Kimley»Horn

MEMORANDUM

To: Danae Hall, AICP
Kimley-Horn and Associates, Inc.

From: Elizabeth Chau, P.E.
Kimley-Horn and Associates, Inc.

Date: July 7, 2026

Subject: 7825 San Leandro Street – Transportation Study

This study summarizes the findings of a transportation analysis of the proposed project (the "Project") at 7825 San Leandro Street in Oakland, California (the "City"). The Project would redevelop an existing 14.9-acre parcel with various industrial buildings into a 310,717 square-foot warehouse building. The proposed project plans to utilize the existing three driveways at 76th Avenue, 77th Avenue, and 81st Avenue. The Project would additionally provide an off-street parking inventory of 228 vehicular stalls and 46 trailer parking stalls. A site plan of the Project site is provided in **Attachment A**.

This study was conducted to determine the potential impact of the Project in accordance with the Oakland *Transportation Impact Review Guidelines*, which includes trip generation calculations, a traffic counts summary, a collision history summary, and an assessment of the Project's compliance with California Environmental Quality Act (CEQA) requirements.

PROJECT DESCRIPTION

Prologis, Inc. (the "Project Applicant") intends to redevelop the approximately 14.9-acre property at 7825 San Leandro Street. The Project site is immediately bounded to the north, east, south, and west by Hegenberger Road, San Leandro Street, existing commercial uses, and a railroad right-of-way (ROW), respectively. Additionally, Elmhurst Creek is located along the southwest corner of the Project site.

Surrounding land uses include commercial and industrial uses on all sides. Neighboring businesses include the San Francisco Oakland Truck Stop to the south, U-Haul Moving & Storage of Oakland Coliseum and Lakeside Non-Ferrous Metals to the east, the Oakland Arena and Coliseum to the north, and Public Storage to the wet. A Class I multi-use trail, Bay Area Rapid Transit (BART) aerial structure, and Union Pacific Railroad (UPRR) ROW are immediately east of San Leandro Street. The Coliseum BART Station is located approximately 1,000 feet northwest of the Project site.

The Project site has historically been occupied by the ABI Foundry. The site is zoned as Commercial Industrial Mix 2 (CIX-2) and Industrial General (IG). No changes to the zoning or land use designation are anticipated as part of the Project.

The Project would construct a new warehouse building on the property. The footprint of the new warehouse would be approximately 310,717 square feet with 285,717 square feet of warehouse space and 25,000 square feet of accessory office space. Surface parking and vehicular circulation would be provided along the north, east, west, and south sides of the Project site. Truck parking

would be located within the Project boundaries along the east side of the Project site. Loading docks would be located along the east side of the proposed warehouse building.

The Project site will utilize three existing driveways at 76th Avenue, 77th Avenue, and 81st Avenue. The driveway entrances at 76th Avenue and 77th Avenue will remain unsignalized and same for the signalized driveway at 81st Avenue. Employee automobiles would have access to the Project site using all three driveways. Trucks would have access to the Project site using the driveway entrances at 77th Avenue and 81st Avenue. All three driveway entrances would be secured.

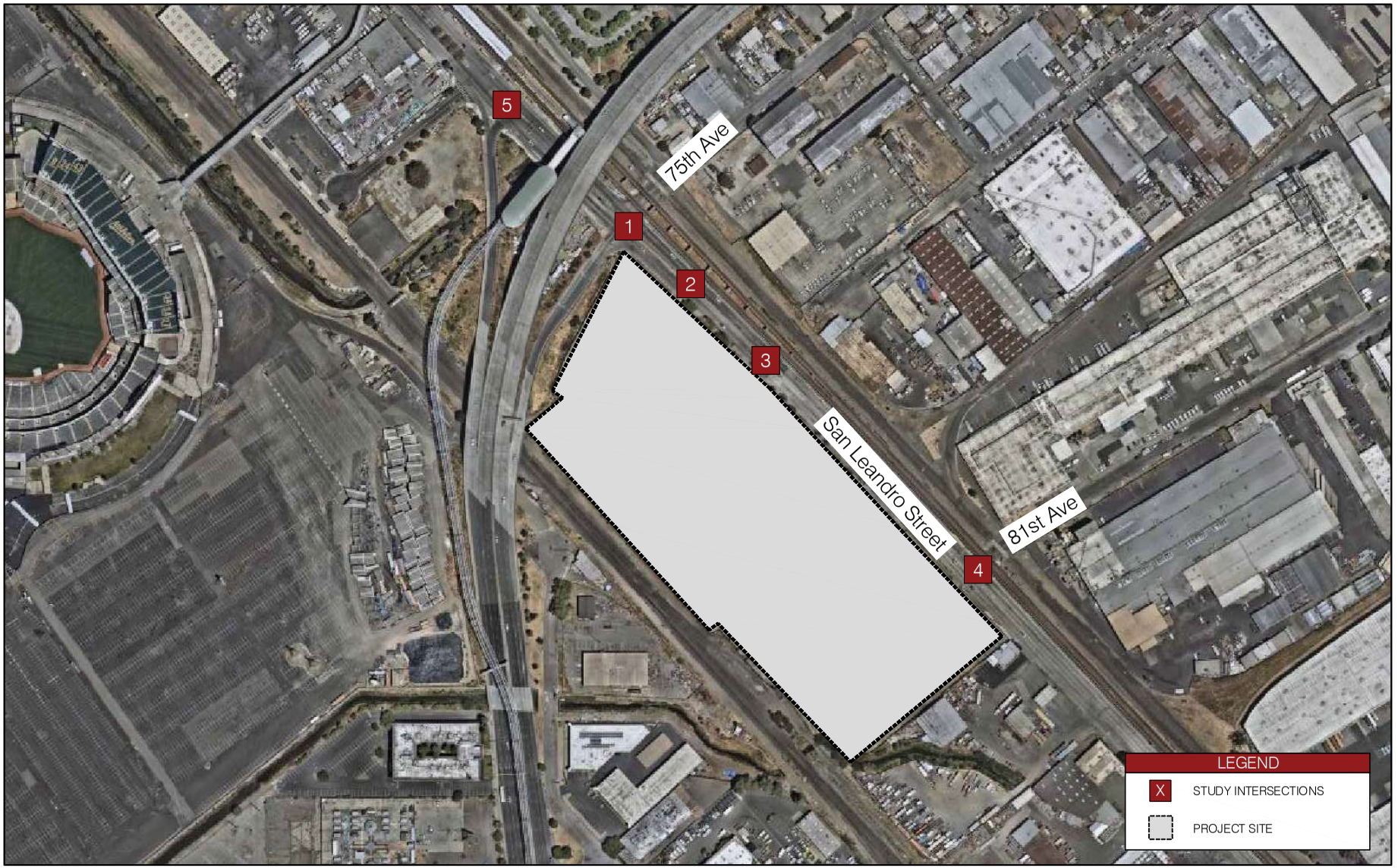
Study Area

The Project site is shown in **Figure 1.** A study area extending approximately 500 feet from the limits of the Project site was selected as the study area in accordance with the Oakland *Transportation Impact Review Guidelines* and confirmed by City staff.

STUDY INTERSECTIONS

In consultation with City of Oakland staff, the following study intersections were included for evaluation:

1. **San Leandro Street & 75th Avenue** – This is an existing signalized intersection north of the Project site. The west leg of the intersection is the eastbound exit ramp of Hegenberger Road.
2. **San Leandro Street & 76th Avenue** – This is an existing unsignalized intersection that serves as a driveway to existing industrial land uses. The west leg of the intersection is planned to be a full-access driveway to the Project site.
3. **San Leandro Street & 77th Avenue** – This is an existing unsignalized intersection that serves as a driveway to existing industrial land uses. The west leg of the intersection is planned to be a full-access driveway to the Project site.
4. **San Leandro Street & 81st Avenue** – This is an existing signalized intersection that serves as a driveway to existing industrial land uses. The west leg of the intersection is planned to be a full-access driveway to the Project site.
5. **San Leandro Street & Hegenberger Road Southbound On-ramp** – This is an existing signalized intersection north of the Project site. The west leg of the intersection is the southbound entrance ramp for Hegenberger Road.



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FIGURE 1
PROJECT LOCATION AND STUDY INTERSECTIONS

July 2026

7825 San Leandro Street

STUDY AREA DESCRIPTION

A description of the local roadway network and existing pedestrian, bicycle, and transit facilities near the Project site is provided.

Existing Roadway Network

Interstate 880 (I-880) is a north-south freeway facility that traverses through the east side of the City of Oakland. I-880 extends from a junction with US 101 in San Jose in the south to a junction with Interstate 80 (I-80) in Oakland north of the Project site. The facility provides the Project site access to regionally significant destinations and transportation corridors, including San Jose, San Francisco, Sacramento, as well as I-80 and US 101, respectively. The posted speed limit is 65 miles per hour.

Hegenberger Road is a six-lane roadway designated as an arterial in the City of Oakland *General Plan*. The roadway connects International Boulevard with Oakland International Airport. The roadway is limited access-controlled and is accessible from San Leandro Street via on- and exit-ramps. Hegenberger Road provides the Project site with easy access to I-880. The posted speed limit is 40 miles per hour.

San Leandro Street is a four-lane north-south roadway designated as an arterial in the City of Oakland *General Plan*. The roadway provides direct access to the Project site and connects to additional locations and local roadways in the City of Oakland. The median area of San Leandro Street includes two-way left-turn lanes, left-turn pocket lanes, and a raised median near the Project site. The raised median runs between 75th Avenue and 76th Avenue, approximately 205 feet. The posted speed limit is 35 miles per hour.

75th Avenue is a two-lane arterial roadway that provides direct access to residential neighborhoods northeast of San Leandro Street. The roadway connects the residential neighborhoods with International Boulevard and I-880 via Hegenberger Road. 75th Avenue connects with San Leandro Street via an at-grade highway-rail crossing. The prima facie speed limit is 25 miles per hour.

76th Avenue is a two-lane local roadway that runs in an east-west orientation through residential neighborhoods east of the Project site. The roadway is bisected by industrial land uses and a UPRR ROW. Thus, the roadway does not provide San Leandro Street and the Project site to the residential neighborhoods. The 76th Avenue extends approximately 135 feet west of San Leandro Street as an existing gated driveway to industrial land uses on the Project site. The prima facie speed limit is 25 miles per hour.

77th Avenue is a two-lane local roadway that runs in an east-west direction east of San Leandro Street. The roadway is bisected by the UPRR ROW just to the east of San Leandro Street and thus does not provide San Leandro Street and the Project site with access to the residential neighborhoods to the east. 77th Avenue extends approximately 380 feet to the west of San Leandro Street as an existing gated driveway to industrial land uses on the Project site. The prima facie speed limit is 25 miles per hour.

81st Avenue is a two-lane local roadway that runs in an east-west orientation and connects residential neighborhoods to the east with San Leandro Street and the Project site via an at-grade highway-rail crossing. The prima facie speed limit is 25 miles per hour.

Pedestrian Facilities

Concrete sidewalks exist on the west side of San Leandro Street that abuts the Project site. A Class I pedestrian-bicycle (ped-bike) path additionally exists on the east side of San Leandro Street. Marked crosswalks, countdown pedestrian signal heads, and textured tactile curb cuts exist at the signalized intersections along San Leandro Street at 75th Avenue and 81st Avenue. Concrete sidewalks exist on both sides of 75th Avenue and 81st Avenue near the Project site.

Bicycle Facilities

A Class I ped-bike path exists on the east side of San Leandro Street near the Project site. Class I bike paths are physically separated from motor vehicle lanes and offer two-way bicycle travel.

The Class I ped-bike path along San Leandro Street is separated from vehicular traffic by a steel physical barrier. A marked crosswalk with green thermoplastic coloring exists on the east legs of San Leandro Street & 75th Avenue and San Leandro Street & 81st Avenue.

Transit Service

The **Capitol Corridor** is a fixed-route commuter rail service that operates a single line between San Jose and Auburn via Oakland and Sacramento. The Capitol Corridor is governed by the Capitol Corridor Joint Powers Authority and operated by the California Department of Transportation (Caltrans), doing business as Amtrak California. The Capitol Corridor serves the Oakland Coliseum/Airport Amtrak Station, which is approximately 600 feet west of the BART Coliseum Station and approximately 1000 feet north of the Project site.

BART is a regional fixed-route heavy rail service that operates six lines throughout the San Francisco Bay Area. The Coliseum Station is approximately 1,000 feet north of the Project site and is served by the Blue Line (Daly City – Dublin/Pleasanton Line), the Orange Line (Richmond – Berryessa/North San Jose Line), and the Green Line (Daly City – Berryessa/North San Jose Line). The Coliseum Station additionally provides access to Oakland International Airport via the Oakland Airport Connector and the Oakland Coliseum via a pedestrian bridge.

AC Transit is a regional fixed-route and demand-response bus service operator that primarily serves Alameda County. The BART Coliseum Station is served by AC Transit's Routes 45, 73, 646, and 657. Route 646 serves a curbside bus stop on the west side of San Leandro Street approximately 50 feet south of its intersection with 81st Avenue. Additionally, Route 646 and Route 90 serve a curbside bus stop on the west side of San Leandro Street just north of its intersection with 77th Avenue.

Traffic Analysis

This section discusses summaries of the Project trip generation, and the existing traffic volumes, and collision histories of the study intersections.

TRIP GENERATION

A trip generation evaluation was conducted to determine the number of trips the Project would generate. Data from the Institute of Transportation Engineer's (ITE) publication, *Trip Generation Manual, 11th Edition*, which is a standard reference used by jurisdictions throughout the country, was used to estimate the trip generation potential of proposed developments. A trip is defined in the *Trip Generation Manual* as a single or one-directional vehicle movement with either the origin or

destination at a project site. In other words, a trip can be either "to" or "from" the site and therefore, a single visitor to a site is counted as two trips.

Trips are typically calculated from trip rates in the *Trip Generation Manual* for times of the day and week during which a proposed development's worst-case traffic impacts on the surrounding roadway network would be expected to occur. These time periods are typically the AM peak hour (generally between the hours of 7:00 AM to 9:00 AM) and the PM peak hour (generally between the hours of 4:00 PM to 6:00 PM) on a typical weekday.

As noted previously, the Project applicant has yet to identify a specific tenant for the future redeveloped building. Therefore, the transportation analysis assumed the highest-intensity industrial land uses for the Project to develop conservative findings. For the purposes of this analysis, ITE Land Use Code (LUC) 156 ("High-Cube Parcel Hub Warehouse") was used to estimate the trip generation potential of the Project. Vehicular and truck trip generation sheets for LUC 156 from *ITE Trip General Manual, 11th Edition*, are available in **Attachment B**.

Note the Project trip generation separate number of trips generated by passenger cars and truck vehicles. As truck trips are not directly comparable, they were converted to passenger car equivalent (PCE) trips using the following equation:

$$PCE_{Trucks} = 2 \times Trucks \qquad \text{Equation 1}$$

The trip generation potential of the Project is shown in **Table 1**. In terms of PCE trips, the Project would generate approximately 1,619 daily trips, 246 trips (123 in, 123 out) during the AM peak hour, and 218 trips (148 in, 70 out) during the PM peak hour.

According to the Oakland *Transportation Impact Review Guidelines*, proposed developments that are expected to generate more than 50 net new AM or PM peak hour vehicle trips must prepare a Transportation and Parking Demand Management (TDM) plan per the City of Oakland Standard Conditions of Approval.

Additionally, according to the Oakland *Transportation Impact Review Guidelines*, proposed developments that are expected to generate 100 or more net new AM or PM peak hour vehicle trips are required to achieve a 20 percent project vehicle trip reduction (VTR) and must submit an annual compliance report for the first five years following completion of the project to the City for review and approval.

The proposed Project exceeds both of the above thresholds and would be required to prepare a TDM plan and achieve a 20 percent VTR to be demonstrated in annual compliance reports for the first five years following its completion. The minimum 20 percent Project VTR is quantified in **Table 2**. Note that the Project would generate both employee-based passenger car trips and freight-related heavy vehicle trip traffic. Passenger car trips were only considered for TDM requirements as truck trips are needed to transport goods and cargo stored in the future warehouse building.

A TDM plan is included with this traffic study in **Attachment C**.

TRAFFIC COUNTS SUMMARY

Intersection turning movement counts (TMC) were collected to determine existing traffic conditions at the four (4) study intersections. TMCs of automobiles, pedestrians, bicyclists, and heavy vehicles

were collected for the two-hour peak periods in the morning (7:00 AM to 9:00 AM) and in the afternoon (4:00 PM to 6:00 PM) on Thursday, May 9, 2024. Collection during school breaks, holidays, construction, and inclement weather was avoided.

The existing turning movement volumes are shown in **Figure 2**.

Intersection TMC data is available in **Attachment D**.

Table 1 – Project Trip Generation

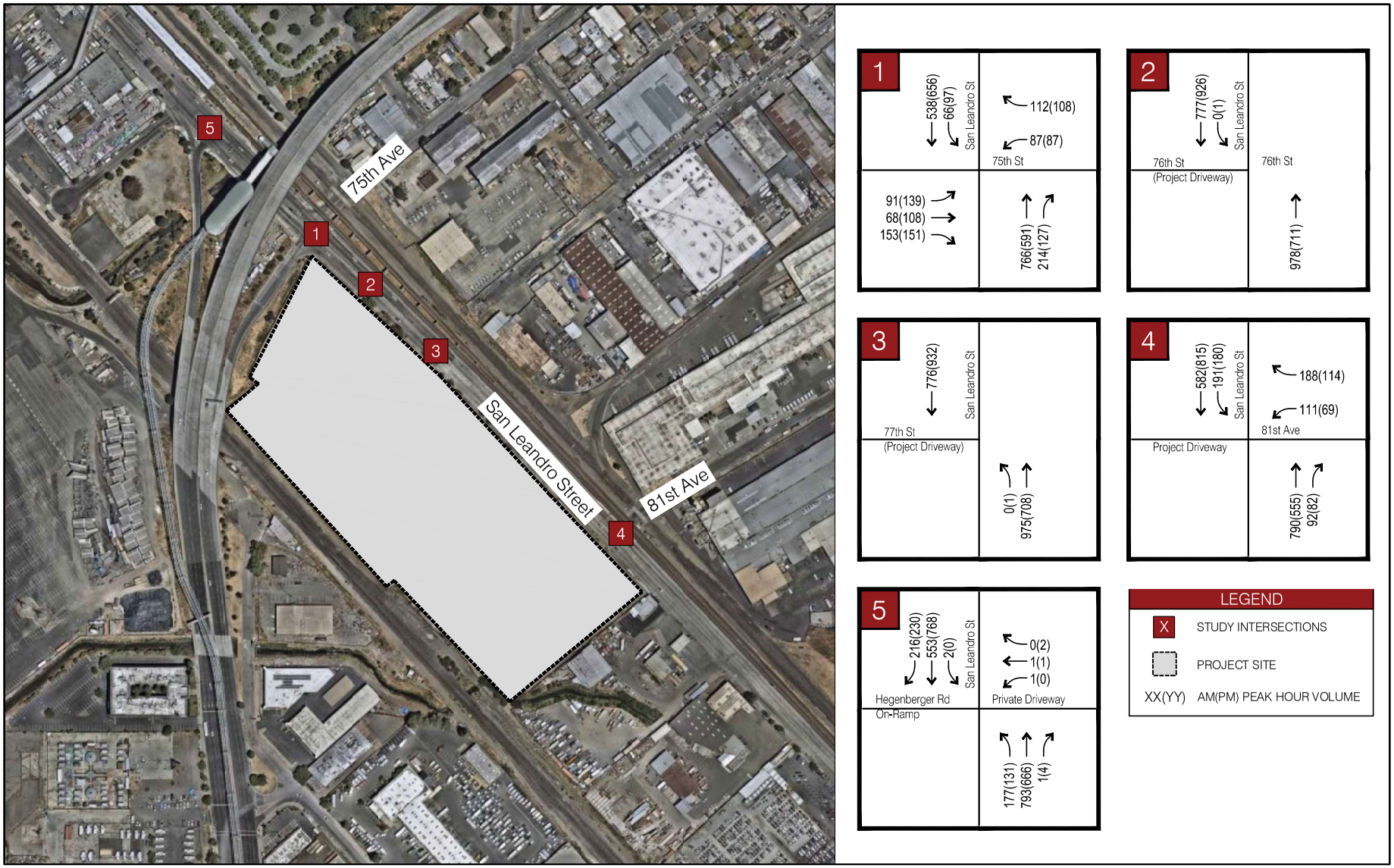
Land Use	ITE Code	Size	Daily		AM Peak Hour					PM Peak Hour				
			Rate / Eqn	Total	Rate / Eqn	In:Out	In	Out	Total	Rate / Eqn	In:Out	In	Out	Total
High-Cube Parcel Hub Warehouse (All Vehicles)	156	310.7 KSF	4.63	1,439	0.70	50:50	109	109	218	0.64	68:32	135	64	199
High-Cube Parcel Hub Warehouse (Trucks[1])	156	310.7 KSF	0.58	180	0.09	50:50	14	14	28	0.06	68:32	13	6	19
PC[3] = All Vehicles - Trucks				1,259			95	95	190			122	58	180
PCE_{Trucks}[2] = Trucks * 2				360			28	28	56			26	12	38
Total Vehicular Trips				**+1,439**			**+109**	**+109**	**+218**			**+135**	**+64**	**+199**
Total PCE Trips				**+1,619**			**+123**	**+123**	**+246**			**+148**	**+70**	**+218**

Notes:

1. *Peak hour directional distributions (% In:% Out) for ITE LUC 156 truck trip generation are not available. Peak hour directional distributions for trucks were approximated by setting them equal to the respective peak hour directional distributions for all vehicles.*
2. *Trucks were assumed to have a passenger-car equivalent (PCE) value of approximately two (2) per one (1) truck.*
3. *The number of passenger car (PC) trips was approximated by taking the difference of the total vehicular trips and the number of truck trips.*
4. *Vehicular and truck trip generation sheets for LUC 156 from ITE Trip General Manual, 11th Edition, are available in **Attachment B**.*

Table 2 – Minimum Project VTR

Vehicle Trips	AM Peak Hour	PM Peak Hour
Passenger Cars Trip Generation	190	180
20% VTR	38	36



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FIGURE 2

EXISTING CONDITION

PEAK HOUR TURNING MOVEMENT VOLUMES

July 2026

7825 San Leandro Street

INTERSECTION OPERATIONAL ANALYSIS

Per Section 3.1.5 of the *Transportation Impact Review Guidelines,* an intersection operational analysis is required for developments that are expected to generate more than 800 peak hour vehicular trips. As shown in **Table 1**, the Project is expected to generate less than 800 peak hour vehicular trips, therefore no intersection operational analysis was conducted.

SITE ANALYSIS

This section discusses the results of site analysis which included site access and circulation evaluations and parking for the Project site.

Site Access and Circulation

The Project site will utilize three existing driveways at 76th Avenue, 77th Avenue, and 81st Avenue. The driveway entrances at 76th Avenue and 77th Avenue will remain unsignalized and same for the signalized driveway at 81st Avenue. Employee automobiles would have access to the Project site using all three driveways. Trucks would have access to the Project site using the driveway entrances at 77th Avenue and 81st Avenue. All three driveway entrances would be secured.

The existing driveway entrances at 76th Avenue and 81st Avenue are only 20 feet and 26 feet wide, respectively, which would be inadequate for the proposed uses. Therefore, the Project would widen both entrances to 30 feet and 40 feet, respectively. To accommodate the widened driveway entrance at 81st Avenue, the Project would reconfigure the existing traffic signal pole on the southeast corner to allow for a new curb ramp, remove and restripe the existing marked crosswalk across San Leandro Street to better align with the reconfigured intersection, and extend the northbound left turn lane to accommodate traffic entering the Project site.

Vehicular Traffic

Employee automobiles would have access to the Project site using all three driveways. All three driveway entrances would be secured. Trucks would have access to the Project site using the proposed driveways at 77th Avenue and 81st Avenue. Each driveway would be 30 or 40 feet wide and would lead directly to the loading or parking area.

Vehicular circulation would take place along parking aisles and paved areas that are approximately 26 feet in width. Parking aisles and paved areas circulate around the proposed building and automobiles would not be required to make U-turns to access the building perimeter. Vehicular access to the site would be provided by three proposed bi-directional driveways (one 30-foot driveway and two 40-foot driveways).

Note the 81st Avenue driveway of 40-foot driveway exceeds the maximum driveway width of 35 feet to accommodate two large tracks at the driveway at the same time. Section 17.73.030 states that driveways that exceed 35 feet in width shall obtain approval from the Engineering Department of Building Service through the Driveway Appeal Process. While not required to address CEQA impact, and at discretion of City Oakland staff, the Project Applicant is seeking a variance through the driveway appeal process.

Pedestrian

Pedestrian access would be provided by existing concrete sidewalks on the west side of San Leandro Street. These sidewalks connect to marked crosswalks at signalized intersections at 75th Avenue and 81st Avenue. The Project's proposed improvement to widen the 81st Avenue driveway would shift the existing south leg marked crosswalk to better align with the reconfigured intersection. A new curb ramp would additionally be built.

On-site, pedestrian access would be provided by paved areas and vehicular parking aisles. Concrete sidewalks circulate around the perimeter of the proposed building and extend alongside accessible spaces.

The Project is not expected to result in significant impacts to pedestrian traffic.

Bicycle

Bicycle access to the Project vicinity is provided by a Class I ped-bike path along the east side of San Leandro Street. The Class I ped-bike path is accommodated by green thermoplastic bicycle pavement markings at 75th Avenue and 81st Avenue.

Bicycle access on site would be provided by vehicular parking aisles and paved areas. Bicycle parking would be available outside and inside of the proposed building towards the east to provide a shorter distance to and from San Leandro Street.

The Project is not expected to result in significant impacts to bicycle traffic.

Transit

Transit access is provided by Amtrak California, BART, and AC Transit. The closest Amtrak California station is Oakland Coliseum/Airport Station, which is approximately 1000 feet north of the Project site. Coliseum Station is the closest BART station, which is approximately 1,000 feet north of the Project site and approximately 600 feet east of the Oakland Coliseum/Airport Amtrak Station. Both the Amtrak California and BART stations are accessible via pedestrian and bicycle facilities in the Project vicinity. The closest AC Transit bus stops are a curbside bus stop on the west side of San Leandro Street approximately 50 feet south of its intersection with 81st Avenue and another curbside bus stop on the west side of San Leandro Street just north of its intersection with 77th Avenue.

The Project is not expected to result in significant impacts to transit.

Emergency Access

Emergency vehicles would have access to the Project site via the three proposed widened driveways at 76th, 77th, and 81st Avenues, allowing for alternative routes in and out of the site in case a driveway is blocked. Parking aisles and paved areas provide multiple paths around the proposed building.

In the Project vicinity, San Leandro Street provides access to points north, south, and east of the Project site. Hegenberger Road provides easy access to I-880.

The Project is not expected to result in significant impacts to emergency vehicle access.

Parking Analysis

Section 17.116.090 of the City of Oakland municipal code contains minimum automobile off-street parking requirements for industrial activities.

The proposed Project parking inventory is shown in **Table 3**. The Project is proposing a total of 279 spaces which include 222 spaces for automobiles and 57 spaces for truck trailers.

Table 3 - Project Off-Street Parking Inventory

Parking Space Type	Number of Spaces
Standard/Compact	169
Accessible	
Standard	5
Van	2
EV with Charger	23
Clean Air / Vanpool / EV without Charger	23
Total (Light Vehicles)	**222**
Truck Trailer	57
Total (All Vehicle)	**279**
Short-Term Bike Rack	10
Long-Term Bike Locker	16
Total (Bikes)	**26**

Automobile Parking

Industrial activities within one-half mile of a major transit stop are exempt from off-street parking requirements. Since the Project site is within one-half mile of a major transit stop (the BART Coliseum Station), the Project is not required to provide off-street parking spaces.

Electric Vehicle (EV) Parking

The minimum electric vehicle (EV) parking requirements for the Project are stated in Table 5.106.5.3.1 of the 2025 California Green Building Standards Code (2025 CalGreen). Based on the 222 light vehicle parking spaces proposed by the Project, the minimum EV parking spaces are summarized in **Table 4**. The Project proposes 46 EV-capable spaces and 23 EV-ready spaces as shown in **Table 4**, which satisfies EV parking requirements.

Table 4 – Project EV Parking Spaces Requirement

Standard	EV Capable		EV Ready	
	Requirement	Parking Spaces Required	Requirement	Parking Spaces Required
2025 CalGreen	20% of Actual Parking Spaces	44	50% of EV capable spaces for land uses other than office and retail	22
Proposed EV Parking	46		23	
Surplus (+) / Deficient (-)	+2		+1	

Source: Table 5.106.5.3.1 in the 2025 California Green Building Standards Code

Loading Docks and Truck Trailer Parking

Section 17.116.150 of the City of Oakland municipal code includes minimum off-street loading dock requirements for industrial land uses. Two (2) loading docks are required for the first 199,999 square feet of building area, and an additional loading dock is required for each additional 150,000 square feet of building area. This equates to a minimum required number of three (3) loading docks for the proposed 310,717 square foot Project building.

The Project proposes 44 loading docks and 57 truck trailer parking spaces, which meets the minimum requirements and is consistent with City of Oakland standards.

Bicycle Parking

Section 17.117.120 of the City of Oakland municipal code includes minimum bicycle parking requirements for industrial activities. Industrial warehousing, storage, and distribution activities are required to provide one (1) long-term bicycle parking space for each 40,000 square feet of floor area, with a minimum of two (2) spaces. No short-term parking spaces are required. This equates to eight (8) long-term parking spaces required for the Project. The Project proposes 10 short-term parking spaces and 16 long-term parking spaces, which satisfies City standards.

Hazards Due to Geometric Design Features

The Project would have a significant impact if it substantially increases hazards due to a geometric design feature (e.g., sharp curve or dangerous intersections) or incompatible uses (e.g., farm equipment).

Based on the Project description and proposed plans, the Project would not have any geometric design features or incompatible uses that would increase hazards. Therefore, there would be no significant impact from the Project. Detail discussions are included below.

Automobile Parking Space, Aisle, and Driveway Dimensions

Sections 17.116.200 and 17.116.210 of the City of Oakland municipal code include minimum parking space dimensions and driveway and maneuvering aisle dimensions. According to the Project site plan, the proposed regular parking spaces meet the minimum parking space dimensions of 18 feet by 8.5 feet for regular parking spaces and 22 feet by 8 feet for parallel parking spaces.

Additionally, proposed parking aisles of 26 feet meet the minimum width of 23 feet.

Furthermore, the proposed driveway widths of 30 feet and 40 feet meet the minimum required widths of nine feet.

Loading Dock Locations

Section 17.73.050 of the City of Oakland municipal code includes restrictions on truck loading docks. New truck loading docks may not be within 50 feet of the development property line if the development is within 300 feet of a residential zone.

The nearest proposed truck loading dock would be approximately 130 feet from the property line of the Project site. Therefore, the location of the proposed truck loading docks is consistent with City of Oakland standards.

Loading Dock Dimensions

Loading dock dimensions for industrial activities are required to be a minimum of 45 feet long, 12 feet wide, and 14 feet high according to Section 17.116.220 of the City of Oakland municipal code. The site plan shows loading docks to have doors with widths of nine feet. Additionally, loading docks are separated by approximately four feet, equating to an average of two feet of clearance on either side of the loading dock doors. Each loading dock would then be approximately 13 feet wide (2' left clearance + 9' door + 2' right clearance). The site plan shows loading docks to be approximately 60 feet long. No dimensions are provided on the site plan for height.

The loading docks meet the minimum required dimensions and are therefore consistent with City of Oakland standards.

COLLISION HISTORY SUMMARY

An intersection collision history analysis was conducted for the study intersections. Crash[1] data from the Statewide Integrated Traffic Records Systems (SWITRS) was obtained from the University of California, Berkeley, Transportation Injury Mapping System (TIMS) online tool. A six-year study period from October 1, 2018, to September 30, 2024, was selected to obtain a sufficiently long crash history and to obtain the latest crash data available from TIMS. Collision summaries are provided in **Table 5**, **Table 6**, and **Table 7**. Note TIMS dataset does not include property damage only (PDO) crash data. Collision data is available in **Attachment E**.

During the six-year study period, approximately 21 collisions were reported at the study intersections on San Leandro Street, with six (29%) occurring at 75th Avenue, seven (33%) occurring at 81st Avenue, and eight (38%) at Hegenberger Road Southbound Ramps. Sixteen (76%) collisions had a severity of "Complaint of Pain," four (19%) collisions were "Other Visible Injury," and one (5%) "Severe Injury." Collision types and factors were varied, where the most comment factors include improper tuning (6 collision, 29%), Unsafe speed (4 collision or 19%), Auto Right-of-Way (3 collision or 14%), and Traffic signal or signs (3 collision or 14%).

The Crash Prediction Module (CPM) within *Interactive Highway Safety Design Model* (IHSDM) software was used to determine the predicted number of crashes based on the Highway Safety

[1] "Crash" and "collision" are used interchangeably throughout this report.

Manual (HSM) Part C predictive methods. The number of crashes is determined based on a number of factors such as facility type, number of lanes, signal phasing, vehicle and pedestrian, and number of certain attractions/destinations (e.g. bus stops or schools). Crash Prediction outputs are available in **Attachment E**.

The resulting predictive crash frequency per year was compared with actual historical crash frequency, which are presented in **Table 8**. The comparison found the following three intersections that exceed predictive collision frequency:

- San Leandro Street & 75th Avenue (#1)
- San Leandro Street & 81st Avenue (#4)
- San Leandro Street & Hegenberger Road Southbound On-ramp (#5)

For San Leandro Street & 75th Avenue (#1) and San Leandro Street & Hegenberger Road Southbound On-ramp (#5), the difference between predictive and actual is nominal, being less than 0.1 crashes per year. At San Leandro Street & 81st Avenue (#4) the Project proposes to make several intersection improvements such as reconfiguring the existing traffic signal pole on the southeast corner to accommodate a wider driveway and new curb ramp, realign the existing marked crosswalk to better align with the reconfigured intersection, and extend the northbound left-turn lane. These improvements would enhance pedestrian safety and Project site accessibility, which may reduce collisions at the intersection. No additional improvements are recommended.

