

TECHNICAL MEMORANDUM

August 29, 2024

Project# 26661

To: Ken Shonkwiler, Oregon Department of Transportation (ODOT) Region 4, Principal Planner
From: Matt Kittelson, PE, Kittelson & Associates, Inc. & Kayla Fleskes-Lane, PE, DKS Associates
CC: Garrett Sabourin, City of Bend
RE: Hawthorne Access Evaluation & Proposed Changes to Bend Parkway Plan

INTRODUCTION

This memorandum summarizes key findings and outcomes from technical analysis and public outreach conducted to support a potential change to the adopted Bend Parkway Plan. As discussed herein, this change would reflect the planning for and ultimate closing of the existing NW Hawthorne Avenue intersection with the Bend Parkway. Currently, the intersection is constructed to allow for only right-in-right-out movements to/from the west at the intersection of NW Hawthorne Avenue with the Bend Parkway. As discussed herein, ODOT could modify the Bend Parkway Plan to reflect closure of this intersection such that no vehicular access is provided to/from NW Hawthorne Avenue in the future.

The need for the proposed change has been identified through the ongoing preliminary design work conducted for the City of Bend's planned Hawthorne Avenue Overcrossing project. This project is being funded by the voter-approved General Obligation (GO) Bond and is a part of the overall Midtown Crossings Project¹. As proposed, the City plans to construct an east-west bridge open only to people walking, bicycling and rolling across the Bend Parkway along the NW Hawthorne Avenue alignment between NW Hill Street and NE 2nd Avenue. As presented within this memorandum, maintaining the existing right-in-right-out configuration at the NW Hawthorne Avenue/Bend Parkway intersection makes it difficult to achieve the connectivity and safety priorities of the City related to the proposed overcrossing.

To facilitate upcoming discussions and decisions regarding the proposed changes to the Bend Parkway Plan and the existing design and operations of the intersection, the following sections summarize relevant prior planning work, updated operational and safety analyses at the intersection, the results of public outreach efforts and feedback, and our recommendations.

PROJECT BACKGROUND

The design and operations of the NW Hawthorne Avenue/Bend Parkway intersection has been the subject of several planning studies conducted by both the City of Bend and ODOT over the past several years. There are also a number of ongoing and upcoming efforts that will further evaluate or refine the role of NW Hawthorne Avenue in achieving the City Council's priority to provide "a variety of safer and more accessible bike and pedestrian routes throughout the community."

¹ [Midtown Crossings Project | City of Bend \(bendoregon.gov\)](#)

Below provides a brief summary of prior, ongoing, and upcoming projects that can help inform the recommendations related to the preferred bridge type and design being planned for NW Hawthorne Avenue over the Bend Parkway.

Bend Parkway Plan

The Bend Parkway Plan (adopted by the Oregon Transportation Commission in 2021) serves as the Facility Plan for US 97 through Bend and was developed with the objective to identify safety and mobility strategies and solutions that meet the existing and future needs of the US 97 corridor within the City.

As detailed within the Parkway Plan, the ability to make changes to the Parkway (US 97) within the City of Bend is limited due to physical constraints along the highway and the high construction costs associated with adding vehicle travel lanes and “through capacity” on the highway. As such, the investment strategy outlined within the Plan focuses on operational improvements within the existing highway footprint.

One of the key operational recommendations is to modify or close most of the existing at-grade intersections along the Parkway. Within the Plan, the existing NW Hawthorne Avenue right-in-right-out intersection with the Parkway is recommended to be limited to allow only for southbound right-turns from the Parkway to NW Hawthorne Avenue (i.e., right-in only). The existing westbound right-turn movement from NW Hawthorne Avenue onto the Parkway would no longer be permitted once this strategy was implemented.

One of the primary reasons for modifying or closing the existing at-grade intersections along the Parkway relate to the fact that the documented crash experience at these intersections exceed a variety of safety-based benchmarks established by the state. The goal of the modifications of these intersections is to reduce the frequency and severity of the crashes.

The Bend Parkway Plan notes that the documented crash experience includes an excess portion of rear-end collisions at the NW Hawthorne Avenue/Bend Parkway intersection and that the existing southbound right-turn lane at this location has a right-turn deceleration length that is appropriate for 45 miles per hour (mph) (i.e., the posted speed of the Parkway), but is not appropriate for a 55 miles per hour design speed. The Parkway Plan recommends extending the length of the deceleration lane to help reduce the frequency of rear-end crashes at this location.

Key Considerations for the NW Hawthorne Avenue/Bend Parkway intersection: Although the Bend Parkway Plan recommends restricting the NW Hawthorne Avenue/Bend Parkway intersection to right-in movements only (i.e., only southbound right-turns allowed), maintaining any vehicular access at this intersection creates bridge design constraints related to achieving the City Council’s safety priorities (as discussed further later in this memorandum). If the City and ODOT wish to restrict the NW Hawthorne Avenue/Bend Parkway intersection to vehicular traffic entirely, the Bend Parkway Plan will need to be modified and approved by the OTC.

Bend Transportation Safety Action Plan

The Bend Transportation Safety Action Plan (TSAP), completed in 2019, focuses on identifying and addressing systemic and location specific crash trends within the Bend Urban Growth Boundary (UGB).

The TSAP also includes recommended mitigation strategies to address locations where crashes are elevated compared to other locations within the UGB and/or exceed various state crash rate benchmarks.

As documented within the Bend TSAP, crashes at the Bend Parkway/Hawthorne Avenue intersection were observed to:

- Be in the Top 10% of sites statewide based on the “Equivalent Property Damage Only” metric
- Have an Excess Portion of Rear-End Collisions

Key Considerations for the NW Hawthorne Avenue/Bend Parkway intersection: As noted both in the TSAP and the Bend Parkway Plan, reducing the frequency of crashes is a key factor in achieving the City and State’s priority to increase safety. In particular, the Bend TSAP’s recommendations to reduce the frequency of crashes at the NW Hawthorne Avenue/Bend Parkway intersection supports the need to make further changes to this location and these recommendations are also consistent with other planning documents.

Midtown Crossing Feasibility Study

The Midtown Crossing Feasibility Study was completed for the City of Bend and evaluated east-west crossing opportunities over the Bend Parkway and the BNSF Rail line in the midtown area. The study included the Greenwood Avenue, Hawthorne Avenue, Franklin Avenue and NE 2nd Street corridors.

Projects at each of these crossing locations were identified in the Bend Transportation System Plan (TSP) and included in the voter approved GO Bond. The evaluation of the Hawthorne Crossing was primarily focused on the bridge’s structure, appearance and cost. Three options were under consideration:

- *Straight Bridge and Approach Ramps* – Single, direct pathway across the bridge for all users with a series of ramps and landings.
- *Switchback Ramps* – Single span bridge with more gradual slope to avoid intermediate landings.
- *Stairs and Elevator without Ramps* – Staircases and an elevator tower to access bridge.

The straight alignment with long approach ramps was selected because it *“best reflects community needs and goals, is more affordable than other designs, prioritizes visibility and safety, with no angles or corners, provides a clear, direct route for walking and biking, offers views in all directions from the bridge deck, meets standards for universal accessibility and is more ADA accessible.”*

Key Considerations for the NW Hawthorne Avenue/Bend Parkway intersection: How the single span bridge option design will interact with the existing NW Hawthorne Avenue intersection and approach road to the Bend Parkway is being further evaluated through the Progressive Design-Build project described below. Achieving the accessibility goals and the associated ramp design will be evaluated considering the existing street infrastructure.

Planning for People Streets – Low-Car District Study

In 2024, the City launched a Low-Car District Study to better plan for “people streets” in Bend. This currently on-going study is intended to help the City define what a “people street” (or “low-car district”) could look like in Bend. This includes a Case Study to evaluate people street and low-car district

considerations for a connected route between Juniper Park and Drake Park utilizing the planned Hawthorne Avenue Pedestrian and Bicycle Overcrossing. This study will inform the City's next update to the Transportation System Plan to meet state land use and transportation planning requirements but starts to set the stage for a changing roadway context on Hawthorne Avenue on either ends of the proposed bridge.

Key Considerations for the NW Hawthorne Avenue/Bend Parkway intersection: The potential full-closure of the Hawthorne Avenue access to US 97 would benefit a low-car or no-car strategy for this corridor by significantly lowering motor vehicle traffic volumes. This result would support the development of a high-quality, low-stress walking and biking connection in central Bend that links higher density, mixed land uses across US 97 with access to the public transit hub, downtown businesses and services, and recreational destinations.

Midtown Crossing Progressive Design-Build Effort

The Midtown Crossing Progressive Design-Build (PDB) project includes the design and construction of the three identified bridges along the corridors identified above.

