AtkinsRéalis

Traffic Impact Assessment

City of Colorado Springs

March 17, 2025
DG0001

FISHERS CANYON OPEN SPACE MASTER PLAN

Contents

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Acronyms and Abbreviations

ADT	Average Daily Traffic
Fishers Canyon Open Space	Fishers Canyon
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
mph	miles per hour

MUTCD	Manual of Uniform Traffic Control Devices
sec/veh	seconds per vehicle
TIA	Traffic Impact Analysis
TMC	Turning Movement Count
vpd	vehicles per day

1. Introduction

AtkinsRéalis was contracted by Studio Campo, LLC, to conduct a Traffic Impact Analysis (TIA) for the proposed recreational improvements at Fishers Canyon Open Space (Fishers Canyon), an outdoor recreational area on the slopes of Cheyenne Mountain, west of Colorado Springs, Colorado. This report explains the methodologies used, the data and assumptions, and summarizes the findings of the study. Comprehensive community engagement, including public workshops, on-site visits, and public surveys were used to develop the alternatives. The TIA conducted for this report includes an evaluation of the conditions of existing traffic operations and assesses the impact these enhancements will have to the surrounding roadway network based on two proposed parking lot and usage scenarios utilizing methodologies, outlined in the Highway Capacity Manual (HCM).

1.1 Project Description

Fishers Canyon is located at the base of Cheyenne Mountain, north of Cheyenne Mountain State Park and Cheyenne Mountain Space Force in Colorado Springs, Colorado, as shown in Figure 1-1. The land was originally slated for single family, residential homes but was sold to the City of Colorado Springs (City) to be utilized by Parks and Open Space. This traffic study supports the concurrent development of the Fishers Canyon Open Space Master Plan, led by Studio Campo, which identifies potential on-site trails and regional trail connection opportunities, on-site uses, and options for parking. Vehicular access to the site is via the existing easement from Wellfleet Road, which is accessed through the Spires neighborhood. Based on extensive input received from the public and stakeholders as part of the Open Space Master Plan, two trail use alternatives were developed along with two on-site parking concepts. Alternative 1 is a lower enhancement scenario with 5–6 miles of proposed trails, and Alternative 2 includes 10–11 miles of a proposed trail. Additionally, two conceptual parking lots were developed, which could be constructed with either Alternative 1 or Alternative 2 of the trail network. A lower capacity parking lot could hold up to 69 vehicles, and a larger, higher-capacity parking lot would include 110 spaces.

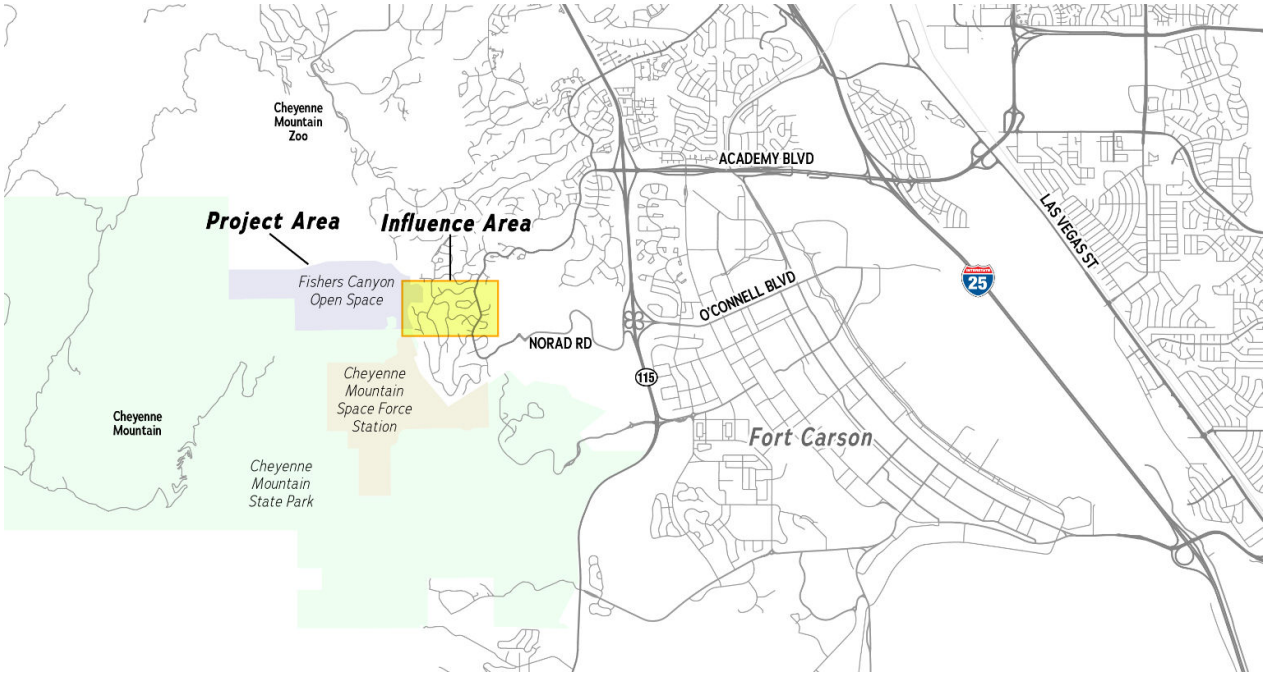


Figure 1-1 - Project Area

1.2 Purpose of the Report

The purpose of this study is to assess the potential traffic impacts of the Fishers Canyon area when the outdoor recreational usage is formalized, with a trail network and on-site parking. The Open Space Master Plan details potential enhancements and uses of the site, with lower-density and higher-density trail alternatives.

1.3 Study Objectives

The objective of this study is to identify the potential traffic impact of Fishers Canyon due to the enhancement of the Open Space area for recreational visitation. This study developed the estimated trips anticipated to be generated, assessed impacts to the local roadway network, and considered mitigation measures (if needed). Metrics, such as level of service (LOS), and vehicular delays were analyzed to assess traffic operations at these intersections. AtkinsRéalis reviewed the existing transportation infrastructure, supporting the existing site to identify an analysis area. The analysis area is a geographic area, which may be affected by the Fishers Canyon site traffic, in terms of trip generation. This potential influence area includes Irvington Court, Ellsworth Street, and Balmoral Road. The intersections of Balmoral Road/Broadmoor Bluffs Drive and Ellsworth Street/Broadmoor Bluffs Drive were also analyzed to determine the impact that additional vehicles will have on traffic operations.

2. Area Conditions

2.1 Study Area Land Use

Fishers Canyon was previously zoned as residential lands but is now zoned as “Existing Park Land and Open Space” and owned by the City.

The neighborhood leading up to the Fishers Canyon property is part of the Spires neighborhood, with more than 500 single family homes. Cheyenne Mountain Space Force Station abuts the property to the south and is accessed via NORAD Road. The Open Space is also adjacent to Cheyenne Mountain State Park and may be accessible via the trail network in the future. To the north, the proposed Chamberlin Trail has a planned future connection within other planned City Open Space lands.

2.1.1 Existing Site Characteristics

The following roadways are located near the project area.

Broadmoor Bluffs Drive

Broadmoor Bluffs Drive runs in a northeast-southeast direction to the east of the proposed site. The road has a posted speed limit of 25 miles per hour (mph), with driveways directly accessing the road. The roadway comprises two lanes, with one in either direction or is approximately 38 feet wide.

Balmoral Road

Balmoral Road is a local road that runs in an east-west direction to the east of the proposed site. The road has a posted speed limit of 25 mph. The roadway comprises two lanes, with one in either direction or is approximately 30 to 32 feet wide. Based on the data collected in April 2024, the weekday and weekend traffic volumes along Balmoral Road are 160 and 130 vehicles per day, respectively. Balmoral Road increases in elevation by more than 150 feet in less than a half-mile, resulting in steep grades traveling west toward Fishers Canyon.

Ellsworth Street

Ellsworth Street is a local road that runs in an east-west direction to the east of the proposed site. The road has a posted speed limit of 25 mph. The roadway comprises two lanes, with one in either direction or is approximately 30 to 32 feet wide. Based on the data collected in April 2024, the weekday and weekend traffic volumes along Ellsworth Street are 650 and 490 vehicles per day, respectively. Ellsworth Street increases in elevation by more than 100 feet, resulting in steep uphill grades traveling west.

Irvington Court and Wellfleet Street

Irvington Court is a local cul-de-sac road accessed via Ellsworth Street. The road has a posted speed limit of 25 mph. The road provides access to Wellfleet Street, which is a local cul-de-sac, where the Fishers Canyon site will obtain access. Based on the data collected in April 2024, the weekday and weekend daily traffic volumes along Irvington Court were 240 and 135 vehicles per day, respectively.

2.2 Site Accessibility

Fishers Canyon is accessible via the existing road network to the east. Vehicles traveling from outside the neighborhood can access the site via NORAD Road to Broadmoor Bluffs from the south or via the Academy Boulevard interchange and Broadmoor Bluffs Drive from the north. The site entrance is proposed via Wellfleet

Street, where there is a dedicated, public right-of-way access easement. This access will include a turnaround, as the site will remain closed overnight to visitors and during extreme fire danger (e.g., red flag warnings, City emergency personnel and staff assessments, etc.). On-site roads will be constructed to provide access to the trailhead parking areas. The proposed entrance on Wellfleet Street is shown in Figure 2-1.

