

Appendix TRA

VMT Analysis and Pedestrian Safety Measures

January 6, 2021

Katherine Green
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Re: VMT Analysis for the Proposed Amare Apartments Project in the City of Martinez

This report presents the results of the trip generation analysis of the proposed Amare Apartments Project in the City of Martinez. The proposed project involves construction of 183 apartments with the main access onto Arnold Drive directly opposite of Starflower Drive in the City of Martinez. A secondary entrance would be provided on Arnold Drive east of the main entrance. The residents of the proposed project would have similar travel patterns as other residents in the area, which is higher than the City average, and based on this analysis the project would have a significant near-term impact on vehicle miles traveled in the County, subject to City approval. Under Cumulative (Year 2040) buildout conditions the project would result in a slight decrease in the total number of residents forecast for the project's TAZ compared to what could otherwise be developed under the existing zoning and General Plan designations. Therefore, under Cumulative (Year 2040) buildout conditions the proposed the project is forecast to result in a less than significant impact to VMT.

VEHICLE MILES TRAVELED

One performance measure that can be used to quantify the transportation impacts of a project is vehicle miles traveled (VMT). This section presents the extent of the VMT-related transportation impacts caused by the Project. It should be noted that the City does not currently have adopted CEQA thresholds for VMT and the Project is not located in a Transit Priority Area or otherwise screened out from further VMT analysis. Because VMT is a relatively new method for measuring transportation impacts under CEQA, less data exists to estimate VMT than trip generation based on use and location. For jurisdictions that have not developed individual VMT models, VMT is typically estimated using an area-wide travel demand model from a regional transportation agency that calculates VMT based on the number of vehicles multiplied by the typical distance traveled by each vehicle originating from or driving to a certain area. As with all models, the accuracy of the output depends on the level of detail in the model. The volume of traffic and distance traveled depends on land use types, density, and location as well as the existing and planned future supporting transportation system, including availability of public transportation. A travel demand model attempts to represent this relationship when forecasting vehicle trips and VMT. This analysis uses the Contra Costa Transportation Authority's (CCTA) Travel Demand Model to estimate VMT per capita for the future residents of the project.

Near-Term Plus Project VMT Analysis - The Travel Demand Model divides areas within CCTA’s jurisdiction into transportation analysis zones, or TAZs. The CCTA Travel Model includes TAZs within the City of Martinez that vary in size from a few city blocks in the downtown area, to larger geographic areas in lower density areas. TAZs are used in transportation planning models for transportation analysis and other planning purposes. Based on the CCTA Travel Model, the County’s average daily VMT per capita (i.e., per resident) is estimated to be 19.4 miles in the year. The homes built by the Project would be expected to have similar VMT as other residential developments in the TAZ. The VMT per capita estimated by the CCTA Travel Model for the Project’s TAZ would therefore be assumed represent the approximate VMT per capita that would be generated by the Project as well. The Project is located in TAZ 20037 which includes the Amare Apartments site. **Table 1** summarizes the 2020 per capita VMT for TAZ 20037, and provides a comparison to regional and Countywide per capita average. It is expected that, as shown for the TAZ where it is located, the Project would have a higher VMT per capita than the Citywide average VMT because, as stated above, the travel from homes built by the Project would be expected to be similar to existing developments in this TAZ.

**TABLE 1
NEAR-TERM PLUS PROJECT VMT ANALYSIS RESULTS**

Scenario	Project TAZ Average VMT Per Capita	VMT Impact Threshold ¹	Impact?
Near-Term Plus Project	16.5 miles	14.7 miles	Yes

NOTE: ¹ *The existing plus project VMT impact threshold for employment projects is 15% below the Contra Costa County average VMT per capita, which is 17.3 miles.*

It is expected that, as shown for the TAZ where it is located, the proposed project would have a higher VMT per capita than the Bay Area or Contra Costa County averages under 2021 conditions. This is because, as stated above, the travel from residents of the proposed project would be expected to be similar to existing developments in this TAZ. Therefore, the project would result in a significant impact to VMT in the area under near-term conditions, according to the VMT analysis guidelines. The VMT generated by the project could be reduced by implementation of a Transportation Demand Management (TDM) program. Subject to City approval, the model results indicate the TDM program would need to achieve a 11% reduction to the average VMT per capita to mitigate the project’s VMT impacts to a less than significant level.

