Park City Mountain Resort
Parking and Traffic Analyses

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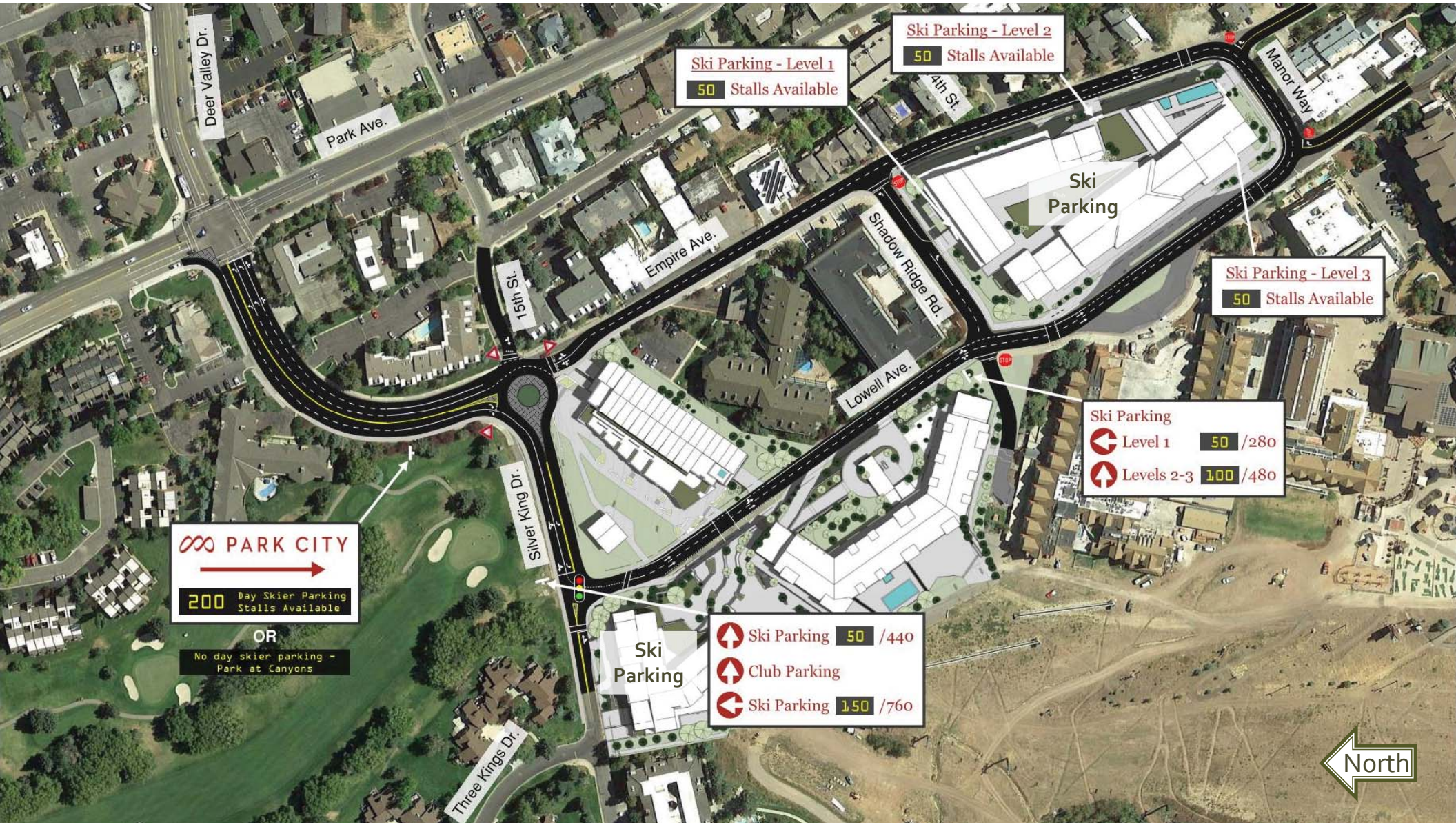
HALES ENGINEERING
innovative transportation solutions

