

**I-5 Exit 127 (North Roseburg)
Interchange Area Management Plan
Douglas County, Oregon**

**DRAFT Technical Memorandum #5
Preferred Alternative**

Prepared for

Oregon Department of Transportation, Region 3
3500 NW Stewart Parkway
Roseburg, Oregon 97470

Prepared by

David Evans and Associates, Inc.
2100 SW River Parkway
Portland, Oregon

December 2013

Table of Contents

- 5. PREFERRED ALTERNATIVE 1**
- 5.1. Alternatives Considered 1**
- 5.2. Intersection Improvements 1**
- 5.2.1. Concept 1 – Edenbower Boulevard/Stewart Parkway: Add Second Eastbound Left-Turn Lane 1
- 5.2.2. Concept 2 – Edenbower Boulevard/Stewart Parkway: Install Multi-Lane Roundabout..... 3
- 5.2.3. Concept 3 – Edenbower Boulevard/Stewart Parkway: Realign Intersection for Major Traffic Flow and Close South Approach 3
- 5.2.4. Concept 4 – Edenbower Boulevard/Stewart Parkway: Create “T” Intersection and Close South Approach..... 4
- 5.2.5. Concept 5 – Edenbower Boulevard/Aviation Drive: Extend Westbound Right-Turn Bay..... 5
- 5.2.6. Concept 6 – Edenbower Boulevard/Stephens Street: Extend Left-Turn Bays 5
- 5.3. Interchange Ramp Improvements..... 6**
- 5.3.1. Concept 7 – Westbound to Northbound On-Ramp: Gore Area Delineation 6
- 5.3.2. Concept 8 – Westbound to Northbound On-Ramp: Visual Barrier..... 7
- 5.4. Multi-Modal Improvements 7**
- 5.4.1. Concept 9 – Northbound Ramp Terminal: Improve North Side Pedestrian Crossing 7
- 5.4.2. Concept 10 – Edenbower Boulevard from Broad Street to Stewart Parkway: Enhance Pedestrian Crossings..... 8
- 5.5. Additional Improvements..... 8**
- 5.5.1. Concept A-1 – Signalize Northbound Ramp Terminal..... 8
- 5.5.2. Concept A-2 – Signal Coordination on Edenbower Boulevard..... 9
- 5.5.3. Concept A-3 – Speed Reduction on Edenbower Boulevard 10
- 5.5.4. Concept A-4 – Edenbower Boulevard/Stewart Parkway: Sight Distance 10
- 5.6. Summary of Recommendations..... 11**
- 5.7. Operations with Recommended Improvements..... 12**

5. PREFERRED ALTERNATIVE

This technical memorandum summarizes the recommendations for the improvements that would constitute the preferred alternative for the I-5 Exit 127 IAMP. These recommendations are based on feedback from the Technical and Citizen Advisory Committees, comments received at the Public Open House, and input from ODOT, City, and County staff.

5.1. Alternatives Considered

The alternatives analysis presented in Technical Memorandum #4 focused on three areas for consideration within the interchange study area:

- Intersection Improvements
- Interchange Ramp Improvements
- Multimodal Improvements

During and following the review of the alternatives analysis, several other ideas were identified for consideration. These have been assessed and recommendations are presented in a new category of improvements: *Additional Improvements*. A table at the end of the memorandum summarizes the recommendations for all of the concepts considered.

The figures illustrating the alternatives previously discussed in Technical Memorandum #4 have not been repeated in this memorandum; however, new figures illustrating additional improvements are attached.

5.2. Intersection Improvements

Six potential intersection improvements were identified during the conceptual development to bring the operations up to standards, provide additional capacity, or address safety concerns. Some of these projects are standalone concepts while others may ultimately be combined into an overall intersection concept.

5.2.1. Concept 1 – Edenbower Boulevard/Stewart Parkway: Add Second Eastbound Left-Turn Lane

Concept 1 considers adding capacity to the Edenbower Boulevard/Stewart Parkway intersection. This concept would install dual left-turn lanes on the eastbound approach of Stewart Parkway, add a second northbound receiving lane on Edenbower Boulevard, and modify signal timing to accommodate the new lane configurations. The purpose of the improvement is to address safety concerns associated with queuing and improve operations to meet the City's dual v/c and LOS standard. Over time, significant congestion at this intersection would potentially impact operations at the interchange ramps.

