FINAL REPORT
CLINE DAHLE CAPACITY STUDY

University of Utah Metropolitan Research Center
Prepared for Summit County Economic Development
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Cline Dahl Capacity Study

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- Site visits to three cities and seven projects: Portland, Seattle, and Whistler

- Development of four design capacity options, each with two levels of density

- Transportation impact analysis: calculating trips and testing traffic impacts

Transit-Oriented Development

Density
Diversity
Design
Distance to transit
Destination accessibility
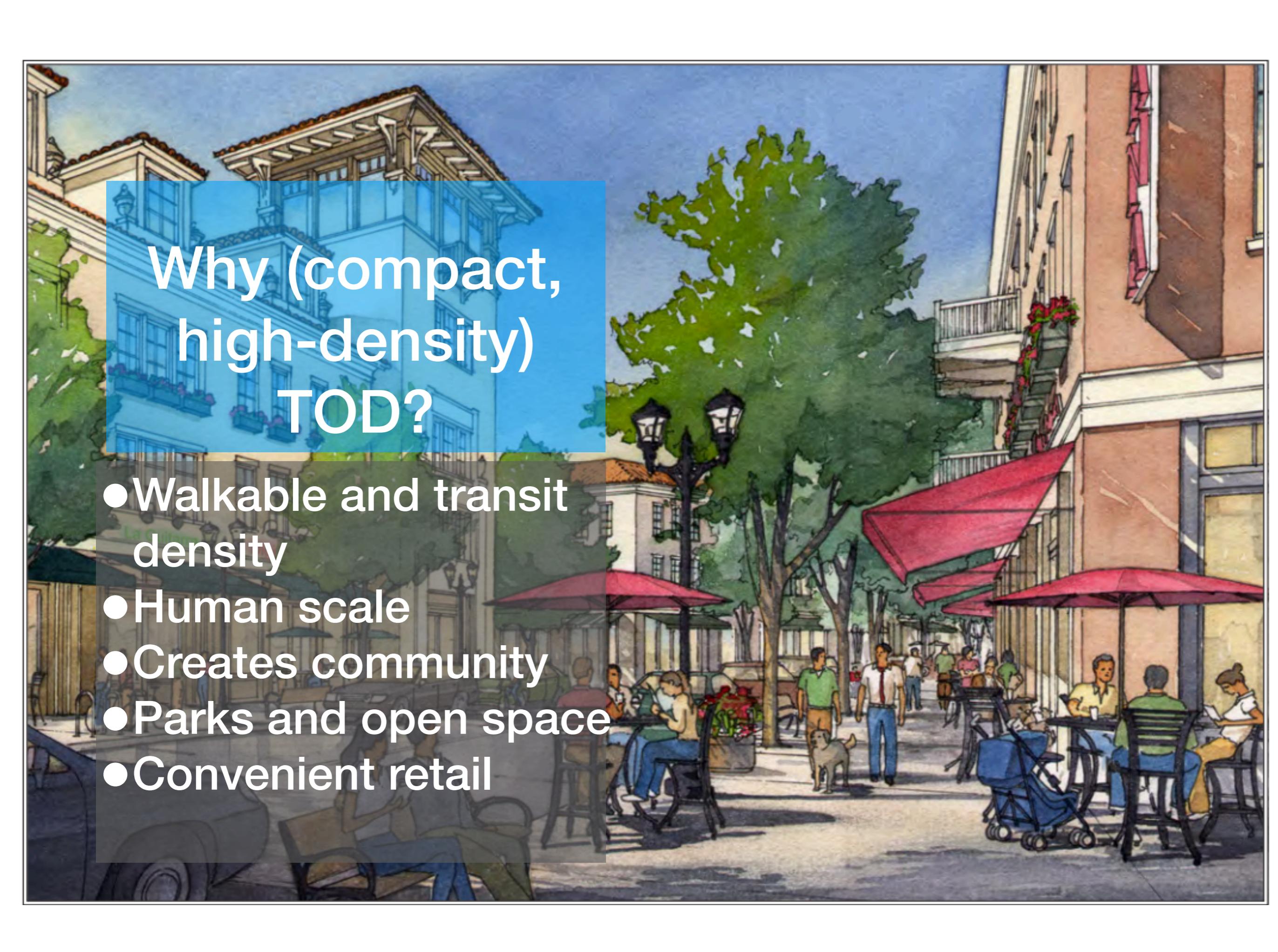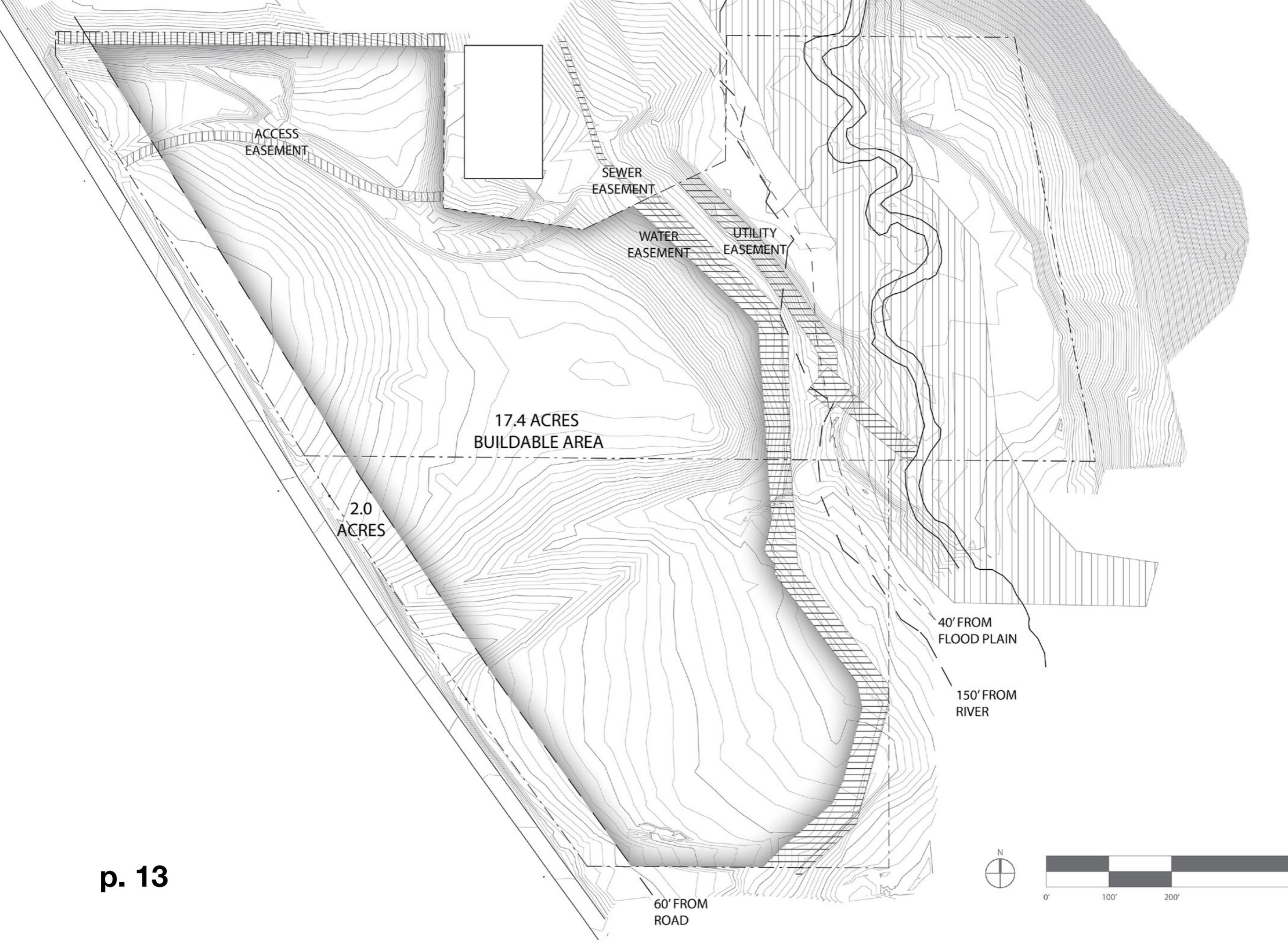
Why (compact, high-density) TOD?