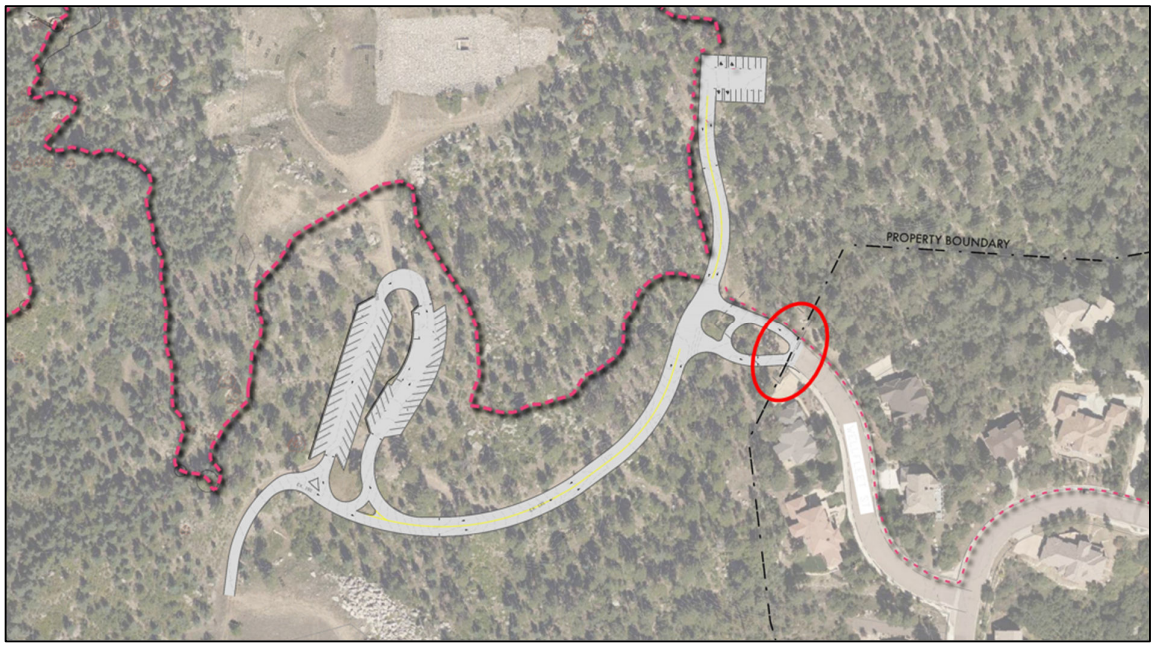


Figure 2-1 - Site Access

2.3 Traffic Volumes and Conditions

2.3.1 Existing Traffic

To understand the traffic impacts that formalized recreational facilities on Fishers Canyon will have on the neighborhood roadways, the existing traffic patterns must first be understood. In coordination with City Public Works staff, data was collected at the study area intersections during the mid-day weekend period which is when the expected highest use will occur for recreational activities. Additionally, daily vehicle volumes were collected on Thursday, Saturday, and Sunday, April 18th, 20th, and 21st, 2024, by All Traffic Data Services, for a 24-hour period along the following roads:

- Balmoral Road
- Ellsworth Street
- Irvington Court

Existing weekday and weekend daily traffic volumes are shown in Figure 2-2, and the raw data is attached in Appendix A.

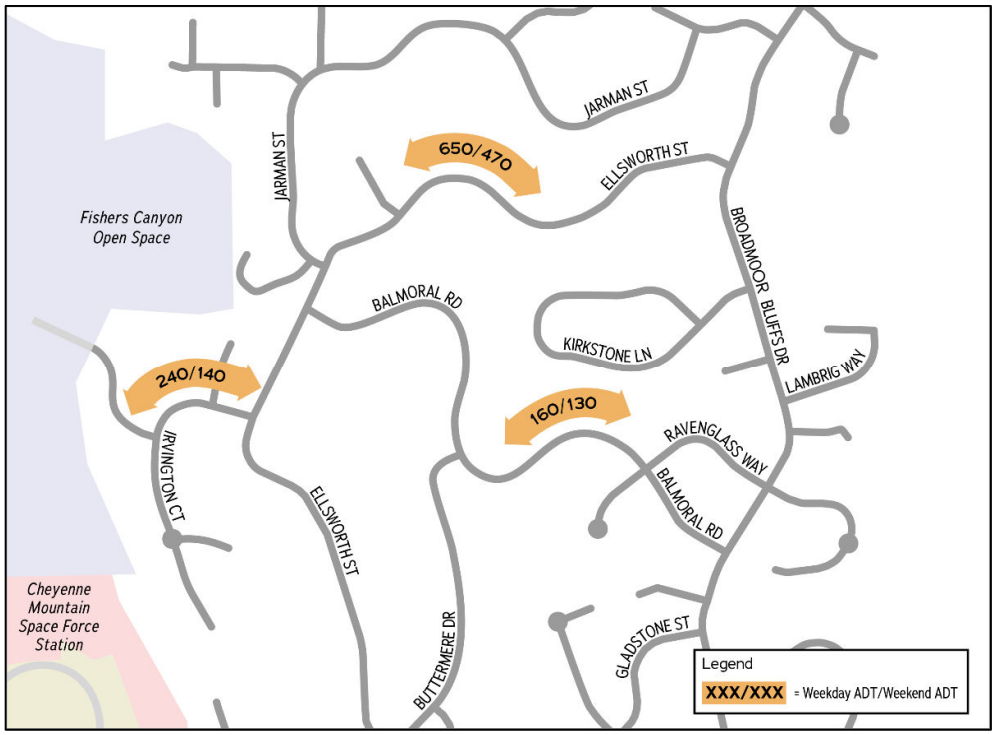


Figure 2-2 - Bidirectional Weekday/Weekend Average Daily Traffic

Intersection turning movement count (TMC) data was collected on Saturday, April 20th, 2024, by All Traffic Data Services, from 11:00 am to 1:00 pm to understand the existing peak period weekend traffic conditions at the following intersections:

- Balmoral Road/Broadmoor Bluffs Drive
- Ellsworth Street/Broadmoor Bluffs Drive

As shown in Figure 2-3, Ellsworth Street typically carries higher traffic volumes than Balmoral Road, and the majority of vehicles exiting Balmoral Road and Ellsworth Street travel north (toward the Academy Boulevard interchange), rather than travel south toward NORAD Road. The raw TMC data is attached in Appendix A.

Figure 2-3 - Weekend Peak Hour TMC

2.3.2 Existing Level of Service

The operating characteristics of intersections are described by the LOS. LOS is a qualitative description of the performance of an intersection based on the average delay per vehicle. Intersection LOS ranges from LOS A, which indicates free flow or excellent conditions with short delays to LOS F, which indicates congested or overloaded conditions with extremely long delays. LOS A through LOS D is considered excellent to satisfactory service levels; LOS E is undesirable; and LOS F conditions are representative of gridlock. The study intersections were evaluated using HCM 6th operations methodology and Synchro 11, a transportation analysis software.

For unsignalized intersections controlled by stop signs or multi-way stop signs, the average delay and LOS operating conditions are calculated by approach (e.g., northbound) and movement (e.g., northbound left-turn); for those movements that are under stop or yield control and, therefore, subject to delay. Table 2-1 presents the LOS criteria for unsignalized intersections.

Table 2-1 - Level of Service for Unsignalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	≤ 10
B	> 10–15
C	> 15–25
D	> 25–35
E	> 35–50
F	> 50

Existing traffic conditions were evaluated using the traffic counts collected on a typical weekend day. Existing peak hour delays in seconds per vehicle (sec/veh), and the LOS was calculated for the study area intersections, as listed in Table 2-2. The Synchro model was developed using the existing roadway geometry, the traffic control type, and peak hour volumes.

Results for the existing condition analysis show that under existing conditions, the two intersections currently operate at LOS A during the weekend peak period. The Synchro outputs for the existing intersections are included in Appendix B. The existing conditions results are summarized in Table 2-2.

Table 2-2 - Existing Intersection Analysis

Intersection		Control	Approach	Midday Peak Hour	
				Delay (s/veh)	LOS
1	Balmoral Road/Broadmoor Bluffs Drive	Stop-controlled	EB	8.8	A
			NB	0.5	A
			SB	0	A
2	Ellsworth Street/Broadmoor Bluffs Drive	Stop-controlled	EB	9.2	A
			NB	0.4	A
			SB	0	A

2.4 Transit Service

There are no existing transit services in the vicinity of the site.

2.5 Crash Analysis

All the study area roadways are local, residential streets with low volumes; therefore, a crash analysis was not performed. There was no input from the public during the outreach process, noting significant crash history on any of the study roadways.

3. Proposed Enhancements

The 343 acres of Fishers Canyon was acquired by Colorado Springs City Council in October 2021. The Open Space Master Plan details the area's planned outdoor recreational uses, including an accessible trail loop; multi-use, on-site trails; a future connection to the regional Chamberlain Trail; additional opportunities for on-site uses, such as rock climbing; and parking. The site will see the formalization of between 5 and 11 miles of multi-use trails upon full build-out.

When developing the Fishers Canyon Open Space Master Plan, Studio Campo presented various trail and parking options to the stakeholders and the public. Based on the input received, two alternatives were included in the draft Master Plan, as of November 2024, which was analyzed in this Traffic Impact Analysis. The first (Alternative 1) includes a lower-density of trails, with approximately 5–6 total miles of planned trails, upon build-out. Alternative 2 includes additional connecting trails, for a total of 10–11 miles of trails, at build-out. Both options include a half-mile, accessible trail loop; numerous on-site trails; and future connections to the Chamberlain Trail; and potentially to trails within Cheyenne Mountain State Park.

Input was received from the neighborhood/community that providing sufficient, on-site parking would be critical to obtain their buy-in of the enhancements. To accommodate visitor parking, two parking lot scenarios were conceptually designed. Both concepts include a small parking lot near the accessible trail that can accommodate 5–15 spaces, depending on final design. A second parking lot is proposed between the two detention ponds. The smaller parking lot concept includes a two-tiered, one-way, circular access, with parking on either side of the drive aisle. This concept would provide up to 69 parking spaces, including at least two spaces for buses or vehicles pulling trailers. The second option would have the same two tiers as the first concept; with a third additional tier of parking that could accommodate approximately 110 total on-site parking spaces. These two parking concepts are shown in Figure 3-1 and Figure 3-2.

