

**REPLINGER & ASSOCIATES LLC**  
TRANSPORTATION ENGINEERING

March 29, 2018

Mr. Pete Walter  
City of Oregon City  
PO Box 3040  
Oregon City, OR 97045

**SUBJECT: REVIEW OF TRAFFIC IMPACT STUDY – PARK PLACE ANNEXATION  
AND REZONING – AN17-04 & ZC17-05**

Dear Mr. Walter:

In response to your request, I have reviewed the materials submitted in support of the proposed Park Place annexation to the city and rezoning. The relevant materials consisted of the Traffic Impact Study (TIS), dated August 2, 2017 and the TIS Addendum #1, dated March 27, 2018. The TIS was prepared under the direction of Michael T. Ard, PE of Lancaster Engineering. The TIS Addendum #1 was prepared under the direction of Todd Mobley, PE of Lancaster Engineering.

Addendum #1 provides new information related to a “worst case” development scenario that is calculated to produce significantly more traffic than that calculated in the original TIS. Addendum #1 presents updated operational analyses for the 16 study area intersections based on the higher trip generation assumed in Addendum #1. Addendum #1 provides some additional discussion of Clackamas County’s operational standards. Addendum #1 provides a calculation of the operational performance of the intersection of Highway 213 and Redland Road assuming it is expanded as specified in Metro’s adopted Regional Transportation Plan (RTP). Finally, Addendum #1 proposes a trip cap on the development proposed for this annexation.

For the purposes of this letter, the trip generation and operational analyses described in the original TIS are assumed to have been superseded by those in Addendum #1.

The proposed annexation and rezoning is for 92 acres located to the north and west of S Livesay Road and south of Holcomb Boulevard. Upon annexation, 87.5 acres of the property will be rezoned to R-5 zoning and 4.5 acres of the property will be rezoned to Neighborhood Commercial, in conformance with the city’s Comprehensive Plan. The development scenario evaluated in the Addendum #1 was for 533 single-family dwellings and a combination of uses allowed under the neighborhood commercial zoning on 4.5 acres.

Addendum #1 provides a comparison of the future traffic operations for key intersections both with and without the proposed rezoning as a basis for assessing compliance with the

Transportation Planning Rule. Current county zoning is calculated to allow 11 single-family dwellings.

The TIS and Addendum #1 provide a basis upon which the annexation and rezoning proposal can be evaluated.

## **Comments**

**1. Study Area.** The study addresses most of the appropriate intersections. The engineer evaluated traffic patterns and traffic volumes and evaluated sixteen locations. The key intersections were:

1. Interstate 205 (I-205) southbound ramps at McLoughlin Boulevard (OR-99E);
2. I-205 northbound ramps at OR-99E;
3. 15th Street at OR-99E;
4. 14th Street at OR-99E;
5. Abernethy Road/S Holcomb Boulevard at Redland Road;
6. Abernethy Road at Washington Street;
7. 15th Street at Washington Street;
8. 14th Street at Washington Street;
9. 14th Street at Main Street;
10. I-205 southbound ramps at Trails End Highway (OR-213);
11. I-205 northbound ramps at OR-213;
12. Prairie Schooner Way/Clackamas River Drive at OR-213;
13. Redland Road at OR-213;
14. Beavercreek Road at OR-213;
15. Holly Lane at S Holcomb Boulevard (future intersection); and
16. Holly Lane at S Redland Road.

These intersections were identified for the study in consultation with city staff and the Oregon Department of Transportation (ODOT). The study area is appropriate.

One additional intersection, Redland Road at Anchor Way, meets the city's criteria for study but was not analyzed in the original TIS or the Addendum. The TIS and Addendum, however, provide sufficient information at adjacent intersections that the absence of an operational analysis in the TIS is not a serious deficiency. A project to upgrade this intersection is included in Oregon City's Transportation System Plan (TSP). Additional discussion of this intersection is included in the Recommendations section of this letter.

