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INITIAL CONCEPTS AND EVALUATION REPORT

I-80 EAST WIDENING
INTERSTATE
NEVADA
80
RENO/SPARKS

Nevada Department of Transportation

I-80 East Widening NEPA

January 2024

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1/18/2024

Introduction

Background.

As Northern Nevada continues to see development and population increases, operations and safety of the Interstate system in the area continue to degrade. The section of I-80 between Vista Boulevard and USA Parkway (SR-439) has specifically seen a significant increase in congestion and safety issues. Approximately half of this thirteen (13)-mile corridor is constrained in a canyon with steep slopes on the north side and the Truckee River and Union Pacific Railroad (UPRR) facilities on the south. NDOT is proposing to improve traffic operations and enhance safety for this area. By widening from four (4) to six (6) lanes, increasing shoulder widths, and incorporating Intelligent Transportation Systems (ITS) and other traffic safety improvements.

Figure 1 – I-80 Corridor Looking West

The purpose of this Project is to perform the necessary studies, documentation, and outreach required to obtain the appropriate environmental clearances and permits through evaluating widening alternatives to select a preferred alternative(s) on I-80 from Vista Boulevard to USA Parkway.

Project Goals.

The goals of the Project are as follows:

- Complete the Project NEPA and environmental clearance requirements
- Identify risks to NEPA completion and project implementation, and through innovative design or other means, minimize environmental impacts and/or potential project delays.
- Engage Project stakeholders and initiate public outreach early in the NEPA process to identify project concerns or issues and implement timely review and resolutions to facilitate accelerated NEPA completion.
- Improve safety, operations, and mobility on I-80 from the City of Sparks to USA Parkway.

This memorandum summarizes the initial concept development and compilation, discusses the initial evaluation and screening criteria, and then provides a recommendation of the most viable concepts for further design development and evaluation.

Concepts were developed to comply with the I-80 East Widening NEPA and Preliminary Design Criteria Report, dated August 2023. A copy of that report is included in Appendix A.

Screening Criteria

The screening criteria was developed closely following NDOT's One Nevada critical goals: Safety, Preserve Infrastructure, Optimize Mobility, Transform Economies, Foster Sustainability, and Connect Communities, and the additional category of Cost and Risk.

- **Safety:** All the concepts were evaluated for their anticipated impact on safety. Consideration was given to items such as wider (safer) shoulders, improved sight distance, improved interchange geometrics, pedestrian and bicycle safety, emergency service access, etc. The overall safety evaluation considered the crash rates and severity, applicable Crash Modification Factors (CMFs), and the of suitability of implementing Incident Management Technology.

- **Preserve Infrastructure:** The existing I-80 facility includes concrete pavement and bridges that have not yet reached their useful life. Concepts that can further utilize these assets were scored higher. Higher scoring was given to concepts that lend themselves to future maintenance for items such as access to drainage and toe of slope/retaining walls, rockfall areas, high retaining walls, multi-use paths, winter maintenance, etc. Alternatives were also scored for constructability and Maintenance of Traffic (MOT) during construction.

- **Optimize Mobility:** Alternatives were evaluated on their ability to optimize mobility of the corridor, i.e., travel delay reduction.

- **Transform Economies:** This factor represents the alternative's influence to improve the economic potential of the area. Key elements include supporting economic development considering factors of freight percentage of the corridor and the freight reliability.

- **Foster Sustainability/Environmental Stewardship:** The alternatives that rank higher in this category will have less impact on the environment during construction and on into the future. It is important to avoid environmentally sensitive areas such as the Truckee River and other cultural resource areas such as the Court of Antiquities area. Alternatives that minimize or avoid impacts to significant environmental resources including cultural and biological are considered superior.

- **Connect Communities:** This category ranks how well the alternative works with the overall transportation plans of the area, including multi-modal impacts.

- **Cost and Risk:** Cost estimates were prepared for the major construction items included in the alternative. Unit prices were used for approximate quantities for the major construction elements, then percentages added for additional items such as mobilization, preliminary engineering, construction engineering, etc. Copies of the cost estimates are included in Appendix C. Risks such as construction difficulties, high cut slopes, and rockfall potential, were considered qualitatively.

Alternative Development

Previous Studies and Concepts

In 2020, CA Group completed the I-80 Corridor Study for NDOT. The study evaluated several concepts for improving the I-80 corridor including but not limited to interchange improvements, widening for additional lanes, reversible lanes, and profile modifications. Improvements outside the corridor were also evaluated to determine their benefit to the corridor by reducing vehicles on I-80. This study also discussed the effects of vanpools, High Occupancy Vehicle lanes and multi-model lanes. The Corridor Study ranked alternatives for many categories (similar to the evaluation factors used for evaluating alternatives as described later in this report) and determined the I-80 widening as the next priority project.

Subsequently, NDOT Scoping Section looked at the Corridor Study recommendations and refined alternatives further, considering items such as geometries, shoulder widths, and Maintenance of Traffic (MOT) during construction. The project team has compiled the most viable project concepts from those previous reports as well as developed additional concepts to be considered.

As stated, the existing I-80 corridor passes through a steep canyon along with the UPRR railroad, the Truckee River, and other environmentally sensitive areas. The current roadway through the canyon has very limited shoulders in areas and widening of the roadway corridor to the desired three lanes in each direction will require careful evaluation to minimize impacts. Multiple alternatives were considered that have varying impacts to the footprint, costs, and the screening criteria described previously.

Figure 2 – Canyon Area Looking East

Outside of the canyon area, Mustang Interchange to USA Parkway, the widening becomes a more traditional trench and widen project, with available right-of-way for full lane width and full shoulders. Consequently, the only widening alternative for this area being considered is three 12' lanes in each direction with a 12' outside shoulder and a 10' inside shoulder.

For the canyon area, all alternatives were developed to meet all criteria outlined in the Design Criteria Memorandum (Appendix A) with the exception of considering more narrow shoulders to evaluate the footprint impacts.

There are locations where the existing geometric alignment does not meet interstate criteria. Correcting these locations has been evaluated to a preliminary level. Some deficiencies are more easily addressed and were consequently included in all the alternatives. Other deficiencies that are more difficult to mitigate or have a high cost were not addressed within these preliminary alternatives but will be reviewed on a case-by-case basis as design progresses. Correcting these deficiencies will have the same relative impacts for each alternative, i.e., the decisions to correct these deficiencies does not have an impact on which alternative will be selected.

The height and slope of the cut slopes on the north side vary between the alternatives evaluated. The cross-section templates were developed utilizing various potential treatments depending on the slope height. As the height increases, progressively complex solutions are needed. Scenarios were developed starting with the most straightforward solution. If the initial configuration did not catch existing ground within right-of-way, the next condition was progressively tested until all improvements were contained within right-of-way. The following are the scenarios developed and were tested in the sequence listed below.

- **Less than 50' high Option 1:** from edge of pavement, 18' 4H:1V foreslope, then 1H:1V backslope till interception with existing ground
- **Less than 50' high Option 2:** 18' 4H:1V foreslope, then 0.75H:1V backslope till interception with existing ground
- **Over 50' high Option 1:** 8' deep x 15' wide rockfall containment ditch with 1H:1V backslope till interception with existing ground
- **Over 50' high Option 2:** 8' deep x 15' wide rockfall containment ditch with 0.75H:1V backslope till interception with existing ground
- **Over 50' high Option 3:** Retaining wall from outside of edge of pavement till interception with existing ground

Canyon Segment Alternatives

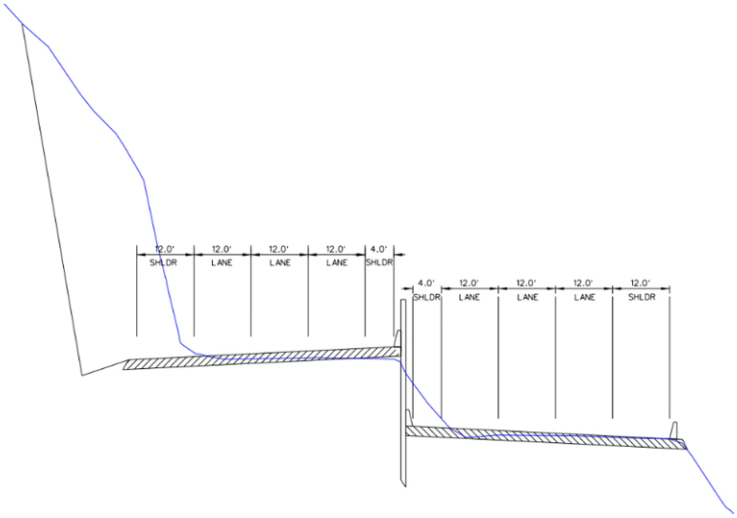
The following alternatives were developed for the canyon segment:

Alternative 1 – 4’ Inside Shoulders

Key elements:

- 3-12’ lanes each direction
- 12’ outside shoulder
- 4’ inside shoulder
- Split profile at existing grade

To minimize the project footprint, a substandard inside shoulder was considered.



