

An architectural rendering of a hillside development, showing various multi-story buildings and structures built into the terrain. The scene is overlaid with a semi-transparent blue filter. The buildings are rendered in a light blue/white color, contrasting with the darker blue background. The rendering shows a mix of residential-style buildings and larger commercial or institutional structures, all integrated into a hilly landscape with some trees and a winding path or road at the bottom.

Treasure Hill Planning Commission

Traffic Study Presentation

September 13, 2017

Overview

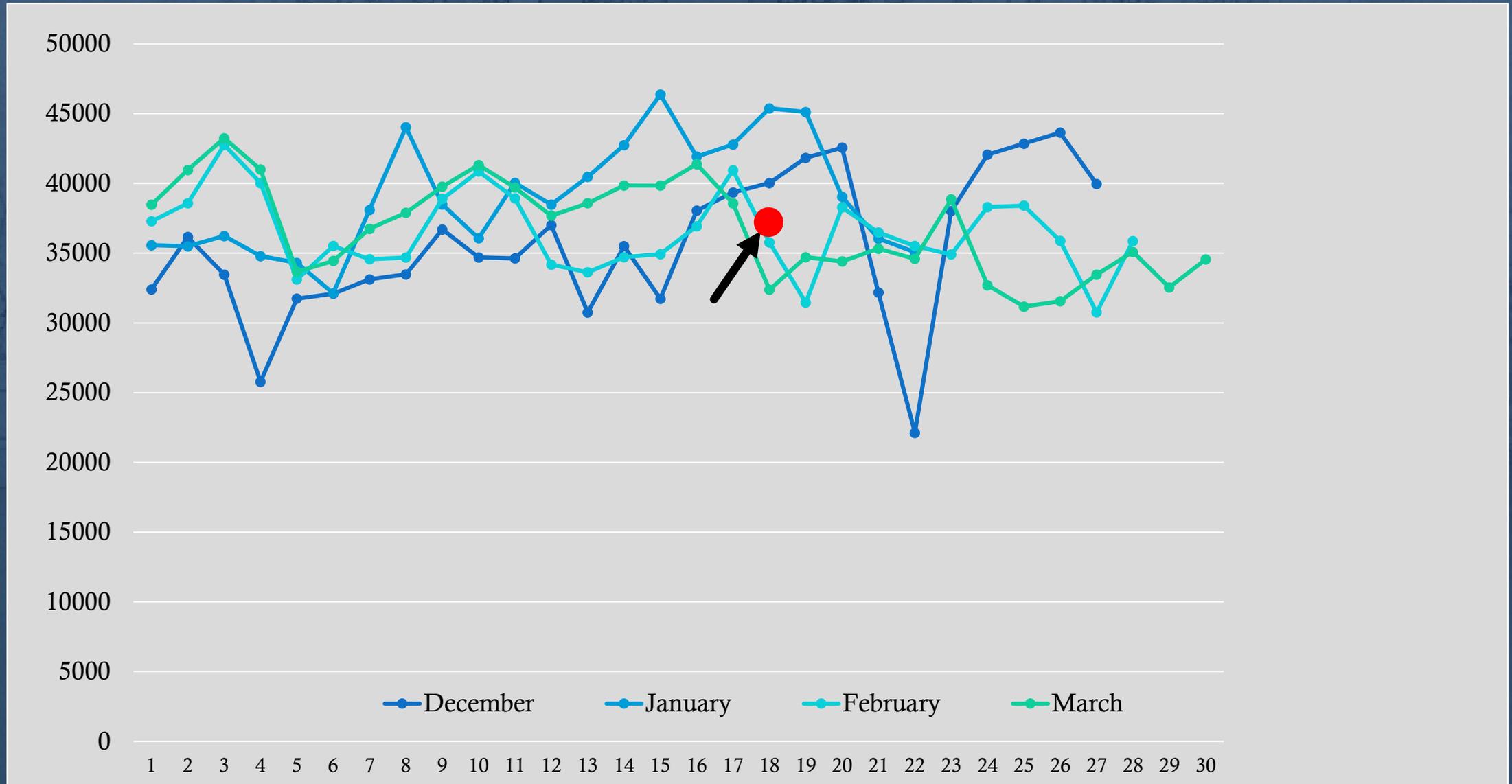
- Traffic Study Summary
- Street capacity
- Pedestrian Accommodations
- Parking
- Construction Traffic

