

Memorandum

DATE: July 10, 2007
TO: Project Management Team
FROM: Carl Springer, PE; Colette Snuffin, PE

SUBJECT: Task 4: Technical Memo #5 – 10th Street Concept Plan (DRAFT) P06246-000

This technical memorandum presents an in-depth evaluation of the 10th Street corridor area for the West Linn Transportation System Plan (TSP) update including existing and future performance deficiencies for all modes of transportation, alternatives evaluation, preliminary cost estimates, and recommendations for TSP projects in the study area. The physical constraints, intensity of land uses and the desired street design standards have created significant challenges in effectively serving this area of the community. Issues were discussed and alternatives were developed by the 10th Street Traffic Task Force in a series of meetings held December 2006 through spring of 2007.

The 10th Street corridor is the area generally bounded by the confluence of Blankenship Road, Salamo Road, I-205, 10th Street and Willamette Falls Drive. The following intersections were included for evaluation of the 10th Street area:

- Blankenship Road / Tannler Drive
- 10th Street / Blankenship Road (ODOT)
- 10th Street / I-205 SB ramps (ODOT)
- 10th Street / I-205 NB ramps (ODOT)
- 10th Street / 8th Avenue – 8th Court
- 10th Street / Willamette Falls Drive
- Willamette Falls Drive / 12th Street
- Willamette Falls Drive / 19th Street

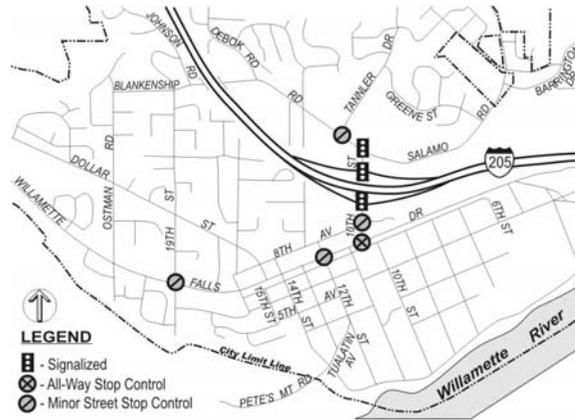


Figure 1: 10th Street Study Area

Constraints and Opportunities

Land Use

As is typical of many urban freeway interchange areas, the land uses nearby the 10th Street interchange with I-205 (Exit 6) is primarily commercial retail and office type, and the uses are clustered along Blankenship Road, Willamette Falls Drive, and 8th Avenue and 8th Court. Many of the vacant parcels or

existing businesses that may redevelop some day are also zoned commercial or office uses. These types of uses, in general, attract a higher volume of traffic than a comparable sized parcel with residential or industrial users. The higher intensity leads to higher auto and truck volumes, and a general demand from local merchants for more frequent access points to their properties. The three largest developments nearby the interchange include:

- Tannler West Property –Development area west of Tannler Road and north of Blankenship Road that has been approved by city council to construct commercial office uses, with access onto Tannler Road and onto Blankenship Road.
- Tannler East Property – Development area west of Tannler Road and north of Blankenship Road – Salamo Drive that was previously denied a land use application for commercial office uses. Vehicle access would be provided on Tannler Road and Salamo Road.
- Willamette Shopping Center – Development area west of 10th Street between 8th Avenue and I-205. Access onto 8th Avenue.

Together, these three developments would generate an estimated 1,030 PM peak hour vehicle trips. As part of the operational analysis, these trips were added to existing traffic volumes to test various transportation improvement alternatives discussed in this memorandum.

Comment [MSOffice1]: The Willamette Marketplace Shopping Center was grandfathered in traffic volumes from pre-existing uses. Due to under-utilization of the site, the 10th St corridor will see additional trips but in reality those trips were already "part of the existing" traffic volumes.

Traffic Operations

Three of the study intersections are controlled by traffic signals along 10th Street. These are at 10th Street/ Blankenship-Salamo Road, 10th Street / I-205 SB ramps and 10th Street / I-205 NB ramps. The first two traffic signals are operated by one traffic signal controller because of their close spacing, about 200 feet apart. A fourth traffic signal was recommended as a condition of approval for the Willamette Shopping Center redevelopment project. This new signal would be at the 10th Street / 8th Avenue – 8th Court intersection, about 250 feet away from the signal at I-205 NB ramps. This new signal has not been supported by ODOT. The intersection of 10th Street/Willamette Falls Drive is all-way stop-controlled and the remaining intersections are stop-controlled on the minor approach.

Comment [MSOffice2]: Traffic signal was not only recommended but has been conditioned as part of the approved land-use action. Stated more correctly later in the text.

