APPENDIX RTC-B

Transportation

FEHR PEERS

Memorandum

Date: March 2022

To: Olivia Ervin, City of Petaluma

From: Matt Goyne and Allison Quach, Fehr & Peers

Subject: Scott Ranch VMT Mitigation Measure Assessment – Final Draft

SF19-0761

During the public comment period on the RDEIR, comments were received requesting further investigation into potentially feasible mitigation options that could reduce or offset the significant vehicle miles traveled generated by the project. This memorandum documents the vehicle miles traveled (VMT) mitigation quantification of on-site, near-site, and off-site measures for the proposed project at Scott Ranch in a manner consistent with the mitigation options identified in the City of Petaluma's July 2021 *Senate Bill 743 Vehicle Miles Traveled Implementation Guidelines Final* (SB 743 Guidelines), although this document was adopted following publication of the RDEIR.

Background

The Scott Ranch project proposes to construct 28 single-family homes and an extension to Helen Putnam Park adjacent to Petaluma's southern city limit, at the intersection of Windsor Drive and D Street. At the time that VMT mitigation for the RDEIR was developed, *Quantifying Greenhouse Gas Mitigation Measures* (CAPCOA, August 2010) provided the latest guidance on quantifying VMT reductions from TDM strategies. In August 2021, CAPCOA released the *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity* (CAPCOA 2021)[1], which provides updated guidelines for quantifying VMT reductions based on the latest research.

The purpose of this memorandum is to document quantification of VMT mitigation measures using the most up-to-date research, as recommended in CAPCOA 2021. As described in the *Response to Comments, Master Response 9, VMT Approach*, the proposed project would need to reduce project-generated VMT by approximately 26 percent and 31 percent under existing plus project and cumulative plus project conditions, respectively, to reduce the project's VMT impact to a less-than-significant level. This

[1] California Air Pollution Control Officers Association, *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*, December 2021. https://www.caleemod.com/handbook/index.html

represents approximately 376 VMT under existing plus project conditions and 465 VMT under cumulative plus project conditions[2].

The RDEIR utilized the MTC model to estimate VMT, which was the best available model at the time the RDEIR was being prepared. Subsequently, the SCTA model was made available and in August of 2021 an updated SCTA was released. Although not required, because the RDEIR was initiated prior to the updated SCTA model taking effect, this document utilized the SCTA model to present VMT generated by the project. Relative to the MTC model, the SCTA model presented a more conservative estimate of VMT generated by the project.[3]

On-Site VMT Reduction Measures

This section documents the potential VMT quantification of on-site and near-site VMT reduction measures. These measures fall into two categories: (1) planned improvements that are part of the proposed project and (2) additional measures for consideration that have the potential to reduce project-generated VMT. In general, there is limited evidence in CAPCOA 2021 that supports on-site VMT reductions for projects in single-use low density location with limited transit service such as the Scott Ranch project. The following CAPCOA 2021 measures were evaluated for the proposed project as described in the following sections as they are appropriate for the residential land use and context of the proposed project. Detailed calculations are presented in Appendix A.

- T-1. Increase Residential Density
- T-4. Integrate Affordable and Below Market Rate Housing
- T-18. Pedestrian Network Improvements
- T-19-A. Construct or Improve Bike Facility
- T-25. Extend Transit Network Coverage or Hours
- T-35. Provide Traffic Calming Measures
- T-40. Implement School Bus Program
- T-49. Replace Traffic Controls with Roundabout

[2] 5.4 VMT per capita * 2.5 average household size in Petaluma * 28 households = 376 VMT over threshold under existing conditions; 6.6 VMT per capita * 2.5 average household size in Petaluma * 28 households = 465 VMT over threshold under cumulative conditions

[3] Using the MTC model, the proposed project would generate 19.6 VMT per capita, compared to the 16.2 under baseline conditions, and 16.1 VMT per capita compared to a threshold of 13.9 VMT under cumulative conditions. With the new SCTA model, the proposed project generates 20.5 VMT per capita compared to a threshold of 15.1 VMT per capita under existing conditions. Under cumulative conditions, the proposed project would generate 21.4 VMT compared to a threshold of 14.8 VMT per capita. Therefore, using the MTC model, the required VMT reduction per capita is 3.4 under existing conditions and 2.2 under cumulative conditions, compared to 5.4 under existing and 6.6 under cumulative conditions using the SCTA model.

Increase Residential Density (T-1)

Incorporating accessory dwelling units (ADUs) into the proposed project would increase the project's residential density. In contexts with mixed-use, moderate to high density surrounding land uses, and available transit service, developments with increased residential densities can influence the way that people choose to travel, and can result in shorter and fewer driving trips. CAPCOA 2021 Measure T-1 quantifies the VMT reduction that could be achieved by projects that are designed at a higher density compared to the baseline residential density in the U.S (9.1 dwelling units/acre). The density of the proposed project without ADUs is 1.9 dwelling units/acre; incorporating one ADU per property into the project (28 ADUs) would double the residential density to approximately 3.7 dwelling units/acre. While ADUs would provide benefits to the City in the form of additional housing, there is no quantifiable VMT reduction for this project because the maximum residential density of the project with ADUs would still be lower than 9.1 dwelling units/acre. Therefore, the addition of ADUs to the proposed project would not help the project achieve quantifiable VMT reductions.

Integrate Affordable and Below Market Rate Housing (T-4)

Integrating affordable or below market rate housing is an important strategy to address the limited availability of affordable housing that might force residents to live far away from jobs or school, requiring longer commutes. The quantification method for this measure accounts for VMT reductions achieved for multifamily residential projects that are deed restricted or otherwise permanently dedicated as affordable housing.[4] The VMT reduction for affordable housing is based on comparisons of daily trip generation rates between affordable and market rate low-rise multi-family projects from the Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition (September 2021). Comparing the daily trip generation rates from ITE's Trip Generation Manual 11th Edition of the proposed project's single-family homes (land use category 210) and multi-family affordable housing projects (land use category 223) indicates that multi-family affordable housing projects generate approximately 50 percent fewer VMT than the proposed project.[5] However, CAPCOA 2021 also indicates that the reduction is partially associated with access to active transportation and transit to destinations, which is not present at the Scott Ranch project. Therefore, the addition of affordable housing units to the proposed project would not help the project achieve quantifiable VMT reductions.

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[4] The California Department of Housing and Community Development (2021) defines lower-income as 80 percent of area median income or below, and affordable housing as costing 30 percent of gross household income or less. California Department of Housing and Community Development. 2021. *Income Limits*. Accessed February 2022 at: https://www.hcd.ca.gov/grants-funding/income-limits/index.shtml#:~:text=%E2%80%9C Affordable%20housing%20cost%E2%80%9D%20for%20lower,of%20gross%20income%2C%20with%20variations.

[5] Based on this data, the addition of 33 affordable housing units could theoretically reduce the project's average VMT per capita for the total project (including the 28 single-family housing units and 33 affordable housing units) to less than significant levels as shown in **Appendix A**.

Pedestrian Network Improvements (T-18)

Building out pedestrian networks that connect the project to nearby destinations can help to shift both project-level and community-level VMT. This accounts for the benefits that the expanded pedestrian networks have for both existing residents and destinations (e.g. the proposed park extension, other nearby homes or land uses) that may be accessed using the pedestrian network expansions. The project would improve pedestrian access by constructing:

- approximately 800 feet of new sidewalk along the east side of D Street, from Windsor Drive to Sunnyslope Avenue (considered in conjunction with on-site improvements due to proximity),
- approximately 400 feet of new multiuse pathways on the west side of D Street south of Windsor Drive and north of Kelly Creek that would connect to new park facilities,
- an additional 600 feet of new multiuse pathways on the west side of D Street and south of Kelly Creek that would connect the new park facilities to the future Ring Trail under cumulative conditions,
- approximately 1,500 feet of new sidewalks along the south side of Windsor Drive, and
- pedestrian crossing improvements at D Street and Windsor Drive and at the new intersection of Windsor Drive and "A" / "B" streets.

The literature on GHG reduction quantification for improving the pedestrian network shows that a 0.05 percent decrease in vehicle travel occurs for every one percent increase in the sidewalk-to-street ratio. CAPCOA 2021 Measure T-18 recommends calculating the VMT reduction on a neighborhood or community basis; however, because sidewalk coverage and VMT on adjacent roadways is not currently known, the methodology was adapted to use available data on existing sidewalk gaps and vehicle traffic:

Potential VMT Reduction = Length of New Sidewalk x Roadway ADT x -0.05

As shown in **Table 1** and **Figure 1**, the pedestrian improvements proposed by the project on D Street would result in a reduction of approximately 78 VMT under existing conditions and 117 VMT under cumulative conditions. The new sidewalks along Windsor Drive would result in a reduction of approximately 27 VMT under both the existing and cumulative condition. Together, these improvements would offset approximately 105 VMT under existing conditions and 144 VMT under cumulative conditions. This includes both the project-level and community-level VMT reductions. These reductions are estimated to off-set VMT over the threshold generated by approximately 7-8 units.

In addition to the pedestrian network improvements proposed by the project, the City of Petaluma is considering a separate quick-build plan to improve pedestrian and bicycle safety connectivity on D Street near the project site.[6] This potential plan includes modifications such as new signage, new crosswalks, and improved bike facilities. While effectiveness of these quick-build measures on VMT cannot be directly quantified (see T-35 below), the combination of these improvements and the proposed project's new

[6] D Street Coalition Draft Quick-Build Plan, https://www.dstreetcoalition.org/news/draft-quick-build-plan

sidewalks, pathways, crosswalks, and the roundabout, which would slow vehicle speeds entering Petaluma and further enhance the pedestrian crossing at Windsor Drive, would improve pedestrian and bicycle access along D Street and support a reduction in VMT.