Cost: $345 Million

Table 1 – Alternative 1 Pros and Cons

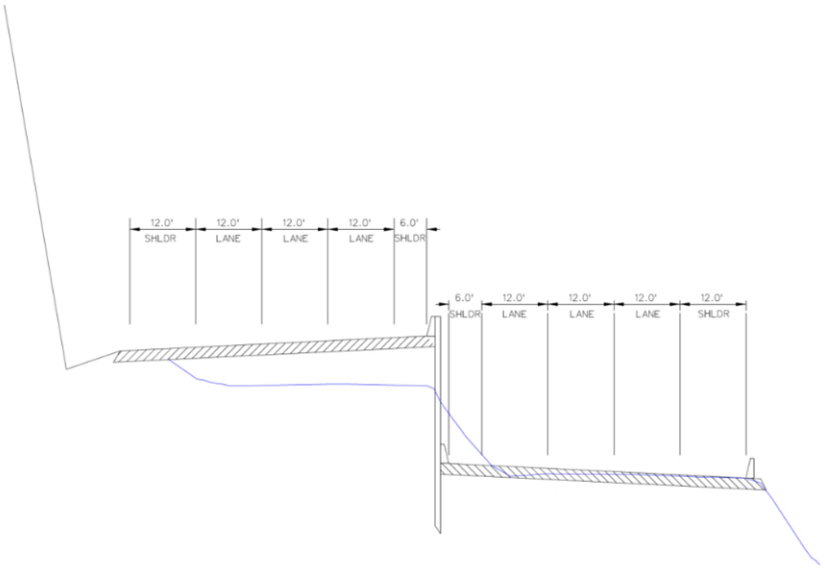
Table 1 – Alternative 1	
Pros	**Cons**
• Smaller footprint • Potential lowest cost • Lower height walls/cut slopes	• Substandard shoulders • Lower sight distances • Narrow shoulders leave less space for MOT and construction phasing • Emergency access between split lanes is limited

Recommendation: Remove from further consideration as the relatively minor earthwork and pavement quantity reduction and footprint impacts for substandard shoulders is not justified.

Alternative 2A and 2B – 6’ Inside Shoulders

Key elements:

- 3-12’ lanes each direction
- 12’ outside shoulder
- 6’ inside shoulder
- Split profile at existing grade (2A)
- Split profile with elevated westbound lanes (2B)



Similar to Alternative 1, the shoulder was reduced, but to 6’. The existing split profile between the lanes was evaluated both at the existing profile grade (Alternative 2A) and with the westbound lanes elevated (Alternative 2B). Elevating the westbound lanes increases the median retaining wall height but reduces the cut slope height. This also reduces the risk of uncertainty and rockfall issues associated with higher cuts.

Cost: ***2A - $351 Million***
2B - $359 Million

Table 2 – Alternative 2A and 2B Pros and Cons

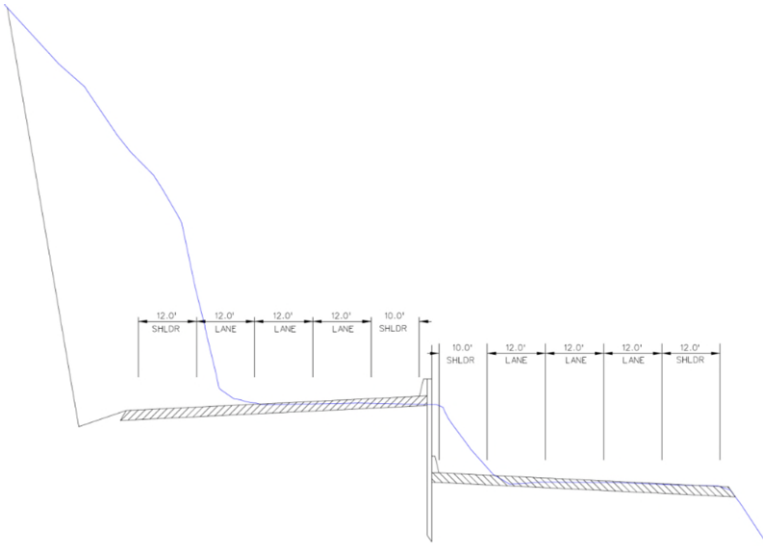
Table 2 – Alternative 2A and 2B	
Pros	**Cons**
• Smaller footprint • Lower cost • Lower height walls/cut slopes	• Substandard shoulders • Lower sight distances • Narrow shoulders leave less space for MOT • Emergency access between split lanes is limited

Recommendation: Remove from further consideration as the relatively minor cost and footprint reduction savings for substandard shoulders are not justified.

Alternative 3A and 3B – 10’ Inside Shoulders

Key elements:

- 3-12’ lanes each direction
- 12’ outside shoulder
- 10’ inside shoulder
- Split profile at existing grade (3A)
- Split profile with elevated westbound lanes (3B)



Alternative 3A follows the existing split alignment at the existing profile grades. Alternative 3B uses an elevated westbound profile grade to minimize the cut slopes on the north side.

Cost: ***3A - $374 Million***
3B - $382 Million

Table 3 – Alternative 3A and 3B Pros and Cons

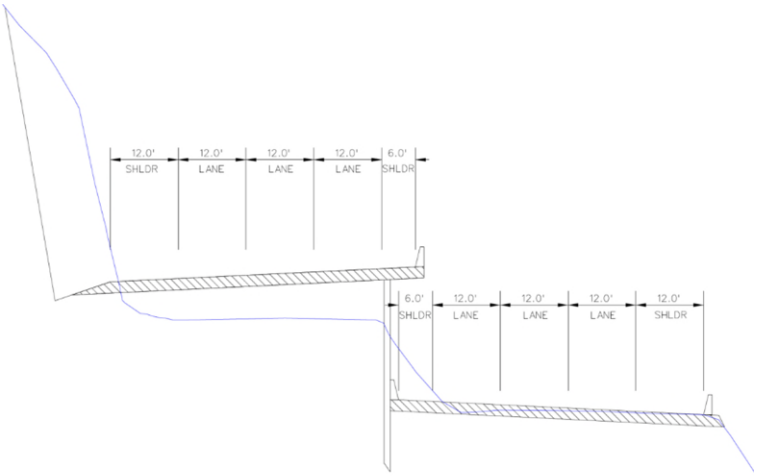
Table 3 – Alternative 3A and 3B	
Pros	**Cons**
• Meets shoulder criteria • Higher sight distances • Provides more room for MOT and construction phasing • Provides additional inside shoulder room for breakdowns, emergency access vehicles, snow storage in wintertime maintenance • 3B – smaller footprint	• Higher costs compared to substandard alternatives • Slightly larger footprint and cut slopes than substandard alternative • Emergency access between split lanes is limited • 3B – Higher walls • 3B – Higher cost

Recommendation: Retain Alternative 3A and 3B for additional design development and evaluation.

Alternative 4 – Cantilever

Key elements:

- 3-12’ lanes each direction
- 12’ outside shoulder
- 6’ inside shoulder
- Cantilevered shoulder on westbound lanes



In an effort to minimize the overall footprint, the shoulder of the westbound lanes was proposed to be cantilevered over the eastbound lanes. This alternative proved to be problematic for the engineering and the high cost it would take to make the cantilever safe. The heavy loads from semi-trucks, large potential impacts to the barrier rail (truck crashes), and concerns about the interface between the retaining wall and cantilevered section make this alternative unfavorable.

Cost: Cost was not developed for this option as it was discarded

Table 4 – Alternative 4 Pros and Cons

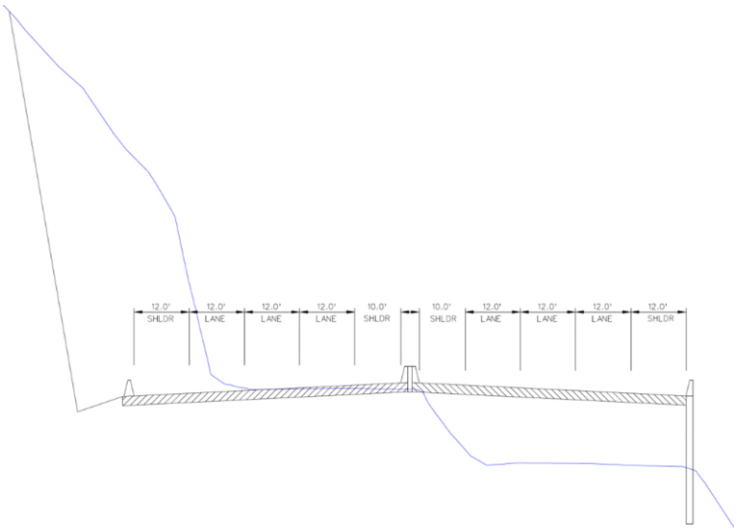
Table 4 – Alternative 4	
Pros	**Cons**
• Smaller footprint, wall, and cut slope heights	• Does not meet shoulder criteria • Lower sight distances • Narrow shoulders leave less space for MOT and construction phasing • Construction and design concerns with interface between cantilever and wall • Safety concerns with large vehicles impacting rail • Emergency access between split lanes is limited

Recommendation: Remove from continued evaluation as construction and safety concerns outweigh the smaller footprint.

