EXECUTIVE SUMMARY

July 2017

WARM SPRINGS COMMERCIAL CORRIDOR SAFETY PLAN

Prepared for:

Oregon Department of Transportation & The Confederated Tribes of Warm Springs

Prepared by:

KITTELSON & ASSOCIATES

TABLE OF CONTENTS

1. PROJECT DESCRIPTION

The Warm Springs Commercial Corridor Safety Plan identifies and documents recommended programs, policies, and projects to improve safety performance on and around the Warm Springs Commercial Corridor across multiple modes of transportation. The recommended projects were identified based on existing transportation system conditions, future analysis, and input received from the public and project stakeholders.

A. PROJECT GOALS

Project goals were identified with input from the Public Advisory Committee. These goals were used to guide the development of The Plan and prioritize programs, policies, and projects.
The Project goals consist of the following:

- Provide a transportation system that promotes the safety performance of current and future travel modes for each user.
- Promote a transportation system that facilitates the use of US 26, Hollywood Boulevard, Tenino Road, Paiute Avenue, and Warm Springs Street for safe and efficient travel while providing safe multimodal corridors and connections to key destinations in the community.
- Reduce the frequency and severity of crashes for each user.
- Evaluate potential roadway geometry modifications to improve roadway safety.
- Identify educational and enforcement strategies to address crash trends and risks.

2. PUBLIC INVOLVEMENT

The Plan was developed through a public involvement process guided by technical data. The public involvement process included a public meeting (safety charrette) as well as guidance from a Public Advisory Committee (PAC). The following sections further describe the public involvement process.

Public Advisory Committee

The PAC guided the project through a series of three meetings to review and discuss technical analyses. The PAC was comprised of stakeholders representing a wide range of parties with interests in the study area, including public works members, public safety representatives, residents, and business owners.

Meeting Date	Meeting Topic
Aug 18 2016	Overview of project goals and objectives, and the proposed study approach
Sep 13 2016	Overview of existing conditions analysis results and identified safety issues
Nov 17 2016	Overview of recommendations and priorities

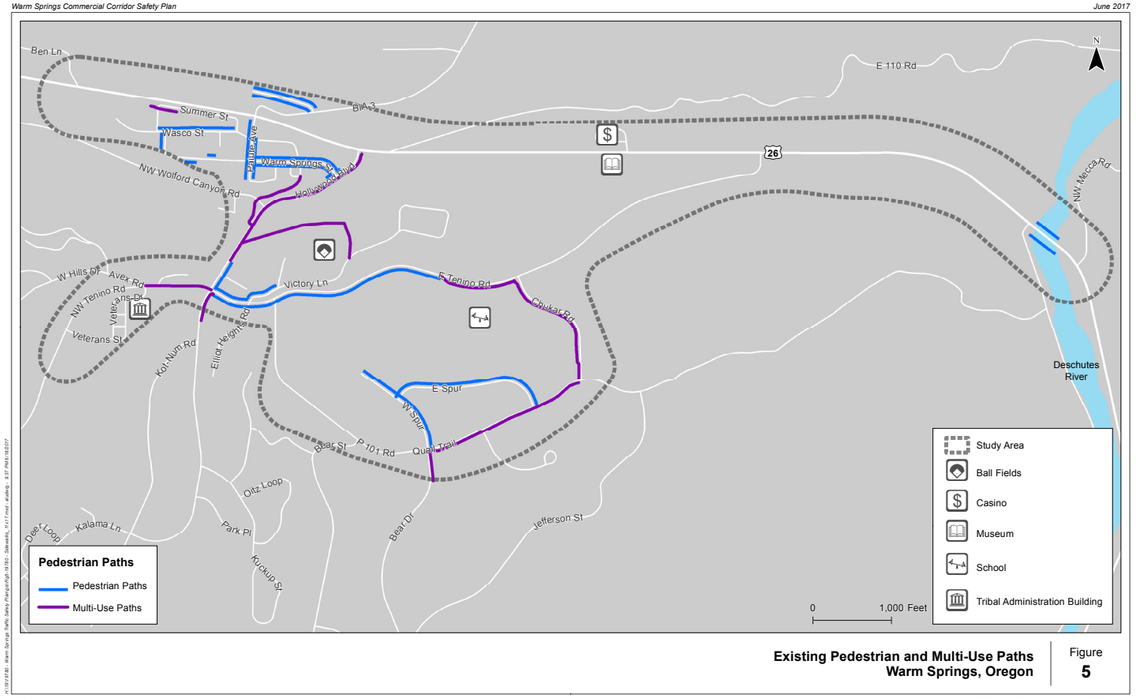
Public Meeting

A Safety Charrette with the general public was held on September 13th, 2016, following the second PAC meeting. The Safety Charrette provided an opportunity for the general public to learn about the project and share their thoughts on potential recommendations and outcomes of the Plan. It was conducted in an interactive format, intended to allow participants to share thoughts about where specific treatments were needed. Participants were provided a toolbox of treatments and encouraged to indicate locations where they recommended implementation of the treatments.

3. IDENTIFICATION OF SAFETY OPPORTUNITIES

A. PEDESTRIAN AND BICYCLE FACILITIES

The figure below shows the location of existing sidewalks and shared-use paths within the study area. The key gaps within the existing network include east-west connections along the US 26 corridor and connections between the school and nearby residential areas.

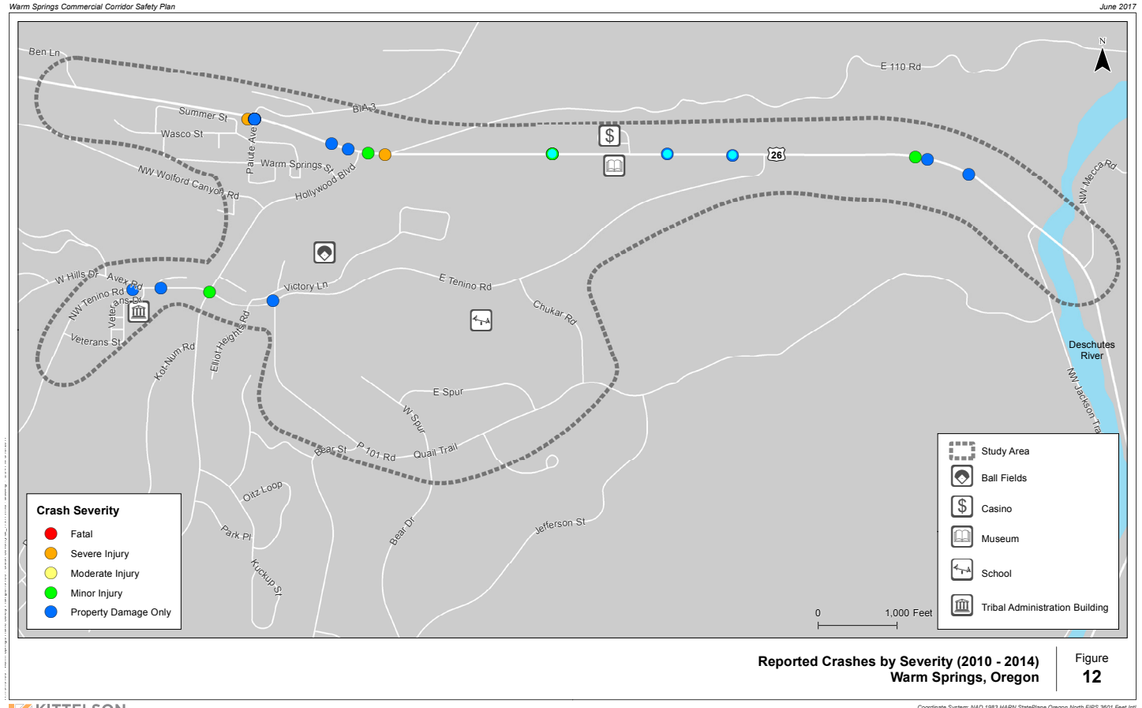


B. REPORTED CRASH HISTORY

The most recent complete five years of reported crash data (2010 through 2014) was obtained from ODOT's crash database for the study area. Reported crashes in ODOT's database include those that resulted in an injury and/or over $1,500 of property damage. The reported crash data from ODOT's crash database was used to complete the crash analysis summarized in this section.

There were 24 reported crashes within the study area boundaries.

Section	Location	Injury	PDO	Total
US 26	Paiute	1	7	8
	Hollywood	2	2	4
	Casino/Museum Area	3	2	5
	East of Tenino Road	1	2	3
Total		**7**	**13**	**20**
Off Highway	Along Tenino	1	3	4

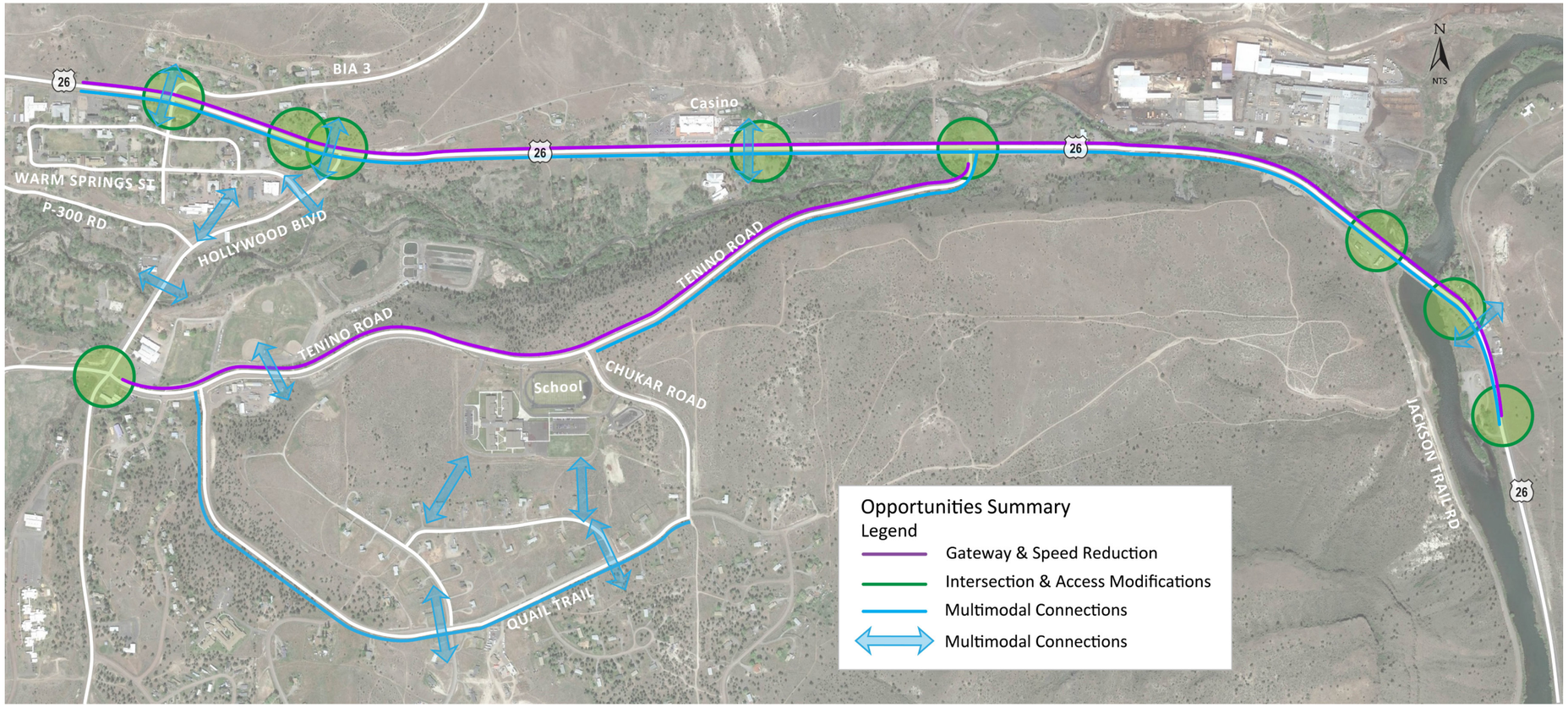


4. SUMMARY OF IDENTIFIED OPPORTUNITIES

Key issues were identified and summarized for the US 26 corridor and the off-highway area based on the data analysis and input from the PAC. The key issues were grouped into three main categories:

- Gateway and speed reduction;
- Intersection and access modifications; and
- Multimodal connectivity.