Table 1. On-Site & Near-Site Pedestrian Network Improvements

	Existing			Cumulative		
Roadway Segment	**Roadway ADT[1]**	**Facility Length**	**Potential VMT Reduction**	**Roadway ADT[2]**	**Facility Length**	**Potential VMT Reduction**
D Street	6,780	1,200'	78	6,780	1,800'	117
Windsor Drive	1,800	1,500'	27	1,800	1,500'	27
Total VMT Reduction			**105**			**144**

Notes:
1. Roadway ADT based on counts collected in 2014 and estimated daily project trip generation.
2. Cumulative ADT estimated based on existing ADT and projected cumulative growth.

Source: Fehr & Peers, 2021

Construct or Improve Bike Facility (T-19-A)

Providing bicycle infrastructure can help to improve biking conditions in a community, and can encourage a mode shift on the roadway parallel to the bicycle facilities from driving to biking. The proposed project would develop a Class I bicycle path along the project frontage on D Street that would connect to the City's existing Class II bicycle lanes on D Street and Windsor Drive. CAPCOA Measure T-19-A quantifies the VMT reduction that would be achieved by a mode shift from driving to biking due to the new Class I bicycle path. Due to the relatively short length of the new bicycle facility, project location at the edge of Petaluma, and average trip lengths in Petaluma, this measure would result in a negligible VMT reduction, although it supports City goals to provide facilities that support a shift from driving to biking.

Extend Transit Network Coverage or Hours (T-25)

Extending the local transit network to the project site could encourage a shift from driving by making transit service more accessible, thereby decreasing VMT (CAPCOA Measure T-25). However, due to the low density and other characteristics of the surrounding community, the City of Petaluma has determined that the project site would not support viable transit service at this time and does not currently have plans to expand service to the neighborhood in the near-term. Therefore, this strategy would be infeasible for reducing the project's on-site VMT. However, Petaluma Transit's upcoming Short Range Transit Plan will re-evaluate the benefit of new fixed-route or on-demand service to serve the project site compared to the benefit of providing service elsewhere in Petaluma.

Figure 1. VMT Thresholds & On-Site Improvements

Non-Quantified Measures

In addition to the on-site measures quantified above, the following additional measures are documented in CAPCOA 2021 as "supporting or non-quantified" measures that could be appropriate for the context of the proposed project. While these measures may support VMT reduction or have other benefits to the project or community, they are not quantified in CAPCOA 2021 because methods have not been developed or they are not supported by the current research. The proposed project's traffic calming measures and roundabout on D Street (T-35 and T-49 below) as well as the quick-build proposal for D Street (T-35) would provide co-benefits with the proposed project's pedestrian network improvements.

- T-35. Provide Traffic Calming Measures
- T-40. Implement School Bus Program
- T-49. Replace Traffic Controls with Roundabout

On-Site VMT Reduction

As shown above, there is limited evidence in CAPCOA 2021 that supports on-site VMT reductions within the context of the proposed project. Implementation of the on-site and near-site measures described above would not reduce project VMT by the 26 and 31 percent necessary to achieve a less-than-significant impact. As described above, the proposed sidewalk extensions on D Street and Windsor Drive would provide a reduction of approximately 105 VMT under existing conditions and 144 VMT under cumulative conditions. As shown in **Table 2**, the proposed project would need to identify additional off-site measures to offset the remaining VMT over the threshold (approximately 271 VMT under existing plus project conditions and 321 VMT under cumulative plus project conditions) to achieve less than significant. Detailed calculations are presented in Appendix A.

Table 2. VMT Impact Summary after On-Site & Near-Site Measures

	Existing	Cumulative
Project-Generated VMT over Threshold	376	465
Quantifiable VMT Reduction (from Table 1)	105	144
Remaining VMT over Threshold	271	321

Source: Fehr & Peers, 2021

Off-Site VMT Reduction Measures

The City of Petaluma is currently investigating a citywide VMT reduction program that could include sidewalk gaps or other VMT reduction strategies. However, given that this work is incomplete, this section focuses on the quantification of potential off-site VMT mitigation measures from CAPCOA 2021 that could offset the remaining VMT over the threshold.

- T-18. Pedestrian Network Improvements

- T-22-B. Implement Electric Bikeshare Program
- T-20. Expand Bikeway Network
- T-26. Increase Transit Service Frequency
- T-9. Implement Subsidized or Discounted Transit Program
- T-46. Improve Transit Access, Safety, and Comfort

Pedestrian Network Improvements (T-18)

Given the effectiveness of the sidewalk measure to reduce VMT in the vicinity of the project site and an expressed desire by City staff to close other sidewalk gaps within the city, a preliminary review of sidewalk gaps was conducted to determine whether Measure *T-18, Provide Pedestrian Network Improvement,* could be applied elsewhere in the City. During a meeting with Petaluma Public Works staff on 8/31/2021, several segments were reviewed for their feasibility and VMT reduction. The segments are shown below in **Table 3**. The VMT reduction potential of closing each of these sidewalk gaps was estimated using the methodology described above:

Potential VMT Reduction = Length of New Sidewalk x Roadway ADT x -0.05

Two sidewalk gaps were identified that, if closed, could collectively offset the remaining VMT over threshold: Petaluma Boulevard South between Vartnaw and Crystal Lane Roundabout (north side, 710 feet), and Lakeville/SR116 west of Marina Avenue (south side, 1,942 feet). These gaps are presented in Appendix B. These segments were selected for study in 2021 for VMT mitigation purposes because they were planned, unfunded, and were determined to be potentially feasible based on a preliminary review with Petaluma Public Works staff.

The sidewalk improvements on Petaluma Boulevard South between Vartnaw and Crystal Lane Roundabout have been proposed as part of the Petaluma Boulevard South Road Diet project. While this project was unfunded at the time the study was conducted, the City has since identified funds to construct this portion of the project and construction was initiated in January 2022 with a completion date of June 2022. The paving and striping plans for this gap are presented in Appendix B.

Active transportation projects, such as sidewalk construction, can be screened from further CEQA analysis per the City's SB 743 Guidelines. The Petaluma Boulevard South sidewalk gap closure of approximately 710 feet in length would have a measurable reduction of between 73 and 78 VMT, as shown in **Table 3**. This segment alone would not be sufficient to offset VMT over the threshold, and would need to be paired with additional measures. However, the timing for construction of the Petaluma Boulevard South Project is expected to occur in 2022, well before Scott Ranch would be occupied and generating VMT. Therefore, this measure is considered infeasible for mitigating VMT impacts as part of the Scott Ranch project.

Table 3. Off-Site Pedestrian Network Improvements

Roadway Segment	Roadway ADT[1,2]	Facility Length	Potential VMT Reduction[2]
Petaluma Boulevard South – north side of street between Vartnaw and Crystal Lane Roundabout	10,851 - 11,529	710'	73-78
Lakeville Highway / SR 116 – south side west of Marina Ave	17,937 - 19,236	1,942'	330-354
Petaluma Boulevard North – east side 500' north of Shasta Ave	21,632	~3,150	~649[3]
Western Avenue – north side between Windsor Drive and Benjamin Lane	3,500	~3,150	~105[3]

Notes:
1. Existing roadway ADT based on the latest counts available (collected in 2014 and 2019),and adjusted for cumulative conditions based on projected growth. Due to feasibility uncertainties, VMT reductions under cumulative conditions were not evaluated for Petaluma Boulevard North and Western Avenue.
2. Ranges presented reflect roadway ADT and VMT reduction under existing and cumulative conditions.
3. Requires feasibility study to identify drainage and ROW requirements.

Source: Fehr & Peers, 2022

Lakeville Highway/SR-116, west of the US-101 interchange, was identified in Caltrans' D4 Pedestrian Plan[7] as missing sidewalks. Additionally, the plan identifies the segment between McNear Avenue and South McDowell Boulevard as having a moderate potential of being used for short trips. A preliminary assessment of Caltrans right-of-way maps for this segment (included in Appendix B) shows that there is sufficient roadway width outside the shoulder stripe to accommodate a sidewalk. Full implementation of the Lakeville Highway segment would be sufficient to reduce citywide VMT by 330 to 354 VMT, which would be greater than the remaining existing plus project (271) and cumulative plus project (321) VMT generated by the project over the threshold. Like Petaluma Boulevard South, this project can be screened from further CEQA analysis per the City's SB 743 Guidelines as an active transportation project, although Caltrans approval would be required through their standard review processes for projects on the state highway system.

Several challenges exist that limit the feasibility of the Lakeville Highway segment. As a Caltrans facility requiring approval from a non-City agency, the approval and timing for construction of a sidewalk gap closure along Lakeville Highway is unknown, and it cannot be determined with certainty that the sidewalk would be approved or installed before the Scott Ranch project is occupied and generating VMT. Additionally, per CAPCOA 2021 guidelines, the full extent of the sidewalk gap would need to be closed in order to achieve the VMT reduction. However, the Scott Ranch project would only be required to implement their fair share of the sidewalk gap closure and there is not currently an implementation plan to complete the remaining sidewalk gap. Finally, because design level engineering drawings (detailing the

[7] Caltrans District 4 Pedestrian Plan for the Bay Area, https://storymaps.arcgis.com/stories/9a25b6f7dcf146328663b62660a0b6f9

necessary drainage, curb and gutter and other supportive infrastructure) have not been planned or initiated, and other potential feasibility constraints cannot be known at this time. Therefore, this measure is considered infeasible for mitigating VMT impacts as part of the Scott Ranch project.

As shown in **Table 3**, two other sidewalk gaps were identified by City staff that also have the potential to reduce citywide VMT by the remaining amount over the threshold. These gaps, on Petaluma Boulevard North and Western Avenue, were identified in the 2008 Bicycle and Pedestrian Master Plan. However, these segments have not yet been studied and their feasibility is currently unknown; additional studies are needed to understand drainage and other design considerations. The need for further study at this time would increase the uncertainty of these segments above those of Petaluma Boulevard South and Lakeville Highway. The City is also embarking on a citywide study of sidewalk gaps to improve citywide pedestrian connectivity. This future study is intended to identify high priority sidewalk gap closure that could achieve measurable VMT reduction. However, this study has not been initiated and the effectiveness or feasibility of other sidewalk gap closures are not known at this time.

