AGENDA
TRI-COUNTY TECHNICAL ADVISORY COMMITTEE
Friday, December 9, 2022
10:00 A.M.

Join Zoom Meeting:

Meeting link: https://us02web.zoom.us/j/5375128983

Call in phone number: +1 669 900 6833; Meeting ID: 537 512 8983

For further information on any of the agenda items please contact the Amador County Planning Department at (209) 223-6380 or email planning@amadorgov.org. Off-agenda items must be approved by the Tri-County Technical Advisory Committee pursuant to Section 54956.5 of the Government Code.

A. Call to Order
B. Approve Agenda
C. Correspondence
D. Minutes: September 9, 2022
E. Public Matters: Informational items and persons wishing to address the Committee regarding non-agenda items
F. Agenda Items:

ITEM 1: Discussion and possible action regarding annual mitigation reports submitted by Kirkwood Mountain Resort:

MM 4.1: Continue avalanche forecasting and control program and annual evaluation
MM 4.7(d): Kirkwood Mountain Resort will prepare an annual report that includes a detailed analysis of day-visitor parking during peak periods
MM 4.09(b) Kirkwood Mountain Resort Snowmaking Noise Management Program
MM 4.10 Kirkwood Mountain Resort Employee Housing Report
MM 4.2 Conduct Street Sweeping Twice a Year
MM 4.05(j) Educational Materials Regarding Cultural Resources
MM 4.03.1 (h) Fishing Regulations Poster
MM 4.12(c) Sensitive Resource Posters at Kirkwood Lake

ITEM 2: Discussion and possible action regarding the triennial traffic report for the SR88/Kirkwood Meadows Drive intersection per MM 4.7(b).

G. Adjournment until the next regularly scheduled meeting January 2023.

SUMMARY MINUTES
TRI-COUNTY TECHNICAL ADVISORY COMMITTEE
Friday, September 9, 2022
10:00 A.M.
VIRTUAL MEETING

Meeting link: https://us06web.zoom.us/j/82895436966?pwd=QVZ4ZCt6U2RjbWl2d0t3T2V

Call in number: +1 669 444 9171; **Meeting ID:** 828 9543 6966**; Passcode:** 797858

A. Call to Order:
The meeting was called to order by Brendan Ferry at 10:00 am. Members present were:
Brendan Ferry, El Dorado County; Sam Booth, Alpine County; and Ethan Gray, Alpine County.

B. Approval of Agenda:
On a motion by Sam Booth and second by Brendan Ferry the agenda was approved as published.

C. Correspondence: Any correspondence received prior to publication of the agenda has been included with the packet.

D. Minutes: August 12, 2022
On a motion by Ethan Gray the minutes from the August 12, 2022 meeting were approved (Brendan Ferry abstained).

E. Public Matters not on the Agenda: None.

F. Agenda Items:

ITEM 1: Continued discussion and possible action regarding a proposal to create 65 parking spaces along the southern half of Loop Road; submitted by Kirkwood Mountain Resort.

Brendan Ferry introduced the item. Greg Kiskinen with KMR asked that agenda items 1 and 2 be discussed together since they are closely related. Committee members Ferry and Booth agreed to discuss the Loop Road and Chair 7 parking improvements concurrently.

Mr. Kiskinen continued, explaining that the improvements to the Chair 7 parking lot will maintain the grade separation with Kirkwood Meadows Drive and minimize tree removal.

Peter Dornbrook asked for clarification on the number of trees to be removed.

Ryan Spreeman with R. O. Anderson explained that 13 trees would be removed.

Mr. Dornbrook asked that action on the parking lot improvements be delayed pending more community notification. Larry Lacey also requested additional community notification.

Erik Christeson, KMPUD General Manager, noted that the District's issues with utility conflicts were related to the Loop Road improvements and not the Chair 7 lot, and confirmed that the TRI-TAC agendas are posted on the District's community calendar.

Matt Jones, KMR General Manager, noted that additional plantings to replace trees would be an acceptable condition to the Chair 7 project.

Larry Lacey commented that existing trees should be retained in addition to creating a screen for the parking lot.

Brendan Ferry commented that tree protection should be installed to prevent damage to mature trees, and tree thinning may be necessary to protect the health of the existing vegetation. Trees that were planted as part of KMPUD, KMR, and community efforts should be replaced. He asked how snow removal efforts and stormwater management would be impacted by the Chair 7 lot improvements.

Mr. Kiskinen noted that snow storage from upper lot 7 would continue to be deposited in the lower lot 7 area. Rob Anderson added that the increase in stormwater would be negligible.

Brendan Ferry asked if KMPUD was satisfied with the amended plans and if there were conditions that could help with the approvals.

Erik Christeson noted that KMR has previously engaged Resource Concepts, Inc., to implement stormwater improvements that have not yet occurred. Implementation of stormwater improvements with the same practical effect should be a condition of approval. Another condition should be placement of bollards between parking improvements and adjacent KMPUD infrastructure and facilities. The District would also like to see the removal of proposed parking spaces directly opposite their maintenance shop to prevent a safety hazard with skiers and District vehicles and equipment, and a condition to keep the Loop road travel width to 32 feet to minimize impacts to emergency vehicle access. A final condition should be a one-year review of the Loop Road parking improvements by Tri-TAC to ensure compliance with the other conditions and discuss any problems that occur during the coming ski season.

After further discussion of possible conditions of approval, Brendan Ferry shared a draft of conditions which were amended as follows:

1. Loop Road - District concerns - conditions:
   a. New storm drain system for Loop Road analyzed and designed with an implementation schedule; plans to be done in 2023; project implemented over three years and monitored
   b. Bollards installed to protect KMPUD vault; Try metal stakes and plastic first, and modify if necessary
   c. Parking spaces across from District driveway modified based on demand and snow storage needs
   d. Maintain a minimum 26-foot width per fire code
   e. One year review by Tri-TAC following parking improvements
   f. Comply with Amador County grading permit
2. Upper lot conditions:
   a. Retain all existing vegetation outside of construction areas on submitted plans with Best Management Practices (i.e., construction fencing, tree protection, etc.)
   b. Revegetate, restore area to replace screening with like for like (i.e., replace vegetation installed by KMPUD/KMR/citizen volunteers)
   c. Comply with Amador County grading permit

Upon a motion by Sam Booth and a second by Brendan Ferry, the Committee approved the plans to create 65 parking spaces along the southern half of Loop Road as submitted and subject to the conditions of approval as discussed and displayed.

Upon a motion by Sam Booth and a second by Brendan Ferry, the Committee approved the plans to add 32 parking spaces to the existing Loop Road parking lot as submitted and and subject to the conditions of approval as discussed and displayed.

G. Adjournment: The meeting was adjourned at 11:47 am.

ITEM 1

October 19, 2022

Chuck Beatty, Amador County
Brendan Ferry, El Dorado County
Larry Shoemaker, Alpine County

Subject: Mitigation Measure: 4.1 (ae) COA 32

Mitigation Measure:
4.1 (ae) (COA 32): Continue avalanche forecasting and control program as well as provide annual evaluation.

Enclosed please find the Kirkwood Mountain Resort 2020/2021 Avalanche Forecasting and Snow Safety Program for your records.

Please contact me should you need additional information or have any questions.

Thank you,

Adam Ikemire
Senior Manager Ski Patrol
(209) 258-7233
Kirkwood Mountain Resort
AIkemire@vailresorts.com

REPORT
Effectiveness of Kirkwood Mountain Resort's
Avalanche Forecasting and Snow Safety Program
2021-22

Kirkwood Mountain Resort's (KMR) Alpine Snow Safety Plan, Explosive Use/Storage Plan, and 105mm M101A1 Howitzer Procedure Plan are referenced in Section 4 of the Winter Site Operating Plan that was originally developed in 1972 prior to opening the ski area. Each year these sections are reviewed and updated as necessary to reflect any improvements to systems that provide increased safety and efficiency for the snow safety program.

KMR's avalanche mitigation procedures have always focused on the safety of the employees first and foremost. This employee safety then trickles down to all other employees, and finally our guests. All avalanche personnel are equipped with the latest state-of-the-art tools and training, including professional digital transceivers, avalanche rescue equipment, avalanche airbag backpacks, uniforms, and an equipment allowance, increased this season, to help subsidize ski equipment.

We continue to invest in our weather and avalanche forecasting equipment annually to keep our program current. Improvements this year include but are not limited to:

- Significant investment in new avalanche airbag backpacks and 3 antennae digital avalanche transceivers for the highest level of worker safety
- New mount and power upgrades for heated precipitation gauge used to track annul precipitation, Snow Water Equivalent (SWE), and snow density
- Continued daily operational use of InfoEx platform to track weather, avalanche, and occurrence info accurately and in one place
- Improvements and additions to existing weather stations and equipment

All of these improvements ultimately contribute to more accurate forecasting and improved employee and guest safety.

Each season, we seek out the highest level training in the industry, and do our best to send as many employees as possible to these trainings. This season, trainings were very limited due to the COVID-19 pandemic. This year's select employees attended the American Avalanche Institutes Pro 1 courses. We plan to enroll in prior trainings that were unavailable, in the upcoming season.

KMR complies with BATF, Cal/OSHA and USFS rules and regulations for the storage and handling of explosives. All avalanche team route leaders are Cal/OSHA licensed blasters, with at least one trained partner as part of each team. Beyond what is mandated by governing agencies, we continue to train and maintain a high standard in the industry in regard to avalanche control route training and testing.

The mountain is not opened until the avalanche hazard has been mitigated to the greatest extent possible. The snow and weather conditions are continually monitored during the course of the day, and if conditions deteriorate to an unacceptable level, areas of the mountain may close until the hazard is ameliorated. Lift closure ultimately is the final safe practice to protect our employees and guests from wind related and/or avalanche related hazards.

Our operating season this year began on December 3rd and ended on May 1st, which included a three week extension. During the operating season, we recorded 328 inches of snowfall at mid-mountain, and 299 inches at the base of the mountain. The Kirkwood Ski Patrol performed 27 days of active mitigation work during this timeframe. 14 days in December and 13 days throughout the remainder of the season.

Regarding our artillery program, there were eight total Howitzer missions, with a total of 144 rounds fired. One of these missions and six rounds were for training or for target-sighting maintenance. KMR Ski Patrol personnel continue to train in the use of the weapon under the guidelines of the US Army, the USFS, and the Avalanche Artillery Users of North America Committee (AAUNAC). Our howitzer program continues to improve, and

continues to be a valuable tool for safety and infrastructure protection, especially in the worst of storms when access to the upper mountain is non-existent.

The use of KMR Ski Patrol personnel for snow study, avalanche forecasting, and the communication of timing for conducting avalanche mitigation continues to be a strong approach, and we feel is at or above the industry standard. The resort is still capable of acquiring the needed explosives for avalanche mitigation work. The USFS continues to support our efforts towards opening a safe mountain.

October 19, 2022

Chuck Beatty, Amador County
Brendan Ferry, El Dorado County
Larry Shoemaker, Alpine County

Subject: **Parking Analysis – 2021-2022**

Mitigation Measure 4.7 (d)
Kirkwood Mountain Resort will prepare an annual report that includes a detailed analysis of day-visitor parking during peak periods during the such as the Christmas holiday, President Day weekend, and other weekends during the ski season, peak periods during the summer and special events when more than 4,000 day-use visitors are at the resort.

The study will compare day-visitor parking demand during these periods to day-visitor parking capacity at the resort. The results will be reported to TC-TAC in June of each year. If the study shows that the number of day-visitor-related vehicles parked within the resort exceeds the amount of parking spaces available for day visitors (approximately 2,500 spaces), TC-TAC will require KMR to implement a mitigation plan which will include one or more of the following actions:

- *Provide additional parking spaces in surface lots or parking structures.*
- *Implement methods to provide greater efficiency in the use of existing parking lots.*
- *Reduce parking demand through greater utilization of mass transit, increased vehicle occupancy, car/van pools or other program that will result in reduced parking demand during peak periods.*
- *Restrict day-visitor use to a level that allows parking demand to be accommodated in existing day-visitor parking areas.*

Please find the attached table showing the parking analysis of day visitor parking on days we had more than 4,000 skiers during the 2021-2022 winter ski season. There was 9 days cars were turned away due to lack of parking spots during the 2021-22 ski season. Space restrictions can happen for a variety of reasons including, but not limited to, timing of heavy snow, snow storage restrictions and snow removal equipment malfunctions & parking lot efficiencies. Extensive parking planning happens every year to maximize efficiency. Employee and in-valley shuttles, employee carpool incentives, group motor coaches, and social media carpooling pages are regularly utilized to reduce parking demands.
Please feel free to contact me if you have additional questions.

Thank you,

Greg Kiskinen
Director of Base Operations
Kirkwood Mountain Resort
Phone: (209) 258-7276
GKiskinen@vailresorts.com

2021-22 Parking Counts on Days with >4000 Skier Visits

Location	12/18/2021	12/19/2021	01/01/2022	01/02/2022	01/08/2022	01/09/2022	01/15/2022	01/16/2022
Red Cliffs Parking Lot	445	457	235	332	420	411	464	452
East Village Parking	75	77	66	76	66	82	77	114
West Village Parking (VIP)	87	109	96	79	99	97	103	96
Village Parking	126	147	132	142	170	125	124	123
KMD + Tennis Courts	436	205	377	468	458	538	194	489
Timber Creek Parking Lots	536	475	511	508	523	546	337	583
Mighty Mountain Parking Lot	84	85	63	76	80	80	83	81
Kirkwood Inn	0	0	0	0	0	0	0	200
Bus	0	1	0	0	0	0	0	0
RV	0		0	0	0	0	1	0
Total	1789	1556	1480	1681	1816	1879	1383	2138

2021-22 Parking Counts on Days with >4000 Skier Visits

Location	01/17/2022	01/23/2022	01/29/2022	01/30/2022	02/05/2022	02/06/2022	02/12/2022	02/13/2022
Red Cliffs Parking Lot	446	481	399	455	483	367	457	438
East Village Parking	116	123	110	117	126	126	77	88
West Village Parking (VIP)	103	114	115	97	112	117	107	92
Village Parking	171	130	138	126	130	152	147	131
KMD + Tennis Courts	257	278	502	299	277	300	198	163
Timber Creek Parking Lots	454	590	664	472	592	494	467	385
Mighty Mountain Parking Lot	81	83	88	90	83	87	85	86
Kirkwood Inn	0	0	0	0	0	0	0	0
Bus	0	2	0	2	2	2	1	1
RV	0	1	3		1			1
Total	1628	1802	2019	1658	1806	1645	1539	1385

2021-22 Parking Counts on Days with >4000 Skier Visits

Location	02/21/2022	02/26/2022	02/27/2022	03/05/2022	03/06/2022	03/19/2022	03/20/2022	
Red Cliffs Parking Lot	435	458	432	423	227	332	317	
East Village Parking	74	104	103	102	104	93	113	
West Village Parking (VIP)	93	107	102	106	106	97	100	
Village Parking	119	142	136	139	144	103	153	
KMD + Tennis Courts	151	589	531	511	582	105	513	
Timber Creek Parking Lots	393	541	603	559	540	315	605	
Mighty Mountain Parking Lot	70	89	91	74	78	60	94	
Kirkwood Inn	0	385		211	189	0	142	
Bus	1	2	1	2	2	0	0	
RV	1	2	2	2	2	0	1	
Total	1337	2419	2001	2129	1974	1105	2038	0

October 19, 2022

Chuck Beatty, Amador County
Brendan Ferry, El Dorado County
Larry Shoemaker, Alpine County

Subject: Mitigation Measure: 4.09 (b) Kirkwood Mountain Resort Snowmaking Noise Management Program

Mitigation Measure:
Kirkwood Mountain Resort will implement the Snowmaking Noise Management Program, which was adopted when the snowmaking project was approved. This incorporates several features, including restrictions on the type of nozzle, shielding of nozzles and acceptable time of operation.

Kirkwood Mountain Resort hereby provides the 2021/2022 Snowmaking Noise Management Program details for your review.

Please contact me should you need additional information or have any questions.

Thank you,

Caroline Miller
Director of Mountain Operations
Kirkwood Mountain Resort
209-258-7232
CMiller8@vailresorts.com

Snowmaking System History:

Kirkwood's snowmaking system was installed in 1996 and began operating in November of 1997. The snowmaking system currently utilizes two pumps in Caples Lake, two booster pumps at the Pump House under Chair 1, two 1600 cfm compressors, six fan guns, and forty-seven air/water guns. In 2016, one SMI Polecat was installed at the bottom of chairs 7 and 9 in the Timber Creek area, the water is supplied through a hydrant by Kirkwood Meadows Public Utility District. One SMI Polecat was installed in 2016 at the bottom of Chair 2/Hay Flat intersection, the water is supplied from the Hay Flat snowmaking line.

