FEHR PEERS

Memorandum

Date: March 14, 2024

To: William Jacobs, North Palisade Partners

From: Sam Tabibnia, Fehr & Peers

Subject: 43990 Fremont Boulevard Industrial Project – Transportation Impact Analysis

OK23-0525

This memorandum summarizes the Transportation Impact Analysis conducted by Fehr & Peers for the proposed industrial project at 43990 Fremont Boulevard in Fremont.

Based on our evaluation:

- The proposed project would have a less-than-significant impact on vehicle miles traveled (VMT).
- The proposed project would not substantially affect intersection level of service (LOS) or queuing at one study intersection (Fremont Boulevard/Ice House Terrace) in the vicinity of the project.
- Based on the project site plan, the project would provide access and circulation for all travel modes.

The remainder of this memorandum provides more detail on our assumptions and findings on these topics.

Project Description

The project is located at the southeast corner of the Fremont Boulevard/Ice House Terrace intersection in the City of Fremont. The 4.2-acre project would consist of an approximately 70,000 square foot warehouse building. The project site is currently occupied by a single building that provides approximately 5,000 square feet of office space, which would be demolished by the project.

Access to the site would be provided through one right-in/right-out only driveway on Fremont Boulevard and two full-access driveways on Ice House Terrace, which is shared with the adjacent parcel. In addition, the project can also be accessed through a driveway on Hugo Terrace via the adjacent parcel to the east. The project would provide 107 automobile parking spaces, 8 long-term bicycle parking spaces, and 10 short-term bicycle parking spaces.

CEQA Vehicle Miles Traveled (VMT) Assessment

One performance measure used to quantify automobile travel impacts is vehicle miles traveled (VMT). The VMT assessment presented in this memorandum is based on the thresholds and guidelines provided in the *City of Fremont Transportation Impact Analysis Handbook* (Final, June 2020).

The discussion below starts by presenting the City of Fremont's applicable threshold of significance for the project, describes the applicability of VMT screening, and estimates the VMT for the proposed project.

City of Fremont Thresholds of Significance

The State Office of Planning and Research's (OPR) *Technical Advisory on Evaluating Transportation Impacts in CEQA* recommends evaluating VMT impacts using an efficiency-based version of the metric, such as VMT per resident for residential developments or VMT per employee for office or other employment-based developments. Consistent with OPR's guidelines, the City of Fremont uses the metric of home-based work VMT per employee for evaluating the impacts of employment-based uses, such as the proposed project. The home-based work VMT per employee measures all the commute trips between employees' homes and the project site and divides that total distance by the number of employees at the site. Consistent with OPR guidelines, the City of Fremont does not include heavy-duty truck VMT as part of VMT analysis.

Based on the City of Fremont guidelines, the following significance thresholds are applicable to the project:

- Industrial Uses: The regional average VMT per employee

VMT Screening Assessment

Screening thresholds can be used to quickly identify projects expected to cause a less than significant impact without conducting a detailed study. The City of Fremont guidelines include several screening methods. The method applicable to the project is the Location Based Screening for Employment criterion.

According to this method, projects that are in low-VMT areas and that have characteristics similar to other uses already located in those areas can be presumed to generate VMT at similar rates. The low-VMT areas in Fremont are defined based on the results of the Alameda County Transportation Commission (CTC) Travel Demand Model and are summarized in maps compiled by the City.

Based on the City of Fremont's employment-based screening map, the project is not in a low-VMT area and therefore does not meet this screening criterion.

Project VMT Estimates

Since the project would not meet the City's screening criterion for VMT, the VMT for the project is estimated using the VMT per employee data provided in the City of Fremont's public GIS database, which is based on the Alameda CTC Model, and is consistent with the Metropolitan Transportation Commission (MTC) Plan Bay Area 2040 (i.e., Sustainable Communities Strategy) transportation network and land uses for 2020. The Alameda CTC Model, which covers the entire nine county Bay Area, is a regional travel demand model that uses socio-economic data and roadway and transit network assumptions to forecast traffic volumes, transit ridership, and VMT using a four-step modeling process that includes trip generation, trip distribution, mode split, and trip assignment. This process accounts for changes in travel patterns due to future growth and expected changes in the transportation network.

Table 1 summarizes the estimated home-based work VMT per employee under 2020 conditions for the project based on the City of Fremont's public GIS database and compares the results to the City of Fremont's thresholds applicable to the project. **Figure 1** shows the home-based work VMT per employee for the transportation analysis zone (TAZ) containing the project site and the surrounding area from the City's public GIS database.

It is estimated that the project employees would have an average home-based work VMT of 15.7 miles per employee per day in 2020, which is below the regional average VMT per employee. Thus, the project would have a less-than-significant impact on VMT. Since the project is consistent with the City of Fremont General Plan, the cumulative VMT impact of the project would also be less-than-significant.

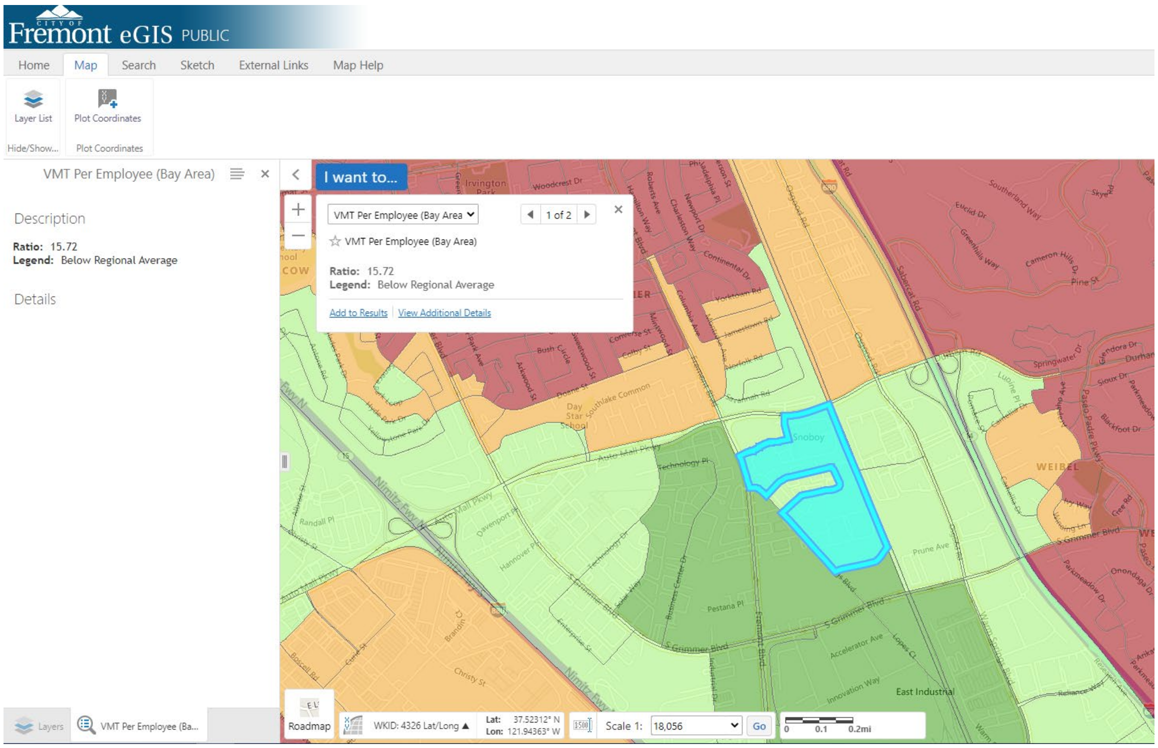
Table 1: Daily Vehicle Miles Traveled Summary

Land Use	Home-Based Work VMT per Employee[1] (2020)
Project	15.7
Bay Area Regional Average (threshold for industrial uses)	18.1

Notes:
1. Based on the City of Fremont public GIS database (https://egis.fremont.gov/gisapps/fremont/index.html?viewer=Public.gvh)

Source: Fehr & Peers, 2024.

Figure 1: Home-Based VMT per Employee of TAZ Containing Project Site



Local Transportation Analysis

This section evaluates the transportation related effects of the project outside of the CEQA process, consistent with the City of Fremont Transportation Impact Analysis (TIA) Handbook. It presents the project trip generation, evaluates the effects of the project on traffic operations, and summarizes access and circulation for various travel modes.

Trip Generation

Trip generation is the process of estimating the number of vehicles that would likely access the project site. Fehr & Peers estimated the trip generation for the project using the data and methodology published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual*, *Eleventh Edition*.

The specific tenants for the project have not been selected. The ITE *Trip Generation Manual* provides several different land use types that may be applicable to the proposed warehouse use. **Table 2** summarizes the trip generation rates for these potential uses. To present the most conservative results, this analysis assumes that the proposed warehouse use would be a High-Cube Fulfillment Center Warehouse – Sort (ITE Land Use Code 155), which is the highest trip generating use in the *Trip Generation Manual* that could occupy the proposed warehouse use.

Table 2: Automobile Trip Generation Rate Comparison

Land Use Type	ITE Land Use Code	Daily	Weekday AM Peak Hour[1]	Weekday PM Peak Hour[2]
General Light Industrial	110	4.87	0.74	0.65
Manufacturing	140	4.75	0.68	0.74
Warehousing	150	1.71	0.17	0.18
High-Cube Transload and Short-Term Storage Warehouse	154	1.40	0.08	0.10
High-Cube Fulfillment Center Warehouse – Non-Sort	155	1.81	0.15	0.16
High-Cube Fulfillment Center Warehouse – Sort	155	6.44	0.87	1.20
High-Cube Parcel Hub Warehouse	156	4.63	0.70	0.64

Notes:
1. Peak hour of adjacent street traffic one hour between 7:00 and 9:00 AM.
2. Peak hour of adjacent street traffic one hour between 4:00 and 6:00 PM.

Source: ITE *Trip Generation Manual,* 2021.

According to the *Trip Generation Manual,* the High-Cube Parcel Hub Warehouse land use would have the highest truck trip generation of the uses under consideration. To present a conservative estimate, the trip generation estimate for this project applies the truck trip generation rates for the High-Cube Parcel Hub Warehouse to the proposed warehouse use. Since trucks are larger and operate slower than passenger vehicles, a passenger car equivalent (PCE) ration of 2.0 is used to convert the truck trips to passenger vehicle trips (each truck is counted as two passenger vehicles).

Table 3 summarizes the trip generation for the project based on the ITE methodology. Accounting for the PCE trips, it is estimated that the project would generate about 440 daily, and 59 AM and 81 PM peak hour net new trips.

Since the proposed project would not generate more than 100 peak hour trips, a more detailed traffic operations analysis is not required, based on City of Fremont guidelines. However, the City requested an operational assessment of the signalized intersection adjacent to the project site (Fremont Boulevard/Ice House Terrace) and a site access analysis. The next section of this memorandum summarizes the traffic operations analysis completed for the project.

Table 3: Project Automobile Trip Generation

Land Use	Size[1]	Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
Warehouse[2]	70.0 KSF	450	49	12	61	33	51	84
Truck Traffic Adjustment[3]		40	5	1	6	2	2	4
Total PCE Trips		*490*	*54*	*13*	*67*	*35*	*53*	*88*
Existing Use Credit								
Office[4]	5.0 KSF	(50)	(7)	(1)	(8)	(1)	(6)	(7)
Net New Trips		**440**	**47**	**12**	**59**	**34**	**47**	**81**

Notes:

1. KSF = 1,000 square feet.
2. ITE *Trip Generation Manual, 11th Edition* land use category 155 (High-Cube Fulfillment Center Warehouse – Sort) in General Urban/Suburban Setting:
   Daily: T = 6.44 * X
   AM Peak Hour: T = 0.87 * X (81% in, 19% out)
   PM Peak Hour: T = 1.20 * X (39% in, 61% out)
3. Based on ITE *Trip Generation Manual, 11th Edition*, land use category 156 (High-Cube Parcel Hub Warehouse) in General Urban/Suburban Setting. Truck trip generation rates applied to the proposed warehouse use:
   Daily: T = 0.58 * X
   AM Peak Hour: T = 0.09 * X (directional distribution not provided, assumed 81% in, 19% out)
   PM Peak Hour: T = 0.06 * X (directional distribution not provided, assumed 39% in, 61% out)
   This trip generation estimate assumes a PCE of 2.0 for the truck trips.
4. ITE *Trip Generation Manual, 11th Edition* land use category 710 (General Office Building) in General Urban/Suburban Setting:
   Daily: T = 10.84 * X
   AM Peak Hour: T = 1.52 * X (88% in, 12% out)
   PM Peak Hour: T = 1.44 * X (17% in, 83% out)

Source: Fehr & Peers, 2024.

