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TO: Christine Kudija

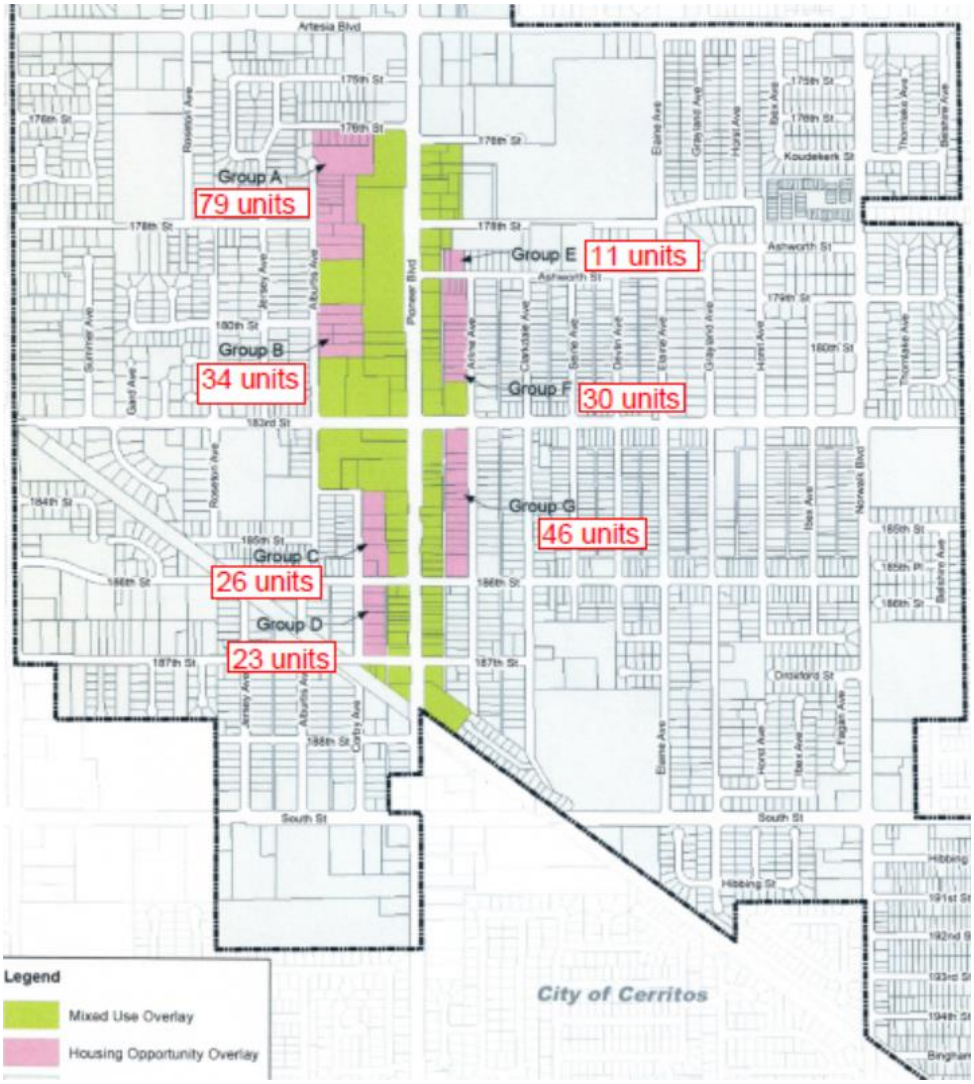
FROM: Gordon Lum

DATE: March 16, 2019

SUBJECT: Traffic Impact Analysis for City of Artesia Housing Overlay Zone

I. INTRODUCTION

This memo, prepared by Willdan Engineering, provides a summary of the traffic impact analysis (TIA) for the proposed City of Artesia Housing Overlay Zone. The City is doing some long-term planning to incentivize landowners to redevelop these properties (most are occupied by rental apartments and shown below in pink as Groups A-G) with greater density. This TIA is based on a "worst-case" scenario that adds units up to 30 units/acre. The number of additional units per Group at 30 units/acre is shown below, totaling 249 additional units for the seven Groups.