- Walkable and transit density
- Human scale
- Creates community
- Parks and open space
- Convenient retail

Orenco Station

MAX Station

3000 ft

ACCESS
EASEMENT

SEWER
EASEMENT

WATER
EASEMENT

UTILITY
EASEMENT

17.4 ACRES
BUILDABLE AREA

2.0
ACRES

40' FROM
FLOOD PLAIN

150' FROM
RIVER

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60' FROM
ROAD

N

0'   100'   200'

Jeremy Ranch Elementary School

Water Conservancy
Building

HOSTEL
80 PPL

3 BR
16

SM.
STUDIO
100

SM.
STUDIO
100

22
SPACES

2 BR
30

42
SPACES

2 BR
30

1 BR
15

1 BR
67

1 BR
67

1 BR
67

2 BR
30

1 BR
20

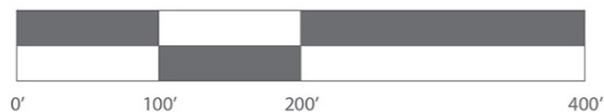Rasmussen Road

1 BR
36

1 BR
78

GARAGE
557 SPACES

3 STORY

2 STORY

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Walking path

Shuttle Stop

N

0'   100'   200'   400'

**Option 1a
634 units
80 bed hostel
10k SF retail
557 park+ride**

Jeremy Ranch Elementary School

26 SPACES

Water Conservancy Building

1 BR 36

1 BR 36

HOSTEL 60 PPL

1 BR 42

1 BR 42

GARAGE 420 SPACES

2 BR 36

24 SPACES

2 BR 26

2 BR 36

Rasmussen Road

18 SPACES

1 BR 54

1 BR 36

1 BR 36

1 BR 36

STUDIO 42

1 BR 36

1 BR 27

1 BR 57

STUDIO 42

1 BR 36

1 BR 39

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Walking path

Shuttle Stop

N

0'   100'   200'   400'
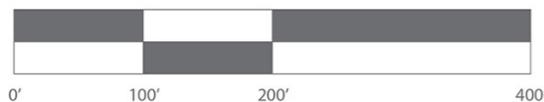
**Option 2a
616 units
80 bed hostel
10k SF retail
182 park+ride**