The combination of the pedestrian access improvements proposed by the project and the additional off-site sidewalk gap closure improvements described above would reduce the proposed project's impact to VMT to a less-than-significant level. However, in consideration of the uncertainty associated with the timing for the Petaluma Boulevard South project and the required approvals from Caltrans for the Lakeville Highway sidewalks, the impact of the proposed project on VMT would remain significant and unavoidable as the feasibility of the mitigation cannot be definitely determined.

Implement Electric Bikeshare Program (T-22-B)

Providing access to a bikeshare program can reduce VMT by encouraging a mode shift from driving to bicycling. Petaluma is in the process of launching a bikeshare pilot program in partnership with SCTA, which is expected to be operational in 2022. This program would provide approximately 40-50 shared bicycles[8] in Petaluma at various hubs near downtown in a high activity areas for a duration of three years.

CAPCOA Measure T-22-B quantifies the VMT reduction associated with expansion of a bikeshare network. This measure best applies to dock-based bikeshare systems; however, the pilot bikeshare program is a hybrid docked and dockless system. An alternative method of quantifying the VMT reduction associated with a bikeshare system is to estimate the reduction associated with each bike in the system. A recent study of bikeshare in the Sacramento region[9] found an average VMT reduction of approximately 2.8 VMT per bike. Using this methodology, the project sponsor could offset up to 271 and 321 VMT by subsidizing an additional 100 to 120 bikes. However, because bikeshare is currently a pilot program, the City of Petaluma cannot guarantee that this strategy would be available or that it would be successful as a VMT

[8] Joint Transit Advisory and Pedestrian & Bicycle Advisory Subcommittee, Discussion of Proposed Bikeshare Hub Locations, https://petaluma.granicus.com/MetaViewer.php?view_id=31&event_id=45525&meta_id=506380

[9] Fukushige, T., Fitch, D., & Handy, S. (2021). How Dock-less Electric Bike Share Influences Travel Behavior, Attitudes, Health, and Equity: Phase II. UC Office of the President: University of California Institute of Transportation Studies. Retrieved from https://escholarship.org/uc/item/0x373679

reduction measure beyond three years. Therefore, this measure is considered infeasible for mitigating VMT impacts as part of the Scott Ranch project.

Expand Bikeway Network (T-20)

Expanding the bicycle network (CAPCOA Measure T-20) in Petaluma can help to improve conditions for bicycling, increasing access to key destinations within a city and encouraging a mode shift from driving to bicycling. Specifically, this measure applies to building new Class I, Class II, or Class IV bikeways. The Petaluma's 2012 Traffic Impact Fee (TIF), assigned a proportional responsibility of the bike network build out to the existing land uses and future development, with approximately 27 percent assigned to new developments. At the time that the 2012 TIF was updated, there were approximately 75 miles of existing bike lanes and another 66 miles planned.[10] Petaluma City staff also identified gaps in multiuse paths such as the Lynch Creek Trail and the Petaluma River Trail, which would contribute to the bike network in Petaluma. Based on existing bicycle mode share in Petaluma, driving mode share, and existing and planned bikeway miles, buildout of the entire Petaluma's bikeway network as planned in the 2012 TIF could mitigate up to 0.05% of citywide VMT.

Similar to the Pedestrian Network Improvements (T-18) proposals, project-level designs have not been completed for the bikeway segments and therefore their feasibility is currently unknown. The City is also embarking on a citywide active transportation plan update to improve citywide bicycle connectivity. As this study has not been complete and the effectiveness or feasibility of other bikeway projects are not known at this time, the impact of the proposed project on VMT would remain significant and unavoidable as the feasibility of the mitigation cannot be determined.

Increase Transit Service Frequency (T-26)

Increasing the frequency of one or more transit routes can encourage a shift from driving to taking transit by improving travel times and the experience of riding transit (CAPCOA Measure T-26). Based on existing transit mode share in Petaluma, existing driving mode share, and the elasticity of transit ridership with respect to service frequency, the proposed project could offset up to 271 and 321 VMT over the threshold (the remaining VMT over the threshold after on- and near-site pedestrian network improvements as shown in **Table 2**) by increasing the frequency of an existing Petaluma Transit route by approximately 25 to 35 percent. Planning for Petaluma Transit's upcoming Short Range Transit Plan (SRTP) update could be used to identify candidate routes for prioritizing service increases.

Similar to the Pedestrian Network Improvements (T-18) proposals, there are no planned programs to expand transit service frequency or expand route coverage in Petaluma. Therefore, the impact of the proposed project on VMT would remain significant as the feasibility of implementing these transit improvements is currently unknown.

[10] Based on existing and planned facilities in the 2008 Bicycle and Pedestrian Master Plan.

Implement Subsidized or Discounted Transit Program (T-9)

Subsidizing or reducing the cost of transit for employees or residents in Petaluma can encourage a shift from driving to riding transit. Based on CAPCOA 2021 Measure T-9, existing transit mode share in Petaluma, and the elasticity of transit use with respect to fares, a transit subsidy program could achieve the remaining 271 and 321 VMT over the threshold by subsidizing transit passes for at least 2,765 participants.

Implementing a monitoring plan could reduce the number of subsidies needed to achieve the required VMT reduction by ensuring that the majority of participants in the program shift their commute modes from driving to taking transit. For example, a transit subsidy program could reduce the project's VMT below the threshold if the program could demonstrate through monitoring that five Petaluma residents shifted their commute trips to downtown San Francisco from driving to taking transit (80 VMT) five (5) days per week. While the City of Petaluma and SCTA are both exploring TDM monitoring programs, there does not currently exist a citywide or regional program for monitoring the effectiveness of on-going TDM measures such as subsidized transit fares. Because it cannot be guaranteed at this time that a monitoring program would be established before the Scott Ranch project opens and begins generating VMT, this measure is considered infeasible for mitigating VMT impacts as part of the Scott Ranch project.

Improve Transit Access, Safety, and Comfort (Non-Quantified Measure)

Petaluma Transit has identified amenities that would improve the transit experience at existing bus stops in Petaluma, including bus shelters, benches and waste collection, and wayfinding signage. While these improvements would support the use of transit by improving the experience of taking transit, CAPCOA 2021 Measure T-46 does not support a quantifiable VMT reduction.

Conclusion

With the exception of the proposed sidewalk extensions on D Street and Windsor Drive, there is limited evidence that supports on-site VMT reductions due to the project's location on the urban fringe of Petaluma. The effectiveness of traditional on-site TDM strategies are highly dependent on the project's location, as contextual features such as the mix and density of land uses and the provision of safe and convenient walking, biking, and transit connections are critical to shifting travel behaviors to non-automobile modes. For the proposed project, the established low-density development pattern and lack of convenient amenities and transit access[11] in the neighborhood adjacent to the project site, limits the effectiveness of on-site VMT-reduction measures. Increasing the density and mix of uses of the

[11] Per conversations with Jared Hall, City of Petaluma's Transit Manager, the City of Petaluma does not currently have plans to extend transit service closer to the project site due to the low density and other design characteristics of the community that would not be expected to support the transit demand required for a viable fixed transit service. Petaluma Transit's upcoming Short Range Transit Plan will evaluate the benefit of new fixed-route service to this area.

surrounding neighborhood is beyond the scope of the proposed project and would be inconsistent with existing City policies, land use designation, and zoning standards.

Implementation of the feasible on-site and near-site measures alone would not reduce project VMT by the required 26 and 31 percent. Therefore, the proposed project would need to offset VMT over the threshold, approximately 376 VMT under existing plus project conditions and 465 VMT under cumulative plus project conditions. The proposed sidewalk extensions as part of the project would provide a reduction of approximately 105 VMT under existing conditions and 144 VMT under cumulative conditions. The remaining VMT over the threshold (approximately 271 VMT under existing plus project conditions and 321 VMT under cumulative plus project conditions) would need to be offset by off-site measures. **Table 4** summarizes off-site measures evaluated for their VMT reduction potential.

Table 4. Off-Site VMT Reduction Summary

Measure	Implementation Summary to Reduce VMT below Threshold	Feasible?
Pedestrian Network Improvements (T-18)	Completion of sidewalk gaps on Petaluma Boulevard South, Lakeville Highway, or other	No
Implement Electric Bikeshare Program (T-22-B)	100-120 additional shared bikes	No
Expand Bikeway Network (T-20)	Proportional share of bike network buildout	No
Increase Transit Service Frequency (T-26)	25-30% increase in frequency to one Petaluma Transit route	No
Implement Subsidized or Discounted Transit Program (T-9)	Petaluma Transit passes for 2,800 residents or Golden Gate Transit passes for at least 5 Petaluma to SF commuters	No

Source: Fehr & Peers, 2021.

The potential off-site measures explored for VMT mitigation of the Scott Ranch project would reduce the costs and improve the safety and convenience for people walking, biking, and riding transit in Petaluma. While there is evidence that all these measures can reduce vehicle miles traveled enough to off-set the amount generated by the Scott Ranch project over the threshold, none are currently feasible for VMT mitigation purposes given the uncertainties related to outside agency approval requirements, the timing that it will take to implement these measures, the lack of design or plans in place to implement, and the lack of a Citywide adminstration plan to oversee the collection of VMT fees and the implementation and monitoring of VMT reductions. Therefore, impacts of the proposed project would remain significant and unavoidable since there is no feasible mitigation.

