and its development discussions. Partnering efforts can also be a mechanism for identifying how to handle this.</p>
4	The transfer of project knowledge from pre-construction to construction field personnel relied heavily upon daily phone calls and contact between the resident engineer, Department construction crews, and contractor personnel. The designer and Project Manager involvement must be maintained into and throughout construction for continuity during construction.	Prepare a project management plan for the construction phase that will be referenced by all CMAR Project Team members. Use partnering workshops to clarify roles, responsibilities, communications, and expectations for CMAR Project Team involvement during construction. Include a mechanism for construction personnel to access the designer during the construction.
5	Decision making roles during construction were no different than that of traditional construction delivery. Field issues were handled through normal construction crew and contractor line of responsibility.	No Action

# CMAR Lessons Learned

## Moana Interchange Improvements

Construction		
No.	Issue	Recommendation
6	The Project Team observed a benefit from design personnel involvement during construction. Example: Field observation by the Department's Senior Geotech Engineer added value for the Department in that the Department could further understand the impact of design and specifications on field efforts. Department Traffic and Signals, Roadway Design, and Landscaping disciplines all benefited from direct field involvement.	Document within the project management plan for the construction phase a formal line of responsibility and ownership for decision making and communication related to construction. To ensure all Project Team members are aware of outcomes/decisions made during construction encourage communication and documentation of decisions.
7	Availability and knowledge of the risk reserve sum created more certainty and quicker action to address risks that arose on site. An example of this was the project experiencing a design change to accommodate a hydraulic issue.	No Action
8	The approach to risk documentation and feedback was considered a benefit. Specifically valuable was the tracking of risk and associated cost on a regular basis to provide continuous feedback, to assess mitigation, and to reduce costs.	During the later portions of the pre-construction phase, reduce the time spent in formalized, facilitated risk workshops. Continue to track and status the management of risk in regularly scheduled team meetings.
9	Discussions leading to the development of the risk reserve sum were considered valuable when understanding risk issues well before they arose in the field. This allowed for decisions during construction to be reached quicker than normal and with more trust and confidence in meeting expected outcomes.	No Action
10	The focus on risk management and mitigation during the preconstruction phase changed the way the project was approached in construction and was impactful because the cost figures discussed would be tangibly input into contract documents, not just an exercise on paper.	Recommend that all team leaders, Design, REs, PMs, CMAR Project Managers "grease the wheels" with staff to describe the intent and value of being actively engaged in those risk meetings, dialogue, and ownership of solutions.
11	Description of the risk reserve sum and risk reserve sum specification effectively identified the categories of risk and how the sum came to be. These risks represented those that could not be allocated to the contractor but may occur.	No Action
12	Decisions regarding quantity risk allocation came too late in the design development and bid process.	Establish the requirements/rules for ownership of quantity risk early in the pre-construction process (e.g., at 60 percent design).
13	The CMAR is able to track the actual quantities for self performed items of work, but not for subcontractor performed effort. The Department tracked actual contract item quantities as done with traditional contract oversight effort. Both parties felt this was valuable to support justification and clarity of issues should field conditions change dramatically from presumed during the design development phase.	Continue tracking field quantities and comparing this data with contract-planned quantities by both the Department and the contractor. Compare and provide feedback to the designer regarding observed discrepancies. Use this information as a performance measure.