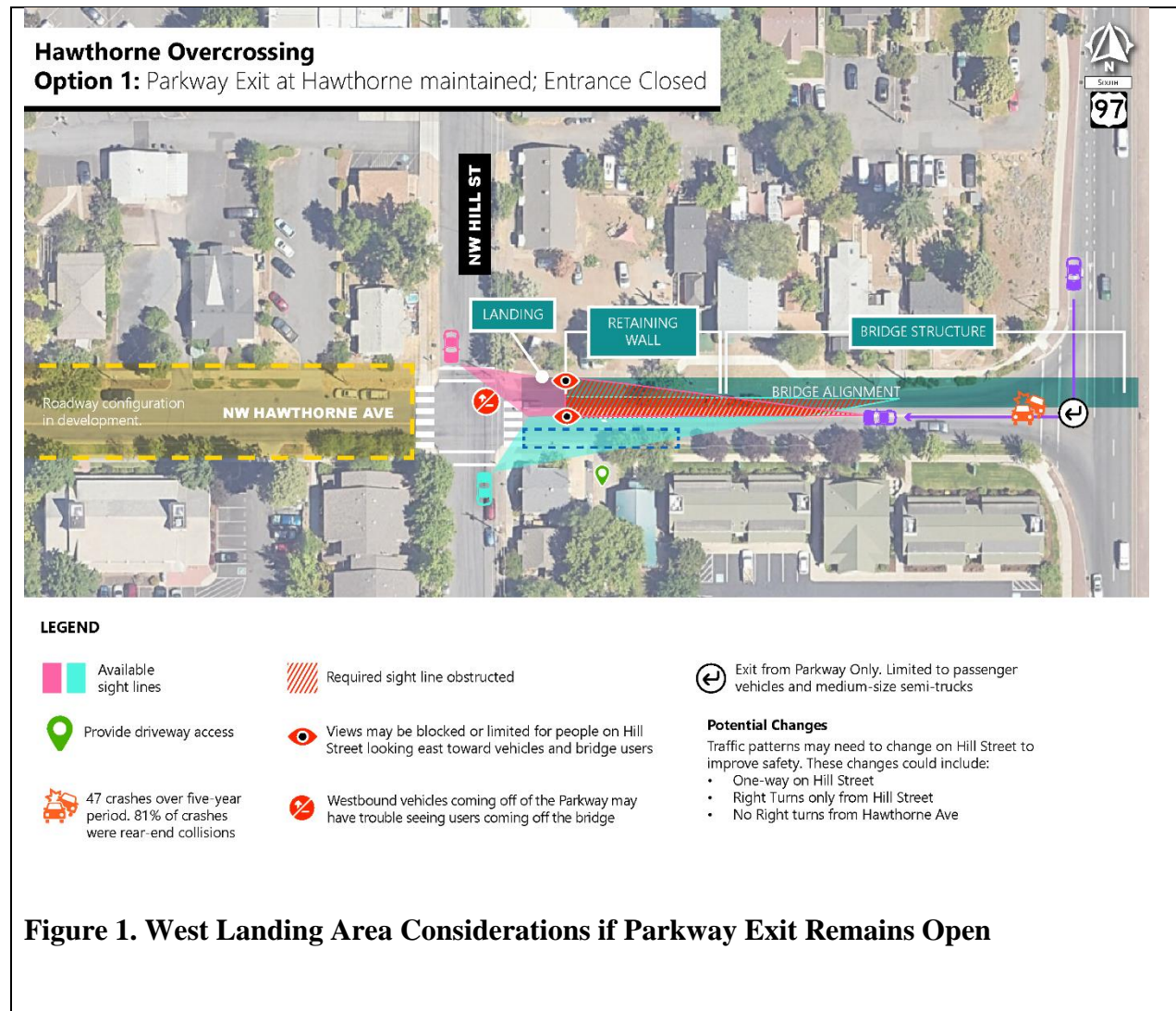
For NW Hawthorne Avenue, the PDB project evaluated four bridge designs related to the straight alignment with long approaches.

The area to the east the bridge is anticipated to match the existing roadway grade approximately 100 feet west of NE 2nd Street (west of the existing Bottle Drop Redemption Center access). City Staff and the project team have determined that the bridge landing must be located on the south side of NW Hawthorne Avenue at this location to maintain access to existing business located to the northeast of the Hawthorne Avenue/1st Street intersection.

The bridge landing on the west side of the Parkway is anticipated to match the existing roadway grade approximately 50 feet east of Hill Street. There are two existing driveways on the southeast corner of Hill Street/Hawthorne Avenue. Access to these properties will be maintained, which will necessitate that the bridge be located far enough north on Hawthorne Avenue to accommodate access to these properties.

Through the work completed by the Midtown Crossing PDB to further define the bridge landing locations, the project team was able to more clearly evaluate the safety and operational conditions that could exist associated with maintaining the Parkway exit at Hawthorne Avenue and the interface between the bridge, westbound vehicles, and the Hill Street/Hawthorne Avenue intersection.

Figures 1 and 2 were developed to visualize potential conflicts between vehicles, pedestrians, and cyclists near the bridge landing if the exit were to remain and if it were closed. Table 1 summarizes tradeoffs between the two options.