Traffic Study Summary – Existing Conditions

Intersection	<u>Estimated Traffic</u> From Original Report		<u>Actual Counts</u> February 19 th 2005		<u>Actual Counts</u> February 18 th 2017	
	AM	PM	AM	PM	AM	PM
Park Ave / Deer Valley	2392	3868	2302	3503	2438	3069
Empire Ave / Silver King	624	1003	314	438	1545	1418
Empire Ave / Shadow Ridge	431	694	188	303	927	937
Empire Ave / Manor Way	277	435	120	190	471	641
Empire Ave / Crescent Tram	84	140	37	123	54	95
Lowell Ave / Shadow Ridge	201	230	82	101	535	396
Lowell Ave / Manor Way	170	637	74	139	416	579
Lowell Ave / North Star	96	197	21	41	29	48
Park Ave / 15 th Street	NA	NA	NA	NA	470	975
Park Ave / 14 th Street	NA	NA	NA	NA	454	946
Park Ave / 8 th Street	NA	NA	NA	NA	276	611
Empire Ave / 14 th Street	NA	NA	NA	NA	573	765
Lowell Ave / Silver King	NA	NA	NA	NA	724	569

Note: The numbers depict the total volume at the intersection during one peak hour.

Traffic Study Summary – Existing Conditions



Traffic Study Summary – Existing Conditions

Intersection	Actual Counts February 18 th 2017		12.8% Factored Counts February 18 th 2017	
	AM	PM	AM	PM
Park Ave / Deer Valley	2438	3069	2756	3467
Empire Ave / Silver King Dr.	1545	1418	1748	1605
Empire Ave / Shadow Ridge	927	937	1048	1057
Empire Ave / Manor Way	471	641	534	726
Empire Ave / Crescent Tram	54	95	64	107
Lowell Ave / Shadow Ridge	535	396	609	453
Lowell Ave / Manor Way	416	579	472	653
Lowell Ave / North Star	29	48	35	57
Park Ave / 15 th Street	470	975	535	1104
Park Ave / 14 th Street	454	946	517	1073
Park Ave / 8 th Street	276	611	314	693
Empire Ave / 14 th Street	573	765	649	867
Lowell Ave / Silver King	724	569	816	641

Note: The numbers depict the total volume at the intersection during one peak hour.

Traffic Study Summary – Existing Conditions

		Worst Approach ¹		Overall Intersection ²
Intersection	Control	LOS AM / PM	Approach AM / PM	LOS AM / PM
Park Ave / Deer Valley	Signal			C (32.5) / D (50.9)
Empire Ave / Silver King	Stop	E (36.6) / F (137.5)	EB / EB	
Empire Ave / Shadow Ridge	Stop	A (9.4) / A (6.8)	NB / EB	
Empire Ave / Manor Way	Stop	A (5.5) / A (7.3)	EB / EB	
Empire Ave / Crescent Tram	Stop	A (4.1) / A (4.4)	WB / WB	
Empire Ave / 14 th Street	Stop	A (9.2) / B (11.4)	WB / WB	
Lowell Ave / Silver King	Stop	C (22.0) / F (122.0)	NB / NB	
Lowell Ave / Manor Way	Stop	A (6.0) / A (7.7)	SB / SB	
Lowell Ave / North Star	Stop	A (4.7) / A (3.6)	EB / EB	
Lowell Ave / Shadow Ridge	Stop	A (6.7) / A (5.8)	WB / WB	
Park Ave / 15 th Street	Stop	A (9.1) / C (15.5)	WB / WB	
Park Ave / 14 th Street	Stop	A (6.7) / B (12.7)	EB / EB	
Park Ave / 8 th Street	Stop	A (5.1) / A (8.2)	EB / EB	

Notes:

(1) The level of service and delay for worst approach is shown for stop-controlled intersections only.