Snowmaking air and water pipes were installed underground on Hay Flat on Chair 1, Buckboard on Chair 11, Race Course and Lower Zachary on Chair 5, all of Lift 8 and areas surrounding Red Cliffs Lodge. Snowmaking air and water pipe is located above ground on Upper Zachary's on Chair 6. A total of fifty-six acres of terrain has snowmaking coverage.

In 2021/2022 season, Kirkwood Mountain Resort pumped water from Caples Lake for a total of 265 hours over the course of 28 days in November and December. The 2020/2021 season resulted in 8,815,645 gallons of water used.

Snowmaking System Noise:

Both Alpine and Amador Counties have established a maximum noise standard of 65 dBA Ldn at property lines for residential use. Pursuant to the Alpine County Use Permit allowing snowmaking activities at Kirkwood, within Alpine County, snowmaking is considered a temporary activity. As such, noise levels associated with snowmaking activities are permitted to exceed acceptable noise levels due to the fact that the noise levels would only temporarily exceed noise thresholds. Typically that threshold is 65 dB.

Amador County Planning Department made the finding that snowmaking is a consistent use of the land for a ski resort operation, and therefore, snowmaking activities do not require a use permit.

Therefore, Kirkwood's snowmaking activities are allowed to exceed the noise standards in Table 10.1 and Table 10.2. Snowmaking activities shall comply with all mitigation measures identified in the Snowmaking Final EIR and Addendum (1995 and 1996).

Noise Mitigation Measures:

Kirkwood snowmaking activities operate near dwellings and will expose residents and visitors to noise levels that surpass county standards. This impact is somewhat mitigated by the fact that the winter visitors will expect some noise associated with ski area operations, and the source of the noise is transient in nature.

To help reduce noise levels near buildings/residences Kirkwood Mountain Resort intends to continue utilizing fan guns and HKD tower guns in those locations as those apparatus have the lowest operating noise levels.

Table 10.3 Noise Levels From Different Snowmaking Nozzles

Snowmaking Nozzle	Quantity	Noise Level
Ratnik *	6	84 dBA @ 100’
HKD *	23	65 dBA @ 150’
SMI Fan Guns *	34	60 dBA @ 100’
HKD Klik*	11	79 DBA @ 100’

* Kirkwood utilizes these apparatus

Kirkwood Mountain Resort also tries to aim snowmaking guns away from residences to minimize noise. At times, wind direction can interfere with this process.

Kirkwood Mountain Resort’s compressors are set up near the Kirkwood Meadows Public Utility District Powerhouse, far away from visitor and permanent residences.

Noise Monitoring:

During snowmaking activities, Kirkwood Mountain Resort performs noise monitoring at various locations throughout Kirkwood. See the attached spreadsheet for this year’s monitoring. We recorded 328 inches of snowfall at mid-mountain, and 299 inches at the base of the mountain in the 2021/2022 operating season. The resort closed to the public on 05/01/2022.

Feedback:

Kirkwood Mountain Resort continues to mitigate issues related to its snowmaking operations and welcomes any input to help achieve this goal.

Suggestions can be sent to:

Michael Niccoli
Senior Manager of Snow Surfaces
Kirkwood Mountain Resort
(209) 258-7325
MNiccoli@vailresorts.com

DATE November 26, 2021

making snow : Yes

TIME	LOCATION	GUN LOCATION	DECIBLES DISTANCE 0ft	DISTANCE 100FT
	PUMP HOUSE (tower 3 ch. 1)		60..6	
	Power House & Shanty Town Drive		62..5	
	THE PLAZA (grand staircase bottom)		75..7	
	SNOW CREST (bottom of front stairs)		39..1	
	TC (grand staircase)		49..4	
	RANGER	Ch. 5 Base	106..4	87..3
	T. RANGER			
	FAN GUN	Ch. 11	94..1	83..9
	T. FAN GUN	TC	88..6	68..5
	IMPULSE 20'			
	T. IMPULSE	RC 17	76..2	70..9
	MILLENNIUM			
	T. MILLENNIUM			
	MV8	LZ Vault	105..5	84..4
	RATNIK			
	SNOWLOGIC			
	SV10			
	IMPULSE 30'			

DATE November 26, 2021

making snow : Yes

TIME	LOCATION	GUN LOCATION	DECIBLES DISTANCE 0ft	DISTANCE 100FT
	PUMP HOUSE (tower 3 ch. 1)			
	Power House & Shanty Town Drive			
	THE PLAZA (grand staircase bottom)			
	SNOW CREST (bottom of front stairs)			
	TC (grand staircase)			
	RANGER			
	T. RANGER			
	FAN GUN	Ch. 10	98..5	74..7
	T. FAN GUN			
	IMPULSE 20'			
	T. IMPULSE			
	MILLENNIUM			
	T. MILLENNIUM			
	MV8			
	RATNIK			
	SNOWLOGIC			
	SV10			
	IMPULSE 30'			

DATE December 3, 2021

making snow : Yes

TIME	LOCATION	GUN LOCATION	DECIBLES DISTANCE 0ft	DISTANCE 100FT
	PUMP HOUSE (tower 3 ch. 1)		55..9	
	Power House & Shanty Town Drive		59..9	
	THE PLAZA (grand staircase bottom)		58..7	
	SNOW CREST (bottom of front stairs)		67..1	
	TC (grand staircase)		48..3	
	RANGER			
	T. RANGER			
	FAN GUN	CH. 5	91..0	69..5
	T. FAN GUN	TC	88..2	67..4
	IMPULSE 20'			
	T. IMPULSE			
	MILLENNIUM			
	T. MILLENNIUM			
	MV8			
	RATNIK			
	SNOWLOGIC			
	SV10			
	IMPULSE 30'			

DATE December 5, 2021

making snow : Yes

TIME	LOCATION	GUN LOCATION	DECIBLES DISTANCE 0ft	DISTANCE 100FT
	PUMP HOUSE (tower 3 ch. 1)		60..9	
	Power House & Shanty Town Drive		61..0	
	THE PLAZA (grand staircase bottom)		72..5	
	SNOW CREST (bottom of front stairs)		62..2	
	TC (grand staircase)			
	RANGER			
	T. RANGER			
	FAN GUN	Ch. 11 Uphiill	87..2	67..3
	T. FAN GUN			
	IMPULSE 20'			
	T. IMPULSE			
	MILLENNIUM			
	T. MILLENNIUM			
	MV8			
	RATNIK	LZ22	102..7	91..4
	SNOWLOGIC			
	SV10			
	IMPULSE 30'			
	SCOUT	Time Square	93..9	83..6

DATE December 10th, 2021

making snow : Yes

TIME	LOCATION	GUN LOCATION	DECIBLES DISTANCE 0ft	DISTANCE 100FT
1008	PUMP HOUSE (tower 3 ch. 1)		57.1	
1144	Power House & Shanty Town Drive		59.3	
1147	THE PLAZA (grand staircase bottom)		58.5	
1150	SNOW CREST (bottom of front stairs)		69.2	
813	TC (grand staircase)		51.7	
	RANGER			
	T. RANGER			
	FAN GUN			
805	T. FAN GUN	Timber Creek	87.6	66.0
737	IMPULSE	RC #3	96.4	72.7
745	T. IMPULSE	RC # 9	79.4	73.5
738	MILLENNIUM	RC# 4	89.3	74.0
	T. MILLENNIUM			
735	MV8	LZ # 1	96.8	78.6
	RATNIK			
	SNOWLOGIC			
	SV10			
	IMPULSE 30'			

October 19, 2022

Chuck Beatty, Amador County
Brendan Ferry, El Dorado County
Larry Shoemaker, Alpine County

2021-2022 KIRKWOOD MOUNTAIN RESORT EMPLOYEE HOUSING REPORT

This annual report of employee housing for Kirkwood Mountain Resort is provided to the Tri-County Technical Advisory Committee (TC-TAC), pursuant to the employee housing documentation requirements of the 2003 Specific Plan. The report identifies the number of full-time equivalent (FTE) employees throughout the winter season together with an inventory of employee housing units necessary to satisfy the Specific Plan conditions.

The format for this reporting is consistent with the previous accepted methodology for the allocated and proposed deed restrictions required since the first employee housing requirement was adopted on 1981 and remaining unallocated credits in each of the existing employee housing as developed in coordination with TC-TAC and Amador County Planning following the 2006/2007 audit.

This past season, Kirkwood opened for winter operations on December 4, 2021 and closed on May 1, 2022. The data presented is for that time period.

The attached table shows that an average of approximately 405 FTE's were employed at Kirkwood Mountain Resort during the winter season, including part time employees. The mitigation measure requires the resort to provide housing to 30% of the average FTE. For 2021-22, this equals 121 employees. The average occupancy during the winter season was 146 employees or 52%.

In a typical year, employees are housed in 171 units of employer-owned housing which includes Red Cliffs, Renwick and Pine Lodge in the Kirkwood Valley. Due to the remodel project for Red Cliffs, the property re-opened in early December.

With the growing employee population requiring housing, Kirkwood Mountain Resort has also added three housing locations in the city of South Lake Tahoe known as "Nickelodeon", "The Coyote's Den" and "The Bears Den". At the end of the season "The Bears Den" was returned to owners. To accommodate housing outside the valley we have also provided an employee shuttle to transport employees from South Lake to Kirkwood on a daily basis during the winter season.

Feel free to contact me with any questions or comments.

Thank you,

Katie Huston
Employee Housing Manager
Kirkwood Mountain Resort
Phone: (775) 750-2277
Kathryn.Victor@vailresorts.com

KIRKWOOD MOUNTAIN RESORT 2021-22 WINTER SEASON EMPLOYMENT AND HOUSING

Season Opening Date: December 4, 2021

Season Closing Date: May 1, 2022

Pay Period Ending	Full Time Employees (>30hrs/wk)	Part Time Employees (<30hrs/wk)*	Total Gross Employees	Total FTEs	Employees Housed
12/10/2021	334	118	452	393	107
12/24/2021	425	131	556	491	156
01/07/2022	434	138	572	503	160
01/21/2022	435	136	571	503	160
02/04/2022	446	143	589	518	159
02/18/2022	448	144	592	520	165
03/04/2022	445	149	594	520	168
03/18/2022	383	147	530	457	172
04/01/2022	346	147	493	420	156
04/15/2022	268	59	327	298	151
04/29/2022	216	31	247	232	128
05/13/2022	6	0	6	6	71
			0	0	
			0	0	
Average	349	112	461	405	146

*Note: For the purposes of calculating FTEs, 2 Part-Time Employees equal 1 Full-Time Employee

Property	Beds Available
The Quad	96
Renwick	37
Pine Lodge	38
Bears Den	46
The Den	32
Nickelodeon	32
Total	**281**

SUMMARY

Total Employees	461
Total FTEs	405
FTE per Ordinance	121

October 19, 2022

Chuck Beatty, Amador County
Brendan Ferry, El Dorado County
Larry Shoemaker, Alpine County

Subject: Mitigation Measure 4.2v (COA 50)

Per our **Mitigation Measures,** *4.2 v(COA 50): Conduct street sweeping twice a year,* Kirkwood Mountain Resort is responsible for biannual street sweeping. Street sweeping was conducted June 13-15, 2022 and October 11-12, 2022. Associated pictures and invoices are attached.

Please contact me should you need additional information or have any questions.

Thank you,

Caroline Miller
Director of Mountain Operations
Kirkwood Mountain Resort
(209) 258-7232
CMiller8@vailresorts.com

BI-STATE SWEEPING SERVICE, INC.

P.O. BOX 13497
SOUTH LAKE TAHOE, CA 96151
530-544-2366

Invoice

Date	Invoice #
6/12/2021	4204

Bill To
KIRKWOOD MOUNTAIN RESORT PO BOX 1 KIRKWOOD, CA 95646

Description	Amount
05/31/21 Power Sweep Streets 8.0 Hours	1,200.00
05/31/21 Travel Time 2.0 Hours	140.00
06/01/21 Power Sweep Streets 8.0 Hours	1,200.00
06/01/21 Travel Time 2.0 Hours	140.00
06/02/21 Power Sweep Streets 9.0 Hours	1,350.00
06/01/21 Travel Time 2.0 Hours	140.00
PO #1440564	
Total	$4,170.00

BI-STATE SWEEPING SERVICE, INC.

P.O. BOX 13497
SOUTH LAKE TAHOE, CA 96151
530-318-7902

Invoice

Date	Invoice #
10/14/2022	4393

Bill To
KIRKWOOD MOUNTAIN RESORT PO BOX 1 KIRKWOOD, CA 95646

Description	Amount
10/11/22 Travel time 4:00am - 5:00am 1.0 Hour	80.00
10/11/22 Power Sweep Streets 11.5 Hours	2,012.50
10/22/22 Travel time 4:30pm - 5:30pm 1.0 Hour	80.00
10/12/22 Travel time 4:00am - 5:00am 1.0 Hour	80.00
10/12/22 Power Sweep Streets 9.0 Hours	1,575.00
10/12/22 Travel time 2:00pm - 3:00pm 1.0 Hour	80.00
PO# 1721679	
Total	$3,907.50

June 2022

June 2022

October 2022

October 2022

October 19, 2022

Chuck Beatty, Amador County
Brendan Ferry, El Dorado County
Larry Shoemaker, Alpine County

Subject: Mitigation Measure 4.05 (j) (COA 93) Educational Material Regarding Cultural Resources

Mitigation Measures
Educational literature will be developed by Kirkwood Mountain Resort to educate guests about the fragile and irreplaceable nature of cultural resources and the penalties for violation of state and federal laws related to cultural resources.

"The Cultural History of Kirkwood California" is available to the public through the Kirkwood Mountain Resort website; *https://www.kirkwood.com/explore-the-resort/about-the-resort/about-kirkwood.aspx*. A copy of the literature is attached.

Please feel free to contact me if you need any additional information or have any questions.

Thank you,

Kelly Keith
Executive Assistant
Kirkwood Mountain Resort
Phone: (209) 258-8737
KKeith@vailresorts.com

HELP PRESERVE THE PAST

Remember, as you explore the Kirkwood region you are entering a historic area. You may find relics of the past and wonder how they got here.

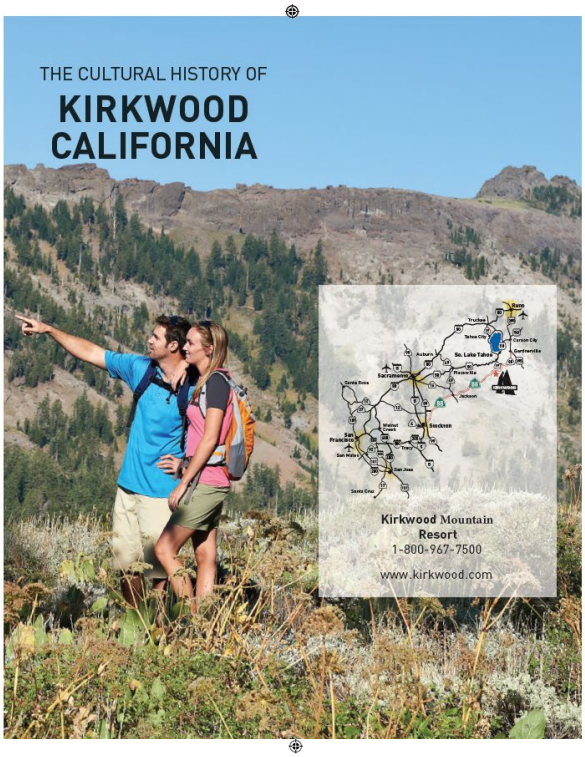
By leaving these items as you found them, you will leave in place clues that could help us answer these very questions. If you take artifacts home with you, or move them to other spots, you may destroy clues to the past. Every artifact is not merely something to be held and examined, it is also a piece of a puzzle which, when put together with other pieces, allows us to unravel the mysteries of the past.

Please treat all historic and archaeological sites with care and respect when you visit them. The remains of prehistoric and historic cultures are a part of our heritage. When artifacts are stolen and archaeological sites are destroyed, we lose important clues about the past, forever. Strict laws protect artifacts and sites on state and Federal and Native American lands. Report violations to your local law enforcement or land management agency.