While either parking lot concept could be constructed initially, it is most likely that Alternative 1 will be the most cost-effective and will provide initial, on-site parking needs; with the option to add a third-tier of parking (as shown in Alternative 2) if additional capacity is needed in the future. For this study's analysis, it was assumed that Alternative 1 would be consistent with the low-range of trip estimates; and Alternative 2 will result in the high-range of trip estimates to the site.

Figure 3-1 - Alternative 1 (November 2024) Conceptual Parking Layout

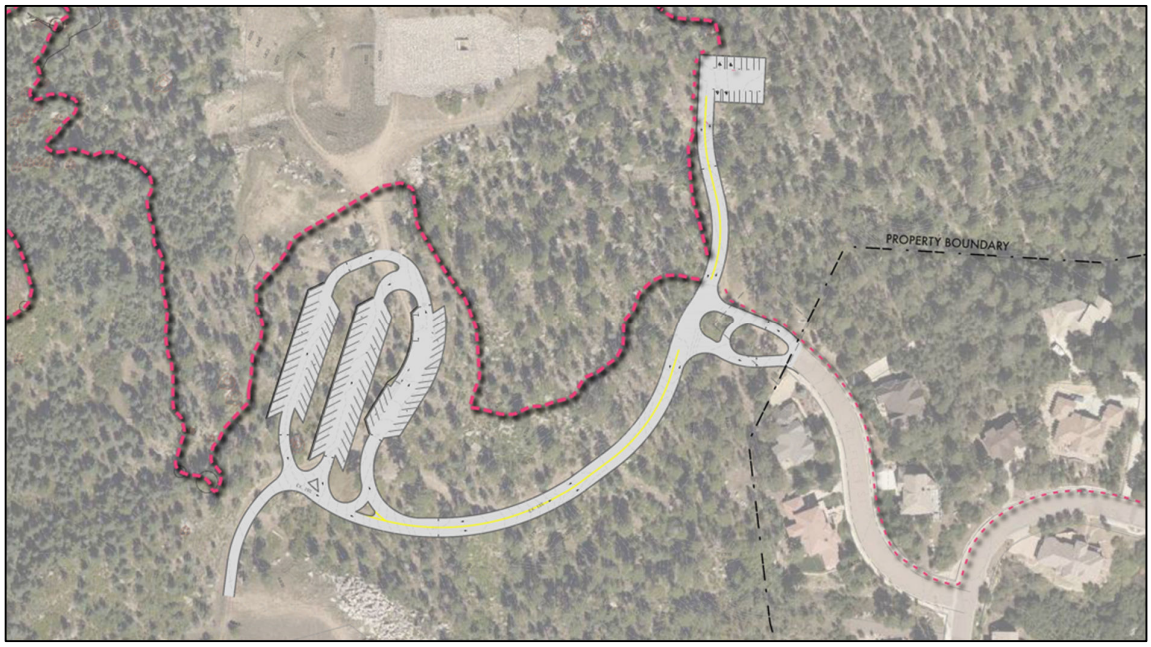


Figure 3-2 - Alternative 2 (November 2024) Conceptual Parking Layout

3.1 Sight Distance

The project is currently at the conceptual stage, and as such, a sight distance analysis has not been assessed at this time.

4. Projected Traffic

4.1 Site-Generated Traffic

For many proposed developments, the Institute of Transportation Engineers (ITE) Trip Generation Manual is utilized to project-site traffic volumes. However, there is not a similar trip generation code for an Open Space facility with trails, and the number of trips expected to be generated will vary greatly based on-site characteristics and surrounding land use. Therefore, the City's Park and Recreation and Traffic Engineering Staff were consulted to develop the estimated trip generation assumptions. The Parks staff reviewed relevant trail counter data for other similar facilities to estimate visitation to the site, when the trails have been constructed.

A trail counter placed on the Chamberlain Trail in Strawberry Hill (south of North Cheyenne Cañon Park), a 190-acre site near Fishers Canyon, was used to develop a low and high end range of visitor numbers for an average weekday and weekend periods, as shown in Table 4-1. Strawberry Hill was selected as a benchmark due to its similar trail network size and usage patterns, making it a reliable comparison for estimating visitation. As shown below, it is estimated that the number of visitors on a typical weekday would be 150–175 and between 300–400 on an average weekend.

Table 4-1 - Daily Visitation Estimates Based on Strawberry Hill Trail Data

Visitor Estimates to Fishers Canyon	Low End	High End
Weekday Visitors	150	175
Weekend Visitors	300	400

The number of visitors was developed based on trail users, so AtkinsRéalis staff developed assumptions on vehicle occupancy based on likely site users and engineering judgement. This calculation resulted in an average vehicle occupancy of 1.4 people/vehicle on the weekdays and 1.7 people/vehicle on the weekend. This information, along with the number of daily vehicle trips shown in Table 4-1, were used to estimate the total number of vehicles accessing the site on an average day.

Based on input from likely neighborhood visitors in the survey that Studio Campo conducted, it is anticipated that some local residents will walk into the site, rather than drive. Therefore, the visitation numbers (shown in Table 4-1) were reduced by 10 percent to account for trips would be walk-in visitors.

Table 4-2 - Fishers Canyon Daily Vehicle-Trip Estimates

Daily Visitor and Vehicle trips	Low End (Alternative 1)	High End (Alternative 2)
Weekday Visitors (arriving by car)	135 ppl/day	158 ppl/day
Total Vehicle trips (based on 1.4 occupancy)	96 veh/day	113 veh/day
Weekend Visitors (arriving by car)	270 ppl/day	360 ppl/day
Total Vehicle trips (based on 1.7 occupancy)	159 veh/day	212 veh/day

An additional calculation was performed to assess the number of visitors on a typical day based on the likely turnover of the parking spaces, along with the anticipated number of daily visitors developed based on Strawberry Hill trail data. This calculation was performed to ensure that the vehicle estimates (developed in Table 4-2) were reasonable based on the likely available parking. For the Master Plan, Studio Campo received input from the public based on their anticipated usage and length of stay on-site. The survey responses showed that most visitors (41 percent of respondents) would utilize the site for between 2–4 hours, 26 percent anticipate using the site for 4–6

hours, 21 percent predict being on site for 1–2 hours, and the remainder anticipate either a short-term visit or other usage. The site will be closed in the evenings and overnight use will be prohibited. The site and trailhead hours will be consistent with other city parks and will be open from 5am to 9pm between November and April, and from 5am to 10am from May through October. Based on the responses, parking lot utilization and turnover assumptions were developed for a typical weekday and weekend of use to calculate trips generated.

Using time on site and parking as a metric, the daily number of visitors accessing the proposed parking lot under Alternative 1 are shown in Table 4-3. This calculation incorporates the low-end usage of the Strawberry Hill estimates and assumes 69 total parking spaces.

Table 4-3 - Low End: Alternative 1 Daily Vehicle Estimates

Number of parking spaces (ADA excluded)	Assumed duration of visit	Weekday		Weekend	
		Utilization per space	Vehicles per day per space	Utilization per space	Vehicles per day per space
5	60 minutes	4	20	5	25
15	90 minutes	2	30	4	60
29	180 minutes	1	29	2	58
18	360 minutes	1	18	1	18
Total Vehicles per day		Weekday	97	Weekend	161
Total Visitors per day		1.4 ppl per vehicle	136	1.7 ppl per vehicle	274

The daily estimate of vehicles utilizing the proposed parking lot under Alternative 2 are shown in Table 4-4. This option assumes the high end of the Strawberry Hill estimates and assumes 110 total parking spaces.

Table 4-4 - High End: Alternative 2 Daily Vehicle Estimates

Number of parking spaces (ADA excluded)	Assumed duration of visit	Weekday		Weekend	
		Utilization per space	Vehicles per day per space	Utilization per space	Vehicles per day per space
8	60 minutes	2	16	6	48
24	90 minutes	1	24	2	48
46	180 minutes	1	46	2	92
29	360 minutes	1	29	1	29
Total Vehicles per day		Weekday	115	Weekend	217
Total Visitors per day		1.4 ppl per vehicle	161	1.7 ppl per vehicle	369

Looking at the comparison of the two approaches to estimating the likely number of visitors, the values of both options (i.e., the turnover based on the number of spaces in the parking lot and the trail users based on total visitation) are similar for the anticipated “low end” of visitation for the 69 parking spaces scenario, and for the “high end” of visitation if 110 spaces are constructed. Therefore, it is assumed that approximately 95 vehicles per day on a weekday and 160 vehicles per day on a weekend would be a reasonable assumption for visitation with the

smaller parking footprint, and approximately 115 vehicles per day on a weekday and 215 vehicles per day on a weekend for the larger 110-space parking lot option. The actual visitor use of the site and the length of stay will depend on many factors, including the length of trail network, the number of connection points and other off-site parking availability for the Chamberlain Trail, possible connectivity to Cheyenne Mountain State Park, other use opportunities such as rock-climbing or wildlife viewing on-site, and the general desirability of the site. The team tried to develop a realistic visitation based on other similar facilities, but actual visitation will depend on these factors as well as weather and other seasonal influences.

4.2 Background and Total Traffic

A timeline of completion for construction of the trail system, trailhead parking, and on-site roads is unknown. However, because the volumes being analyzed are within a fully built-out neighborhood where no additional growth is anticipated besides the added Fishers Canyon traffic, no growth rate was applied to develop future traffic volumes. Therefore, existing volumes were used as a baseline to analyze total build traffic volumes. Furthermore, pass-by trips are unlikely to significantly impact the traffic patterns in this context based on the area's characteristics and surrounding traffic environment, as the trail network will primarily attract new trips specifically made for recreational purposes, rather than intermediate stops by vehicles already on the road and are subsequently not considered in the analysis.

