



COMMUNITY DEVELOPMENT
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Date: August 18, 2008

From: Ray Jarvis, Public Works Director
Mark Wardlaw, Community Development Director

Re: Nelson\Nygaard Sustainable Transportation Report for Mammoth Crossing Project

Background/Context:

Nelson\Nygaard Consulting Associates, a transit and multi-modal transportation planning firm, was retained by the Town of Mammoth Lakes Public Works Department to perform third party peer reviews of the mobility and transportation related aspects of various currently proposed large-scale development projects while they are still in the conceptual design phase. These peer reviews have provided assessments of the potential vehicle-trip producing characteristics of the proposed developments and have provided associated observations and recommendations to help the Town move towards more fully achieving the Mobility Goals described in the 2007 General Plan.

In their consideration of the conceptual development plans of the various proposed projects, Nelson\Nygaard has offered observations identifying multimodal infrastructure, parking operations, and Travel Demand Management (TDM) measures and programs that could be implemented by such proposed developments in an effort to maximize the use of alternate modes of transportation and reduce vehicle trips.

The third party peer reviews performed by Nelson\Nygaard are intended to provide information to assist in the Town's evaluation of the initial site-design of these major projects with regard to mobility planning, as well as inform the long-range town-wide sustainable transportation plan currently under development. Their observations and recommendations have been prepared within the context of other proposed development projects in Mammoth Lakes, the Mammoth Mountain Ski Area development program, and all current Town of Mammoth Lakes mobility programs.

Some observations and recommendations made for individual projects as part of the major projects review may be incorporated as project features or mitigations during the planning and initial site-design stage. However, others may require further evaluation by staff, and input from decision-makers, the public and applicants to determine their feasibility, and so may be reflected in conditions of approval or other requirements at the Use Permit and/or Building Permit phase of the project.

Summary of Nelson\Nygaard General Recommendations:

Nelson\Nygaard's third party recommendations include a number of general recommendations and a series of more tailored, project-specific measures. Nelson\Nygaard's more general recommendations, that they have also made for other projects, largely focus on several common elements and strategies to curb vehicular impacts by creating pedestrian, bicycle, and transit friendly environments as well as through various travel demand management and parking programs. These recommended strategies include (but are not limited to) the following, which individually may or may not be applicable to all projects:

Multi-modal Transportation Infrastructure:

Bicycle Access and Facilities – Recommendations include:

- Improve on-site and off-site connectivity and circulation by providing bicycle routes on-street and off-street.
- Improve safety for cyclists by minimizing vehicular conflict points
- Provide facilities that make cycling more accessible, convenient and attractive as a transportation option, including provide bike racks and/or storage facilities, and lockers and showers for employees, etc.

Pedestrian Access and Facilities – Recommendations include:

- Improve on-site and off-site connectivity and circulation by providing sidewalks and plazas that fill-in gaps in the existing pedestrian network
- Improve safety for pedestrians by minimizing vehicular conflicts points
- Provide improved access and facilities that encourage walking as a transportation option, including the incorporation of wayfinding systems, traffic calming measures, and pedestrian priority at intersections, etc.

Transit Access and Facilities – Recommendations include:

- Provide improved access and facilities that encourage the use of transit as a transportation option, including improved signage and wayfinding systems, convenient transit stop locations for users, and improved shelters and bus pull-outs, etc.
- Provide dedicated shuttle services that augment the existing transit system by filling in gaps

Travel Demand Management:

- Car-Sharing Program – implement a shared-car service for visitors and employees.
- Guaranteed Ride Home Program – implement a guaranteed ride home service to provide free transportation in emergencies or after transit service hours.
- Ride Matching Service – establish a ride matching service for employees.
- Monitoring – implement a project-level trip monitoring program to evaluate the effectiveness of TDM measures, participate in Town's Annual Traffic Monitoring Program.

Parking:

- Shared Parking – balance supply and demand by sharing among uses with different peak demands.
- Off-site parking – allow development to provide parking off-site through shared-use

agreements, park and ride facilities, etc.

- Parking Pricing – reduce parking demand by charging market-rate prices for visitor and employee parking.
- Parking Cash-Out – reduce parking demand by offering visitors and employees the option to “cash-out” the value of providing a parking space. Usually offered as a paycheck credit to employees and a reduced room rate to hotel guests.
- On-street Parking Pricing – reduce parking demand and encourage parking turnover by implementing parking pricing for on-street parking as part of a “parking benefit district”.

As part of the Town’s evaluative process of project applications, many of the above recommendations are fully supported by the Town for immediate incorporation into project plans, while other recommendations may be further considered as part of a long-term multimodal transportation strategy. In particular, the Town encourages multimodal transportation infrastructure planning during the earliest phases of the design development process. However, parking demand management strategies such as parking pricing would be more appropriately qualified as long-term strategies requiring further consideration at the Use Permit phase and as Town policy develops in response to parking needs.

Mammoth Crossing Project-Specific Review and Recommendations:

In addition to the above recommendations, Nelson\Nygaard also makes a series of project-specific comments and recommendations regarding the Mammoth Crossing proposed project. The formation of Nelson\Nygaard’s observations and related recommendations for the Mammoth Crossing project stem from two efforts: comparison of the vehicle trip-generation methodology and results reported in the Mammoth Crossing Traffic Impact Study (prepared by LSA Associates) to Nelson\Nygaard’s own trip-generation analysis using URBEMIS (an air quality management tool based on vehicle-trip production characteristics and impacts), and through review of the conceptual project site plan.

Traffic Impact Study:

LSA Associates approach and methodology to estimate the number of trips generated by the Mammoth Crossing project in the Traffic Impact Study were reviewed by the Town’s traffic engineering consultant, LSC Transportation Consultants, as well as by Town staff. The methodology, assumptions and findings of the TIA meet the standards and requirements of the Town and of CEQA, and accurately and fully disclose the project’s projected impacts and required mitigation measures.

The comparison of trip-generation analyses conducted by Nelson\Nygaard is not intended to call into question the methodologies or results of the Traffic Impact Study, rather it is intended to demonstrate the trip-reducing benefits that can be achieved through considerations of project location, physical site design, and implementation of demand management programs. Typically, these trip-reducing benefits are not adequately addressed through standard trip-generation estimation methods. This analysis, coupled with review of the conceptual site design, was then used to formulate project-specific recommendations in addition to the general recommendation noted above.

Conceptual Site Plan Review:

The Town has carefully reviewed Nelson\Nygaard’s recommendations regarding the Mammoth

Crossing conceptual project; their suggestions generally reflect sound principles in sustainable transportation planning. At the same time, the Town wishes to set some of these recommendations in context, and acknowledge those with which staff is in general agreement, and respond to several points of critique made by Nelson\Nygaard for the Mammoth Crossing project that staff feel need to be qualified:

1. Modifications to Main Street/Minaret/Lake Mary Road intersection: Nelson\Nygaard identifies the intersection of Main Street/Minaret Road/Lake Mary Road as a “barrier” to pedestrian safety and connectivity in terms of crossing distances and crossing times. Recommendations include narrowing lanes or reducing the number of lanes, constructing curb extensions at crosswalk locations, constructing pedestrian crossing islands at specific locations, and the elimination of the proposed slip-lane from eastbound Lake Mary Road to southbound Minaret Road.

The feasibility and logistics of such recommended changes may not be viable at this time, and would require more detailed analysis for staff to support this recommendation. In addition to Town analysis, potential lane reductions and other roadway treatments on Highway 203 would require coordination with Caltrans. Although not proposed as part of the Mammoth Crossing project, it is worth noting that Nelson\Nygaard specifically states that the installation of underground pedestrian crossing tunnels are NOT recommended at this location. Therefore, for the purposes of project review at this time, the Town suggests that the proposed treatment of this intersection by Mammoth Crossing is reasonable and appropriate.

2. Implement on-street metered parking on Lake Mary Road adjacent to Sites 1 and 2:

Nelson\Nygaard’s recommendation to include metered on-street parking is suggested as a means to regulate parking demand as part of a “parking pricing” strategy that would help to ensure that on-street spaces are used only for short-term parking, and that other would-be long-term parkers either use alternate transportation modes or park in more remote facilities. While the project has proposed on-street parking along Lake Mary Road, the Town does not support a requirement for metered parking in the short-term, until a more comprehensive strategy to address parking within the North Village, including possible implementation of a parking district, can be developed.

3. Implement a parking fee for visitors and employees:

See response above.

4. Site-design and pedestrian connection improvements:

- All Sites – provide ample (10 – 12 foot) sidewalk widths between buildings and street frontage.
- Site 2 – consider consolidating the two driveways on Minaret Road into one driveway.
- Site 3 – consider modifying the orientation of buildings to improve the pedestrian connection to Main Street.

The Town supports the provision of ample sidewalk widths, the reduction of pedestrian-vehicle conflict points via consolidated curb-cuts, and the improvement of pedestrian connectivity through site design in an effort to achieve the Mobility Goals outlined in the 2007 General Plan. At the same time, the Town recognizes a) that the site plan reviewed is conceptual and that final site plans, building placements, sidewalks and circulation will be further developed and refined at the Use Permit stage and b) that constraints of topography, engineering, and on site-access and circulation conditions may affect the ability of the project to precisely reflect Nelson\Nygaard's recommendations.

Conclusions:

The Nelson\Nygaard study provides a number of important insights and recommendations that reflect the “state-of-the-art” in sustainable transportation planning, and that have proven successful in communities throughout the United States. The study appropriately acknowledges many of the specific ways in which the Mammoth Crossing project would help to support feet first mobility and connectivity goals, and prospective measures the project could incorporate to further these goals. The Town will consider all relevant recommendations in the review and analysis of the Mammoth Crossing project, and will ultimately determine their individual feasibility and appropriateness in the context of the Town’s broader transportation and mobility strategies, local conditions, and broader range of project objectives.

Memorandum

To: Peter Bernasconi, Town of Mammoth Lakes
From: Jason Schrieber, Nelson\Nygaard
Date: July 3, 2008
Subject: Mammoth Crossing Sustainable Transportation Report

Attached please find our peer review of the proposed Mammoth Crossing development in Mammoth Lakes. We have based our analysis on the project details described in the April 2008 revised *Mammoth Crossing Project Administrative Draft Environmental Impact Review* and the May 2008 revised *Traffic Impact Analysis*.

The amount of development proposed for this location is appropriate, however the specifics of this plan could be enhanced further to better support the Town's "Feet First" policy goal as laid out in the General Plan. The proposed mix of uses and several walkability enhancements are very appropriate, but several key additions described in this report would have a more positive impact on walking, biking and transit in the district..Our recommended changes to the proposal as described in the *Administrative Draft Environmental Impact Review* and *Traffic Impact Analysis* are described in the attached "Sustainable Transportation Report."

We welcome your reaction and comments.

Mammoth Crossing Development: Sustainable Transportation Report

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1. Analysis Methodology

Nelson\Nygaard has conducted a multi-modal transportation review of the proposed Mammoth Crossing development on three sites at the corner of the Main Street/Lake Mary Road and Minaret Road intersection in Mammoth Lakes, as described in the *Mammoth Crossing Project Administrative Draft Environmental Impact Review (ADEIR)* revised in April and May 2008 and the *Traffic Impact Analysis: Mammoth Crossing (TIA)* revised in April and May 2008. This review takes into consideration the potential for reduced automobile reliance by implementing a series of demand management, operations, and infrastructure improvements that have been rigorously demonstrated to reduce vehicle trips at similar developments in comparable communities in California and throughout the United States¹.

2. Trip Generation Assessment

The trip generation analysis for the proposed Mammoth Crossing development was initially conducted by LSA Associates Inc. in February 2008 and revised in May 2008.