Study Intersections

The study area (shown below) consists of the following three signalized intersections:

1. Pioneer Boulevard and Artesia Boulevard
2. Pioneer Boulevard and 178th Street / Artesia Oasis Plaza
3. Pioneer Boulevard and 183rd Street.

Analysis Scenarios

To evaluate the project's potential traffic impacts on the study intersections, the following four scenarios were analyzed:

- Existing (2019) Conditions
- Existing Plus Project Conditions
- Horizon Year (2030) Without Project Conditions
- Horizon Year Plus Project Conditions.

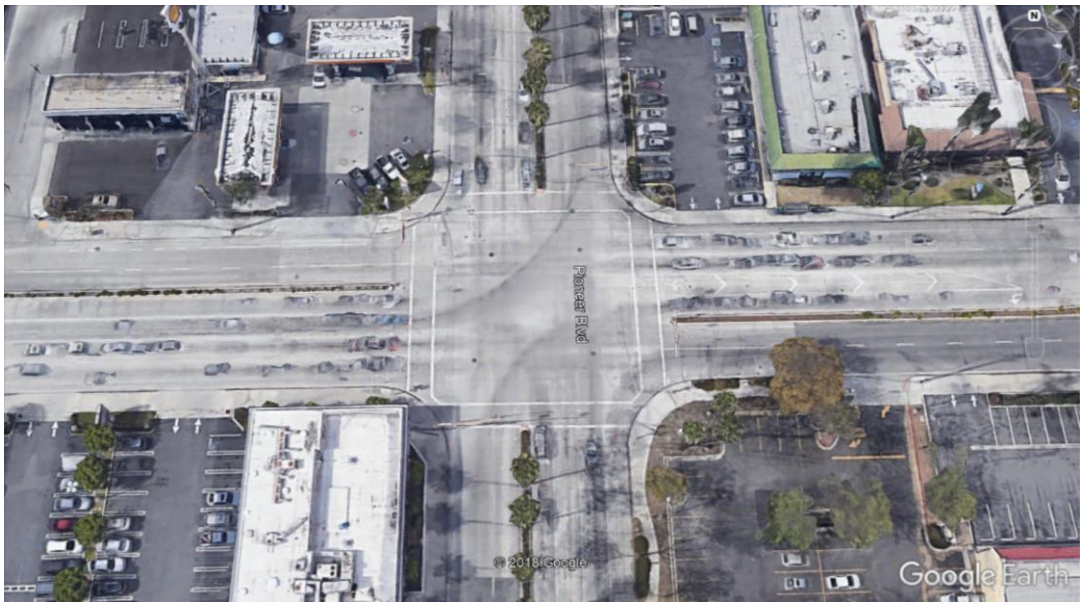
Traffic Analysis Methodology

Synchro software was used to analyze the operating conditions, or Level of Service (LOS), of the study intersections for the various scenarios. The Synchro analysis used the *Highway Capacity Manual* (HCM) 6th Edition methodology, which is based on the average delay, in seconds, of the vehicles moving through the intersection. Levels of Service are described using letter "grades", which are associated with intersection control delay times (in seconds), where "A" is considered the best and "F" is over capacity.

