

## TECHNICAL MEMORANDUM

Date: September 7, 2021

To: Jack Varozza, PE – City of Roseville

From: John Gard, PE – Fehr & Peers

**Subject: *Transportation Impact Study for Sierra View Residential Project***

RS21-4081

This memorandum analyzes the transportation impacts associated with construction of the Sierra View Residential Project, which would be situated west of Shasta Street and south of Diamond Oaks Road in Roseville, CA. Refer to **Figure 1** for project location and **Figure 2** for project site plan. This memorandum consists of the following sections:

- Existing Conditions
- Existing Plus Project Conditions
- Cumulative Conditions
- Vehicle Miles Traveled
- Review of Project Access

### Existing Conditions

The project site would be served by the following roadways:

- Diamond Oaks Road – is an east-west, two-lane residential street with a posted speed limit of 25 miles per hour (mph) that extends 1.8 miles from Washington Boulevard to Reserve Drive. Single-family residences front the vast majority of this street. It is used to access local residences, the Diamond Oaks Golf Course, and is also used by some motorists as a cut-through route to access various destinations including Roseville High School. A motorist traveling the entirety of this roadway would encounter three all-way stop-controlled intersections, including at Diamond Oaks Road/Shasta Street.
- Shasta Street – is a north-south two-lane residential street with a posted speed limit of 25 mph that extends 1.0 miles from Diamond Oaks Road to Sierra Drive, which provides access to the “crooked bridge” connecting to Old Town Roseville. It also connects to Yosemite Avenue, which provides access to Atlantic Street and downtown Roseville and Interstate 80. Land uses along this segment include single-family (front-on) dwelling units, multi-family units, Ferris Spanger Elementary School, and Diamond Oaks Park. Similar to Diamond Oaks Road, Shasta Street is used for a variety of trip purposes.

*Tech Memo: Transportation Impact Study for Sierra View Residential Project*

Due to the COVID-19 pandemic and the resulting changes to travel patterns due to the statewide stay-at-home directive implemented in March 2020, existing traffic counts were not collected. Instead, traffic count data was obtained from a “Big Data” vendor, StreetLight Data, Inc. StreetLight Data captures anonymized location records from smart phones and navigation devices in connected cars and trucks. Because StreetLight Data collects location records at all times of the day and year, providing for a much larger data set when compared to a traditional data collection effort on a single day.

**Table 1** displays the resulting Average Daily Traffic (ADT) on the study roadways. This data is also shown geographically on **Figure 3**. Mid-week (Tuesday through Thursday) traffic data was obtained from September and October 2019 to establish existing conditions. Data was collected for all movements at the Diamond Oaks Road/Shasta Street intersection for a typical 24-hour mid-week period. From this data, it was possible to identify both the amount of daily traffic on each roadway segment and the amount of AM and PM peak hour traffic at the intersection by turning movement. For quality control purposes, pre-COVID traffic data was obtained at the Diamond Oaks Road/Washington Boulevard signalized intersection using the City’s Intelligent Transportation System (ITS) count database to confirm that the volume of traffic on Diamond Oaks Road between Washington Boulevard and Shasta Street was similar for each source. This was found to be the case.

**Table 1: Average Daily Traffic (ADT) on Study Roadways – Existing Conditions**

Segment	ADT <sup>1</sup>
Diamond Oaks Road west of Shasta Street	5,200
Diamond Oaks Road east of Shasta Street	4,300
Shasta Street south of Diamond Oaks Road	4,200
Shasta Street south of Ferris Spanger Elementary School <sup>2</sup>	4,500

## Notes:

1. Data represents pre-COVID conditions (i.e., September/October 2019).
2. Estimated based on directionality of trips in/out of Ferris Spanger Elementary School and known usage of the Diamond Bar Lane-Manzanita Avenue route by Roseville High School students.

Values rounded to the nearest one hundred.

Source: Fehr & Peers, 2021.

## Existing Plus Project Conditions

### *Project Description*

According to the project site plan (*Sierra View Tentative Subdivision Map*, MacKay & Somps, April 2021), the project would consist of 75 single-family dwelling units in a gated community. All streets within the community would be private.

Vehicular access would be provided by a private street (shown as Whistling Straits Drive on the site plan) situated on the south side of Diamond Oaks Road about 550 feet west of Shasta Street. This access would have a turn-around area for vehicles that are turned away at the gate. An emergency vehicle access (EVA) would be provided on Shasta Street opposite Ferris Spanger Elementary School. Sidewalks would be provided on one side of each access street to connect the neighborhood to the adjacent public street.

Preliminary analyses of the project focused on the benefits and drawbacks of four distinct scenarios consisting of full, partial, and no vehicular access from the Diamond Oaks Road and Shasta Street access points. Below is a summary of how these options were evaluated (Appendix A provides additional details regarding site constraints and evaluation of the options):

- Two of the four options consisted of full access onto Shasta Street with varying levels of access on Diamond Oaks Road. These two options were removed from further consideration because they would have substantially increased vehicular conflicts with Ferris Spanger Elementary School and would have introduced a sight distance constraint (i.e., horizontal curvature of Shasta Street) that may have proven difficult to solve.
- A third option consisting of full access on Diamond Oaks Road and partial access on Shasta Street, allowing for exiting movements only (along with an EVA) was also considered. This was also rejected because of the potential for wrong-way travel as well as continued conflicts with school traffic.
- The fourth option is the proposed project.

