



## MEMORANDUM

**To:** Matt Cassel, P.E. , PCMC

**From:** Charles Allen, P.E., InterPlan  
Tim Peterson, InterPlan

**Date:** April 2, 2015

**Subject:** Lowell Avenue Traffic Modeling

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### Introduction

The purpose of this memo is to document traffic modeling results for Lowell Avenue and Empire Avenue in Park City, Utah. Park City Municipal Corporation (PCMC) plans to reconstruct Lowell Avenue in the near future and forecasted traffic volumes are an important consideration in determining the design cross-section of the roadway. This memo summarizes the forecast volumes on Lowell Avenue under a variety of land use and traffic assignment scenarios.

### Description of Project

PCMC plans to reconstruct Lowell Avenue south of Manor Way to the "horseshoe bend" at Empire Avenue. Currently, Lowell Avenue features the "Local Road - Old Town" functional class designation. Pavement width is approximately 25 feet, there are no paved sidewalks and on-street, parallel parking is permitted only along the east side of street. In the project area, Lowell Avenue is lined by several homes and condos. Further to the north, Lowell Avenue is a major access road and circulator around the Park City Mountain Resort (PCMR) base area and parking lots. Between Manor Way and Shadow Ridge Road, Lowell Avenue is one-way for southbound traffic.

The scope to which PCMC reconstructs Lowell Avenue south of Manor Way is influenced by its future functional classification in connection with traffic volumes anticipated from potential future development and forecasted growth. The *Park City Traffic and Transportation Master Plan 2011* (TMP) identifies daily traffic volume brackets for each functional class. If future traffic is expected to push traffic volumes above the upper bracket for a Local Road - Old Town classification, then PCMC may consider reconstructing Lowell Avenue at the next higher functional classification: Minor Residential Collector. Pavement widths for Minor Residential Collectors are greater than local roads, meaning a higher functional classification would have a significant impact on Lowell Avenue reconstruction designs. (See Appendix for TMP Functional Class cross sections.)

Including the overall build-out of the Park City area, this analysis considers the potential traffic impact of two major potential areas of development:

- Treasure Hill and
- Bamberger property

**Figure 1 – Study Area**



### *Treasure Hill*

Treasure Hill is a large planned development for the western slopes above Old Town Park City. Though the development was technically approved in the 1980s, it remains an uncertain and controversial project. Nevertheless, Treasure Hill has the potential to significantly affect Lowell Avenue traffic volumes since the only planned roadway access would be directly at the horseshoe bend where Lowell Avenue connects with Empire Avenue. Thus, all Treasure Hill vehicle traffic would enter and exit either via Lowell Avenue and/or Empire Avenue. As per the scope of work, this analysis examines various road network scenarios, including several with Treasure Hill traffic limited solely to either Lowell Avenue or Empire Avenue. Finally, access to Treasure Hill is also planned via a cabriolet connection from Treasure Hill directly to the Town Lift on Main Street. This feature has the potential to reduce vehicle trips in and out of Treasure Hill by providing direct patron and guest access to the restaurants and shops in Old Town.

### *Bamberger Property*

The Bamberger property is a large piece of land to the west of Lowell Avenue and to the south of the current PCMR base area. Though once platted for homes, PCMC has since vacated the right of way for the streets that would serve the area. No development has been approved or is in the foreseeable future for the Bamberger property. However, this analysis did consider scenarios where Bamberger was developed in addition to Park City build-out and Treasure Hill development to test the impact on Lowell Avenue traffic volumes. For the analysis, it was assumed that development of the Bamberger property would not resemble the typical Old Town street and parcel layout originally platted for the property. Approximately 60 percent of the 20 acre Bamberger property is now zoned as Open Space with only the corner of the property near the PCMR base being zoned for development. Thus, it was assumed that the number of residential units that were originally platted for the entire property would be developed as equivalent resort-type development in the Resort Commercial zoned area near the existing PCMR base. Access to Bamberger property development was assumed to be located on Lowell Avenue adjacent to the PCMR base area.

### **Travel Demand Model Setup**

This analysis examines future traffic volumes on Lowell Avenue through use of the Travel Demand Model developed for the TMP update in 2011. The Travel Demand Model consists of a combination of a spreadsheet-based algorithm for calculating trip generation, trip distribution, and mode choice and a micro-simulation platform for dynamic traffic assignment. The dynamic traffic assignment is conducted through the use of VISSIM traffic simulation software.