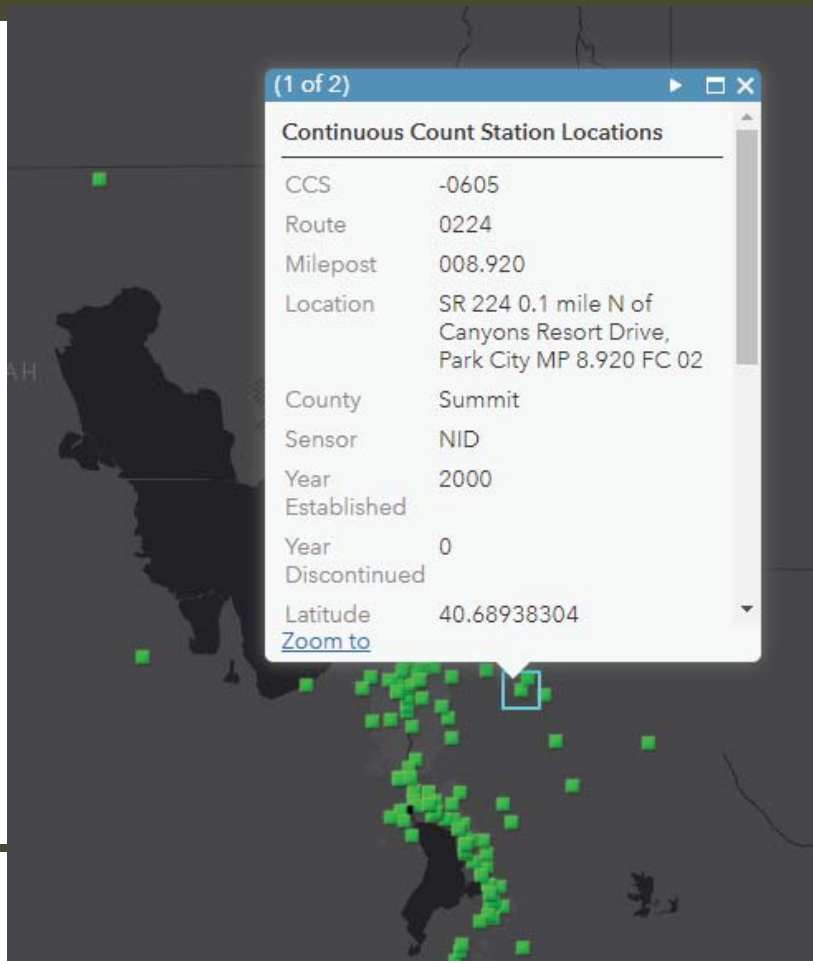
Parking - Wayfinding

- Wayfinding signs are used to direct drivers to available parking to reduce circuitous routes
- These will be used with variable messaging for day skier and resort parking
- The day skier parking will be in parcels B and E, near accesses to the ski hill


Deer Valley Dr.
Park Ave.
Ski Parking - Level 1
50 Stalls Available
Ski Parking - Level 2
50 Stalls Available
4th St.
Manor Way
Ski Parking
Empire Ave.
15th St.
Shadow Ridge Rd.
Ski Parking - Level 3
50 Stalls Available
Lowell Ave.
Ski Parking
Level 1 50 /280
Levels 2-3 100 /480
PARK CITY
200 Day Skier Parking Stalls Available
OR
No day skier parking - Park at Canyons
Silver King Dr.
Ski Parking
Ski Parking 50 /440
Club Parking
Ski Parking 150 /760
Three Kings Dr.
North