The effectiveness of TDM measures for this location are difficult to quantify as the literature documenting the effectiveness of TDM strategies are generally related to suburban vs. urban

areas. For projects in a suburban setting studies indicate the maximum VMT reduction associated with the implementation of TDM strategies that can be expected for a residential project is about 10 percent. Even this reduction could be difficult to achieve for this location given its proximity to walkable services for residents and available transit services in the area. A reduction in daily VMT of 11 percent in the near-term would exceed the expected level of VMT reduction from a TDM plan in a suburban area, according to the California Air Pollution Control Officers Association (CAPCOA).¹ However, while the level of VMT reduction associated with TDM measures are unlikely to mitigate the project’s impact to a less-than-significant level, CEQA still requires that feasible mitigation measures be implemented to reduce the project’s level of impact.

Cumulative Plus Project VMT Analysis - Since the project is forecast to result in a near-term impact to VMT in the City, the analysis is required to determine if the Countywide VMT increases or decreases with the proposed project, relative to the VMT generated that would otherwise be generated by full General Plan buildout.

The cumulative VMT impacts of the project were evaluated by running the CCTA Travel Demand Model with the updated zoning and general plan designations proposed for the site. Implementation of the project would ultimately result in a slight decrease to the number of residents in the traffic analysis zone (TAZ) where the project site is located. **Table 2** presents the total forecast 2040 Countywide average VMT per day with and without the proposed project. The project would result in a slight decrease in the total number of residents forecast for the project’s TAZ compared to what could otherwise be developed under the existing zoning and General Plan designations. Therefore, the proposed the project is forecast to result in a less than significant impact to VMT under Cumulative (Year 2040) buildout conditions, according to the VMT analysis guidelines.

**TABLE 2
CUMULATIVE PLUS PROJECT VMT ANALYSIS RESULTS**

Scenario	Cumulative 2040 - Countywide VMT	Cumulative Plus Project - Countywide VMT	Change in Countywide VMT	Impact?¹
Cumulative (2040) Conditions	55,100,259	55,095,006	-5,253	No

NOTE: ¹ A significant impact would occur if the project increases the total Countywide VMT.

¹ *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures*, California Air Pollution Control Officers Association, August, 2010.

Please don't hesitate to contact me if you have any questions or need additional information.

Sincerely,

A handwritten signature in black ink that reads "Stephen Abrams". The signature is written in a cursive style with a large, prominent "S" at the beginning.

Stephen C. Abrams
President, Abrams Associates
T.E. License No. 1852

March 8, 2022

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Re: Potential Pedestrian Improvement Measures for the Proposed Amare Apartments Project in the City of Martinez

This report was prepared to summarize some potential pedestrian improvement measures the City could consider for the proposed Amare Apartments Project in the City of Martinez. The proposed project involves construction of 183 apartments with the main access onto Arnold Drive directly opposite of Starflower Drive in the City of Martinez. A secondary entrance would be provided on Arnold Drive east of the main entrance.

It is likely there will be some pedestrian crossings across Arnold Drive at Starflower Drive as a result of people walking between the proposed apartments and the existing neighborhood to the north. Current forecasts indicate these pedestrian volumes will be light and will probably be no more than 10 to 15 pedestrians per hour during peak periods. While this number of pedestrians may not be enough to warrant installation of a marked crosswalk, any amount of pedestrians crossing Arnold Drive to and from the project is a concern because through traffic does not stop and speeding has been observed to occur in this area.