Kirkwood Mountain Resort
1-800-967-7500

U.S. Forest Service
Amador Ranger District
(209) 295-4251

THE CULTURAL HISTORY OF KIRKWOOD CALIFORNIA



THE KIRKWOOD INN

Kirkwood Station, as it was originally called, soon became a hostelry, post office and stagecoach depot, which served many travelers through the Sierra in the late 1800's. In 2019, the Kirkwood Inn celebrated its 155th year of friendly western hospitality.

Today the Inn is a popular restaurant and bar located at Kirkwood's entrance on Scenic California State Route 88. The Inn sits on the point where Alpine, Amador and El Dorado counties' boundaries all meet. The Alpine/El Dorado county line actually runs right through the old bar room.

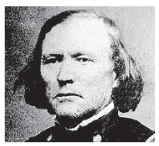
Zachariah S. Kirkwood chose this lush alpine valley for his summer ranching operations and settled here in the late 1850's. In 1861, he began the construction of the log cabin we know today as the Kirkwood Inn.

EARLY KIRKWOOD HISTORY

Kirkwood's mountains, valleys, lakes and rivers hold a special place in the history of our country, having afforded many solace, shelter and opportunity through its abundant natural resources and unique location in the Sierra Nevada mountain range.

The original native people of the Kirkwood area are the Washo, a tribe whose history spans nearly 9,000 years. The Washo people created a way of life that utilized seasonal migration and where they could live in harmony with the land.
People moved purposefully to the high mountain lakes and meadows to hunt, fish and collect medicinal plants, roots, and berries for the winter season in the valleys below.

Like the Washo before them, explorers, trappers and the early gold-seeking emigrants of the 1800's would find the barren mountaintops and ridges as the easiest of passable routes through the mountains during the snow months. These high altitude routes were favored for travel because their exposure to the wind would scour away the deep, impassable snow pack.



Christopher Houston "Kit" Carson

One of the earliest documentations of travel in this area by European descendants can be found in the memoirs of Jedediah Strong Smith who is believed to have passed through this area as early as 1826. Kit Carson also explored near here on his many trapping and scouting trips as early as 1838.

Captain John C. Fremont led his exploration party, which included Kit Carson as a scout, through the Sierra in January and February of 1844 in search of a passable route to Sutter's Fort in the California gold country. Following an old Native American trade trail, Fremont's party including 67 horses and mules first sighted Lake Tahoe on February 14, 1844 from the top of what is believed to be the nearby 10,067 foot Red Lake Peak.

John C. Fremont

Word of Fremont's successful passage through the Sierra spread, and by the summer of 1848, a battalion of Mormon soldiers attempted the same route in reverse, back to Salt Lake City from Sacramento. The soldiers cleared and charted Captain Fremont's route, making it accessible for their wagons. This trail became heavily traveled during the late 1840s and 1850's, and has had many names including the Carson Emigrant Road, Amador Grade and the Carson Canyon Route. Today this popular route is widely known as the Mormon Emigrant Trail.

The Mormon Emigrant Trail passes through the Kirkwood mountain area, winding up over the saddle just south of Thimble Peak, following approximately the same route as Kirkwood's Sunrise Chair #4. To this day, rust marks from the iron wagon wheels can be seen on the granite rocks along the route. Some scars on the trees made from the ropes and pulleys used to haul the heavy wagons up over the rugged terrain still remain. The trail continues around Emigrant Lake, located just south of Kirkwood's Iron Horse Chair #3, and then easterly along the south side of Caples Lake and up and over Carson Pass.

Covered Wagon Peak at Kirkwood

Regular mail delivery was established in the 1850's but was stopped during the winter months when deep snow closed the roads. In 1856, a Norwegian emigrant, Jon Torsteinson-Rue, nicknamed "Snowshoe Thompson," took on the mail delivery job.

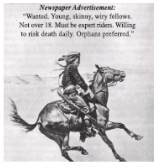
Snowshoe became legendary as the only communication link over the Sierra during that time. He delivered the mail two to four times a month, for 20 years, and routinely passed through the Kirkwood area until 1876.

Snowshoe Thompson

Snowshoe learned to ski in the Telemark region of Norway, and skiing on 10-foot long homemade oak skis, he made the two-day trek to Sacramento and the return three-day trip back to Genoa, Nevada via the Mormon Emigrant Trail.

Soon there became a greater need for a quick mail delivery system, and the Pony Express Company was born in January of 1860. A pony relay system of 120 stations was established across the west. For five weeks the Pony Express trail ran through Kirkwood before it was re-routed over Kingsbury Grade to shorten the distance from Virginia City to Sacramento by 15 miles.

Newer and faster routes connecting emerging cities and towns resulted in fewer travelers taking the old Mormon Immigrant Trail. Over the next 100 years, the Kirkwood area would host mostly sheepherders and fishermen, few staying for very long.



At the heart of it all is the essence of Kirkwood; respect for the environment, pioneering spirit, a sense of adventure, a love for the legends and lore of days gone by—its colorful past is forever intertwined into its future.

October 19, 2022

Chuck Beatty, Amador County
Brendan Ferry, El Dorado County
Larry Shoemaker, Alpine County

Subject: Mitigation Measure 4.03.1 (h) COA's 56 and 75 Fishing Regulations Poster

Mitigation Measure:

Kirkwood Mountain Resort will assist in educating Kirkwood residents and visitors about fishing regulations at Kirkwood Lake and with permission of the Forest Service, post such regulations at angler access points to the lake.

Kirkwood Mountain Resort (KMR) has posted the regulations at Kirkwood Lake as of June 29, 2022. Regulations are also posted in the Red Cliff's Lodge.

Please contact me should you need additional information or have any questions.

Thank you,

Kelly Keith
Executive Assistant
Kirkwood Mountain Resort
(209) 258-8737
KKeith@vailresorts.com

Fishing at Kirkwood Lake

TYPICAL FISH FOUND AT KIRKWOOD LAKE

Rainbow Trout (Oncorhynchus mykiss)

Colors on the back of the fish can range from brown to olive to dark blue. Fish have a pinkish stripe/band running the length of their bodies, with a silvery underside that fades to pearl white. They have small black spots on their backs, fins, and tail.

Brook Trout (Salvelinus fontinalus)

The brook trout has a dark green to brown color with a distinctive light marbled pattern across the sides and back extending at least to the dorsal (back) fin and often to the tail. A distinctive sprinkling of red dots surrounded by blue haloes occurs along the sides of the fish. The belly and lower fins are reddish in color, the latter with white leading edges.

CALIFORNIA FISHING LICENSE REQUIRED:

Any person who is 16 years of age or older must have a sport fishing license to take any kind of fish, mollusk, invertebrate, amphibian or crustacean in California, except for persons angling from a public pier in ocean or bay waters.

CALIFORNIA FISHING LICENSE MAY BE PURCHASED AT:

wildlife.ca.gov/licensing/online-sales

FREE FISHING DAYS!

Every year the California Department of Fish & Wildlife (CDFW) announces two Free Fishing Days. On these days, anyone ages 16 or older can go fishing without getting a sport fishing license. All other regulations apply.

GENERAL FISHING METHODS

All fish must be taken only by angling with one closely attended rod and line or one hand line with not more than three hooks nor more than three artificial lures (each lure may have three hooks attached). Anglers in possession of a valid two rod stamp and are under 16 years of age may use up to two rods in lakes and reservoirs.

BAIT FISH USE IN THE SIERRA REGION

Live or dead fin fish shall not be used or possessed for use as bait in the Sierra Region.

CATCH LIMIT

5 per day - 10 in possession plus up to 10 additional Brook Trout per day less than 10" total length may be taken and possessed in addition to the other daily bag and possession.

HOW TO RELEASE FISH UNHARMED

1. Land your fish as carefully and as quickly as possible.
2. Try to avoid removing the fish from the water. Underwater unhooking and release is preferred.
3. Do not squeeze the fish, or touch it's eyes or gills.
4. Remove only those hooks you can see and remove easily, otherwise clip the line near the mouth on deeply hooked fish.
5. Use artificial lures (no bait) to minimize deep hooking. Barbless hooks or hooks with flattened barbs make unhooking easier and less stressful on the fish.

USE PROPER FISH CLEANING METHODS

Prevent Water Pollution. Do not clean fish in the lakes and streams. Clean fish well away from lakes and streams. Do not throw entrails into the water or leave on shore. Fish heads, tails, and entrails need to be disposed of properly to avoid attracting insects and bears. Do not clean fish at water faucets in campground. Water faucets may be used only for filling containers for camp- site use.

HELP WILDLIFE OFFICERS PUT AN END TO POACHING

Report Poachers and Polluters to CALTIP at 888-334 -2258 or 911. Text 847411 begin message with "CalTip" followed by detailS.

October 19, 2022

Chuck Beatty, Amador County
Brendan Ferry, El Dorado County
Larry Shoemaker, Alpine County

Subject: Mitigation Measure: 4.12 (c) COA's 140 and 169

Mitigation Measure:
4.12 c (COA 140 Amador County and 169 Alpine County): Kirkwood Mountain Resort will work with the Forest Service to develop and implement an instructional/interpretive program to inform Kirkwood visitors about sensitive resource issues at Kirkwood Lake.

Kirkwood Mountain Resort (KMR) has posted the sensitive resource poster at Kirkwood Lake along with the fishing regulation poster.

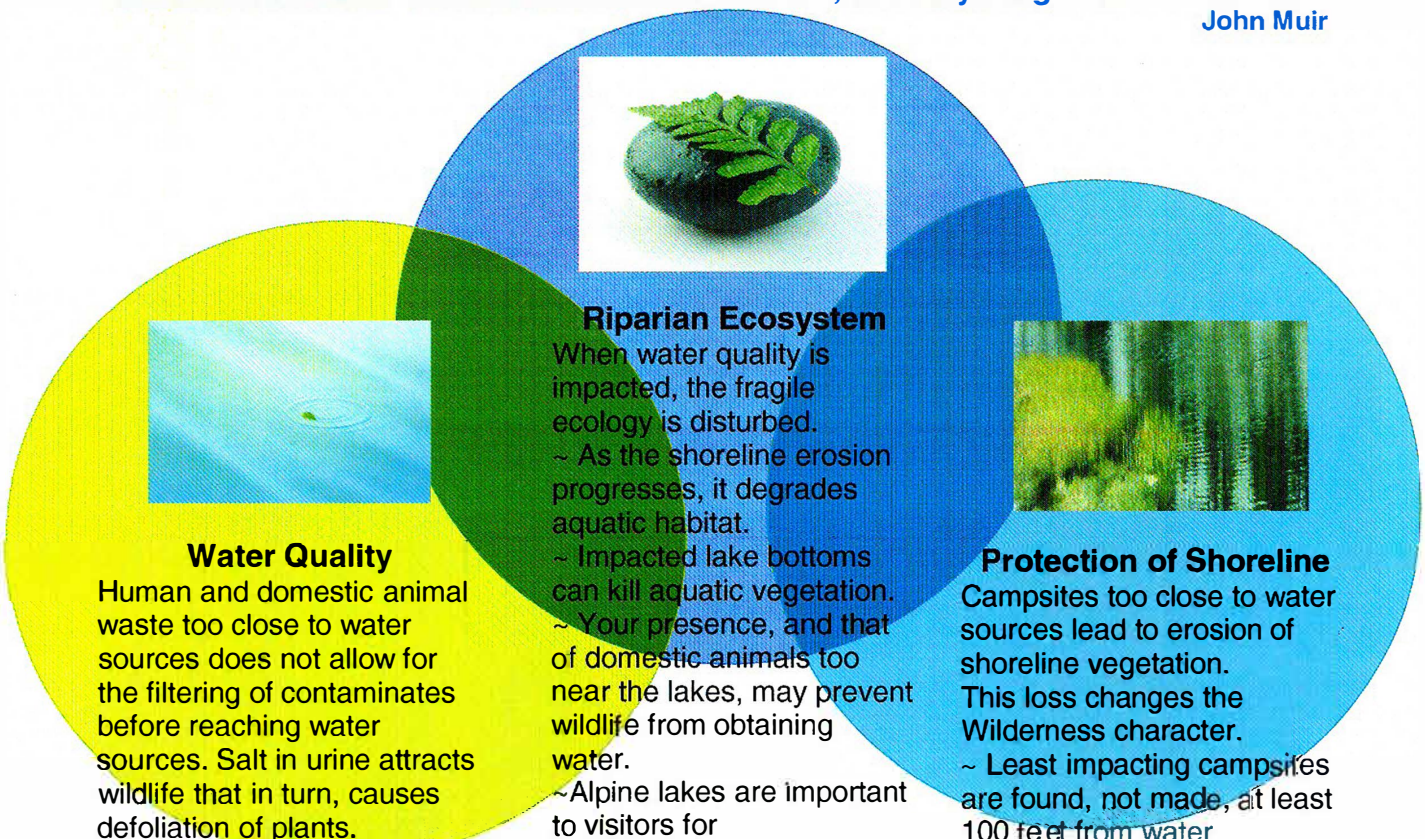
Please contact me should you need additional information or have any questions.

Thank you,

Kelly Keith
Executive Assistant
Kirkwood Mountain Resort
Phone: (209) 258-8737
KKeith@vailresorts.com

HELP US
PROTECT AND PRESERVE
OUR HIGH SIERRA LAKES

"When we try to pick out anything by itself we find that it is bound fast by a thousand invisible cords that cannot be broken, to everything in the universe."
John Muir



Water Quality

Human and domestic animal waste too close to water sources does not allow for the filtering of contaminates before reaching water sources. Salt in urine attracts wildlife that in turn, causes defoliation of plants.

~ Deposit human waste in 6 to 8-inch cat holes at least 200 feet from water sources.

~ Carry your cleaning water to wash yourself and dishes at least 200 feet from water sources, using small amounts of bio-degradable soap.

~ "Pack it in; pack it out. "

Riparian Ecosystem

When water quality is impacted, the fragile ecology is disturbed.

~ As the shoreline erosion progresses, it degrades aquatic habitat.

~ Impacted lake bottoms can kill aquatic vegetation.

~ Your presence, and that of domestic animals too near the lakes, may prevent wildlife from obtaining water.

~Alpine lakes are important to visitors for their beauty, wildlife, wildflower displays, and drinking water.

~The lakes support the micro climate providing nourishment for native land and aquatic species.

Protection of Shoreline

Campsites too close to water sources lead to erosion of shoreline vegetation. This loss changes the Wilderness character.

~ Least impacting campsites are found, not made, at least 100 feet from water resources.

~ Keep campsites small to lessen impact.

~ Wilderness is impacted by moving rocks, plants or other natural objects, or by building a structure.

~ Leave your campsites cleaner than you find them.

It is our responsibility and requires our personal commitment to protect the delicate ecological balance of the alpine jewels of the Sierra

KIRKWOOD

The USFS and Kirkwood Mountain Resort have partnered to raise awareness of the sensitive resources in high Sierra lakes such as Kirkwood Lake

FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

ITEM 2

2003 KIRKWOOD SPECIFIC PLAN

MITIGATION MONITORING PLAN SUBMITTAL

To whom it may concern:

Pursuant to Mitigation Measure/COA #4.07 (b) of the 2003 Kirkwood Specific Plan, the attached 2022 Traffic Study is hereby submitted on September 27, 2022.

Accepted by: _____ Date:_____

Cc: (X) Amador County Planning

(X) Alpine County Planning

(X) El Dorado County Planning

( ) PMC

( ) KMR, Vail Resorts

FEHR PEERS

TECHNICAL MEMORANDUM

Date: September 8, 2022

To: Suzanne Bennett – Kirkwood Mountain Development

From: John Gard, TE – Fehr & Peers

Subject: Kirkwood Mountain Resort Mitigation Monitoring

RS22-4146

This memorandum documents the data collection, analysis, and conclusions of our traffic analysis to fulfill mitigation monitoring requirements for Kirkwood Mountain Resort (KMR).

Background

The *2003 Kirkwood Master Plan Environmental Impact Report* (EIR) requires monitoring of the State Route 88/Kirkwood Meadows Drive intersection every three years during winter and summer periods to ensure average Level of Service (LOS) B conditions are maintained. Mitigation Measure 4.7 (b) specifically states that the analysis of winter periods should reflect conditions on a day in which at least 4,000 skiers/boarders visit KMR.

Fehr & Peers previously conducted monitoring at this intersection in 2018. Note that this study would have been conducted in 2021 (i.e., once every three years), but the decision was made to defer it by one year due to the effects of COVID on travel behavior. That effort included traffic counts and analysis for four peak winter weekend study periods and one Friday summer peak study period. Traffic levels during the Friday summer peak period were substantially lower than winter levels and all movements at the study intersection operated with minimal delay (i.e., level of service A). Therefore, this monitoring effort focuses on the much busier winter period, with traffic counts collected during the AM and PM peak periods for four winter weekend days in 2022.

