

ADMINISTRATIVE DRAFT

TECHNICAL MEMORANDUM

TO: Lynn Rodrian, California Department of General Services
cc: Louis Utsumi, Myra L. Frank & Associates

FROM: Sean Mohn

SUBJECT: Fairview Development Center – Phase I Surplus Site Development
Preliminary Site Access and Traffic Impact Analysis

DATE: October 9, 2003 **REF:** 1679

This memorandum summarizes the results of a preliminary site access and traffic impact analysis conducted by Kaku Associates, Inc. relative to the development of the Phase I surplus site at the Fairview Development Center (FDC) facility in the City of Costa Mesa. The Phase I surplus site (Parcel C1) is located on the northwest corner of Harbor Boulevard and Fair Drive. We have based the analysis and our conclusions on the current City of Costa Mesa guidelines for conducting traffic impact analyses.

PROJECT DESCRIPTION

As shown in Figure 1, Parcel C1 is located on the northwest corner of Harbor Boulevard and Fair Drive within the City of Costa Mesa and is approximately 6.7 acres in size. For analysis purposes, the development of this parcel is assumed to consist of multi-family housing at a density of 20 units per acre (yielding approximately 134 units). Primary access to the development would be from Fair Drive, with the possibility of a secondary right-turn only entrance/exit located along Harbor Boulevard.

STUDY SCOPE

The study first proposes and evaluates various site access alternatives for Parcel C1 based on the existing street network. The study then analyzes the potential project-generated traffic impacts on the street system specific to the development of Parcel C1. Traffic impacts for the project were evaluated for typical weekday morning (7:00 to 9:00 AM) and evening peak periods (4:00 to 6:00 PM). The following traffic scenarios were analyzed in the study:

- Existing (Year 2003) Conditions - The analysis of existing morning and evening peak hour traffic conditions provided a basis for the assessment of future traffic conditions. The

existing conditions analysis included traffic volumes and current intersection operating conditions.

- Cumulative Base (Year 2008) Conditions - This scenario projected the future traffic growth and intersection operating conditions that are expected from background growth by the year 2008. These analyses provided the baseline conditions against which project impacts were evaluated.
- Cumulative Plus Project (Year 2008) Conditions - This analysis identified the potential incremental impacts of the development of Parcel C1 on future traffic operating conditions by adding the traffic expected to be generated by the project to the cumulative base traffic forecasts.

This study examined five intersections in the vicinity of the project site for each of the three traffic scenarios. The study intersections are listed below and shown in Figure 1.

- Harbor Boulevard & Adams Avenue
- Harbor Boulevard & Merrimac Way
- Harbor Boulevard & Fair Drive
- Harbor Boulevard & Victoria Street
- Fairview Road & Fair Drive

PHASE I SITE ACCESS ANALYSIS

The discussion of site access centers around the development of Parcel C1 and whether or not any of the access alternatives presented for Parcel C1 could be impacted by the separate development of surplus Parcel A.

Parcel C1 covers approximately 6.7 acres and is generally bounded by Harbor Boulevard to the east, Fair Drive to the south, and residential developments to the north and west. There is also an operating one-way westbound-only roadway located on the west side of Harbor Boulevard north of Fair Drive at the southern edge of Parcel C1. This roadway connects to Fair Drive roughly at the southwestern corner of Parcel C1.

A review of the surrounding street system reveals that several different access alternatives could be realized. For analysis purposes, the development of site access alternatives focused on two distinct variables: whether or not direct access is provided to Parcel C1 from Harbor Boulevard, and whether or not the one-way westbound-only roadway would remain in operation. From these variables, four general site access alternatives were found. These alternatives are described below:

- Alternative 1 - Primary access to Parcel C1 would be from the south along Fair Drive, near the southwestern corner of the Parcel C1 site. Secondary access to the site would be provided along Harbor Boulevard via a right-turn only entrance/exit. The one-way

westbound-only roadway located on the west side of Harbor Boulevard directly north of Fair Drive would be closed. Traffic utilizing this roadway would be rerouted to Fair Drive. Alternative 1 is shown in Figure 2.

