

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

**DRAFT Technical Memorandum #4
Concept Development and Evaluation**

Prepared for

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August 2013

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4. CONCEPT DEVELOPMENT AND EVALUATION

This memorandum presents the preliminary improvement concepts developed to address deficiencies in the IAMP 127 Interchange Management Study Area (IMSA). The goal of the identified improvement concepts is to help achieve the goals and objectives set forth for this project, while addressing identified deficiencies for all modes.

Once concepts are selected for further analysis, they will be combined to create a comprehensive improvement strategy. As the overall strategy is developed, concepts will be refined so that the improvements work well together.

4.1. Concept Development

Each improvement concept was developed to address specific deficiencies, safety issues, or access concerns. These concepts were developed based upon available standards, warrants, perceived need, safety data, traffic operations, and community livability. Concepts were not limited to roadway issues, and include bicycle, pedestrian, and transit-related projects.

The concepts were developed keeping in mind the objectives developed for this IAMP:

- Protect the function of the interchange and Edenbower Boulevard as specified in the Oregon Highway Plan (OHP) and City of Roseburg Transportation System Plan.
- Develop concepts to improve safety and maximize operational efficiency of the freeway and existing interchange facility.
- Evaluate the need for capacity improvements to address future needs based on the adopted comprehensive land use plans of Roseburg and Douglas County.
- Identify potential local system enhancements that maintain connectivity and complement the interchange function.
- Incorporate bicycle and pedestrian elements, such as sidewalks, bike lanes, and pathways, as well as corresponding roadway crossings.
- Develop an access management plan that provides for safe and acceptable operations on the transportation network, and moves towards achieving the applicable access spacing standards in Oregon Administrative Rule (OAR) 734-051.
- Coordinate planning efforts with other plans and projects in the study area.
- Prioritize IAMP improvements with consideration for potential funding mechanisms.

This memorandum considers changes/improvements in three general categories:

- **Intersection Improvements** – These concepts identify potential improvements to improve traffic flow, provide additional capacity, and/or address safety concerns at individual intersections within the IMSA.
- **Interchange Ramp Improvements** – These concepts address concerns raised about driver expectation and safety on interchange ramps.

- **Multimodal Improvements** – These concepts identify potential improvements to enhance safety, desirability, and continuity of facilities for non-auto users in the IMSA.

4.1.1. Intersection Improvements

The concepts developed for intersection improvements address operational and safety deficiencies at individual intersections within the IMSA. Many of the intersection improvements are targeted at Edenbower Boulevard and Stewart Parkway – the only intersection within the study area that is expected to fail to meet City of Roseburg mobility targets during the IAMP planning period. Other suggested improvements may address queue storage lengths and safety at intersections where overall capacity is not expected to be of concern.

Two significant intersection capacity and timing improvements completed in late 2012 and early 2013 have addressed many of the congestion issues within the IMSA and these have been included in the baseline analysis for the IAMP.

4.1.2. Interchange Ramp Improvements

While the current interchange ramps have some features that may deviate from the desired configuration, a detailed review of crash history data for the period between January 1, 2006, and December 31, 2010 did not show consistent crash patterns associated with ramp geometry. However, several concepts to address citizen concerns raised about driver expectation are included for consideration.

4.1.3. Multimodal Improvements

In alignment with the goals of this plan, the proposed improvements provide enhanced safety, desirability, and continuity of facilities for non-auto users in the IMSA. These improvements primarily serve pedestrians because the existing bike network is complete and there is currently no transit service on most of the IMSA roadways. The concepts focus on improving crossings where pedestrians interact with motorized vehicles.

4.2. Concept Evaluation

Not all of the concepts proposed in this memorandum will be recommended for implementation. Each improvement concept will be evaluated with regard to applicable impacts (e.g. traffic operations, safety, environmental, etc.), feasibility, stakeholder feedback, and ability to meet the goals of the IAMP.

The concept analysis included traffic operations, road geometries and ROW requirements, environmental and land use consequences, and cost opinions.

4.2.1. Traffic Operations and Safety

Traffic operations were evaluated for concepts that were identified to address operational deficiencies. The operational assessment focuses on the volume-to-capacity (v/c) ratio and

level of service (LOS) for the 2035 future condition. Operational results for the concepts were compared to the mobility targets set forth in the Oregon Highway Plan (OHP)¹ and Highway Design Manual² (HDM), as well as City of Roseburg operational standards.

At intersections where potential changes in traffic control or turn lanes were considered, the procedures in the ODOT Analysis Procedures Manual (APM) were followed in concert with City of Roseburg design standards, based on the governing jurisdiction.

The existing (2012) and future baseline (2035) traffic volumes have been attached to this memo (Figure 4-1 and Figure 4-2) for easy reference.

Some improvements are focused on addressing traffic operation deficiencies or may address operational as well as safety concerns. Crash patterns from the five-year analysis period (2006 through 2010) are discussed for those improvements that address safety.

4.2.2. Basic Roadway Geometries and Right-of-Way Requirements

Evaluations of basic roadway geometry and ROW needs were conducted for concepts that involve infrastructure improvements. Geometric improvements in the concepts generally follow ODOT design standards and accommodate a WB-67 truck. These items are addressed in the detailed concept discussions.

4.2.3. Environmental and Land Use Assessment

Impacts to resources were qualitatively assessed based on the data assembled for the environmental and land use reconnaissance. The level of analysis of the study area is designed to identify those areas judged to have considerable potential for conflict.

4.2.4. Concepts Cost Opinions

Rough order of magnitude cost opinions were developed using present day dollars and are consistent with standard estimating methods. The estimates include a contingency factor and preliminary engineering but do not include ROW, utility relocation, or hazardous material costs. The cost opinions are intended to help differentiate alternatives by approximating the relative costs of each concept.

4.3. Intersection Improvements

Five potential intersection improvements were identified to improve traffic flow, provide additional capacity, or address safety concerns. A brief summary of the projects is presented in Table 4-1 with more detailed concept layouts identified in Figure 4-3 through Figure 4-11. The following sections discuss in detail potential intersection improvements.

¹ Table 6: Volume to Capacity Ratio Targets for Peak Hour Operating Conditions, 1999 Oregon Highway Plan, Amended December 2011, online reference: <http://www.oregon.gov/ODOT/TD/TP/OHP2011.shtml>

² Table 10-1: 20 Year Design-Mobility Standards (Volume/Capacity [V/C] Ratio), Highway Design Manual, 2003, online reference: http://egov.oregon.gov/ODOT/HWY/ENGSERVICES/hwy_manuals.shtml

Table 4-1. Intersection Improvement Concepts

ID	Location	General Description	Purpose
1	Edenbower Blvd at Stewart Pkwy	Add second eastbound left-turn lane	Improve operations
2	Edenbower Blvd at Stewart Pkwy	Install a multi-lane roundabout with dual approach lanes on all legs	Improve operations and safety
3	Edenbower Blvd at Stewart Pkwy	Close access to southwest leg and realign intersection to better accommodate major movements	Improve operations and safety
4	Edenbower Blvd at Stewart Pkwy	Close access to southwest leg and realign approaches to form a perpendicular "T" intersection	Improve operations and safety
5	Edenbower Blvd at Aviation Dr	Extend westbound right-turn bay	Address queuing concerns
6	Edenbower Blvd at Stephens St (OR 99)	Extend eastbound left-turn bay and northbound left-turn bay	Address queuing concerns

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

The signalized intersection of Edenbower Boulevard/Stewart Parkway is expected to exceed the City's v/c ratio standard of 0.85 within five years. The forecast demand would exceed available capacity by the year 2035 (v/c ratio = 1.02) and forecast Level of Service (LOS) E would be worse than the City's standard of LOS D.

As identified in the existing conditions³, the intersection of Edenbower Boulevard at Stewart Parkway has lanes on each approach with queues currently exceeding available storage. The eastbound left-turn has queuing that continues into the two-way left-turn lane and spills out into through traffic more than half of the peak hour. The westbound movements all experience queuing issues with the turning vehicles spilling out into the through movement, and the through movement blocking the nearest access point or entrance into the turn lanes.

In addition, 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 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 and taking a right-turn-on-red only have 125-150 feet of unobstructed sight distance, when looking west for conflicting eastbound through traffic.

³ Including the recently installed (2012) southbound right-turn lane

Lastly, this is the only intersection where the critical crash rate (0.61 crashes/million entering vehicles [mev]) is exceeded. 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. One of these crashes involved a serious injury and 20 involved minor injuries.

Concept 1 would improve the Edenbower Boulevard/Stewart Parkway intersection by adding additional capacity where needed. This concept would install dual left turns 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. This concept would meet the City's dual v/c and LOS standard.

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 striping differs 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. This concept is consistent with the preferred alternative identified in the recent Traffic Impact Study⁴ recommendations developed in 2011. Concept 1, Option A is illustrated in Figure 4-3.
- **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. Concept 1, Option B is illustrated in Figure 4-4.
- **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. Concept 1, Option C is illustrated in Figure 4-5.

Concept 1 – Traffic Operations and Safety

Current traffic demand along Edenbower Boulevard at this intersection is approximately 14,800 vehicles per day (vpd), with a higher 2035 forecast demand of approximately 18,650 vpd. The total daily volume entering the intersection is approximately 24,300 vpd, with a 2035 forecast demand of 31,700 vpd.

⁴ Edenbower Boulevard/Stewart Parkway Intersection Improvements, Kittelson Associates, Inc., 2011.

The proposed improvements would provide additional capacity for the eastbound left-turn movement from Stewart Parkway to Edenbower Boulevard; this movement carries almost one third of the total volume entering the intersection during the peak hour.

Concept 1, Option A would provide a reduction in delay and queuing during peak periods, and the most gains in operational benefits, with a 2035 forecast v/c ratio of 0.75 and LOS C operations. This option would provide protected left-turn signal phasing where movements are currently permitted on the northbound and southbound approaches. This modification would reduce the potential for turning and angle collisions, which are crash types that often result in injuries. The addition of dual receiving lanes on the north leg could lead to an increase in collisions where the northbound traffic merges from two lanes to one.

Concept 1, Option B would provide a slightly smaller reduction in delay and queuing during peak periods, compared to Option A, but result in fewer impacts to adjacent lands. With a 2035 forecast v/c ratio of 0.80 and LOS D operations, this option is expected to meet operational standards. Split phasing on Stewart Parkway would be required to accommodate the new eastbound left-through lane configuration. This option changes the dedicated left-turn lanes on the southbound approaches to a shared left/through and could lead to an increase in turning and angle collisions. As in Option A, the addition of dual receiving lanes on the north leg could lead to an increase in collisions where the northbound traffic merges from two-lanes to one.