(2) The overall intersection level of service is shown for signalized intersections only

Traffic Study Summary – Future Conditions

Future Volume Summary

Two Methodologies Applied

- 1) Summit County Regional Traffic Model
 - Only included population growth (VMT still being evaluated)
 - Higher number reflects less impacts due to Treasure Hill
- 2) Forecast Potential Development
 - Bamberger Property
 - Park City Mountain Resort

Traffic Study Summary – Future Conditions

Intersection	12.8% Factored Counts February 18 th 2017		Future Traffic Volumes 2037	
	AM	PM	AM	PM
Park Ave / Deer Valley	2756	3467	3472	4367
Empire Ave / Silver King Dr.	1748	1605	2206	2024
Empire Ave / Shadow Ridge	1048	1057	1321	1336
Empire Ave / Manor Way	534	726	675	917
Empire Ave / Crescent Tram	64	107	82	143
Lowell Ave / Shadow Ridge	609	453	768	575
Lowell Ave / Manor Way	472	653	596	825
Lowell Ave / North Star	35	57	46	74
Park Ave / 15 th Street	535	1104	679	1393
Park Ave / 14 th Street	517	1073	654	1354
Park Ave / 8 th Street	314	693	399	875
Empire Ave / 14 th Street	649	867	820	1094
Lowell Ave / Silver King	816	641	1030	810

Note: The numbers depict the total volume at the intersection during one peak hour.

Traffic Study Summary – Future Conditions

*Future
Conditions
2037
without
Treasure*

		Worst Approach ¹		Overall Intersection ²
Intersection	Control	LOS AM / PM	Approach AM / PM	LOS AM / PM
Park Ave / Deer Valley	Signal			F (133.8) / F (117.5)
Empire Ave / Silver King	Stop	F (147.1) / F (175.6)	EB / EB	
Empire Ave / Shadow Ridge	Stop	B (13.0) / C (19.8)	NB / EB	
Empire Ave / Manor Way	Stop	A (6.5) / A (9.4)	EB / EB	
Empire Ave / Crescent Tram	Stop	A (4.0) / A (4.5)	WB / WB	
Empire Ave / 14 th Street	Stop	B (12.5) / C (18.0)	WB / WB	
Lowell Ave / Silver King	Stop	F (100.8) / F (195.4)	NB / NB	
Lowell Ave / Manor Way	Stop	A (6.4) / B (10.7)	SB / SB	
Lowell Ave / North Star	Stop	A (3.6) / A (4.7)	EB / EB	
Lowell Ave / Shadow Ridge	Stop	A (7.4) / A (6.9)	WB / WB	
Park Ave / 15 th Street	Stop	A (8.3) / C (17.0)	WB / EB	
Park Ave / 14 th Street	Stop	A (8.1) / C (18.8)	EB / EB	
Park Ave / 8 th Street	Stop	A (5.0) / A (8.4)	EB / EB	

Notes:

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- (2) The overall intersection level of service is shown for signalized intersections only

Traffic Study Summary – Future Conditions

		Worst Approach ¹		Overall Intersection ²
Intersection	Control	LOS AM / PM	Approach AM / PM	LOS
Park Ave / Deer Valley	Signal			C (29.1) / E (68.9)
Empire Ave / Silver King	Roundabout or Signal			A (8.4) / C (20.0)
Lowell Ave / Silver King	Stop	D (28.0) / B (12.5)	NB / NB	

Notes:

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(2) The overall intersection level of service is shown for signalized intersections only

Future Conditions 2037 without Treasure and Intersections Improvements

Park Ave / Deer Valley

- Free right turn movement from Park Ave (SR-224) onto Empire Ave.
- An additional southbound left turn lane (dual left turn lanes) from Park Ave onto Deer Valley
- A right turn channelized yield on the westbound movement from Deer Valley onto Park Ave (SR-224)

Traffic Study Summary – Future Conditions

		Worst Approach ¹		Overall Intersection ²
Intersection	Control	LOS AM / PM	Approach AM / PM	LOS
Park Ave / Deer Valley	Signal			C (29.1) / E (68.9)
Empire Ave / Silver King	Roundabout or Signal			A (8.4) / C (20.0)
Lowell Ave / Silver King	Stop	D (28.0) / B (12.5)	NB / NB	