Analysis Methodology

Motorized vehicle LOS is a qualitative measure of traffic flow from the perspective of motorists and is an indication of the comfort and convenience associated with driving. Typical factors that affect motorized vehicle LOS include speed, travel time, traffic interruptions, and freedom to maneuver. Empirical LOS criteria and methods of calculation are documented in the *Highway Capacity Manual,*

6th Edition published by the Transportation Research Board. The HCM defines six levels of service ranging from LOS A (representing free-flow vehicular traffic conditions with little to no congestion) to LOS F (oversaturated conditions where traffic demand exceeds capacity resulting in long queues and delays). The LOS definitions and calculations contained in the HCM are the prevailing measurement standard used throughout the United States and are used in this study. Table 1 summarizes intersection LOS criteria for unsignalized intersections.

TABLE 1
UNSIGNALIZED INTERSECTION LOS CRITERIA

LOS	Description	Average Control Delay (seconds per vehicle)[1]
A	Represents free flow. Individual users are virtually unaffected by others in the traffic stream.	≤ 10
B	Stable flow, but the presence of other users in the traffic stream begins to be noticeable.	> 10 to 15
C	Stable flow, but the operation of individual users becomes significantly affected by interactions with others in the traffic stream.	> 15 to 25
D	Represents high-density, but stable flow.	> 25 to 35
E	Represents operating conditions at or near the capacity level.	> 35 to 50
F	Represents forced or breakdown flow.	> 50

Source:
1. *Highway Capacity Manual 6th Edition*, Transportation Research Board, 2018.

Intersection operations were analyzed using the SimTraffic microsimulation model which employs procedures from the 6th Edition of the HCM. SimTraffic captures variations in driver behavior and the interaction between vehicles in a study network. To ensure that the SimTraffic model accurately reflects operating conditions at the SR 88/Kirkwood Meadows Drive intersection, the SimTraffic model was calibrated to the observed peak hour turn volumes. Additionally, on one of the count days, queue spillback from the resort parking lots affected intersection operations. Special calibration of this condition was required to match inbound vehicle flow rates and the duration/severity of queuing. However, as noted later, certain driver behaviors observed at the intersection cannot be properly simulated.

Consistent with Caltrans District 10 guidance, each peak hour was modeled using measured traffic volumes during each of four 15-minute time-periods. Reported results thus reflect conditions for

the entire hour, but also considering peaking that occurs within it. In conclusion, LOS methods using this technical approach are appropriate for analyzing the intersection.

Existing Conditions

Site Access

Kirkwood Mountain Resort is located on State Route 88, approximately 30 miles from South Lake Tahoe and 60 miles from the City of Jackson. The resort area is situated in both Alpine and Amador Counties.

SR 88 provides the only access to KMR via its intersection at Kirkwood Meadows Drive. SR 88 is a two-lane, winding, mountainous road operated and maintained by Caltrans that serves as the principal east-west arterial in Amador County and northern Alpine County. The SR 88/Kirkwood Meadows Drive intersection is a three-legged side-street stop controlled intersection featuring a 200-foot westbound left turn lane and a 400-foot eastbound right-turn lane. Kirkwood Meadows Drive is a two-lane undivided street with a posted speed limit of 30 miles per hour (mph).

Data Collection

Fehr & Peers collected traffic counts at the SR 88/Kirkwood Meadows Drive intersection during the morning arrival (7:30 to 10:30 AM) and afternoon departure (2:00 to 5:00 PM) periods on the following days:

- Saturday, January 22, 2022
- Sunday, January 23, 2022
- Sunday, February 20, 2022
- Monday, February 21, 2022

Although January 22-23 was not a holiday weekend, it was selected because the Sierra Nevada had recently received considerable snowfall making for excellent skiing conditions. February 19-20 was Presidents Day Weekend, with Monday February 21st being a holiday for most schools, public agencies, and many businesses.[1]

[1] All data collection was conducted using video cameras placed outside the state right-of-way. Cameras were placed on the Friday prior to the Presidents Day Weekend and footage was collected on Saturday, February 19th in the event it was busier than Sunday. This turned out not to be the case. Thus, the Sunday and Monday data from this holiday weekend were used in the analysis.

Table 2 provides an overview of conditions during each count day.

TABLE 2
OVERVIEW OF OBSERVATIONS AT SR 88/KIRKWOOD MEADOWS DRIVE INTERSECTION

Date	Weather Conditions	CHP Present?	Skier/Boarder Visitation	Coning Program in Effect? [1]	Number of Vehicles	
					Inbound (8 -10 AM)	Outbound (3 -5 PM)
Saturday, January 22, 2022	Dry, Sunny, and Windy	AM Peak: Yes, but did not assign ROW. PM Peak: Not present.	Slightly below 4,000 skiers/boarders	Yes	1,080 [2]	[2]
Sunday, January 23, 2022	Dry and Sunny		Well above 4,000 skiers/boarders	Yes	1,214	1,329
Sunday, February 20, 2022	Dry and Sunny		Slightly below 4,000 skiers/boarders	Yes	783 [2]	925 [2]
Monday, February 21, 2022	Dry and Partly Sunny		Slightly above 4,000 skiers/boarders	Yes	910	827

Notes:

1. Consists of the following coning patterns to facilitate directional traffic:
   AM Peak Period: Two inbound travel lanes on Kirkwood Meadows Drive extending for about 500 feet south of SR 88 (i.e., allows eastbound right-turns and westbound left-turns from SR 88 to be made concurrently onto Kirkwood Meadows Drive).
   PM Peak Period: Two outbound travel lanes that begin on Kirkwood Meadows Drive about 500 feet south of SR 88 (i.e., providing dedicated turn lanes for northbound left and right turns onto SR 88).
2. Because visitation was slightly below the required 4,000 skier/boarder threshold, it was necessary to increase traffic levels by a modest (about 10 percent) amount to reflect conditions with at least 4,000 skiers/boarders. All traffic data presented in this memorandum reflects these increases. Note that specific visitation levels are not reported due to the proprietary nature of this data.

CHP = California Highway Patrol

Source: Fehr & Peers, 2022.

Figures 1 - 4 display the AM and PM peak hour counts on each count day. The AM peak hour most often occurred from 8:15 - 9:15 AM. On three count days, the PM peak hour occurred from 3:45 – 4:45 PM. However, on Monday, February 21st, the PM peak hour occurred from 2 to 3 PM, due primarily to increased flows of traffic heading westbound on SR 88 (i.e., at the end of the three-day weekend). On this day, the resort's PM peak hour of outbound travel occurred from 3:15 to 4:15 PM. Note that the resort ski hours are 9 AM to 4 PM.

Chart 1 shows the volume of inbound traffic in 15-minute intervals on Kirkwood Meadows Drive between 8 and 10 AM during each count day. The orange line, which represents traffic flows on Sunday, January 23, 2022, is consistently greater than all other count days with one single exception.

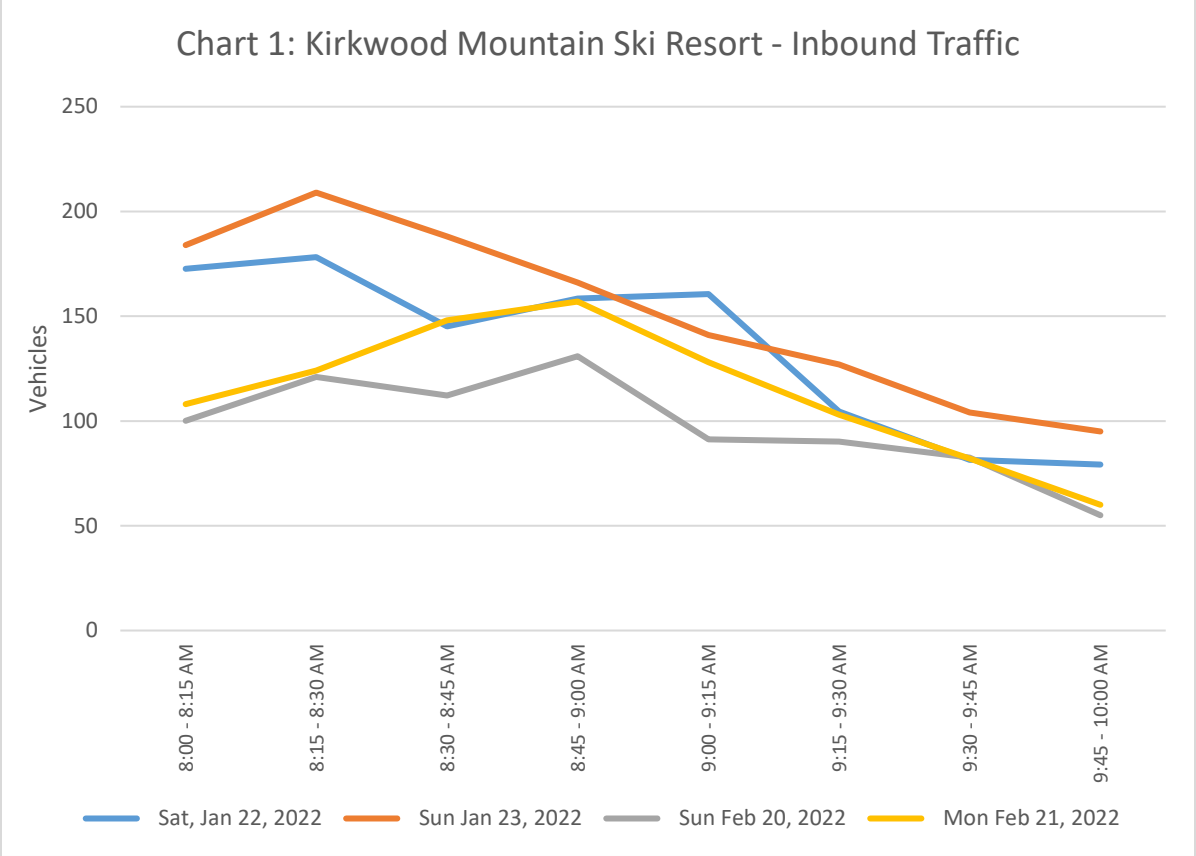


Chart 2 shows the volume of outbound traffic in 15-minute intervals on Kirkwood Meadows Drive between 3 and 5 PM during each count day. Similar to the AM peak hour, Sunday, January 23, 2022 was consistently busier than all other count days with one single exception.

Table 3 provides a qualitative assessment of conditions during each count day based on review of video data collection collected by our count vendor (NDS). One camera was focused on the intersection itself, while the other camera was positioned to observe conditions on Kirkwood Meadows Road a short distance south of SR 88. **Appendix A** contains specific screen captures from the video camera from all four days.

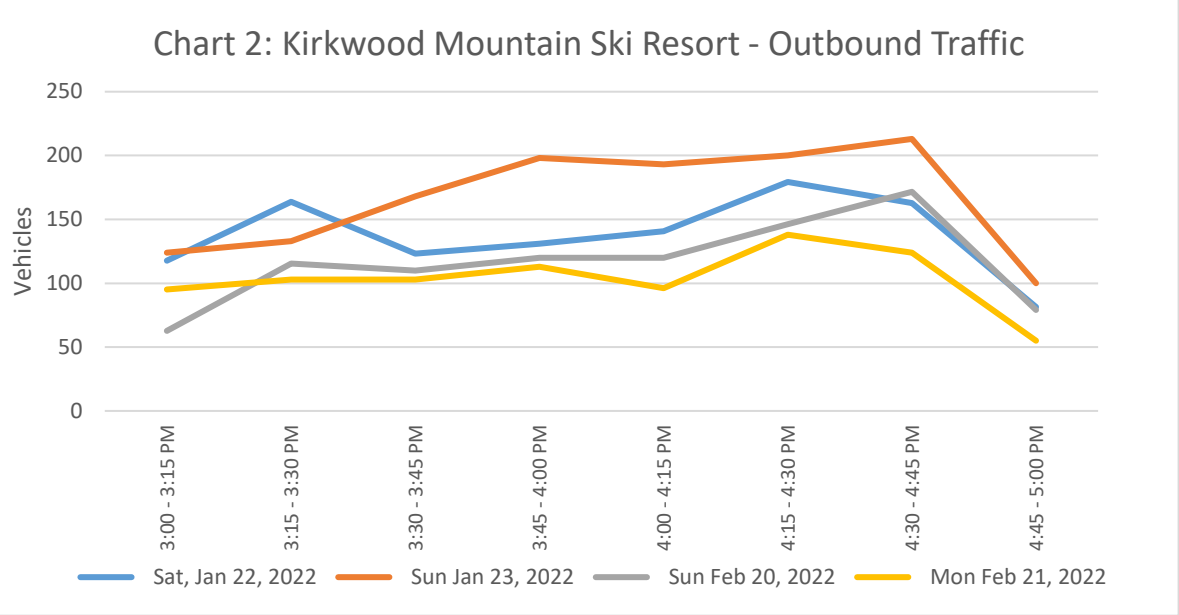


TABLE 3
QUALITATIVE ASSESSMENT OF TRAVEL CONDITIONS ON COUNT DAYS

Date	AM Peak Period	PM Peak Period
Saturday, January 22, 2022	Inbound traffic did not spill back on Kirkwood Meadows Drive to SR 88. Free-flow travel observed the entire peak period.	Free-flow travel observed the entire peak period. Maximum queue of about 6 waiting vehicles on Kirkwood Meadows Drive at SR 88.
Sunday, January 23, 2022	Kirkwood Meadows Drive was free-flow until about 8:30 AM, at which time the queue from the parking lot spilled back to where the two inbound lanes from SR 88 merge into a single lane. That merge occurs about 500 feet south of SR 88. Queued vehicles extended back onto SR 88 with queuing occurring until about 9:30 AM.	Continuous northbound travel during peak hour. Similar to the Saturday observations, northbound queues at SR 88 never exceeded about 6 vehicles.
Sunday, February 20, 2022	Inbound traffic did not spill back on Kirkwood Meadows Drive to SR 88. Free-flow travel observed the entire peak period.	Several erratic driver behaviors contributed to more lengthy queues than would otherwise be expected. [1]
Monday, February 21, 2022		Free-flow travel observed. Maximum queue of 6 left-turns and 4 right-turns observed on Kirkwood Meadows Drive at SR 88.

Note: [1] Appendix A provides imagery of those behaviors. They included:
- Motorists turning left from the outside lane.
- Very slow moving vehicle (causing queue of 8 vehicles in the outside lane).
- Pedestrian activity on the east side of Kirkwood Meadows Drive south of SR 88 may have contributed to slowing.

Source: Fehr & Peers, 2022.

Figure 2 indicates that the AM peak hour inbound traffic volume of 747 vehicles on January 23rd was 16% greater than the volume of the next busiest day (i.e., 642 vehicles on January 22nd). Southbound travel on Kirkwood Meadows Drive on January 23rd was gridlocked for over an hour, while conditions on all other days were free-flow. It was apparent from the video imagery that a bottleneck was present south of the intersection (i.e., well beyond the coning program lane merge). KMR staff reported that the bottleneck occurred near the resort as a result of an unexpected staff medical absence and the need for staff that were present to attend to an urgent issue involving a resort guest. Due to this unexpected and atypical situation, traffic conditions near the resort itself had an adverse effect on SR 88 on that single day, but this was not the case on any of the three other count days. The Kirkwood Meadows Drive/SR 88 intersection is studied in more detail in the following section.

A review of the 8-10 AM and 3-5 PM turning movements at the SR 88/Kirkwood Meadows Drive intersection reveals the following travel behaviors:

- On Sunday, January 23rd, 60% of inbound traffic originated from the east on SR 88 and 59% of outbound traffic was destined to the west on SR 88.
- On Sunday, February 20th, between 65%-70% of traffic was distributed to/from the east on SR 88, which was the largest percentage of any count day.

Intersection Operations

Table 4 summarizes traffic operations at the SR88/Kirkwood Meadows Drive intersection during each study peak hour. Refer to **Appendix B** for technical calculations. As shown, all movements operate at LOS A or B during three of the four count days.