Concept 1, Option C has similar operations to Option B with a v/c of 0.81 and LOS C. This option creates a “trap” lane when the inner eastbound through lane becomes a dedicated left-turn lane; trap lanes are not considered desirable as they violate driver expectation. Advanced signing and ample pavement paint can help mitigate last minute lane changes. The same safety concerns on the Edenbower Boulevard approaches for Option B exist for Option C.

None of these options specifically address the identified sight distance concerns on eastbound Stewart Parkway or northbound Edenbower Boulevard.

All three options would require additional access control considerations because of the dual turn lanes and merge points associated with the improvements.

Concept 1 – Basic Roadway Geometries and Right-of-Way Requirements

The geometric layouts for Concept 1 are shown in Figure 4-3, Figure 4-4, and Figure 4-5 for Options A, B, and C, respectively.

Concept 1, Option A would have the most extensive ROW impacts of the three options. To avoid building impacts, Stewart Parkway would be widened on its north side to the west of Edenbower Boulevard to add the second left-turn lane on the eastbound approach (west leg). Stewart Parkway would also be widened to the east of Edenbower Boulevard (southeast leg) to align the westbound through movements with their receiving lanes. Edenbower Boulevard north of Stewart Parkway (north leg) would require an additional northbound receiving lane,

which would be accommodated by widening primarily the east side of the roadway. The additional receiving lane would need to extend approximately 700 feet to the north of the intersection before tapering 300 feet back to a single lane, which would impact approximately 1,000 feet of roadway frontage.

Concept 1, Option B would involve less ROW impacts than Option A; the second left-turn lane on the eastbound approach of Stewart Parkway would be accommodated by converting the existing center through lane to a shared left/through lane. Therefore, no roadway widening or additional ROW would be required on the west leg of Stewart Parkway. The additional receiving lane on Edenbower Boulevard would be partially accommodated by reallocating turn lanes on the southbound approach. The dedicated left-turn and through lanes would be consolidated into a shared left/through lane; however, some additional widening would still be required on the east side of Edenbower Boulevard on the north leg. The additional receiving lanes would need to extend approximately 700 feet to the north of the intersection before tapering 300 feet back to a single lane. This would involve ROW impacts for parcels in the northeast quadrant.

Concept 1, Option C would involve the same ROW impacts as Option B. In this option, the second left-turn lane on the eastbound approach of Stewart Parkway would be accommodated by converting the existing center through lane to a dedicated left-turn lane, with no additional ROW required. As in Option B, the additional receiving lane on Edenbower Boulevard would primarily be accommodated by reallocating turn lanes on the southbound approach by combining the dedicated left-turn and through lanes into a single shared left/through lane. This additional widening would occur on the east side of Edenbower Boulevard on the north leg, as in Option B. Additional receiving lanes would need to extend approximately 700 feet to the north of the intersection before tapering 300 feet back to a single lane. This would involve ROW impacts for parcels in the northeast quadrant.

Concept 1 – Environmental and Land Use Assessment

This concept would involve some property impacts for each of the proposed options, although Option B and Option C would involve fewer impacts than Option A. Only Option A may involve environmental impacts (trees, shrubs, etc.). All three options would require additional access control considerations that could affect some business operations.

Concept 1, Option A would involve removal and/or modification of parking for parcels immediately adjacent to the Stewart Parkway frontage in the northwest and northeast quadrants. Parking could be removed and/or converted to parallel or angle orientations to maintain appropriate drive-isle widths in the northwest quadrant, and minimize impacts in the northeast and southeast quadrants. Stewart Parkway would be widened to the north to add dual left-turn lanes on the west leg. Edenbower Boulevard would require an additional receiving lane, which would be accommodated by widening on the east side of the north leg. This would involve property impacts for parcels in the northeast quadrant, within the merge area, including some potential building impacts. Additional design refinement would be needed to more accurately assess the extent of property impact.

Depending on project extents, Option A has potential for the following environmental impacts:

- **Wetlands & Waters.** Sweetbrier Creek and its associated wetland and riparian corridor is north of Stewart Parkway and widening for the second eastbound left-turn lane would bring the roadway closer to the creek, especially near Mercy Drive. Newton Creek and its associated wetland and riparian corridor, which include Coho Salmon and Winter Steelhead habit area, is located south of the Stewart Parkway/Edenbower Boulevard intersection. The creek could be impacted by widening Stewart Parkway east of Edenbower Boulevard. A wetland and waters delineation is necessary to establish the true resource extents and potential for impacts.
- **Floodplain.** Newton Creek has an associated 100-year floodplain. If the project encroaches on the floodplain, the project may have to demonstrate it will be consistent with applicable FEMA and local floodplain standards through the local land use permitting process.

Concept 1, Option B would involve fewer property impacts than Option A. The second left-turn lane on the eastbound approach of Stewart Parkway would be accommodated by converting the existing center through lane to a shared through/left turn lane; thus, would no property impacts are anticipated along Stewart Parkway. However, the additional receiving lane on Edenbower Boulevard would still be needed. Although it could be partially accommodated by reallocating turn lanes on the southbound approach, some additional widening would still be required on the east side of Edenbower Boulevard on the north leg. Additional receiving lanes would need to extend approximately 700 feet to the north of the intersection before tapering 300 feet back to a single lane. This would involve property impacts for parcels in the northeast quadrant, within the merge area, including some potential building impacts. Additional design refinement would be needed to more accurately assess the extent of property impact.

Concept 1, Option C would involve the same ROW impacts as Option B. In this option, the second left-turn lane on the eastbound approach of Stewart Parkway would be accommodated by converting the existing center through lane to a dedicated left-turn lane, with no additional ROW required. As in Option B, the additional receiving lane on Edenbower Boulevard would be partially accommodated by reallocating turn lanes on the southbound approach but would still require some roadway widening that would result in property impacts for parcels in the northeast quadrant including some potential building impacts would occur. Additional design refinement would be needed to more accurately assess the extent of property impact.

Concept 1 – Cost Opinions

Estimates include roadway widening and sidewalk replacement but no ROW acquisition or environmental mitigation costs. The estimates for this concept are:

- Concept 1, Option A improvements are preliminarily estimated at \$1.6 million.
- Concept 1, Option B improvements are estimated at \$700 thousand.
- Concept 1, Option C improvements are estimated at \$700 thousand.

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

As described in Concept 1, the signalized intersection of Edenbower Boulevard and Stewart Parkway would not meet applicable operational standards during the PM peak period, would have queuing issues for multiple movements, and would have sight distance concerns associated with obstructions in the SW quadrant.

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. The general alignment and layout of the roundabout is illustrated in Figure 4-6.

Concept 2 – Traffic Operations and Safety

Existing (2012) and future (2035) traffic demand at this intersection would be the same as the demand described for Concept 1. Concept 2 could accommodate this 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

This intersection has the highest number of crashes within the IMSA. In general, roundabouts lessen the potential for collisions by reducing the number of conflict points and slowing traffic movements. Bicyclists may have difficulty traveling with vehicular traffic, depending on experience level, but can be provided the option to dismount and become a pedestrian to navigate the intersection via crosswalks. Pedestrian crossing widths would be shortened by the addition of islands via two-stage crossings. Crosswalks would be located one vehicle behind the yield line, so approaching vehicles interact with pedestrians first, then vehicles inside the roundabout, not simultaneously. Additional traffic control, such as pedestrian-activated beacons may also be installed.

Concept 2 – Basic Roadway Geometries and Right-of-Way Requirements

This concept would involve significant ROW impacts. All approaches would need to be widened or realigned to accommodate the footprint of the roundabout. Further refinement of this design would need to be completed in order to fully understand the impacts to each approach.

Concept 2 – Environmental and Land Use Assessment

Potential impacts to consider for Concept 2 are similar to those for Concept 1, but more extensive in the southwest and southeast quadrants. This concept would likely have no residence or business displacements. However, several commercial or institutional parking lots may be impacted including a parking lot for the Department of Forestry. Due to the number of parking lots and spaces in the immediate area, significant businesses impacts due to loss of parking are not anticipated. Parking could be removed and/or converted to parallel or angle orientations to maintain appropriate drive-isle widths in the northwest quadrant, and minimal impacts in the northeast and southeast quadrants.

This project should be vetted with Mercy Hospital and emergency response personnel due to the change in traffic operations and potential for intersection closure during construction.

Depending on project extents, Concept 2 also has potential for similar wetland and floodplain impacts outlined for Concept 1 but would also include a potential parks and trails impact. Charles S. Gardiner Park is connected to and accessed by Edenbower Boulevard via trail along Newton Creek. If the project extends to the trail access off of Edenbower Boulevard, there could be 4(f) impacts.

Concept 2 – Cost Opinions

The estimated cost of Concept 2 is approximately \$2.6 million excluding ROW acquisition. The estimate assumes full closure of the intersection for construction. A staged construction approach would incur significantly more cost and ROW take.

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

As described in Concept 1, the signalized intersection of Edenbower Boulevard and Stewart Parkway would not meet applicable operational standards during the PM peak period, would have queuing issues for multiple movements, and would have sight distance concerns associated with obstructions in the SW quadrant.

Concept 3 would improve operations at the Edenbower Boulevard/Stewart Parkway intersection by eliminating the connection to Edenbower Boulevard south of Stewart Parkway and realigning 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 an east-west major street and the current east leg (Stewart Parkway) would “T” into the new Edenbower Boulevard mainline as the south leg. Figure 4-7 shows a high level conceptual view of the proposed improvement.

Concept 3 – Traffic Operations and Safety

Existing (2012) and future (2035) traffic demand at this intersection would be the same as the demand described for Concept 1. The proposed closure of the south leg (Edenbower Boulevard) would redirect approximately 20 percent of the peak total entering volumes (approximately 24,300 vpd in 2012 and 31,700 vpd in 2035) to other access points and driveways on Stewart Parkway.

Even with the shifts in traffic demand, 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, and potentially increase delay at alternate access points. Further evaluation these traffic impacts would need to be completed in order to fully understand the impacts. Also, this concept may require the addition of new alternate access.

This intersection has the highest number of crashes within the IMSA. Over 60 percent of the crashes at this intersection are rear end collisions and under current conditions, the eastbound-left and southbound-right movements make up almost half of the total entering peak volume. By realigning the intersection, the major movements can more easily travel through the intersection.

