START Bus
2020-2025 Routing Plan

START BUS

TRANSPORTATION CONSULTANTS, INC.

Alternatives Development

November 2019

Goals Today

- Recap Rider Survey Results
- Recap Community Survey Results
- Review Mobility Trends
- Review Transit Planning Best Practices
- Discuss Preliminary System Alternatives

Project Process

November 2019

- Preliminary Alternatives
- Ideas to spur discussion and input

End of January 2020

- Preferred Alternative(s)
- Detailed analysis and route/service details

February 2020

- Public open houses
- Community survey

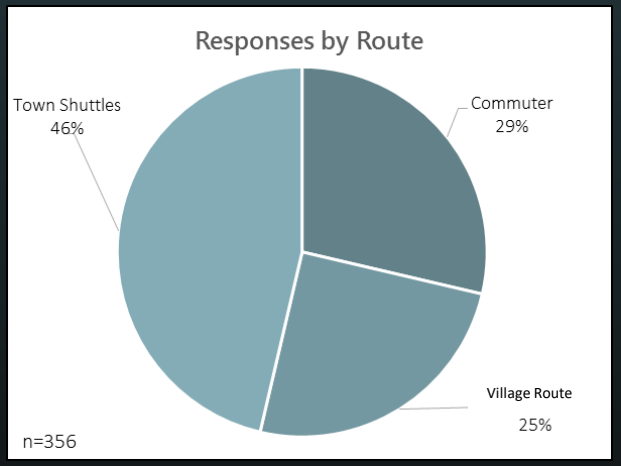
March 2020

- Refined Final Alternative
- Draft and Final of complete Route Plan

Onboard Rider Survey

- Survey dates: August 14-16, 2019
- 3 different survey forms were distributed
  - LSC – Town Shuttles and Village Route
  - START Bus Drivers – Teton Valley and Star Valley

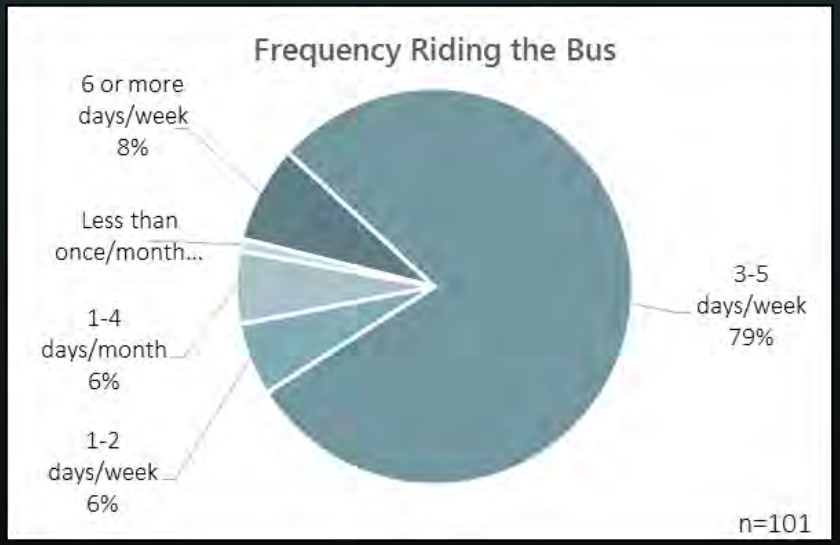
- Total responses: 356
  - Commuter: 102
  - Village Route: 89
  - Town Shuttles: 165