As noted previously, queued traffic from near the resort spilled back to SR 88 on the morning of Sunday, January 23rd. This had an adverse effect on intersection operations, as evidenced by several individual movements operating at LOS E or F. Inbound traffic during the morning peak hour on Sunday, January 23rd was 12% greater than the next busiest day, Saturday, January 22nd. On Saturday, January 22nd, all intersection movements operated at LOS A. It is thus apparent that the degraded operations on Sunday, January 23rd were not caused by the modest increase over the day prior, but due to the aforementioned atypical bottleneck that occurred at the resort. The intersection would have likely operated at LOS A or B had that bottleneck not be present.

TABLE 4
EXISTING INTERSECTION OPERATIONS – SR 88/KIRKWOOD MEADOWS DRIVE

Movement	Average Delay (seconds per vehicle) / LOS [1]							
	Saturday January 22, 2022		Sunday January 23, 2022		Sunday February 20, 2022		Monday February 21, 2022	
	AM Peak Hour	PM Peak Hour	AM Peak Hour [2]	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Northbound Left	9 / A	8 / A	4 / A	11 / B	4 / A	9 / A	8 / A	14 / B
Northbound Right	5 / A	9 / A	6 / A	7 / A	4 / A	7 / A	5 / A	5 / A
Eastbound Through	3 / A	2 / A	3 / A	2 / A	1 / A	1 / A	2 / A	1 / A
Eastbound Right	5 / A	2 / A	24 / C	1 / A	3 / A	1 / A	5 / A	2 / A
Westbound Left	5 / A	1 / A	60 / F	1 / A	5 / A	1 / A	4 / A	1 / A
Westbound Through	4 / A	1 / A	41 / E	2 / A	3 / A	1 / A	2 / A	1 / A
Overall Intersection	5 / A	7 / A	40 / E	8 / A	4 / A	6 / A	4 / A	6 / A

Notes:
1. Results based on output from SimTraffic microsimulation model.
2. Refer to paragraph above for explanation of how a bottleneck on Kirkwood Meadows Drive affected intersection operations during this peak hour.

Source: Fehr & Peers, 2022.

Queuing Analysis

Table 5 presents the maximum vehicle queue lengths at the SR 88/Kirkwood Meadows Drive intersection based on outputs from the SimTraffic model. Estimated queue lengths did not exceed the available storage during three of the four count days. During the AM peak hour on Sunday, January 23rd, vehicle queues spilled back onto SR 88, though the extent of the queuing is not known. The estimates in this table for this particular peak hour were derived using the calibrated flow rate data.

TABLE 5
EXISTING INTERSECTION QUEUING – SR 88/KIRKWOOD MEADOWS DRIVE

Movement	Turn Lane Storage	Maximum Vehicle Queue [1]							
		Saturday January 22, 2022		Sunday January 23, 2022		Sunday February 20, 2022		Monday February 21, 2022	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Eastbound Right-Turn	400 feet	0 ft.	-	150 ft.	-	0 ft.	-	0 ft.	-
Westbound Left-Turn	200 feet	75 ft.	-	175 ft.	-	50 ft.	-	75 ft.	-
Northbound Left-Turn	500 feet [2]	-	100 ft.	-	175 ft.[3]	-	100 ft.	-	150 ft.
Northbound Right-Turn	500 feet [2]	-	150 ft.	-	100 ft.	-	150 ft.	-	100 ft.

Notes:

1. Maximum vehicle queues based on SimTraffic model results (values rounded up to the nearest 25 feet).
2. Approximate amount of storage (based on cone placements) based on review of video data collection.
3. During this peak hour, 473 vehicles turned left (exhibiting a movement-specific 0.92 PHF). This level of side-street traffic would normally result in lengthy queues. However, the major street volume was only 159 vehicles, which allows for plenty of available gaps. Video imagery did not reveal queues that exceed 150 feet in length, as such queues would have extended into the frame of the camera facing Kirkwood Meadows Drive.

Source: Fehr & Peers, 2022.

Collision Data

Mitigation Measure 4.7 (b) requires collection of three-year collision history within 500 feet of the SR 88/Kirkwood Meadows Drive intersection. Collision data was obtained from the Transportation Injury Mapping System (TIMS), Safe Transportation Research and Education Center, University of California, Berkeley, 2022. Data was queried for the three-year period from January 1, 2018 through December 31, 2020. During this period, one injury collision was reported within 500 feet of the SR 88/Kirkwood Meadows Drive intersection. Occurring on March 16, 2019, it was a broadside collision between a northbound left-turning vehicle and an eastbound though vehicle. The collision occurred in the afternoon under clear weather conditions. This data is used in the following section to evaluate whether the intersection may require signalization.

Signal Warrant Analysis

The potential need for a traffic signal at the SR 88/Kirkwood Meadows Drive intersection was evaluated using the following warrants contained in the *Manual of Uniform Traffic Control Devices* (MUTCD) (Caltrans, Amended March 2021):

- Warrant 3B (Peak Hour Volume)
- Warrant 7 (Crash Experience)

Page 833 of the CA MUTCD states the following with respect to the Peak Hour Volume warrant:

> *The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.*

It is apparent from **Table 4** that minor street (i.e., motorists on Kirkwood Meadows Drive) did not experience undue delays. Operations were at LOS A or B during all four study days.

Figure 4C-4 of the CA MUTCD contains a chart that plots the minor street volume and the major street volume to determine whether the warrant is satisfied. However, the minimum major street volume on the chart is 300 vehicles which is greater than the volumes measured during the PM peak hour on any of the study days. Therefore, this chart is not a reliable indicator of the need for a traffic signal at this location.

The CA MUTCD includes an alternate test for determining whether the Peak Hour Volume warrant would be satisfied. The warrant would be met if all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:

1. The total stopped time delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach; and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

During the busiest observed study day (January 23rd), the 473 northbound left-turns experienced an average delay of 11 seconds, while the 331 northbound right-turns experienced an average delay of 7 seconds. Together, these movements resulted in 7,520 vehicle-seconds of delay or 2.1 vehicle-hours of delay. Thus, even when four peak winter weekend days were selected, criteria #1 above would not met (though it is noted that criteria 2 and 3 would be met).

The crash experience warrant is not met because there are not five or more collisions within a 12-month period of a type (i.e., multi-vehicle broadside crashes) susceptible to correction by a traffic control signal. Other requirements of this particular warrant were also not satisfied.

This analysis has found that the Peak Hour Volume and Crash Experience Warrants for a traffic signal at the SR 88/Kirkwood Meadows Drive intersection are not met.

Conclusions and Recommendations

This study analyzed conditions at the SR 88/Kirkwood Meadows Drive intersection during the AM and PM peak hours of four peak winter weekend days. Operations were at LOS A or B during all but one of the 8 peak hour time periods that were studied. During the AM peak hour on Sunday, January 23rd, an unexpected and atypical bottleneck on Kirkwood Meadows Drive near the resort adversely affected intersection operations, causing atypically high delays. The following recommendation is offered to improve the flow of traffic entering KMR:

- **KMR Security personnel who are positioned during AM peak hour peak ski days on Kirkwood Meadows Drive at the Timber Creek Base crosswalk should prioritize arriving traffic (by holding crossing pedestrians).**

The following recommendation is offered to improve the flow of traffic turning into and out of Kirkwood Meadows Drive from SR 88:

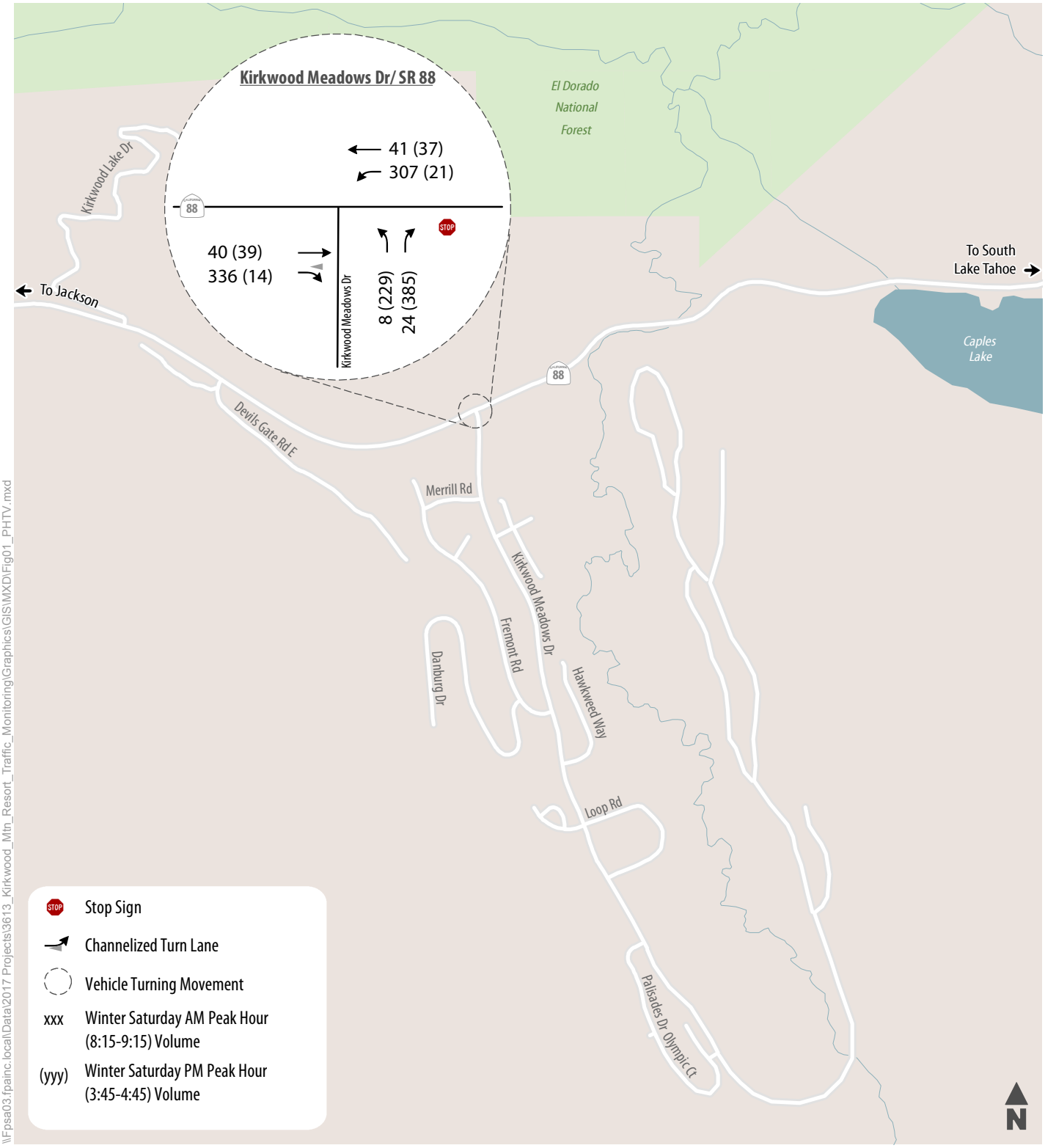
- **The coning pattern at SR 88/Kirkwood Meadows Drive should be modified and upgraded by including wayfinding signage in the outbound direction and an improved coning pattern.** The following three specific changes are recommended:

  <u>AM Peak Period</u>

  1. To the extent permitted by Caltrans, extend the coning pattern toward the eastbound right-turn to allow westbound left-turning motorists to more clearly distinguish the outside receiving lane as being designated for eastbound right-turns only.

PM Peak Period

2. Post a wayfinding sign on northbound Kirkwood Meadows Drive to designate the inside coned lane as being toward Jackson and the outside coned lane as being toward Lake Tahoe.
3. Decrease distance between cones to reduce likelihood of last-minute lane changes.

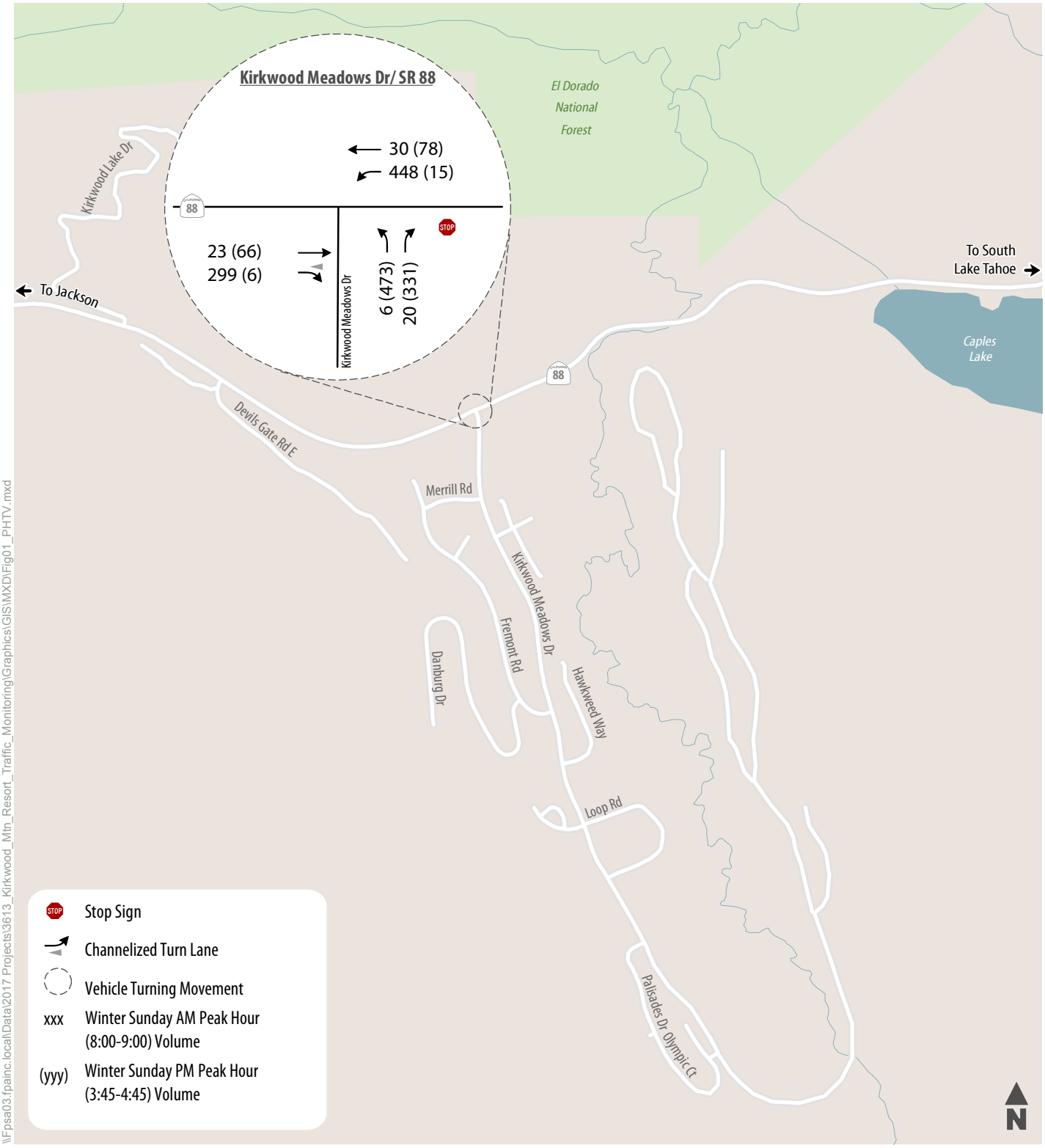


\\Fpsa03.fpainc.local\Data\2017 Projects\3613_Kirkwood_Mtn_Resort_Traffic_Monitoring\Graphics\GIS\MXD\Fig01_PHTV.mxd

*Note:
Traffic volumes for winter Saturday AM and PM peak hour represent conditions associated with a 4,000 skier day.