The daily visitation numbers developed were next used to determine the impact that Fishers Canyon will have on the neighborhood roadway network. Visitors will access the site through the neighborhood via either Ellsworth Street or Balmoral Road. Ellsworth Street currently carries much higher volumes than Balmoral Road, so it was assumed that patterns to Fishers Canyon would be similar, and 75 percent of the trips were assigned to Ellsworth Street with 25 percent of the remaining trips assumed to use Balmoral Road. The site will be day-use only, so the trips were assumed to be 50 percent entering and 50 percent exiting. Table 4-5 reiterates the total vehicles used in the weekday and weekend analyses.

Table 4-5 - Number of Vehicles Per Day Accessing Fishers Canyon

Vehicles per day to Fishers Canyon	Alternative 1	Alternative 2
Weekday	97	115
Weekend	161	217

Each vehicle that accesses the site will result in two trips on the roadway: one trip to enter and one to exit. Therefore, to determine the total impact to the roadway network, the number of vehicle trips was developed, as shown in Table 4-6.

Table 4-6 - Number of Vehicle Trips

Trips per day to Fishers Canyon	Alternative 1	Alternative 2
Weekday	194	230
Weekend	322	434

The total number of vehicle trips generated per day were applied to the existing weekday and weekend daily volumes on the project area roadways, and the total daily volumes for both scenarios were developed, as shown in Table 4-7. The table summarizes the anticipated total traffic under either the Alternative 1 (69 spaces) or Alternative 2 (110 spaces) parking scenario. Fishers Canyon site-generated trips were split 75 percent/25 percent on Ellsworth Street and Balmoral Road.

Table 4-7 - Daily Existing and Build Daily Traffic Volumes

Roadway	Weekday			Weekend		
	Existing ADT	Alt 1 Build ADT	Alt 2 Build ADT	Existing ADT	Alt 1 Build ADT	Alt 2 Build ADT
Ellsworth Street	650	795	820	470	710	795
Balmoral Road	160	210	220	130	210	240
Irvington Court	240	435	470	140	460	575

The total weekday and weekend Build daily volumes for Alternative 1 are shown in Figure 4-1 and Alternative 2 in Figure 4-2.

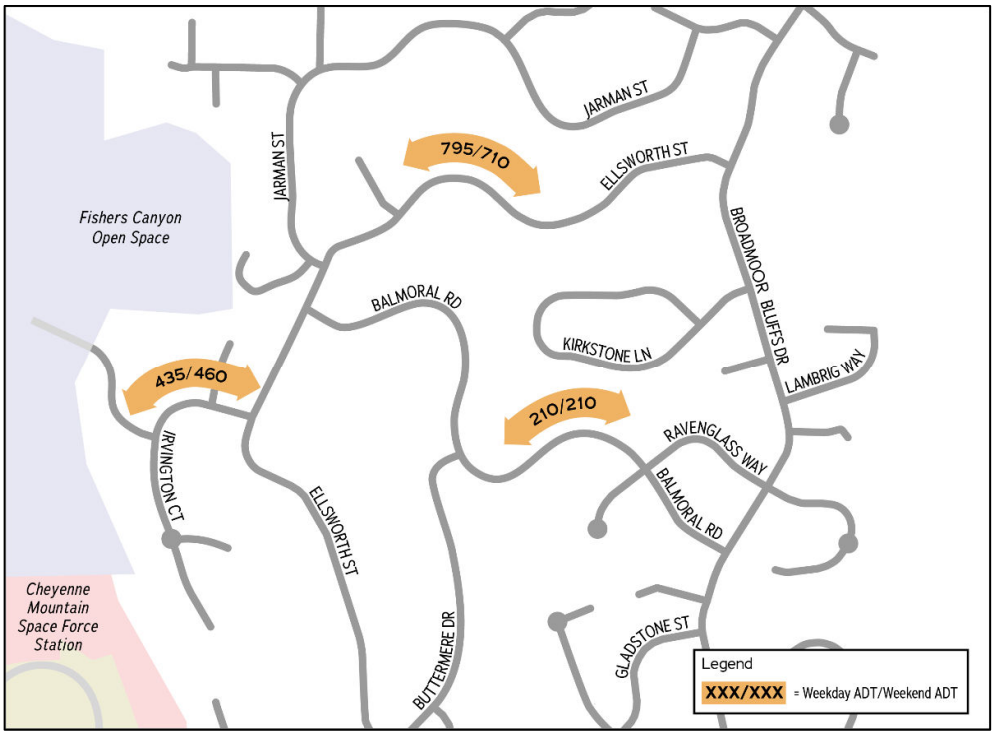


Figure 4-1 - Alternative 1 Build Bidirectional Weekday/Weekend Average Daily Traffic

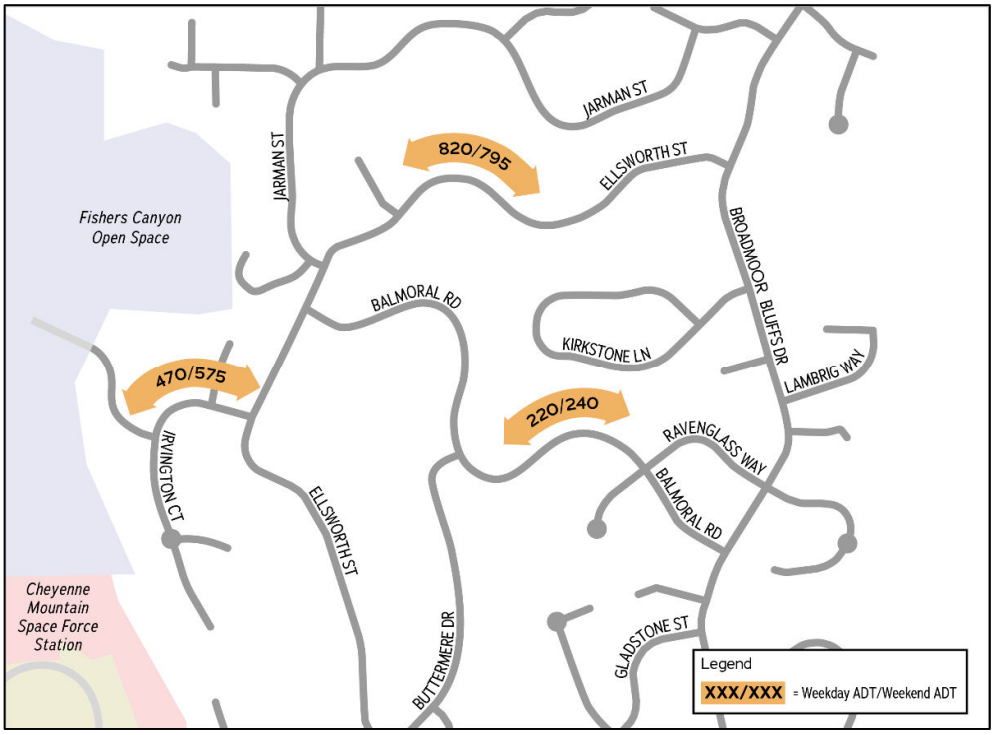


Figure 4-2 - Alternative 2 Build Bidirectional Weekday/Weekend Average Daily Traffic

To assess the impact that the added vehicles will have on the network, a peak hour factor was applied to estimate the number of trips generated during the peak hour, which was established to be during the weekend mid-day period. No trips will occur overnight at the site, as it will be closed from either 9pm or 10pm until 5am daily. To model a typical afternoon period, 10 percent of the total daily trips were assumed to occur in one-hour mid-day, and the traffic entering and exiting was equally split. Table 4-8 displays the peak hour trip assignment. Trips have been split with 75 percent of the trips using Ellsworth Street and 25 percent of the trips using Balmoral Road.

Table 4-8 - Weekend Peak Hour Trip Assignment

	Weekend Inbound (trips/hour)		Weekend Outbound (trips/hour)	
	Ellsworth Street	Balmoral Road	Ellsworth Street	Balmoral Road
Alternative 1	12	4	12	4
Alternative 2	16	5	16	5

The weekend peak hour trip assignment from Table 4-8 was added to the existing peak hour TMC data (shown in Figure 2-3) to create the Alternative 1 and Alternate 2 weekend total peak hour volumes (shown in Figure 4-3 and Figure 4-4), respectively.

Figure 4-3 - Alternative 1 Weekend Peak Hour Volumes

Figure 4-4 - Alternative 2 Weekend Peak Hour Volumes

The Fishers Canyon property was previously zoned residential with a proposed 70 single-family homes. The ITE Trip Generation Manual was used to estimate the anticipated daily trips that would have been created by the

original development. The number of daily vehicle trips generated by the original planned development is shown in Table 4-9 for both weekday and weekend daily trips and is compared to the anticipated daily volumes that will be generated under Alternative 1 and Alternative 2 (from Table 4-6).

Table 4-9 - Number of Daily Vehicle Trips Comparison

Daily Trips	Alternative 1	Alternative 2	Previous Land Use (Single-Faily Homes)
Weekday	194	230	660
Weekend	322	434	664

Table 4-9 indicates that there will be significantly fewer trips generated from the Fishers Canyon Open Space compared to the number of daily vehicle trips that would have been generated under the original planned single family housing development.

5. Traffic Analysis

To analyze the proposed enhancements and the resulting trips that will be added to the local road network, the proposed site traffic was added to existing TMCs. The intersections of Balmoral Road/Broadmoor Bluffs Drive and Ellsworth Street/Broadmoor Bluffs Drive were analyzed, with Alternative 1 (shown in Figure 4-3) and Alternative 2 (shown in Figure 4-4). This traffic was analyzed in Synchro for Alternative 1 (as shown in Table 5-1) and Alternative 2 (as shown in Table 5-2), and these are included in Appendix C.