Traffic Operations Analysis

This section presents the traffic operations analysis completed for the project. Consistent with OPR guidelines which prohibit the use of delay-based metrics in environmental documents, the traffic operations analysis is conducted outside of the CEQA process. This section starts by describing trip distribution and trip assignment for the project, describing the methodologies used to evaluate traffic operations, followed by selection of study intersections, summary of traffic operations under Existing and Existing Plus Project conditions, and summary of project effects on delay, level of service (LOS), and queuing at the study intersections.

Trip Distribution, Trip Assignment, and Study Intersection Selection

The trip distribution and assignment process estimates how the vehicle trips generated by the project site would distribute across the roadway network. **Figure 2** shows the trip distribution for the project site. The directions of approach and departure of project trips were based on the existing travel patterns, the street network serving the project site, and the location of the project driveways. Trips generated by the project were assigned to the roadway network according to the trip distribution described above. This analysis assumes all trucks would use Hugo Terrace and the driveway shared with the adjacent parcel to access the site.

Figure 2 shows the resulting trip assignment at the study intersection for the AM and PM peak hours. This analysis evaluates the AM and PM peak hour intersection operations at the following study intersection under Existing and Existing Plus Project conditions:

1. Fremont Boulevard/Ice House Terrace

Consistent with the recommendations in the City's TIA Handbook, this intersection was selected for analysis because the proposed project would add more than 50 peak hour trips to the intersection, and it is most likely to be affected by the proposed project.

Analysis Methodology and Tools

Intersection operations are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on factors such as speed, travel time, delay, and freedom to maneuver. Letter grades range from LOS A, with no congestion and little delay, to LOS F, which represents over-capacity conditions with excessive vehicle delay. The Transportation Research Board's *Highway Capacity Manual (HCM)* provides a methodology to calculate LOS at intersections based on average vehicle delay. **Appendix A** describes the various LOS and the corresponding ranges of delays for signalized intersections based on HCM, 6th Edition methodology. According to the City's TIA Handbook, the City of Fremont's goal for this signalized intersection is LOS D because it is located outside of the Town Centers.

The intersection operations analysis also includes an assessment of queue length at the study intersection, which is defined as the length of vehicles waiting to be cleared at the end of a red light. A vehicle is considered to be queued when it approaches within one car length of a stopped vehicle and is itself about to stop. This analysis reports the average and 95th percentile queue lengths[1] for the movements most affected by the project at the study intersection.

The Synchro 11 software is used to estimate delay and the corresponding LOS for the study intersection, as well as the queue lengths. Synchro uses the equations provided in the HCM, 6th Edition to calculate control delay and queues. These equations use intersection characteristics,

---

[1] 95th percentile queue is defined as the queue length that has only a 5% probability of being exceeded during the analyzed peak hour.

such as vehicle and pedestrian volumes, lane geometry, and signal phasing, as inputs in estimating control delay.

Existing Traffic Volumes

Traffic patterns and travel behavior have shifted substantially in Fremont and throughout the Bay Area because of the ongoing COVID-19 pandemic. As a result, traditional traffic counts collected under current conditions may not reflect typical traffic volumes prior to the start of the pandemic or long-term conditions. Thus, this analysis uses a data-driven method for estimating the pre-pandemic traffic volumes and assumes that the traffic volumes in the long-term would be similar to the pre-pandemic volumes. This analysis uses data from StreetLight Data (a big data vendor of anonymous location records from GPS devices) to estimate the turning movement counts at the study intersection.

In early 2020, Fehr & Peers conducted an independent review of StreetLight Data volume estimates by comparing the volume estimates to historical count data. The review concluded that StreetLight volume estimates are a reasonable and acceptable source of data as a replacement for traditional traffic counts. Streetlight Data volume estimates are generally more robust than traditional traffic counts since they assess travel patterns across several months, rather than a single day.[2] StreetLight Data volume estimates were downloaded for midweek days (Tuesdays, Wednesdays, and Thursdays) for the year 2019 (months of February, March, April, May, September, and October) and aggregated to averages for the study intersection. **Appendix B** presents the detailed StreetLight volume data for the study intersection. **Figure 3** shows the existing AM and PM peak hour intersection vehicle volumes (7:30 AM to 8:30 AM and 5:00 to 6:00 PM), lane configurations, and signal control at the study intersection.

Existing Plus Project Traffic Volumes

Figure 4 shows the Existing Plus Project traffic volumes, which consists of traffic volumes under Existing No Project conditions (Figure 3) plus traffic generated by the Project (Figure 2). This analysis assumes no other roadway modifications at the study intersection under the Existing Plus Project conditions.

Intersection LOS Analysis

Based on the volumes, intersection controls, and roadway configurations presented on Figures 3 and 4, and the existing signal timing at the study intersection provided by the City of Fremont, Fehr & Peers calculated the AM and PM peak hour LOS using the methodologies presented above under Existing and Existing Plus Project conditions. **Table 4** summarizes the weekday AM

---

[2] For more information about the StreetLight data collection approach, including the Fehr & Peers white paper "A Transformative Data Collection Solution", visit: https://www.fehrandpeers.com/transformative-data-collection-solution/

and PM peak hour intersection LOS analysis results. **Appendix C** provides the detailed calculation worksheets.

According to the City's TIA Handbook, the LOS goal for signalized intersections outside of Town Centers is to maintain LOS D or better. As shown in Table 4, the study intersection would operate at LOS D or better during the AM and PM peak hours under both the Existing and Existing Plus Project conditions. Thus, the study intersection would be consistent with the City's LOS goal for signalized intersections outside of Town Centers.

Table 4: Intersection LOS Summary

#	Intersection	Traffic Control	Peak Hour	Existing No Project		Existing Plus Project	
				Delay (Seconds)[1]	LOS[1]	Delay (Seconds)[1]	LOS[1]
1	Fremont Boulevard/ Ice House Terrace	Signal	AM	16	B	17	B
			PM	42	D	47	D

Notes:
1. Average intersection delay and LOS based on the HCM, 6th Edition method.

Source: Fehr & Peers, 2024.

Queuing Summary

Table 5 summarizes the average and 95th percentile queue lengths for the key movements at the study intersection under Existing and Existing Plus Project conditions. **Appendix D** provides the detailed queuing calculations.

The proposed project would increase the average and 95th percentile queue lengths at some of the movements at the study intersection. The average and 95th percentile queue lengths would continue to be accommodated within the available storage lengths during both the AM and PM peak hours under Existing Plus Project conditions at all the reported locations except for the northbound thru queue. The northbound average and 95th percentile thru queues extend to the upstream intersection (Fremont Boulevard/Old Warm Springs Boulevard) in the PM peak hour in both the No Project and Plus Project scenarios. The proposed project is estimated to increase the average queue by about 10 feet and the 95th percentile queue by about 40 feet. However, the intersection would continue to operate at LOS D during the PM peak hour after the completion of the project. This analysis is somewhat conservative in that it evaluates the Fremont Boulevard/Ice House Terrace intersection as an isolated intersection and does not account for the effects of the upstream signal at the Fremont Boulevard/Old Warm Springs Boulevard intersection on platooning or the effects of signal coordination along the Fremont Boulevard corridor on traffic flow. Since the estimated increase in queue length is within the day-to-day fluctuation in traffic volumes and queue lengths expected at the intersection, no modifications at the intersection are recommended at this time.

Table 5: Queue Length Summary[1]

#	Intersection	Movement[2]	Storage Length (feet)	Peak Hour	Existing No Project		Existing Plus Project	
					Average (feet)	95th % (feet)	Average (feet)	95th % (feet)
1	Fremont Boulevard/ Ice House Terrace	NB Thru[3]	440	AM	170	230	180	240
				PM	**1,270**	**1,400**	**1,280**	**1,440**
		SB Left	165	AM	20	40	30	50
				PM	30	60	40	80
		SB Thru	535	AM	270	360	270	360
				PM	40	60	40	60
		WB Left	165	AM	20	50	20	50
				PM	20	60	30	70
		WB Right	165	AM	0	30	0	30
				PM	0	60	0	60

Notes:
Bold indicates queue length exceeding the available storage length
1. Average queue and 95th percentile queue lengths in feet as calculated by Synchro.
2. NB = northbound, SB = southbound, WB = westbound.
3. Northbound thru queue expected to spillback to upstream intersection in the PM peak hour in both the No Project and Plus Project scenarios.

Source: Fehr & Peers, 2022.

Project Access and Circulation

This section summarizes an evaluation of access and circulation for all travel modes based on the project site plan dated March 4, 2024, which is provided in **Appendix E**.

Automobile Access and Circulation

Motor vehicles would access the project site through the following four access points:

- A new driveway on Fremont Boulevard south of Ice House Terrace. This driveway would be 35 feet wide and accommodate passenger vehicles and trucks. Due to the raised median on Fremont Boulevard, this driveway would be restricted to right-in/ right-out turning movements only. Trucks (up to WB-67 trucks) would use this driveway to exit the site.

- A new driveway on Ice House Terrace east of Fremont Boulevard would be 20 feet wide and would accommodate passenger vehicles.
- The project would have access to the existing driveway on Ice House Terrace which is shared with the parcel to the east of the project site. This driveway is 28 feet wide and can accommodate passenger vehicles and trucks. Trucks (including WB-67 trucks) are expected to use this driveway to access the Project site.
- The project would have access to the existing driveway on Hugo Terrace that connects through the parcel to the east of the project site.

All four access locations would provide adequate sight distance between vehicles entering or exiting the site and pedestrians on the adjacent sidewalks and vehicles in both directions of the adjacent streets.

The project driveways would provide access to the 107 surface parking spaces provided throughout the site. All parking spaces would be perpendicular spaces along two-way drive aisles. The drive aisle in the northeast of the site that would accommodate only passenger vehicles would be 24 feet wide, which is adequate space for two-way circulation and would accommodate passenger vehicles maneuvering into and out of the parking spaces, which are only on one side of the drive aisle. The drive aisles that would also accommodate trucks would be generally 35 feet wide which would provide adequate space for truck circulation as well as passenger vehicle access. Based on a review of the site plan, the project parking lot would provide adequate sight distance throughout the site. The site plan shows one short dead-end drive aisles, one on the northeast side of the site. The dead-end drive aisle would provide a turnaround at the end of the aisle, which would allow vehicles to maneuver through the drive aisle if all the parking spaces are occupied.

Automobile Parking

The Fremont Municipal Code states the required parking spaces by type of use in Section 18.183.030. For warehousing uses, the parking requirement is 5 per KSF office area and similar activities plus 1.25 per KSF other indoor areas, minimum of 1.6 per KSF average overall." The project site plan assumes approximately 5 KSF of the overall project building would be office use. Applying the office and warehouse requirement, the project requires 107 parking spaces; however, applying the minimum overall (1.6 per KSF) to the site, the project requires 112 spaces.