The eastern and western ends of the US 26 study area act as transition areas between the community and the rural highway; speed management is a key issue in these areas and continues throughout the US 26 corridor. The US 26 segment between Hollywood Boulevard and the casino is an important pedestrian and bicycle connection; the lack of facilities in this segment is a key issue. Opportunities in the off-highway area include speed management, particularly along Tenino Road, and bicycle and pedestrian connectivity. Key gaps in the pedestrian and bicycle system include connections between residential areas and the school as well as pedestrian crossings.



5. RECOMMENDATIONS

Recommendations are divided into two general sections: recommended policies & programs, and recommended projects. The recommendations were identified and refined through collaboration between KAI, ODOT, and the CTWS and vetted by the project stakeholders, PAC members, and the public at the Safety Charrette.

A. PROGRAMMATIC AND POLICY RECOMMENDATIONS

The policy and programmatic recommendations are intended to complement the recommended projects to form a comprehensive safety plan. Recommendations include the following:

- **Education:** Education content for students at the school should address safe crossing practices, appropriate side of the road for traveling when sidewalks are not present, and best practices for skateboarding.
- **Enforcement:** Many of the recommended projects will not be successful without effective enforcement. For example, enforcement should focus on maintaining speeds throughout the 45 mph zone based on the identified issue of speed management.
- **Improved Data Collection:** The CTWS should develop a consistent method of gathering data for crashes and reporting the data to the state. Comprehensive data would assist the CTWS in being competitive for future project grants in addition to monitoring for progress towards the goals of the Safety Plan.
- **Safe Routes to School:** The CTWS should develop a Safe Routes to School Plan to identify additional improvements and supporting programs that may be needed.
- **Development Standards:** The CTWS should adopt development standards that require new developments to include frontage improvements along their roadway, consistent with the cross-section for the specific location. This will help the CTWS build towards the community's vision.
- **Transit Connections:** The CTWS should prioritize pedestrian and lighting enhancements at transit stops and along transit routes.

B. PROJECTS

The recommended projects were developed and prioritized based on the crash trends, identified risk factors, community input, effectiveness of the treatment, and relative cost and ease of implementation. Mobility issues that were not indicative of safety issues were not considered as part of this Plan. The recommended projects include further evaluation for traffic control devices when necessary.

The recommended projects have been prioritized into the following categories:

- Near-term projects: These projects have the potential to be implemented within the next 1-to-2 years and can be completed with limited engineering and/or project programming and permitting.
- Medium-term projects: These projects have the potential to be implemented within approximately 2-to-5 years and may require more design details and stakeholder outreach to support project programming.
- Long-term projects: These projects may take longer than 5 years to implement and may require overcoming such challenges as obtaining funding and/or purchasing right-of-way. Some projects identified on the long-term plan should also be considered as part of development-driven projects; projects that are recognized for their benefits but are lower priority under existing conditions.

Location ID	Location	Near-Term	Medium-Term	Long-Term	Total
1	US 26 (West of Paiute Ave/BIA 3)	$80,000	$0	$40,000	**$120,000**
2	US 26/Paiute Ave/BIA 3 Intersection	$5,000	$543,000	$3,000	**$551,000**
3	US 26 (Paiute Ave to Hollywood Blvd)	$0	$530,000	$200,000	**$730,000**
4	US 26/Hollywood Boulevard Intersection	$910,000	$50,000	$20,000	**$980,000**
5	US 26 (Hollywood Boulevard to Casino/Museum Intersection)	$620,000	$0	$360,000	**$980,000**
6	US 26/Casino/ Museum Intersection	$60,000	$31,000	$235,000	**$326,000**
7	US 26 (Casino/ Museum to Tenino Road)	$0	$0	$1,410,000	**$1,410,000**
8	US 26/Tenino Road Intersection	$0	$0	$23,000	**$23,000**
9	US 26 (Tenino Road to Deschutes River)	$0	$0	$285,000	**$285,000**
10	US 26 (Deschutes River to East End of Study Area)	$1,500	$170,000	$190,000	**$361,500**
11	Off Highway - School Area	$0	$580,000	$0	**$580,000**
12	Off Highway - Hollywood Boulevard	$90,000	$0	$40,000	**$130,000**
13	Off Highway - Tenino Road	$30,000	$0	$250,000	**$280,000**
	Total	**$1,796,500**	**$1,904,000**	**$3,056,000**	**$6,756,500**

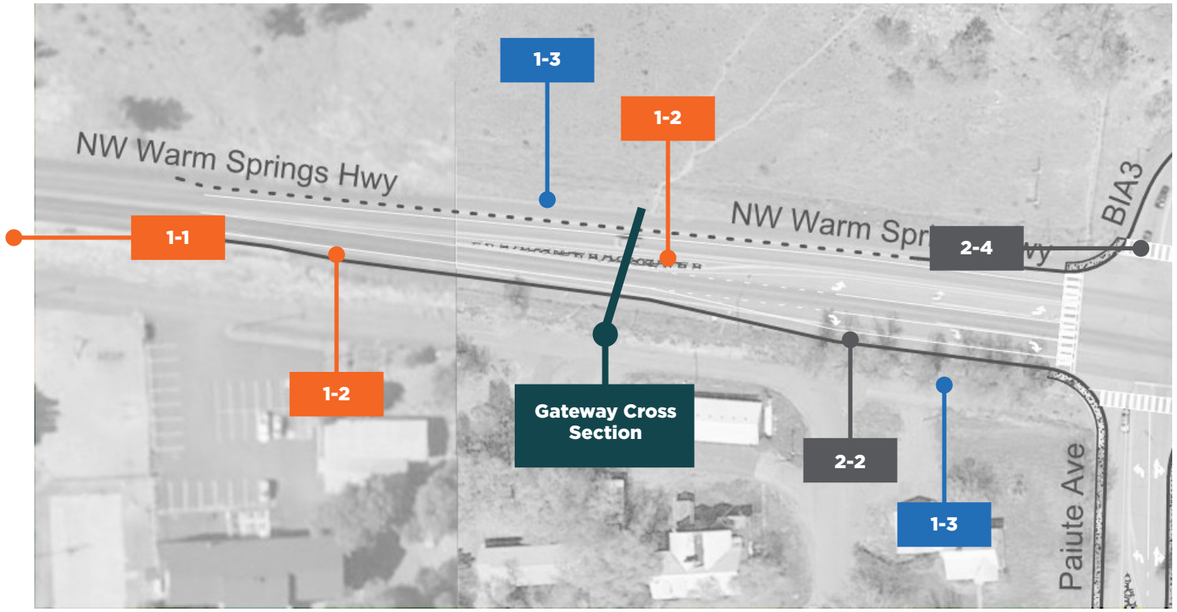
Table 1. Summary of Project Costs

The recommendations in this plan are meant to be flexible and adaptive over time. The priorities and timelines could shift over time as the conditions and context within the community change. However, the foundational nature of the implementation approach does not diminish as the CTWS adapts to varying community needs. The priorities are intended to serve as guidelines for Warm Springs without binding the CTWS to complete all near-term projects before beginning long-term projects. The CTWS is encouraged to use these project groupings to determine the most efficient use of future funding.

LOCATION

1

US 26—WEST OF PAIUTE AVENUE/BIA 3



LOCATION DESCRIPTION

This segment forms the approach (gateway) to the Warm Springs community for vehicles traveling eastbound.

Crashes: There were no reported crashes along this segment between the years of 2010 and 2014.

NEAR TERM

MEDIUM TERM

LONG TERM

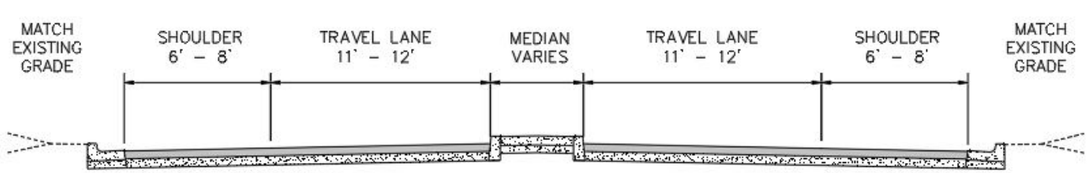
PROJECT ON DIFFERENT PAGE

	ID	PROJECT	PROJECT DESCIPTION	BENEFITS[1]	COST ESTIMATE[2]	OPPORTUNITIES & CONSIDERATIONS	PROJECT COORDINATION
NEAR TERM	1-1	Retain Existing Speed Feedback Sign	Retain existing speed feedback sign for eastbound traffic. To the extent possible, the feedback sign could be integrated with downstream intersection warning devices.	• Speed reduction upon entry to Warm Springs. • CRF: 41% all crash types	Exists under current conditions	• Speed reduction reinforcement • There may be an opportunity to interconnect the speed feedback sign with the intersection warning device at the US 26 and Paiute Avenue/BIA 3 intersection.	-
	1-2	Install Gateway Treatments	Install curb and median, and consider restriping and narrowing travel lanes to provide visual cues that alert eastbound drivers to a new environment, encourage slower speeds, and increase driver awareness of the change in land use.	• Speed reduction; increased awareness of approaching community and intersection. • CRF: 15% injury crashes (based on 10% reduction in speed)	$80K B/C: 1.4	• Project could be constructed at the same time as project 1-3 for maximum benefits. However, project may be phased (i.e., curb along the south as a near-term project and curb along the north as a medium-term project. Curb on the north side should extend a minimum of 100' west from the intersection in initial phase. • Project assumes no roadway widening. Lane widths could be reduced to 11' and 6' shoulders. Coordinate with the freight industry during the project design to establish cross section dimensions. The gateway treatments begin approximately 500' west of the intersection. The raised median should include end treatment channelization and shy distance per the Highway Design Manual and will remain within existing striped median width.	1-3
LONG TERM	1-3	Install Additional Roadway Illumination	Install up to three additional light poles to increase illumination.	• Visual cues for speed reduction, increased driver awareness. • CRF: 28% nighttime crashes	$40K B/C: 1.3	-	1-2

[1] CRF=Crash Reduction Factor. CRFs are not available to quantify all safety benefits associated with the recommendations. Therefore, B/C ratios (B/C) are provided in the cost estimate column, when available, to inform prioritization recommendations, but engineering judgement and risk factors supplement these numbers.