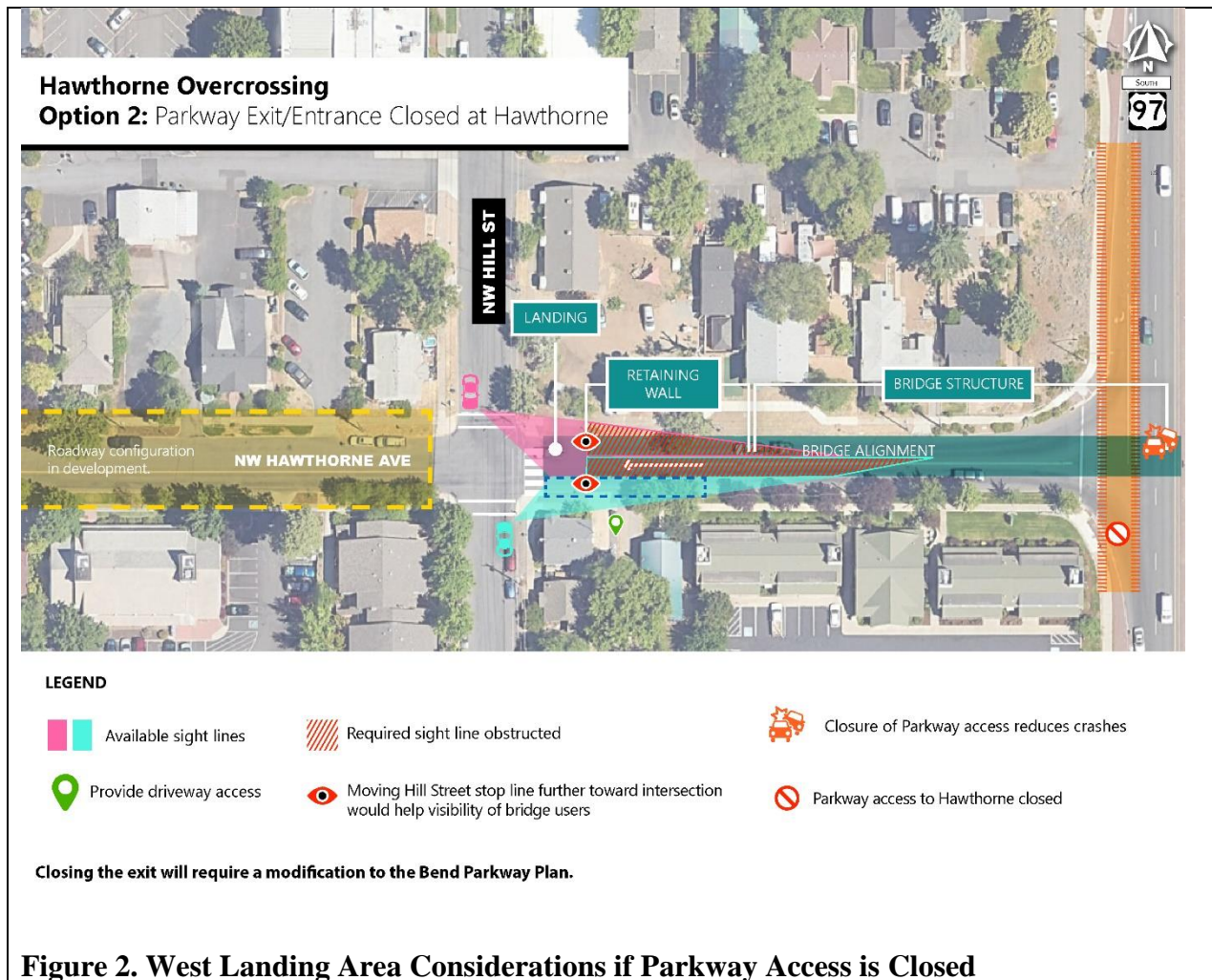


Table 1. Hawthorne Avenue Parkway Access Comparison

Category & Description	Option 1 – Parkway Exit Open	Option 2 – Parkway Access Restricted
<p>Bridge Location:</p> <p><i>How would the alignment of the bridge be affected by the provision of Parkway access via Hawthorne Avenue?</i></p>	<p>To accommodate exiting vehicles from the Parkway, the bridge would have to be as far north as possible within the existing right-of-way to provide width for the bridge, vehicle travel lane, and access to the SE property.</p>	<p>The bridge could be located further south than Option 1 resulting in shorter north-south crossing distances, increased separation between the bridge and properties on the north side of Hawthorne Ave, and improved alignment between the bridge access and Hawthorne Ave to the west.</p>
<p>SE Property Access:</p> <p><i>How would Parkway access affect how access could be provided to the two properties on the SE corner of the Hawthorne Avenue/Hill Street intersection?</i></p>	<p>Driveway access to these properties would need to be provided alongside an exiting lane from the Parkway and the physical bridge structure. The driveway would need to accommodate residential access, emergency services, maintenance vehicles (snow removal, garbage/recycling), and delivery vehicles.</p>	<p>Driveway access would be provided alongside only the physical bridge structure, which would allow for more space and less constrained conditions. Like under Option 1, the driveway would need to accommodate residential access, emergency services, maintenance vehicles (snow removal, garbage/recycling), and delivery vehicles.</p>
<p>Intersection Conflict Points at Hill Street/Hawthorne Avenue:</p> <p><i>How would conflict points at this intersection compare with or without Parkway access provided?</i></p>	<p>Existing Parkway vehicles and bridge users traveling westbound would converge at Hill Street. Since Parkway vehicles would be at-grade and bridge users would be descending from the overcrossing, the ability for users to see each other would be challenging to impossible.</p> <p>The resulting sight line conflicts may require turning or north-south crossing movements to be restricted at Hill Street, which would limit overall system connectivity for everyone.</p>	<p>With no Parkway vehicles, the vertical sight line challenges described for Option 1 would be eliminated, which would reduce the number of conflict points at this intersection.</p> <p>Sight lines would still need to be reviewed for vehicles and people walking and biking north-south along Hill Street to ensure adequate sight distance is provided between these users and people descending the bridge structure westbound.</p>

Category & Description	Option 1 – Parkway Exit Open	Option 2 – Parkway Access Restricted
<p>Crash History at US 97/Hawthorne Avenue</p> <p><i>How would changes to Parkway access help reduce observed crashes at this intersection?</i></p>	<p>Most of the observed crashes at this location are classified as rear-end collisions for eastbound vehicles. Closing right-turn onto to the Parkway, which this Option would implement (consistent with the Bend Parkway Plan) would eliminate the field condition when most crashes are observed to occur.</p>	<p>The full closure of vehicular access at US 97/Hawthorne Avenue would have the same effect as described for Option 1 plus also eliminating the rear-end collisions that are observed to occur for southbound right-turning vehicles. This Option would also eliminate vehicular conflicts at this location for people walking north-south along the west side of US 97.</p>

In early August 2024, the Bend City Council identified the single tower cable stay bridge design as the preferred approach and directed City staff to collaborate with ODOT on a possible closure of the NW Hawthorne Avenue intersection to the Bend Parkway due to safety concerns exit because of safety concerns. ODOT will continue the design work of the overcrossing starting in later 2024 through 2026 with construction anticipated in 2027.

Key Considerations for the NW Hawthorne Avenue/Bend Parkway intersection: Outcomes of this effort will be directly relevant to a potential recommendation to the OTC by ODT staff to modify the Bend Parkway Plan to close the NW Hawthorne Avenue intersection with the Bend Parkway.

OPERATIONAL AND SAFETY ANALYSIS AND EVALUATION

Operational Analysis

The Parkway Plan evaluated future year (2040) peak hour operations conditions for US 97 access points and nearby key intersections to determine facility performance and support the determination of best management strategies for the at-grade connections. Scenarios were evaluated for both partial and full closures of connections at Hawthorne Avenue and Lafayette Avenue utilizing the Bend-Redmond regional travel demand model (BRM) and peak hour intersection operations analysis. Based on the findings of the evaluation, the adopted Parkway Plan includes the closure of the right-on access to US 97 at both Hawthorne Avenue and Lafayette Avenue. The plan also identified that Wall Street/Lafayette Avenue (currently a two-way stop-controlled intersection) is projected to be over-capacity in the future if the off-ramp at Hawthorne Avenue is also closed.

Since the completion of the Parkway Plan, the BRM has been updated to a horizon year of 2045 with updated growth projections and land use patterns, including additional density in central Bend supporting the concept of emphasizing mixed-use growth in areas with high quality facilities for all travel modes and less dependence on driving motor vehicles. For the transportation network around US 97, Hawthorne

Avenue, and Lafayette Avenue, these updated projections result in minimal change to horizon year traffic volumes even with an additional 5-years of growth.

An updated analysis was conducted to evaluate the potential impacts of the full closure at Hawthorne Avenue at US 97 utilizing the updated BRM under future year 2045 conditions. To be consistent with the Parkway Plan, an intersection was flagged as having a potential impact if more than 50 new p.m. peak hour trips were expected to travel through the intersection (see Appendix A for more details). Key findings from this evaluation include:

- Closing the off-ramp from southbound US 97 to Hawthorne Avenue primarily shifts traffic volumes to Lafayette Avenue (consistent with the Parkway Plan evaluation).
- No ODOT intersections were impacted by a full Hawthorne Avenue closure compared to the partial closure recommended by the Parkway Plan.
- Added demand at two City intersections exceeded 50 p.m. peak hour trips (Wall Street/Greenwood Avenue and Wall Street/Lafayette Avenue). Both locations were previously flagged in the Parkway Plan as locations with significant added trips, with Wall Street/Lafayette Avenue identified as failing to meet mobility targets in the future, although no specific mitigation strategy was recommended. In the City's next TSP update, these intersections can be analyzed in more detail to determine if any mitigation strategies may be needed in the future.

Safety Evaluation

To help inform the proposed changes to the Bend Parkway Plan, we reviewed the most recent 5-year crash history available through ODOT. As mentioned above, the TSAP was based on the 2012-2016 data whereas the most recent available data includes the time period from January 1, 2018 – December 31, 2022. The reported crashes are provided in Appendix B.

Based on the most recent 5-years of data, 47 crashes occurred at US 97/Hawthorne Avenue. Of those crashes, 88 percent were rear-end collisions and 71 percent were property damage only. We further note there were no reported major injury crashes nor fatalities. There was one reported pedestrian crash that occurred in October 2020 at 2 PM in the afternoon that involved a minor injury. Per the crash records, an eastbound motorist did not yield to the pedestrian crossing in the crosswalk at the intersection.

Based on a review of the most current crash records, the safety-related conclusions of the Bend TSAP and Bend Parkway remain unchanged.

PUBLIC MEETING FEEDBACK

The City of Bend conducted an in-person event on July 10, 2024 and an online open house from July 3 to July 17 to solicit input and feedback on possible bridge structure types and the possibility of modifying the Bend Parkway Plan to recommend full closure at US 97/Hawthorne Avenue.

In total, 351 people submitted feedback online whereas approximately 80 people attended the in-person open house, of which 45 comment forms were submitted.

According to the Open House Event Summary (included in Appendix C), people who submitted comments showed a majority support for the proposed modification to the Bend Parkway Plan to plan for full closure at US 97/Hawthorne Avenue, with 67% responded “Yes” when asked if they supported the modification. Those that responded this way cited existing and future safety conditions, including the speed at which vehicles travel along the Parkway. Respondents also shared that they observe this intersection in its current condition impedes travel along the Parkway today due to the lack of on- and off-ramps. People also mentioned that the new bridge was meant to prioritize walking and biking, which would be better achieved through the closure of vehicular traffic at this location.

Those Unsure (15%) or Opposed (19%) to the modification to the Parkway Plan cited the benefits the current access provides to the downtown area and a concern that a full closure would cause more cut-through traffic on neighborhood streets.

BEND CITY COUNCIL

As noted above, the Bend City Council received an overview of the possibility of modifying the Bend Parkway Plan to include a full closure at the US 97/Hawthorne Avenue intersection during a work session on August 7, 2024. During that work session, Council heard about the public meeting feedback presented above and discussed the possible operational changes that could occur due to the modification. At the conclusion of the work session, Council directed City staff to work with ODOT on a modification to the Bend Parkway Plan that would modify the US 97/Hawthorne Avenue intersection to a full closure to vehicular traffic.

CONCLUSION/NEXT STEPS

Based on the information presented here, a modification to the Bend Parkway Plan to plan for a full closure at the US 97/Hawthorne Avenue intersection would:

- Reduce conflict points both at the existing intersection and the future western bridge landing area;
- Eliminate the existing turning movements that are observed to result in rear-end crashes at the rate higher than other locations in the community for both vehicles entering and exiting the Bend Parkway at this location;
- Result in minimal operational changes to the transportation system in the vicinity on both the City and State Highway system;
- Meet the community objectives to improve east-west connectivity and safety for people walking, riding bikes and rolling
- Support both the overwhelming feedback and City Council directives to improve safety.

With these observations, the Bend Parkway Plan should be modified to include a full closure at the US 97/Hawthorne Avenue intersection.

Appendix A:
US 97 Access at Hawthorne Avenue
Operational Analysis



TECHNICAL MEMORANDUM - DRAFT

DATE: August 26, 2024

TO: Garrett Sabourin | City of Bend
Jacki Smith and Matt Kittelson | Kittelson & Associates, Inc.

FROM: Eileen Chai, EIT; Kayla Fleskes-Lane, PE; Chris Maciejewski, PE | DKS Associates

SUBJECT: Bend GO Bond Traffic Engineering Services: Project #21239-000
US 97 Access at Hawthorne Avenue Analysis

The City of Bend is currently selecting the preferred design for the Hawthorne Avenue Overcrossing as part of the Bend GO Bond Midtown Crossing project. The new bridge, designed for walking, biking, and rolling, will improve system connectivity and provide safer passage over US 97 and the Burlington Northern Santa Fe (BNSF) railroad. It features a straight alignment with long approach ramps on Hawthorne Avenue, spanning from Hill Street to Second Street.