Table 5 – Intersection Crash Severity

No.	Intersection	Crash Severity				
		Complaint of Pain	Other Visible Injury	Severe Injury	Fatal	Total
1	San Leandro St. & 75th Ave.	5	1	-	-	**6**
2	San Leandro St. & 76th Ave.	-	-	-	-	**0**
3	San Leandro St. & 77th Ave.	-	-	-	-	**0**
4	San Leandro St. & 81st Ave.	5	1	1	-	**7**
5	San Leandro St. & Hegenberger Rd SB On-ramp	6	2	-	-	**8**
Total		**16**	**4**	**1**	**0**	**21**

Source: UC Berkeley TIMS, https://tims.berkeley.edu/help/Query_and_Map.php

Table 6 - Intersection Crash Type

No.	Intersection	Collision Type								
		Head-on	Sideswipe	Rear-End	Broadside	Hit Object	Overturned	Veh-Ped	Unstated/Other	Total
1	San Leandro St. & 75th Ave.	-	-	1	2	-	1	2	-	6
2	San Leandro St. & 76th Ave.	-	-	-	-	-	-	-	-	**0**
3	San Leandro St. & 77th Ave.	-	-	-	-	-	-	-	-	**0**
4	San Leandro St. & 81st Ave.	2	1	2	-	-	-	-	2	**7**
5	San Leandro St. & Hegenberger Rd SB On-ramp	2	1	3	1	1	-	-	-	**8**
Total		**4**	**2**	**6**	**3**	**1**	**1**	**2**	**2**	**21**

Source: UC Berkeley TIMS, https://tims.berkeley.edu/help/Query_and_Map.php

Table 7 - Intersection Crash Factor

No.	Intersection	Crash Factor													
		Under Influence of Alcohol/ Drug	Impeding Traffic	Unsafe Speed	Following Too Closely	Wrong Side or Road	Improper Passing	Unsafe Lane Change	Improper Turning	Auto ROW	Ped ROW	Pedestrian Violation	Traffic Signal or Signs	Unstated / Other	Total
1	San Leandro St. & 75th Ave.	1	-	-	-	-	-	-	1	1	1	-	2	-	6
2	San Leandro St. & 76th Ave.	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
3	San Leandro St. & 77th Ave.	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
4	San Leandro St. & 81st Ave.	-	-	2	-	-	-	-	2	1	1	-	-	1	**7**
5	San Leandro St. & Hegenberger Rd SB On-ramp	-	-	2	1	-	-	-	3	1	-	-	1	-	**8**
Total		**1**	**0**	**4**	**1**	**0**	**0**	**0**	**6**	**3**	**2**	**0**	**3**	**1**	**21**

Source: UC Berkeley TIMS, https://tims.berkeley.edu/help/Query_and_Map.php

Table 8 - Predictive Crash Frequency Comparison

No.	Intersection	Predicted Collision Frequency (per year)	Actual Collision Frequency (per year)	Difference (Actual - Predicted)
1	San Leandro St. & 75th Ave.	0.94	1.00	0.06
2	San Leandro St. & 76th Ave.	0.18	0.00	-0.18
3	San Leandro St. & 77th Ave.	0.18	0.00	-0.18
4	San Leandro St. & 81st Ave.	0.62	1.17	0.55
5	San Leandro St. & Hegenberger Rd SB On-ramp	0.07	0.17	0.10

Source: HSM Predictive Method ; UC Berkeley TIMS, https://tims.berkeley.edu/help/Query_and_Map.php

CEQA Compliance

Per the State CEQA Guidelines (known as "Appendix G") and the City's CEQA transportation thresholds, the Project would have significant transportation related impact if it would:

1. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.
2. Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b).
3. Substantially increase hazards due to a geometric design feature (e.g., sharp curve or dangerous intersections) or incompatible uses (e.g., farm equipment).
4. Result in inadequate emergency access.

Each of the items above are discussed below.

CONFLICT WITH A TRANSPORTATION PROGRAM, PLAN, ORDINANCE, OR POLICY

The Project would have a significant impact if it would conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. The following are applicable regulations, plans, and standards for the Project:

1. City of Oakland Plans
    a. General Plan Land Use and Transportation Element
    b. Bicycle Master Plan
    c. Pedestrian Master Plan
    d. Transit Action Strategy
    e. General Plan Noise Element
    f. Scenic Highways Element
    g. Coliseum Area Specific Plan
2. City of Oakland Department of Transportation Standards, Guidelines, and Resources
    a. Americans with Disabilities Programs
    b. Bicycle Facility Design Guidelines
    c. Complete Streets Design Guidelines
3. City of Oakland Policies
    a. Complete Streets Policy
    b. Public Transit and Alternative Modes Policy

Oakland General Plan Land Use and Transportation Element

Policy I/C3.1 Locating Commercial Business

Commercial uses, which serve long term retail needs of regional consumers and which primarily offer durable goods, should be located in areas adjacent to the I-880 freeway or at locations visible or amenable to high volumes of vehicular traffic, and accessible by multiple modes of transportation.

Policy T1.8 Re-routing and Enforcing Truck Routes

The City should make efforts to re-route truck traffic away from neighborhoods, where possible, and enforce truck route controls.

Policy T4.1 Incorporating Design Features for Alternative Travel

The City will require new development, rebuilding, or retrofit to incorporate design features in their projects that encourage use of alternative modes of transportation such as transit, bicycling, and walking.

Oakland Bicycle Master Plan

Objective B from Access Goal

Support public transit service.

Oakland Pedestrian Master Plan

Outcome 3

Improve Walkability to Key Destinations.

Oakland Transit Action Strategy

Policy #17

Work with private developments to improve transit operations and access.

Oakland General Plan Noise Element

Action 1.2

Continue using the City's zoning regulations and permit processes to limit the hours of operation of noise-producing activities which create conflicts with residential uses and to attach noise-abatement requirements to such activities.

Action 2.2

As resources permit, increase enforcement of noise-related complaints and also of vehicle speed limits and of operational noise from cars, trucks and motorcycles.

Oakland General Plan Scenic Highways Element

San Leandro Street is not designated as a scenic highway by the Scenic Highways Element. The policies of the Scenic Highways Element do not apply to San Leandro Street.

Oakland Coliseum Area Specific Plan

Note that while San Leandro Street & Hegenberger Road Southbound On-ramp falls within the plan area of the Coliseum Area Specific Plan, the Project site does not. Due to its proximity to the plan area, the Project site could be subject to Sewer Mitigation Fees. Sewer Mitigation Fees would be used to rebuild existing sanitary sewer infrastructure, which is old within the plan area and is susceptible to inflow and infiltration.

Oakland Americans with Disabilities Programs

The Oakland *ADA Standards for Accessible Design Technical Bulletin* dated March 15, 2012, contains standards regarding accessible employee work areas and locations of accessible routes.

Oakland Bicycle Facility Design Guidelines

The *Oakland Bicycle Facility Design Guidelines* webpage on the City's website contains various technical guidelines pertaining to the design of bicycle infrastructure on the local roadway network and on proposed development sites.

Oakland Complete Streets Design Guidelines

Chapters 12.02 and 16.16 of the City of Oakland municipal code contain guidelines for roadways to be designed as complete streets.

Oakland Complete Streets Policy

The *Resolution Adopting a Complete Streets Policy to Further Ensure that Oakland Streets Provide Safe and Convenient Travel Options for All Users* dated January 3, 2013, requires the City to consider the implementation and maintenance of complete streets infrastructure during any change to transportation infrastructure, including those caused by proposed developments.

Oakland Public Transit and Alternative Modes Policy

The *Resolution Declaring the City of Oakland's Support of Public Transit and Other Alternatives to Single-Occupant Vehicles* dated October 29, 1996, requires the City to update its policies and plans with the intent to promote transportation modes that are alternatives to the single-occupancy automobile, including infrastructure and traffic control supportive of transit, bicyclists, and pedestrians.

Plan Consistency Evaluation

Based on the Project Description and the site plan, the Project would not conflict with the above transportation-related regulations, plans, and standards. The Project would not create traffic, bicycle, or pedestrian hazards or conflict with vehicular traffic movements. Off-site parking is not expected to occur due to the Project as the Project includes three parking areas: two for light vehicles (for employees and visitors) and one for heavy vehicles (delivery trucks). The parking areas would be accessible by bi-directional driveways and do not create conflicts with on-site circulation or circulation on the local roadway network of bicycles, pedestrians, and vehicles.

Additionally, the Project would be accessible to I-880 via Hegenberger Road and San Leandro Street (both designated truck routes; see **Attachment F**) and is approximately 530 feet from the nearest residential neighborhoods. The Project is not expected to result in the encroachment of residential neighborhoods by Project-related truck traffic.

Finally, the Project is approximately 1,000 feet from the BART Coliseum Station, which is additionally served by AC Transit bus routes. Through TDM measures, the Project Applicant would encourage site employees and visitors to use nearby transit services and support the City's multimodal goals and policies.

VMT ANALYSIS

Traffic impacts related to the proposed Project were evaluated for both compliance with applicable regulatory documents and environmental significance as defined in the California Environmental Quality Act (CEQA). In accordance with the California Governor's Office of Planning and Research's (OPR) *2018 Technical Advisory on Evaluating Transportation Impacts in CEQA* (the "*Technical Advisory*"), a quantitative VMT assessment is the preferred methodology for determining the

environmental significance of transportation impacts of development projects under CEQA. Effective July 1, 2020, vehicular delay on roadway segments and intersections qualitatively measured using the level of service (LOS) metric can no longer be used to determine the environmental significance of transportation impacts of development projects for CEQA purposes.

VMT is a metric that quantifies vehicular travel volumes on transportation facilities. A quantity of ten VMT could equate to one vehicle traveling ten miles or ten vehicles traveling one mile.

VMT Screening

Senate Bill 743 of 2013 ("SB 743") directs OPR to establish specific criteria for determining the significance of transportation impacts of development projects for CEQA purposes. Screening criteria are used to identify proposed developments with particular characteristics that would presumably not exceed VMT thresholds of significance and would thus not be required to undergo a full quantitative VMT evaluation. The OPR *Technical Advisory* provides such specific criteria but additionally allows local jurisdictions and agencies the discretion to set or apply their own thresholds of significance. The City of Oakland provides guidance for CEQA compliance in its *Transportation Impact Review Guidelines*, which includes the following:

- Small Projects
- Residential, Retail, and/or Office Projects in Low-VMT Areas
- Residential, Retail, and/or Office Projects Near a Major Transit Stop or a High-Quality Transit Corridor
- Screening and Threshold for Other Land Uses

The Project would not be subject to a full quantitative VMT analysis if it meets at least one of the above screening criteria.

Small Projects

The City of Oakland considers proposed developments that would generate fewer than 100 vehicle trips per day to be "small projects" that would cause a less-than-significant transportation impact.

The OPR *Technical Guidance* considers VMT to refer "to the amount and distance of automobile travel attributable to a project," where the term "automobile' refers to on-road passenger vehicles, specifically cars and light trucks." Therefore, heavy duty truck traffic is not considered in VMT screening analyses.

The Project is expected to generate approximately 1,259 daily passenger car trips according to **Table 1** and therefore exceeds the 100-daily vehicle trip threshold. The Project does not meet the definition of a "small project" and would not be screened out by this screening criterion.

Residential, Retail, and/or Office Projects in Low-VMT Areas

The City of Oakland considers residential, retail, and/or office developments that are proposed in areas with relatively low VMT and that incorporate similar features (i.e., density, mix of uses, low parking ratios, and transit accessibility) of existing surrounding developments to likely exhibit similarly low VMT.

VMT methodologies typically lump proposed developments into the three land use categories of residential, office, and retail (even if those proposed developments do not fit the exact definitions of the three categories) as the OPR *Technical Advisory* provides VMT significance thresholds for those three land use categories. Proposed developments are lumped by matching their demographic data and employment-based trip behavior as closely as possible with those of the three land use categories. Thus, while the Project does not meet the exact definition of residential, retail, or office land use, for the purposes of this analysis it would be categorized as an office development as most trips related to industrial land uses tend to be employment-based similarly to those of office land uses. The Project would thus be subject to evaluation of the low VMT screening criteria.

The City of Oakland considers proposed office developments to cause substantial additional VMT if it exceeds the existing regional VMT per employee minus 15 percent. Since the City does not provide a specific numerical definition of "existing regional VMT per employee minus 15 percent," and since the City's *Transportation Impact Review Guidelines* allows the use of "maps or tables illustrating areas that exhibit below-threshold VMT to screen out residential, office, and retail projects which may not require a detailed VMT analysis," this analysis utilized VMT mapping resources from the Alameda County Transportation Commission (ACTC). According to the ACTC North Planning Area maps (see **Attachment G**),[2] the Project is located in a travel analysis zone (TAZ) with approximately 14.41 VMT per employee. Additionally, the ACTC North Planning Area maps note the Alameda County average VMT per employee (which this study considers as the existing regional VMT per employee) to be 15.9. The existing regional VMT per employee minus 15 percent threshold is therefore 13.5.

The Project is therefore located in an area that exceeds the threshold and thus is not considered to be in a low-VMT area. The Project would not be screened out according to this criterion.

Residential, Retail, and/or Office Projects Near a Major Transit Stop or a High-Quality Transit Corridor

The City of Oakland considers proposed residential, retail, and office (which the Project is categorized as based on employment-based trip behavior for the purposes of this analysis) developments, or developments with a mix of these uses, to have a less-than-significant impact on VMT if they are within one-half of a mile of an existing major transit stop or an existing stop along a high-quality transit corridor and do not satisfy the following characteristics:

- Have an overall floor-area ratio (FAR) of less than 0.75,
- Include more parking for use by residents, customers, or employees of the project than required (if parking minimums pertain to the site) or allowed without a conditional use permit (if minimums and/or maximums pertain to the site),
- Are inconsistent with Plan Bay Area, the applicable Sustainable Communities Strategy (as determined by the lead agency) with input from the Metropolitan Transportation Commission), or
- Have a retail component that is greater than 80,000 square feet,

[2] The maps (dated May 2019) present TAZ estimates from the Alameda County Travel Demand Model and are consistent with the Metropolitan Transportation Commission's *Plan Bay Area 2040*, which serves as the Regional Transportation Plan and Sustainable Communities Strategy for the nine-county San Francisco Bay Area.

Although the Project is within one-half of a mile of a major transit stop (i.e., the BART Coliseum Station), the Project's building area of 310,717 square feet and parcel size of 649,044 square feet (14.9 acres) leads to a FAR of 0.48, which is less than the threshold of 0.75. Therefore, the Project would not be screened out according to this criterion.

Screening and Thresholds for Other Land Uses

The City allows proposed developments that do not fall within the categories of residential, retail, or office land uses to be considered for map-based or proximity-to-transit-station VMT screening if they are one of the following:

- Tourist hotels, student housing, single-room occupancy hotels, and group housing land uses to be considered as residential land uses,
- Childcare, K-12 schools, post-secondary institutional (non-student housing), medical, and production, distribution, and repair (PDR) land uses to be considered as office land uses,
- Grocery stores, local-serving entertainment venues, religious institutions, parks, and athletic clubs land uses to be considered as retail
- Public services.

The Project would not be considered as any of the above land uses and thus would not be screened out according to this criterion.

VMT Screening Summary

The Project would not be screened out by any of the City's screening criteria and is thus subject to a full quantitative VMT analysis.

VMT Analysis

As noted previously, according to the ACTC North Planning Area maps, the Project is located in a travel analysis zone (TAZ) with approximately 14.41 VMT per employee. Additionally, the ACTC North Planning Area maps note the Alameda County average VMT per employee (which this study considers as the existing regional VMT per employee) to be 15.90. The existing regional VMT per employee minus 15 percent threshold is therefore 13.52. The Project is therefore located in an area that exceeds the threshold and thus is not considered to be in a low-VMT area. The Project would be required to reduce its expected VMT per employee by a minimum of approximately 0.90 VMT per employee or 6.21 percent.

The VMT Reduction Calculator Tool developed by ACTC was used to compute VMT reductions based on proposed TDM measures by the Project. The VMT Reduction Calculator Tool was originally developed by the San Diego Association of Governments and was adjusted by ACTC for use in Alameda County. The VMT Reduction Calculator Tool is an Excel-based tool that estimates a percent reduction in VMT resulting from the application of mobility management strategies to proposed developments. The Tool is intended to be used as a resource for jurisdictions and developers to quantify the VMT impacts of mobility management strategies as part of the development review and transportation analysis process under CEQA.

As was noted in the Trip Generation section, the Project is required by the City of Oakland Standard Conditions of Approval to prepare a TDM plan and to submit annual compliance reports for the first five years after its completion because it is expected to generate more than 100 net new AM or PM

peak hour vehicle trips. Therefore, the Project Applicant would be contractually required to implement a regular TDM performance monitoring and reporting program.

A mandatory commute trip reduction (CTR) program is one of the mobility management strategies available in the VMT Reduction Calculator Tool and discourages single-occupancy vehicle trips while encouraging alternative modes of transportation such as carpooling, taking transit, walking, and biking to reduce VMT and greenhouse gas emissions. The CTR program includes mandatory trip reduction requirements (including penalties for non-compliance) and regular monitoring and reporting, and thus was selected as the appropriate strategy for the Project.

The CTR program would result in a maximum reduction of 26 percent in VMT per employee when all employees are subject to the CTR. The Project VMT per employee would decrease by approximately 3.75 to 10.66, which is below the maximum regional VMT per employee minus 15 percent threshold of 13.52. The Project would therefore have a less-than-significant transportation impact. The computations are summarized in **Table 9** below.

Table 9 – VMT Analysis Summary

Existing Project TAZ VMT per Employee	Regional Average VMT per Employee	15% Reduction of Regional Average VMT per Employee	Minimum Required Project VMT per Employee Reduction	Mandatory CTR Program Maximum VMT per Employee Reduction	Mitigated Project VMT per Employee
14.41	15.90	13.52	-0.90 (-6.21%)	-3.75 (-26.00%)	10.66

Conclusion

This study summarized the findings of a transportation analysis of the proposed Project, which would redevelop existing industrial land uses at 7825 San Leandro Street in Oakland, California, into a new 310,717 square foot warehouse building.

This study was conducted to determine the potential impact of the Project in accordance with the Oakland *Transportation Impact Review Guidelines*, which includes trip generation calculations, a traffic counts summary, a collision history summary, site analysis, and an assessment of the Project's compliance with California Environmental Quality Act (CEQA) requirements.

Based on the results of the traffic analysis and evaluation the following improvements are recommended:

- **Driveway Widths:** While not required to address a CEQA impact, and at the discretion of City Oakland staff, the Project Applicant is seeking a variance through the driveway appeal process to the maximum driveway width of 35 feet.
- **Electric Vehicle Parking:** While not required to address a CEQA impact, and at the discretion of City Oakland staff, it is recommended that the Project provides the required number of EV-ready spaces.

The CEQA Compliance evaluation concludes the following:

1. The Project **would not** conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.
2. The Project with mitigations **would not** conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b).
3. The Project **would not** substantially increase hazards due to a geometric design feature (e.g., sharp curve or dangerous intersections) or incompatible uses (e.g., farm equipment).
4. The Project **would not** result in inadequate emergency access.

Attachments

Attachment A – Site Plan....A
Attachment B – Trip Generation Sheets....B
Attachment C – TDM Plan....C
Attachment D – Intersection Turning Movement Counts....D
Attachment E – Collision Data....E
Attachment F – Oakland Designated Truck Routes Map....F
Attachment G – ACTC VMT North Area Planning Map....G

Attachment A – Site Plan

TENTATIVE MAP SITE PLAN
OF
OAKLAND FOUNDRY
FOR
DUKE REALTY
OAKLAND, CALIFORNIA
KIER+WRIGHT
2850 Collier Canyon Road
Livermore, CA 94551
Phone: (925) 245-7285
www.kierwright.com
DATE SEPTEMBER, 2022
SCALE AS SHOWN
SURVEYOR MWS
DRAWN BY REG
JOB NO. A22003
SHEET 4
OF 4 SHEET
NO. REVISION BY
SAN LEANDRO STREET
(R/W VARIES, A PUBLIC ROAD)
PROPOSED PARCEL 1
GROSS AREA= 14.8984± ACRES
NET AREA= 14.8984± ACRES
PROPOSED BUILDING
81ST AVENUE
77TH AVENUE
76TH AVENUE
50.00' R/W, A PUBLIC ROAD
HEGENBERGER ROAD
(R/W VARIES, A PUBLIC ROAD)
LANDS OF SP CO
872-1-89-POR 9
APN: 41-4209-6 D.N.A.
LANDS OF C.P.R.R.
2092 OR 383
LANDS OF SALDIAN
(6913-32303 OR)
LEGEND
REFERENCES
R1 ROS NO. 2662, 42 RS 1
R2 PM NO. 9399, 300 PM 41
R3 SFSMART R/W MAP
R4 ROS NO. 1961, 28 RS 47
R5 2010-386694 O.R.
R6 94-242380 O.R.
PROPOSED BUILDING
CONCRETE
PROPOSED PUBLIC UTILITY EASEMENT AND INGRESS EGRESS EASEMENT
PROPOSED STREET VACATION, AREA TO BE RETAINED AS PUBLIC UTILITY, INGRESS EGRESS EASEMENT
EXISTING
PROPOSED
BLOCK/RETAINING WALL
CENTER LINE
CONCRETE CURB
CONCRETE CURB & GUTTER
CONTOUR LINE
DRAINAGE EASEMENT
REMOVE EXISTING UTILITY AND RELOCATE
FIRE SERVICE & VALVE
FIRE HYDRANT & VALVE
FENCE LINE
GAS LINE & METER
GAS / BRANCH LINE
LOT LINE
SANITARY SEWER LINE
SANITARY SEWER MANHOLE & CLEANOUT
SIDEWALK
STORM DRAIN MANHOLE & CATCH BASIN
WATER LINE & VALVE
BACKFLOW PREVENTION DEVICE
ELECTRICITY
POST INDICATOR VALVE
STREET LIGHT
TRAFFIC SIGN
TREE
UTILITY BOX
ANCHOR
BACK OF WALK
BACKFLOW PREVENTION DEVICE
CATCH BASIN
DOUBLE DETECTOR CHECK VALVE
DOOR
EASEMENT
EDGE OF PAVEMENT
FIRE HYDRANT
FLOW LINE
GAS VALVE
INGRESS EGRESS EASEMENT
LIGHT
POST INDICATOR VALVE
PUBLIC UTILITY EASEMENT
R/W DEDICATION
SANITARY SEWER CLEANOUT
SANITARY SEWER EASEMENT
SANITARY SEWER MANHOLE
STREET LIGHT
STREET LIGHT BOX
TELEPHONE MANHOLE
TELEPHONE BOX
WATER METER
WATER VALVE
BOUNDARY
Scale 1" = 40'
0 20 40 80 120
z:\2022\A22023\Dwg\SURVEY\MAPPING\A22023-TPM.dwg 9-24-25 01:29:45 PM mamin

Attachment B – Trip Generation Sheets

High-Cube Parcel Hub Warehouse
(156)

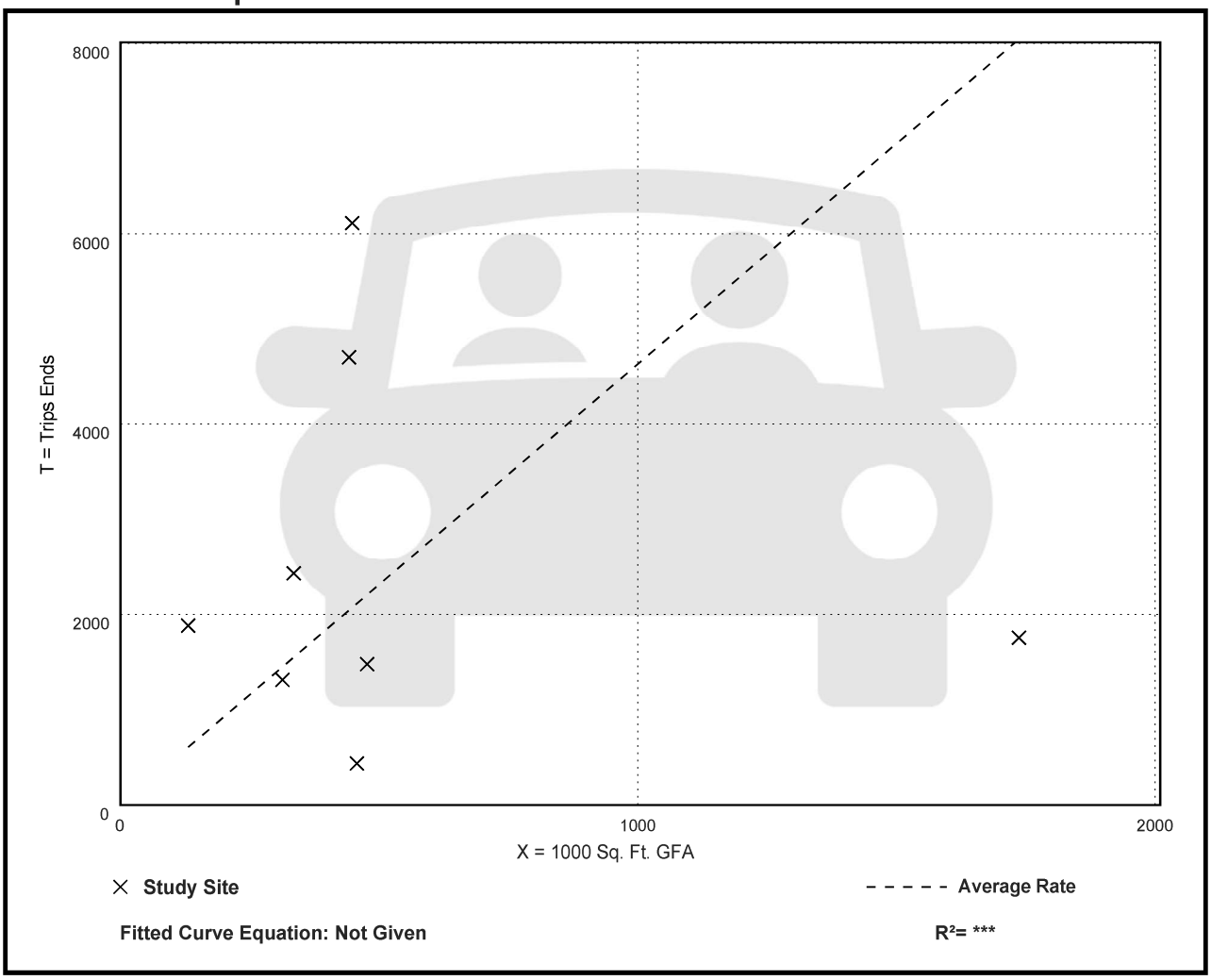
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 8
Avg. 1000 Sq. Ft. GFA: 543
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
4.63	0.95 - 14.38	5.06

Data Plot and Equation



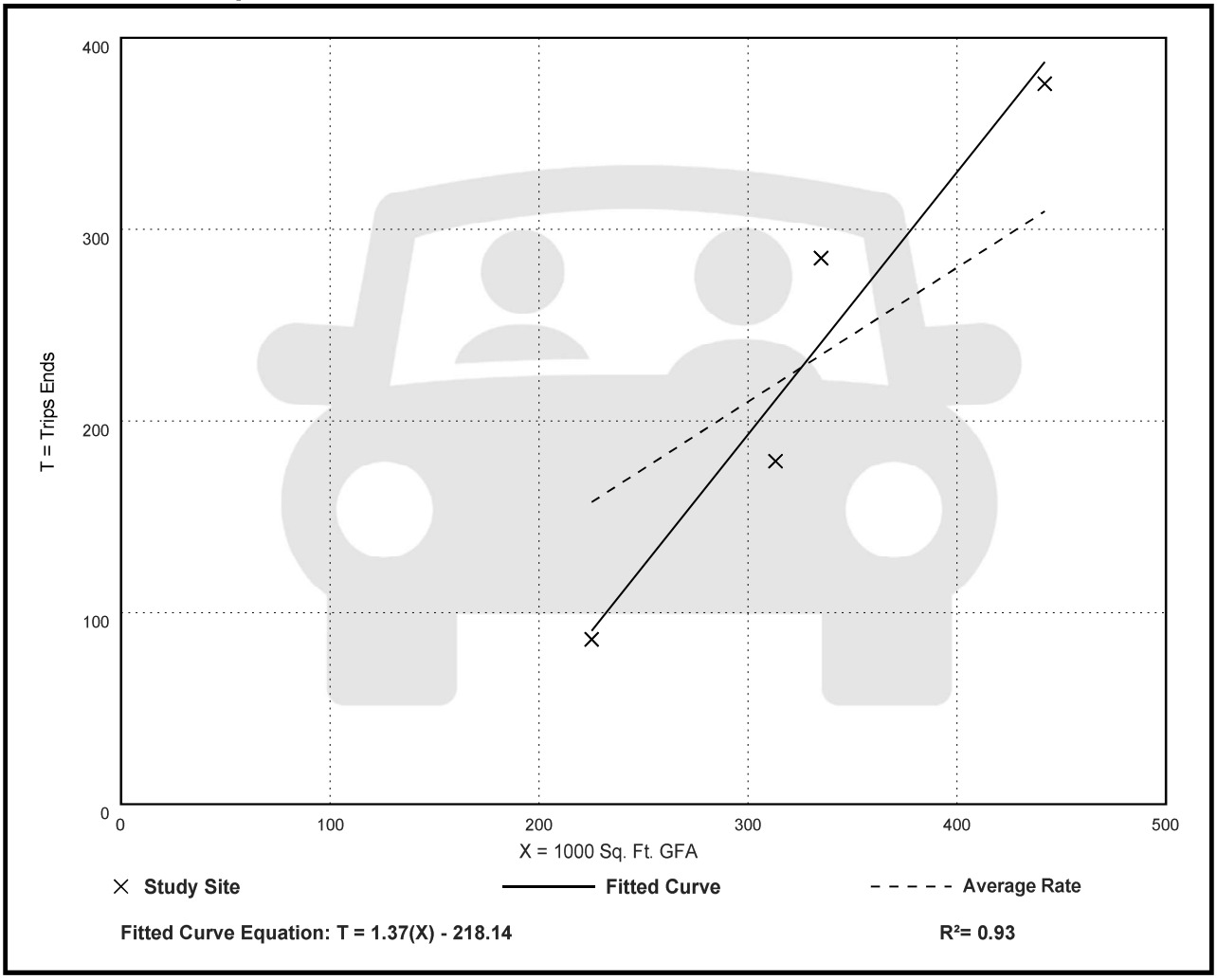
High-Cube Parcel Hub Warehouse
(156)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 4
Avg. 1000 Sq. Ft. GFA: 329
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.70	0.38 - 0.85	0.21

Data Plot and Equation



Fitted Curve Equation: T = 1.37(X) - 218.14

R^2= 0.93

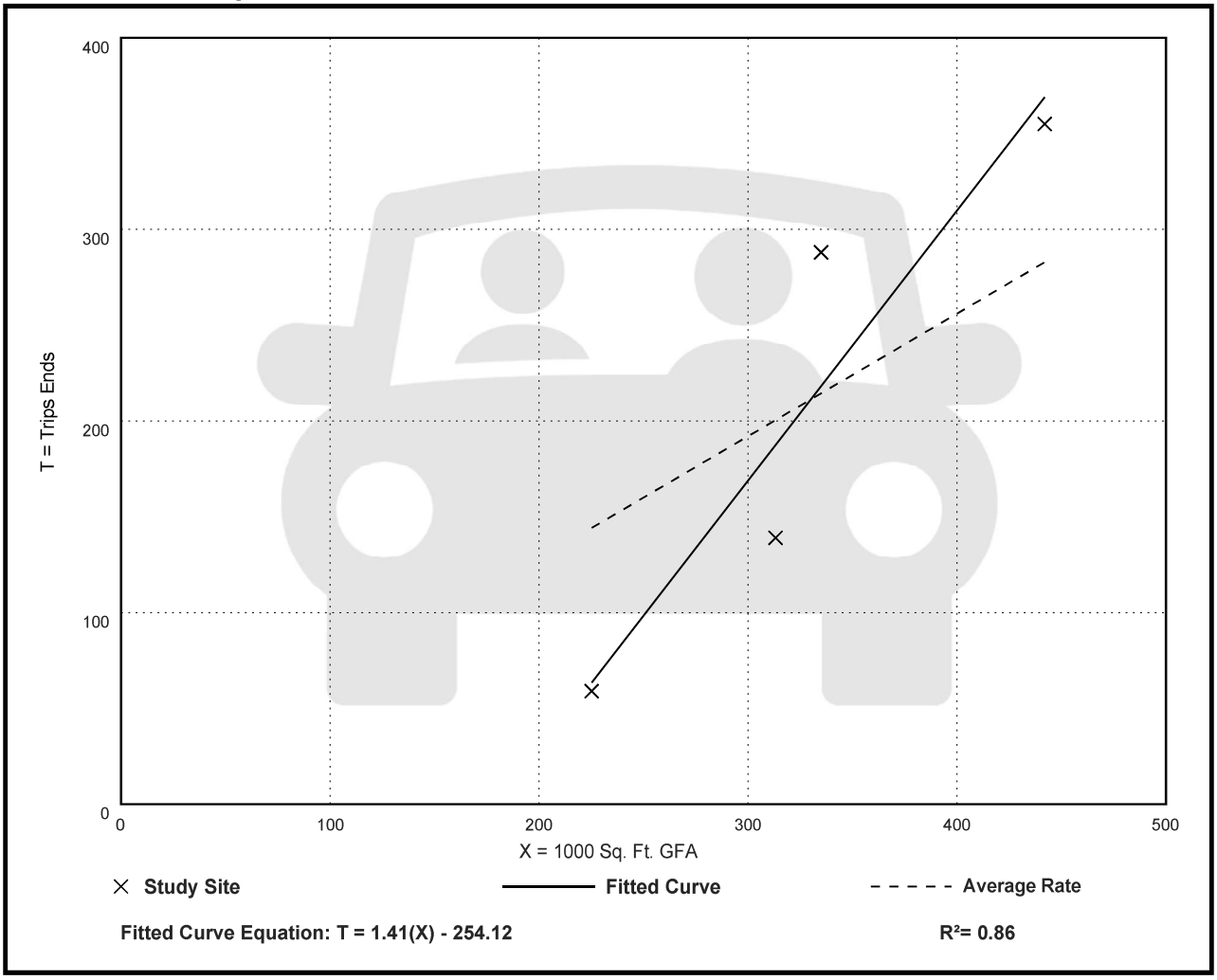
High-Cube Parcel Hub Warehouse
(156)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 4
Avg. 1000 Sq. Ft. GFA: 329
Directional Distribution: 68% entering, 32% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.64	0.26 - 0.86	0.27

Data Plot and Equation



High-Cube Parcel Hub Warehouse
(156)