Existing Travel Conditions

The current use of the proposed site for the Mammoth Crossing development is two vacant motels, an inn, a partially occupied office building, a restaurant, a church (currently used as meeting space but analyzed as a church by LSA), and one home, according to the *ADEIR* and *TIA*. According to the traffic analysis by LSA, the existing land uses create 773 daily trips with 87 occurring during the midday Saturday peak hour.

The site on the northwest corner (Site 1) includes an extensive surface parking lot that provides more supply than is needed to serve peak parking demand. This is complemented by

¹ Successful examples of ski communities that have reduced vehicle trips dramatically below conventional estimates include Park City UT, Aspen CO, Alta UT and Ketchum ID (Sun Valley).

at least four large automobile curb cuts on Lake Mary Road with another on Canyon Boulevard. Access to the remaining corner sites – the southwestern (Site 2) and southeastern (Site 3) – is not controlled with any curb cuts. There are sidewalks along Canyon Boulevard west of Site 1, but no sidewalks exist along Lake Mary Road, Main Street or Minaret Road adjacent to the project. Two stops for the Mammoth Mountain Ski Area’s red line are located adjacent to the southeastern corner site on Main Street with the main transit hub just north of Site 1 along Canyon Boulevard.

Proposed Trip Generation

The project potentially removes all existing uses (the restaurant on Site 1 may remain) and builds a new mixed-use development of 468 condominium hotel units² of varying sizes, 68 employee residential units, 5,063 sq. ft. in two quality restaurants, 5,063 sq. ft. in two high-turnover sit down restaurants, a 3,000 sq. ft. market, and about 27,400 sq. ft. of retail. While all of these uses will be present in the project, they are split up among the three sites. Site 1 will contain 170 hotel units on the upper floors, a 2,750 sq. ft. quality restaurant, a 2,750 sq. ft. high-turnover sit down restaurant, and 16,500 sq. ft. of retail on the ground floor. Site 2 will follow a similar pattern with 193 hotels units, 41 employee residential units, a 2,313 sq. ft. quality restaurant, a 2,313 sq. ft. high-turnover sit down restaurant, and a 10,875 sq. ft. of retail space, and a 3,000 sq. ft. market on the ground level concentrated along Lake Mary Road near the intersection of Minaret Road. Site 3 will be strictly residential in character with 105 hotel units and 27 employee residential units.

LSA prepared a typical winter Saturday trip generation estimate for the proposed Mammoth Crossing project using standard trip rates from the Town and ITE for all retail uses and employee residences. For the condominium hotel component, observed rates from the Village Lodges were used with back-up counts from the Westin hotel. The resulting measured trip rate is noticeably lower than standard ITE estimates would be, even if they were adjusted downward to consider existing site characteristics such as existing transit service and the close proximity of destinations that could be served on foot. These adjustments were modeled by Nelson\Nygaard using a tool known as URBEMIS³ and are summarized in Figure 1.

Figure 1: Comparison of Proposed Trip Rates to Unmitigated URBEMIS Trip Rates

Land Use Type	Unit Type	ITE	LSA	URBEMIS	
		Trip Rate	Trip Rate	Trip Rate (No TDM)	Difference w/LSA
Condo Townhouse General	<i>d.u.</i>	5.67	5.67	4.4	-1.27 -22%
Quality Restaurant	<i>1000 sq ft</i>	94.36	94.36	46.09	-48.27 -51%
High-Turnover Restaurant	<i>1000 sq ft</i>	158.37	158.37	65.44	-92.93 -59%
Hotel	<i>rooms</i>	8.19	3.19	3.86	0.68 21%
Retail	<i>1000 sq ft</i>	49.97	49.97	20.64	-29.33 -59%
Supermarket	<i>1000 sq ft</i>	177.59	177.59	54.15	-123.44 -70%

² While Mammoth Crossing’s hotel is often described in terms of “keys” rather than “units,” trip generation calculations are based on units. Therefore, to maintain consistency with standard industry practice, the Institute of Transportation Engineers, and LSA’s Traffic Impact Analysis, the hotel will be discussed in terms of units.

³ URBEMIS tool is described in detail below.

LSA has noted that their trip rates reflect the project’s proximity to the Gondola, transit hub and North Village. While Nelson\Nygaard agrees that the unique conditions of a resort complex in the proposed location warrant significantly revised trip generation rates, certain adjustments should be taken carefully:

- For the condominium hotel units, Nelson\Nygaard finds the Village Lodge comparison to be questionable as those residences are situated significantly closer to the gondola without intervening street crossings, have convenient access to the Red line bus, and have more shopping and dining options on-site. However, this idealized trip basis may be appropriate, as discussed below.
- The pass-by percentage of 36-percent is appropriate for the market, but LSA has taken an additional 50-percent internal trip capture reduction on top of it. Nelson\Nygaard recognizes the difference between these two factors, but a blended rate is a more appropriate way to estimate the parallel effects of these reductions.
- The 50-percent internal trip capture reduction is twice that assumed by ITE for shopping centers (land use code 820) on a Saturday (26-percent) and approximately twice ITE’s recommendations for general retail and residential trip capture (see Figure 2 below). However, again acknowledging the resort nature of this and other nearby developments, this may be appropriate as discussed below.

To verify its trip reduction estimates, LSA recommended an on-going annual monitoring program of trip activity at Mammoth Crossing. This is an appropriate effort for any large development, especially where trip impacts are of concern to a community. Nelson\Nygaard concurs with this recommendation.

Figure 2: ITE Recommended Internal Capture Rates

Table 7.1 Unconstrained Internal Capture Rates for Trip Origins within a Multi-Use Development

		WEEKDAY		
		MIDDAY PEAK HOUR	P.M. PEAK HOUR OF ADJACENT STREET TRAFFIC	DAILY
from RETAIL	to Retail	29%	20%	30%
	to Residential	7%	12%	11%
from RESIDENTIAL	to Retail	34%	53%	38%
	to Residential	N/A	N/A	N/A

Table 7.2 Unconstrained Internal Capture Rates for Trip Destinations within a Multi-Use Development

		WEEKDAY		
		MIDDAY PEAK HOUR	P.M. PEAK HOUR OF ADJACENT STREET TRAFFIC	DAILY
to RETAIL	from Retail	31%	20%	28%
	from Residential	5%	9%	9%
to RESIDENTIAL	from Retail	37%	31%	33%
	from Residential	N/A	N/A	N/A

The TIA estimates that the project would create a net addition to the site of 2,604 daily trips, with 235 occurring in the Saturday peak hour. As noted, this includes adjusted trip rates that reflect the project’s locational advantages. Nelson\Nygaard’s review of this project incorporates a similar philosophy that recognizes the shortcomings of traditional evaluation methods. In a well-planned mixed-use development incorporating the same types of uses proposed for the Mammoth Crossing site, many design, management, and programmatic factors can easily contribute to reduced external trip rates due to the ability to serve multiple trip purposes at the same location. Condominium guests have the ability to shop and dine on-site without using traveling elsewhere, and hotel or retail employees may be able to live on-site without traveling to a separate home. These mixed-use advantages are often referred to as internal trip capture

(which create dual-purpose trips) and are not accommodated well by standard ITE methodologies.

While ITE's *Trip Generation* and its companion *Trip Generation Handbook* are the most definitive available sources for estimating the automobile traffic that different land uses will generate, its information is most useful for auto-oriented, stand-alone suburban sites, from where the vast majority of data were collected. For denser areas or areas with mixed uses, ITE advises that traffic engineers should collect local data, or adjust the ITE average trip generation rate to account for reduced automobile use. LSA has done just this to adjust its base trip rates for resort hotel uses at the Mammoth Crossing development.

For comparison, Nelson\Nygaard has utilized a tool developed in 2004 by the air quality management districts of California, along with the California State Department of Transportation, that examines all of the key variables that influence automobile trip generation. The tool quantifies the trip generation impacts of key locational and programmatic factors and inserts these formulas into URBEMIS, a national model for calculating air quality impacts of projects. URBEMIS is a simple yet powerful tool; it employs standard traffic engineering methodologies, but provides the opportunity to adjust ITE average rates to quantify the impact of a development's location, physical characteristics and any demand management programs. In this way, it provides an opportunity to fairly evaluate developments that can minimize their transportation impact. In order to run the URBEMIS model, Nelson\Nygaard collected local site data and assumed best-possible improvements to local walking and biking conditions, as summarized in Figure 3 below. An asterisk (*) indicates a value that Nelson\Nygaard assumed was feasible but had not actually been proposed by the development. All of the associated measures are summarized in our recommendations.

Figure 3: URBEMIS Inputs

	Project Assumptions	Project Assumptions w/TDM Program
Land Uses		
All Planned Non-Residential (Sq. Ft.) and Residential Uses (Units)	(see TIA & ADEIR)	(see TIA & ADEIR)
Area Characteristics		
Number of housing units within 1/2 mile radius	5076	5076
Employment within 1/2 mile radius	600	600
Presence of local serving retail within 1/4 mile (Y/N)	Y	Y
Transportation Services and Facilities		
Number of Saturday fixed-route buses stopping w/in 1/4 mile of site	394	394
Number of daily rail or rapid transit buses stopping w/in 1/2 mile of site	0	0
Number of dedicated daily shuttle trips	20*	20*
Number of intersections per square mile	150	150
Percent of streets w/in 1/2 mile with sidewalks on one side	0%	8%*
Percent of streets w/in 1/2 mile with sidewalks on both sides	5%	90%*
Percent of arterials/collectors with bike lanes (or where suitable, direct parallel routes exist)	5%	100%*
(Parking spaces provided on-site for non-residential uses)	162	200
Transportation Demand Management		
Secure bike parking (at least one space per 20 vehicle parking spaces) (Y/N)	N	Y*
Showers/changing facilities provided (Y/N)	N	Y*
Building Management and/or Tenant Programs		
Daily Parking Charge	\$0.00	\$0.00
Free transit passes (Y/N)	Y	Y
Car-sharing services provided (Y/N)	N	N
Information provided on transportation alternatives (bus schedules, maps) (Y/N)	N	Y*
Carpool matching programs (Y/N)	N	N
Preferential carpool/vanpool parking (Y/N)	N	N
Dedicated employee transportation coordinator (Y/N)	N	Y*
Guaranteed ride home program provided (Y/N)	N	Y*
Employee Telecommuting Program (Y/N)	N	N
Compressed Work Schedule 3/36 (Y/N)	N	N
Compressed Work Schedule 4/40	N	N
Compressed Work Schedule 9/80	N	N

Figure 4 below summarizes LSA’s trip generation estimates as compared to URBEMIS with and without the asterisked transportation and transportation demand management (TDM) improvements noted above. The proposed development program already incorporates a mix of proximate uses, new bus shelters for existing nearby transit service, a dedicated shuttle, a trip monitoring program, plus improvements to pedestrian facilities on and surrounding the development. The URBEMIS model incorporates all of these factors as inputs. In order to consider the maximum amount of trip reduction possible for this site, Nelson\Nygaard also included improvements to transit amenities, the installation of sidewalks and bike lanes on most streets within a ½ mile radius, plus an aggressive TDM program. These are summarized in Figure 3 and explained in greater detail in Sections 4 & 5 below. Based on all of these factors, the URBEMIS model predicts the Mammoth Crossing development to generate 2,352 daily trips (approximately 212 Saturday peak hour trips). This represents a 10-percent reduction in vehicle trips from those estimated by the TIA.