As shown on the site plan in **Appendix E**, the project proposes to meet the parking requirement by providing six motorcycle parking space and 16 bicycle parking spaces. The Fremont Municipal Code Section 18.183.130 allows a reduction of one automobile parking space per two motorcycle parking spaces and one automobile parking space per eight bicycle parking spaces for up to five percent of the total automobile parking requirement

Truck Access and Circulation

Trucks (including WB-67s) would enter the site through the shared driveway on Ice House Terrace and leave through the driveway on Fremont Boulevard. Since trucks cannot turn between the project driveway and southbound Fremont Boulevard, trucks would use other parallel arterials, such as South Grimmer Boulevard or Osgood Road, to travel between northbound Fremont Boulevard and their origin or destination. The proposed warehouse use would provide 7 loading docks on the south side of the building. **Appendix F** provides truck turning movement diagrams for both a WB-67 and WB-40 truck.

Bicycle Access and Circulation

Existing bicycle facilities in the vicinity of the project include:

- Class II bicycle lanes on Fremont Boulevard
- Class II bicycle lanes on Auto Mall Parkway

The *City of Fremont's 2018 Bicycle Master Plan* proposes the following near the project site:

- Upgrade the existing Class II bicycle lanes on Fremont Boulevard to Class IV separated bikeway
- Upgrade the existing Class II bicycle lanes on Auto Mall Parkway to Class IV separated bikeway

Considering the uses at the site, the project is expected to generate minimal bicycle trips. Most cyclists are expected to use Fremont Boulevard and Auto Mall Parkway to access the site.

Bicycle Parking

Per City of Fremont Municipal Code Section 18.183.135, the project is required to provide the following bicycle parking:

- Long-term bicycle parking = 1, plus 5% of required automobile parking for tenants or occupants
- Short-term bicycle parking = 4, plus 5% of required automobile parking for visitors

Long-term bicycle parking is defined as bicycle lockers, indoor bicycle storage, or similar facilities protected from the weather and with a higher degree of security designed to serve primarily employees who leave their bikes for longer periods of time, and short-term bicycle parking is defined as bicycle racks designed to serve visitors who leave their bikes for relatively short periods of time.

The project would provide on-site bicycle parking as required by the Code. Considering the automobile parking requirements for the project, the proposed warehouse use is required to provide 7 long-term and 10 short-term bicycle parking spaces. The project proposes to exceed this requirement by one additional long-term bicycle parking space. The short-term bicycle parking would be located adjacent to the north side of the building approximately 70 feet west of the main entrance and along the internal sidewalk network. The long-term bicycle parking would be located inside of the building just south of the potential office area on the northwest corner of the building and accessible through an adjacent entry.

Pedestrian Access and Circulation

Near the project, most streets provide a sidewalk on at least one side of the street. The existing sidewalks adjacent to the project site are described below:

- Fremont Boulevard currently provides a four-foot sidewalk west of the project site on the east side of the street and no sidewalks on the west side of the street.
- Ice House Terrace provides a four-foot sidewalk and a three-foot landscape buffer on the south side of the street along the north portion of the project frontage and no sidewalks on the north side of the street.

The signalized Fremont Boulevard/Ice House Terrace intersection provides a marked crosswalk, pedestrian signal heads with pushbuttons, and one curb ramp per corner on the east approach of the intersection. Pedestrian crossings of Fremont Boulevard across both the north and south approaches of the intersection are prohibited because there is no sidewalk on the west side of Fremont Boulevard.

The project would maintain the existing sidewalks on Fremont Boulevard and Ice House Terrace and would provide internal sidewalks within the project site which can be used to walk between the project building and the parking facilities within the site and the sidewalks on the adjacent streets. The existing sidewalks on Fremont Boulevard and Ice House Terrace meet the minimum four-foot width recommended in the City of Fremont Pedestrian Master Plan for arterial and collector streets. The internal sidewalks are proposed to be six feet in width.

Please contact Sam (stabibnia@fehrandpeers.com, 510-835-1943) with questions or comments.

Attachments:

Figure 2 – Project Trip Assignment and Distribution

Figure 3 – Existing Peak Hour Traffic Volumes, Lane Configurations, and Traffic Controls

Figure 4 – Existing Plus Project Peak Hour Traffic Volumes, Lane Configurations, and Traffic Controls

Appendix A - LOS Evaluation Criteria

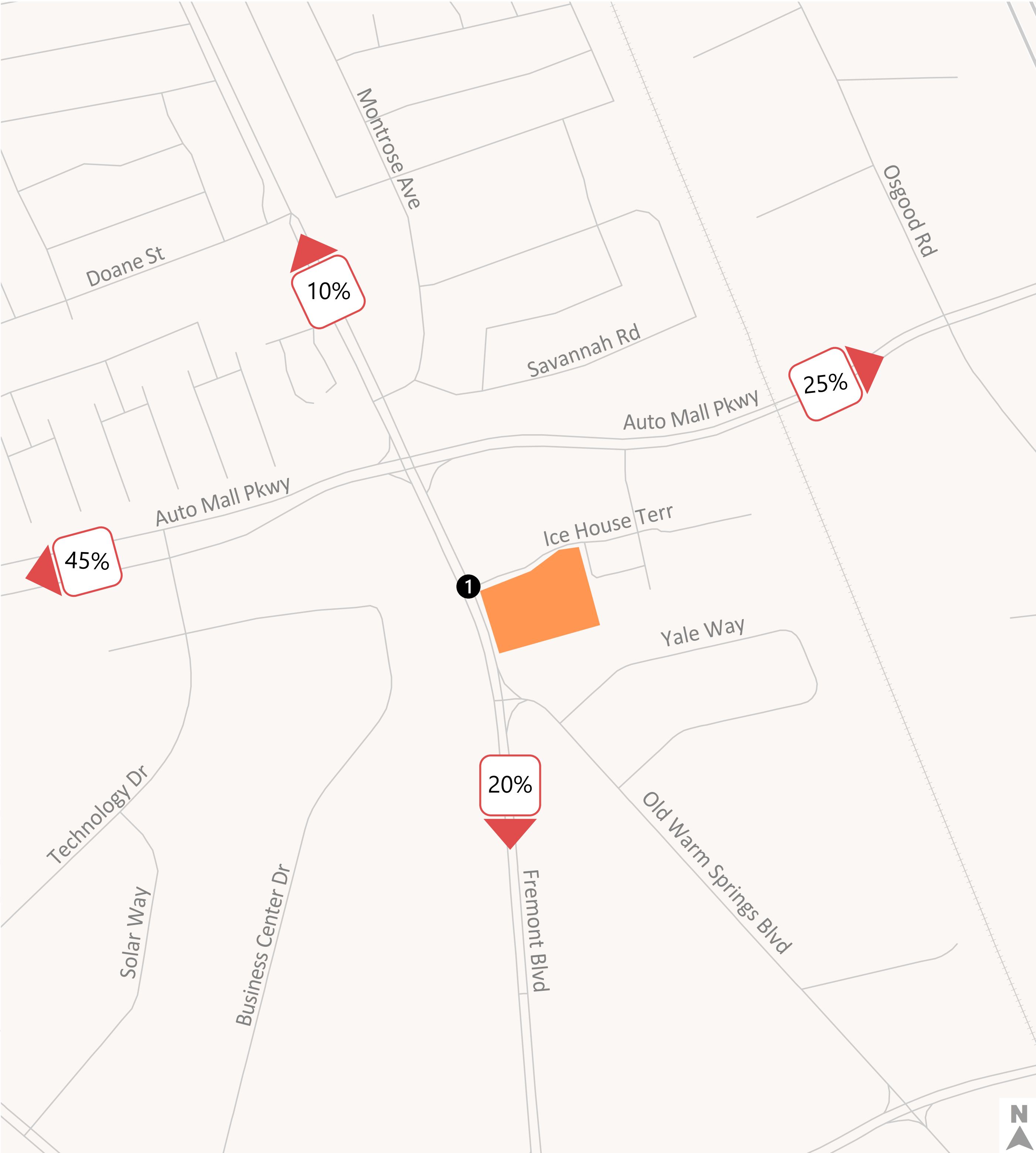
Appendix B – StreetLight Intersection Volumes

Appendix C – Intersection LOS Worksheets

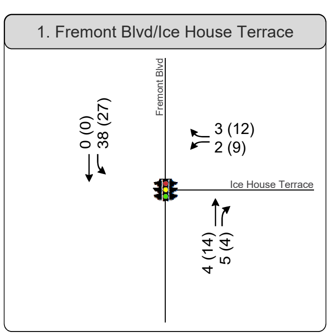
Appendix D – Intersection Queuing Worksheets

Appendix E – Project Site Plan

Appendix F – Truck Turning Movement Graphics



- Study Intersections
- Proposed Project Site
- % Trip Distribution

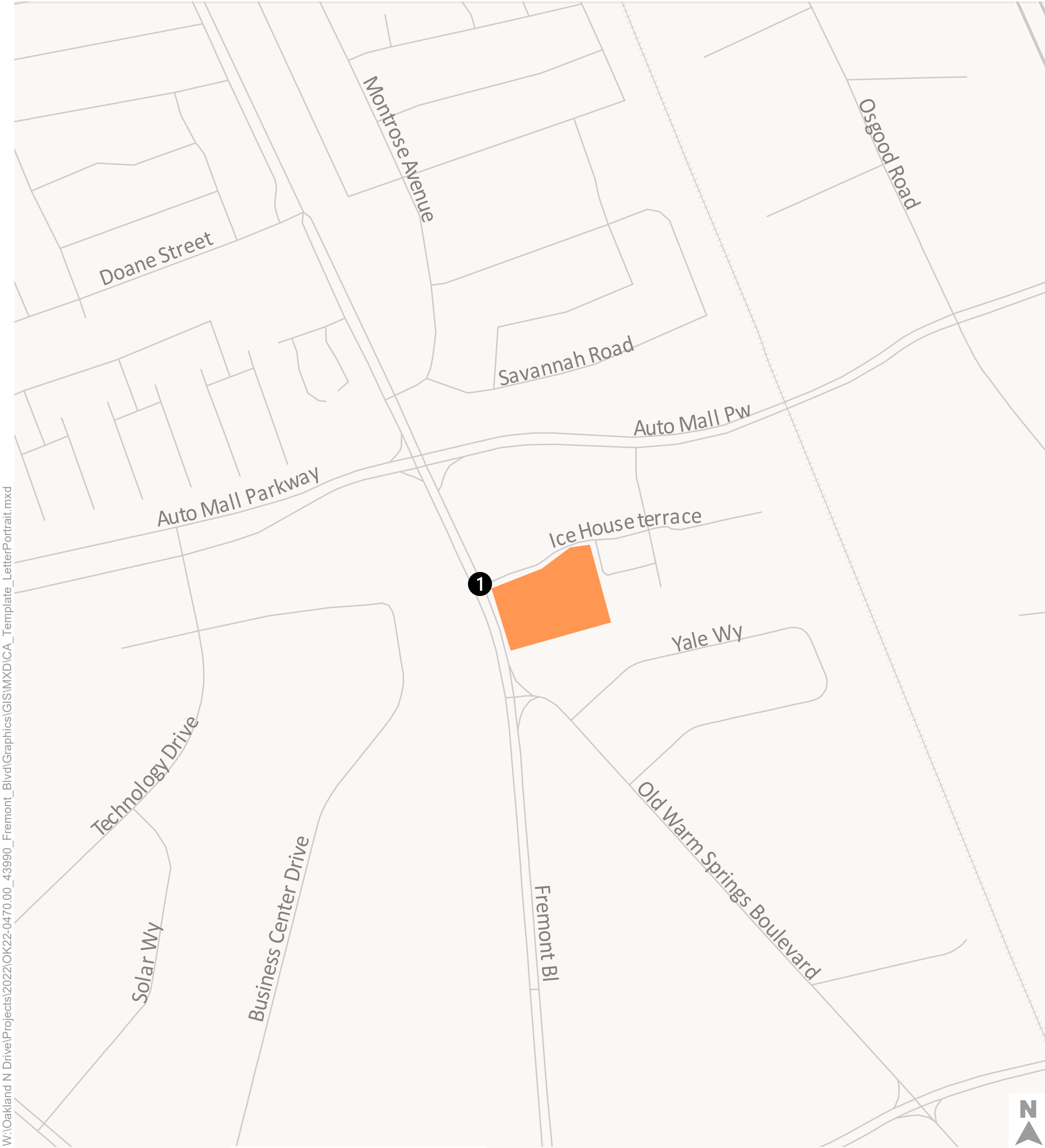


XX (YY) AM (PM) Peak Hour Traffic Volumes

Signalized Intersection

Figure 2

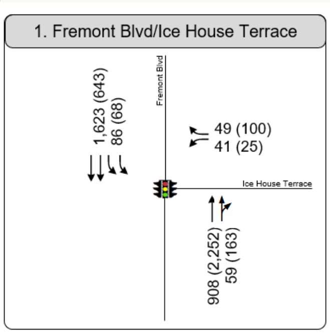
Project Trip Assignment and Distribution



