

City of San Mateo



Truck Route Study and Policy

Prepared by:

City of San Mateo Public Works Department

With support of:



HEXAGON TRANSPORTATION CONSULTANTS, INC.

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Table of Contents

1. Introduction	1
2. Existing Truck Policies.....	3
3. Establishing Truck Routes.....	14
4. Impact of Truck Traffic	29

List of Tables

Table 1	Truck Size Categories	4
Table 2	Vehicle Weights.....	4
Table 3	Typical Trucks and Gross Vehicle Weights	5
Table 4	Locations of “No Trucks” Signs.....	10
Table 5	Truck Traffic Producing Land Uses	17
Table 6	Bridge Heights	22
Table 7	Average Equivalent Single Axle Load	30
Table 8	Pavement Condition.....	30

List of Figures

Figure 1	Existing Truck Routes	9
Figure 2	Existing “No Trucks” Signs.....	13
Figure 3	City of San Mateo Designated Arterial Streets.....	16
Figure 4	Properties that Generate Truck Traffic	18
Figure 5	Commercial Properties not Served by Arterials	21
Figure 6	Bridge Heights	24
Figure 7	Bridge Capacity	25
Figure 8	Recommended Truck Routes.....	28

Appendix A	List of Cities Contacted and Publications Reviewed
Appendix B	City of San Mateo Designated Arterial Streets

1.

Introduction

This study was commissioned by the City of San Mateo for the purpose of providing background information and recommendations on establishing truck routes in the city and exploring the concept of recovering maintenance costs brought about truck activity. The City may wish to enact additional policies with regard to truck travel as a result of the conclusions and recommendations of this study. The City believes truck traffic requires special attention because the weight and noise of trucks are substantially different than cars, and trucks are not appropriate as regular users of all roads in San Mateo. It should be understood that although the common terminology is “truck route”, the authorizing law actually uses the phrase “commercial vehicles or vehicles exceeding a maximum gross weight limit.” The California Vehicle Code (CVC) does not have a simple definition for truck, but does have definitions for commercial vehicles and for various types of trucks including motor truck, semi-trailer, tow truck as well as various weight categories. Therefore, the use of “truck route” and “commercial vehicle” may be used interchangeably in this document.

The purpose of this study is to identify a network of truck routes that can serve all commercial districts in San Mateo while minimizing truck traffic diversion into residential neighborhoods. The intent of these truck routes is not to expand the number of routes that trucks can use, but instead to identify what routes are currently being used and acknowledge them through the formal adoption as truck routes.

Scope of Study

As directed by City staff, this truck route study focuses on three principal areas of concern: (1) identification of existing policies, both state and local, that govern truck operations, (2) identification of potential truck routes in San Mateo based on appropriate criteria, and (3) discussion of the damage caused to roadways by truck traffic and the potential of a truck impact fee to offset maintenance costs brought about by trucking operations.

Existing Policies – Examination of existing policies allows staff and decision makers to see what latitude they have in regulating trucks within the context of statewide regulations and within the existing San Mateo regulations like the General Plan and Municipal Code.

Truck Routes – City staff would like a systematic way to identify truck routes, which could be used to adopt a more inclusive truck route policy. Some streets are appropriate for trucks and some streets are not.

While the City has some adopted truck routes, much of the city is unserved by truck routes. This creates a situation of ambiguity as to whether certain streets are appropriate for trucks or not.

Impact Fee – Many studies have shown that trucks cause a disproportionate share of damage to City streets. It would be desirable from a fiscal, and fairness, standpoint to adopt a program that would recover some of these costs from trucking operations.

To conduct this analysis, research was taken from a variety of established publications, as well as informal interviews with public agency staff in several San Mateo County cities (See Appendix A for a list of Cities contacted, and publications reviewed). Please note that the scope of study does not include field research or lab testing as to the impacts of truck traffic on streets. Rather, the research collected for this analysis reflects the existing body of work that has already been conducted by transportation professionals on the subject matter both in terms of empirical testing and transportation policy.

Report Organization

The remainder of this report is divided into three chapters. Chapter 2 describes existing truck route policies and regulations. Chapter 3 presents recommendations for establishing truck routes in San Mateo. Chapter 4 describes the potential damage that trucks cause to the roadway network, and recommends the City establish a way to be reimbursed for this damage.

2. Existing Truck Policies

There are several existing policies that govern the use of trucks on City streets. Some of these policies, relative to vehicle weight and size, are established by Caltrans. Other policies, dealing with the right to regulate trucks and enforce weight limits come from the California Vehicle Code. The City of San Mateo also has some of its own local policies that regulate the specific streets that trucks are allowed to use. This chapter summarizes the State policies and the existing City of San Mateo truck route policies.

State Regulations

The California Department of Transportation (Caltrans) sets transportation regulations relating to maximum truck size and weight. These regulations are to insure that trucks have safe operating characteristics (fitting under bridges, adequate turning radius, stopping capability, etc.) and that trucks do not create undue damage to State highways and City streets. The California Vehicle Code (CVC) does allow local jurisdictions to issue permits to vehicles in excess of these size or weight standards, provided they aren't operated on State highways. The CVC includes sections regulating how truck size and weight limits may be enforced. The CVC also provides local jurisdictions the authority to establish truck routes on their city streets and prohibit trucks on other streets

Truck Size

According to CVC Length Sections 35400-35414, Width Sections 35100-35111, and Height Section 35250, "California Legal" trucks are at a maximum 14 feet high, 8.5 feet wide and 40 feet long if one vehicle, and 65 feet long if a combination vehicle. Truck tractor – semi-trailer – trailer combinations (doubles) may reach 75 feet in length if each trailer is no more than 28 feet six inches long.

Table 1
Truck Size Categories

STAA Truck ¹ with Single Trailer	STAA Truck with Double Trailer
Semi-trailer = 48 feet maximum	Semi-trailer = 28 feet 6 inches maximum
KPRA ² = no limit	Trailer = 28 feet 6 inches maximum
-OR-	KPRA = no limit
Semi-trailer = over 48 feet, but 53 feet maximum	Combination length = no limit
KPRA = 40 feet max	
Combination length = no limit	
"California Legal" Truck with Single Trailer	"California Legal" Truck with Double Trailer
Semi-trailer = no limit	Semi-trailer = 28 feet 6 inches maximum
KPRA = 40 feet maximum (if 2 axles in rear)	Trailer = 28 feet 6 inches maximum
KPRA = 38 feet maximum (if 1 axle in rear)	KPRA = no limit
Combination length = 65 feet maximum	Combination trailer = 75 feet maximum
	-OR-
	Either trailer or semi-trailer = 28 feet, 6 inches maximum; the other trailer has no limit
	KPRA = no limit
	Combination length = 65 feet maximum

¹Larger trucks approved by the federal government in the 1982 Surface Transportation Assistance Act.

²Kingpin-to-rear-axle distance

Source: California Vehicle Code, 2006.

Weight Limits

Caltrans has also established standardized maximum vehicle weights across the State of California in CVC Weight Sections 35550 - 35558. The following table is the basic rule regarding vehicle weights:

Table 2
Vehicle Weights

Gross Weight		
Unit		Maximum
Vehicle Combination		80,000 pounds
Axle Weights		
Unit		Maximum
Single Axle		20,000 pounds
Axle Group: less than 8' - 6" between outer axles		34,000 pounds
Axle Group: 8' - 6" or more between outer axles	See the Axle Group Weight Chart in the Appendix	

Source: California Vehicle Code, 2006.

Vehicles are also classified by a gross vehicle weight rating (GVWR). Section 350 of the CVC defines GVWR as the weight specified by the manufacturer as the loaded weight of a single vehicle. This is the maximum allowable total weight of a road vehicle or trailer that is loaded, including the weight of the

vehicle itself plus fuel, passengers, cargo, and trailer tongue weight. Gross vehicle weight ratings are separated into eight categories as follows:

- Class 1 <6,000 lb GVWR
- Class 2 6,000 – 10,000 lb GVWR
- Class 3 10,000 – 14,000 lb GVWR
- Class 4 14,000 – 16,000 lb GVWR
- Class 5 16,000 – 19,500 lb GVWR
- Class 6 19,500 – 26,000 lb GVWR
- Class 7 26,000 – 33,000 lb GVWR
- Class 8 >33,000 lb GVWR

Example of typical trucks and their gross vehicle weight rating are provided in the following table.

Table 3
Typical Trucks and Gross Vehicle Weights

Descriptive Size	Class	GVWR (lbs.)	# of Axles	Representative Vehicles
Light	1	<6,000	2	Pick-up, Van
	2	6,000 – 10,000	2	Step Van, Small Courier Van
Medium	3	10,000 – 14,000	2	Metro Van, Small Tow Truck
	4	14,000 – 16,000	2	Flat Bed
	5	16,000 – 19,500	2	Large Tow Truck, Package Delivery Van
Light-Heavy	6	19,500 – 26,000	3	Single Unit Truck (30'), Moving Van, Beverage Truck, Armored Car, Mini-Bus
Heavy	7	26,000 – 33,000	3	Tractor Trailer (40'), Moving Truck, Dump Truck, Transit Bus
	8	>33,000	3+	Tractor Trailer (50'), Moving Truck, Freight Truck, Gravel Truck, Articulated Bus

Extralegal Loads

In addition to the standard weight limits established by Caltrans, there are exemptions for overloads beyond standard dimensions and weights. The State of California categorizes these truck loads with a color system. These trucks can only access San Mateo streets via extralegal load permits issued by Caltrans, and reviewed and approved by the City. The following discussion describes the different color categories according to dimension or load limit.

Red Loading

Red designates vehicles that only exceed posted height, length or width limits. Gross weight remains equal to or less than the posted maximum for any structure on a proposed route.