[2] All cost estimates are planning level and do not include right-of-way or significant earthwork costs. A 50% contingency is applied to cost estimates.

CROSS SECTION FOR GATEWAY TREATMENTS (WEST OF TURN LANES)



Actual cross-section will vary throughout corridor based on changing environmental, topographic, and right-of-way constraints.

OPPORTUNITIES

- Increase driver awareness to the change in environment (gateway treatments)
- Reduce speed of vehicles entering the community
- Creating a safer environment for pedestrians/bicycles

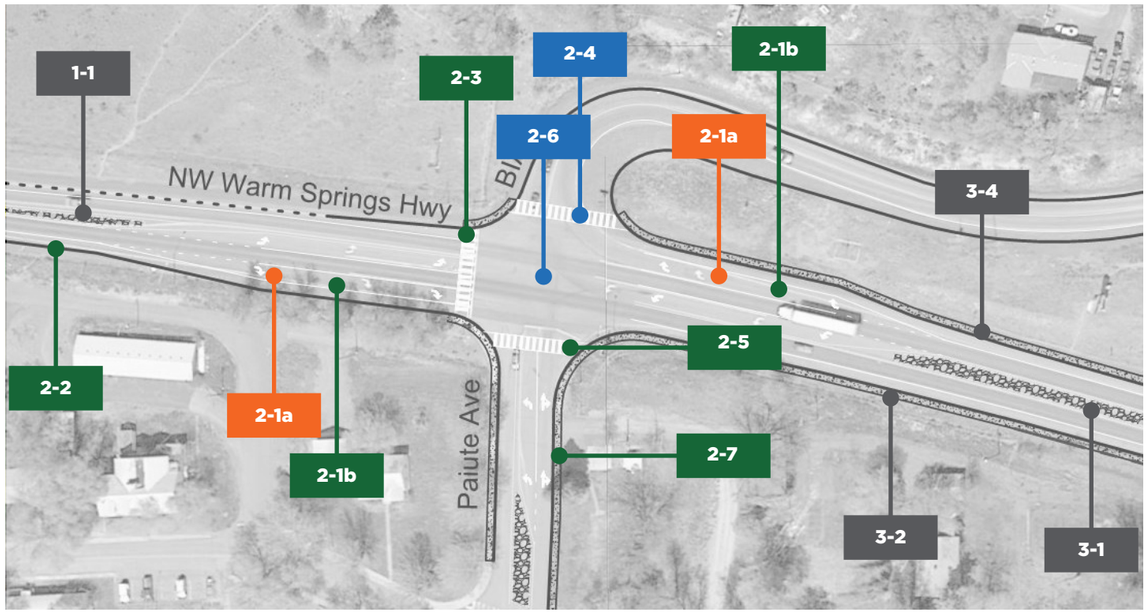
CHALLENGES

- Accommodating freight trucks on US 26

LOCATION

2

US 26/PAIUTE AVENUE/BIA 3 INTERSECTION



LOCATION DESCRIPTION

US 26/Paiute Avenue/BIA 3 is the first intersection vehicles encounter when approaching Warm Springs from the west.

Crashes: **8** reported crashes between the years of 2010 and 2014.
- **1** Severe crash

Collision types included:
- **3** angle crashes
- **1** rear end crash
- **1** turning movement crash

NEAR TERM

MEDIUM TERM

LONG TERM

PROJECT ON DIFFERENT PAGE

OPPORTUNITIES

- Reduce speed of vehicles entering the community
- Add or improve pedestrian/ bicycle facilities

CHALLENGES

- Accommodate freight trucks on US 26
- Impacts to current right-of-way limits

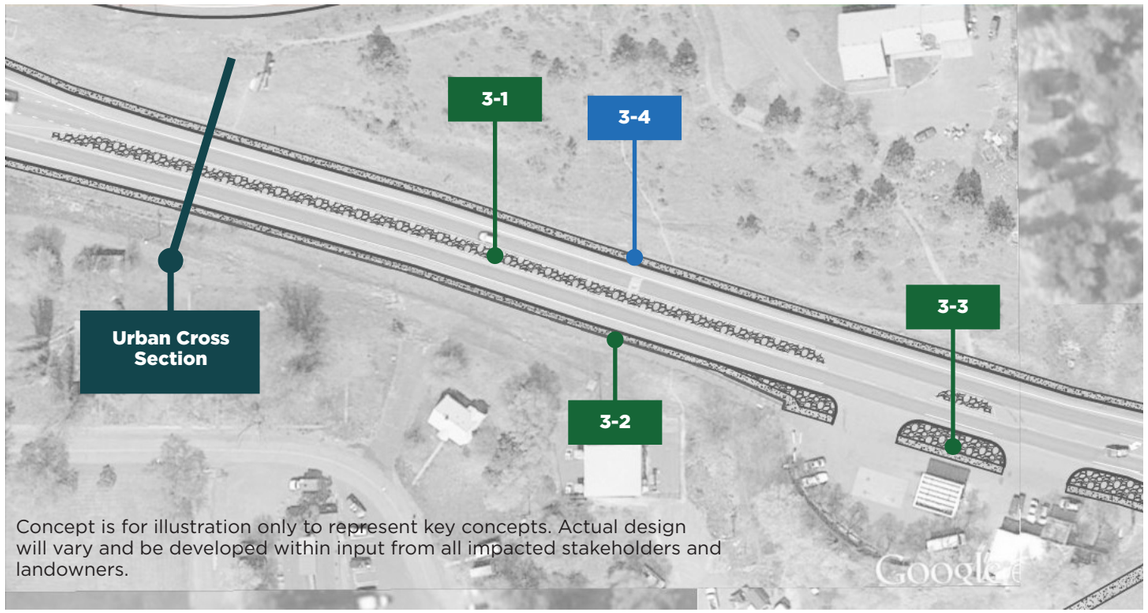
	ID	PROJECT	PROJECT DESCIPTION	BENEFITS[1]	COST ESTIMATE[2]	OPPORTUNITIES & CONSIDERATIONS	PROJECT COORDINATION
NEAR TERM	2-1a	Restripe Right Turn Lanes	Restripe east and westbound right turn lanes to better define merge areas to encourage drivers to complete the merge from the travel lane to the turn lane.	• Speed reduction; Increased sight distance at side streets. • CRF: 15% injury crashes	$5K B/C: 13.2	• Reduce turning vehicle speeds at crosswalks • Interim treatment for project 2-1b. Design evaluations should consider widening for future ped refuge island.	2-1b
MEDIUM TERM	2-1b	Restripe and Widen Right Turn Lanes	Restripe and widen east and westbound right turn lanes to an urbanized format with shorter tapers and longer storage lengths.	• Speed reduction; Increased sight distance at side streets. • CRF: 15% injury crashes	$375K B/C: 0.7	• Not needed if roundabout (project 2-6) occurs first. Should consider widening for pedestrian refuge island and existing topography constraints.	2-1a 2-3 2-6
	2-2	Install Intersection Warning System	Install eastbound intelligent transportation system (ITS) intersection warning system to alert drivers approaching from the west of potential conflicts ahead.	• Speed reduction; Alerts vehicles of potential conflicts. • CRF: --	$70K	• Could potentially be integrated with existing feedback sign • Not needed if roundabout (2-6) occurs first	2-6
	2-3	Install Pedestrian Crossing on West Leg of Intersection	Install enhanced pedestrian crossing across US 26. This could take the form of advanced signage, pavement markings, illumination, an RRFB or a hybrid pedestrian beacon. A ped refuge island should be installed prior to activation.	• Speed reduction; Vehicular and pedestrian visibility and awareness. • CRF: 56% RRFB CRF: 46% island CRF: 15% Marked crosswalk	$70K	• Should be completed when Project 3-4 is installed. • An engineering study including considerations of traffic speeds should inform the preferred design. Recommendations are based on speeds of 45 mph and crossing volumes <13 people/ hour.	2-1b 3-4
	2-7	Install Pedestrian Connection on Paiute Avenue	Install 8-10' hard surface, accessible, shared use path on the east side of Paiute Avenue between US 26 and Wasco Street.	• Conflict reduction. • CRF: --	$25K	• Should include curbs and consider right-of-way impacts and which agency is responsible for maintenance. May also include center median island on Paiute Avenue.	3-2
	2-5	Install Pedestrian Crossing on South Leg of Intersection	Install marked pedestrian crosswalk and commensurate signage on the Paiute Avenue (northbound) leg to the intersection.	• Speed reduction; Vehicular and pedestrian visibility and awareness. • CRF: 15% marked crosswalk	$3K	-	3-4
LONG TERM	2-4	Install Pedestrian Crossing on North Leg of Intersection	Install marked pedestrian crosswalk and commensurate signage on the BIA 3 (southbound) leg to the intersection	• Speed reduction; Vehicular and pedestrian visibility and awareness. • CRF: 15% marked crosswalk	$3K	-	3-4
	2-6	Conduct Roundabout Evaluation	Evaluate the feasibility of constructing a roundabout. A roundabout would reinforce speed reduction/gateway treatments and be expected to have lower crash frequency/severity than a potential signal.	• Gateway; Speed reduction; Access for pedestrians. • CRF: 82% injury crashes	Study: $20K $3.5M (round-about estimate) B/C: 0.4	• Roundabout would decrease speeds and act as gateway to community. • Evaluation should be completed if volumes or crashes increase. Should consider freight accommodation, pedestrian crossings, topographic constraints, right-of-way impacts, cultural impacts, and operational analysis at a minimum.	2-1b 2-2

[1] CRF=Crash Reduction Factor. CRFs are not available to quantify all safety benefits associated with the recommendations. Therefore, B/C ratios (B/C) are provided in the cost estimate column, when available, to inform prioritization recommendations, but engineering judgement and risk factors supplement these numbers.
[2] All cost estimates are planning level and do not include right-of-way or significant earthwork costs. A 50% contingency is applied to cost estimates.

LOCATION

3

US 26—BETWEEN PAIUTE AVENUE AND HOLLYWOOD BOULEVARD



Concept is for illustration only to represent key concepts. Actual design will vary and be developed within input from all impacted stakeholders and landowners.

LOCATION DESCRIPTION

This segment between Paiute Avenue and Hollywood Boulevard contains the existing gas station access. Observations indicate queueing at the gas station sometimes extends onto the highway.