Realigning the intersection provides the opportunity to address the identified sight distance concerns associated with obstructions in the southwest quadrant.

Concept 3 would require additional access control considerations because of the proximity to the realigned intersection and merge points associated with the improvements.

Concept 3 – Basic Roadway Geometries and Right-of-Way Requirements

The improvement would have significant ROW impacts, as shown in Figure 4-7. Depending on the geometric alignment of the east-west main route, impacts to the property on the northwest corner of the intersection could be significant. Additionally, Edenbower Boulevard north of Stewart Parkway (north leg) would require an additional northbound receiving lane, which would be accommodated by widening both sides of the roadway. The additional receiving lane would need to extend approximately 700 feet to the north of the intersection before tapering 300 feet back to a single lane, which would impact approximately 1,000 feet of roadway frontage.

Additional access to the properties currently served by the south leg of Edenbower Boulevard has not been shown but any new connections would also have geometric and ROW impacts.

Concept 3 – Environmental and Land Use Assessment

Concept 3 would have property impacts due to roadway realignment. Depending on the geometric alignment of the east-west main route, impacts to the property on the northwest corner of the intersection could be significant. Additionally, the need for two receiving lanes on the north leg would require widening north of the intersection, impacting properties on either side of Edenbower Boulevard.

Unlike Concepts 1 and 2, Concept 3 would also have potentially significant economic impacts to businesses served by the south leg of Edenbower Boulevard. The south leg of Edenbower Boulevard provides the closest signalized access with all movements served. Businesses south of this intersection would be served by the existing right-in right-out driveway on Stewart Parkway; however, vehicles wanting to make left turns while entering or exiting the commercial area would have to travel approximately two-thirds of a mile out of direction to the signalized intersection of Renann Street and Stewart Parkway. The Albertsons parking lot would likely experience an increase in cut-through traffic as drivers seek access to Stewart Parkway. Businesses served by the south leg of Edenbower Boulevard and the adjacent parking lots would likely experience economic hardship from the closure of Edenbower Boulevard due to access limitations and a potential reduction in pass-by traffic demand.

A new connection to Stewart Parkway that would provide additional access to the properties currently served by the south leg of Edenbower Boulevard has not been shown, but would have potential land use and environmental impacts.

The parking lot at Albertsons west of Edenbower and south of Stewart parkway is also a bus stop. The Umpqua Transit Agency should be consulted to identify potential impacts areas for coordination if this concept is carried forward.

Potential environmental impacts to consider for Concept 3 are similar to those for Concept 1. These include Sweetbrier Creek north of Stewart Parkway and Newton Creek south of the Stewart Parkway/Edenbower Boulevard intersection..

Concept 3 – Cost Opinions

The estimated cost of Concept 3 is approximately \$1.9 million excluding ROW acquisition. Any provision for additional access to the properties currently served by the south leg of Edenbower Boulevard has not been shown but any new connections would add to the project cost.

The estimate assumes full closure of the intersection for construction. A staged construction approach would incur significantly more cost and ROW take.

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

As described in Concept 1, the signalized intersection of Edenbower Boulevard and Stewart Parkway would not meet applicable operational standards during the PM peak period, would have queuing issues for multiple movements, and would have sight distance concerns associated with obstructions in the SW quadrant.

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. Figure 4-8 and shows a high level conceptual view of the proposed improvement.
- **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. The dual turn lanes would require a second northbound receiving lane on Edenbower Boulevard to the north of the intersection. Figure 4-9 and shows a high level conceptual view of the proposed improvement.

Concept 4 – Traffic Operations and Safety

Existing (2012) and future (2035) traffic demand at this intersection would be the same as the demand described for Concept 1. The proposed closure of the south leg (Edenbower Boulevard) would redirect approximately 20 percent of the peak total entering volumes to other access points and driveways on Stewart Parkway, as described for Concept 3.

Concept 4, Option A realigns 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.

Concept 4, Option B realigns the intersection similar 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.

Both options for Concept 4 would require additional access control considerations because of the proximity to the realigned intersection and merge points associated with the improvements.

Concept 4 – Basic Roadway Geometries and Right-of-Way Requirements

The geometric layouts for Concept 4 are shown in Figure 4-8 and Figure 4-9 for Options A and B, respectively.

Concept 4, Option A would involve fewer ROW impacts in the northwest quadrant than Concept 3. The west leg of Stewart Parkway would remain the same cross-section to facilitate dual left-turn lanes on the south leg. The north leg would require minor widening to align the southbound through movement with the receiving lanes.

Concept 4, Option B would have the same ROW impacts as those detailed for Option A except along Edenbower Boulevard north of the intersection. Some additional widening over Option A would be needed to provide the second northbound receiving lane for the dual left-turn lanes on the west leg (eastbound approach). Additional receiving lanes would need to extend approximately 700 feet to the north of the intersection before tapering 300 feet back to a single lane.

As with Concept 3, additional access to the properties currently served by the south leg of Edenbower Boulevard has not been shown but any new connections would also have geometric and ROW impacts.

Concept 4 – Environmental and Land Use Assessment

Concept 4, Option A Concept 4 would have minor property impacts due to roadway realignment. These would occur in the northwest quadrant along the frontage of the Department of Forestry. The properties on the east side of Stewart Parkway and Edenbower Boulevard would also be impacted by the intersection realignment. It is likely that impacts to parking on properties could be avoided.

Concept 4, Option B would have the same impacts as those detailed for Option A except along Edenbower Boulevard north of the intersection. Some additional widening over Option A would be needed to provide the second northbound receiving lane for the dual left-turn lanes on the west leg (eastbound approach). Additional receiving lanes would need to extend approximately 700 feet to the north of the intersection before tapering 300 feet back to a single lane.

Concept 4 would have the same potentially significant economic impacts to businesses as Concept 3 because of the closure of the south leg of Edenbower Boulevard that would cause access limitations and a potential reduction in pass-by traffic demand. It would also have similar potential impacts to the transit stop and bus routing.

The potential for environmental impacts would be lower for Concept 4 than Concept 3.

Concept 4 – Cost Opinions

Estimates include roadway realignment but no ROW acquisition or environmental mitigation costs. The estimates for this concept are:

- Concept 4, Option A improvements are preliminarily estimated at \$1.6 million.
- Concept 4, Option B improvements are estimated at \$1.9 million.

Any provision for additional access to the properties currently served by the south leg of Edenbower Boulevard has not been shown, but any new connections would add to the project cost.

The estimate assumes full closure of the intersection for construction. A staged construction approach would incur significantly more cost and ROW take.

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

By the year 2035, the signalized intersection of Edenbower Boulevard at Aviation Drive is expected to experience queues that exceed available storage for the westbound right-turn lane. Westbound traffic is expected to regularly queue back approximately halfway between Aviation

Drive and Stephens Street, and depending on the traffic from Stephens Street, may occasionally queue back even further.

Concept 5 would enhance safety 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. This concept would also improve operations for westbound through traffic. Concept 5 is illustrated in Figure 4-10.

Concept 5 – Traffic Operations and Safety

Current traffic demand at this intersection is approximately 16,700 vpd total daily volumes entering the intersection, with higher 2035 forecast demand of approximately 19,800 vpd. The current right-turn demand during the peak hour from Edenbower Boulevard to Aviation Drive accounts for approximately 13 percent of the westbound traffic at this intersection.

Ten crashes were reported at this location in the 5-year analysis period, the majority of which were rear end collisions. Most of the collisions involved vehicles traveling through on Edenbower Boulevard. Nevertheless, extending the right-turn turn bay would improve safety by allowing vehicles to decelerate away from through traffic. There would also be operational benefits for both the turning and through vehicles through reduced delays.

Concept 5 – Basic Roadway Geometries and Right-of-Way Requirements

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 conflicts with westbound through traffic. This lane would likely require an additional 10 feet of ROW to accommodate the lane extension since existing ROW on Edenbower Boulevard narrows from 80 feet where the right-turn lane is present to approximately 70 feet where the cross section is only three lanes. Lighting and sidewalks would need to be relocated in this concept.

Concept 5 – Environmental and Land Use Assessment

Some additional ROW would likely be needed on the north side of Edenbower Boulevard but the property is currently undeveloped. There are some freshwater forested/shrub wetlands identified to the north but the improvement is not expected to extend into any undisturbed areas.

Concept 5 – Cost Opinions

The estimated cost of Concept 5 is approximately \$75,000, excluding costs for ROW acquisition.

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

At the signalized intersection of Edenbower Boulevard and Stephens Street, the eastbound left-turn lane queue currently exceeds available striped storage bay. The northbound left-turn lane queues are expected to exceed turn lane storage under future conditions (year 2035).

Concept 6 restripes the center two-way, left-turn lane to delineate longer left-turn storage bays on the eastbound and northbound approaches of the intersection, as shown in Figure 4-11.

Concept 6 – Traffic Operations and Safety

Current traffic demand at this intersection is approximately 19,850 vpd with a 2035 forecast demand of approximately 22,800 vpd. The current peak hour left-turn demand on the eastbound approach is 57 percent of total eastbound approach volume, and the northbound left-turn demand is 43 percent of the total northbound approach volume; these ratios are close to what is expected in the future as well.

There were 12 reported crashes at this location within the 5-year crash analysis period. The majority of these incidents were rear end or turning movement crashes on the northbound and eastbound approaches.

The proposed improvement extends the delineated storage for the northbound and eastbound left-turn lanes by restriping the two-way, left-turn lane. 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.

The longer left-turn lanes would also provide safety benefits. The potential for rear-end crashes may reduce because left-turning vehicles would be less likely to be slowing or stopping in the adjacent through travel lane when long queues are present.

Concept 6 – Basic Roadway Geometries and Right-of-Way Requirements

The improvement would modify the striping of the northbound and eastbound left-turn lanes to provide appropriate storage bay length to allow queuing vehicles to avoid conflicts with through traffic. Due to the existing center two-way left-turn lane on Edenbower Boulevard and Stephens Street, this restriping can be accommodated within the existing ROW. No additional widening would be necessary to complete this improvement.

Concept 6 – Environmental and Land Use Assessment

The project would be completed all within existing ROW. No potential for land use or environmental impacts identified.

Concept 6 – Cost Opinions

The cost of Concept 6 is estimated at less than \$15,000.