Orange Loading

Orange designates a vehicle that has a maximum load that exceeds legal loading. To qualify as an orange load, the sum of axle weights within any 18 feet shall not exceed:

- a. Single axle 20,000 lb.
- b. Tandem axles (spacing less than 6 feet) 32,000 lb.

Green Loading

Green designates a vehicle that has a maximum load that exceeds an orange load. To qualify as a green load, the sum of axle weights within any 18 feet shall not exceed:

- a. Single axle 24,000 lb.
- b. Tandem axles 40,000 lb.

Purple Loading

Purple designates a vehicle that has a maximum load 20 percent heavier than a green loading. To qualify as a purple load, the sum of axle weights within any 18 feet shall not exceed:

- a. Single axle 28,000 lb.
- b. Tandem axles 46,000 lb.

Enforcement

The California Vehicle Code (CVC) provides a legal framework for establishment and enforcement of truck routes. The Vehicle Code is updated annually with new fine schedules. Law enforcement agencies such as the California Highway Patrol (CHP), San Mateo County Sheriff and the San Mateo Police Department may enforce the CVC within the City of San Mateo. In practice, the CHP tends to confine its activity to the State highways, and the San Mateo Police Department patrols all roads, including El Camino Real, which is a State highway. There are no County roads in the San Mateo city limits, so the County Sheriff typically is not involved in truck regulations within San Mateo. Rights of Law Enforcement

Per CVC Load Inspection Section 2802, any traffic officer may require a driver to stop and submit to an inspection if believed the vehicle exceeds safety guidelines for height, width, length, or weight. The driver may be subject to vehicle measurement or weighing).

Weight

Per the CVC Section 35655a regarding Violation of Decreased Restriction, no person shall drive a vehicle on any state highway when the weight of the vehicle and load is greater than the maximum weight which the highway will sustain.

Local Authorities

CVC Section 35701, Decreases by Local Authorities, any city or county may, by ordinance, prohibits the use of any vehicle exceeding any maximum gross weight limit in residential areas. This excludes certain vehicles, such as refuse collection trucks. The ordinance is not effective until appropriate signs are erected. No ordinance proposed under CVC Section 35701 is effective with respect to any highway which is not under the exclusive jurisdiction of the local authority enacting the ordinance (CVC Section 35702 – Approval of Ordinances) In the case of any state highway, the ordinance must be submitted and approved by the Department of Transportation (CVC 35702). Upon restriction of any vehicle exceeding the maximum gross weight limit, the governing body of the local authority must designate an alternate route for the use of such vehicles (CVC 35702).

The effect of these CVC regulations is to establish the authority of local jurisdictions to regulate and enforce truck weight limits within their cities, including prohibiting trucks on residential streets.

Existing City of San Mateo Truck Route Policies

The San Mateo General Plan and the Municipal Code outline several goals and policies that affect existing and potential truck traffic on a local level. The truck-related items are excerpted below:

General Plan

GOAL 1: Design and regulate use of city streets according to their classification and intended function.

POLICIES:

C 1.1: Minimize Traffic Diversion.

Discourage non-local and commercial traffic from using local and collector residential streets through land use restrictions and traffic control devices, where appropriate. Design existing arterial roadways to minimize the diversion of traffic onto local residential streets.

It is intended that residential neighborhoods be protected from the impacts of traffic diversion onto local and collector streets from the more heavily traveled roadways. This can be accomplished by ensuring, where feasible, adequate capacity of arterials, regulating the direction of traffic flow, and/or through placement of cul-de-sacs, ovals or islands or some other delineation device to avoid convenient substitute routes.

C 1.3: Restrict Truck Traffic.

Restrict truck through traffic on all city streets as designated by City ordinance.

Trucks adversely affect traffic flow and roadway capacity. The noise, vibrations and exhaust fumes generated by trucks also create nuisance problems for residential neighborhoods. To minimize these impacts, truck through traffic is restricted to the freeways and major arterials designated by City ordinance. These routes provide efficient through circulation and truck access to the major commercial areas in the community.

As shown by these excerpts the current General Plan establishes as truck routes only major arterials and freeways. However, the General Plan does not include street classifications called “major arterial” or “collector residential.” Therefore, the existing General Plan is somewhat ambiguous as to which streets have been established as truck routes. The attempt to clarify this ambiguity in the Municipal Code is not successful, as detailed further below.

Municipal Code

The City of San Mateo has currently designated certain streets as truck routes in the municipal code (see Figure 1). Relevant sections of the Municipal Code are excerpted below.

11.28.050 Truck Traffic Routes -- Schedule

- *Route 101 (Bayshore Freeway)*
- *Route 82 (El Camino Real)*
- *Route 92 (J. Arthur Younger Freeway)*
- *East Hillsdale Boulevard, between Bayshore Freeway and El Camino Real;*
- *East Third Avenue, from the easterly city limits to Route 101 between the hours of 8:30 a.m. to 4:30 p.m. eastbound;*
- *East Third Avenue, between Route 101 and South Claremont Street;*
- *East Fourth Avenue, between Bayshore Freeway and South Claremont Street;*

- *South Claremont Street, between East Third Avenue and Ninth Avenue;*
- *The southerly side of Peninsula Avenue, between Bayshore Freeway and El Camino Real;*
- *North Bayshore Boulevard between Peninsula Avenue and East Poplar Avenue.*

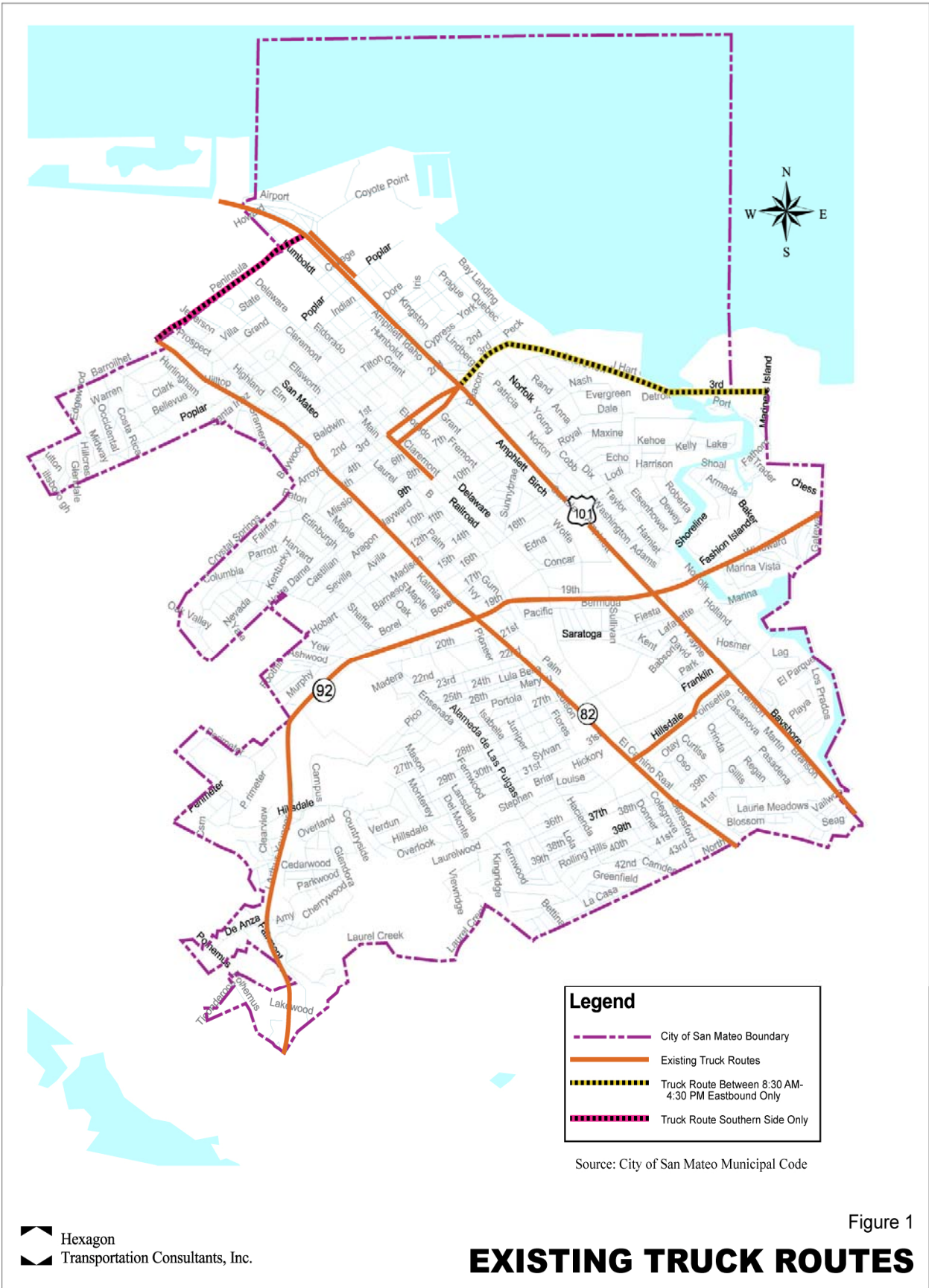
Commercial trucks and all vehicles exceeding a maximum gross weight of three tons must drive on these routes and none other, except when necessary to access another street or streets for:

- *Pickup or delivery of goods, wares and merchandise from or to any building located on a restricted street;*
- *Delivering materials to be used in actual and bona fide repair, alteration, remodeling or construction of any building or structure upon such restricted street for which a building permit has been previously obtained.*

These restrictions do not apply to vehicles owned by utility companies while in use.

There are several problems with the Municipal Code provisions, as described below.

