Summary of Traffic Analysis:
Lane Repurposing/Road Diet on Columbus Drive from west of Rome Ave. to N. Boulevard.
Revised 9/8/2020

The purpose of this document is to summarize the anticipated traffic impacts that might occur on Columbus Drive as a result of converting the four-lane roadway to a three-lane roadway, and to develop recommendations to eliminate or mitigate any such impacts. This summary was developed by the City of Tampa Mobility Department, Transportation in coordination with an upcoming resurfacing project managed by the Hillsborough County Public Works Department.

Purpose of Proposed Road Diet:
The goal of the road diet scenario is to improve safety, operations and overall level of service for all modes of transportation during non-peak hours -- which constitutes a majority of the average day. The evaluation of the road diet scenario seeks to achieve this goal while also minimizing any increase to peak hour delay. The current level of service for walk/bike users of Columbus Drive and the Columbus Drive Bridge is poor and not consistent with the needs of the surrounding community. The four-lane undivided typical section is also not a preferred configuration from both an operational standpoint and a systemic safety standpoint, as further described below.

Study Limits: The segment selected for study is from east of Howard Avenue to west of North Boulevard. These limits were selected with the intention of focusing on the section with the lowest AADT based on the assumption that this section would likely be the most feasible and generate the least amount impacts to peak-hour travel time and require the least amount of mitigation.

Safety & Operational Considerations: It is anticipated that a road diet would allow for improve operations and safety throughout the corridor, based on the following considerations:

- Improved operations of left-turn maneuvers throughout the corridor are anticipated under a road diet condition due to the ability of vehicles to queue prior to turning left without blocking through traffic on Columbus. Under, the current roadway configuration these left-turn movements are unrestricted along the entire corridor. Since no dedicated left turn lanes are present, these movements must occur from the inside through lane. This maneuver is not preferred from a systemic safety perspective because it increases the opportunity for rear-end crashes to occur by causing vehicle passing maneuvers under a significant speed differential.
- The constrained nature of the corridor creates limited visibility from side-streets, increasing the risk of crashes related to left and right turning movements conflicting with through movements in the outside lanes. It is anticipated that a road diet would allow for the outside lanes to be positioned closer to the center of the roadway, improving visibility for motorists on Columbus Drive and for motorists approaching Columbus from the various side-streets. This improved visibility would be a systemic safety improvement compared to the current configuration.
- A shift in the alignment of the outside lanes closer to the center of the roadway would create buffer space between the existing sidewalk and through traffic, improving pedestrian comfort as well as increased systemic and perceived safety of pedestrians. This buffer could also serve as an opportunity to provide dedicated bike lanes along the corridor.
- The reduced number of through lanes is also anticipated to serve as a speed management strategy by allowing vehicles to maintain the same pace with one another (minimizing speed differential) and eliminating the opportunity for vehicle passing maneuvers which are not appropriate given the urban traffic conditions and surrounding context.

Average Annualized Daily Traffic (AADT):
National criteria for road diets indicates that a 4-lane corridor should be considered for a conversion to a 3-lane cross section if the traffic volume is below 20,000 vehicles per day. Corridors with less than 25,000 vehicles per day may be considered but analysis should be performed to better understand and mitigate for any impacts. The subject section of Columbus Drive has an average annualized daily traffic (AADT) of 17,700 (2015) which falls well below this threshold.

Microsimulation:
The first series of microsimulation model runs evaluated a no-build scenario and two alternatives that are based on a two-lane roadway and a new traffic signal at the intersection of Rome Avenue and Columbus Drive. A signal warrant analysis has not yet been conducted but it is anticipated that a signal may be warranted in the future and should be included in the analysis. The difference between the two alternatives is the lane configuration at several of the intersections. The City of Tampa Mobility Department, Smart Mobility Division, has adopted a standard Performance Management methodology to evaluate critical performance indicators such as queue length, level of service, and intersection delay. These indicators are represented by a consolidated Performance Index (PI) that is used to compare performance of each alternative.

Parameters of Run #1 – Corridor Microsimulation: Two-Lane Typical Section with Signal at Rome Ave.

Scenario	Description	Corridor Performance Index
No Build	No changes (four-lane undivided)	103.3 (AM) 89.8 (PM)
Alternative 1	Two-Way Left Turn Lane throughout with Signal at Rome Ave.	141.7 (AM) 92.6 (PM)
Alternative 2	Two-Way Left Turn Lane with signal at Rome Ave. Four-lane undivided eastbound and westbound approaches at both Rome Ave and Ridgewood Ave intersections	98.6 (AM) 71.5 (PM)

Run #1 – Two-Lane Typical Section with signal at Rome Ave:
Microsimulation models were developed using Synchro for three alternatives to evaluate queue length, LOS, and the intersection delays using the parameters described in the table above.

- Summary of Results of Run 1, Alternative 1:
    a. Delay: Increased traffic delay was observed and long queue lengths on Columbus Dr. at the intersections of Ridgewood Ave., and Rome Ave. particularly westbound during the morning rush hour. This is presumably due to the reduction in capacity triggered by the conversion of the shared thru-left turn lane at each location to two-way left turn/left-turn only lanes.
    b. LOS: The Synchro timing report shows that the LOS would be F.
    c. Queue Length: The 50% queue length for westbound traffic would be over 1,200 ft and 1,400 ft at Ridgewood Ave. and Rome Ave, respectively. The signal spacing between Ridgewood and N. Blvd is 1,700 which **is adequate** to store the observed WB PM queue in Alternative 1. The spacing between Rome and Ridgewood is only 1,100 which is less than the distance between Rome and Ridgewood. Therefore, the peak-hour queue at Rome could spill back into the intersection at Ridgewood.