- Alternative 2 - Primary access to Parcel C1 would be from the south along Fair Drive, near the southwestern corner of the Parcel C1 site. Secondary access to the site would be provided along Harbor Boulevard via a right-turn only entrance/exit. The one-way westbound-only roadway located on the west side of Harbor Boulevard directly north of Fair Drive would remain open. Alternative 2 is shown in Figure 3.
- Alternative 3 - Primary access to Parcel C1 would be from the south along Fair Drive, near the southwestern corner of the Parcel C1 site. There would be no access to the site from Harbor Boulevard. The one-way westbound-only roadway located on the west side of Harbor Boulevard directly north of Fair Drive would be closed. Traffic utilizing this roadway would be rerouted to Fair Drive. Alternative 3 is shown in Figure 4.
- Alternative 4 - Primary access to Parcel C1 would be from the south along Fair Drive, near the southwestern corner of the Parcel C1 site. There would be no access to the site from Harbor Boulevard. The one-way westbound-only roadway located on the west side of Harbor Boulevard directly north of Fair Drive would remain open. Alternative 4 is shown in Figure 5.

Of the above alternatives, Alternative 1 is considered to be superior from both an access and operational standpoint, as it would provide more than one access point into the site and the proposed access from Fair Drive could be configured as a standard T-intersection. If the existing one-way westbound roadway north of Fair Drive is not removed, as proposed in Alternative 2 and Alternative 4, both the configuration and operation of the Fair Drive access point would become more complicated. It should be noted that potential access to Parcel C1 via Mark Lane, which is the existing Parcel C2 roadway, would require removal of existing house or houses along Mark Lane in Parcel C2 and was therefore not considered during this analysis.

Parcel A is a separate 14.5-acre surplus site located within the FDC facility on the southwest corner of Shelley Circle South and Florence Way that may be developed someday independently of Phase I development of Parcel C1. For the purpose of this study, potential access to Parcel A was evaluated from the perspective of whether such access would affect any of the access options for Parcel C1. It is anticipated that access to Parcel A would occur via Shelley Circle South and that Shelley Circle South would be redesigned to appear and function more like a local street than an internal roadway and parking lot throughway. This would require the loss and/or reconfiguration of existing FDC parking along the western side of Shelley Circle South. It is also anticipated that Shelley Circle North and/or Shelley Circle South would be realigned at their intersection with Fair Drive to eliminate the existing offset between the two roadways. These potential improvements would all be located to the west of the Parcel C1 access point along Fair Drive, and as such the development of Parcel A would not appear to impact any of the proposed Parcel C1 access alternatives.

Fair Drive is currently a two-lane roadway west of Harbor Boulevard. Two lanes should be adequate to accommodate existing traffic volumes and projected traffic volumes with development of Parcel C1. Future development of other surplus parcels within the FDC facility beyond the currently-anticipated Parcels A and C1, however, could potentially require improvement of Fair Drive. It is therefore recommended that development on Parcel C1 be set back from Fair Drive sufficient to allow future widening of Fair Drive should it become necessary.

PHASE I OFF-SITE TRAFFIC IMPACT ANALYSIS

Existing Conditions

The assessment of existing conditions relevant to this study includes traffic volumes and operating conditions at five key intersections in the vicinity of the project site during the year 2003. Existing morning and evening peak hour traffic counts were conducted on August 27, 2003.

Level of service (LOS) is a qualitative measure used to describe the condition of traffic flow ranging from excellent conditions at LOS A to overload conditions at LOS F. The City of Costa Mesa uses LOS D as the lowest acceptable level of service for roadways, meaning that LOS D or better represents satisfactory conditions, while LOS E or F are generally considered unsatisfactory.

All of the analyzed intersections are currently controlled by traffic signals. As required by the City of Costa Mesa, the "Intersection Capacity Utilization" (ICU) method of intersection analysis was used to determine the intersection volume to capacity (V/C) ratio and corresponding level of service for the signalized intersections. Level of service definitions for signalized intersections are included in Table 1.

As shown in Table 2, all of study intersections currently operate at LOS D or better during both the AM and PM peak hours.

24-hour ADT counts were also conducted at two locations within the project vicinity. Currently there are approximately 3,400 vehicles per day traveling along Fair Drive west of Harbor Boulevard, with approximately 1,250 vehicles traveling westbound and 2,150 vehicles traveling eastbound. Approximately 890 vehicles per day utilize the one-way westbound-only roadway north of Fair Drive.