### *Trip Generation*

The project's trip generation was calculated based on trip rates and methodologies published in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 10<sup>th</sup> Edition* (2017). Because the project consists of single-family detached units, the "Single-Family Detached Housing" land use category was used to estimate daily and peak hour trips generated by the project.

**Table 2** shows the project’s trip generation on a daily basis and during the AM and PM peak hours. As shown, the project would generate approximately 710 daily trips, with 56 occurring during the AM peak hour and 75 occurring during the PM peak hour.

**Table 2: Project Trip Generation**

Land Use <sup>2</sup>	Quantity	Units <sup>1</sup>	Daily Total	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Single-Family Detached Housing (Code 210)	75	du	708	14	42	56	47	28	75

Notes:

1. "du" represents dwelling units
2. Based on trip rates from *Trip Generation Manual, 10<sup>th</sup> Edition* (Institute of Transportation Engineers, 2017).

Source: Fehr & Peers, 2021.

*Trip Distribution and Trip Assignment*

Streetlight Data, Inc. offers another innovative data product consisting of quantification of the spatial distribution of trips generated by a given neighborhood. This data was obtained for this study, focusing on the neighborhood immediately north of the northerly terminus of Shasta Street (i.e., Nicklaus Circle).

Because the project would be situated in close proximity to this neighborhood, it would presumably have similar trip distribution characteristics. **Figure 4** displays the expected daily distribution of project trips based on the characteristics of these neighborhoods. This figure shows that the majority of trips (75 percent) are expected to be distributed to/from the east or west on Diamond Oaks Road. This makes sense because these routes provide access to a variety of retail destinations and employment centers.

Project trips were added to existing volumes to yield the Existing Plus Project roadway segment daily volumes shown on **Figure 5**. Key findings from this figure are:

1. The largest increase in project trips would occur on the segment of Diamond Oaks Road between Shasta Street and the project access. The volume on this segment would increase from 5,200 to 5,670 vehicles, a nine percent increase.<sup>1</sup> During the PM peak hour, the volume on this segment would increase by about 50 vehicles, or one additional vehicle per minute.

<sup>1</sup> To put this increase in perspective, it is typical to see fluctuations of five to ten percent in traffic from one weekday to the next.

2. The daily traffic volume on Diamond Oaks Road east of Shasta Street would increase from 4,300 to 4,590 vehicles, a seven percent increase.
3. Project-related traffic volumes on Shasta Street south of Diamond Oaks Road would be modest at about 200 vehicles per day.

The City of Roseville does not use roadway ADT values to analyze project impacts. This information has been prepared for informational purposes so that reviewers of the project understand how traffic volumes on surrounding roadways would change if the project was constructed.

Given the project's size and expected travel characteristics, it was deemed unnecessary to study any nearby intersections. During the PM peak hour, the project would add 26 trips to the Washington Boulevard/Diamond Oaks Road intersection, which is a small percentage of the current volume at the intersection. The intersection is in the midst of being widened to provide more capacity along Washington Boulevard. Analysis of that intersection would not have yielded the need for any additional improvements. The project would add 30 PM peak hour trips to Reserve Drive, which would be distributed either to the north toward Roseville Parkway or the south toward Berry Street. Again, this modest level of traffic increase would not materially affect operations at those locations.

Instruction at Ferris Spanger Elementary School begins at 8:15 AM and ends at 2:35 PM. During the schools' two peak hours (i.e., 8-9 AM and 2-3 PM), the project would add 11 and 12 trips, respectively, along the school frontage. This would represent about a three percent increase over the existing volumes during each school peak hour. This level of increase is less than the daily fluctuation in traffic on streets such as this, and thus would not be noticeable to most drivers.

## Cumulative Conditions

Traffic forecasts were developed for cumulative conditions using the City of Roseville 2035 travel demand model. This model considers reasonably foreseeable land uses and roadway network improvements throughout the City as well as adjacent cities. Noteworthy improvements include the widening of Washington Boulevard from two to four lanes from south of Pleasant Grove Boulevard to Sawtell Road. This is an important alternate route to Shasta Street and Diamond Oaks Road.

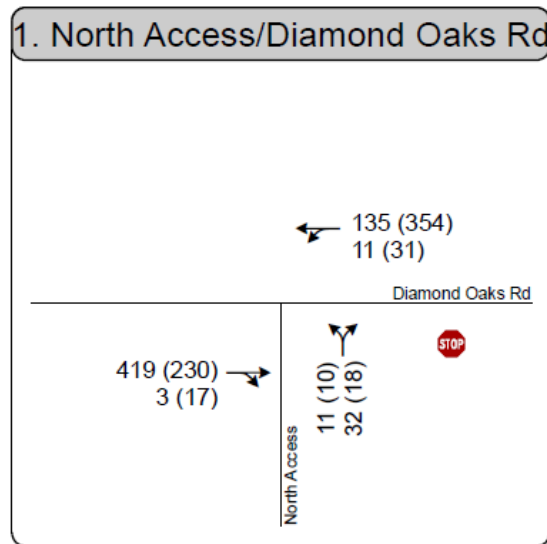
**Figure 6** shows the Cumulative No Project ADT volumes on the study roadways. A comparison of these volumes to existing conditions shows the greatest growth in background traffic (about 800 ADT) would occur on Diamond Oaks Road west of Shasta Street.