**2. Traffic Counts.** Most of the traffic counts were conducted in January 2017 and May 2017. Some intersections were counted during 2015 and 2016 but were adjusted to 2017 conditions based on the difference observed at nearby intersections to account for regional growth during the intervening period. The adjustments appear adequate to

account for base year 2017 conditions at the intersections in #1, above. Traffic counts were conducted during the AM and PM peak periods. The base year traffic volumes appear reasonable.

- 3. Trip Generation.** The TIS and Addendum #1 present information on trip generation under both current and proposed zoning. Under current county zoning, the engineer calculated 8 AM peak hour trips; 11 PM peak hour trips; and 104 total weekday trips.

The original TIS based the trip generation of the 4.5 acres of neighborhood commercial using the trip rates for 49,000 square foot shopping center using rates taken from the Institute of Transportation Engineers' *Trip Generation Manual – 9<sup>th</sup> Edition*. The Oregon Department of Transportation objected to this classification. In response, the applicant's engineer calculated the neighborhood commercial development five specific land uses individually. In Addendum #1, the engineer calculated the trip generation from 1) a 25,000 square-foot supermarket, 2) a 2,000 square foot convenience market, 3) an 8,000 square-foot pharmacy, 4) a 5,000 square-foot high-turnover restaurant, and 5) a 2,000 square-foot fast-food restaurant. For these land uses, the engineer used appropriate rates from ITE's *Trip Generation Manual*. He accounted for internal trips (those that remain within the zone, and pass-by trips for the neighborhood commercial area.

As presented in Addendum #1, the engineer calculated the combination of residences and five individual land uses in the 4.5-acre neighborhood commercial would produce 538 AM peak hour trips; 679 PM peak hour trips; and 7,406 total weekday trips that need to be accounted for on the major street network.

ODOT staff has raised concerns that the methodology used by the applicant's engineer underestimates the total traffic impact by using reductions for both pass-by trips and internal trips. In response to ODOT's concern, the applicant is proposing a trip cap based on the values cited above. The use of a trip cap, as proposed in the conditions of approval, require the applicant to undertake an additional analysis showing compliance with the Transportation Planning Rule if the proposed development exceeded the specified level. This analysis would be required to assess compliance with the Transportation Planning Rule.

- 4. Trip Distribution.** The engineer's trip distribution shows traffic using a variety of routes and distribution to major regional facilities as follows:

- Approximately 25 percent of site trips will travel to/from the northeast along I-205;
- Approximately 15 percent of site trips will travel to/from the southwest along I-205;

- Approximately 13 percent of site trips will travel to/from the southwest along Washington Street;
- Approximately 9 percent of site trips will travel to/from the east along S Holcomb Boulevard;
- Approximately 9 percent of site trips will travel to/from the east along S Redland Road;
- Approximately 8 percent of site trips will travel to/from the north along OR-99E;
- Approximately 4 percent of site trips will travel to/from the south along S Holly Lane;
- Approximately 3 percent of site trips will travel to/from the southwest along Main Street;
- Approximately 3 percent of site trips will travel to/from the southwest along S Anchor Way;
- Approximately 2 percent of site trips will travel to/from the south along OR-213;
- Approximately 1.5 percent of site trips will travel to/from the west along Beavercreek Road;
- Approximately 1 percent of site trips will travel to/from the southwest along OR-99E;
- Approximately 0.5 percent of site trips will travel to/from the east along Beavercreek Road; and
- Approximately 6 percent of site trips will travel to/from locales within the immediate vicinity, including surrounding residential areas, Holcomb Elementary School, and other land-uses such as Steve's Marketplace and the Quick Stop Market.

For traffic to and from the subject area, Redland Road is calculated to be the most heavily utilized route with a lesser amount of traffic using Holcomb Boulevard.

The trip distribution seems reasonable.

- 5. Traffic Growth.** The engineer calculated 2035 traffic volumes using several factors. The predicted increase in total peak hour trips specified in the Transportation System Plan (TSP) were used to develop an annual traffic volume increase applicable to local streets. ODOT's Future Volume Tables were used to calculate increases in traffic on Highway 213 and Highway 99E. This methodology is likely to produce somewhat different future year volumes than those developed from a regional transportation model, as used in the TSP, for example, but the methodology does allow a good assessment of the impact of the proposed zone change with assumed development of the subject property.