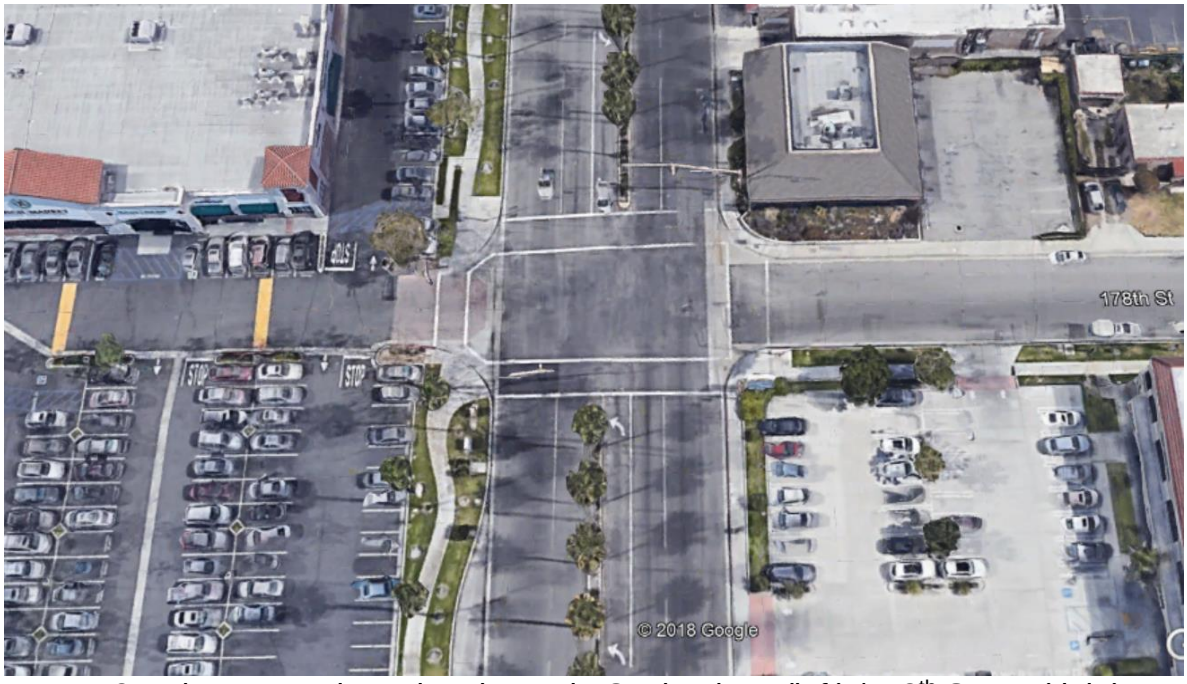
II. EXISTING CONDITIONS

Intersection Configurations

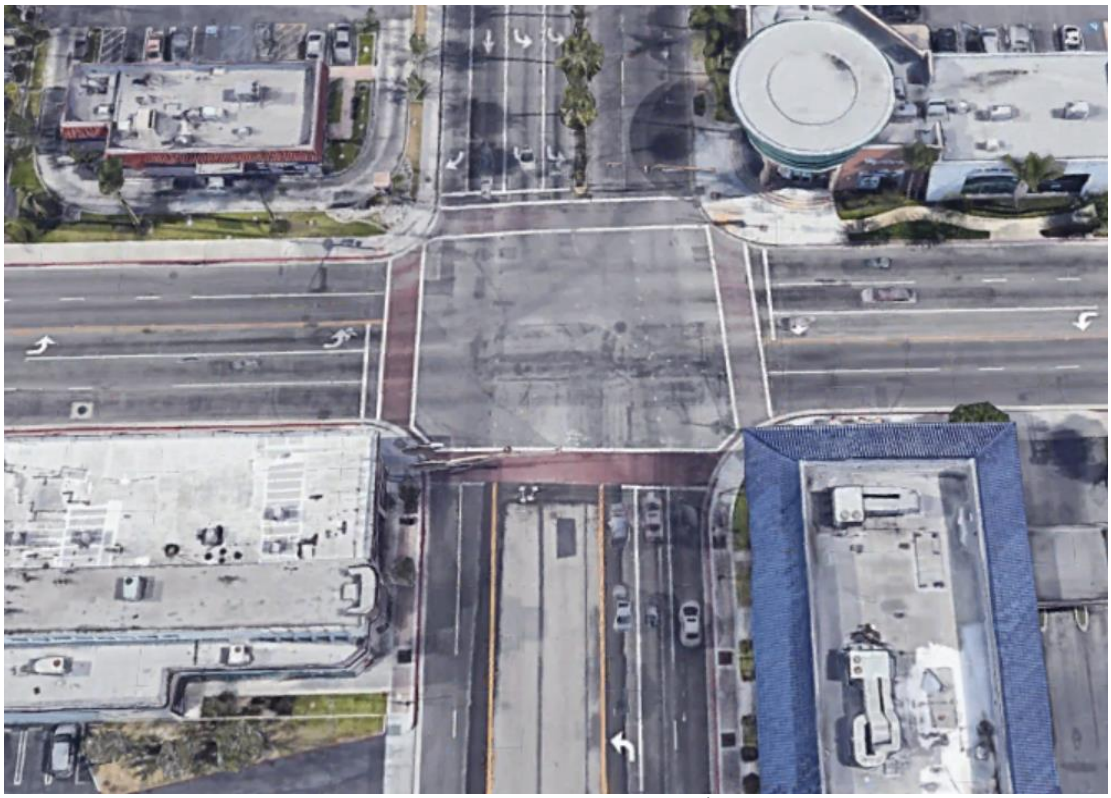
The next three photos (Source: Google Earth) present the existing lane configurations at the study intersections.