Cumulative Base Conditions

The assessment of future conditions relevant to this study includes traffic volumes and operating conditions at five key intersections in the vicinity of the project site during the year 2008. For the purposes of this study, a background growth rate of 2% per year was assumed. The projected increase in traffic related to the potential future development of surplus Parcel A was also taken

into consideration (assuming 14.5 acres at 20 units per acre). The future year 2008 base peak hour traffic volumes were thus obtained by first increasing the existing traffic volumes by a total of 10% and then adding future trips generated by development of Parcel A. The resulting levels of service obtained from these adjusted traffic volumes represent the Cumulative Base conditions, i.e., the future conditions prior to the addition of the proposed project traffic.

As shown in Table 3, three of the five study intersections are projected to operate at LOS D or better during both the AM and PM peak hours. The intersection of Harbor Boulevard & Adams Avenue is projected to operate at LOS E during both the AM and PM peak hours, while the intersection of Harbor Boulevard & Victoria Street is projected to operated at LOS E during the evening peak hour.

Traffic Impact Analysis

Project Trip Generation

As described previously, the proposed development of surplus Parcel C1 is assumed to consist of multi-family housing at 20 units per acre. Average trip generation rates provided in the Institute of Transportation Engineers' *Trip Generation, 6th Edition* (1997) were used to estimate the magnitude of traffic that may be generated by this development. Table 4 presents the rates used in this analysis. Using these rates, the total future trips generated by the proposed development were estimated as also shown in Table 4.

It is estimated that the development of Parcel C1 would generate approximately 888 daily vehicle trips, of which about 68 vehicles per hour (vph) would travel during the AM peak hour and 83 vph would travel during the PM peak hour.

Project Trip Distribution and Assignment

The geographic distribution of the traffic generated by the proposed development would depend on several factors. These factors include the geographic distribution of activity centers (employment, commercial, and other) to which residents of the proposed project may travel, the proximity of freeway access in relation to the surrounding street system, as well as travel characteristics specific to the proposed development. It is assumed that the proposed development would draw approximately 30% of its traffic from the north, 30% from the east, 15% from the west, and 25% from the south.

The various site access alternatives discussed previously were also taken into consideration when assigning the proposed development traffic, as each alternative would yield a different trip distribution pattern through the intersection of Harbor Boulevard & Fair Drive.

Cumulative Plus Project Levels of Service

The project traffic forecasted above for the development of Parcel C1 for each peak hour was added to the Cumulative Base traffic based on the distribution patterns discussed above.

As shown in Table 3, three of the five study intersections are projected to operate at LOS D or better during both the AM and PM peak hours after the addition of project-generated traffic. The intersection of Harbor Boulevard & Adams Avenue is projected to operate at LOS E during both the AM and PM peak hours, while the intersection of Harbor Boulevard & Victoria Street is projected to operated at LOS E during the evening peak hour.

Project Traffic Impacts

The City of Costa Mesa has established criteria to determine whether a project has a significant impact at an intersection. Using the City of Costa Mesa criteria, a project impact would be considered significant if the following condition is met:

<u>Level of Service</u>	<u>Final V/C Ratio</u>	<u>Project-Related Increase In V/C</u>
E, F	>0.900	equal to or greater than 0.01

Using these criteria, a project would not have a significant impact at an intersection, for example, if it is operating at LOS D or better after the addition of project traffic regardless of the magnitude of the increase in the V/C ratio. If the intersection is operating, however, at LOS E or F after the addition of project traffic and the incremental change in the V/C ratio is equal or greater than the criteria described above, the project would have a significant impact at that location.

The results of the V/C ratio and LOS analysis at the five study intersections for both the Cumulative Base and the Cumulative Plus Project conditions are presented in Table 3. As shown in Table 3, the incremental increase in the volume/capacity ratio at each of the five study intersections is less than the City's criteria for significance; therefore none of the intersections are projected to be significantly impacted by the proposed Parcel C1 development.