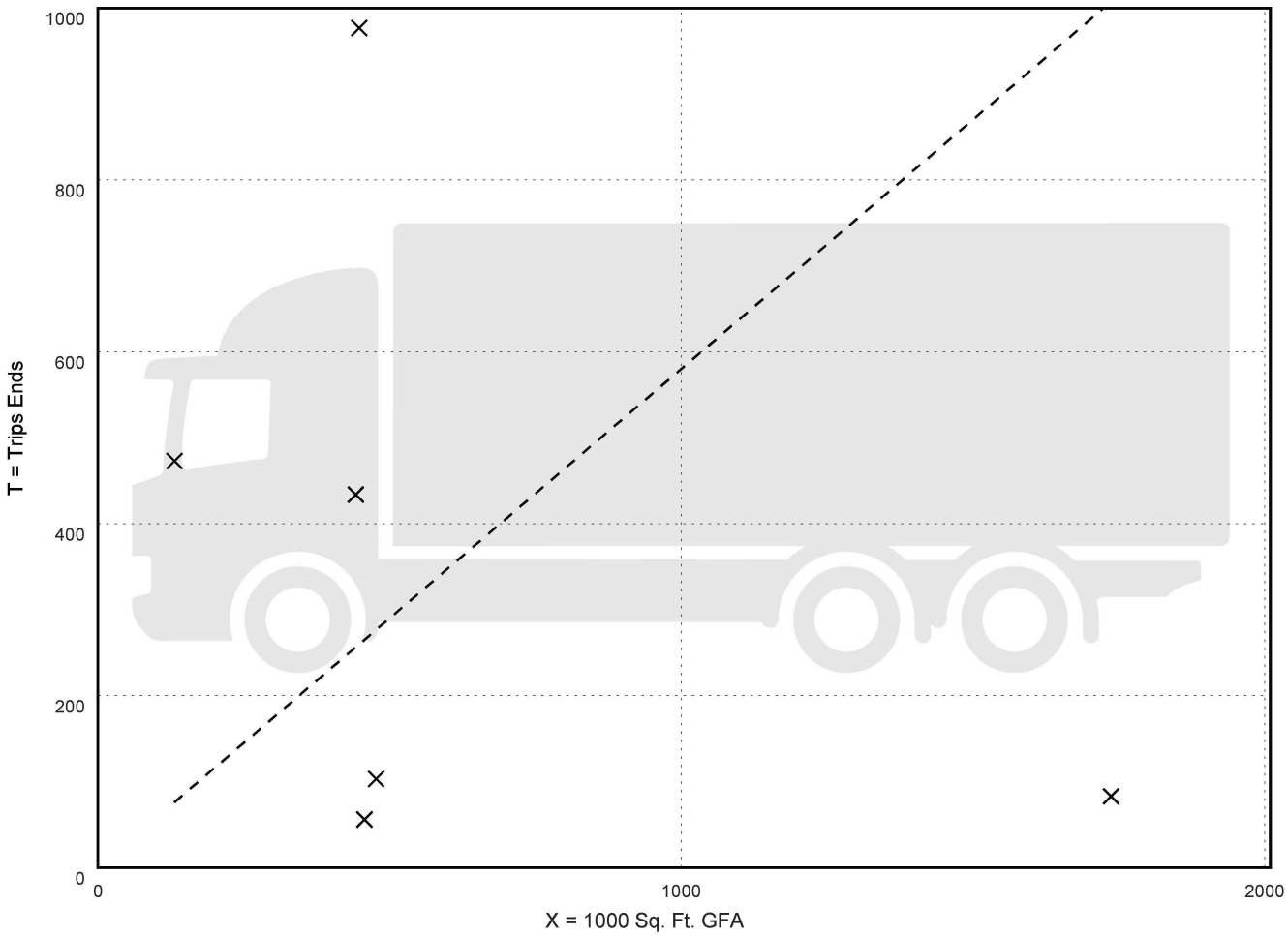
Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 6
Avg. 1000 Sq. Ft. GFA: 615
Directional Distribution: 50% entering, 50% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.58	0.05 - 3.61	1.00

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= *

High-Cube Parcel Hub Warehouse
(156)

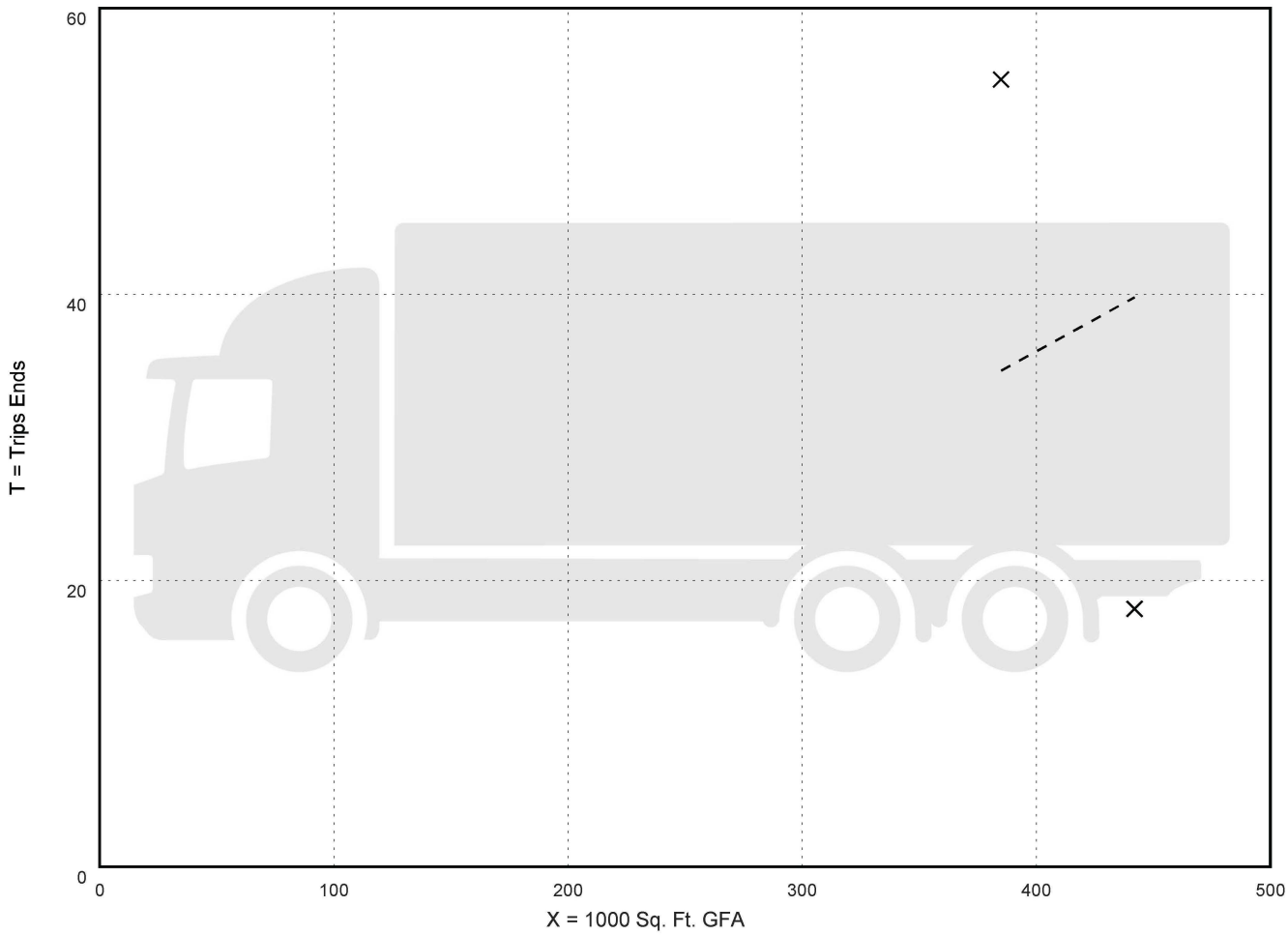
Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 2
Avg. 1000 Sq. Ft. GFA: 414
Directional Distribution: Not Available

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.09	0.04 - 0.14	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= *

High-Cube Parcel Hub Warehouse
(156)

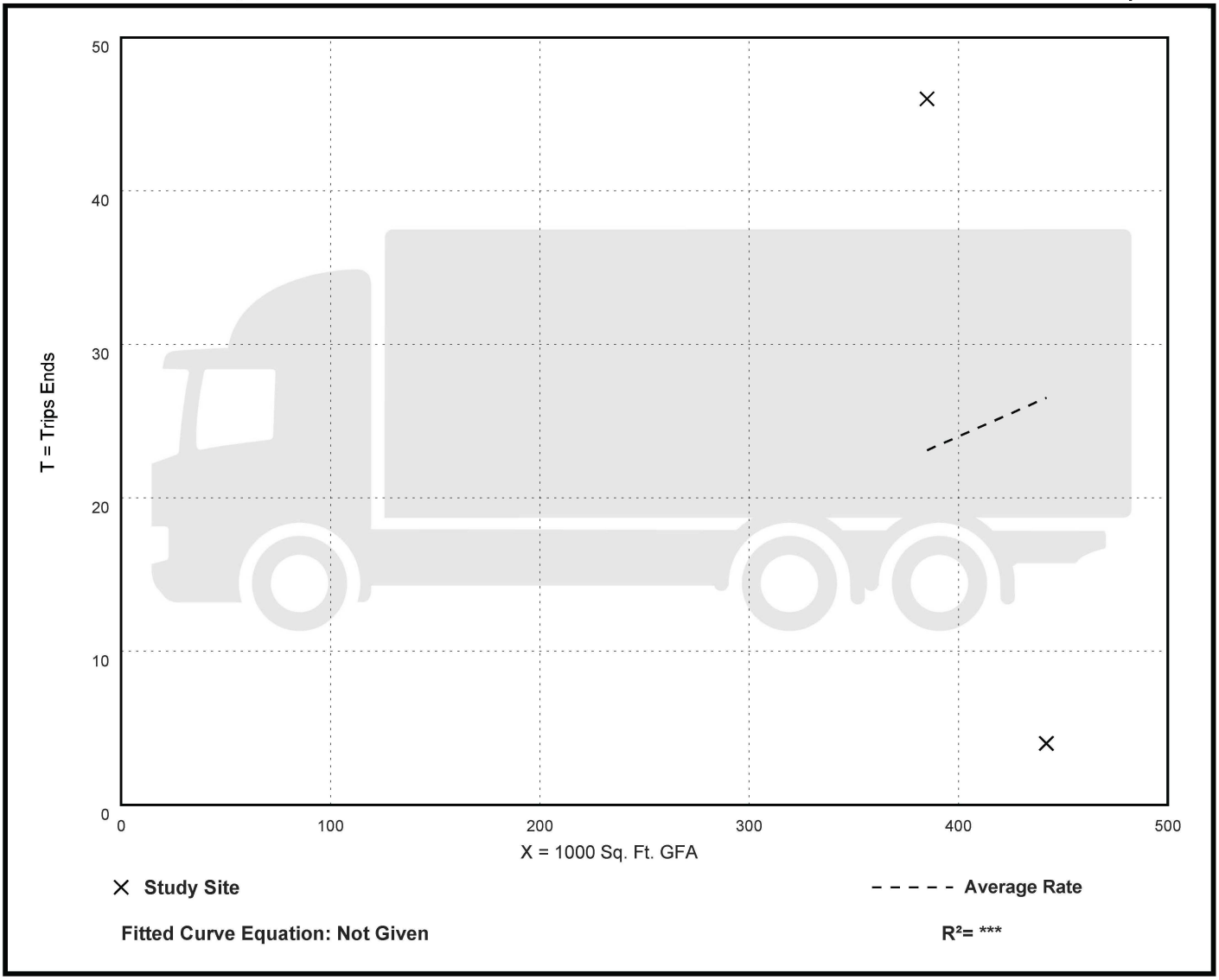
Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 2
Avg. 1000 Sq. Ft. GFA: 414
Directional Distribution: Not Available

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.06	0.01 - 0.12	***

Data Plot and Equation

Caution – Small Sample Size



Attachment C – TDM Plan

7825 San Leandro Street Oakland Foundry

Draft Transportation Demand Management (TDM) Plan

June 2026

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Draft

1. Introduction

This report serves as the Transportation and Parking Demand Management (TDM) Plan for a proposed project (the "Project") at 7825 San Leandro Street in Oakland, California (the "City"). This report was prepared as required by the Oakland *Transportation Impact Review Guidelines* and the California Environmental Quality Act (CEQA).

The Project would redevelop existing industrial land uses into a 310,717 square-foot warehouse building. The Project would additionally provide an off-street parking inventory of 228 vehicular stalls and 46 trailer parking stalls.

1.1 Project Description

The Project vicinity and a site plan are shown in **Figure 1** and **Figure 2**, respectively. Prologis, Inc. (the "Project Applicant") intends to redevelop the approximately 14.9-acre property at 7825 San Leandro Street. The Project site is immediately bounded to the north, east, south, and west by Hegenberger Road, San Leandro Street, existing commercial uses, and a railroad right-of-way (ROW), respectively. Additionally, Elmhurst Creek is located along the southwest corner of the Project site. The full site plan is included in **Appendix A**.

Surrounding land uses include commercial and industrial uses on all sides. Neighboring businesses include the San Francisco Oakland Truck Stop to the south, U-Haul Moving & Storage of Oakland Coliseum and Lakeside Non-Ferrous Metals to the east, the Oakland Arena and Coliseum to the north, and Public Storage to the wet. A Class I multi-use trail, Bay Area Rapid Transit (BART) aerial structure, and Union Pacific Railroad (UPRR) ROW are immediately east of San Leandro Street. The Coliseum BART Station is located approximately 1,000 feet northwest of the Project site. The next nearest sensitive receptor is a residential neighborhood located approximately 1,100 feet east of the northeast corner of the Project site.

The Project site has historically been occupied by the ABI Foundry. The site is zoned as Commercial Industrial Mix 2 (CIX-2) and Industrial General (IG). No changes to the zoning or land use designation are anticipated as part of the Project.

The Project would construct a new warehouse building on the property. The footprint of the new warehouse would be approximately 310,717 square feet with 285,717 square feet of warehouse space and 25,000 square feet of accessory office space. Surface parking would be constructed along the north, east, and south sides of the Project site. Truck parking would be located within the Project boundaries along the east side of the Project site. Loading docks would be located along the east side of the proposed warehouse building.

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Figure 1: Project Vicinity

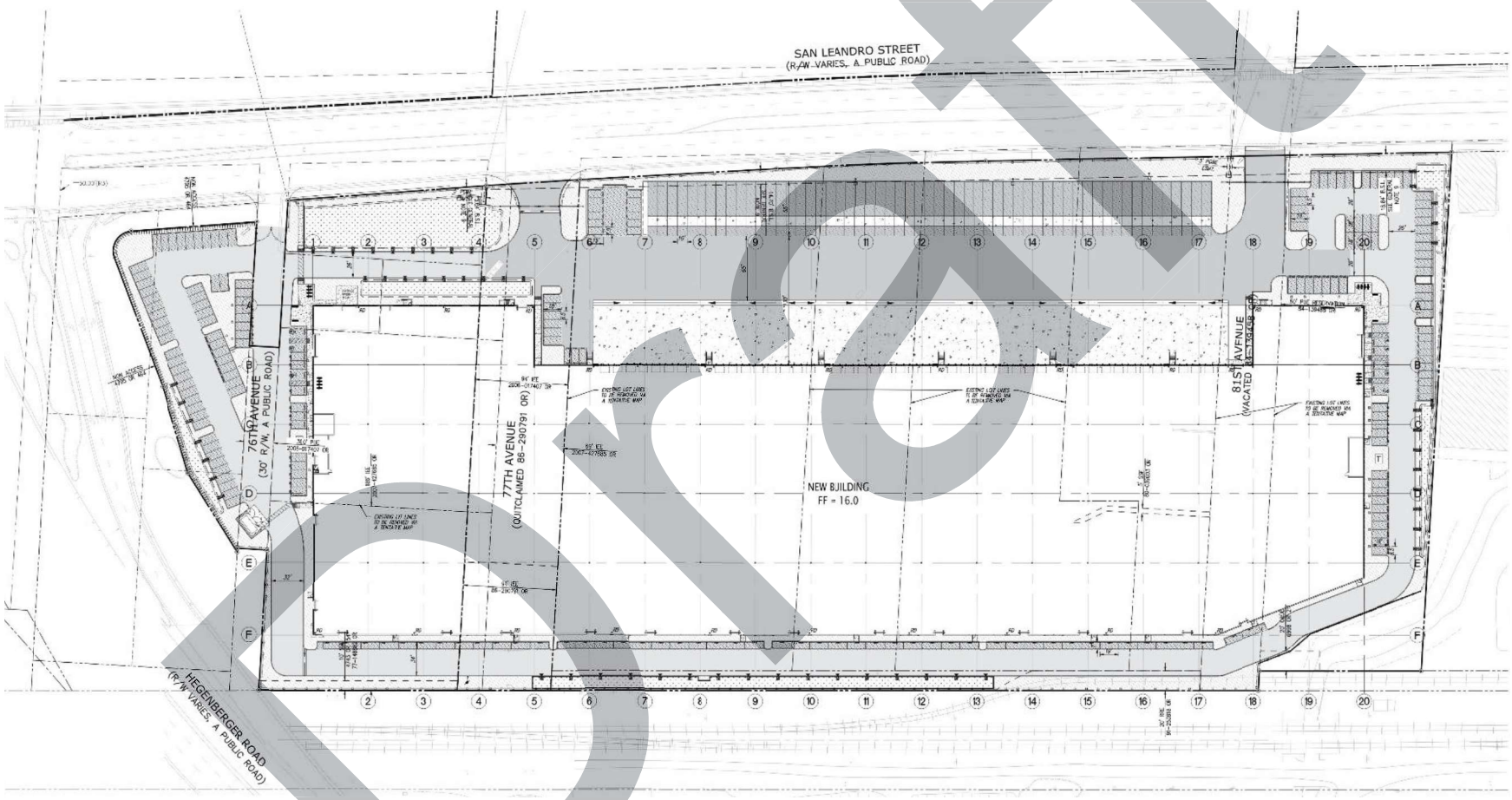


Figure 2: Project Site Plan

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1.1.1 Parking

Vehicle parking spaces are located along the perimeter of the building, with the majority of parking spaces along the east and west sides. The Project will provide a total of 222 vehicle parking spaces which includes 46 spaces that are for or are convertible to clean air and electric vehicles. The breakdown of the parking spaces is summarized in **Table 1**. A larger site plan denoting the locations of parking spaces for clean air and electric vehicles is available in **Appendix A**.

Section 17.117.120 of the City of Oakland Planning Code includes minimum bicycle parking requirements for industrial activities. Industrial warehousing, storage, and distribution activities are required to provide one (1) long-term bicycle parking space for each 40,000 square feet of floor area, with a minimum of two (2) spaces. No short-term parking spaces are required. This equates to eight (8) long-term parking spaces required for the Project. The Project proposes 10 short-term parking spaces and 16 long-term parking spaces, which satisfies City standards.

Table 1: Provided Vehicle Parking Summary

Parking Space Type	Number of Spaces
Standard/Compact	169
Accessible	
Standard	5
Van	2
EV with Charger	23
Clean Air / Vanpool / EV without Charger	23
Total (Light Vehicles)	**222**
Truck Trailer	57
Total (All Vehicle)	**279**
Short-Term Bike Rack	10
Long-Term Bike Locker	16
Total (Bikes)	**26**

1.1.2 Electric Vehicle Parking

The minimum electric vehicle (EV) parking requirements for the Project are stated in Table 5.106.5.3.1 of the 2025 California Green Building Standards Code (2025 CalGreen). Based on the 222 light vehicle parking spaces proposed by the Project, the minimum EV parking spaces are summarized in **Table 2**. The Project proposes 46 EV-capable spaces and 23 EV-ready spaces as shown in **Table 2**, which satisfies EV parking requirements.

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Table 2: Project EV Parking Spaces Requirement

Standard	EV Capable		EV Ready	
	Requirement	Parking Spaces Required	Requirement	Parking Spaces Required
2025 CalGreen	20% of Actual Parking Spaces	44	50% of EV capable spaces for land uses other than office and retail	22
Proposed EV Parking	46		23	
Surplus (+) / Deficient (-)	+2		+1	

Source: Table 5.106.5.3.1 in the 2025 California Green Building Standards Code

1.1.3 Project Trip Generation and TDM Requirements

According to the Oakland *Transportation Impact Review Guidelines*, proposed developments that are expected to generate more than 50 net new AM or PM peak hour vehicle trips must prepare a TDM plan per the City of Oakland Standard Conditions of Approval (COA).

Additionally, according to the Oakland *Transportation Impact Review Guidelines*, proposed developments that are expected to generate 100 or more net new AM or PM peak hour vehicle trips are required to achieve a 20 percent project vehicle trip reduction (VTR) and must submit an annual compliance report for the first five years following completion of the project to the City for review and approval.

A trip generation evaluation was conducted in the Transportation Study to determine the number trips the Project would generate. Data from the Institute of Transportation Engineer's (ITE) publication, *Trip Generation Manual, 11th Edition*, which is a standard reference used by jurisdictions throughout the country, was used to estimate the trip generation potential of proposed developments. The traffic study utilized data for ITE Land Use Code (LUC) 156 ("High-Cube Parcel Hub Warehouse).

Note this land use generates both employee-based passenger car trips and freight-related heavy duty trip traffic. For this TDM plan, passenger car trips were only considered for TDM requirements as truck trips are needed to transport the goods or cargo stored in the future warehouse building.

The proposed Project exceeds both of the above thresholds and would be required to prepare a TDM plan and achieve a 20 percent VTR to be demonstrated in annual compliance reports for the first five years following its completion. The 20 percent VTR is quantified in **Table 3**.

Table 3: Project Trip Generation and Required VTR

	AM Peak Hour	PM Peak Hour
Passenger Cars Trip Generation	190	180
20% VTR	38	36

Source: Kimley-Horn & Associates.

Table 4 provides a list of TDM strategies that the Oakland *Transportation Impact Review Guidelines* suggests for development projects.

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Table 4: TDM Program Elements

TDM Strategies	Required When . . .	Required for Project
Bus boarding bulbs or islands	• A bus boarding bulb or island does not already exist and a bus stop is located along the project frontage; and/or • A bus stop along the project frontage serves a route with 15 minutes or better peak hour service and has a shared bus-bike lane curb.	Yes[1]
Bus shelter	• A stop with no shelter is located within the project frontage, or The project is located within 0.10 miles of a flag stop with 25 or more boardings per day.	Yes[1]
Concrete bus pad	• A bus stop is located along the project frontage and a concrete bus pad does not already exist.	Yes[1]
Curb extensions or bulb-outs	• Identified as an improvement within site analysis.	No
Corridor-level bikeway improvements	• A buffered Class II or Class IV bikeway facility is in a local or county adopted plan within 0.10 miles of the project location; and • The project would generate 500 or more daily bicycle trips.	No, generating less than 500 daily bicycle trips
Corridor-level transit capital improvements	• A high-quality transit facility is in a local or county adopted plan within 0.25 miles of the project location; and • The project would generate 400 or more peak period transit trips.	No, generating less than 400 peak period transit trips
Pedestrian Streetscaping	• Always required.	Yes, improvements such as reorienting the south leg marked crosswalk at San Leandro St & 81st Ave to accommodate the widened Project driveway would be implemented.
Pedestrian Safety Improvements	• When improvements are identified in the Pedestrian Master Plan along project frontage or at an adjacent intersection.	No
In-street bicycle corral	• A project includes more than 10,000 square feet of ground floor retail, is located along a Tier 1 bikeway, and on-street vehicle parking is provided along the project frontages.	No
Intersection improvements	• Identified as an improvement within site analysis.	No
ADA Improvements	• Always required.	Yes, on-site pedestrian facilities would be designed to conform with Public Right-of-Way Accessibility Guidelines
No monthly permits and establish minimum price floor for public parking	• If proposed parking ratio exceeds 1:1000 square feet (commercial).	No
Parking garage is designed with retrofit capability	• Optional if proposed parking ratio exceeds 1:1.25 (residential) or 1:1000 square feet (commercial).	No
Parking space reserved for car share	• A project is located within downtown. One car share space preserved for buildings between 50 - 200 units, then one car share space per 200 units.	No
Paving, lane striping or restriping (vehicle and bicycle), and signs to midpoint of street section	• Typically required.	Yes, lane striping and markings along the Project frontage on San Leandro St up to the midpoint of the street would be refreshed
Pedestrian crossing improvements, pedestrian-supportive signal changes	• Identified as an improvement within site analysis. • Identified as an improvement within operations analysis.	No
Real-time transit information system	• A project frontage block includes a bus stop or BART station and is along a Tier 1 transit route with 2 or more routes or peak period frequency of 15 minutes or better.	No
Relocating bus stops to far side	• A project is located within 0.10 mile of any active bus stop that is currently near-side.	No[1,2]
Signal upgrades	• Project size exceeds 100 residential units, 80,000 square feet of retail, or 100,000 square feet of commercial; and • Project frontage abuts an intersection with signal infrastructure older than 15 years.	Yes[1]
Transit queue jumps	• Identified as a needed improvement within operations analysis of a project with frontage along a Tier 1 transit route with 2 or more routes or peak period frequency of 15 minutes or better.	No
Trenching and placement of conduit for providing traffic signal interconnect	• Project size exceeds 100 residential units, 80,000 square feet of retail, or 100,000 square feet of commercial; and • Project frontage block is identified for signal interconnect improvements as part of a planned ITS improvement; and A major transit improvement is identified within operations analysis requiring traffic signal interconnect.	No
Unbundled parking	• If proposed parking ratio exceeds 1:1.25 (residential)	No

Source: City of Oakland, 2017, *Oakland Transportation Impact Review Guidelines*

[1]Pending City of Oakland, AC Transit, and Project Applicant coordination and approval, as feasible, during the PX permit phase.

[2]San Leandro St & 81st Ave stops (ID 52281 and ID 57965) are already on the far side of the intersection. The strategy does not apply to the 81st Ave & San Leandro St (ID 58929) stop since there is no far side or to the San Leandro St & 77th Ave (ID 55210) stop since 77th Ave is a driveway and not an intersection.

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2. Existing Conditions

This section provides additional information on the existing transit services, bicycle facilities, and pedestrian facilities near the Project site.

2.1 Existing Transit Service

2.1.1 BART

BART is a regional fixed-route heavy rail service that operates six lines throughout the San Francisco Bay Area. The Coliseum Station is approximately 1,000 feet from the Project site and is served by the Blue Line (Daly City – Dublin/Pleasanton Line), the Orange Line (Richmond – Berryessa/North San Jose Line), and the Green Line (Daly City – Berryessa/North San Jose Line). The Coliseum Station additionally provides access to Oakland International Airport via the Oakland Airport Connector and the Oakland Coliseum via a pedestrian bridge.

2.1.2 AC Transit

AC Transit is a regional fixed-route and demand-response bus service operator that primarily serves Alameda County. The BART Coliseum Station is served by AC Transit's routes 45, 73, 646, and 657. Route 646 serves a curbside bus stop on the west side of San Leandro Street approximately 50 feet south of its intersection with 81st Avenue.

2.2 Existing Bicycle and Pedestrian Facilities

2.2.1 Bicycle Facilities

A Class I ped-bike path exists on the east side of San Leandro Street near the Project site. Class I bike paths are physically separated from motor vehicle lanes and offer two-way bicycle travel.

The Class I ped-bike path along San Leandro Street is separated from vehicular traffic by a steel physical barrier. A marked crosswalk with green thermoplastic coloring exists on the east legs of San Leandro Street & 75th Avenue and San Leandro Street & 81st Avenue.

2.2.2 Pedestrian Facilities

Concrete sidewalks exist on the west side of San Leandro Street that abuts the Project site. A Class I pedestrian-bicycle (ped-bike) path additionally exists on the east side of San Leandro Street. Marked crosswalks, countdown pedestrian signal heads, and textured tactile curb cuts exist at the signalized intersections along San Leandro Street at 75th Avenue and 81st Avenue. Concrete sidewalks exist on both sides of 75th Avenue and 81st Avenue near the Project site.

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3. Transportation Demand Management (TDM) Program

3.1 Framework

The TDM program will be comprised of three major components: 1) Education, 2) Program Elements, and 3) Monitoring. The Education component is discussed in Section 3.2; the Program Elements component is discussed in Section 3.3; and the Monitoring component is discussed in Section 4.

3.1.1 511

511 is source for traffic, transit, carpool, vanpool, and bicycle information in San Francisco Bay Area. This resource is led by the Metropolitan Transportation Commission (MTC), California Highway Patrol (CHP), and California Department of Transportation (Caltrans). Their website (511.org) provides a variety of TDM-related services, programs, and information such as:

- Commuter Benefits Program
- Employer-based shuttle programs
- Guaranteed and Emergency Ride Home Programs
- Carpool/Vanpool incentives
- Bay Area Bike Mobile repair clinic
- Bike to Work/School Days
- Spare the Air Days

3.2 Education

The Education component focuses on awareness and communication to reduce vehicle trips to the building by employees and visitors. This can be done by providing informational kiosks, new employee packages, etc.

3.3 Program Elements

The TDM program will implement elements that will promote carpool, bicycling, walking, and transit in place of drive-alone vehicle trips to and from the Project site. These elements may change or be adjusted to adapt to new tenants or changing transportation trends and to maximize the efficiency and performance of the program.

3.3.1 VMT Reduction

Potential VMT reduction was determined using the Alameda County Transportation Commission (Alameda CTC) VMT Reduction Calculator Tool, as well as information from California Air Pollution Control Officers Association (CAPCOA) *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*. Details on specific required TDM strategies are provided in **Table 5**. Since employee shift information for the end user is currently unavailable and may influence eligibility for certain TDM measures, anticipated VTRs were estimated for each measure based on a range of eligible employee percentages.

It should be noted that TDM measures lose effectiveness when implemented with other measures because they often target overlapping user groups and travel decisions. For example, carpool programs

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and bike-to-work incentives both aim to shift drive-alone commuters, but an individual typically adopts only one alternative mode. As a result, the combined effect of both measures is not additive and can lead to diminishing returns when estimating total trip reduction. Additionally, once commuters are captured by one measure, there is a smaller remaining pool for other measures to influence, which further reduces the other measures' incremental effectiveness. Both the Alameda CTC VMT Tool and CAPCOA cap the VTR reduction to 26 percent,

Based on the information presented in **Table 5**, it is anticipated that the Project may achieve its 20 percent VTR reduction requirements.

3.3.2 Optional Additional TDM Strategies

As discussed previously, the Project expects changes in tenants or commute patterns over time and will revise the TDM program to accommodate these changes. In addition, the Project may implement new strategies if needed to achieve its 20 percent peak hour trip reduction goal. These optional additional strategies may include incentives for TDM participation or flex-time. The additional strategies are shown along with required strategies that the Project is subject to in **Table 5**.

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Table 5: TDM Strategies

Measure	Description	% Reduction								
		Alameda CTC[4]					CAPCOA[4]			
		ID #	% Eligible Employees				Measure #	% Eligible Employees			
			25%	50%	75%	100%		25%	50%	75%	100%
Carpool Program	Facilitate ride matching for employees. Existing programs such as 511.org program can be utilized to facilitate carpooling. The specific strategy on how a carpooling program is administered would be up to the determination of the future tenant of the Project.	1C	1.0%	2.0%	3.0%	4.0%	T-8	1.0%	2.0%	3.0%	4.0%
Vanpool Program	Facilitate ride matching for employees. Existing programs such as 511.org program can be utilized to facilitate vanpooling. The specific strategy on how a vanpooling program is administered (e.g., contracting with a vanpooling service or purchasing vans for employee use) would be up to the determination of the future tenant of the Project.	1E	6.8%	6.8%	6.8%	6.8%	T-11	0.4%	0.8%	1.2%	1.5%
Guaranteed Ride Home Program	Alameda CTC provides Guaranteed Ride Home (GRH) is a program that provides a "back-up" ride to employees who use transit, carpool, biking/walking, or other alternative as their commute mode.	-	-[1]	-[1]	-[1]	-[1]	T-5	1.0%	2.0%	3.0%	4.0%
Parking spaces for carpool/vanpool	23 parking spaces for Clear Air, EV, or Vanpool	-	-[1]	-[1]	-[1]	-[1]	-	-[1]	-[1]	-[1]	-[1]
Bicycle Parking	The Project is providing 10 short-term bicycle racks and 16 long-term bicycle lockers throughout site.	3D	0.5%	0.5%	0.5%	0.5%	T-10	0.9%	0.9%	0.9%	0.9%
Showers and Changing Facilities Lockers	Provide shower and changing facilities for those who bicycle to work	3D	2.1%	2.1%	2.1%	2.1%	T-10	3.6%	3.6%	3.6%	3.6%
TDM Coordinator	TDM Coordinator will administer, update, and monitor TDM program, as well as coordinate with the City.	1B	-[1]	-[1]	-[1]	-[1]	T-7	-[1]	-[1]	-[1]	-[1]
Information Programs	Provide educational or marketing that promotes employees about their travel choices.	1B	-[1]	-[1]	-[1]	-[1]	T-7	1.0%	2.0%	3.0%	4.0%
Free or Subsidized Transit Pass	Provide employee free or subsidized transit passes.	1D1	0.5%	1.0%	1.5%	2.1%	T-9	0.3%	0.7%	1.0%	1.3%
Pre-tax commute benefits	Provide financial incentives for employees to use other modes of travel.	-	-[1]	-[1]	-[1]	-[1]	-	-[1]	-[1]	-[1]	-[1]
Parking Cash Out	Offer employee parking cash out when using other modes of travel	3B	3.0%	6.0%	9.0%	12.0%	T-13	3.0%	6.0%	9.0%	12.0%
Telecommute Option	Office employees to work from home. Does not apply to warehouse workers.	1F	1.0%	1.0%	1.0%	1.0%	-	1.0%	1.0%	1.0%	1.0%
Staggered work hours	Shift in set work hours to all employees	-	-[1]	-[1]	-[1]	-[1]	-	-[1]	-[1]	-[1]	-[1]
Pedestrian-Oriented Uses & Amenities	Pedestrian-oriented uses and amenities (e.g., food trucks) could be provided to discourage off-site vehicular trips by employees throughout the workday.	-	3.0%[3]	3.0%[3]	3.0%[3]	3.0%[3]	-	3.0%[3]	3.0%[3]	3.0%[3]	3.0%[3]
	Total[2]		**17.9%**	**22.4%**	**26.9%**	**31.5%**		**15.2%**	**22.0%**	**28.7%**	**35.3%**
	Target Vehicle Trip Reduction		**20.0%**								
	Difference (Total - Target)		**-2.1%**	**2.4%**	**+6.9%**	**+11.5%**		**-4.8%**	**1.9%**	**+8.6%**	**+15.3%**

Notes:

1. The percent reduction for some measures cannot be calculated because it is complementary to other measures and current literature and resources do not include methodologies for determining their individual effectiveness.
2. The total does not equal the total expected VTR because implementing overlapping measures will dampen their effectiveness. The trip reduction for mandatory commute benefit programs are capped at 26% reduction.
3. Both Alameda CTC and CAPCOA does not provide reduction for pedestrian-oriented uses & amenities, therefore reductions for Measure M26 from the City/County Association of Governments of San Mateo County (C/CAG) TDM is listed.
4. Percent reductions for each TDM measure are provided in the **Appendix B**.

