
Traffic Impact Study

Executive Summary Only

The complete Traffic Impact Study is available upon request

Prepared For:

Vail Valley Medical Center Master Plan

I-70 South Frontage Road,
Just west of the main Vail interchange

Vail, Colorado



September 30, 2014

1 Executive Summary

1.1 Introduction

This report documents the traffic impact study (TIS) for the proposed Vail Valley Medical Center (VVMC) Master Plan (Project) in the Town of Vail (TOV), Colorado. The VVMC is located on the south side of the I-70 South Frontage Road (Frontage Road) about 750 feet west of the main Vail interchange. The VVMC also has access to West Meadow Drive. See Figure 1 for the Project Vicinity Map.

All land use details listed in this TIS are based on the VVMC Master Plan effort, and will be updated as the Project concept is refined. Another key assumption is a future roundabout on the Frontage Road, which would provide optimal access to each of the three adjacent properties when this area builds out. The TOV has recently been working with adjacent property owners to evaluate alternative roundabout locations and to define the preferred location for this roundabout. This TIS assumed a roundabout configuration, but the roundabout solution is dependent upon the participation of all three property owners, and is based on the assumption that each of the properties will be redeveloped at the same time.

Since the timing of these projects may not occur simultaneously, VVMC evaluated Frontage Road improvements that would be necessary if VVMC were to redevelop “First and Alone”. The “First and Alone” evaluation was done to find a workable VVMC access solution that could occur within the existing right of way. The ultimate roundabout configuration would require additional highway right of way for implementation. In addition, CDOT understands that over-designed roundabouts can create operational issues, which is another reason that VVMC evaluated access options that do not include a roundabout.

This TIS will be updated as necessary and resubmitted for the TOV Condition Use Permit (CUP) and Colorado Department of Transportation (CDOT) access permit processes.

1.2 Study Area

The Study Area includes the intersections listed below, which are shown in Figure 1. Figure 2 shows the lane geometry and traffic control.

Intersections

- #1 Frontage Road and Evergreen Access (South Leg)
(Proposed intersection west of VVMC Access – assumed to be a roundabout)
- #2 Frontage Road and VVMC Access (South Leg) / TOV Access (North Leg)
- #3 Vail Road and Meadow Drive

The Vail Road and Meadow Drive intersection was added to the Study Area because the VVMC trips at this intersection will increase during the East End construction. The increase in VVMC trips at this intersection will occur because the 69 parking spaces at the US Bank Building will be accessed via West Meadow Drive instead of the Frontage Road.

The south roundabout at the Main Vail Interchange was not included in the Study Area. The 2025 Vail Transportation Plan (Vail TMP) concluded that there is a limited amount of realistic capacity improvements that could be constructed at this interchange, and discussed other system-wide improvements that would help alleviate congestion at the Main Vail Interchange.

1.3 Traffic Analysis Periods and Years

The traffic analysis was conducted for the periods and conditions listed below. The traffic volumes used in the analysis are based on traffic data from the peak summer and winter seasons. In addition, traffic volumes from the Vail TMP were used for the Frontage Road.

Periods

- Weekday AM Peak Hour
- Weekday PM Peak Hour

Conditions

- Year 2015 – West End (During Construction)
- Year 2016 – West End (Construction Completed)
- Year 2017 – East End (During Construction)
- Year 2018 – East End (Construction Completed)
- Year 2035 – Build-out (20-year horizon)

Definitions:

West End improvements include approximately 40,000 SF of medical space on and around the existing West Wing of the VVMC.

East End improvements include approximately 25,000 SF of net new medical space and an expanded parking structure at the east end of the Campus.

1.4 Background Traffic Assumptions Related to Adjacent Development

The future traffic volumes used in this study assume the following:

- VVMC build out
- Evergreen Site redevelopment, per previous traffic study for this site
- No changes to the Town of Vail municipal site

1.5 Existing and Proposed Project Uses

Table 1 shows the existing and proposed Project uses for each condition. Table 2 shows the number of employee and guest/patron parking spaces for each condition.