Level of service, delay and volume to capacity ratios are used as measures of effectiveness for study intersection performance. ODOT operating performance standards¹ require intersections on I-205 to operate below a maximum volume-to-capacity (v/c) ratio of 0.99. The minimum operational standard specified in the City of West Linn Comprehensive Plan (April 2006) is LOS D for those 10th Street study area intersections that are not under ODOT jurisdiction.

The PM peak hour intersection volumes were used to determine the existing study intersection operating conditions based on the 2000 Highway Capacity Manual methodology for signalized and unsignalized intersections². Future volumes developed for the Transportation System Plan (TSP) update were used to determine 2030 Base operating conditions.

¹1999 Oregon Highway Plan, Oregon Department of Transportation, August 2006, Policy 1F.

² 2000 Highway Capacity Manual, Transportation Research Board, 2000.

Table 1: Existing and Future 2030 Base PM Peak Traffic Operations for the 10th Street Area

| Intersection | Traffic Control | Existing PM Peak | | 2030 Base Case PM Peak | |
|---|-----------------|------------------|--------------------------|------------------------|--------------------------|
| | | Level of Service | Volume-to-Capacity Ratio | Level of Service | Volume-to-Capacity Ratio |
| Blankenship Rd / Tannler Dr | Two-Way Stop | A/F | 0.13 / 0.52 | B/F | 0.19 / >1 |
| 10 th St / Blankenship Rd | Signal | D | 0.63 | F | >1 |
| 10 th St / I-205 SB ramps | Signal | C | 0.61 | F | >1 |
| 10 th St / I-205 NB ramps | Signal | B | 0.65 | E | >1 |
| 10 th St / 8 th Ave | Two-Way Stop | A/F | 0.13 / 0.73 | B/F | 0.18 / >1 |
| 10 th St / Willamette Falls Dr | All-Way Stop | C | 0.87 | F | >1 |
| Willamette Falls Dr / 12 th St | Two-Way Stop | A/C | 0.17 / 0.23 | B/F | 0.44 / >1 |
| Willamette Falls Dr / 19 th St | Two-Way Stop | A/B | 0.02 / 0.02 | A/C | 0.04 / 0.04 |

Notes: Two-way Stop controlled intersections:
A/A = Major street / Minor street turn LOS
= Major street / Minor street turn v/c

Referring to Table 1 above, the existing PM peak hour conditions generally are acceptable with the exception of the minor street stop-controlled movements for Tannler Drive and 8th Avenue. Also, the westbound (Salamo Road) approach at 10th Street/Blankenship-Salamo Road is LOS F with substantial queuing. Nearly every intersection in the 10th Street study area exceeds performance standards in 2030 with no changes to traffic control or lane configurations.

Heavy truck volumes are higher at the interchange ramp intersections than at other intersections the city – about 5% of total PM peak volume.

Pedestrians and Bicycles

The 10th Street area is primarily commercial, but pedestrian and bicycle traffic is light according to data gathered for the TSP update. Ten or fewer pedestrians and two or fewer bikes were counted at each of the study intersections during the PM peak hour. There are five bus stops for TriMet bus route #154 in the study area. Although ridership is light for this route, two of the busiest stops according to the spring 2006 census were Blankenship Road/Tannler Drive and 10th Street/8th Avenue with 16 and 20 riders per day, respectively.

There is sidewalk on at least one side of the street along 10th Street and Blankenship Road. There is no sidewalk on Salamo Road. Willamette Falls Drive has sidewalk on both sides of the street west of 10th Street. Crosswalks are not marked at all legs of the signalized intersections on 10th Street, presumably to

improve operations. Traffic is stop-controlled for crosswalks at 10th Street/Willamette Falls Drive. There is one uncontrolled, marked crosswalk at 8th Avenue across 10th Street.

The pedestrian signal crossing at the I-205 NB ramps and the stop-controlled crossing at Willamette Falls Drive are about 500 feet apart with 8th Avenue about midway in between the two. If the marked crosswalk at 8th Avenue was removed and no traffic signal installed, pedestrians at 8th Avenue wishing to cross 10th Street would need to walk **only** about 500 feet (less than 0.1 miles) round-trip out of direction to a controlled crossing location at I-205 NB ramps or Willamette Falls Drive.

Comment [MSOffice3]: While 500 feet does not seem like a long way, discussions we had during the application review indicated a doubt that pedestrians would go out of their way that far and would likely attempt to cross at 10th and 8th.