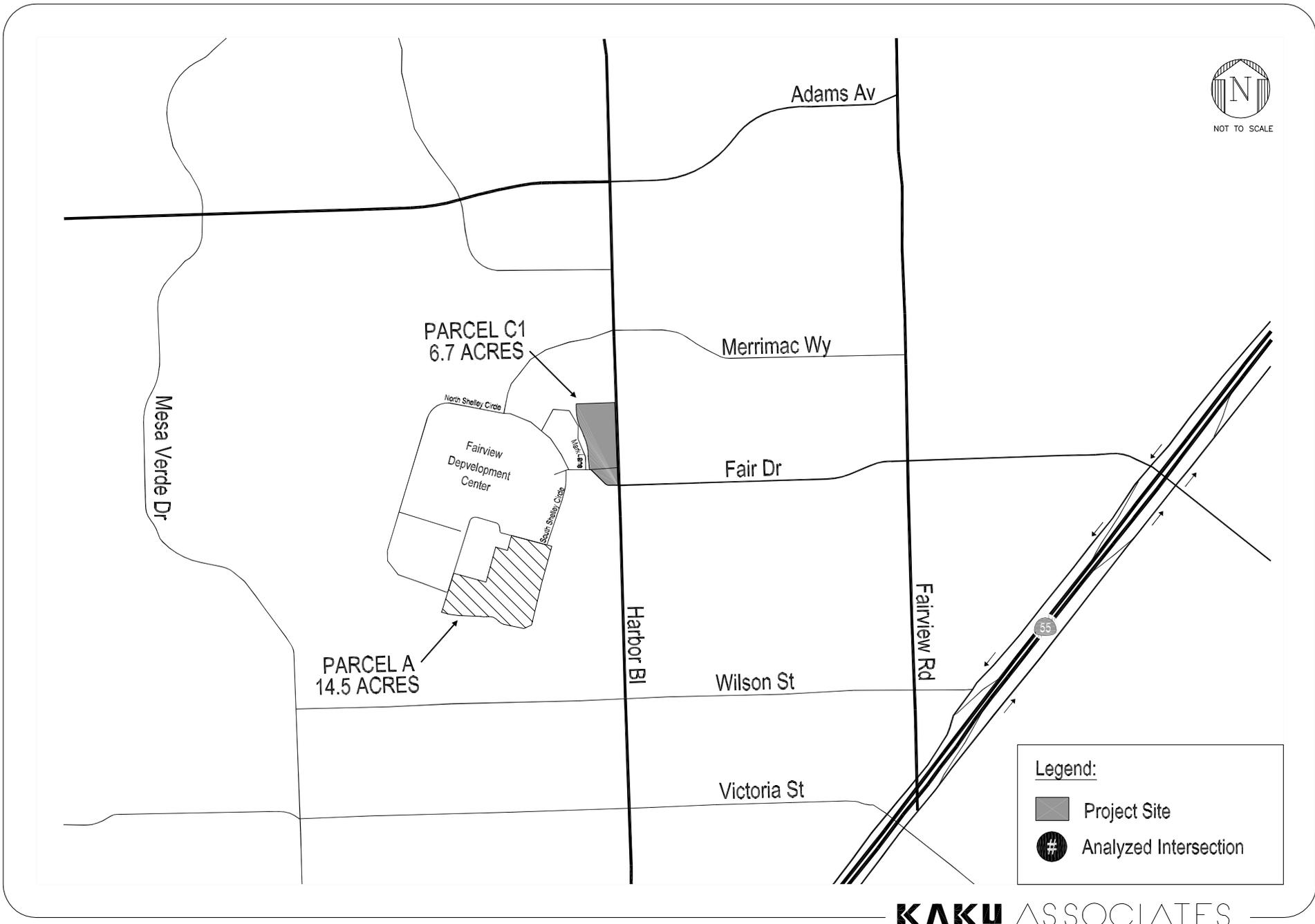
The four Parcel C1 access alternatives discussed previously would result in minor changes in the amount of project traffic that would travel through the intersection of Harbor Boulevard & Fair Drive. For example, alternatives that eliminate the existing one-way westbound roadway from Harbor Boulevard north of Fair Drive would result in additional southbound right-turn movements from Harbor Boulevard to Fair Drive, since all existing and potential future project right-turns from Harbor Boulevard to the one-way roadway would need to shift to Fair Drive. Alternatives without a right-turn access to/from Harbor Boulevard would be expected to result in additional project-generated right-turn movements at Harbor Boulevard/Fair Drive. Alternatives with right-turn access to Harbor Boulevard could create southbound U-turns at Harbor Boulevard/Fair Drive that would otherwise be left-turns from eastbound Fair Drive onto Harbor Boulevard. The level of service analysis on Table 3 shows, however, that the shifts in traffic volumes related to the

different access options would be so small that they would not have a noticeable effect on operating conditions at the Harbor Boulevard/Fair Drive intersection.