- Summary of Results of Run 1, Alternative 2:

a. Alternative 2 was developed based on a modification to Alternative 1 to mitigate for the increased delay and queue lengths at the previously mentioned intersections. The modification consists of retaining the existing lane configuration (shared left-thru lane and shared thru right in both directions) at both Columbus Dr. and Ridgewood Ave. and Columbus Dr. and Rome Ave.
b. Delay: The difference in the peak-hour approach delay at Rome Ave between Alternative 1 & 2 is approximately 60 seconds (18 seconds with two WB thru lanes vs 80 seconds with 1 WB thru lane).
c. Queue Length: Queue lengths observed were acceptable when compared to available storage.
d. LOS: Per the performance index shown on the Synchro network Measures of Effectiveness (MOEs), Alternative #2 yields a better result for the entire network when compared to Alternative #1 *and the existing condition*. This improvement in performance is probably due to the signalization of the Columbus Dr. and Rome Ave. intersection.
e. The road diet functions acceptably throughout the corridor but the greatest potential impact to peak hour delay would be anticipated at the Rome Ave intersection. The Alternative #2 analysis results indicate that the road diet would operate acceptably under this configuration at such a time that the intersection is warranted for signalization. It was determined that another run should be performed to develop an optimized interim configuration of the Rome Ave intersection that could be applied prior to signalization.

Run #2: Two-Lane Typical Section with modifications at Rome Ave intersection:
Since the intersection at Rome is not yet warranted, Alternative 2 in Run #1 was re-evaluated with changes to the traffic control treatment at the intersection in order to generate an optimized interim lane configuration. Four alternatives were analyzed, as described below.

Parameters of Run #2 – Intersection Microsimulation: Rome Ave intersection

Scenario	Description of Rome Ave intersection lane configuration	Intersection Performance Index
Alternative 1	Traffic Control: Signalized Eastbound: Single through lane and a dedicated left-turn lane Westbound: **Two through lanes with no dedicated left-turn lane**	117.4 (AM) 91.1 (PM)
Alternative 2	Traffic Control: **Two-way stop (no change)** Eastbound: Single through lane with a dedicated left-turn lane Westbound: **Single through lane with a dedicated left-turn lane**	112.4 (AM) 708.3 (PM)
Alternative 3	Traffic Control: **Two-way stop (no change)** Eastbound: **Two through lanes with no dedicated left-turn lane** Westbound: **Single through lane with a dedicated left-turn lane**	114 (AM) 707.4 (PM)
Alternative 4	Traffic Control: **Two-way Stop (no change)** **Eastbound: Single through lane with dedicated left turn lane and dedicated right turn lane** Westbound: **Single through lane with a dedicated left-turn lane**	110.9 (AM) 140.4 (PM)

Note: Northbound & Southbound approaches for all four alternatives remained the same as existing (single lane with no dedicated turn lanes).

Comparison of Alternatives 1 & 2: Both Alternatives 1 & 2 yielded favorable results for queue length and peak hour LOS for both eastbound and westbound traffic at Rome Ave. However, the simulation

indicates that there could be a significant increase in peak-hour delay for northbound Rome Ave approaching Columbus Drive. Per the Performance Management Measures of Effectiveness (MOE) of Alternative #2, the Performance Index (PI) will increase to 708. This increase in PI could be due to a combination of the heavy NB right turn traffic and the reduction in available gaps caused by the road diet lane configuration on Columbus Dr.

Comparison of Alternatives 3 & 4: Alternatives 3 & 4 were developed to mitigate for the observed increase in delay in Alternatives 1 & 2, and further refine the optimal lane configuration for a two-way stop control condition prior to the ultimate signalization of the intersection. Of primary concern is the PM peak hour as the analysis yielded significant delay for the eastbound movement during this period. The difference between Alternatives 2, 3 and 4 primarily deal with modifications to the lane configuration of the eastbound movement. Alternative 3 incorporated an additional eastbound through lane at the intersection in lieu of a dedicated left turn lane, and Alternative 4 incorporated a single through lane with both a dedicated left turn lane and a dedicated right turn lane. Alternative 4 yielded the most favorable results with a PM score of 140.4 during the PM peak period.

Recommendation:
If the road diet configuration is to be incorporated into the upcoming resurfacing project, and no major geometric changes are anticipated, Alternative #4 is the recommended alternative. Alternative #4 best minimizes operational impacts and optimizes performance under the road diet configuration compared to the other alternatives analyzed, absent other major geometric changes such as widening or reconstruction of the intersection.

At such a time that the signalization of the intersection at Rome Ave is warranted, it is recommended that additional analysis be performed (i.e. Intersection Control Evaluation) to determine if other traffic control measures for the intersection of Rome Ave and Columbus Drive would further optimize intersection operations.

The following minimum turn lane storage lengths are recommended for the Rome Ave intersection:

- EBLT – 50’ to 75’
- EBRT – 70’ to 100’
- WBLT- 125’ to 150’