Notes:

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Future Conditions 2037 without Treasure and Intersections Improvements

Empire Ave / Silver King

- Install roundabout or traffic signal

Lowell Ave / Silver King is acceptable with improvements at Empire Ave / Silver King

Traffic Study Summary – Trip Generation

Trip Generation

- 1) Hotel
 - Resort hotel
- 2) Employee Housing
 - Dedicated to Treasure Hill, no trips during peak hour (shift schedule)
- 3) Condominium / Townhouse
 - ITE standard
- 4) Commercial Space
 - 17,470 sq ft calculated for trip generation
 - Specialty Retail / Quality Restaurant

Traffic Study Summary – Trip Generation

Land Use (ITE Reference)	Independent Variable	Size	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Resort Hotel (330)	Occupied Rooms	172 units	55	45	100	92	69	162
Employee Housing (220)	Dwelling Units	6,669 sq-ft or 25 units	5	11	16	18	12	30
Condominium/Townhouse (230)	Dwelling Units	103 units	10	42	52	45	26	71
Specialty Retail Center (826) & Quality Restaurant (931)	1000 Square Feet	17,470 sq-ft	27	29	56	64	45	109
Total			111	139	250	209	144	353

Traffic Study Summary – Trip Generation

Trip Reduction

- 1) Resort Hotel
 - 85% Occupancy – from report at The Canyons
- 2) Internal capture for mixed use development
 - 22% from ITE worksheet
- 3) Ski Runs (Trails)
 - Data from Park City Chamber of Commerce and Visitors Bureau
 - Trip reduction of 43.3%
- 4) Cabriolet
 - 10% reduction

Traffic Study Summary – Trip Generation

Land Use (ITE Reference)	Independent Variable	Size	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Resort Hotel (330)	Occupied Rooms	172 units	22	18	42	29	22	51
Employee Housing (220)	Dwelling Units	6,669 sq-ft or 25 units	0	0	0	0	0	0
Condominium/Townhouse (230)	Dwelling Units	103 units	5	20	25	19	11	30
Specialty Retail Center (826) & Quality Restaurant (931)	1000 Square Feet	17,470 sq-ft	20	22	42	43	29	72
Total			47	60	107	92	63	153

Traffic Study Summary – Future Conditions

*Future
Conditions
2037
with
Treasure
and
improvements*

Intersection	Control	Worst Approach ¹		Overall Intersection ²
		LOS AM / PM	Approach AM / PM	LOS AM / PM
Park Ave / Deer Valley	Signal			C (29.1) / E (75.7)
Empire Ave / Silver King	Roundabout			B (10.8) / C (20.4)
Empire Ave / Shadow Ridge	Stop	D (33.9) / C (23.0)	EB / EB	
Empire Ave / Manor Way	Stop	A (7.4) / C (15.1)	EB / EB	
Empire Ave / Crescent Tram	Stop	A (3.9) / A (4.5)	WB / WB	
Empire Ave / 14 th Street	Stop	C (15.7) / C (21.6)	WB / WB	
Lowell Ave / Silver King	Stop	D (34.6) / B (11.2)	NB / NB	
Lowell Ave / Manor Way	Stop	A (7.0) / C (23.4)	SB / SB	
Lowell Ave / North Star	Stop	A (3.9) / A (6.0)	EB / EB	
Lowell Ave / Shadow Ridge	Stop	A (7.4) / A (6.8)	WB / WB	
Park Ave / 15 th Street	Stop	B (10.1) / D (29.7)	WB / WB	
Park Ave / 14 th Street	Stop	A (8.2) / C (22.6)	EB / EB	
Park Ave / 8 th Street	Stop	A (5.7) / A (9.5)	EB / EB	
Access 1 / Empire Ave	Stop	A (4.1) / A (2.6)	NB / NB	
Access 2 / Lowell Ave	Stop	A (3.9) / A (3.8)	EB / EB	