Project trips were added to those volumes to yield the Cumulative Plus Project daily volumes also shown on that figure. Consistent with the earlier findings, project trips would be distributed in a fairly even manner on all three routes, with the most project trips (470 ADT) added to the short segment of Diamond Oaks Road between the project access and Shasta Street.

## Evaluation of Project Access

### *Vehicular Access on Diamond Oaks Road*

Shown below is the weekday AM (without parentheses) and PM (with parentheses) peak hour traffic volumes at the Diamond Oaks/Project Access intersection under Existing Plus Project conditions.



The following is recommended based on the traffic volumes shown above:

- Operate the Diamond Oaks/Project Access intersection with side-street stop-control.

A review of sight distance was conducted for motorists desiring to turn left from westbound Diamond Oaks Road into the project site. To the west of the access, Diamond Oaks Road features a gradual horizontal curve. Field observations indicate that motorists operating their vehicles at normal operating speeds would be visible for in excess of 7.5-seconds before passing the project access. This sight value, often referred to as the 7.5-second rule, is associated with adequate sight distance. Adequate sight distance would also be provided for motorists exiting the project site (provided that no shrubs or monuments or placed within the intersection sight triangle).

It is also noted that the project access intersection has been positioned such that the beam of a vehicle's headlights exiting the project would not be directed towards residents' windows on the north side of the street.

#### *Emergency Vehicle Access on Shasta Street*

A gate would be constructed at this access to prohibit travel by all motorists except emergency vehicles. Pedestrians and bicyclists would be able to access the project through a gated walkway. The project site plan shows the placement of landscaping and a detention basin along the project frontage of Shasta Street. This would effectively preclude the undesired current practice whereby parents park on the west side of the street and walk across Shasta Street to pick-up or drop-off their student. The following is recommended:

- Post "No Stopping" signs within the short EVA driveway apron.

## Vehicle Miles Traveled (VMT)

Page 4.3-29 of the *City of Roseville General Plan Update Final EIR (2020)* contains the following statements regarding VMT analysis:

*"Quantitative analysis would not be required if it can be demonstrated that a project is consistent with the General Plan and would generate VMT which is equivalent to or less than what was assumed in this General Plan EIR."*

Page TI 16-22 of the *January 2021 Amendments to the City of Roseville Design and Construction Standards* contains the following statements regarding VMT analysis:

*"A project may be screened from additional VMT analysis if it meets one or more of the following criteria. These criteria are based on the Governor's Office of Planning and Research (OPR) Technical Advisory on Evaluating Transportation Impacts in CEQA (December 2018)."*

1. *Within Scope of Prior CEQA Analysis* – *The VMT generated by the project is within the scope of a prior CEQA analysis, and is therefore covered by a prior analysis, Prior analysis includes analysis performed for the General Plan.*

The project site would be situated within infill zone 100, which has an R3 zoning and Medium Density Residential land use designation. According to data from the City, there are 170 remaining units among the 223 units (i.e., 32.98 acres at 6.8 units per acre) that were allocated. Since the proposed project, which would include a rezone from Medium to Low Density Residential, proposes only 75

units, it would generate less VMT than what was assumed in the General Plan. Accordingly, VMT impacts would be less than significant.

We hope this information is helpful. Please with any questions or comments.



## Appendix A – Vehicular Access Options for Sierra View Residential Project

### Part 1 – Summary of Issues at Shasta Street Access

#### Proximity of the Ferris Spanger Elementary School

This school is situated directly across Shasta Street from the project site. Field observations during school hours revealed the following:

- Moderate queuing and congestion were observed along Shasta Street.
- Some parents/guardians were observed to park on the opposite side of Shasta Street from the school to pick-up students. This resulted in moderate numbers of pedestrian crossings.

The photos below illustrate existing conditions.



**Image 1: Photo of pedestrians crossing Shasta Street during student pick-up.**



**Image 2: Photo of queued vehicles on northbound Shasta Street during student pick-up.**

#### Horizontal Curvature of Shasta Street

The project's southerly access point would be directly south of a portion of Shasta Street that features a horizontal curve. Additionally, shrubs and tree branches and fencing also limit the line of sight. Refer to photo below for current line of sight.