Hawthorne Avenue is currently one of the primary accesses between US 97 southbound and downtown Bend via an at-grade, right-in right-out connection. The Oregon Department of Transportation (ODOT) identified several improvements at US 97 and Hawthorne Avenue (and Lafayette Avenue) as part of the 2021 US 97 Bend Parkway Plan¹ (referred herein as the Parkway Plan) to address safety and operational needs. Improvements identified at Hawthorne Avenue and Lafayette Avenue included the closure of the southbound on-ramp movement to US 97 (i.e., restriction of the eastbound right-turn from Hawthorne Avenue and Lafayette Avenue onto southbound US 97) and lengthening of the deceleration lanes for the southbound off-ramp right-turn movement.

As the Hawthorne Avenue Overcrossing design concepts have advanced, potential conflict points between the bridge ramp near Hill Street and westbound traffic coming from US 97 have been identified, specifically regarding visibility of people walking, biking, and rolling off the bridge. One proposed solution to reduce these conflicts is to close the US 97 southbound off-ramp movement to Hawthorne Avenue. This change would require a modification to the Parkway Plan.

The purpose of this memorandum is to provide the City of Bend and ODOT with additional information on the expected traffic impacts of a potential full closure of the Hawthorne Avenue connection to US 97 to better understand how that change may impact adopted facility plans.

¹ US 97 Bend Parkway Plan, Oregon Department of Transportation, February 2021.

Additional information about the safety and bridge design implications is being developed by the City's consultant team and will be documented in a separate memorandum.

BACKGROUND: PARKWAY PLAN ANALYSIS SUMMARY

The Parkway Plan is a facility plan for US 97 from Tumalo Road to Baker Road in Bend, Oregon. While the Parkway Plan identified improvements throughout the study area, this summary is focused on the at-grade access points near downtown Bend, including Hawthorne Avenue and Lafayette Avenue. The Parkway Plan identified safety and operational needs at both the US 97/Hawthorne Avenue and US 97/Lafayette Avenue intersections, highlighting over-capacity conditions and extensive eastbound queueing in both the existing and future no-build conditions. Also, both intersections were flagged as a safety focus due to the high proportion of rear-end crashes under existing conditions.

To help address these challenges, the Parkway Plan evaluated six closure scenarios:

- Scenario 1: Closure of Lafayette Avenue (full closure)
- Scenario 2: Closure of Hawthorne Avenue (full closure)
- Scenario 3: Conversion of Lafayette Avenue to right-in only (partial closure of on-ramp only)
- Scenario 4: Conversion of Hawthorne Avenue to right-in only (partial closure of on-ramp only)
- Scenario 5: Closure of Nels Anderson Place, Truman Avenue and Reed Lane
- Scenario 6: Closure of all intersections listed above

For each closure scenario, a volume diversion analysis was conducted using the Bend-Remond regional travel demand model (BRM). If a closure scenario was expected to increase p.m. peak hour trips at an individual intersection by more than 50 vehicles per hour², intersection operations were then evaluated to understand if the additional trips would result in a significant impact to the intersection volume-to-capacity (v/c) ratio. Intersection operations were compared against the applicable v/c ratio mobility targets.

According to the Parkway Plan, a partial (on-ramp) closure at Hawthorne Avenue would increase daily trips at Lafayette Avenue/US 97 by nearly 15 percent and further degrade operational conditions at US 97/Lafayette Avenue if modifications at Lafayette Avenue were not made. The Hawthorne Avenue/Oregon Avenue intersection east of Bond Street would experience significant traffic decreases, with minimal changes elsewhere downtown. It should be noted that the analysis in the Parkway Plan evaluating a partial closure at Hawthorne Avenue did not account for the on-ramp closure ultimately recommended at Lafayette Avenue and may therefore underestimate the combined impact. Additionally, the Parkway Plan identified US 97/Lafayette Avenue and Wall Street/Lafayette Avenue as being over capacity under the Hawthorne Avenue closure scenario. However, with the Lafayette Avenue on-ramp closure ultimately recommended by the Parkway Plan, the over capacity condition on the eastbound on-ramp approach at US 97/Lafayette Avenue

² This threshold corresponds with thresholds denoted in the City's Transportation Impact Analysis requirements per Bend Development Code 4.7.500.B.1.b

would no longer exist. No mitigations were identified or recommended at Wall Street/Lafayette Avenue.

Based on the findings from the analysis and discussion with the Parkway Plan advisory committees, the Parkway Plan recommended improvements at Hawthorne Avenue and Lafayette Avenue, which included the closure of the southbound on-ramps to US 97 and lengthening the deceleration lanes for the southbound off-ramps. The Parkway Plan also acknowledged the need for a phasing plan with any at-grade access closure but did not recommend any specific phasing or implementation considerations.

ANALYSIS METHODOLOGY

The Parkway Plan utilized the BRM to evaluate potential traffic diversion associated with various at-grade on-ramp and off-ramp closures along US 97 to identify the recommended closures. This analysis builds upon that work to understand long-term traffic impacts from a full closure at US 97 and Hawthorne Avenue to inform a potential future amendment to the Parkway Plan. Similar to the Parkway Plan analysis, a threshold of adding 50 p.m. peak vehicle trips was used to screen for potential impacts at intersections before evaluating further. However, while this evaluation utilizes an impact assessment approach to understand potential issues to address in amending adopted facility or system plans, this memorandum does not provide formal compliance findings that would be needed to satisfy Transportation Planning Rule (TPR) regulations in OAR 660-012-0060 (including detailed forecast model post-processing, intersection operations analysis, and detailed mitigation evaluation).

The Bend Metropolitan Planning Organization (MPO) is currently updating the BRM as part of the Metropolitan Transportation Plan (MTP) update. This includes a future year (2045) scenario that incorporates revised land use and network assumptions compared to the models used of the Parkway Plan analysis, as discussed in more detail below. Based on the comparison below, the analysis in this memorandum utilizes the updated 2045 model, which includes MTP committed projects.

KEY DIFFERENCES BETWEEN THE 2040 AND 2045 BRM SCENARIOS

LAND USE AND NETWORK COMPARISON

The 2045 BRM scenario contains updated network and land use assumptions compared to the 2040 scenario used for development of the Parkway Plan. For instance, the Aune Street extension south of Colorado Avenue is now included in the model, which improves connectivity to the US 97 Colorado Avenue interchange. Additionally, the 2045 model includes the Bend north corridor project, which involves realigning US 97 and improving a portion of US 20 north of the city, is expected to shift how traffic assessing downtown.

Additionally, Figure 1 shows the increases in household and employment growth estimates between the 2040 to 2045 scenarios in the downtown area. As shown in the figure, more households and employment were assumed in the Core Area near downtown in the 2045 scenario compared to the 2040 scenario, specifically between US 97 and 3rd Street.