# CMAR Lessons Learned

## Moana Interchange Improvements

Construction		
No.	Issue	Recommendation
14	A form for documenting the use of the risk reserve sum was created with approval threshold levels of \$25,000, \$50,000, and \$100,000.	Recommend inclusion of this form in the project management plan for the construction phase to alert all CMAR Project Team members of its use and approval requirements.
15	Internal coding of project payments to the proper Department budgets was incorrect.	Recommend that the project management plan for the construction phase clearly defines accounting requirements and differentiates between costs to be allocated to the Alternative Project Delivery program versus construction division budgets.
16	Decisions regarding inclusion and magnitude of liquidated damages came too late in the design development and bid process.	Establish the terms for liquidated damages early on in the pre-construction phase (e.g., at 60 percent design).
17	Is it valuable to have a category in the risk reserve sum/specification for "schedule" risks?	Inherently, schedule impact for the contractor is accounted for within the contractor's assessment of schedule risk under their assignment of cost to their anticipated production rates in the build up of the project estimates. The CMAR Project Team is to continuously work to identify risks to the schedule, avoid/or mitigate within the project approach, and ultimately document in the project's plans and specifications. No further action is required.
18	Who is to provide schedule management assistance during construction?	Consider retaining the ICE to support the Resident Engineer in evaluating the schedule on construction projects of 120 days or more. Work may include schedule update, review, and cost analysis for documenting the use of the risk reserve sum or change orders.
19	The appropriate level of design plan development for a successful CMAR-delivered project netted the following observations. <ul style="list-style-type: none"> <li>• Department construction crews indicated a need for items, such as structure lists and quantity breakouts.</li> </ul> Whereas, the contractor did not necessarily need the structural quantity breakouts. <ul style="list-style-type: none"> <li>• Traffic control plans were reduced in detail from traditional delivery plan set expectations, given the requirement for the contractor to provide for a certified traffic control set.</li> </ul>	The Project Team should retain a level of discretion to deviate from format standards as long as the plans and specifications clearly communicate all requirements.
20	Field survey completed by Department construction survey crew was highly valuable to get hard data to the designer during pre-construction development. This has not been a conventional practice of the Department under traditional design-bid-build delivery.	The Department is now requesting construction survey crew participation for traditional design-bid-build delivered projects in the pre-construction phase. Additionally, it is important to allow the designer to communicate directly with the survey crew in determining scope of survey work required.
21	The perceived credibility of having the contractor present with the public and interested impacted stakeholders during pre-construction development phase was valuable to moving the project forward. The public interaction with the contractor, who will be daily supervising work and fulfilling the commitments discussed or reached with the public, creates mutual trust and commitment from both the public and contractor.	No Action
22	Determination of and approval of DBE project goals early in the project was difficult.	Establish DBE percentage goal no later than the 60 percent design stage.

## CMAR Lessons Learned Moana Interchange Improvements

Construction		
No.	Issue	Recommendation
23	Resolve the potential for maintaining compliance with DBE requirements when a DBE subcontractor fails to perform and must be replaced.	Consider a contingency plan to substitute subcontractors that are non-performing.
24	Qualifications-based selection of subcontractors other than on the basis of lowest price. The Department is fairly well schooled in doing this and could guide the CMAR Project Team in developing a more detailed subcontractor selection plan with such metrics. The current statute related to subcontractor procurement merely states that "a subcontractor selected pursuant to subsection 9 need not be selected by the construction manager at risk solely on the basis of lowest price" (NRS338.16995 (9)).	It is recommended that a defensible qualification-based selection criteria be included in the original subcontractor procurement plan and conveyed appropriately to all proposing subcontractors, which will further advance the value-oriented approach that the CMAR process embodies.

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Attachment C: Project Delivery Selection Approach  
(PDSA)

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## Nevada Department of Transportation (NDOT) Project Delivery Selection Approach (PDSA)

### Overview

This Project Delivery Selection Approach (PDSA) provides a process to assist the Department in their selection of an appropriate project delivery method. The PDSA includes generic forms and questions for use by Department staff, the Project Manager, and the Project Delivery Selection Committee (PDSC). Every PDSC member must be generally familiar with the alternative contracting delivery methods discussed herein, the overview of these delivery methods provided below, and the applicable reference links attached. By applying the PDSA, the PDSC can arrive at a recommended project delivery method for each project evaluated. However, the Project Manager and Pioneer Program Manager are responsible for filling out the PDSA and the *Project Delivery Method Recommendation Form*. This recommendation will be forwarded to the Pioneer Program Director and the Department Director for a final determination on a delivery method.

The primary objectives of this document are to:

- Present a structured approach to assist Department staff in making project delivery method recommendations;
- Assist the Department in determining if there is a dominant or obvious choice of project delivery method for the project being evaluated; and
- Provide a project delivery method recommendation based on a consensus opinion by the Project Delivery Selection Committee (PDSC).

### Background

Currently, there are three types of project delivery methods available for publicly-funded transportation projects in Nevada. The two most common are the Design-Bid-Build (DBB) and the Design-Build (DB), with the Construction Manager at Risk (CMAR) method now considered for evaluation. The following paragraphs only briefly describe each delivery method. For a more complete description, see Section 1.4 of the Pioneer Program Guidelines and the attached reference links.