Appendix A: Detailed VMT Reduction Calculations

PEDESTRIAN NETWORK IMPROVEMENTS

	Total VMT Over Threshold	Total VMT Over Threshold - On-Site Reductions
Existing	376	271
Cumulative	465	321

T-17. Pedestrian Network Improvements

= (sidewalk coverage with project - existing sidewalk coverage) / (existing sidewalk coverage) x elasticity

On-Site Reductions

	Existing Conditions			Cumulative Conditions		
	Roadway ADT	**Facility Length (ft)**	**Total VMT**	**Roadway ADT**	**Facility Length (ft)**	**Total VMT**
D Street (1)	6,780	1,200	78	6,780	1,800	117
Windsor Drive (2)	1,800	1,500	27	1,800	1,500	27
Total On-Site Reductions			105			144
Required VMT Reduction Per HH			13			N/A
HH VMT Offset by On-Site Improvements			7.8			N/A
Remaining VMT to Mitigate (after on-site improvements)			**271**			**321**

Off-Site Reductions

	Existing Conditions			Cumulative Conditions		
	Roadway ADT	**Facility Length**	**Total VMT**	**Roadway ADT**	**Facility Length**	**Total VMT**
Petaluma Boulevard South (McNears to Crystal Lane) (2)	10,851	0.13	73	11,529	0.13	78
Lakeville Highway (3)	17,937	0.37	330	19,236	0.37	354
Petaluma Boulevard North (2)	26,556	0.60	797	N/A	N/A	N/A
Western Avenue between Windsor & Benjamin (2)	3,294	0.60	99	N/A	N/A	N/A

	Existing Conditions		Cumulative Conditions	
Potential Off-Site Improvement Scenarios	**PBS + LH (partial)**	**LH (partial)**	**PBS + LH (partial)**	**LH (partial)**
Petaluma Boulevard South VMT Reduction	73	0	73	0
Lakeville Highway VMT Reduction	198	271	248	321

Notes:

- Existing roadway ADT based on the latest counts available (collected in 2014 and 2019), and adjusted for cumulative conditions based on projected growth.
- Due to feasibility uncertainties, VMT reductions under cumulative conditions were not evaluated for Petaluma Boulevard North and Western Avenue.
- Cost estimate for Petaluma Boulevard South from bid for road diet work (lowest bid). Cost estimate for Lakeville Highway based on estimates from Petaluma Public Works.
- Potential off-site improvement scenarios were developed to understand the range of costs that could be required to off-set VMT over the threshold.

Sources:

(1) 2019 ADT

(2) 2014 Citywide ADT

(3) Unincorporated Sonoma County ADT

BIKESHARE

	Total VMT Over Threshold	Total VMT Over Threshold - On-Site Reductions
Existing	376	271
Cumulative	465	321

T-21-B. Implement Electric Bikeshare Program (Modified)

= average VMT reduced per bike x additional bikeshare bikes

	Existing	**Cumulative**
VMT Per Bike	2.8	2.8
Bikes Needed	97	115
Bikes Per Station	8	8
Stations Needed	13	15

Source: How Dock-less Electric Bike Share Influences Travel Behavior, Attitudes, Health, and Equity: Phase II, 2021. https://escholarship.org/uc/item/0x373679

BIKE NETWORK IMPROVEMENTS

	Total VMT Over Threshold	Total VMT Over Threshold - On-Site Reductions	Total Citywide VMT
Existing	376	271	4,418,264
Cumulative	465	321	

T-18A. Construct or Improve Bike Facility

= percent of VMT on roadway x (days of use/365 x (active transportation adjustment factor + credits for key destinations) x growth factor adjustment x existing bicycle trip length)/existing average vehicle trip length		
Percent of plan/community VMT on parallel roadway	0.035%	
Active transportation adjustment factor	0.0019	CAPCOA 2021, Table T-18.1
Credits for key destinations near project	0	CAPCOA 2021, Table T-18.2
Growth Factor Adjustment	1.54	CAPCOA 2021, Table T-18.3
Days of Use (Marin/Solano Average)	300	CAPCOA 2021, Table T-18.4
Existing regional average one-way bicycle trip length	2.1	CAPCOA 2021, Table T-9.1
Existing regional average one-way vehicle trip length	12.4	CAPCOA 2021, Table T-9.1
Percent Reduction	0.0000144%	
VMT Reduction	0.64	

T-19. Expand Bikeway Network

= percent change in bikeway miles x bicycle modeshare x existing average bicycle trip length x elasticity of bike commuters)/(existing average vehicle trip length x vehicle modeshare)		
Existing bikeway miles in plan/community	75	Petaluma Traffic Mitigation Fee Program Update (2012)
Bikeway miles in plan/community with measure	140	Petaluma Traffic Mitigation Fee Program Update (2012)
Percent change in bikeway miles	88%	
Percent reduction from full buildout	0.05%	
VMT reduction from full buildout	2,101	

TRANSITION SERVICE IMPROVEMENTS AND TRANSIT SUBSIDIES

	Total VMT Over Threshold	Total VMT Over Threshold - On-Site Reductions	Total Citywide VMT
Existing	376	271	4,418,264
Cumulative	465	321	

T-25. Increase Transit Service Frequency

= (percent increase in transit frequency x level of implementation x elasticity x transit modeshare x statewide mode shift factor)/driving modeshare

Percent increase in transit frequency (0-300%)	30%		
Level of implementation (% of existing routes)	8%	1	12 = 6 Petaluma Transit + 3 Sonoma County Transit + 2 Golden Gate Transit + 1 SMART
Percent Reduction	0.01%		
VMT Reduced	333		

T-8. Transit Subsidy Program

CAPCOA Methodology

*= percent subsidy x percent eligible for subsidy x percent VMT from population x transit modeshare x elasticity of transit boardings * percent of transit trips that would otherwise be made in a vehicle*

	Petaluma Transit	Golden Gate Transit
Transit fare without subsidy	$3.80	$10.80
Subsidy amount	$3.80	$10.80
Number eligible for subsidy	2,800	2,800
Percent of residents eligible for subsidy	3.80%	3.80%
Percent VMT from population	100%	100%
Percent Reduction	0.01%	0.01%
VMT Reduced	325	325

Subsidy Program with Monitoring (assumes 100% participation)

= average daily VMT x participants

	Petaluma Transit	Golden Gate Transit
Transit fare without subsidy	$3.80	$10.80
Subsidy amount	$3.80	$10.80
Average daily VMT reduced	7	80
Minimum participants needed	46	5
VMT Reduced	322	400

Affordable Housing Options for VMT per Cap Mitigation						
	ITE rate	Daily Rate	VMT per Cap by Land Use	Project	Same total	Added units
SFDU	210	9.43	20.5	28	13	28
Affordable	223	4.81	10.5	0	15	33
VMT per Cap for Project				20.5	15.1	15.1

Threshold 15.1

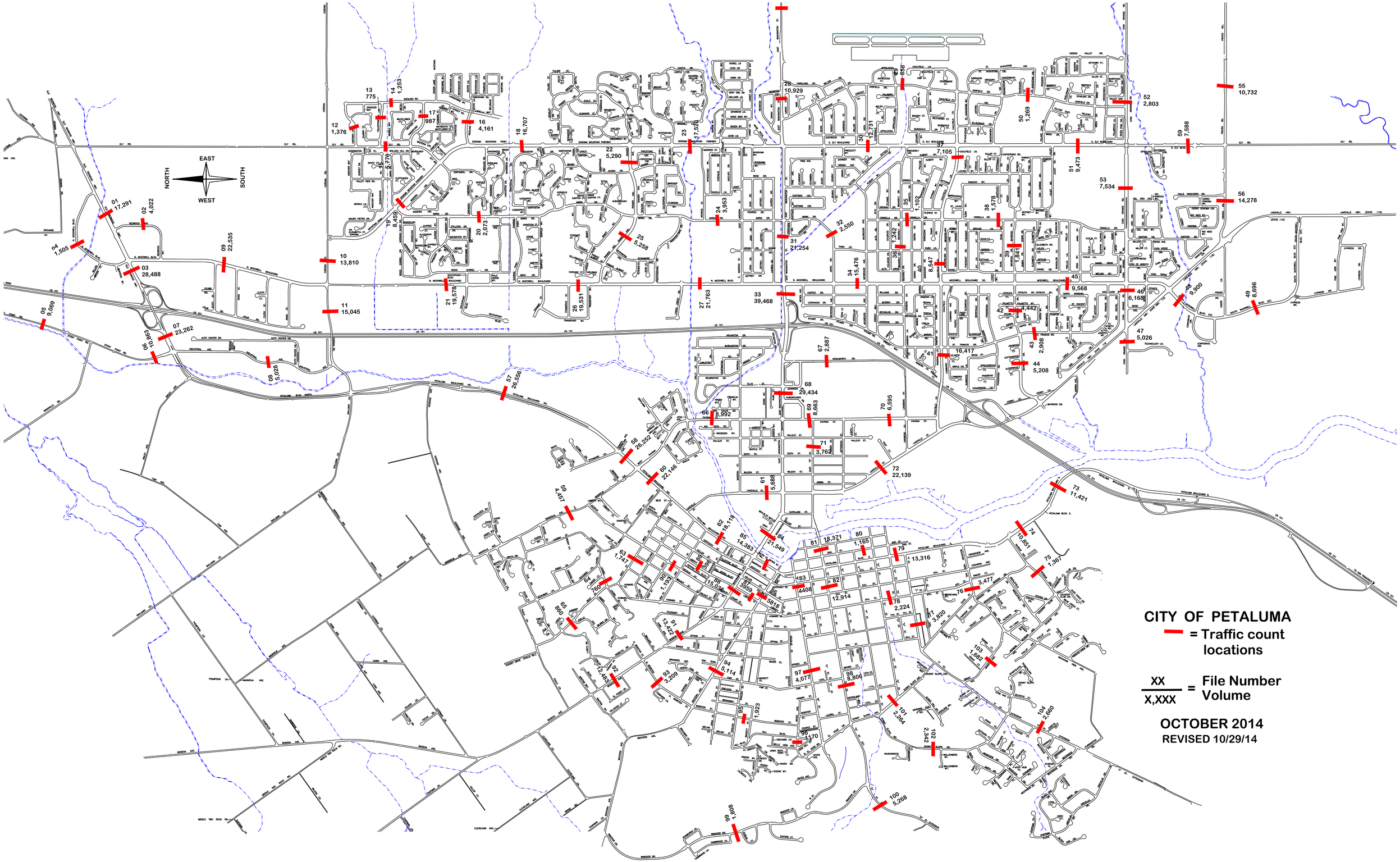
Appendix B: Sidewalk Improvement Projects