1. Pioneer Boulevard (north-south) and Artesia Boulevard (east-west)



2. Pioneer Boulevard and Artesia Oasis Plaza (left) /178th Street (right)



3. Pioneer Boulevard (north-south) and 183rd Street (east-west)

The turning movement counts (see ***Appendix A***) were collected on Saturday, March 9, 2019, 11:00 AM-1:00 PM and 4:00 PM – 6:00 PM and Tuesday, March 12, 2019, 7:00 AM-9:00 AM and 4:00 PM-6:00 PM. The peak hour at the busiest study intersection (i.e., Pioneer Boulevard and Artesia Boulevard) during each of the two-hour count periods were as follows:

- Saturday, Noon-1:00 PM (3,363 total vehicles entering the intersection)
- Tuesday, 7:30 AM-8:30 AM (2,925)
- Tuesday, 5:00 PM-6:00 PM (3,498).

Operating conditions at the study intersections were analyzed during these three peak hours using the Highway Capacity Manual (HCM) methodology. The results of the intersection analyses for the City intersections under existing conditions are summarized in ***Table 1***. As noted in ***Table 1***, all three study intersections are currently operating at LOS B or better. The intersection analysis worksheets can be referenced in ***Appendix B***.

Table 1: Existing Conditions Level-of-Service Results

Study Intersection	AM Peak (sec./veh.)	PM Peak (sec./veh.)	Saturday Peak (sec./veh.)
1.Pioneer Boulevard-Artesia Boulevard	12.4 (LOS B)	12.9 (LOS B)	12.5 (LOS B)
2.Pioneer Blvd.-178th St.-Artesia Oasis Plaza	8.3 (LOS A)	5.6 (LOS A)	6.5 (LOS A)
3.Pioneer Boulevard-183rd Street	9.4 (LOS A)	11.5 (LOS B)	12.7 (LOS B)

III. PROJECT TRIP GENERATION AND ASSIGNMENT

Project Trip Generation

The maximum proposed density is 30 units/acre, which will result in a total of 249 additional units in the seven Groups as follows:

- Group A maximum increase=79 multi-family units
- Group B=34 units
- Group C=26 units
- Group D=23 units
- Group E=11 units
- Group F=30 units
- Group G=46 units.

The trip generation rates (Land Use Code 220 for weekday and Land Use Code 222 for Saturday) for the three different peak hours are summarized in ***Table 2***.

Table 2: Project Trip Generation

Weekday: AM Peak Hour of Adjacent Street

ITE Code	Land Use	Quantity	Variable	Rate	In %	Out %	In	Out	Total
220	Multi-family	249	Dwelling Units	0.51	20	80	25	102	127

Weekday: PM Peak Hour of Adjacent Street

ITE Code	Land Use	Quantity	Variable	Rate	In %	Out %	In	Out	Total
220	Multi-family	249	Dwelling Units	0.62	65	35	100	54	154