- DBB is the traditional project delivery method in which an agency designs a project and awards a construction contract to the lowest bidder based on the agency's completed construction documents. The agency "owns" the details of design during construction and the risk associated with any changed conditions, unknowns, errors, or omissions that are encountered during construction.

- DB is a project delivery method in which the agency contracts a single entity to complete design and construction of a project. Characteristically, a project is approximately 25 to 30 percent designed with a well-defined scope and knowledge of project risks at the point invitations to bid are requested via a value-based procurement. The design-builder retains the risks associated with design, quantities, constructability, etc. normally retained by the agency, resulting in greater cost and schedule certainty.
- CMAR is a project delivery method by which the agency leads a coordinated team, which works to develop design and construction documents in a manner to minimize overall project risk, improve project delivery schedule, and apply potential innovation to meet or exceed project goals. The other two members of the team, the designer and contractor, individually and independently are contracted and directly are accountable to the agency. Characteristically, a project is approximately 5 to 10 percent designed with a partially defined scope and vague knowledge and definition of associated risk when invitations to participate on the project's pre-construction team are released. The procurement of the contractor is done through qualifications and/or value-based selection for pre-construction and construction services. The contractor is obtained early in the design phase, allowing for the contractor to offer expertise with regard to the schedule, budget, constructability, as well as the identification, evaluation, and mitigation of risk. Upon final design of the project, or a portion thereof, the agency will ask the contractor to submit a fixed-price bid. The agency and the contractor may negotiate reassignment of risk if the agency finds the bid too high. If the parties cannot agree on a price, the agency may release the project for bid using the DBB method. The contractor may enter into a fixed-price contract with the agency based on a reasonable final cost and time of construction (agreeable to the agency) to complete the project. This method allows the agency to control the development of scope, understand and allocate project risk, encourage the use of new construction techniques, and phase project delivery to reduce overall delivery costs and schedule.

It should be noted that one can use different methods on the same project, and the objective is to recommend the best delivery method for the project. Each project delivery method is distinguished by how risk is managed and how the project's scope, schedule, and budget are managed. Each of the delivery methods poses both overlapping and unique advantages as well as associated disadvantages in their use. Each project must be evaluated individually, taking into consideration project goals, prioritization of project goals as each relates to the Department's overall mission, and the attributes of each delivery method in meeting or exceeding a project's goals.

**Step-by-step Project Delivery Selection Approach**

The PDSC should use their professional judgment when recommending the most appropriate delivery method. This PDSA provides a systematic approach to understanding the delivery options; defining project goals, challenges, and opportunities; evaluating potential delivery methods; compiling the results in descending preference; and, lastly, recommending the appropriate delivery method for the project.

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Step 1 is for the Project Manager, with assistance from the Project Management Team (PMT) (defined below) and other Department staff as necessary, to research and understand the various elements of the project. The following is a list of representative information that the Project Manager must consider in order to provide the PDSC the necessary information to appropriately apply the PDSA. The checklist is not exhaustive, and certain elements might not be known at the time of evaluation. Other items can be added if they influence the project delivery decision, and relevant information can be appended.

- 1) Project Name
- 2) Project Location
- 3) Project Sponsor
  - Local
  - State
  - Federal
- 4) Project Description
  - Purpose and Need
- 5) Estimated Project Cost Range (Total)
- 6) Budget Availability (Yr. and Qtr.)
- 7) On State Transportation Improvement Program (STIP)? (Fiscal Year)
- 8) NEPA Status
- 9) Right of Way Status
- 10) Desired Project Delivery Date (Yr. and Qtr.): Start of construction and substantial completion of construction
  - Established by what entity?
  - For what purpose?
- 11) Funding Source(s): Local, State, FHWA, etc.
- 12) Project Corridor
  - Corridor Plans
  - Adjacent Projects (status of existing and future projects [3 to 5 years])
- 13) Major Project Features: Pavement, bridge, sound barriers, etc.
- 14) Schedule Milestones: Milestones could include start of construction, end of construction, deliverables, etc.
- 15) Stakeholders
  - Third Party
  - Regulatory Agencies
  - Utility
  - Railroad
  - General Public
  - Other Governmental Interest
- 16) Major Challenges