**Image 3: View of southbound Shasta Street from approximate location of southerly project access.**

Part 2 – Evaluation of Four Access Scenarios

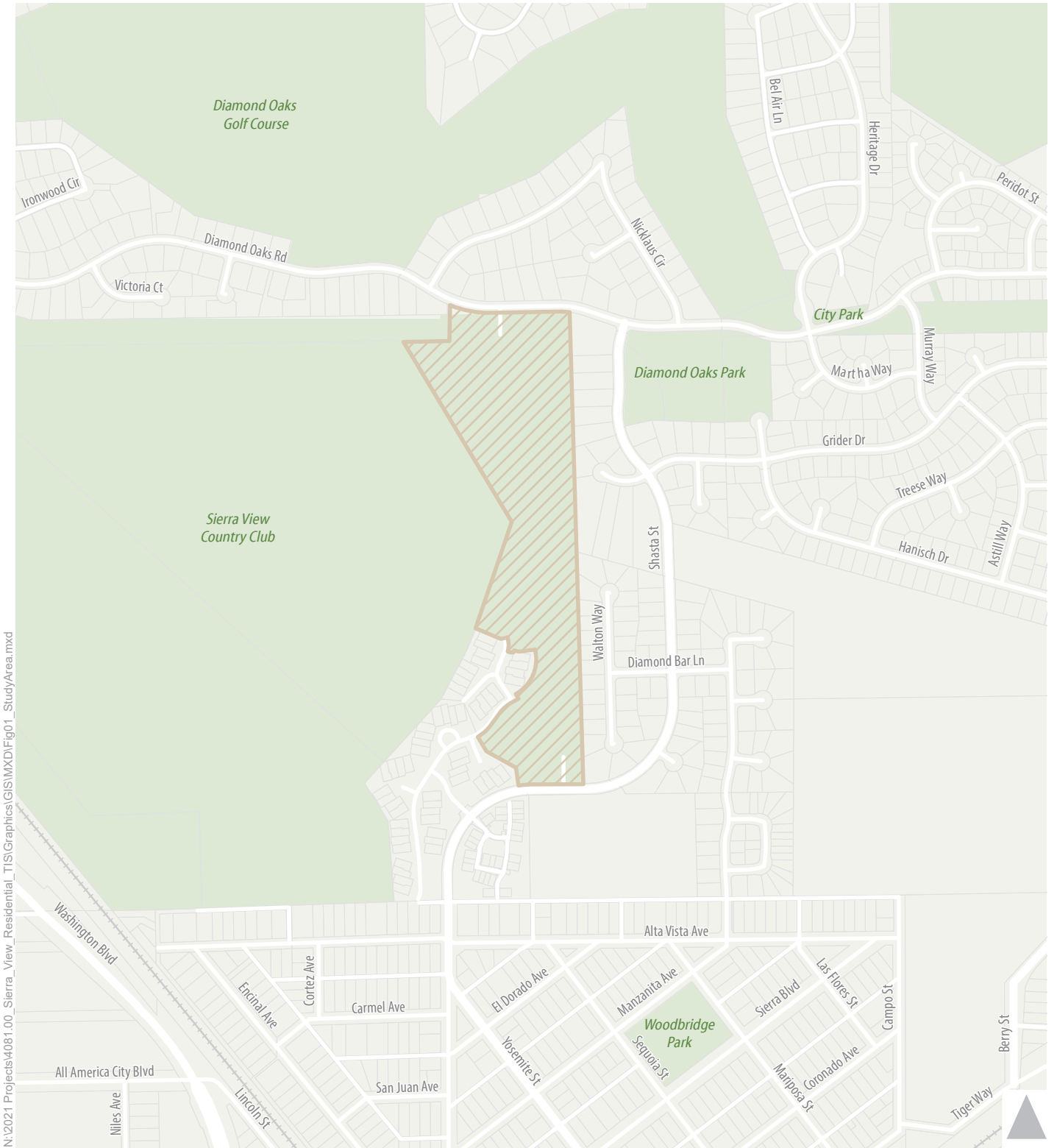
**Table: Study Recommendations**

Scenario	Recommendation
<u>Scenario 1</u> : Full Access on Diamond Oaks Road and Shasta Street	Remove from further consideration because it would introduce substantially increased vehicular conflicts with Ferris Spanger Elementary School.
<u>Scenario 2</u> : Full access on Shasta Street and emergency vehicle access (EVA) on Diamond Oaks Road	Remove from further consideration because it would introduce substantially increased conflicts with access to Ferris Spanger Elementary School and cause unnecessary traffic volume increases on Shasta Street
<u>Scenario 3</u> : Full access on Diamond Oaks Road and partial access on Shasta Street, allowing for exiting movements only	Less desirable than Scenario 4 because the two issues raised in Part 1 would be difficult to address <sup>1</sup> .
<u>Scenario 4</u> : Full access on Diamond Oaks Road and emergency vehicle access (EVA) on Shasta Street	. Proposed Project

Note:

<sup>1</sup>Allowing outbound (exiting) movements would have less interference with school-related trips (versus full access). However, conflicts would nevertheless increase due to the frequency of activity along the street (turning vehicles, queued vehicles, parked vehicles, pedestrian crossings, etc.) in the immediate driveway vicinity.