Traffic Analysis – Existing Conditions

- Two directional circulation (one lane each way)
- Data collected on Saturday, February 18, 2017 (President's Day Weekend)
- Peak hours 8:15 to 9:15 am, and 4:00 to 5:00 pm
- Evening peak was 25% higher than morning peak
- Volumes adjusted to a peak snow year (2016) based on UDOT CCS data **(+14%)**



Traffic Analysis – Level of Service

- Acceptable level of service (LOS) ranges are from LOS A-D
- LOS E-F are poor levels of service and mitigations are identified to improve intersections within these ranges

Level of Service	Description of Traffic Conditions	Average Delay (seconds/vehicle)
	Signalized Intersections	**Overall Intersection**
A	Extremely favorable progression and a very low level of control delay. Individual users are virtually unaffected by others in the traffic stream.	0 ≤ 10.0
B	Good progression and a low level of control delay. The presence of other users in the traffic stream becomes noticeable.	> 10.0 and ≤ 20.0
C	Fair progression and a moderate level of control delay. The operation of individual users becomes somewhat affected by interactions with others in the traffic stream.	>20.0 and ≤ 35.0
D	Marginal progression with relatively elevated levels of control delay. Operating conditions are noticeably more constrained.	> 35.0 and ≤ 55.0
E	Poor progression with unacceptably elevated levels of control delay. Operating conditions are at or near capacity.	> 55.0 and ≤ 80.0
F	Unacceptable progression with forced or breakdown operating conditions.	> 80.0
	Unsignalized Intersections	**Worst Approach**
A	Free Flow / Insignificant Delay	0 ≤ 10.0
B	Stable Operations / Minimum Delays	>10.0 and ≤ 15.0
C	Stable Operations / Acceptable Delays	>15.0 and ≤ 25.0
D	Approaching Unstable Flows / Tolerable Delays	>25.0 and ≤ 35.0
E	Unstable Operations / Significant Delays Can Occur	>35.0 and ≤ 50.0
F	Forced Flows / Unpredictable Flows / Excessive Delays Occur	> 50.0

Source: Hales Engineering Descriptions, based on the *Highway Capacity Manual* (HCM), 6th Edition, 2016 Methodology (Transportation Research Board)

Traffic Analysis – Existing LOS Conditions

- Existing intersections with poor LOS
  - Silver King Drive / Empire Avenue
  - Silver King Drive / Lowell Avenue
- All others at acceptable LOS

Traffic Analysis – Alternative Scenarios

- Several roadway configuration alternatives were considered:
  - **No-build with and without a roundabout at** Silver King Drive / Empire Avenue
  - **Alt. 1**: One-way loop except for two-way travel on Silver King and Shadow Ridge
  - **Alt. 2**: One-way loop except for two-way travel on Silver King, Shadow Ridge, and Empire to Shadow Ridge
  - **Alt. 3**: One-way road on Lowell Ave from Silver King to Manor Way
  - **Alt. 4**: One-way loop except for two-way travel on Silver King with roundabout at Silver King / Empire Ave
  - **Alt. 5**: One-way loop except for two-way travel on Silver King with roundabout at Silver King / Empire Ave
  - **Alt. 6a**: One-way loop except for two-way travel on Silver King with roundabouts at Silver King / Empire Ave and Lowell Ave / Silver King
  - **Alt. 6b (preferred)**: Same as 6a, but with a signal at Lowell Ave / Silver King instead of a roundabout