- The Municipal Code does not specify a sufficient number of truck routes. Many commercial areas in the City could not be accessed using just the streets listed in the Code. This issue is analyzed in detail in Chapter 3.
- The Municipal Code does not agree with the General Plan in the particular designation of South Claremont Street and North Bayshore Boulevard. Neither of these streets is an arterial, and yet they are designated as truck routes.
- The Municipal Code specifies that all vehicles exceeding three tons drive on the designated truck routes and no other. This is unrealistic given that some SUVs and pick-up trucks exceed this weight limit.
- There is no exception for garbage trucks, utility company and City maintenance vehicles, which must travel all the residential streets, and there is no exception for buses, which must use certain collector streets to complete their routes.



City of San Mateo Truck Route Sign Policies

The California Vehicle Code (CVC 35701) provides the City of San Mateo the authority to erect signs for residential districts as they see fit. The San Mateo Municipal Code (section 11.28.060) compels the City to erect signs on any street that is not a designated truck route, as excerpted below.

11.28.060 SIGNS. Whenever any resolution of this city designates and describes any street or portion thereof as a street, the use of which is prohibited by any commercial vehicle or by any vehicle exceeding a maximum gross weight limit of three tons, the City Manager shall erect and maintain appropriate signs on those streets affected by such resolution. No such resolution shall prohibit any commercial vehicle from using any street, the use of which is not restricted, for the purpose of delivering or unloading for transportation, goods, wares or merchandise. (Prior code § 73.40)

In recognition of this Municipal Code provision and in response to citizen requests, signs have been erected on various streets around the city. These signs state that commercial trucks and any vehicles exceeding a maximum gross weight limit of three tons (6,000 pounds) are prohibited on that street. According to the City of San Mateo, the following locations have signs erected (see Figure 2).

Table 4
Locations of “No Trucks” Signs

Street	Location	Street	Location
400 Bermuda Dr	SE	419 42nd Ave	SW
1766 Grant St	between 19th and Bermuda	101 South Blvd	NE
1519 Claremont St	SW	900 Palm Ave	SW
1100 Claremont St	NE	B St at 9th Ave	SW
501 Delaware St	SW	20th Ave at Palm Ave	NE
932 5th Ave	SW	Bovet Rd at Borel Ave	
Amphlett Blvd at 7th Ave	NW	Barneson Ave at Maple St	NE
Amphlett Blvd at Sunnysbrae Blvd	SW	Virginia Ave at Edinburgh St	SW
Folkstone Ave at Grant St	SE	625 Barneson Ave	
Humboldt St at 2nd Ave	NE	Mission Dr at El Camino Real	NW
Humboldt St at Poplar Ave	SE	Barneson Ave at Edinburgh St	NW
9th Ave at El Camino Real	SE	16th Ave at Claremont St	NE
9th Ave at Palm Ave	NE	Birch Ave at Claremont St	SW
3rd Ave at Parrott Dr	SE	Hillsdale Blvd at Edison St	NW
Maple St at 5th Ave	SW	42nd Ave at Beresford St	NW
31st Ave at Alameda de Las Pulgas	NW	Hillsdale Blvd at Clearview Way	300' E
Hillsdale Blvd at Alameda de Las Pulgas	Island	4th Ave at B St	SW
Delaware St at Peninsula Ave	SW	Poplar Ave at Delaware St	NE
Hillsdale Blvd at Glendora Dr	SW		

Source: City of San Mateo, 2006.

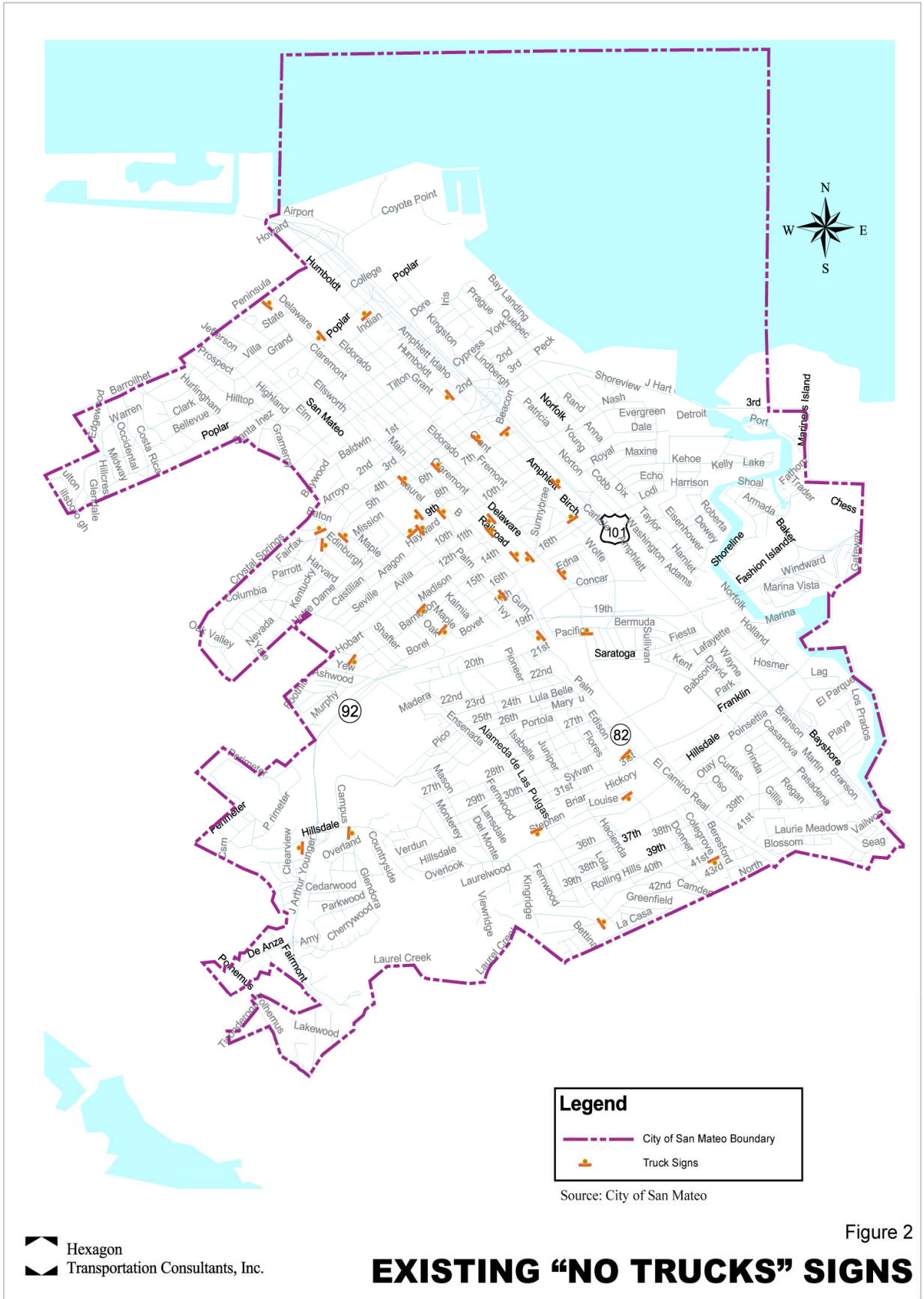
As can be seen by looking at the existing sign locations, there is no logic to the current signage installations. Technically, truck prohibition signs could be erected on almost every street in San Mateo. However, such a proliferation of signs would be visually intrusive and would create a real maintenance burden. Also, trucks are allowed to make deliveries in the neighborhoods, and utility trucks and garbage trucks are allowed to use neighborhood streets. Therefore, the signs create a false expectation for residents that trucks will never use their streets.

Recommendations

Hexagon offers the following recommendations regarding the current situation with truck routes and signage in San Mateo.

- Designate specific City truck routes through ordinance, or a combination of ordinances and resolutions, so that every commercial and industrial area within San Mateo can be served. The specific recommended truck routes and the logic behind their derivation are discussed in Chapter 3.
- Modify the street categories used in the General Plan to be consistent throughout; Arterial, Collector and Local streets.
- Change the truck weight limit within the Municipal Code to a maximum gross weight limit of five (5) tons (GVWR). This will allow all passenger vehicles to come under the limit but still prohibit the kind of trucks that create noise and pavement damage.
- Provide clear language within the Municipal Code to specify that “Truck Route” signs (R14-1) and “No Truck” signs (R5-2) are enforceable.
- Provide a system of “Truck Route” signs (R14-1) along the designated truck routes, to provide adequate notice to truck drivers, so they know which routes to follow. If there is a need to designate the end of a truck route, a supplemental “End” sign (R81B) can be used in combination with the R14-1 sign.
- Coordinate with the Police Department for the enforcement of the established truck routes to keep trucks from using non-designated streets.
- Clarify language within the Municipal Code to specify that garbage/recycle trucks, buses, utility service/maintenance vehicles, street sweepers, tow trucks, emergency vehicles and moving vans are exempt from the prohibition providing they are engaged in an activity that is providing a service on that street or they are using that street in-route to a location to provide service.
- Allow for the use of residential streets by trucks for delivery of materials to a specific location. When not on a designated truck route, trucks are to use the most direct route which will impact as few residential properties as possible between designated truck route and delivery destination.
- Review all existing truck prohibition signs to determine if they qualify under the criteria identified below. Signs not meeting the criteria shall be removed. Signs identified as meeting the criteria shall remain and be formally approved.
- Allow the Public Works Director the discretion to install the minimum amount of truck prohibition signs (R5-2) required to provide adequate notice to truck drivers to instruct them which routes are restricted for trucks use. Signs should be erected only in the following cases:
 1. On streets where trucks are repeatedly using a particular street in violation of the truck route policy, including cutting through a residential neighborhood instead of using an alternative designated truck route where there is a clear parallel alternate route that the truck can use.
 2. On streets where there has been evidence of trucks getting stuck or causing damage due to inadequate roadway widths, reduced intersection return radii, a lower tree canopy or excessive street grade.
 3. On streets designated by the Public Works Director to not be adequate or appropriate for truck traffic.