The engineer also accounted for the effect of the North Holly Lane Extension between Holcomb Boulevard and Redland Road, project D48 in the TSP. This new facility is predicted to cause some adjustment to existing traffic patterns by allowing traffic from Holcomb Boulevard to go south to Redland Road and beyond.

It is worth noting that transportation analysis zone (TAZ) 726, which includes the subject property, is predicted in the TSP to experience an increase of 397 dwelling units prior to 2035. The development of the subject property as assumed in the TIS is somewhat more intense than assumed in the TSP.

6. **Analysis.** Traffic volumes were calculated for the intersections described in #1, above. At each location, the level of service (LOS), delay calculations, and the volume-to-capacity ratio (v/c) were provided to assess operations relative to the ODOT and city's operational standards. The analysis was undertaken for the AM and PM peak hours and included year 2017 existing conditions, 2035 background conditions, and year 2035 traffic conditions with the proposed zone change.

According to the TIS and Addendum #1, six intersections are predicted to fail to meet the applicable performance standards by 2035, the TSP planning horizon year. At some intersections, the predicted failure is attributable to growth in background traffic with minimal effect from the proposed rezoning. In other cases, some degradation in performance is significant and is attributable to the rezoning. Each of these is discussed below.

At the I-205/99E interchange, both the northbound and southbound ramp terminals are predicted to fail to meet ODOT performance standards by 2035 with or without the proposed rezoning and development. This prediction is consistent with the TSP, which included projects to improve the southbound ramp terminal (TSP Project D75) and the northbound ramp terminal (TSP Project D76). Addendum #1 predicts that the v/c at the southbound ramp terminal would be 1.21 during the AM peak hour and 1.13 during the PM peak hour with or without the annexation and rezoning. The TIS predicts that the v/c at the northbound ramp terminal would be 1.33 during the AM peak hour and 1.17 during the PM peak hour with or without the annexation and rezoning. The failure of these ramp terminals to meet performance standards is attributable to background traffic growth. With dual turn lanes and ramp widening, both ramp terminals are predicted to operate within adopted performance standards.

According to Addendum #1, the impact of the zone change and development of the subject property has virtually no effect on the intersection of Highway 213/Beavercreek Road. The predicted increase in traffic volumes from potential development of the 92 acres is only 21 trips during the AM peak hour and 27 trips during the PM peak hour. The calculated v/c is 1.01 during the AM peak hour with or without the annexation and development. The calculated v/c is 1.06 during the PM peak hour with or without the

annexation and development. A project to improve the operation of this intersection was identified in the 2017 Highway 213 Corridor Alternative Mobility Targets study. The project cost was estimated to be \$1.5 million. Inclusion of this project in the TSP is anticipated with an amendment planned for 2018.

The intersection of Highway 99E/14<sup>th</sup> Street is also predicted to operate below adopted performance standards in 2035. Under both 2035 background conditions and 2035 with the annexation, the intersection is predicted to operate at a v/c of 1.14 during the AM peak hour. The long delays and lengthy queues impact adjacent intersections including Main Street/14<sup>th</sup> Street. Washington Street/14<sup>th</sup> Street is also predicted to fail to meet operational standard and is calculated to operate at 1.06 and 1.17 under 2035 background conditions during the AM and PM peak hours respectively. With the increased traffic associated with the annexation, the performance is expected to degrade to v/c of 1.12 and 1.26 for the AM and PM peak hours respectively. To address the operational problems at these intersections, the TSP identified Projects D7, D8, and D13. These involve reconfiguration of several streets including 14<sup>th</sup> Street and 15<sup>th</sup> Street and signal modifications.

The intersection of Abernethy/Holcomb/Redland Road was predicted to operate at a v/c of 1.14 during the PM peak hour. In the TIS, the engineer explored mitigation concepts that could be used to improve the performance of the Redland Road/Holcomb Boulevard/Abernethy Road intersection. He concludes that adding an eastbound right turn lane to the Abernethy Road approach would improve the intersection's performance to a v/c of 0.93 during the PM peak hour. This offers a feasible, potential solution that would allow the intersection operate better than it would in its current configuration. Additional analysis of this concept could lead to inclusion of a project at this location in the TSP.