Traffic Analysis – Alternative Scenarios

Preliminary Level of Service Analysis

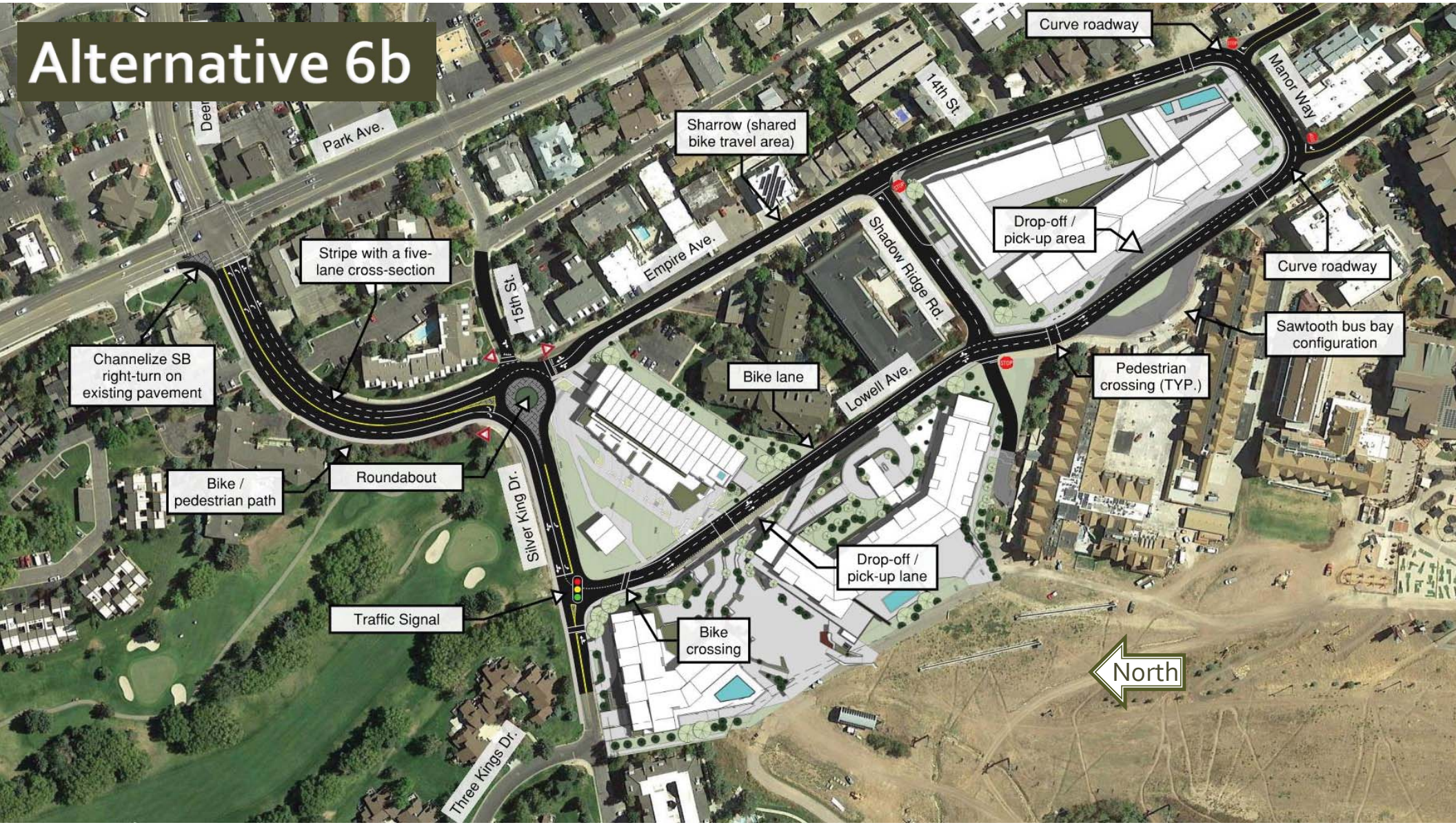
	Intersection	Existing (2019) Background	Existing (2019) Plus Project								
			No Build	No Build w/Rndbt	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5		Alt. 6a / 6b	
		PM	PM	PM	PM	PM	PM	PM	AM	PM	AM	PM
1	Empire Ave & Deer Valley Dr / Park Ave	D	D	D	D	D	D	D	C	D	C	D
2	Silver King Dr / Empire Ave	f	f	A	f	f	f	A	A	A	A	A
3	Lowell Ave / Silver King Dr	f	f	a	d	b	a	a	e	d	A	A
4	Three Kings Dr / Silver King Dr	a	f	b	a	a	a	a	a	a	a	a
5	Shadow Ridge Rd / Empire Ave	a	d	d	d	f	f	a	a	a	a	a
6	Shadow Ridge Rd / Lowell Ave	a	e	c	c	f	f	a	a	a	a	a
7	14th Street / Empire Ave	a	f	e	a	e	d	a	a	a	a	a
8	Manor Way / Empire Ave	a	d	b	b	d	a	a	a	a	a	a
9	Manor Way / Lowell Ave	a	d	c	a	c	a	a	a	a	a	a
10	North E Access / Silver King Dr	-	f	b	b	c	a	a	e	e	a	b
11	East E Access / Lowell Ave	-	f	b	a	a	b	a	-	-	-	-
12	West D Access / Lowell Ave	-	f	f	b	f	f	b	c	c	c	b
13	C Access / Lowell Ave	-	f	b	a	d	f	a	a	c	a	c
14	East D Access / Empire Ave	-	c	f	b	d	d	f	a	b	a	b
15	North B Access / Shadow Ridge Rd	-	e	c	f	f	f	a	a	a	a	a
16	South B Access / Manor Way	-	f	f	b	d	f	b	a	a	a	a
17	East B Access / Empire Ave	-	f	d	b	d	c	a	a	a	a	a