Figure 4: Comparison of LSA Trip Generation to URBEMIS

Traffic Impact Analysis						URBEMIS						
						Analysis		Comparison with TIA				
	Site 1	Site 2	Site 3	No Internal Capture	Internal Capture	No TDM	TDM Measures	No TDM		TDM Measures		
Residential	541	847	488	1,876	1,876	2,117	1,919	241	13%	43	2%	
Commercial	1,520	1,661	0	3,181	1,494	1,300	1,200	-1,881	-59%	-294	-20%	
Transit				6	6	6	6					
Total	No Internal Capture	2,061	2,508	488	5,057	X	3,423	X	-1,634	-32%	X	X
	Internal Capture	1,301	1,582	488	X	3,371	X	3,125	X	X	-246	-7%
Existing	719	54	0	773	773	773	773					
Traffic Demand Increase	No Internal Capture	1,342	2,454	488	4,290	X	2,650	X	-1,640	-38%	X	X
	Internal Capture	583	1,528	488	X	2,604	X	2,352	X	X	-252	-10%

LSA’s trip generation analysis may be an accurate estimate of future project performance. However, Nelson\Nygaard has not observed projects to produce such reduced numbers of vehicle trips without a host of sustainable transportation measures that have not yet been proposed for Mammoth Crossing. Therefore, it is possible that LSA’s methodology underestimates the amount of trip-making activity that will occur without active measures to reduce vehicle trips. The following methodological items are likely sources of this discrepancy:

- As noted previously, the use of observed trip rates from a somewhat dissimilar location (the Village Lodges) may result in an artificially low number of resort hotel trips. URBEMIS predicts a trips rate that is 21-percent higher than the LSA estimate.
- The application of a 50-percent internal capture reduction to all commercial uses may be optimistic. According to ITE, high internal capture ratios are usually reserved for strictly accessory uses. It is not expected that a food market and a restaurant will achieve such a heavily localized demand.

Recommendation 1: Develop Strong Measures to Ensure Trip Estimates

LSA's trip generation numbers for Mammoth Crossing appear optimistic, but they represent the reduced vehicle trip-making potential of a well-designed ski resort as compared to standard ITE trip rates for stand-alone uses without the amenity the North Village has to offer. LSA's rates are supported by actual observations of a similar nearby resort. This is the most reliable and recommended form of trip generation data. While other area resorts will produce different trip rates, the Village Lodges data is a clear example of the benefit of a pedestrian-oriented mixed-use development in close proximity to key destinations. Every effort should be taken at Mammoth Crossing to promote a similar walking environment and maximize the use of biking, transit and carpools. Therefore, Nelson\Nygaard recommends the following trip reduction strategies be considered by the Town, Mammoth Crossing, and other district developments:

- Implement parking management programs as described below in Section 3;
- Develop a detailed transit operating plan for Eastern Sierra Transit Authority, the Mammoth Mountain Ski Area, and the Town of Mammoth as recommended in Section 4;
- Make significant improvements to the walking environment, as suggested in Section 5;
- Initiate a transportation demand management program, as described in Section 6; and
- As described in Section 6, conduct annual monitoring programs to demonstrate that trip-making reductions are achievable.

3. Parking Supply and Demand

How parking is provided, its accessibility, and what it costs can have a direct impact on the trip-making characteristics of land development.

Proposed Parking Plan

Parking requirements for the Mammoth Crossing residential and commercial uses is 711 spaces, according to the North Village Specific Plan parking code. The proponent has indicated that they will provide this required supply with an additional 9 temporary parking spaces for check-in, service, etc. and a public parking garage with 100 spaces, resulting in 820 total spaces on-site.

Conformance with General Plan & North Village Specific Plan

Mammoth Crossing proposes to meet the Town's North Village parking code, satisfying the General Plan's Mitigation Measure TRA-4. Mammoth Crossing's use of underground parking helps address a portion of the Town's policy M.6.A for developing efficient and flexible parking strategies to reduce the amount of land devoted to parking. This policy would also benefit by allowing shared parking for the greater North Village district within Mammoth Crossing's garages. The Town should simultaneously balance the construction of expensive new parking with cheaper demand management programs that reduce the need for more parking. Several

effective tools that will minimize the amount of expensive structured parking in return for better public space improvements include:

- Providing developers the option to pay a per-space in-lieu fee for a portion of the minimum zoning requirement in order to incentivize the construction of less parking. In-lieu funds would be dedicated to specific walking, biking and transit improvements beyond the borders of a development.
- Utilization of on-street supply to meet a portion of minimum zoning requirements.
- Accommodation of a portion of parking supply in remote surface lots with direct shuttle or transit connections.

These strategies and others should be implemented throughout the North Village District as part of a comprehensive parking management strategy, as called for in Policy M.6.A. Implementing simple parking management techniques, pricing policies, and certain TDM incentives can flatten demand spikes and reduce overall parking demand throughout the day so that large supplies of parking for each development are not needed.

Unfortunately, the North Village Specific Plan recommends the elimination of on-street parking. On-street parking has demonstrated positive impacts on the pedestrian environment in a number of ways:

- Providing a buffer between pedestrians on sidewalks and moving vehicles that help create a pedestrian space with less threat of impact and less vehicle noise.
- Creating automatic pedestrian activity through motorists exiting and entering their vehicles.
- Providing a traffic-calming “friction” effect to reduce vehicular speeds.
- Providing a short-term customer parking amenity to support retail uses.
- Enabling the retail use portions of off-street supplies to be provided on-street at less cost.

Many successful U.S. ski resorts utilize and manage on-street parking very successfully to promote a pedestrian environment in their commercial districts. The reverse-angle parking proposed along Lake Mary Road should be retained, and the treatment should be expanded to the project’s frontage on the remainder of Lake Mary as well as Minaret.

Recommendation 2: Balance Parking Supply with Actual Demand

Mixed-use developments, such as the Mammoth Crossing development, offer the opportunity to share parking spaces between various uses, thereby reducing the total number of spaces required compared to the same uses in stand-alone developments. This is a primary benefit in mixed-use development contexts of moderate-to-high density. Shared parking operations offer many localized benefits to the surrounding community, including a more efficient use of land resources and reduced traffic congestion. The Town’s parking code for the North Village reflects this overall intent, and the required minimum parking quantities are much lower than parking

demand would be for stand-alone uses. Nelson\Nygaard has conducted a shared parking analysis which demonstrates that the Town's code is appropriate.

Shared Parking Analysis

There are two basic types of shared parking opportunities: 1) proximate uses with staggered demand peaks, and 2) internal capture of trips between proximate uses.

- **Staggered Peaks.** The first shared parking opportunity offered by mixed-use development comes from the staggered demand peaks associated with each use. Different land uses generate unique levels and patterns of parking demand. Parking supplies at mixed-use locations accommodate these demand fluctuations more efficiently than segregated supplies by accommodating peaking uses with spaces left vacant by other uses. Thus, the same parking lot that was full of workers' vehicles during the day can be used for residents at night.
- **Internal Capture.** Mixed-use projects such as Mammoth Crossing allow for parking efficiencies through "internal capture" trips. Such trips are made by patrons who, having already parked, travel between uses without accessing their vehicle. Restaurants and retail services are common generators of internal capture trips in mixed-use developments, as they serve both employees and residents within the same development. Not only does this proximity of uses present an opportunity to conserve land area from parking uses, but it reduces localized congestion as local employees and residents are presented with daily goods and services within walking distance.

Captive Market Methodology

The first step in the analysis of the actual parking demand for the proposed project was to apply a captive market reduction of 10% for commercial uses and 25% for residential uses compared to industry standard parking generation rates published by the Institute of Transportation Engineers (ITE) and the Urban Land Institute (ULI). A 25% parking reduction for captive market effects is appropriate for residential uses in typical mixed-use projects.

Parking Demand Management and Operational Efficiencies

Developments like Mammoth Crossing have an opportunity to implement several effective parking demand management and trip reduction tools. The parking demand reduction measures listed in Section 6 have been shown to reduce vehicle trips and parking demand in comparable development contexts. Figure 5 shows the maximum potential reduction for each of these parking reduction factors based on a survey of the academic literature and best practices.

Figure 5: Potential Impact of Trip Reduction Measures on Estimated Parking Demand as Observed Nationally

	Residential ⁽¹⁾	Non-Residential
Physical Measures		
Net Residential Density	Up to 55%	N/A
Mix of Uses	Up to 9%	Up to 9%
Local-Serving Retail	2%	2%
Transit Service	Up to 15%	Up to 15%
Pedestrian/Bicycle Friendliness	Up to 9%	Up to 9%
<i>Physical Measures subtotal</i>	<i>Up to 90%</i>	<i>Up to 35%</i>
Demand Management and Similar Measures		
Parking Supply ⁽²⁾	N/A	No limit
Parking Pricing/Cash Out	N/A	Up to 25%
Free Transit	25% reduction for transit service	25% reduction for transit service
Telecommuting ⁽³⁾	N/A	No limit
Other TDM Programs	N/A	Up to 2%, plus 10% of the credit for transit and ped/bike friendliness
<i>Demand Management subtotal</i> ⁽⁴⁾	<i>Up to 7.75%</i>	<i>Up to 31.65%</i>

Notes:

- (1) For residential uses, the percentage reductions shown apply to the ITE average trip generation rate for single-family detached housing. For other residential land use types, some level of these mitigation measures is implicit in ITE average trip generation rates, and the percentage reduction will be lower.
- (2) Only if greater than sum of other trip reduction measures.
- (3) Not additive with other trip reduction measures.
- (4) Excluding credits for parking supply and telecommuting, which have no limit.

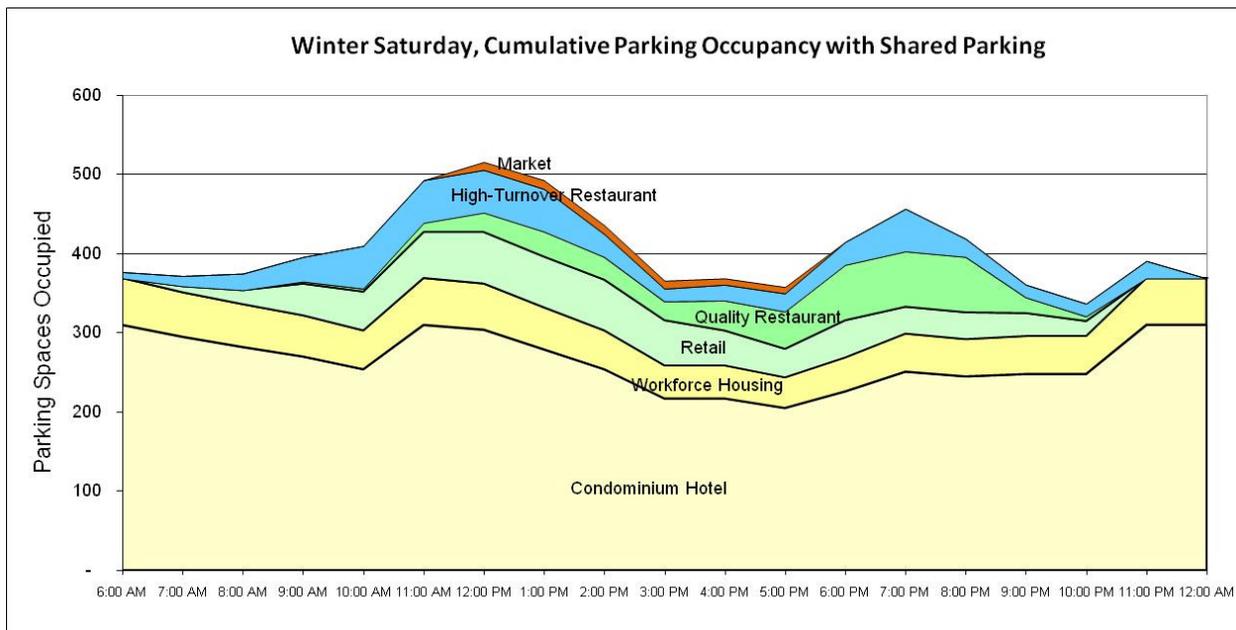
The Mammoth Crossing development has the opportunity to take advantage of some of these factors simply based on its location, density, a mix of uses and existing transit service. Several additions to this environment plus the use of demand management measures have the ability to further reduce Mammoth Crossing’s parking demand. These measures are summarized in Section 6. We estimate that implementation of several parking management, trip reduction, and operational efficiency measures will result conservatively in an estimated parking demand reduction of 15% for residential uses and 10% for all other uses. We believe this is conservative because as the Figure 5 makes clear, significantly greater reductions have been documented.