Figure 1

Peak Hour Traffic Volumes and Lane Configurations on Saturday, January 22, 2022



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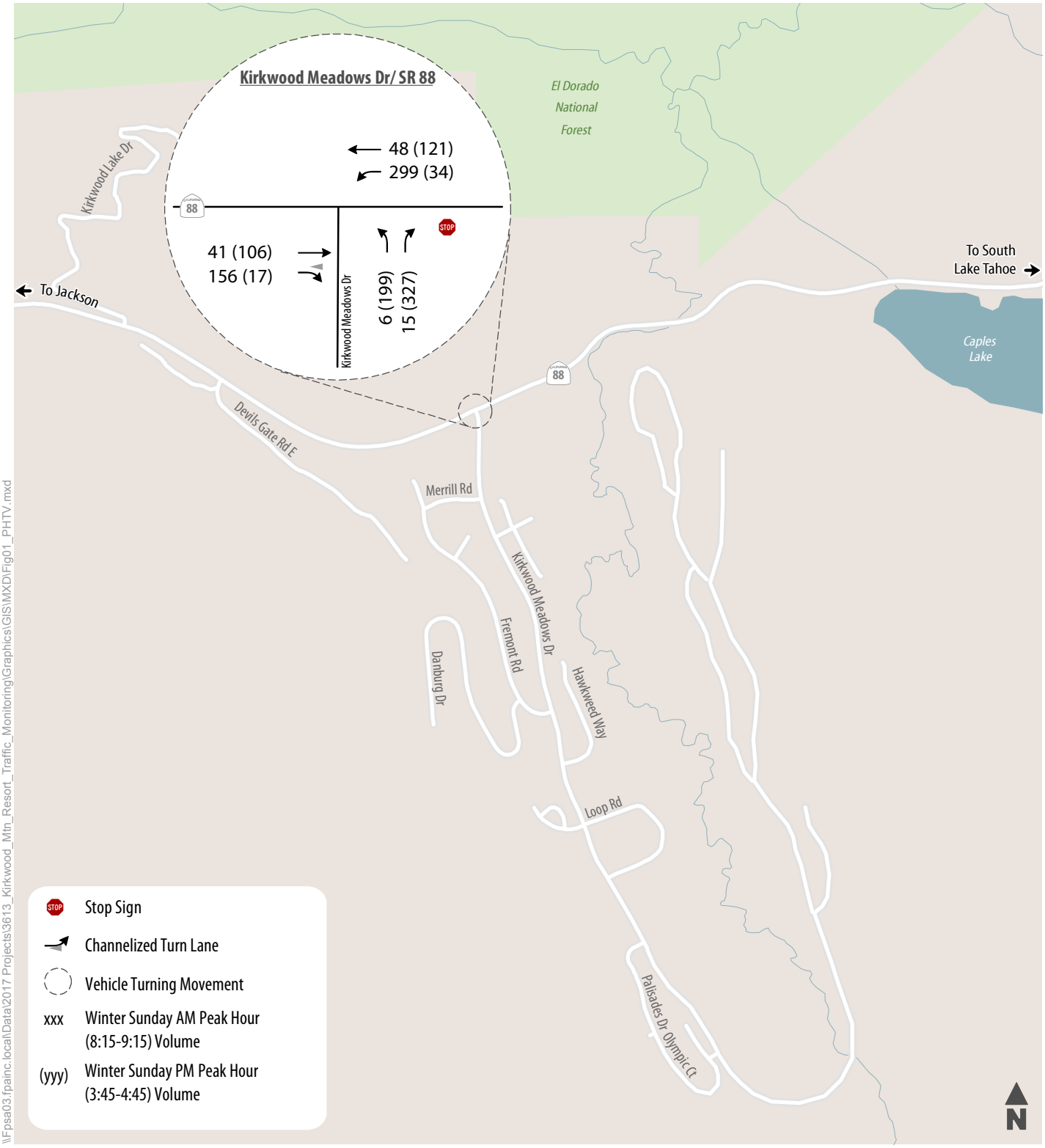
*Note:
Traffic volumes for Sunday AM and PM peak hour represent conditions for visitation well in excess of 4,000 daily skiers.

Figure 2

Peak Hour Traffic Volumes and Lane Configurations

on Sunday, January 23, 2022



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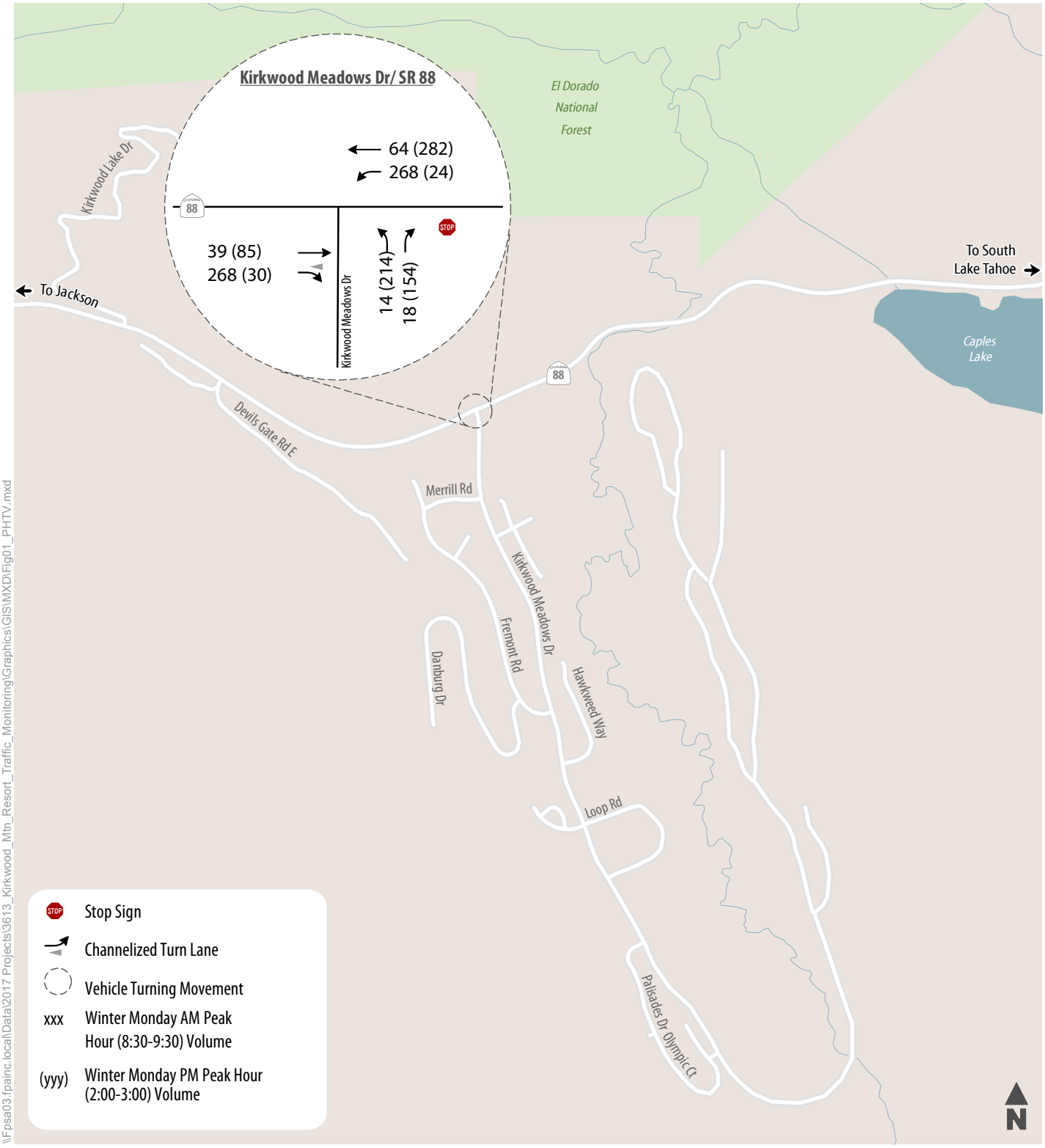
*Note:
Traffic volumes for winter Sunday AM and PM peak hour represent conditions associated with a 4,000 skier day.

Figure 3

Peak Hour Traffic Volumes and Lane Configurations on Sunday, February 20, 2022



\\Fpsa03.fpainc.local\Data\2017 Projects\3613_Kirkwood_Mtn_Resort_Traffic_Monitoring\Graphics\GIS\MXD\Fig01_PHTV.mxd

*Note:
Traffic volumes for Monday AM and PM peak hour represent conditions for visitation in excess of 4,000 daily skiers.

Figure 4

Peak Hour Traffic Volumes and Lane Configurations

on Monday, February 21, 2022

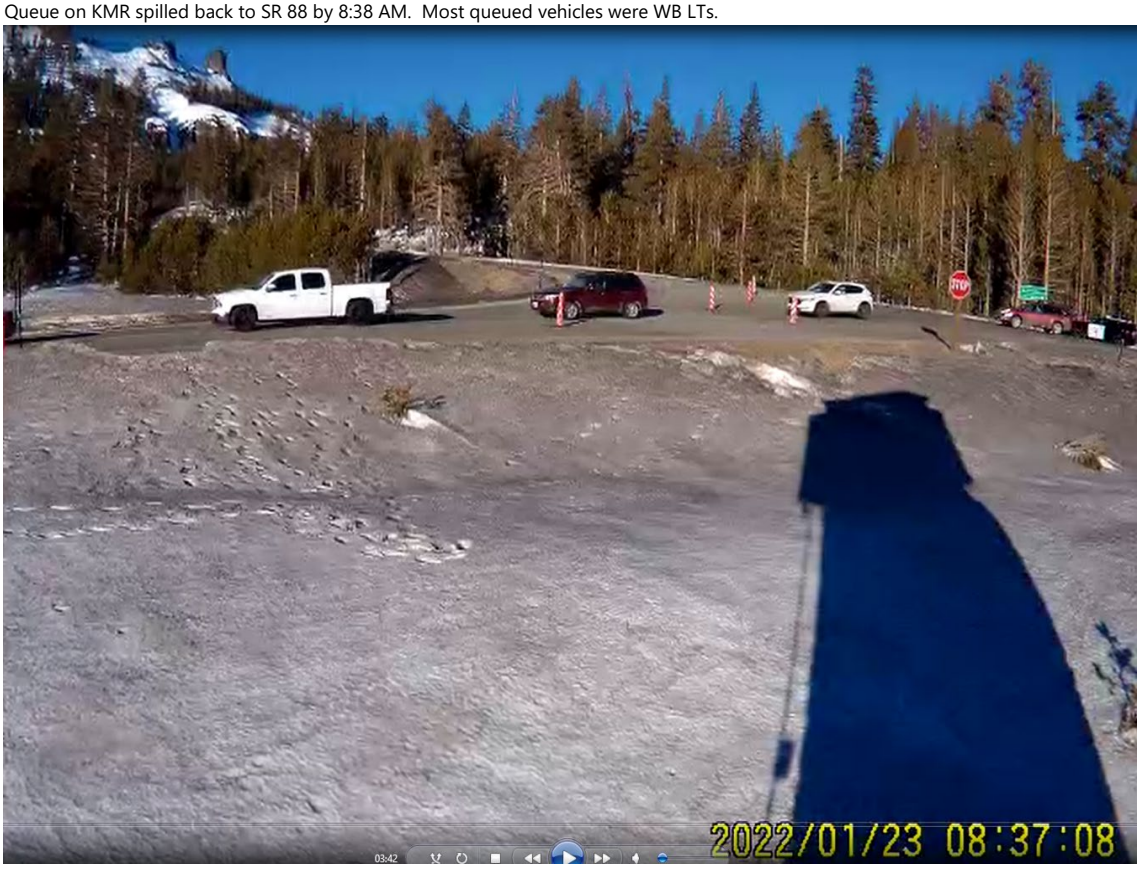
Appendix A – Video Images of Travel Activity at SR 88/Kirkwood Meadows Drive Intersection

Saturday January 22 PM Peak Hour Conditions: One of the longest queues observed on video

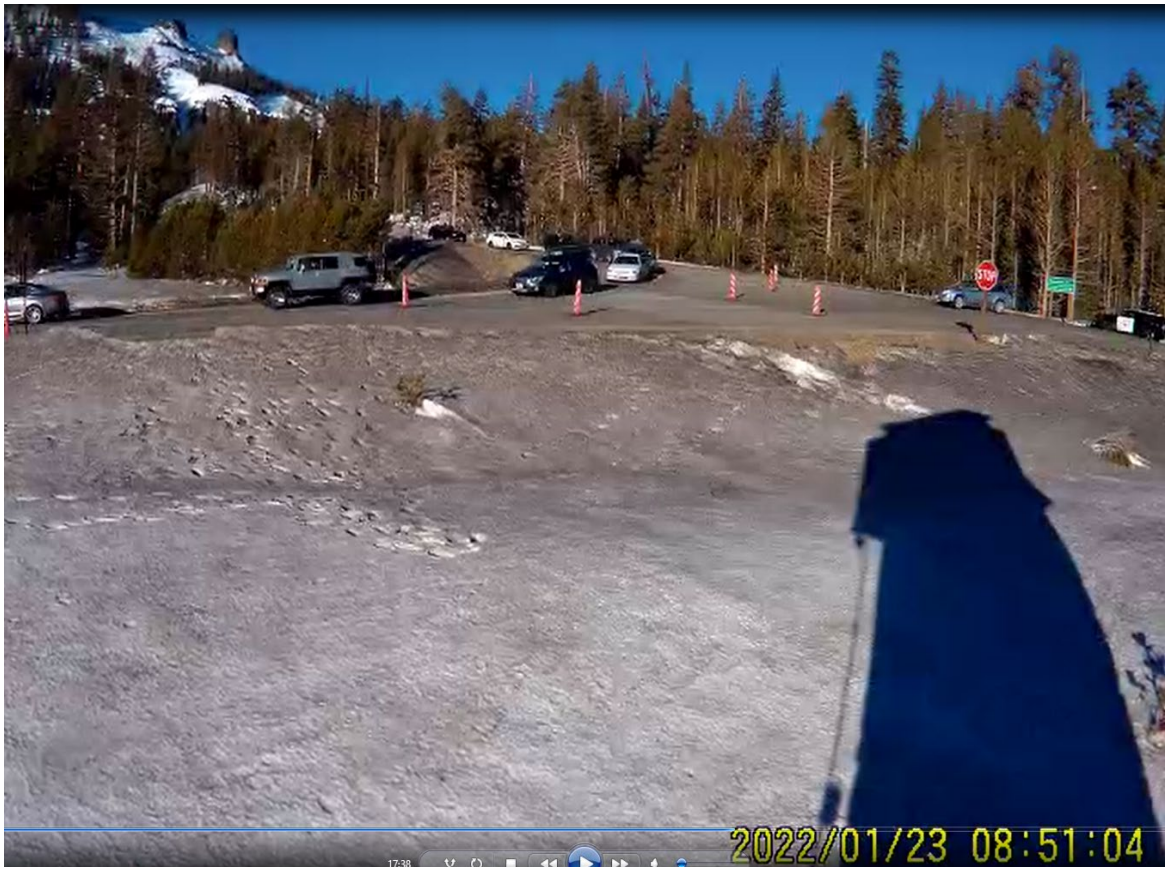
Queue on Sunday Jan 23rd at 8:35 AM

SR 88/KMR still free-flow at 8:33 AM. Coning pattern in place. Officer present, not assigning ROW.

Queue on KMR spilled back to SR 88 by 8:38 AM. Most queued vehicles were WB LTs.



Considerable EB RT queues by around 8:50 AM

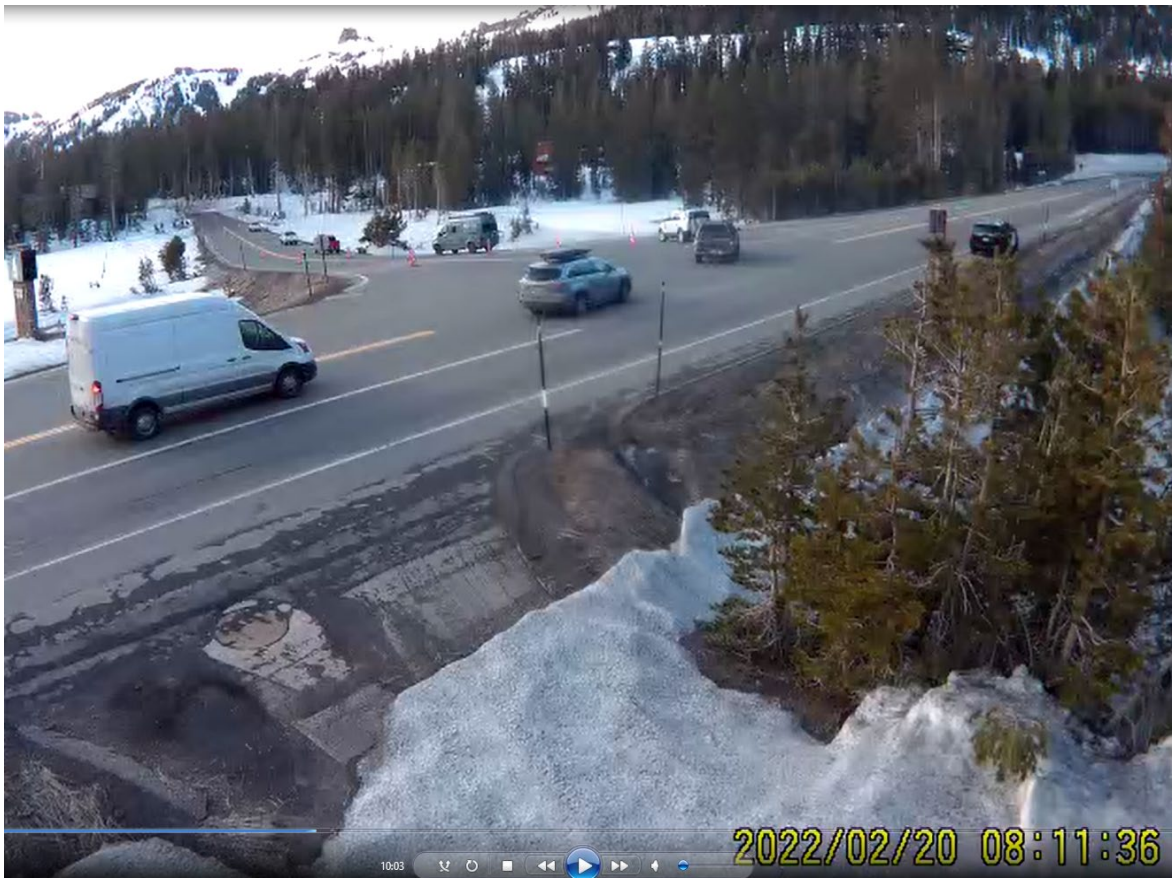


Queue still at i/s at 9:21 AM. Queue no longer present by 9:23 AM.