Three options for creating a second left-turn lane on Stewart Parkway were developed for this concept. All three options include adding the second northbound receiving lane on Edenbower

Boulevard north of Stewart Parkway, but the lane configurations differ between options. The Concept 1 improvement options include:

- **Option A:** Add a second left-turn lane on the eastbound approach of Stewart Parkway by widening the roadway to the north. Widen Edenbower Boulevard to include two northbound receiving lanes which merge back to a single lane. Modify the traffic signal to provide protected left-turn phasing on all approaches.
- **Option B:** Add a second left-turn on the eastbound approach of Stewart Parkway by converting a through travel lane to a shared left-through lane. Widen Edenbower Boulevard to include two northbound receiving lanes but try to minimize widening impacts by reducing the number of southbound approach lanes from three (left, through, and right) to two (left-through and right) lanes. Traffic signal changes include split phasing (one approach is stopped while the opposing approach proceeds) on Stewart Parkway.
- **Option C:** Add a second left-turn lane on the eastbound approach by converting the existing center through lane to a dedicated left-turn lane. Widen Edenbower Boulevard to include two northbound receiving lanes but try to minimize widening impacts by reducing the number of southbound approach lanes from three (left, through, and right) to two (left-through and right) lanes.

Discussion

Of the three options under consideration, Option A would provide the most operational benefits during the PM peak hour with 2035 forecast volumes.

Option B would provide a slightly smaller reduction in delay and queuing during peak periods, compared to Option A, but would result in fewer impacts to adjacent lands. This option is expected to meet operational standards. Split phasing¹ on Stewart Parkway would be required to accommodate the new shared eastbound left-through lane configuration. This type of phasing has more limited flexibility to adapt to shifts in traffic patterns over time, or future growth at the intersection.

Option C provides similar operations to Option B. However, it creates a “trap” lane when the inner eastbound through lane becomes a dedicated left-turn lane; trap lanes are not considered desirable as they have the potential to challenge driver expectation.

Recommendation

Both Concept 1, Option A and Option B are recommended as elements of the I-5 Exit 127 IAMP. Option B may not provide a long-term solution for the intersection because the split phasing required on Stewart Parkway does not allow as much flexibility to respond to changing demand, but it could be constructed as a first phase with Option A as the full improvement. Option B,

¹ Split phasing is a method of signal timing that sequences traffic flow so that opposing approaches proceed consecutively rather than concurrently.

the lane restriping on Stewart Parkway to add a second (shared) eastbound left-turn lane paired with Edenbower Boulevard widening and lane reallocation, is recommended as a medium priority project. The Option A widening of Stewart Parkway to add a dedicated second eastbound left-turn lane is recommended as a low priority second phase of the improvement, due to the higher cost when compared to Option A. Or, if funding allows, Option A could be constructed first as the long-term solution. Triggers for the improvements will be based on operational need.

Concept 1, Option C is not recommended for the I-5 Exit 127 IAMP. Although it would nearly address operational deficiencies, trap lanes are not desirable and the operational benefits are not as significant as other options.

5.2.2. Concept 2 – Edenbower Boulevard/Stewart Parkway: Install Multi-Lane Roundabout

Concept 2 would improve the Edenbower Boulevard/Stewart Parkway intersection by adding additional capacity by replacing the currently signalized intersection with a two-lane roundabout.

Discussion

Concept 2 would accommodate anticipated vehicular demand, reduce delay and queuing during peak periods, and meet agency standards with a 2035 forecast v/c ratio of 0.85 and LOS D operations. A roundabout would have potential to improve safety for vehicular traffic by reducing conflict points, although it would require additional considerations for pedestrian and bicycle travel. The right-of-way impacts would be significant as all approaches would need to be widened or realigned to accommodate the footprint of the roundabout.

Recommendation

Concept 2 is not recommended for the I-5 Exit 127 IAMP. Although it would address safety and operational deficiencies, it would do so at a substantially higher cost and require the most right-of-way compared to other concepts.