Transportation Issues

There are numerous transportation issues for the 10th Street study area that warrant special consideration. Intersection spacing along 10th Street is very short (between 250 and 600 feet), creating problems with traffic signal coordination and queuing. There are no nearby freeway crossings requiring local trips to pass through the interchange along with regional traffic that is entering or exiting the freeway. The closest freeway undercrossing is Blankenship Road via 19th Street, roughly one-half mile away from 10th Street. Heavy peak hour congestion on I-205 triggers diverted commute traffic along Willamette Falls Drive as a parallel route. These diverted commuters significantly increase peak hour volumes on Willamette Falls Drive, and at the interchanges at 10th Street and at Highway 43 (Willamette Drive), approximately 2.5 miles to the east.

The 10th Street Traffic Task Force identified the following transportation issues to be addressed through this study, with the intent of carrying forward key solutions or options into the greater TSP update efforts.

- 10th Street intersections approaching or below minimum standards.
- Traffic volumes on 10th Street growing.
- Access onto and across 10th Street at 8th Avenue difficult during peaks.
- Access onto and across Willamette Falls Drive difficult during peaks.
- Excessive peak hour traffic on Willamette Falls Drive due to freeway diversion.
- Close spacing of freeway ramp junctions to city street intersections.
- Interchange area serves access to and from and across the freeway. No nearby overcrossings.
- Limited street and pedestrian connections over or under I-205 between north-south Willamette.
- Limited alternative circulation to retail uses.
- Emergency vehicle response impacts as congestion grows.
- Lack of parking capacity on Willamette Falls Drive.
- Closure of Dollar Street **for** bridge construction.

Comment [MSOffice4]: Instead of "for", "in conjunction with" or as a result of" would be a better statement.

Alternatives analysis was focused first on solving major operational issues with improvements broken into groups appropriate for concurrent funding and construction, then on providing access alternatives specific to Tannler Drive and 8th Court.

Alternatives Analysis

Numerous transportation improvement ideas were suggested by the Task Force to solve the identified transportation issues. The list of suggestions included those **improvement** previously recommended to mitigate planned developments, plus an array of ideas for the broader 10th Street study area that included roadway extensions, roadway realignments, new or improved I-205 crossings, additional lanes, new traffic signals, four-way stop control, turn restrictions, and roundabouts. The initial list numbered over 30 suggestions, and, initially the Task Force attempted to score each of these suggestions against a wide range of criteria and concerns. About one-third of the solutions were then screened out based on criteria identified by Task Force. However, ultimately the discussion was directed to focus around how these suggestions met the primary needs identified by the Task Force, and also around the challenges involved with implementing them. This focusing effort helped to bundle the suggestions into three groups, as described below.

Comment [MSOffice5]: Should be plural "improvements"

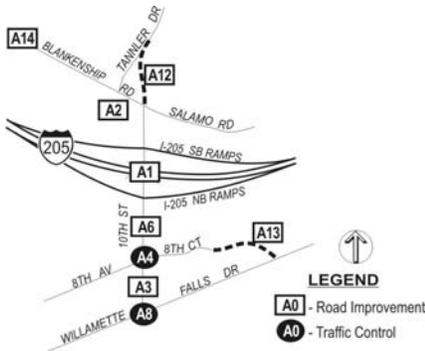
- Group A: Improvement that primarily enhance peak hour operating capacity within the 10th Street corridor, and the existing interchange configuration. These improvements typically do not require additional right-of-way, and can be **implemented** minimal review and approval between the city and ODOT.
- Group B: Improvements that help to manage access on Willamette Falls Drive, and enhance circulation in the Willamette district area.
- Group C: Major highway improvement concepts that would substantially alter the existing configuration. These would require major environmental and project programming analysis and review, and would involve both ODOT and FHWA approval.

Comment [MSOffice6]: Install "with" between implemented and minimal

The following sections summarize each group of improvements that were considered. Operational analysis of the 2030 No Build scenario and each group of improvements is summarized in Table 2.

The overall goal of each alternative circulation and operations concept was to serve local merchants and provide safe and convenient access to I-205.

**Group A:
10th Street Capacity Improvements within
Existing Street Alignment**



| No. | Description |
|-----|---|
| A1 | Added through lanes on 10th Street for a total of 2 lanes each direction, plus center turn lane for left-turning movements. |
| A2 | Added turn lanes on Blankenship Road and Salamo Road approaches. |
| A3 | Added through lanes on 10th Street for a total of 2 lanes in each direction. |
| A4 | Change/upgrade traffic control to either signal or roundabout |
| A6 | Added turn lanes on northbound 10th St. and on the off-ramp. |
| A8 | Change / upgrade traffic control to either signal or roundabout |
| A12 | Realign Tannler Rd to 10 th St to reduce turning conflicts at nearby major intersection. |
| A13 | Extend 8 th Ct to Willamette Falls Dr. to provide additional access to 8th Court retail, |
| A14 | Change/upgrade traffic control |

Big Ideas:

- Add roadway capacity to 10th Street approaches to reduce vehicle queues and shorten delays during peak hours.
- Upgrade traffic controls at major intersections to serve higher traffic flows.
- Extend or re-align local roadways to mitigate closely spaced side streets, and allow for better traffic flow and safety.