Alternative 5 – Common Crown

Key elements:

- 3-12’ lanes each direction
- 12’ outside shoulder
- 10’ inside shoulder
- Common Crown (match WB profile)



The final alternative considered for this report was to elevate the eastbound lanes to the westbound lane profile and share a common crown. This alternative has the benefits of some additional flexibility of MOT during construction and better emergency access between lanes in the final condition. The retaining wall on the south side of the eastbound lanes would be constructed on a very steep slope next to the Truckee River, making maintenance access here very difficult.

Cost: $389 Million

Table 5 – Alternative 5 Pros and Cons

Table 5 – Alternative 5	
Pros	**Cons**
• Meets shoulder criteria • Easier emergency access between lanes • More flexible Alternative for MOT during construction	• Maintenance access is very limited for the lower retaining wall • Higher costs

Recommendation: Retain Alternative 5 for continued evaluation.

Additional Alternatives

Further variations of the above alternatives were considered but through the development process were dropped from further consideration:

Similar to Alternative 1 (3-12' lanes, 4' inside shoulders, 12' outside shoulders), but with the westbound profile elevated was discarded as the team agreed the incremental cost and footprint increase to attain full standard shoulders was warranted. No further alternatives with substandard shoulders are being recommended to be evaluated further.

Reversible lanes were considered but discarded. As previous studies noted, the peaks in traffic volume occur multiple times daily in each direction. Consequently, there are not significant periods of time where it is compatible to dedicate one direction of traffic at the expense of the other lane.

The Tahoe Pyramid Trail/Shared Use Path concept was also evaluated. Consideration was given to incorporating a shared use path (SUP) through the canyon area by adding the path on the south side of the interstate, on the eastbound lanes profile, and on a lowered profile near the toe of slope/bottom of the outside retaining wall along the westbound lanes. The path was also evaluated as an elevated profile along the westbound lanes. Due to the canyon constraints, inclusion of the path would be cost prohibitive, adding between 25 and 50 million dollars to the various alternatives. There were concerns the path would introduce additional safety concerns as the lower and elevated path options would not be visible from the roadway. There were also additional maintenance concerns for access to the path as well as snow removal operations that would plow snow from the roadway onto the path. NDOT will continue to work with the local stakeholders to coordinate Tahoe Pyramid Trail alternatives and develop the continued alternatives so they do not make construction of the path more difficult.

Initial Concepts Screening Results

Two screening meetings were held to discuss and evaluate the alternatives developed. The first meeting was held on September 12, 2023. The screening criteria was discussed and modified. Several alternatives were dismissed (some of which discussed in the previous section of this report), and some alternatives were added/modified for further consideration. A second screening meeting was held on October 4, 2023. This meeting further evaluated all the alternatives against the screening criteria, and the team developed a consensus on which alternatives warranted further consideration. Copies of the meeting minutes from both meetings are included in the appendix.

The alternatives were screened against the criteria previously described and given a rating following the description below.

- ● Substantially Addresses Criteria
- ◉ Addresses Criteria
- ○ Does Not Address Criteria
- ⊘ Conflicts with Criteria

The following table summarizes the consensus rating of the project team.

Table 6 – Screening Criteria Ratings

Table 6 – Screening Criteria Ratings								
Alternative	**Enhance Safety**	**O&M**	**Optimize Mobility**	**Transform Economies**	**Environmental Stewardship**	**Connect Communities**	**Cost & Risk**	**Overall**
1A - 4' Inside Shoulder, ex profile	○	○	⊙	●	●	⊙	●	⊙
2A - 6' Inside Shoulder, ex profile	⊙	○	⊙	●	●	⊙	⊙	⊙+
2B - 6' Inside Shoulder, WB profile	⊙	○	⊙	●	●	⊙	⊙	⊙+
3A – 10' Inside Shoulder, ex. profile	●	⊙	⊙+	●	●	⊙	⊙	●
3B - 10' Inside Shoulder, WB profile	●	⊙	⊙+	●	●	⊙	⊙	●
4 – 6' Cantilever	⊙	◯	⊙	●	●	⊙	◯	◯
5 – Common Crown	●	○	●	●	●	⊙	⊙	●

Recommendations

Through the alternative development process and screening criteria meetings, the team consensus was to consider the following alternatives as the most favorable and recommended them to remain in consideration and be developed further:

Alternative 3A

- 3-12’ lanes each direction
- 12’ outside shoulder
- 10’ inside shoulder
- Split profile at existing grade

Alternative 3B

- 3-12’ lanes each direction
- 12’ outside shoulder
- 10’ inside shoulder
- Split profile with elevated westbound lanes (3B)

Alternative 5:

- 3-12’ lanes each direction
- 12’ outside shoulder
- 10’ inside shoulder
- Common Crown (matching westbound profile grade)

Appendix A

I-80 East Widening NEPA and Preliminary Design Criteria Report

Nevada Department of Transportation

I-80 East Widening NEPA and Preliminary Design Design Criteria Report

August 2023

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Project Background

The I-80 East Widening project will widen I-80 from the Vista Boulevard Interchange to the USA Parkway interchange from two to three lanes in each direction. In addition to expanding capacity, the project will consider widening the existing inside and outside shoulders to provide additional safety enhancements.

The corridor from the Vista Boulevard interchange to the Mustang interchange is considered mountainous terrain due to the topographical and cultural resource constraints, especially in terms of horizontal geometry. From the Mustang interchange to USA Parkway, the corridor is considered rolling terrain as topographical and cultural resource constraints still exist; however, there is more flexibility with their proximity to the existing roadway and associated right-of-way.

Design Criteria

Applicable standards

The design of all roadways shall be in accordance with the Nevada Department of Transportation's (NDOT's) Road Design Guide, 2019 Edition, and AASHTO's A Policy on Geometric Design of Highways and Streets (AASHTO 2018) (referred to as the 2018 ***Green Book***) and shall be supplemented with the following standards.

Note: add I-80 Landscape & Aesthetic Corridor Plan and the Aesthetic Alternatives for NDOT Design Standards to any future reference of applicable standards

- Access Management System and Standards, NDOT, 2017
- ADA Field Guide, NDOT 2017
- Managed Lanes and Ramp Metering Manual NDOT 2013
- Road Design Guide, NDOT, 2019
- Roadway Functional Classification Map, Washoe County, Reno Urbanized Index (B2), NDOT
- Standard Plans for Road and Bridge Construction, latest edition, NDOT 2022
- Standard Specifications for Road and Bridge Construction, NDOT 2014
- Structures Manual, NDOT, 2008

AASHTO Publications:

- Guide for the Development of Bicycle Facilities, 4th Edition (GBF- 4) AASHTO, 2012
- Guide for the Planning Design and Operation of Pedestrian Facilities, 1st Edition (GPF–1) AASHTO, 2004
- Policy on Design Standards – Interstate System 6th Edition, AASHTO, May 2016
- Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018
- Roadside Design Guide, 4th Edition (RSDG-4), AASHTO, 2011

Other Publications:

- Highway Capacity Manual, 6th Edition (HCM6E) Transportation Research Board, 2016
- Guidelines for Railroad Grade Separation Projects, UPRR, 2016

- City of Sparks, Construction Details, 2020

Criteria updates

This Roadway Design Criteria report is intended to be a living document. It will be updated as the project progresses and more information becomes available. Updates will be prepared as needed.