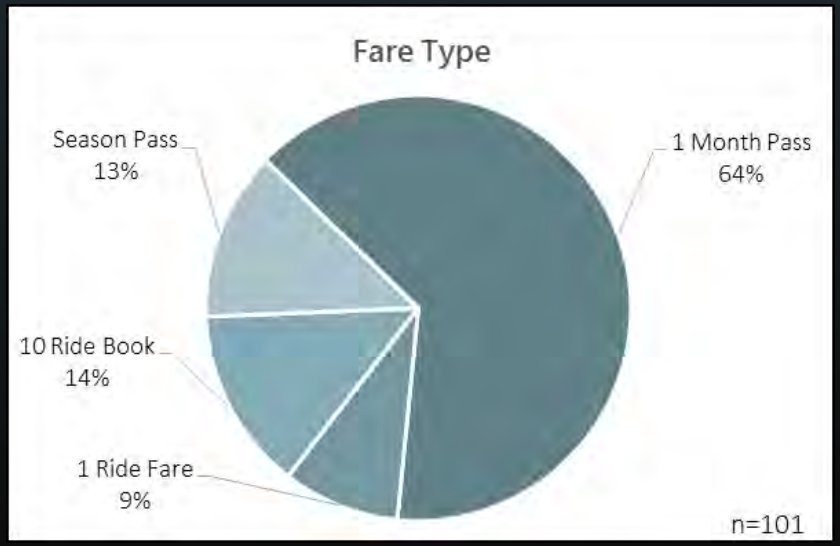


- Language: 86% English, 14% Spanish

Commuter Survey Results

- 57% Star Valley, 43% Teton Valley
- 79% ride 3-5 days per week
- Most popular reasons for riding: save money on driving (63%), avoid driving (49%), and for the environment (31%)
- 89% are employed year-round full-time
- 10% reported using the bike rack
- 64% pay with a 1 month pass
- 44% between the ages of 40-59, 31% between 25-39





Commuter Survey Results

- Overall, Commuters would like to see better buses (reliability and comfort) and schedule changes/additional runs, but are very happy with START service and drivers

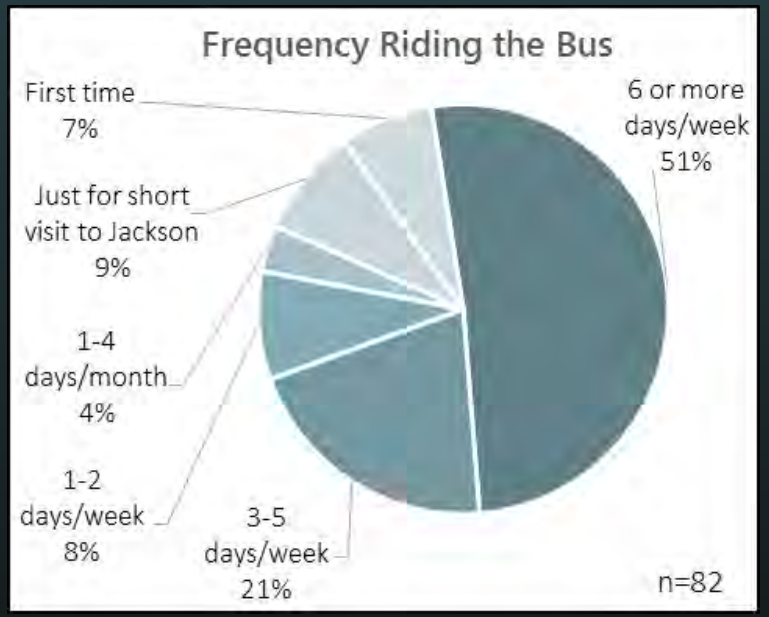
Commuter Satisfaction with Existing Service	
Attribute	Average Score
Driver Courtesy	4.76
Start Time of Service	4.41
Overall Safety of START	4.41
Ease in Planning Trip	4.39
Overall Satisfaction	4.37
Service Area Covered	4.17
Convenience of Bus Stops	4.15
End Time of Service	4.12
Service Frequency	4.07
Travel Time on Bus	4.00

Desired Change for How START Operates		
Change	Number of Respondents	Percent of Respondents
Additional Commuter Runs - Longer Service Hours	30	43%
Better Buses (Comfort and Reliability)	13	19%
Express/Direct Service	9	13%
Weekend Service	9	13%
Midday Service	8	11%
Additional/Modifications to Existing Bus Stops	6	9%
Improve Safety	4	6%
Improve Connections Between Routes	3	4%
Improve Communication with Passengers	2	3%
Other	0	0%
Total	**84**	**171%**

Additional Comments Received from Commuters		
Change	Number of Respondents	Percent of Respondents
Better Buses (Comfort and Reliability)	16	31%
Positive Comment About START Drivers	11	21%
Positive Comment About START	9	17%
Schedule Changes/Additional Commuter Runs	9	17%
Improve On-Time Performance	4	8%
Bus Stop Locations Aren't Convenient	2	4%
Express/Direct Service	2	4%
Weekend Service	2	4%
Other	8	15%
Total	**63**	**121%**