Saturday: Peak Hour of Generator

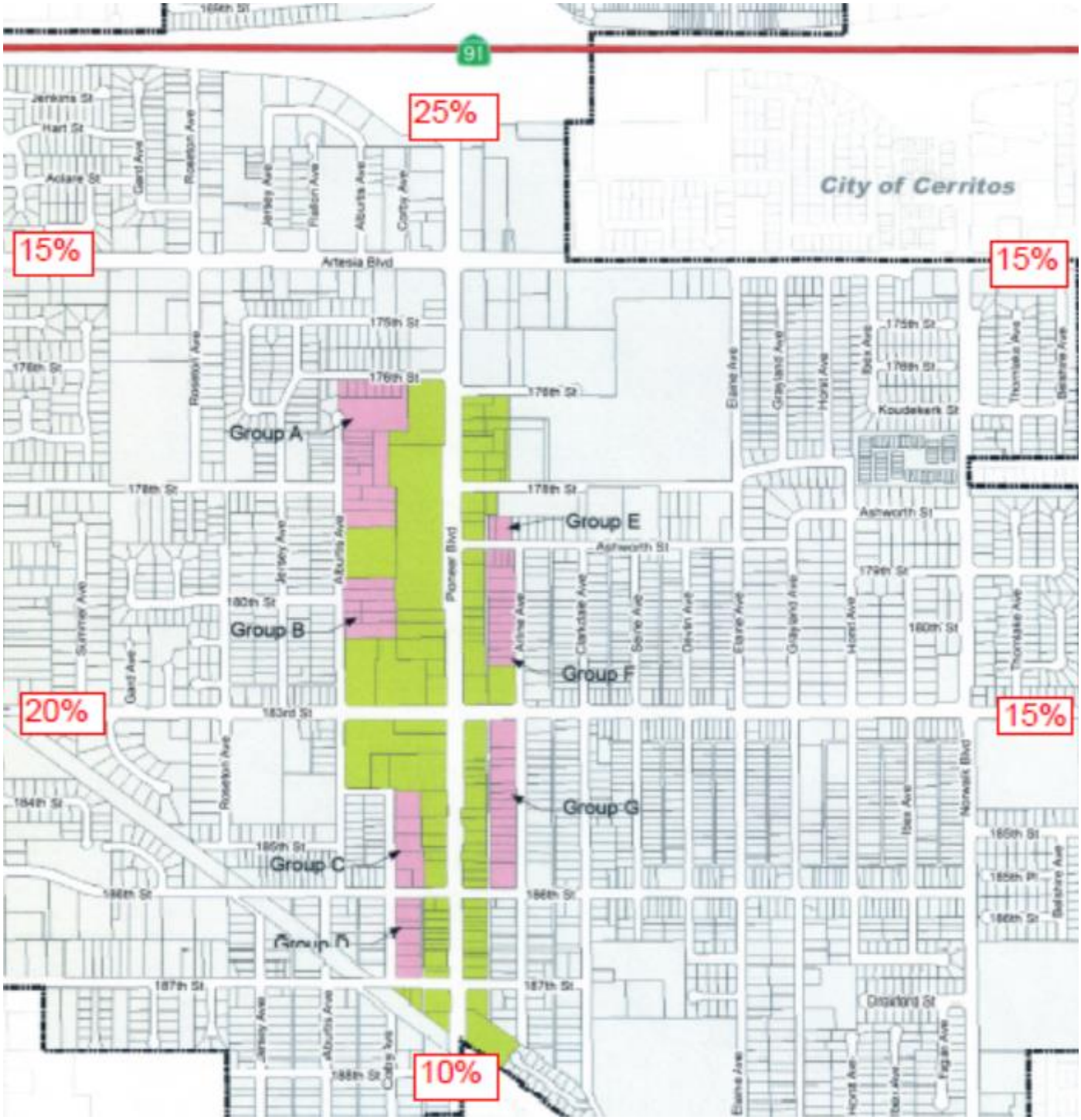
ITE Code	Land Use	Quantity	Variable	Rate	In %	Out %	In	Out	Total
222	Multi-family	249	Dwelling Units	0.18	43	57	19	26	45

Project Trip Distribution and Assignment

The proposed project outbound trips are expected to be distributed onto the study area roadways as shown on the next page. In general, the inbound trips are assumed to be the reverse of the outbound trips. Most weekday commuters are assumed to use Highway 91-Pioneer Boulevard interchange located north of the three study intersections.

The project's AM and PM weekday and Saturday peak hour trip assignments at the three study intersections are included in ***Appendix C***. Most project trips are assumed to pass through the middle study intersection (i.e., Pioneer Boulevard and 178th Street-Artesia Oasis Plaza).