Notes:

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(2) The overall intersection level of service is shown for signalized intersections only

Traffic Study Summary

- Treasure will pay their portion of the improvement costs
 - Two Calculation Methodologies

Park Ave / Deer Valley

Volume change = 105 cars (AM peak) = 2.94% increase
152 cars (PM peak) = 3.36% increase
Average = 3.15%

Delay change = 0.0 seconds (AM peak) = 0% increase
6.8 seconds (PM peak) = 8.98% increase
Average = 4.49%

TOTAL AVERAGE = 3.82%

Traffic Study Summary

- Treasure will pay their portion of the improvement costs
 - Two Calculation Methodologies

Empire Ave / Silver King

Volume change = 97 cars (AM peak) = 4.21% increase

139 cars (PM peak) = 6.43% increase

Average = 5.32%

Delay change = 2.4 seconds (AM peak) = 22.22% increase

0.4 seconds (PM peak) = 1.96% increase

Average = 12.09%

TOTAL AVERAGE = 8.70%

Traffic Study Summary

Conclusion

Two intersections require improvements

- With or without Treasure Hill
- Treasure Hill is willing to pay their portion of those improvements



Street Capacity

- Acceptable capacity April to November
- Concerns during December to March
- Street capacity basics
 - 1800 vehicles per hour total two-way (LOS D)
 - Fewer cars = higher LOS
 - ADT versus AADT
 - Capacity versus speed
 - Numerous elements that impact that volume

Street Capacity (Continued)

What impacts Street Capacity on Lowell Ave. and Empire Ave.

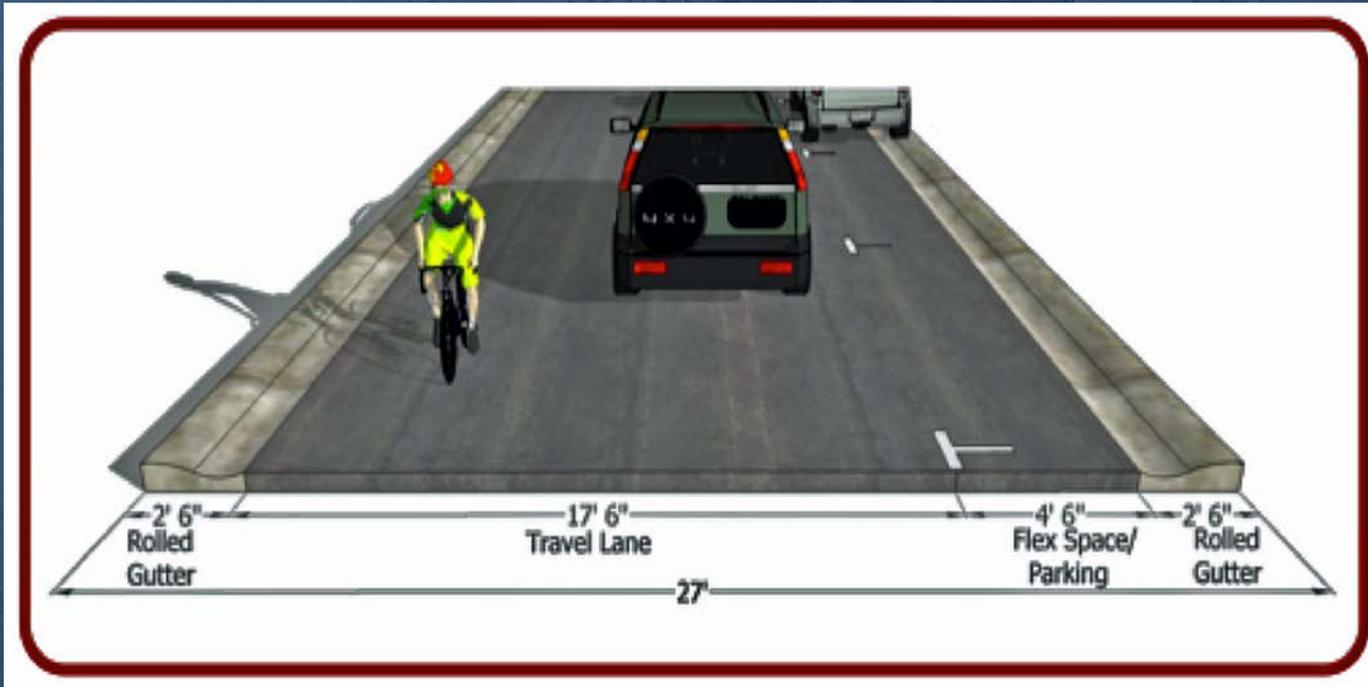
- Pedestrian accommodations and usage
- Volume of vehicles
- Number of access points
- Shoulder widths
- Speed Limit
- Horizontal clearance to vertical obstructions
- Intersection spacing