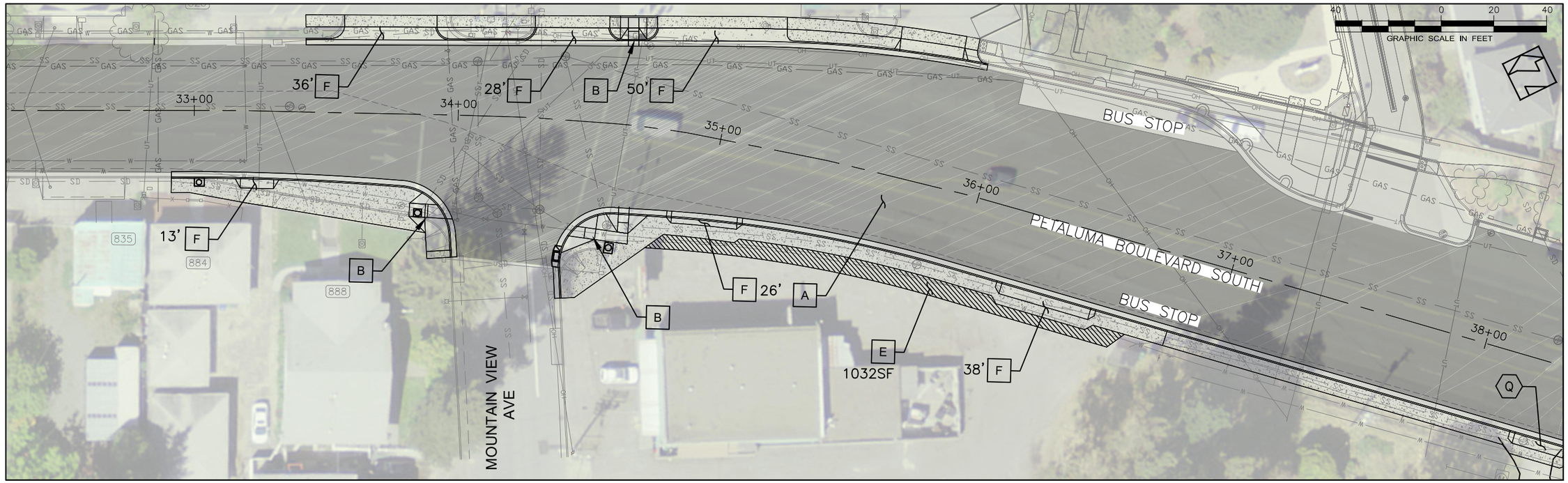
Location: D St S/O Sunnyslope Ave
Date Range: 5/2/2019 - 5/8/2019
Site Code: 01

	Thursday			Friday			Saturday			Sunday			Monday			Tuesday			Wednesday					
	5/2/2019			5/3/2019			5/4/2019			5/5/2019			5/6/2019			5/7/2019			5/8/2019			Mid-Week Average		
Time	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total
12:00 AM	5	12	17	5	10	15	12	16	28	-	-	-	-	-	-	-	-	-	-	-	-	5	12	17
1:00 AM	3	0	3	2	2	4	5	4	9	-	-	-	-	-	-	-	-	-	-	-	-	3	0	3
2:00 AM	2	2	4	1	3	4	2	7	9	-	-	-	-	-	-	-	-	-	-	-	-	2	2	4
3:00 AM	3	7	10	3	5	8	1	7	8	-	-	-	-	-	-	-	-	-	-	-	-	3	7	10
4:00 AM	10	11	21	11	14	25	7	10	17	-	-	-	-	-	-	-	-	-	-	-	-	10	11	21
5:00 AM	29	61	90	28	61	89	12	21	33	-	-	-	-	-	-	-	-	-	-	-	-	29	61	90
6:00 AM	60	314	374	44	250	294	33	65	98	-	-	-	-	-	-	-	-	-	-	-	-	60	314	374
7:00 AM	126	**403**	**529**	119	290	409	66	121	187	-	-	-	-	-	-	-	-	-	-	-	-	126	**403**	**529**
8:00 AM	**183**	320	503	**219**	**314**	**533**	95	**169**	264	-	-	-	-	-	-	-	-	-	-	-	-	**183**	320	503
9:00 AM	160	194	354	169	191	360	**142**	152	**294**	-	-	-	-	-	-	-	-	-	-	-	-	160	194	354
10:00 AM	145	164	309	148	184	332	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	145	164	309
11:00 AM	155	139	294	176	166	342	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	155	139	294
12:00 PM	161	148	309	231	180	411	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	161	148	309
1:00 PM	225	175	400	327	145	472	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	225	175	400
2:00 PM	264	177	441	460	161	621	232	183	415	-	-	-	-	-	-	-	-	-	-	-	-	264	177	441
3:00 PM	414	**194**	608	646	185	831	276	208	**484**	-	-	-	-	-	-	-	-	-	-	-	-	414	**194**	608
4:00 PM	**548**	184	**732**	**698**	161	**859**	237	**228**	465	-	-	-	-	-	-	-	-	-	-	-	-	**548**	184	**732**
5:00 PM	525	161	686	633	**188**	821	**279**	200	479	-	-	-	-	-	-	-	-	-	-	-	-	525	161	686
6:00 PM	340	143	483	336	131	467	179	146	325	-	-	-	-	-	-	-	-	-	-	-	-	340	143	483
7:00 PM	160	93	253	184	104	288	141	111	252	-	-	-	-	-	-	-	-	-	-	-	-	160	93	253
8:00 PM	77	80	157	78	92	170	119	89	208	-	-	-	-	-	-	-	-	-	-	-	-	77	80	157
9:00 PM	35	78	113	65	57	122	82	76	158	-	-	-	-	-	-	-	-	-	-	-	-	35	78	113
10:00 PM	26	29	55	41	43	84	81	66	147	-	-	-	-	-	-	-	-	-	-	-	-	26	29	55
11:00 PM	21	16	37	27	24	51	36	44	80	-	-	-	-	-	-	-	-	-	-	-	-	21	16	37
Total	3,677	3,105	6,782	4,651	2,961	7,612	2,037	1,923	3,960	-	-	-	-	-	-	-	-	-	-	-	-	3,677	3,105	6,782
Percent	54%	46%	-	61%	39%	-	51%	49%	-	-	-	-	-	-	-	-	-	-	-	-	-	54%	46%	-
AM Peak	08:00	07:00	07:00	08:00	08:00	08:00	09:00	08:00	09:00	-	-	-	-	-	-	-	-	-	-	-	-	08:00	07:00	07:00
Vol.	183	403	529	219	314	533	142	169	294	-	-	-	-	-	-	-	-	-	-	-	-	183	403	529
PM Peak	16:00	15:00	16:00	16:00	17:00	16:00	17:00	16:00	15:00	-	-	-	-	-	-	-	-	-	-	-	-	16:00	15:00	16:00
Vol.	548	194	732	698	188	859	279	228	484	-	-	-	-	-	-	-	-	-	-	-	-	548	194	732

1. Mid-week average includes data between Tuesday and Thursday.

Project Manager: (415) 310-6469
project.manager.ca@idaxdata.com


NORTH
EAST
SOUTH
WEST
CITY OF PETALUMA
= Traffic count locations
XX / X,XXX = File Number Volume
OCTOBER 2014
REVISED 10/29/14



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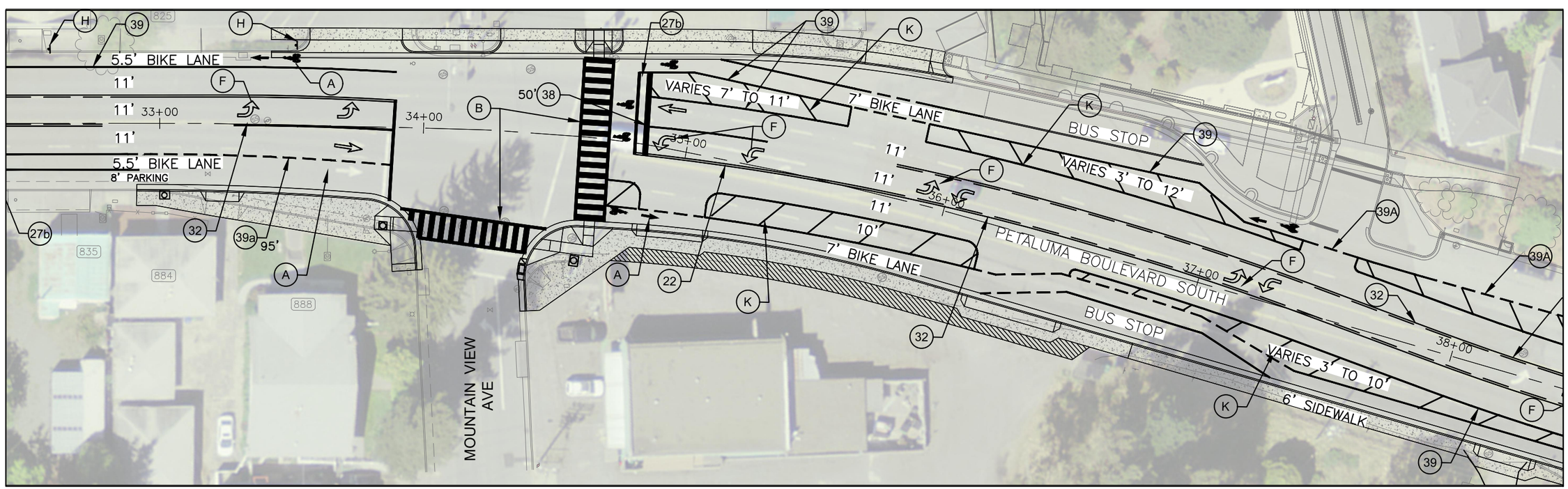