Table 1 – Existing and Proposed Project Uses

Condition	Year	Gross Bldg Area (SF)	Full-time Employees (FTE)	Patient Beds	Exam Rooms
Existing	2014	202,000	569	58	155
West End <i>(During Const)</i>	2015	202,000	569	58	160
West End <i>(Const Completed)</i>	2016	242,000	590	58	190
East End <i>(During Const)</i>	2017	242,000	590	58	190
East End <i>(Const Completed)</i>	2018	268,000	610	58	197
Build-out	Prior to 2035	300,000 ¹	700	58	260 ¹
Overall Increase <i>(Existing to Build-out)</i>		49%	23%	0%	68%

Notes:

SF – square footage

1. The SF and exam rooms shown for the Build-out Condition are speculative in nature. Estimates are provided for long-range traffic planning purposes only

Table 2 – Existing and Proposed Parking Spaces

Note: the number of parking spaces were estimated based on schematic designs for the Master Plan effort; the final parking numbers are subject to change as more detailed design work is completed.

Condition	Year	# Parking Spaces Accessed via						Total # Parking Spaces		
		West Meadow Drive			Frontage Road			Emp	P / G	Total
		Emp	P / G	Total	Emp	P / G	Total			
Existing	2014	9	107	116	245	46	291	254	153	407
West End <i>(During Const)</i>	2015	9	57	66	195	96	291	204	153	357
West End <i>(Const Completed)</i>	2016	9	107	116	245	46	291	254	153	407
East End <i>(During Const)</i>	2017	32 ¹	153 ¹	185 ¹	0 ²	0	0	32	153	185
East End <i>(Const Completed)</i>	2018	5 ³	0	5	404	210	614	409	210	619
Build-out	Prior to 2035	5 ³	0	5	435	260	695	440	260	700
Overall Increase <i>(Existing to Build-out)</i>								73%	70%	72%

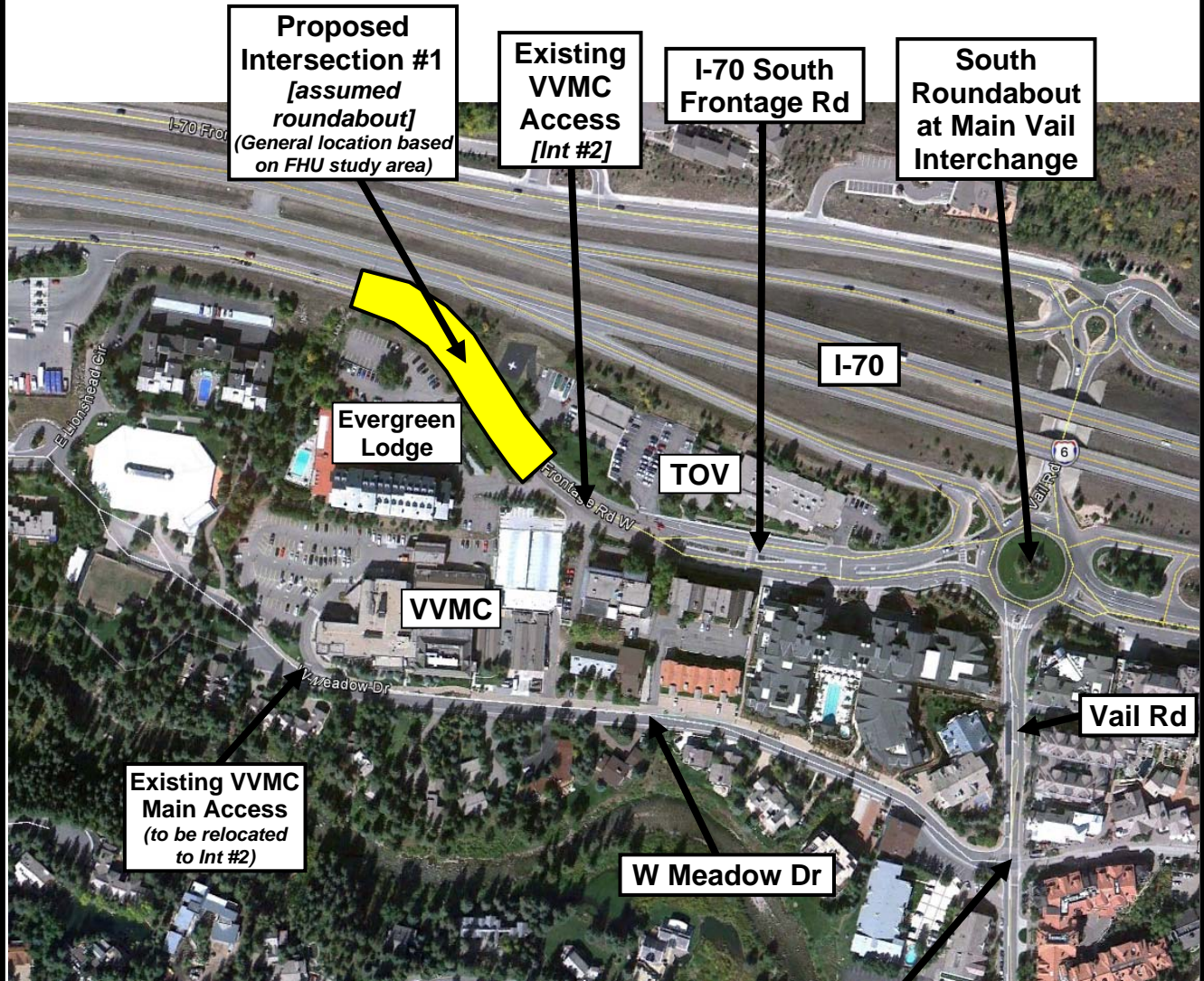
Notes:

Emp – Employee, P / G – Patron / Guest

1. Includes 69 parking spaces (46 = P / G, 23 = Emp) at the US Bank Building that will be accessed from West Meadow Drive instead of the Frontage Road.
2. During the East End Construction, the VVMC will “replace” 245 parking spaces by leasing parking spaces at nearby parking structures, and/or increasing transit and shuttle use by employees.
3. These 5 parking spaces are for service vehicles



Not To Scale

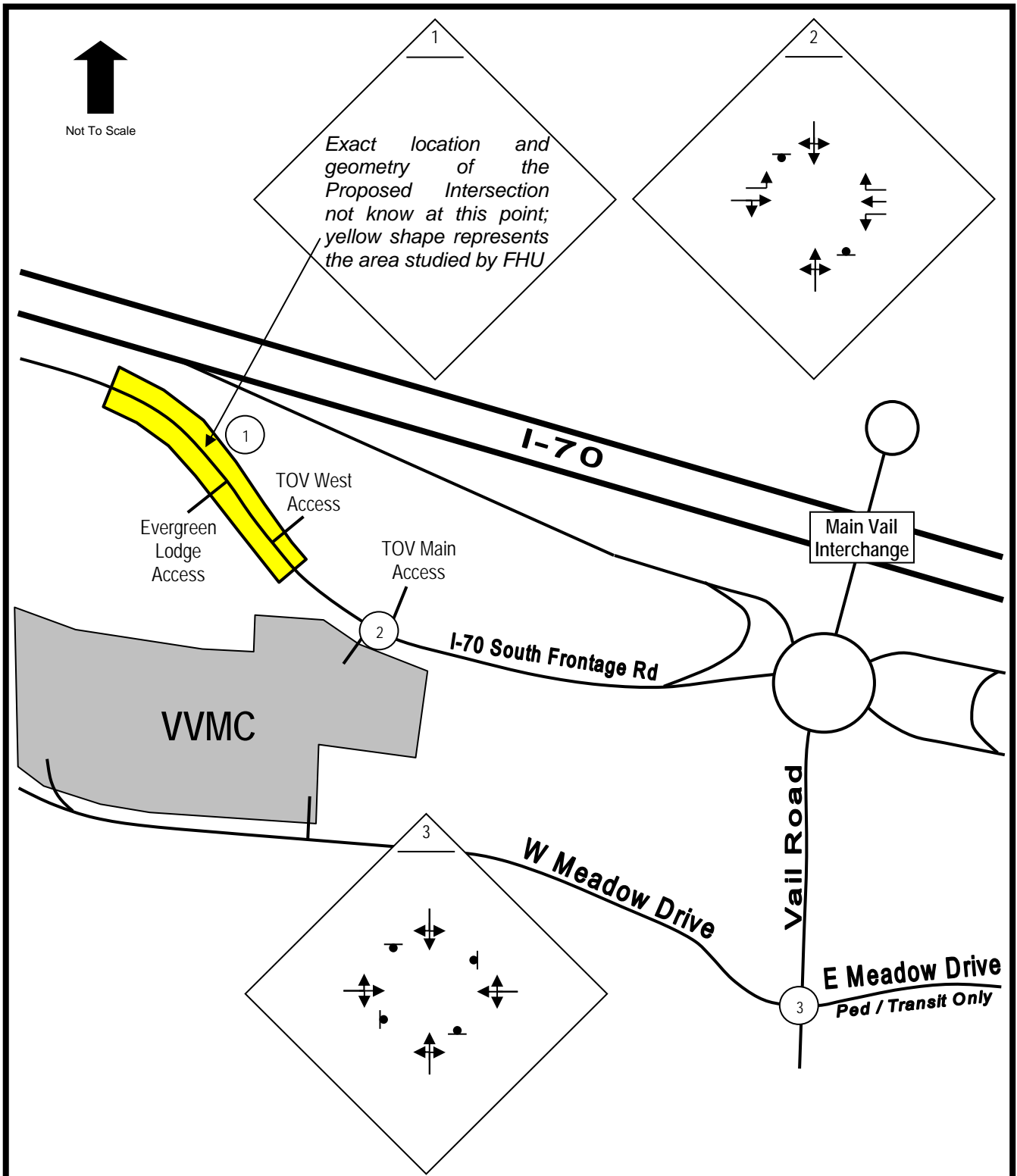


Vail Valley Medical Center (VVMC) Master Plan

Figure

Vicinity Map

1



Vail Valley Medical Center (VVMC) Master Plan

Figure

Existing Lane Geometry and Traffic Control

2

1.6 Summary of Traffic Analysis Results

The following sections summarize the traffic analysis results at the three Study Area intersections.

1.6.1 Intersection #1 on Frontage Road - Assumed Roundabout

The TOV has taken the lead on the preliminary design of the Proposed Roundabout on the Frontage Road. The participants in this process include all adjacent property owners because the roundabout would require additional right of way from these properties. VVMC, TOV, and the Evergreen Lodge have been meeting for a couple months to evaluate various roundabout location and configuration options. The TOV has retained Felsburg Holt and Ullevig (FHU) to provide technical support to the effort, and they produced a memorandum to the TOV on 8/1/14. The FHU memo summarized the results of the alternatives analysis for the roundabout, which was based on build out conditions of all three properties in the year 2035. The most recent team meeting was held on 8/5/14 where the participants agreed that the roundabout would be likely be located near the shared property line between the VVMC and Evergreen properties. FHU is currently looking at several different access configurations for the roundabout at this location. This VVMC TIS could not analyze the proposed roundabout because the preferred configuration is not known yet. Therefore, this