4. On streets where the amount of truck traffic measured is substantially greater than what would be expected of a typical street of that classification.



3.

Establishing Truck Routes

This chapter includes Hexagon's recommendations for revising the current system of truck routes in San Mateo and provides the analysis behind the recommendations. First is a discussion of street classifications and how these relate to appropriate truck routes. Then there is a discussion and analysis of physical constraints that can influence truck route designations. Next is an enumeration of the types of land uses that typically generate truck trips. Then a discussion of specific principles used to identify specific truck routes within San Mateo. Last are Hexagon's recommended truck routes with a truck route map.

Street Classifications

Different streets serve different purposes in the street network. Some of these streets are appropriate for trucks and some are not. In the San Mateo General Plan, the city has designated a hierarchy of streets that serve different purposes. These include freeways, arterials, collectors and local streets. The following language from the General Plan defines and describes the different street types.

Freeways

Freeways route traffic through the community and are characterized by large traffic volumes and high speed travel. There are two freeways in San Mateo: US 101 (Bayshore Freeway) and SR 92 (J. Arthur Younger Freeway or 19th Avenue Freeway). State Route 280 also provides regional access to the community and is located just west of the City's sphere of influence.

The Land Use Element of the General Plan concentrates large-scale commercial development close to freeway ramps so that regional traffic is not routed through the community. The SR 92 corridor, for example, contains several high intensity commercial centers that are suitable for intensification, given their good freeway access and relative isolation from residential neighborhoods.

Arterials

Arterials link residential and commercial districts, and serve shorter through traffic needs. Due to the heavier traffic on arterials, adjacent land uses are intended to be a mix of commercial and

multi-family residential, such as along El Camino Real (SR 82) and San Mateo Drive. In San Mateo, however, many arterials are located in single-family neighborhoods. Examples include portions of Hillsdale Boulevard, Norfolk Street, and Alameda de las Pulgas.

Because the primary function of arterials is to move relatively high volumes of traffic, interruptions to traffic flow caused by turning movements at driveways and intersections should ideally be minimized. In San Mateo, however, established patterns of development have created driveways along most arterials. While the Land Use Element retains established single-family neighborhoods along many arterials, it is expected that increased traffic on these roadways will occur.

Collectors

Collector streets link neighborhoods to arterials and are not intended for through traffic, but are nonetheless intended to move traffic in an efficient manner. Collectors should not form a continuous system, so that they are not used as convenient substitutes to arterials. In San Mateo, as drivers avoid congested thoroughfares, traffic diversion onto collectors has increasingly impacted neighborhoods close to such major arterials as El Camino Real (SR 82) and Hillsdale Boulevard.

Local Streets

Local streets are designed to serve only adjacent land uses and are intended to protect residents from through traffic impacts. New multi-family residential and commercial development should not have primary access on local streets, except where there is no feasible alternative.

Under the current General Plan and Municipal Code, truck routes are identified on freeways and select arterials. Arterial streets, which are designed to link residential and commercial districts, are good candidates for truck routes. Arterials, such as SR 82 (El Camino Real) and Hillsdale Boulevard, commonly feature wider street widths and turn radii than collectors or local streets. In addition, the pavement on arterials is designed and built to withstand substantially increased traffic and heavier vehicles. Collector streets and particularly residential streets are not built to a standard that can accommodate regular truck traffic.

Figure 3 shows the designated arterials in the General Plan. (These streets are also listed in Appendix B.)

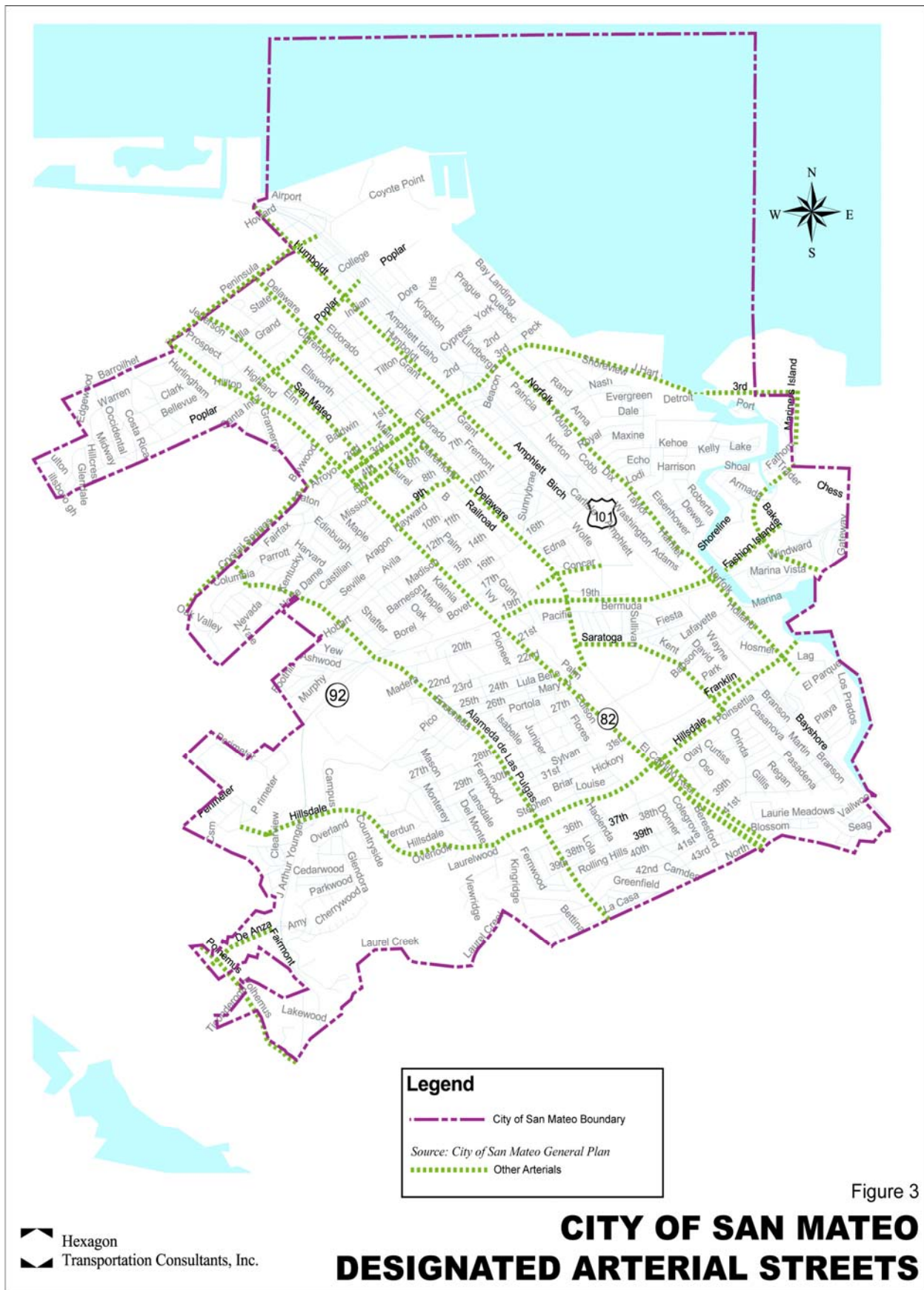


Figure 3

Land Use Considerations

Another consideration in determining truck routes is to identify properties that will routinely generate truck traffic. Industrial and commercial development may routinely generate truck traffic, either for deliveries or as part of their regular business activities. Table 3 lists the industrial and commercial zoning categories that would be expected to generate truck traffic.

Table 5
Truck Traffic Producing Land Uses

Land Use
Neighborhood Commercial
Regional/Community Commercial
Service Commercial
Downtown Retail Core
Downtown Retail Core Support
Manufacturing
Major Institution/Special Facility

Source: City of San Mateo Land Use Plan, 2006.

In the City of San Mateo these industrial and commercial zoning districts typically are located along existing arterials (see Figure 4). The four geographical areas that produce the majority of truck traffic are described below.

Downtown San Mateo

Downtown San Mateo features a highly diverse mix of retail and entertainment land uses. This portion of San Mateo falls under the Central Traffic District. The Central Traffic District features area-specific regulations designed to protect quality of life issues for businesses and visitors located in Downtown San Mateo. Chief among them is the restriction of most trucks between 10:00 a.m. and 6:00 p.m. of any day. The specific municipal code language is as follows.