The engineer also analyzed two other intersections that are important: Redland Road/Holly Lane and Holcomb Boulevard/Holly Lane. The former is currently a three-leg, T-intersection to which the North Holly Lane Extension would connect; the second does not exist yet. Both are identified in the TSP for future roundabouts. The Redland/Holly intersection is identified as TSP Project D36; the Holcomb/Holly intersection is TSP Project D43. The engineer calculated that the Holcomb/Holly intersection would operate acceptably as a stop-controlled intersection or as a roundabout. He calculated that the Redland/Holly intersection would meet warrants for left-turn lanes on both Redland approaches and it would meet warrants for installation of a traffic signal by 2035. He also calculated that it would operate acceptably either as a signal-controlled intersection or as a roundabout as specified in the TSP.

In its current configuration, the intersection of Highway 213/Redland Road is also predicted to fail to meet intersection performance standards during the PM peak hour in 2035 with or without the proposed rezoning. The predicted performance is worse with the

rezoning. The calculated v/c during the PM peak hour is 1.19 under background conditions and 1.24 with the development. The TSP proposed a solution for the predicted failure to achieve operational standards at the intersection of Highway 213/Redland Road. The principal capacity-increasing feature of this project was increasing the number of through lanes on Highway 213 in both the northbound and southbound directions. The engineer calculated that the PM peak hour v/c would decrease to 0.96, easily meeting the adopted performance standard. The Highway 213/Redland Road project, identified in the TSP as project D79, was listed among the “not likely to be funded” category. It is, however, listed in the financially-constrained project list in the Regional Transportation Plan.

The engineer’s operational analysis and explanation of potential mitigation measures appears appropriate.

- 7. *Crash Information.*** The TIS provides crash information for the five-year period from 2011 through 2015. Two intersections experienced a crash rate in excess of 1.0 crashes per million entering vehicles. These two intersections are discussed below.

The crash history at the intersection of Highway 213/Beavercreek Road puts it in the top ten percent of high crash locations in the state. The engineer summarizes the crash history. Rear-end crashes are the most common type. The engineer recommended installation of a queue warning system and notes that the TSP includes a project (D14) that would involve a queue warning system. This project is in the likely to be funded category. The very few numbers of vehicles added to the intersection from the subject annexation and development have no measurable effect on the need for implementation of this project or any other safety mitigation measures at the Highway 213/Beavercreek Road intersection.

The intersection of Main Street and 14<sup>th</sup> Street experienced a crash rate of just under 1.5 reported crashes per million entering vehicles. The high crash rate at this intersection has been previously documented. Many of the crashes at this intersection are susceptible to correction by conversion to all-way stop-control. As noted above, TSP projects D7 and D8 would involve modification of this intersection.

The engineer supports the implementation of the queue warning system at Beavercreek/213 (TSP Project D14) and conversion of Main Street/14<sup>th</sup> Street (TSP Project D7). There is no reason to expect that the proposed annexation would have a disproportionate effect on the safety of the transportation system.

- 8. *Transportation Planning Rule Analysis.*** Because the proposed annexation also involves rezoning of the property to R-10, a TPR analysis is also included. The analysis is predicated on the development of the land at a density that would allow 533 single-family dwellings and 4.5 acres of neighborhood commercial establishments consisting of

1) a 25,000 square-foot supermarket, 2) a 2,000 square foot convenience market, 3) an 8,000 square-foot pharmacy, 4) a 5,000 square-foot high-turnover restaurant, and 5) a 2,000 square-foot fast-food restaurant. The engineer states that the proposal does not change the functional classification of any existing or planned transportation facility and does not alter the standards for implementing the functional classification system.

The applicant's engineer further recommends a trip cap for the entire 92-acre annexation property. He recommends limiting the total trip generation for the residential and commercial property to 538 AM peak hour trips; 679 PM peak hour trips; and 7,406 total weekday trips. Exceeding any of these values under any development proposal would trigger the requirement for a new analysis showing compliance with the Transportation Planning Rule.