TIS refers to and relies upon the FHU memo for the roundabout operational analysis in the build out condition. The FHU memo indicates that the proposed roundabout would operate at LOS B or better, even when using conservative background traffic and site trip generation estimates. It is anticipated that the preferred roundabout location and configuration will be identified sometime during the VVMC Master Plan approval process, so this TIS will be updated accordingly.

VVMC has identified the Frontage Road improvements that would be necessary if VVMC were to redevelop "First and Alone". The "First and Alone" evaluation was done to find a workable VVMC access solution that could occur within the existing right of way. The ultimate roundabout configuration would require additional highway right of way for implementation. In addition, CDOT understands that over-designed roundabouts can create operational issues, which is another reason that VVMC evaluated the "First and Alone" access options that do not include a roundabout.

The Proposed Roundabout on the Frontage Road was analyzed for the completion of of the VVMC Master Plan, which is anticipated to be year 2018. Table 3 shows the level of service (LOS), delay, and queuing results of the roundabout analysis based on the HCM 2010 Roundabout Methodology.

Table 3 – Int #1 - Assumed Roundabout Analysis Results [Year 2018]

Roundabout Approach	AM Peak Hour		PM Peak Hour	
	LOS – Delay (sec)	95 th % Queue (ft)	LOS – Delay (sec)	95 th % Queue (ft)
West Leg (Frontage Road)	A – 5	20	A – 9	70
East Leg (Frontage Road)	A – 6	50	A – 6	50
South Leg (Evergreen Lodge Access)	A – 6	20	A – 9	20
North Leg (TOV Service Access)	A – 6	20	A – 6	20
Overall Roundabout (all vehicles)	A – 6	50 (max)	A – 7	70 (max)

Table 3 shows that **the Proposed Roundabout will operate at LOS A with minimal queuing in year 2018, the anticipated opening year of the VVMC Master Plan.**

Refer to the FHU memo in the Appendix for the year 2035 Build-out analysis results.