Table 5-1 - Alternative 1: Intersection Analysis

Intersection		Control	Approach	Existing Peak Hour		Build Peak Hour		Difference	
				Delay [sec/veh]	LOS	Delay [sec/veh]	LOS	Delay [sec/veh]	LOS
1	Balmoral Road & Broadmoor Bluffs Drive	Stop-controlled on Balmoral Road	EB	8.8	A	8.9	A	0.1	-
			NB	0.5	A	0.6	A	0.1	-
			SB	0	A	0	A	-	-
2	Ellsworth Street & Broadmoor Bluffs Drive	Stop-controlled on Ellsworth Street	EB	9.2	A	9.4	A	0.2	-
			NB	0.4	A	0.7	A	0.3	-
			SB	0	A	0	A	-	-

Table 5-2 - Alternative 2: Intersection Analysis

Intersection		Control	Approach	Existing Peak Hour		Build Peak Hour		Difference	
				Delay [sec/veh]	Delay [sec/veh]	Delay [sec/veh]	LOS	Delay [sec/veh]	LOS
1	Balmoral Road & Broadmoor Bluffs Drive	Stop-controlled on Balmoral Road	EB	8.8	A	8.9	A	0.1	-
			NB	0.5	A	0.6	A	0.1	-
			SB	0	A	0	A	-	-
2			EB	9.2	A	9.4	A	0.2	-

	Ellsworth Street & Broadmoor Bluffs Drive	Stop-controlled on Ellsworth Street	NB	0.4	A	0.8	A	0.4	-
			SB	0	A	0	A	-	-

In both the Alternative 1 and Alternative 2 scenarios, these intersections remain at LOS A and delay increases by less than half a second over existing conditions of each approach. The minimal increase in delay and the maintenance of LOS A indicate that these intersections can handle the additional traffic without operational degradation.

Table 5-3 below shows bidirectional daily vehicles per day along Ellsworth Street, Balmoral Road, and Irvington Court for the existing, Alternative 1, and Alternative 2 scenarios. The largest increase in daily traffic volumes will occur on Irvington Court; however, even with the maximum anticipated added traffic, all the study area roadways will remain low-volume roads, with all of the roads continuing to carry under 1,000 vehicles per day. Additionally, the added hourly traffic is anticipated to be no more than 42 trips in an hour.

Table 5-3 - Existing and Proposed Daily Bidirectional Traffic

Location	Scenario	Weekday (vpd)	Increase over existing	Weekend (vpd)	Increase over existing	LOS Impact
Ellsworth Street	Existing	650	N/A	470	N/A	No change in LOS. Intersections remain LOS A, which indicates free flow or excellent conditions with short delays.
	Alternative 1	795	22%	710	51%	
	Alternative 2	820	26%	795	69%	
Balmoral Road	Existing	160	N/A	130	N/A	
	Alternative 1	210	31%	210	62%	
	Alternative 2	220	38%	240	85%	
Irvington Court	Existing	240	N/A	140	N/A	
	Alternative 1	435	81%	460	229%	
	Alternative 2	470	96%	575	311%	

6. Emergency Evacuation

During the public meetings held to discuss the proposed project, the public expressed concern regarding the additional traffic generated by the site, in the case of an emergency evacuation, such as a nearby wildfire. The team used Synchro software to assess the outcome of evacuating all residential properties in the neighborhood with the addition of the Fishers Canyon parking lot at full capacity. The analysis assumed that all local and site traffic would either utilize NORAD Road or the Academy Boulevard interchange to evacuate the area. The analysis showed minor additional vehicular delays at the local intersections with the additional traffic from Fishers Canyon compared to base conditions without the Open Space traffic. The neighborhood intersections remained at capacity, with only minor changes to the LOS during the evacuation. Therefore, it is likely that the Fishers Canyon added vehicles would not significantly impact evacuations out of the Spires neighborhood. It is possible that further downstream, such as near Highway 115, that there could be capacity issues in the case of a large-scale evacuation, but that would occur regardless of the Fishers Canyon traffic.

7. Recommendations and Conclusion

Implementing a formalized trail system at Fishers Canyon will provide the residents of Colorado Springs and surrounding areas opportunities to access the City's Open Space areas and connect to longer regional trails. To ensure that adequate on-site parking can be provided, the project team developed two concepts for parking: one that will accommodate as many as 69 parking spaces, and a second option to expand to up to 110 total spaces. Based on similar sites in the City's Open Space trail network, it is anticipated that the site will generate approximately 150–200 visitors per day on weekdays and 300–400 visitors per day on weekends. This results in approximately 95–115 vehicles per day on weekdays and 160–215 vehicles per day on weekends that will be added to the local street network. **Build-out of the site's trail network will increase the existing neighborhood roadway's daily volumes, but the roads will still carry fewer than 1,000 vehicles per day, and intersection operations will be negligibly impacted with the added site traffic.**

Neighborhood concerns during the outreach process included addressing the speeding and safety concerns with the added traffic. To ensure that the routes to and from the Open Space can accommodate the site traffic, the following measures are recommended to promote safety and wayfinding:

- The intersection of Wellfleet Road and Irvington Court was missing a stop sign on Wellfleet Road. During the outreach stage of this project, a stop sign was added on the approach to the intersection to denote which approach should stop.
- Additional speed limit signs should be added on Balmoral Road and Ellsworth Street to reinforce the 25-mph speed limit.
- Unmarked crosswalks along the access routes to the site should be formalized with crosswalk bars at intersections to draw attention to possible pedestrians in the roadway.
- "Stop Ahead" signs may be considered on the downhill approach to Broadmoor Bluffs Drive on Ellsworth Street and Balmoral Road.
- Wayfinding signs to and from the site should be added to prevent driver confusion and unnecessary additional trips within the neighborhood to and from the Fishers Canyon site.
- Assess the existing sidewalk network leading to the site and construct new sidewalk where there are gaps in connectivity.

These proactive measures will help ensure that the neighborhood's traffic operations remain efficient and safe, despite the increased visitation. Signage recommendations should follow Manual of Uniform Traffic Control Devices (MUTCD) standards.

In conclusion, the analyses conducted by AtkinsRéalis determined that while daily traffic along the local neighborhood roads will increase with construction of the Fishers Canyon Open Space facilities, it will have a minimal overall impact on operations within the neighborhood.

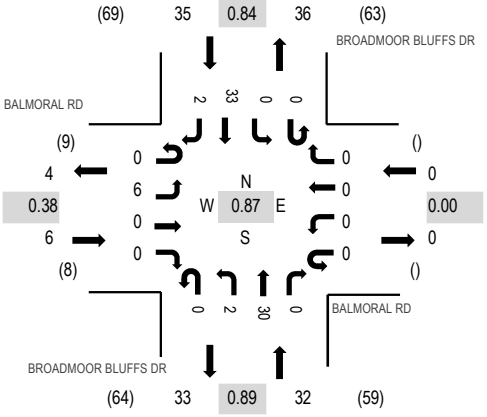
APPENDICES

Appendix A. Traffic Count Data

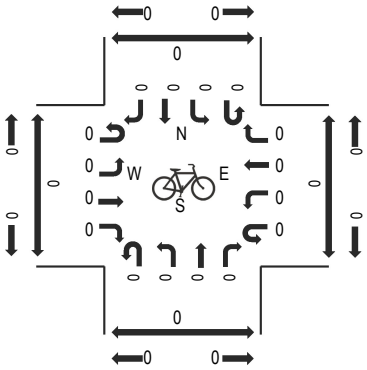
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 1 BROADMOOR BLUFFS DR & BALMORAL RD Noon
Date: Saturday, April 20, 2024
Peak Hour: 11:00 AM - 12:00 PM
Peak 15-Minutes: 11:00 AM - 11:15 AM

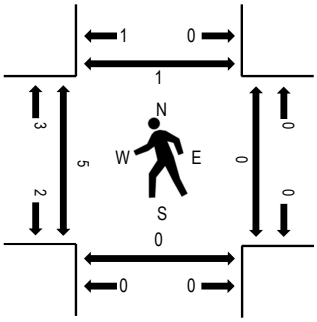
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

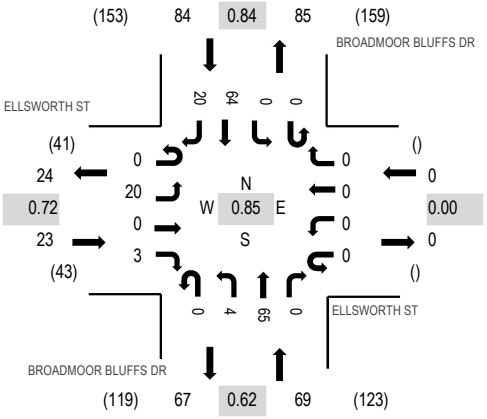
Traffic Counts - Motorized Vehicles

Interval Start Time	BALMORAL RD Eastbound				BALMORAL RD Westbound				BROADMOOR BLUFFS DR Northbound				BROADMOOR BLUFFS DR Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
11:00 AM	0	4	0	0	0	0	0	0	0	0	9	0	0	0	8	0	21	73	1	0	0	0
11:15 AM	0	1	0	0	0	0	0	0	0	1	7	0	0	0	9	1	19	70	4	0	0	1
11:30 AM	0	0	0	0	0	0	0	0	0	1	7	0	0	0	6	0	14	66	0	0	0	0
11:45 AM	0	1	0	0	0	0	0	0	0	0	7	0	0	0	10	1	19	69	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	9	0	0	0	9	0	18	63	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	4	0	0	0	8	3	15		1	0	0	1
12:30 PM	0	1	0	0	0	0	0	0	0	1	10	0	0	0	4	1	17		0	0	0	0
12:45 PM	0	0	0	1	0	0	0	0	0	0	3	0	0	0	9	0	13		0	0	0	0
Count Total	0	7	0	1	0	0	0	0	0	3	56	0	0	0	63	6	136		6	0	0	2
Peak Hour	0	6	0	0	0	0	0	0	0	2	30	0	0	0	33	2	73		5	0	0	1