Street Capacity (Continued)

What impacts Street Capacity on Lowell Ave. and Empire Ave.

- Type of vehicles on the roadway
- Quantity and duration of snow events
- How the streets are plowed and maintained after snow events
- Where and how individuals elect to park
- How diligent PCMC enforces parking regulations
- Service delivery needs (garbage pickup, express mail delivery, etc.)

Street Capacity (Continued)



Options to maintain capacity with new roadway cross section

- How to assign the asphalt width available
- Maintain summer travel width
- Add sidewalks behind rolled gutter
- Create pockets of snow storage
- Add parking area as well behind rolled gutter
- Enforce parking standards
- Consider one-way option if needed

Street Capacity (Continued)

*One Way
Future
Conditions
2037
with
Treasure
and
improvements*

		Worst Approach ¹		Overall Intersection ²
Intersection	Control	LOS AM / PM	Approach AM / PM	LOS AM / PM
Park Ave / Deer Valley	Signal			D (36.9) / E (61.9)
Empire Ave / Silver King	Roundabout			A (7.3) / A (7.9)
Empire Ave / Shadow Ridge	Stop	A (1.9) / A (1.8)	EB / EB	
Empire Ave / Manor Way	Stop	A (6.7) / A (8.9)	EB / EB	
Empire Ave / Crescent Tram	Stop	A (2.7) / A (2.8)	WB / WB	
Empire Ave / 14 th Street	Stop	A (4.1) / A (4.4)	WB / WB	
Lowell Ave / Silver King	Stop	A (8.2) / A (5.6)	WB / WB	
Lowell Ave / Manor Way	Stop	A (6.5) / A (8.6)	SB / SB	
Lowell Ave / North Star	Stop	A (1.8) / A (3.3)	EB / EB	
Lowell Ave / Shadow Ridge	Stop	A (6.6) / A (8.6)	EB / SB	
Park Ave / 15 th Street	Stop	A (8.5) / C (22.5)	WB / WB	
Park Ave / 14 th Street	Stop	A (7.6) / C (24.4)	EB / EB	
Park Ave / 8 th Street	Stop	A (4.9) / B (10.1)	EB / EB	
Access 1 / Empire Ave	Stop	A (2.4) / A (2.4)	NB / NB	
Access 2 / Lowell Ave	Stop	A (.1) / A (.4)	SB / SB	

Notes:

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Pedestrian Accommodations

- Improve safety
- Install signs and paint crosswalks
- Two location for stair improvements
 - 6th Street from Woodside Avenue to Treasure Hill
 - 8th Street from Woodside Avenue to Treasure Hill
- Sidewalks along Lowell Avenue and Empire Avenue

Parking Summary

4th edition of *Parking Generation*, published by the Institute of Transportation Engineers (“ITE”)

- Resort Hotel - Land Use 310: Hotel, Urban
- Employee Housing - Land Use 221: Low/Mid-Rise Apartment, Urban
- Condominium/Townhouse - Land Use 230: Residential Condominium/Townhouse, Suburban and Urban
- Commercial - Land Use 820: **Shopping Center** & Land Use 931: Quality Restaurant

Parking Summary

Land Use (ITE Reference)	Size or Units	Weekday Parking Generation	Weekend Parking Generation
Hotel (310)	122,225 sq-ft or 202 units	129	182
Employee Housing	6,669 sq-ft or 25 units	30	32
Condominium/Townhouse	103 units	142	88 *
Commercial	17,470 sq-ft	178	184
Total		485	486