5.2.3. Concept 3 – Edenbower Boulevard/Stewart Parkway: Realign Intersection for Major Traffic Flow and Close South Approach

Concept 3 would eliminate the connection to Edenbower Boulevard south of Stewart Parkway and realign the intersection to better accommodate the major vehicular movements. The north (Edenbower Boulevard) and west (Stewart Parkway) legs of the intersection would be realigned to create a west-north - major street and the current east leg (Stewart Parkway) would “T” into the new Edenbower Boulevard mainline as the south leg.

Discussion

The proposed closure of the south leg (Edenbower Boulevard) would redirect approximately 20 percent of the total peak volume entering the intersection (approximately 24,300 total entering

vehicles [TEV] in 2012 and 31,700 TEV in 2035) to other access points and driveways on Stewart Parkway.

Concept 3 would provide a reduction in intersection delay and queuing (at Edenbower Boulevard/Stewart Parkway) during peak periods and meet the dual mobility standard with a v/c ratio of 0.83 and LOS C operations. However, the 20 percent of redirected vehicles would experience out-of-direction travel, increase delay at alternate access points, and have potential economic impacts for adjacent businesses

Recommendation

Concept 3 is not recommended as an element of the I-5 Exit 127 IAMP. The concept would improve operations at the intersection, but the closure of the south leg is not supported due to anticipated traffic and economic impacts.

5.2.4. Concept 4 – Edenbower Boulevard/Stewart Parkway: Create “T” Intersection and Close South Approach

Similar to Concept 3, Concept 4 would realign the Edenbower Boulevard/Stewart Parkway intersection by eliminating access to Edenbower Boulevard south of Stewart Parkway. The north (Edenbower Boulevard) and east (Stewart Parkway) legs of the intersection would be realigned to create a north-south major street. The current west leg (Stewart Parkway) would “T” into the new Edenbower Boulevard mainline roadway.

Two options for the realigned intersection were developed for this concept:

- **Option A:** Realign the west leg of the intersection to “T” into a newly aligned north-south Edenbower connecting the existing north and east legs. Stripe one left-turn lane and one right-turn lane on the eastbound Stewart Parkway approach, dual left turn lanes and one through lane on the northbound Stewart Parkway approach, and one right-turn lane and one through lane on the southbound Edenbower Boulevard approach.
- **Option B:** Travel lanes on the approaches for Option B would be the same as those described for Option A except that eastbound Stewart Parkway would have two left-turn lanes rather than a single left-turn lane.

Discussion

Option A would realign the intersection with less skew than the existing configuration and addresses sight distance concerns caused by the existing horizontal curvature and obstructions associated with the existing configuration. This realignment and lane configuration changes would provide an improvement over baseline operations during peak periods but would exceed the v/c ratio mobility standard (0.85) with a v/c ratio of 0.90 for the projected 2035 volumes. The option would meet LOS mobility standards with a LOS D.

Option B would realign the intersection similarly to Option A, but provides dual left-turn lanes on the eastbound approach. Sight distance issues at intersection approaches are addressed by

the realignment, and peak period operations are expected to dramatically improve. The intersection would meet the dual mobility standards with a v/c ratio of 0.60 and LOS B operations

Similar to Concept 3, both Option A and Option B would require closing the south leg (Edenbower Boulevard), and would redirect approximately 20 percent of the total peak volume entering the intersection to other access points and driveways on Stewart Parkway. Redirected vehicles would experience out-of-direction travel, increase delay at alternate access points, and have potential economic impacts for adjacent businesses. Recommendation

Neither Option A nor Option B of Concept 4 is recommended as an element of the I-5 Exit 127 IAMP. The concept would improve operations at the intersection, but the closure of the south leg is not supported due to anticipated traffic and economic impacts.

5.2.5. Concept 5 – Edenbower Boulevard/Aviation Drive: Extend Westbound Right-Turn Bay

Concept 5 would enhance safety and improve operations for both turning and through vehicles by extending the current westbound right-turn bay to allow vehicles to decelerate safely in a lane separated from higher-speed through traffic.

Discussion

The improvement would likely require additional ROW, and would modify the northeast corner of the intersection to extend the existing westbound right-turn bay an appropriate length (from 100 to 175 feet) to allow queuing vehicles to avoid blocking the westbound through traffic. Extension of the turn lane would require cutting into and stabilizing the hillside next to Edenbower Boulevard which will increase the cost of this improvement. .