1. Intersection LOS values represent the overall intersection average for roundabout, signalized, and all-way stop-controlled (AWSC) intersections (uppercase letter) and the worst movement for all other unsignalized intersections (lowercase letter)

Source: Hales Engineering, September 2020

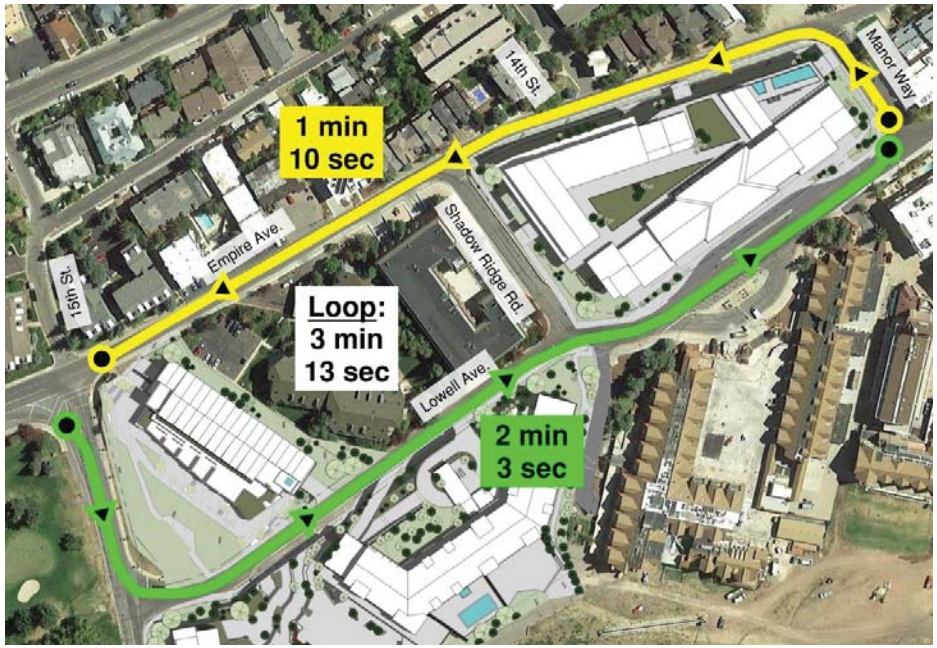
Traffic Analysis – Alternative Scenarios