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4. Monitoring and Evaluation

To ensure that the TDM program is working effectively and achieving its target, regular monitoring of commute patterns and reviewing the TDM program is necessary for the life of the Project.

4.1 Review of TDM Plan

The TDM program should be reviewed at least on an annual basis. Adjustments should be made based on information from annual commute surveys, shifts in traffic pattern, and change in technology. If necessary, adjustments to the TDM program may include:

- Implementing additional TDM elements
- Modifications to existing TDM elements (i.e. adding additional bicycle storage)

If adjustments are made to the TDM program, the TDM coordinator(s) will communicate these adjustments to employees.

4.2 Monitoring

Regular monitoring is needed to assess the compliance with meeting the City's requirement of 20% reduction in peak hour trips. The monitoring process would include the following:

- Annual Travel Survey
- Annual Report

4.2.1 Annual Travel Survey

An annual travel survey will be conducted to assess the current use of alternative transportation options by employees and visitors. Results of the survey should be used to identify adjustments that could be made to sustain or increase the use of transit, carpool, bicycle, and walking.

4.2.2 Annual Trip Counts

To assess compliance with meeting the City's and requirement, the development shall perform trip counts collected at the project's driveway. To ensure that the set of data is valid to fairly assess compliance with the trip limit, trip counts should be conducted as follows:

- Trip counts will be conducted on an annual basis.
- Trip counts will count the number of peak hour weekday trips entering and exiting at the Project's driveways on San Leandro Street.
- Trip counts should exclude heavy vehicle counts as heavy vehicles would not be subject to TDM or VMT requirements. In general, heavy vehicle trip patterns do not typically follow work-based employee commute patterns.

4.2.3 Annual Report

The Project will prepare an annual report which describes the operation and utilization of TDM strategies. The report will also report the results of the travel survey.

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4.3 Evaluation

The City will review the annual report to determine if the Project is in compliance in achieving its TDM target.

4.3.1 Compliance with TDM Target

If the Project is found to be compliant with TDM target, the Project will continue to monitor TDM as described in **Section 4.2**.

4.3.2 Non- Compliance with TDM Target

If annual reports are not submitted in a timely manner and/or the annual reports indicate that the Project Applicant has failed to implement the TDM program, the Project will be considered to be in violation of the COA. The City may initiate enforcement action as provided for in the COA if the Project Applicant does not demonstrate reasonable, good faith efforts to make the Project become compliant again. The Project shall not be considered in violation of the COA if the TDM program is implemented but the vehicle trip reduction goal is not achieved.

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Appendix A – Site Plan

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7825 SAN LEANDRO STREET
OAKLAND, CA

NON-CONDITIONED SHELL BUILDING

SHEET INDEX

ARCHITECTURAL

DAB-A0.1	TITLE SHEET
DAB-A1.1	OVERALL SITE PLAN
DAB-A1.2	SITE SIGNAGE PLAN
DAB-A2.1	OVERALL FLOOR PLAN
DAB-A2.2	ENLARGED FLOOR PLANS
DAB-A2.3	ENLARGED FLOOR PLANS @1.6' A.F.F.
DAB-A2.4	ENLARGED FLOOR PLANS @1.6' A.F.F.
DAB-A3.1	ELEVATIONS
DAB-A4.1	FENCE AND GATE DETAILS
	COLOR ELEVATIONS
	MATERIAL BOARD
	PERSPECTIVE
	AMENITY AREA ENLARGED PLAN

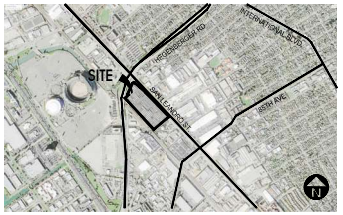
CIVIL

C1.0	COVER SHEET
C2.0	TOPOGRAPHIC SURVEY
C3.0	SECTIONS
C4.0	PRELIMINARY GRADING & DRAINAGE PLAN
C5.0	PRELIMINARY UTILITY PLAN
C6.0	PRELIMINARY EROSION CONTROL PLAN
C7.0	PRELIMINARY STORMWATER QUALITY CONTROL PLAN
C8.0	WB-67 TRUCK TURN EXHIBIT
C8.1	FIRE TRUCK TURN EXHIBIT
C9.0	PRELIMINARY OFFSITE STREET IMPROVEMENTS

LANDSCAPE

L-1	PRELIMINARY LANDSCAPE PLAN

VICINITY MAP



PROPERTY OWNER

PROLOGIS
6160 N. McCARTHY BLVD.
SUITE 100
MILPITAS, CA 95035
PHONE: (510) 661-4019
CONTACT: BLAIR RUSHING
E-MAIL: JRUSHING@PROLOGIS.COM

APPLICANT'S REPRESENTATIVE

HPA, INC.
600 GRAND AVE., STE 302
OAKLAND, CA 94610
PHONE: (949) 862-2175
CONTACT: TYNEISE BEYER
E-MAIL: TYNEISE.BEYER@HPARCHS.COM

PROJECT REPRESENTATIVES

BUILDING & PLANNING DEPT.
PLANNING :
BUILDING PLAN CHECK NO.

CODE ANALYSIS:
BUILDING OCCUPANCY: B & S-1

APPLICANT'S REPRESENTATIVE :
HPA, INC.
600 GRAND AVE., STE.# 302
OAKLAND, CA 94610
PHONE: (949) 862.2175
CONTACT:TYNEISE BEYER

ASSESSOR'S PARCEL NO. :
PARCEL NO. SEE CIVIL
ZONING :
ZONED: ZONING – IG & CIX-2

BUILDING ADDRESS :
7825 San Leandro Street
OAKLAND, CA

GOVERNING CODE :
2022 CALIFORNIA BUILDING CODE
2022 CALIFORNIA PLUMBING CODE
2022 CALIFORNIA MECHANICAL CODE
2022 CALIFORNIA ELECTRICAL CODE
2022 CALIFORNIA FIRE CODE
2022 CALIFORNIA ENERGY CODE
2022 CALIFORNIA GREEN BUILDING STANDARDS

PROJECT DATA

	BUILDING
SITE AREA	
In s.f.	649,390 sf
In acres	14.9 ac
BUILDING AREA	
Office - 1st floor	20,000 sf
Office - 2nd floor	5,000 sf
Warehouse	287,717 sf
TOTAL	312,717 sf
Building footprint	305,717 sf
FLOOR AREA RATIO	
Maximum	2.0, NONRESIDENTIAL
Actual	1.48
AUTO PARKING REQUIRED	
Office: 1/400 s.f.	42 stalls
Whse: 1/3,500 s.f.	82 stalls
TOTAL	123 stalls
EV PARKING REQUIRED	
EV Capable without EVSE (10%) (Clean Air/Vanpool/EV)	23 stalls
EV Capable with EVSE (10%) (EV Charging Only)	23 stalls
EVSE STANDARD 21	
EV Capable with EVSE ADA parking (EV Charging Only) 1	
EV Capable with EVSE ADA Van parking (EV Charging Only) 1	
Note: Electrical panel capacity sufficient to supply 20% of spaces. Full circuits are counted towards the panel capacity requirment.	
AUTO PARKING PROVIDED	
Standard (8.5' x 18')	96 stalls
Accessible parking (8' x 18'+5' Aisle)	5 stalls
Accessible Van (12' x 18'+5' Aisle)	2 stalls
Compact (7'-6' x 15')	25 stalls
Compact Parallel (7' x 19')	48 stalls
EV Capable without EVSE - inaccessible countduit installed (10%) (Clean Air/Vanpool/EV)	23 stalls
EV Capable with EVSE - full circuit (14%) (EV Charging Only)	21 stalls
EV Capable with EVSE ADA parking (EV Charging Only)	1 stalls
EV Capable with EVSE ADA Van parking (EV Charging Only)	1 stalls
TOTAL	222 stalls
TRAILER PARKING PROVIDED	
Trailer (10' x 53')	97 stalls
BICYCLE PARKING REQUIRED	
Short Term (5% of total stalls)	12
Long Term (5% of total stalls)	12
BICYCLE PARKING PROVIDED	
Short Term	16
Long Term	16
MAXIMUM BUILDING HEIGHT ALLOWED	
Height - 55'	
EXISTING ZONING DESIGNATION	
Zoning - IG & CIX-2	
SETBACKS	
Minimum Front Yard Setback - 0 ft.	
Minimum interior side yard setback - 0 ft.	
Minimum street side of a corner lot - 10 ft.	
Minimum rear yard setback - 0 ft.	

OFFICIAL USE ONLY

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oakland, ca
94610
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email: hpa@hparchs.com

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OAKLAND, CA

Consultants:

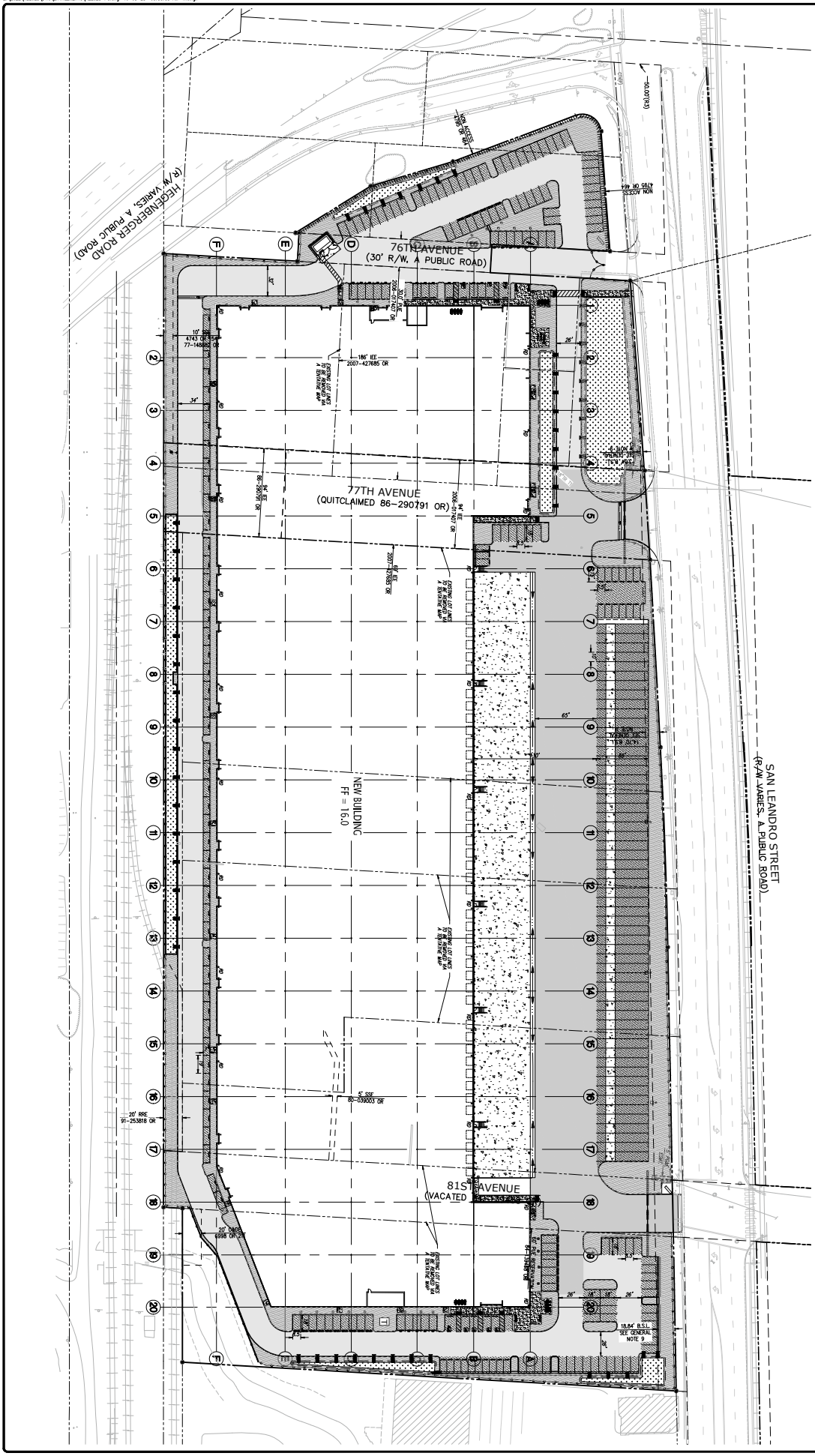
CIVIL	Kier & Wright
STRUCTURAL	-
MECHANICAL	-
PLUMBING	-
ELECTRICAL	-
LANDSCAPE	Yamasaki
FIRE PROTECTION	-
SOILS ENGINEER	-

Title: TITLE SHEET

Project Number: 22036
Drawn by: ST
Date: 04/05/2024
Revision:
1st PLANNING SUBMITTAL 04/05/2024
2nd PLANNING SUBMITTAL 10/01/2025

Sheet:
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SITE PLAN
OF
7825 SAN LEANDRO STREET
FOR
PROLOGIS

OAKLAND, CALIFORNIA

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NO.	REVISION	BY	NO.	REVISION	BY
1			1		
2			2		
3			3		
4			4		
5			5		

DATE	JUNE 2025
SCALE	AS SHOWN
DESIGNER	LMC
DRAWN BY	MMC
JOB NO.	A22023
SHEET	C3.0
OF	12 SHEETS

Appendix B – Alameda CTC, CAPCOA Handbook, & San Mateo County C/CAG TDM Measures

Draft

1C. Employer Carpool Program

Level of application: **Project/Site**
Type of VMT affected: **Employee commute trips**
Max VMT reduction: **8.0%**

Return to Main
Results Summary

This strategy will implement a ridesharing program and establish a permanent transportation management association with funding requirements for employers. Ridesharing encourages carpooled vehicle trips in place of single-occupied vehicle trips, thereby reducing the number of trips, VMT, and GHG emissions. When providing a ridesharing program, a best practice is to establish funding by a non-revocable funding mechanism. Ridesharing must be promoted through a multi-faceted approach, such as:

- Designating a certain percentage of parking spaces for ridesharing vehicles.
- Designating adequate passenger loading and unloading and waiting areas for ridesharing vehicles.
- Providing an app or website for coordinating rides.

Place type of project/site	Suburban center	Alameda CTC model
% of employees eligible	100%	user input
% reduction in employee commute VMT	-4.0%	coefficient, source (1)
Change in VMT	-4.0%	☐ Exclude from Results — Active

Formula: % Change in VMT = % of employees eligible * % reduction in employee commute VMT

Sources:
(1) San Diego Association of Governments (SANDAG). 2019. Mobility Management VMT Reduction Calculator Tool – Design Document. June. Available: https://www.icommutesd.com/docs/default-source/planning/tool-design-document_final_7-17-19.pdf?sfvrsn=ec39eb3b_2. Accessed: January 2021.

1D1. Implement Subsidized or Discounted Transit Program (for Employees)

Level of application: **Project/Site**
Type of VMT affected: **Employee commute trips**
Max VMT reduction: **5.5%**

Return to Main
Results Summary

This strategy will provide subsidized, discounted, or free transit passes for employees. Reducing the out-of-pocket cost for choosing transit improves the competitiveness of transit against driving, increasing the total number of transit trips and decreasing vehicle trips. This decrease in vehicle trips results in reduced VMT and thus a reduction in GHG emissions. When implementing transit discounts or subsidies, projects should adhere to the following guidance:

• Project should be located either within one mile of high-quality transit service (either rail, or bus with headways of no more than 15 minutes), one-half mile of local or less frequent transit service, or along a designated shuttle route providing last-mile connections to rail service. As an alternative to shuttle service, if bikeshare service (Strategy 4E) is available, the site may be located up to two miles from a high-quality transit service.
• If more than one transit agency serves the site, subsidies should be provided that can be applied to each of the services available. If subsidies are applied for only one service, all variable inputs below should also pertain only to the service which is subsidized.

Transit fare unit	$/trip	user input
Average transit fare without subsidy	$6.00	user input
Subsidy amount	$6.00	user input
Percent of employees eligible for subsidy	100%	user input
Default transit mode share of work trips	9.6%	Alameda CTC model
User override of transit mode share of work trips		user input, optional
Transit mode share of work trips used for calculation	9.6%	calculated
Elasticity of transit boardings with respect to transit fare price	-0.43	constant, source (2, 3, 4)
Percent of transit trips that would otherwise be made in a vehicle	50%	constant, source (2)
Conversion factor of vehicle trips to VMT	1	standard assumption
Change in VMT	-2.1%	☐ Exclude from Results Active

Formula: % Change in VMT = ((Subsidy amount / Average transit fare without subsidy)* Elasticity of transit boardings with respect to transit fare price) * Percent of employees eligible for subsidy * Transit mode share of work trips * Percent of transit trips that would otherwise be made in a vehicle * Conversion factor of vehicle trips to VMT

Subsidy amount is capped at 100% of average transit fare without subsidy

Sources:

(1) Federal Highway Administration (FHWA). 2017. National Household Travel Survey – 2017 Table Designer. Travel Day PMT by TRPTRANS by HH_CBSA, Workers by WRKTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) Handy, L., Boarnet, S. 2013. Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions. Available: http://www.arb.ca.gov/cc/sb375/policies/transitservice/transit_brief.pdf. Accessed: January 2021.

(3) Litman, T. 2020a. Transit Price Elasticities and Cross-elasticities. Victoria Transport Policy Institute. April. Available: https://www.vtpi.org/tranelas.pdf. Accessed: January 2021.

(4) Taylor, B., Miller, D., Iseki, H., & Fink, C. 2008. Nature and/or Nurture? Analyzing the Determinants of Transit Ridership Across US Urbanized Areas. Transportation Research Part A: Policy and Practice, 43(1), 60-77. Available: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.367.5311&rep=rep1&type=pdf. Accessed: January 2021.

1E. Employer Vanpool Program

Level of application: **Project/Site**
Type of VMT affected: **Employee commute trips**
Max VMT reduction: **10.4%**

Return to Main
Results Summary

This strategy will implement an employer-sponsored vanpool service. Vanpooling is a flexible form of public transportation that provides groups of 5 to 15 people with a cost-effective and convenient rideshare option for commuting. The mode shift from long-distance, single-occupied vehicles to shared vehicles reduces overall commute VMT, thereby reducing GHG emissions. When implementing a vanpool service, best practice is to subsidize the cost for employees that have a similar origin and destination and provide priority parking for employees that vanpool.

Does employer sponsor a vanpool program?	yes	user input
Default % of employees that participate in vanpool program	2.7%	constant, source (2)
User override of % of employees that participate		user input, optional
Vanpool participation rate used for calculation	2.7%	calculated
Default average length of one-way vehicle commute trip in region (miles)	13.2	Alameda CTC model
User override of length of one-way vehicle commute trip in region		user input, optional
Length of one-way vehicle commute trip in region used for calculation	13.2	calculated
Default average length of one-way vanpool commute trip (miles)	42.0	constant, source (2)
User override of length of one-way vanpool commute trip		user input, optional
Length of one-way vanpool commute trip used for calculation	42.0	calculated
Average vanpool occupancy (including driver)	6.25	constant, source (2)
Change in VMT	-6.8%	☐ Exclude from Results Active

Formula: % Change in VMT = ((((1- Vanpool participation rate)* Length of one-way vehicle commute trip in region + Vanpool participation rate *(Length of one-way vanpool commute trip / Average vanpool occupancy (including driver)))/((1- Vanpool participation rate)* Length of one-way vehicle commute trip in region + Vanpool participation rate * Length of one-way vanpool commute trip))-1)

If the user override of vanpool participation rate exceeds maximum of 15%, the default value will be used, source (1, 2)

Sources:

(1) Federal Highway Administration (FHWA). 2017. National Household Travel Survey – 2017 Table Designer. Travel Day VT by HH_CBSA by TRPTRANS by TRIPPURP. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) San Diego Association of Governments (SANDAG). 2019. Mobility Management VMT Reduction Calculator Tool – Design Document. June. Available: https://www.icommutesd.com/docs/default-source/planning/tool-design-document_final_7- 17-19.pdf?sfvrsn=ec39eb3b_2. Accessed: January 2021.

1F. Employer Telework Program

Level of application: **Project/Site**
Type of VMT affected: **Employee commute trips**
Max VMT reduction: **44.0%**

Return to Main
Results Summary

A telework program enables employees to work from home or a remote location on a periodic basis. Depending on the nature of the work, schedules can range from full-time, specific days of the week, or as needed. The VMT impacts of telework are similar to a flexible work schedule program, which enables employees to work long hours in exchange for one day off every week or two.

% of employees who participate	25%	user input
Days/week average employee telecommutes	3	user input
% change in commute VMT for 1% of employees telecommuting @ 3 days/week	-0.44%	coefficient, source (1, 2)
Change in VMT	-11.0%	☐ Exclude from Results Active

Formula: % Change in VMT = % of employees who participate * % change in commute VMT for 1% of employees telecommuting @ 3 days/week

Sources:

(1). Cambridge Systematics. 2009. "Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions." Technical Appendices. Prepared for the Urban Land Institute.
www.reconnectingamerica.org/assets/Uploads/2009movingcoolerexecsumandappend.pdf

(2). California Air Pollution Control Officers Association. 2010. "Quantifying Greenhouse Gas Mitigation Measures."
www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

3A1. Price Workplace Parking

Level of application: **Project/Site**
Type of VMT affected: **Employee commute trips**
Max VMT reduction: **20.0%**

Return to Main
Results Summary

This strategy will price on-site parking at workplaces. This may include the following: explicitly charging for parking for its employees, implementing above market rate pricing, validating parking only for invited guests, not providing employee parking and transportation allowances, and/or educating employees about available alternatives to driving. Because free employee parking is a common benefit, charging employees to park on-site increases the cost of choosing to drive to work. This is expected to reduce single-occupant vehicle commute trips, resulting in decreased VMT, thereby reducing associated GHG emissions.

When implementing workplace parking, best practice is to ensure that other transportation options are available, convenient, and have competitive travel times (i.e., transit service near the project site, shuttle service, or a complete active transportation network serving the site and surrounding community), and that there is no alternative free parking available nearby (such as on-street). This strategy is ineffective in environments that do not have other modes available. Though like Strategy 3B, Parking "Cash-Out," this strategy focuses on implementing market rate and above market rate pricing to provide a price signal for employees to consider other modes for their work commute. Strategy 3B requires employers to offer employee parking "cash-out."

Parking price unit	$/month	user input
Baseline parking price	$65.00	user input
Proposed parking price	$120.00	user input
% change in parking price	50%	calculated
Share of project users paying for parking	100%	user input
Elasticity of parking demand with respect to parking price	-0.4	constant, source (1)
Ratio of vehicle trip reduction to VMT	1	standard assumption
Change in VMT	**-20.0%**	☐ Exclude from Results Active

Formula: % Change in VMT = ((Proposed parking price - Baseline parking price)/ Baseline parking price)* Elasticity of parking demand with respect to parking price * Share of project users paying for parking * Ratio of vehicle trip reduction to VMT

% increase in parking price is capped at 50%

Sources:
(1) Lehner, S., Stefanie, P. 2019. The Price Elasticity of Parking: A Meta-analysis. Transportation Research Part A: Policy and Practice 121 2019. Available: http://sustainabletransportationsc.org/garage/pdf/parking_elasticity.pdf. Accessed: January 2021.

3B. Parking Cash Out

Level of application: **Project/Site**
Type of VMT affected: **Employee commute trips**
Max VMT reduction: **12.0%**

Return to Main
Results Summary

This strategy will require project employers to offer employee parking cash-out. Cash-out is when employers provide employees with a choice of forgoing their current subsidized/free parking for a cash payment equivalent that is equal to or greater than the cost of the parking space. This encourages employees to use other modes of travel instead of single occupancy vehicles. This mode shift results in people driving less and thereby reduces VMT and GHG emissions.

% of employees eligible	20%	user input
% reduction in commute VMT from implementation of strategy	-12%	constant, source (1)
Change in VMT	-2.4%	☐ Exclude from Results Active

Formula: % Change in VMT = % of employees eligible * % reduction in commute VMT from implementation of strategy

Sources:
(1) Shoup, D. 2005. Parking Cash Out. Planners Advisory Service, American Planning Association. Available: http://shoup.bol.ucla.edu/ParkingCashOut.pdf. Accessed: January 2021.

3D. Provide Bike Parking

Level of application: **Project/Site**
Type of VMT affected: **Project-generated trips**
Max VMT reduction: **4.4%**

Return to Main
Results Summary

This strategy will install and maintain end-of-trip facilities for employee use. End-of-trip facilities include bike parking, bike lockers, showers, and personal lockers. The provision of secure bike parking and related facilities encourages commuting by bicycle, thereby reducing VMT and GHG emissions.

Would the project provide bike parking?	no	user input
Default average one-way bicycle trip length in neighborhood/city (miles)	3.3	Alameda CTC model
User override of one-way bicycle trip length in neighborhood/city (miles)		user input, optional
One-way bicycle trip length used for calculation (miles)	3.3	calculated
Default average one-way vehicle trip length in neighborhood/city (miles)	7.9	Alameda CTC model
User override of one-way vehicle trip length in neighborhood/city (miles)		user input, optional
One-way vehicle trip length in neighborhood/city used for calculation (miles)	7.9	calculated
Default bicycle mode share for work trips in region	1%	Alameda CTC model
User override of bicycle mode share for work trips in region		user input, optional
Bicycle mode share for work trips used for calculation	1%	calculated
Default vehicle mode share for work trips in region	81%	Alameda CTC model
User override of vehicle mode share for work trips in region		user input, optional
Vehicle mode share for work trips used for calculation	81%	calculated
Type of Facility	Parking with showers, bike lockers, and personal lockers	
Bike mode adjustment factor	4.86	coefficient, source (1)
Change in VMT		☐ Exclude from Results Not Active

Formula: % Change in VMT = (One-way bicycle trip length (miles) *(Bicycle mode share for work trips -(Bike mode adjustment factor * Bicycle mode share for work trips))/(One-way vehicle trip length in neighborhood/city (miles) * Vehicle mode share for work trips)

Sources:

(1) Buehler, R. 2012. Determinants of bicycle commuting in the Washington, DC region: The role bicycle parking, cyclist showers, and free car parking at work. Transportation Research Part D, 17, 525– 531. Available: http://www.pedbikeinfo.org/cms/downloads/DeterminantsofBicycleCommuting.pdf. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017a. National Household Travel Survey – 2017 Table Designer. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(3) Federal Highway Administration (FHWA). 2017b. National Household Travel Survey – 2017 Table Designer. Workers by WRKTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

4E. Bikeshare

Level of application: **Neighborhood/City**
Type of VMT affected: **All neighborhood/city trips**
Max VMT reduction: **0.1%**

Return to Main
Results Summary

This strategy will establish a bikeshare program. Bikeshare programs provide users with on-demand access to bikes for short-term rentals. This encourages a mode shift from vehicles to bicycles, displacing VMT and thus reducing GHG emissions. There are two primary types of pedal bikeshare programs: docked (station-based) and dockless (free-floating). When implementing a bikeshare program, a best practice is to discount bikeshare membership and dedicate bikeshare parking to encourage use of the service.

% of residences in neighborhood/city with access to bikeshare system without strategy	100%	user input
% of residences in neighborhood/city with access to bikeshare system with strategy	100%	user input
Daily bikeshare trips per person	0.021	coefficient, source (5)
Daily vehicle trips per person	2.7	coefficient, source (3)
Default average one-way vehicle trip length in neighborhood/city (miles)	7.9	Alameda CTC model
User override of one-way vehicle trip length in neighborhood/city (miles)		user input, optional
One-way vehicle trip length in neighborhood/city used for calculation (miles)	7.9	calculated
Default average one-way bicycle trip length in neighborhood/city (miles)	3.3	Alameda CTC model
User override of one-way bicycle trip length in neighborhood/city (miles)		user input, optional
One-way bicycle trip length used for calculation (miles)	3.3	calculated
Vehicle to bikeshare substitution rate	50	coefficient, source (1)
Change in VMT	0.0%	☐ Exclude from Results Active

Formula: % Change in VMT = -1*(((% of residences in neighborhood/city with access to bikeshare system with strategy - % of residences in neighborhood/city with access to bikeshare system without strategy)* Daily bikeshare trips per person * Vehicle to bikeshare substitution rate * One-way bicycle trip length (miles))/(Daily vehicle trips per person * One-way vehicle trip length in neighborhood/city (miles)))

Sources:

(1) California Air Resources Board (CARB). 2020a. Revisiting Average Trip Length Defaults and Adjustment Factors for Quantifying VMT Reductions from Car Share, Bike Share, and Scooter Share Services. May. Available: https://ww2.arb.ca.gov/sites/default/files/classic//cc/capandtrade/auctionproceeds/sharedm obility_technical_052920.pdf. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017. National Household Travel Survey – 2017 Table Designer. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(3) Federal Highway Administration (FHWA). 2018. Summary of Travel Trends 2017 – National Household Travel Survey. July. Available: https://www.fhwa.dot.gov/policyinformation/documents/2017_nhts_summary_travel_trends.p df. Accessed: January 2021.

(4) Lazarus, J., Pourquier, J., Feng, F., Hammel, H., Shaheen, S. 2019. Bikesharing Evolution and Expansion: Understanding How Docked and Dockless Models Complement and Compete – A Case Study of San Francisco. Paper No. 19-02761. Annual Meeting of the Transportation Research Board: Washington, D.C. Available: https://trid.trb.org/view/1572878. Accessed: January 2021.

(5) Metropolitan Transportation Commission (MTC). 2017. Plan Bay Area 2040 Final Supplemental Report – Travel Modeling Report. July. Available: http://2040.planbayarea.org/files/2020- 02/Travel_Modeling_PBA2040_Supplemental%20Report_7-2017.pdf. Accessed: January 2021.

4F. Carshare

Level of application: **Neighborhood/City**
Type of VMT affected: **All neighborhood/city trips**
Max VMT reduction: **0.7%**

Return to Main
Results Summary

This strategy will increase carshare access in the user's neighborhood/city by deploying carshare vehicles. Carsharing offers people convenient access to a vehicle for personal or commuting purposes. This helps encourage transportation alternatives by reducing vehicle ownership, thereby avoiding VMT and associated GHG emissions. When implementing a carshare program, best practice is to discount carshare membership and provide priority parking for carshare vehicles to encourage use of the service.

% adults in Oakland with existing carshare access	100%	user input
% adults in Oakland with carshare access with strategy	100%	user input
Change in % of adults with carshare access due to strategy	0%	calculated
% of adults with carshare access who become members	2%	constant, source (3)
Percent VMT reduction by carshare members	32.9%	constant, source (1, 2)
Change in VMT	0.0%	☐ Exclude from Results Active

Formula: % Change in VMT = -(% adults in Oakland with carshare access with strategy - % adults in Oakland with existing carshare access)* % of adults with carshare access who become members * Percent VMT reduction by carshare members

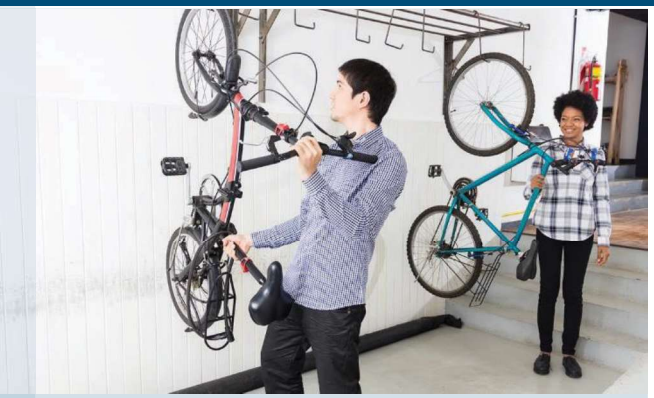
Sources:

(1) Cervero, R., Golub, A., Nee, B. 2007. San Francisco City CarShare: Longer-Term Travel-Demand and Car Ownership Impacts. January. Available: https://iurd.berkeley.edu/wp/2006-07.pdf. Accessed: January 2021.

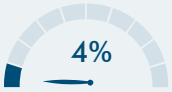
(2) Lovejoy, K., Handy, S., Boarnet, M. 2013. Impacts of Carsharing on Passenger Vehicle Use and Greenhouse Gas Emissions Policy Brief. October. Available: https://ww2.arb.ca.gov/sites/default/files/2020- 06/Impacts_of_Carsharing_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Policy_B rief.pdf. Accessed: January 2021.

(3) San Diego Association of Governments (SANDAG). 2017. San Diego Regional Transportation Study. Volume 1: Technical Report. Available: https://www.sandag.org/uploads/publicationid/publicationid_2145_23025.pdf. Accessed: January 2021.

T-5. Implement Commute Trip Reduction Program (Voluntary)



GHG Mitigation Potential



Up to 4.0% of GHG emissions from project/site employee commute VMT

Co-Benefits (icon key on pg. 34)



Climate Resilience

CTR programs could result in less traffic, potentially reducing congestion or delays on major roads during peak AM and PM traffic periods. When this reduction occurs during extreme weather events, it better allows emergency responders to access a hazard site. Lower transportation costs would also increase community resilience by freeing up resources for other purposes.

Health and Equity Considerations

Design of CTR programs need to ensure equitable access and benefits to all employees are provided considering disparate existing mobility options in diverse communities.

Measure Description

This measure will implement a voluntary commute trip reduction (CTR) program with employers. CTR programs discourage single-occupancy vehicle trips and encourage alternative modes of transportation such as carpooling, taking transit, walking, and biking, thereby reducing VMT and GHG emissions. Voluntary implementation elements are described in this measure.

Subsector

Trip Reduction Programs

Locational Context

Urban, suburban

Scale of Application

Project/Site

Implementation Requirements

Voluntary CTR programs must include the following elements to apply the VMT reductions reported in literature.