Recommendation

Concept 5 is recommended for the I-5 Exit 127 IAMP as a low priority project. Queuing should be monitored over time and the turn lane extension would be triggered when queues consistently spill out of the existing turn lane into the adjacent through lane.

5.2.6. Concept 6 – Edenbower Boulevard/Stephens Street: Extend Left-Turn Bays

Concept 6 restripes the center two-way, left-turn lanes to delineate longer left-turn storage bays on the eastbound and northbound approaches of the intersection of Edenbower Boulevard and Stephens Street.

Discussion

The proposed improvement extends the delineated storage for the northbound and eastbound left-turn lanes by restriping the two-way, left-turn lanes. Additional storage would prevent left-turn queues from interfering with the flow of through traffic by reducing the likelihood of spillover from left-turn lanes. Additional storage can benefit intersection operations by

reducing delay for through movements caused by left-turning vehicles stopped in the through travel lane. It can also reduce delays for the left-turn movements by improving accessibility to the turn lane.

This restriping can be accommodated within the existing ROW because of the existing center two-way left-turn lanes on both Edenbower Boulevard and Stephens Street.

Recommendation

Concept 6 is recommended as a transportation system management (TSM) improvement for the I-5 Exit 127 IAMP as a medium priority project. Queuing should be monitored over time and striping changes would be triggered when queues consistently extend beyond the existing striped turn lane.

5.3. Interchange Ramp Improvements

Two potential improvements were identified to address driver expectation concerns on the interchange ramps.

5.3.1. Concept 7 – Westbound to Northbound On-Ramp: Gore Area Delineation

Concept 7 would install additional delineation between the I-5 northbound mainline and westbound to northbound on ramp to improve safety. The gore area would be painted with a chevron pattern to provide a visual cue to drivers to let them know when they should prepare to merge with freeway traffic.

Discussion

The long northbound on-ramp may cause drivers to begin looking over their shoulders well before necessary to make the merging movement to the mainline. Since the length of the ramp cannot be shortened, more distinctive pavement markings in the gore may provide a better visual cue for drivers to keep them from prematurely looking back toward the freeway traffic instead of focusing on the roadway and vehicles in front of them.

The enhanced gore delineation would have no impact on vehicular capacity, as all striping would occur within the existing gore. However, visual delineation would incur additional maintenance costs.

Recommendation

Since the crash history does not identify any noteworthy patterns, Concept 7 is recommended as a low priority element of the I-5 Exit 127 IAMP. It should be considered as a first phase improvement that would be triggered if crash rates on the ramp continue to be consistently higher than the other freeway ramps, or of an associated pattern of crashes is observed.

5.3.2. Concept 8 – Westbound to Northbound On-Ramp: Visual Barrier

Concept 8 would install a visual barrier on the west side of the on ramp in the form of a concrete barrier with glare shields to prohibit drivers from prematurely looking at the mainline traffic to prepare to merge.

Discussion

This concept has the same type of safety benefits as Concept 7. The installation of a concrete barrier could be designed to have no impact on vehicular capacity, since a guardrail on the west side currently defines the unobstructed roadway width of the ramp. However, installing a barrier would incur additional maintenance costs.

Recommendation

Since the crash history does not identify any noteworthy patterns, Concept 8 is recommended as a low priority element of the I-5 Exit 127 IAMP. This concept would be triggered as a second phase improvement if crash rates on the ramp continue to be consistently higher than the other freeway ramps, or if an associated pattern of crashes is observed, and gore striping does not address these concerns on the ramp.

5.4. Multi-Modal Improvements

Two potential multi-modal improvements were identified during the concept development process to improve the safety and continuity of pedestrian facilities in the study area.

5.4.1.

5.4.2. Concept 9 – Northbound Ramp Terminal: Improve North Side Pedestrian Crossing

Concept 9 would shorten the pedestrian crossing distance for the westbound to northbound on-ramp and create a crossing that is more consistent with the crossings at the other ramp connections with Edenbower Boulevard.