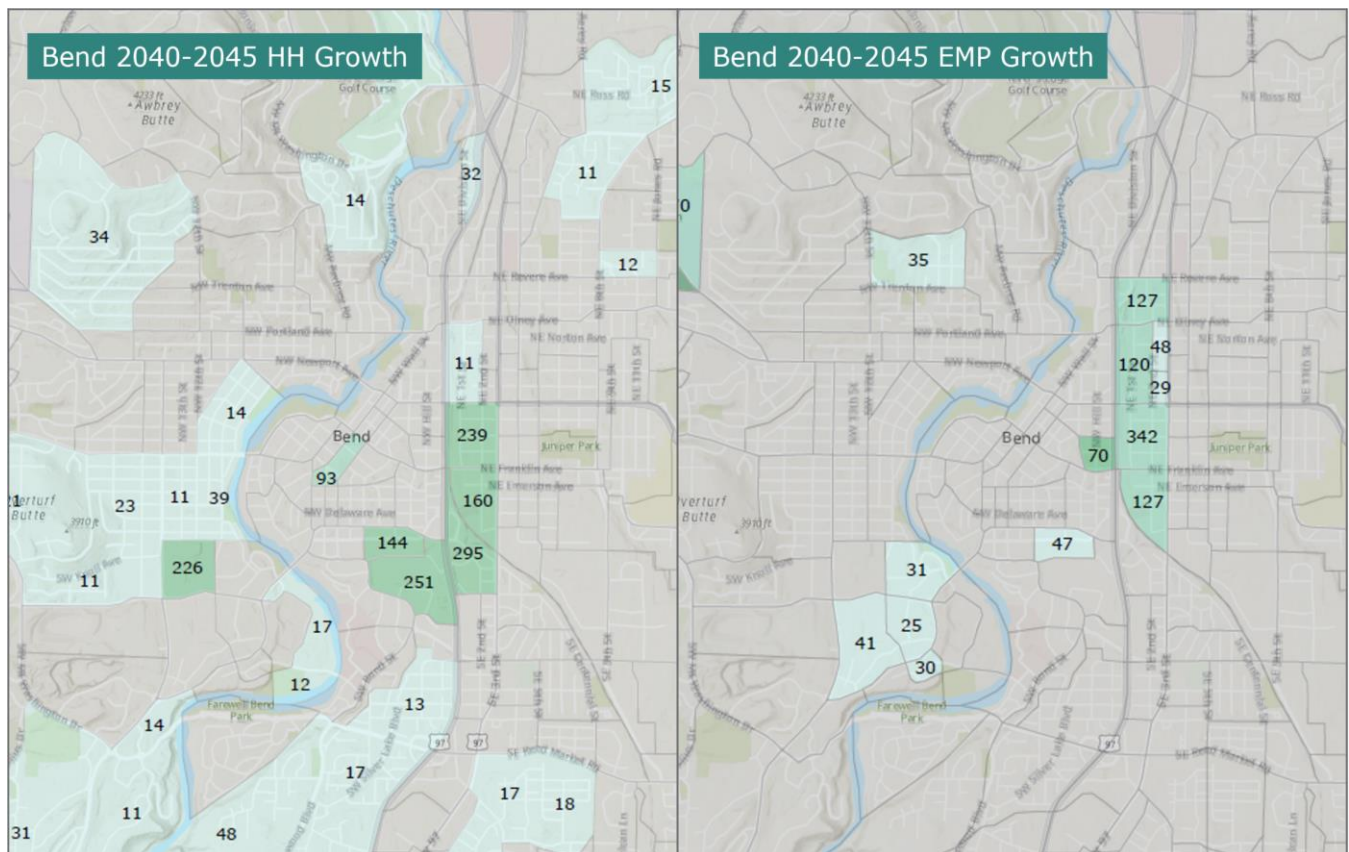


FIGURE 1. INCREASES IN DOWNTOWN BEND HOUSEHOLD (HH) AND EMPLOYMENT (EMP) GROWTH ESTIMATES FROM 2040 TO 2045

FORECASTED DEMAND COMPARISON

To understand how the land use and network changes between the 2040 and 2045 scenarios may impact the findings, the 2040 Parkway Plan scenario and the draft 2045 MTP Committed scenario model results for average weekday p.m. peak hour traffic conditions were compared. A comparison between the two scenarios is included in Appendix A-1. In general, the 2045 scenario sees more p.m. peak hour traffic on the east side of downtown (near the Core Area) with denser land use assumed, resulting in more trips along 3rd Street. Additionally, the Bend north corridor project appears to contribute to this increase. More trips also travelled along Aune Road with the extension south of Colorado Avenue. These differences in results were expected based on the different land use and network assumptions in the area.

Table 1 compares several key routes to downtown and highlights similarities between the different models. Based on this comparison, the rest of this analysis utilized the updated 2045 model, which includes MTP committed projects to be more consistent with the latest land use assumptions when evaluating potential impacts of a full closure at Hawthorne Avenue.

TABLE 1. TRAFFIC DEMAND COMPARSION BETWEEN 2040 MODEL AND 2045 MODEL

STREET	2040 PEAK HOUR DEMAND ^A	2045 PEAK HOUR DEMAND ^B	DIFFERENCE	NOTES
US 97 SB NORTH OF REVERE AVE	3290	3000	-10%	More traffic is using US 20 (3 rd St)
US 20 (3RD ST) SB NORTH OF REVERE AVENUE	1180	1415	+20%	More traffic due to land use and network updates
GREENWOOD AVE WB WEST OF 3 RD ST	1175	795	-30%	Volume shifts due to land use updates
OLNEY AVE WB WEST OF 3 RD ST	405	540	+30%	Volume shifts due to land use updates
FRANKLIN AVE WB WEST OF 3 RD ST	595	405	-30%	Volume shifts due to land use updates and more traffic is using Colorado Ave
COLORADO AVE WB WEST OF US 97	1060	1420	+35%	More traffic due to network updates
REVERE AVE SB OFF RAMP	660	350	-45%	More traffic is using US 20 (3 rd St)

^A Parkway Plan model CIRCA 2017 demand

^B Updated MTP committed model CIRCA 2024 demand

It should be noted that the model appears to underestimate demand on Hawthorne Avenue relative to counts collected in recent years. When discussing the impact analysis in later sections, adjustments were made to factor the model volumes up to better reflect the patterns that exist today in the downtown area.

LONG-TERM IMPACT ANALYSIS

To understand how a full closure of Hawthorne Avenue may change the findings from the Parkway Plan, two different long-range scenarios were evaluated as listed in. PM peak hour model volumes were compared for Scenario A, which assumes 2045 conditions consistent with the current Parkway Plan (southbound off-ramp only at Hawthorne Avenue) and Scenario B, which Table 2 assumes 2045 conditions and a full closure of turning movements at Hawthorne Avenue. A comparison between the two scenarios is included in Appendix A-2 for reference.

TABLE 2. LONG-TERM IMPACT TRAFFIC ANALYSIS SCENARIOS

#	DESCRIPTION	HAWTHORNE AVE ON-RAMP	HAWTHORNE AVE OFF-RAMP	LAFAYETTE AVE ON-RAMP	LAFAYETTE AVE OFF-RAMP
A	2045 MTP Committed + Parkway Plan	Closed	Open	Closed	Open
B	2045 MTP Committed + Parkway Plan + Hawthorne Ave Full Closure	Closed	Closed	Closed	Open

The results indicate that:

- Trips to downtown from US 97 southbound that were using the Hawthorne Avenue off-ramp access would mostly shift to Revere Avenue southbound off-ramp (around 30 percent) and Lafayette Avenue off-ramp (around 25 percent) if there was a full closure at Hawthorne Avenue.
- No ODOT intersections would be impacted by 50 or more additional p.m. peak hour vehicles with the full closure of Hawthorne Avenue.
- Two local intersections would be impacted by 50 or more additional p.m. peak hour vehicles with the full closure of Hawthorne Avenue compared to a partial closure³. Both intersections were identified as potential intersections of impact during the Parkway Plan analysis under future conditions. These intersections include:
 - Wall Street at Greenwood Avenue
 - In the City's TSP, this intersection was analyzed with the Parkway Plan recommended changes (off-ramp access only at both Hawthorne Avenue and Lafayette Avenue) and the results indicated it would perform better than the mobility target (v/c of 0.72).
 - With an additional 85 trips (estimated using diversion analysis from the 2045 BRM model scenario) or less than 5 percent of trips added to this intersection with a full access closure at Hawthorne Avenue, the intersection would be likely to continue to meet the City's mobility target in the future, indicating limited impact from a full closure at Hawthorne Avenue.
 - Wall Street at Lafayette Avenue
 - Per the Parkway Plan, this intersection would fail to meet the mobility target given the current intersection configuration and control due to the traffic diversion from Hawthorne Avenue to Lafayette Avenue under a partial on-ramp closure and full access closure at Hawthorne Avenue (which did not assume any modifications at Lafayette Avenue). While the Parkway Plan did not prescribe specific mitigation strategies, it identified that mitigation measures would be necessary at this intersection.
 - With an additional 90 pm peak hour trips (estimated using diversion analysis from the 2045 BRM model scenario) added to this intersection beyond what was evaluated in the

³ It should be noted that the model seems to underestimate the trips accessing Hawthorne Avenue, therefore, a factor has been applied to the differences at US 97/Hawthorne Avenue (southbound-right), US 97/Lafayette Avenue (southbound-right), Lafayette Avenue/Wall Street (westbound), and Greenwood Avenue/Wall Street (southbound) to account for the discrepancy. The factor is calculated based on model turn volumes and existing counts at US 97/Hawthorne Avenue, and the adjustment intersections were selected based on the proximity to Hawthorne Avenue and Lafayette Avenue.

Parkway Plan, the intersection would be expected to continue to fail to meet the City's mobility target in the future and the further degradation of intersection performance could require mitigation for amending the Parkway Plan or City's TSP.

KEY FINDINGS

Key findings of the analysis described in this memorandum is summarized below:

- No significant impact is expected at ODOT intersections with a full closure at Hawthorne Avenue compared to the recommended partial closure in the Parkway Plan.
- In the 2045 horizon year with planned system improvements, adding the closure of the US 97 southbound off-ramp at Hawthorne Avenue primarily shifts traffic to Lafayette Avenue and is expected to increase traffic demand at two City intersections (listed below) by more than 50 p.m. peak hour trips. Both locations were previously flagged in the Parkway Plan as locations with significant added trips, with Wall Street/Lafayette Avenue identified as failing to meet mobility targets in the future, although no specific mitigation strategy was recommended. In the City's next TSP update, these intersections can be analyzed in more detail to determine if any mitigation strategies may be needed in the future.
 - At Wall Street/Greenwood Avenue, the TSP identified the intersection is expected to operate well below capacity in 2040. Therefore, the added traffic volume would likely not trigger a performance failure or require mitigation, although this can be analyzed in more detail in the City's next TSP update.
 - At Wall Street/Lafayette Avenue, the forecasted future year operations in the Parkway Plan found that this intersection would fail to meet mobility targets. Therefore, the added traffic volume would likely need to be mitigated at some point in the future. Potential mitigation options can be evaluated in the City's next TSP update or as part of the next phase of the Hawthorne Avenue Overcrossing design-build project.