- Employer-provided services, infrastructure, and incentives for alternative modes such as ridesharing (Measure T-8), discounted transit (Measure T-9), bicycling (Measure T-10), vanpool (Measure T-11), and guaranteed ride home.
- Information, coordination, and marketing for said services, infrastructure, and incentives (Measure T-7).

Cost Considerations

Employer costs may include recurring costs for transit subsidies, capital and maintenance costs for the alternative transportation infrastructure, and labor costs for staff to manage the program. Where the local municipality has a VMT reduction ordinance, costs may include the labor costs for government staff to track the efficacy of the program.

Expanded Mitigation Options

Other strategies may also be included as part of a voluntary CTR program, though they are not included in the VMT reductions reported by literature and thus are not incorporated in the VMT reductions for this measure.

This program typically serves as a complement to the more effective workplace CTR measures such as pricing workplace parking (Measure T-12) or implementing employee parking "cash-out" (Measure T-13).

GHG Reduction Formula

$A = B \times C$

GHG Calculation Variables

ID	Variable	Value	Unit	Source
Output				
A	Percent reduction in GHG emissions from project/site employee commute VMT	0–4.0	%	calculated
User Inputs				
B	Percent of employees eligible for program	0–100	%	user input
Constants, Assumptions, and Available Defaults				
C	Percent reduction in commute VMT from eligible employees	-4	%	Boarnet et al. 2014

Further explanation of key variables:

- (B) – This refers to the percent of employees that would be able to participate in the program. Employees who might not be able to participate could include those who work nighttime hours when transit and rideshare services are not available or employees who are required to drive to work as part of their job duties. This input does not refer to the percent of employees who participate in the program.
- (C) – A policy brief summarizing the results of employer-based trip reduction studies concluded that these programs reduce total commute VMT for employees at participating work sites by 4 to 6 percent (Boarnet et al. 2014). To be conservative, the low end of the range is cited.

GHG Calculation Caps or Maximums

Measure Maximum

(A_{max}) The maximum GHG reduction from this measure is 4 percent. This maximum scenario is presented in the below example quantification.

Subsector Maximum

($\sum A_{max_{T\text{-}5 \text{ through } T\text{-}13}} \leq 45\%$) This measure is in the Trip Reduction Programs subsector. This subcategory includes Measures T-5 through T-13. The employee commute VMT reduction from the combined implementation of all measures within this subsector is capped at 45 percent.

Mutually Exclusive Measures

If this measure is selected, the user may not also take credit for Measure T-6, which represents the same implementation activities as Measure T-5, except that the CTR program would be mandatory. Users should select either Measure T-5 or T-6.

If this measure is selected, the user may not also take credit for Measures T-7 through T-11. Measure T-5 accounts for the combined GHG reductions achieved by each of these individual measures. To combine the GHG reductions from T-5 with any of these measures would be considered double counting. However, the user may take credit for Measures T-12 through T-13 within the larger CTR subcategory, so long as the combined VMT reduction does not exceed 45 percent, as noted above.

Example GHG Reduction Quantification

The user reduces employee commute VMT by requiring that employers of a project offer a voluntary commute trip reduction program to their employees. In this example, the percent of employees eligible (B) is 100 percent, which would reduce GHG emissions from employee commute VMT by 4 percent.

$$A = 100\% \times -4\% = -4\%$$

Quantified Co-Benefits

Improved Local Air Quality

The percent reduction in GHG emissions (A) would be the same as the percent reduction in NO_X, CO, NO_2, SO_2, and PM. Reductions in ROG emissions can be calculated by multiplying the percent reduction in GHG emissions (A) by an adjustment factor of 87 percent. See *Adjusting VMT Reductions to Emission Reductions* above for further discussion.

Energy and Fuel Savings

The percent reduction in vehicle fuel consumption would be the same as the percent reduction in GHG emissions (A).

VMT Reductions

The percent reduction in VMT would be the same as the percent reduction in GHG emissions (A).

Sources

- Boarnet, M., H. Hsu, and S. Handy. 2014. *Impacts of Employer-Based Trip Reduction Programs and Vanpools on Passenger Vehicle Use and Greenhouse Gas Emissions*. September. Available: https://ww2.arb.ca.gov/sites/default/files/2020-06/Impacts_of_Employer-Based_Trip_Reduction_Programs_and_Vanpools_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Policy_Brief.pdf. Accessed: January 2021.

T-7. Implement Commute Trip Reduction Marketing



Photo Credit: Sacramento Area Council of Governments, 2012

GHG Mitigation Potential



Up to 4.0% of GHG emissions from project/site employee commute VMT

Co-Benefits (icon key on pg. 34)

Climate Resilience

Commute trip reduction programs could result in less traffic, potentially reducing congestion or delays on major roads during peak AM and PM traffic periods. When this reduction occurs during extreme weather events, it better allows emergency responders to access a hazard site. Lower transportation costs would also increase community resilience by freeing up resources for other purposes.

Health and Equity Considerations

Design of CTR programs needs to consider existing mobility options in diverse communities and ensure equitable access and benefit to all employees. CTR programs may need to include multi-language materials.

Measure Description

This measure will implement a marketing strategy to promote the project site employer's CTR program. Information sharing and marketing promote and educate employees about their travel choices to the employment location beyond driving such as carpooling, taking transit, walking, and biking, thereby reducing VMT and GHG emissions.

Subsector

Trip Reduction Programs

Locational Context

Urban, suburban

Scale of Application

Project/Site

Implementation Requirements

The following features (or similar alternatives) of the marketing strategy are essential for effectiveness.

- Onsite or online commuter information services.
- Employee transportation coordinators.
- Onsite or online transit pass sales.
- Guaranteed ride home service.

Cost Considerations

Employer costs include labor and materials for development and distribution of survey and marketing materials to promote the program and educate potential participants.

Expanded Mitigation Options

This measure could be packaged with other commute trip reduction measures (Measures T-8 through T-13) as a comprehensive CTR program (Measure T-5 or T-6).

GHG Reduction Formula

$A = B \times C \times D$

GHG Calculation Variables

ID	Variable	Value	Unit	Source
Output				
A	Percent reduction in GHG emissions from project/site employee commute VMT	0–4.0	%	calculated
User Inputs				
B	Percent of employees eligible for program	0–100	%	user input
Constants, Assumptions, and Available Defaults				
C	Percent reduction in employee commute vehicle trips	-4	%	TRB 2010
D	Adjustment from vehicle trips to VMT	1	unitless	assumed

Further explanation of key variables:

- (B) – This refers to the percent of employees that would be able to participate in the program. This will usually be 100 percent. Employees who might not be able to participate could include those who work nighttime hours when transit and rideshare services are not available or employees who are required to drive to work as part of their job duties. This input does not refer to the percent of employees who actually participate in the program.
- (C) – A review of studies measuring the effect of transportation demand management measures on traveler behavior notes that the average empirically-based estimate of reductions in vehicle trips for full-scale, site-specific employer support programs is 4 to 5 percent. To be conservative, the low end of the range is cited (TRB 2010).
- (D) – The adjustment factor from vehicle trips to VMT is 1. This assumes that all vehicle trips will average out to typical trip length ("assumes all trip lengths are equal"). Thus, it can be assumed that a percentage reduction in vehicle trips will equal the same percentage reduction in VMT.

GHG Calculation Caps or Maximums

Measure Maximum

(A_{max}) The maximum GHG reduction from this measure is 4 percent. This maximum scenario is presented in the below example quantification.

Subsector Maximum

($\sum A_{max_{T\text{-}5 \text{ through } T\text{-}13}} \leq 45\%$) This measure is in the Trip Reduction Programs subsector. This subcategory includes Measures T-5 through T-13. The employee commute VMT reduction from the combined implementation of all measures within this subsector is capped at 45 percent.

Mutually Exclusive Measures

If this measure is selected, the user may not also take credit for either Measure T-5 or T-6. However, this measure may be implemented alongside other individual CTR measures (Measures T-8 through T-13). The efficacy of individual programs may vary highly based on individual employers and local contexts.

Example GHG Reduction Quantification

The user reduces employee commute VMT by requiring that employers of a project market to employees travel options for modes alternative to single-occupied vehicles. In this example, the percent of employees eligible (B) is 100 percent, which would reduce GHG emissions from employee commute VMT by 4 percent.

$$A = 100\% \times -4\% \times 1 = -4\%$$

Quantified Co-Benefits

Improved Local Air Quality

The percent reduction in GHG emissions (A) would be the same as the percent reduction in NO_X, CO, NO_2, SO_2, and PM. Reductions in ROG emissions can be calculated by multiplying the percent reduction in GHG emissions (A) by an adjustment factor of 87 percent. See *Adjusting VMT Reductions to Emission Reductions* above for further discussion.

Energy and Fuel Savings

The percent reduction in vehicle fuel consumption would be the same as the percent reduction in GHG emissions (A).

VMT Reductions

The percent reduction in VMT would be the same as the percent reduction in GHG emissions (A).

Sources

- Transportation Research Board (TRB). 2010. *Traveler Response to Transportation System Changes Handbook, Third Edition: Chapter 19, Employer and Institutional TDM Strategies*. June. Available: http://www.trb.org/Publications/Blurbs/163781.aspx. Accessed: January 2021.

T-8. Provide Ridesharing Program



GHG Mitigation Potential



Up to 8.0% of GHG emissions from project/site employee commute VMT

Co-Benefits (icon key on pg. 34)

Climate Resilience

Ridesharing programs could result in less traffic, potentially reducing congestion or delays on major roads during peak AM and PM traffic periods. When this reduction occurs during extreme weather events, it better allows emergency responders to access a hazard site. Lower transportation costs would also increase community resilience by freeing up resources for other purposes.

Health and Equity Considerations

Program should include all onsite workers, such as contractors, interns, and service workers. Because ridesharing is vehicle-based, and some employees may not be in areas with feasible rideshare networks, design of programs need to ensure equitable benefits to those with and without access to rideshare opportunities.

Measure Description

This measure will implement a ridesharing program and establish a permanent transportation management association with funding requirements for employers. Ridesharing encourages carpooled vehicle trips in place of single-occupied vehicle trips, thereby reducing the number of trips, VMT, and GHG emissions.

Subsector

Trip Reduction Programs

Locational Context

Urban, suburban

Scale of Application

Project/Site

Implementation Requirements

Ridesharing must be promoted through a multifaceted approach. Examples include the following.

- Designating a certain percentage of desirable parking spaces for ridesharing vehicles.
- Designating adequate passenger loading and unloading and waiting areas for ridesharing vehicles.
- Providing an app or website for coordinating rides.

Cost Considerations

Costs of developing, implementing, and maintaining a rideshare program in a way that encourages participation are generally borne by municipalities or employers. The beneficiaries include the program participants saving on commuting costs, the employer reducing onsite parking expenses, and the municipality reducing cars on the road, which leads to lower infrastructure and roadway maintenance costs.

Expanded Mitigation Options

When providing a ridesharing program, a best practice is to establish funding by a non-revocable funding mechanism for employer-provided subsidies. In addition, encourage use of low-emission ridesharing vehicles (e.g., shared Uber Green).

This measure could be paired with any combination of the other commute trip reduction strategies (Measures T-7 through T-13) for increased reductions.

GHG Reduction Formula

$A = B \times C$

GHG Calculation Variables

ID	Variable	Value	Unit	Source
Output				
A	Percent reduction in GHG emissions from project/site employee commute VMT	0–8.0	%	calculated
User Inputs				
B	Percent of employees eligible for program	0–100	%	user input
Constants, Assumptions, and Available Defaults				
C	Percent reduction in employee commute VMT	Table T-8.1	%	SANDAG 2019

Further explanation of key variables:

- (B) – This refers to the percent of employees that would be able to participate in the program. This will usually be 100 percent. Employees who might not be able to participate could include those who work nighttime hours when transit and rideshare services are not available or employees who are required to drive to work as part of their job duties. This input does not refer to the percent of employees who actually participate in the program.
- (C) – The percent reduction in employee commute VMT by place type is provided in Table T-8.1 in Appendix C. The reduction differs by place type because the willingness and ability to participate in carpooling is higher in urban areas than in suburban areas. Note that this measure is not applicable for implementation in rural areas (SANDAG 2019).

GHG Calculation Caps or Maximums

Measure Maximum

(A_{max}) The maximum GHG reduction from this measure is 8 percent.

Subsector Maximum

($\sum A_{max_{T\text{-}5 \text{ through } T\text{-}13}} \leq 45\%$) This measure is in the Trip Reduction Programs subsector. This subcategory includes Measures T-5 through T-13. The employee commute VMT reduction from the combined implementation of all measures within this subsector is capped at 45 percent.

Mutually Exclusive Measures

If this measure is selected, the user may not also take credit for either Measure T-5 or T-6. However, this measure may be implemented alongside other individual CTR measures (Measures T-7 and T-9 through T-13). The efficacy of individual programs may vary highly based on individual employers and local contexts.

Example GHG Reduction Quantification

The user reduces employee commute VMT by requiring that employers of a project provide a ridesharing program to their employees. In this example, the percent of employees eligible (B) at a packaging and distribution center is 50 percent and the place type of the project is urban (C). GHG emissions from employee commute VMT would be reduced by 4 percent.

$A = 50\% \times -8\% = -4\%$

Quantified Co-Benefits

Improved Local Air Quality

The percent reduction in GHG emissions (A) would be the same as the percent reduction in NO_X, CO, NO_2, SO_2, and PM. Reductions in ROG emissions can be calculated by multiplying the percent reduction in GHG emissions (A) by an adjustment factor of 87 percent. See *Adjusting VMT Reductions to Emission Reductions* above for further discussion.

Energy and Fuel Savings

The percent reduction in vehicle fuel consumption would be the same as the percent reduction in GHG emissions (A).

VMT Reductions

The percent reduction in VMT would be the same as the percent reduction in GHG emissions (A).

Sources

- San Diego Association of Governments (SANDAG). 2019. *Mobility Management VMT Reduction Calculator Tool–Design Document*. June. Available: https://www.icommutesd.com/docs/default-source/planning/tool-design-document_final_7-17-19.pdf?sfvrsn=ec39eb3b_2. Accessed: January 2021.

T-9. Implement Subsidized or Discounted Transit Program



GHG Mitigation Potential



Up to 5.5% of emissions from employee/resident vehicles accessing the site

Co-Benefits (icon key on pg. 34)

Climate Resilience

Subsidized and discounted transit programs increase the capacity of low-income populations to use transit to evacuate or access resources during an extreme weather event. They could also incentivize more people to use transit, resulting in less traffic and better allowing emergency responders to access a hazard site during an extreme weather event. Lower overall out-of-pocket costs would also help increase community resilience by freeing up resources for other purposes.

Health and Equity Considerations

Program should include all onsite workers, such as contractors, interns, and service workers.

Measure Description

This measure will provide subsidized or discounted, or free transit passes for employees and/or residents. Reducing the out-of-pocket cost for choosing transit improves the competitiveness of transit against driving, increasing the total number of transit trips and decreasing vehicle trips. This decrease in vehicle trips results in reduced VMT and thus a reduction in GHG emissions.

Subsector

Trip Reduction Programs

Locational Context

Urban, suburban

Scale of Application

Project/Site

Implementation Requirements

The project should be accessible either within 1 mile of high-quality transit service (rail or bus with headways of less than 15 minutes), 0.5 mile of local or less frequent transit service, or along a designated shuttle route providing last-mile connections to rail service. If a well-established bikeshare service (Measure T-22-A) is available, the site may be located up to 2 miles from a high-quality transit service.

If more than one transit agency serves the site, subsidies should be provided that can be applied to each of the services available. If subsidies are applied for only one service, all variable inputs below should also pertain only to the service that is subsidized.

Cost Considerations

The employer cost is the recurring, direct cost for transit subsidies. The subsidies will lower the per capita income of the transit service, decreasing the revenue of the local transit agency. This cost may be offset by increased revenue from increased ridership. The beneficiaries include the program participants saving on commuting cost, the employer reducing onsite parking expenses, and the municipality reducing cars on the road, which leads to lower infrastructure and roadway maintenance costs.

Expanded Mitigation Options

This measure could be paired with any combination of the other commute trip reduction strategies (Measures T-7 through T-13) for increased reductions.

GHG Reduction Formula

$$A = \frac{C}{B} \times G \times D \times E \times F \times H \times I$$

GHG Calculation Variables

If subsidies or discounts target employees, the GHG reduction from this measure may be limited to work-related employee trips only (i.e., home-to- work) and work-to-other, where at least one trip end is work). If residents are targeted, the GHG reductions extend to all trips.

ID	Variable	Value	Unit	Source
Output				
A	Percent reduction in GHG emissions from employee/resident vehicles accessing the site	0–5.5	%	calculated
User Inputs				
B	Average transit fare without subsidy	[ ]	$	user input
C	Subsidy amount	[ ]	$	user input
D	Percent of employees/residents eligible for subsidy	0–100	%	user input
E	Percent of project-generated VMT from employees/residents	0–100	%	user input
Constants, Assumptions, and Available Defaults				
F	Transit mode share of all trips or work trips	Table T-3.1 or Table T-9.1	%	FHWA 2017
G	Elasticity of transit boardings with respect to transit fare price	-0.43	unitless	Taylor et al. 2008
H	Percent of transit trips that would otherwise be made in a vehicle	50	%	Handy & Boarnet 2013
I	Conversion factor of vehicle trips to VMT	1.0	unitless	assumption

Further explanation of key variables:

- (B and C) – The average transit fare and subsidy amount can be presented as either a fare per ride, or the cost of a monthly pass for typical transit service near the site. Pricing should be based on the expected means of subsidy implementation; for instance, if a monthly pass is provided to all residents, prices should be input on a monthly basis.
- (D) – The percentage of employees/residents associated with the site who have access to the subsidy. If subsidy is provided as an employee benefit, care should be taken to account for any contract or temporary workers who do not receive such benefits.
- (E) – The percentage of project-generated VMT from employees/residents is used to adjust the percent reduction in GHG emissions from the scale of employee and/or resident-generated VMT to project-generated VMT. If subsidies or discounts target employees at an office development, this value would simply be 100 percent. If the project site is a multifamily development with no onsite workers, this value would also be

100 percent. If the project site is a retail development, this value would be less than 100 percent, as it does not account for retail shopper trips to the site. The share of total VMT generated by employees for visitor-intensive uses, such as retail or medical offices, can be roughly estimated by multiplying the total number of employees by two (to account for both arrival and departure), divided by the total number of daily trips.

- (F) – Ideally, the user will calculate transit mode share for work trips or all trips of a Project/Site at a scale no larger than a census tract. Potential data sources include the U.S. Census, California Household Travel Survey (preferred), or local survey efforts. Care should be taken *not* to present the reported commute mode share as retrieved from the American Community Survey (ACS), unless the land use is office or employment based and the tables are based on work location (rather than home location). If the subsidies or discounts target employees and their commute trips, then the mode share should use the home-to-work trip purpose. If the user is not able to provide a project-specific value using one of the data sources described above, they have the option to input the transit mode share for one of the six most populated CBSAs in California. The transit mode share for work trips by CBSA is presented in Table T-9.1 in Appendix C (FHWA 2017). The transit mode share for all trips is provided in Table T-3.1 in Appendix C.
- (G) – A cross-sectional analysis of transit use in 265 urbanized areas in the U.S. found that a 0.43 percent decrease in transit boardings occurs for every 1 percent increase in transit fare price (Taylor et al. 2008). A policy brief summarizing the results of transit service strategies found this analysis to fall in the mid-point of observed, short-term values (Handy & Boarnet 2013). Price elasticities of transit demand vary based on both long-term and short-term demand, service type, and service location (Litman 2020 and Handy & Boarnet 2013).
- (H) – Not all new transit trips replace a vehicle trip. The share of transit trips that would otherwise be made by private vehicle ranges from less than 5 percent to 50 percent across studies. This assumption is based on observed values for high quality BRT service under the assumption that this measure is implemented alongside marketing measures and is targeted primarily at reducing vehicle commute trips. (Handy & Boarnet 2013). Note that this study looked at service improvements rather than fare changes and is used as a proxy variable. If project-specific or location-specific information is available, it should be substituted for this assumptive variable.
- (I) – The adjustment factor from vehicle trips to VMT is 1. This assumes that all vehicle trips will average out to typical trip length ("assumes all trip lengths are equal"). Thus, it can be assumed that a percentage reduction in vehicle trips will equal the same percentage reduction in VMT. Subsidies or discounts targeting commute trips may have a higher factor as they are generally longer than the trip lengths for other purposes.

GHG Calculation Caps or Maximums

Measure Maximum

(A_{max}) The GHG reduction is capped at 5.5 percent, which is based on the following assumptions:

- (C=B) – The subsidy coverage is capped at 100 percent of the typical transit fare.
- (D) – All employees are eligible for the subsidy.

- (E) – All project-generated VMT is from employee-generated VMT.
- (F) – Employees at an office development in the San Francisco-Oakland-Hayward CBSA have a default transit mode share for work trips of 25.60 percent.

Subsector Maximum

$(\sum A_{max_{T\text{-}5 \text{ through } T\text{-}13}} \leq 45\%)$ This measure is in the Trip Reduction Programs subsector. This subcategory includes Measures T-5 through T-13. The employee commute VMT reduction from the combined implementation of all measures within this subsector is capped at 45 percent.

Mutually Exclusive Measures

If this measure is selected, the user may not also take credit for either Measure T-5 or T-6. However, this measure may be implemented alongside other individual CTR measures (Measures T-7, T-8, T-10 through T-13). The efficacy of individual programs may vary highly based on individual employers and local contexts.

Example GHG Reduction Quantification

In this example, the user reduces VMT by providing all employees (D) of a proposed office development in the San Francisco-Oakland-Hayward CBSA a 100 percent transit subsidy in the form of a $100 monthly transit pass (C=B). The user would reduce GHG emissions from VMT by 5.5 percent.

$$A = \left(\frac{\$100}{\$100} \times -0.43\right) \times 100\% \times 100\% \times 25.60\% \times 50\% \times 1 = -5.5\%$$

Quantified Co-Benefits

Improved Local Air Quality

The percent reduction in GHG emissions (A) would be the same as the percent reduction in NO_X, CO, NO_2, SO_2, and PM. Reductions in ROG emissions can be calculated by multiplying the percent reduction in GHG emissions (A) by an adjustment factor of 87 percent. See *Adjusting VMT Reductions to Emission Reductions* above for further discussion.

Energy and Fuel Savings

The percent reduction in vehicle fuel consumption would be the same as the percent reduction in GHG emissions (A).

VMT Reductions

The percent reduction in VMT would be the same as the percent reduction in GHG emissions (A).

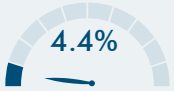
Sources

- Federal Highway Administration (FHWA). 2017. *National Household Travel Survey–2017 Table Designer.* Travel Day PMT by TRPTRANS by HH_CBSA, Workers by WRKTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.
- Handy, L. and S. Boarnet. 2013. *Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions.* Available: http://www.arb.ca.gov/cc/sb375/policies/transitservice/transit_brief.pdf. Accessed: January 2021.
- Litman, T. 2020. *Transit Price Elasticities and Cross-elasticities.* Victoria Transport Policy Institute. April. Available: https://www.vtpi.org/tranelas.pdf. Accessed: January 2021.
- Taylor, B., D. Miller, H. Iseki, and C. Fink. 2008. *Nature and/or Nurture? Analyzing the Determinants of Transit Ridership Across US Urbanized Areas.* Transportation Research Part A: Policy and Practice, 43(1), 60-77. Available: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.367.5311&rep=rep1&type=pdf. Accessed: January 2021.

T-10. Provide End-of-Trip Bicycle Facilities



GHG Mitigation Potential



Up to 4.4% of GHG emissions from project/site employee commute VMT

Co-Benefits (icon key on pg. 34)



Climate Resilience

End-of-trip bicycle facilities could take more cars off the road, resulting in less traffic and better allowing emergency responders to access a hazard site during an extreme weather event. They could also make it easier for bicycle users to access resources in an extreme weather event.

Health and Equity Considerations

Facilities should be inclusive of all gender identities and expressions. Consider including gender-neutral, single-occupancy options to allow for additional privacy for those who want it.

Measure Description

This measure will install and maintain end-of-trip facilities for employee use. End-of-trip facilities include bike parking, bike lockers, showers, and personal lockers. The provision and maintenance of secure bike parking and related facilities encourages commuting by bicycle, thereby reducing VMT and GHG emissions.

Subsector

Trip Reduction Programs

Locational Context

Urban, suburban

Scale of Application

Project/Site

Implementation Requirements

End-of-trip facilities should be installed at a size proportional to the number of commuting bicyclists and regularly maintained.

Cost Considerations

Employer costs include capital and maintenance costs for construction and maintenance of facilities and potentially labor and materials costs for staff to monitor facilities and provide marketing to encourage use of new facilities. The beneficiaries include the program participants saving on commuting cost, the employer reducing onsite parking expenses, and the municipality reducing cars on the road, which leads to lower infrastructure and roadway maintenance costs.

Expanded Mitigation Options

Best practice is to include an onsite bicycle repair station and post signage on or near secure parking and personal lockers with information about how to reserve or obtain access to these amenities.

This measure could be paired with any combination of the other commute trip reduction strategies (Measures T-7 through T-13) for increased reductions.

GHG Reduction Formula

$$A = \frac{C \times (E - (B \times E))}{D \times F}$$

GHG Calculation Variables

ID	Variable	Value	Unit	Source
Output				
A	Percent reduction in GHG emissions from employee project/site commute VMT	0.1–4.4	%	calculated
User Inputs				
	None			
Constants, Assumptions, and Available Defaults				
B	Bike mode adjustment factor	1.78 or 4.86	unitless	Buehler 2012
C	Existing bicycle trip length for all trips in region	Table T-10.1	miles	FHWA 2017a
D	Existing vehicle trip length for all trips in region	Table T-10.1	miles	FHWA 2017a
E	Existing bicycle mode share for work trips in region	Table T-10.2	%	FHWA 2017b
F	Existing vehicle mode share for work trips in region	Table T-10.2	%	FHWA 2017b

Further explanation of key variables:

- (B) – The bike mode adjustment factor should be provided by the user based on type of bike facility. A study found that commuters with showers, lockers, and bike parking at work are associated with 4.86 times greater likelihood to commute by bicycle when compared to individuals without any bicycle facilities at work. Individuals with bike parking, but no showers and lockers at the workplace, are associated with 1.78 times greater likelihood to cycle to work than those without trip-end facilities (Buehler 2012).
- (C and D) – Ideally, the user will calculate bicycle and auto trip length for a Project/Site at a scale no larger than a census tract. Potential data sources include the U.S. Census, California Household Travel Survey (preferred), or local survey efforts. If the user is not able to provide a project-specific value using one of these data sources, they have the option to input the trip lengths for bicycles and vehicles for one of the six most populated CBSAs in California, as presented in Table T-10.1 in Appendix C (FHWA 2017a). Trip lengths are likely to be longer for areas not covered by the listed CBSAs, which represent the denser areas of the state.
- (E and F) – Ideally, the user will calculate bicycle and auto mode share for work trips for a Project/Site at a scale no larger than a census tract. Potential data sources include the U.S. Census, California Household Travel Survey (preferred), or local survey efforts. If the user is not able to provide a project-specific value using one of these data sources, they have the option to input the regional average mode shares for bicycle and vehicle

work trips for one of the six most populated CBSAs in California, as presented in Table T-10.2 in Appendix C (FHWA 2017b). If the project study area is not within the listed CBSAs or the user is able to provide a project-specific value, the user should replace these regional defaults in the GHG reduction formula. For areas not covered by the listed CBSAs, which represent the denser areas of the state, bicycle mode share is likely to be lower and vehicle share higher than presented in Table T-10.2.

GHG Calculation Caps or Maximums

Measure Maximum

(A_{max}) The maximum GHG reduction from this measure is 4.4 percent. This maximum scenario is presented in the below example quantification.

Subsector Maximum

($\sum A_{max_{T\text{-}5 \text{ through } T\text{-}13}} \leq 45\%$) This measure is in the Trip Reduction Programs subsector. This subcategory includes Measures T-5 through T-13. The employee commute VMT reduction from the combined implementation of all measures within this subsector is capped at 45 percent.

Mutually Exclusive Measures

If this measure is selected, the user may not also take credit for either Measure T-5 or T-6. However, this measure may be implemented alongside other individual CTR measures (Measures T-7, T-8, T-9, and T-11 through T-13). The efficacy of individual programs may vary highly based on individual employers and local contexts.

Example GHG Reduction Quantification

The user reduces VMT by providing end-of-trip facilities for the project's employees, which encourages bicycle trips in place of vehicle trips. In this example, the type of bike facility provided by the project is parking with showers, bike lockers, and personal lockers (B). The project is within San Jose-Sunnyvale-Santa Clara CBSA, and the user does not have project-specific values for trip lengths and mode shares and for bicycles and vehicles. Per Tables T-10.1 and T-10.2 in Appendix C, inputs for these variables are 2.8 miles, 11.5 miles, 4.1 percent, and 86.6 percent, respectively (C, D, E, and F). GHG emissions from employee commute VMT would be reduced by 4.4 percent.

$$A = \frac{2.8 \text{ miles} \times \left(4.1\% - (4.86 \times 4.1\%)\right)}{11.5 \text{ miles} \times 86.6\%} = -4.4\%$$

Quantified Co-Benefits

Improved Local Air Quality

The percent reduction in GHG emissions (A) would be the same as the percent reduction in NO_X, CO, NO_2, SO_2, and PM. Reductions in ROG emissions can be

calculated by multiplying the percent reduction in GHG emissions (A) by an adjustment factor of 87 percent. See *Adjusting VMT Reductions to Emission Reductions* above for further discussion.

Energy and Fuel Savings

The percent reduction in vehicle fuel consumption would be the same as the percent reduction in GHG emissions (A).

VMT Reductions

The percent reduction in VMT would be the same as the percent reduction in GHG emissions (A).

Sources

- Buehler, R. 2012. *Determinants of bicycle commuting in the Washington, DC region: The role bicycle parking, cyclist showers, and free car parking at work.* Transportation Research Part D, 17, 525–531. Available: http://www.pedbikeinfo.org/cms/downloads/DeterminantsofBicycleCommuting.pdf. Accessed: January 2021.
- Federal Highway Administration (FHWA). 2017a. *National Household Travel Survey–2017 Table Designer*. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.
- Federal Highway Administration (FHWA). 2017b. *National Household Travel Survey–2017 Table Designer.* Workers by WRKTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

T-11. Provide Employer-Sponsored Vanpool



Photo Credit: UCLA Transportation/Flickr, 2021

GHG Mitigation Potential



Up to 20.4% of GHG emissions from project/site employee commute VMT

Co-Benefits (icon key on pg. 34)



Climate Resilience

Employer-sponsored vanpools could result in less traffic, potentially reducing congestion or delays on major roads during peak AM and PM traffic periods. When this reduction occurs during extreme weather events, it better allows emergency responders to access a hazard site.

Health and Equity Considerations

Consider using zero-emission or plug-in electric vehicles (PHEVs) for additional emission reduction benefits.

Measure Description

This measure will implement an employer-sponsored vanpool service. Vanpooling is a flexible form of public transportation that provides groups of 5 to 15 people with a cost-effective and convenient rideshare option for commuting. The mode shift from long-distance, single-occupied vehicles to shared vehicles reduces overall commute VMT, thereby reducing GHG emissions.

Subsector

Trip Reduction Programs

Locational Context

Urban, suburban, rural

Scale of Application

Project/Site

Implementation Requirements

Vanpool programs are more appropriate for the building occupant or tenant (i.e., employer) to implement and monitor than the building owner or developer.

Cost Considerations

Employer costs primarily include the capital costs of vehicle acquisition and the labor costs of drivers, either through incentives to current employees or the hiring of dedicated drivers. The beneficiaries include the program participants saving on commuting cost, the employer reducing onsite parking expenses, and the municipality reducing cars on the road, which leads to lower infrastructure and roadway maintenance costs.

Expanded Mitigation Options

When implementing a vanpool service, best practice is to subsidize the cost for employees that have a similar origin and destination and provide priority parking for employees that vanpool.

This measure could be paired with any combination of the other commute trip reduction strategies (Measures T-7 through T-13) for increased reductions.

GHG Reduction Formula

$$A = \frac{((1 - B) \times C \times F) + \left(B \times \frac{D}{E} \times G\right)}{((1 - B) \times C \times F) + (B \times D \times F)} - 1$$

GHG Calculation Variables

ID	Variable	Value	Unit	Source
Output				
A	Percent reduction in GHG emissions from project/site employee commute VMT	3.4–20.4	%	calculated
User Inputs				
	None			
Constants, Assumptions, and Available Defaults				
B	Percent of employees that participate in vanpool program	2.7	%	SANDAG 2019
C	Average length of one-way vehicle commute trip in region	Table T-11.1	miles per trip	FHWA 2017
D	Average length of one-way vanpool commute trip	42.0	miles per trip	SANDAG 2019
E	Average vanpool occupancy (including driver)	6.25	occupants	SANDAG 2019
F	Average emission factor of average employee vehicle	307.5	g CO_2e per mile	CARB 2020
G	Vanpool emission factor	763.4	g CO_2e per mile	CARB 2020

Further explanation of key variables:

- (B) – The percent of employees that would participate in a vanpool program is based on a survey of commuters in San Diego County (SANDAG 2019). If the project is not within San Diego County or the user is able to provide a project-specific value for within San Diego County, the user should replace the default employee participation rate in the GHG reduction formula.
- (C) – Ideally, the user will calculate auto commute trip lengths for a Project/Site at a scale no larger than a census tract. Potential data sources include the U.S. Census, California Household Travel Survey (preferred), or local survey efforts. If the user is not able to provide a project-specific value using one of these data sources, they have the option to input the regional average one-way auto commute trip length for one of the six most populated CBSAs in California, as presented in Table T-11.1 in Appendix C (FHWA 2017). Trip lengths are likely to be longer for areas not covered by the listed CBSAs, which represent the denser areas of the state.
- (D and E) – The average one-way vanpool commute trip length and occupancy are based on data from the San Diego Association of Government's regional vanpool program (SANDAG 2019). If the project is not within San Diego County or the user is

able to provide a project-specific value for within San Diego County, the user should replace these defaults in the GHG reduction formula.

- (F and G) – The average GHG emission factors for employee commute and vanpool vehicles were calculated in terms of CO_2e per mile using EMFAC2017 (v1.0.3). The model was run for a 2020 statewide average using diesel and gasoline fuel. The average of the light-duty automobile (LDA) and light duty truck (LDT1/LDT2) vehicle categories represents employee non-vanpool vehicles and the light-heavy duty truck (LHDT1) vehicle category conservatively represents a large cargo vanpool vehicle. The running emission factors for CO_2, CH_4, and N_2O (CARB 2020) were multiplied by the corresponding 100-year GWP values from the IPCC's Fourth Assessment Report (IPCC 2007). If the user can provide a project-specific value (i.e., for a future year and project location), the user should run EMFAC to replace the defaults in the GHG reduction formula.