Parking Summary - Reduced

Land Use (ITE Reference)	Size or Units	Weekday Parking Generation	Weekend Parking Generation
Hotel	122,225 sq-ft or 202 units	129	182
Employee Housing	6,669 sq-ft or 25 units	27	26
Condominium/Townhouse	103 units	128	79
Commercial	17,470 sq-ft	142	147
Total		426	432

Temporary Construction Traffic

- Enter from Lowell exit on Empire
- Employees access to the site
- Product delivery limitations December to March (winter)
 - Outside peak hours
- Product delivery limitations April to November (summer)
- Snow plow when necessary to accommodate deliveries
- Parking (Richardson Flats, Ecker (new), or other locations)
 - Depends on location of employees and contractor
 - Changes and needs to remain fluid to service needs

Questions

Planning Commission and Public Comments:

Construction traffic entrance and exit? **Enter from Lowell and Exit on Empire**

Long term traffic entrance exit? **Enter from Lowell and Empire (assumed 50% each)**

Construction traffic - how many trips during peak hour? **Not provided because of fluctuation during construction**

Empire and Lowell street capacity? **Discussed, depends on use of paved surface area**

Operational street capacity? **Discussed, depends on use of paved surface area**

ITE 9th edition date - confirmation (LSC Comments)? **Latest edition was used, 2012**

Commercial traffic drawing from other than Treasure Hill visitors? **Primarily oriented towards the project**

Mitigation to keep construction traffic off Empire? **Education and reminders with contractor / sub-contractors**

Table 1 - 2005 vs 2017 (change in traffic percentage)? **Corrected**

Trip Generation Commercial space (LSC comments)? **Applied expected use for the proposed development**

Street width and capacity? **Discussed, depends on use of paved surface area**

Volume of cars on one-way? **Discussed, depends on use of paved surface area**

Questions

Construction traffic on Lowell Ave - two trucks at the same times? **Discussed, depends on use of paved surface area**

Street capacity on Lowell and Avenue Table 3? **Discussed, depends on use of paved surface area**

3rd party review - 100% occupancy? **Traffic engineering and planning focuses on typical day**

Commercial square footage not valid over time? **Not answered with traffic analysis**

3rd party study - worst scenario (winter) - Interstate 40/248 interchange & Kimball Junction? **Traffic engineering and planning focuses on typical day, SR-224 and SR-248 along with associated improvements are accounted for by UDOT.**

February 2017 - capacity of street? **Discussed, depends on use of paved surface area**

Table 3 - Lowell Ave / Manor 12.8% Increase? **Corrected**

Off site parking facilities? **Discussed and it is dependent upon on when construction occurs, where employees live, and contractor / sub-contractors**

Pedestrian traffic, safety and Sidewalk? **Discussed, currently needed and will solve future needs**

Mitigation strategies - year round? **Included in report, cabriolet, trails and shuttles**

Employee - require them not to drive to work? **Recommended incentives**

Questions

Outside customers not permitted into Treasure commercial? **Primarily oriented towards the project**

Winter condition - trigger of stoppage of construction? **Contractor oriented decision**

Worst case scenario - Heavy snow what can be done? **Not included in traffic analysis but discussed Traffic engineering and planning focuses on typical day**

Number of trucks needed for snow removal from Empire and Lowell? **PCMC best to respond**

PQS - Intent and goals and can we support? **Still being discussed between applicant and PCMC**

LSC versus Triton Engineering trip generation and trip reduction? **Discussed, applied most applicable land uses and reasonable trip reduction**

Emergency situation on worst case scenario? **Response recommended from emergency service personnel**

Parking question (hotel, condo parking requirements) - ITE Parking Generation 4th Provide support information? **Discussed urban and suburban**

One-way success - Matt & Alfred? **PCMC best to respond**

PQS tied to criteria? **Still being discussed between applicant and PCMC**

Modified plan - trip impacts? **Accounted with existing counts and factored up for future potential**