- Alternative 6b was identified as the preferred alternative
- The one-way loop was determined to be safe and efficient
  - Safety:
    - Pedestrians look in one direction to see traffic
    - Vehicles have better visibility without opposing traffic flow
    - The overall number of vehicle conflict points has been reduced
  - Efficiency:
    - Transit and passenger vehicles flow efficiently with minimal conflicts
- Travel times were estimated using simulation software for existing two-way configuration and proposed one-way configuration
  - Travel times were reduced with one-way configuration

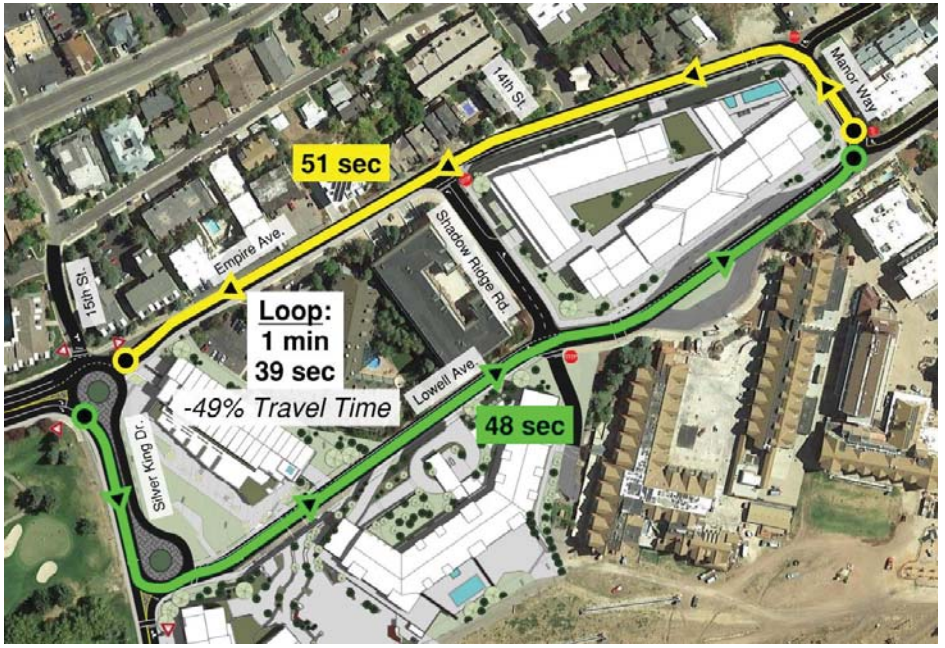

Alternative 6b
Curve roadway
Manor Way
14th St.
Park Ave.
Sharrow (shared bike travel area)
Empire Ave.
15th St.
Shadow Ridge Rd.
Drop-off / pick-up area
Curve roadway
Stripe with a five-lane cross-section
Sawtooth bus bay configuration
Channelize SB right-turn on existing pavement
Bike lane
Lowell Ave.
Pedestrian crossing (TYP.)
Bike / pedestrian path
Roundabout
Silver King Dr.
Drop-off / pick-up lane
Traffic Signal
Bike crossing
North
Three Kings Dr.

Traffic Analysis – Travel Times (Loop)