- With Right of Way, Utilities, Environmental Approvals, Permits, and Clearances
- During Construction Phase
- Specialty Items or Constructability Issues

17) Sources of Risk

- Design Risk by Discipline: Potential risk related to Utility, Structure, Right of Way Acquisition, Environmental Commitments, Definition of Scope, etc.
- Construction Risk: Potential risk for Geotechnical, Dewatering, Material Sources, Maintenance of Traffic, Environmental Constraints, Long-lead Items, Utilities, etc.

18) Potential for Innovation

19) Availability of Department Resources to Support Delivery Schedule

20) Prior Project Work (including design) and Project Status

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Given that the understanding of the project is completed (Step 1), Step 2 is for the Project Manager, with assistance from the PMT and the Department staff as necessary and input from the Pioneer Program Director and other significant stakeholders as necessary, to clearly define and agree on measurable project goals, challenges, and opportunities in which the PDSC will use to appropriately apply the PDSA.

Typically, the project goals can be defined in five to ten items. Examples are provided in Appendix B. The PDSC is to consult the Project Manager, the Deputy Director (as applicable), and other significant stakeholders to assist in understanding and developing the project goals. These goals are intended to remain consistent over the life of the project.

Project Goals (Enter the project-specific goals as follows):

1. Goal #1
2. Goal #2
3. Goal #3
4. Goal #4
5. Goal #5

Once the Project Manager has defined the project goals, it is critical to define elements of the project that would create the greatest challenges and opportunities related to achieving these project goals. Below are examples of various elements one might consider.

<p><b>Opportunities</b></p> <p>What opportunities enhance achieving project goals?</p>	<p><b>Challenges</b></p> <p>What challenges hinder achieving project goals?</p>
<ul style="list-style-type: none"> <li>• Innovations to reduce maintenance of traffic impacts</li> <li>• Improve water quality</li> <li>• Life cycle benefits</li> <li>• Enhance safety</li> </ul>	<ul style="list-style-type: none"> <li>• Utility conflicts</li> <li>• Railroad conflicts</li> <li>• Right-of-way acquisition delays</li> <li>• Lack of definition of aesthetics</li> <li>• Undefined project limits</li> </ul>

Do these elements constitute a good description of the issues of complexity or risks associated with delivery of the project? Yes:  No:

If no, the Project Manager should reevaluate the project goals and the project opportunities and challenges until they represent a good description of the issues of complexity or risks associated with delivery of the project.

**End Result:** The Project Manager will have an understanding of the project goals and a clear definition of challenges, opportunities, issues of complexity, and associated risks that can be communicated to the PDSC to appropriately apply the PDSA.



### Step 3: Evaluating the Appropriateness of a Delivery Method

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Step 3 is for the PDSC to evaluate the appropriateness of each delivery method to the project. NDOT and the Federal Highway Administration (FHWA) have identified five criteria for determining the appropriateness of applying an alternative delivery method. These criteria are:

1. Cost Impacts
2. Schedule Impacts
3. Opportunity to Manage Risk
4. Complexity of Design and Construction Phasing
5. Opportunity for Innovation

This tool provides a list of typical advantages and disadvantages associated with each delivery method that are to be considered when evaluating a delivery method's appropriateness for the specific project. This list of advantages and disadvantages is not exhaustive, and the PDSC will supplement additional characteristics, when appropriate, that further describe the advantages and disadvantages of the delivery method from their knowledge of the method and their professional judgment.

Based on their understanding of the delivery method's advantages and disadvantages as well as the Project's goals, challenges, opportunities, risks, and complexities, the PDSC will form a consensus opinion of the most appropriate delivery method for each of the five criteria, and then summarize the key issues considered in arriving at this opinion.

For each of the five (5) criteria, the PDSC should consider the preferred delivery method in descending order by circling the "green," "yellow," or "orange" markers. **Note:** Each delivery method must be rated by one of the three colors under each criterion, and each color may only be used once under each criterion.