Comment [cts7]: check that #s of projects are correct and that none were left out – had a hard time following powerpoint slides – danella has redlines to revise graphics

Findings:

- Consistent with short-term Traffic Impact Analysis recommendations.
- Consistent with past plans.
- Targets capacity shortcomings on 10th Street.
- Most projects can be implemented with local funding and approvals.
- Not sufficient for long-term needs, at most 10 years of growth.
- Some investments would be ‘discarded’ at a later date.

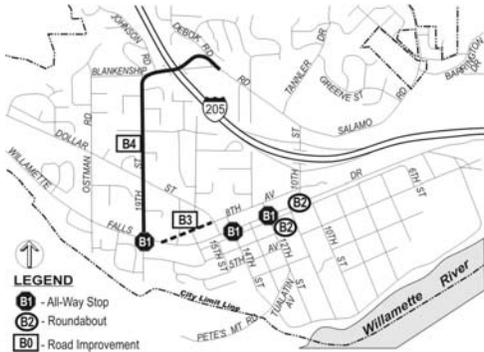
Operational Results:

- Capacity improvement enough to make core locations work within standards.
- Significant vehicle queues spill back and block upstream intersections.

Recommendations:

- Advance all elements to TSP stage, except A12, which has major cost with minimal operational gain.

**Group B:
Willamette Falls Drive Improvements to
Manage Peak Hour Traffic**



| No. | Description |
|-----|---|
| B1 | Change / upgrade traffic control – All-way Stop at 12th, 14th and 19th Street |
| B2 | Change / upgrade traffic control – Roundabout |
| B3 | Modify Dollar St connection to reconnect to 8th Avenue, and provide alternative route for local trips. |
| B4 | Upgrade 19th Street and connection to Blankenship Road to current city standards, including bike lanes, sidewalks, and turns lanes. |

Big Ideas:

- Provide better access to and from and across Willamette Falls Drive (WFD) during peak hours.
- Upgrade traffic controls along WFD at key cross streets.
- Re-connect 8th Avenue and Dollar Street to local trips stay off of WFD.

Findings:

- No specific planned improvements; except at Willamette Falls Drive and 10th Street.
- Solutions target peak period ‘through’ traffic management; accessibility for locals.
- Roundabout would require property acquisition. (Minimum 130’ diameter).
- All-way STOP would have enforcements issues; maybe select fewer locations.
- Various streets need to be upgraded to current standards (e.g., 8th Avenue).

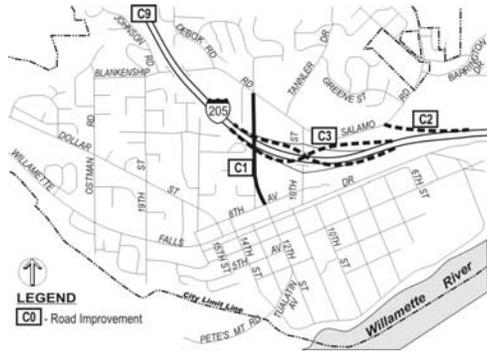
Operational Results:

- Roundabouts probably not the ‘best fit’ for Willamette Falls Drive at either 10th Street or 12th Street.
- Traffic signals or all-way stop control are better solutions.
- 12th Street cannot operate in long-term without traffic signal controls.
- 19th Street upgrade to current city standards relieves Willamette Falls Drive and 10th Street by 100 to 200 vehicles in peak hour.
- Minor ‘negative’ impact at Blankenship Road/10th Street because of higher east-west through traffic.

Recommendations:

- Advance all elements to TSP stage.
- Drop roundabouts from consideration at 12th Street.

**Group C:
Major System Improvements that
Require Multi-Agency Review and
Approval**



| No. | Description |
|-----|--|
| C1 | 13th Street overpass |
| C2 | New freeway ramp (SB access onto Salamo) |
| C3 | Modify existing interchange (SPUI) |
| C9 | Add corridor capacity on I-205 |

Big Ideas:

- Consolidate existing configurations into a single point interchange, to improve intersection spacing with nearby city streets.
- Add new ramp alignments to reduce volume through existing ramps.
- Add new highway overcrossing to give local trips alternative route across I-205.