EXISTING TWO-WAY CONFIGURATION

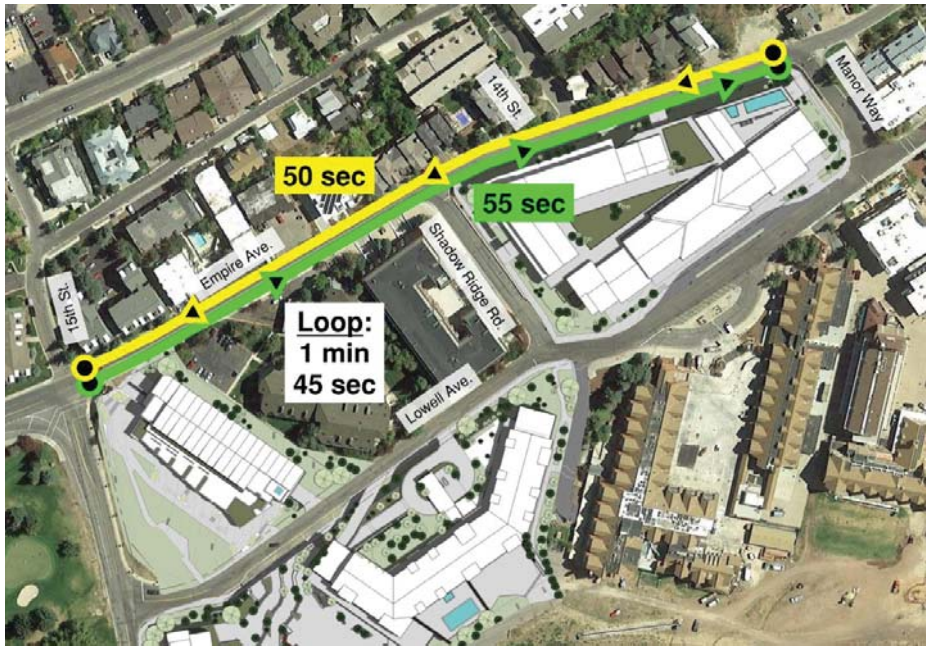


ONE-WAY CONFIGURATION

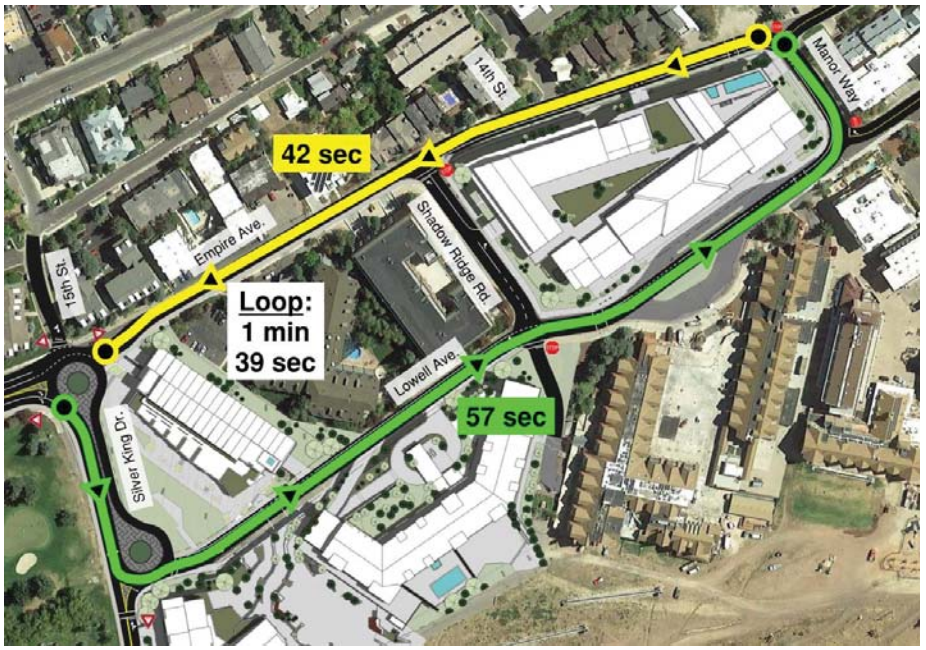


Traffic Analysis – Travel Times (To Manor Way)

EXISTING TWO-WAY CONFIGURATION



ONE-WAY CONFIGURATION



Traffic Impact Study

- The traffic impact study (TIS) evaluated existing and future conditions with and without the project
- The one-way loop alternative was assumed in future conditions with the project
- Mitigations and recommendations were made as needed with each scenario