**Criterion 1: Cost Impacts**

**Overview:** This criterion considers aspects of project cost and must be evaluated with respect to previously defined budget goals of the project, e.g., the ability of a given delivery method to handle budget restrictions, identify early and precise cost estimates, and control of all project costs, not just construction. In other words, this criterion assesses the abilities of each delivery method in terms of cost estimating and project budget control.

Delivery Method	Potential Advantages	Potential Disadvantages	Preference (Circle One <sup>1</sup> )
DBB	<ul style="list-style-type: none"> <li>NDOT is assured the lowest price of the bid package because of competitive bidding.</li> </ul>	<ul style="list-style-type: none"> <li>NDOT may experience less cost certainty from change orders stemming from errors, omissions, and unknowns.</li> <li>Once the bid is open, NDOT may incur costs associated with any changes.</li> </ul>	
DB	<ul style="list-style-type: none"> <li>NDOT may benefit from documentation of a fair price due to competitive bidding.</li> <li>NDOT may benefit from cost certainty at the award of construction (e.g., no or limited change orders) due to the contractor's ownership or increased knowledge of project risks.</li> <li>NDOT may benefit from cost certainty because the contractor accepts the risks associated with design, quantities, constructability, etc.</li> <li>NDOT may benefit from Alternative Technical Concepts from losing Proposers who received a stipend.</li> </ul>	<ul style="list-style-type: none"> <li>NDOT may experience an increase in cost for transfer of risk to the contractor.</li> <li>NDOT may not receive full cost savings for contractor innovation.</li> <li>NDOT pays for RFP development by multiple contractors.</li> <li>NDOT pays for contractor involvement in design work.</li> <li>NDOT experiences increased internal costs for staff to administer procurement and support the design phase.</li> </ul>	
CMAR	<ul style="list-style-type: none"> <li>NDOT may benefit from cost certainty at the award of construction (e.g., no or limited change orders) due to the contractor's ownership or increased knowledge of project risks.</li> <li>NDOT may reduce overall project costs from avoidance, allocation, or mitigation of a project's risks during design development.</li> <li>NDOT may reduce overall project costs from contractor input on constructability, cost saving innovations, and value engineering input.</li> <li>NDOT may make better quality design solutions with contractor input on cost.</li> </ul>	<ul style="list-style-type: none"> <li>NDOT pays for contractor involvement in design work.</li> <li>NDOT is not assured of receiving the lowest price without competitive bidding.</li> <li>NDOT experiences increased internal costs for staff to administer procurement and support the design phase.</li> </ul>	

Summary of key issues justifying the above opinion:

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<sup>1</sup> **Note:** Each delivery method must be rated by one of the three colors, and a color may only be used once. = Most appropriate = Neutral = Least Appropriate

**Criterion 2: Schedule Impacts**

**Overview:** This criterion considers aspects of project schedule including the ability to shorten the schedule and the opportunity to control and prevent time growth. In other words, this criterion addresses the abilities of each delivery method in terms of schedule compression and control.

Delivery Method	Potential Advantages	Potential Disadvantages	Preference (Circle One <sup>2</sup> )
DBB	<ul style="list-style-type: none"> <li>NDOT can expect a higher probability of completing construction on schedule because third-party agreements (e.g., right-of-way acquisition, utilities, railroads) are normally completed prior to construction beginning.</li> </ul>	<ul style="list-style-type: none"> <li>NDOT may experience a delay in project completion stemming from time extensions to resolve errors, omissions, and unknowns in construction.</li> <li>NDOT may have a delay in schedule due to the awarding of an under-qualified, low-bid contractor.</li> <li>NDOT may experience schedule delay because the DBB process is normally sequential with few options to accelerate delivery.</li> </ul>	
DB	<ul style="list-style-type: none"> <li>NDOT can expect a higher probability of completing construction on schedule because the contractor accepts the schedule risks associated with design, quantities, constructability, etc.</li> <li>NDOT may benefit from the potential for a shortened project delivery due to parallel design and construction activity.</li> </ul>	<ul style="list-style-type: none"> <li>NDOT may have to allot considerable time and staff effort for the preparation and evaluation of the RFQ and RFP as well as during the design phase.</li> </ul>	
CMAR	<ul style="list-style-type: none"> <li>NDOT may be able to compress the schedule through an early start and the shortening of the amount of time between design and construction (e.g., early procurement of long lead items, utility relocation, earthwork, etc.).</li> <li>NDOT may be take advantage of an innovative approach to maintenance of traffic, reducing delay to the travelling public.</li> </ul>	<ul style="list-style-type: none"> <li>NDOT may experience an increase in schedule due to the time needed to agree on price or, in the extreme case in the absence of an agreement, requiring advertising for competitive bids.</li> <li>NDOT may have to allot considerable time and staff effort for the preparation and evaluation of the RFP as well as during the pre-construction phase.</li> </ul>	