Staggered Parking Analysis

Further parking efficiency gains are possible by implementing a shared parking arrangement among different project uses with staggered parking demand peaks. In recognition of the fact that parking demand for different land uses fluctuate throughout the day, each land use for this project has a variable parking demand rate by time of day. This varying demand is expressed as “occupancy rates”: a percentage of spaces allocated for a particular land use that are likely to be occupied at any given time. If parking is shared, then the total demand for parking is the sum of the number of parking spaces occupied for all land uses at the busiest hour.

As a result of the fluctuations of hourly parking demand patterns among different uses, Figure 6 illustrates the parking efficiencies that Mammoth Crossing could take advantage of by mixing different uses with different peak parking demands.

Figure 6: Shared Parking Demand for Mammoth Crossing Development



Combining the reasonable reductions for captive market effects and demand reduction measures, we estimate a peak parking demand of 659 cars on a Saturday. Allowing for up to a 10-percent excess for special events and ease of finding a space in the garage, the maximum required parking supply should be no more than 725 spaces – nearly the same as required by code (720 spaces). In addition to these project-specific spaces, a shared public parking supply of 100 additional spaces has been proposed for a total of 820 spaces split among the three sites.

4. Transit Connections

Mammoth Lakes benefits from having a robust set of local transit services, which is surprising given that it is a remote mountain community. During the winter months, five free daytime fixed-routes, provided by Mammoth Mountain Ski Area Mammoth Area Shuttle (MMSA), are complimented by a fixed-route service and a door-to-door “Dial-a-Ride” service, provided by the Town and operated by Eastern Sierra Transit Authority (ESTA). The Dial-a-Ride service operates into the evening as well as two of the fixed-routes. Figure 7 and 8 show the winter day and evening transit services in Mammoth Lakes. These are summarized below.

ESTA assumed operating authority from the former Inyo Mono Transit, in 2007. Along with operating the Town provided local service, ESTA offers regional transit connections through its interregional CREST and town-to-town service through the Mountain Express. Year round

transit is provided between Reno, Nevada, Mammoth Lakes, and Ridgecrest by CREST and Mountain Express runs between Mammoth Lakes, June Lake, and Lee Vining.

Figure 7: Mammoth Daytime Transit Services

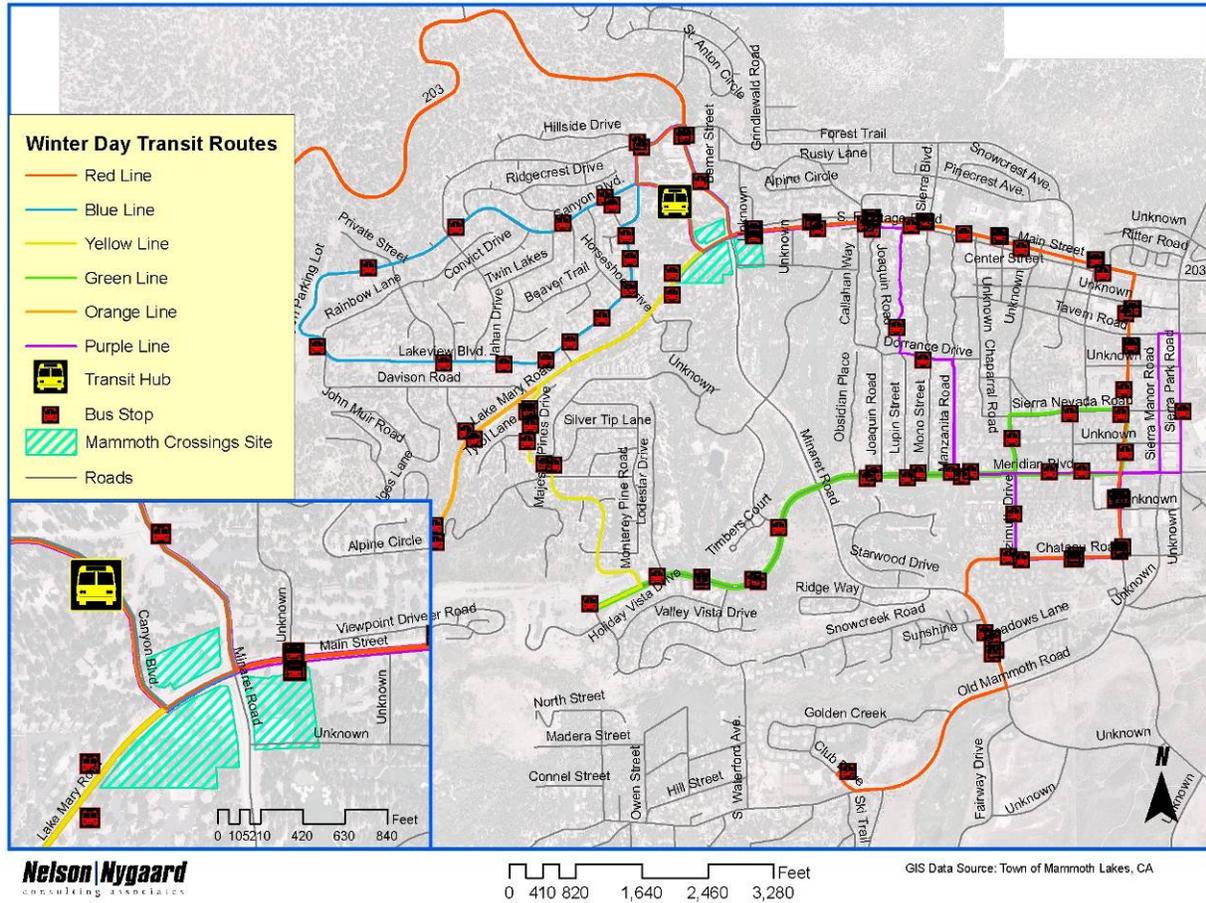
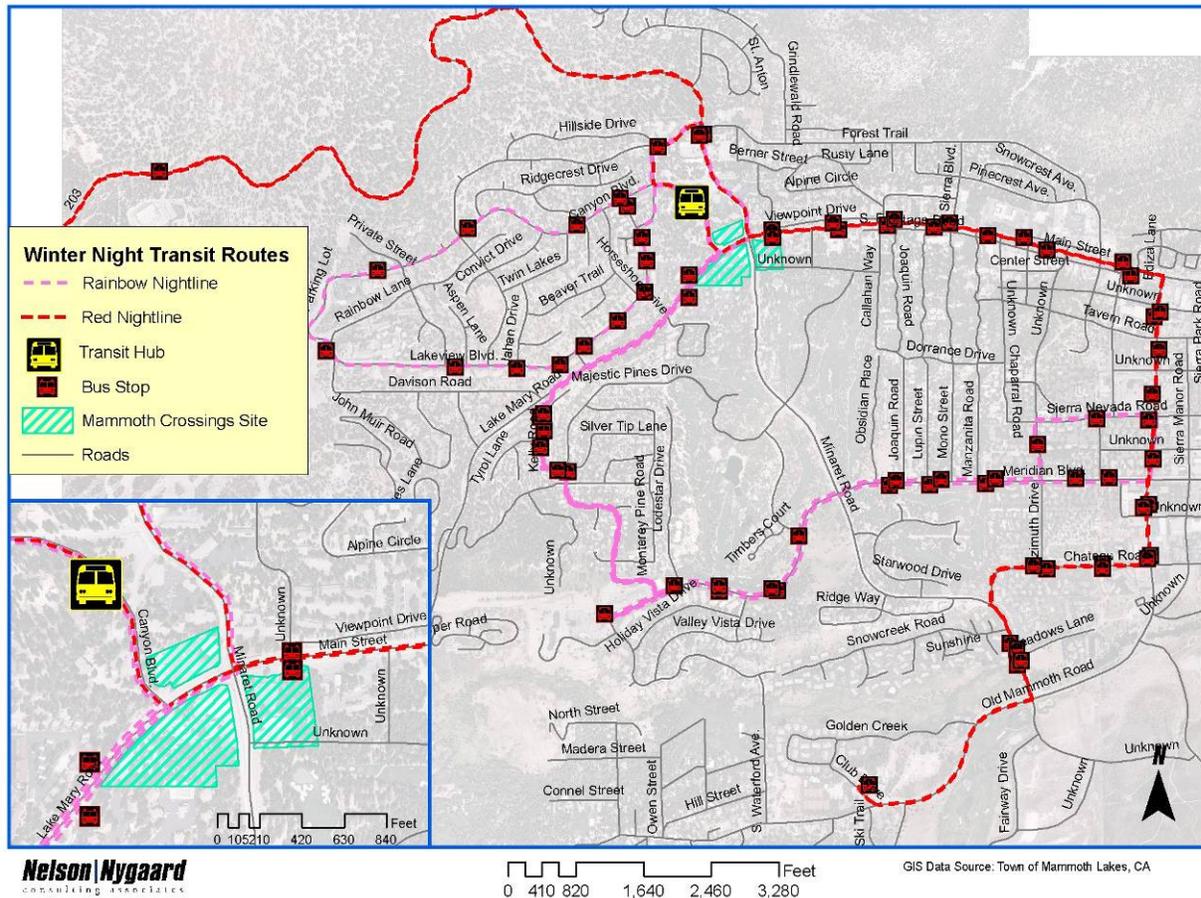


Figure 8: Mammoth Evening Transit Services



- MMSA provides five free fixed-route services that operate with twenty-two buses, seven days a week, from November to April.
 - Red and Blue Lines run at fifteen minute intervals beginning at 7:00 AM and continuing until 5:30 PM
 - Yellow and Green Lines run at fifteen minute intervals beginning at 7:30 AM and continuing until 5:30 PM
 - Orange Line runs at sixty minute intervals beginning at 8:30 AM and continuing until 5:00 PM
- Seven days a week, Mammoth Lakes provides a free fixed-route service and, for a nominal fee, a door-to-door Dial-a-Ride shuttle service
 - Winter Lift, now the Purple Line runs at thirty minute intervals beginning at 7:00 AM and continuing on until 6:00 PM
 - Dial-a-Ride is a demand responsive service beginning at 8:00 AM and continuing until 1:00 AM
- Evening service is provided through two fixed routes as well as the Dial-a-Ride
 - Night Trolley, or the Red Nightline, runs at fifteen minute intervals from 5:30 PM until 1:00 AM
 - Rainbow Evening Line runs along a comprised of the combined Blue, Yellow and Green Lines, at sixty minute intervals, from 6:00 PM until 12:00 AM

Transit Capacity Assessment

Mammoth Crossing is estimated by URBEMIS to generate nearly 300 daily transit trips (see Figure 9). However, it is possible that many more daily transit trips will be taken by Mammoth Crossing guests traveling to Mammoth Mountain during the daytime and to downtown Mammoth for evening dining. Therefore, a transit capacity analysis was conducted to ensure enough reserve capacity exists in the Mammoth Lakes transit system.