4.4. Interchange Ramp Improvements

While the current interchange ramps and terminals have some features that may deviate from the desired geometric layout, a detailed review of crash data for the period between January 1, 2006, and December 31, 2010 did not identify consistent crash patterns associated with ramp geometry. However, two concepts have been developed to address citizen concerns raised about driver expectation and perceived safety on the westbound to northbound on-ramp. A brief summary of the projects is presented in Table 4-3, with locations identified in Figure 4-12 and Figure 4-13.

Table 4-2. Interchange Ramp Improvement Concepts

ID	Location	General Description	Purpose
7	Westbound to Northbound On-Ramp	Provide additional delineation in gore area with chevron paint	Address driver expectation concerns
8	Westbound to Northbound On-Ramp	Install a visual barrier on the west side of the northbound on-ramp	Address driver expectation concerns

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

With the previous addition of the northbound loop on-ramp, the existing westbound to northbound on-ramp was extended to provide adequate spacing between the two ramp merge points on the freeway. The ramp extension resulted in a long painted gore area that is only delineated by a white line on either side of the restricted area. The IAMP advisory committees identified concerns that the geometry of the on-ramp is unusual and drivers do not know when they should start looking at mainline traffic to prepare to merge onto the freeway.

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.

Concept 7 – Traffic Operations and Safety

The westbound to northbound on-ramp had eight crashes in the 5-year analysis period. Further investigation into the crash data did not identify a consistent pattern other than that the majority of the crashes (rear-end and sideswipe) could potentially be related to the unique configuration of the NB On-Ramp. The long 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.

Concept 7 – Basic Roadway Geometries and Right-of-Way Requirements

Improvements included in this concept would occur within the available right of way (ROW). The on-ramp length meets standards although it may seem excessive to the average driver. Painting in the gore area would provide delineation between the mainline and on-ramp.

Concept 7 – Environmental and Land Use Assessment

There are not any anticipated environmental or land use impacts associated with the proposed lighting improvements.

Concept 7 – Cost Opinions

The estimated cost of Concept 7 is \$20,000 and assumes 8-inch striping.

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

Concept 8 addresses the same issue discussed for Concept 7 related to driver expectation and behavior on the westbound to northbound on-ramp. 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. This concept could be done in conjunction with Concept 7, or as a standalone improvement.

Concept 8 – Traffic Operations and Safety

This concept has the same type of operational and safety benefits as Concept 8.

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.

Concept 8 – Basic Roadway Geometries and Right-of-Way Requirements

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

Concept 8 – Environmental and Land Use Assessment

There are not any anticipated environmental or land use impacts associated with the proposed lighting improvements.

Concept 8 – Cost Opinions

The estimated cost of Concept 8 is \$100,000. This estimate assumes concrete barrier with glare shields.

4.5. 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. A brief summary of the projects is presented in Table 4-3.

Table 4-3. Multi-Modal Improvement Concepts

ID	Location	General Description	Purpose
9	Northbound Ramp Terminal	Improve east-west pedestrian crossing across north leg	Improve safety and continuity of pedestrian facilities
10	Edenbower Blvd from Broad St to Stewart Pkwy	Enhance pedestrian north-south pedestrian crossings along the west side of Edenbower Blvd.	Improve safety and continuity of pedestrian facilities

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

When the eastbound to northbound loop on-ramp was installed, it included an eastbound right-turn lane with raised island that reduces the pedestrian crossing distance along the south side Edenbower Boulevard at the ramp terminal. Crosswalks are striped perpendicular to the right-turn movement onto the freeway as well as the off-ramp approach to Edenbower Boulevard. The loop ramp eliminated the left-turn movement from eastbound Edenbower Boulevard and a raised median was installed in the former left-turn lane. However, no changes were made to the pedestrian crossing on the north side of the ramp terminal.

Concept 9 would shorten the pedestrian crossing distance for the westbound to northbound on-ramp by installing a raised island or extending the curb and sidewalk in the northwest quadrant of the intersection. Either of these options could include a striped pedestrian crosswalk. See Figure 4-14 for an illustration of potential improvements.

Concept 9 – Traffic Operations and Safety

This concept would shorten the crossing distance for pedestrians by either providing a raised island or extending the existing corner in the northwest quadrant. The shorter crossing distance would reduce pedestrian exposure at the conflict point with vehicular traffic. The addition of striped crosswalks would further increase driver awareness of potential pedestrian activity, but would not be required with the construction of the raised surface.

This concept 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.

Concept 9 – Basic Roadway Geometries and Right-of-Way Requirements

Construction of a raised island or 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).

Concept 9 – Environmental and Land Use Assessment

There are not any anticipated environmental or land use impacts associated with the proposed improvements.

Concept 9 – Cost Opinions

The estimated cost of Concept 9 is approximately \$20,000

4.5.2. Concept 10 - Edenbower Boulevard from Broad Street to Stewart Parkway – Enhance Pedestrian Crossings

Currently there are sidewalks and striped bike lanes along both sides of Edenbower Boulevard; however, there are no striped crosswalks between the southbound ramp terminal and Stewart Parkway. Furthermore, the curb ramps along the west side of Edenbower are currently a single-ramp design, which provide less directional guidance for visually impaired pedestrians and wheelchairs, when compared to separate directional ramps at a corner.

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. See Figure 4-15 for an illustration of potential improvement locations.

Concept 10 – Traffic Operations and Safety

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 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. However, driver compliance may be greater with the striped crosswalks which may result in a negligible reduction in vehicular capacity.

Concept 10 – Basic Roadway Geometries and Right-of-Way Requirements

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

Concept 10 – Environmental and Land Use Assessment

There are not any anticipated environmental or land use impacts associated with the proposed improvements.

Concept 10 – Cost Opinions

The estimated cost of Concept 10 is approximately \$25,000.

4.6. Evaluation Matrix

The information presented in this memo is also summarized in the attached matrix for a summary comparison of alternatives.

Attachments:

Figure 4-1. 2012 PM Peak Volumes

Figure 4-2. 2035 PM Peak Volumes

Figure 4-3. Concept 1, Option A – Edenbower/Stewart Intersection – Add Second Eastbound Left-Turn Lane

Figure 4-4. Concept 1, Option B – Edenbower/Stewart Intersection – Add Second Shared Left-Through Lane

Figure 4-5. Concept 1, Option C – Edenbower/Stewart Intersection – Convert Eastbound Through to Left-Turn Lane

Figure 4-6. Concept 2 – Edenbower/Stewart Intersection – Install a Multi-Lane Roundabout

Figure 4-7. Concept 3 – Edenbower/Stewart Intersection – Realign for Major Traffic Flow

Figure 4-8. Concept 4, Option A – Edenbower/Stewart Intersection – Create “T” Intersection

Figure 4-9. Concept 4, Option B – Edenbower/Stewart Intersection – Create “T” Intersection with Dual Lefts

Figure 4-10. Concept 5 – Edenbower/Aviation Intersection – Extend Westbound Right-Turn Bay

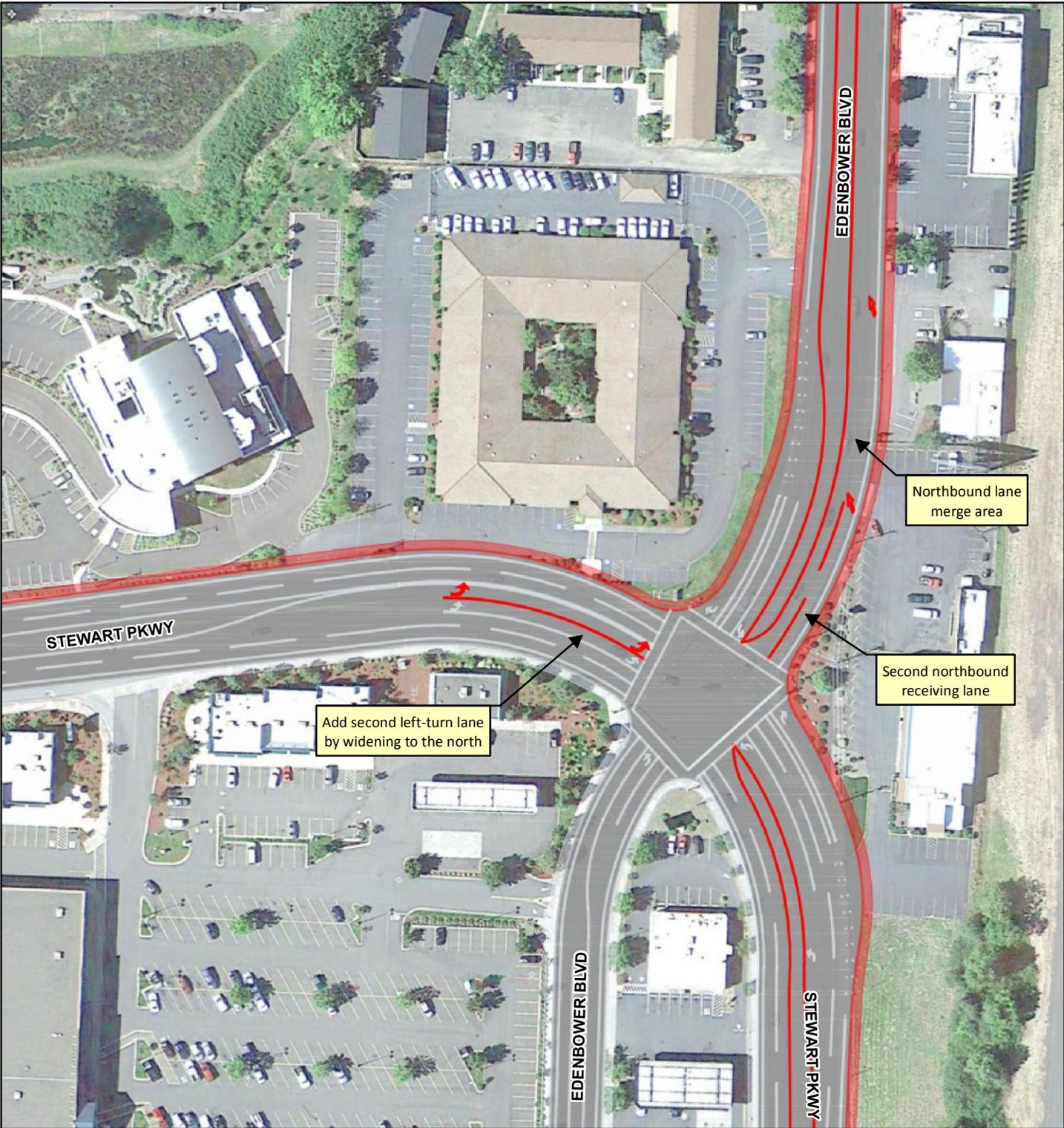
Figure 4-11. Concept 6 – Edenbower/Stephens Intersection – Extend Left-Turn Bays