Level of Service Analysis - Traffic Impact Study, Evening Peak Hour					
Intersection	Existing (2019)	Future (2024)		Future (2040)	
	Background	Background	Plus Project	Background	Plus Project
Empire Ave / Park Ave	D	D	E	F	F
Silver King Dr / Empire Ave	f	A	A	B	A
Lowell Ave / Silver King Dr	f	a	A	c	A
Three Kings Dr & NW E Access / Silver King Dr	a	a	a	a	a
Shadow Ridge Rd / Empire Ave	a	a	a	c	b
Shadow Ridge Rd / Lowell Ave	a	a	a	a	b
14th Street / Empire Ave	a	b	a	c	a
Manor Way / Empire Ave	a	a	a	b	b
Manor Way / Lowell Ave	a	a	a	b	a
NE E Access / Silver King Dr	-	-	a	-	a
North B Access / Shadow Ridge Rd	-	-	a	-	a
South B Access / Manor Way	-	-	a	-	b
East B Access / Empire Ave	-	-	a	-	b
West D Access / Lowell Avenue	-	-	-	-	b
C Access / Lowell Avenue	-	-	-	-	a
East D Access / Empire Avenue	-	-	-	-	d

1. Intersection LOS values represent the overall intersection average for roundabout, signalized, and all-way stop-controlled (AWSC) intersections (uppercase letter) and the worst movement for all other unsignalized intersections (lowercase letter)

Source: Hales Engineering, September 2020

Traffic Impact Study - Recommendations

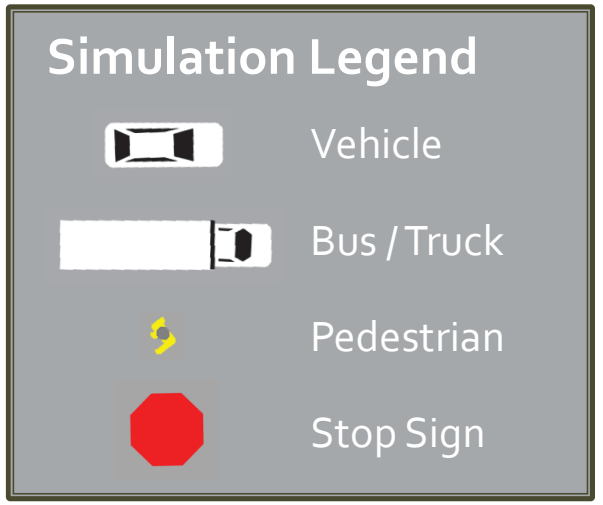
- UDOT, Park City, and PCMR should discuss solutions for the Park Avenue / Empire Avenue / SR-224 intersection
- Re-stripe Empire Avenue to five lanes between Park Avenue and Silver King Drive
- Install roundabout at Silver King Drive / Empire Avenue
- Install traffic signal at Silver King Drive / Lowell Avenue
- Implement one-way circulation with two travel lanes
- Enhance experience for all transportation modes: Park City Transit, rideshare, pedestrians, shuttles, and personal vehicles

Traffic Impact Study - Recommendations

- Transit:
  - Expanded bus opportunities (4 bus queuing area)
  - Sawtooth bus loading configuration, like the Kimball Junction intermodal hub
  - Incentivize transit ridership by charging for parking
- Active Transportation
  - Bike lanes provided on one-way loop
  - Pedestrian safety enhancements
  - Strategically placed crosswalks with one raised crossing from the plaza lawn to the ski beach

Traffic Analysis - Simulation

- Traffic analysis is completed using SimTraffic software
- The simulation accounts for interaction between intersections




Simulation Legend
Vehicle
Bus / Truck
Pedestrian
Stop Sign
Silver King Dr
East D Access
NW E Access
E E Access
West D Access
Empire Ave
Park Ave
Evening Peak Hour
Running at 2x Speed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