

ANSWERS TO COUNCILOR ZACK GEARY'S QUESTIONS FROM AN EMAIL DATED JUNE 14, 2022. (Attached). Answers provided by Region 2, Oregon Department of Transportation and Transportation Planners and Engineers from David Evans and Associates.

- 1.) Can we get more information relative to the concepts and thresholds of VC ratios? Are there policy or discussion papers available germane to V/C ratios?

ODOT Region 2 Response: v/c ratios signify the volume to theoretical capacity ratio of a roadway. ODOT uses v/c ratios to measure vehicular highway mobility performances. The Oregon Highway Plan (<https://www.oregon.gov/odot/Planning/Documents/OHP.pdf>) provides some additional information. See Highway Mobility Standards (starting on page 69), Policy 1F: Highway Mobility Policy (starting on page 74), and Table 6 (page 84). Table 6 details out the volume to capacity ratio targets by highway category and location characteristics.

- 2.) Generally, more information is needed on what the .80 represents. What do shifts in VC mean in terms of traffic safety? Are there particular thresholds in VC ratios that move traffic safety to higher dangers?

ODOT Region 2 Response: A v/c ratio of 0.80 means that 80% of the available roadway capacity is utilized. As the v/c ratio increases congestion increases, leading to smaller gaps in traffic which may result in vehicles accepting smaller gaps to complete their movements (i.e. someone on the side street trying to make a left onto the mainline may take the left turn with an oncoming car much closer than they typically would like after they've been waiting at the stop sign for some time). In general, there is no particular v/c ratio which denotes "higher danger" at an intersection as there are several factors which may lead to higher crash rates at an intersection.

- 3.) Are there different VC ratios/calculi used for intersections with and without signals? If so, what was used/assumed?

ODOT Region 2 Response: V/c ratios are calculated using formulas from the Highway Capacity Manual (HCM, published by the Transportation Research Board), a nationally accepted method for determining v/c, as well as delay and Level of Service (LOS). Unsignalized intersections report the critical movement (the movement with the highest v/c ratio, typically seen on the side street). Signalized intersections report an overall v/c ratio which is a function of traffic volumes, capacity, signal cycle lengths, and lost time (the time signals are yellow and red, instead of green). Roundabouts report the approach with the highest v/c ratio. ODOT's Analysis Procedures Manual (APM) provides some additional information: Unsignalized (minor street stop control, all-way stop-control, roundabout)

https://www.oregon.gov/odot/Planning/Documents/APMv2_Ch12.pdf), *signalized* (https://www.oregon.gov/odot/Planning/Documents/APMv2_Ch13.pdf).

David Evans and Associates Response: *The 3MLAP study followed the application of V/C measures (APM) and thresholds (OHP), and the study findings were reviewed and approved by ODOT Region 2 and TPAU*

- 4.) Is the V/C ratio based on a peak usage period and extrapolated for data? If so, which one?

ODOT Region 2 Response: *v/c ratios are typically based on 30 Highest Hour Volume (HV), which is designed to capture the vast majority of peak traffic hours (excepting the top 30 hours of the year). A typical field count is converted to 30 HV by applying a seasonal factor. See ODOT's APM, particularly section 5.2* (https://www.oregon.gov/odot/Planning/Documents/APMv2_Ch5.pdf)

- 5.) What is the margin of error for the 20 year build out model? For the 3MLAP added development?

ODOT Region 2 Response: *Travel Demand Models (TDMs) are a tool used to predict future traffic demands and patterns. Models are based on a variety of inputs (population and demographic changes, land use assumptions and adopted land use plans, developable land, the roadway network and any future planned improvements). The models break down areas by zones and based on land use assumptions (such as how many people live in this zone, how many work in this zone) and travel patterns it then quantifies the amount of travel/trips on the surrounding roadway network. TDMs predict out 15 – 25 years, as you begin to lose reliability after that point. Base year models (such as a 2020 base year model for a future 2045 year model) are calibrated using existing conditions such as population, land uses, roadways networks, and traffic volumes. TDMs provide a good estimate of future travel demands, however it would be unreasonable to expect 100% accuracy. ODOT's APM chapter on Travel Demand Modeling provides some additional information* https://www.oregon.gov/odot/Planning/Documents/APMv2_Ch17.pdf

- 6.) Are there other factors beyond V/C ratio that contribute to delay? If what are they and can you elaborate and/or educate on these factors?

ODOT Region 2 Response: *Traffic operations at an intersection can be quantified in a few ways. v/c ratios is a more static measure of the capacity of a roadway or intersection, and how much of the capacity is being used. Delay and Level of Service (which is determined by the amount of delay) measure the quality of service, as it is the amount of time the average user is sitting at an intersection waiting to make their movement.* https://www.oregon.gov/odot/Planning/Documents/V-CRatio_DelayPlanningDesignDecisions_SignalizedIntersections.pdf

David Evans and Associates Response: Traffic volume influences the level of traffic delay, V/C is a metric that considers the level of traffic volume given a particular intersection of highway segment capacity. Delay is not used in the OHP and APM policy and practices that guide transportation planning.

- 7.) Is there adequate future capacity for this and surrounding roads and support infrastructure?

ODOT Region 2 Response: The 3MLAP was developed to determine a proposed network aimed at meeting OHP mobility targets. ODOT was a stakeholder in developing the plan and the resulting analysis documented that intersections on OR 18 meet mobility targets as defined by the OHP and are projected to continue to meet targets in the 20 year horizon plan with the planned transportation improvements (Preferred Alternative).

David Evans and Associates Response: The 3MLAP fundamentally concludes that there is sufficient study area highway and intersection capacity within the 20-year planning horizon, supported by the transportation system improvements noted in the 3MLAP. The analytical process by which these conclusions are made followed the guidelines and best practices provided by ODOT in the Analysis Procedures Manual (APM), and the mobility standards affecting OR 18 as adopted in the Oregon Highway Plan. These findings were reviewed and acknowledged by ODOT as a member of the 3MLAP Technical Advisory Committee. ODOT's Oregon Small Urban Area Model was also prepared following statewide best practices; and its utility in the 3MLAP also followed ODOT's APM best practices.

From: [Zack Geary](#)
To: [Heather Richards](#)
Cc: [Jeff Towery](#); [Remy Drabkin](#)
Subject: transportation questions for Three Mile Lane
Date: Tuesday, June 14, 2022 9:31:06 PM

Heather-

Please pass these questions on to Andrew and the other ODOT specialists for transportation relative to the Three Mile Lane Area Plan:

- Can we get more information relative to the concepts and thresholds of VC ratios? Are there policy or discussion papers available germane to V/C ratios?
- Generally, more information is needed on what the .80 represents. What do shifts in VC mean in terms of traffic safety? Are there particular thresholds in VC ratios that move traffic safety to higher dangers?
- Are there different VC ratios/calculi used for intersections with and without signals? If so, what was used/assumed?
- Is the V/C ratio based on a peak usage period and extrapolated for data? If so, which one?
- What is the margin of error for the 20 year build out model? For the 3MLP added development?
- Are there other factors beyond V/C ratio that contribute to delay? If what are they and can you elaborate and/or educate on these factors?
- Is there adequate future capacity for this and surrounding roads and support infrastructure?

Thank you-

Sent from [Mail](#) for Windows