Table 1. General Overview

Design Standards	Interstate	Service IC Ramp	System IC Loop Ramp
Functional Classification	**Interstate**	**Ramp**	**System Loop Ramp**
Ownership	NDOT		
Access	Interstate Control of Access (Limited at Interchanges)		
Terrain Classification	Rolling		
Design Speed (DS) (mph)	70 (*2018 Green Book,* Page 8-2)	60/50/35	60/50/25
Posted Speed (mph)	65	Varies	Varies
Minimum Number of Lanes	3 Each Direction	Varies	Varies
Minimum Lane Width	12' (*2018 Green Book,* Page 8-3)		
Minimum Shoulder Width – Left/Inside	4' Min	4' Min (*2018 Green Book,* Page 10-121)	
Minimum Shoulder Width - Right/Outside	10' Min (Rolling) 4' Min (Mountainous) Policy on Design Standards – Interstate System May 2016, Page 4	8' Min (*2018 Green Book*, Page 10-121)	
Normal Cross Slope (Lane & Shoulder)	2% (Section 3.4, Road Design Guide, NDOT, 2019)		
Design Vehicle	WB-67 (*2018 Green Book,* Page 2-58)		
Stopping Sight Distance	Based on Design Speed (*2018 Green Book,* Page, 3-4 [Table 3-1])		
Intersection Sight Distance	Varies Section 9.5, Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018		
Physical Gore	4' to 8' Section 3.10, Road Design Guide, NDOT, 2019		

Table 2 Geometry

Design Standards	Interstate	Service IC Ramp	System IC Loop Ramp
Functional Classification	**Interstate**	**Ramp**	**System Loop Ramp**
Horizontal Alignment			
Minimum Horizontal Radius Curve	2040' AASHTO 2018 Table 3-7 pp. 3-43	1330' – 833'- 340' AASHTO 2018 Table 3-7 pp. 3-43	1330'-833'-144' AASHTO 2018 Table 3-7 pp.3-43
Minimum Length of Curve	1050' Section 3.3.13 (Road Design Guide, NDOT, 2019)	15x Design Speed (MPH) AASHTO 2018 pp.3 – 120 (Lc, min = 15V)	
Compound Curves	1.5:1 to 2:1 Section 3.3.13 (Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018)		
Maximum Superelevation	6% AASHTO 2018 page 3-41 thru 3-43 (Table 3.9b)		
Design Superelevation Rate	Method 5. (AASHTO 2018 page 3-37 (Table 3-9b)		
Minimum Length of Runoff	Table 3-16a & Equation 3-23 (Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018)		
Minimum Length of Runout	Equation 3-24 (Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018)		
Runoff Transition% on Tangent	67% Preferred (2018 *Green Book,* Page 3-70) Section 3.3.8.2.3 (Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018)		
Ramp Terminal Spacing (Painted Nose to Painted Nose Figure 10—70) (Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018)	EN-EN/EX-EX:1000' EX-EN:500' Turning Roadway: 600'-800' EN-EX (Weaving); 1600'-2000'		
Speed Change Lanes			
Gap Acceptance Length (Lg)		300' to 500' Figure 10-72 & Figure 10-76 (Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018)	
Acceleration/Deceleration Length		Acceleration: Table 10-4 & Table 10-5 (Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018) Deceleration: Table 10-5 & Table 10-6 (Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018)	

Design Standards	Interstate	Service IC Ramp	System IC Loop Ramp
Functional Classification	**Interstate**	**Ramp**	**System Loop Ramp**
Auxiliary Lane Length		**Entrance:** Section 10.9.5.10, Figure 10-72 and Figure 10-76 (Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018) **Exit:** Section 10.9.5.10, Figure 10-73 & Figure 10-77 (Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018)	
Entrance Lane Merge		Figure 10-72 & Figure 10-76 (Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018)	
Exit Ramp Add Lane		Taper 2° to 5° Figure 10-73 (Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018) **Parallel:** 250' Figure 10-73 (Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018)	
Vertical Alignment			
Maximum Grade	4% (Rolling) 5% (Mountainous) Table 2 (Policy on Design Standards – Interstate System May 2016	6% *2018 Green Book,* Page 8-5 (Table 8-1)	
Maximum Grade Approaching an Intersection		2% to 4% Section 3.9 (Road Design Guide, NDOT, 2019)	
Minimum Grade	0.5% NDOT Drainage Manual 2006 Edition, Section 3.3 2.2		
Grade Break without Vertical Curve	Not Allowed		
Minimum Rate of Vertical Curvature (K_{sag}- Design)	181 AASHTO 2018 Page 3 – 169 (Figure 3-37) and 3 -170 (Table 3-35)	136-96-49 AASHTO 2018 Page 3 – 169 (Figure 3-37) and 3 -170 (Table 3-35)	136-96-26 AASHTO 2018 Page 3 – 169 (Figure 3-37) and 3 -170 (Table 3-35)
Minimum Rate of Vertical Curvature (K_{crest} – Design)	247 AASHTO 2018 Page 3 – 169 (Figure 3-37) and 3 -170 (Table 3-35)	151-84-29 AASHTO 2018 Page 3 – 169 (Figure 3-37) and 3 -170 (Table 3-35)	151-84-12 AASHTO 2018 Page 3 – 169 (Figure 3-37) and 3 -170 (Table 3-35)

Design Standards	Interstate	Service IC Ramp	System IC Loop Ramp
Functional Classification	**Interstate**	**Ramp**	**System Loop Ramp**
Minimum Length of Vertical Curve	1000' (Road Design Guide, NDOT, 2019)	3x Design Speed (Road Design Guide, NDOT, 2019)	3x Design Speed (Road Design Guide, NDOT, 2019)
Maximum Allowable Rollover (Longitudinal Grade Break)	5% Section 10.9.6.2.14 & Table 9-18 (Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018)		
Minimum Vertical Clearance – New Roadway Structures	16'-6" (Road Design Guide, NDOT, 2019)		
Minimum Vertical Clearance - Railroad	23'-6'		

Table 3 Miscellaneous

Design Standards	Interstate	Service IC Ramp	System IC Loop Ramp
Functional Classification	**Interstate**	**Ramp**	**System Loop Ramp**
Intersections			
Intersection Sight Distance	Varies Section 9.5 (Policy on Geometric Design of Highways and Streets, 7th Edition, AASHTO, 2018)		
Design vehicle (Inside Lane / Outside Lane)		**In:** SU-40 **Out:** WB-67	
Minimum No. of Turn Lanes		Varies	
Minimum Turn Lane Width		12'	
Corner Radii		Agency & Vehicle Specific	
Grading			
Change in Side Slope Ratio (ex: 2:1 to 6:1)	50' for every unit of change Section 3.12 (Road Design Guide, NDOT, 2019)		
Barrier Offset (Beyond Normal Edge of Shoulder)	0'		
Concrete Barrier Rail Lateral Flare Rate	Standard Dwg RB-35A (Standard Plans for Road and Bridge Construction, latest edition, NDOT, 2020)		
Concrete Barrier Rail	42" Single Slope 54" Single Slope adjacent to bridge substructures		
Maintenance Access	10' to 20' Section 4.18 (Road Design Guide, NDOT, 2019)		

Design Standards	Interstate	Service IC Ramp	System IC Loop Ramp
Functional Classification	**Interstate**	**Ramp**	**System Loop Ramp**
Roadside Safety			
Minimum Clear Zone Distance	30' Table 3-1 (Roadside Design Guide 4th Edition (RSDG-4), AASHTO, 2011	Table 3-1 (Roadside Design Guide 4th Edition (RSDG-4), AASHTO, 2011	
Clear Zone Modification		Table 3-2 (Roadside Design Guide 4th Edition (RSDG-4), AASHTO, 2011	

Appendix B

Screening Workshop Meeting Notes

I80 East Widening NEPA

Initial Concepts Workshop

Agenda
July 17, 2023
1:00 pm – 4:00 pm
3rd Floor Large Conference Room – NDOT HQ
Microsoft Teams: Phone – 1-702-935-0157 ID# 167 888 754#
See meeting invite for Teams link

1. Introductions

2. Workshop Goals – ***workshop goals were identified and discussed.***
   - ***Dismiss undesirable concepts.***
   - ***Identify preferred cross sections.***
   - ***Identify unique treatments (i.e., slopes and walls).***

3. Project Constraints
   - Avoidance areas
     - Truckee River ***– Study team is aware of the TRFMA Vista Narrows project and are in the project of obtaining project info. Should not impact the project.***
     - UPRR
     - Cultural Resources – ***Cultural resources include several resources immediately south of the edge of pavement through the Narrows.***
   - Permitting concerns
     - US Army Corps of Engineers
     - Nationwide vs Project Specific – ***Study team to identify maximum impact size per crossing and work to stay within the Nationwide limits.***
   - Maintenance of Traffic
     - Night vs Day
     - Continuous lane closures
     - Maintain existing joints ***– Study team asked if the project could assume full reconstruction or if existing pavement had to be utilized. It was decided that the full reconstruction assumption is acceptable due to the constraints. It was discussed that if existing PCCP joint could be utilized in unconstrained areas that would be of benefit, but not necessary.***

4. Project Segments ***– The study team will be breaking the project up into several segments based on constraints and minimum cross section. The Narrows and Mini-Narrows are the more constrained area while Mustang and Patrick/Tracy may allow for a larger cross section.***
   - Narrows
     - ***Sparks boulevard to Exit 23 (mustang) (STA 745+00)***
     - ***Most constrained***