GHG Calculation Caps or Maximums

Measure Maximum

(A_{max}) For projects in San Diego County that use default CBSA data from Table T-11.1 and (B_{max}), the maximum percent reduction in GHG emissions (A) is 20.4 percent. This maximum scenario is presented in the below example quantification.

(B_{max}) The percent of employees that participate in the vanpool program is capped at 15 percent, which is based on the high end of vanpool participation survey data for several successful programs in the U.S. (SANDAG 2019).

Subsector Maximum

($\sum A_{max_{T\text{-}5 \text{ through } T\text{-}13}} \leq 45\%$) This measure is in the Trip Reduction Programs subsector. This subcategory includes Measures T-5 through T-13. The employee commute VMT reduction from the combined implementation of all measures within this subsector is capped at 45 percent.

Mutually Exclusive Measures

If this measure is selected, the user may not also take credit for either Measure T-5 or T-6. However, this measure may be implemented alongside other individual CTR measures (Measures T-7 through T-10, T-12, and T-13). The efficacy of individual programs may vary highly based on individual employers and local contexts.

Example GHG Reduction Quantification

The user reduces employee commute VMT by requiring that the employer of the project to sponsor a vanpool program. In this example, the project is in the San Diego-Carlsbad CBSA and would have an average vehicle commute trip length of 14.52 miles (C). The percent of employees that participate in the vanpool program is 15 percent (B_{max}). GHG emissions from employee commute would be reduced by 20.4 percent.

$$A = \frac{\left((1-15\%) \times 14.52 \frac{\text{miles}}{\text{trip}} \times 307.5 \frac{\text{g } CO_2e}{\text{miles}}\right) + \left(15\% \times \frac{42 \frac{\text{miles}}{\text{trip}}}{6.25 \text{ occupants}} \times 763.4 \frac{\text{g } CO_2e}{\text{miles}}\right)}{\left((1-15\%) \times 14.52 \frac{\text{miles}}{\text{trip}} \times 307.5 \frac{\text{g } CO_2e}{\text{miles}}\right) + \left(15\% \times 42 \frac{\text{miles}}{\text{trip}} \times 307.5 \frac{\text{g } CO_2e}{\text{miles}}\right)} - 1 = -20.4\%$$

Quantified Co-Benefits

Improved Local Air Quality

The percent reduction in GHG emissions (A) would be the same as the percent reduction in NO_X, CO, NO_2, SO_2, and PM. Reductions in ROG emissions can be calculated by multiplying the percent reduction in GHG emissions (A) by an adjustment factor of 87 percent. See *Adjusting VMT Reductions to Emission Reductions* above for further discussion.

Energy and Fuel Savings

The percent reduction in vehicle fuel consumption (H) can be calculated using the GHG reduction formula except that (F) and (G) should be replaced by (I) and (J), as follows.

Fuel Use Reduction Formula

$$H = \frac{\left((1-B) \times C \times I\right) + \left(B \times \frac{D}{E} \times J\right)}{\left((1-B) \times C \times I\right) + (B \times D \times I)} - 1$$

Fuel Use Reduction Calculation Variables

ID	Variable	Value	Unit	Source
Output				
H	Percent reduction in fuel use from project/site employee commute VMT	4.7–21.4	%	calculated
User Inputs				
	None			
Constants, Assumptions, and Available Defaults				
I	Fuel efficiency of average employee vehicle	0.03639	gallon (gal) per mile	CARB 2020
J	Fuel efficiency of vanpool vehicle	0.08328	gal per mile	CARB 2020

Further explanation of key variables:

- (I and J) – The average fuel efficiencies for employee commute and vanpool vehicles were calculated using EMFAC2017 (v1.0.3). The model was run for a 2020 statewide average using diesel and gasoline fuel. The average of the LDA,

LDT1, and LDT2 vehicle categories represents employee non-vanpool vehicles, and the LHDT1 vehicle category conservatively represents a large cargo vanpool vehicle. If the user can provide a project-specific value (i.e., for a future year and project location), the user should run EMFAC to replace the defaults in the fuel use reduction formula.

- Please refer to the GHG Calculation Variables table above for definitions of variables that have been previously defined.

VMT Reductions

The percent reduction in VMT can be calculated using a modified version of the GHG reduction formula, as shown below.

$$\%\ \text{VMT Reduction} = \frac{((1 - B) \times C) + \left(B \times \frac{D}{E}\right)}{C} - 1$$

Sources

- California Air Resources Board (CARB). 2020. *EMFAC2017 v1.0.3*. August. Available: https://arb.ca.gov/emfac/emissions-inventory. Accessed: January 2021.
- Federal Highway Administration (FHWA). 2017. *National Household Travel Survey–2017 Table Designer*. Travel Day VT by HH_CBSA by TRPTRANS by TRIPPURP. Available: https://nhts.ornl.gov/. Accessed: January 2021.
- Intergovernmental Panel on Climate Change (IPCC). 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp. Available: https://www.ipcc.ch/report/ar4/wg1/. Accessed: January 2021.
- San Diego Association of Governments (SANDAG). 2019. *Mobility Management VMT Reduction Calculator Tool–Design Document*. June. Available: https://www.icommutesd.com/docs/default-source/planning/tool-design-document_final_7-17-19.pdf?sfvrsn=ec39eb3b_2. Accessed: January 2021.

T-12. Price Workplace Parking



GHG Mitigation Potential



Up to 20.0% of GHG emissions from project/site employee commute VMT

Co-Benefits (icon key on pg. 34)

Climate Resilience

Priced workplace parking could incentivize increased use of public transit and thus result in less traffic, potentially reducing congestion or delays on major roads during peak AM and PM traffic periods. When this reduction occurs during extreme weather events, it better allows emergency responders to access a hazard site.

Health and Equity Considerations

Parking pricing should include hourly and daily options so part-time staff do not need a monthly pass. If the project includes low-waged employees that have fewer transportation choices or time and resource constraints, it is instead recommended to consider implementing Measure T-13, *Implement Employee Parking Cash-Out*, or other transportation subsidy.

Measure Description

This measure will price onsite parking at workplaces. Because free employee parking is a common benefit, charging employees to park onsite increases the cost of choosing to drive to work. This is expected to reduce single-occupancy vehicle commute trips, resulting in decreased VMT, thereby reducing associated GHG emissions.

Subsector

Trip Reduction Programs

Locational Context

Urban, suburban

Scale of Application

Project/Site

Implementation Requirements

Implementation may include the following.

- Explicitly charging for employee parking.
- Implementing above-market rate pricing.
- Validating parking only for invited guests (or not providing parking validation at all).
- Not providing employee parking and transportation allowances.

In addition, this measure should include marketing and education regarding available alternatives to driving.

Cost Considerations

Parking fees would be a direct, recurring cost for employees. Employer costs include labor costs for program management and monitoring, but this may be offset by revenue generated by the program.

Expanded Mitigation Options

Best practice is to ensure that other transportation options are available, convenient, and have competitive travel times (i.e., transit service near the project site, shuttle service, or a complete active transportation network serving the site and surrounding community), and that there is not alternative free parking available nearby (such as on-street). This measure is substantially less effective in environments that do not have other modes available or where unrestricted street parking or other offsite parking is available nearby and has adequate capacity to accommodate project-related vehicle parking demand.

GHG Reduction Formula

For calculating effectiveness of pricing residential parking, see Measure T-16, *Unbundle Residential Parking Costs from Property Cost*. For calculating effectiveness of pricing parking at visitor-intensive land uses, see Measure T-24, *Implement Market Price Public Parking (On-Street)*.

$$A = \frac{B - C}{C} \times E \times D \times F$$

GHG Calculation Variables

ID	Variable	Value	Unit	Source
Output				
A	Percent reduction in GHG emissions from employee commute VMT	0–20.0	%	calculated
User Inputs				
B	Proposed parking price	[ ]	$	user input
C	Baseline parking price	[ ]	$	user input
D	Share of employees paying for parking	[ ]	%	user input
Constants, Assumptions, and Available Defaults				
E	Elasticity of parking demand with respecting to parking price	-0.4	unitless	Lehner & Peer 2019
F	Ratio of vehicle trip reduction to VMT	1	unitless	assumption

Further explanation of key variables:

- (B) – Parking price can be provided on an hourly, daily, or monthly basis. Monthly pricing is less effective than requiring daily or hourly payment since the price signal is diluted to only once a month.
- (C) – If baseline parking price is $0 (that is, if parking is typically free), set C = ¼ B, allowing for the maximum 50 percent increase in price. Alternatively, for locations that are located within 0.5 mile of transit service, set C = average transit fare to/from the location.
- (D) – Many organizations allow some employees free parking benefits. VMT reductions should be adjusted based on the share of employees that would be paying for parking.
- (E) – A meta-analysis of parking price studies found that a 0.40 percent decrease in parking demand occurs for every 1 percent increase in parking price (Lehner & Peer 2019). Price elasticity of parking demand varies by location, day of the week, and time of day.
- (F) – The adjustment factor from vehicle trips to VMT is 1. This assumes that all vehicle trips will average out to typical trip length ("assumes all trip lengths are equal"). Thus, it can be assumed that a percentage reduction in vehicle trips will equal the same percentage reduction in VMT. Subsidies or discounts targeting commute trips may have a higher factor as they are generally longer than the trip lengths for other purposes.

GHG Calculation Caps or Maximums

Measure Maximum

(A_{max}) The GHG reduction from priced workplace parking is capped at 20 percent. This maximum scenario is presented in the below example quantification.

($\left(\frac{B-C}{C}\right)_{max}$) The percent increase in parking price is capped at 50 percent.

Subsector Maximum

($\sum A_{max_{T\text{-}5 \text{ through } T\text{-}13}} \leq 45\%$) This measure is in the Trip Reduction Programs subsector. This subcategory includes Measures T-5 through T-13. The employee commute VMT reduction from the combined implementation of all measures within this subsector is capped at 45 percent.

Mutually Exclusive Measures

If this measure is selected, the user may not also take credit for Measure T-13, *Implement Employee Parking Cash-Out*. While both measures focus on providing a price signal for employees to consider other modes for their work commute, this measure actively charges all employees to park, while Measure T-13 reimburses employees who do not park. Users should select either Measure T-12 or T-13.

Example GHG Reduction Quantification

The user reduces VMT by increasing the price of a monthly parking permit. In this example, the permit fee is increased from $50 (C) to $75 (B). If 100 percent of employees are subject to parking pricing (D), the user would reduce GHG emissions from VMT by 20 percent.

$$A = \frac{\$75 - \$50}{\$50} \times -0.4 \times 100\% \times 1 = -20\%$$

Quantified Co-Benefits

Improved Local Air Quality

The percent reduction in GHG emissions (A) would be the same as the percent reduction in NO_X, CO, NO_2, SO_2, and PM. Reductions in ROG emissions can be calculated by multiplying the percent reduction in GHG emissions (A) by an adjustment factor of 87 percent. See *Adjusting VMT Reductions to Emission Reductions* above for further discussion.

Energy and Fuel Savings

The percent reduction in vehicle fuel consumption would be the same as the percent reduction in GHG emissions (A).

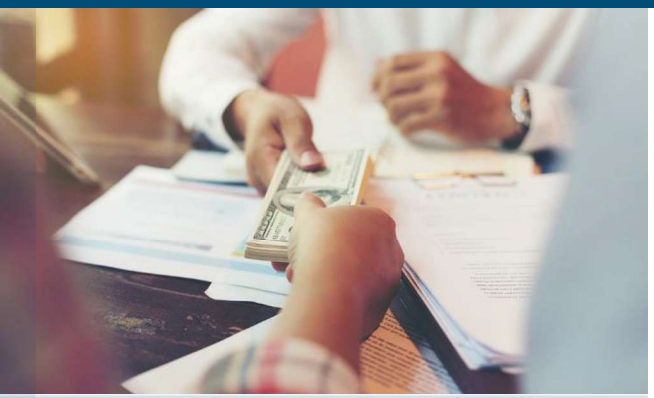
VMT Reductions

The percent reduction in VMT would be the same as the percent reduction in GHG emissions (A).

Sources

- Lehner, S., Peer, S. 2019. *The Price Elasticity of Parking: A Meta-analysis*. Transportation Research Part A: Policy and Practice 121 2019. Available: http://sustainabletransportationsc.org/garage/pdf/parking_elasticity.pdf. Accessed: January 2021.

T-13. Implement Employee Parking Cash-Out



GHG Mitigation Potential



Up to 12.0% of GHG emissions from project/site employee commute VMT

Co-Benefits (icon key on pg. 34)

Climate Resilience

Employee parking cash-out could incentivize increased use of public transit and thus result in less traffic, potentially reducing congestion or delays on major roads during peak AM and PM traffic periods. When this reduction occurs during extreme weather events, it better allows emergency responders to access a hazard site.

Health and Equity Considerations

Non-applicable

Measure Description

This measure will require project employers to offer employee parking cash-out. Cash-out is when employers provide employees with a choice of forgoing their current subsidized/free parking for a cash payment equivalent to or greater than the cost of the parking space. This encourages employees to use other modes of travel instead of single occupancy vehicles. This mode shift results in people driving less and thereby reduces VMT and GHG emissions.

Subsector

Trip Reduction Programs

Locational Context

Urban, suburban

Scale of Application

Project/Site

Implementation Requirements

To prevent spill-over parking and continued use of single occupancy vehicles, residential parking in the surrounding area must be permitted, and public on-street parking must be market rate.

Cost Considerations

Employer costs include the recurring, direct cost for payment to program participants and labor costs for program management. Employees that participate in the program would achieve cost savings through the cash-out benefit and potentially through reduced vehicle ownership and usage.

Expanded Mitigation Options

This measure could be paired with many other commute trip reduction strategies (Measures T-7 through T-11) for increased reductions.

GHG Reduction Formula

$A = B \times C$

GHG Calculation Variables

ID	Variable	Value	Unit	Source
Output				
A	Percent reduction in GHG emissions from project/site commute VMT	0–12.0	%	calculated
User Inputs				
B	Percentage of employees eligible	[ ]	%	user input
Constants, Assumptions, and Available Defaults				
C	Percent reduction in commute VMT from implementation of measure	-12	%	Shoup 2005

Further explanation of key variables:

- (B) – The percentage of employees eligible refers to the employees that would be able to participate in the program. This will usually be 100 percent. Employees who might not be able to participate could include those who work nighttime hours when transit and rideshare services are not available or employees who are required to drive to work as part of their job duties. This does not refer to the percentage of employees who end up participating in the program.
- (C) – A study of eight California firms that complied with California's 1992 parking cash-out law found employee commute VMT decreased by an average of 12 percent (Shoup 2005).

GHG Calculation Caps or Maximums

Measure Maximum

(A_{max}) The maximum percent reduction in GHG emissions (A) is 12.0 percent. This maximum scenario is presented in the below example quantification.

Subsector Maximum

($\sum A_{max_{T\text{-}5 \text{ through } T\text{-}13}} \leq 45\%$) This measure is in the Trip Reduction Programs subsector. This subcategory includes Measures T-5 through T-13. The employee commute VMT reduction from the combined implementation of all measures within this subsector is capped at 45 percent.

Mutually Exclusive Measures

If this measure is selected, the user may not also take credit for Measure T-12, *Price Workplace Parking*. While both measures focus on providing a price signal for employees to consider other modes for their work commute, this measure reimburses employees who

do not park, while Measure T-12 actively charges all employees to park. Users should select either Measure T-12 or T-13.

Example GHG Reduction Quantification

The user reduces project/site VMT by offering commuters the option to choose a cash payment equal to or greater than the current parking subsidy offered by their employer. In this example, all employees (i.e., 100 percent) are eligible to participate (B), which would reduce GHG emissions from employee commute VMT by 12 percent.

$$A = 100\% \times -12\% = -12\%$$

Quantified Co-Benefits

Improved Local Air Quality

The percent reduction in GHG emissions (A) would be the same as the percent reduction in NO_X, CO, NO_2, SO_2, and PM. Reductions in ROG emissions can be calculated by multiplying the percent reduction in GHG emissions (A) by an adjustment factor of 87 percent. See *Adjusting VMT Reductions to Emission Reductions* above for further discussion.

Energy and Fuel Savings

The percent reduction in vehicle fuel consumption would be the same as the percent reduction in GHG emissions (A).

VMT Reductions

The percent reduction in VMT would be the same as the percent reduction in GHG emissions (A).

Sources

- Shoup, D. 2005. *Parking Cash Out*. Planners Advisory Service, American Planning Association. Available: http://shoup.bol.ucla.edu/ParkingCashOut.pdf. Accessed: January 2021.

T-21-A. Implement Conventional Carshare Program



GHG Mitigation Potential



Up to 0.15% of GHG emissions from vehicle travel in the plan/community

Co-Benefits (icon key on pg. 34)

Climate Resilience

Carshare programs can increase accessibility and provide redundancy to vehicles that can be used to evacuate or obtain resources during an extreme weather event. Carshare programs can allow residents to give up or avoid car ownership, leading to cost savings that can help build economic resilience.

Health and Equity Considerations

Provide inclusive mechanisms so people without bank accounts, credit cards, or smart phones can access the system.

Measure Description

This measure will increase carshare access in the user's community by deploying conventional carshare vehicles. Carsharing offers people convenient access to a vehicle for personal or commuting purposes. This helps encourage transportation alternatives and reduces vehicle ownership, thereby avoiding VMT and associated GHG emissions. A variation of this measure, electric carsharing, is described in Measure T-21-B, *Implement Electric Carshare Program*.

Subsector

Neighborhood Design

Locational Context

Urban, suburban

Scale of Application

Plan/Community

Implementation Requirements

The GHG mitigation potential is based, in part, on literature analyzing one-way carsharing service with a free-floating operational model. This measure should be applied with caution if using a different form of carsharing (e.g., roundtrip, peer-to-peer, fractional).

Cost Considerations

The costs incurred by the carshare program service manager (typically a municipality or carshare company) may include the capital costs of purchasing vehicles; costs of storing, maintaining, and replacing the fleet; and costs for marketing and administration. Some of these costs may be offset by income generated through program use.

Expanded Mitigation Options

When implementing a carshare program, best practice is to discount carshare membership and provide priority parking for carshare vehicles to encourage use of the service.

GHG Reduction Formula

$$A = \frac{B \times (E - D)}{C}$$

GHG Calculation Variables

ID	Variable	Value	Unit	Source
Output				
A	Percent reduction in GHG emissions from vehicle travel in plan/community	0–0.15	%	calculated
User Inputs				
B	Number of vehicles deployed in plan/community	[ ]	integer	user input
C	VMT in plan/community without measure	[ ]	VMT per day	user input
Constants, Assumptions, and Available Defaults				
D	Conventional VMT avoided with measure	68.2	VMT per day per vehicle	Martin and Shaheen 2016
E	Conventional VMT added with measure	24.4	VMT per day per vehicle	Martin and Shaheen 2016

Further explanation of key variables:

- (B) – The number of cars in the carshare program is selected by the carshare provider, but its magnitude is relative to the size of the service area. A study of several carsharing programs (Martin and Shaheen 2016) documented a range of carshare fleet sizes for different North American cities: Calgary (590), San Diego (406), Seattle (640), Vancouver (920), Washington, D.C. (626).
- (C) – The total plan/community VMT should represent the expected total VMT generated by all land use in that area. The most appropriate source for this data is from a local travel demand model.
- (D) – Conventional VMT avoided per deployed carshare vehicle was derived based on a study of conventional-engine based car share programs in Calgary, Seattle, Vancouver, and Washington, D.C. It accounts for VMT avoided from carshare users who sold their personal vehicles and carshare users who decided not to purchase a personal vehicle, both directly because of the availability of carshare (Martin and Shaheen 2016).
- (E) – Conventional VMT added per deployed carshare vehicle was derived based on a study of conventional-engine based car share programs in Calgary, Seattle, Vancouver, and Washington, D.C. It accounts for the VMT of the carshare vehicles (Martin and Shaheen 2016).

GHG Calculation Caps or Maximums

Measure Maximum

(A_{max}) The maximum GHG reduction from this measure is 0.15 percent. This maximum scenario is presented in the below example quantification.

Subsector Maximum

($\sum A_{max_{T\text{-}18 \text{ through } T\text{-}22\text{-}D}} \leq 10\%$) This measure is in the Neighborhood Design subsector. This subcategory includes Measures T-18 through T-22-D. The VMT reduction from the combined implementation of all measures within this subsector is capped at 10 percent.

Example GHG Reduction Quantification

The user reduces plan/community VMT by deploying carshare vehicles. In this example, the project would be in the city of San Diego, which in 2017 had a VMT per day of 24,101,089 miles (C) (SANDAG 2019). Assuming twice the number of vehicles used in the Car2go San Diego program (B), the GHG emissions from plan/community VMT would be reduced by 0.15 percent.

$$A = \frac{812 \text{ vehicles} \times \left(24.4 \frac{\text{VMT}}{\text{day·vehicle}} - 68.2 \frac{\text{VMT}}{\text{day·vehicle}}\right)}{24{,}101{,}089 \frac{\text{VMT}}{\text{day}}} = -0.15\%$$

Quantified Co-Benefits

Improved Local Air Quality

The percent reduction in GHG emissions (A) would be the same as the percent reduction in NO_X, CO, NO_2, SO_2, and PM. Reductions in ROG emissions can be calculated by multiplying the percent reduction in GHG emissions (A) by an adjustment factor of 87 percent. See *Adjusting VMT Reductions to Emission Reductions* above for further discussion.

Energy and Fuel Savings

The percent reduction in vehicle fuel consumption would be the same as the percent reduction in GHG emissions (A).

VMT Reductions

The percent reduction in VMT would be the same as the percent reduction in GHG emissions (A).

Sources

- Martin, E. and S. Shaheen. 2016. *The Impacts of Car2go on Vehicle Ownership, Modal Shift, Vehicle Miles Traveled, and Greenhouse Gas Emissions: An Analysis of Five North American Cities.* July. Available: https://tsrc.berkeley.edu/publications/impacts-car2go-vehicle-ownership-modal-shift-vehicle-miles-traveled-and-greenhouse-gas. Accessed: March 2021.
- San Diego Association of Governments (SANDAG). 2019. *Mobility Management VMT Reduction Calculator Tool – Design Document.* June. Available: https://www.icommutesd.com/docs/default-source/planning/tool-design-document_final_7-17-19.pdf?sfvrsn=ec39eb3b_2. Accessed: January 2021.

T-22-A. Implement Pedal (Non-Electric) Bikeshare Program



GHG Mitigation Potential



Up to 0.02% of GHG emissions from vehicle travel in the plan/community

Co-Benefits (icon key on pg. 34)

Climate Resilience

Bikeshare programs can incentivize more bicycle use and decrease vehicle use, which have health benefits and can thus improve community resilience. This can also improve connectivity between residents and resources that may be needed in an extreme weather event.

Health and Equity Considerations

Provide inclusive mechanisms so people without bank accounts, credit cards, or smart phones can access the system.

Measure Description

This measure will establish a bikeshare program. Bikeshare programs provide users with on-demand access to bikes for short-term rentals. This encourages a mode shift from vehicles to bicycles, displacing VMT and thus reducing GHG emissions. Variations of this measure are described in Measure T-22-B, *Implement Electric Bikeshare Program*, Measure T-22-C, *Implement Scootershare Program,* and Measure T-22-D, *Transition Conventional to Electric Bikeshare*.

Subsector

Neighborhood Design

Locational Context

Urban, suburban

Scale of Application

Plan/Community

Implementation Requirements

The GHG mitigation potential is based, in part, on literature analyzing docked (i.e., station-based) bikeshare programs. This measure should be applied with caution if using dockless (free-floating) bikeshare.

Cost Considerations

The costs incurred by the service manager (e.g., municipality or bikeshare company) may include the capital costs for purchasing a bicycle fleet; installing accessible and secure docking stations; storing, maintaining, and replacing the fleet; and marketing and administration. Some of these costs may be offset by income generated through program use. Program participants will benefit from the cost savings from access to cheaper transportation alternatives (compared to private vehicles, private bicycles, or use of ride-hailing services). The local municipality may achieve cost savings through a reduction of cars on the road leading to lower infrastructure and roadway maintenance costs.

Expanded Mitigation Options

Best practice is to discount bikeshare membership and dedicate bikeshare parking to encourage use of the service. Also consider including space on the vehicle to store personal items while traveling, such as a basket.

GHG Reduction Formula

This measure methodology does not account for the direct GHG emissions from vehicle travel of program employees picking up and dropping off bikes.

$$A = -1 \times \frac{(C - B) \times D \times E \times F}{G \times H}$$

GHG Calculation Variables

ID	Variable	Value	Unit	Source
Output				
A	Percent reduction in GHG emissions from vehicle travel in plan/community	0–0.02	%	calculated
User Inputs				
B	Percent of residences in plan/community with access to bikeshare system without measure	0–100	%	user input
C	Percent of residences in plan/community with access to bikeshare system with measure	0–100	%	user input
Constants, Assumptions, and Available Defaults				
D	Daily bikeshare trips per person	0.021	trips per day per person	MTC 2017
E	Vehicle to bikeshare substitution rate	19.6	%	McQueen et al. 2020
F	Bikeshare average one-way trip length	1.4	miles per trip	Lazarus et al. 2019
G	Daily vehicle trips per person	2.7	trips per day per person	FHWA 2018
H	Regional average one-way vehicle trip length	Table T-10.1	miles per trip	FHWA 2017

Further explanation of key variables:

- (B and C) – Access to bikesharing is measured as the percent of residences in the plan/community within 0.25 mile of a bikeshare station. For dockless bikes, assume that all residences within 0.25 mile of the designated dockless service area would have access.
- (D) – An analysis of bike share service areas in the San Francisco Bay Area estimated that in locations with access to bikesharing, there were between 21 and 25 bikeshare trips per day per 1,000 residents (MTC 2017). To be conservative, the low end of this range is cited.
- (E) – A literature review of several academic and government reports found that the average car trip substitution rate by bikeshare trips was 19.6 percent. This included bikeshare programs in Washington D.C., Minneapolis, and Montreal (McQueen et al. 2020).

- (F) – A case study on average trip lengths for pedal and electric bikeshare programs in San Francisco reported a one-way pedal bikeshare trip of 1.4 miles (Lazarus et al. 2019).
- (G) – A summary report of the 2017 National Household Travel Survey data found that the average person in the U.S. takes 2.7 vehicle trips per day (FHWA 2018).
- (H) – Ideally, the user will calculate auto trip length for a plan/community at a scale no larger than a census tract. Potential data sources include the U.S. Census, California Household Travel Survey (preferred), or local survey efforts. If the user is not able to provide a plan-specific value using one of these data sources, they have the option to input the existing regional average one-way auto trip length for one of the six most populated CBSAs in California, as presented in Table T-10.1 in Appendix C (FHWA 2017). Trip lengths are likely to be longer for areas not covered by the listed CBSAs, which represent the denser areas of the state.

GHG Calculation Caps or Maximums

Measure Maximum

(A_{max}) For projects that use default CBSA data from Table T-10.1, the maximum percent reduction in GHG emissions (A) is 0.02 percent. This maximum scenario is presented in the below example quantification.

Subsector Maximum

($\sum A_{max_{T\text{-}18 \text{ through } T\text{-}22\text{-}D}} \leq 10\%$) This measure is in the Neighborhood Design subsector. This subcategory includes Measures T-18 through T-22-D. The VMT reduction from the combined implementation of all measures within this subsector is capped at 10 percent.

Example GHG Reduction Quantification

The user reduces plan/community VMT by deploying bikesharing throughout the area. In this example, the project is in the Los Angeles-Long Beach-Anaheim CBSA, and the one-way vehicle trip length would be 9.72 miles (H). Assuming 100 percent of residents in the plan/community would have bikeshare access (C) where there was no existing access (B), the user would reduce GHG emissions from plan/community VMT by 0.02 percent.

$$A = -1 \times \frac{(100\% - 0\%) \times 0.021 \ \frac{\text{trips}}{\text{day·person}} \times 19.6\% \times 1.4 \ \frac{\text{miles}}{\text{trip}}}{2.7 \ \frac{\text{trips}}{\text{day·person}} \times 9.72 \ \frac{\text{miles}}{\text{trip}}} = -0.02\%$$

Quantified Co-Benefits

Improved Local Air Quality

The percent reduction in GHG emissions (A) would be the same as the percent reduction in NO_X, CO, NO_2, SO_2, and PM. Reductions in ROG emissions can be calculated by multiplying the percent reduction in GHG emissions (A) by an

adjustment factor of 87 percent. See *Adjusting VMT Reductions to Emission Reductions* above for further discussion.

Energy and Fuel Savings

The percent reduction in vehicle fuel consumption would be the same as the percent reduction in GHG emissions (A).

VMT Reductions

The percent reduction in VMT would be the same as the percent reduction in GHG emissions (A).

Sources

- Federal Highway Administration (FHWA). 2017. *National Household Travel Survey–2017 Table Designer*. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.
- Federal Highway Administration (FHWA). 2018. *Summary of Travel Trends 2017–National Household Travel Survey*. July. Available: https://www.fhwa.dot.gov/policyinformation/documents/2017_nhts_summary_travel_trends.pdf. Accessed: January 2021.
- Lazarus, J., J. Pourquier, F. Feng, H. Hammel, and S. Shaheen. 2019. *Bikesharing Evolution and Expansion: Understanding How Docked and Dockless Models Complement and Compete – A Case Study of San Francisco*. Paper No. 19-02761. Annual Meeting of the Transportation Research Board: Washington, D.C. Available: https://trid.trb.org/view/1572878. Accessed: January 2021.
- McQueen, M., G. Abou-Zeid, J. MacArthur, and K. Clifton. 2020. Transportation Transformation: Is Micromobility Making a Macro Impact on Sustainability? *Journal of Planning Literature*. November. Available: https://doi.org/10.1177/0885412220972696. Accessed: March 2021.
- Metropolitan Transportation Commission (MTC). 2017. *Plan Bay Area 2040 Final Supplemental Report–Travel Modeling Report*. July. Available: http://2040.planbayarea.org/files/2020-02/Travel_Modeling_PBA2040_Supplemental%20Report_7-2017.pdf. Accessed: January 2021.

T-46. Provide Transit Shelters



GHG Mitigation Potential



Up to 0.32% of GHG emissions associated with plan/community VMT

Co-Benefits (icon key on pg. 34)

Climate Resilience

Transit shelters protect passengers from extreme weather, such as high temperatures and heavy precipitation. Providing transit shelters can also incentivize more people to use transit, resulting in less traffic and better allowing emergency responders to access a hazard site during an extreme weather event.

Health and Equity Considerations

Transit shelters can increase shade and provide heat mitigation for waiting passengers. Transit shelters also provide rest areas for people with disabilities and pregnant passengers. Increased access to safe, efficient, comfortable, and well-maintained public transit promotes physical activity and results in reduced health risk.

Measure Description

For this measure, a local government or transit agency provides amenities that make it safer and more comfortable to wait for the bus. The two interventions that have proven to lead to changes in rider perceptions are adding bus shelters and adding real-time arrival information. Research into transit ridership shows that adding these amenities decreases both the real and the perceived wait time for riders, which impacts riders' willingness to ride.

Subsector

Transit

Locational Context

Urban, suburban

Scale of Application

Plan/Community

Implementation Requirements

This measure requires that bus shelters also have benches because the combined effect of shelters and benches was measured in the studies cited.

Cost Considerations

Providing amenities requires capital investment to construct bus shelters and improve passenger communication systems to relay arrival information. Staff and maintenance costs may also increase. A portion of these costs may be offset by increased transit ridership and associated income. Increased ridership also reduces vehicle use, which has cost benefits for both commuters and municipalities.

Expanded Mitigation Options

When adding bus shelters, providing lighting is recommended as it increases rider perceptions of safety at night.

GHG Reduction Formula

$$A1 = \mathbf{B} \times \frac{C}{D} \times \mathbf{E} \times \frac{F}{G} \times (H\text{-}I1) \times J \text{ (for bus shelters only)}$$

$$A2 = \mathbf{B} \times \frac{C}{D} \times \mathbf{E} \times \frac{F}{G} \times (H\text{-}I2) \times J \text{ (for bus shelters and real-time arrival information)}$$

GHG Calculation Variables

ID	Parameter	Value	Unit	Source
Output				
A1, A2	Percent reduction in GHG emissions from vehicle travel in plan/community	0–0.32	%	calculated
User Inputs				
B	Number of transit stops with new bus shelters and benches	[ ]	unitless	user input
C	Average number of boardings per day at each transit station with added amenities	[ ]	boardings/day	user input
D	Average number of boardings per day across the transit agency	[ ]	boardings/day	user input
E	Transit mode share in the core-based statistical area	Table T-3.1	%	FHWA 2017
Constants, Assumptions, and Available Defaults				
F	Percent of transit users who would otherwise drive	83.3	%	FHWA 2017
G	Average auto occupancy	1.45	riders/vehicle	FHWA 2023
H	Percent of total travel time spent waiting (transit trips)	24.9	%	FHWA 2023
I1	Percent of perceived total travel time spent waiting (transit trips with shelters)	20.3	%	Fan 2016
I2	Percent of total travel time spent waiting (transit trips with shelters and real-time arrival information [RTI])	15.8	%	Watkins 2011
J	Wait time elasticity	-0.54	unitless	Taylor et al. 2009

Further explanation of key variables:

- (B) – This input is the number of bus stops that get equipped with new amenities (either shelters or shelters and real-time information).
- (C) – This input is the average number of boardings per day at the bus stop before the new amenities are added.

- (D) – This input is the average number of boardings per day across the entire transit agency.
- (E) – This is the transit mode share in the city where the bus amenities are being added. It is recommended that users use local data from the California extension of the NHTS or the U.S. Census for where the project(s) is located. The user can also use the values for CBSAs in the case where the projects are spread out across multiple cities.
- (F) – This constant is based on the percentage of trips taken by car from NHTS, weighted by transit ridership and number of cars available in the household to account for the fact that some riders do not have a choice to take transit and would ride regardless of the wait time. This value from FHWA 2018 represents pre-COVID-19 pandemic conditions but is the most recent value from FHWA.
- (G) – This is the average car occupancy for trips taken as of the latest version of the NHTS in 2022. This value accounts for the effects of the COVID-19 pandemic.
- (H) – This value represents the percentage of the total transit trip travel time that is composed of waiting and is derived from average wait times and travel times in the NHTS in the Pacific region.
- (I1, I2) – This represents the percentage of the total transit trip travel time that is composed of waiting after the addition of transit amenities. This is derived from the average wait times and travel times in the NHTS and the perceived wait time changes found in Fan 2016 and Watkins 2011.
- (J) – This elasticity is sourced from a study (Taylor et al. 2009) that uses data from LA Metro to estimate the effect of wait time and travel time on ridership across the system.