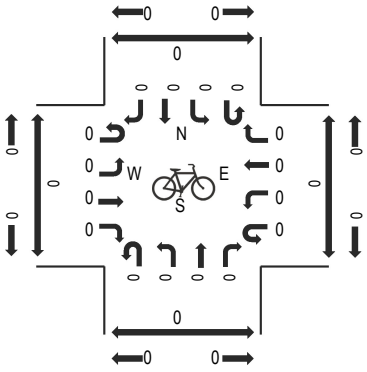
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 2 BROADMOOR BLUFFS DR & ELLSWORTH ST Noon
Date: Saturday, April 20, 2024
Peak Hour: 11:00 AM - 12:00 PM
Peak 15-Minutes: 11:00 AM - 11:15 AM

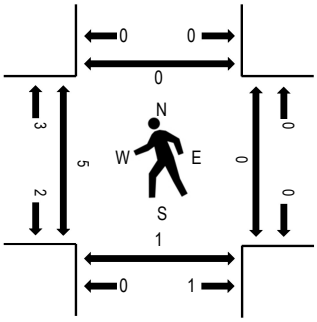
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

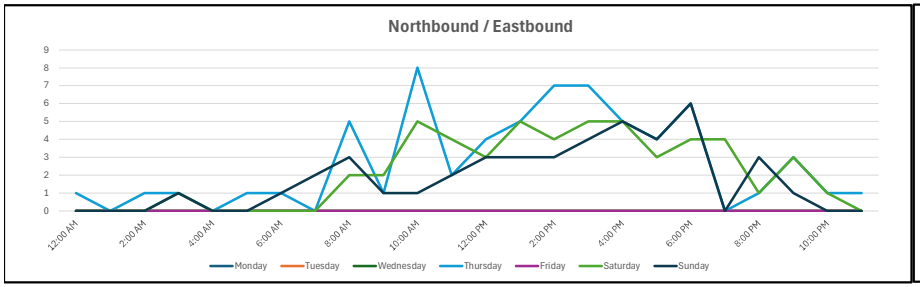
Traffic Counts - Motorized Vehicles

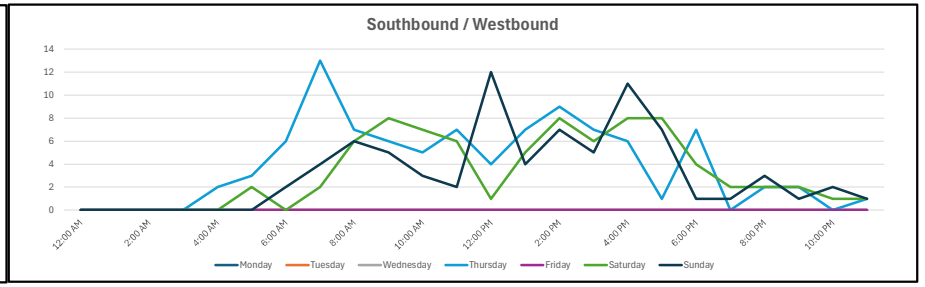
Interval Start Time	ELLSWORTH ST Eastbound				ELLSWORTH ST Westbound				BROADMOOR BLUFFS DR Northbound				BROADMOOR BLUFFS DR Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
11:00 AM	0	4	0	2	0	0	0	0	0	2	26	0	0	0	13	5	52	176	3	0	1	0
11:15 AM	0	6	0	0	0	0	0	0	0	0	12	0	0	0	19	6	43	160	0	0	0	0
11:30 AM	0	5	0	0	0	0	0	0	0	1	12	0	0	0	15	8	41	155	2	0	0	0
11:45 AM	0	5	0	1	0	0	0	0	0	1	15	0	0	0	17	1	40	154	0	0	0	0
12:00 PM	0	3	0	0	0	0	0	0	0	1	17	0	0	0	12	3	36	143	0	0	0	0
12:15 PM	0	6	0	0	0	0	0	0	0	0	7	0	1	0	18	6	38		2	0	0	0
12:30 PM	0	8	0	0	0	0	0	0	0	0	20	0	0	0	9	3	40		0	0	0	0
12:45 PM	0	3	0	0	0	0	0	0	0	0	9	0	0	0	13	4	29		2	0	0	0
Count Total	0	40	0	3	0	0	0	0	0	5	118	0	1	0	116	36	319		9	0	1	0
Peak Hour	0	20	0	3	0	0	0	0	0	4	65	0	0	0	64	20	176		5	0	1	0

Vehicle Volume Report - Hourly

Site Description: BALMORAL RD W.O. BROADMOOR BLUFFS DR
Site Number: 3
Start Date: 4/18/2024
End Date: 4/21/2024

Time	Monday 4/22/24			Tuesday 4/23/24			Wednesday 4/24/24			Thursday 4/18/24			Friday 4/19/24			Saturday 4/20/24			Sunday 4/21/24			3 Day Avg Tue-Thu		5 Day Avg Mon-Fri		7 Day Avg Mon-Sun	
	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	EB	WB	EB	WB
12:00 AM	-	-	-	-	-	-	-	-	-	1	0	1	-	-	-	0	0	0	0	0	0	-	-	-	-	-	-
1:00 AM	-	-	-	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0	0	0	-	-	-	-	-	-
2:00 AM	-	-	-	-	-	-	-	-	-	1	0	1	-	-	-	0	0	0	0	0	0	-	-	-	-	-	-
3:00 AM	-	-	-	-	-	-	-	-	-	1	0	1	-	-	-	1	0	1	1	0	1	-	-	-	-	-	-
4:00 AM	-	-	-	-	-	-	-	-	-	0	2	2	-	-	-	0	0	0	0	0	0	-	-	-	-	-	-
5:00 AM	-	-	-	-	-	-	-	-	-	1	3	4	-	-	-	0	2	2	0	0	0	-	-	-	-	-	-
6:00 AM	-	-	-	-	-	-	-	-	-	1	6	7	-	-	-	0	0	0	1	2	3	-	-	-	-	-	-
7:00 AM	-	-	-	-	-	-	-	-	-	0	13	13	-	-	-	0	2	2	2	4	6	-	-	-	-	-	-
8:00 AM	-	-	-	-	-	-	-	-	-	5	7	12	-	-	-	2	6	8	3	6	9	-	-	-	-	-	-
9:00 AM	-	-	-	-	-	-	-	-	-	1	6	7	-	-	-	2	8	10	1	5	6	-	-	-	-	-	-
10:00 AM	-	-	-	-	-	-	-	-	-	8	5	13	-	-	-	5	7	12	1	3	4	-	-	-	-	-	-
11:00 AM	-	-	-	-	-	-	-	-	-	2	7	9	-	-	-	4	6	10	2	2	4	-	-	-	-	-	-
12:00 PM	-	-	-	-	-	-	-	-	-	4	4	8	-	-	-	3	1	4	3	12	15	-	-	-	-	-	-
1:00 PM	-	-	-	-	-	-	-	-	-	5	7	12	-	-	-	5	5	10	3	4	7	-	-	-	-	-	-
2:00 PM	-	-	-	-	-	-	-	-	-	7	9	16	-	-	-	4	8	12	3	7	10	-	-	-	-	-	-
3:00 PM	-	-	-	-	-	-	-	-	-	7	7	14	-	-	-	5	6	11	4	5	9	-	-	-	-	-	-
4:00 PM	-	-	-	-	-	-	-	-	-	5	6	11	-	-	-	5	8	13	5	11	16	-	-	-	-	-	-
5:00 PM	-	-	-	-	-	-	-	-	-	4	1	5	-	-	-	3	8	11	4	7	11	-	-	-	-	-	-
6:00 PM	-	-	-	-	-	-	-	-	-	6	7	13	-	-	-	4	4	8	6	1	7	-	-	-	-	-	-
7:00 PM	-	-	-	-	-	-	-	-	-	0	0	0	-	-	-	4	2	6	0	1	1	-	-	-	-	-	-
8:00 PM	-	-	-	-	-	-	-	-	-	1	2	3	-	-	-	1	2	3	3	3	6	-	-	-	-	-	-
9:00 PM	-	-	-	-	-	-	-	-	-	3	2	5	-	-	-	3	2	5	1	1	2	-	-	-	-	-	-
10:00 PM	-	-	-	-	-	-	-	-	-	1	0	1	-	-	-	1	1	2	0	2	2	-	-	-	-	-	-
11:00 PM	-	-	-	-	-	-	-	-	-	1	1	2	-	-	-	0	1	1	0	1	1	-	-	-	-	-	-
6:00 AM - 9:00 AM	-	-	-	-	-	-	-	-	-	6	26	32	-	-	-	2	8	10	6	12	18	-	-	-	-	-	-
3:00 PM - 6:00 PM	-	-	-	-	-	-	-	-	-	16	14	30	-	-	-	13	22	35	13	23	36	-	-	-	-	-	-
6:00 AM - 7:00 PM	-	-	-	-	-	-	-	-	-	55	85	140	-	-	-	42	69	111	38	69	107	-	-	-	-	-	-
12:00 AM - 12:00 AM	-	-	-	-	-	-	-	-	-	65	95	160	-	-	-	52	79	131	43	77	120	-	-	-	-	-	-
Percent	-	-	-	-	-	-	-	-	-	*40.6%*	*59.4%*	*100.0%*	-	-	-	*39.7%*	*60.3%*	*100.0%*	*35.8%*	*64.2%*	*100.0%*	-	-	-	-	-	-
AM Peak	-	-		-	-		-	-		7:00 AM	8:00 AM		-	-		10:00 AM	11:00 AM		8:00 AM	9:00 AM							
PM Peak	-	-		-	-		-	-		2:00 PM	3:00 PM		-	-		4:00 PM	5:00 PM		4:00 PM	5:00 PM							