- Mustang
  - ***Exit 23 (STA 745+00 to STA 890+00)***
- Mini-Narrows
  - ***STA 890+00 to Patrick WB On-Ramp (STA 975+00)***
- Patrick/Tracy
  - ***Patrick WB On Ramp (STA 975+00) to Exit 32 (USA Parkway)***

5. Review Previous Work Done
   - I-80 Corridor Study
     - ***Identified several studies.***
     - ***In-plane and independent profiles***
     - ***10' inside shoulder, 12' lanes, 12' outside shoulders***
     - ***Widening north and south***
   - NDOT Scoping and Safety Studies
     - ***Identified variety of roadway section***
     - ***Varying shoulder and lane widths***
     - ***Safety benefits/cost***
     - ***NDOT study narrowed in on median wall alternative. Utilized PCCP option, widening in the north and south. PCCP option shifts to the south more, which would require more NSC walls and challenges with hydraulics.***

6. Roadway Cross Section
   - Existing Condition (Widths and Joints)
     - ***12' Lanes***
     - ***4' Inside Shoulder***
     - ***8' outside shoulder***
     - ***PCCP pavement joints***
   - Must Have ***– The team discussed "must have" elements for the project. These elements where also discussed in the NDOT Scoping and Safety assessment.***
     - ***12' outside shoulders (project need) - Emergency Access and Pull-off.***
     - ***One additional lane in each direction. (Project need) - Capacity***
     - ***Acceleration lanes need to also be provided at interchanges for vehicles to get up to speed and find gaps especially for trucks.***
   - Lane Widths ***– Discussions were held on what shoulder and lane widths should be evaluated as part of the study. Study team presented a table showing a variety of possibilities.***
     - 12' vs 11'
       - ***The group decided 12' travel lane width is preferred, justified due to curves and amount of freight/long haul truckers. 11' does not have a positive benefit cost ratio.***
   - Shoulders ***– Similar to lane widths, inside shoulder widths were discussed.***
     - 4' to 10'
       - ***In previous studies, 4" inside shoulder was preferred with 12' outside shoulder due to cost benefit analysis.***

        - ***6' inside shoulder may need to be considered due to the inside wall placement.***
        - ***The group decided based on the previous safety assessment that the study team would evaluate 4' and 6' inside should scenarios within the Narrows and Mini-Narrows segments and 10' inside shoulder in the Mustang and Patrick/Tracy segments when not encroaching into avoidance areas.***
    - Median sight distance concerns ***– Provide best sight distance possible based on constraints, however, it is anticipated that design exceptions will be noted.***
- Median ***– Median width was briefly discussed and that the width be as required by median barriers and any associated median retaining walls.***
    - 0' in constrained areas
    - Maintain existing outside of constrained areas and add barrier protection.
- Profile ***– The team discussed potential profile approaches to the project. No specific approach is required, however, a major key item that must be considered is constructability/maintenance of traffic. Also, avoiding impacts to cultural areas, UPRR, and Truckee River are also a priority.***
    - In-plane
    - Directionally independent
    - Cantilevered ***– Study team discussed the potential for minor cantilevering. While concerns, such as seismic, were discussed, minor cantilevering can be part of the overall assessment.***

      Other items discussed included:
        - ***Building up from the west bound may help with constraints/widening issues.***
            - ***Cons: the construction will cost significantly more. Drainage may also be an issue.***
        - ***Bringing fill to lower profile east bound and bringing it up to grade west bound may be challenging while maintaining traffic.***

- Widening
    - Minimize widening towards Truckee/UPRR when constrained.
        - ***Consider widening more to the south if environmental and constraint factors allow.***
        - ***From a cultural perspective, widening to the south is not a consideration. The narrows are the large challenge. (e.a. near Vista where the river is very close)***
    - Prioritize widening towards north.

7. Geotechnical ***– Discussion was provided in regards to the geotechnical characteristics within the corridor. Key items discussed include:***
    - ***Wide variety of bedrock types: geologically young and old volcanic rocks including lava flows, pyroclastic flows, breccias, tuffs; as well as localized metamorphic and sedimentary rocks***
    - ***Bedrock type can vary over short distances.***
    - ***Bedrock is typically highly fractured and blocky.***

- ***Bedrock strength anticipated to range from very weak to strong.***
- ***Constraints***
  - ***Tall and steep slopes with blocky bedrock results in significant rock fall hazard***
  - ***Wide variety of rockfall mitigations will likely be required.***
  - ***Bedrock excavation and drilling characteristics will vary over relatively short distances.***
- ***South Widening:***
  - ***Existing roadway slopes down toward Railroad and Truckee River***
  - ***Any retaining walls would be on existing roadway slopes that can potentially impact stability.***
  - ***ROW and Environmental/Cultural resources constraints***
- ***Median Widening***
  - ***Westbound lanes are generally at higher elevation.***
  - ***Existing steep slopes between westbound and eastbound lanes***
  - ***Limited space for retaining wall construction in the median.***
- ***North Widening***
  - ***Existing steep natural and cut slopes with varying geology.***
  - ***Rockfall hazard and mitigation***
  - ***Rock excavation, retaining walls, and slope stability.***
  - ***Need for detailed topographic map along the project alignment.***
- ***Need to consider rock wall containment.***

8. Additional Discussion
   - ***PCCP vs Asphalt***
     - ***PCCP is preferred in areas that would be difficult to get back into after 12 years, such as interstate highways.***
   - ***Interchanges***
     - ***Vista improvements identified in NDOT Scoping report.***
     - ***Lockwood: acceleration lane modifications, lengthening westbound on ramp.***
     - ***Reconstructing bridge over UPRR at Lockwood. NDOT did discuss potentially evaluating have one bridge for UPRR and I80 interchange.***
     - ***Mustang interchange: possible roundabout, or diamond interchange***
     - ***Patrick Interchange: clean up interchange, improve acceleration/deceleration***
   - ***The study team discussed current posted speed limits and potential design speeds. CA Group to evaluate existing centerline geometry and come back with recommended design speeds to the group.***

9. Next Steps

   - The document dismissed concepts and reasoning.
   - Move forward developing concepts discussed today.
   - Conduct concept evaluation and screening mid/late September.
   - Prepare draft initial concepts and evaluation tech mom late oct.
   - Public meeting to present concepts.

10. Action Items

11. Attendance

	NAME	Organization	Email address
X	Abdelmoez Abdalla	FHWA	Abdelmoez.abdalla@dot.gov
X	Alexa Cavaretta	CA Group	Alexa.cavaretta@c-agroup.com
X	Andrea Engelman	CA Group	Andrea.engelman@c-agroup.com
X	Chad Anson	CA Group	Chad.anson@c-agroup.com
X	Chris Deal	NDOT Roadway	cdeal@dot.nv.gov
X	Chris Kuhn	NDOT PM	ckuhn@dot.nv.gov
X	Chris Young	NDOT Environmental	cyoung@dot.nv.gov
X	Cody Barr		cjbarr@dot.nv.gov
X	Dave Dodson	CA Group	David.dodson@dot.nv.gov
X	Devin Cartwright		Devin.cartwright@jacobs.com
X	Fred Shakal	NDOT PM	fshakal@dot.nv.gov
X	Jake Waclaw	FHWA	Jacob.waclaw@dot.gov
X	Jared Feser	NDOT Scoping	jfeser@dot.nv.gov
X	John L'etoile	NDOT	jletoile@dot.nv.gov
X	Joshua Trowbridge		jtrowbridge@dot.nv.gov
X	Mary Taitano	NDOT Environmental	mtaitano@dot.nv.gov
X	Meg Ragonese	NDOT	mragonese@dot.nv.gov
X	Nick Johnson	NDOT	njohnson@dot.nv.gov
X	Paul Frost	CA Group	Paul.frost@c-agroup.com
X	Ravee Raveendra	Jacobs	Ravee.ravendra@jacobs.com
X	Robbie Coomes	Jacobs	robbie.coomes@jacobs.com
X	Sreekar Pulijala	Jacobs	Srekker.pulijala@jacobs.com
X	Steve Bird	CA Group	Steve.bird@c-agroup.com
X	Troy Martin	HDR	Troy.martin@hdrinc.com

I80 East Widening NEPA

Initial Concepts Follow Up Screening Workshop

Meeting Minutes
October 4, 2023
1:00 pm – 4:30 pm
3rd Floor Large Conference Room – NDOT HQ
Microsoft Teams: Phone – 1-702-935-0157 ID# 574 794 779#
See meeting invite for Teams link