Figure 4-12. Concept 7 – Westbound to Northbound On-Ramp – Paint Gore Area

Figure 4-13. Concept 8 – Westbound to Northbound On-Ramp – Install Visual Barrier

Figure 4-14. Concept 9 – Northbound Ramp Terminal: Improve North Side Pedestrian Crossing

Figure 4-15. Concept 10 – Broad Street to Stewart Parkway – Enhance Pedestrian Crossings



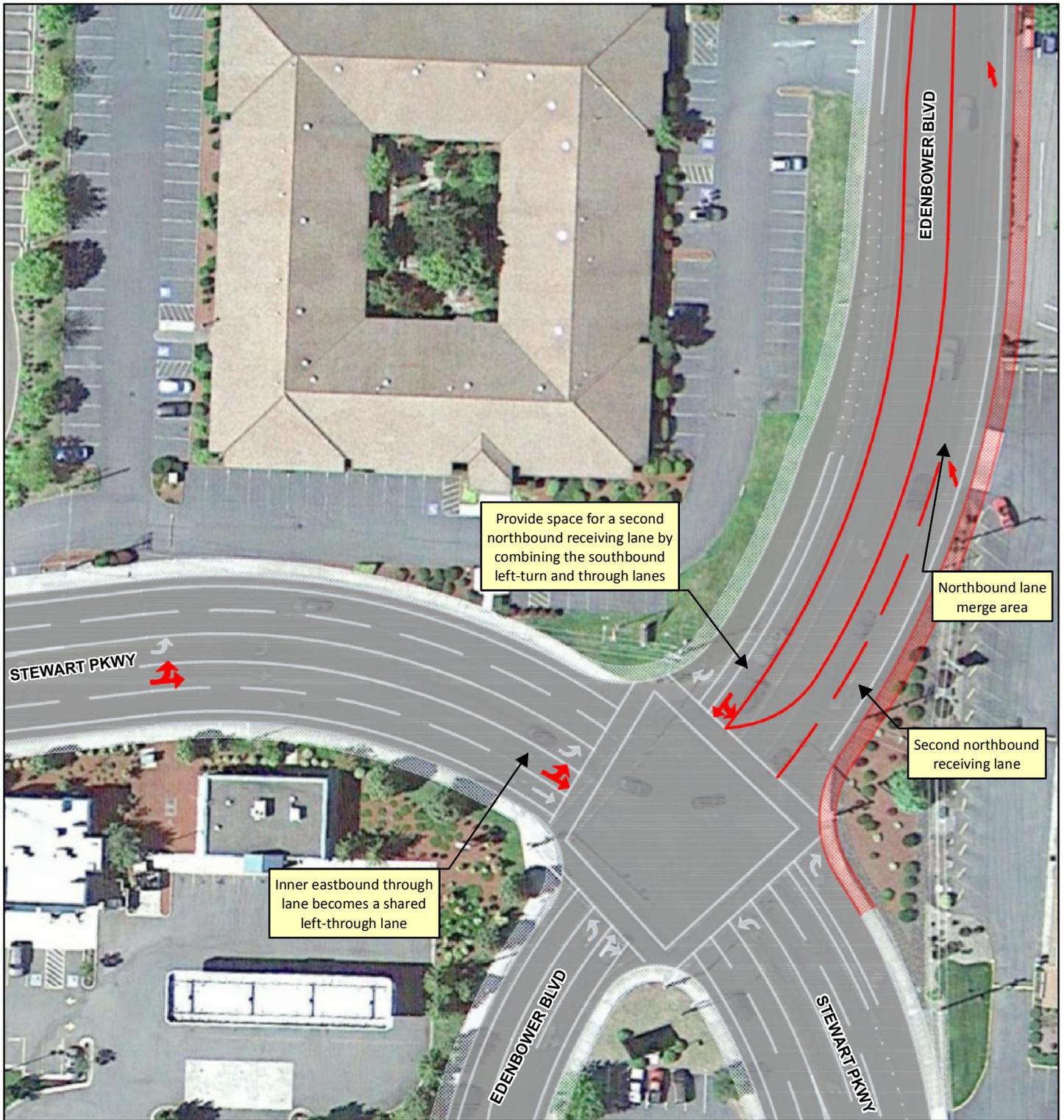
I-5 Exit 127 (North Roseburg) IAMP

Legend

-  Proposed Lane Configuration
-  Proposed Striping
-  Existing Lane Configuration
-  Estimated Boundary of Impacts

Figure 4-3
 Concept 1 - Option A
 Add 2nd Eastbound
 Left-Turn Lane





I-5 Exit 127 (North Roseburg) IAMP

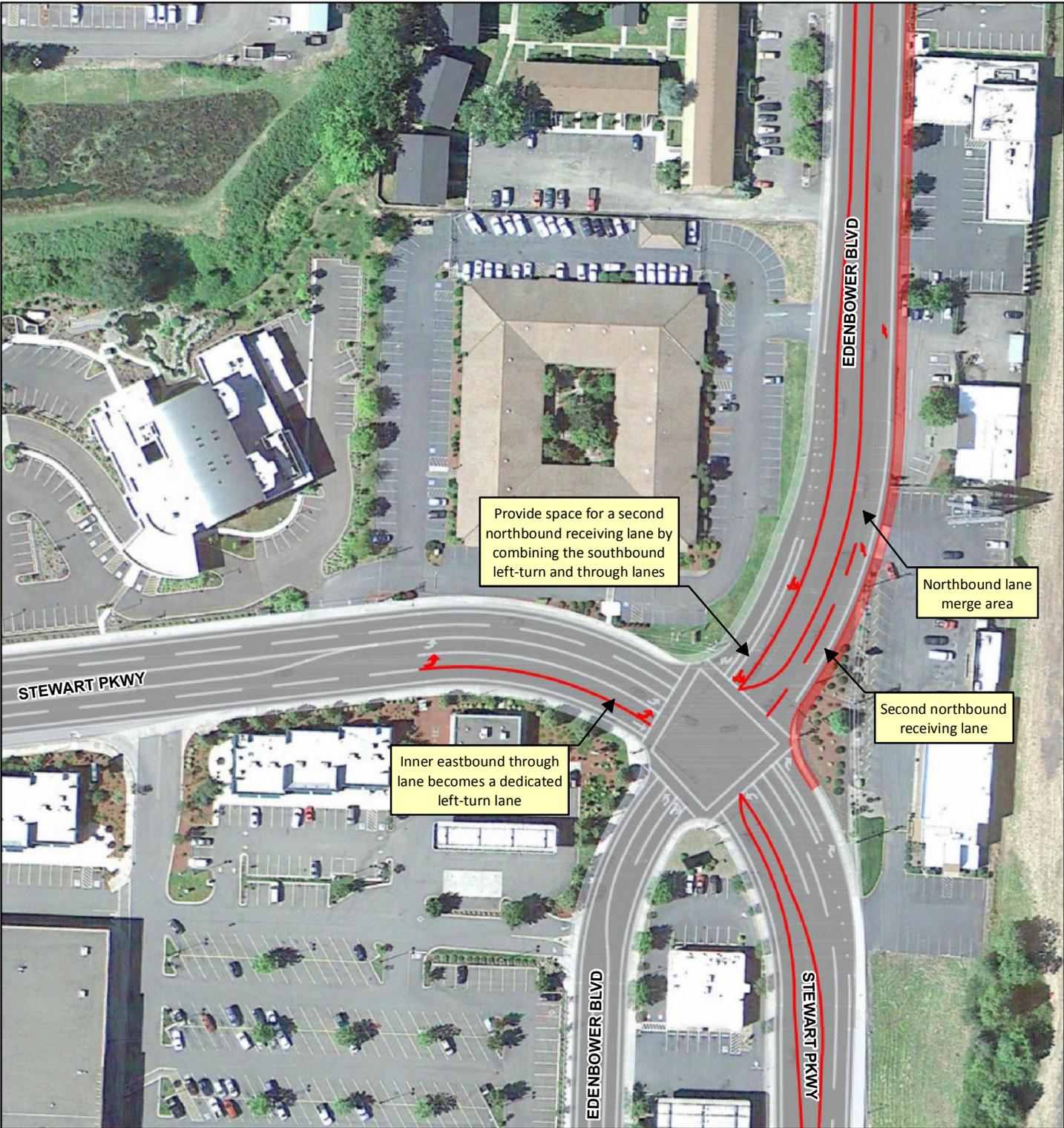
Legend

-  Proposed Lane Configuration
-  Proposed Striping
-  Existing Lane Configuration
-  Estimated Boundary of Impacts