Crashes: **2** reported crashes between the years of 2010 and 2014

- Both angle crashes occurred near the gas station access

NEAR TERM

MEDIUM TERM

LONG TERM

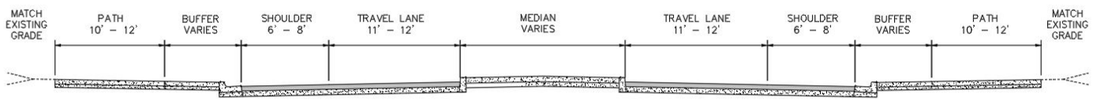
PROJECT ON DIFFERENT PAGE

	ID	PROJECT	PROJECT DESCIPTION	BENEFITS[1]	COST ESTIMATE[2]	OPPORTUNITIES & CONSIDERATIONS	PROJECT COORDINATION
MEDIUM TERM	3-1	Install Urban Cross Section	Install urban cross section along segment of road between Paiute Avenue & Hollywood Boulevard to help manage speed reduction.	• Speed reduction; increased driver awareness. • CRF: 15% injury crashes (based on 10% speed reduction)	$310K B/C: 0.1	• Coordination between ODOT and property owners is required for this project. The median island will provide clear delineation for left-turning vehicles at the gas station.	3-3 4-1
	3-2	Install Shared-Use Path (South Side)	Install a hard surface, accessible (10' – 12' wide) path with pedestrian scale illumination along south side of US 26 between Paiute Avenue & Hollywood Boulevard.	• Conflict reduction; quality of service. • CRF: --	$200K	• Minimizing buffer width while providing adequate space for utilities and snow (8' minimum when possible) will increase the speed reduction effects of the urban cross section. • Considerations should include topography, right-of-way impacts, and how the path would cross the gas station. Maintenance and funding responsibility for illumination should be agreed upon by ODOT and the CTWS.	2-7 3-3
	3-3	Access Management at Gas Station	Redefine access into and out of the gas station to reduce conflict points and increase driver awareness.	• Conflict reduction. • CRF: 25% injury crashes (based on reduction in driveway density)	$20K B/C: 3.8	• Coordination between all parties is required for this project. Operational analysis should consider queuing and turn lanes.	3-1 3-2
LONG TERM	3-4	Install Shared-Use Path (North Side)	Install a hard surface, accessible path (8'-10' wide) along north side of US 26 between Paiute Avenue & Hollywood Boulevard to provide a separated facility for pedestrians and bicyclists. Include pedestrian scale illumination.	• Conflict reduction; quality of service. • CRF: --	$200K	• Minimizing buffer width while providing adequate space for utilities and snow (8' minimum when possible) will increase the speed reduction effects of the urban cross section. • Topography and right-of-way impacts will need to be assessed when considering configurations. Maintenance and funding responsibility for illumination should be agreed upon by ODOT and the CTWS.	2-3 2-4 2-5

[1] CRF=Crash Reduction Factor. CRFs are not available to quantify all safety benefits associated with the recommendations. Therefore, B/C ratios (B/C) are provided in the cost estimate column, when available, to inform prioritization recommendations, but engineering judgement and risk factors supplement these numbers.

[2] All cost estimates are planning level and do not include right-of-way or significant earthwork costs. A 50% contingency is applied to cost estimates.

CROSS SECTION FOR URBAN STREET TREATMENTS AT LOCATION 3



Actual cross-section will vary throughout corridor based on changing environmental, topographic, and right-of-way constraints.

OPPORTUNITIES

- Add or improve pedestrian/ bicycle facilities
- Increase vehicle and pedestrian awareness
- Continue speed management as eastbound vehicles travel through the community

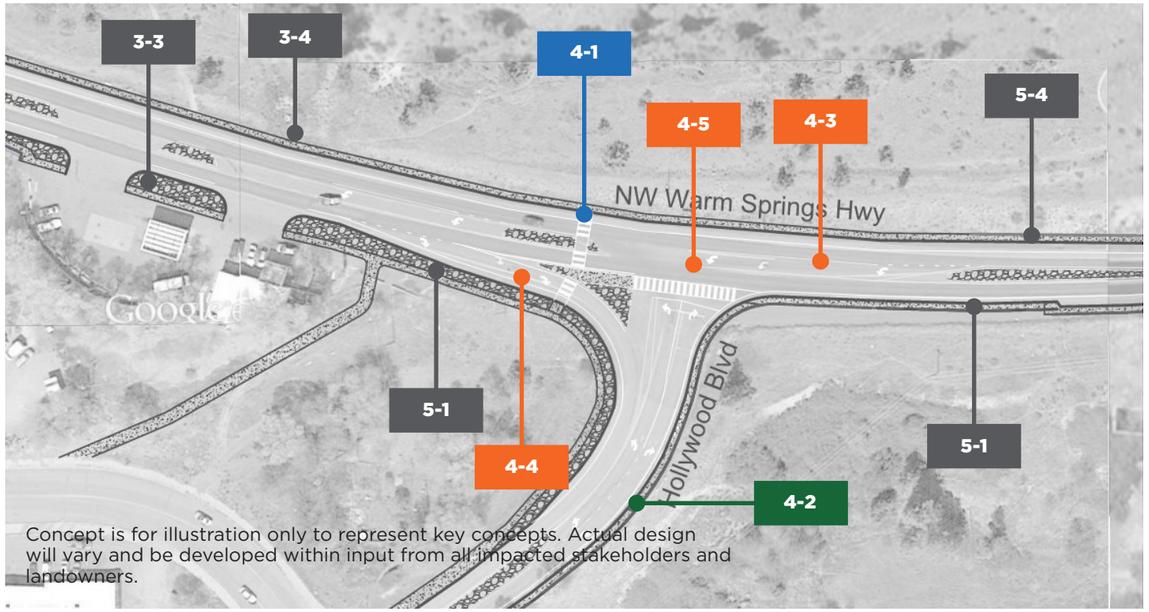
CHALLENGES

- Access management at the gas station
- Impacts to current right-of-way

LOCATION

4

US 26/HOLLYWOOD BOULEVARD INTERSECTION



Concept is for illustration only to represent key concepts. Actual design will vary and be developed within input from all impacted stakeholders and landowners.

LOCATION DESCRIPTION

The intersection of Hollywood Boulevard/US 26 connects much of the Warm Springs community to US 26. The intersection sits on a horizontal and vertical curve in close proximity to the gas station.

Crashes: **2** reported crashes between the years of 2010 and 2014

- Both were rear end crashes

NEAR TERM

MEDIUM TERM

LONG TERM

PROJECT ON DIFFERENT PAGE

OPPORTUNITIES

- Enhance intersection to improve sight distance from the side street approach
- Increase pedestrian and bicycle awareness and visibility

CHALLENGES

- Impacts to current right-of-way
- Grade changes within intersection
- Accommodate freight trucks (serves as a connection to the alternate route through town)

	ID	PROJECT	PROJECT DESCIPTION	BENEFITS[1]	COST ESTIMATE[2]	OPPORTUNITIES & CONSIDERATIONS	PROJECT COORDINATION
NEAR TERM	4-3	Update Left Turn Lane on US 26	Reconfigure westbound left turn lane to convert from rural design into an urbanized format with shorter tapers and longer storage lengths.	• Speed reduction; conflict reduction; sight distance improvement. • CRF: --	$40K	• No widening is assumed (construct within existing median space). Project includes median construction on approach to westbound left-turn lane.	4-5
NEAR TERM	4-4	Update Right Turn Lane on US 26	Reconfigure eastbound right turn lane to convert from rural design into an urbanized format with shorter tapers and longer storage lengths. The channelized right-turn will allow a pedestrian refuge island and encourage reduced turning vehicle speeds.	• Speed reduction; sight distance improvement; reduced pedestrian crossing distance. • CRF: --	$45K	• Truck access should be considered in the design. [3]Project should include defining the westbound right-turn merge area and tightening the turn radius with the addition of a median island.	4-1 4-5
NEAR TERM	4-5	Enhance Intersection Sight Distance	Reduce superelevation of US 26 at the intersection to improve sight distance for the Hollywood Boulevard approach.	• Sight distance improvement. • CRF: 15% injury crashes	$825K B/C: 0.2	• Truck access should be considered in the design. [3] This is near-term since the design evaluations are extensive. The effort would reduce superelevation to near 2%.	4-3 4-4 5-1
MEDIUM TERM	4-2	Install Path on Hollywood Boulevard	Install shared-use path on the east side of Hollywood Boulevard to connect the path along the south side of US 26 to the crossing at Warm Springs Street.	• Conflict reduction. • CRF: --	$50K	• Project should include consideration of right-of-way impacts, cultural site southeast of intersection, amount of fill needed, and pedestrian scale illumination along the path and at motor vehicle conflict points.	5-1 12-2
LONG TERM	4-1	Install Pedestrian Crossing	Install pedestrian crossing with raised pedestrian refuge island across US 26 at Hollywood Boulevard.	• Conflict reduction. • CRF: --	$20K	• Projects 3-1, 3-4, 4-4, and 5-4 should be completed prior to or in conjunction with installing a crossing at this location. Crossing design should consider traffic speeds and pedestrian volume.	3-1 4-4

[1] CRF=Crash Reduction Factor. CRFs are not available to quantify all safety benefits associated with the recommendations. Therefore, B/C ratios (B/C) are provided in the cost estimate column, when available, to inform prioritization recommendations, but engineering judgement and risk factors supplement these numbers.

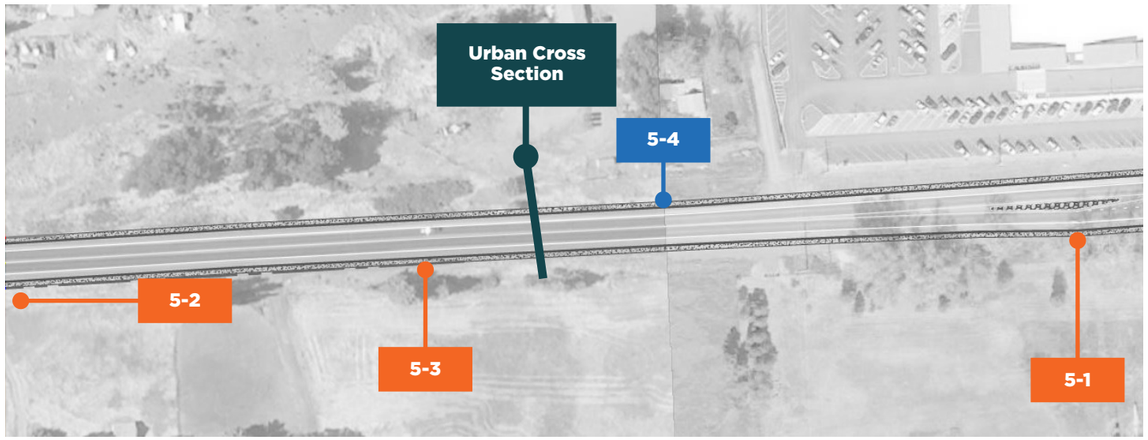
[2] All cost estimates are planning level and do not include right-of-way or significant earthwork costs. A 50% contingency is applied to cost estimates.

[3] This is part of the Hollywood Boulevard/Tenino Road route that is used as a bypass to US 26 when rare events cause the highway to close.

LOCATION

5

US 26—BETWEEN HOLLYWOOD BOULEVARD AND CASINO/ MUSEUM



LOCATION DESCRIPTION

This segment of US 26 is a relatively long segment between key employment centers and Hollywood Boulevard. Pedestrians frequently walk beside the highway along this corridor.

Crashes: **3** reported crashes between the years of 2010 and 2014

- All were rear end crashes

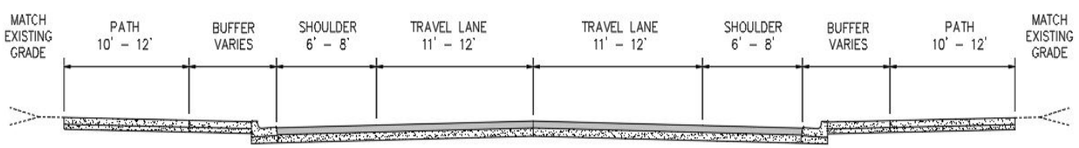
NEAR TERM

MEDIUM TERM

LONG TERM

PROJECT ON DIFFERENT PAGE

CROSS SECTION FOR URBAN STREET TREATMENTS AT LOCATION 5



Actual cross-section will vary throughout corridor based on changing environmental, topographic, and right-of-way constraints.