Jeremy Ranch Elementary School

2 BR
40

Water Conservancy
Building

2 BR
36

2 BR
36

75 SPACES

2 BR
44

2 BR
36

1 BR
60

1 BR
56

177 SPACES

1 BR
48

STUDIO
56

Rasmussen Road

STUDIO
42

STUDIO
56

2 BR
48

1 BR
56

88 SPACES

STUDIO
42

1 BR
36

1 BR
33

1 BR
55
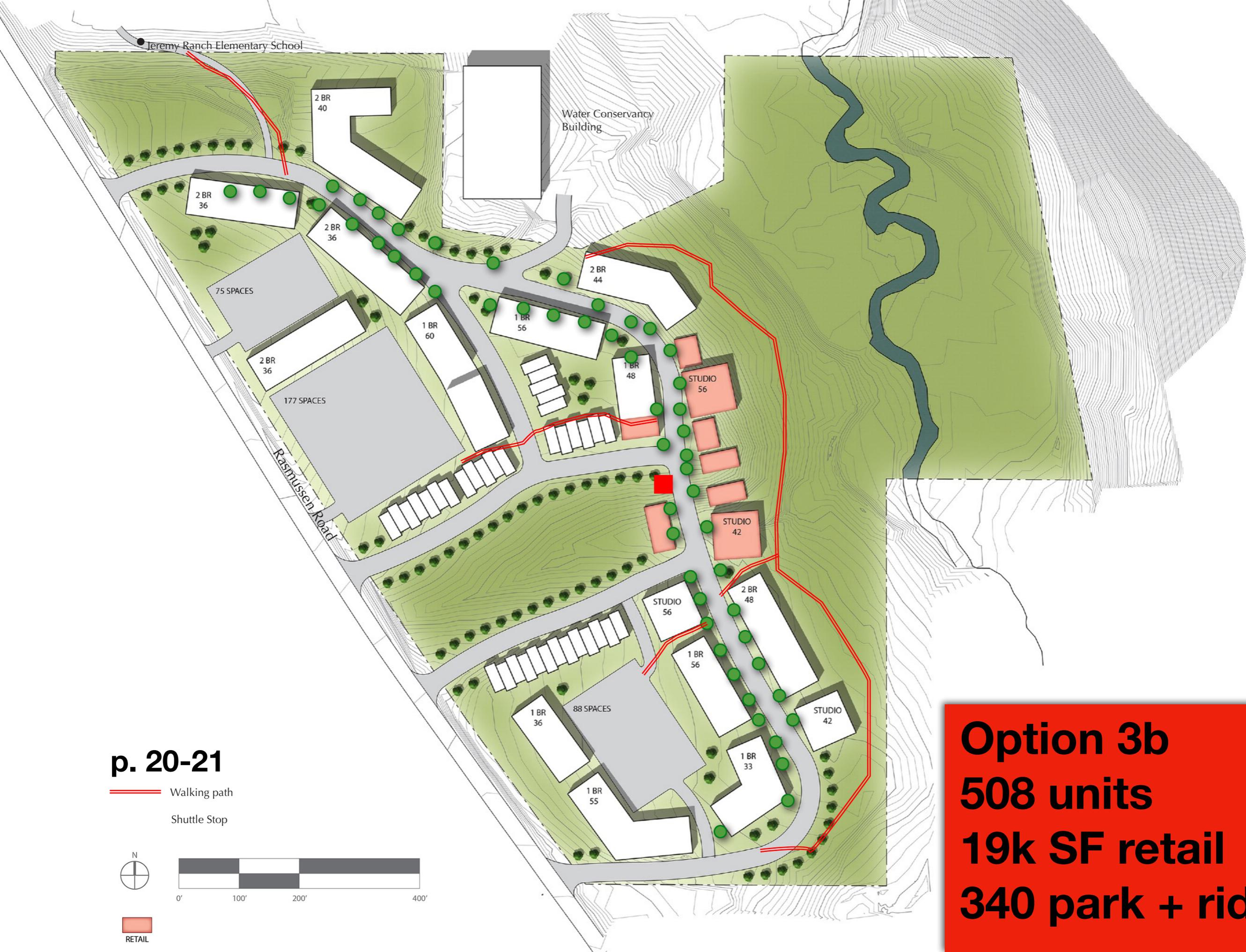
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Walking path

Shuttle Stop

N

0'   100'   200'   400'

RETAIL

**Option 3b
508 units
19k SF retail
340 park + ride**