Figure 4-4
 Concept 1 - Option B
 Create Eastbound Shared
 Left-Through Lane





I-5 Exit 127 (North Roseburg) IAMP

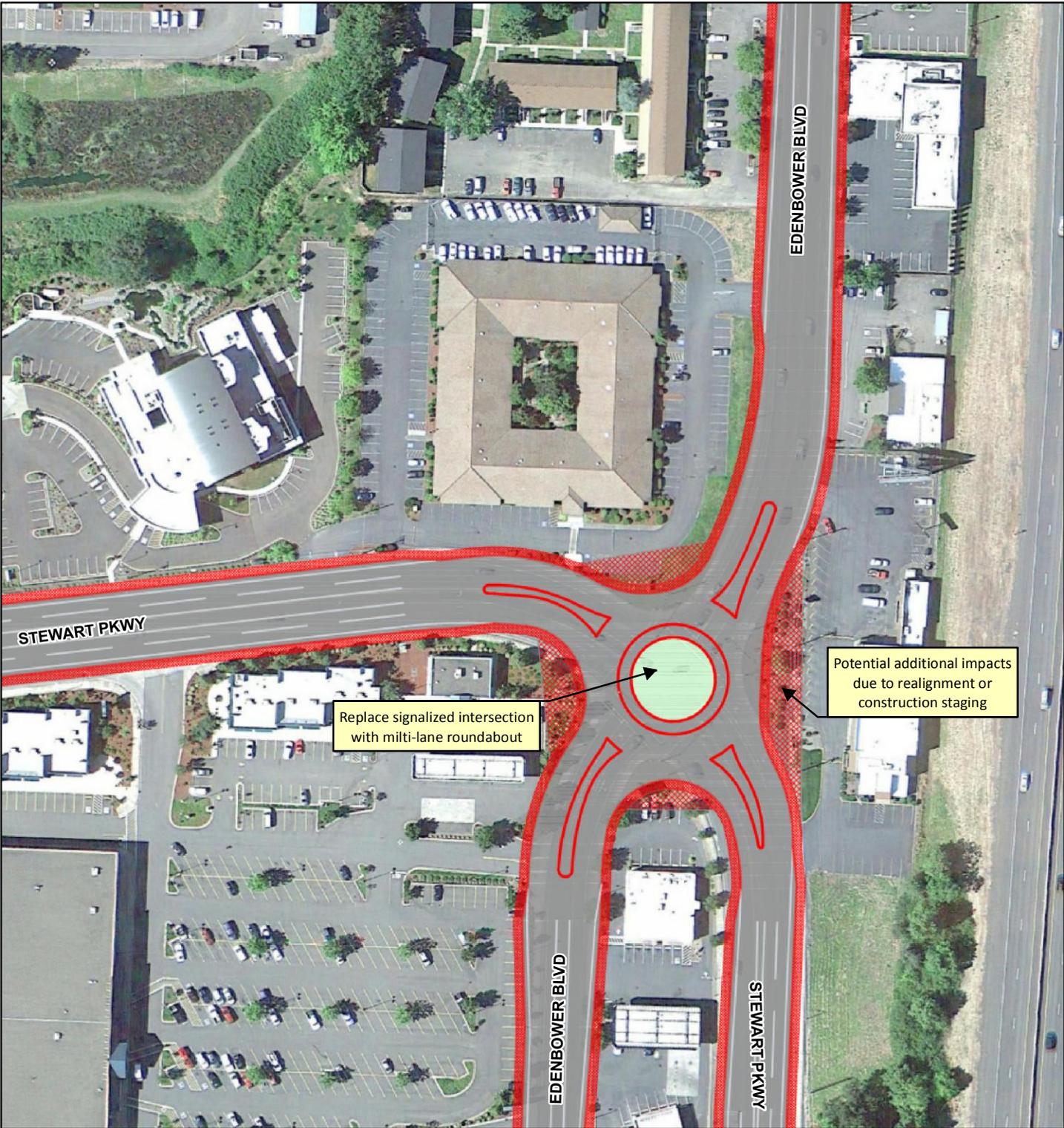
Legend

-  Proposed Lane Configuration
-  Proposed Striping
-  Existing Lane Configuration
-  Estimated Boundary of Impacts



Figure 4-5
 Concept 1 - Option C
 Reallocate Center Through-Lane to Left-Turn Lane





I-5 Exit 127 (North Roseburg) IAMP

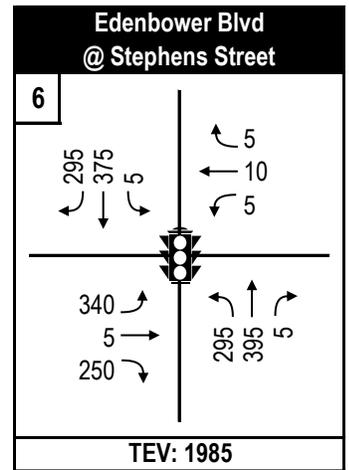
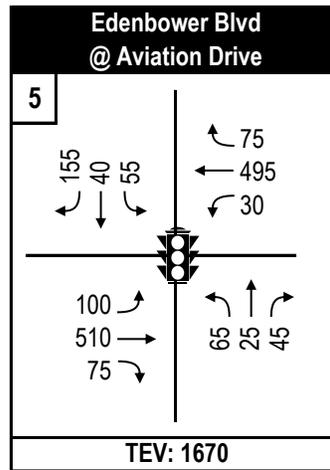
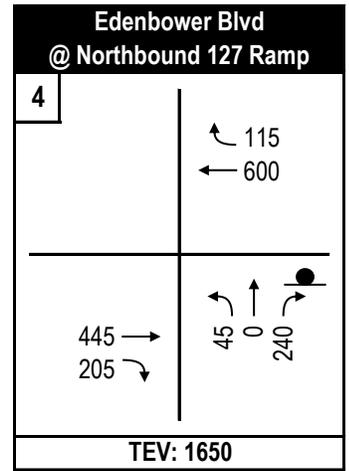
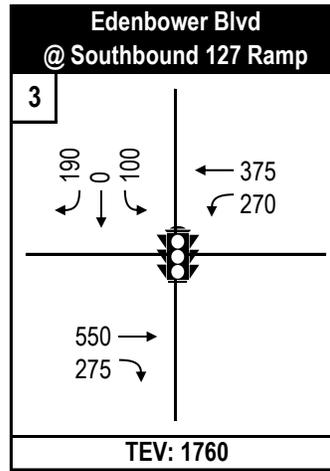
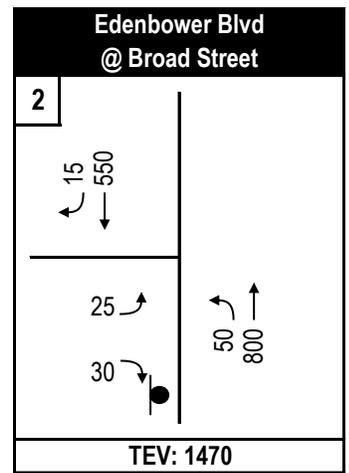
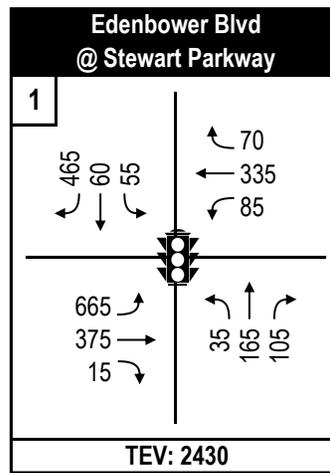
Legend

-  Proposed Lane Configuration
-  Proposed Striping
-  Existing Lane Configuration
-  Proposed Roundabout
-  Estimated Boundary of Impacts



Figure 4-6
 Concept 2
 Install Multi-Lane
 Roundabout





I-5 Exit 127 (North Roseburg) IAMP

Legend

→ Allowable Movement

TEV: Total Entering Volume

PM Peak Hour Turning Movement Volume



Signalized Intersection



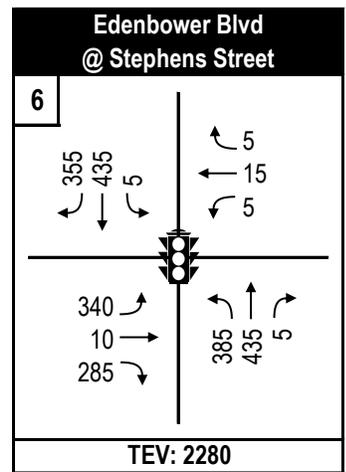
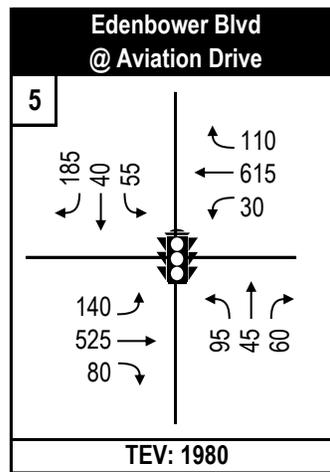
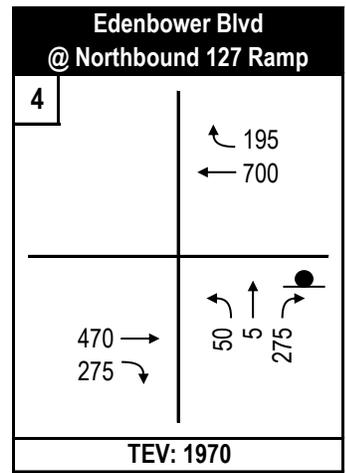
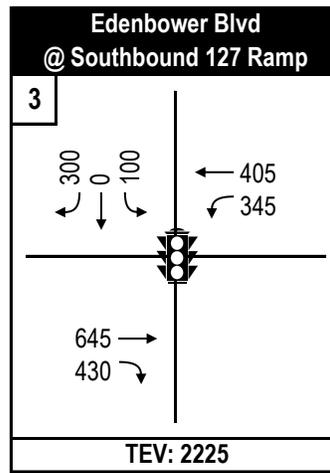
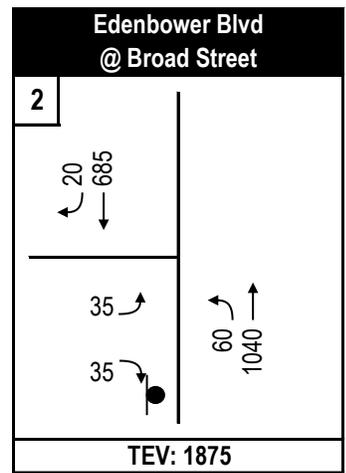
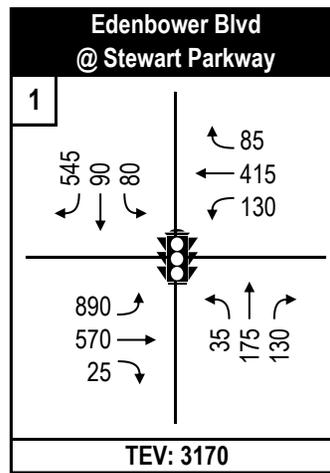
STOP Controlled Approach