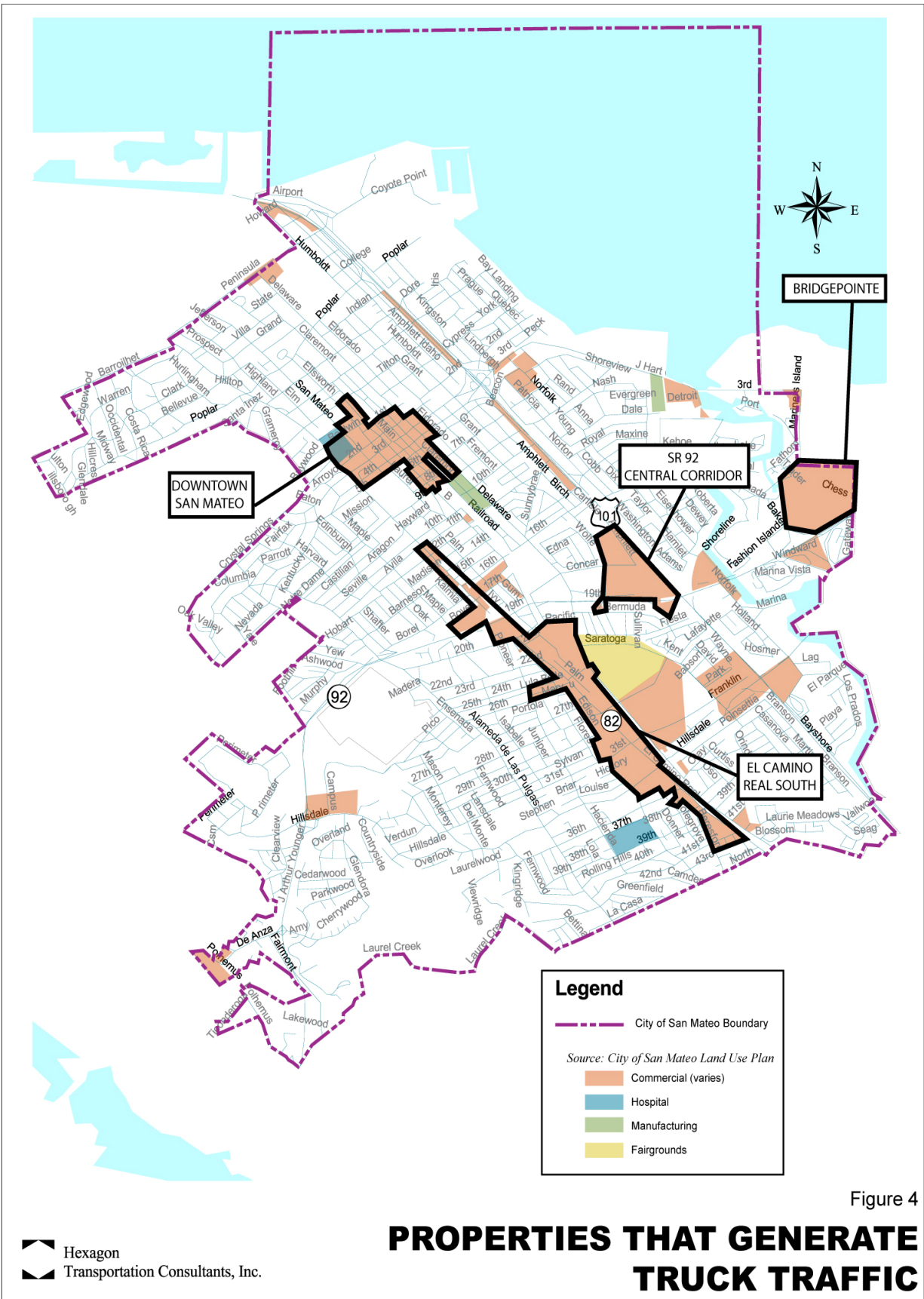
11.28.010 CENTRAL TRAFFIC DISTRICT -- PROHIBITED VEHICLES.

(a) No person shall operate any of the following vehicles in the central traffic district between the hours of ten a.m. and six p.m. of any day:

- (1) Any freight vehicle more than eight and one-half feet in width, with load, or any freight vehicle so loaded that any part of its load extends more than twenty feet to the front or rear of such vehicle;*
- (2) Any vehicle carrying building material that has not been loaded, or is not to be unloaded, at some point within the central traffic district;*
- (3) Any freight vehicle with a trailer;*
- (4) Any vehicle conveying refuse, rubbish or garbage;*
- (5) Any vehicle carrying crude or fuel oil.*

Provided that, the Chief of Police may by written permit authorize the operation of any such vehicle for the purpose of making necessary emergency deliveries to or from points within the central traffic district. (Ord. 1977-8 § 3, 1977: prior code § 73.33).

Notwithstanding these restrictions, trucks can access Downtown San Mateo from US 101 via 3rd/4th Avenue (currently a designated truck route) or from SR 92 via El Camino Real (also, currently a truck



route). In addition, Hexagon recommends revising the municipal code to allow the Director of Public Works, along with the Police Chief, to authorize truck traffic in the Central Traffic District.

Bridgepointe

Bridgepointe is a large, regional shopping center located at the eastern border of San Mateo, adjacent to Foster City. The surrounding area is zoned for mixed-use, ranging from High Density Multi-Family to Regional/Community Commercial. From SR 92 eastbound, trucks can exit to Mariners Island Boulevard to access the shopping center. From SR 92 westbound, trucks can exit to Fashion Island Boulevard to access the shopping center. However, neither Mariners Island Boulevard nor Fashion Island Boulevard currently is designated as a truck route.

El Camino Real South

El Camino Real is lined with commercial uses through San Mateo, especially south of downtown to the southern city limits. Hillsdale Shopping Center, a major regional shopping destination, is located at the intersection of El Camino Real and Hillsdale Boulevard. El Camino Real currently is a designated truck route. Trucks can access El Camino Real via SR 92 or via Hillsdale Boulevard from US 101. Hillsdale Boulevard currently is a designated truck route between US 101 and El Camino Real.

SR 92 Central Corridor

The section of SR 92 between El Camino Real and US 101 is lined with commercial uses. Access to the commercial primarily is provided by the Delaware interchange with SR 92. Delaware Street currently is not a designated truck route.

Commercial Properties Not Served by Arterials

The commercial areas described above all are served by arterials, even if some of the arterials currently are not designated truck routes. The following properties also may generate truck traffic, but they are not directly accessible by arterials or currently designated truck routes (see Figure 5). The focus is to designate arterial roads as truck routes that will provide the most direct path between the regional transportation network and the commercial area. If necessary, collector or local streets may be designated as truck routes if there is not a clear route between the arterial truck route and the commercial destination. It is expected trucks will access the commercial district via the designated truck route then proceed along the most direct path to the destination and back to the truck route. The installation of truck prohibition signage, to restrict truck traffic past these commercial areas and into the adjacent neighborhoods, will be recommended in conjunction with these new routes.

It should be noted that local and collector streets may not be structurally built to sustain heavy truck traffic. Hexagon recommends that any collector or local streets recommended as a truck route be inspected via core sampling to determine whether additional structural section thickness is necessary. Any deficient street sections must undergo reconstruction as necessary to provide a suitable pavement section to accommodate truck traffic prior to its designation as a truck route.

South Claremont Manufacturing Area

The manufacturing properties on Claremont Street stretch from 9th Avenue in the north to Birch Avenue in the south. This section of Claremont Street is classified as a local street and can be accessed via truck routes on 9th Avenue and South Delaware Street at the north and south limits of the commercial area. The specific truck routes that would serve this commercial area are:

- 9th Avenue between El Camino Real and South Claremont Street
- South Delaware Street between Garvey Way and Concar Drive (SR 92 ramps)

To prevent truck traffic from proceeding southbound on South Claremont Street into the residential neighborhood, it is recommended that the existing “No Truck” sign at Birch Avenue remain. To facilitate truck traffic exiting the commercial area, it is recommended that five (5) parking spaces be removed from the south side of Birch Avenue between South Claremont Street and Railroad Avenue.

North Amphlett Commercial Area (North of 3rd Avenue)

The commercial properties on Amphlett Boulevard stretch from Howard Avenue in the north to 2nd Avenue in the south. Amphlett Boulevard and 2nd Avenue are classified as collector streets. The specific truck routes that would serve this commercial area are:

- Peninsula Avenue between the US 101 ramps and Amphlett Boulevard
- East Poplar Avenue between the southbound US 101 ramps and Amphlett Boulevard
- North Humboldt Street between 2nd Avenue and 4th Avenue
- 2nd Avenue, between Humboldt Street and Amphlett Boulevard

The designated truck routes would allow truck traffic to access the North Amphlett Commercial area via the Poplar Avenue ramps with US 101, Humboldt Street or Peninsula Avenue, all arterials, or via 2nd Avenue. To prevent the North Amphlett Boulevard truck traffic from entering the adjacent neighborhood, it is recommended that “No Truck” signage be installed at the North Amphlett Boulevard intersections with Santa Inez Avenue, Monte Diablo Avenue, Tilton Avenue and Cypress Avenue to prevent westbound truck traffic.

South Amphlett Commercial Area (South of 3rd Avenue)

The commercial properties on Amphlett Boulevard stretch from 5th Avenue in the north to Folkstone Avenue in the south. This section of Amphlett Boulevard is classified as a local street. The specific truck routes that would serve this commercial area are:

- South Humboldt Street between 3rd Avenue and 5th Avenue
- South Delaware Street between Garvey Way and Concar Drive (SR 92 ramps)
- 5th Avenue between South Humboldt Street and South Amphlett Boulevard

Trucks would be expected to exit the commercial area to the designated truck routes via 5th Avenue and Sunnybrae Boulevard. To allow truck egress from the commercial area via Sunnybrae Boulevard, the existing truck prohibition sign is recommended to be removed. To prevent South Amphlett Boulevard truck traffic from entering the adjacent neighborhood, it is recommended that “No Truck” signage be installed at the South Amphlett Boulevard intersections with 7th Avenue and 10th Avenue.

San Mateo Medical Center

The San Mateo Medical Center is bordered by Hacienda Street to the west, 37th Avenue to the north, Edison Street to the east and 39th Street to the south. This section of 37th Avenue is classified as a collector street. The specific truck route that would serve this commercial area is:

- 37th Avenue between El Camino Real and Edison Street

Trucks would be expected to use 37th Avenue between El Camino Real and the Medical Center site.