GHG Calculation Caps or Maximums

Measure Maximum

(A_{max}) The percent reduction in GHG emissions (A) is capped at 0.32 percent. This assumes that the CBSA is San Francisco-Oakland-Hayward, which has a default transit mode share for all trips of 11.38 percent.

Subsector Maximum

($\sum A_{max_{T\text{-}25 \text{ through } T\text{-}29,\ T\text{-}46}} \leq 15\%$) This measure is in the Transit subsector. This subcategory includes Measures T-25 through T-29 and T-46. The VMT reduction from the combined implementation of all measures within this subsector is capped at 15 percent.

Example GHG Reduction Quantification

The user reduces VMT by constructing twelve transit shelters in Oakland with real time information for a bus system that has an average of 15,000 boardings per day (D) and

$$A = 12 \times \frac{300}{15{,}000} \times 11.38\% \times \frac{83.3\%}{1.45} \times (24.9\% - 15.8\%) \times -0.54 = -0.077\%$$

300 boardings per day at each of the stops (C) before the project. This leads to a reduction in transportation related GHG emissions of 0.077 percent.

Quantified Co-Benefits

Improved Air Quality

The percent reduction in GHG emissions (A) would be the same as the percent reduction in NOx, CO, NO_2, SO_2, and PM. Reductions in ROG emissions can be calculated by multiplying the percent reduction in GHG emissions (A) by an adjustment factor of 87 percent. See *Adjusting VMT Reductions to Emission Reductions* for further discussion.

Energy and Fuel Savings

The percent reduction in vehicle fuel consumption achieved by the measure would be the same as the percent reduction in GHG emissions (A).

VMT Reductions

The percent reduction in VMT achieved by the measure would be the same as the percent reduction in GHG emissions (A).

Sources

- Fan, Y., A. Guthrie, and D. Levinson. 2016. Waiting time perceptions at transit stops and stations: Effects of basic amenities, gender, and security. Transportation Research Part A: Policy & Practice 88:251–264. Available: https://doi.org/10.1016/j.tra.2016.04.012. Accessed: December 2023.
- Federal Highway Administration (FHWA). 2017. 2017 National Household Travel Survey. Available: https://nhts.ornl.gov/. Accessed: December 2023.
- Federal Highway Administration (FHWA). 2023. 2022 National Household Travel Survey. Available: https://nhts.ornl.gov/. Accessed: January 2024.
- Taylor, B. D., H. Iseki, M. Smart, and M. A. Miller. 2009. The Effects of Out-of-Vehicle Time on Travel Behavior: Implications for Transit Transfers. California PATH Program. Available: https://trid.trb.org/view/886713. Accessed: December 2023.
- Watkins, K., B. Ferris, A. Borning, G. Scott Rutherford, and D. Layton. 2011. Where Is My Bus? Impact of mobile real-time information on the perceived and actual wait time of transit riders. Transportation Research Part A: Policy & Practice 45:839–848. Accessed: December 2023.

C/CAG TDM Checklist

ccagtdm.org

Non-Residential (Office, Industrial, Institutional) Land Use: Large Project

500+ ADT; ~50,000+ sq ft

About this Form

Any new development project anticipated to generate at least 100 average daily trips is subject to the C/CAG TDM Policy and must complete a TDM Checklist and implement associated measures to mitigate traffic impacts. Read more at ccagtdm.org

Questions?
support@ccagtdm.org

A Applicant Information

Project Address	Contact First and Last Name
Parcel Number / Application Date (D D M M Y Y Y Y)	Contact Phone Address
Project Jurisdiction	Contact Email Address

B Trip Reduction Target

Select one option based on your project's distance to high quality transit

Read more about high quality transit at ccagtdm.org/high-quality-transit

Identify your project type

☐ TOD	☐ Transit Proximate	☐ Non-Transit Proximate
Less than 1/2-mile from high quality transit service	1/2 to 3 miles from high quality transit service	More than 3 miles from high quality transit service
25% Trip Reduction Required	**35%** Trip Reduction Required	**35%** Trip Reduction Required

C Required Measures

You must select all measures that apply for your project type

Click on each measure's title for more information

	Measure	Project Types	Percentage	Yes
1	**M1 - Free/Preferential Parking for Carpools** Provide free or preferential parking, including reserved spaces or spaces near an entrance or other desirable location, to incentivize ridesharing.	ALL	1%	☐
2	**M3 - TDM Coordinator/Contact Person** Provide TDM coordinator/liaison for tenants. May be contracted through 3rd party provider, such as Commute.org.	ALL	0.5%	☐
3	**M4 - Actively Participate in Commute.org or Transportation Management Association (TMA) Equivalent** Obtain certification of registration from Commute.org or equivalent TMA incorporation documents. Select only one based on Project Type	TOD & Non-transit Proximate Transit Proximate	6.5% 16.5%	☐ ☐
4	**M5 - Carpool or Vanpool Program** Establish carpool/vanpool program for tenants and register program with Commute.org.	ALL	2%	☐
5	**M6 - Transit or Ridesharing Passes/Subsidies** Offer tenants passes or subsidies for monthly public transit or ridesharing costs incurred, equivalent to 30% of value or $50 - whichever is lower.	ALL	10%	☐
6	**M7 - Pre-Tax Transportation Benefits** Offer option for tenants to participate in a pre-tax transit program to encourage the use of sustainable transportation modes and leverage pre-tax income to pay for commute trip costs.	ALL	1%	☐
7	**M8 - Secure Bicycle Storage** Comply with CalGREEN minimum bicycle parking requirements.	ALL	1%	☐
8	**M9 - Design Streets to Encourage Bike/Ped Access** Design adjacent streets or roadways to facilitate multimodal travel.	ALL	1%	☐
9	**M25 - Showers, Lockers, and Changing Rooms for Cyclists** These amenities serve as end of trip facilities for employees arriving by bike or other active transportation forms.	ALL	2%	☐
10	**Total from Required Measures** Sum percentages from each selected measure from rows 1-9			☐ %

Form Continues on Page 2 →

D Additional Recommended

Select enough to meet the trip reduction target from section B

Click on each measure's title for more information

	Measure	Project Types	Percentage	Yes
11	**M12 - Flex Time, Compressed Work Week, Telecommute** Flex time allows employees some flexibility in their daily work schedules. Compressed work week allows employees to work fewer but longer days. Telecommuting functions similarly, allowing employees to work from home rather than the office, reducing vehicle travel on the days they work remotely.	ALL	5%	☐
12	**M14 - Paid Parking at Market Rate** Offer hourly/daily parking rates proportional to monthly rate or equivalent to cost of transit fare.	ALL	25%	☐
13	**M15 - Reduced Parking** Provide off-street parking at least 10% below locally-required minimums, or else below the locally-permitted parking maximums. Consideration may be required of potential spillover parking into surrounding areas.	ALL	10%	☐
14	**M16 - Short-Term Daily Parking** Offer daily or hourly parking rates that are proportional to the monthly rate or approximately the cost of a transit fare.	ALL	2%	☐
15	**M17 - Developer TDM Fee/TDM Fund** Voluntary impact fee payment on a per unit or square footage basis, to fund the implementation of TDM programs.	ALL	4%	☐
16	**M18 - Car Share On-Site** Provide on-site car share or vehicle fleets.	ALL	1%	☐
17	**M19 - Land Dedication or Capital Improvements for Transit** Contribute space on, or adjacent to, the project site for transit improvements. Select one or more Bus Pullout Space 1% ☐ Bus Shelter 1% ☐ Visual/Electrical Improvements (i.e., Lighting, Signage) 1% ☐ Other (i.e., Micromobility Parking Zone, TNC Loading Zone) 1% ☐	ALL →	☐ % Total percentages selected	☐
18	**M20 - Shuttle Program/Shuttle Consortium/Fund Transit Service** Establish a shuttle service to regional transit hubs or commercial centers. Shuttle service should be provided free of charge to employees and guests.	Non-transit Proximate	10%	☐
19	**M21 - Bike/Scooter Share On-Site** Allocate space for bike/scooter share parking.	All	1%	☐
20	**M22 - Active Transportation Subsidies** Offer biking/walking incentives to tenants, such as gift card/product raffles.	All	2%	☐
21	**M23 - Gap Closure** Construct or enhance quality of biking and walking facilities to/from site to existing trails, bikeways, and/or adjacent streets.	All	7%	☐
22	**M24 - Bike Repair Station** Offer on-site bike repair space/tools in visible, secure area.	All	0.5%	☐
23	**M26 - Pedestrian Oriented Uses & Amenities on Ground Floor** Provide on-site, visible amenities to tenants and guests, such as cafes, gyms, childcare, retail.	All	3%	☐
24	**Total from Additional Measures** Sum percentages from each selected measure from rows 11 - 23		☐ %	

E Project Totals

Percentage from Required Measures
Section C Row 10 ☐ %

\+ Percentage from Additional Measures
Section D Row 24 ☐ %

Total Percentage from all Selected Measures
Sum of required and additional measures ☐ %

Trip Reduction Target
Copy from Section B ☐ %

Total Percentage from all selected measures must be greater than or equal to Trip Reduction Target

F Submit Checklist

See ccagtdm.org/submission for how to submit this form.

Questions?

Email Us
support@ccagtdm.org

Visit Our Website
ccagtdm.org

Attachment D – Intersection Turning Movement Counts

Prepared by National Data & Surveying Services

San Leandro St & 75th Ave

Peak Hour Turning Movement Count

ID: 24-080120-001
City: Oakland

Day: Thursday
Date: 5/9/2024

PEAK HOURS		COUNT PERIODS
AM	07:45 AM - 08:45 AM	7:00 AM - 09:00 AM
NOON	NONE	NONE
PM	04:30 PM - 05:30 PM	4:00 PM - 06:00 PM

SOUTHBOUND (San Leandro St)

AM	0	538	64	2	971	AM
NOON	0	0	0	0	0	NOON
PM	0	656	95	2	840	PM

EASTBOUND (75th Ave)

AM	NOON	PM		
0	0	0		
0	0	0	0	
91	0	139	1.5	
68	0	108	0.5	
153	0	151	1	

WESTBOUND (75th Ave)

	PM	NOON	AM
0	108	0	112
1	0	0	0
0	87	0	87
0	0	0	0
	330	0	346

NORTHBOUND (San Leandro St)

PM	894	0	0	591	127	PM
NOON	0	0	0	0	0	NOON
AM	778	0	0	766	214	AM

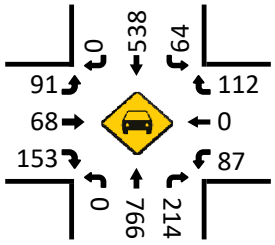
CONTROL

Signalized

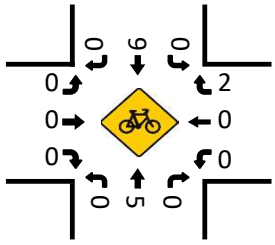
TEV	2095 AM	0 NOON	2064 PM
PHF	0.97		0.96

Turning movements: 0 2 1 0 (SB) | 0 0 2 0 (NB)

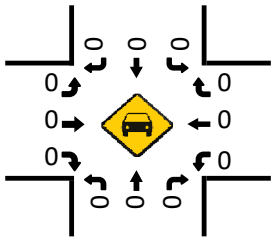
Totals (AM)



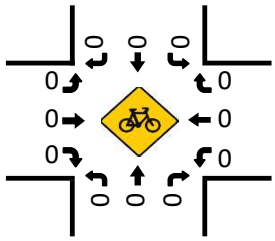
Total Bikes (AM)



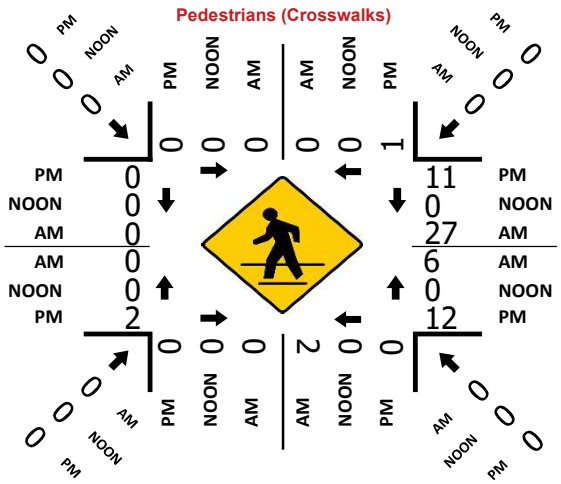
Totals (NOON)



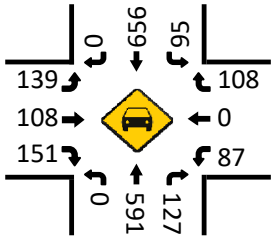
Total Bikes (NOON)



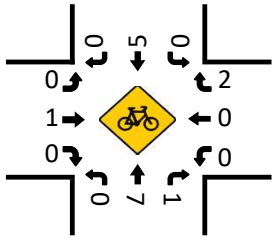
Pedestrians (Crosswalks)



Totals (PM)



Total Bikes (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: San Leandro St & 75th Ave
City: Oakland
Control: Signalized

Project ID: 24-080120-001
Date: 5/9/2024

Data - Totals

AM

NS/EW Streets:	San Leandro St				San Leandro St				75th Ave				75th Ave				
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	1	2	0	0	1.5	0.5	1	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	95	10	0	8	66	0	1	18	13	20	0	15	0	45	0	291
7:15 AM	0	110	13	0	10	83	0	2	19	12	19	0	10	0	26	0	304
7:30 AM	0	152	18	0	6	87	0	1	20	10	19	0	15	0	36	0	364
7:45 AM	0	192	44	0	11	138	0	1	23	16	41	0	15	0	32	0	513
8:00 AM	0	203	45	0	15	135	0	0	20	15	38	0	20	0	23	0	514
8:15 AM	0	182	76	0	19	131	0	1	19	18	31	0	26	0	39	0	542
8:30 AM	0	189	49	0	19	134	0	0	29	19	43	0	26	0	18	0	526
8:45 AM	0	168	31	0	14	107	0	2	21	15	38	0	15	0	19	0	430
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1291	286	0	102	881	0	8	169	118	249	0	142	0	238	0	3484
APPROACH %'s :	0.00%	81.86%	18.14%	0.00%	10.29%	88.90%	0.00%	0.81%	31.53%	22.01%	46.46%	0.00%	37.37%	0.00%	62.63%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	766	214	0	64	538	0	2	91	68	153	0	87	0	112	0	2095
PEAK HR FACTOR :	0.000	0.943	0.704	0.000	0.842	0.975	0.000	0.500	0.784	0.895	0.890	0.000	0.837	0.000	0.718	0.000	0.966
		0.950				0.987				0.857				0.765			

PM

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	1	2	0	0	1.5	0.5	1	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	146	36	0	20	142	0	3	44	31	44	0	33	0	19	0	518
4:15 PM	0	152	29	0	28	144	0	2	26	20	45	0	30	0	20	0	496
4:30 PM	0	129	30	0	26	142	0	0	43	25	37	0	27	0	26	0	485
4:45 PM	0	159	40	0	21	169	0	1	37	23	38	0	18	0	29	0	535
5:00 PM	0	146	30	0	24	172	0	0	35	29	41	0	27	0	21	0	525
5:15 PM	0	157	27	0	24	173	0	1	24	31	35	0	15	0	32	0	519
5:30 PM	0	122	27	0	19	181	0	0	33	16	35	0	22	0	15	0	470
5:45 PM	0	112	21	0	21	176	0	0	30	24	32	0	25	0	28	0	469
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1123	240	0	183	1299	0	7	272	199	307	0	197	0	190	0	4017
APPROACH %'s :	0.00%	82.39%	17.61%	0.00%	12.29%	87.24%	0.00%	0.47%	34.96%	25.58%	39.46%	0.00%	50.90%	0.00%	49.10%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	591	127	0	95	656	0	2	139	108	151	0	87	0	108	0	2064
PEAK HR FACTOR :	0.000	0.929	0.794	0.000	0.913	0.948	0.000	0.500	0.808	0.871	0.921	0.000	0.806	0.000	0.844	0.000	0.964
		0.902				0.951				0.948				0.920			

National Data & Surveying Services

Intersection Turning Movement Count

Location: San Leandro St & 75th Ave
City: Oakland
Control: Signalized

Project ID: 24-080120-001
Date: 5/9/2024

Data - Bikes

NS/EW Streets:	San Leandro St				San Leandro St				75th Ave				75th Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	1	2	0	0	1.5	0.5	1	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	2	0	0	3	4	0	0	0	0	0	0	1	0	2	0	12
7:15 AM	0	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	4
7:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	2
7:45 AM	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
8:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	2
8:15 AM	0	1	0	0	0	2	0	0	0	0	0	0	0	0	1	0	4
8:30 AM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
8:45 AM	0	1	0	0	1	1	0	0	0	0	0	0	2	0	0	0	5
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	9	0	0	4	13	0	0	0	1	0	0	3	0	6	0	36
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	23.53%	76.47%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	33.33%	0.00%	66.67%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	5	0	0	0	6	0	0	0	0	0	0	0	0	2	0	13
PEAK HR FACTOR :	0.000	0.625	0.000	0.000	0.000	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.813
	0.625				0.750								0.500				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	1	2	0	0	1.5	0.5	1	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	2	1	0	0	0	0	0	0	0	0	0	0	0	1	0	4
4:15 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
4:30 PM	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4
4:45 PM	0	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	4
5:00 PM	0	1	0	0	0	4	0	0	0	0	0	0	0	0	1	0	6
5:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
5:30 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
5:45 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	9	2	0	3	8	0	0	0	1	0	0	0	0	3	0	26
APPROACH %'s :	0.00%	81.82%	18.18%	0.00%	27.27%	72.73%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	7	1	0	0	5	0	0	0	1	0	0	0	0	2	0	16
PEAK HR FACTOR :	0.000	0.583	0.250	0.000	0.000	0.313	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.500	0.000	0.667
	0.667				0.313				0.250				0.500				

National Data & Surveying Services

Intersection Turning Movement Count

Location: San Leandro St & 75th Ave
City: Oakland

Project ID: 24-080120-001
Date: 5/9/2024

Data - Pedestrians (Crosswalks)

NS/EW Streets:	San Leandro St		San Leandro St		75th Ave		75th Ave		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
7:00 AM	0	0	0	0	4	2	0	0	6
7:15 AM	0	0	0	0	1	8	0	0	9
7:30 AM	1	0	0	0	1	0	0	0	2
7:45 AM	0	0	0	0	2	15	0	0	17
8:00 AM	0	0	0	0	1	3	0	0	4
8:15 AM	0	0	0	2	1	3	0	0	6
8:30 AM	0	0	0	0	2	6	0	0	8
8:45 AM	1	0	0	0	0	1	0	0	2
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	2	0	0	2	12	38	0	0	54
APPROACH %'s :	100.00%	0.00%	0.00%	100.00%	24.00%	76.00%			
PEAK HR :	**07:45 AM - 08:45 AM**								TOTAL
PEAK HR VOL :	0	0	0	2	6	27	0	0	35
PEAK HR FACTOR :				0.250	0.750	0.450			0.515
			0.250		0.485				

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	2	3	0	0	5
4:15 PM	1	0	0	0	0	1	0	0	2
4:30 PM	0	0	0	0	6	0	0	0	6
4:45 PM	0	0	0	0	5	3	0	0	8
5:00 PM	0	0	0	0	0	5	0	0	5
5:15 PM	0	1	0	0	1	3	2	0	7
5:30 PM	0	0	0	0	2	2	1	0	5
5:45 PM	0	0	0	0	4	4	0	0	8
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	1	1	0	0	20	21	3	0	46
APPROACH %'s :	50.00%	50.00%			48.78%	51.22%	100.00%	0.00%	
PEAK HR :	**04:30 PM - 05:30 PM**								TOTAL
PEAK HR VOL :	0	1	0	0	12	11	2	0	26
PEAK HR FACTOR :		0.250			0.500	0.550	0.250		0.813
	0.250				0.719		0.250		

Prepared by National Data & Surveying Services

San Leandro St & 76th Ave

Peak Hour Turning Movement Count

ID: 24-080120-002
City: Oakland

Day: Thursday
Date: 5/9/2024

PEAK HOURS	COUNT PERIODS
07:45 AM - 08:45 AM	7:00 AM - 09:00 AM
NONE	NONE
04:45 PM - 05:45 PM	4:00 PM - 06:00 PM

SOUTHBOUND (San Leandro St)

AM	0	777	0	0	978	AM
NOON	0	0	0	0	0	NOON
PM	0	926	0	1	712	PM

EASTBOUND (76th Ave)

AM	NOON	PM	
0	0	0	
0	0	0	0
0	0	0	0
0	0	0	1
0	0	0	0
AM	NOON	PM	

WESTBOUND (76th Ave)

PM	NOON	AM	
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	
PM	NOON	AM	

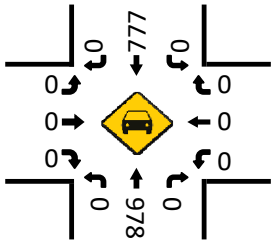
NORTHBOUND (San Leandro St)

PM	926	0	0	711	0	PM
NOON	0	0	0	0	0	NOON
AM	777	0	0	978	0	AM

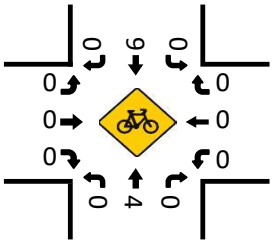
	0	2	0
0			0
0			0
0			0
0			0
0	0	2	0

CONTROL			
1-Way Stop(EB)			
TEV	1755 AM	0 NOON	1638 PM
PHF	0.97		0.95

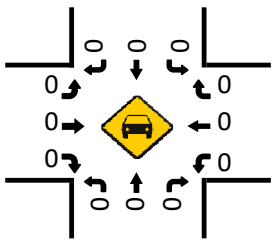
Totals (AM)



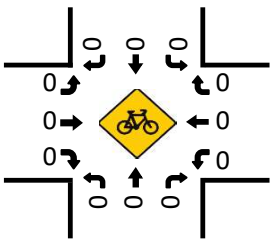
Total Bikes (AM)



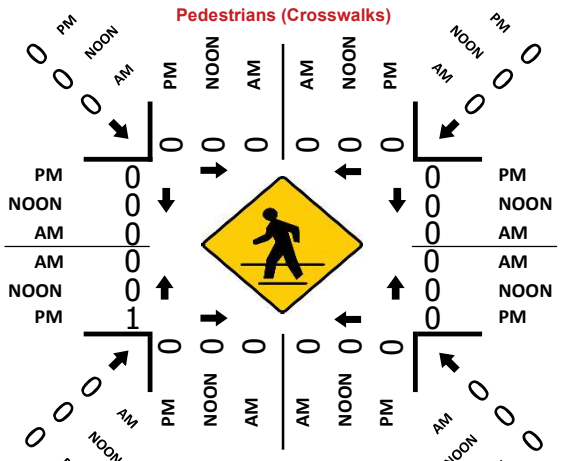
Totals (NOON)



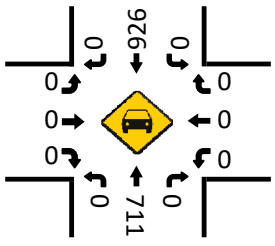
Total Bikes (NOON)



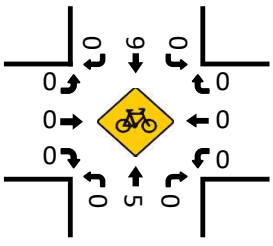
Pedestrians (Crosswalks)



Totals (PM)



Total Bikes (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: San Leandro St & 76th Ave
City: Oakland
Control: 1-Way Stop(EB)

Project ID: 24-080120-002
Date: 5/9/2024

Data - Totals

NS/EW Streets:	San Leandro St				San Leandro St				76th Ave				76th Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	109	0	0	0	101	0	0	0	0	0	0	0	0	0	0	210
7:15 AM	0	119	0	0	0	112	0	0	0	0	0	0	0	0	0	0	231
7:30 AM	0	179	0	0	0	121	0	0	0	0	0	0	0	0	0	0	300
7:45 AM	0	227	0	0	0	193	0	0	0	0	0	0	0	0	0	0	420
8:00 AM	0	250	0	0	0	194	0	0	0	0	0	0	0	0	0	0	444
8:15 AM	0	265	0	0	0	188	0	0	0	0	0	0	0	0	0	0	453
8:30 AM	0	236	0	0	0	202	0	0	0	0	0	0	0	0	0	0	438
8:45 AM	0	192	0	0	0	161	0	0	0	0	0	0	0	0	0	0	353
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1577	0	0	0	1272	0	0	0	0	0	0	0	0	0	0	2849
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%									
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	978	0	0	0	777	0	0	0	0	0	0	0	0	0	0	1755
PEAK HR FACTOR :	0.000	0.923	0.000	0.000	0.000	0.962	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.969
		0.923				0.962											

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	176	0	0	0	223	0	0	0	0	0	0	0	0	0	0	399
4:15 PM	0	187	0	0	0	213	0	0	0	0	0	0	0	0	0	0	400
4:30 PM	0	153	0	0	0	210	0	0	0	0	0	0	0	0	0	0	363
4:45 PM	0	202	0	0	0	227	0	0	0	0	0	0	0	0	0	0	429
5:00 PM	0	183	0	0	0	234	0	0	0	0	0	0	0	0	0	0	417
5:15 PM	0	174	0	0	0	229	0	0	0	0	0	0	0	0	0	0	403
5:30 PM	0	152	0	0	0	236	0	1	0	0	0	0	0	0	0	0	389
5:45 PM	0	129	0	0	0	234	0	0	0	0	0	0	0	0	0	0	363
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1356	0	0	0	1806	0	1	0	0	0	0	0	0	0	0	3163
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	99.94%	0.00%	0.06%									
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	0	711	0	0	0	926	0	1	0	0	0	0	0	0	0	0	1638
PEAK HR FACTOR :	0.000	0.880	0.000	0.000	0.000	0.981	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.955
		0.880				0.978											

National Data & Surveying Services

Intersection Turning Movement Count

Location: San Leandro St & 76th Ave
City: Oakland
Control: 1-Way Stop(EB)

Project ID: 24-080120-002
Date: 5/9/2024

Data - Bikes

NS/EW Streets:	San Leandro St				San Leandro St				76th Ave				76th Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	1	0	0	0	5	0	0	0	0	0	0	0	0	0	0	6
7:15 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
7:30 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
7:45 AM	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3
8:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
8:30 AM	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
8:45 AM	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	4
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	8	0	0	0	16	0	0	0	0	0	0	0	0	0	0	24
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%									
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	4	0	0	0	6	0	0	0	0	0	0	0	0	0	0	10
PEAK HR FACTOR :	0.000	0.500	0.000	0.000	0.000	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.625
		0.500				0.750											

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
4:15 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
4:30 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
4:45 PM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5:00 PM	0	1	0	0	0	5	0	0	0	0	0	0	0	0	0	0	6
5:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	11	0	0	0	8	0	0	0	0	0	0	0	0	0	0	19
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%									
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	0	5	0	0	0	6	0	0	0	0	0	0	0	0	0	0	11
PEAK HR FACTOR :	0.000	0.417	0.000	0.000	0.000	0.300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.458
		0.417				0.300											

National Data & Surveying Services

Intersection Turning Movement Count

Location: San Leandro St & 76th Ave
City: Oakland

Project ID: 24-080120-002
Date: 5/9/2024

Data - Pedestrians (Crosswalks)

NS/EW Streets:	San Leandro St		San Leandro St		76th Ave		76th Ave		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0
APPROACH %'s :									
PEAK HR :	07:45 AM - 08:45 AM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	1	0	1
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	1	0	1
APPROACH %'s :							100.00%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	1	0	1
PEAK HR FACTOR :							0.250		0.250
							0.250		

Prepared by National Data & Surveying Services

San Leandro St & 77th Ave

Peak Hour Turning Movement Count

ID: 24-080120-003
City: Oakland

Day: Thursday
Date: 5/9/2024

PEAK HOURS

AM: 07:45 AM - 08:45 AM
NOON: NONE
PM: 04:45 PM - 05:45 PM

COUNT PERIODS

AM: 7:00 AM - 09:00 AM
NOON: NONE
PM: 4:00 PM - 06:00 PM

SOUTHBOUND (San Leandro St)

AM	0	776	0	0	975	AM
NOON	0	0	0	0	0	NOON
PM	0	932	0	0	708	PM

EASTBOUND (77th Ave)

AM	NOON	PM	
0	0	0	
0	0	0	0
0	0	0	0
0	0	0	1
0	0	0	0
AM	NOON	PM	

WESTBOUND (77th Ave)

PM	NOON	AM	
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	
PM	NOON	AM	

NORTHBOUND (San Leandro St)

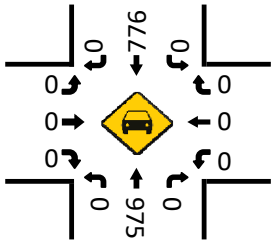
PM	933	1	0	708	0	PM
NOON	0	0	0	0	0	NOON
AM	776	0	0	975	0	AM

	0	2	0
0	1	2	0

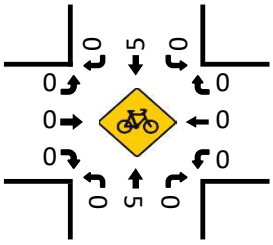
CONTROL: 1-Way Stop(EB)

TEV	1751	0	1641
	AM	NOON	PM
PHF	0.97		0.95

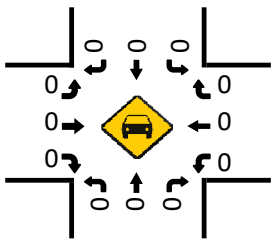
Totals (AM)



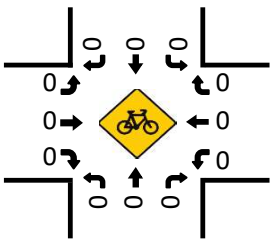
Total Bikes (AM)



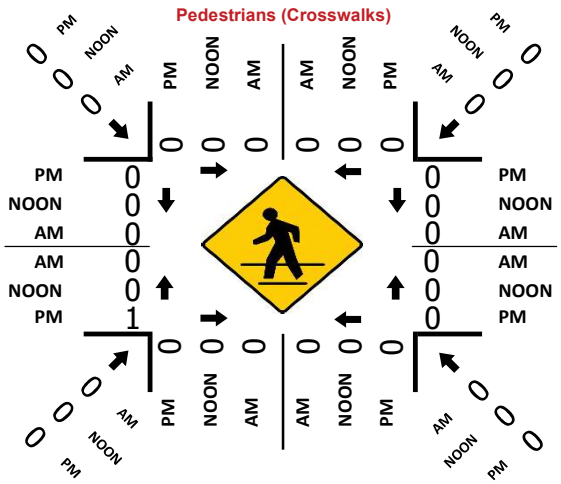
Totals (NOON)



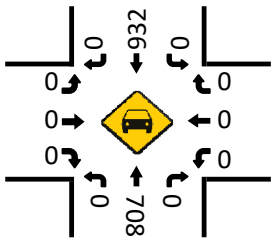
Total Bikes (NOON)



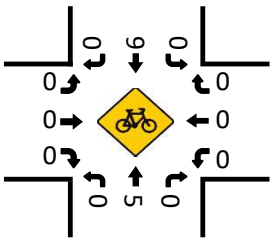
Pedestrians (Crosswalks)



Totals (PM)



Total Bikes (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: San Leandro St & 77th Ave
City: Oakland
Control: 1-Way Stop(EB)

Project ID: 24-080120-003
Date: 5/9/2024

Data - Totals

NS/EW Streets:	San Leandro St				San Leandro St				77th Ave				77th Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	110	0	0	0	102	0	0	0	0	0	0	0	0	0	0	212
7:15 AM	0	118	0	0	0	112	0	0	0	0	0	0	0	0	0	0	230
7:30 AM	0	185	0	0	0	121	0	0	0	0	0	0	0	0	0	0	306
7:45 AM	0	221	0	0	0	193	0	0	0	0	0	0	0	0	0	0	414
8:00 AM	0	253	0	0	0	193	0	0	0	0	0	0	0	0	0	0	446
8:15 AM	0	262	0	0	0	189	0	0	0	0	0	0	0	0	0	0	451
8:30 AM	0	239	0	0	0	201	0	0	0	0	0	0	0	0	0	0	440
8:45 AM	0	189	0	0	0	162	0	0	0	0	0	0	0	0	0	0	351
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1577	0	0	0	1273	0	0	0	0	0	0	0	0	0	0	2850
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%									
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	975	0	0	0	776	0	0	0	0	0	0	0	0	0	0	1751
PEAK HR FACTOR :	0.000	0.930	0.000	0.000	0.000	0.965	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.971
		0.930				0.965											

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	171	0	0	0	215	0	0	0	0	0	0	0	0	0	0	386
4:15 PM	0	188	0	0	0	220	0	1	0	0	0	0	0	0	0	0	409
4:30 PM	0	156	0	0	0	204	0	0	0	0	0	0	0	0	0	0	360
4:45 PM	0	197	0	0	0	233	0	0	0	0	0	0	0	0	0	0	430
5:00 PM	0	194	0	0	0	232	0	0	0	0	0	0	0	0	0	0	426
5:15 PM	0	163	0	0	0	231	0	0	0	0	0	0	0	0	0	0	394
5:30 PM	0	154	0	1	0	236	0	0	0	0	0	0	0	0	0	0	391
5:45 PM	0	127	0	0	0	233	0	0	0	0	0	0	0	0	0	0	360
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1350	0	1	0	1804	0	1	0	0	0	0	0	0	0	0	3156
APPROACH %'s :	0.00%	99.93%	0.00%	0.07%	0.00%	99.94%	0.00%	0.06%									
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	0	708	0	1	0	932	0	0	0	0	0	0	0	0	0	0	1641
PEAK HR FACTOR :	0.000	0.898	0.000	0.250	0.000	0.987	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.954
		0.900				0.987											

National Data & Surveying Services

Intersection Turning Movement Count

Location: San Leandro St & 77th Ave
City: Oakland
Control: 1-Way Stop(EB)