Figure 4-1

2012 Baseline

PM Peak Hour Volumes





I-5 Exit 137 (North Roseburg) IAMP

Legend

→ Allowable Movement

TEV: Total Entering Volume

PM Peak Hour Turning Movement Volume



Signalized Intersection

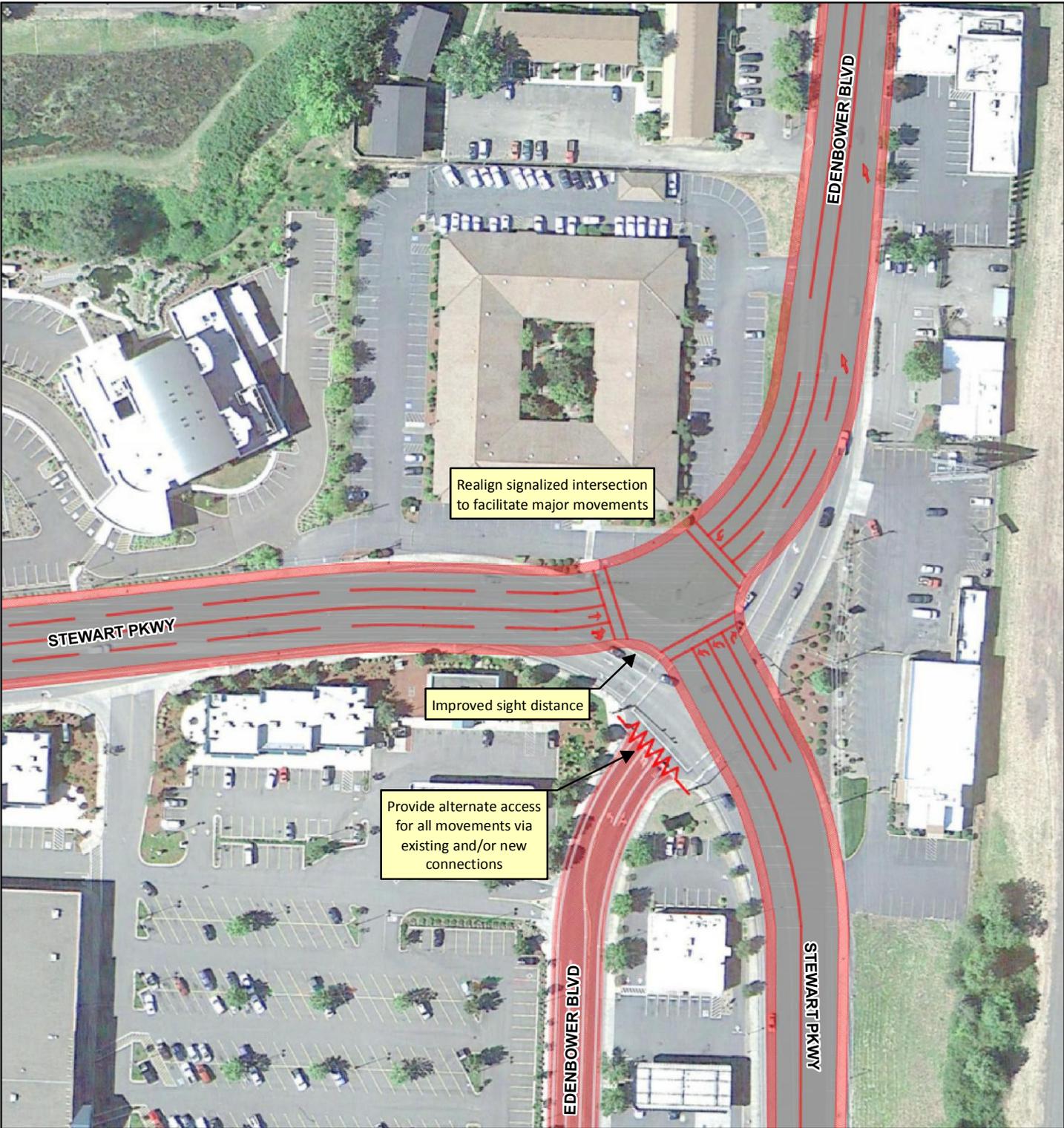


STOP Controlled Approach

Figure 4-2

*2035 Future Baseline
PM Peak Hour Volumes*





I-5 Exit 127 (North Roseburg) IAMP

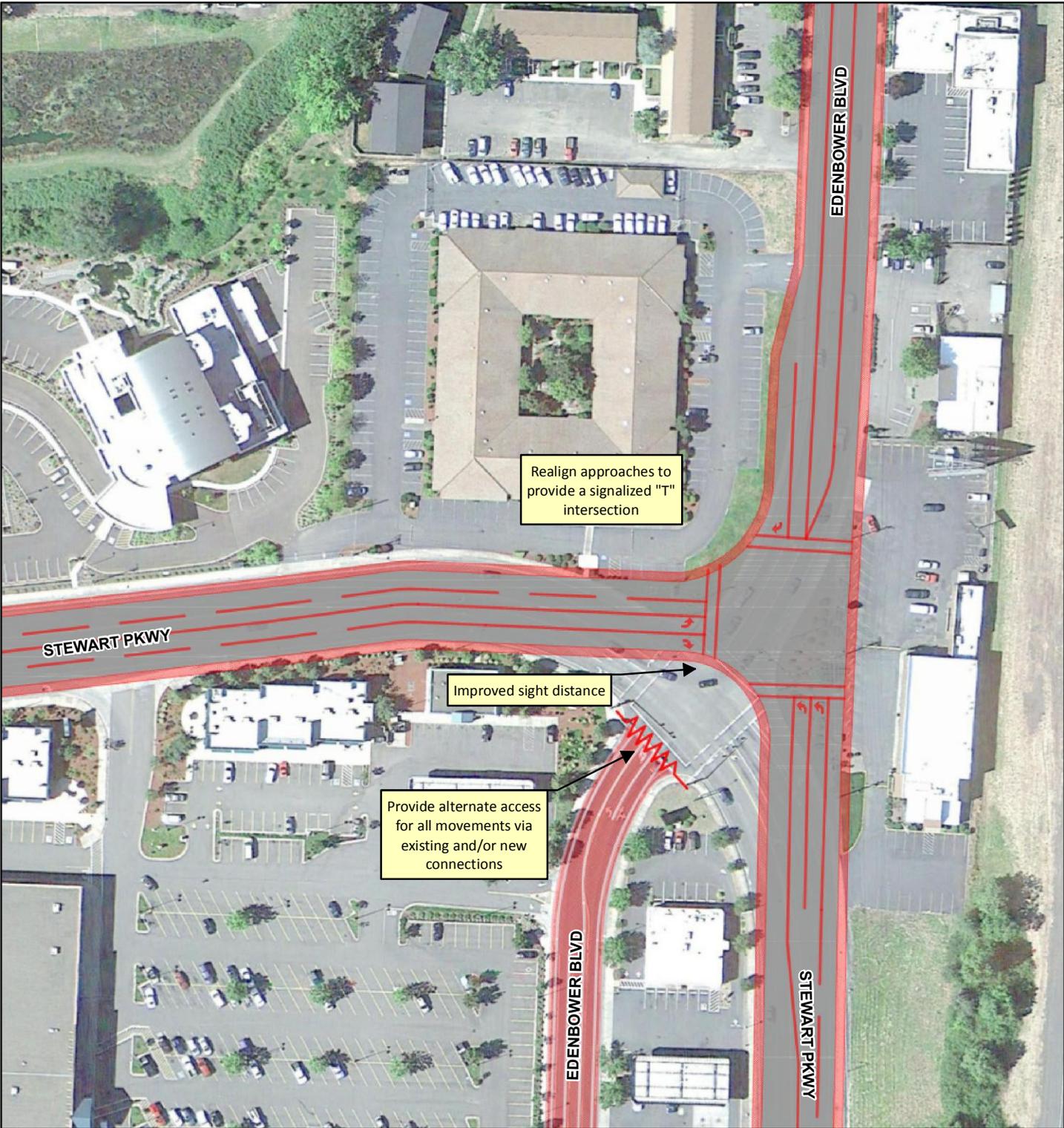
Legend

-  Proposed Lane Configuration
-  Proposed Striping
-  Existing Lane Configuration
-  Proposed Access Closure
-  Estimated Boundary of Impacts



Figure 4-7
 Concept 3
Realign Intersection to East-West "T"





I-5 Exit 127 (North Roseburg) IAMP

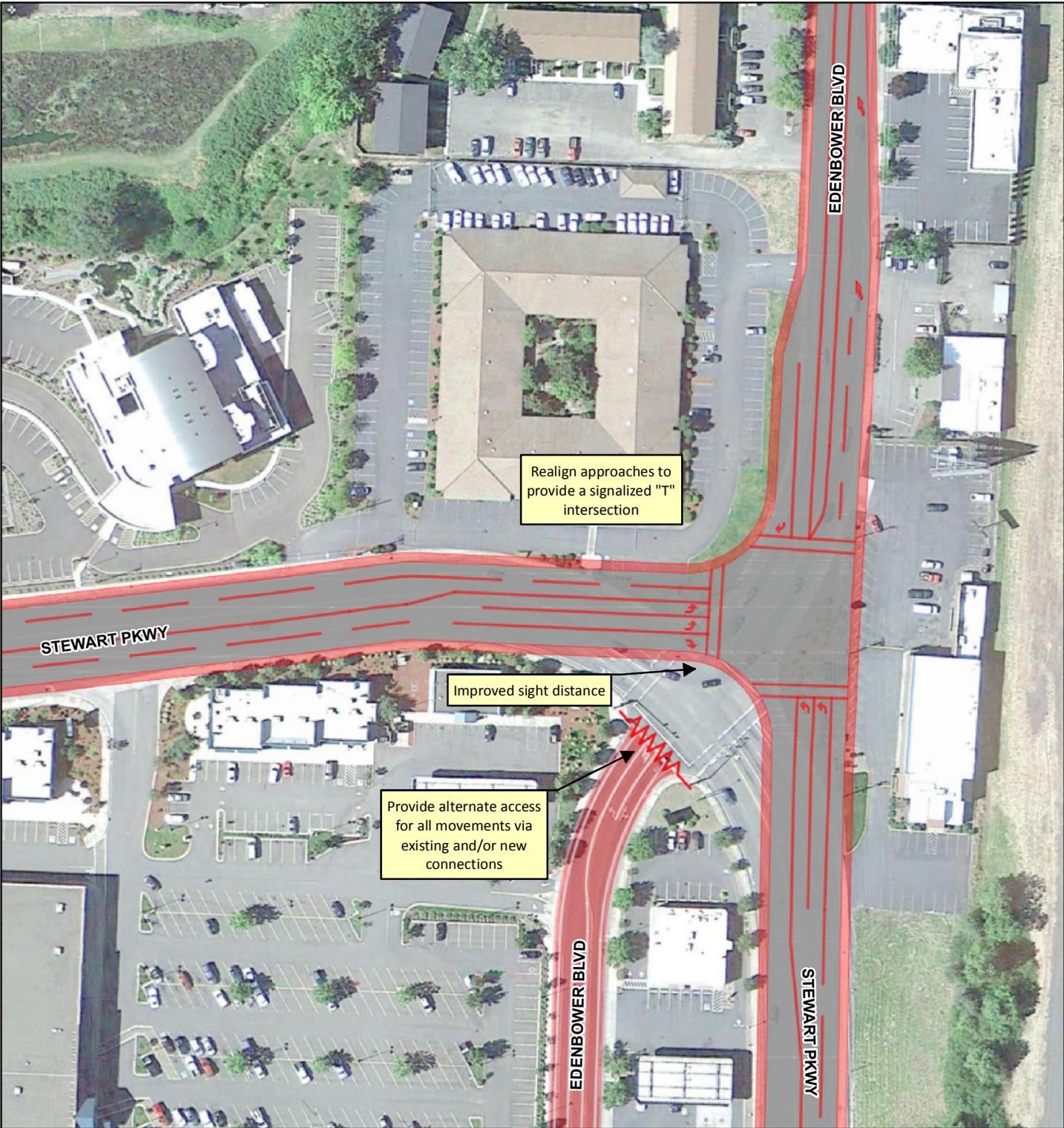
Legend

-  Proposed Lane Configuration
-  Proposed Striping
-  Existing Lane Configuration
-  Proposed Access Closure
-  Estimated Boundary of Impacts