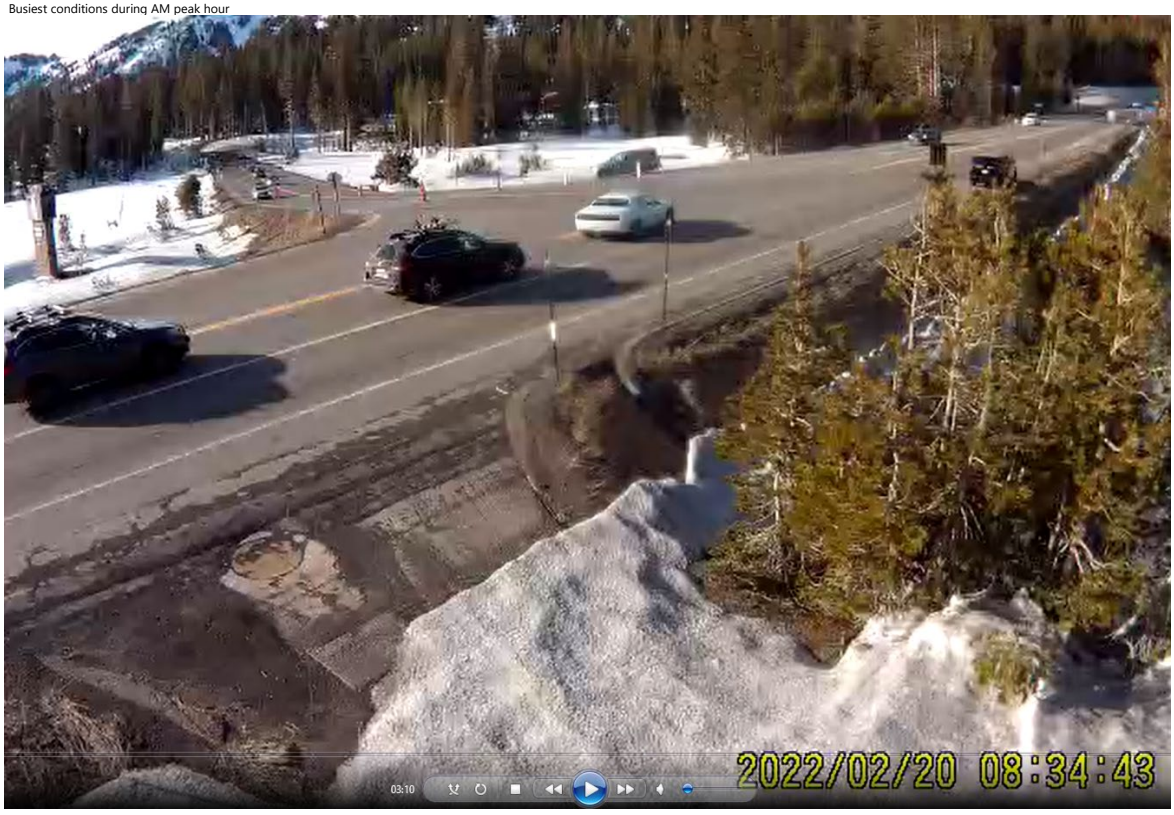
Worst queue observed around 3:55 PM. Both coned lanes being used. No CHP present.

Observations on Sunday, February 20, 2022

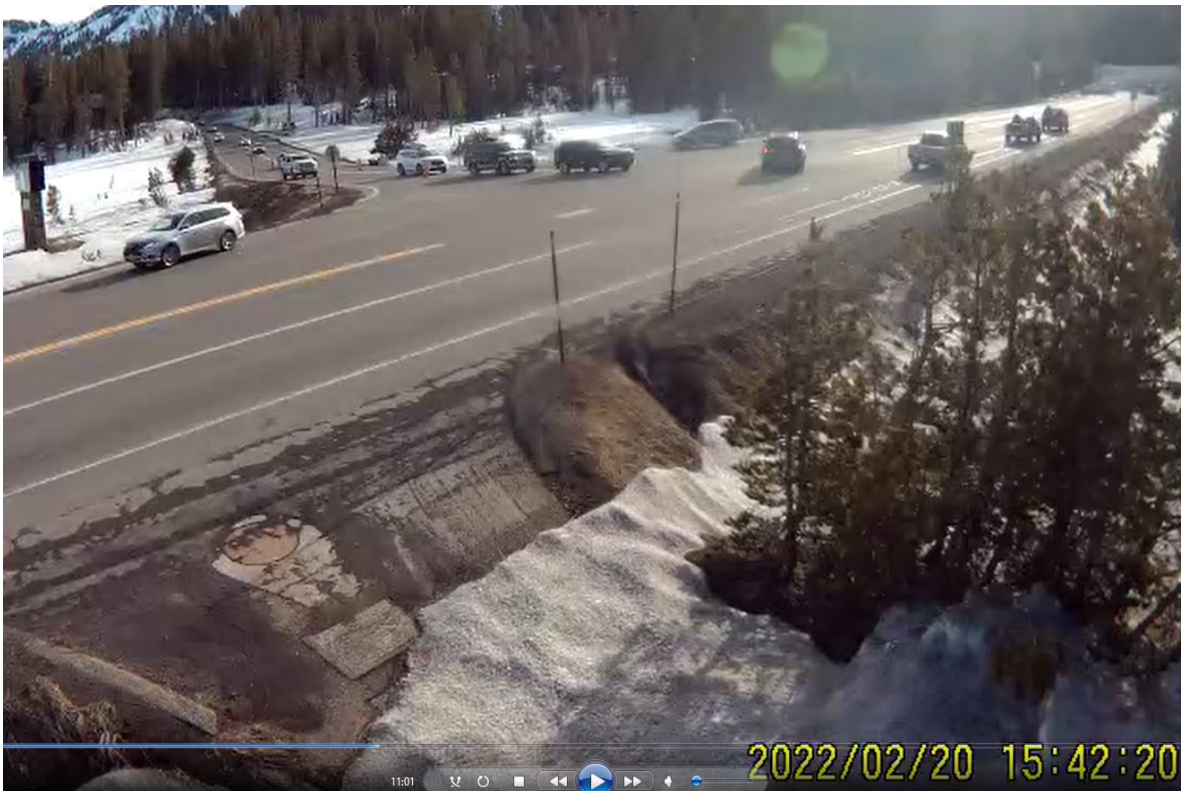
WB Left-Turn vehicles turning into outside coned lane



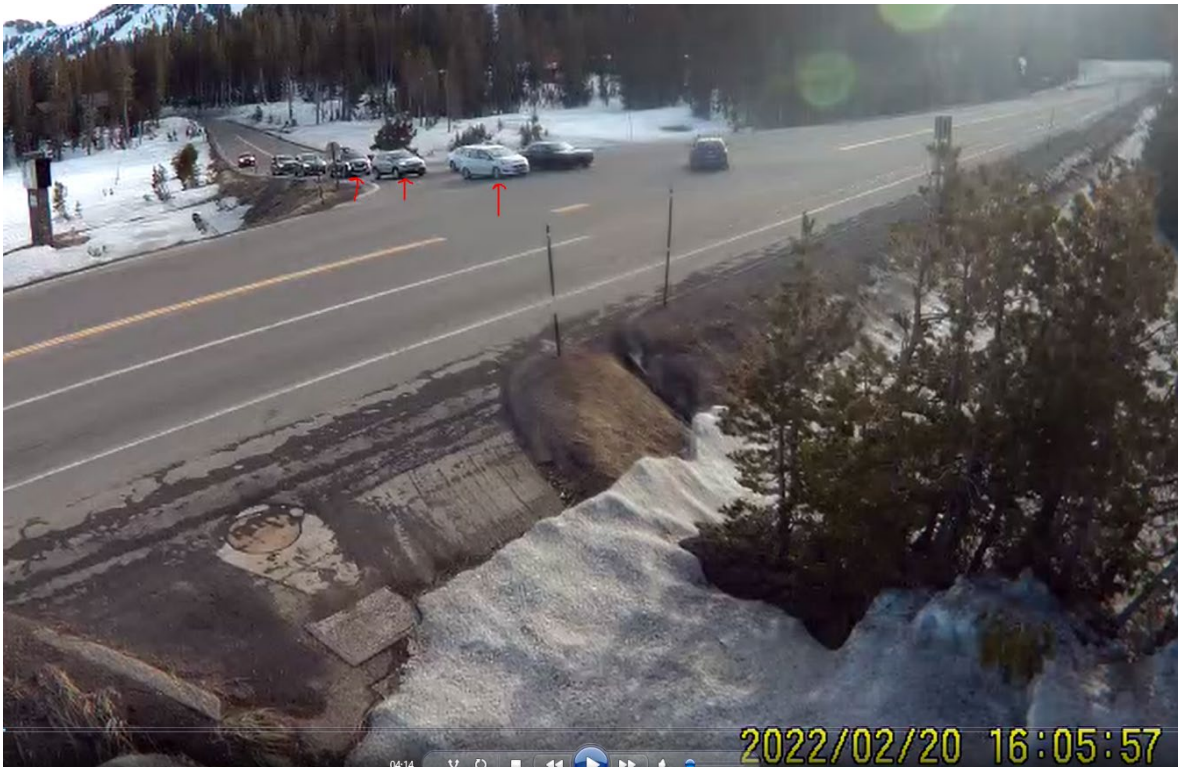
Busiest conditions during AM peak hour



Busiest conditions during PM peak hour



Vehicles shown with red arrows turning left from the outside lane



Images of vehicles with red arrows after turning left from the outside lane

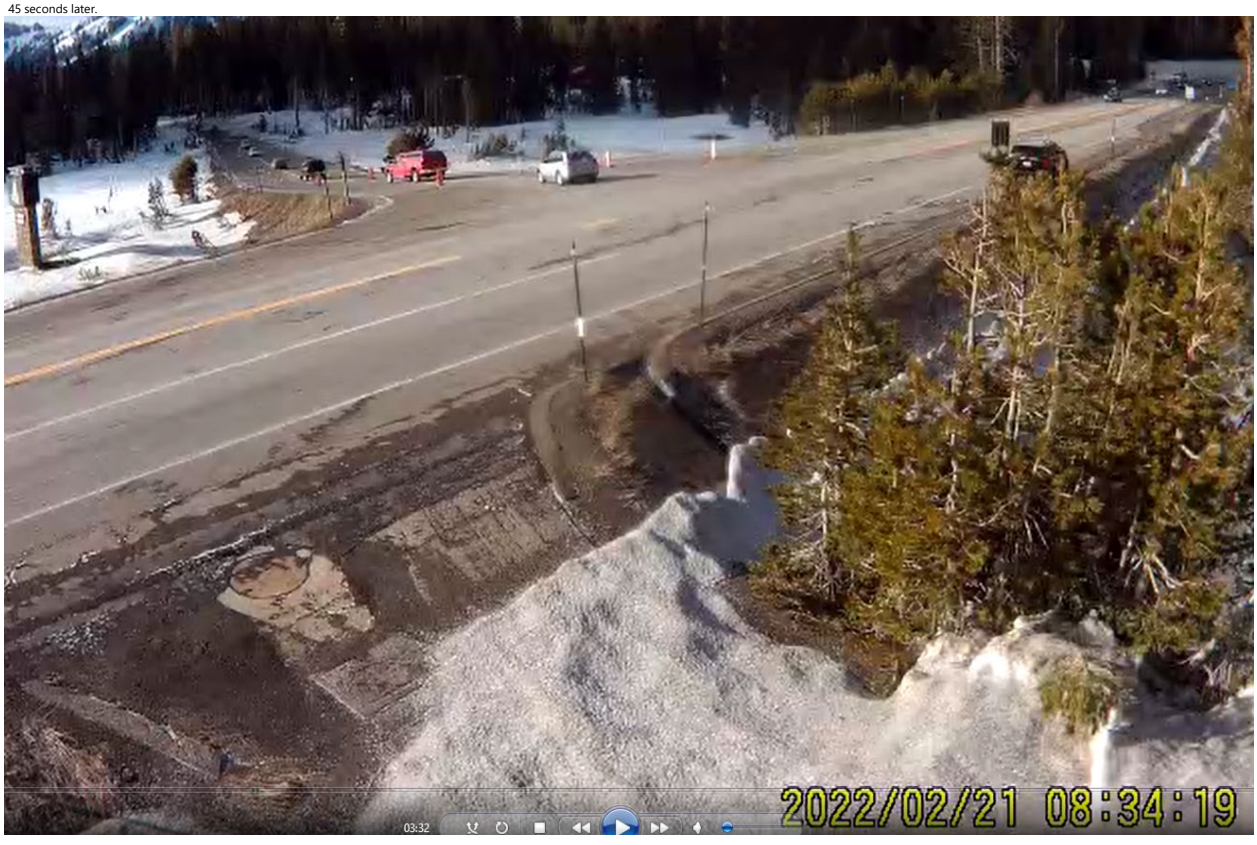
Truck with camper trailer traveled very slow and turned from outside lane onto WB SR 88.

Observations on Monday, February 21, 2022

Start of AM peak hour.

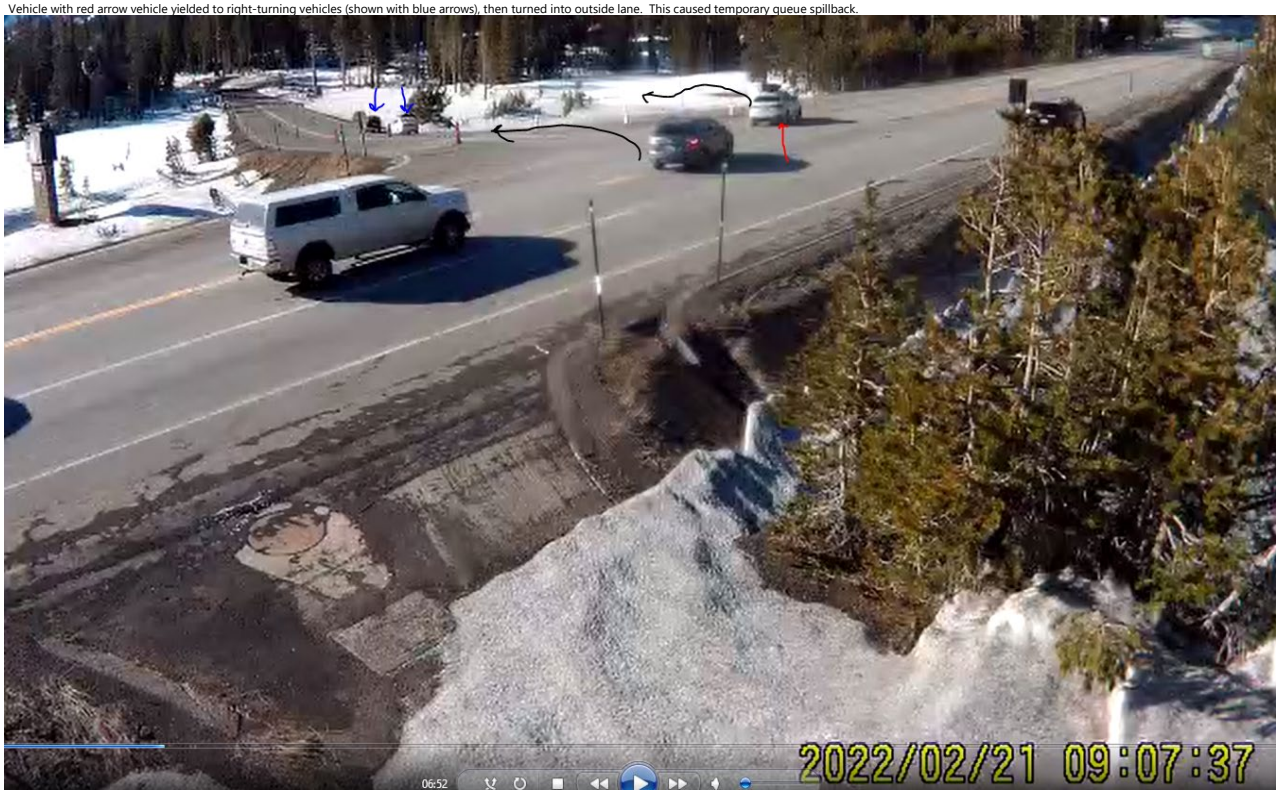
White car turning onto Kirkwood Meadows Drive makes the move at 8:33 AM and 45 seconds. During the next 45 seconds, a continuous gap in the opposing eastbound through movement is available, allowing for 14 additional vehicles turn left. This equates to an effective saturation flow of 1,200 vehicles per hour. However, as shown later, this flow rate was not always maintained due to driver reluctance to turn when EB right-turns were present.