Findings:

- All projects at least \$5 million and up.
- Solutions target long-range system-level issues.
- Some have major property impacts and implications.
- Extensive inter-agency review required.
- Environmental assessment needed.
- Process likely 10 years or more to implement.
- Best addressed through TSP and RTP update process.

Operational Results:

- 13th Street overpass draws roughly 400 vehicle trips off of 10th Street – modest benefit to 10th Street core intersections.
- 2nd SB off-ramp to Salamo draws substantial traffic out of the 10th / Blankenship / Salamo intersection.
- Analysis not completed: Benefits of SPUI configuration.

Recommendations:

- Advance the SPUI design concept at 10th Street to the TSP for consideration.
- Advance preference for additional I-205 corridor capacity to TSP.
- Drop other elements.

Comment [MSOffice8]: If 2nd SB off-ramp to Salamo draws substantial traffic out of the 10th / Blankenship / Salamo intersection...why is not advanced as part of the recommendations to the TSP?

**Table 2: Operational Alternatives Evaluation for 10th Street Corridor Improvements
by Funding Group – 2030 PM Peak Hour**

| Intersection | No Build | | Group A* | | Group B | | Group C | |
|---|----------|-----------|----------|-----------|---------|-----------|---------|-----------|
| | LOS | v/c | LOS | v/c | LOS | v/c | LOS | v/c |
| Blankenship Rd / Tannler Dr | B/F | 0.19/>1 | B/F | 0.19/>1 | B/F | 0.21/>1 | B/F | 0.25/>1 |
| 10 th St / Blankenship Rd | F | >1 | D | 0.79 | E | 0.81 | F | 0.76 |
| 10 th St / I-205 SB ramps | F | >1 | E | 0.89 | D | 0.84 | D | 0.71 |
| 10 th St / I-205 NB ramps | E | >1 | D | 0.99 | D | 0.94 | D | 0.90 |
| 10 th St / 8 th Ave | B/F | 0.18/>1 | C | 0.61 | C | 0.55 | C | 0.49 |
| 10 th St / Willamette Falls Dr | F** | >1 | E | 0.90 | E | 0.89 | D | 0.84 |
| Willamette Falls Dr / 12 th St | B/F | 0.44/>1 | B/F | 0.44/>1 | F** | >1 | F** | >1 |
| Willamette Falls Dr / 19 th St | A/C | 0.04/0.04 | A/C | 0.04/0.04 | A/C | 0.03/0.04 | A/C | 0.03/0.04 |

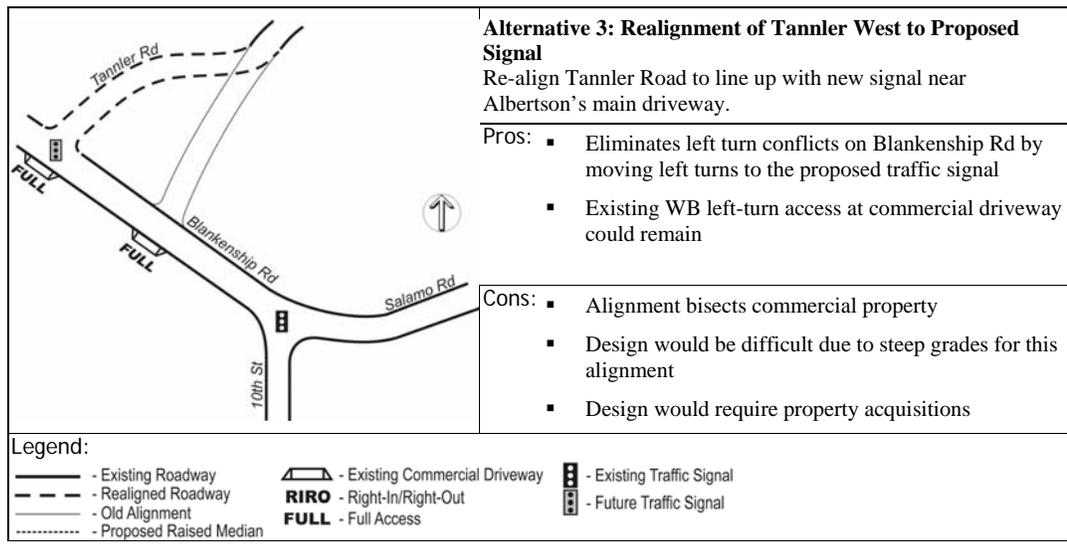
Notes: * Tannler Road realignment not included.
 ** Four-way stop control
 LOS = Level of Service
 Delay = Average vehicle delay in the peak hour for entire intersection in seconds.
 Unsignalized Intersection Operations:
 A/A = Major street turn LOS / Minor street turn LOS
 ## = Major street turn v/c / Minor street turn v/c

Tannler Road Access Alternatives

The existing alignment of Tannler Road tees into Blankenship Road about 300 feet west of 10th Street and 350 feet east of existing commercial driveways that have been approved for a new traffic signal. The problems with this configuration include excessive queuing on both streets, left turn conflicts, and excessive delays. Three alternatives were developed to address these problems. Each alternative has significant impacts to access to both developed and undeveloped commercial properties north and south of Blankenship Road. Another obstacle to realignment of Tannler Road is the steep terrain north of Blankenship Road; additional study would be required to determine a feasible alignment. Table 3 describes each alternative that was considered and the merits of each.