N:\2021\Projects\4081.00 Sierra\_View\_Residential\_TIS\Graphics\GIS\MXD\Fig01\_StudyArea.mxd

-  Project Site
-  Park/Open Space



Figure 1  
Study Area

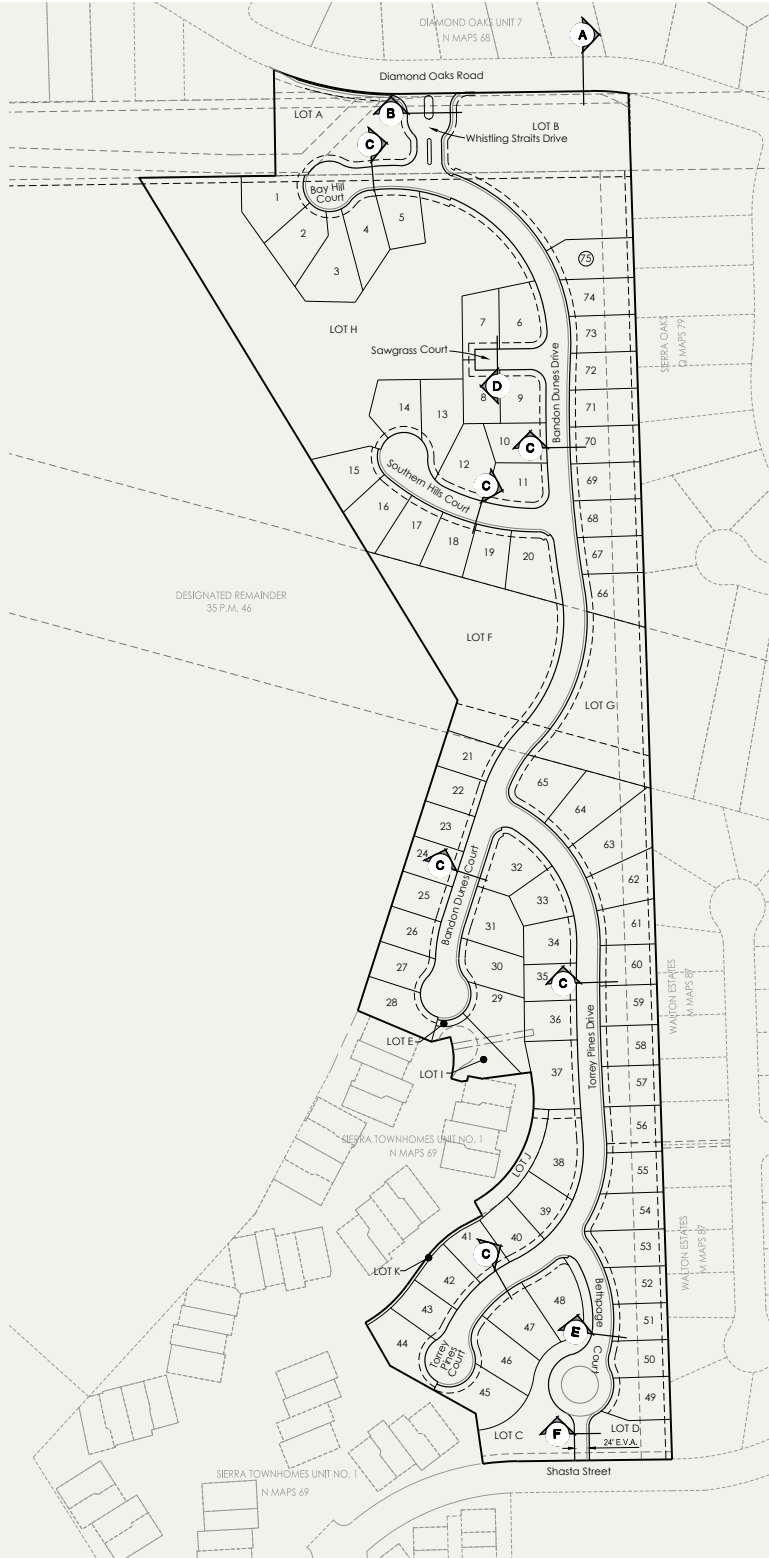
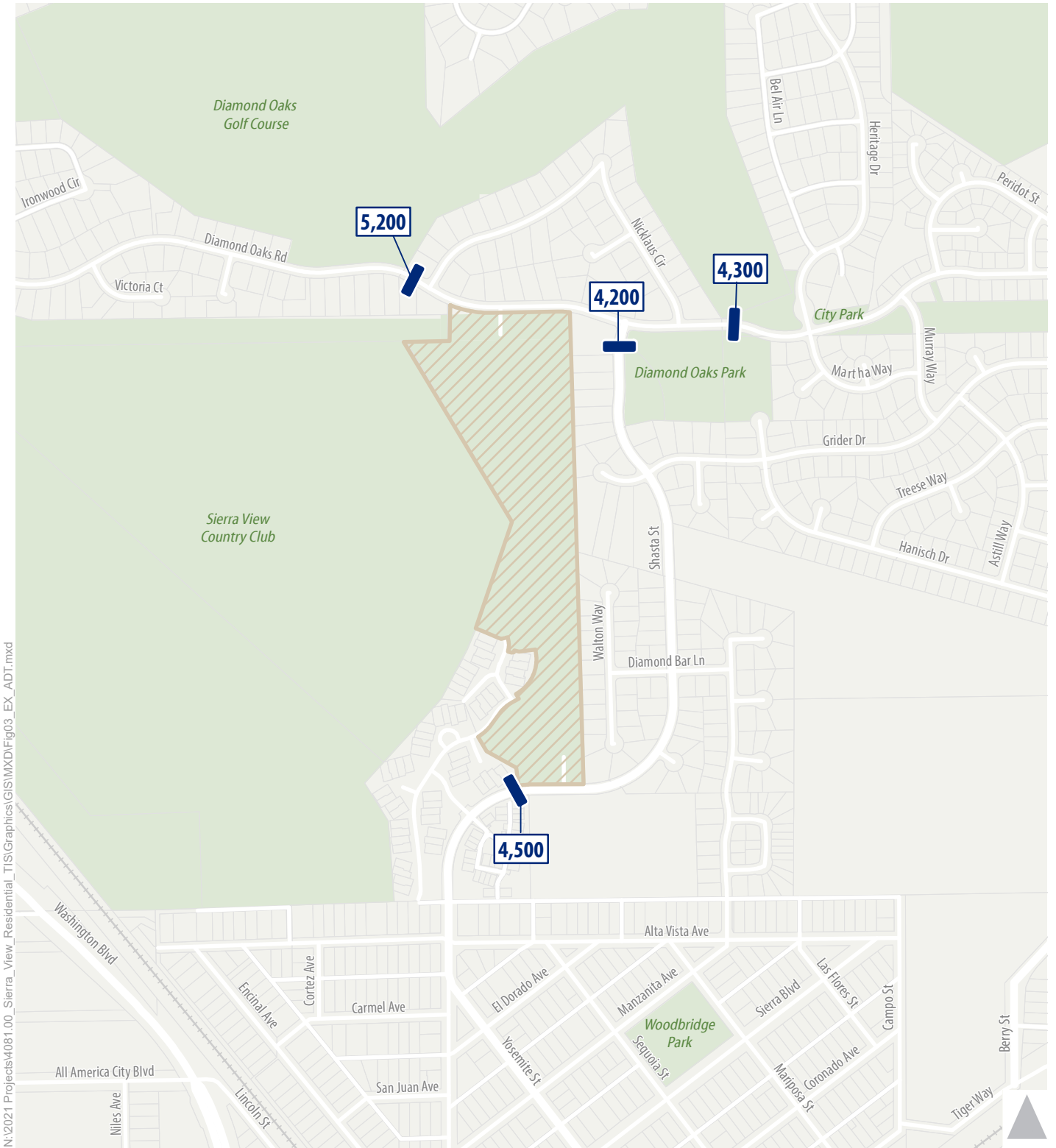