Simply marking crosswalk lines across Arnold Drive in this area without any other improvements is not recommended because this could give pedestrians a false sense of security that motorists will automatically stop for them because of the marked crosswalk lines. The truth is a significant portion of motorists regularly fail to yield the right of way to pedestrians in marked crosswalks, particularly in locations where through traffic does not otherwise have to stop (i.e., for a stop sign or traffic signal). However, there are some options for improving compliance and safety at mid-block crosswalks. Below is a summary of some potential options the City could consider to improve safety for pedestrian crossings across Arnold Drive at Starflower Drive.

Improved Street Lighting at the Starflower Drive Intersection with Arnold Drive – Improved street lighting would be one option for improving pedestrian safety at the intersection. About two-thirds of pedestrian fatalities in the U.S. occur at night or under low-light conditions. Pedestrian fatalities are 3 to 6.75 times more likely at night, taking into account pedestrian volumes. Several studies have found that pedestrian injuries at nighttime are typically reduced by roughly half by illumination.¹ Additional street lighting would also provide benefits with

¹ *Innovations in Lighting for Pedestrian Safety and Walkability*, San Francisco Municipal Transportation Agency, San Francisco, June, 2017.

respect to traffic safety for motorists in the area. Lastly, improved street lighting has also been linked to a reduction in crime.

Construction of a Median to Provide a Pedestrian Refuge – The median is the area between opposing lanes of traffic. A median can either be open (pavement markings only) or they can be channelized (raised medians or islands) to separate various road users. Providing raised medians or pedestrian refuge areas at pedestrian crossings at marked crosswalks has demonstrated a 46 percent reduction in pedestrian crashes. At unmarked crosswalk locations, pedestrian crashes have been reduced by 39 percent.² Raised medians and pedestrian refuge islands allow pedestrians to cross one direction of traffic at a time. This significantly reduces the complexity of the crossing. Installing raised pedestrian refuge islands on the approaches to unsignalized intersections is one of the improvements that has been shown to have the most impact in reducing pedestrian crashes. Other potential benefits of raised medians include the following:

- Reducing vehicle speeds on the roadway.
- Providing space for additional landscaping within the right-of-way.
- Providing space to install additional roadway lighting.
- Providing space to provide supplemental signage.

Rectangular Rapid Flashing Beacons - Another option for improving compliance and safety at a marked crosswalk (at an uncontrolled location) is to install Rectangular Rapid Flashing Beacons (RRFB's). However, it is recommended that this option only be implemented if there ends up being a significant number of pedestrian crossings and/or safety concerns at this location after the project opens. Guidelines for the installation of RRFB's specify they should be reserved for "*locations with significant pedestrian safety issues, as over-use of RRFB treatments may diminish their effectiveness.*" The CAMUTCD specifies that a crosswalk would not warrant having flashing beacons unless there were a minimum of 40 pedestrians per hour for at least two hours a day, which is unlikely to ever be the case at this location.

Pedestrian Hybrid Beacon - The review of potential improvements to address pedestrian crossings at the Starflower Drive intersection with Arnold Drive was conducted based on the California Manual of Uniform Traffic Control Devices (CAMUTCD). The review indicated the intersection would not meet any of Caltrans warrants for installation of a traffic signal but it was determined that the intersection could potentially meet the established CAMUTCD warrant for installation of a pedestrian hybrid signal (PHB) if there were enough pedestrian crossings in the future. If this were the case then a detailed engineering and traffic study would need to be conducted to determine if installation of a PHB would be appropriate for this location.

² *Guidance Memorandum on Consideration and Implementation of Proven Safety Countermeasures*, Lindley, J., FHWA, Washington, DC, July 2008.