Table 3: Access Alternatives for Tannler Road at Blankenship Road

| | |
|--|---|
| | <p>Alternative 1: Turn Movement Restrictions Construct raised median on Blankenship at first driveway west of 10th Street to limit turns to right-in / right-out only (RIRO). This concept could also be modified to include a left-turn ingress into the first commercial driveway.</p> <p>Pros: <ul style="list-style-type: none"> Median eliminates left turn conflicts on Blankenship Rd by moving left turns to the proposed traffic signal. </p> <p>Cons: <ul style="list-style-type: none"> Tannler Road does not have left turn access – left-turning vehicles are required to find another route such as cutting through parking lots of future commercial developments or using Greene St, which would increase traffic on Salamo Rd Change in access patterns to shopping center on south side could increase on-site circulation. </p> |
| | <p>Alternative 2: Realignment of Tannler to 10th Street Re-align Tannler Road west to align with 10th Street. Restrict access at 1st driveway to RIRO.</p> <p>Pros: <ul style="list-style-type: none"> Eliminates left turn conflicts on Blankenship Rd by moving left turns to the existing traffic signal Direct site access for vacant land zoned for office uses (Tannler East) </p> <p>Cons: <ul style="list-style-type: none"> Adding a fourth leg to the intersection of 10th St/Salamo Rd would degrade traffic operations. Alignment bisects commercial property (Tannler East site), and would reduce buildable area. Design would be difficult due to steep grades for this alignment Change in access patterns to shopping center on south side could increase on-site circulation. </p> |



Findings

Alternative 1 is the least expensive Tannler Road access alternative to implement, and would have significant benefits to safety and level of service at the expense of requiring motorists to sometimes take more circuitous routes to their destinations. Alternative 2 would severely deteriorate the performance of the 10th Street/Blankenship Road intersection with the current interchange configuration. Analysis of an I-205/10th Street SPUI configuration was not done. Alternative 3 is probably the most difficult and expensive alternative to implement, but has the most benefits to long-term capacity and safety, not only for vehicles, but also for pedestrians. Another variation of Alt. 3 would be to extend Greene Street westerly, to provide alternative access for residents that now use Tannler Road for their primary access. Further engineering review is needed to determine the feasibility of such an extension.

Table 4 lists key factors for each Tannler Road access alternative and how each alternative measures up.

Table 4: Overview of Access Alternatives for Tannler Road and Blankenship Road

| Alternative | Impact on Land Access | Peak Hour Vehicle Queues on Arterials Fit | Maintains Acceptable Level of Service | Traffic Safety Enhanced for Non-Autos | Estimated Cost |
|---|-------------------------------|---|---------------------------------------|---------------------------------------|----------------|
| Do Nothing | N/A | No | No | N/A | None |
| Alt. 1: Existing road alignments and RIRO restriction | Moderate | Yes | Yes | No | \$ |
| Alt. 2: Re-align Tannler opposite 10th Street | Major | Yes | No | No | \$\$\$ |
| Alt. 3: Re-align Tannler to west shopping center driveway | Major (north) / Minor (south) | Yes | Yes | Yes | \$\$\$ |

8th Court Access Alternatives

Properties that access 8th Avenue and 8th Court at 10th Street are primarily commercial. A new traffic signal at 8th Avenue/10th Street has been approved for a new development west of 10th Street. This intersection is 300 feet south of I-205 northbound ramps/10th Street, which is currently signalized, and 250 feet north of Willamette Falls Drive/10th Street, which is currently all-way stop controlled, but a traffic signal is planned. The signal spacing on 10th Street after installation of the two planned signals will be too close for effective coordination or storage of queues. Four alternatives have been developed to address access and operational issues for 8th Avenue, 10th Street and Willamette Falls Drive. In all cases, it is assumed that the Group A and B improvements would be in place, aside from the issues specific noted below.

Table 5 describes each alternative that was considered and the merits of each. In all cases, it is assumed that the Group A and B improvements would be in place, aside from the issues specific noted below.