Jeremy Ranch Elementary School

72 SPACES

32 SPACES

Water Conservancy Building

36 SPACES

SOCCER FIELD

SOCCER FIELD

40 SPACES

24 SPACES

2 BR 44

1 BR 56

1 BR 56

1 BR 48

STUDIO 56

STUDIO 56

Rasmussen Road

2 BR 48

STUDIO 56

1 BR 56

2 BR 56

88 SPACES

1 BR 48

1 BR 60

STUDIO 56

1 BR 44

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Walking path

Shuttle Stop

N

0'   100'   200'   400'
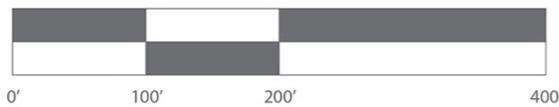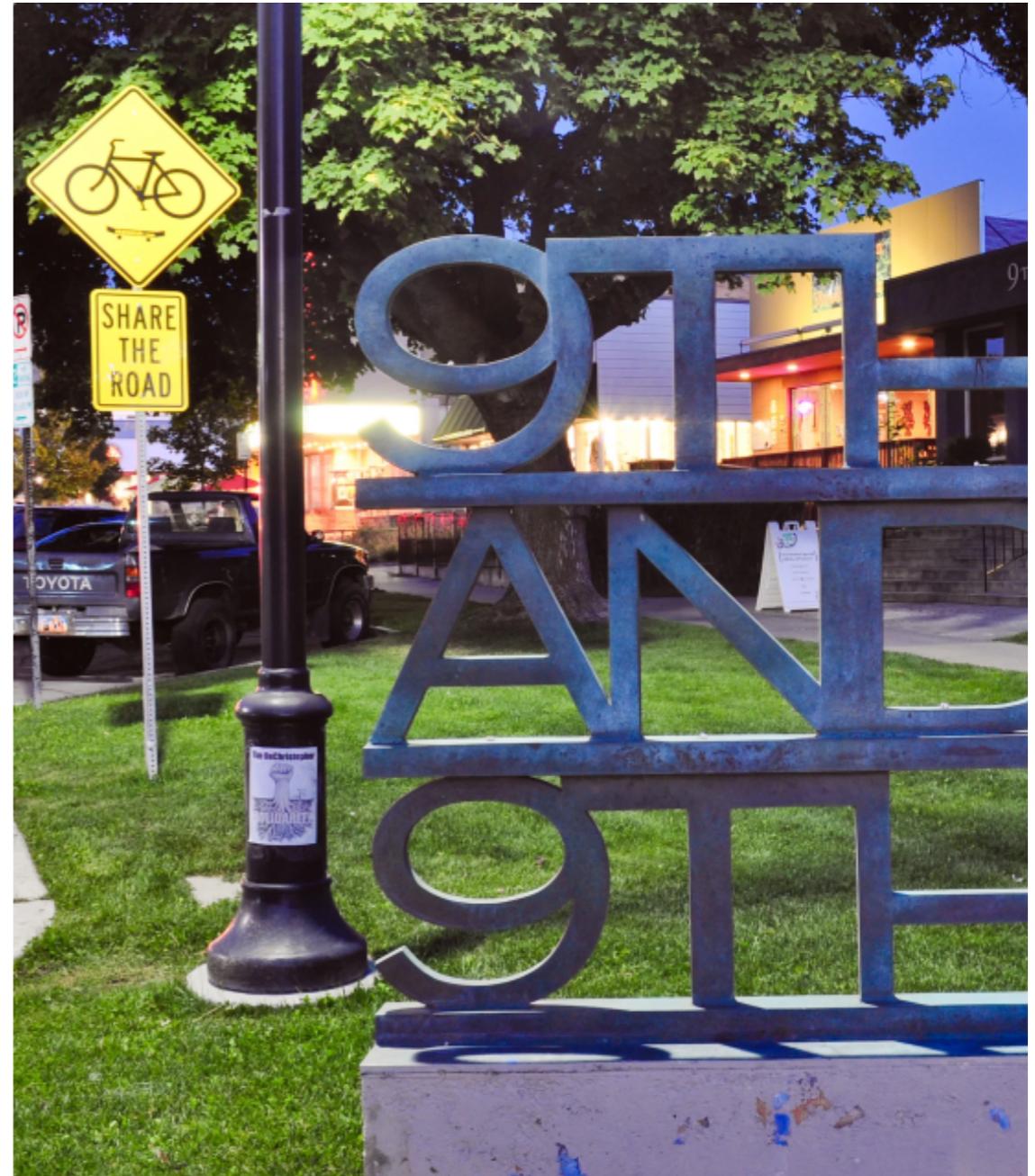
RETAIL