The PHB is a special type of hybrid traffic signal that is used to warn and stop traffic at an unsignalized location to assist pedestrians in crossing a street or highway at a crosswalk. A pedestrian hybrid beacon may be considered for installation to facilitate pedestrian crossings at a location that does not meet the warrants for a full traffic signal. The PHB treatment has been approved for use in California and was adopted in the 2012 CAMUTCD. Chapter 4F of the CAMUTCD contains provisions on how PHBs can be installed and used in conjunction with signs and pavement markings to warn and control traffic at locations where pedestrians enter or cross a street or highway. The MUTCD also identifies factors for agencies to consider in determining the use of PHBs, including pedestrian and traffic volumes, roadway speeds, and sight distance. Based on Figure 4F-2 of the CAMUTCD the intersection would not meet the warrant for installation of a PHB due to the relatively low pedestrian and traffic volumes at his location.

The CAMUTCD specifies there should be a minimum of 20 pedestrian crossings per hour on an average day to warrant consideration of a hybrid pedestrian beacon. Our review indicates there is unlikely to ever be 20 crossings per hour at this location, but the City could monitor this in the future if there are concerns there could be a substantial number of crossings. When it comes to mid-block crosswalks the State of California (i.e., the CAMUTCD) clearly puts the onus on the engineer-in-charge by stating: "*Mid-block pedestrian crossings are generally unexpected by the motorist and should be discouraged unless, in the opinion of the engineer, there is strong justification in favor of such installation.*" In other words, these installations need to be based on actual evidence that there would be an overall benefit to safety if a hybrid pedestrian beacon were installed.

Provision for On-Street Parking on Arnold Drive – The presence of on-street parking can help reduce motorists' speeds, enhancing pedestrian safety and comfort. However, this assumes the on-street parking can be implemented in a manner that would not obscure the sight distance for pedestrians at any nearby crosswalks and would not introduce any new safety problems for bicyclists. On busy streets where there are queuing and congestion issues on-street parking is sometimes undesirable, but it has been documented that this is not the case adjacent to the proposed project site.

Implementing on-street parking typically narrows the width of the adjacent vehicle travel lane. As a result, most motorists will slow down in order to maintain an acceptable level of comfort and safety. When implemented in combination with bulb outs at crosswalks this can also reduce the distance a pedestrian walks to cross the street, reducing exposure to pedestrian/vehicle conflicts. Given that pedestrian crossings across Arnold Drive from the proposed project are a potential concern, it is recommended that on-street parking only be considered for the southern side of the street, adjacent to the project site.

Radar Speed Signs - There is the potential to install a radar speed sign that would display the speeds of vehicles approaching the Starflower Drive intersection. In our experience this may

work in the short-term but would not be as effective as radar enforcement by the police in the long run. One of the primary considerations for sign-mounted radar guns is the cost, which can also include the cost to power the sign if solar panels are not used. However, assuming cost is not critical factor then it should also be noted that if the sign displaying the speed is combined with a photo trailer, then it can be used to identify vehicles and mail out warnings which is generally much more effective.

It is important to note that the costs and logistics involved in identifying speeders with photos and getting the warnings to the correct addresses can be problematic. In summary, it is our opinion that a sign mounted radar gun with photo enforcement would probably have some effect on travel speeds but the potential speed reductions would probably not justify the costs that would be required to implement such a plan. The reduction in speeds under this option would probably only occur in the immediate vicinity of the proposed signs while a police officer with radar could reduce speeds throughout the area. In addition, reducing the speeds in the immediate vicinity of a radar sign may not provide the overall improvement to safety that is desired.

Speed Limit and Signage Changes – There are no additional signage changes recommended at this time unless an improvement (such as a PHB) that requires signage is selected. However, it should be noted that the City could consider reducing the speed limit by 5 mph in this area to minimize traffic conflicts and improve pedestrian safety. Studies show that reduced speeds can lower the rate and severity of collisions. To achieve this radar speed surveys would need to be conducted and an ordinance or resolution would need to be approved by the City in support of creation of a 35 mile per hour zone.

Please don't hesitate to contact me if you have any questions or need additional information.

Sincerely,



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