Figure 2  
Project Site Plan



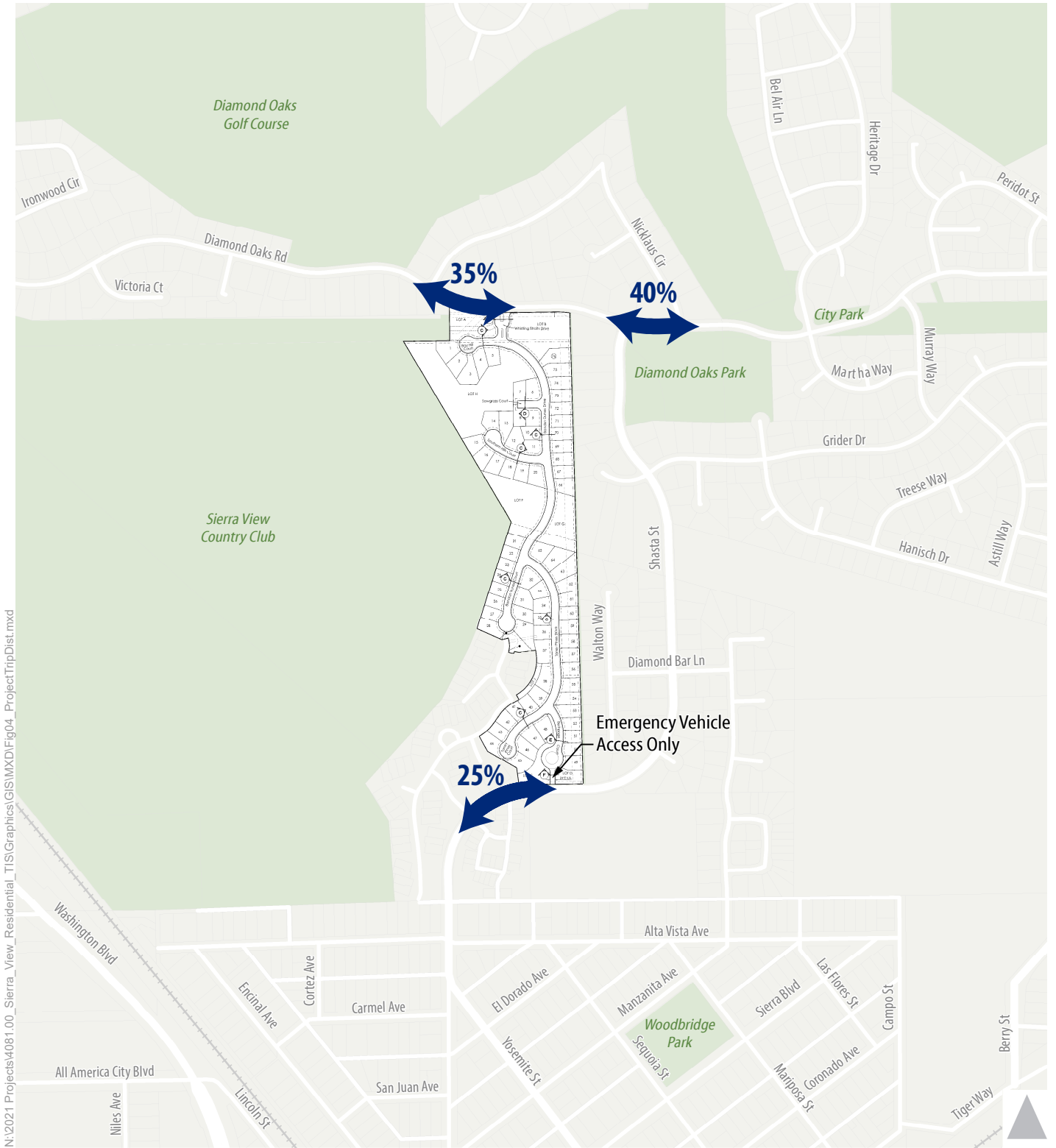
N:\2021\Projects\4081.00 Sierra\_View\_Residential\_TIS\Graphics\GIS\MXD\Fig03\_EX\_ADT.mxd