1.6.2 VVMC Access / TOV Access on Frontage Road [Intersection #2]

The year 2018 East End (Construction Completed) analysis showed that the existing roadway configuration at the VVMC Access will probably create grid-lock on the Frontage Road and Main Vail interchange. **If the proposed roundabout is not constructed prior to year 2018, the “First and Alone” alternative should be constructed prior to (or coincide with) the completion of the VVMC Master Plan construction in year 2018.** Table 4 shows that the “First and Alone” alternative will provide acceptable traffic operations at the VVMC Access and TOV Access thru the year 2035. In addition, an eastbound right-turn deceleration lane should be constructed at the VVMC Access on the Frontage Road.

Table 4 – VVMC Access: “First and Alone” Alternative [Year 2035]

VVMC Access is RIRO; TOV Access is ¾ (Left-turn IN prohibited)

Direction	Movement	AM Peak Hour		PM Peak Hour	
		LOS – Delay (sec)	95 th % Queue (ft)	LOS – Delay (sec)	95 th % Queue (ft)
Southbound (TOV Access)	Shared Left- and Right-Turn	C – 16	30	C – 19	50
Northbound (VVMC Access)	Right-turn	A – 4	55	A – 10	105
Westbound (Evergreen Lodge Access)	U-turn	A – 5	95	B – 13	120

Table 5 shows that the RIRO configuration at the VVMC and TOV Accesses on the Frontage Road will operate at LOS A in the Year 2035 Build-out Condition.

Table 5 – VVMC/TOV Access on Frontage Road Analysis Results [Year 2035]

VVMC and TOV Accesses are RIRO (in conjunction with the Proposed Roundabout)

Direction	Movement	AM Peak Hour		PM Peak Hour	
		LOS – Delay (sec)	95 th % Queue (ft)	LOS – Delay (sec)	95 th % Queue (ft)
Northbound <i>(VVMC Access)</i>	Right-turn	A – 3	45	A – 8	95
Southbound <i>(TOV Access)</i>	Right-turn	A – 4	35	A – 5	50

1.6.3 Vail Road and Meadow Drive [Intersection #3]

The existing main access to the VVMC is on West Meadow Drive. In order to get to the VVMC main access, drivers pass thru the Vail Road and Meadow Drive intersection, which is a small four-way stop intersection with a high number of pedestrians and local buses. The VVMC Master Plan proposes to relocate the main access to the Frontage Road, but the new main access on the Frontage Road will not be open until year 2018. In addition, when the East End is being constructed in year 2017, it will be necessary to access the 69 parking spaces at the US Bank Building via West Meadow Drive. This means that the VVMC traffic on West Meadow Drive will increase over the existing condition when the East End is under construction.

The existing roadway configuration was analyzed for the year 2017 East End (During Construction) scenario. Table 6 shows what can be expected at the this intersection when the 69 parking spaces at the US Bank Building are access via West Meadow Drive during the construction of the East End parking structure.

Table 6 – Vail Road and Meadow Drive Analysis Results [Year 2017]

Approach	AM Peak Hour		PM Peak Hour	
	LOS – Delay (sec)	95 th % Queue (ft)	LOS – Delay (sec)	95 th % Queue (ft)
Eastbound <i>(West Meadow Drive)</i>	A – 7	50	B – 10	95
Westbound <i>(East Meadow Drive)</i>	A – 10	55	A – 9	65
Northbound <i>(Vail Road)</i>	A – 8	55	B – 12	90
Southbound <i>(Vail Road)</i>	A – 10	115	B – 11	100
Overall Intersection <i>(all vehicles)</i>	A – 9	115 (max)	B – 11	100 (max)

Table 6 shows that ***there will not be a noticeable change in the LOS, delay, or queuing at the Vail Road and Meadow Drive intersection during the construction of the East End when the 69 parking spaces at the US Bank Building will be accessed via West Meadow Drive.***

The 69 parking spaces at the US Bank Building represents a 60% increase in VVMC parking spaces accessed via West Meadow Drive (116 existing vs 185 during East End Construction). However, the traffic data obtained in February 2014 showed that the peak hour trips to/from the US Bank Building were 36 vph (AM) and 43 (PM). Based on the existing peak hour traffic volumes at the Vail Road and Meadow Drive intersection (AM = 316 vph, PM = 518 vph), the increase in VVMC trips on West Meadow Drive to/from the US Bank Building during the East End Constructions is only 11% (AM) and 8% (PM).