STRIPING PLAN- PETALUMA BLVD S

STA. 32+50 TO STA. 38+00

DATE: NOVEMBER 2021
DESIGNED BY: JS
DRAWN BY: MT
CHECKED BY: JB

PROJECT NO.
C16101601

REGISTERED PROFESSIONAL ENGINEER
ROBERT A STUDDARD
NO. 79843
STATE OF CALIFORNIA

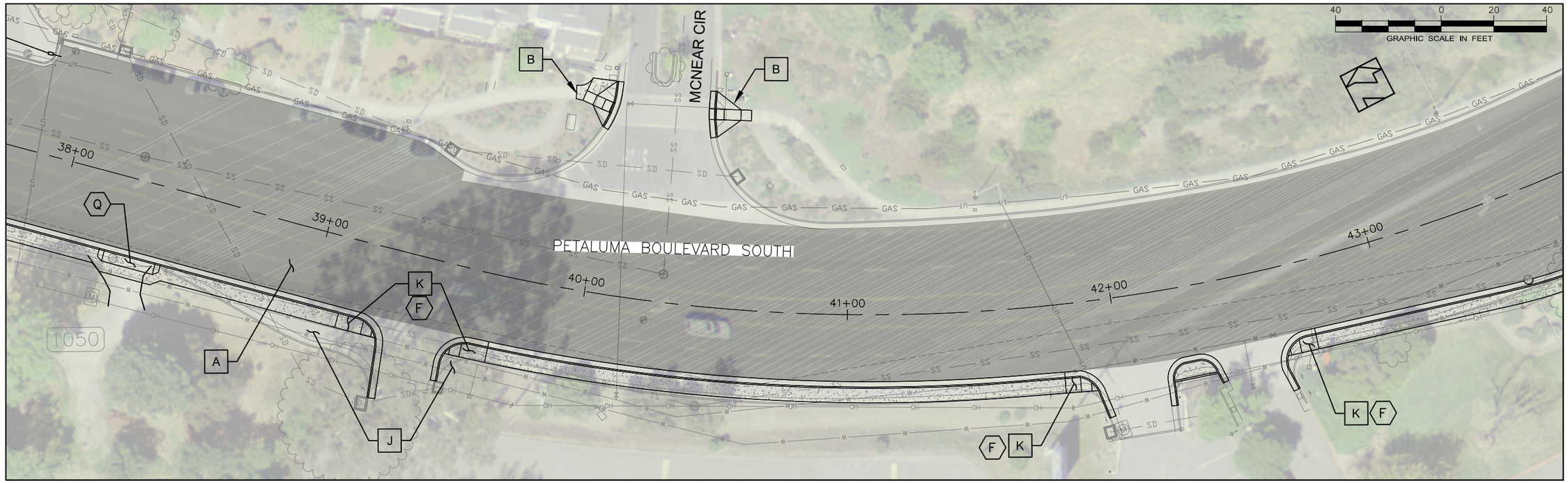
CITY OF PETALUMA
PUBLIC WORKS & UTILITIES
202 N. McDowell Blvd., PETALUMA, CALIFORNIA, 94954
PH. 707-778-4546 FAX. 707-778-4508

PETALUMA BLVD S ROAD DIET

PAVING / STRIPING PLAN

SHEET
C7
10 OF 32

MATCH LINE - SEE TOP RIGHT, PREVIOUS SHEET



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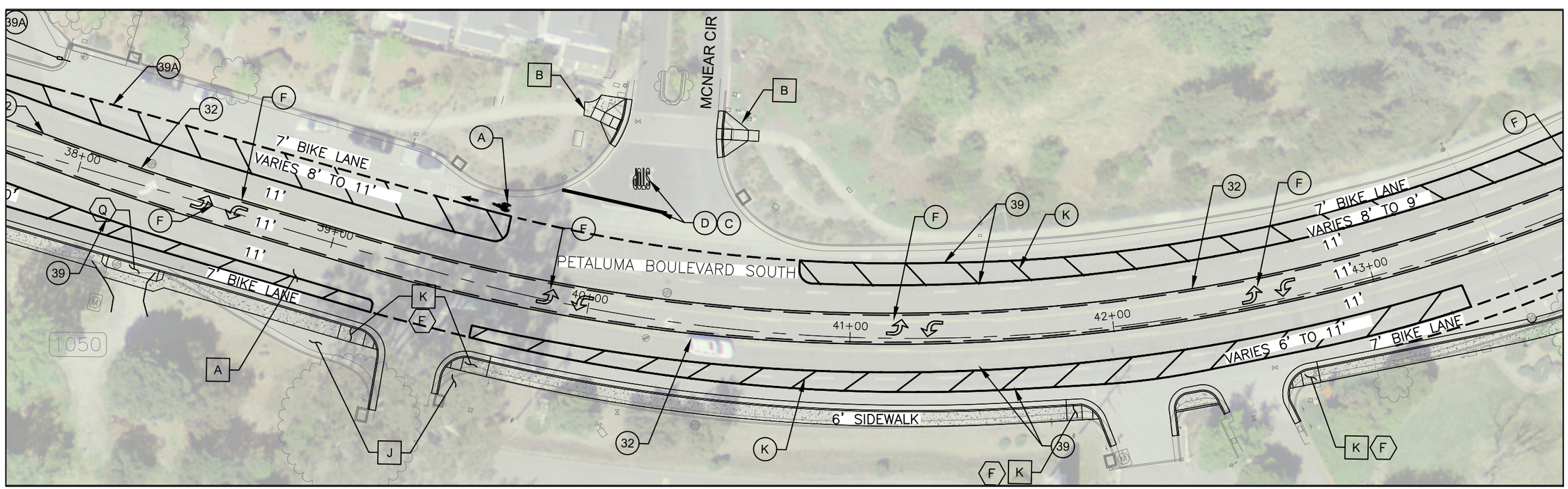

STRIPING PLAN- PETALUMA BLVD S

STA. 38+00 TO STA. 43+50

MATCH LINE - SEE TOP LEFT, NEXT SHEET

MATCH LINE - SEE BOTTOM LEFT, NEXT SHEET

DATE: NOVEMBER 2021

DESIGNED BY: JS

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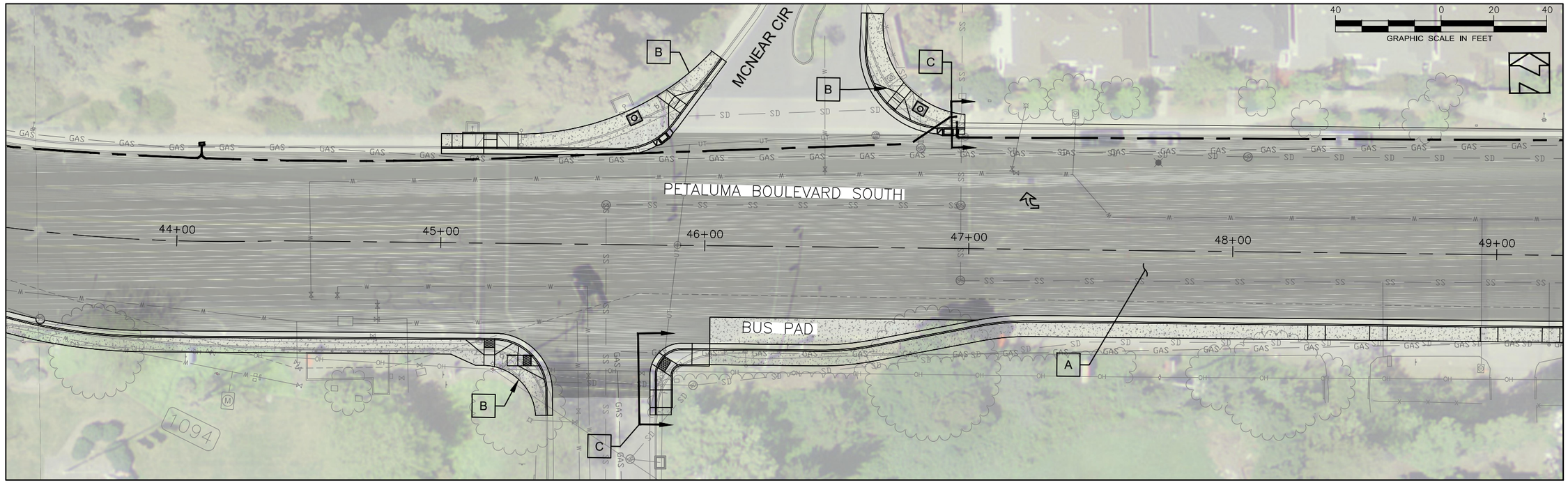
PETALUMA BLVD S ROAD DIET