Figure 9: Estimated Transit Ridership per URBEMIS

Use	URBEMIS Transit Capture Rate		Unmitigated Base Trips	Estimated Transit Capture			
	Transit Capture	Free Transit Pass		Transit	Free Pass	Daily Transit Trips	Daily Transit Trips
Residential	6.74%	1.69%	2,107	142	36	178	287
Non-Residential	6.74%	1.69%	1,294	87	22	109	

Utilizing average monthly ridership for the MMSA system and average daily ridership for the Town services, total monthly transit ridership is about 173,000 riders (see Figure 10). A total monthly system capacity using existing service schedules and bus capacities of 510,000 rides was calculated. Therefore, the entire system's capacity is currently 44-percent utilized. The Mammoth Crossing project is expected to consume 3-percent of the remaining 66-percent of transit system capacity.

Figure 10: Estimated Transit System Capacity

	EXISTING CONDITIONS						PROJECT			POST PROJECT			
	Ridership	# Buses	Capacity				Ridership	% Increase	% Consumed	Ridership	# Buses	Remaining Capacity	% Remaining
			Per Bus	Total	Remaining	% Remaining							
MAS Average Peak Monthly	155,950	8,310	50	415,500	259,550	62%	8,610	5%	3%	182,037	11,464	328,083	64%
Town Average Peak Monthly	17,477	3,154	30	94,620	77,143	82%							
Total	173,427			510,120	336,693	66%							

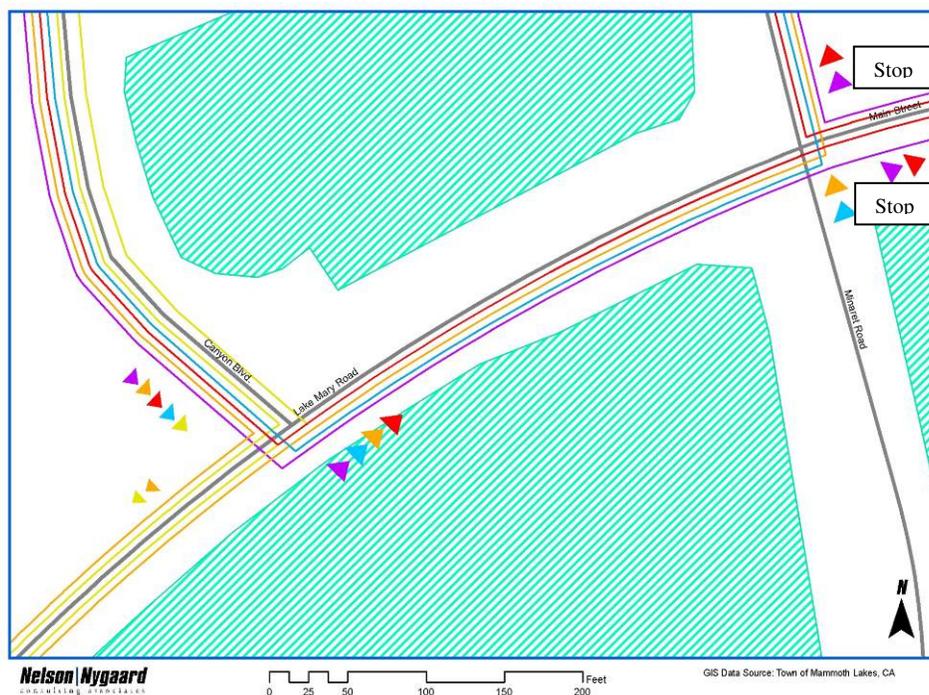
While sufficient capacity remains in the overall transit system for this and other projects, several peak hour buses are already reported over capacity. More detailed boarding counts of MMSA buses are needed to evaluate line by line capacity during peak hours. Certain schedule adjustments or additional vehicle fleet may be necessary to ease peak crowding today. Given the high monthly capacity, it is likely that many off-peak runs are very underutilized. While this is a common dilemma for any transit system, there is some opportunity to reassign assets if overcrowding exists for extended periods on multiple lines.

Fortunately, the Mammoth Crossing site is benefitted by the service of multiple transit lines on a high combined frequency, enabling riders to wait only a short time for buses with available capacity. Nonetheless, it is recommended that a more thorough system analysis be conducted.

Local Transit Access

The proposed Mammoth Crossing development is served by nearly all of Mammoth’s transit services (with the addition of the proposed stop on Lake Mary Road). Figure 11 depicts the routes and stops adjacent to the three sites. The six services provide a potential⁴ combined peak frequency from the site to the Town’s transit hub of one bus nearly every 3 minutes and a return frequency approaching 3 minutes. While this level of service is typically considered to be superior, peak service only operates between the hours of 9:00 AM and 5:30 PM, with a maximum early morning frequency of 6 minutes and maximum evening frequencies ranging between 12 minutes and 30 minutes. Furthermore, since any portion of the site is between a 2.5 and 6 minute walk from the Village gondola, only the Red line - with direct service past the transit hub to the main mountain access points - is of significant time-savings value to Mammoth Crossing guests. The Red Line has a maximum frequency of 15 minutes. As noted in Figure 11, its mountain-bound stop is located at the furthest edge of the site, requiring at least one street crossing from all proposed Mammoth Crossing buildings. Therefore, the high quality of transit service in general does not serve this site well as currently configured.

Figure 11: Local Mammoth Crossing Daytime Transit Services



Proposed Transit Improvements

The Mammoth Crossing development has proposed to provide a bus pull-out for one of the four bus stops adjacent to the site. Under current transit circulation patterns, this pull-out would serve only the Blue, Orange and evening Rainbow lines with service towards the Village. For service away from the Village, the pull-out would serve only the Blue, Red and Purple lines. The closest Red and Purple line stop for Village-bound service is at the northeast corner of Main at

⁴ Potential service frequency represents an idealized scenario based on number of hourly departures. Actual frequencies vary substantially due to limited coordination between lines and changes in operating conditions.

Minaret. The closest Orange, Yellow and Rainbow line stops departing the Village area would be up Canyon Boulevard at the transit hub.

The proponent also has proposed to provide a dedicated shuttle to unspecified “local areas of attraction, ski lifts, and the airport.”

Recommendation 3: Enhance Transit Access and Operations

Transit Access

While the recommended bus pull-out along Lake Mary Road is a welcome transit access improvement, it mostly serves workers arriving to the site on the Blue, Orange and (for late shifts) Rainbow lines. Workers arriving on other lines would exit at the transit hub or on Main Street at the northeast corner of Minaret, where no bus stop improvement is proposed.

Bus pull-outs are mostly beneficial for improving traffic operations. They provide no additional benefit to riders. However, bus stop amenities for waiting riders have the potential to increase the attractiveness of riding transit, and a shelter at this location would be very appropriate. The stop serves workers departing the area on the Blue, Red and Purple lines. Installation of a shelter, information kiosk, heating and/or other stop amenities would significantly increase the utility of transit for employees as well as for guests heading away from the Village to Main Street commercial destinations. Unfortunately, under current transit circulation patterns, these improvements would not benefit riders waiting to head to the main lodge, Eagle Lodge, or out the Orange line.

Improved transit waiting amenities at this location would provide skiers destined for the Village gondola with an alternate to walking by improving access to the Blue and Orange lines, which have a combined potential frequency of 10 minutes. However, clear on-bus destination information or shelter signing would be necessary to prevent skiers from boarding Red or Purple lines at this location. It’s also worth noting that the average wait time is equal to or longer than the walk time to the gondola from this bus stop.

There has been discussion of a village jitney service that would operate on a continuous loop serving the North Village, gondola, hotels and the immediate area. Rather than providing a separate exclusive shuttle for the Mammoth Crossing resort, consideration should be given to developing a jitney service operating fund that this and other projects could contribute to on an annual basis.

Circulation Changes

While Mammoth’s transit system provides high quality service for many guests, residents and employees, the counter-clockwise circulation of five routes around the central Minaret/Forest/Hillside/Canyon/Lake Mary loop leaves most riders having to cross these streets either to wait for boarding or immediately upon disembarking a bus. With right-side doors, all stops are on the outside of this loop. However, the primary destination for workers and skiers in the morning is on the interior at the Village Center or its gondola. Similarly in the afternoon,

departing workers and skiers arriving on the planned ski-back trail would have to cross these streets to wait for their buses.

From an operational perspective, this configuration adds delays to service. As currently configured, drivers must make four left-turns across opposing traffic. Left-turn movements are the most delayed movement at any intersection. Furthermore, disembarking riders often proceed directly to the closest crosswalk, which is often in front of the bus. This causes delays as the bus waits for its passengers to cross the street, plus it imposes a safety concern as passengers have to 1) cross a street, and 2) are blocked from view by the bus until they are exposed to on-coming traffic. With clockwise circulation, crossing delays and safety concerns are eliminated while the number of necessary left-turns is reduced to only one.

The project proponent should work with the ESTA and MMSA to study rerouting options. If implemented, this simple circulation change would have a dramatic impact on the appeal of transit services to all potential riders.

On-Site Access

The proposed configuration of Site 2 has the unique characteristic of being able to allow transit buses to use the entry court as a bus stop location. This has the advantage of allowing all transit lines direct access to the site, which also gives clear traffic signal indication to Yellow, Orange, and Rainbow line buses that would need to take lefts back out onto Lake Mary Road. If this circulation change is complemented by the reverse routing of the Red and Purple lines around the Village loop as recommended above, Mammoth Crossing could be served by all routes and realize the potential of 3 minute frequencies to and from the Village. Therefore, it is recommended that in addition to adding a shuttle service (preferably to the airport), the proponent work with the Town and MMSA to re-route services to better serve the site and all Mammoth transit users.

Transit Information

The Eastern Sierra Transit Authority and the Mammoth Mountain Ski Area have created a new transit map and simpler transit route labeling and routing for 2008. Unfortunately, up to three older versions of Mammoth's transit network exist on the travel information pages of many current Mammoth-related websites, including Mammoth Mountain's, the Chamber of Commerce's "MammothWeb," and the Town's own website. The updated information is available on the Tourism and Recreation Department's website, but with so many conflicting sources the system is hard to understand. The Town should ask Mammoth Crossing and other developments to help disseminate this updated information and request that all websites link directly to the centralized map that ESTA and MMSA have prepared. Centralized control over the town's transit information allows for cohesion within the transit system and reduces the likelihood of disseminating conflicting information. The Town also should endeavor to have ESTA and MMSA distribute this information in small and more-easily downloaded file formats.

Conformance with General Plan & North Village Specific Plan

The transit information recommendations above will go a long way towards creating a clear and centralized information hub for transit services, as noted in the General Plan Action item M.5.C.1.c. Additionally, the General Plan's Policy M.5.C seeks to increase the availability of transit services by working collaboratively with other transit agencies. The Town has already begun a program to consolidate local transit operations by marketing the Town's Lift service as

the purple line to reduce rider confusion. Dual names should be done away with, such as Winter Lift/Purple Line and the Night Trolley/Red Line. Multiple names for the same or virtually the same route tend to create confusion and misunderstanding, ultimately making the use of transit less appealing. Another advantage of consolidation could be gained by standardizing the bus stop labeling system. The numbered system of the MMSA is not continued on the Orange line or the Town's Purple Line. The numbered bus stop labeling system provides an easy to understand wayfinding tool that can be used across the system, including the dial-a-ride. Further consolidation would help to simplify operations from riders' perspectives, greatly increasing the ease of riding.