APPENDIX

CONTENTS

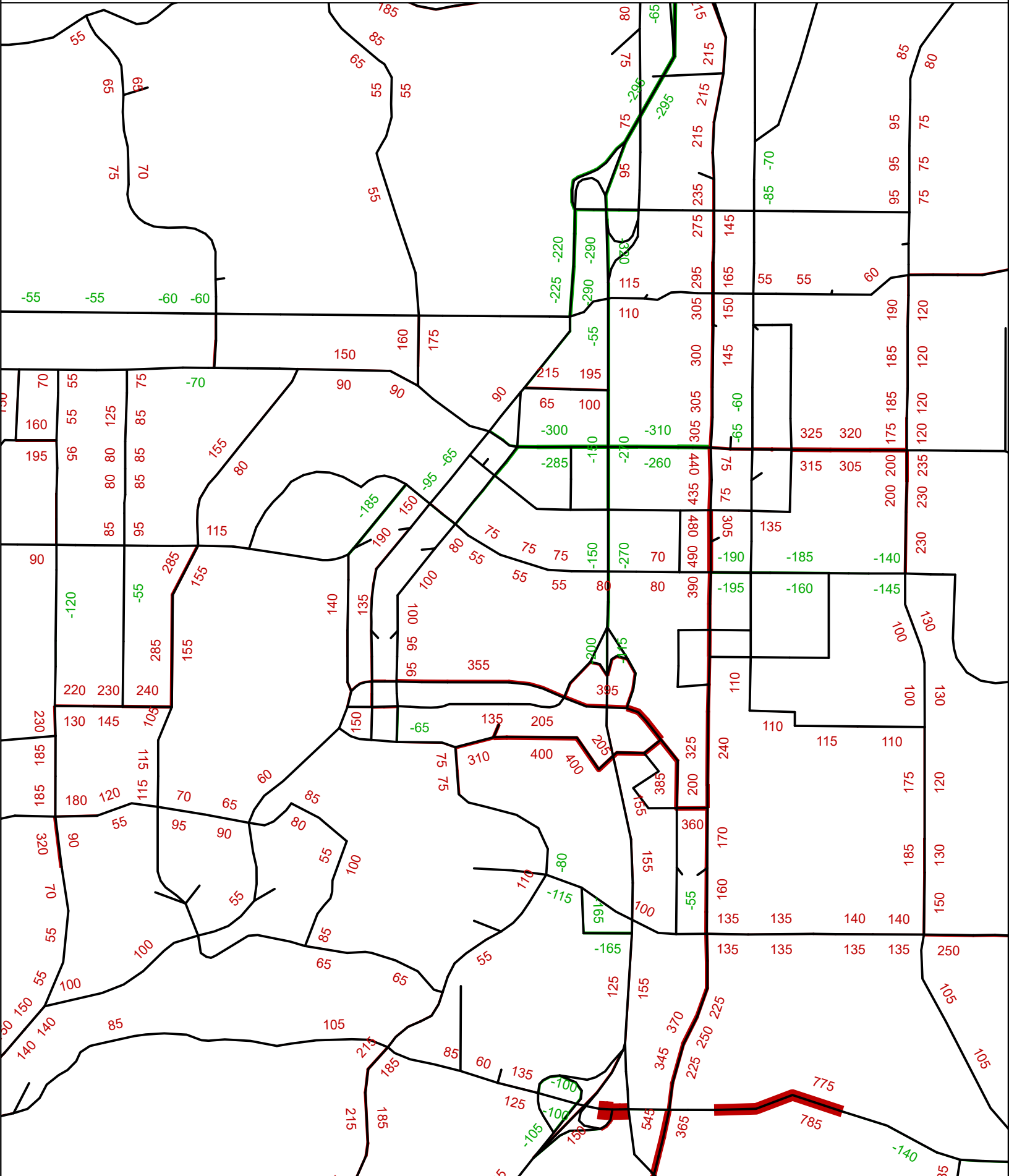
APPENDIX A: MODEL VOLUME DIFFERENCE PLOTS



APPENDIX A: MODEL VOLUME DIFFERENCE PLOTS

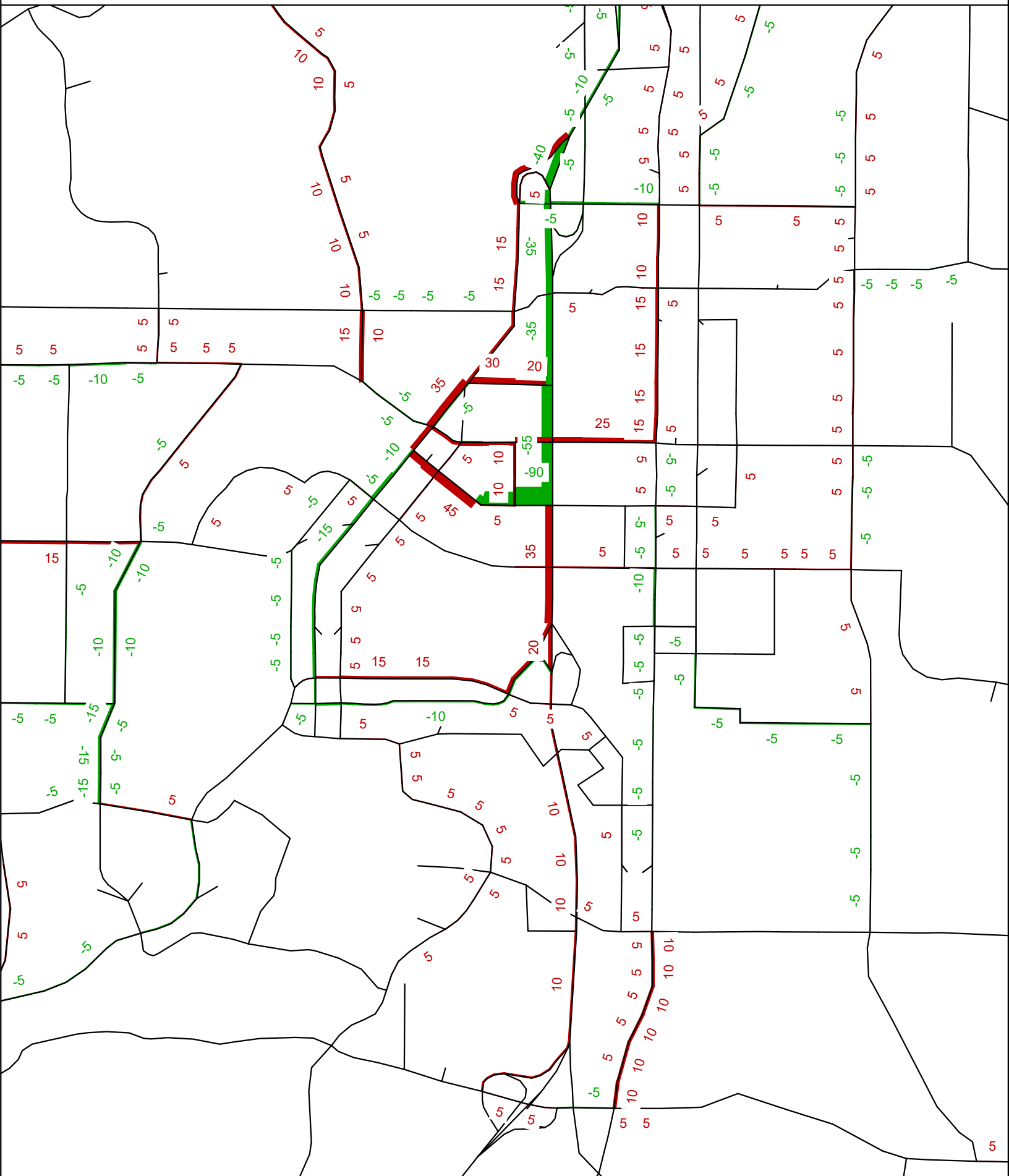


Peak Hour: 2040 Model & 2045 Model



VISUM 2024.01 PTV AG	Hawthorne RIRO Study	Assignment_peak.ver
DKS Associates	Appendix A - 1	August 2024

Peak Hour: Scenario A & Scenario B



VISUM 2024.01 PTV AG	Hawthorne RIRO Study	2_Assignment_peak.ver
DKS Associates	Appendix A - 2	August 2024