Discussion

Two options were described for this concept: one would extend the curb and sidewalk on the northwest corner of the intersection while the other could construct an island channelizing the right turns from Edenbower Boulevard. The extension of the northwest corner appears to be the more feasible layout with the current roadway width. The shorter crossing distance would reduce pedestrian exposure at the conflict point with vehicular traffic. Striping crosswalks could further increase driver awareness of potential pedestrian activity, but striped crosswalks are not required with the improvement.

Construction of a curb extension would need to account for the turning requirements onto the freeway for the westbound right-turning traffic as well as the through movement from the

northbound off-ramp. Improvements included in this concept would occur within the available right of way (ROW).

Recommendation

Concept 9 is recommended as an element of the I-5 Exit 127 IAMP. The preferred improvement is the extension of the northwest corner rather than the channelizing island. The project addresses an existing deficiency and should be considered as a medium priority.

5.4.3. Concept 10 – Edenbower Boulevard from Broad Street to Stewart Parkway: Enhance Pedestrian Crossings

Concept 10 would add striped crosswalks at Broad Street, Sweetbrier Avenue, Plateau Drive (north), and Plateau Drive (South) for north-south pedestrian travel along the west side of Edenbower Boulevard. Also, curb ramps would be enhanced at these locations to provide improved directional guidance where appropriate.

Discussion

Striped crosswalks would help identify the presence of pedestrian activity and increase visibility to motorists turning onto the side streets. Clearly defined and frequent crosswalks may encourage slower travel speeds along Edenbower Boulevard. The crosswalks as the currently exist

The striping of the crosswalks themselves would have no impact on vehicular capacity since motorists are supposed to yield to pedestrians crossing the roadway even at intersection locations where a crosswalk is not striped.

Recommendation

Concept 10 is not recommended as an element of the I-5 Exit 127 IAMP due to cost. If new construction impacts any of the existing crossings, then an improvement would be warranted.

5.5. Additional Improvements

During and following the evaluation of the alternatives analysis, several other ideas were identified for consideration. These ideas are discussed below with recommendations for those improvements that would be included in the preferred alternative for the I-5 Exit 127 IAMP. Many of the suggested improvements should only be implemented if a specific trigger (i.e., queuing, crash frequency, increased delay) is met.

5.5.1. Concept A-1 – Signalize Northbound Ramp Terminal

Concept A-1 considers signalizing the I-5 Northbound Ramp Terminal at Edenbower Boulevard if operations or crashes become a concern. The purpose of this improvement is to address traffic operations and safety.

Discussion

Without a traffic signal, side street traffic must pull out into the traffic on Edenbower Boulevard when adequate gaps in the traffic stream are available. Making right turns is relatively easy but making left turns can be difficult, particularly during the peak commuting periods. Conditions for making left turns will only get worse as traffic volumes on the expressway continue to increase.

There were 13 crashes reported at the northbound ramp terminal. The crash rate was 0.43 crashes/million entering vehicles (mev), which was equal to the critical crash rate for this intersection. There were two minor-injury crashes reported at this location, and no serious/fatal injuries. There is not a pronounced trend observed in crash types. Ten of the crashes at this intersection occurred in the years prior to or during the construction of the eastbound to southbound loop ramp.

Preliminary signal warrants, based on traffic volumes, are not met under existing conditions (year 2012) or within five years. If unexpected land use changes direct more traffic to this location, or the frequency of turning or angle collisions increase, a signal may be warranted.

The addition of a traffic signal would reduce delays and queues for some movements, particularly for left turns from the northbound off-ramp. However, through traffic on Edenbower Boulevard would experience increased delay throughout the day.

The addition of a traffic signal would likely reduce the frequency and severity of the turning and angle collisions by stopping the through traffic on Edenbower Boulevard to allow vehicles to turn from the northbound off-ramp. However, a signal installation typically increases the potential for rear-end collisions due to a high frequency of stopping vehicles, but rear end collisions are typically much less severe than high speed turning and angle collisions.

Recommendation

Concept A-1 is recommended as an element of the I-5 Exit 127 IAMP as a low priority project. This project would only be implemented if an increased pattern of turning and angle collisions develops or traffic volumes increase beyond what is currently projected and triggers a vehicular warrant.

5.5.2. Concept A-2 – Signal Coordination on Edenbower Boulevard

Concept A-2 considers signal coordination on Edenbower Boulevard from Stephens Street through the southbound ramp terminal. The purpose of this improvement would be to manage delays and queuing in the corridor to reduce future operational or safety concerns.