As discussed in #6, above, the annexation and development of the subject property is predicted to degrade the performance at key intersections such that these intersections would not meet applicable performance standards. The applicant's participation in the funding of projects identified in the TSP or from other analyses area proposed to mitigate for these impacts.

**9. *Conclusions and Recommendations.*** As stated in the TIS, several intersections are predicted to fail to meet applicable performance standards. The engineer recognizes that conditions may be necessary to limit development to that allowed under current zoning or development agreements provide for mitigation in proportion to the development's impacts.

## **Conclusions and Recommendations**

I find that the TIS and Addendum #1 provide an adequate basis upon which to assess the impacts of the proposed annexation and rezoning. I agree that the proposal does not cause the need for change in the functional classification of any existing or planned facility.

I concur with the engineer's analysis concluding that key intersections will fail to meet adopted performance standards at the following intersections:

- I-205/99E Northbound Ramp Terminal
- I-205/99E Southbound Ramp Terminal
- Highway 99E/14<sup>th</sup> Street
- 14<sup>th</sup> Street/Washington Street
- Beavercreek/Highway 213
- Redland Road/Holcomb Boulevard/Abernethy Road



In addition, the TIS and Addendum #1 provide additional evidence of the need to implement TSP projects at the following intersections:

- Highway 213/Redland Road
- Redland Road/Anchor Way
- Main Street/14<sup>th</sup> Street
- Holly Lane/Holcomb Boulevard
- Holly Lane/Redland Road

In addition, poor operating performance is predicted at the intersection of Redland Road/Holcomb Boulevard/Abernethy Road. The engineer's analysis indicates that the addition of an eastbound right-turn lane would significantly improve the performance of the intersection.

## **Recommendations**

I conclude that the applicant's analysis is sufficient to judge the impact of the proposed annexation and rezoning and its long-term impact and relationship to Oregon City's adopted TSP. The analysis clearly illustrates the need to implement several TSP projects to support and accommodate the planned development for the area subject of this land use action.

This analysis does not, however, provide sufficient information to determine when specific development proposals (e.g. subdivisions of various sizes or retail businesses) will require implementation of TSP projects, construction of local roads, or other mitigation. Such analyses are required under city code when specific development proposals are brought forward. Due to the magnitude (approximately 92 acres) of the current land use action (annexation and rezoning), a master plan performed in conformance with OCMC Chapter 17.65 is appropriate. Among other things, the applicant will need to develop a phasing plan. Under OCMC 17.65 the transportation impacts are assessed for each phase of the development while taking into account the regional traffic growth that is expected during each phase of the applicant's master plan. The applicant must commit to specific implementation measures in connection with each phase.

With regard to the proposed annexation and zone change, I recommend the following conditions of approval:

- A. A trip cap is established for the subject property equal to 538 AM peak hour trips; 679 PM peak hour trips; and 7,406 total weekday trips. Any proposal involving development exceeding this trip cap would require additional analysis showing compliance with the Transportation Planning Rule, OAR660-12-060.