W:\Oakland N Drive\Projects\2022\OK22-0470.00_43990_Fremont_Blvd\Graphics\GIS\MXD\CA_Template_LetterPortrait.mxd

Study Intersections

Proposed Project Site



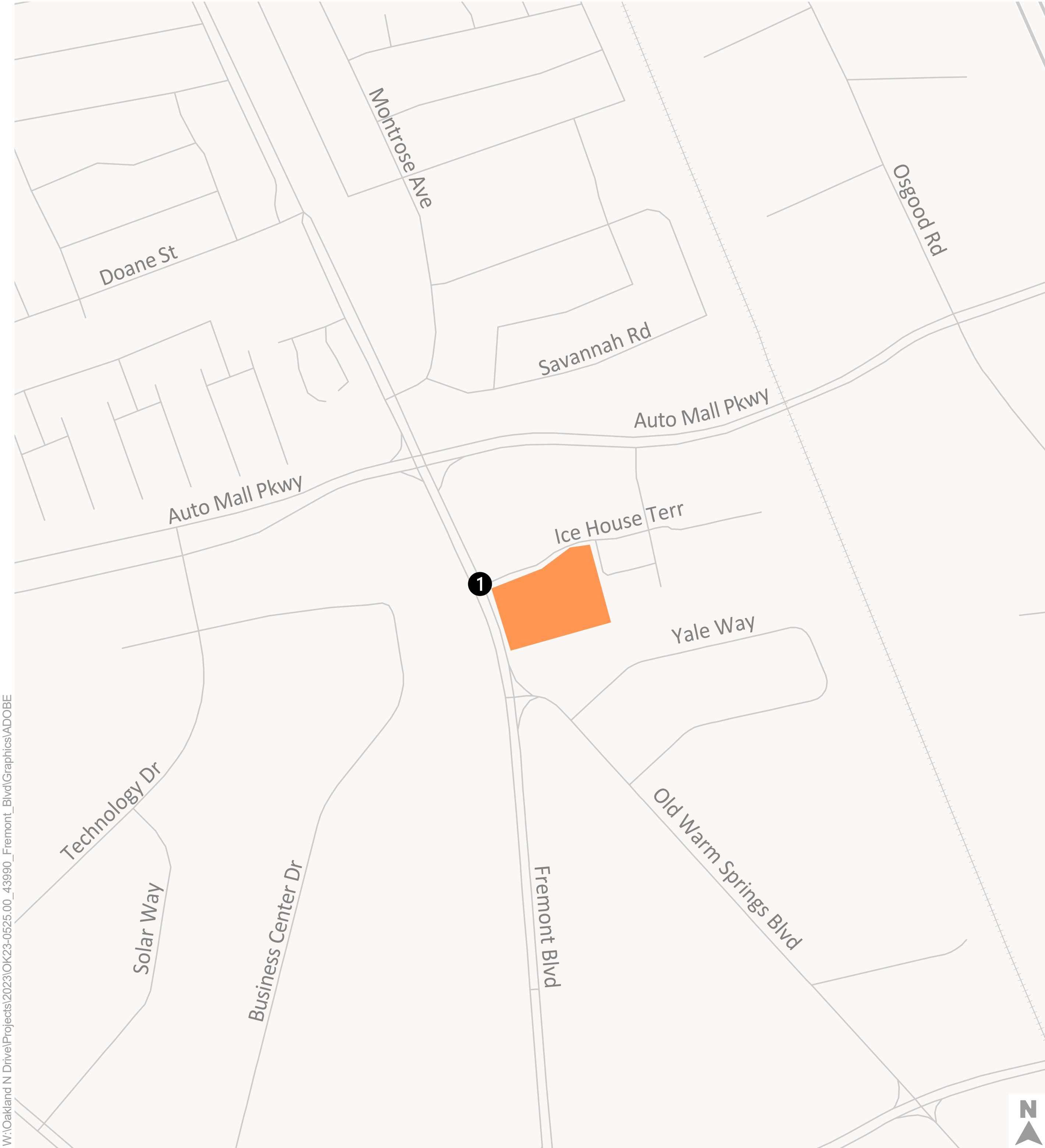
XX (YY) AM (PM) Peak Hour Traffic Volumes

Signalized Intersection

Figure 3

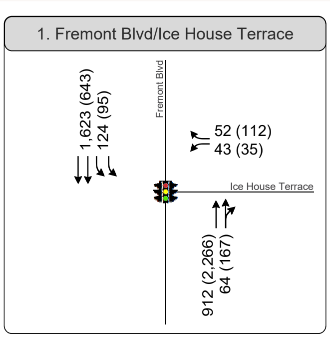
Existing Conditions Peak Hour

Intersection Traffic Volumes, Lane Configurations and Traffic Controls



Study Intersections

Proposed Project Site



XX (YY) AM (PM) Peak Hour Traffic Volumes

Signalized Intersection

Figure 4

Existing with Project Conditions Peak Hour

Intersection Traffic Volumes, Lane Configurations and Traffic Controls

Appendix A:
LOS Evaluation Criteria

Appendix A – Intersection Level of Service Analysis Criteria

Intersection operations are evaluated using the methods provided in the Highway Capacity Manual, 6th Edition (HCM). These methods use intersection characteristics to estimate average control delay and then assigns a Level of Service (LOS) value. Control delay is defined as the delay associated with deceleration, stopping, moving up in the queue, and acceleration experienced by drivers at a signalized intersection. **Table A-1** describes the various LOS and the corresponding ranges of delays for signalized intersections.

TABLE A-1: SIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

Level of Service Grade	Average Control Vehicle Delay (Seconds)	Description
A	≤10.0	Free Flow or Insignificant Delays: Operations with very low delay, when signal progression is extremely favorable and most vehicles arrive during the green light phase. Most vehicles do not stop at all.
B	>10.0 and ≤20.0	Stable Operation or Minimal Delays: Generally occurs with good signal progression and/or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average delay. An occasional approach phase is fully utilized.
C	>20.0 and ≤35.0	Stable Operation or Acceptable Delays: Higher delays resulting from fair signal progression and/ or longer cycle lengths. Drivers begin having to wait through more than one red light. Most drivers feel somewhat restricted.
D	>35.0 and ≤55.0	Approaching Unstable or Tolerable Delays: Influence of congestion becomes more noticeable. Longer delays result from unfavorable signal progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop. Drivers may have to wait through more than one red light. Queues may develop, but dissipate rapidly, without excessive delays.
E	>55.0 and ≤80.0	Unstable Operation or Significant Delays: Considered to be the limit of acceptable delay. High delays indicate poor signal progression, long cycle lengths and high volume to capacity ratios. Individual cycle failures are frequent occurrences. Vehicles may wait through several signal cycles. Long queues form upstream from intersection.
F	>80.0	Forced Flow or Excessive Delays: Occurs with oversaturation when flows exceed the intersection capacity. Represents jammed conditions. Many cycle failures. Queues may block upstream intersections.
Source: Highway Capacity Manual, Transportation Research Board, 2016.		

Appendix B:
Streetlight Intersection Volumes

Day Type:	1: Weekday (Tu-Th)	
	Volume	**Hour**
Peak Hour AM:	2,766	30: 7:30am-7:45am
		31: 7:45am-8:00am
		32: 8:00am-8:15am
		33: 8:15am-8:30am
Peak Hour PM:	3,252	68: 5:00pm-5:15pm
		69: 5:15pm-5:30pm
		70: 5:30pm-5:45pm
		71: 5:45pm-6:00pm

		NBL	NBT	NBR	EBL	EBT	EBR	SBL	SBT	SBR	WBL	WBT	WBR
Intersection	Rotation	NBL	NBT	NBR	EBL	EBT	EBR	SBL	SBT	SBR	WBL	WBT	WBR
Fremont Blvd & Ice AM	730	-	908	59	-	-	-	86	1,623	-	41	-	49
Fremont Blvd & Ice PM	1700	-	2,252	163	-	-	-	68	643	-	26	-	100

Final	NBL	NBT	NBR	EBL	EBT	EBR	SBL	SBT	SBR	WBL	WBT	WBR
730	-	908	59	-	-	-	86	1,623	-	41	-	49
1700	-	2,252	163	-	-	-	68	643	-	26	-	100