VVMC Trips on West Meadow Drive after the VVMC Master Plan is Completed

After the VVMC Master Plan is completed in year 2018, the VVMC traffic volume on West Meadow Drive will go from about 1,000-1,400 vehicles per day (1,000 = summer season, 1,400 = winter season) to 58 vehicles per day (service and delivery vehicles only). The 58 vehicles per day on West Meadow Drive is 29 services and delivery vehicles that make 29 trips IN and 29 trips OUT for a total of 58 daily trips. The existing peak hour VVMC traffic at the Vail Road and Meadow Drive intersection represents 21% (AM) and 29% (PM). After completion of the VVMC Master Plan in year 2018, the peak hour traffic volume at this intersection will decrease by those same percentages.

1.7 Conclusions and Recommendations

The following conclusions and recommendations are based on the Project trip generation and traffic analysis.

1.7.1 Proposed Roundabout on Frontage Road [Intersection #1]

The TOV has taken the lead on the preliminary design of the Proposed Roundabout on the Frontage Road. The participants in this process include all adjacent property owners because the roundabout would require additional right of way from these properties. VVMC, TOV, and the Evergreen Lodge have been meeting for a couple months to evaluate various roundabout location and configuration options. The TOV has retained Felsburg Holt and Ullevig (FHU) to provide technical support to the effort, and they produced a memorandum to the TOV on 8/1/14. The FHU memo summarized the results of the alternatives analysis for the roundabout, which was based on build out conditions on all three properties in the year 2035. The most recent team meeting was held on 8/5/14 where the participants agreed that the roundabout would be likely be located near the shared property line between the VVMC and Evergreen properties. FHU is currently looking at several different access configurations for the roundabout at this location. This VVMC TIS could not analyze the proposed roundabout because the preferred configuration is not known yet. Therefore, this TIS refers to and relies upon the FHU memo for the roundabout operational analysis in the build out condition. The FHU memo indicates that the

proposed roundabout would operate at LOS B or better, even when using conservative background traffic and site trip generation estimates. It is anticipated that the preferred roundabout location and configuration will be identified sometime during the VVMC Master Plan approval process, so this TIS will be updated accordingly.

VVMC has identified the Frontage Road improvements that would be necessary if VVMC were to redevelop “First and Alone”. The “First and Alone” evaluation was done to find a workable VVMC access solution that could occur within the existing right of way. The ultimate roundabout configuration would require additional highway right of way for implementation. In addition, CDOT understands that over-designed roundabouts can create operational issues, which is another reason that VVMC evaluated the “First and Alone” access options that do not include a roundabout.

1.7.2 VVMC Access on Frontage Road [Intersection #2]

The year 2018 East End (Construction Completed) analysis showed that the existing roadway configuration at the VVMC Access will probably create grid-lock on the Frontage Road and Main Vail interchange. ***If the proposed roundabout is not constructed prior to year 2018, the “First and Alone” alternative should be constructed prior to (or coincide with) the completion of the VVMC Master Plan construction in year 2018.*** The “First and Alone” alternative will provide acceptable traffic operations at the VVMC Access (RIRO) and TOV Access (3/4 movement) thru the year 2035. In addition, an eastbound right-turn deceleration lane should be constructed at the VVMC Access on the Frontage Road.

1.7.3 Vail Road and Meadow Drive [Intersection #3]

The VVMC trips at this intersection will increase during the East End construction due to the 69 parking spaces at the US Bank Building being accesses via West Meadow Drive. However, the increase in traffic at this intersection will only be 11% (AM) and 8% (PM), and there will not be a noticeable change in the LOS, delay, or queuing at this intersection. ***No changes are recommended at this intersection.***

The complete Traffic Impact Study is available upon request.