Option 4a
758 units
19k SF retail
2 soccer fields
268 park+ride

MXD database and methodology

- **412 MXDs (mixed-use developments or mixed-use districts) in 13 diverse regions of the U.S.**
- Examples from the Salt Lake region: Gateway, City Creek Center, Trolley Square, 9th and 9th, Commons at Sugarhouse, Magna Main Street, Quarry Bend, and Daybreak.

TRIP GENERATION MANUAL

9th Edition • Volume 1: User's Guide and Handbook

Institute of Transportation Engineers

Trip generation predicts the number of trips originating in or destined for a particular traffic analysis zone

Table 1 Option 4A Trip Generation Example

land uses			unit or sf	parking	daily trips	am peak	pm peak	ITE land use type
Residential	Townhouse	3	18	18	105	8	9	230 townhouse
	1 -BR	4	368	331	1,827	155	221	220 apartment
	2_BR	4	148	178	1,225	104	148	220 apartment
	Studio	4	224	112	741	63	90	220 apartment
	subTOTAL		**758**	**639**	**3,898**	**329**	**468**	
Commercial uses	coffee		2,200		1,941	238	90	936 coffee/donut shop
	recreation		5,600		922	39	99	492 health/fitness club
	day care		2,800		207	34	35	565 day care center
	convenience		2,100		717	65	73	852 convenience market
	sports bar		3,600		490	4	41	925 drinking place
	office		2,700		31	5	5	715 single tenant office
	subTOTAL		**19,000**	50	4,309	386	341	
Soccer fields			2		143	2	35	488 soccer complex
Subtotal for development			758 / 19,000	689	8,350	717	844	
Park-and-ride			--	268	509	127	127	
Total			758 / 19,000	**957**	**8,859**	**845**	**972**	

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Trip Reduction

Internal Capture:

internal share of trips = -0.06 + 0.037*ln area + 0.026*ln actden + 0.011*ln jobpop – 0.078*ln vehcap

External Walking:

walk share of external trips = -0.481 – 0.029*ln area + 0.031*ln actden + 0.009*ln jobpop + 0.021*ln empmile – 0.133* ln vehcap

External Transit:

transit share of external trips = -0.286 – 0.009*ln area + 0.022*ln actden + 0.010*ln empmile – 0.092*ln vehcap

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Variables

"area" is the buildable area of the site in square miles.

"actden" is activity density, which equals (population + employment)/area.

"jobpop" is job-population balance, which equals 1 – [ABS(employment – 0.2*population) / (employment + 0.2*population)].

"empmile" is the number of employees within one mile of the boundary of the development, not including employment within the development

"vehcaplow" is the vehicles per capita for the Low Parking assumption.