5. Pedestrian and Bicycle Infrastructure

This project should endeavor to support and fulfill the objectives of the North Village Specific Plan and achieve its reduced trip generation goals. Much of this relies on creating a walking and biking environment where one does not currently exist. Successful mixed-use spaces are characterized not by automobile traffic but by walking traffic on sidewalks, trails and in plazas. Walking will be an essential part of Mammoth Crossing's success given its location at the most congested intersection in Mammoth. Easy connections to the North Village and the gondola will avoid adding vehicle trips to this intersection and other Mammoth roads.

A successful pedestrian and bicycle network is one that minimizes gaps in natural walking and biking routes, especially in connections between major destinations. For this section, Nelson\Nygaard assessed barriers and missing links in the 5- and 10-minute walking and biking radius around the project site.

Existing Walking and Biking Environment

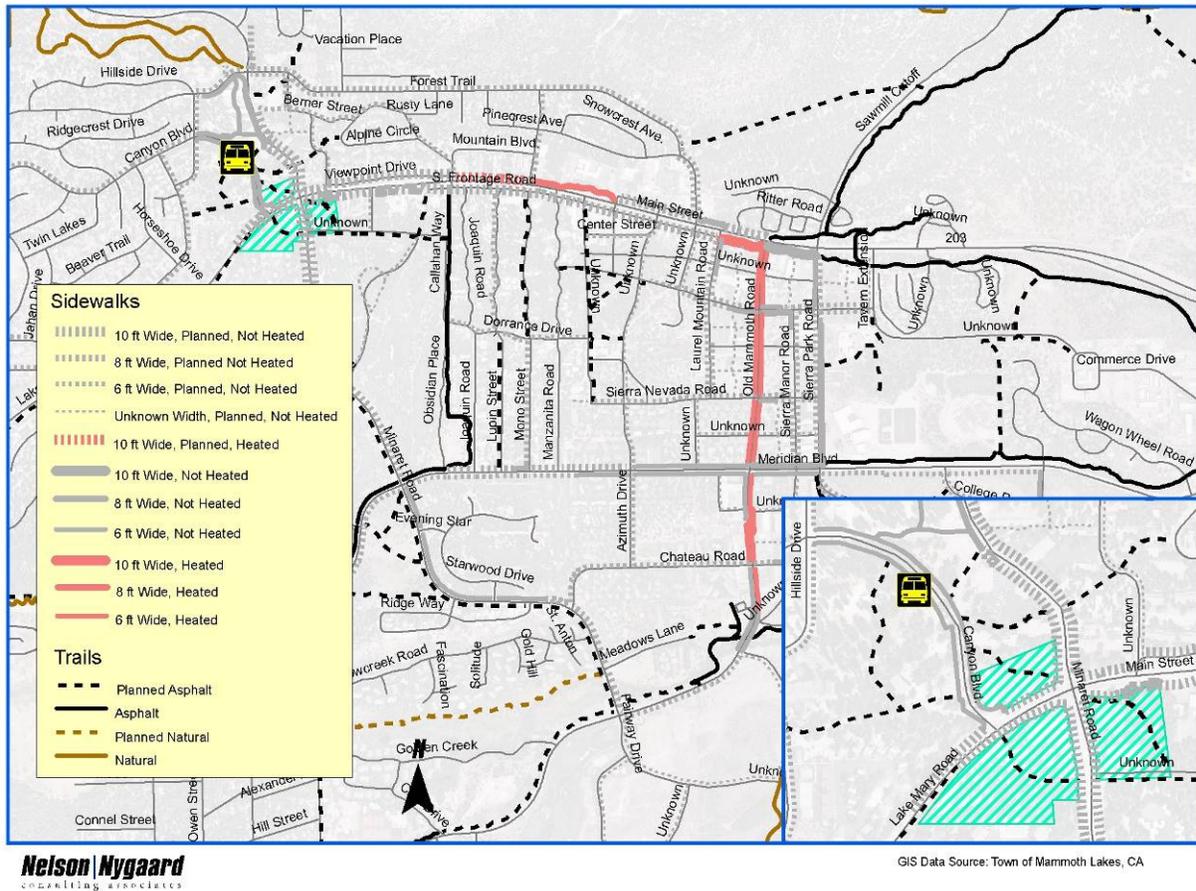
The three sites that make up Mammoth Crossing surround the intersection of Lake Mary Road/Main Street and Minaret Road. Lake Mary west of Mammoth Crossing is a 2-lane road with shoulders (~35 feet) that widens to 4-lanes with right- and left-turn pockets at its intersection with Minaret Road, resulting in a 6-lane cross-section (~75 feet wide). Minaret Road south of Mammoth Crossing is a 2-lane road with shoulders (~60 feet wide) that widens to 3-lanes with a northbound left-turn pocket at Lake Mary. To the north of Lake Mary, Minaret is a wide 2-lane road (~65 feet wide) that widens at Lake Mary to a 4-lane cross-section with wide shoulders (~75 feet wide) to accommodate exclusive right- and left-turn lanes.

While Mammoth Crossing is only a 500-1200 foot walk (depending on the sub-site) to the gondola plaza, there are no existing sidewalks except on Canyon Boulevard, across Lake Mary Road from Site 2. The site also is only a 1500-foot walk (7 minutes) from the Main Street commercial district to the east. However, sidewalks do not exist on Main Street until nearly 2,000 feet from the site.

The Town of Mammoth Lakes intends to make a number of near and long-term improvements to its pedestrian facility system, per the comprehensive Sidewalk Master Plan that was adopted in July 2003 and the updated Plan due for adoption in 2009. The goal is to increase the connectivity and safety of the existing bikeway, trail and sidewalk network. Additionally, the Town of Mammoth Lakes Trail System Master Plan (MLTSMP), which was adopted in May 1991, focuses on non-motorized facilities for alternative forms of transportation, including

pedestrians, bicyclists and cross country skiers. The MLTSM provides trails that connect and pass through a series of parks and open space areas, having numerous access points in and around the Town. Currently, approximately 80 percent or 7.5 miles of trails within the MLTSM have been developed. A portion of these facilities is shown in Figure 12.

Figure 12: Pedestrian and Trail Facilities Near Mammoth Crossing



Proposed Non-Motorized Enhancements

The proposed project would create sidewalks on both sides of Lake Mary, Minaret and Main in the immediate vicinity of the project. West of Canyon Boulevard, only one sidewalk is planned on the south side of Lake Mary Road. All sidewalks are wide and easily meet the Town’s design standards. New crosswalks are provided on all legs of the Canyon & Lake Mary intersection, and bike lanes are proposed on Lake Mary/Main and Minaret. Back-in angle on-street parking is proposed on both sides of Lake Mary Road between Canyon and Minaret.

Each site at Mammoth Crossing incorporates welcoming plaza entries with permeable connections through each parcel by pedestrians. All buildings and entrances seem to relate well to surrounding sidewalks. Curb cuts have been minimized, with only one serving Site 1, three serving Site 2, and two serving Site 3 off of the 7B road, which connects to Minaret. Significant grade changes seem to be addressed well through stepped plazas with building lobbies on multiple stories.

Recommendation 4: Create a Pedestrian-Oriented District

The North Village Specific Plan clearly states its primary vision:

“The primary purpose of the North Village Specific Plan is to provide new land use guidelines and development standards for the North Village area which will enable the development of a cohesive, pedestrian-oriented resort activity node, with supporting facilities, to create a year-round focus for visitor activity in the Town of Mammoth Lakes.”

The proposed site treatments at each Mammoth Crossing sub-site seem to reflect this vision well. However, the collective vision for these sites and how they interrelate with each other could be improved for the benefit of the district as the details of a Use Permit are evaluated in the future. Possible improvements are discussed below.

Barriers

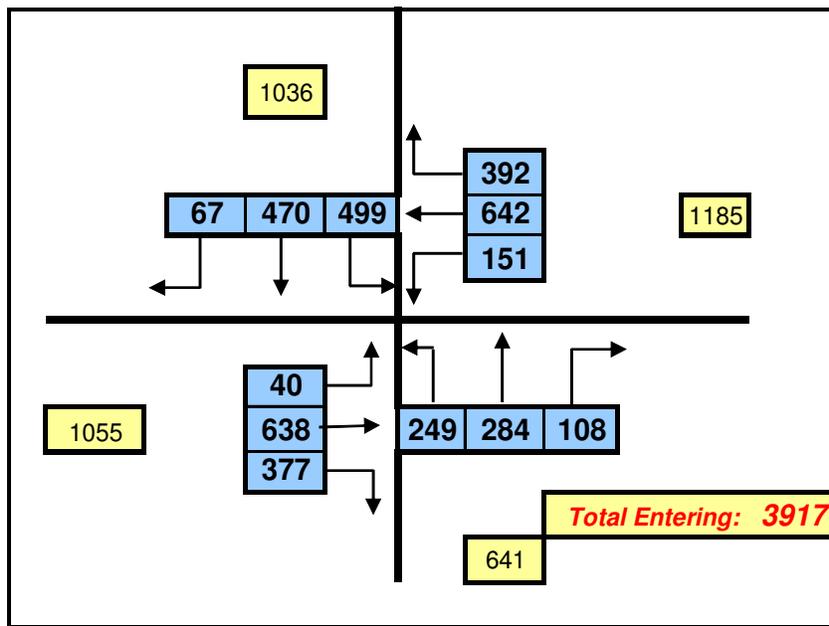
The sites for Mammoth Crossing present a difficult challenge for creating a walkable district in the North Village. Today, both Main Street and Minaret Road – especially east and north of their intersection – are significant barriers to pedestrian movement across them. The four and six-lane cross-sections of over 70-feet in width adjacent to the site are significant barriers to pedestrians, but current street improvement plans retain all lanes with only modest cross-section reductions. The eastbound Lake Mary approach at Minaret is actually widened to accommodate a proposed slip lane splitter island. While accommodating pedestrian crossings concurrently with parallel vehicle traffic is the most efficient form of intersection operation, concurrent crossings are not safe with these cross-sections. However, the alternative of crossing under exclusive signal protection requires a significant delay for the pedestrian phase to begin (longer if the phase is not on recall and requires push-button activation). Once the crossing begins, a minimum of 20 seconds must be provided to the “Flashing Don’t Walk” phase for safe clearance. Therefore, it is unlikely that the “Walk” phase can be more than a few seconds to maintain an acceptable intersection level-of-service (LOS) for vehicles. The resulting pedestrian delay (or pedestrian LOS) is likely to be unacceptable (LOS F). Crossing Lake Mary at Canyon is only somewhat better due to a narrower 4-lane cross-section.

These crossing delays immediately compromise the North Village vision of a walkable district and impact the ability to reduce vehicle trips. A seamless pedestrian interface is necessary to create a pedestrian-oriented district south of Lake Mary Road. Even with nice pedestrian spaces on-site, the lack of easily accessible walking destinations could leave these well-designed spaces underutilized.

An investigation by some combination of the Mammoth Crossing developer, the Town, and/or CALTRANS of the potential to shorten the crossing distances (at least across Lake Mary and Minaret to the west and south of their intersection) is recommended. A quick review of the existing intersection volumes plus projected traffic from 33 cumulative area projects (per LSA’s analysis) at Main & Minaret reveals that during the Saturday peak, 3,917 vehicles enter the intersection (see Figure 13). Not only is this volume 30-percent of the intersection’s current

capacity, it is only 60-percent of the capacity of an intersection with single-lane approaches⁵. The full build-out of Mammoth Crossing will reduce this spare capacity by only 5-percent. Therefore, the current and proposed roadway configurations are overbuilt, providing ample vehicular capacity while causing significant pedestrian delay.

Figure 13: Entering Peak Hour Vehicle Volumes at Main & Minaret



As currently conceived, the barriers of Lake Mary and Minaret Roads will continue to hamper the development of a successful pedestrian district south of Lake Mary Road. However, roadway volumes suggest that pedestrian crossing distances could be reduced by up to 50-percent, resulting in a dramatic improvement in the pedestrian environment while also having the positive effect of calming vehicular traffic speeds.