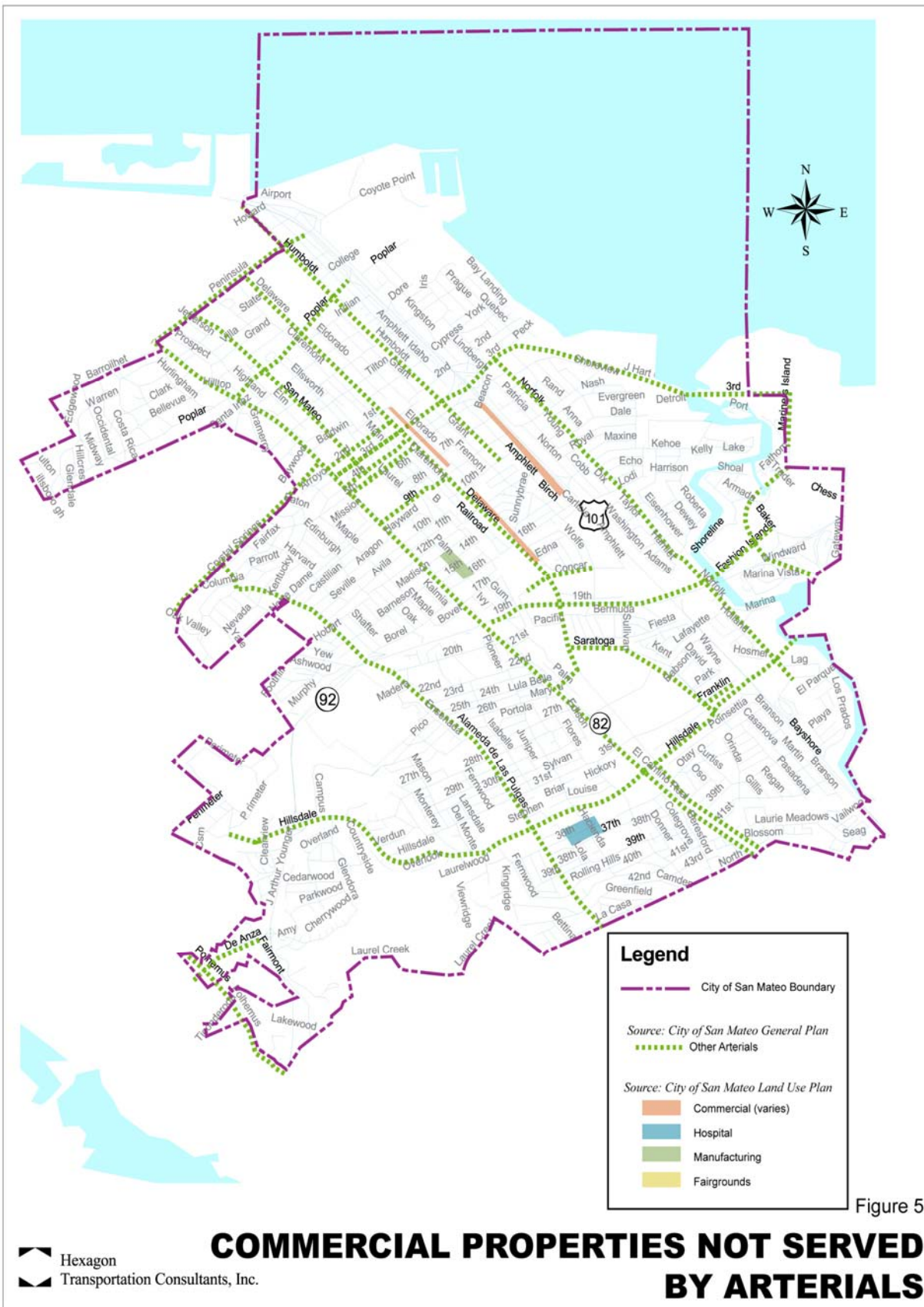


Figure 5

Physical Constraints

The designation of truck routes needs to consider the physical capabilities of the street system in addition to the locations that need to be served. Physical capabilities include lane widths, turn radii, pavement section, street grades, and lateral and vertical clearance. Hexagon has not made an assessment of many of these physical characteristics. Rather, it is assumed that streets classified as arterials have been built to provide for trucks in terms of pavement section, widths, radii, and lateral clearance.

Street Grades

Hexagon has determined that one arterial, Hillsdale Boulevard between Alameda de las Pulgas and SR 92, is too steep to safely accommodate trucks. Therefore, this section of Hillsdale Boulevard should not be a truck route and should be signed to prohibit trucks.

Bridge Heights

Bridge heights also can be a limiting factor for truck routes. Some arterials, and other streets in San Mateo, have bridges with insufficient clearance. Legal truck heights are approaching 14 feet in height. Table 7 shows the bridges in San Mateo that are below 14 feet.

Table 6
Bridge Heights

Rating	Bridge	Height
Insufficient Height	Tilton at RR	8' - 1"
	Monte Diablo at RR	11' - 1"
	Santa Inez at RR	12' - 3"
	Poplar at RR	13' - 0"
Sufficient Height	N Bayshore Blvd at MD Ped Bridge	14' - 11"
	El Camino Real at Hillsdale	15' - 1"
	92 at Alameda	15' - 2"
	El Camino Real at 92	15' - 3"
	Hillsdale at RR/Pacific	15' - 3"
	101 at Monte Diablo Pedestrian Bridge	15' - 4"
	El Camino Real at 92	15' - 5"
	Grant at 92	15' - 5"
	Hillsdale at 92	15' - 5"
	19th Ave at 92	Over 14'
	42nd Ave at RR	Over 14'
	Amphlet at Peninsula	Over 14'
	DeAnza at 92	Over 14'
	Delaware at 92	Over 14'
	N Bayshore Blvd at Peninsula	Over 14'
	Norfolk at 92	Over 14'
	Pacific at 92	Over 14'
	Palm at 92	Over 14'

Source: City of San Mateo, 2006.

The following bridges may prove problematic for truck routes (see Figure 6).

- Tilton Avenue at Caltrain railroad tracks
- Monte Diablo Avenue at Caltrain railroad tracks
- Santa Inez Avenue at Caltrain railroad tracks

- East Poplar Avenue at Caltrain railroad tracks

Tilton, Monte Diablo, and Santa Inez are designated as collectors and, therefore, are not recommended as truck routes anyway. Poplar is a designated arterial, but due to the restricted bridge height at the railroad tracks, Poplar is not currently recommended as a truck route. It should be noted that future Caltrain expansion will result in rebuilding the Poplar bridge. At that time the bridge height will be increased to 14 feet. This bridge height allows for safe truck travel. Once reconstruction is complete, East Poplar Avenue may be designated a truck route.

Bridge Capacities

In addition to clearance restraints, bridges have inherent weight limitations due to structural design. Caltrans maintains structural data on 28 bridges that exist in the City of San Mateo. Twenty of these bridges provide roadway links over natural water features such as creeks, channels and lagoons. The other eight bridges are Caltrain bridges or parking structure access. Thus, these eight bridges do not provide access to trucks and are not rated for carrying capacity by Caltrans. Out of the truck-accessible bridges, eleven allow loads up to 28,000 lb. - single axle (46,000 lb. tandem axles) one allows loads only up to 24,000 lb. - single axle (40,000 lb. tandem axles). Eight bridges are not built to handle extralegal loads (see Figure 7).

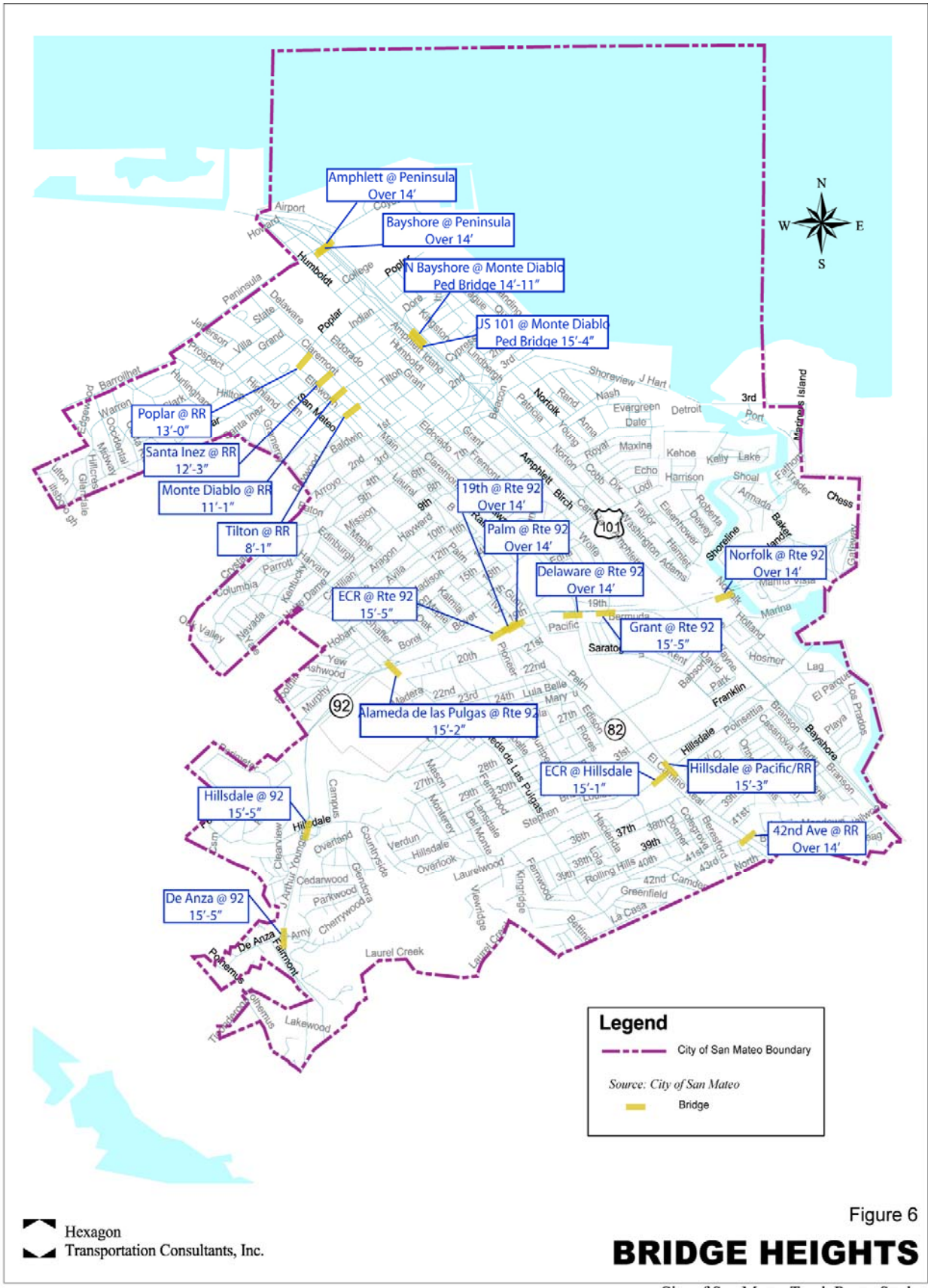
Caltrans administers overload permits to truck operators. These color specific permits ensure that overload trucks access streets and bridges that are built to sustain such traffic. Prior to issuing a permit, Caltrans requests the City to identify an acceptable route. The routing should consider these identified bridge weight limits.