Summary of key issues justifying the above opinion:

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<sup>2</sup> **Note:** Each delivery method must be rated by one of the three colors, and a color may only be used once. = Most appropriate = Neutral = Least Appropriate

**Criterion 3: Opportunity to Manage Risk**

**Overview:** Every project has some level of risk during various phases of its project development, and each delivery method handles risks differently in their ability to identify, quantify, and mitigate risks. The most effective approach to manage and allocate risks is to assign project risks to the parties in the best position to manage them.

Delivery Method	Potential Advantages	Potential Disadvantages	Preference (Circle One <sup>3</sup> )
DBB	<ul style="list-style-type: none"> <li>NDOT has the ability to mitigate risks that they may be positioned best to manage (e.g., third party utilities and right-of-way acquisitions), reducing potential risks and offering more project certainty.</li> </ul>	<ul style="list-style-type: none"> <li>NDOT may experience more change orders because they own risks associated with design, quantities, constructability, etc.</li> <li>NDOT is in the position of managing risk during construction, which is the most expensive time to resolve issues.</li> </ul>	
DB	<ul style="list-style-type: none"> <li>NDOT may experience fewer change orders because the contractor owns the risks associated with design, quantities, constructability, etc.</li> <li>NDOT is able to relinquish risks better managed by the contractor because the contractor's design and approach are tailored to the contractor's abilities.</li> </ul>	<ul style="list-style-type: none"> <li>NDOT may experience fewer bidders because of an increase in proposal costs.</li> <li>NDOT may inappropriately relinquish risk to the contractor that NDOT is more capable of managing, causing a negative impact to schedule, cost, or the public.</li> <li>NDOT may experience less innovation as the contractor may not introduce new construction methods or techniques to avoid taking on risk.</li> </ul>	
CMAR	<ul style="list-style-type: none"> <li>NDOT may reduce project risks resulting in improvements to schedule, cost, safety, quality, and public impacts because of contractor input during development of design.</li> <li>NDOT may reduce the risk of design rework and project unknowns (e.g., reduce right-of-way impacts and acquisitions and identify utilities before construction).</li> </ul>	<ul style="list-style-type: none"> <li>NDOT is least able to manage the risk of the public's and industry's perception of cost reasonableness.</li> <li>NDOT is least able to manage the risk of the public's and industry's perception of a CMAR selection.</li> </ul>	

Summary of key issues justifying the above opinion:

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<sup>3</sup> **Note:** Each delivery method must be rated by one of the three colors, and a color may only be used once. = Most appropriate = Neutral = Least Appropriate



## Step 4: Compiling the Results and Recommendation

### Criterion 4: Complexity of Design and Construction Phasing

**Overview:** This criterion considers aspects of a project that are unique or more complex than normally encountered. The factors may be associated with the unique project scope, goals, and objectives specified by the Department. Complexity may occur in the uniqueness of design, maintenance of traffic, phasing of the project, constructability, location of the project, unknowns, etc.