Travel Demand Model socioeconomic (SE) inputs for the Treasure Hill area were adopted from the Treasure Hill SE assumptions developed during the 2011 TMP update. InterPlan reviewed the 2011 TMP update assumptions with the most recent Treasure Hill development information provided by PCMC. The 2011 TMP update Treasure Hill SE inputs were found to be valid and consistent, and so were carried over for use in this modeling effort.

New SE inputs were needed for the Bamberger property and were based on the developable square footage of the property and its zoning category of Resort Commercial. Using the equivalent number of residential units originally platted for the property, InterPlan applied the housing-employment-population ratios assumed for future developments at the PCMR base area in the 2011 TMP update to calculate the equivalent resort-type SE inputs for Bamberger.

**Table 1 – Development Assumptions**

Development	Residential Square Feet	Equivalent Residential Units	Commercial Square Feet	Equivalent Commercial Units	Total Developable Square Feet
Treasure Hill	394,000	197	19,000	19	413,000
Bamberger	265,959	133	12,825	13	278,784

**Analysis**

With the SE inputs for Treasure Hill, the Bamberger property, and Park City build out, InterPlan conducted travel demand model runs for three network scenarios:

- Treasure Hill traffic only permitted access via Lowell Avenue
- Treasure Hill traffic only permitted access via Empire Avenue
- Treasure Hill traffic permitted access via either road

Travel demand model results are generated as hourly volumes for the PM peak period. However, volume thresholds for TMP are expressed as daily traffic volumes. Thus, InterPlan used data from Utah Department of Transportation (UDOT) Automated Traffic Recorders (ATR) to convert PM peak period model volume outputs to an Annual Average Daily Traffic volume (AADT). UDOT maintains two ATRs in the Park City area. One ATR is located on SR-224 just north of Canyon Resort Drive and the other is on SR-248 west of Round Valley Drive. Each ATR records hourly traffic volumes by direction throughout the year. InterPlan analyzed the relationship between PM peak period traffic volumes and AADT volumes at the ATRs to develop a conversion factor to apply to travel demand model outputs. Generally, the PM peak period hourly volume is approximately 12 percent of the AADT volume in Park City.

Table 2 summarizes the factored travel demand model outputs for two land use scenarios and the three network scenarios. The two land use scenarios include Park City build out plus Treasure Hill developed and Park City Build out plus Treasure Hill *and* Bamberger property developed. Traffic volumes on Empire Avenue are generally higher than Lowell Avenue except for cases where Treasure Hill traffic is restricted to access via Lowell Avenue only. It should be noted that these volumes reflect only the portions of Lowell Avenue and Empire Avenue south of Manor Way, since this represents the planned reconstruction area.

According to the 2011 TMP update, the upper volume threshold for a Local Road - Old Town functional classification is 2,500 vehicles per day. Results indicate that none of the development scenarios and network scenario combinations are anticipated to produce average annual daily traffic volumes that exceed the threshold for either Lowell Avenue or Empire Avenue.



**Table 2 – Forecasted Average Daily Volumes for Lowell Avenue and Empire Avenue**

	Park City Build Out + Treasure Hill		Park City Build Out + Treasure Hill + Bamberger Property	
	Lowell Ave	Empire Ave	Lowell Ave	Empire Ave
Treasure Hill Traffic Permitted on Lowell Avenue Only	1,000	600	1,500	900
Treasure Hill Traffic Permitted on Empire Avenue Only	600	1,000	1,100	1,300
Treasure Hill Traffic Permitted on Both	700	900	1,300	1,300

**Conclusions**

Many factors can influence the design considerations and functional classification of a roadway, including traffic volumes, right-of-way, land use, and roadway network configuration. This analysis compares predicted future traffic volumes on Lowell Avenue against functional classification volume thresholds in the 2011 TMP update. Results show Lowell Avenue is expected to remain below the threshold for a Local Road- Old Town classification for a number of development and road network scenarios. Thus, from a forecasted volume standpoint, Lowell Avenue can be reconstructed to Local Road functional class specifications.