PAVING / STRIPING PLAN

SHEET
C8

MATCH LINE - SEE TOP RIGHT, PREVIOUS SHEET



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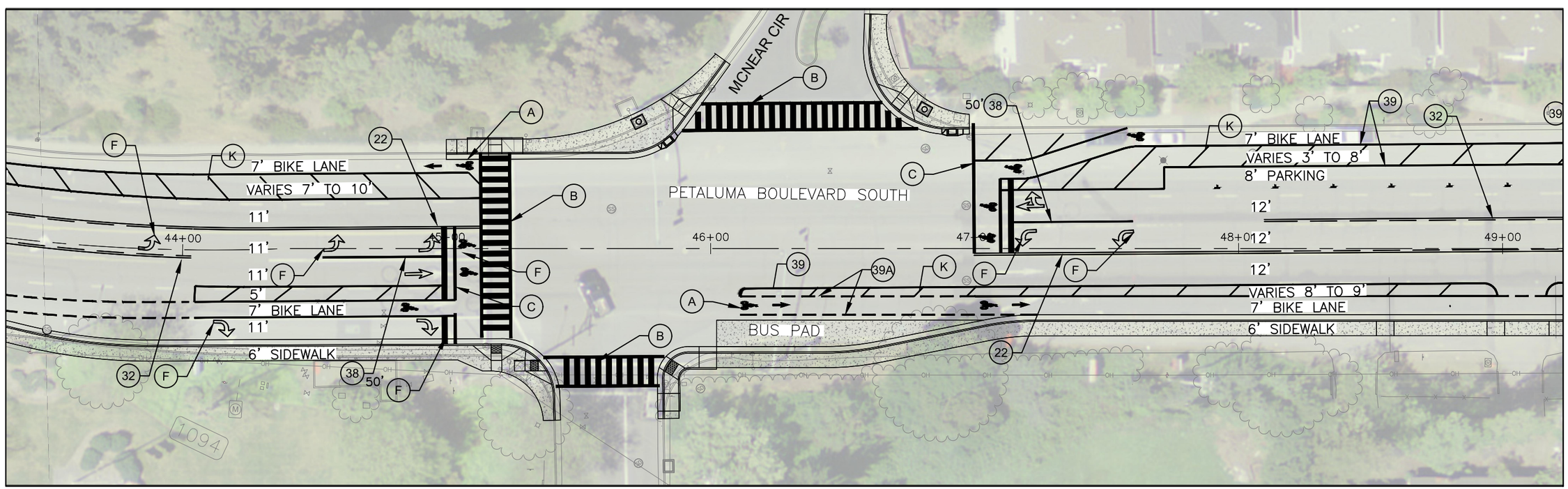

MATCH LINE - SEE BOTTOM LEFT, NEXT SHEET

STRIPING PLAN- PETALUMA BLVD S

STA. 43+50 TO STA. 49+00

DATE: NOVEMBER 2021
DESIGNED BY: JS
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PETALUMA 1858

PETALUMA BLVD S ROAD DIET

PAVING / STRIPING PLAN

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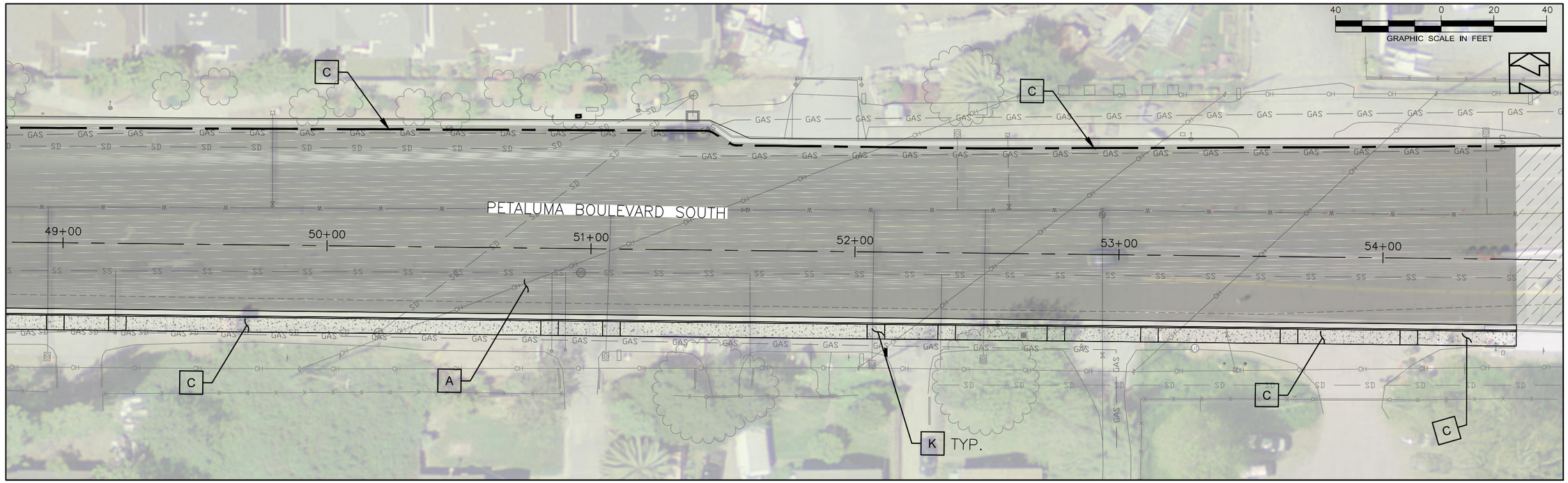
C9
12 OF 32

MATCH LINE - SEE TOP RIGHT, PREVIOUS SHEET



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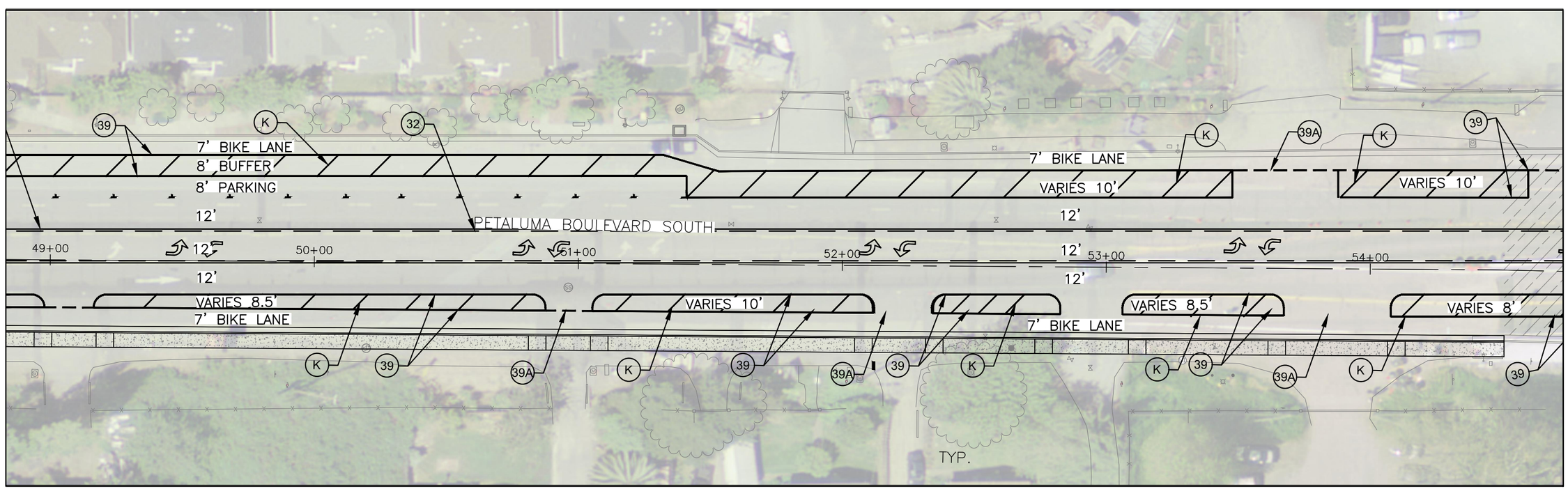

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STRIPING PLAN- PETALUMA BLVD S

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DATE: NOVEMBER 2021
DESIGNED BY: JS
DRAWN BY: MT
CHECKED BY: JB

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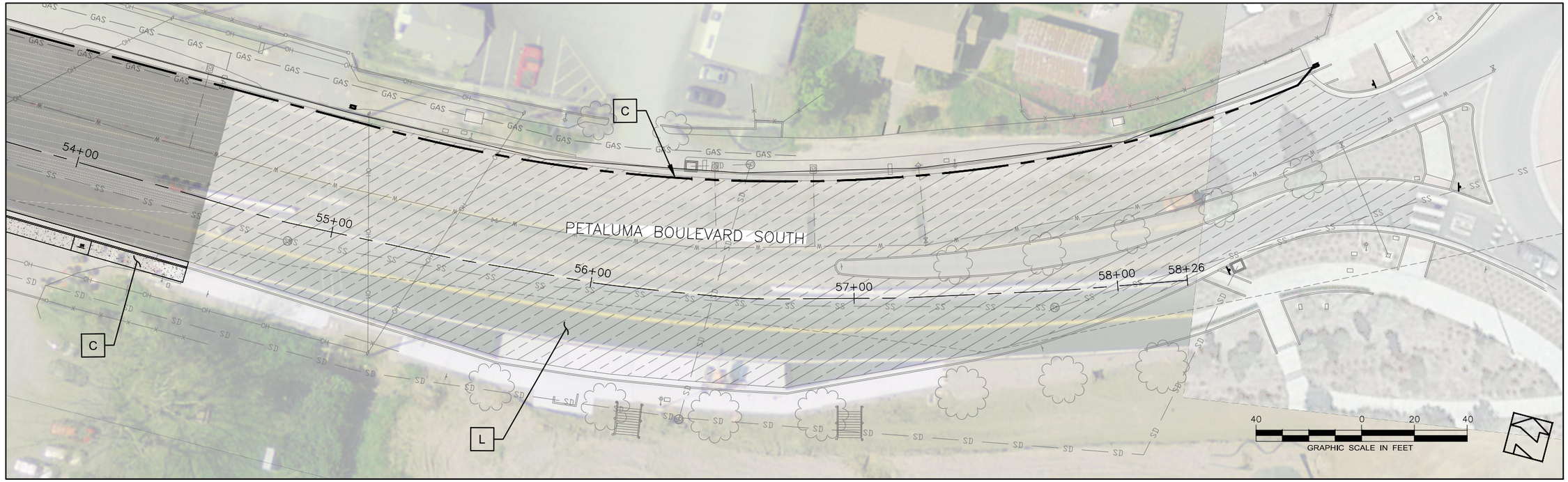
PETALUMA BLVD S ROAD DIET