Project Trip Distribution



IV. EXISTING PLUS PROJECT CONDITIONS ANALYSIS

The impact of adding project traffic to existing traffic was assessed. ***Table 3*** provides a comparison of peak hour LOS values for Existing conditions without and with the project. This comparison is used to determine if the addition of project traffic at each study intersection would exceed the thresholds of significant impact. The supporting HCM intersection analysis worksheets can be referenced in ***Appendix D***.

Table 3: Existing vs. Existing plus Project (E+P) Conditions LOS Comparison

Study Intersection	AM Peak (seconds/vehicle) Existing / E+P	PM Peak (seconds/vehicle) Existing / E+P	Saturday Peak (seconds/vehicle) Existing / E+P
1.Pioneer-Artesia	12.4-LOS B / 12.7-LOS B	12.9-LOS B / 13.2-LOS B	12.5-LOS B /12.7-LOS B
2.Pioneer-178th	8.3-LOS A / 8.5-LOS A	5.6-LOS A / 5.7 LOS A	6.5-LOS A / 6.6 LOS A
3.Pioneer-183rd	9.4-LOS A / 9.7-LOS A	11.5-LOS A / 11.9-LOS B	12.7-LOS B / 13.0 LOS B

V. HORIZON YEAR (2030) CONDITIONS ANALYSIS

Horizon Year (2030) Without Project Conditions Intersection Analysis

Horizon Year (2030) without Project Conditions consists of the addition of Ambient Growth (i.e., two percent a year without compounding) volumes to Existing volumes, to assess traffic conditions 11 years in the future. The results of the intersection LOS analysis are summarized in ***Table 4*** and indicate that even with the Existing volume increasing by 22 percent all three study intersections are expected to operate at LOS B or better. The supporting HCM intersection analysis worksheets can be referenced in ***Appendix E***.

Table 4: 2030 Without Project Conditions LOS Results

Study Intersection	AM Peak (sec./veh.)	PM Peak (sec./veh.)	Saturday Peak (sec./veh.)
1.Pioneer Boulevard-Artesia Boulevard	15.1 (LOS B)	17.6 (LOS B)	15.4 (LOS B)
2.Pioneer Blvd.-178th St.-Artesia Oasis Plaza	9.7 (LOS A)	6.5 (LOS A)	8.1 (LOS A)
3.Pioneer Boulevard-183rd Street	9.9 (LOS A)	13.2 (LOS B)	16.9 (LOS B)

Horizon Year (2030) With Project Conditions Intersection Analysis

Table 5 compares peak hour LOS values without and with the Project for 2030 conditions. This comparison is used to determine if the addition of Project traffic at each study intersection would exceed the significant impact thresholds. The supporting HCM intersection analysis worksheets can also be referenced in ***Appendix E***.

Table 5: 2030 without Project (2030) vs. 2030 plus Project Conditions LOS Comparison

Study Intersection	AM Peak (seconds/vehicle) 2030 / 2030+Project	PM Peak (seconds/vehicle) 2030 / 2030+Project	Saturday Peak (seconds/vehicle) 2030 / 2030+Project
1.Pioneer-Artesia	15.1-LOS B / 15.8-LOS B	17.6-LOS B / 18.5-LOS B	15.4-LOS B / 15.7-LOS B
2.Pioneer-178th	9.7-LOS A / 10.1-LOS B	6.5-LOS A / 6.7-LOS A	8.1-LOS A / 8.2-LOS A
3.Pioneer-183rd	9.9-LOS A / 10.4-LOS B	13.2-LOS B / 14.2-LOS B	16.9-LOS B / 18.0-LOS B

VI. CONCLUSIONS

Increasing the density of multi-family dwelling units to 30 units/acre on both sides of Pioneer Boulevard between 176th Street and 187th Street is not expected to cause a significant traffic impact at the three study intersections under both Existing and 2030 Conditions.

Appendix A: Turning Movement Counts
Appendix B: Existing Conditions LOS Calculations
Appendix C: Project Trips
Appendix D: Existing plus Project Conditions LOS Calculations
Appendix E: Horizon Year (2030) LOS Calculations