Principles for Truck Route Designation

Cities are obligated to ensure that adequate, convenient truck access is provided from the regional transportation system to commercial and industrial areas. Truck routes are established, signed and enforced to ensure that trucks use streets that are designed for the heavier vehicles. These are normally streets designated as Collector or Arterial streets in the City's General Plan Circulation Element. Designation of truck routes permits enforcement when trucks use residential streets. In this way, truck routes are intended to support the protection of residential areas from unnecessary intrusion by trucks. The protection of residential areas can be reinforced using regulatory "No Trucks" signing. This signage can only be enforced if reasonable truck route alternatives are provided and clearly signed. However, it is not possible to define routes in San Mateo that do not impact some residential areas since our collector and arterial streets are often fronted by residential uses.

This philosophy suggests that the selection and designation of truck routes should be based on the following principals:

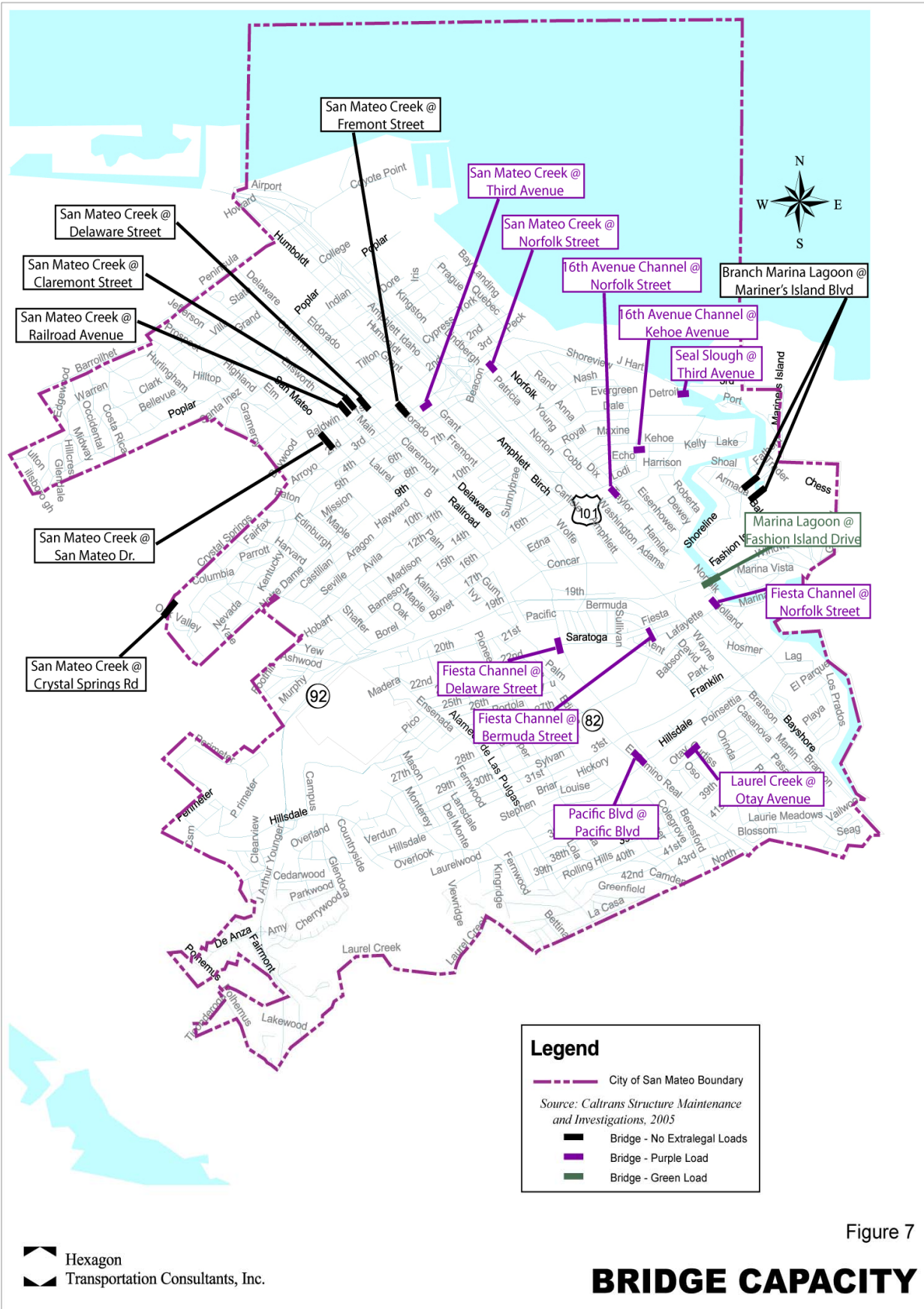
- Adequate and convenient truck routes must be provided to commercial and industrial areas of San Mateo
- Designated routes should reflect current truck access patterns and should not attract additional trucks to streets not currently used by trucks
- Routes should be as direct as possible and should impact as few residential properties as possible
- The number of routes should be minimized
- Routes should be defined from the regional system to the commercial or industrial areas and need not define circulation within the commercial areas



Hexagon
Transportation Consultants, Inc.

Figure 6
BRIDGE HEIGHTS

City of San Mateo Truck Route Study



Summary of Recommended Truck Routes

Considering the factors described above, Hexagon recommends:

- Designating the freeways/state route system (US 101, SR 92, Hwy. 82 – El Camino Real) within the city limits as official truck routes.
- Designate specific routes to provide direct access from the freeway/state route system to commercial areas requiring deliveries as official truck routes. Where possible, use existing arterial streets as designated truck routes. These routes would provide truck access to the majority of truck traffic-producing land uses. Due to potentially unsafe bridge heights for tall trucks, it is recommended that Poplar Avenue (an existing arterial) not be included as a truck route, that it be signed accordingly and an alternate route provided for SB US 101 exiting traffic.
- Because of excessive grade, restrict the use of Hillsdale Boulevard by trucks between Alameda de las Pulgas and Scenic Way.
- The following truck routes should be established to provide access to truck-producing land uses. Those recommended routes that are currently classified as local streets in the General Plan Circulation Element will be reclassified to collector streets. It is recommended that the following street segments be designated as truck routes (see Figure 8):

Recommended Truck Routes

- US 101 (Bayshore Freeway)
- State Route 82 (El Camino Real)
- State Route 92 (J. Arthur Younger Freeway)
- 2nd Avenue between South Humboldt Street and North Amphlett Boulevard
- East 3rd Avenue (J. Hart Clinton) from the easterly city limits to US 101 (between the hours of eight-thirty a.m. to four-thirty p.m. eastbound)
- East 3rd Avenue between US 101 and South Claremont Street
- East 4th Avenue between US 101 and South Claremont Street
- 5th Avenue between South Humboldt Street and South Amphlett Boulevard (between the hours of 6am and 6pm, Monday through Friday)*
- 9th Avenue between El Camino Real and South Claremont Street
- 19th Avenue between South Delaware Street and Fashion Island Boulevard
- East 25th Avenue between El Camino Real and South Delaware Street
- 28th Avenue between Edison Street and El Camino Real
- 37th Avenue between El Camino Real and Edison Street
- Bridgepointe Parkway between Baker Way and Bridgepointe Circle
- South Claremont Street between 3rd Avenue and 9th Avenue*
- Concar Drive between Westbound SR 92 Ramps and Grant Street
- South Delaware Street between Garvey Way and 25th Avenue
- Edison Street between 28th Avenue and the Hillsdale Shopping Center*
- Fashion Island Boulevard between 19th Avenue and Baker Way
- Franklin Parkway between US 101 and Saratoga Drive
- East Hillsdale Boulevard between El Camino Real and US 101
- East Hillsdale Boulevard between US 101 and easterly city limit
- South Humboldt Street between 2nd Avenue and 4th Avenue
- South Humboldt Street between 4th Avenue and 5th Avenue (between the hours of 6am and 6pm, Monday through Friday)
- Kehoe Avenue between Northbound US 101 Ramps and South Norfolk Street (between the hours of 6am and 6pm, Monday through Friday)
- Mariner's Island Boulevard between Eastbound SR 92 Ramps and Fashion Island Boulevard

- South Norfolk Street between East 3rd Avenue and Fashion Island Boulevard (between the hours of 6am and 6pm, Monday through Friday)
 - The southerly side of Peninsula Avenue, between Bayshore Freeway and El Camino Real
 - Saratoga Drive between Franklin Parkway and East Hillsdale Boulevard
- * Streets to be reclassified from local to collector.