PAVING / STRIPING PLAN

SHEET
C10
13 OF 32

MATCH LINE - SEE TOP RIGHT, PREVIOUS SHEET



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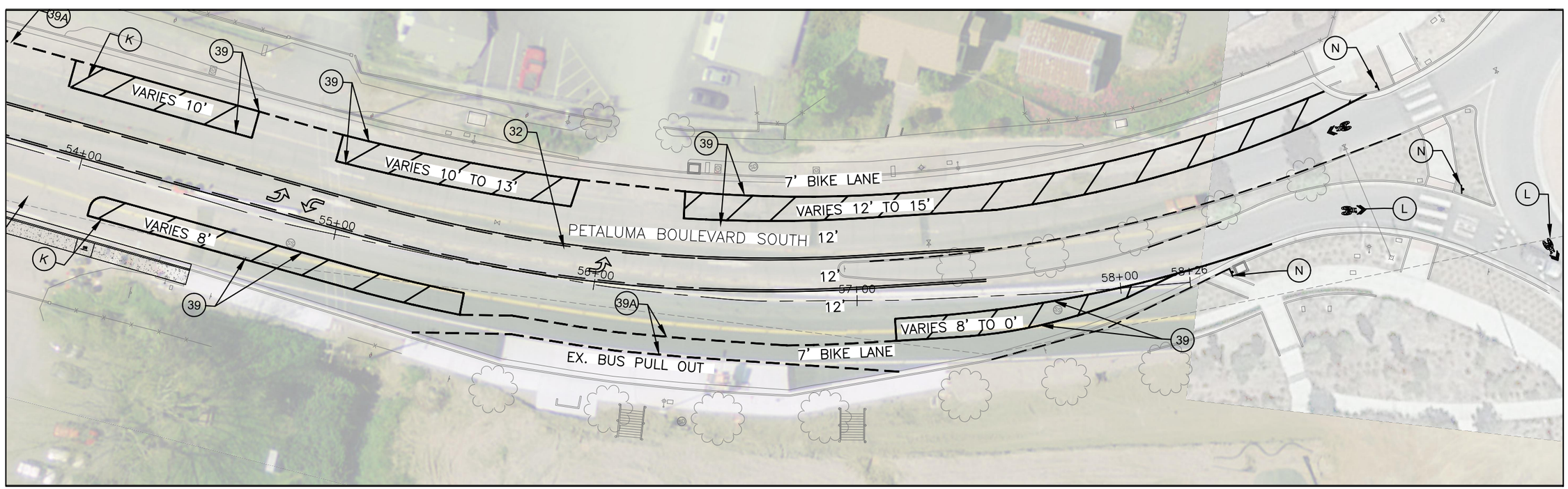
MATCH LINE - SEE BOTTOM RIGHT, PREVIOUS SHEET



STRIPING PLAN- PETALUMA BLVD S

STA. 54+00 TO STA. 57+00

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PETALUMA BLVD S ROAD DIET

PAVING / STRIPING PLAN

SHEET
C11
14 OF 32

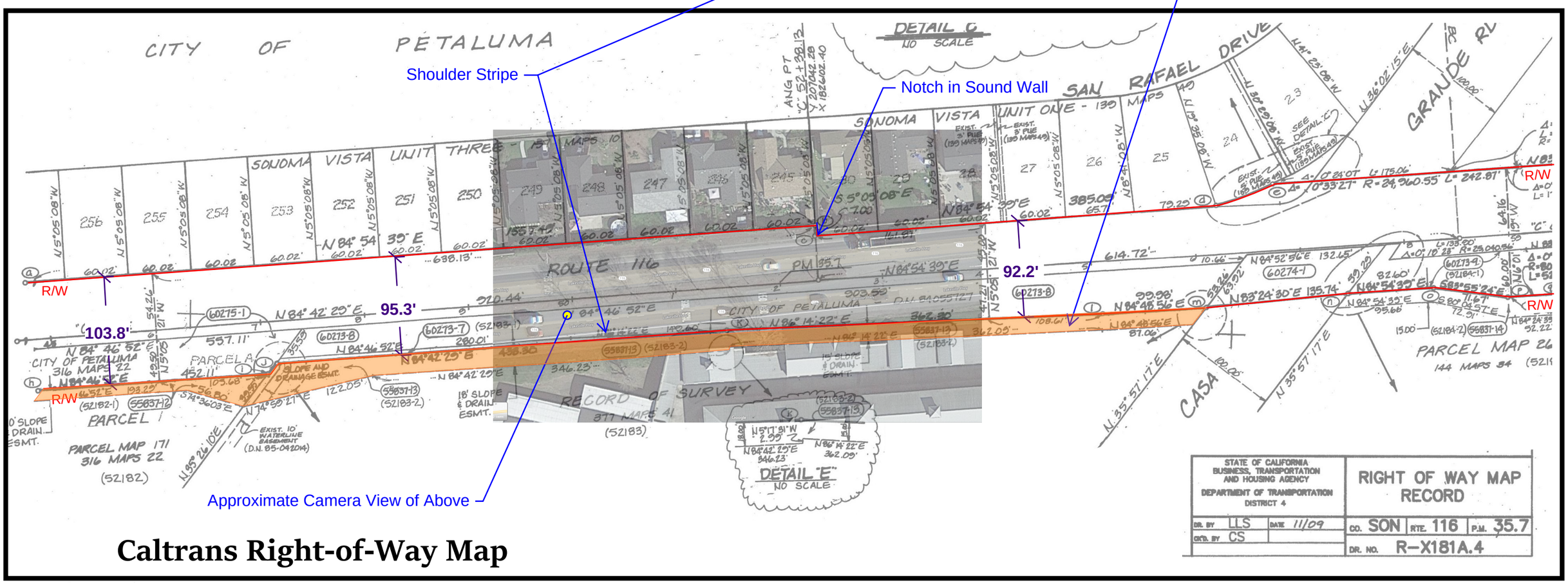
Lakeville Sidewalk Feasibility Assessment

Fehr & Peers
10/22/2021

Not to Scale

PRELIMINARY - NOT FOR CONSTRUCTION
ADDITIONAL ANALYSIS AND ENGINEERING REQUIRED

Streetview (Looking East)



Caltrans Right-of-Way Map

Scott Ranch Project

72-Hour Vehicle Traffic Counts,
May 2019, Fehr and Peers

Location: D St S/O Sunnyslope Ave
Date Range: 5/2/2019 - 5/8/2019
Site Code: 01

	Thursday			Friday			Saturday			Sunday			Monday			Tuesday			Wednesday					
	5/2/2019			5/3/2019			5/4/2019			5/5/2019			5/6/2019			5/7/2019			5/8/2019			Mid-Week Average		
Time	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total
12:00 AM	5	12	17	5	10	15	12	16	28	-	-	-	-	-	-	-	-	-	-	-	-	5	12	17
1:00 AM	3	0	3	2	2	4	5	4	9	-	-	-	-	-	-	-	-	-	-	-	-	3	0	3
2:00 AM	2	2	4	1	3	4	2	7	9	-	-	-	-	-	-	-	-	-	-	-	-	2	2	4
3:00 AM	3	7	10	3	5	8	1	7	8	-	-	-	-	-	-	-	-	-	-	-	-	3	7	10
4:00 AM	10	11	21	11	14	25	7	10	17	-	-	-	-	-	-	-	-	-	-	-	-	10	11	21
5:00 AM	29	61	90	28	61	89	12	21	33	-	-	-	-	-	-	-	-	-	-	-	-	29	61	90
6:00 AM	60	314	374	44	250	294	33	65	98	-	-	-	-	-	-	-	-	-	-	-	-	60	314	374
7:00 AM	126	**403**	**529**	119	290	409	66	121	187	-	-	-	-	-	-	-	-	-	-	-	-	126	**403**	**529**
8:00 AM	**183**	320	503	**219**	**314**	**533**	95	**169**	264	-	-	-	-	-	-	-	-	-	-	-	-	**183**	320	503
9:00 AM	160	194	354	169	191	360	**142**	152	**294**	-	-	-	-	-	-	-	-	-	-	-	-	160	194	354
10:00 AM	145	164	309	148	184	332	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	145	164	309
11:00 AM	155	139	294	176	166	342	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	155	139	294
12:00 PM	161	148	309	231	180	411	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	161	148	309
1:00 PM	225	175	400	327	145	472	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	225	175	400
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5:00 PM	525	161	686	633	**188**	821	**279**	200	479	-	-	-	-	-	-	-	-	-	-	-	-	525	161	686
6:00 PM	340	143	483	336	131	467	179	146	325	-	-	-	-	-	-	-	-	-	-	-	-	340	143	483
7:00 PM	160	93	253	184	104	288	141	111	252	-	-	-	-	-	-	-	-	-	-	-	-	160	93	253
8:00 PM	77	80	157	78	92	170	119	89	208	-	-	-	-	-	-	-	-	-	-	-	-	77	80	157
9:00 PM	35	78	113	65	57	122	82	76	158	-	-	-	-	-	-	-	-	-	-	-	-	35	78	113
10:00 PM	26	29	55	41	43	84	81	66	147	-	-	-	-	-	-	-	-	-	-	-	-	26	29	55
11:00 PM	21	16	37	27	24	51	36	44	80	-	-	-	-	-	-	-	-	-	-	-	-	21	16	37
Total	3,677	3,105	6,782	4,651	2,961	7,612	2,037	1,923	3,960	-	-	-	-	-	-	-	-	-	-	-	-	3,677	3,105	6,782
Percent	54%	46%	-	61%	39%	-	51%	49%	-	-	-	-	-	-	-	-	-	-	-	-	-	54%	46%	-
AM Peak	08:00	07:00	07:00	08:00	08:00	08:00	09:00	08:00	09:00	-	-	-	-	-	-	-	-	-	-	-	-	08:00	07:00	07:00
Vol.	183	403	529	219	314	533	142	169	294	-	-	-	-	-	-	-	-	-	-	-	-	183	403	529
PM Peak	16:00	15:00	16:00	16:00	17:00	16:00	17:00	16:00	15:00	-	-	-	-	-	-	-	-	-	-	-	-	16:00	15:00	16:00
Vol.	548	194	732	698	188	859	279	228	484	-	-	-	-	-	-	-	-	-	-	-	-	548	194	732

1. Mid-week average includes data between Tuesday and Thursday.

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