Appendix B: Crash Data

CITY OF BEND, DESCHUTES COUNTY

SER#	P	R	J	S	W	DATE	CLASS	CITY STREET	INT-TYPE	SPCL USE																			
INVEST	E	A	U	I	C	O	DAY	DIST	FIRST STREET	RD CHAR	(MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	TRLR	QTY	MOVE	A	S									
RD DPT	E	L	G	N	H	R	TIME	FROM	SECOND STREET	DIRECT	LEGS	TRAF-	RNDBT	SURF	COLL	OWNER	FROM	PRTC	INJ	G	E	LICNS	PED						
UNLOC?	D	C	S	V	L	K	LAT	LONG	LRS	LOCTN	(#LANES)	CONTL	DRVWY	LIGHT	SVRTY	V#	TYPE	TO	P#	TYPE	SVRTY	E	X	RES	LOC	ERROR	ACT	EVENT	CAUSE
01835	N	N	N	N			11/14/2018	14	BEND PKY	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE	0	STRGHT										
NONE							WE		NW HAWTHORNE AVE	W		STOP SIGN	N	DRY	REAR		PRVTE	W -E								000		00	
N							5P			06	0		N	DARK	INJ		PSNGR	CAR	01	DRVR	NONE	67	M	OR-Y	026	000		29	
N							44 3 28.62	-121 18 25.71	000400100S00														OR<25						
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																	PRVTE	W -E	01	DRVR	INJC	51	F	OTH-Y	000	000	000	00	
																	PSNGR	CAR						N-RES					
02044	N	N	N	N			12/14/2018	14	BEND PKY	INTER	3-LEG	N	N	RAIN	S-STRGHT	01	NONE	0	STRGHT									29	
NO RPT							FR		NW HAWTHORNE AVE	W		STOP SIGN	N	WET	REAR		PRVTE	W -E								000		00	
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NO RPT							SA		NW HAWTHORNE AVE	W		STOP SIGN	N	DRY	TURN		N/A	W -S								015		00	
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00257	N	N	N	N			02/14/2018	17	NW HAWTHORNE AVE	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE	9	STRGHT									07,29	
CITY							WE		BEND PKY	W		STOP SIGN	N	DRY	REAR		N/A	W -E								000		00	
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01656	N	N	N	N	N	N	10/12/2021	14	BEND PKY	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE	0	TURN-R									07,29	
CITY							TU		NW HAWTHORNE AVE	W		ONE-WAY	N	DRY	REAR		PRVTE	W -S								000		00	
N							2P			06	0		N	DAY	INJ		PSNGR	CAR	01	DRVR	NONE	83	M	OR-Y	043,026	000		07,29	
N							44 3 28.62	-121 18 25.69	000400100S00														OR<25						
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																	PSNGR	CAR						N-RES					

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

Appendix C: Community Open House Summary

MIDTOWN CROSSINGS PROJECT

HAWTHORNE OVERCROSSING OPEN HOUSE

Public Feedback Summary July 2024

Prepared for:

City of Bend



CITY OF BEND

Prepared by:

JLA Public Involvement



Completed:

August 6, 2024

TABLE OF CONTENTS

Overview.....3

 Outreach Activities and Participation3

 Promotion.....3

 Key Takeaways.....4

Feedback Summary.....5

Participant Information.....9

OVERVIEW

The Hawthorne Overcrossing open house offered the community a chance to provide input on plans for a brand-new bridge for people walking and biking on Hawthorne Avenue. The project team shared four bridge structure types with the public: Cable Stayed-Two Tower, Cable Stayed-One Tower, Extradosed and Truss. Attendees were asked to share their preferred bridge type, and which priorities they considered most important to the decision. Factors like cost, aesthetics, and construction impact were presented. Additionally, community members weighed in on the potential closure of the Parkway exit at Hawthorne Ave based on safety considerations.

The Hawthorne Overcrossing open house is part of the Midtown Crossings Project, which is focused on developing safer travel for all users on four key corridors in the city of Bend: Greenwood Avenue, Franklin Avenue, Hawthorne Avenue and Second Street.

Outreach Activities and Participation

Outreach activities for this phase of the project included:

- **July 3 through July 17** – Online open house
 - **351 people** submitted the survey form
- **July 10** – In-person open house at Campfire Hotel's meeting room
 - Approximately **80 people attended**, 45 submitted comment forms

All information and questions provided at the in-person event were replicated in the online event. Two people submitted responses via email. The Hawthorne Overcrossing open houses had approximately 435 people participate with 398 submitting responses.



The online and in-person open houses were available in English and Spanish. No responses were received online in Spanish. One person at the event provided comments in Spanish.

Promotion

To promote the project and the open house, the following communications were completed:

- **Postcard:** mailed to the project area of 4,785 addresses
- **Email:** sent to the project mailing list of 1,193 subscribers with a 45% open rate
- **Website update**
- **Press release:** submitted on July 2, 2024
- **Social media posts:** on July 8
 - Facebook: 1k reached, 12 reactions, 0 comments and 1 share
 - Instagram 1.3k reached, 18 likes, 0 comments and 4 shares

Key Takeaways

The Hawthorne Overcrossing Open Houses engaged over 400 community members and received 398 responses through an in-person event and online survey. We found the main takeaways from community participants were:

The **Truss bridge type received the most support** from the public (167), with the **Extradosed bridge type a close second** (132).

- Participants who supported the Truss type shared that this option retains Bend's historical character and is more cost-friendly for the project, including ongoing maintenance. Other participants shared that the Truss type would look outdated (reminiscent of a 1930s railroad bridge) and is not unique enough for Bend.
- Participants who supported the Extradosed type shared that this option fits with Bend as a growing, vibrant city. This option was seen as more pleasant to look at.



TWO TOWER CABLE-STAY



SINGLE TOWER CABLE-STAY



EXTRADOSED



STEEL TRUSS

Design elements repeatedly mentioned by participants were lighting, safety and accessibility, and connectivity to the surrounding transportation network.

- **Lighting:** nearly half of the participants care about lighting including safety concerns, maintenance, and wildlife considerations.
- **Safety and accessibility:** participants mentioned clear signage, safe landings, and special attention to making the entrances accessible for all users, including stairs, elevators, and/or ramps.
- **Connectivity:** participants want to ensure the bridge is connected to Bend's key corridors, bike network, and walking trails.

Greater aesthetics, better land-use compatibility, and limited maintenance cost were the most selected priorities in our participants' selection process.

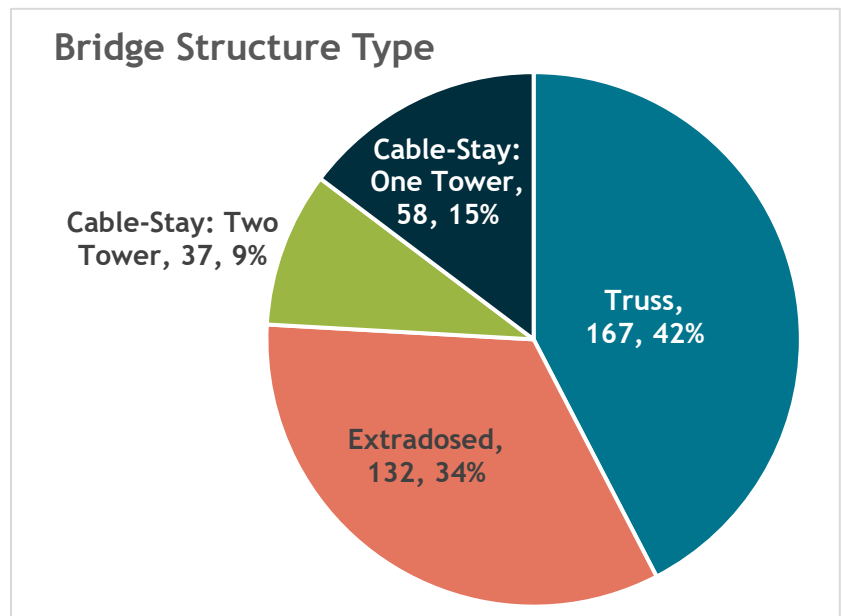
Regarding the **Bend Parkway Plan**, participants showed a majority support, with **67% saying "Yes"** and **15% saying "Unsure,"** citing safety as a key consideration. From observations, many shared that vehicles and drivers leaving the Parkway are often continuing to travel at near highway speeds. Participants saying "No" (18%) shared reasons including increased traffic at other exits and losing a vital access point to downtown.

FEEDBACK SUMMARY

We received 45 in-person, 351 online, and two (2) email responses. The following feedback themes emerged from the 398 surveys submitted.

1. Which of the four bridge structure types would you like to see advanced into the design phase? (381 responses)

Through this outreach activity, the **Truss bridge type received the most support from the community at 42%**. Support was followed closely by the **Extradosed bridge type at 34%**. The Extradosed type received slightly more support at the in-person open house. In the comments, some participants mentioned that the Truss type feels more rustic or suitable for a “mountain town” with a historical character. Participants shared that the Truss type is functional and streamlined without being too showy. Participants liked that it was less expensive and had lower maintenance costs than the other options. However, some participants shared that the Truss type would quickly feel outdated without some extra effort to make it more modern. Some supporters of the Extradosed type shared that they want a modern bridge that is still attractive and welcoming and retains lower maintenance costs. One participant did not select a type and wrote in “none.”



2. What other design elements (e.g. lighting, wayfinding, connectivity, safety, aesthetics, stairs) would you like to see considered as design proceeds for the bridge overcrossing? (212 responses)

- (97) Nearly half of those who left comments in this section mentioned **lighting** as key to a successful bridge design. A few even brought up the need for lighting under the bridge for safety and activation. Other participants see lighting opportunities for seasonal and holiday events.
 - (13) Some mentioned the need for **dark sky compliance** and limiting environmental impacts at night.
- (50) **Safety and accessibility** were significant considerations for participants. Getting on and off the bridge easily and feeling comfortable doing so is very important.
- (41) The bridge's **connectivity to the surrounding transportation network** is critical to many participants. This includes safety in making connections to nearby locations (bike network, downtown businesses, integration with Drake and Juniper parks and other key routes) without stress.