Fremont Blvd & Ice House Terrace

Day Type	Time	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND		
		NBL	NBT	NBR	EBL	EBT	EBR	SBL	SBT	SBR	WBL	WBT	WBR
1: Weekday (Tu-Th)	00: 12:00am-12:15am	0	26	2	0	0	0	0	6	0	0	0	1
1: Weekday (Tu-Th)	01: 12:15am-12:30am	0	16	1	0	0	0	0	5	0	1	0	0
1: Weekday (Tu-Th)	02: 12:30am-12:45am	0	10	1	0	0	0	0	7	0	0	0	0
1: Weekday (Tu-Th)	03: 12:45am-1:00am	0	9	1	0	0	0	0	6	0	0	0	1
1: Weekday (Tu-Th)	04: 1:00am-1:15am	0	8	0	0	0	0	0	5	0	0	0	1
1: Weekday (Tu-Th)	05: 1:15am-1:30am	0	11	0	0	0	0	0	5	0	0	0	1
1: Weekday (Tu-Th)	06: 1:30am-1:45am	0	10	1	0	0	0	0	3	0	0	0	1
1: Weekday (Tu-Th)	07: 1:45am-2:00am	0	7	1	0	0	0	0	3	0	0	0	0
1: Weekday (Tu-Th)	08: 2:00am-2:15am	0	6	1	0	0	0	0	4	0	0	0	0
1: Weekday (Tu-Th)	09: 2:15am-2:30am	0	7	0	0	0	0	0	6	0	0	0	0
1: Weekday (Tu-Th)	10: 2:30am-2:45am	0	8	0	0	0	0	1	11	0	0	0	0
1: Weekday (Tu-Th)	11: 2:45am-3:00am	0	6	1	0	0	0	0	12	0	0	0	0
1: Weekday (Tu-Th)	12: 3:00am-3:15am	0	8	1	0	0	0	0	8	0	0	0	0
1: Weekday (Tu-Th)	13: 3:15am-3:30am	0	12	2	0	0	0	0	11	0	0	0	0
1: Weekday (Tu-Th)	14: 3:30am-3:45am	0	28	4	0	0	0	0	23	0	0	0	0
1: Weekday (Tu-Th)	15: 3:45am-4:00am	0	14	4	0	0	0	0	30	0	0	0	0
1: Weekday (Tu-Th)	16: 4:00am-4:15am	0	11	2	0	0	0	0	51	0	1	0	1
1: Weekday (Tu-Th)	17: 4:15am-4:30am	0	8	2	0	0	0	0	82	0	1	0	1
1: Weekday (Tu-Th)	18: 4:30am-4:45am	0	11	2	0	0	0	0	101	0	0	0	3
1: Weekday (Tu-Th)	19: 4:45am-5:00am	0	17	2	0	0	0	1	137	0	1	0	5
1: Weekday (Tu-Th)	20: 5:00am-5:15am	0	48	6	0	0	0	1	121	0	2	0	3
1: Weekday (Tu-Th)	21: 5:15am-5:30am	0	46	7	0	0	0	1	154	0	2	0	5
1: Weekday (Tu-Th)	22: 5:30am-5:45am	0	76	11	0	0	0	1	149	0	1	0	7
1: Weekday (Tu-Th)	23: 5:45am-6:00am	0	78	13	0	0	0	2	149	0	3	0	6
1: Weekday (Tu-Th)	24: 6:00am-6:15am	0	86	17	0	0	0	5	255	0	5	0	4
1: Weekday (Tu-Th)	25: 6:15am-6:30am	0	169	26	0	0	0	8	181	0	7	0	4
1: Weekday (Tu-Th)	26: 6:30am-6:45am	0	181	26	0	0	0	7	207	0	7	0	5
1: Weekday (Tu-Th)	27: 6:45am-7:00am	0	90	19	0	0	0	6	224	0	7	0	9
1: Weekday (Tu-Th)	28: 7:00am-7:15am	0	88	20	0	0	0	7	211	0	8	0	10
1: Weekday (Tu-Th)	29: 7:15am-7:30am	0	131	30	0	0	0	12	235	0	11	0	8
1: Weekday (Tu-Th)	30: 7:30am-7:45am	0	382	18	0	0	0	17	361	0	12	0	10
1: Weekday (Tu-Th)	31: 7:45am-8:00am	0	328	16	0	0	0	21	409	0	10	0	11
1: Weekday (Tu-Th)	32: 8:00am-8:15am	0	98	11	0	0	0	24	438	0	9	0	12
1: Weekday (Tu-Th)	33: 8:15am-8:30am	0	100	14	0	0	0	24	415	0	10	0	16
1: Weekday (Tu-Th)	34: 8:30am-8:45am	0	81	15	0	0	0	18	644	0	12	0	22
1: Weekday (Tu-Th)	35: 8:45am-9:00am	0	73	18	0	0	0	18	509	0	10	0	21
1: Weekday (Tu-Th)	36: 9:00am-9:15am	0	59	21	0	0	0	26	358	0	9	0	17
1: Weekday (Tu-Th)	37: 9:15am-9:30am	0	61	17	0	0	0	20	336	0	9	0	17
1: Weekday (Tu-Th)	38: 9:30am-9:45am	0	66	16	0	0	0	21	305	0	11	0	18
1: Weekday (Tu-Th)	39: 9:45am-10:00am	0	66	18	0	0	0	18	307	0	11	0	19
1: Weekday (Tu-Th)	40: 10:00am-10:15am	0	67	23	0	0	0	22	210	0	11	0	26
1: Weekday (Tu-Th)	41: 10:15am-10:30am	0	62	20	0	0	0	21	166	0	8	0	22
1: Weekday (Tu-Th)	42: 10:30am-10:45am	0	66	19	0	0	0	20	131	0	6	0	20
1: Weekday (Tu-Th)	43: 10:45am-11:00am	0	71	17	0	0	0	20	123	0	8	0	26
1: Weekday (Tu-Th)	44: 11:00am-11:15am	0	77	20	0	0	0	25	125	0	9	0	22
1: Weekday (Tu-Th)	45: 11:15am-11:30am	0	86	19	0	0	0	22	98	0	8	0	18
1: Weekday (Tu-Th)	46: 11:30am-11:45am	0	115	21	0	0	0	28	115	0	8	0	19
1: Weekday (Tu-Th)	47: 11:45am-12:00noon	0	121	26	0	0	0	30	121	0	9	0	27
1: Weekday (Tu-Th)	48: 12:00noon-12:15noon	0	136	37	0	0	0	28	97	0	12	0	36
1: Weekday (Tu-Th)	49: 12:15noon-12:30noon	0	142	35	0	0	0	29	112	0	12	0	23
1: Weekday (Tu-Th)	50: 12:30noon-12:45noon	0	138	37	0	0	0	22	105	0	9	0	33
1: Weekday (Tu-Th)	51: 12:45noon-1:00pm	0	142	32	0	0	0	28	115	0	10	0	27
1: Weekday (Tu-Th)	52: 1:00pm-1:15pm	0	179	28	0	0	0	36	136	0	10	0	25
1: Weekday (Tu-Th)	53: 1:15pm-1:30pm	0	159	29	0	0	0	29	122	0	12	0	25
1: Weekday (Tu-Th)	54: 1:30pm-1:45pm	0	210	37	0	0	0	23	170	0	10	0	22
1: Weekday (Tu-Th)	55: 1:45pm-2:00pm	0	292	31	0	0	0	28	139	0	9	0	26
1: Weekday (Tu-Th)	56: 2:00pm-2:15pm	0	289	30	0	0	0	30	106	0	9	0	24
1: Weekday (Tu-Th)	57: 2:15pm-2:30pm	0	321	34	0	0	0	20	110	0	7	0	29
1: Weekday (Tu-Th)	58: 2:30pm-2:45pm	0	373	32	0	0	0	21	228	0	7	0	26
1: Weekday (Tu-Th)	59: 2:45pm-3:00pm	0	340	38	0	0	0	22	233	0	9	0	21
1: Weekday (Tu-Th)	60: 3:00pm-3:15pm	0	378	40	0	0	0	24	219	0	9	0	23
1: Weekday (Tu-Th)	61: 3:15pm-3:30pm	0	392	35	0	0	0	19	191	0	9	0	20
1: Weekday (Tu-Th)	62: 3:30pm-3:45pm	0	432	31	0	0	0	16	119	0	9	0	19
1: Weekday (Tu-Th)	63: 3:45pm-4:00pm	0	478	44	0	0	0	19	107	0	7	0	19
1: Weekday (Tu-Th)	64: 4:00pm-4:15pm	0	430	27	0	0	0	16	147	0	8	0	16
1: Weekday (Tu-Th)	65: 4:15pm-4:30pm	0	398	44	0	0	0	14	168	0	7	0	20
1: Weekday (Tu-Th)	66: 4:30pm-4:45pm	0	475	45	0	0	0	16	156	0	7	0	20
1: Weekday (Tu-Th)	67: 4:45pm-5:00pm	0	507	46	0	0	0	15	155	0	9	0	21
1: Weekday (Tu-Th)	68: 5:00pm-5:15pm	0	570	48	0	0	0	17	186	0	7	0	33
1: Weekday (Tu-Th)	69: 5:15pm-5:30pm	0	548	41	0	0	0	16	155	0	7	0	23
1: Weekday (Tu-Th)	70: 5:30pm-5:45pm	0	560	36	0	0	0	16	156	0	7	0	21
1: Weekday (Tu-Th)	71: 5:45pm-6:00pm	0	574	38	0	0	0	19	146	0	5	0	23
1: Weekday (Tu-Th)	72: 6:00pm-6:15pm	0	450	39	0	0	0	23	130	0	5	0	23
1: Weekday (Tu-Th)	73: 6:15pm-6:30pm	0	487	44	0	0	0	18	135	0	4	0	20
1: Weekday (Tu-Th)	74: 6:30pm-6:45pm	0	575	58	0	0	0	14	100	0	4	0	23
1: Weekday (Tu-Th)	75: 6:45pm-7:00pm	0	478	46	0	0	0	15	96	0	3	0	25
1: Weekday (Tu-Th)	76: 7:00pm-7:15pm	0	424	43	0	0	0	15	91	0	2	0	21
1: Weekday (Tu-Th)	77: 7:15pm-7:30pm	0	362	35	0	0	0	15	95	0	4	0	27
1: Weekday (Tu-Th)	78: 7:30pm-7:45pm	0	354	40	0	0	0	13	83	0	4	0	21
1: Weekday (Tu-Th)	79: 7:45pm-8:00pm	0	270	31	0	0	0	15	67	0	2	0	19
1: Weekday (Tu-Th)	80: 8:00pm-8:15pm	0	237	24	0	0	0	12	71	0	3	0	29
1: Weekday (Tu-Th)	81: 8:15pm-8:30pm	0	173	20	0	0	0	11	60	0	2	0	20
1: Weekday (Tu-Th)	82: 8:30pm-8:45pm	0	139	12	0	0	0	8	70	0	1	0	16
1: Weekday (Tu-Th)	83: 8:45pm-9:00pm	0	118	11	0	0	0	6	44	0	1	0	11
1: Weekday (Tu-Th)	84: 9:00pm-9:15pm	0	95	8	0	0	0	5	51	0	1	0	10
1: Weekday (Tu-Th)	85: 9:15pm-9:30pm	0	103	6	0	0	0	4	41	0	1	0	11
1: Weekday (Tu-Th)	86: 9:30pm-9:45pm	0	124	6	0	0	0	2	53	0	1	0	9
1: Weekday (Tu-Th)	87: 9:45pm-10:00pm	0	83	5	0	0	0	1	57	0	0	0	7
1: Weekday (Tu-Th)	88: 10:00pm-10:15pm	0	58	5	0	0	0	1	42	0	0	0	5
1: Weekday (Tu-Th)	89: 10:15pm-10:30pm	0	78	3	0	0	0	1	35	0	1	0	2
1: Weekday (Tu-Th)	90: 10:30pm-10:45pm	0	72	2	0	0	0	1	27	0	0	0	1
1: Weekday (Tu-Th)	91: 10:45pm-11:00pm	0	45	3	0	0	0	1	29	0	0	0	1
Peak Hour AM	7:30am-8:30am	-	908	59	-	-	-	86	1,623	-	41	-	49
Peak Hour PM	5:00pm-6:00pm	-	2,252	163	-	-	-	68	643	-	26	-	100

Note: Data collected by Streetlight for February 1st-June 1st and September 1st-November 15th, 2019. AM and PM peak hours are highlighted in green

Appendix C
Intersection LOS
Worksheets

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	41	49	908	59	86	1623
Future Volume (veh/h)	41	49	908	59	86	1623
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	48	57	1056	69	100	1887
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	25	25	25	25	25	25
Cap, veh/h	187	167	1499	98	323	2092
Arrive On Green	0.13	0.13	0.54	0.54	0.11	0.72
Sat Flow, veh/h	1457	1296	2846	181	2826	2983
Grp Volume(v), veh/h	48	57	554	571	100	1887
Grp Sat Flow(s),veh/h/ln	1457	1296	1453	1497	1413	1453
Q Serve(g_s), s	2.1	2.8	19.8	19.8	2.3	36.3
Cycle Q Clear(g_c), s	2.1	2.8	19.8	19.8	2.3	36.3
Prop In Lane	1.00	1.00		0.12	1.00	
Lane Grp Cap(c), veh/h	187	167	787	810	323	2092
V/C Ratio(X)	0.26	0.34	0.70	0.70	0.31	0.90
Avail Cap(c_a), veh/h	258	230	787	810	424	2092
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.5	27.8	11.9	11.9	28.5	7.8
Incr Delay (d2), s/veh	0.3	0.4	5.2	5.1	0.2	6.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.9	5.9	6.1	0.7	7.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.7	28.2	17.1	17.0	28.7	14.7
LnGrp LOS	C	C	B	B	C	B
Approach Vol, veh/h	105		1125			1987
Approach Delay, s/veh	28.0		17.1			15.4
Approach LOS	C		B			B

Timer - Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	12.5	43.9				56.4		13.6
Change Period (Y+Rc), s	4.5	6.0				6.0		4.6
Max Green Setting (Gmax), s	10.5	32.0				47.0		12.4
Max Q Clear Time (g_c+I1), s	4.3	21.8				38.3		4.8
Green Ext Time (p_c), s	0.0	3.4				5.9		0.0