Crossing Options

The following conceptual changes have been proven to greatly improve the pedestrian experience in other locations while having minimal impacts on traffic volumes:

- Narrowed Lanes.** According to the latest research from the American Association of State Highway Transportation Officials (AASHTO), there is no evidence to suggest that vehicular crash rates are affected by narrowed lanes on arterial highways, such as SR 203 (Main Street)⁶. This change alone could reduce Lake Mary crossing distances by 12-feet, the width of one current travel lane.

⁵ Capacity is based on the Albany Capital District Transportation Committee’s Systematic Traffic Evaluation and Planning (STEP) model, which utilizes TMODEL2 software to perform planning-level Highway Capacity Manual calculations for arterial intersections and corridors. Based on the model’s regression analysis for dozens of suburban arterial intersections, the capacity of the Main & Minaret intersection is estimated to be 8,396 vehicles. Inputs to the model are: no. of approaches: 4; no. of turn lanes: 8; no. of approach lanes: 14; type of traffic control: signalized.

⁶ Potts, Harwood, and Richard. “Relationship of Lane Width to Safety for Urban and Suburban Arterials.” TRB 2007 Annual Meeting.

- **Curb Extensions.** Extended sidewalks at crosswalk locations help to reduce crossing distances as well as increase visibility of pedestrians to motorists. Curb extensions are warranted on all four corners of the Lake Mary & Minaret intersection where space is dedicated to a wide, unused shoulder.
- **Pedestrian Refuge Islands.** Crossing islands on the centerlines of multi-lane intersection approaches enable concurrent crossings by helping to reduce the exposure distance for crossing pedestrians, especially where signals have more than two vehicle phases (such as at Lake Mary & Minaret). They are particularly effective where a left-turn lane can be “shadowed” on the opposite approach by a crossing island. This is easily accommodated on Lake Mary Road eastbound at Minaret, where the low left-turn volume does not necessitate a left-turn lane. Crossing islands should also be considered on the eastern and northern approaches to this intersection. The southern and western approaches should only have islands if vehicle volumes warrant multiple lane approaches. Current projections suggest that these approaches require only a two-lane cross-section, but the current designs have four lanes.
- **Elimination of Slip Lanes.** The right-turn slip-lane from Lake Mary eastbound to Minaret southbound is not warranted. It creates an additional crossing for pedestrians and widens the Lake Mary cross-section.

These options should be carefully evaluated by the Town in partnership with area developers as well as the California Department of Transportation (CALTRANS), which oversees the operations and maintenance of S.R. 203 (Main Street).

Other Options

While the surrounding terrain has natural advantages for providing grade separated crossings – particularly a tunnel – their installation is NOT recommended. Removing pedestrian traffic from the surface works entirely against the Town’s “Feet First” policy by accepting the dominance of vehicles at this intersection and removing the “problem” of pedestrians. The only recommended pedestrian bridge is one connecting the southern Main Street sidewalk directly into an upper-level lobby in the Site 3 structure to help activate this sidewalk, create a potential retail presence, and encourage pedestrian connections east along Main Street.

Roundabouts have also been discussed for the intersections of Canyon & Lake Mary as well as Main & Minaret. Roundabouts are highly-effective at managing turning vehicles and could serve vehicle movements at either location well. However, pedestrian crossings are not easily accommodated if roundabouts require two-lane approaches or travel sections. Roundabouts require traffic to yield to pedestrians. Two-lane yields present a “double-threat” to crossing pedestrians who must wait for both lanes to stop, generally causing pedestrian and driver confusion – worsening pedestrian safety. If single-lane roundabouts cannot be accommodated, they should not be installed.

Connections

Clear, direct and accessible pedestrian connections are an essential part of encouraging employees and guests alike to walk and not drive. Obvious visual queues, well-defined pedestrian streetwalls, protected human-scale facades, and ample yet not-barren walkway widths are essential components of conveying pedestrians to destinations easily. While wayfinding signs and queues are helpful, they are not necessary in the best designs. Without

strong walking connections, a pedestrian-oriented district will have difficulty becoming successful.

While each Mammoth Crossing site is well-designed on its own, certain improvements would improve how the sites interact with each other and the broader district. Each site has a well-designed pedestrian interface with the public space at its front door, but most of these spaces might be able to relate better to each other, adjacent properties and the North Village with some of the changes recommended below.

Site 1

The pedestrian plaza at the intersection of Minaret and Main is a great public feature. This plaza directly connects to a corridor and courtyard through the site, welcoming pedestrians. The modulated texture of the building footprints suggests a pleasing walking environment.

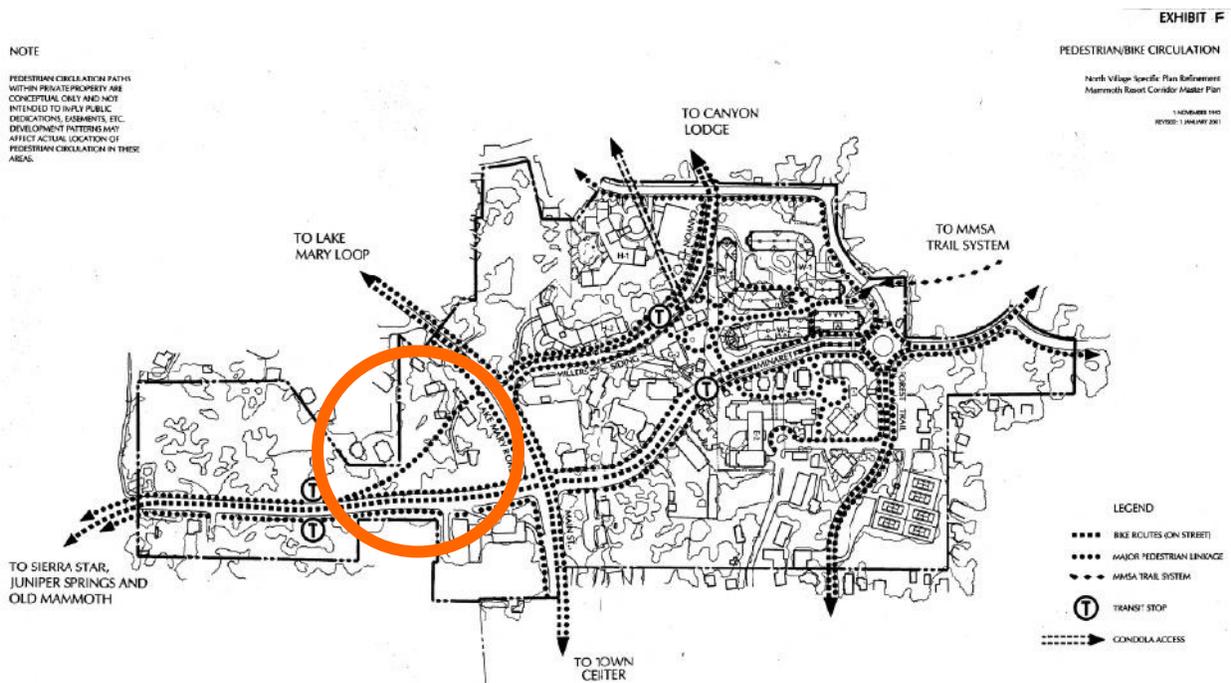
While the reduced building setbacks suggest a positive engagement with the surrounding sidewalks, in several locations the building encroaches upon the pedestrian right-of-way. During the final design phase, consideration should be given to increasing the setback enough to provide ample sidewalk widths of at least 10 or 12 feet. In the Mammoth Lakes winter environment, there is need for substantial snow storage space on the sidewalk. The snow storage consumes a good portion of the effective walking space as does the building-walkway interface. Along the Minaret Road frontage and at the Lake Mary Road & Canyon Boulevard corner, it would be beneficial to increase the distance between building face and curb edge to this dimension or greater (see Figure 14)..

The current design for the Canyon Boulevard hotel arrival plaza may be too auto-oriented. While the hotel entry is appropriately oriented towards the Village gondola, the pedestrian connection to the Canyon Boulevard sidewalk is not clear, though pavement treatments to delineate pedestrian and vehicular space have been recommended in the TIA. While all drop-off, parking and loading operations have been appropriately consolidated into a single curb-cut, Nelson\Nygaard recommends a careful consideration of what the pedestrian's experience will be as one travels to and from the Village Center by foot. As configured, pedestrian desire lines will cross entering vehicle paths in at least three separate locations (see Figure 14). Careful attention should be paid to this Canyon Boulevard interface during final design. As noted in the figure above, the Town's MLTPSA has already anticipated the importance of the pedestrian movement from the transit hub through the site to the intersection of Main & Minaret, and the development of Site 1 should continue to make every effort to make this movement safe, direct, and accommodating.

Encouraging this connection – at least for pedestrians – is important to this project, the North Village district, the proposed Sierra Star project, and overall walkability within Mammoth. Sierra Star represents a large population of guests south of the site that will both benefit from the improved pedestrian accessibility as well as contribute to the success of the retail businesses at Site 2. Pedestrians drawn through the site will activate its spaces and provide customers for retail businesses while reducing vehicle trip-making. This enables the North Village to generate sufficient pedestrian activity to create the necessary shift from vehicle trips that is needed to minimize vehicle congestion. Ultimately, greater Mammoth benefits from direct pedestrian connections into the North Village district through key corridors such as this, which had already been clearly identified in the 2000 North Village Specific Plan (see Figure 16 below). While a pedestrian connection accommodating this movement has been provided along the east side of the hotel, additional or stronger connections and obvious visual queues for approaching pedestrians are recommended.

The project itself will also benefit substantially from this connection by welcoming guests and residents of Site 3 to the services of Site 2 (Site 3 has no retail uses proposed). While the proponent has clearly considered this by providing a walkway and crosswalk between the sites, the Minaret frontage does not appear to have clear visual permeability. Mammoth Crossing and Sierra Star might be able to collaborate on their design efforts to increase the interactivity of the two projects.

Figure 16: North Village Specific Plan Pedestrian/Bike Circulation



Site 3

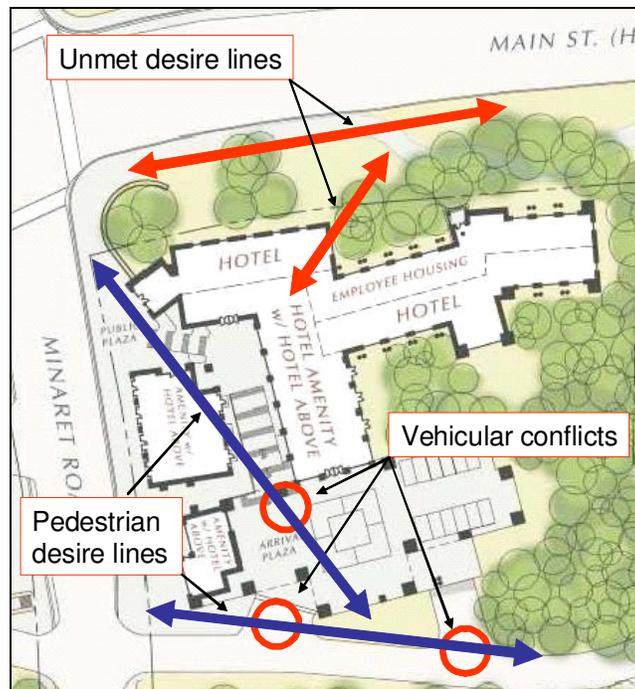
The proponent has created an intriguing series of public spaces on Site 3 that tend to draw pedestrians through the site along the general northwest to southeast alignment of the trail connection envisioned by the MLTPSA. This includes a pedestrian plaza, a wide walkway, and the hotel’s arrival plaza. However, the connection currently terminates at the vehicular arrival

plaza, and any further connection along the alignment envisioned in the MLTPSA would encounter vehicular conflicts at the arrival plaza and garage driveways. Further development of a through connection would be appropriate as designs are finalized.