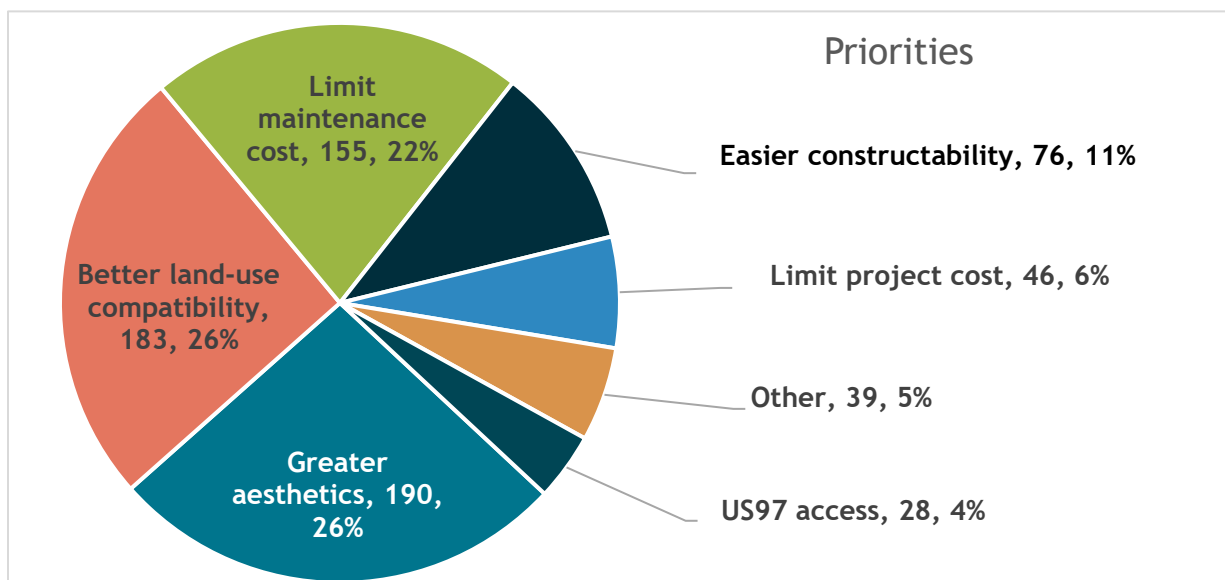


- (35) **Aesthetics** is an overall high priority for those participating. Some participants mentioned “iconic” in their preferred classification. i.e., an iconic part of the skyline or pedestrian landmark for Bend.
- (26) Several participants mentioned **stairs or elevator access** as being important, specifically at the First Street landing. Participants shared that the stairs would allow for a shorter crossing for those not traveling on bikes or stairs with a bike rail so cyclists can access the stairs, too.
- (26) **Wayfinding** was equally as important. Maps or signage to businesses and parks at both landings
- (21) Some participants mentioned the need for **separate and marked lanes** for biking and walking to increase safety and reduce conflicts between pedestrians and cyclists. They would like lanes that are wide and spacious, so users don’t experience the bridge as a “funnel.”
- (15) Several people suggested convenience measures, such as **noise reduction barriers** to reduce highway noise or **weather protection** (shade, heat strips for de-icing, or anti-slip surfaces).
- (11) Some brought up an interest in activating the **landing areas** at the ends of the bridge or the space under the bridge landings. Ideas include food trucks, parks, tree landscaping, public art, and a plaza space.
- (8) A few people desired a more casual experience on the bridge, somewhere to stop and rest or take in the views of the mountains. (7) Some also mentioned adding landscaping on the bridge itself or on the landings for aesthetic, environmental, and climate resilience reasons.

3. What are your priorities for the selection of the bridge? (688 selections - Participants could select up to two options.)

We asked participants for their top two priorities in deciding which bridge to build. The options were:

- **Better land-use compatibility** – I want the bridge to fit well with the planned surrounding development.
- **Greater aesthetics** – I want a more visually appealing bridge.
- **Limiting maintenance cost** – I want lower annual and long-term costs.
- **Easier constructability** – I want the bridge to be constructed quickly and with less impact on the surroundings.
- **Limiting project cost** – I want the bridge to cost less to design, construct, and purchase the right of way.
- **Maintaining US97 Southbound access at Hawthorne exit** – I don't want the Parkway exit to close or limit vehicle size.
- **Other priority?**



Greater aesthetics and land-use compatibility were the top two choices of participants, with 26% each of the selections. Limiting on-going maintenance was the third most selected option with 22%. 39 people added in an additional priority, with the following themes emerging.

Please provide the other priority not listed above. (39 responses)

- (20) **Ease of use for bikes and pedestrians** emerged as the primary priority in comments. This includes considering the grade of the ramps, separation of uses, and accessibility. These participants expressed concern about ensuring that most users can access the bridge and begin to use it regularly.
- (12) **Safety** emerged as a significant follow-up to accessibility as a priority.
- (7) **Connecting existing and new infrastructure** for bikes to ensure the bridge functions well within the transportation network was listed as key to the future success of the bridge. This includes better intersection treatments and crosswalks. Some mentioned the closure of the Parkway exit would be critical to this end.
- A few items that were mentioned just once or twice include:
 - Weather protection
 - Wildlife or environmental impacts
 - Traffic/noise reduction
 - Protecting views
 - Suicide prevention measures
- Two participants indicated they think the bridge is a waste of money.

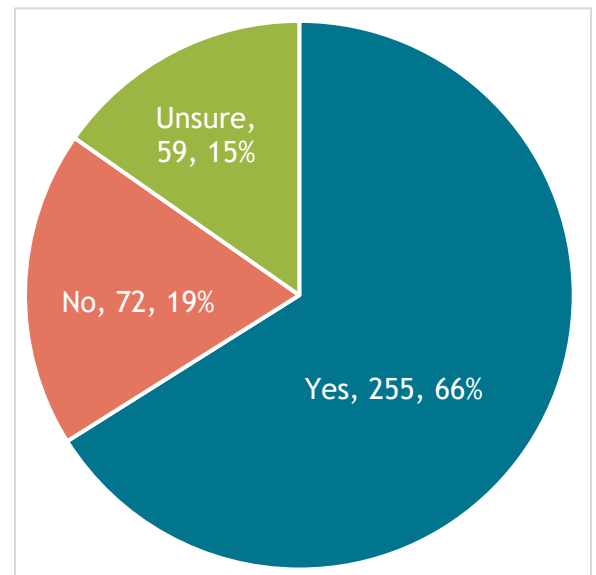


4. The current Bend Parkway Plan includes a closure of the entrance to the Parkway at Hawthorne Avenue and maintains the exit for vehicles to go westbound on Hawthorne. Based on the safety considerations you've seen presented, would you support the team pursuing an amendment to the Parkway Plan to fully close the Hawthorne exit and entrance to the Parkway? (385 responses)

The majority (67%) of participants are in favor of pursuing closure of the Hawthorne exit and entrance for the Parkway.

Additional reasoning? (165 responses)

- (61) The overwhelming reason for supporting the closure was that it feels **unsafe**. Many said the current corridor already feels unsafe without a bridge and bike lane. Participants said it would feel very dangerous when additional travel modes are added at this location. Several participants said they would support the exit closure even if the bridge were not built.
 - (13) Other participants supporting the full closure cite the current **traffic** in this location, with many drivers exceeding the **speed limit**.



- (32) Several mentioned that the new bridge on Hawthorne Avenue is meant to prioritize multi-modal travel, especially for biking and walking. Closure would be needed to achieve this goal.
- (31) Many participants mentioned that this intersection **often impedes traffic on US97**. Since there are no on or off-ramps, it can be difficult to use, and they avoid this exit/entrance whenever they can. (6) Some participants mentioned that if the Parkway exit/entrance is left open, a deceleration/acceleration lane should be added.
- (17) Participants across all responses share concern about how the closure would affect **other intersections and Parkway exits**. A complete traffic analysis and corresponding improvements will be needed to ensure consistent travel times.
- (14) Some suggested just **closing the onramp but keeping the exit** would be a better option.
- (13) Even among participants who do not support the closure, many said the **speeds on the Parkway are too fast** and need better speed control measures.
- (11) The use of Hawthorne for downtown access was mentioned, whether for getting folks out of downtown after an event or helping them find businesses in the area. Some participants also mentioned that the closure could cause more cut-through traffic on the neighborhood streets.

5. Do you have any other comments or questions? Is there anything else you want to share with us? (95 responses)

- (25) General support for the project
- (14) Support for biking access and multi-modal transportation system
- (14) Requests to consider additional connectivity and traffic issues
- (8) Opposition to the project
- (5) Concerns that project cost is not worth the benefit

Participants shared concern for the environmental impacts and a desire for artwork to be considered as part of the project.

Some see this bridge and other Midtown improvements as increasing vehicle congestion. A participant cites the 2019 City surveys which showed traffic congestion as a high concern for the community.

A few people talked about their appreciation for the Truss bridge type:

“The non-truss designs are too flashy and overreach for Bend. I'd like to see something that doesn't detract from the mountains and that blends into the small-city vibe we still have and preserves local dollars for connectivity.”



PARTICIPANT INFORMATION

Primary neighborhoods that participants indicated as having an association with:

- Larkspur 20
- Orchard District 20
- River West 14
- Old Farm District 14
- Old Bend 11
- Mountain View 11
- Midtown 10
- Summit West 10
- Southern Crossing 6

Neighborhoods with less than 5 responses were not included in this list.