Table 5: Access Alternatives for 8th Court Access

| | |
|--|---|
| | <p>Alternative 1: No Extension of 8th Court Traffic signal installed at 10th Street and 8th Avenue, per condition of approval of Willamette Shopping Center redevelopment</p> <p>Pros:</p> <ul style="list-style-type: none"> No property impacts for new ROW Signal provides safe pedestrian crossing at 8th <p>Cons:</p> <ul style="list-style-type: none"> Queuing between signals impacts operations No improvement in traffic operations on 10th St |
| | <p>Alternative 2: Extension of 8th Court Same as Alt. 1, plus westerly extension of 8th Court through private parking lot adjacent to Sharri's Restaurant, and continuing east through adjoining residential properties to a new connection with Willamette Falls Drive</p> <p>Pros:</p> <ul style="list-style-type: none"> Improves connectivity Provides alternative access to existing and potential future businesses Potentially increases value of residential property along extension that could be re-zoned for commercial uses. <p>Cons:</p> <ul style="list-style-type: none"> Queuing between signals impacts operations May encourage cut-through traffic from WB Willamette Falls Dr to 10th Street Requires property acquisition Requires access easements through existing parking lots |

Comment [MSOffice9]: Properties adjacent to the proposed 8th Ct extension are all zoned General Commercial but are currently utilized in part as residential use.

| | | | | | | | | | | | | | |
|--|--|---------------------------|----------------------------------|----------------------|---------------------|-----------------------|---------------------------|-----------------|-------------------------|--|--------------------------|--|--|
| | <p>Alternative 3a: Extension of 8th Court with No Traffic Signal at 10th Street/8th Court Variation on Alt. 2. The new traffic signal is not constructed, and existing STOP sign controls on side streets remain.</p> <p>Pros:</p> <ul style="list-style-type: none"> Improves connectivity Provides greater signal spacing to improve coordination and queuing on 10th St <p>Cons:</p> <ul style="list-style-type: none"> Difficult left turns in and out at 8th cause longer queues and encourage drivers to accept inadequate gaps and greater risk Pedestrian crossing is difficult at 8th Requires property acquisition (Same as Alt. 2) | | | | | | | | | | | | |
| | <p>Alternative 3b: Extension of 8th Court with No Traffic Signal at 10th Street/8th Court plus Turn Movement Restrictions Variation on Alt. 3a. A median island on 10th Street would prohibit left-turns out from the side street onto 10th Street. However, it would allow for left-turns into 8th Court. Would include pedestrian refuge island on 10th Street on the south leg.</p> <p>Pros:</p> <ul style="list-style-type: none"> Eliminates conflicts from EB and WB left-turning vehicles Improves traffic operations on 10th St Provide a pedestrian facility to cross 10th Street without a traffic signal. <p>Cons:</p> <ul style="list-style-type: none"> EB and WB left-turning vehicles are required to re-route to Willamette Falls Dr via 12th St or 8th Ct Adds traffic volumes through intervening intersections for re-routed traffic, and worsens congestion during peak hours. Requires property acquisition (Same as Alt. 2) | | | | | | | | | | | | |
| <p>Legend:</p> <table border="0"> <tr> <td> - Existing Roadway</td> <td>RiRO - Right-In/Right-Out</td> <td> - Existing Stop Sign</td> </tr> <tr> <td> - Realigned Roadway</td> <td>RO - Right-Out</td> <td> - Proposed 'No Left Turn'</td> </tr> <tr> <td> - Old Alignment</td> <td> - Future Traffic Signal</td> <td></td> </tr> <tr> <td> - Proposed Raised Median</td> <td></td> <td></td> </tr> </table> | | - Existing Roadway | RiRO - Right-In/Right-Out | - Existing Stop Sign | - Realigned Roadway | RO - Right-Out | - Proposed 'No Left Turn' | - Old Alignment | - Future Traffic Signal | | - Proposed Raised Median | | |
| - Existing Roadway | RiRO - Right-In/Right-Out | - Existing Stop Sign | | | | | | | | | | | |
| - Realigned Roadway | RO - Right-Out | - Proposed 'No Left Turn' | | | | | | | | | | | |
| - Old Alignment | - Future Traffic Signal | | | | | | | | | | | | |
| - Proposed Raised Median | | | | | | | | | | | | | |

Operational performance of each of the four access alternatives at 8th Court were evaluated and summarized in Table 6. This operational analysis suggests that Alternative 2 would yield the best *intersection* performance, but queuing problems with the short signal spacing would be significant. See the discussion following Table 6 for more details.