OPPORTUNITIES

- Increase pedestrian and bicycle awareness and separation from vehicles
- Maintain decreased speeds established at gateways
- Create a safer environment for pedestrians and bicycles

CHALLENGES

- Existing pedestrian and bicycle use without dedicated facilities

	ID	PROJECT	PROJECT DESCIPTION	BENEFITS[1]	COST ESTIMATE[2]	OPPORTUNITIES & CONSIDERATIONS	PROJECT COORDINATION
NEAR TERM	5-1	Shared Use Path (South Side)	Install a hard surface, accessible path (10' – 12' wide) along south side of US 26 between Hollywood Boulevard and the Casino/Museum to provide a separated facility for pedestrians and bicyclists. Include pedestrian scale illumination along the path and at path/vehicle conflict points.	• Conflict reduction. • CRF: --	$390K	• Minimizing buffer width while providing adequate space for utilities and snow (8' minimum when possible) will increase the speed reduction effects of the urban cross section. • The design of this project should tie-in to existing path behind the gas station on the west side of Hollywood Boulevard and should consider topography and right-of-way impacts. Extensive earthwork is expected. Design should consider the widening needed for project 6-1. Illumination maintenance should be agreed upon by ODOT and the CTWS.	4-2 4-5 5-3 6-1
	5-2	Install Eastbound Feedback Sign	Install feedback sign for eastbound drivers to help maintain reduced speeds along the corridor.	• Speed reduction. • CRF: 41% all crashes	$15K B/C: 34.9	-	5-3 6-1
	5-3	Install Urban Cross Section	Install urban cross section between Hollywood Boulevard and the Casino/Museum to encourage speed reduction. This should include lane narrowing and adding curbs on both sides of the roadway where they do not exist.	• Speed reduction. • CRF: 15% injury crashes (based on 10% speed reduction)	$215K B/C: 0.6	• Coordination between all property owners and the freight industry is required for this project. Lane widths may be reduced to 11' and shoulder widths to 6'. Wide shoulders are not recommended to discourage trucks from parking on the shoulder.	5-1 5-2
LONG TERM	5-4	Install Shared-Use Path (North Side)	Install a hard surface, accessible path (10'-12' wide) along north side of US 26 between Hollywood Boulevard and the Casino/Museum to provide a separated facility for pedestrians and bicyclists. Include pedestrian scale illumination.	• Conflict reduction. • CRF: --	$360K	• Minimizing buffer width while providing adequate space for utilities and snow (8' minimum when possible) will increase the speed reduction effects of the urban cross section. • Topography and right-of-way impacts should be assessed through the design of this project. Retaining walls may be needed. Illumination maintenance should be agreed upon by ODOT and the CTWS.	-

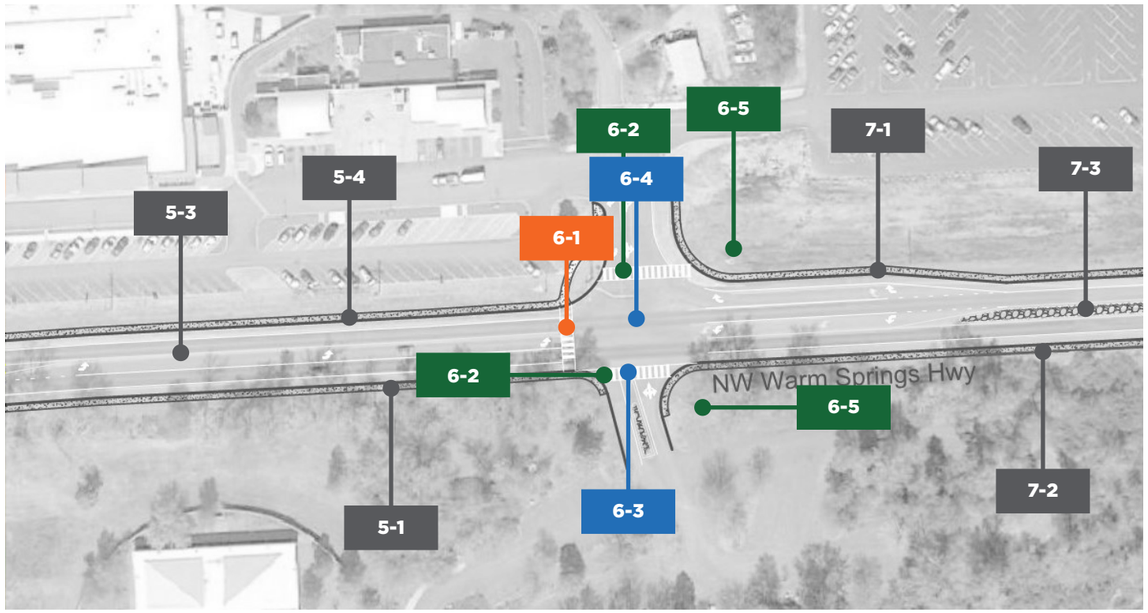
[1] CRF=Crash Reduction Factor. CRFs are not available to quantify all safety benefits associated with the recommendations. Therefore, B/C ratios (B/C) are provided in the cost estimate column, when available, to inform prioritization recommendations, but engineering judgement and risk factors supplement these numbers.

[2] All cost estimates are planning level and do not include right-of-way or significant earthwork costs. A 50% contingency is applied to cost estimates.

LOCATION

6

US 26/CASINO/MUSEUM INTERSECTION



LOCATION DESCRIPTION

This location serves as the access to the casino and the museum. Both locations are key employment centers and tourist attractions.

Crashes: There were no reported crashes at this intersection between the years of 2010 and 2014.

NEAR TERM

MEDIUM TERM

LONG TERM

PROJECT ON DIFFERENT PAGE

OPPORTUNITIES

- Enhance sight distance on the side street approaches to the intersection
- Increase pedestrian and bicycle awareness, visibility, and comfort crossing

CHALLENGES

- Restricted sight distance from the side streets

	ID	PROJECT	PROJECT DESCIPTION	BENEFITS[1]	COST ESTIMATE[2]	OPPORTUNITIES & CONSIDERATIONS	PROJECT COORDINATION
NEAR TERM	6-1	Enhance Existing Pedestrian Crosswalk	Install enhanced crossing across US 26 with a pedestrian refuge island. Include supplemental illumination on the SW intersection corner. Consider an active crossing if volumes increase.	• Pedestrian and intersection awareness; speed reduction. • CRF (pedestrian crashes): 46%: island • CRF: 15% marked crosswalk	$60K	• Should consider widening roadway for a pedestrian refuge island. Some space may be obtained through lane narrowing. • Pedestrian crossing volumes from the 2016 Casino Traffic Monitoring Study do not warrant an active crossing and should be reevaluated after completion of the path.	5-1 5-2 6-2 6-3
MEDIUM TERM	6-2	Install Pedestrian Crosswalks	Install marked pedestrian crosswalks and commensurate signage on both minor street approaches to the intersection.	• Pedestrian and intersection awareness. • CRF: 15% marked crosswalk	$6K	-	6-1 6-3 6-5 7-1 7-2
	6-5	Install Intersection Illumination	Install intersection illumination in the northeast and southeast corners of the intersection.	• Pedestrian and intersection awareness. • CRF: 38% injury crashes at night	$25K B/C: 0.5	-	6-2
LONG TERM	6-3	Enhance Intersection Sight Distance	Adjust grades at south leg of intersection to bring the approach up to the highway and enhance sight distance for drivers entering US 26 .	• Improved sight distance. • CRF: 15% injury crashes (sight distance improvements)	$215K B/C: 0.3	• Project should include the review of sight distance and the relocation/removal of trees or objects that restrict sight distance. • Project should include coordination with the museum property owner for right-of-way and access considerations.	6-1
	6-4	Conduct Evaluation for Signal or Roundabout	Evaluate the feasibility of a signal or roundabout if traffic volumes, number of crashes, or crash severity increases.	• CRF: 67-77% angle crashes (signal); *58-143% increase in rear-end crashes* • CRF: 82% injury crashes (roundabout)	Study: $20K Varies ($400K - $3.5K)	• A roundabout would reinforce of speed reduction treatments and the opportunity for vehicles to turn around in the event of a highway closure. • Project (intersection control evaluation) should be initiated by the Casino per the IGA developed between the casino and ODOT. Evaluation should consider right-of-way impacts, safety, operations, freight, and environmental impacts. Traffic data collected in 2015 as part of the Casino's traffic monitoring report did not meet warrants for a traffic signal, with the exception of Sunday.	-

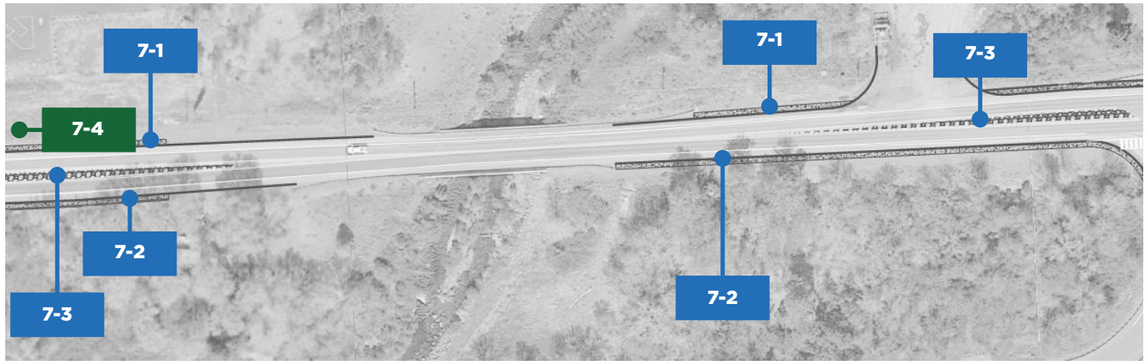
[1] CRF=Crash Reduction Factor. CRFs are not available to quantify all safety benefits associated with the recommendations. Therefore, B/C ratios (B/C) are provided in the cost estimate column, when available, to inform prioritization recommendations, but engineering judgement and risk factors supplement these numbers.

[2] All cost estimates are planning level and do not include right-of-way or significant earthwork costs. A 50% contingency is applied to cost estimates.

LOCATION

7

US 26—BETWEEN MUSEUM/ CASINO INTERSECTION AND TENINO ROAD



LOCATION DESCRIPTION

This segment forms part of the connection between the casino/museum and the western portion of the community. With the closure of the lumber mill, this segment is not as heavily used by pedestrians as it once may have been.