1. Introductions

NAME	Organization	Email address
Andrea Engelman	CA Group	Andrea.engelman@c-agroup.com
Andy Lawrence	NDOT District 2	alawrence@dot.nv.gov
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Vinay Virupaksha	CA Group	Vinay.virupaksha@c-agroup.com

2. Workshop Goals – ***Workshop goals were discussed as identified below.***
   2.1. Review new and updated concepts – ***It was noted that new concepts evaluation, primarily a ten-foot shoulder option was introduced at the initial concepts screening. In addition, the team had made some refinement to concepts evaluated as part of the initial concepts screening***.
   2.2. Identify potential new alternative concerns/risks
   2.3. Screen concepts and discuss dismissing any concepts from additional development

3. Review Work to Date – ***The team reviewed and discussed a comparison between utilizing 6-foot and 10-foot inside shoulders. The 10-foot inside concept was brought up at the previous Concept Screening workshop. The widening approach is similar to previous concepts where the eastbound outside edge of pavement is held, and all improvements are widened to the north. This concept comparison is only related to the narrows area since 10-foot inside shoulders are proposed for the area east of Mustang. An additional update to both concepts was the use of a 0.75H:1V maximum excavation slope based on more recent geotechnical information. During the initial concept development, a 0.5H:1V maximum slope was utilized.***
   3.1. At-Grade Profile
      3.1.1. 6’ inside shoulder ***– This option was utilized as a base case for comparing other alternatives presented during this workshop. This alternative would utilize existing profiles for proposed eastbound and westbound travel lanes. For benchmark quantities (earthwork and retaining wall) this concept, through the narrows area, has approximately 956,880 CUYD of cut and 109,410 SQFT of retaining wall. Based on current excavation assumptions no outside retaining walls would be required in the eastbound or westbound directions.***
      3.1.2. 10’ inside shoulder – ***This is a new option presented since the initial concept screening. This option would provide 10-foot inside shoulders which would comply with NDOT and AASHTO standards for inside shoulder width (excluding sight distance). Utilizing eastbound and westbound profiles this option would require an additional 151,550 CUYD of excavation and 10,750 SQFT of additional wall. Part of the additional wall area would include some wall locations on the northbound side of westbound lanes.***
      3.1.3. Shared use path – ***See Tahoe-Pyramid Bike trail section.***
   3.2. Westbound Elevated Profile – ***These options were also evaluated and discussed by the design team. The elevated profile options elevated the westbound profile up to a***

maximum of 20-feet above eastbound to try and minimize the earthwork on the northside of the widening. It was noted the trade-off is the need for more median retaining wall.

3.2.1. 6' inside shoulder – ***Similar to the at-grade profile with 6-foot shoulders this option would not require retaining walls on the outside of the eastbound or westbound roadways. This option resulted in an approximate earthwork reduction of 294,040 CUYD but would require an additional 114,770 SQFT of median wall.***

3.2.2. 10' inside shoulder – ***Similar to the at-grade profile with 10-foot shoulders this option would require wall on the north side of the westbound lanes in addition to the median retaining wall. This option resulted in an approximate earthwork reduction of 183,820 CUYD and would require an additional 111,400 SQFT of retaining wall when compared to the baseline 6-foot shoulder at-grade concept.***

3.2.3. Shared use path – ***See Tahoe Pyramid Bike Trail Section***

3.3. Common Crown ***– A common crown section was also evaluated that utilized 10-foot inside shoulders. This concept would keep westbound travel lanes at grade but raise eastbound to be in plane with westbound. This concept would require retaining wall on the south side of the eastbound lanes. The benefit of this concept would be the potential to provide emergency crossovers since both eastbound and westbound would be at the same elevation. This concept would require an additional 106,240 CUYD of excavation and an additional 13,160 SQFT of retaining wall when compared to the 6-foot at grade section.***

3.4. Tahoe-Pyramid Bike Trail (Single Track) ***– The Tahoe Pyramid Trail (TPT) is a trail intended to connect Lake Tahoe to Pyramid Lake. One final missing section is the piece from Vista Boulevard to Lockwood. The design team looked at options of providing a trail in the initial concept workshop which resulted in only refining the potential trail on the north side of the I-80 lanes. Since the facility would be NDOT owned and maintained, if built with the I-80 project, a ten-foot multi-use path was utilized. The concept looked at raising the path up to 20-feet above westbound for safety and to save earthwork excavation. The team look at this option with both 6-foot and 10-foot inside shoulders. These options resulted in additional costs ranging from $25-50 million.***

The TPT organization is also looking at potential alternatives and have been working with NDOT on potential permitting of these facilities. TPT's alternatives utilize a "single-track" which can minimize overall trail impacts. Based on many factors including cost, footprint, maintenance, and safety concerns, the group decided it was best to not move forward with providing a 10-multi-use path and instead allow the TPT organization to continue to work with their alternatives best as possible while keeping safety and environmental concerns as a priority.

4. Alternative Concerns/Risks ***– Primary risks discussed were focused on the shared use path alternatives. Key risks were long-term maintenance, potential for encampments, limited visibility from the road, and significant additional cost. There was the benefit of the potential of using the shared use path area as a utility corridor.***

5. Screen Concepts – ***Concepts presented were then screened based on criteria developed and agreed upon in the initial concept screening workshop. The shared use path options ranked the lowest while the 10-foot shoulder options ranked highest based on the enhanced safety.***

6. Dismiss Concepts (if applicable) ***– A key goal of this meeting was to identify alternative(s) to move forward with into 15-percent design for a more detailed evaluation. The team collectively agreed that the 10-foot shoulder options of at-grade and westbound elevated profile should move forward. The 6-foot shoulder options and multi-use path options either did not meet overall project needs or did not provide as much safety benefit as the ten-foot options.***

7. Additional Discussion – ***No additional discussion.***

8. Next Steps - ***The project's next steps were discussed as outlined in the presentation.***

9. Action Items – ***CA Group to move forward with 15% design evaluation of the 10-foot shoulder at-grade and elevated westbound options.***

Appendix C

Cost Estimates

Alternative 1

Summary Of Quantities

I-80 EAST NEPA (4-FOOT INSIDE SHOULDERS AT GRADE)

IPD Bid Item #	Description	Quantity		Cost per Unit	Unit Total
202 0990	REMOVAL OF BITUMINOUS SURFACE (COLD MILLING)	17.333.3	_ _ _ _	$ 5.00	$ 86,666.67
203 0140	ROADWAY EXCAVATION	999,900.0	CUYD	$ 40.00	$ 39,996,000.00
2030200	BORROW EMBANKMENT	1.1	CUYD	$ 25.00	$ 27.50
302 0130	TYPE 1 CLASS B AGGREGATE BASE	582,324.9	TON	$ 20.00	$ 11,646,498.96
402 0190	PLANTMIX SURFACING (TYPE 2C)(WET)	390,157.7	TON	$ 120.00	$ 46,818,925.83
403 0110	PLANTMIX OPEN-GRADED SURFACING (3/8-INCH)(WET)	36,395.3	TON	$ 130.00	$ 4,731,390.20
406 0120	PRIME COAT	919.460.4	_ _ _ _	$ 1.00	$ 919,460.44
502 0180	CONCRETE BARRIER RAIL (TYPE B)	136,222.0	LINFT	$ 65.00	$ 8,854,430.00
502 XXXX	CONCRETE BRIDGE CONSTRUCTION	32,160.0	SQFT	$ 400.00	$ 12,864,000.00
616 0740	TYPE A-4S FENCE	20,811.0	LINFT	$ 35.00	$ 728,385.00
624 0130	UNIFORMED TRAFFIC CONTROL OFFICER	1.0	FA	$ 100,000.00	$ 100,000.00
637 0110	TEMPORARY POLLUTION CONTROL	1.0	LS	$ 75,000.00	$ 75,000.00
641 0150	IMPACT ATTENUATOR (70 MPH)	20.0	EACH	$ 10,000.00	$ 200,000.00
642 0100	CONCRETE PANEL WALL	109,410.0	SQFT	$ 175.00	$ 19,146,750.00
642 0110	MECHANICALLY STABILIZED EARTH BACKFILL	16,208.9	CUYD	$ 55.00	$ 891,488.89
736 0190	DUST CONTROL	1.0	LS	$ 50,000.00	$ 50,000.00
736 0013	ASPHALT ESCALATION	1.0	LS	$ 25,000.00	$ 25,000.00
736 0016	FUEL ESCALATION	1.0	LS	$ 15,000.00	$ 15,000.00
736 0016	INCIDENTAL CONTRUCTION	1.0	LS	$ 250,000.00	$ 250,000.00