Intersection Summary	
HCM 6th Ctrl Delay	16.4
HCM 6th LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	26	100	2252	163	68	643
Future Volume (veh/h)	26	100	2252	163	68	643
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	28	106	2396	173	72	684
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	142	127	2339	167	193	2781
Arrive On Green	0.09	0.09	0.74	0.74	0.06	0.84
Sat Flow, veh/h	1668	1485	3238	225	3237	3416
Grp Volume(v), veh/h	28	106	1252	1317	72	684
Grp Sat Flow(s),veh/h/ln	1668	1485	1664	1711	1618	1664
Q Serve(g_s), s	2.1	9.4	99.5	99.5	2.9	5.7
Cycle Q Clear(g_c), s	2.1	9.4	99.5	99.5	2.9	5.7
Prop In Lane	1.00	1.00		0.13	1.00	
Lane Grp Cap(c), veh/h	142	127	1235	1270	193	2781
V/C Ratio(X)	0.20	0.84	1.01	1.04	0.37	0.25
Avail Cap(c_a), veh/h	167	148	1235	1270	278	2781
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.0	60.4	17.3	17.3	60.6	2.3
Incr Delay (d2), s/veh	0.2	25.6	28.9	35.4	0.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	4.5	38.9	42.3	1.2	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	57.3	86.0	46.2	52.6	61.0	2.5
LnGrp LOS	E	F	F	F	E	A
Approach Vol, veh/h	134		2569			756
Approach Delay, s/veh	80.0		49.5			8.1
Approach LOS	E		D			A

Timer - Assigned Phs	1	2	6	8
Phs Duration (G+Y+Rc), s	12.5	105.5	118.0	16.0
Change Period (Y+Rc), s	4.5	6.0	6.0	4.6
Max Green Setting (Gmax), s	11.5	94.0	110.0	13.4
Max Q Clear Time (g_c+I1), s	4.9	101.5	7.7	11.4
Green Ext Time (p_c), s	0.0	0.0	3.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	41.6
HCM 6th LOS	D

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	43	52	912	64	124	1623
Future Volume (veh/h)	43	52	912	64	124	1623
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	50	60	1060	74	144	1887
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	25	25	25	25	25	25
Cap, veh/h	187	167	1492	104	323	2092
Arrive On Green	0.13	0.13	0.54	0.54	0.11	0.72
Sat Flow, veh/h	1457	1296	2832	192	2826	2983
Grp Volume(v), veh/h	50	60	559	575	144	1887
Grp Sat Flow(s),veh/h/ln	1457	1296	1453	1495	1413	1453
Q Serve(g_s), s	2.2	3.0	20.1	20.1	3.3	36.3
Cycle Q Clear(g_c), s	2.2	3.0	20.1	20.1	3.3	36.3
Prop In Lane	1.00	1.00		0.13	1.00	
Lane Grp Cap(c), veh/h	187	167	787	809	323	2092
V/C Ratio(X)	0.27	0.36	0.71	0.71	0.45	0.90
Avail Cap(c_a), veh/h	258	230	787	809	424	2092
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.5	27.9	12.0	12.0	28.9	7.8
Incr Delay (d2), s/veh	0.3	0.5	5.4	5.3	0.4	6.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.9	6.0	6.2	1.1	7.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.8	28.4	17.3	17.2	29.3	14.7
LnGrp LOS	C	C	B	B	C	B
Approach Vol, veh/h	110		1134			2031
Approach Delay, s/veh	28.1		17.3			15.7
Approach LOS	C		B			B

Timer - Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	12.5	43.9				56.4		13.6
Change Period (Y+Rc), s	4.5	6.0				6.0		4.6
Max Green Setting (Gmax), s	10.5	32.0				47.0		12.4
Max Q Clear Time (g_c+I1), s	5.3	22.1				38.3		5.0
Green Ext Time (p_c), s	0.0	3.4				5.9		0.0

Intersection Summary		
HCM 6th Ctrl Delay		16.7
HCM 6th LOS		B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	35	112	2266	167	95	643
Future Volume (veh/h)	35	112	2266	167	95	643
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	37	119	2411	178	101	684
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	157	139	2308	168	193	2753
Arrive On Green	0.09	0.09	0.73	0.73	0.06	0.83
Sat Flow, veh/h	1668	1485	3233	229	3237	3416
Grp Volume(v), veh/h	37	119	1261	1328	101	684
Grp Sat Flow(s),veh/h/ln	1668	1485	1664	1711	1618	1664
Q Serve(g_s), s	2.8	10.6	98.3	98.3	4.1	6.0
Cycle Q Clear(g_c), s	2.8	10.6	98.3	98.3	4.1	6.0
Prop In Lane	1.00	1.00		0.13	1.00	
Lane Grp Cap(c), veh/h	157	139	1221	1255	193	2753
V/C Ratio(X)	0.24	0.85	1.03	1.06	0.52	0.25
Avail Cap(c_a), veh/h	167	148	1221	1255	278	2753
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.3	59.8	17.8	17.8	61.1	2.5
Incr Delay (d2), s/veh	0.3	32.1	34.6	42.2	0.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	5.3	40.8	44.7	1.7	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	56.5	91.9	52.5	60.1	62.0	2.7
LnGrp LOS	E	F	F	F	E	A
Approach Vol, veh/h	156		2589			785
Approach Delay, s/veh	83.5		56.4			10.4
Approach LOS	F		E			B

Timer - Assigned Phs	1	2	6	8
Phs Duration (G+Y+Rc), s	12.5	104.3	116.8	17.2
Change Period (Y+Rc), s	4.5	6.0	6.0	4.6
Max Green Setting (Gmax), s	11.5	94.0	110.0	13.4
Max Q Clear Time (g_c+I1), s	6.1	100.3	8.0	12.6
Green Ext Time (p_c), s	0.0	0.0	3.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	47.3
HCM 6th LOS	D

Appendix D
Intersection Queuing
Worksheets

Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	48	57	1125	100	1887
v/c Ratio	0.26	0.27	0.72	0.31	0.91
Control Delay	31.5	12.1	15.4	31.4	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	12.1	15.4	31.4	16.5
Queue Length 50th (ft)	19	0	174	20	272
Queue Length 95th (ft)	46	28	227	40	359
Internal Link Dist (ft)	577		455		516
Turn Bay Length (ft)	165			165	
Base Capacity (vph)	255	275	1555	420	2079
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.19	0.21	0.72	0.24	0.91

Intersection Summary

Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	28	106	2569	72	684
v/c Ratio	0.25	0.54	1.04	0.38	0.24
Control Delay	65.2	21.0	46.5	66.6	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	65.2	21.0	46.5	66.6	2.0
Queue Length 50th (ft)	24	0	~1266	31	43
Queue Length 95th (ft)	57	60	#1397	58	55
Internal Link Dist (ft)	577		455		516
Turn Bay Length (ft)	165			165	
Base Capacity (vph)	164	242	2472	273	2800
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.17	0.44	1.04	0.26	0.24

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	50	60	1134	144	1887
v/c Ratio	0.27	0.28	0.73	0.44	0.91
Control Delay	31.8	12.1	15.8	33.2	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.8	12.1	15.8	33.2	16.5
Queue Length 50th (ft)	20	0	176	30	272
Queue Length 95th (ft)	47	28	239	53	359
Internal Link Dist (ft)	577		455		516
Turn Bay Length (ft)	165			165	
Base Capacity (vph)	255	278	1545	420	2079
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.20	0.22	0.73	0.34	0.91

Intersection Summary

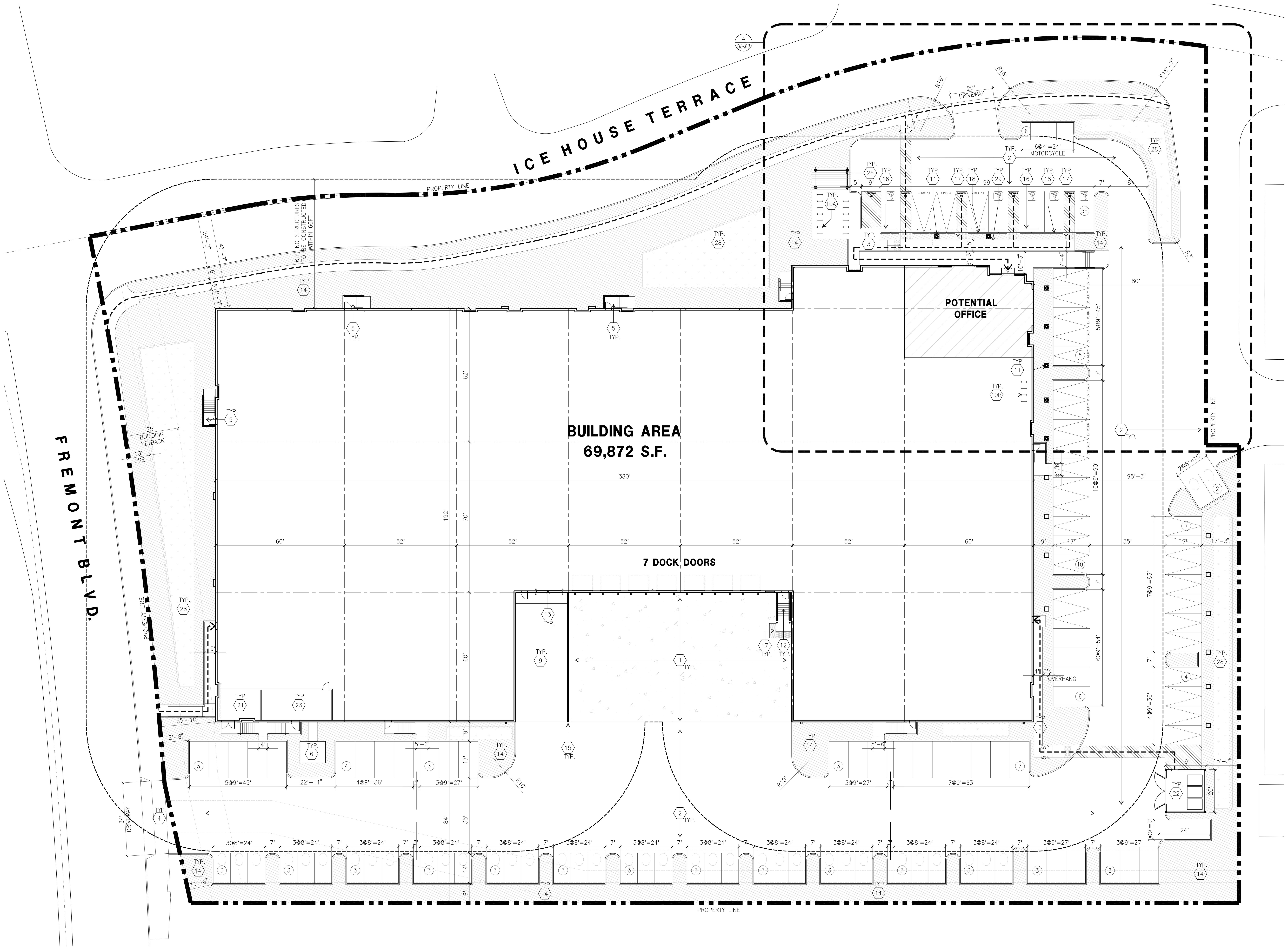
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	37	119	2589	101	684
v/c Ratio	0.33	0.56	1.05	0.51	0.24
Control Delay	67.8	20.9	51.1	70.1	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	20.9	51.1	70.1	2.1
Queue Length 50th (ft)	31	0	~1285	44	43
Queue Length 95th (ft)	69	62	#1442	75	57
Internal Link Dist (ft)	577		455		516
Turn Bay Length (ft)	165			165	
Base Capacity (vph)	164	253	2462	273	2797
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.23	0.47	1.05	0.37	0.24

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Appendix E
Project Site Plan



OVERALL SITE PLAN (A)
scale: 1" = 20'-0"

SCALE: 1" = 20'-0" 0 20' 40' 60'

TRUE NORTH PLAN NORTH

PROJECT INFORMATION

Owner/Applicant

NORTH PALISADE PARTNERS
1330 FACTORY PLACE, SUITE 105
LOS ANGELES, CA 90013
PHONE: (213) 495-2949
CONTACT: WILLIAM JACOBS