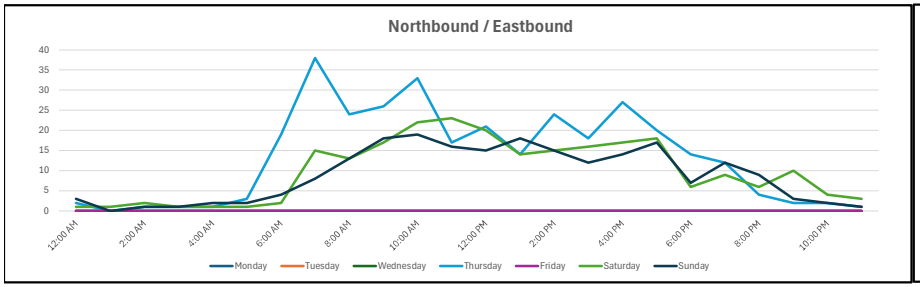


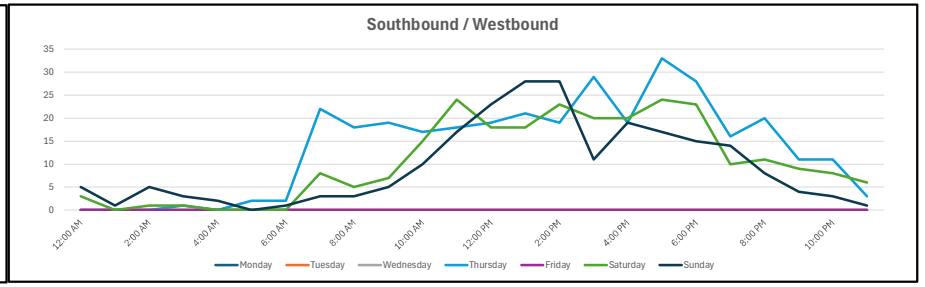


Vehicle Volume Report - Hourly

Site Description: ELLSWORTH ST W.O. BROADMOOR BLUFFS DR
Site Number: 4
Start Date: 4/18/2024
End Date: 4/21/2024

Time	Monday 4/22/24			Tuesday 4/23/24			Wednesday 4/24/24			Thursday 4/18/24			Friday 4/19/24			Saturday 4/20/24			Sunday 4/21/24			3 Day Avg Tue-Thu		5 Day Avg Mon-Fri		7 Day Avg Mon-Sun	
	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	EB	WB	EB	WB
12:00 AM	-	-	-	-	-	-	-	-	-	2	0	2	-	-	-	1	3	4	3	5	8	-	-	-	-	-	-
1:00 AM	-	-	-	-	-	-	-	-	-	0	0	0	-	-	-	1	0	1	0	1	1	-	-	-	-	-	-
2:00 AM	-	-	-	-	-	-	-	-	-	1	0	1	-	-	-	2	1	3	1	5	6	-	-	-	-	-	-
3:00 AM	-	-	-	-	-	-	-	-	-	1	1	2	-	-	-	1	1	2	1	3	4	-	-	-	-	-	-
4:00 AM	-	-	-	-	-	-	-	-	-	1	0	1	-	-	-	1	0	1	2	2	4	-	-	-	-	-	-
5:00 AM	-	-	-	-	-	-	-	-	-	3	2	5	-	-	-	1	0	1	2	0	2	-	-	-	-	-	-
6:00 AM	-	-	-	-	-	-	-	-	-	19	2	21	-	-	-	2	0	2	4	1	5	-	-	-	-	-	-
7:00 AM	-	-	-	-	-	-	-	-	-	38	22	60	-	-	-	15	8	23	8	3	11	-	-	-	-	-	-
8:00 AM	-	-	-	-	-	-	-	-	-	24	18	42	-	-	-	13	5	18	13	3	16	-	-	-	-	-	-
9:00 AM	-	-	-	-	-	-	-	-	-	26	19	45	-	-	-	17	7	24	18	5	23	-	-	-	-	-	-
10:00 AM	-	-	-	-	-	-	-	-	-	33	17	50	-	-	-	22	15	37	19	10	29	-	-	-	-	-	-
11:00 AM	-	-	-	-	-	-	-	-	-	17	18	35	-	-	-	23	24	47	16	17	33	-	-	-	-	-	-
12:00 PM	-	-	-	-	-	-	-	-	-	21	19	40	-	-	-	20	18	38	15	23	38	-	-	-	-	-	-
1:00 PM	-	-	-	-	-	-	-	-	-	14	21	35	-	-	-	14	18	32	18	28	46	-	-	-	-	-	-
2:00 PM	-	-	-	-	-	-	-	-	-	24	19	43	-	-	-	15	23	38	15	28	43	-	-	-	-	-	-
3:00 PM	-	-	-	-	-	-	-	-	-	18	29	47	-	-	-	16	20	36	12	11	23	-	-	-	-	-	-
4:00 PM	-	-	-	-	-	-	-	-	-	27	19	46	-	-	-	17	20	37	14	19	33	-	-	-	-	-	-
5:00 PM	-	-	-	-	-	-	-	-	-	20	33	53	-	-	-	18	24	42	17	17	34	-	-	-	-	-	-
6:00 PM	-	-	-	-	-	-	-	-	-	14	28	42	-	-	-	6	23	29	7	15	22	-	-	-	-	-	-
7:00 PM	-	-	-	-	-	-	-	-	-	12	16	28	-	-	-	9	10	19	12	14	26	-	-	-	-	-	-
8:00 PM	-	-	-	-	-	-	-	-	-	4	20	24	-	-	-	6	11	17	9	8	17	-	-	-	-	-	-
9:00 PM	-	-	-	-	-	-	-	-	-	2	11	13	-	-	-	10	9	19	3	4	7	-	-	-	-	-	-
10:00 PM	-	-	-	-	-	-	-	-	-	2	11	13	-	-	-	4	8	12	2	3	5	-	-	-	-	-	-
11:00 PM	-	-	-	-	-	-	-	-	-	1	3	4	-	-	-	3	6	9	1	1	2	-	-	-	-	-	-
6:00 AM - 9:00 AM	-	-	-	-	-	-	-	-	-	**81**	**42**	**123**	-	-	-	**30**	**13**	**43**	**25**	**7**	**32**	-	-	-	-	-	-
3:00 PM - 6:00 PM	-	-	-	-	-	-	-	-	-	**65**	**81**	**146**	-	-	-	**51**	**64**	**115**	**43**	**47**	**90**	-	-	-	-	-	-
6:00 AM - 7:00 PM	-	-	-	-	-	-	-	-	-	**295**	**264**	**559**	-	-	-	**198**	**205**	**403**	**176**	**180**	**356**	-	-	-	-	-	-
12:00 AM - 12:00 AM	-	-	-	-	-	-	-	-	-	**324**	**328**	**652**	-	-	-	**237**	**254**	**491**	**212**	**226**	**438**	-	-	-	-	-	-
Percent	-	-	-	-	-	-	-	-	-	***49.7%***	***50.3%***	***100.0%***	-	-	-	***48.3%***	***51.7%***	***100.0%***	***48.4%***	***51.6%***	***100.0%***	-	-	-	-	-	-
AM Peak	-	-		-	-		-	-		**7:00 AM**	**8:00 AM**		-	-		**11:00 AM**	**12:00 PM**		**11:00 AM**	**12:00 PM**							
PM Peak	-	-		-	-		-	-		**5:00 PM**	**6:00 PM**		-	-		**5:00 PM**	**6:00 PM**		**1:00 PM**	**2:00 PM**							

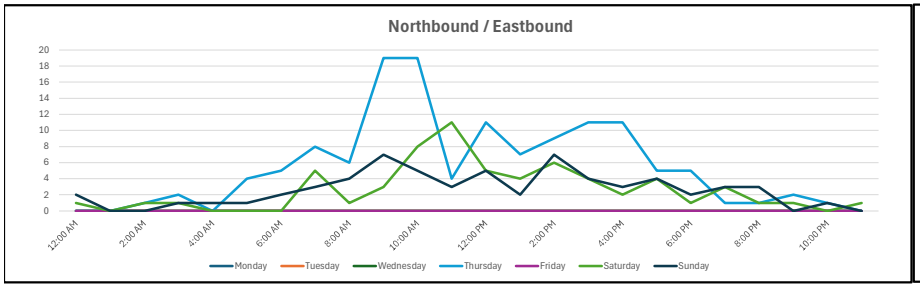


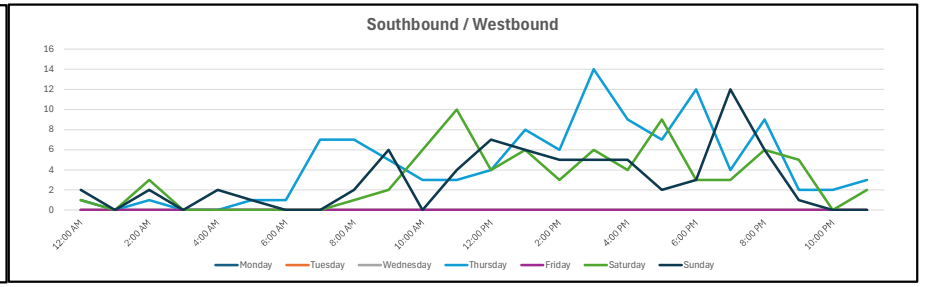


Vehicle Volume Report - Hourly

Site Description: IRVINGTON CT W.O. ELLSWORTH ST
Site Number: 5
Start Date: 4/18/2024
End Date: 4/21/2024