Delivery Method	Potential Advantages	Potential Disadvantages	Preference (Circle One <sup>4</sup> )
DBB	<ul style="list-style-type: none"> <li>NDOT has more time to develop design solutions.</li> </ul>	<ul style="list-style-type: none"> <li>NDOT would not gain constructability value from a contractor until after award, thereby potentially losing the benefit of cost savings.</li> <li>NDOT could experience a limitation for potential innovative constructability concepts.</li> <li>NDOT may incur a higher number of change orders from an inexperienced, low-bid contractor.</li> </ul>	
DB	<ul style="list-style-type: none"> <li>NDOT can transfer risk that could be better managed by the contractor, potentially improving constructability and reducing errors and change orders.</li> <li>NDOT gains the benefit of innovative ideas being integrated early in the design process.</li> </ul>	<ul style="list-style-type: none"> <li>NDOT has less control of the design and implementation.</li> <li>NDOT may incur unexpected project results due to the difficulty in scoping the unique issues and complexities of a project.</li> </ul>	
CMAR	<ul style="list-style-type: none"> <li>NDOT gains the benefit of innovative ideas being integrated early in the design process.</li> <li>NDOT may potentially reduce and mitigate project complexity through design, thereby gaining more certainty to cost, quality, and schedule delivery and construction.</li> </ul>	<ul style="list-style-type: none"> <li>NDOT may be in an undesirable negotiating position having to retain the contractor for subsequent construction project phases.</li> </ul>	

Summary of key issues justifying the above opinion:

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<sup>4</sup> **Note:** Each delivery method must be rated by one of the three colors, and a color may only be used once. = Most appropriate = Neutral = Least Appropriate



## Step 4: Compiling the Results and Recommendation

### Criterion 5: Opportunity for Innovation

**Overview:** This criterion considers the opportunity for encouraging and integrating innovation for new designs, products, technologies, project approaches, and construction techniques to achieve the project's goals.

Delivery Method	Potential Advantages	Potential Disadvantages	Preference (Circle One <sup>5</sup> )
DBB	<ul style="list-style-type: none"> <li>NDOT can select innovation independent of the contractor's experience or abilities.</li> <li>NDOT may gain greater buy-in of the agency for the implementation of innovation ideas given the agency's control of the value engineering process.</li> <li>NDOT has more time to explore and integrate opportunities for innovation.</li> </ul>	<ul style="list-style-type: none"> <li>NDOT may be limited to integrate innovations by using a low-bid contractor instead of a contractor selected on qualifications.</li> <li>NDOT may incur cost and/or schedule impacts from introduction of NDOT-derived innovations that may not be constructible.</li> <li>NDOT may have to dedicate additional resources to approve and confirm the success of innovative concepts.</li> </ul>	
DB	<ul style="list-style-type: none"> <li>NDOT gains the benefit of contractor-derived innovative ideas being introduced early in the design process.</li> </ul>	<ul style="list-style-type: none"> <li>NDOT may not experience the full opportunity to innovate because innovation may be limited by contractor abilities, comfort, and time constraints to prepare an RFP.</li> <li>NDOT may not realize savings from innovations because the saving usually accrues to the contractor.</li> </ul>	
CMAR	<ul style="list-style-type: none"> <li>NDOT can encourage innovation because risk is better identified and communicated.</li> <li>NDOT can reduce the constraints related to the contractor's abilities, level of comfort with innovative concepts, or time constraints, providing for increased opportunities for innovation.</li> <li>NDOT can benefit from contractor participation in helping to mitigate potential risk through the introduction of new technologies or innovative delivery.</li> </ul>	<ul style="list-style-type: none"> <li>NDOT may experience difficulty in negotiating the guaranteed maximum price due to inherent unknowns associated with the introduction of new innovative concepts.</li> </ul>	

Summary of key issues justifying the above opinion:

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<sup>5</sup> **Note:** Each delivery method must be rated by one of the three colors, and a color may only be used once. = Most appropriate = Neutral = Least Appropriate

Step 4a involves the color coding of each criterion cell based on the colors assigned in Step 3. An example of a completed table is provided.<sup>6</sup>

Step 4a

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

Step 4b is where the Project Manager and the PDSC summarize the delivery method preference. The PDSC will indicate (with a green, yellow, and orange color coding) the recommended delivery method for the project under evaluation. The recommended delivery method will be identified as green in a table similar to the example below, which shows that the CMAR delivery method is the recommended delivery method for the evaluated project.