Project ID: 24-080120-003
Date: 5/9/2024

Data - Bikes

NS/EW Streets:	San Leandro St				San Leandro St				77th Ave				77th Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	1	0	0	0	5	0	0	0	0	0	0	0	0	0	0	6
7:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:30 AM	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3
7:45 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
8:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
8:15 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
8:30 AM	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4
8:45 AM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	8	0	0	0	16	0	0	0	0	0	0	0	0	0	0	24
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%									
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	10
PEAK HR FACTOR :	0.000	0.417	0.000	0.000	0.000	0.625	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.625
	0.417				0.625												

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
4:15 PM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
4:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5:00 PM	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	5
5:15 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	11	0	0	0	8	0	0	0	0	0	0	0	0	0	0	19
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%									
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	0	5	0	0	0	6	0	0	0	0	0	0	0	0	0	0	11
PEAK HR FACTOR :	0.000	0.417	0.000	0.000	0.000	0.375	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.550
	0.417				0.375												

National Data & Surveying Services

Intersection Turning Movement Count

Location: San Leandro St & 77th Ave
City: Oakland

Project ID: 24-080120-003
Date: 5/9/2024

Data - Pedestrians (Crosswalks)

NS/EW Streets:	San Leandro St		San Leandro St		77th Ave		77th Ave		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0
APPROACH %'s :									
PEAK HR :	07:45 AM - 08:45 AM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	1	0	1
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	1	0	1
APPROACH %'s :							100.00%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	1	0	1
PEAK HR FACTOR :							0.250		0.250
							0.250		

Prepared by National Data & Surveying Services

San Leandro St & 81st Ave

Peak Hour Turning Movement Count

ID: 24-080120-005
City: Oakland

Day: Thursday
Date: 5/9/2024

PEAK HOURS

AM: 07:45 AM - 08:45 AM
NOON: NONE
PM: 04:00 PM - 05:00 PM

COUNT PERIODS

AM: 7:00 AM - 09:00 AM
NOON: NONE
PM: 4:00 PM - 06:00 PM

SOUTHBOUND (San Leandro St)

AM	0	582	191	0	978	AM
NOON	0	0	0	0	0	NOON
PM	0	815	180	0	669	PM

EASTBOUND (81st Ave)

AM	NOON	PM	
0	0	0	⇦
0	0	0	↶ 0
0	0	0	↱ 0
0	0	0	→ 1
0	0	0	↷ 0
AM	NOON	PM	

WESTBOUND (81st Ave)

PM	NOON	AM	
114	0	188	↶ 0
0	0	0	← 1
69	0	111	↱ 0
0	0	0	↷ 0
262	0	283	⇨
PM	NOON	AM	

NORTHBOUND (San Leandro St)

PM	884	0	0	555	82	PM
NOON	0	0	0	0	0	NOON
AM	693	0	0	790	92	AM

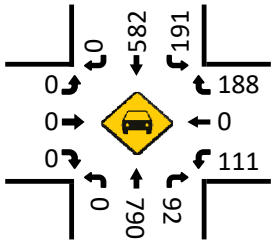
CONTROL

Signalized

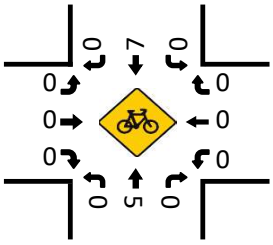
TEV	1954	0	1815
	AM	NOON	PM
PHF	0.96		0.95

Turning movements at the intersection: 0 2 1 0 (SB) | 0 1 2 0 (NB) | 0 1 0 0 (WB) | 0 0 0 0 (EB)

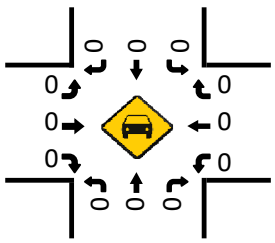
Totals (AM)



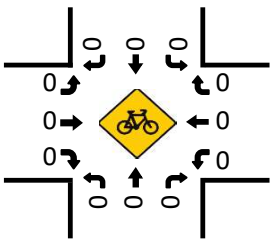
Total Bikes (AM)



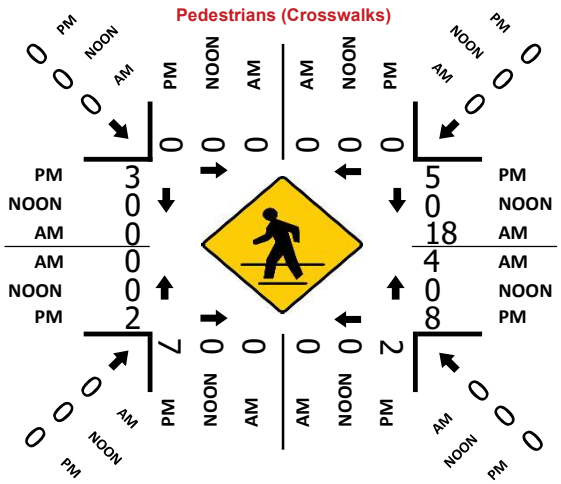
Totals (NOON)



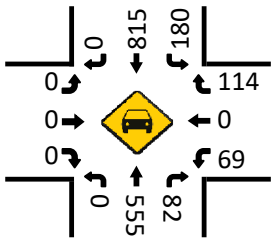
Total Bikes (NOON)



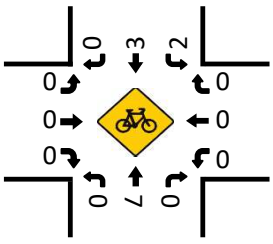
Pedestrians (Crosswalks)



Totals (PM)



Total Bikes (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: San Leandro St & 81st Ave
City: Oakland
Control: Signalized

Project ID: 24-080120-005
Date: 5/9/2024

Data - Totals

NS/EW Streets:	San Leandro St				San Leandro St				81st Ave				81st Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	81	9	0	17	83	0	0	0	0	0	0	7	0	24	0	221
7:15 AM	0	102	6	0	16	94	0	0	0	0	0	0	12	0	21	0	251
7:30 AM	0	134	9	0	21	104	0	0	0	0	0	0	15	0	46	0	329
7:45 AM	0	178	24	0	50	141	0	0	0	0	0	0	25	0	45	0	463
8:00 AM	0	222	23	0	45	144	0	0	0	0	0	0	22	0	52	0	508
8:15 AM	0	194	25	0	42	153	0	0	0	0	0	0	29	0	45	0	488
8:30 AM	0	196	20	0	54	144	0	0	0	0	0	0	35	0	46	0	495
8:45 AM	0	146	15	0	34	131	0	0	0	0	0	0	27	0	40	0	393
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1253	131	0	279	994	0	0	0	0	0	0	172	0	319	0	3148
APPROACH %'s :	0.00%	90.53%	9.47%	0.00%	21.92%	78.08%	0.00%	0.00%					35.03%	0.00%	64.97%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	790	92	0	191	582	0	0	0	0	0	0	111	0	188	0	1954
PEAK HR FACTOR :	0.000	0.890	0.920	0.000	0.884	0.951	0.000	0.000	0.000	0.000	0.000	0.000	0.793	0.000	0.904	0.000	0.962
		0.900				0.976								0.923			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	136	28	0	51	214	0	0	0	0	0	0	17	0	31	0	477
4:15 PM	0	149	18	0	43	209	0	0	0	0	0	0	19	0	35	0	473
4:30 PM	0	148	19	0	45	193	0	0	0	0	0	0	16	0	24	0	445
4:45 PM	0	122	17	0	41	199	0	0	0	0	0	0	17	0	24	0	420
5:00 PM	0	141	19	0	27	222	0	0	0	0	0	0	17	0	31	0	457
5:15 PM	0	143	17	0	33	214	0	0	0	0	0	0	15	0	32	0	454
5:30 PM	0	136	16	0	48	192	0	0	0	0	0	0	13	0	36	0	441
5:45 PM	0	131	12	0	34	200	0	0	0	0	0	0	18	0	34	0	429
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1106	146	0	322	1643	0	0	0	0	0	0	132	0	247	0	3596
APPROACH %'s :	0.00%	88.34%	11.66%	0.00%	16.39%	83.61%	0.00%	0.00%					34.83%	0.00%	65.17%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	555	82	0	180	815	0	0	0	0	0	0	69	0	114	0	1815
PEAK HR FACTOR :	0.000	0.931	0.732	0.000	0.882	0.952	0.000	0.000	0.000	0.000	0.000	0.000	0.908	0.000	0.814	0.000	0.951
		0.954				0.939								0.847			

National Data & Surveying Services

Intersection Turning Movement Count

Location: San Leandro St & 81st Ave
City: Oakland
Control: Signalized

Project ID: 24-080120-005
Date: 5/9/2024

Data - Bikes

NS/EW Streets:	San Leandro St				San Leandro St				81st Ave				81st Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	1	0	0	0	5	0	0	0	0	0	0	0	0	0	0	6
7:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:45 AM	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	0	5
8:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
8:30 AM	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4
8:45 AM	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	4
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	9	0	0	0	15	0	0	0	0	0	0	0	0	0	0	24
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%									
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	5	0	0	0	7	0	0	0	0	0	0	0	0	0	0	12
PEAK HR FACTOR :	0.000	0.417	0.000	0.000	0.000	0.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.600
	0.417				0.583												

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	4
4:30 PM	0	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	4
4:45 PM	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4
5:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	1	0	0	0	2	0	0	0	0	0	0	0	0	3	0	6
5:30 PM	0	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	4
5:45 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	11	0	0	3	7	0	0	0	0	0	0	0	0	4	0	25
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	30.00%	70.00%	0.00%	0.00%					0.00%	0.00%	100.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	7	0	0	2	3	0	0	0	0	0	0	0	0	0	0	12
PEAK HR FACTOR :	0.000	0.583	0.000	0.000	0.500	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.750
	0.583				0.625												

National Data & Surveying Services

Intersection Turning Movement Count

Location: San Leandro St & 81st Ave
City: Oakland

Project ID: 24-080120-005
Date: 5/9/2024

Data - Pedestrians (Crosswalks)

NS/EW Streets:	San Leandro St		San Leandro St		81st Ave		81st Ave		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
7:00 AM	0	0	1	0	3	0	0	0	4
7:15 AM	0	0	0	0	0	4	0	0	4
7:30 AM	0	0	0	0	1	2	0	0	3
7:45 AM	0	0	0	0	0	7	0	0	7
8:00 AM	0	0	0	0	2	6	0	0	8
8:15 AM	0	0	0	0	0	1	0	0	1
8:30 AM	0	0	0	0	2	4	0	0	6
8:45 AM	0	0	0	2	0	1	0	0	3
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	1	2	8	25	0	0	36
APPROACH %'s :			33.33%	66.67%	24.24%	75.76%			
PEAK HR :	07:45 AM - 08:45 AM								TOTAL
PEAK HR VOL :	0	0	0	0	4	18	0	0	22
PEAK HR FACTOR :					0.500	0.643			0.688
					0.688				

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	5	0	0	2	0	3	10
4:15 PM	0	0	2	2	2	2	2	0	10
4:30 PM	0	0	0	0	4	0	0	0	4
4:45 PM	0	0	0	0	2	1	0	0	3
5:00 PM	0	0	0	0	0	2	0	0	2
5:15 PM	0	0	0	0	0	3	1	0	4
5:30 PM	0	0	0	0	1	2	0	0	3
5:45 PM	0	0	0	0	2	0	0	0	2
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	7	2	11	12	3	3	38
APPROACH %'s :			77.78%	22.22%	47.83%	52.17%	50.00%	50.00%	
PEAK HR :	04:00 PM - 05:00 PM								TOTAL
PEAK HR VOL :	0	0	7	2	8	5	2	3	27
PEAK HR FACTOR :			0.350	0.250	0.500	0.625	0.250	0.250	0.675
			0.450		0.813		0.417		

Attachment E – Collision Data

CASE_ID	COLLISION_DATE	COLLISION_TIME	PRIMARY_RD	SECONDARY_RD	DISTANCE	DIRECTION	INTERSECTION	COLLISION_SEVERITY	NUMBER_KILLED	NUMBER_INJURED	PARTY_COUNT	PRIMARY_COLL_FACTOR	PCF_VIOL_CATEGORY	TYPE_OF_COLLISION
8778234	1/2/2019	1153	SAN LEANDRO ST	81ST AV	0		Y	3	0	1	1	A	8	H
8886365	4/29/2019	1000	SAN LEANDRO ST	81ST AV	0		Y	4	0	1	2	A	10	A
8977159	8/26/2019	2319	75TH AV	SAN LEANDRO ST	0		Y	4	0	1	2	A	10	G
9019915	10/16/2019	2209	SAN LEANDRO ST	75TH AV	1000	W	N	3	0	1	2	A	8	C
9055158	12/29/2019	1258	81ST AV	SAN LEANDRO ST	0		Y	2	0	3	4	A	9	A
9346332	7/6/2021	200	SAN LEANDRO BL	81ST AV	0		Y	4	0	1	2	D	0	H
9437931	4/13/2022	1444	81ST AV	SAN LEANDRO ST	1320	N	N	4	0	1	2	A	8	B
9463710	12/21/2021	908	SAN LEANDRO ST	75TH AV	0		Y	4	0	1	2	A	9	F
9468275	12/17/2022	1711	HEGENBERGER RD	SAN LEANDRO ST	0		Y	4	0	2	1	A	8	A
9498316	9/9/2022	800	SAN LEANDRO ST	81ST AV	20	E	N	4	0	2	2	A	3	C
9576770	2/25/2023	756	SAN LEANDRO ST	75TH AV	0		Y	4	0	1	2	A	12	D
9639810	8/7/2023	32	SAN LEANDRO ST	75TH AV	0		Y	4	0	1	2	A	1	D
9670558	2/1/2024	2124	SAN LEANDRO ST	81ST AV	0		Y	4	0	1	2	A	3	C
9711737	3/28/2024	2135	75TH AV	SAN LEANDRO ST	25	N	N	4	0	4	2	A	12	G

Table 1. Evaluation and Crash Data (CSD) (if applicable) Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Number of Approaches with Permissive Left-Turn Phasing	Number of Approaches with Permissive/Protected or Protected/Permissive Left-Turn Phasing	Number of Approaches with Protected Left-Turn Phasing	Number of Approaches on which Right Turn on Red is Prohibited	Presence of Red-Light Cameras	Pedestrian Volumes Crossing all Intersection Legs (crossings/day)	Max. Number of Lanes Crossed by Pedestrians	Number of Bus Stops within 1000 ft of Intersection	Number of Schools within 1000 ft of Intersection	Number of Alcohol Sales Establishments within 1000 ft of Intersection
1	4SG2x21e5	San Leandro St. & 75th Ave.		2018: 13239; 2019: 13484; 2020: 13729; 2021: 13974; 2022: 14219; 2023: 14464; 2024: 14710	2018: 5337; 2019: 5435; 2020: 5534; 2021: 5633; 2022: 5732; 2023: 5831; 2024: 5930	2	1	yes	2	0	1	0	no	100	10	6	0	0

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Travel Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	4SG	San Leandro St. & 75th Ave.		18.066	2.5809	0.9393	1.6415	0.36	2.5809
		Total	Total	18.066	2.5809	0.9393	1.6415	0.36	2.5809

Table 3. Predicted Crash Frequencies by Year (4SG)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2018	2.42	0.88	36.448	1.53	63.552
2019	2.47	0.90	36.428	1.57	63.572
2020	2.52	0.92	36.411	1.61	63.589
2021	2.58	0.94	36.394	1.64	63.606
2022	2.64	0.96	36.379	1.68	63.621
2023	2.69	0.98	36.365	1.71	63.635
2024	2.75	1.00	36.352	1.75	63.648
Total	18.07	6.58	36.396	11.49	63.604
Average	2.58	0.94	36.396	1.64	63.604

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Table 4. Predicted 4SG Crash Type Distribution

Element Type	Crash Type	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)	Total Crashes	Percent Total (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Bicycle	0.25	1.4	0.00	0.0	0.25	1.4
Intersection	Collision with Fixed Object	0.25	1.4	0.72	4.0	0.97	5.4
Intersection	Non-Collision	0.05	0.3	0.03	0.2	0.07	0.4
Intersection	Collision with Other Object	0.02	0.1	0.06	0.3	0.08	0.5
Intersection	Other Single-vehicle Collision	0.01	0.1	0.02	0.1	0.03	0.2
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	1.03	5.7	0.00	0.0	1.03	5.7
Intersection	Total Intersection Single Vehicle Crashes	1.62	8.9	0.83	4.6	2.44	13.5
Intersection	Angle Collision	1.72	9.5	2.60	14.4	4.32	23.9
Intersection	Head-on Collision	0.24	1.3	0.32	1.8	0.56	3.1
Intersection	Other Multi-vehicle Collision	0.27	1.5	2.25	12.5	2.52	14.0
Intersection	Rear-end Collision	2.23	12.4	5.15	28.5	7.38	40.9
Intersection	Sideswipe	0.49	2.7	0.34	1.9	0.83	4.6
Intersection	Total Intersection Multiple Vehicle Crashes	4.96	27.5	10.66	59.0	15.62	86.5
Intersection	Total Intersection Crashes	6.58	36.4	11.49	63.6	18.07	100.0
	Total Crashes	6.58	36.4	11.49	63.6	18.07	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Table 1. Evaluation and Crash Data (CSD) (if applicable) Intersection Sites

Site No.	Type	Highway	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting
1	3ST2x2le5	San Leandro St. & 76th Ave.	2018: 14742; 2019: 15015; 2020: 15288; 2021: 15561; 2022: 15834; 2023: 16107; 2024: 16380	2018: 90; 2019: 91; 2020: 93; 2021: 95; 2022: 96; 2023: 98; 2024: 100	1	0	no

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Travel Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	3ST	San Leandro St. & 76th Ave.		2.487	0.3553	0.1804	0.1749	0.06	0.3553
		Total	Total	2.487	0.3553	0.1804	0.1749	0.06	0.3553

Table 3. Predicted Crash Frequencies by Year (3ST)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2018	0.33	0.17	51.009	0.16	48.991
2019	0.34	0.17	50.964	0.17	49.036
2020	0.35	0.18	50.867	0.17	49.133
2021	0.36	0.18	50.772	0.17	49.228
2022	0.36	0.18	50.728	0.18	49.272
2023	0.37	0.19	50.635	0.18	49.365
2024	0.38	0.19	50.544	0.19	49.456
Total	2.49	1.26	50.781	1.22	49.219
Average	0.35	0.18	50.781	0.17	49.219

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Table 4. Predicted 3ST Crash Type Distribution

Element Type	Crash Type	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)	Total Crashes	Percent Total (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.1	0.00	0.1
Intersection	Collision with Bicycle	0.04	1.5	0.00	0.0	0.04	1.5
Intersection	Collision with Fixed Object	0.06	2.6	0.14	5.5	0.20	8.0
Intersection	Non-Collision	0.01	0.4	0.01	0.2	0.01	0.5
Intersection	Collision with Other Object	0.01	0.3	0.01	0.6	0.02	0.9
Intersection	Other Single-vehicle Collision	0.00	0.1	0.00	0.2	0.01	0.3
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.05	2.0	0.00	0.0	0.05	2.0
Intersection	Total Intersection Single Vehicle Crashes	0.17	6.9	0.16	6.6	0.34	13.5
Intersection	Angle Collision	0.37	15.0	0.28	11.2	0.65	26.2
Intersection	Head-on Collision	0.05	2.0	0.02	1.0	0.07	3.0
Intersection	Other Multi-vehicle Collision	0.07	2.9	0.25	10.0	0.32	12.9
Intersection	Rear-end Collision	0.46	18.5	0.47	18.8	0.93	37.2
Intersection	Sideswipe	0.14	5.5	0.04	1.7	0.18	7.2
Intersection	Total Intersection Multiple Vehicle Crashes	1.09	43.9	1.06	42.7	2.15	86.5
Intersection	Total Intersection Crashes	1.26	50.8	1.22	49.2	2.49	100.0
	Total Crashes	1.26	50.8	1.22	49.2	2.49	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Table 1. Evaluation and Crash Data (CSD) (if applicable) Intersection Sites

Site No.	Type	Highway	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting
1	3ST2x2le5	San Leandro St. & 77th Ave.	2018: 14769; 2019: 15042; 2020: 15316; 2021: 15589; 2022: 15863; 2023: 16136; 2024: 16410	2018: 90; 2019: 91; 2020: 93; 2021: 95; 2022: 96; 2023: 98; 2024: 100	1	0	no

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Travel Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	3ST	San Leandro St. & 77th Ave.		2.491	0.3559	0.1807	0.1752	0.06	0.3559
		Total	Total	2.491	0.3559	0.1807	0.1752	0.06	0.3559

Table 3. Predicted Crash Frequencies by Year (3ST)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2018	0.33	0.17	51.010	0.16	48.990
2019	0.34	0.17	50.964	0.17	49.036
2020	0.35	0.18	50.868	0.17	49.132
2021	0.36	0.18	50.773	0.17	49.227
2022	0.36	0.18	50.729	0.18	49.271
2023	0.37	0.19	50.636	0.18	49.364
2024	0.38	0.19	50.544	0.19	49.456
Total	2.49	1.26	50.781	1.23	49.219
Average	0.36	0.18	50.781	0.17	49.219

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Table 4. Predicted 3ST Crash Type Distribution

Element Type	Crash Type	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)	Total Crashes	Percent Total (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.1	0.00	0.1
Intersection	Collision with Bicycle	0.04	1.5	0.00	0.0	0.04	1.5
Intersection	Collision with Fixed Object	0.06	2.6	0.14	5.5	0.20	8.0
Intersection	Non-Collision	0.01	0.4	0.01	0.2	0.01	0.5
Intersection	Collision with Other Object	0.01	0.3	0.01	0.6	0.02	0.9
Intersection	Other Single-vehicle Collision	0.00	0.1	0.00	0.2	0.01	0.3
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.05	2.0	0.00	0.0	0.05	2.0
Intersection	Total Intersection Single Vehicle Crashes	0.17	6.9	0.16	6.6	0.34	13.5
Intersection	Angle Collision	0.38	15.0	0.28	11.2	0.65	26.2
Intersection	Head-on Collision	0.05	2.0	0.02	1.0	0.07	3.0
Intersection	Other Multi-vehicle Collision	0.07	2.9	0.25	10.0	0.32	12.9
Intersection	Rear-end Collision	0.46	18.5	0.47	18.8	0.93	37.2
Intersection	Sideswipe	0.14	5.5	0.04	1.7	0.18	7.2
Intersection	Total Intersection Multiple Vehicle Crashes	1.09	43.9	1.06	42.7	2.16	86.5
Intersection	Total Intersection Crashes	1.26	50.8	1.23	49.2	2.49	100.0
	Total Crashes	1.26	50.8	1.23	49.2	2.49	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Table 1. Evaluation and Crash Data (CSD) (if applicable) Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Number of Approaches with Permissive Left-Turn Phasing	Number of Approaches with Permissive/Protected or Protected/Permissive Left-Turn Phasing	Number of Approaches with Protected Left-Turn Phasing	Number of Approaches on which Right Turn on Red is Prohibited	Presence of Red-Light Cameras	Pedestrian Volumes Crossing all Intersection Legs (crossings/day)	Max. Number of Lanes Crossed by Pedestrians	Number of Bus Stops within 1000 ft of Intersection	Number of Schools within 1000 ft of Intersection	Number of Alcohol Sales Establishments within 1000 ft of Intersection
1	3SG2x21e5	San Leandro St. & 81st Ave.		2018: 14688; 2019: 14960; 2020: 15232; 2021: 15504; 2022: 15776; 2023: 16048; 2024: 16320	2018: 1647; 2019: 1677; 2020: 1708; 2021: 1738; 2022: 1769; 2023: 1799; 2024: 1830	2	0	yes	2	0	0	0	no	74	8	4	0	0

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Travel Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	3SG	San Leandro St. & 81st Ave.		10.545	1.5065	0.6160	0.8904	0.25	1.5065
		Total	Total	10.545	1.5065	0.6160	0.8904	0.25	1.5065

Table 3. Predicted Crash Frequencies by Year (3SG)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2018	1.41	0.58	41.334	0.82	58.666
2019	1.44	0.59	41.186	0.85	58.814
2020	1.47	0.60	41.040	0.87	58.960
2021	1.51	0.62	40.899	0.89	59.101
2022	1.54	0.63	40.760	0.91	59.240
2023	1.57	0.64	40.625	0.93	59.375
2024	1.61	0.65	40.492	0.96	59.508
Total	10.54	4.31	40.892	6.23	59.108
Average	1.51	0.62	40.892	0.89	59.108

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Table 4. Predicted 3SG Crash Type Distribution

Element Type	Crash Type	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)	Total Crashes	Percent Total (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Bicycle	0.11	1.0	0.00	0.0	0.11	1.0
Intersection	Collision with Fixed Object	0.13	1.2	0.50	4.8	0.63	6.0
Intersection	Non-Collision	0.04	0.4	0.01	0.1	0.05	0.5
Intersection	Collision with Other Object	0.02	0.2	0.04	0.4	0.06	0.5
Intersection	Other Single-vehicle Collision	0.01	0.1	0.01	0.1	0.02	0.2
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.46	4.3	0.00	0.0	0.46	4.3
Intersection	Total Intersection Single Vehicle Crashes	0.76	7.2	0.56	5.3	1.32	12.5
Intersection	Angle Collision	0.99	9.4	1.16	11.0	2.15	20.4
Intersection	Head-on Collision	0.14	1.3	0.11	1.1	0.25	2.4
Intersection	Other Multi-vehicle Collision	0.20	1.9	1.12	10.7	1.33	12.6
Intersection	Rear-end Collision	1.95	18.5	3.10	29.4	5.05	47.9
Intersection	Sideswipe	0.27	2.6	0.18	1.7	0.45	4.3
Intersection	Total Intersection Multiple Vehicle Crashes	3.55	33.7	5.67	53.8	9.22	87.5
Intersection	Total Intersection Crashes	4.31	40.9	6.23	59.1	10.54	100.0
	Total Crashes	4.31	40.9	6.23	59.1	10.54	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Table 1. Evaluation and Crash Data (CSD) (if applicable) Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Presence of Lighting	Number of Approaches on which Right Turn on Red is Prohibited	Presence of Red-Light Cameras	Pedestrian Volumes Crossing all Intersection Legs (crossings/day)	Max. Number of Lanes Crossed by Pedestrians	Number of Bus Stops within 1000 ft of Intersection	Number of Schools within 1000 ft of Intersection	Number of Alcohol Sales Establishments within 1000 ft of Intersection
1	3SG1x1	San Leandro St. & Hegenberger Rd.		2018: 16191; 2019: 16490; 2020: 16790; 2021: 17090; 2022: 17390; 2023: 17690; 2024: 17990	2018-2019: 27; 2020-2021: 28; 2022-2023: 29; 2024: 30	yes	0	no	369	2	6	0	1

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Travel Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	3SG	San Leandro St. & Hegenberger Rd.		2.782	0.3974	0.0726	0.3247	0.06	0.3974
		Total	Total	2.782	0.3974	0.0726	0.3247	0.06	0.3974

Table 3. Predicted Crash Frequencies by Year (3SG_1WA)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2018	0.38	0.07	18.427	0.31	81.573
2019	0.39	0.07	18.361	0.31	81.639
2020	0.39	0.07	18.331	0.32	81.668
2021	0.40	0.07	18.270	0.32	81.730
2022	0.40	0.07	18.245	0.33	81.755
2023	0.41	0.07	18.188	0.33	81.812
2024	0.41	0.07	18.167	0.34	81.833
Total	2.78	0.51	18.282	2.27	81.718
Average	0.40	0.07	18.282	0.33	81.718

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Table 4. Predicted USA 3SG_1WA Sites Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.0009	0.0189	0.1802	0.3085	2.2731
Total	0.0009	0.0189	0.1802	0.3085	2.2731

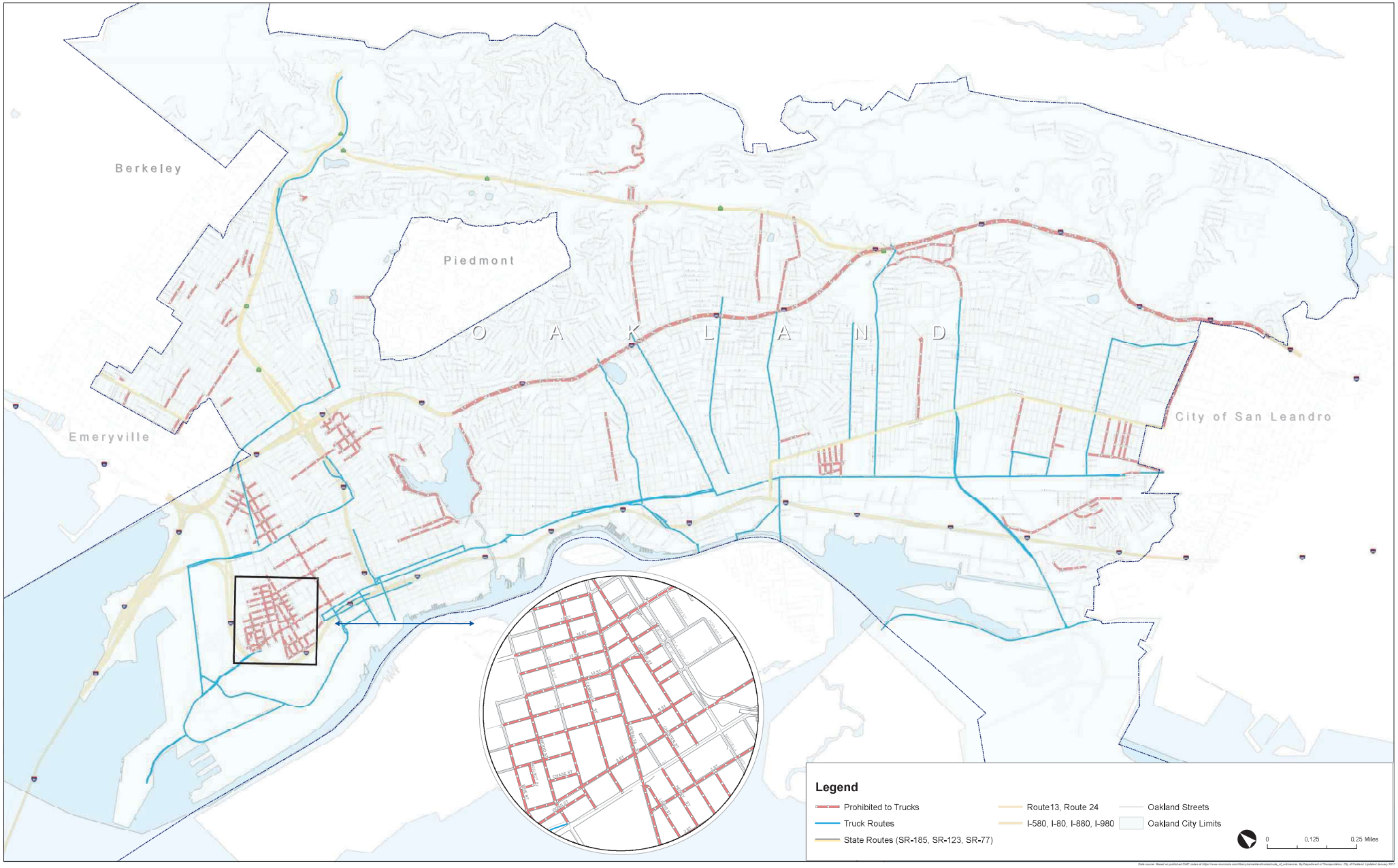
Table 5. Predicted 3SG_1WA Crash Type Distribution

Element Type	Crash Type	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)	Total Crashes	Percent Total (%)
Intersection	Angle Collision	0.23	8.3	1.30	46.7	1.53	55.0
Intersection	Collision with Bicycle	0.04	1.5	0.00	0.0	0.04	1.5
Intersection	Head-on Collision	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Other Multi-vehicle Collision	0.00	0.0	0.16	5.8	0.16	5.8
Intersection	Other Single-vehicle Collision	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.21	7.5	0.00	0.0	0.21	7.5
Intersection	Rear-end Collision	0.03	1.0	0.33	11.7	0.35	12.7
Intersection	Sideswipe	0.00	0.0	0.49	17.5	0.49	17.5
Intersection	Total Intersection Total Vehicle Crashes	0.51	18.3	2.27	81.7	2.78	100.0
Intersection	Total Intersection Crashes	0.51	18.3	2.27	81.7	2.78	100.0
	Total Crashes	0.51	18.3	2.27	81.7	2.78	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Attachment F – Oakland Designated Truck Routes Map

City of Oakland Truck Routes and Prohibited Streets



Attachment G – ACTC VMT North Area Planning Map

Vehicle Miles Traveled per Employee
North Planning Area

North Planning Area Average (Target -15%): 14.5 (12.3)
Alameda County Average (Target -15%): 15.9 (13.5)

2020 Vehicle Miles Traveled per Employee by TAZ

- > 25.00
- 20.01 - 25.00
- 15.01 - 20.00
- 10.01 - 15.00
- 0.01 - 10.00
- 0.00

Data Source: Alameda Countywide Travel Model, Plan Bay Area 2040 version, May 2019

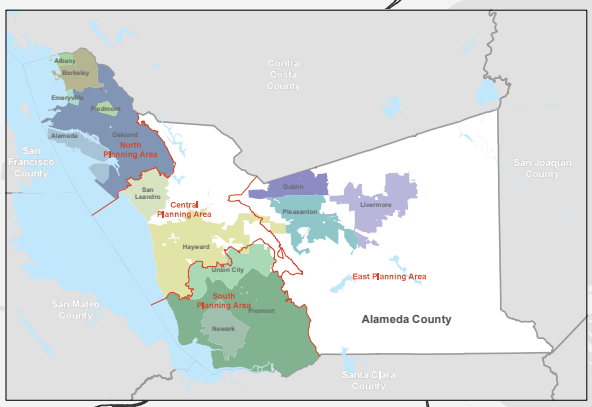
Vehicle miles traveled (VMT) = home-based trips (home-based work, school, shopping/errands, social/recreation) at transportation analysis zone (TAZ) containing residence site

VMT also includes estimates of non-home trips generated by residents at the non-residential end of the home-based trip (e.g. lunch trips from workplace)

VMT per capita = home-based VMT at residence TAZ divided by total population in TAZ

VMT includes all travel within 9-county Bay Area plus San Joaquin County plus estimates of travel distances beyond the 10-county model area

TAZs with zero values (white) did not have population in the 2020 model



0 1 2 3 Miles

ALAMEDA County Transportation Commission