Crashes: **2** reported crashes between the years of 2010 and 2014

- **1** rear end
- **1** miscellaneous

NEAR TERM

MEDIUM TERM

LONG TERM

PROJECT ON DIFFERENT PAGE

OPPORTUNITIES

- Speed management
- Pedestrian and bicycle connectivity

CHALLENGES

- Existing bridge constraints on US 26

	ID	PROJECT	PROJECT DESCIPTION	BENEFITS[1]	COST ESTIMATE[2]	OPPORTUNITIES & CONSIDERATIONS	PROJECT COORDINATION
MEDIUM TERM	7-4	Maintain Westbound Speed Feedback Sign	Maintain existing westbound speed feedback sign to help maintain reduced speeds along the corridor.	• Speed reduction. • CRF: 41% all crashes	Exists under current conditions	-	7-3
LONG TERM	7-1	Install Shared-Use Path on North Side of US 26	Install a hard surface, accessible path (10' – 12' wide) on the north side of US 26 between the casino and the Deschutes River to provide a separated facility for pedestrians and bicyclists. Include pedestrian scale illumination.	• Conflict reduction. • CRF: --	$580K	• Minimizing buffer width while providing adequate space for utilities and snow (8' minimum when possible) will increase the speed reduction effects of the urban cross section. • The design of this project should consider topography, right-of-way impacts, proximity to the creek and steelhead sensitivity buffer, and bridge dimensions. The existing US 26 bridge over Shitike Creek is not wide enough to accommodate the path. Project design should tie into existing sidewalks on the US 26 bridge over the Deschutes River. Buffer width may require design variations from the Highway Design Manual due to these constraints. Illumination maintenance should be agreed upon by ODOT and the CTWS.	6-2 7-3 9-1
	7-2	Install Path on South Side of US 26	Install path a hard surface, accessible path (10' – 12' wide) on the south side of US 26 between the casino and the Deschutes River parking area to provide a separated facility for pedestrians and bicyclists. Include pedestrian scale illumination.	• Conflict reduction. • CRF: --	$580K	• This project may increase in priority if redevelopment of land south of US 26 occurs. Minimizing buffer width while providing adequate space for utilities and snow (8' minimum when possible) will increase the speed reduction effects of the urban cross section. • The design of this project should consider topography, right-of-way impacts and bridge constraints. Project should tie into existing US 26 bridge over the Deschutes River. Buffer width may require design variations from the Highway Design Manual due to these constraints. Further study is needed to evaluate the existing US 26 bridge crossing over Shitike Creek. Illumination maintenance should be agreed upon by ODOT and the CTWS.	6-2 7-3 8-2 9-1 9-2
	7-3	Install Urban Cross Section	Install urban cross section to encourage speed reduction. This should include lane narrowing and adding curbs on both sides of the roadway where they do not exist.	• Speed reduction. • CRF: 15% injury crashes (based on 10% reduction in speed)	$250K B/C: 0.36	• Coordination with freight industry should be completed during the design of the project. Lane widths may be reduced to 11' and shoulder widths to 6'. Wide shoulders are not recommended to discourage trucks from parking on the shoulder.	7-1 7-2 7-3

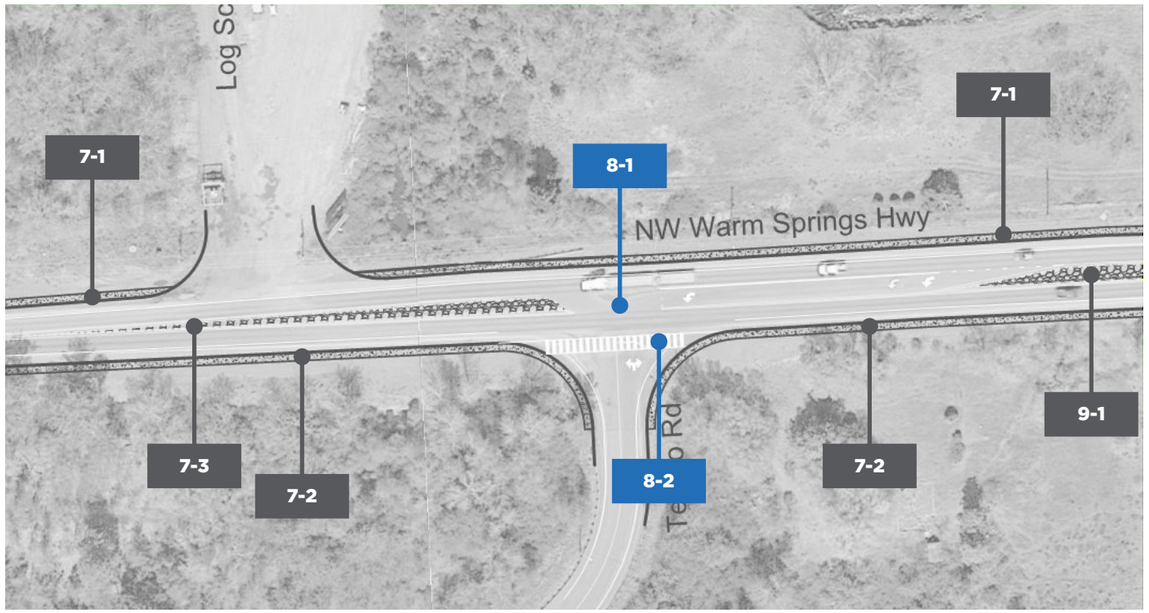
[1] CRF=Crash Reduction Factor. CRFs are not available to quantify all safety benefits associated with the recommendations. Therefore, B/C ratios (B/C) are provided in the cost estimate column, when available, to inform prioritization recommendations, but engineering judgement and risk factors supplement these numbers.

[2] All cost estimates are planning level and do not include right-of-way or significant earthwork costs. A 50% contingency is applied to cost estimates.

LOCATION

8

US 26/TENINO ROAD INTERSECTION



LOCATION DESCRIPTION

The intersection of US 26/Tenino Road forms an eastern connection to the Warm Springs community. Tenino Road connects to the local school and provides an alternate route to US 26 in the event of emergency highway closures.

Crashes: There were no reported crashes at this intersection between the years of 2010 and 2014.

NEAR TERM

MEDIUM TERM

LONG TERM

PROJECT ON DIFFERENT PAGE

OPPORTUNITIES

- Enhance intersection to facilitate movements between Tenino Road/US 26
- Increase pedestrian and bicycle awareness
- Maintain speed reduction

CHALLENGES

- Accommodate freight trucks (alternate route through town)

	ID	PROJECT	PROJECT DESCIPTION	BENEFITS[1]	COST ESTIMATE[2]	OPPORTUNITIES & CONSIDERATIONS	PROJECT COORDINATION
LONG TERM	8-1	Conduct Evaluation for Signal or Roundabout	Evaluate the feasibility of a signal or roundabout if traffic volumes, number of crashes, or crash severity increases.	• CRF: 67-77% angle crashes (signal); *58-143% increase in rear-end crashes.* • CRF: 82% injury crashes (roundabout)	Study: $20K Varies ($400K - $3.5K)	• A roundabout would reinforce the speed reduction treatments and the opportunity for vehicles to turn around in the event of a highway closure. • The evaluation should consider right-of-way impacts, safety impacts, operational impacts, freight, and environmental impacts at minimum.	-
	8-2	Install Pedestrian Crosswalk	Install marked pedestrian crosswalk and commensurate signage on the Tenino (southbound) leg to the intersection.	• Pedestrian & intersection awareness; speed reduction. • CRF (pedestrian crashes): 15% marked crosswalk	$3K	• The crosswalk should be installed at the same time as the path on the south side of US 26 (project 7-2).	7-2

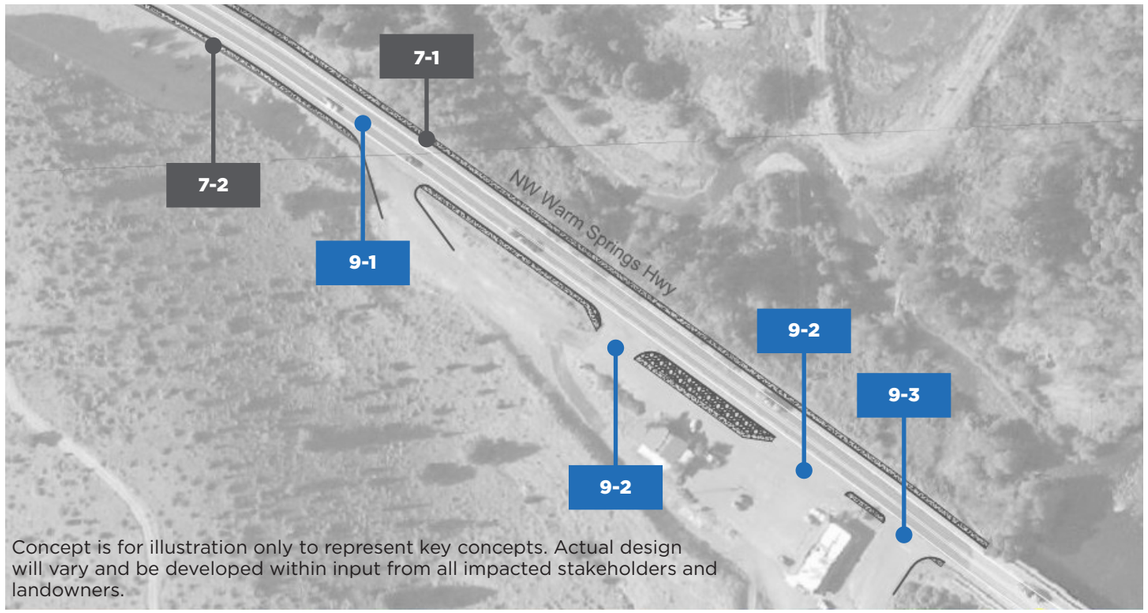
[1] CRF=Crash Reduction Factor. CRFs are not available to quantify all safety benefits associated with the recommendations. Therefore, B/C ratios (B/C) are provided in the cost estimate column, when available, to inform prioritization recommendations, but engineering judgement and risk factors supplement these numbers.

[2] All cost estimates are planning level and do not include right-of-way or significant earthwork costs. A 50% contingency is applied to cost estimates.

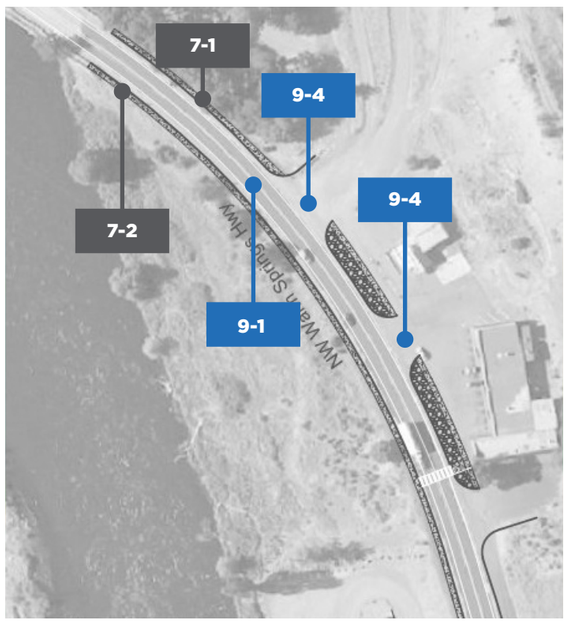
LOCATION

9

US 26—BETWEEN TENINO ROAD AND DESCHUTES CROSSING AREA



Concept is for illustration only to represent key concepts. Actual design will vary and be developed within input from all impacted stakeholders and landowners.



LOCATION DESCRIPTION

This segment of US 26 contains several destinations with undefined access along US 26.