CONCLUSIONS

This study was undertaken to analyze potential site access and project traffic impacts generated by the proposed FDC Phase I surplus site development. The following conclusions are outlined below:

- Phase I Site Access - Based on the existing street network, it was determined that four general access alternatives could be developed for Parcel C1. Alternative 1, consisting of closure of the westbound roadway connecting Harbor Boulevard to Fair Drive, provision of a primary access point onto Fair Drive at roughly the southwestern corner of the Parcel C1 site, and provision of a secondary right-turn only access onto Harbor Boulevard, would provide the best access scheme from an operational and flexibility standpoint. Access to Parcel C1 is not expected to be materially affected by the potential future development of Parcel A.
- Phase I Off-Site Traffic Impact Analysis - The results of the traffic impact analysis for the proposed development of Parcel C1 indicate that none of the five analyzed study intersections would be significantly impacted under the City of Costa Mesa criteria. Furthermore, no measurable differences in operating conditions are projected at the intersection of Harbor Boulevard and Fair Drive between the four access alternatives.

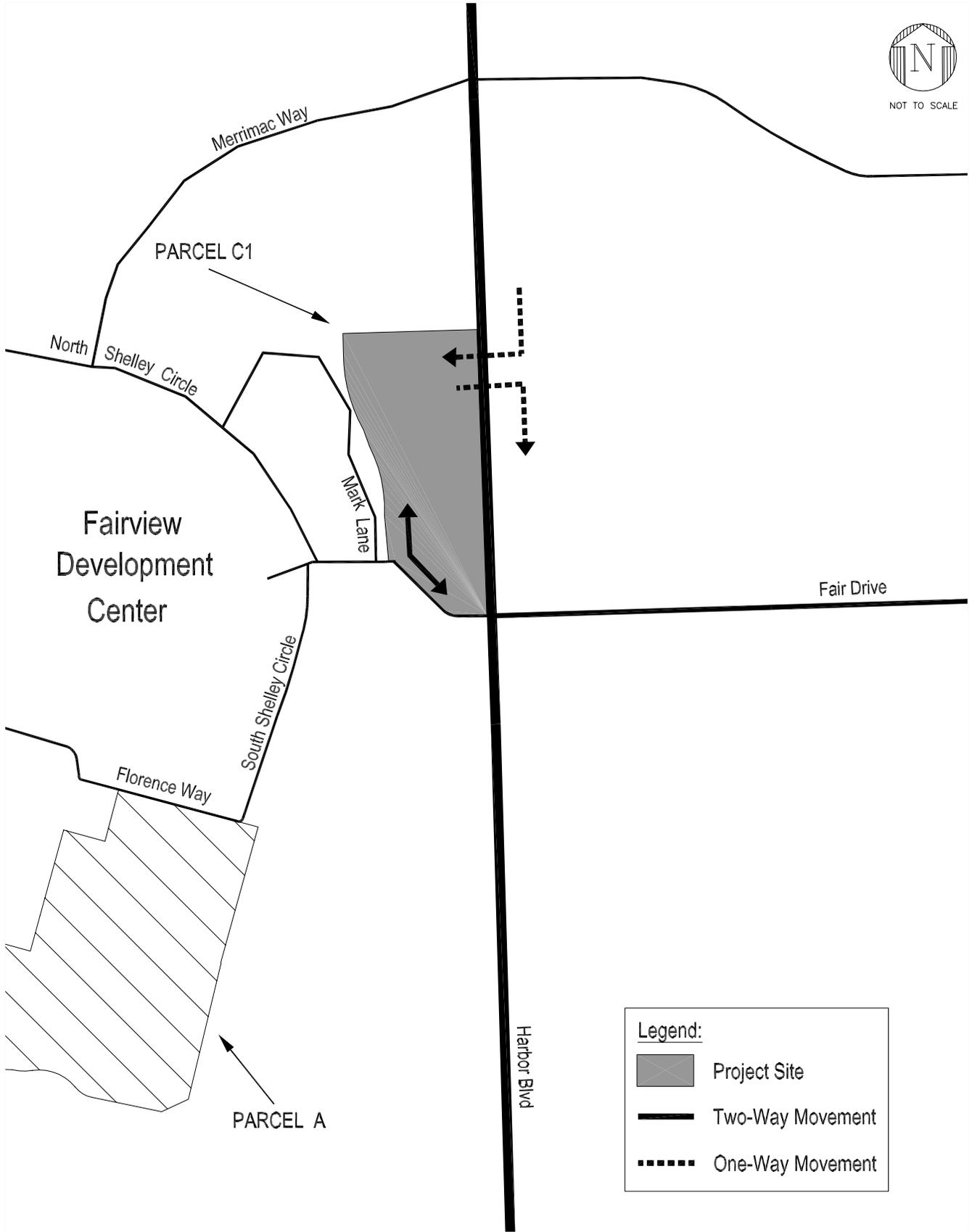


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FIGURE 1
PROJECT LOCATION AND ANALYZED INTERSECTIONS



NOT TO SCALE

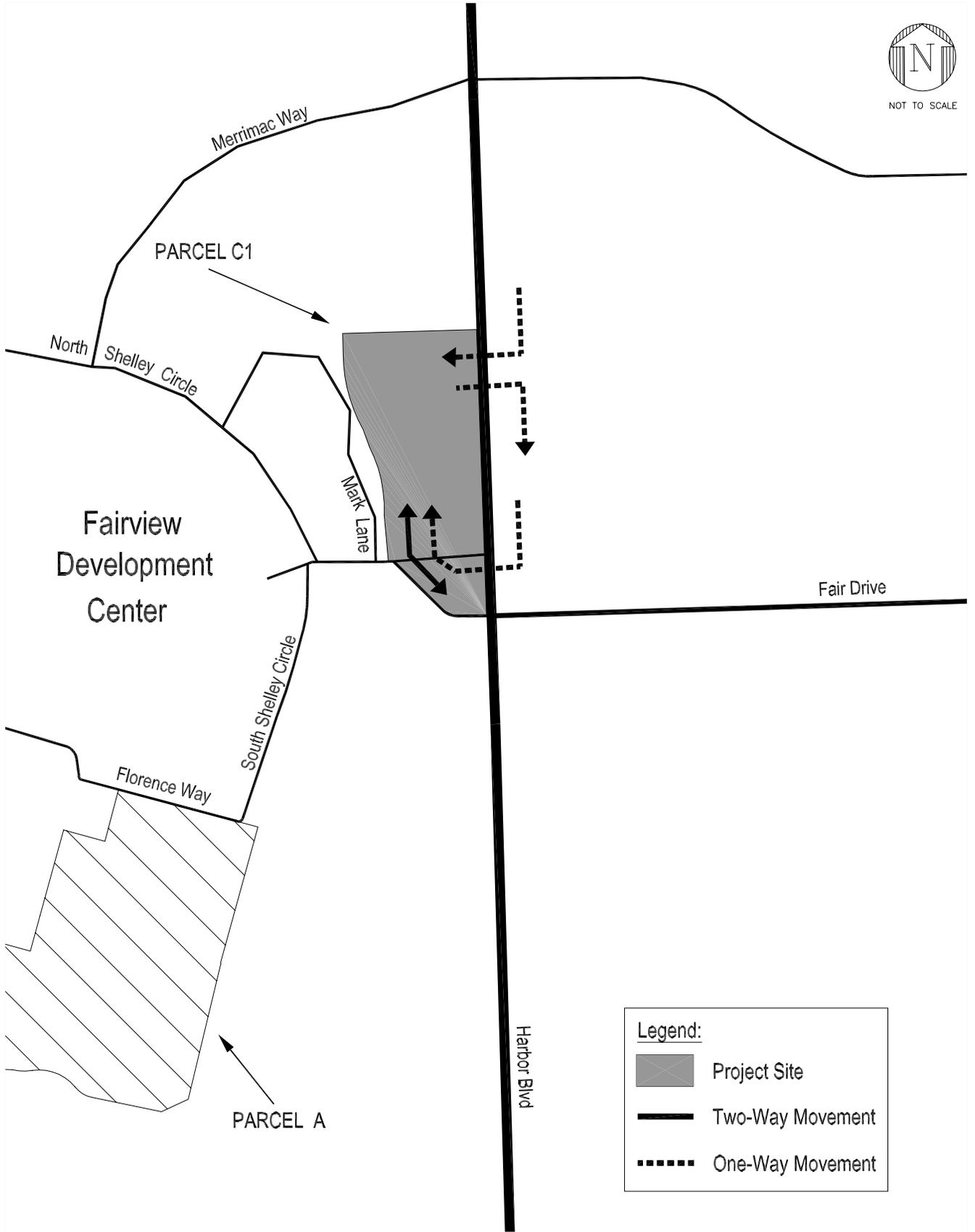


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FIGURE 2
PARCEL C1 SITE ACCESS - ALTERNATIVE 1