Table 6: Access Alternatives Evaluation for 8th Court Access – 2030 PM Peak Hour

| Intersection | Alternative 1 | | Alternative 2 | | Alternative 3a | | Alternative 3b | |
|--|---------------|---------|---------------|---------|----------------|---------|----------------|------------|
| | LOS | v/c | LOS | v/c | LOS | v/c | LOS | v/c |
| 10 th St/8 th Ave | C | 0.60 | C | 0.58 | A/F | 0.16/>1 | A/C | 0.16/ 0.26 |
| 10 th St/ Willamette Falls Dr | E | 0.89 | E | 0.87 | E | 0.87 | E* | 1.0 |
| 12 th St/ Willamette Falls Dr | B/F | 0.43/>1 | B/F | 0.43/>1 | B/F | 0.43/>1 | B/F** | 0.43/>1 |

Notes: These results assume Group A improvements are in place unless modified by an alternative. Group A includes NB left turn restriction at 10th/8th, new signals at 10th/8th and 10th/Willamette Fall Dr, and additional lanes at 10th/8th. Group A analysis assumed 8th Court extension, but Alternative 1 does not.

* Performance can be mitigated to LOS D and v/c of 0.79 with the addition of a second EB left turn lane.

** Performance can be mitigated to LOS D and v/c of 0.98 with a signal, NB right turn lane with overlap, and left turn lanes with protected phasing on all legs.

LOS = Level of Service

Delay = Average vehicle delay in the peak hour for entire intersection in seconds.

MOE = Measure of Effectiveness

Unsignalized Intersection Operations (highlighted in gray):

A/A = Major street turn LOS / Minor street turn LOS

##/ = Major street turn v/c / Minor street turn v/c

Although the intersection at 10th Street/8th Avenue appears to operate well with a signal (Alternatives 1 and 2 above) based on LOS and v/c, there would be severe queuing problems by 2030. Intersection spacing along 10th Street is very short, 250 feet from Willamette Falls Drive to 8th Avenue and 300 feet from 8th Avenue to I-205 NB ramps. In traffic simulation runs, storage in the northbound lanes at I-205 NB ramps is frequently full, preventing 8th Avenue and 8th Court traffic from making turns into those lanes during the side street green time. The same problem would exist for the northbound lanes at 8th Avenue, preventing Willamette Falls Drive traffic from entering 10th Street and causing long queues along Willamette Falls Drive. The addition of a WB right turn lane at 10th Street/Willamette Falls Drive improves this queuing situation.

Eliminating the traffic signal and imposing turn restrictions (Alternative 3b above) would improve operational performance at 10th Street/8th Avenue, but would redirect traffic to Willamette Falls Drive, impacting both 10th Street/Willamette Falls Drive and 12th Street/Willamette Falls Drive.

Findings

The foregoing analysis assumed that the Group B improvements would be implemented and that the 8th Avenue connection to Dollar Street would be re-established. With that as a premise, Alternative 1 is the least expensive 8th Court access alternative to implement, but would have the most detrimental effect on traffic operations for the corridor. Alternative 2 would also deteriorate the performance of the 10th Street corridor, but would provide alternate access to commercial properties on 8th Court. Installing a signal at 8th Court would benefit pedestrian crossings at 10th Street; however, adjacent intersections with crosswalks are very close and not an unreasonable distance for pedestrians to walk out of direction when traffic is too heavy to safely cross 10th Street. Furthermore, the ultimate design for the 10th Street / 8th Court intersection could include pedestrian refuge areas in the median to facilitate crossings without signals. Additional turn restrictions are the only difference between Alternative 3a and 3b. Restricting left turns from 8th Court and 8th Avenue improves traffic operations and provides a pedestrian refuge for crossing 10th Street. Table 7 lists key factors for each 8th Court access alternative and how each alternative measures up.

Table 7: Overview of Access Alternatives for 10th Street and 8th Avenue / 8th Court

| Alternative | Impact on Land Access | Peak Hour Vehicle Queues on Arterials Fit | Maintains Acceptable Level of Service | Traffic Safety Enhanced for Non-Autos | Estimated Cost |
|--|------------------------------|--|--|--|-----------------------|
| Do Nothing | N/A | No | No | No | None |
| Alt. 1: Install Traffic Signal at 8th Court | None | No | No | Yes | \$ |
| Alt. 2: Install Traffic Signal and Extend 8th Court to WFD | Moderate | No | No | Yes | \$\$\$ |
| Alt. 3a: Retain Stop Signs on Side Streets and Extend 8th Court to WFD | Major | Yes | Yes | No | \$\$\$ |
| Alt. 3b: Channelized Access Side Streets and Extend 8th Court to WFD | Major | Yes | Yes | Yes | \$\$\$ |