Discussion

Although queuing between intersections does not currently interfere with operations, as traffic volumes grow or patterns shift over time, queuing may become a concern. One of the ways to manage the queuing between intersections would be to coordinate the traffic signals to benefit

certain travel patterns. This can be done by manually creating signal timing plans with consistent cycle lengths and coordinated off-sets. Although ultimately, an interconnected signal system may be desirable. The adverse impact of signal coordination could be increased delay for some of the minor traffic movements as heavy traffic flows are favored.

Recommendation

Concept A-2 is recommended as a high to medium priority TSM measure for the I-5 Exit 127 IAMP. Queues should be monitored along Edenbower Boulevard between Stephens Street and the I-5 southbound ramp terminal. Signal coordination can be implemented through adjustments to existing signal plans without investment in an interconnected system. Signal interconnect may be necessary as a long-term (low priority) project.

5.5.3. Concept A-3 – Speed Reduction on Edenbower Boulevard

Concept A-3 considers reducing the posted speed on Edenbower Boulevard between Stewart Parkway and the Southbound Ramp Terminal if crashes become a concern. The purpose of this improvement is to address geometric concerns and safety.

Discussion

The curve of Edenbower Boulevard between Broad Street and the I-5 Southbound Ramp Terminal is identified in the I-5 State of the Interstate Report as sharp for the posted speed of 40 miles per hour (mph). There is no pattern of crashes associated with the roadway curvature in the most recent five years of crash data.

However, with increased traffic volumes in the corridor and potential changes in lane configurations on Edenbower Boulevard near Stewart Parkway, a speed study may be conducted to determine if a speed reduction in the corridor is appropriate.

Recommendation

Concept A-3 is recommended as an element of the I-5 Exist 127 IAMP with medium priority because the improvement may respond to safety concerns. A speed study should be conducted with the implementation of Phase 1 improvements at the Edenbower Boulevard/Stewart Parkway intersection. Recommendations for a reduction in posted speed could result at that time. Otherwise, a speed study and possible reduction in posted speed should be considered any time it appears that drivers are changing their behavior or travel speeds on this section of roadway, or if a crash pattern associated with roadway curvature develops.

5.5.4. Concept A-4 – Edenbower Boulevard/Stewart Parkway: Sight Distance

Concept A-4 considers improvements mitigate the existing sight distance limitations that restrict visibility for drivers traveling through the intersection on the eastbound (Stewart Parkway) and northbound (Edenbower Boulevard) approaches. The purpose of this improvement is to improve safety.

Discussion

Obstructions in the southwest quadrant limit the sight distance for drivers traveling through the intersection on the eastbound (Stewart Parkway) and northbound (Edenbower Boulevard) approaches. Vehicles heading eastbound on Stewart Parkway cannot see the main overhead traffic signal until they are between 100 and 150 feet from the intersection. Although a secondary/supplemental pole mounted signal for the eastbound traffic has been installed to address this concern, unfamiliar drivers may not identify it or understand its purpose. Vehicles heading northbound on Edenbower Boulevard and taking a right-turn-on-red only have 125 to 150 feet of unobstructed sight distance, when looking west for conflicting eastbound through traffic.

This intersection has the highest crash rate (0.83 crashes/mev) and number of reported collisions (37) within the study area in the five-year analysis period, but crash data does not identify a trend of crashes related to the identified sight distance limitations.

Increasing the intersection sight distance at this location would require a change in the geometric configuration or removing roadside obstructions (trees, shrubs, etc.). As an alternative to, or in concert with increasing sight distance, including a “no right turn on red” limitation for northbound traffic may serve as an appropriate mitigation.

Recommendation

Concept A-4 is recommended as an element of the I-5 Exit 127 IAMP with medium priority because the improvement may respond to safety concerns. Sight distance improvements should be considered with Concept 1 improvements, but may also be triggered if a crash pattern associated with limited sight distance develops.

5.6. Summary of Recommendations

The following table summarizes each of the concepts and the recommendations for implementation.

