Transportation Master Plan (TMP): Safety Prioritization Metrics

There have been questions regarding the safety metrics used in the TMP and the Sidewalk Prioritization Plan. This paper provides information on those questions which have been paraphrased for ease in responding.

Background

The draft TMP project safety metrics to prioritize projects based on collision history, speed limit, and street classification (see Figure 1 below) are the same as those used in the Sidewalk Prioritization Plan.

Figure 1

Shoreline TMP Prioritization Metrics Framework

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Goal	Project Prioritization Metrics	Max Points
Safety	**Safety Metrics**	
	*Location of improvement has a **collision history** (auto and/or pedestrian/bike):*	X Points
	*At least **one injury collision** within the past five years*	X Points
	*At least **one pedestrian or bike/auto collision** within the past five years*	X Points
	***Two** or more **pedestrian or bike/auto collisions** within the past five years*	X Points
	*Location of improvement is along a street with **speed limit**:*	
	≤ 25 mph	X Points
	≤ 30 mph	X Points
	≤ 35 mph	X Points
	*Location of improvement has a **street classification** of:*	
	Collector Arterial	X Points
	Minor Arterial	X Points
	Principal Arterial	X Points

Why do we use both speed and volume data for pedestrian safety metrics?

Staff recommends metrics to identify safety priorities based on automobile speed (via posted speed limit) and traffic volume (via street classification as a proxy for traffic volume). This approach is used to identify collision risk factors since higher speeds and volumes are indicative of worse collision outcomes and higher likelihood of collisions, respectively. It is worth noting, that the proposed sub metrics for street classification are for the categories of arterial streets (i.e., collector arterial, minor arterial, and principal arterial). The project team did not include local streets as a sub metric because the objective is to identify and prioritize improvements for streets that have the highest safety risks, which are typically arterials with higher traffic speed and volume. Local streets have low traffic speed and volume and therefore the number of collisions on local streets is very low.

While there is some overlap with regard to street classification and the associated "typical" speed shown in the Figure 2, there are certainly speed limit variation within a specific street classification that's important to account for. For example, 15th Ave NE is a principal arterial

(with high traffic volumes), however has a speed limit of 25 MPH along one segment, and currently speed limits of 30 MPH and 35 MPH elsewhere along the length of the corridor. That is why the project team proposes to use both posted speed limit street classification as sub metrics for the project prioritization process.

Why do we use functional street classification as a proxy for measured traffic volume data and why do we use posted speed limits rather than actual speed limits?

Street classification has a general association with traffic volume ranges (see Figure 2 from the current Shoreline TMP). Up-to-date actual traffic volume data is not readily available for all arterial street segments, so street classification is a way to approximate this in a schedule and budget in an efficient manner.

Figure 2

Table 2.1: Typical Shoreline Street Characteristics

	Arterial Streets			Non Arterial (Local) Streets	
	Principal Arterial	**Minor Arterial**	**Collector Arterial**	**Local Primary Street**	**Local Secondary Street**
Function	- Connect cities and urban centers with minimum delay - Connect traffic to Interstate system - Accommodate long and through trips	- Connect activity centers within the City - Connect traffic to Principal Arterials and Interstate - Accommodate some long trips	- Provide access to community services and businesses - Connect traffic from Non Arterial Streets to Minor or Principal Arterials - Accommodate medium length trips	- Connect traffic from local secondary streets to Arterials - Accommodate short trips to neighborhood destinations - Provide local accesses	- Provide local accesses
Speed Limits	30-40 mph	30-35 mph	25-30 mph	25 mph	25 mph
Daily Volume (vehicles per day)	More than 15,000	7,000 – 20,000	2,000 – 8,000	less than 3,000	less than 3,000

Posted Speed limits provide a strong association with actual traffic speeds as speed limit setting methodology is primarily informed by measured speeds (either 85th percentile or 50th percentile depending on roadway characteristics). All Shoreline arterial speed limits have been studied and set using a methodology that relies upon measured speeds, however some have not been studied since 2007 so data may be somewhat outdated.

In consideration of the TMP update budget and ongoing funding, staff resource, and schedule constraints, staff recommended use of posted speed (to represent traffic speed) and street classification (to represent traffic volume) as the means of prioritizing safety for transportation projects as it provides appropriate data for this use. This approach is an efficient use of resources (funding and staff capacity) and requires less time allowing work to progress more quickly.

Actual traffic volume data can be used for this and future prioritization processes, however the City does not routinely collect volume data for all City streets so additional funding and schedule flexibility would be required for the TMP update process, and future prioritization work. The same principal would apply to speed data.

What is an estimate of the cost and time to measure speed and volume on all roads (that we do not routinely collect this data)?

As mentioned above, the City routinely conducts traffic counts on a selection of arterial streets and uses that data in various ways including to inform intersection control studies, to perform signal timing updates, in traffic modeling, and many other traffic operational considerations. However, this work does not cover all arterial streets of interest for the prioritization work. It is worth noting, that the City does not routinely conduct traffic counts for local streets because local streets inherently do not have high volumes of automobiles travelling on them. Data is sometimes collected where nearby projects are anticipated to add significant increased traffic volume to the street, or where requested by the community, however without significant change in nearby land uses, volumes do not typically change much on local streets from year to year.

To fill the gap in traffic volume data for arterial streets, we would review data recently developed for the travel demand model. Most of the higher traveled areas are well covered with recent traffic counts, however some of the areas on the outer edges of the City (i.e., some arterial streets in Richmond Beach, Innis Arden, Briarcrest, etc.) are modeled based on extrapolations of past data and data collected in the nearby vicinity, which is common practice, but may not perfectly represent actual conditions.

To perform a one-time (7-day tube) count of actual traffic volumes to fill in gaps in arterial street data, it would cost around $15,000. After receiving raw data traffic consultants would need to bin the data (like the categories in Figure 2 above), which would then be provided to City GIS staff to use for prioritization. Staff management time would be required to coordinate this effort is estimated to be 80 hours. Please note, that this estimate does not include gathering and processing traffic volume data for local streets for the reasons mentioned previously in this paper. If the objective is to include local streets as a sub metric, the impacts to costs, staff resources, and schedule could be three to four times greater than the effort to fill gaps in the arterial street volume data.

What are the pros and cons of using actual traffic counts for a TMP safety metric?

PRO: Using actual traffic count data (vs. street classification) for a safety metric may identify some streets that have higher or lower traffic volumes than expected and thus provide a truer measure for assigning points for this safety prioritization metric.

CON: If the City uses actual traffic volumes for the safety metric, it will impact the current Transportation Element/TMP update schedule. The project team plans to develop a draft

project list, prioritize it, and bring to Council in early summer of 2022. Achieving a fully vetted project list is an essential component of the update to the Comprehensive Plan's Transportation Element (TE) that is scheduled for adoption by the end of 2022 and will also be part of the TMP update. If we change direction to use actual volumes instead of street classifications as a proxy, it could delay the process by about one month or more. The current project schedule does not have the flexibility to absorb a one-month delay and stay on track for the adoption of the TE by the end of 2022.

CON: Additionally, if the City uses actual volumes for a safety metric, it will take a more staff time and money for the tube counts than was anticipated. Given limited staff capacity and constrained resources this work would have to be prioritized at the expense of other high priority activities.

How will a change to using actuals traffic counts impact to future updates to the prioritization metrics?

If we move forward with the direction to use actual traffic volumes for a safety metric, then the City will incur the cost of tube counts and data processing for every five-year data refresh cycle going forward (per the staff recommendation for a five-year data refresh and a 10-year major update to the prioritization process for the TMP and the Sidewalk Prioritization Plan).