NOT TO SCALE



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FIGURE 3
PARCEL C1 SITE ACCESS - ALTERNATIVE 2



NOT TO SCALE



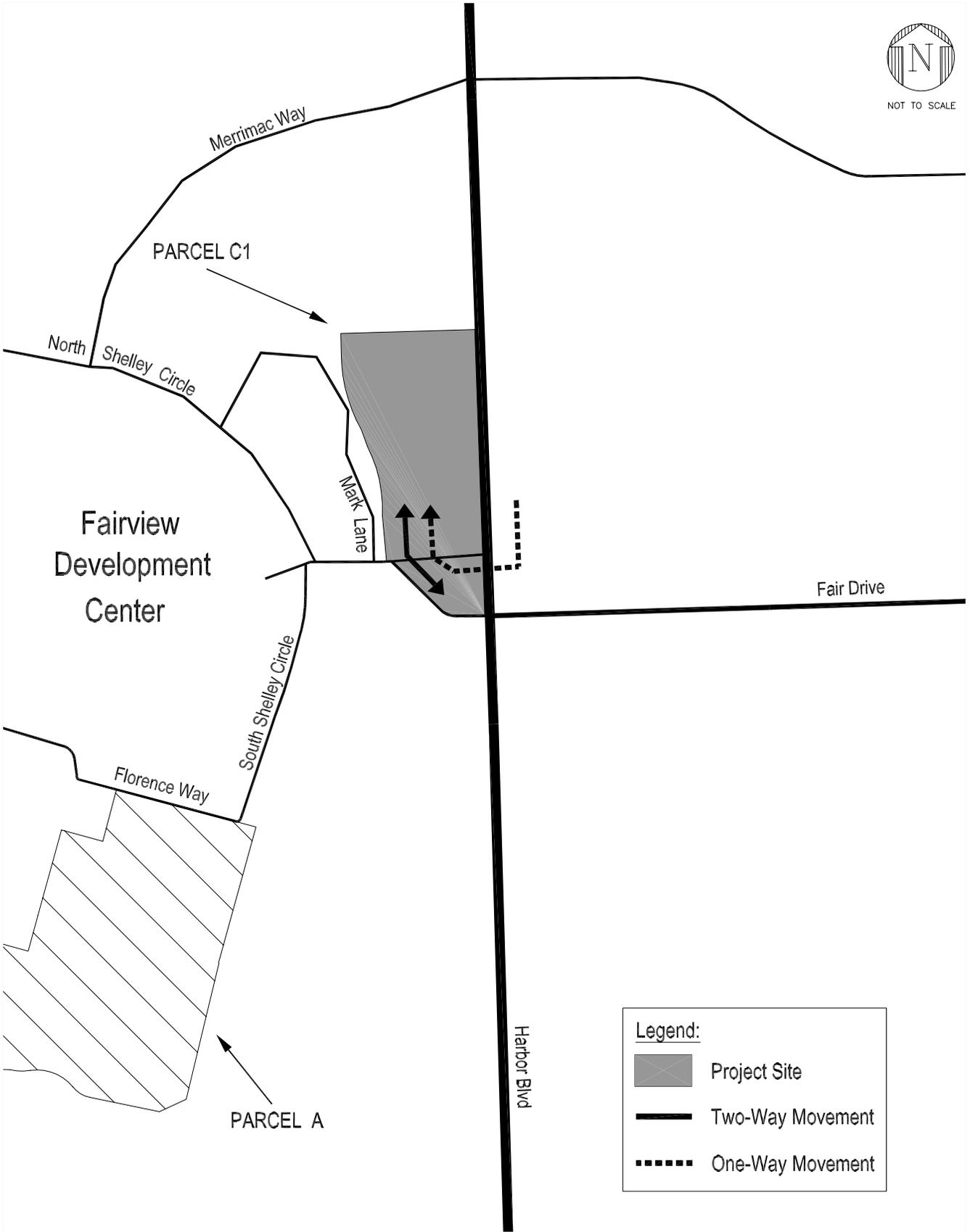
Legend:

-  Project Site
-  Two-Way Movement
-  One-Way Movement

FIGURE 4
PARCEL C1 SITE ACCESS - ALTERNATIVE 3



NOT TO SCALE



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FIGURE 5
PARCEL C1 SITE ACCESS - ALTERNATIVE 4

TABLE 1
LEVEL OF SERVICE DEFINITIONS FOR SIGNALIZED INTERSECTIONS

Level of Service	V/C Ratio	Definition
A	0.000 - 0.600	EXCELLENT. No vehicle waits longer than one red light and no approach phase is fully used.
B	0.601 - 0.700	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701 - 0.800	GOOD. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801 - 0.900	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901 - 1.000	POOR. Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	>1.000	FAILURE. Backups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths.

Source: Adapted from Transportation Research Board, *Highway Capacity Manual, Special Report 209*, October 1994.

**TABLE 2
YEAR 2003 EXISTING CONDITIONS
INTERSECTION LEVELS OF SERVICE**

Intersection	Peak Hour	Year 2003 Existing	
		V/C or Delay	LOS
1. Harbor Bl & Adams Bl	AM	0.82	D
	PM	0.88	D
2. Harbor Bl & Merrimac Way	AM	0.47	A
	PM	0.70	B
3. Harbor Bl & Fair Dr	AM	0.40	A
	PM	0.72	C
4. Harbor Bl & Victoria St	AM	0.59	A
	PM	0.86	D
5. Fairview Rd & Fair Dr	AM	0.36	A
	PM	0.68	B

**TABLE 3
YEAR 2008 FUTURE CONDITIONS
INTERSECTION LEVELS OF SERVICE**

Intersection	Peak Hour	Year 2008 Cumulative Base		Year 2008 Cumulative Plus Project			
		V/C or Delay	LOS	V/C or Delay	LOS	Increase in V/C	Significant Impact?
1. Harbor Bl & Adams Bl	AM	0.91	E	0.91	E	0.00	NO
	PM	0.98	E	0.98	E	0.00	NO
2. Harbor Bl & Merrimac Way	AM	0.54	A	0.55	A	0.01	NO
	PM	0.77	C	0.77	C	0.00	NO
3. Harbor Bl & Fair Dr	AM	0.46	A	0.48	A	0.02	NO
	PM	0.81	D	0.82	D	0.01	NO
<i>Access Alternative 2</i>	AM	0.46	A	0.48	A	0.02	NO
	PM	0.81	D	0.82	D	0.01	NO
<i>Access Alternative 3</i>	AM	0.46	A	0.48	A	0.02	NO
	PM	0.81	D	0.82	D	0.01	NO
<i>Access Alternative 4</i>	AM	0.46	A	0.48	A	0.02	NO
	PM	0.81	D	0.82	D	0.01	NO
4. Harbor Bl & Victoria St	AM	0.65	B	0.65	B	0.00	NO
	PM	0.96	E	0.96	E	0.00	NO
5. Fairview Rd & Fair Dr	AM	0.39	A	0.39	A	0.00	NO
	PM	0.75	C	0.75	C	0.00	NO

**TABLE 4
FAIRVIEW DEVELOPMENT PROJECT - TRIP GENERATION**

Land Use	Size [b]	Trip Generation Rates [a]									Estimated Trip Generation						
		ITE Code	Daily Rate	AM Peak Hour			PM Peak Hour			Trip Rate Unit	Daily Trips	AM Peak Hour Trips			PM Peak Hour Trips		
				Rate	% In	% Out	Rate	% In	% Out			In	Out	Total	In	Out	Total
PROPOSED PROJECT Parcel C1	6.7 acres 134 units	220	6.63	0.51	16%	84%	0.62	67%	33%	per unit	888	11	57	68	56	27	83

Notes:

[a] Source: Institute of Transportation Engineers (ITE), Trip Generation, Sixth Edition, 1997.

[b] Assumed 20 dwelling units per acre.