45 seconds later.

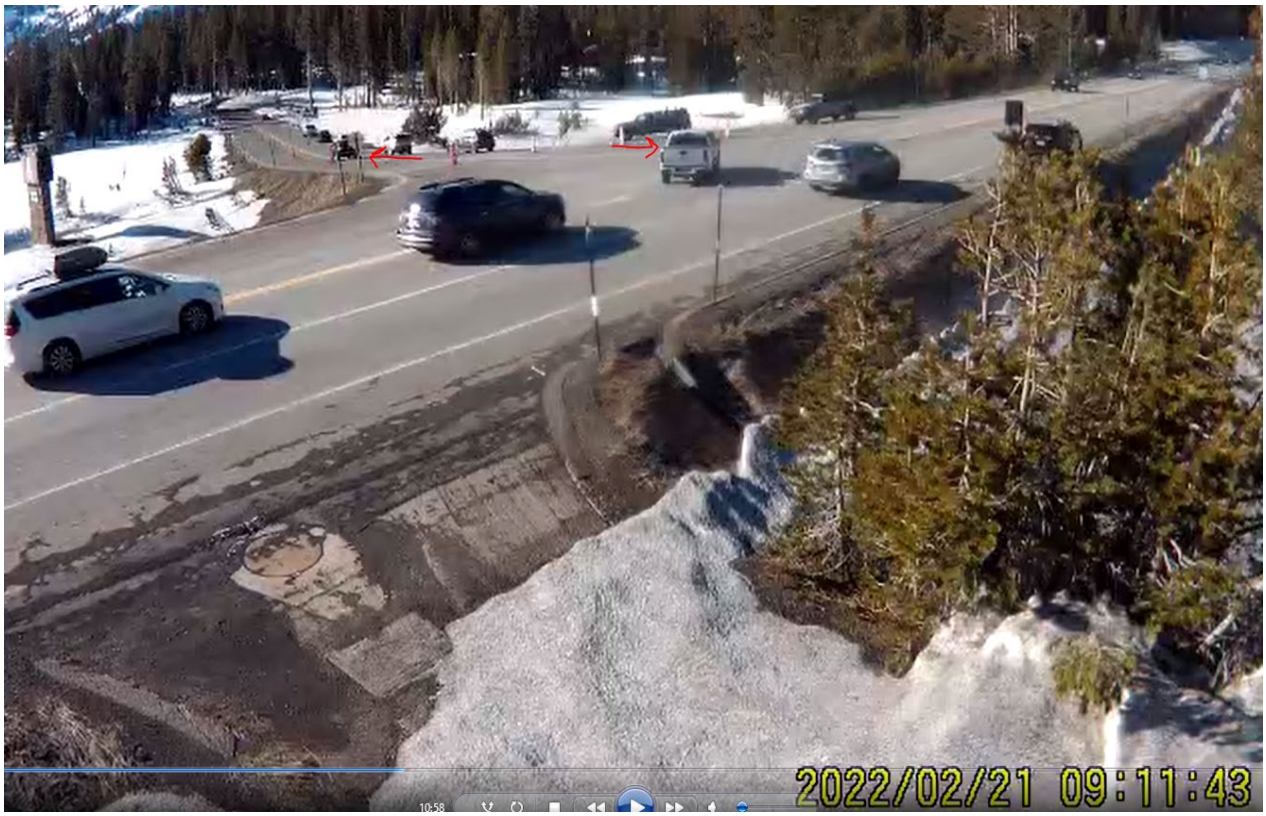


Driver reluctance to turn left due to uncertainty if oncoming vehicle is turning right or continuing straight.

Vehicle with red arrow vehicle yielded to right-turning vehicles (shown with blue arrows), then turned into outside lane. This caused temporary queue spillback.



Considerable gap between successive vehicles (despite no EB Thru Traffic) due to white truck reluctance to turn



Downstream lane merge operates smoothly

Both vehicles turning left from outside lane. Caused temporary delay to right-turning vehicle.

Maximum NB Left-Turn Queue of 6 vehicles. 30 seconds later, entire queued dissipated.

Two vehicles performing last minute lane change between cones to access left-turn lane.

Appendix B – Technical Calculations at SR 88/Kirkwood Meadows Drive Intersection

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Kirkwood Traffic Monitoring
Existing Conditions
AM Peak Hour
Saturday, January 22, 2022

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	8	9	108.8%	9.3	3.9	A
	Through						
	Right Turn	24	23	97.5%	4.5	0.7	A
	Subtotal	32	32	100.3%	6.1	1.6	A
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	40	38	94.3%	2.8	1.1	A
	Right Turn	336	341	101.5%	5.1	0.7	A
	Subtotal	376	379	100.7%	4.9	0.7	A
WB	Left Turn	307	312	101.6%	5.2	0.7	A
	Through	41	44	108.0%	3.5	1.5	A
	Right Turn						
	Subtotal	348	356	102.3%	5.1	0.6	A
Total		756	767	101.4%	5.0	0.5	A

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
NB	Left Turn	500	8	2	30	4	40	11	0%	0%
	Right Turn	500	17	2	43	3	38	10	0%	0%
WB	Left Turn	200	14	3	42	5	52	16	0%	0%
	Through	200	0	0	0	0	0	0	0%	0%
EB	Through	2,488	0	0	0	0	0	0	0%	0%
	Right Turn	400	0	0	0	0	0	0	0%	0%

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Kirkwood Traffic Monitoring
Existing Conditions
PM Peak Hour
Saturday, January 22, 2022

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	229	223	97.2%	7.7	0.8	A
	Through						
	Right Turn	385	375	97.3%	8.5	0.9	A
	Subtotal	614	597	97.2%	8.2	0.6	A
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	39	40	102.6%	1.6	1.1	A
	Right Turn	14	15	107.1%	1.8	0.5	A
	Subtotal	53	55	103.8%	1.7	0.9	A
WB	Left Turn	21	19	91.4%	1.4	0.8	A
	Through	37	40	108.6%	0.9	0.5	A
	Right Turn						
	Subtotal	58	59	102.4%	1.0	0.4	A
Total		725	711	98.1%	7.1	0.6	A

SimTraffic Post-Processor **Kirkwood Traffic Monitoring**
Average Results from 10 Runs **Existing Conditions**
Queue Length **PM Peak Hour**
Saturday, January 22, 2022

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
NB	Left Turn	500	56	5	85	8	100	19	0%	0%
	Right Turn	500	72	3	106	8	130	20	0%	0%
WB	Left Turn	200	1	1	5	5	13	14	0%	0%
	Through	200	0	0	0	0	0	0	0%	0%
EB	Through	2,488	0	0	0	0	0	0	0%	0%
	Right Turn	400	0	0	0	0	0	0	0%	0%

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Kirkwood Traffic Monitoring
Existing Conditions
AM Peak Hour
Sunday, January 23, 2022

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	6	5	75.0%	4.2	5.7	A
	Through						
	Right Turn	20	16	79.0%	6.0	0.4	A
	Subtotal	26	20	78.1%	6.5	1.6	A
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	23	21	90.9%	3.0	1.8	A
	Right Turn	299	305	101.9%	24.2	36.0	C
	Subtotal	322	326	101.1%	23.0	34.2	C
WB	Left Turn	448	442	98.6%	59.7	109.0	F
	Through	30	30	99.0%	41.0	108.2	E
	Right Turn						
	Subtotal	478	471	98.6%	58.1	108.7	F
Total		826	817	98.9%	39.5	66.6	E

SimTraffic Post-Processor
Average Results from 10 Runs
Queue Length

Kirkwood Traffic Monitoring
Existing Conditions
AM Peak Hour
Sunday, January 23, 2022

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Through	2,449	2	7	22	68	63	199	0%	0%
	Right Turn	400	37	71	114	196	141	215	1%	0%
NB	Left Turn	500	5	4	21	11	34	16	0%	0%
	Right Turn	500	12	1	37	2	33	0	0%	0%
WB	Left Turn	200	55	66	158	160	176	151	10%	0%
	Through	2,927	82	230	246	608	276	562	0%	0%

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
NB	Through	972	16	3	43	4	43	12	0%	0%
SB	Through	460	200	104	424	225	385	156	0%	17%
EB	Left Turn	179	0	0	0	0	0	0	0%	0%
	Right Turn	179	0	0	0	0	0	0	0%	0%

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Kirkwood Traffic Monitoring
Existing Conditions
PM Peak Hour
Sunday, January 23, 2022

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	473	449	94.9%	10.5	1.4	B
	Through						
	Right Turn	331	327	98.9%	7.3	0.3	A
	Subtotal	804	776	96.5%	9.2	1.0	A
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	66	68	102.3%	1.5	0.6	A
	Right Turn	6	8	130.0%	1.3	0.7	A
	Subtotal	72	75	104.6%	1.5	0.5	A
WB	Left Turn	15	13	84.7%	1.2	0.7	A
	Through	78	76	97.6%	2.2	0.6	A
	Right Turn						
	Subtotal	93	89	95.5%	2.1	0.5	A
Total		969	940	97.0%	8.0	0.8	A

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
NB	Left Turn	500	84	7	133	12	170	27	0%	0%
	Right Turn	500	60	2	82	5	95	10	0%	0%
WB	Left Turn	200	1	1	5	7	10	13	0%	0%
	Through	200	0	0	0	0	0	0	0%	0%
EB	Through	2,488	0	0	0	0	0	0	0%	0%
	Right Turn	400	0	0	0	0	0	0	0%	0%

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Kirkwood Traffic Monitoring
Existing Conditions
AM Peak Hour
Sunday, February 20, 2022

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	6	5	90.0%	3.8	3.5	A
	Through						
	Right Turn	15	14	95.3%	4.2	0.5	A
	Subtotal	21	20	93.8%	4.6	0.5	A
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	41	38	92.4%	1.0	0.6	A
	Right Turn	156	154	98.6%	2.8	0.4	A
	Subtotal	197	192	97.3%	2.4	0.4	A
WB	Left Turn	299	292	97.6%	5.0	0.8	A
	Through	48	48	100.0%	3.0	1.2	A
	Right Turn						
	Subtotal	347	340	98.0%	4.6	0.8	A
Total		565	551	97.6%	3.9	0.6	A

SimTraffic Post-Processor **Kirkwood Traffic Monitoring**
Average Results from 10 Runs **Existing Conditions**
Queue Length **AM Peak Hour**
Sunday, February 20, 2022

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
NB	Left Turn	500	5	2	23	5	31	0	0%	0%
	Right Turn	500	12	2	39	4	42	12	0%	0%
WB	Left Turn	200	12	4	38	7	49	11	0%	0%
	Through	200	0	0	0	0	0	0	0%	0%
EB	Through	2,488	0	0	0	0	0	0	0%	0%
	Right Turn	400	0	0	0	0	0	0	0%	0%

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Kirkwood Traffic Monitoring
Existing Conditions
PM Peak Hour
Sunday, February 20, 2022

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	199	196	98.5%	8.6	1.2	A
	Through						
	Right Turn	327	330	100.8%	7.3	1.2	A
	Subtotal	526	526	99.9%	7.7	0.8	A
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	106	99	92.9%	1.4	0.4	A
	Right Turn	17	17	100.0%	1.2	0.6	A
	Subtotal	123	116	93.9%	1.5	0.3	A
WB	Left Turn	34	31	92.1%	1.4	0.8	A
	Through	121	127	105.2%	1.0	0.4	A
	Right Turn						
	Subtotal	155	159	102.3%	1.1	0.4	A
Total		804	800	99.5%	5.6	0.7	A

SimTraffic Post-Processor **Kirkwood Traffic Monitoring**
Average Results from 10 Runs **Existing Conditions**
Queue Length **PM Peak Hour**
Sunday, February 20, 2022

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
NB	Left Turn	500	52	5	79	8	94	8	0%	0%
	Right Turn	500	66	3	105	13	143	42	0%	0%
WB	Left Turn	200	4	1	19	3	28	2	0%	0%
	Through	200	0	0	0	0	0	0	0%	0%
EB	Through	2,488	0	0	0	0	0	0	0%	0%
	Right Turn	400	0	0	0	0	0	0	0%	0%

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Kirkwood Traffic Monitoring
Existing Conditions
AM Peak Hour
Monday, February 21, 2022

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	14	12	85.0%	7.5	3.6	A
	Through						
	Right Turn	18	16	90.6%	4.6	1.7	A
	Subtotal	32	28	88.1%	6.4	3.0	A
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	39	41	103.8%	2.0	0.6	A
	Right Turn	268	268	99.9%	4.6	0.5	A
	Subtotal	307	308	100.4%	4.3	0.4	A
WB	Left Turn	268	270	100.8%	4.1	1.1	A
	Through	64	64	100.0%	2.2	1.0	A
	Right Turn						
	Subtotal	332	334	100.6%	3.7	1.1	A
Total		671	671	99.9%	4.2	0.6	A

SimTraffic Post-Processor **Kirkwood Traffic Monitoring**
Average Results from 10 Runs **Existing Conditions**
Queue Length **AM Peak Hour**
Monday, February 21, 2022

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
NB	Left Turn	500	11	3	34	5	40	11	0%	0%
	Right Turn	500	13	3	38	3	33	1	0%	0%
WB	Left Turn	200	13	2	40	2	53	7	0%	0%
	Through	200	0	0	0	0	0	0	0%	0%
EB	Through	2,488	0	0	0	0	0	0	0%	0%
	Right Turn	400	0	0	0	0	0	0	0%	0%

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Kirkwood Traffic Monitoring
Existing Conditions
PM Peak Hour
Monday, February 21, 2022

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	214	214	100.1%	14.1	2.2	B
	Through						
	Right Turn	154	158	102.9%	5.3	0.4	A
	Subtotal	368	373	101.3%	10.6	1.6	B
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	85	81	95.8%	0.7	0.2	A
	Right Turn	30	31	102.3%	1.5	0.4	A
	Subtotal	115	112	97.5%	0.9	0.2	A
WB	Left Turn	24	23	93.8%	0.9	0.4	A
	Through	282	283	100.4%	1.3	0.2	A
	Right Turn						
	Subtotal	306	306	99.8%	1.3	0.2	A
Total		789	790	100.2%	5.7	0.9	A

SimTraffic Post-Processor **Kirkwood Traffic Monitoring**
Average Results from 10 Runs **Existing Conditions**
Queue Length **PM Peak Hour**
Monday, February 21, 2022

Intersection 1 **Kirkwood Meadows Drive/SR-88** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
NB	Left Turn	500	69	7	115	13	145	23	0%	0%
	Right Turn	500	43	2	66	3	77	16	0%	0%
WB	Left Turn	200	2	1	12	6	24	8	0%	0%
	Through	200	0	0	0	0	0	0	0%	0%
EB	Through	2,488	0	0	0	0	0	0	0%	0%
	Right Turn	400	0	0	0	0	0	0	0%	0%