Sub-Total:	$147,399,023.50
Drainage (25%):	$36,849,755.87
Erosion Control (10% of Drainage):	$3,684,975.59
Revegatation (5%):	$7,369,951.17
ITS (LS):	$5,000,000.00
Signing and Striping (3%):	$4,421,970.70
Traffic Control (1%):	$1,473,990.23
Miscellaneous Item Allowance (30%):	$44,219,707.05
Bid Item Sub-Total	$250,419,374.12
Mobilization (12%):	$30,050,324.89
Contract Total:	$280,469,699.02
Construction Engineering (10%):	$28,046,969.90
Preliminary Engineering (10%):	$28,046,969.90
Construction Contingency (3%):	$8,414,090.97
Right-of-Way Acquisition:	$0.00
Utility Relocation:	$0.00
Total:	**$344,977,730**

Alternative 2A

Summary Of Quantities

I-80 EAST NEPA (6-FOOT INSIDE SHOULDERS AT GRADE)

IPD Bid Item #	Description	Quantity		Cost per Unit	Unit Total
202 0990	REMOVAL OF BITUMINOUS SURFACE (COLD MILLING)	17.333.3	[illegible]	$ 5.00	$ 86,666.67
203 0140	ROADWAY EXCAVATION	1,052,568.0	CUYD	$ 40.00	$ 42,102,720.00
2030200	BORROW EMBANKMENT	1.1	CUYD	$ 25.00	$ 27.50
302 0130	TYPE 1 CLASS B AGGREGATE BASE	588,182.9	TON	$ 20.00	$ 11,763,657.19
402 0190	PLANTMIX SURFACING (TYPE 2C)(WET)	394,082.5	TON	$ 120.00	$ 47,289,901.88
403 0110	PLANTMIX OPEN-GRADED SURFACING (3/8-INCH)(WET)	36,761.4	TON	$ 130.00	$ 4,778,985.73
406 0120	PRIME COAT	928,709.8	SQYD	$ 1.00	$ 928,709.78
502 0180	CONCRETE BARRIER RAIL (TYPE B)	136,222.0	LINFT	$ 65.00	$ 8,854,430.00
502 XXXX	CONCRETE BRIDGE CONSTRUCTION	32,160.0	SQFT	$ 400.00	$ 12,864,000.00
616 0740	TYPE A-4S FENCE	20,811.0	LINFT	$ 35.00	$ 728,385.00
624 0130	UNIFORMED TRAFFIC CONTROL OFFICER	1.0	FA	$ 100,000.00	$ 100,000.00
637 0110	TEMPORARY POLLUTION CONTROL	1.0	LS	$ 75,000.00	$ 75,000.00
641 0150	IMPACT ATTENUATOR (70 MPH)	20.0	EACH	$ 10,000.00	$ 200,000.00
642 0100	CONCRETE PANEL WALL	109,410.0	SQFT	$ 175.00	$ 19,146,750.00
642 0110	MECHANICALLY STABILIZED EARTH BACKFILL	16,208.9	CUYD	$ 55.00	$ 891,488.89
736 0190	DUST CONTROL	1.0	LS	$ 50,000.00	$ 50,000.00
736 0013	ASPHALT ESCALATION	1.0	LS	$ 25,000.00	$ 25,000.00
736 0016	FUEL ESCALATION	1.0	LS	$ 15,000.00	$ 15,000.00
736 0016	INCIDENTAL CONTRUCTION	1.0	LS	$ 250,000.00	$ 250,000.00

Sub-Total:	$150,150,722.63
Drainage (25%):	$37,537,680.66
Erosion Control (10% of Drainage):	$3,753,768.07
Revegatation (5%):	$7,507,536.13
ITS (LS):	$5,000,000.00
Signing and Striping (3%):	$4,504,521.68
Traffic Control (1%):	$1,501,507.23
Miscellaneous Item Allowance (30%):	$45,045,216.79
Bid Item Sub-Total	$255,000,953.19
Mobilization (12%):	$30,600,114.38
Contract Total:	$285,601,067.57
Construction Engineering (10%):	$28,560,106.76
Preliminary Engineering (10%):	$28,560,106.76
Construction Contingency (3%):	$8,568,032.03
Right-of-Way Acquisition:	$0.00
Utility Relocation:	$0.00
Total:	**$351,289,313**

Alternative 2B

Summary Of Quantities

I-80 EAST NEPA (6-FOOT INSIDE SHOULDERS)(RAISED PROFILE)

IPD Bid Item #	Description	Quantity		Cost per Unit	Unit Total
202 0990	REMOVAL OF BITUMINOUS SURFACE (COLD MILLING)	17,333.3	SQYD	$ 5.00	$ 86,666.67
203 0140	ROADWAY EXCAVATION	606,180.0	CUYD	$ 40.00	$ 24,247,200.00
2030200	BORROW EMBANKMENT	1.1	CUYD	$ 25.00	$ 27.50
302 0130	TYPE 1 CLASS B AGGREGATE BASE	588,182.9	TON	$ 20.00	$ 11,763,657.19
402 0190	PLANTMIX SURFACING (TYPE 2C)(WET)	[illegible]	[illegible]	120.00	[illegible]
403 0110	PLANTMIX OPEN-GRADED SURFACING (3/8-INCH)(WET)	36,761.4	TON	$ 130.00	$ 4,778,985.73
406 0120	PRIME COAT	[illegible]	[illegible]	1.00	928.709.78
502 0180	CONCRETE BARRIER RAIL (TYPE B)	[illegible]	[illegible]	65.00	8.854.430.00
502 XXXX	CONCRETE BRIDGE CONSTRUCTION	[illegible]	[illegible]	400.00	12.864.000.00
616 0740	TYPE A-4S FENCE	[illegible]	[illegible]	35.00	728.385.00
624 0130	UNIFORMED TRAFFIC CONTROL OFFICER	[illegible]	[illegible]	100.000.00	100.000.00
637 0110	TEMPORARY POLLUTION CONTROL	[illegible]	[illegible]	75.000.00	75.000.00
641 0150	IMPACT ATTENUATOR (70 MPH)	[illegible]	[illegible]	10.000.00	200.000.00
642 0100	CONCRETE PANEL WALL	[illegible]	[illegible]	175.00	39.231.500.00
642 0110	MECHANICALLY STABILIZED EARTH BACKFILL	[illegible]	[illegible]	55.00	1.826.651.85
736 0190	DUST CONTROL	[illegible]	[illegible]	50.000.00	50.000.00
736 0013	ASPHALT ESCALATION	[illegible]	[illegible]	25.000.00	25.000.00
736 0016	FUEL ESCALATION	[illegible]	[illegible]	15.000.00	15.000.00
736 0016	INCIDENTAL CONTRUCTION	[illegible]	[illegible]	250.000.00	250.000.00

Sub-Total:	$153,315,115.60
Drainage (25%):	$38,328,778.90
Erosion Control (10% of Drainage):	$3,832,877.89
Revegatation (5%):	$7,665,755.78
ITS (LS):	$5,000,000.00
Signing and Striping (3%):	$4,599,453.47
Traffic Control (1%):	$1,533,151.16
Miscellaneous Item Allowance (30%):	$45,994,534.68
Bid Item Sub-Total	$260,269,667.47
Mobilization (12%):	$31,232,360.10
Contract Total:	$291,502,027.57
Construction Engineering (10%):	$29,150,202.76
Preliminary Engineering (10%):	$29,150,202.76
Construction Contingency (3%):	$8,745,060.83
Right-of-Way Acquisition:	$0.00
Utility Relocation:	$0.00
Total:	**$358,547,494**

Alternative 3A

Summary Of Quantities **I-80 EAST NEPA (10-FOOT INSIDE SHOULDERS AT GRADE)**

IPD Bid Item #	Description	Quantity		Cost per Unit	Unit Total
202 0990	REMOVAL OF BITUMINOUS SURFACE (COLD MILLING)	17,333.3	_ _ _	$ 5.00	$ 86,666.67
203 0140	ROADWAY EXCAVATION	1,219,273.0	CUYD	$ 40.00	$ 48,770,920.00
2030200	BORROW EMBANKMENT	1.1	CUYD	$ 25.00	$ 27.50
302 0130	TYPE 1 CLASS B AGGREGATE BASE	599,898.7	TON	$ 20.00	$ 11,997,973.63
402 0190	PLANTMIX SURFACING (TYPE 2C)(WET)	401,932.1	TON	$ 120.00	$ 48,231,853.99
403 0110	PLANTMIX OPEN-GRADED SURFACING (3/8-INCH)(WET)	37,493.7	TON	$ 130.00	$ 4,874,176.79
406 0120	PRIME COAT	947,208.4	SQYD	$ 1.00	$ 947,208.44
502 0180	CONCRETE BARRIER RAIL (TYPE B)	136,222.0	LINFT	$ 65.00	$ 8,854,430.00
502 XXXX	CONCRETE BRIDGE CONSTRUCTION	32,160.0	SQFT	$ 400.00	$ 12,864,000.00
616 0740	TYPE A-4S FENCE	20,811.0	LINFT	$ 35.00	$ 728,385.00
624 0130	UNIFORMED TRAFFIC CONTROL OFFICER	1.0	FA	$ 100,000.00	$ 100,000.00
637 0110	TEMPORARY POLLUTION CONTROL	1.0	LS	$ 75,000.00	$ 75,000.00
641 0150	IMPACT ATTENUATOR (70 MPH)	20.0	EACH	$ 10,000.00	$ 200,000.00
642 0100	CONCRETE PANEL WALL	119,980.0	SQFT	$ 175.00	$ 20,996,500.00
642 0110	MECHANICALLY STABILIZED EARTH BACKFILL	17,774.8	CUYD	$ 55.00	$ 977,614.81
736 0190	DUST CONTROL	1.0	LS	$ 50,000.00	$ 50,000.00
736 0013	ASPHALT ESCALATION	1.0	LS	$ 25,000.00	$ 25,000.00
736 0016	FUEL ESCALATION	1.0	LS	$ 15,000.00	$ 15,000.00
736 0016	INCIDENTAL CONTRUCTION	1.0	LS	$ 250,000.00	$ 250,000.00