Table 5-1. Summary of IAMP 127 Concepts

Concept	Recommendation
Intersection Improvements	
Concept 1 – Edenbower Boulevard/Stewart Parkway: Add Second Eastbound Left-Turn Lane	Phase 1 (Option B) – medium priority triggered by operations Phase 2 (Option A) – low priority triggered by operations
Concept 2 – Edenbower Boulevard/Stewart Parkway: Install Multi-Lane Roundabout	Not Recommended
Concept 3 – Edenbower Boulevard/Stewart Parkway: Realign Intersection for Major Traffic Flow and Close South Approach	Not Recommended
Concept 4 – Edenbower Boulevard/Stewart Parkway: Create “T” Intersection and Close South Approach	Not Recommended
Concept 5 – Edenbower Boulevard/Aviation Drive: Extend Westbound Right-Turn Bay	Low priority triggered by queuing/safety
Concept 6 – Edenbower Boulevard/Stephens Street: Extend Left-Turn Bays	Medium priority triggered by queuing/safety
Interchange Ramp Improvements	
Concept 7 – Westbound to Northbound On-Ramp: Gore Area Delineation	Low priority triggered by safety
Concept 8 – Westbound to Northbound On-Ramp: Visual Barrier	Low priority triggered if Concept 7 is not sufficient
Multi-Modal Improvements	
Concept 9 – Northbound Ramp Terminal: Improve North Side Pedestrian Crossing	High to medium priority based on existing deficiency
Concept 10 – Edenbower Boulevard from Broad Street to Stewart Parkway: Enhance Pedestrian Crossings	Not Recommended
ADDITIONAL CONSIDERATION CONCEPTS	
Concept A-1 – Signalize Northbound Ramp Terminal	Low priority triggered by signal warrants
Concept A-2 – Signal Coordination on Edenbower Boulevard	High to medium priority triggered by queuing
Concept A-3 – Speed Reduction on Edenbower Boulevard	Medium priority triggered by safety
Concept A-3 – Speed Reduction on Edenbower Boulevard/Edenbower Boulevard/Stewart Parkway: Sight Distance	Medium priority triggered by safety or in concert with Concept 1

5.7. Operations with Recommended Improvements

Traffic operations with the combined recommendations have been evaluated based on 2035 conditions from the 2035 LU 1.2 travel demand model. Table 5-2 summarizes operations for all intersections. All study area intersections would meet mobility standards with the 2035 forecasts.

Table 5-2: Operations with Recommended Improvements

Intersection	Critical Movement ¹	V/C Ratio ²	LOS ²	Mobility Standard ³
Edenbower Blvd. at Stewart Pkwy. (Signalized)	Overall	V/C = 0.82 ⁴	LOS = C	LOS D V/C ≤ 0.85
Edenbower Blvd. at Broad St.	EB L/R	V/C = 0.26	LOS = C	LOS D V/C ≤ 0.85
Edenbower Blvd. at SB Ramp Terminal (Signalized)	Overall	V/C = 0.69	LOS = B	LOS D V/C ≤ 0.85
Edenbower Blvd. at NB Ramp Terminal	NB R	V/C = 0.48	LOS = D	LOS D V/C ≤ 0.85
Edenbower Blvd. at Aviation Dr. (Signalized)	Overall	V/C = 0.61	LOS = B	LOS D V/C ≤ 0.85
Edenbower Blvd. at Stephens St. (Signalized)	Overall	V/C = 0.71	LOS = C	LOS D V/C ≤ 0.85

Notes:

1. At signalized intersections, the overall results are reported along with all individual movements, while at unsignalized intersections the results are reported for all movements that must stop or yield the right of travel to other traffic flows. Signalized intersection results are based on HCM 2000 methodology, while unsignalized intersection results are based on HCM 2010 methodology.
2. The v/c ratios and LOS are based on the results of the macrosimulation analysis using Synchro, which cannot account for the influence of adjacent intersection operations.
3. The Roseburg Transportation System Plan (TSP) designates the traffic operations standard on City facilities and defers to ODOT standards for intersections with state highways within the City, while the Douglas County TSP identifies standards for County facilities.
4. Operations reflect an assumption that 65 percent of the eastbound left-turning traffic will use the far left-turn lane while 35 percent will use the near left-turn lane and merge into the northbound traffic flow on Edenbower Boulevard.

Source: Synchro HCM Intersection Analysis Report