Crashes: There were **4** reported crashes between the years of 2010 and 2014

- **2** rear ends
- **1** non-collision
- **1** sideswipe

NEAR TERM

MEDIUM TERM

LONG TERM

PROJECT ON DIFFERENT PAGE

	ID	PROJECT	PROJECT DESCIPTION	BENEFITS[1]	COST ESTIMATE[2]	OPPORTUNITIES & CONSIDERATIONS	PROJECT COORDINATION
LONG TERM	9-1	Install Urban Cross Section	Install urban cross section between Tenino Road and the Rainbow Market area to help manage speed reduction.	• Speed reduction. • CRF: 15% injury crashes (based on 10% speed reduction)	$135K B/C: 0.92	• Coordinate with freight industry and Jefferson County. • Design should consider right-of-way impacts and environmental	7-1 7-2 9-2
	9-2	Access Management at Eagle Crossing Restaurant Area	Redefine to reduce conflict points and increase driver awareness. Clearly defining vehicle access will reduce potential conflicts for vehicles, pedestrians, and bicyclists.	• Conflict reduction. • CRF: 25% injury crashes (based on reduction in driveway density)	$60K B/C: 3.44	• Coordination with all property owners is required for this project. Operational analysis should consider queuing and turn lanes. • Consider tree removal to improve sight distance.	9-1 9-3
	9-3	Conduct Feasibility Study to Realign Jackson Trail	Conduct a feasibility study to realign the Jackson Trail approach to US 26 to the west of the Eagle Crossing development area.	• Improve sight distance • CRF: --	$30K	• The study should consider right-of-way impacts, topography and coordination with land owners.	9-2
	9-4	Access Management at Rainbow Market	Redefine access points to reduce conflict points and increase driver awareness. Clearly defining vehicle access will reduce potential conflicts for vehicles, pedestrians, and bicyclists.	• Conflict reduction. • CRF: 25% injury crashes (based on reduction in driveway density)	$60K B/C: 2.24	• Coordination with Jefferson County and all owners is required for this project. Operational analysis should consider queuing and the need for eastbound left-turn lanes.	10-1

[1] CRF=Crash Reduction Factor. CRFs are not available to quantify all safety benefits associated with the recommendations. Therefore, B/C ratios (B/C) are provided in the cost estimate column, when available, to inform prioritization recommendations, but engineering judgement and risk factors supplement these numbers.

[2] All cost estimates are planning level and do not include right-of-way or significant earthwork costs. A 50% contingency is applied to cost estimates.

OPPORTUNITIES

- Continue speed reduction from eastern gateway

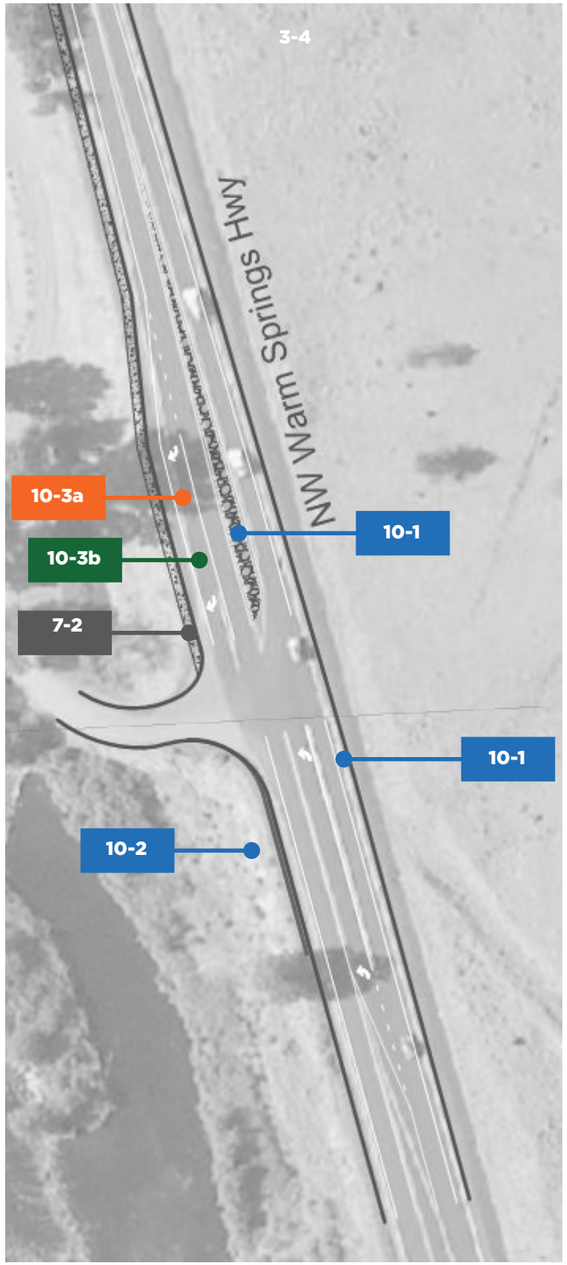
CHALLENGES

- Uncertain timing and impacts of future development
- Access management at current establishments

LOCATION

10

US 26 FROM DESCHUTES CROSSING AREA TO EAST END OF THE CORRIDOR



LOCATION DESCRIPTION

This segment forms the approach (gateway) to the Warm Springs community for vehicles traveling westbound.

Crashes: There were no reported crashes along this segment between the years of 2010 & 2014.

NEAR TERM

MEDIUM TERM

LONG TERM

PROJECT ON DIFFERENT PAGE

OPPORTUNITIES

- Increase driver awareness to the change in environment (gateway treatments)
- Reduce speed of vehicles entering the community
- Creating a safer environment for pedestrians/bicycles

CHALLENGES

- Accommodating freight trucks on US 26

	ID	PROJECT	PROJECT DESCIPTION	BENEFITS[1]	COST ESTIMATE[2]	OPPORTUNITIES & CONSIDERATIONS	PROJECT COORDINATION
NEAR TERM	10-3a	Restripe Turn Lane	Restripe turn lanes to better define merge areas to encourage drivers to complete the merge from the travel lane to the turn lane, better indicating lane choices and increasing driveway sight distance.	• Speed reduction; sight distance improvements. • CRF: 48% injury crashes (sight distance improvements)	$1.5K	• This will assist in reducing vehicle turning speeds where pedestrians may be crossing the driveway. • This project is an interim project for 10-3b. • Coordinate with Jefferson County.	10-3b
MEDIUM TERM	10-3b	Restripe and Widen Turn Lane	Restripe and widen turn lanes to an urbanized format with shorter tapers and longer storage lengths. This encourages drivers to access their turn-lane farther upstream compared to the existing rural striping configuration. This will indicate lane choices earlier and increase driveway sight distance.	• Speed reduction; sight distance improvements. • CRF: 48% injury crashes (sight distance improvements)	$170K	• This will assist in reducing vehicle turning speeds where pedestrians may be crossing the driveway. • Cost estimates do not include significant earthwork, and adapting to existing topography may increase construction costs. • Coordinate with Jefferson County.	10-3a
LONG TERM	10-1	Install Gateway Treatments	Install curb, median, speed feedback sign, and potentially restripe and narrow travel lanes to provide visual cues that alert westbound drivers to a new environment, encourage slower speeds, and increase driver awareness of the changed land uses.	• Speed reduction. • CRF: 15% injury crashes (based on 10% speed reduction)	$50K	• Project assumes no roadway widening (raised median will remain within existing striped median width). The median should include end treatment channelization and shy distance per the Highway Design Manual. Coordination with the freight industry is needed regarding lane widths (11' recommended) and shoulder widths (6' minimum). • Coordinate with Jefferson County.	9-4 10-2
	10-2	Install Roadway Illumination	Install light poles to increase illumination.	• Speed reduction. • CRF: 28% nighttime injury crashes	$140K	• Coordinate with Jefferson County.	10-1

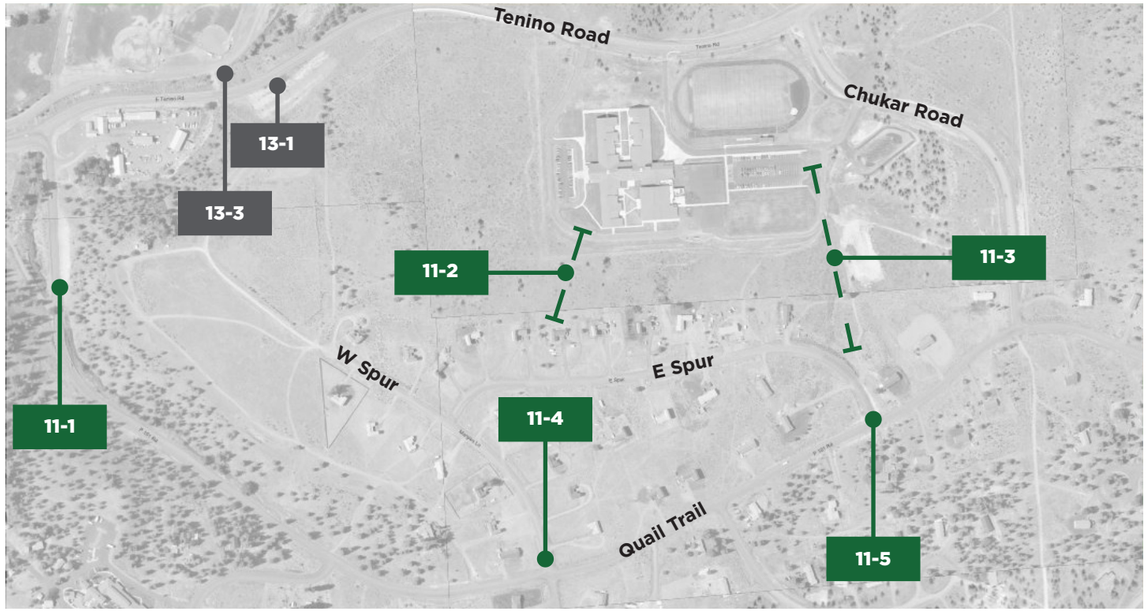
[1] CRF=Crash Reduction Factor. CRFs are not available to quantify all safety benefits associated with the recommendations. Therefore, B/C ratios (B/C) are provided in the cost estimate column, when available, to inform prioritization recommendations, but engineering judgement and risk factors supplement these numbers.

[2] All cost estimates are planning level and do not include right-of-way or significant earthwork costs. A 50% contingency is applied to cost estimates.

LOCATION

11

OFF HIGHWAY - SCHOOL AREA



LOCATION DESCRIPTION

This section of Warm Springs contains the school and residential housing areas.

Crashes: There were no reported crashes within this area between the years of 2010 and 2014.