- Average Daily Traffic Volume
- Park/Open Space
- Project Site

Figure 3

## Average Daily Traffic Volumes - Existing Conditions





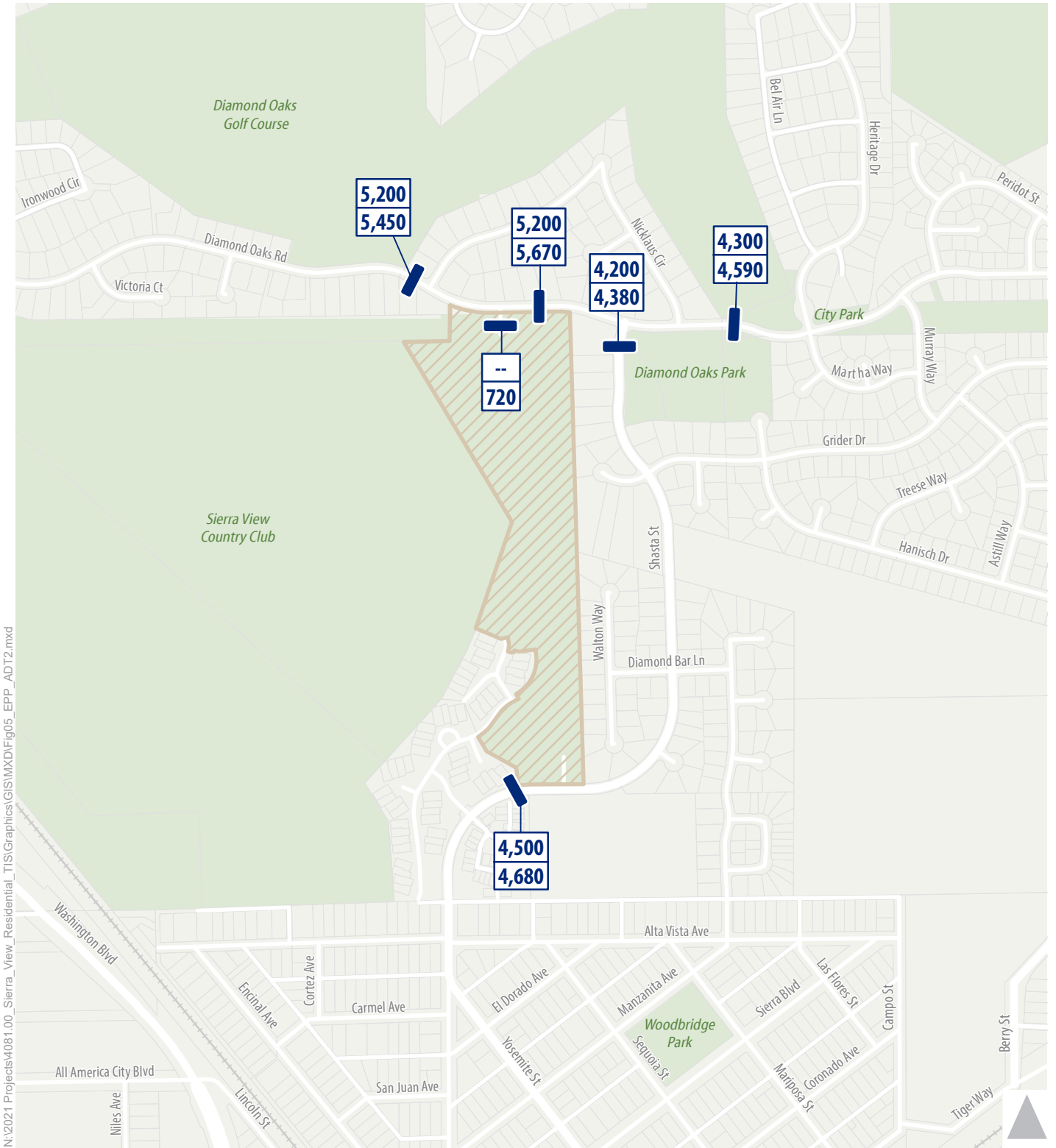
N:\2021\Projects\4081.00\_Sierra\_View\_Residential\_TIS\Graphics\GIS\MXD\Fig04\_ProjectTripDist.mxd