Figure 4-8
 Concept 4 - Option A
 Realign Intersection to
 North-South "T"





I-5 Exit 127 (North Roseburg) IAMP

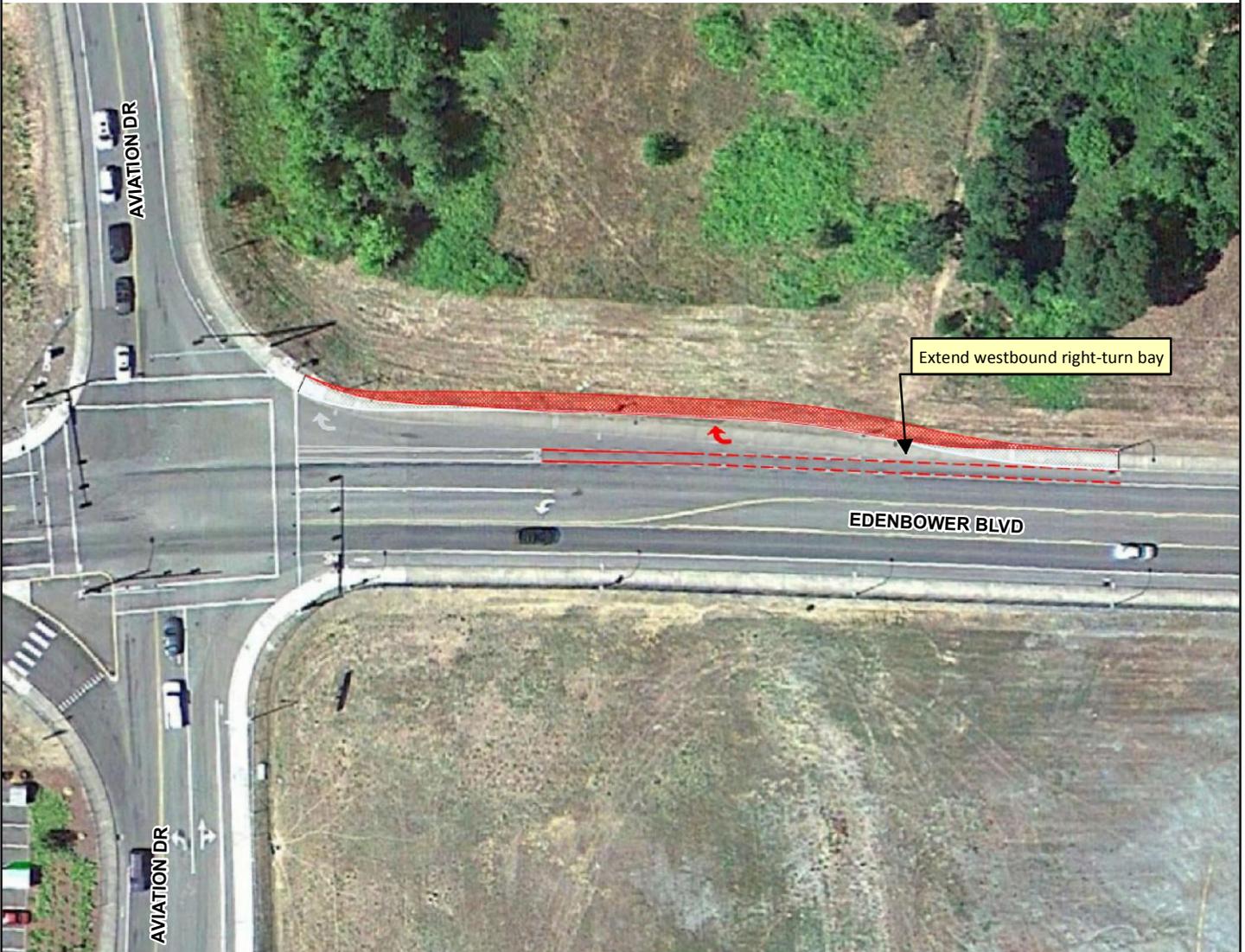
Legend

-  Proposed Lane Configuration
-  Proposed Striping
-  Existing Lane Configuration
-  Proposed Access Closure
-  Estimated Boundary of Impacts



Figure 4-9
 Concept 4 - Option B
 Realign Intersection to
 North-South "T"





I-5 Exit 127 (North Roseburg) IAMP

Legend

-  Proposed Lane Configuration
-  Proposed Striping
-  Existing Lane Configuration
-  Proposed Extension
-  Estimated Boundary of Impacts



Figure 4-10
Concept 5
Extend Westbound
Right-Turn Bay





I-5 Exit 127 (North Roseburg) IAMP

Legend

-  Proposed Lane Configuration
-  Proposed Striping
-  Existing Lane Configuration
-  Proposed Striping

Figure 4-11
 Concept 6
Extend Left-Turn Bays





Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

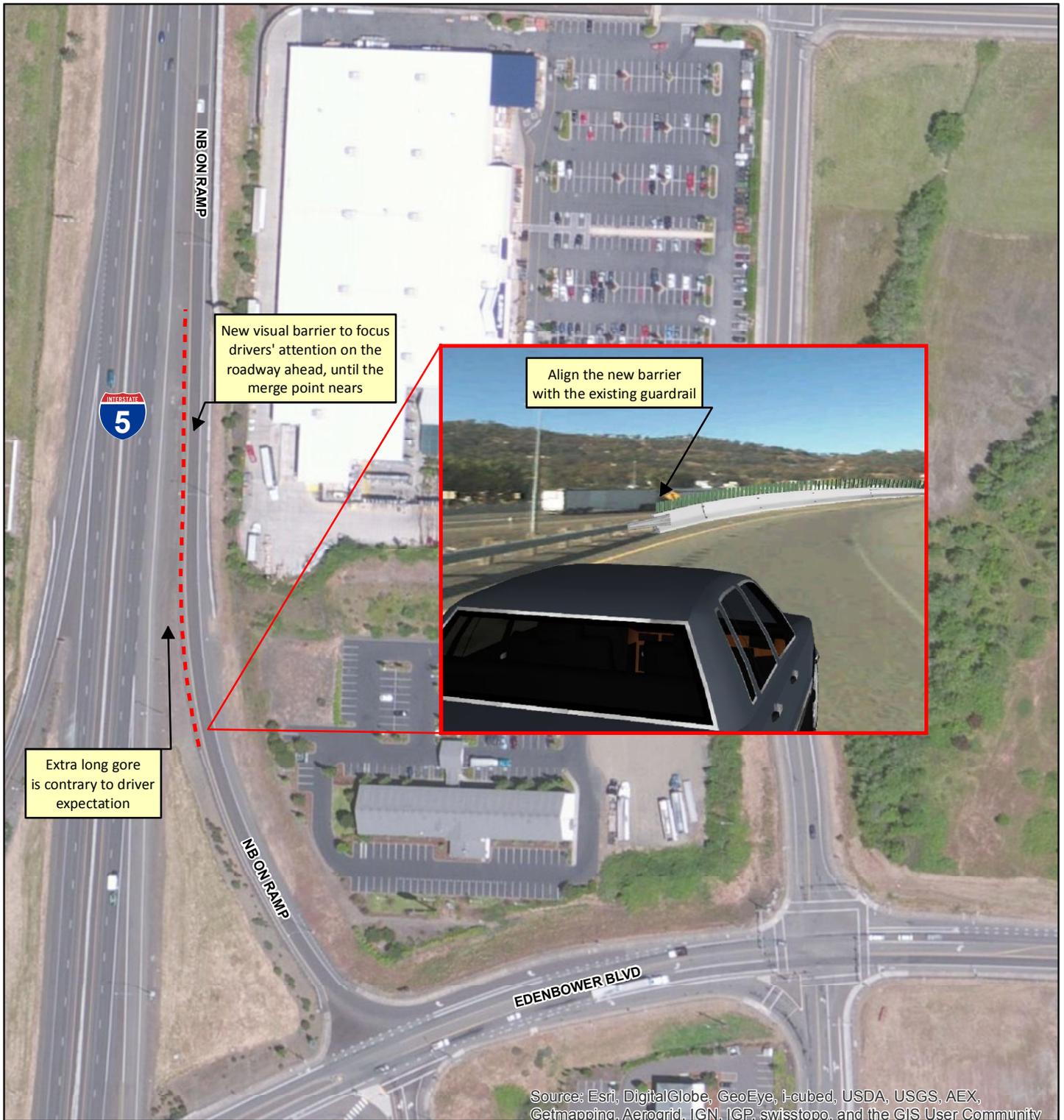
I-5 Exit 127 (North Roseburg) IAMP

Legend

 Proposed Gore Striping

Figure 4-12
 Concept 7
*Delineate Gore Area
 With Chevron Paint*





Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

I-5 Exit 127 (North Roseburg) IAMP

Legend

..... Proposed Visual (concrete) Barrier

Figure 4-13
 Concept 8
Install Visual Barrier





Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

I-5 Exit 127 (North Roseburg) IAMP

Legend

 Proposed Pedestrian Improvements



Figure 4-14
 Concept 9
*Improve North Side
 Pedestrian Crossing*





Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

I-5 Exit 127 (North Roseburg) IAMP

Legend

 Proposed Pedestrian Improvements



Figure 4-15
 Concept 10
*Improve Pedestrian Crossings
 Along Edenbower Blvd*