NEAR TERM

MEDIUM TERM

LONG TERM

PROJECT ON DIFFERENT PAGE

OPPORTUNITIES

- More complete pedestrian connectivity throughout area and to the school

CHALLENGES

- Coordination with private property owners

	ID	PROJECT	PROJECT DESCIPTION	BENEFITS[1]	COST ESTIMATE[2]	OPPORTUNITIES & CONSIDERATIONS	PROJECT COORDINATION
MEDIUM TERM	11-1	Install Sidewalk Along Quail Trail	Install sidewalk to provide a separated facility for pedestrians. Illumination should be installed at motor vehicle crossing points.	• Conflict reduction. • CRF: --	$350K	• The design of this project should consider topography and right-of-way impacts.	11-4 11-5
	11-2	Install Path to Connect Community to School	Install a hard surface, accessible path (10-12' wide) with illumination to provide a separated facility for pedestrians and bicyclists.	• Conflict reduction; quality of service. • CRF: --	$100K	• The design of this project should consider topography and right-of-way impacts. Coordination with property owners will be needed.	-
	11-3	Install Path to Connect Community to School	Install a hard surface, accessible path (10-12' wide) with illumination to provide a separated facility for pedestrians and bicyclists.	• Conflict reduction; quality of service. • CRF: --	$120K	• The design of this project should consider topography and right-of-way impacts. Coordination with property owners will be needed.	-
	11-4	Install Pedestrian Crossings to Connect Community to School	Install a marked pedestrian crossing and commensurate signage across the four legs of the intersection at Quail Trail/ W Spur Road.	• Pedestrian visibility & awareness; intersection awareness. • CRF (pedestrian crashes): 15% marked crosswalk	$5K	• The design of this project should consider topography and right-of-way impacts.	11-1 11-5
	11-5	Install Pedestrian Crossings to Connect Community to School	Install a marked pedestrian crossing and commensurate signage across the four legs of the intersection at Quail Trail/ E Spur Road.	• Pedestrian visibility & awareness; intersection awareness. • CRF (pedestrian crashes): 15% marked crosswalk	$5K	• The design of this project should consider topography and right-of-way impacts.	11-1 11-4

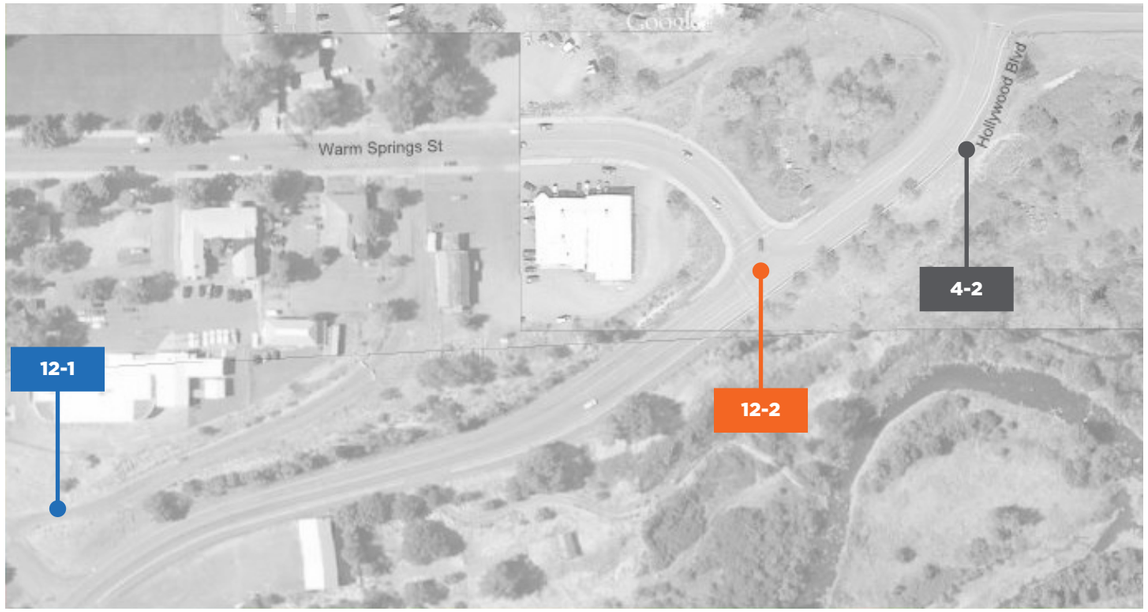
[1] CRF=Crash Reduction Factor. CRFs are not available to quantify all safety benefits associated with the recommendations. Therefore, B/C ratios (B/C) are provided in the cost estimate column, when available, to inform prioritization recommendations, but engineering judgement and risk factors supplement these numbers.

[2] All cost estimates are planning level and do not include right-of-way or significant earthwork costs. A 50% contingency is applied to cost estimates.

LOCATION

12

OFF HIGHWAY - HOLLYWOOD BOULEVARD



LOCATION DESCRIPTION

Hollywood Boulevard forms the primary connection between the community of Warm Springs and US 26.

Crashes: There were no reported crashes along this segment between the years of 2010 and 2014.

NEAR TERM

MEDIUM TERM

LONG TERM

PROJECT ON DIFFERENT PAGE

	ID	PROJECT	PROJECT DESCIPTION	BENEFITS[1]	COST ESTIMATE[2]	OPPORTUNITIES & CONSIDERATIONS	PROJECT COORDINATION
NEAR TERM	12-2	Enhance Existing Pedestrian Crosswalk	Install enhanced crossing with illumination across Hollywood Blvd.	• Pedestrian visibility & awareness. • CRF (pedestrian crashes): 56% RRFB • CRF: 15% marked crosswalk	$30K	• The design of this project should consider topography and right-of-way impacts. An active crossing should be considered if volumes increase.	4-2
NEAR TERM	12-3	Enhance Existing Pedestrian Crosswalk	Install enhanced crossing with illumination across Hollywood Blvd.	• Pedestrian visibility & awareness. • CRF (pedestrian crashes): 56% RRFB • CRF: 15% marked crosswalk	$30K	• The design of this project should consider topography and right-of-way impacts. An active crossing should be considered if volumes increase.	12-1
NEAR TERM	12-4	Enhance Existing Pedestrian Crosswalk	Install enhanced crossing with illumination across Hollywood Blvd.	• Pedestrian visibility & awareness. • CRF (pedestrian crashes): 56% RRFB • CRF: 15% marked crosswalk	$30K	• The design of this project should consider topography and right-of-way impacts. An active crossing should be considered if volumes increase.	-
LONG TERM	12-1	Enhance Shared-Use Path	Install lighting along existing path to provide a greater visibility and driver awareness.	• Pedestrian visibility & awareness. • CRF: --	$40K	• The design of this project should consider topography and right-of-way impacts.	12-3

[1] CRF=Crash Reduction Factor. CRFs are not available to quantify all safety benefits associated with the recommendations. Therefore, B/C ratios (B/C) are provided in the cost estimate column, when available, to inform prioritization recommendations, but engineering judgement and risk factors supplement these numbers.

[2] All cost estimates are planning level and do not include right-of-way or significant earthwork costs. A 50% contingency is applied to cost estimates.

OPPORTUNITIES

- More complete pedestrian connectivity
- Creating a safer environment for pedestrians/bicycles

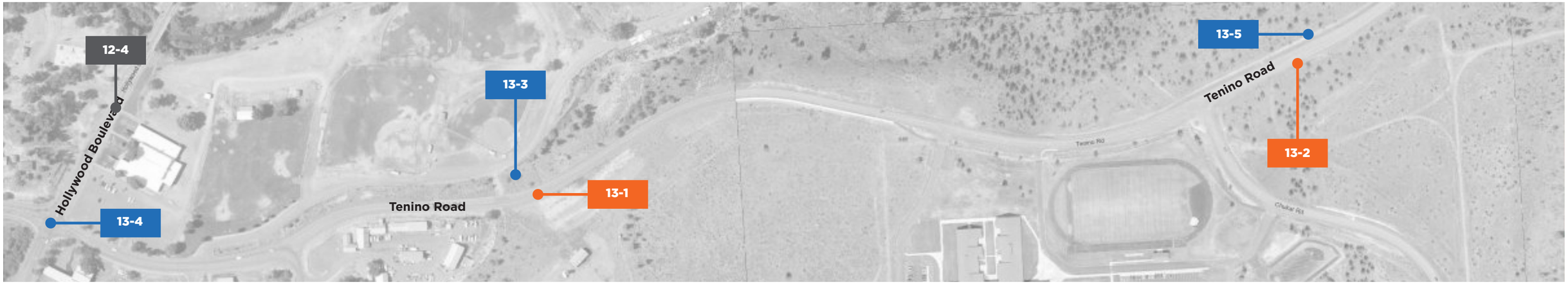
CHALLENGES

- Accommodating freight trucks as an alternate route to US 26

LOCATION

13

OFF HIGHWAY – TENINO ROAD



LOCATION DESCRIPTION

Tenino Road serves as a key alternate route to US 26. It also provides access to the Warm Springs school and residential areas.

Crashes: There were **2** reported crashes between the years of 2010 and 2014

- **1** angle
- **1** turning movement

NEAR TERM

MEDIUM TERM

LONG TERM

PROJECT ON DIFFERENT PAGE

OPPORTUNITIES

- More complete pedestrian connectivity
- Speed reduction

CHALLENGES

- Accommodating freight trucks as an alternate route to US 26
- Topography constraints on the north side of Tenino Road

	ID	PROJECT	PROJECT DESCIPTION	BENEFITS[1]	COST ESTIMATE[2]	OPPORTUNITIES & CONSIDERATIONS	PROJECT COORDINATION
NEAR TERM	13-1	Install Eastbound Feedback Sign	Install feedback sign for eastbound drivers to help maintain reduced speeds along the corridor.	• Speed reduction. • CRF: 41% all crashes	$15K B/C: 2.18	• This will reinforce school zone speed limits.	-
NEAR TERM	13-2	Install Westbound Feedback Sign	Install feedback sign for westbound drivers to help maintain reduced speeds along the corridor.	• Speed reduction. • CRF: 41% all crashes	$15K B/C: 2.40	• This will reinforce school zone speed limits.	13-5
LONG TERM	13-3	Feasibility Study for Ballfield Connections	Conduct a feasibility study to determine the preferred alternative and alignment for a more direct connection such as a shared-use path or stair case to connect the ballfields with Tenino Road.	• Conflict reduction; improved quality of service. • CRF: --	$30K	• The design should account for a pedestrian crossing of Tenino Road where the preferred alternative ties in with Tenino Road. Topography will be a challenge.	-
LONG TERM	13-4	Conduct Evaluation for Signal or Roundabout	Evaluate the feasibility of a signal or roundabout at Hollywood Boulevard/ Tenino Road if traffic volumes, number of crashes, or crash severity increases.	• CRF: 67-77% angle crashes (signal); *58-143% increase in rear-end crashes* • CRF: 82% injury crashes (roundabout)	$20k	• A roundabout would reinforce the speed reduction treatments along Tenino Road and Hollywood Boulevard. • The evaluation should consider right-of-way impacts, safety impacts, operational impacts, freight, and environmental impacts. This is an important intersection as part of the US 26 by-pass route for trucks in the event of a highway closure.	-
LONG TERM	13-5	Install Sidewalks	Install sidewalk on one side of Tenino Road between Chukar Road and US 26 to connect existing paths along Tenino Road with paths along US 26.	• Conflict reduction; improved quality of service. • CRF: --	$200K	-	13-2

[1] CRF=Crash Reduction Factor. CRFs are not available to quantify all safety benefits associated with the recommendations. Therefore, B/C ratios (B/C) are provided in the cost estimate column, when available, to inform prioritization recommendations, but engineering judgement and risk factors supplement these numbers.

[2] All cost estimates are planning level and do not include right-of-way or significant earthwork costs. A 50% contingency is applied to cost estimates.