**xx%** Project Trip Distribution Percentage

 Project Site  
 Park/Open Space



Figure 4  
 Project Trip Distribution



N:\2021\Projects\4081.00 Sierra\_View\_Residential\_TIS\Graphics\GIS\MXD\Fig05\_EPP\_ADT2.mxd

**X,XXX** Existing ADT  
**X,XXX** Existing Plus Project ADT

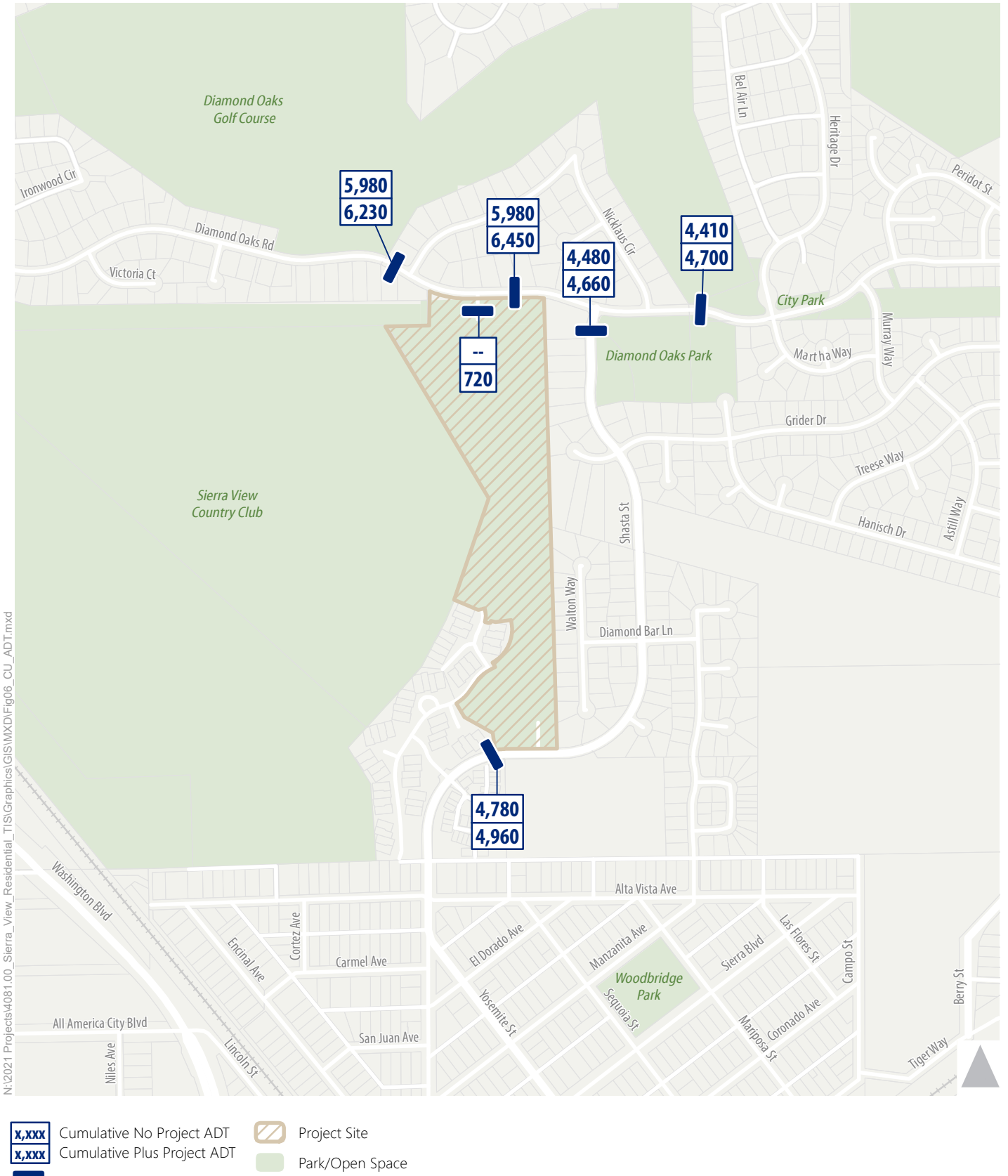
Project Site  
 Park/Open Space

Figure 5

### Average Daily Traffic Volumes (ADT) - Existing Plus Project Conditions







N:\2021\Projects\4081.00 Sierra\_View\_Residential\_TIS\Graphics\GIS\MXD\Fig06\_CU\_ADT.mxd

Figure 6

## Average Daily Traffic Volumes (ADT) - Cumulative Conditions