Time	Monday 4/22/24			Tuesday 4/23/24			Wednesday 4/24/24			Thursday 4/18/24			Friday 4/19/24			Saturday 4/20/24			Sunday 4/21/24			3 Day Avg Tue-Thu		5 Day Avg Mon-Fri		7 Day Avg Mon-Sun	
	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	EB	WB	EB	WB
12:00 AM	-	-	-	-	-	-	-	-	-	0	1	1	-	-	-	1	1	2	2	2	4	-	-	-	-	-	-
1:00 AM	-	-	-	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0	0	0	-	-	-	-	-	-
2:00 AM	-	-	-	-	-	-	-	-	-	1	1	2	-	-	-	1	3	4	0	2	2	-	-	-	-	-	-
3:00 AM	-	-	-	-	-	-	-	-	-	2	0	2	-	-	-	1	0	1	1	0	1	-	-	-	-	-	-
4:00 AM	-	-	-	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	1	2	3	-	-	-	-	-	-
5:00 AM	-	-	-	-	-	-	-	-	-	4	1	5	-	-	-	0	0	0	1	1	2	-	-	-	-	-	-
6:00 AM	-	-	-	-	-	-	-	-	-	5	1	6	-	-	-	0	0	0	2	0	2	-	-	-	-	-	-
7:00 AM	-	-	-	-	-	-	-	-	-	8	7	15	-	-	-	5	0	5	3	0	3	-	-	-	-	-	-
8:00 AM	-	-	-	-	-	-	-	-	-	6	7	13	-	-	-	1	1	2	4	2	6	-	-	-	-	-	-
9:00 AM	-	-	-	-	-	-	-	-	-	19	5	24	-	-	-	3	2	5	7	6	13	-	-	-	-	-	-
10:00 AM	-	-	-	-	-	-	-	-	-	19	3	22	-	-	-	8	6	14	5	0	5	-	-	-	-	-	-
11:00 AM	-	-	-	-	-	-	-	-	-	4	3	7	-	-	-	11	10	21	3	4	7	-	-	-	-	-	-
12:00 PM	-	-	-	-	-	-	-	-	-	11	4	15	-	-	-	5	4	9	5	7	12	-	-	-	-	-	-
1:00 PM	-	-	-	-	-	-	-	-	-	7	8	15	-	-	-	4	6	10	2	6	8	-	-	-	-	-	-
2:00 PM	-	-	-	-	-	-	-	-	-	9	6	15	-	-	-	6	3	9	7	5	12	-	-	-	-	-	-
3:00 PM	-	-	-	-	-	-	-	-	-	11	14	25	-	-	-	4	6	10	4	5	9	-	-	-	-	-	-
4:00 PM	-	-	-	-	-	-	-	-	-	11	9	20	-	-	-	2	4	6	3	5	8	-	-	-	-	-	-
5:00 PM	-	-	-	-	-	-	-	-	-	5	7	12	-	-	-	4	9	13	4	2	6	-	-	-	-	-	-
6:00 PM	-	-	-	-	-	-	-	-	-	5	12	17	-	-	-	1	3	4	2	3	5	-	-	-	-	-	-
7:00 PM	-	-	-	-	-	-	-	-	-	1	4	5	-	-	-	3	3	6	3	12	15	-	-	-	-	-	-
8:00 PM	-	-	-	-	-	-	-	-	-	1	9	10	-	-	-	1	6	7	3	6	9	-	-	-	-	-	-
9:00 PM	-	-	-	-	-	-	-	-	-	2	2	4	-	-	-	1	5	6	0	1	1	-	-	-	-	-	-
10:00 PM	-	-	-	-	-	-	-	-	-	1	2	3	-	-	-	0	0	0	1	0	1	-	-	-	-	-	-
11:00 PM	-	-	-	-	-	-	-	-	-	0	3	3	-	-	-	1	2	3	0	0	0	-	-	-	-	-	-
6:00 AM - 9:00 AM	-	-	-	-	-	-	-	-	-	19	15	34	-	-	-	6	1	7	9	2	11	-	-	-	-	-	-
3:00 PM - 6:00 PM	-	-	-	-	-	-	-	-	-	27	30	57	-	-	-	10	19	29	11	12	23	-	-	-	-	-	-
6:00 AM - 7:00 PM	-	-	-	-	-	-	-	-	-	120	86	206	-	-	-	54	54	108	51	45	96	-	-	-	-	-	-
12:00 AM - 12:00 AM	-	-	-	-	-	-	-	-	-	132	109	241	-	-	-	63	74	137	63	71	134	-	-	-	-	-	-
Percent	-	-	-	-	-	-	-	-	-	*54.8%*	*45.2%*	*100.0%*	-	-	-	*46.0%*	*54.0%*	*100.0%*	*47.0%*	*53.0%*	*100.0%*	-	-	-	-	-	-
AM Peak	-	-		-	-		-	-		9:00 AM	10:00 AM		-	-		11:00 AM	12:00 PM		9:00 AM	10:00 AM							
PM Peak	-	-		-	-		-	-		3:00 PM	4:00 PM		-	-		5:00 PM	6:00 PM		7:00 PM	8:00 PM							





Appendix B. Existing Condition Synchro Reports

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	3	4	65	64	20
Future Vol, veh/h	20	3	4	65	64	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-4	-	-	0	0	-
Peak Hour Factor	85	85	92	92	92	92
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	24	4	4	71	70	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	160	81	92	0	-	0
Stage 1	81	-	-	-	-	-
Stage 2	79	-	-	-	-	-
Critical Hdwy	5.6	5.8	4.1	-	-	-
Critical Hdwy Stg 1	4.6	-	-	-	-	-
Critical Hdwy Stg 2	4.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	866	993	1515	-	-	-
Stage 1	964	-	-	-	-	-
Stage 2	966	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	863	993	1515	-	-	-
Mov Cap-2 Maneuver	863	-	-	-	-	-
Stage 1	961	-	-	-	-	-
Stage 2	966	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1515	-	878	-	-
HCM Lane V/C Ratio	0.003	-	0.031	-	-
HCM Control Delay (s)	7.4	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	0	2	30	33	2
Future Vol, veh/h	6	0	2	30	33	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-3	-	-	0	0	-
Peak Hour Factor	87	87	92	92	92	92
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	7	0	2	33	36	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	74	37	38	0	-	0
Stage 1	37	-	-	-	-	-
Stage 2	37	-	-	-	-	-
Critical Hdwy	5.8	5.9	4.1	-	-	-
Critical Hdwy Stg 1	4.8	-	-	-	-	-
Critical Hdwy Stg 2	4.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	946	1044	1585	-	-	-
Stage 1	997	-	-	-	-	-
Stage 2	997	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	945	1044	1585	-	-	-
Mov Cap-2 Maneuver	945	-	-	-	-	-
Stage 1	996	-	-	-	-	-
Stage 2	997	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1585	-	945	-	-
HCM Lane V/C Ratio	0.001	-	0.007	-	-
HCM Control Delay (s)	7.3	0	8.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Appendix C. Build Condition Synchro Reports

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	29	6	7	68	67	29
Future Vol, veh/h	29	6	7	68	67	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-4	-	-	0	0	-
Peak Hour Factor	85	85	92	92	92	92
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	34	7	8	74	73	32

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	179	89	105	0	-	0
Stage 1	89	-	-	-	-	-
Stage 2	90	-	-	-	-	-
Critical Hdwy	5.6	5.8	4.1	-	-	-
Critical Hdwy Stg 1	4.6	-	-	-	-	-
Critical Hdwy Stg 2	4.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	848	984	1499	-	-	-
Stage 1	958	-	-	-	-	-
Stage 2	958	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	843	984	1499	-	-	-
Mov Cap-2 Maneuver	843	-	-	-	-	-
Stage 1	952	-	-	-	-	-
Stage 2	958	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	0.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1499	-	864	-	-
HCM Lane V/C Ratio	0.005	-	0.048	-	-
HCM Control Delay (s)	7.4	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	1	3	33	36	5
Future Vol, veh/h	9	1	3	33	36	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-3	-	-	0	0	-
Peak Hour Factor	87	87	92	92	92	92
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	10	1	3	36	39	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	84	42	44	0	-	0
Stage 1	42	-	-	-	-	-
Stage 2	42	-	-	-	-	-
Critical Hdwy	5.8	5.9	4.1	-	-	-
Critical Hdwy Stg 1	4.8	-	-	-	-	-
Critical Hdwy Stg 2	4.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	936	1038	1577	-	-	-
Stage 1	993	-	-	-	-	-
Stage 2	993	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	934	1038	1577	-	-	-
Mov Cap-2 Maneuver	934	-	-	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	993	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.9	0.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1577	-	943	-	-
HCM Lane V/C Ratio	0.002	-	0.012	-	-
HCM Control Delay (s)	7.3	0	8.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	7	8	69	68	32
Future Vol, veh/h	32	7	8	69	68	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-4	-	-	0	0	-
Peak Hour Factor	85	85	92	92	92	92
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	38	8	9	75	74	35

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	185	92	109	0	-	0
Stage 1	92	-	-	-	-	-
Stage 2	93	-	-	-	-	-
Critical Hdwy	5.6	5.8	4.1	-	-	-
Critical Hdwy Stg 1	4.6	-	-	-	-	-
Critical Hdwy Stg 2	4.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	843	981	1494	-	-	-
Stage 1	956	-	-	-	-	-
Stage 2	955	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	838	981	1494	-	-	-
Mov Cap-2 Maneuver	838	-	-	-	-	-
Stage 1	950	-	-	-	-	-
Stage 2	955	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	0.8	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1494	-	861	-	-
HCM Lane V/C Ratio	0.006	-	0.053	-	-
HCM Control Delay (s)	7.4	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	1	3	34	37	6
Future Vol, veh/h	10	1	3	34	37	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-3	-	-	0	0	-
Peak Hour Factor	87	87	92	92	92	92
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	11	1	3	37	40	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	87	44	47	0	-	0
Stage 1	44	-	-	-	-	-
Stage 2	43	-	-	-	-	-
Critical Hdwy	5.8	5.9	4.1	-	-	-
Critical Hdwy Stg 1	4.8	-	-	-	-	-
Critical Hdwy Stg 2	4.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	932	1036	1573	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	992	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	930	1036	1573	-	-	-
Mov Cap-2 Maneuver	930	-	-	-	-	-
Stage 1	989	-	-	-	-	-
Stage 2	992	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.9	0.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1573	-	939	-	-
HCM Lane V/C Ratio	0.002	-	0.013	-	-
HCM Control Delay (s)	7.3	0	8.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

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