"vehcaphigh" is the vehicles per capita for the High Parking assumption.

Trip Reduction by Option

Table 3. Total Reduction for Different Development Scenarios

| | internal share of trips | | external trips | | | | total reduction | |
| | | | walk share | | transit share | | | |
	low	high	low	high	low	high	low	high
Option 1A	11.4%	8.5%	16.9%	12.0%	10.5%	7.1%	35.7%	26.0%
Option 1B	11.8%	8.9%	17.6%	12.6%	11.1%	7.6%	37.1%	27.4%
Option 2A	12.1%	9.6%	17.6%	13.4%	10.8%	7.9%	37.0%	28.9%
Option 2B	12.4%	10.2%	18.1%	14.3%	11.3%	8.7%	38.1%	30.8%
Option 3A	12.6%	9.4%	18.3%	12.9%	11.3%	7.6%	38.5%	27.9%
Option 3B	12.1%	8.8%	17.6%	12.0%	10.6%	6.8%	36.9%	26.0%
Option 3C	13.0%	9.8%	18.9%	13.5%	11.9%	8.1%	39.7%	29.3%
Option 4A	12.2%	9.3%	17.7%	12.7%	10.8%	7.4%	37.2%	27.6%
Option 4B	12.6%	9.9%	18.3%	13.6%	11.5%	8.2%	38.6%	29.5%

PM Peak Hour Trips

Table 6	PM Peak Hour Vehicle Trips of the Development					PM Peak hour Trips of Park and Ride
		Low Parking		High Parking		
	ITE Estimation	Reduction	Net Trips	Reduction	Net Trips	
Option 1A	620	35.7%	399	26.0%	459	265
Option 1B	706	37.1%	444	27.4%	513	265
Option 2A	631	37.0%	398	28.9%	448	86
Option 2B	813	38.1%	503	30.8%	562	86
Option 3A	847	38.5%	521	27.9%	610	162
Option 3B	685	36.9%	432	26.0%	507	162
Option 3C	1,009	39.7%	608	29.3%	713	162
Option 4A	845	37.2%	531	27.6%	612	127
Option 4B	1,071	38.6%	658	29.5%	755	127

- The PM (afternoon) peak hour trip generation by the Cline Dahle site is of greatest interest to us.
- For all options on the Cline Dahle site, the estimated reductions in ITE vehicle trips range from 26.0% to 39.7%.
- This is higher than the average vehicle trip reduction for the 412 MXDs in our sample, 22.4%.
- This is due to the higher than average density and the lower than average vehicle ownership per capita of all options

Vehicle Trip Distribution

Table 7. Trip Distribution for the PM Peak Hour Vehicle Generated by the development	Alternative 2A (low parking)	Alternative 4B (high parking)
Total Trips Generated	*398*	*755*
Outbound		
Outbound total	119	229
turn right out of development onto Rassmussen northbound	84	159
enter north RAB and take 2nd exit onto I-80 westbound	21	40
enter north RAB and take 3rd exit onto RAB Homestead southbound	63	119
enter south RAB and take 2nd exit onto Pinebrook southbound	19	40
enter south RAB and take 4th exit onto I-80 eastbound	44	83
Inbound		
Inbound total	279	528
turn left into development (from Rassmussen north)	195	370
enter north RAB from east/I-80 and take 1st exit on Rassmussen north	59	111
enter north RAB from south/Homestead south and take 1st exit onto Rassmussen north	137	259
enter south RAB from I-80 eastbound and take 3rd exit onto Homestead northbound	82	155
enter south RAB from Pinebrook northbound and take 2nd exit onto Homestead northbound	27	52
enter south RAB from Kilby westbound and take 1st exit onto Homestead northbound	27	52

Traffic Simulation

Figure 4: Future 2040 Plus Project Low Parking Level of Service

Figure 5. Future 2040 Plus Project High Parking Level of Service

- These results serve as a baseline condition for the impact analysis of the proposed development during future (2040) conditions.

- The 2040 background volumes, to which development-related traffic is added, come from UDOT and assume dramatic growth in Summit County population toward the end of the period.

- Given existing zoning and other constraints, Summit County planners question whether growth like this is realistic.

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Conclusions

- At least 600 units mixed use: combination of 3 bedroom townhouse; studio, 1 bedroom, and 2 bedroom apartments; plus retail of 10k to 15k will provide a good basis for TOD without impacting traffic

- The more park + ride there is, the more it impacts traffic at the planned roundabout

- There is some uncertainty in the traffic projections due to the timing, other development, and future projections