Project Address

43990 Fremont Blvd
Fremont, CA 94538

Applicant's Representative

HPA, INC.
600 GRAND AVENUE – STE. 302
OAKLAND, CA 94610
PHONE: (949) 863-1770
CONTACT: JUN LEE

Zoning

EXISTING	REGIONAL DISTRICT (C-R)
PROPOSED	TECH INDUSTRIAL DISTRICT (I-T)

Assessors Parcel Number

525-1390-009
525-1390-010

CODE ANALYSIS

CONCRETE TILT-UP BUILDING

BUILDING OCCUPANCY:	S-1 / B
OCCUPANCY SEPARATION:	NONE
CONSTRUCTION TYPE:	III-B
NUMBER OF STORIES:	2
AUTOMATIC FIRE SPRINKLER	YES (ESFR SYSTEM)
ALLOWABLE HEIGHT W/ AUTOMATIC SPRINKLER	75' (CBC 504.3)
PROPOSED BUILDING HEIGHT	44-0" (INCLUDING PARAPET WALL)
ACTUAL AREA	69,872 SF
ALLOWABLE AREA PER CBC 507	UNLIMITED BUILDING AREA
GOVERNING CODE	CBC 2022

STRUCTURE IS LESS THAN 50 YEARS OLD
BUILDING IS LOCATED IN EARTHQUAKE INDUCED LIQUEFACTION ZONE
NO NATURAL GAS

PROJECT DATA

SITE AREA	
In s.f.	181,487 sf
In acres	4.2 ac
BUILDING AREA	
Office - 1st floor	2,500 sf
Office - 2nd floor	2,498 sf
Warehouse / Manufacturing	64,874 sf
TOTAL	69,872 sf
footprint	67,374 sf
FLOOR AREA RATIO	
Maximum Allowed	0.45
Proposed	0.38
AUTO PARKING REQUIRED	
Office: 5/1,000 s.f.	25 stalls
Whse: 1.25/1,000 s.f.	82 stalls
TOTAL	107 stalls
Min. 1.6 per 1,000 s.f.	112 stalls
AUTO PARKING PROVIDED	
Standard (9' x 19' including overhang)	33 stalls
Compact (8' x 16' including overhang)	38 stalls
Accessible Standard (9' x 19')	4 stalls
Accessible Van (12' x 19')	1 stalls
Accessible Standard EV (9' x 19')	1 stalls
Accessible Ambulatory EV (10' x 19')	1 stalls
Accessible Van EV (12' x 19')	1 stalls
EV Ready with charger (9' x 19' including overhang)	9 stalls
EV Capable with charger (9' x 19' including overhang	19 stalls
TOTAL	107 stalls
AUTO PARKING TRADE OFF	
Omitted Auto Stalls (Max. 5% of total required)	5 stalls
Proposed Motorcycle Parking (1 auto / 2 motorcycle)	6
Proposed Bicycle Parking (1 auto / 8 bicycle)	16
BICYCLE PARKING REQUIRED	
Short Term (4 + 5% of total req. stalls)	10
Long Term (1 + 5% of total req. stalls)	7
BICYCLE PARKING PROVIDED	
Short Term (4 + 5% of total req. stalls)	10
Long Term (1 + 5% of total req. stalls)	8
ZONING ORDINANCE	
Zoning Designation - Tech Industrial (I-T) (proposed)	
MAXIMUM BUILDING HEIGHT ALLOWED	
Height - 75'	
SETBACKS	
Building	
Front/Street Side - 25'	
Side - 0', 50' if adjacent to R zone	
Rear - 0', 50' if adjacent to R zone	

SITE PLAN GENERAL NOTES

- CONCRETE PAVING. SEE "C" DRWGS. FOR THICKNESS
- COMPACT PARKING STALL 8' X 16' (14' W/ 2' OVERHANG)
- STANDARD PARKING STALL 9' X 19' (17' W/ 2' OVERHANG)
- EV READY WITH CHARGER
- EV CAPABLE WITH CHARGER
- LANDSCAPED AREA
- ACCESSIBLE PARKING STALL (9' X 19') + 5' W/ ACCESSIBLE AISLE
- ACCESSIBLE PARKING (AMBULATORY) STALL (10' X 19') + 5' W/ ACCESSIBLE AISLE
- ACCESSIBLE PARKING (VAN) STALL (12' X 19') + 5' W/ ACCESSIBLE AISLE
- PATH OF TRAVEL. MINIMUM WIDTH TO BE 4'. SLOPE NOT TO EXCEED 5% IN THE DIRECTION OF TRAVEL AND CROSS SLOPE NOT TO EXCEED 2%, SEE CIVIL FOR GRADING PLAN

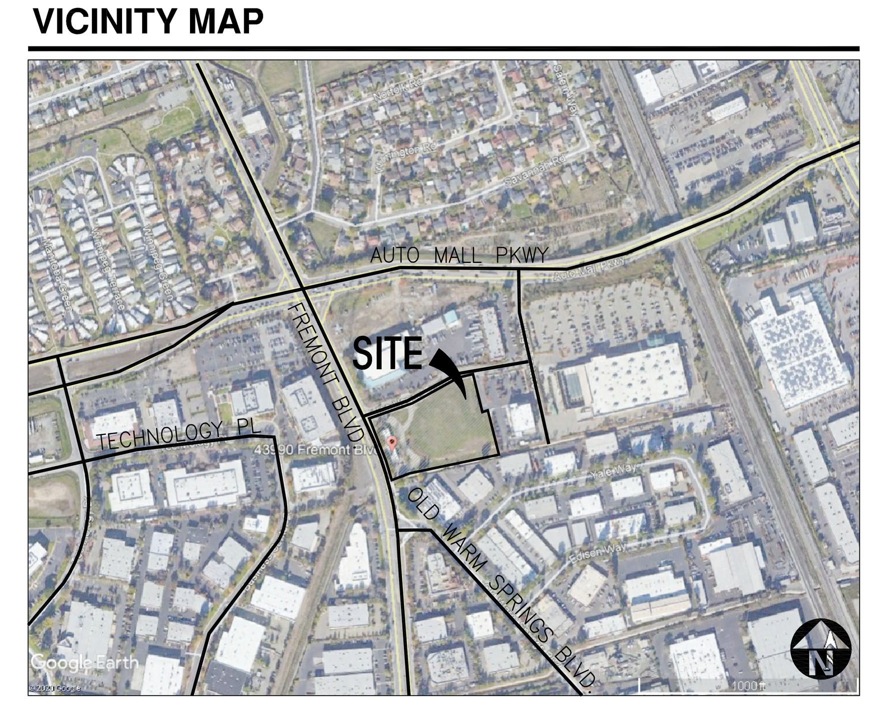
SITE PLAN KEYNOTES

1. HEAVY BROOM FINISH CONCRETE PAVEMENT.
2. ASPHALT CONCRETE (AC) PAVING
3. ACCESSIBLE PATH OF TRAVEL
4. DRIVEWAY APRONS
5. 5'-6"X5'-6"X4" THICK CONCRETE EXTERIOR LANDING PAD TYP. AT ALL EXTERIOR MAN DOORS TO LANDSCAPED AREAS. FINISH TO BE MEDIUM BROOM FINISH SLOPE TO BE 1/4" : 12" MAX.
6. LOCATION OF TRANSFORMER. CONTRACTOR TO VERIFY
7. 8' HIGH METAL GATES W/ KNOX-BOX PER FIRE DEPARTMENT
8. CONCRETE WALKWAY, MEDIUM BROOM FINISH.
9. CONCRETE RAMP WITH CONCRETE GUARD WALL.
- 10A SHORT-TERM BIKE RACK.
- 10B LONG-TERM BIKE RACK.
11. ELECTRIC VEHICLE CHARGER.
12. EXTERIOR STEEL STAIR.
13. 12' x 14' DRIVE-IN DOOR
14. LANDSCAPE.
15. CONC. FILLED GUARD POST 6" DIA. U.N.O. 48" H.
16. PRE-CAST CONC. WHEEL STOP.
17. TRUNCATED DOMES.
18. ACCESSIBLE PARKING STALL SIGN.
19. HARDSCAPE AT ENTRANCE.
20. ACCESSIBLE ENTRY SIGN.
21. PUMP ROOM.
22. TRASH ENCLOSURE.
23. ELECTRICAL ROOM.
24. NOT USED.
25. EASEMENTS. SEE "C" DRAWINGS.
26. OUTDOOR EMPLOYEE BREAK AREA
27. EXTERIOR PARKING LIGHT POLE.
28. STORM TREATMENT.
29. 30" X 48" CLEAR SPACE AT EV CHARGER

SITE PLAN GENERAL NOTES

1. THE SITE PLAN BASED ON THE SOILS REPORT PREPARED BY GEOTECHNICAL ENGINEER, DATE, PROJECT NUMBER #
2. IF SOILS ARE EXPANSIVE IN NATURE, USE STEEL REINFORCING FOR ALL SITE CONCRETE
3. ALL DIMENSIONS ARE TO THE FACE OF CONCRETE WALL, FACE OF CONCRETE CURB OR GRID LINE U.N.O.
4. SEE "C" PLANS FOR ALL CONCRETE CURBS, GUTTERS AND SWALES
5. PROVIDE STRUCTURAL CALCULATION AND CONSTRUCTION ANCHORAGE DETAIL FOR TRANSFORMER PRIOR TO INSTALLATION.
6. SEE "C" DRAWINGS FOR POINT OF CONNECTIONS TO OFF-SITE UTILITIES. CONTRACTOR SHALL VERIFY ACTUAL UTILITY LOCATIONS.
7. PROVIDE POSITIVE DRAINAGE AWAY FROM BLDG. SEE "C" DRAWINGS.
8. CONTRACTOR TO REFER TO "C" DRAWINGS FOR ALL HORIZONTAL CONTROL DIMENSIONS. SITE PLANS ARE FOR GUIDANCE AND STARTING LAYOUT POINTS.
9. SEE "C" DRAWINGS FOR FINISH GRADE ELEVATIONS.
10. CONCRETE SIDEWALKS TO BE A MINIMUM OF 4" THICK W/ TOOLED JOINTS AT 6' O.C. EXPANSION/CONSTRUCTION JOINTS SHALL BE A MAXIMUM 12' EA. WAY W/ 1:20 MAX. SLOPE. EXPANSION JOINTS TO HAVE COMPRESSIVE EXPANSION FILLER MATERIAL OF 1/4". FINISH TO BE A MEDIUM BROOM FINISH
11. U.N.O. PROVIDE KNOX BOXES AT ALL OFFICE ENTRANCES.
12. PAINT CURBS AND PROVIDE SIGNS TO INFORM OF FIRE LANES AS REQUIRED BY FIRE DEPARTMENT.
13. ON-SITE FIRE MAIN, FIRE SPRINKLER, AND SPRINKLER MONITORING SYSTEM SHALL BE SUBMITTED SEPARATELY TO THE FIRE DEPARTMENT FOR REVIEW AND PERMITTING.
14. ALL VERTICAL MOUNTING POLES OF FENCING SHALL BE CAPPED.
15. LANDSCAPED AREAS SHALL BE DELINEATED WITH A MINIMUM SIX INCHES (6") HIGH CURB
16. ALL INTERIOR AND EXTERIOR WALK SURFACES TO BE NON-SLIP TYPE
17. SECURITY GATES MUST BE AUTOMATED FOR THE GARBAGE/RECYCLING TRUCK DRIVERS TO ACCESS THE TRASH ENCLOSURE. INSTALL AN ACCESS CARD SYSTEM, PUNCH KEYPAD, OR INFRARED ACCESS SYSTEM, THOUGH A KEYPAD ACCESS SYSTEM IS PREFERRED. THE AUTOMATED GATE ENTRY SYSTEM FOR THE GARBAGE TRUCK ACCESS MUST BE DIFFERENT THAN THE FIRE DEPARTMENT KNOX BOX.