Future Truck Routes

- 31st Avenue between El Camino Real and Saratoga Drive (based on Bay Meadows Phase II project and 31st Avenue grade separation at JPB ROW)
 - North Humboldt Street between Peninsula Avenue and 2nd Avenue (based on turning restrictions generated by future safety improvements constructed at Poplar/Amphlett)
- Prior to any residential street being reclassified as a collector and designated as a truck route, its pavement section shall be analyzed through core sampling, or other means, to determine if sufficient pavement thickness is provided to support truck traffic. Designated streets with inadequate thickness will not be labeled as “Truck Routes” until such time as the pavement thickness is sufficient. These streets will be identified as high priority for repaving within the City’s CIP program.
 - “Truck Route” signs shall be posted along all designated truck routes. Trucks shall be allowed to detour from any designated truck route to a specific commercial or non-commercial destination so long as the alternate route selected is the most direct. The route the detouring truck takes shall impact as few residential properties as possible. Signs designating “End Truck Route” may be used as necessary to restrict truck access to adjacent streets and neighborhoods.
 - North Amphlett Boulevard is currently a commercial area that is accessed via a portion of South Humboldt Street south of 2nd Avenue. Should truck access along North Amphlett Boulevard be blocked by future safety improvements at its intersection with East Poplar Avenue, truck access to North Amphlett Boulevard may need to be provided via North Humboldt Street between Peninsula Avenue and 2nd Avenue.
 - East Poplar Avenue between El Camino Real and US 101 is not currently identified as a truck route due to the limited vertical clearance of the railroad grade separation (13’-0”). Should the JPB raise tracks at this grade separation to a height that would support truck traffic, East Poplar Avenue between El Camino Real and US 101 could be designated as a truck route.
 - That an education program be developed, and necessary training provided, for Police Department enforcement personnel so there is a clear understanding of how to enforce the truck route signage.



4.

Impact of Truck Traffic

This chapter discusses the potential structural impact of truck traffic on City of San Mateo streets. Hexagon has reviewed research into the impact of heavy vehicles, such as construction trucks, waste collection trucks and buses on pavement damage and maintenance. Research shows that trucks create a disproportionate share of street maintenance costs.

Need for an Impact Fee

Because of their great weight, especially weight per axle, trucks are more damaging to street pavement than passenger vehicles. City budgets typically are inadequate to maintain pavement in good condition, and many San Mateo streets are deteriorating. Pavement deterioration can be attributed to multiple factors. Environmental factors such as swift temperature changes, rain, tectonic movement and vehicle weight all contribute to pavement deterioration. Existing roads have a finite life span that is shortened by sustained use.

Heavy Vehicle Impacts

The American Association of State Highway Officials (AASHTO) is a transportation standard setting organization that publishes test protocols, specifications and guidelines used at the local, state and federal level. AASHTO has introduced many concepts that are standards in pavement engineering. AASHTO studies have shown that truck traffic is responsible for substantially more damage than passenger vehicles. Research conducted by AASHTO show that for each doubling of weight on an axle causes sixteen fold increase in pavement damage. For example, AASHTO research points out that one 80,000 pound five axle truck is equivalent to 9,600 automobiles in causing pavement damage. This research into pavement damage developed into a measure referred to as equivalent single axle loads or ESAL. ESAL's convey the per pass pavement damage of a standard single axle, 18,000-pound, dual tired vehicle. The following table presents the average ESAL for various vehicles.

Table 7
Average Equivalent Single Axle Load

Vehicle Type	Average Equivalent Single Axle Load
Automobile	0.0008
Construction Vehicles (residential)	0.923
Other Trucks	0.25
Solid Waste refuse collection vehicle	2.02
Yard Waste refuse collection vehicle	1.495
Recycling refuse collection vehicle	0.58

Source: Matrix Consulting Group *Los Altos Hills - Analysis of the Roadway Impact Fee*, 2004.

Based on the number of trucks typically found in the traffic stream on city streets compared to the total volume on those streets, studies have shown that truck traffic causes about 60% of the damage to city roadways¹.

Existing Pavement Condition

The Pavement Condition Index (PCI) is a statistical index developed by the U.S. Army Corps of Engineers to rate the condition of any given roadway. It is a standard measurement used in civil engineering. Utilizing a visual survey of pavement conditions, roadways are assigned a numerical value between 0 and 100 (with 100 representing excellent pavement). The following is a table that describes various PCI scores.

Table 8
Pavement Condition

PCI Score	Condition	Description
100 – 70	Very Good	Pavements that have no distress and require mostly preventative maintenance.
70 – 50	Good	Pavement in this range offers acceptable ride quality, though road surfaces are becoming worn to the point where rehabilitation is needed to prevent rapid deterioration.
50 – 30	Poor	Pavements that have extensive amounts of distress and require major rehabilitation or reconstruction.
30 – 0	Very Poor	

Source: Street Saver Version 8.0

In October 2006, the Metropolitan Transportation Commission released a report on pavement quality in the San Francisco Bay Area for 2005. The region's best pavement conditions were found in the Contra Costa County city of Oakley, where local streets averaged a PCI score of 87. The region's worst pavement conditions were found in unincorporated Sonoma County, where local streets averaged a PCI score of 44. Overall, the nine county San Francisco Bay Area achieved a PCI score of 64. In comparison, the City of San Mateo achieved a PCI score of 66. According to the PCI score, pavement conditions in the City of San Mateo, "...offer acceptable ride quality, though road surfaces are becoming worn to the point where rehabilitation is needed to prevent rapid deterioration." Thus, it can be concluded that additional funding is necessary to prevent San Mateo streets from deteriorating to an unacceptable condition.

¹ *Rough Ride Ahead, Metro Areas with the Roughest Rides and Strategies to Make our Roads Smoother*, TRIP, 1726 M Street, NW, Suite 401, Washington DC 20036, May 2005.

Due to the impact of truck traffic on city streets, Hexagon recommends that the City of San Mateo develop a fee program that charges both garbage trucks and construction trucks for their damage to City streets.

Appendix A

List of Cities Contacted and Publications Reviewed

- California Vehicle Code (CVC), 2007
- General Plan, City of Belmont, August 1982
- General Plan, Town of Colma, 1999
- General Plan, City of Redwood City, January 1990
- General Plan, City of San Mateo, 1997
- Bay Area Pavement Quality Remains in Danger Zone, Metropolitan Transportation Commission (MTC), October 2006.
- Rough Ride Ahead, Metro Areas with the Roughest Rides and Strategies to Make our Roads Smoother, TRIP, May 2005.
- Approving Construction Activity Road Impact Fee, City of Monterey, September 2005
- Analysis of the Roadway Impact Fee – Los Altos Hills, Matrix Consulting Group, August 2004
- City of San Mateo Signage provided by city staff, 2007
- City of San Mateo Bridge Heights provided by city staff, 2007
- Interviews with City staff's from:
 - Town of Atherton
 - City of Belmont
 - City of Brisbane
 - City of Burlingame
 - Town of Colma
 - City of Daly City
 - City of East Palo Alto
 - City of Foster City
 - City of Half Moon Bay
 - Town of Hillsborough
 - City of Menlo Park
 - City of Millbrae
 - City of Pacifica
 - Town of Portola Valley
 - City of Redwood City
 - City of San Bruno
 - City of San Carlos
 - City of San Mateo
 - Town of Woodside

Appendix B

City of San Mateo Designated Arterial Streets

Street	Span
2nd Avenue	El Camino Real to Delaware Street
3rd Avenue*	El Camino Real to US-101 (currently a truck route the easterly city limits to US-101 between the hours of 8:30 a.m. to 4:30 p.m. eastbound and US-101 to South Claremont Street)
4th Avenue*	El Camino Real to US-101 (currently a truck route US-101 to South Claremont Street)
5th Avenue	El Camino Real to Delaware Street
9th Avenue	El Camino Real to Delaware Street
19th Avenue	Pacific Boulevard to US-101
Alameda de Las Pulgas	Crystal Springs Road to the southern city limits
Concar Drive	SR 92 to Grant Street
Crystal Springs Road	western city limits to El Camino Real
De Anza Boulevard	Polhemus Road to SR 92
Delaware Street	Peninsula Avenue to 25th Avenue
El Camino Real*	Peninsula Avenue to the southern city limits
Fashion Island Boulevard	US-101 to Bridgepoint Circle
Franklin Parkway	Saratoga Drive to US-101
Hillsdale Boulevard*	College of San Mateo to the eastern city limits (currently a truck route US-101 to El Camino Real)
Humboldt Street	US-101 to 10th Avenue
Mariners Island Boulevard	J. Hart Clinton Drive to SR 92
Norfolk Street	J. Hart Clinton Drive to Hillsdale Boulevard
Pacific Boulevard	Hillsdale Boulevard to the southern city limits
Peninsula Avenue*	El Camino Real to US-101
Polhemus Road	Bunker Hill Drive to SR 92
Poplar Avenue	El Camino Real to US-101
San Mateo Drive	Peninsula Avenue in the north to 5th Avenue in the south
Saratoga Drive	Delaware Street to Hillsdale Boulevard

In addition to the arterials listed above the following roadways already are identified as truck routes.

US-101*	
SR 92*	
Bayshore Boulevard*	Peninsula to Poplar Avenue
South Claremont Street*	3rd Avenue to 9th Avenue

* Current truck route according to San Mateo Municipal Code.

Source: City of San Mateo General Plan.