The configuration of the building may be able to be modified somewhat to provide additional pedestrian connections – particularly to Main Street – which would further encourage walking and access to the site. Located at the gateway to the North Village, this site has the unique ability to welcome pedestrian movements to and through the site with clear connections between Minaret and Main. However, due to the steep grade, the building has difficulty connecting to Main Street, and welcoming pedestrian entries have had to be placed only on Minaret (see Figure 17).

The severe grade change that places Site 3 well below the grade of Main Street also can be viewed as a potential opportunity for yet another interesting public space. A grade-level pedestrian entrance on Main Street could connect with an upper floor of the main building, creating a pedestrian entrance and space along the Main Street sidewalk. This connection should be further explored during design development. This also would encourage the development of a more accommodating sidewalk along Main Street.

Figure 17: Site 3 Pedestrian Circulation Issues



Pedestrian Prioritization

In a pedestrian-oriented district, it is necessary to prioritize pedestrian movement over vehicle movement. The current and proposed street layout can be improved further to meet this goal. In addition to finding ways to reduce the barrier of Lake Mary Road, the following items should be considered by the Town as Mammoth Crossing’s design is developed:

- **Driveways:** Overall, the current design does a great job of limiting the number of driveways and curb cuts that cross the surrounding sidewalks, with the exception of two curb cuts from Site 2 onto Minaret Road. An attempt should be made to consolidate these into one. All project driveways should be designed with the sidewalk level across the curb cut and the driveway ramping up to sidewalk level. Sidewalks should not ramp down to street level because that gives vehicles clear priority and contributes to sidewalk clearance difficulties in the winter.
- **Traffic Calming:** Section M.8. on traffic calming in the General Plan could be addressed with a few simple interventions. Efforts to slow cars and reduce pedestrian crossing delays could be aided by curb extensions, reduced corner radii at intersections, pedestrian crossing islands at mid-block crossings, and the removal of any dedicated right-turn lanes or slip-lanes. All crosswalks should be marked with international-standard “zebra” bars in reflective thermoplastic or inlay tape.
- **Wayfinding:** An inexpensive and effective way to encourage walking and bicycling is to install signs that inform people how far they must travel in number of minutes and feet until they reach the next few major destinations. People traveling from the project site to the Village center, gondola and Main Street businesses will appreciate help with orientation.

Impacts on Emergency Services

Pedestrian crossing infrastructure often elicits concern over impacts to emergency vehicle response times, as curb extensions reduce turning speeds and crossing islands can obstruct vehicle paths. In practice, however, emergency vehicles experience few conflicts from these devices. During a rapid response deployment, large and small emergency vehicles almost always operate outside of designated lanes at intersections in order to maximize visibility when crossing or turning. In congested conditions, this frequently involves operating in the opposing lane of traffic through an intersection. In uncongested conditions, vehicles will occupy more than one travel lane if available. Since multiple travel lanes are available on every approach to Main & Minaret, pedestrian crossing enhancements are not expected to have any impact on the required turn radii that is necessary to maintain current response times through the intersection during congested or uncongested conditions.

The main Mammoth fire station is under one-mile from the site, allowing superior response times compared to other locations in Mammoth Lakes. Any projected increase in vehicle queues at the intersection of Main & Minaret is not going to substantially alter the existing peak hour queues that must be negotiated by fire apparatus today. However, it is recommended that additional safety equipment be considered for this intersection, particularly a transponder-activated all-stop “emergency” phase at this signal.

Traffic Crash Rates

While preserving emergency vehicle access is an important priority for any community, a careful balance must be struck between adequate access and excessive roadway infrastructure. The perception by many fire departments that wider streets ensure safe access by fire apparatus works against crash results that demonstrate throughout the U.S. that wider streets result in significantly higher vehicle, pedestrian and bicycle crash rates due to the higher speeds encountered (see Figure 18).

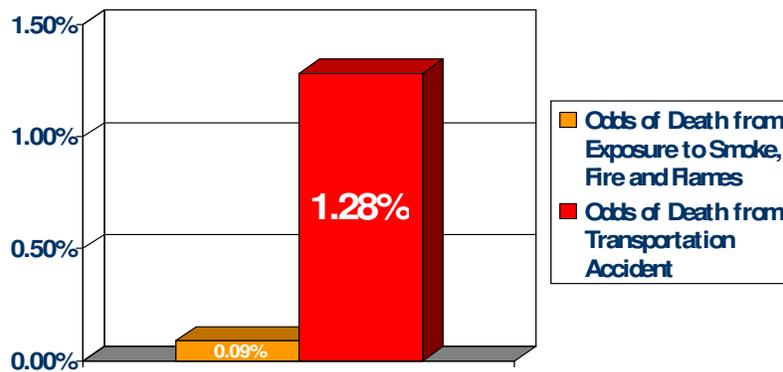
Figure 18: Street Width and Injury Accident Rate



Source: *Residential Street Typology and Injury Accident Frequency*, Peter Swift, P. E., Dan Painter, AICP, Matthew Goldstein.

Striking this correct balance between street width and emergency access is also important when considering that the vast majority of emergency responses are to vehicle crashes as opposed to fires, as illustrated by the rates of vehicle and fire fatalities nationally (Figure 19).

Figure 19: Crash Versus Fire Fatality Odds



Source: *Fire Loss in the United States During 1999*, Michael J. Karter, Jr. (National Fire Protection Association, September 2000)

Conformance with General Plan

The General Plan calls for improving the safety of sidewalks, trails and streets,⁷ providing a high-quality pedestrian system linked throughout the community with year-round access,⁸ and

⁷ Walking and Bicycling Policy M.4.A.

⁸ Walking and Bicycling Policy M.4.B.

designing streets, sidewalks and trails to ensure public safety.⁹ The General Plan also lists preferred pedestrian design items, including glare-free lighting, directional and informational signage, benches, and access to roadway crossings. While the details of Mammoth Crossing’s design treatments are not available at this early stage to address the Plan’s preferred items, the recommended improvements will help the project meet the Town’s “Feet First” goal.

6. Sustainable Transportation Plan

The North Village Specific Plan clearly states the following goal:

“To establish transportation policies that will promote the development of a comprehensive transportation system for the community.” Fundamental to the success of the North Village Development is the establishment of an integrated transportation system. The system will include improved street circulation, increased emphasis on public transportation, and development of a comprehensive pedestrian circulation system with connections to the town-wide trail system, bicycle paths, and bus stops, all in proximity to major destinations.”

Mammoth Crossing has the potential to meet this goal more strongly given a number of structural and programmatic changes to the current proposal. Based on our review, Nelson\Nygaard recommends the following program.

Recommendation 5: Implement a Sustainable Transportation Action Plan

Implementing the measures described in Sections 4 and 5 to encourage walking, bicycling, and transit usage will help to make Mammoth Crossing and the North Village District even more livable than currently envisioned by reducing vehicle trips and parking demand and encouraging alternate forms of transportation. Many of these measures can be implemented as part of the Mammoth Crossing development. Others will need the leadership of the Town, MMSA and/or CALTRANS. The key measures are highlighted below:

1. Transit System Study: Study a restructuring of transit routing and service schedules with special attention to a clockwise configuration around the North Village, as described in Section 4.
2. Pedestrian Circulation Enhancements: The configuration of building elements and roadways at each site can be changed to improve the potential for pedestrian activity. Section 5 recommendations to reduce roadway width/crossing distance, reduce the number of driveways, traffic calm the vehicular right-of-way, improve the interface with adjacent properties, and provide good way finding, should be considered.
3. Car-Sharing: The hotels & retailers could provide a shared-car service for guests and employees. This strategy has proven successful in reducing household vehicle

⁹ Walking and Bicycling Policy M.4.C.

ownership; encouraging visitors to arrive by tour bus or plane; and reducing the percentage of employees who drive to work alone who may also benefit from having a car for errands during the workday.

4. Guaranteed Ride Home Program: The hotel and restaurant could offer a guaranteed ride home program for employees. One of the key reasons why employees are reluctant to try new ways of getting to work is the worry that they may have an unforeseen circumstance that derails their alternative transportation plans, e.g. they have to stay at work beyond transit service hours or their carpool partner has to leave early for an emergency. Guaranteed Ride Home (GRH) programs address these oft-stated fears by offering emergency taxi rides home to employees when they are unable to return home using their standard arrangement. It provides a level of certainty that allows people to comfortably try alternative ways of getting to and from work.
5. Establish a Ride-Matching Service: Drive-alone trips will be greatly reduced by organizing a ride-matching service to help employees identify potential driving companions. Many online ride-matching services already exist, allowing potential users to enter information about their trips – including origin and destination, time of day, which days of the week, etc – and the system can pair them up with others with similar requirements.
6. Transportation Resource Center: The project could establish a Transportation Resource Center (TRC) with an employee designated as a Mobility Coordinator, who will administer and actively market all demand management programs and alternative transportation options. The Mobility Coordinator would serve as a resort-wide concierge, providing personalized information on transit routes and schedules, ridesharing information, bicycle routes and facilities, and other transportation options available to residents, employees, and guests.
7. Parking pricing: Market-rate parking prices are one of the most effective strategies for reducing parking demand and vehicle trips. Market-rate parking charges have been found to reduce vehicle trips from 8% to 21%, with reductions of up to 38% in more suburban locations. Mammoth Crossing should consider charging all guests and employees to park, either upon initial occupancy or at a later date, especially if the project is successful and parking demand is high.
8. Parking Cash-Out: As an alternate to directly charging guests and employees for parking, the project could implement a parking cash-out program by offering the option to “cash out” the value of providing a parking space for each employee or guest. This creates a condition in which all commute modes are subsidized equally and create incentives for commuters to carpool, take transit, and bike or walk to work. Under a parking cash out requirement, the project offers free parking to all with the option of offering the cash value of the parking subsidy to anyone who does not drive. The parking subsidy is an amount somewhat lower than the cost of operating, maintaining and financing a parking space (at current underground garage construction prices of over \$40,000 per space, this cost is at least \$200 per month or \$9/day). The cash value of the parking subsidy is usually offered to employees as a paycheck credit. For guests who chose to arrive by transit or plane, it is reflected as a reduced room rate. The Town can be a partner in incentivizing this program by leasing public parking spaces that can be shared by other developments.

9. On-Street Parking Pricing: The proposed parking along Lake Mary Road could be pay-parking with all revenues beyond operations and maintenance going to Mammoth Crossing's merchants for façade or other improvements. Initially, the fee can be nominal, starting at \$0.25/hour through the use of pay stations in order to discourage long-term parking and to maintain enough turnover so short-term customers can find a space easily. Prices would vary by time of day and day of week: for example, higher at dining hours, lower during midday, and free overnight. Expanding the program throughout the North Village would go a long way towards improving short-term parking availability for retailers while creating revenue to make improvements to the walking environment. This type of "parking benefit district" program has been extremely successful at similar ski resort towns.

10. Implement a Comprehensive Monitoring Program: As recommended in the TIA, a comprehensive monitoring program should be put into place to demonstrate that the aggressive trip generation reductions are feasible. This program should include mode share and origin surveys, driveway counts, and doorway intercept surveys. The data can be used to adjust TDM and parking programs in addition to justifying similar mixed-use developments in the North Village.