VICINITY MAP



OFFICIAL USE ONLY

HPA architecture

hpa, inc.
600 grand ave, suite 302
oakland, ca
94610
tel: 949-862-2113
email: hpa@hparchs.com

LICENSED ARCHITECT — C-29451 — 3-31-25 RENEWAL DATE — STATE OF CALIFORNIA

Owner:

NORTH PALISADE PARTNERS
1330 FACTORY PLACE, SUITE 105
LOS ANGELES, CA 90013
TEL: (213) 495-2949

Project:

43990 FREMONT BLVD

FREMONT, CA

Consultants:

CIVIL	K&W
STRUCTURAL	-
MECHANICAL	-
PLUMBING	-
ELECTRICAL	-
LANDSCAPE	GREEN DESIGN
FIRE PROTECTION	-
SOILS ENGINEER	-

Title: OVERALL SITE PLAN

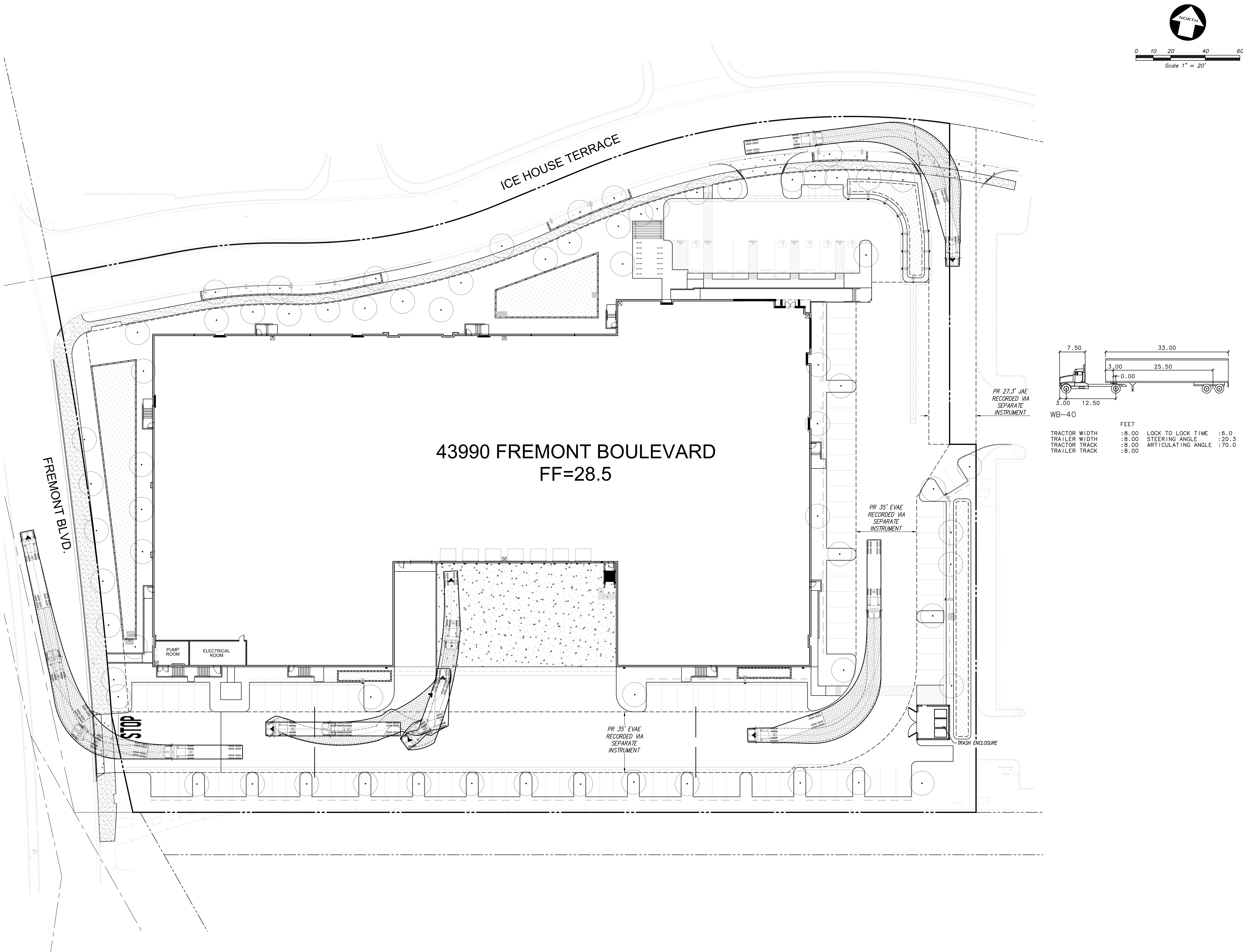
Project Number:	20502
Drawn by:	M.D.
Date:	03/04/2024

Revision:
12/1/23 1st Submittal
3/4/24 2nd Submittal

Sheet:

DAB-A1.1

Appendix F
Truck Turning Movement Graphics



Z:\2021\A21600-2\DWG\ENTITLEMENTS\PD PERMIT\ A21600-2-PG-TRCK.dwg USER: ameckler DATE: 3/01/2024 - 5:45pm

HPA architecture

hpa, inc.
600 grand ave, suite 302
oakland, ca
94610
tel: 949-862-2113
email: hpa@hparchs.com

KIER+WRIGHT

3350 Scott Boulevard, Building 22
Santa Clara, California 95054
Phone: (408) 727-6665
www.kierwright.com

Owner:

NORTH PALISADE PARTNERS

ATTN: WILLIAM JACOBS
1330 FACTORY PLACE, SUIT 105
LOS ANGELES, CA 90013

Project:

43990 FREMONT BLVD

FREMONT, CA

Consultants:

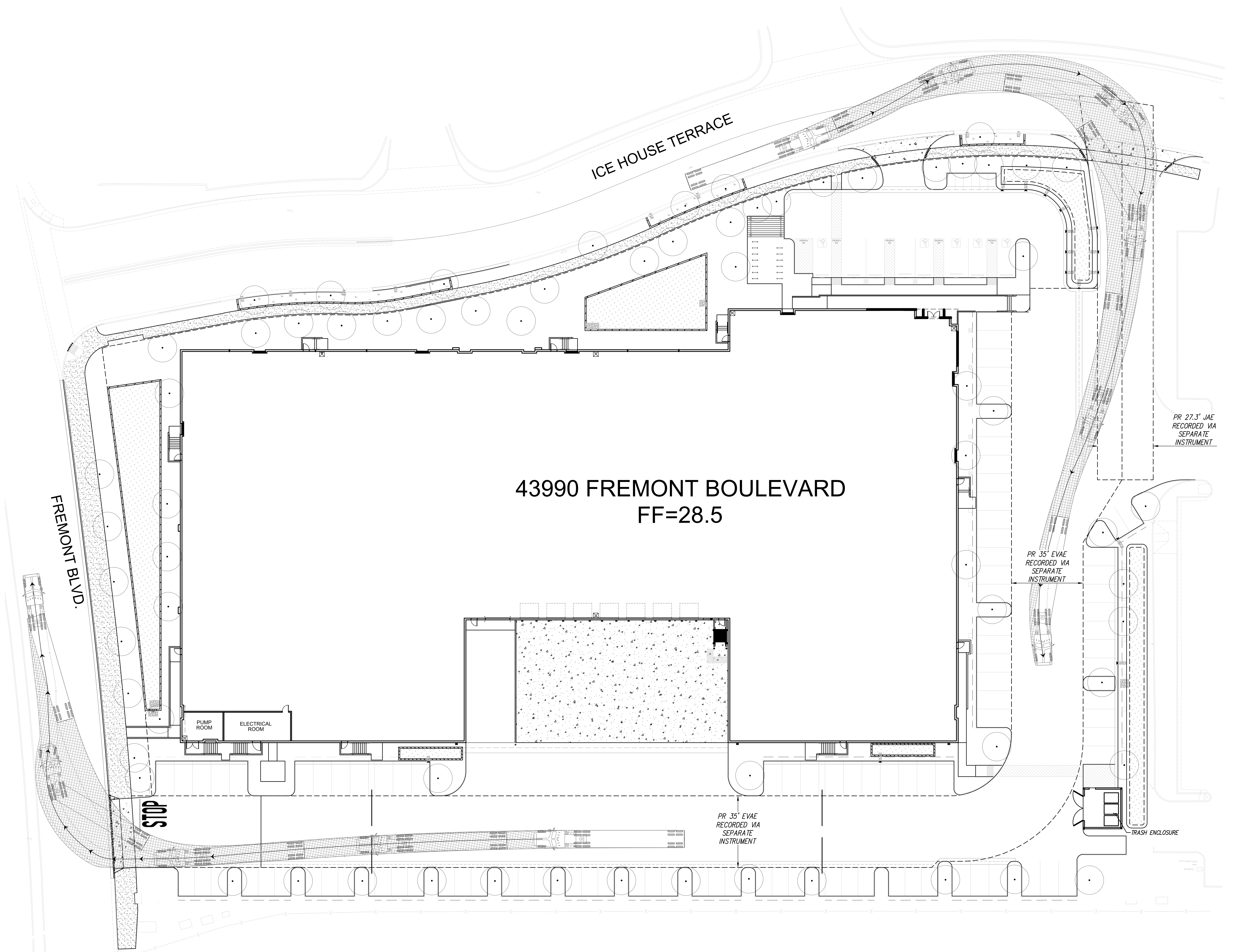
CIVIL	K&W
STRUCTURAL	-
MECHANICAL	-
PLUMBING	-
ELECTRICAL	-
LANDSCAPE	GREEN DESIGN
FIRE PROTECTION	-
SOILS ENGINEER	-

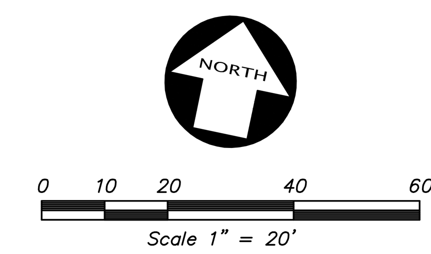
WB40 TRUCK ACCESS

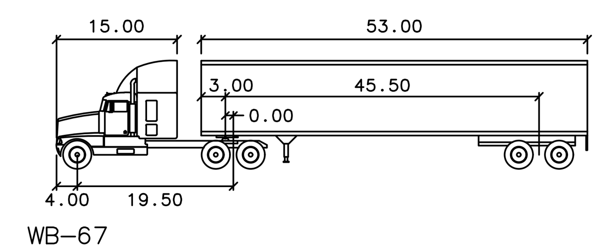
Project Number:	A21600
Drawn by:	CJG
Date:	03/01/24
Revision:	

Sheet:

C5.1







	feet		
Tractor Width	:8.00	Lock to Lock Time	:6.0
Trailer Width	:8.50	Steering Angle	:28.4
Tractor Track	:8.00	Articulating Angle	:75.0
Trailer Track	:8.50		

HPA architecture

hpa, inc.
600 grand ave, suite 302
oakland, ca
94610
tel: 949-862-2113
email: hpa@hparchs.com

KIER+WRIGHT
3350 Scott Boulevard, Building 22
Santa Clara, California 95054
Phone: (408) 727-6665
www.kierwright.com

Owner:

NORTH PALISADE PARTNERS

ATTN: WILLIAM JACOBS
1330 FACTORY PLACE, SUIT 105
LOS ANGELES, CA 90013

Project:

43990 FREMONT BLVD

FREMONT, CA

Consultants:

CIVIL	K&W
STRUCTURAL	-
MECHANICAL	-
PLUMBING	-
ELECTRICAL	-
LANDSCAPE	GREEN DESIGN
FIRE PROTECTION	-
SOILS ENGINEER	-

WB67 TRUCK ACCESS

Project Number:	A21600
Drawn by:	CJG
Date:	03/01/24
Revision:	

Sheet:

C5.1

Z:\2021\A21600-2\DWG\ENTITLEMENTS\PD PERMIT\ A21600-2-PG-TRCK.dwg USER: cgoodman DATE: 3/06/2024 - 8:03am