Sub-Total:	$160,044,756.83
Drainage (25%):	$40,011,189.21
Erosion Control (10% of Drainage):	$4,001,118.92
Revegatation (5%):	$8,002,237.84
ITS (LS):	$5,000,000.00
Signing and Striping (3%):	$4,801,342.71
Traffic Control (1%):	$1,600,447.57
Miscellaneous Item Allowance (30%):	$48,013,427.05
Bid Item Sub-Total	$271,474,520.13
Mobilization (12%):	$32,576,942.42
Contract Total:	$304,051,462.54
Construction Engineering (10%):	$30,405,146.25
Preliminary Engineering (10%):	$30,405,146.25
Construction Contingency (3%):	$9,121,543.88
Right-of-Way Acquisition:	$0.00
Utility Relocation:	$0.00
Total:	**$373,983,299**

Alternative 3B

Summary Of Quantities

I-80 EAST NEPA (10-FOOT INSIDE SHOULDERS)(RAISED PROFILE)

IPD Bid Item #	Description	Quantity		Cost per Unit	Unit Total
202 0990	REMOVAL OF BITUMINOUS SURFACE (COLD MILLING)	17,333.3	SQYD	$ 5.00	$ 86,666.67
203 0140	ROADWAY EXCAVATION	850,366.0	CUYD	$ 40.00	$ 34,014,640.00
2030200	BORROW EMBANKMENT	1.1	CUYD	$ 25.00	$ 27.50
302 0130	TYPE 1 CLASS B AGGREGATE BASE	599,898.7	TON	$ 20.00	$ 11,997,973.63
402 0190	PLANTMIX SURFACING (TYPE 2C)(WET)	[illegible]	[illegible]	120.00	[illegible]
403 0110	PLANTMIX OPEN-GRADED SURFACING (3/8-INCH)(WET)	37,493.7	TON	$ 130.00	$ 4,874,176.79
406 0120	PRIME COAT	[illegible]	[illegible]	1.00	947,208.44
502 0180	CONCRETE BARRIER RAIL (TYPE B)	[illegible]	[illegible]	65.00	8.854.430.00
502 XXXX	CONCRETE BRIDGE CONSTRUCTION	[illegible]	[illegible]	400.00	12.864.000.00
616 0740	TYPE A-4S FENCE	[illegible]	[illegible]	35.00	728.385.00
624 0130	UNIFORMED TRAFFIC CONTROL OFFICER	[illegible]	[illegible]	100.000.00	100.000.00
637 0110	TEMPORARY POLLUTION CONTROL	[illegible]	[illegible]	75.000.00	75.000.00
641 0150	IMPACT ATTENUATOR (70 MPH)	[illegible]	[illegible]	10.000.00	200.000.00
642 0100	CONCRETE PANEL WALL	[illegible]	[illegible]	175.00	38.641.750.00
642 0110	MECHANICALLY STABILIZED EARTH BACKFILL	[illegible]	[illegible]	55.00	1.799.192.59
736 0190	DUST CONTROL	[illegible]	[illegible]	50.000.00	50.000.00
736 0013	ASPHALT ESCALATION	[illegible]	[illegible]	25.000.00	25.000.00
736 0016	FUEL ESCALATION	[illegible]	[illegible]	15.000.00	15.000.00
736 0016	INCIDENTAL CONTRUCTION	[illegible]	[illegible]	250.000.00	250.000.00

Sub-Total:	$163,755,304.61
Drainage (25%):	$40,938,826.15
Erosion Control (10% of Drainage):	$4,093,882.62
Revegatation (5%):	$8,187,765.23
ITS (LS):	$5,000,000.00
Signing and Striping (3%):	$4,912,659.14
Traffic Control (1%):	$1,637,553.05
Miscellaneous Item Allowance (30%):	$49,126,591.38
Bid Item Sub-Total	$277,652,582.18
Mobilization (12%):	$33,318,309.86
Contract Total:	$310,970,892.04
Construction Engineering (10%):	$31,097,089.20
Preliminary Engineering (10%):	$31,097,089.20
Construction Contingency (3%):	$9,329,126.76
Right-of-Way Acquisition:	$0.00
Utility Relocation:	$0.00
Total:	**$382,494,197**

Alternative 5

Summary Of Quantities

I-80 EAST NEPA (10-FOOT INSIDE SHOULDERS)(COMMON CROWN)

IPD Bid Item #	Description	Quantity		Cost per Unit	Unit Total
202 0990	REMOVAL OF BITUMINOUS SURFACE (COLD MILLING)	17,333.3	SQYD	$ 5.00	$ 86,666.67
203 0140	ROADWAY EXCAVATION	1,169,432.0	CUYD	$ 40.00	$ 46,777,280.00
2030200	BORROW EMBANKMENT	1.1	CUYD	$ 25.00	$ 27.50
302 0130	TYPE 1 CLASS B AGGREGATE BASE	599,898.7	TON	$ 25.00	$ 14,997,467.04
402 0190	PLANTMIX SURFACING (TYPE 2C)(WET)	401,932.1	TON	$ 120.00	$ 48,231,853.99
403 0110	PLANTMIX OPEN-GRADED SURFACING (3/8-INCH)(WET)	37,493.7	TON	$ 130.00	$ 4,874,176.79
406 0120	PRIME COAT	947,208.4	SQYD	$ 1.00	$ 947,208.44
502 0180	CONCRETE BARRIER RAIL (TYPE B)	136,222.0	LINFT	$ 65.00	$ 8,854,430.00
502 XXXX	CONCRETE BRIDGE CONSTRUCTION	32,160.0	SQFT	$ 400.00	$ 12,864,000.00
616 0740	TYPE A-4S FENCE	20,811.0	LINFT	$ 35.00	$ 728,385.00
624 0130	UNIFORMED TRAFFIC CONTROL OFFICER	1.0	FA	$ 100,000.00	$ 100,000.00
637 0110	TEMPORARY POLLUTION CONTROL	1.0	LS	$ 75,000.00	$ 75,000.00
641 0150	IMPACT ATTENUATOR (70 MPH)	20.0	EACH	$ 10,000.00	$ 200,000.00
642 0100	CONCRETE PANEL WALL	122,570.0		175.00	21.449.750.00
642 0110	MECHANICALLY STABILIZED EARTH BACKFILL	110,992.0		55.00	6.104.560.00
736 0190	DUST CONTROL	1.0	LS	$ 50,000.00	$ 50,000.00
736 0013	ASPHALT ESCALATION	1.0	LS	$ 25,000.00	$ 25,000.00
736 0016	FUEL ESCALATION	1.0	LS	$ 15,000.00	$ 15,000.00
736 0016	INCIDENTAL CONTRUCTION	1.0	LS	$ 250,000.00	$ 250,000.00

Sub-Total:	$166,630,805.43
Drainage (25%):	$41,657,701.36
Erosion Control (10% of Drainage):	$4,165,770.14
Revegatation (5%):	$8,331,540.27
ITS (LS):	$5,000,000.00
Signing and Striping (3%):	$4,998,924.16
Traffic Control (1%):	$1,666,308.05
Miscellaneous Item Allowance (30%):	$49,989,241.63
Bid Item Sub-Total	$282,440,291.03
Mobilization (12%):	$33,892,834.92
Contract Total:	$316,333,125.96
Construction Engineering (10%):	$31,633,312.60
Preliminary Engineering (10%):	$31,633,312.60
Construction Contingency (3%):	$9,489,993.78
Right-of-Way Acquisition:	$0.00
Utility Relocation:	$0.00
Total:	**$389,089,745**