- B. Prior to any development activity of parcels subject to this land use action, the applicant shall prepare a General Development Plan or Detailed Development Plan for the subject property consistent with the provisions of OCMC Chapter 17.65. The applicant shall address transportation issues including, but not limited to, the land uses, phasing of development, and phasing of transportation infrastructure including both TSP and non-TSP projects.
- C. At such time as a Detailed Development Plan is prepared or in connection with specific development proposals for individual subdivisions or parcels, the applicant will need to submit additional materials to address specific requirements outlined in the city's *Guidelines for Transportation Impact Analyses*. These include, but are not limited to requirements associated with intersection spacing, sight distance, turn lanes, and frontage improvements.
- D. With regard to the mitigation for off-site transportation impacts of proposed annexation and rezoning, I recommend the following conditions of approval be carried forward to apply to the required General Development Plan and Detailed Development Plan:
  - i. The developer shall participate in the funding of improvements for the I-205/OR-99E ramp terminal projects (TSP Projects D75 and D76) in proportion to the development's traffic volumes as a percentage of total year 2035 intersection volumes from the TSP. The project cost for D75 is \$2,990,000. Based on this methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 0.96 percent of the 2035 volume and the development's share of the project is \$28,700. The project cost of D76 is \$1,990,000. The development accounts for 0.87 percent of the 2035 volume and the development's share is \$17,300.
  - ii. The developer shall participate in the funding of improvements for the Main Street/14<sup>th</sup> Street improvements (TSP Projects D7 and D8) in proportion to the development's traffic volume as a percentage of the predicted 2035 traffic volume at the intersection calculated in the TSP. The cost of these projects as listed in the 2017 TSDC Project List is \$845,000 and \$960,000, respectively. Based on this methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 3.63 percent of the 2035 volume and the development's share of the project is \$65,500.
  - iii. The developer shall participate in the funding of improvements for the Abernethy/Holcomb/Redland intersection in proportion to the development's traffic volume as a percentage of the predicted 2035 traffic volume. No project is currently identified in the TSP. The project concept is to provide an additional lane on the eastbound approach; it may involve restriping or widening and signal modifications. No project cost is available at this time. Based on this

methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 19.7 percent of the 2035 volume.

- iv. The developer shall participate in the funding of improvements for the intersection of OR213/Redland Road (TSP Project D79) in proportion to the development's traffic volume as a percentage of the predicted 2035 traffic volume at the intersection calculated in the TSP. The 2017 TSDC Project List shows a project cost of \$10,105,000. Based on this methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 4.77 percent of the 2035 volume and the development's share of the project is \$482,000.
- v. The developer shall participate in the funding of improvements for the Holly Lane/Holcomb Boulevard intersection (TSP Project D43) in proportion to the development's traffic volume as a percentage of the predicted 2035 traffic volume. Project D43 is a roundabout with an estimated project cost \$1,040,000 according to the 2017 TSDC Project List. Based on this methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 38.1 percent of the 2035 volume and the development's share of the project is \$396,000.
- vi. The developer shall participate in the funding of improvements for the Holly Lane/Redland Road intersection (TSP Project D36) in proportion to the development's traffic volume as a percentage of the predicted 2035 traffic volume. Project D36 is a roundabout with an estimated project cost of \$1,040,000 according to the 2017 TSDC Project List. Based on this methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 28.3 percent of the 2035 volume and the development's share of the project is \$204,000.
- vii. The developer shall participate in the funding of improvements for the Highway 213/Beavercreek Road intersection in proportion to the development's traffic volume as a percentage of the predicted 2035 traffic volume. A project to add a right-turn lane on westbound Beavercreek Road and a merge lane on northbound Highway 213 was identified in the July 2017 Highway 213 Corridor Alternative Mobility Study. The project's cost was estimated at \$1.5 million. Inclusion of this project in the TSP is anticipated by an amendment planned during 2018. Based on this methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 0.35 percent of the 2035 volume and the development's share of the project is \$5,200.

- viii. The applicant's preliminary proportionate share for project listed above as conditions of approval are based on the total trip generation for the annexation property using the proposed trip cap of 538 AM peak hour trips; 679 PM peak hour trips; and 7,406 total weekday trips. A less intense development is likely to decrease the applicant's share of projects as calculated above. A more intense development, in addition to requiring analysis showing compliance with the Transportation Planning Rule, is likely to increase the applicant's share of projects as calculated above.
- ix. The applicant's final share of project costs may be modified as necessary when a Master Plan is approved to reflect any a modification of the development's trip generation or a change in project costs resulting from revisions to project costs associated with an updates to the City's Transportation System Plan or Capital Improvement Program.
- x. The absence of project in this condition of approval does not exempt the applicant from evaluating a project or participating in funding of such projects.

If you have any questions or need any further information concerning this review, please contact me at [replinger-associates@comcast.net](mailto:replinger-associates@comcast.net).

Sincerely,

A handwritten signature in black ink that reads "John Replinger". The signature is written in a cursive, flowing style.

John Replinger, PE  
Principal