Step 4b

Recommended Delivery Method		
DBB	DB	CMAR

The Project Manager and Pioneer Program Manager are to use the attached *Project Delivery Method Recommendation Form* to provide a delivery method recommendation to the Pioneer Program Director and Department Director for the project. When determining this recommendation, the Pioneer Program Manager will also consider factors such as program-level considerations, the number of projects to be delivered under a given method at a given time, the capacity of Department staffing to support project procurement and execution, FHWA input, current market conditions, and other factors. The Pioneer Program Director and

<sup>6</sup> Instruction for electronic users: To use this table electronically and fill in the assigned colors for each criterion and delivery method, the user must double click on the table above to access the table. Once the table is open, an EXCEL toolbar will exist where the WORD toolbar does now. On this toolbar, the user can click on three color styles (green, yellow, and orange) that are located just to the right of the conditional formatting button in order to color code the chosen cell. Complete this step for each cell. Once done, move and click the cursor on any narrative section outside of the table to return to the document.



#### Step 4: Compiling the Results and Recommendation

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Department Director will review the recommendation to make a final decision on a delivery method.

Additional instructions are included in Section 1.6.1 of the Pioneer Program Guidelines.

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## Appendix A: Delivery Method Reference Material

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For NDOT guidelines, see the Pioneer Program Guidelines at:

<http://www.nevadadot.com/uploadedFiles/NDOT/Micro-Sites/PioneerProgram/Pioneer%20Program%20Guidelines%203-14-11.pdf>

For the approved FHWA SEP-14 application, see:

<http://www.fhwa.dot.gov/programadmin/contracts/sep14nv2011.pdf>

For further material concerning various project delivery methods, see the Transportation Research Board's *Evaluation of Project Delivery Methods* at:

[http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_webdoc\\_41.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_webdoc_41.pdf)

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## Appendix B: Examples of Project Goals

The following project goals are examples for reference when defining and documenting goals specific to a project.

### General Project Goals

Schedule:

- Minimize project delivery time on a phase or the entire project in a desire to reach guaranteed maximum price in six months.
- Reach substantial completion by (month, year).

Cost:

- Minimize project cost.
- Maximize project budget.
- Complete the project on budget.

Quality:

- Meet or exceed maintenance of traffic requirements.
  - Maintain x lanes of traffic in each direction at all times during construction except for bridge replacements as noted below.
  - Limit road shut down to one consecutive 72-hour period through the duration of project.
- Provide the lowest life-cycle costs.

Note: Goals should be consistent with environmental documents when applicable.

### DB-oriented Project Goals

Schedule Issues:

- Substantial Completion (Final Acceptance) by (date/event)
- Substantial Completion (Final Acceptance) within \_\_\_\_ days of Notice to Proceed

Cost/Financial:

- Cost not to exceed \$\_\_\_\_\_
- Maintenance costs not to exceed \$\_\_\_\_\_
- Payment to the service provider to be paid over \_\_\_\_ years
- Borrowing cost not to exceed \_\_\_\_%

Quality/Innovation:

- Design life of \_\_\_\_ years
- Warranty of \_\_\_\_ years
- Minimize disruption to residents, businesses, and the traveling public during construction
- Provide aesthetic solution to minimize visual impact

Scope:

- Available funding to build \_\_\_\_\_
- Available funding to build \_\_\_\_\_ lane miles

Risk Allocation:

- Shift \_\_\_\_ risks to Design-Builder

**CMAR-oriented Project Goals**

- Minimize conflict of the work effort with the adjacent contractor, while achieving seamless construction from the vantage point of the public between the Department's Project and the RTC's Moana Lane Widening Project.
- Minimize delays and impacts to the traveling public, local residents, and local businesses, while maintaining pedestrian movement at all times during construction.
- Establish open, timely, and accurate communication and coordination with the public and the Project stakeholders through the Department.
- Reach a fair and reasonable Construction GMP in order to award a Construction Contract on October 8, 2012 or earlier so as to achieve seamless construction from the vantage point of the public between this Project and the RTC's Moana Lane Widening Project.
- Achieve the Project schedule of completing work within one (1) concurrent construction season and achieve substantial completion no later than July 1, 2013.
- Build a professional and collaborative Project Team.
- Strive to achieve zero (0) change orders on the Project.



## Project Delivery Method Recommendation Form

Project Name: \_\_\_\_\_

Step 4a

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

● = Most appropriate  
 ● = Neutral  
 ● = Least Appropriate

Step 4b

Recommended Delivery Method		
DBB	DB	CMAR

Summary of key issues justifying the above opinion:

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