Village Route Survey Results

- 48% traveling Jackson to TV, 42% TV to Jackson
- 51% ride 6 or more days per week
- Trip purpose: 62% work, 20% recreation/social, 8% shopping, 8% sightseeing
- Most popular reasons for riding: no car available (48%), more convenient (27%), no driver's license (18%)
- Resident Status: 38% Full-Time, 30% Part-Time, 32% Not a Resident
- Resident Location: 34% TV, 25% Wilson, 8% Alpine, 8% Victor
- Employment Status: 47% Seasonal Full-Time, 31% Year-Round Full-Time, 14% Seasonal Part-Time
- 5% reported using the bike rack
- 39% between the ages of 19-24, 35% between 25-39



Village Route Survey Results

- Overall, Village Route riders would like to see extended service hours, increased service frequency, improvement to on-time performance, and service to the airport

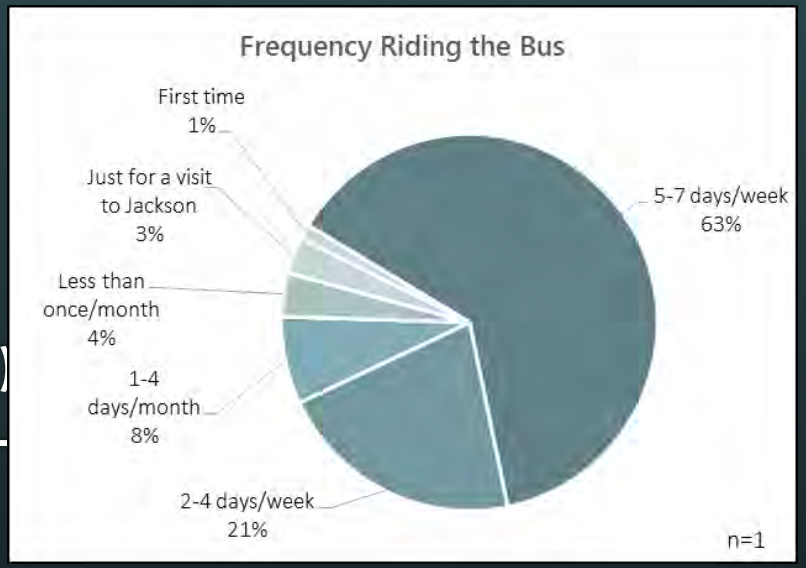
Village Route Satisfaction with Existing Service	
Attribute	Average Score
Overall Satisfaction	4.44
Convenience of Bus Stops	4.43
Ease in Planning Ttrip	4.41
Overall Safety of START	4.39
Driver Courtesy	4.35
Start Tme of Service	4.35
Service Area Covered	4.33
Service Frequency	4.13
End Time of Service	4.01

Desired Change for How START Operates		
Change	Number of Respondents	Percent of Respondents
Extend Service Hours	20	41%
Increase Service Frequency	14	29%
Improve On-Time Performance	6	12%
Schedule Changes	4	8%
Bus Changes	3	6%
More Direct/Express Service	3	6%
Additional Teton Valley Service	2	4%
Expand Service Area	2	4%
Improve App	2	4%
Improve Wifi Service	2	4%
Other	4	8%
Total	**62**	**127%**

Desired New START Route/Service		
	Number of Respondents	Percent of Respondents
New Service to the Airport	11	34%
More Direct/Express Service	3	9%
Service to Wilson	3	9%
Later Service	2	6%
More Service on Star Valley Route	2	6%
Service to Grand Teton National Park	2	6%
Service to Rafter J	2	6%
Bus Stop on the Town Square	2	6%
Other	9	28%
Total	**36**	**113%**

Town Shuttle Survey Results

- 69% Town Shuttle 1, 31% Town Shuttle 2
- Trip purpose: 50% work,18% personal business, 16% shopping
- 63% ride 5-7 days per week
- Most popular reasons for riding: no car available (53%), no driver's license (30%)
- Resident Status: 58% Full-Time, 21% Part-Time, 21% Not a Resident
- 87% of residents live in Jackson
- Employment Status: 33% Seasonal Full-Time, 33% Year-Round Full-Time, 18% Seasonal Part-Time
- 8% reported using the bike rack
- 38% between the ages of 19-24, 28% between 25-39



Town Shuttle Survey Results

- Overall, would like extended service hours, increased service frequency, and improved on-time performance

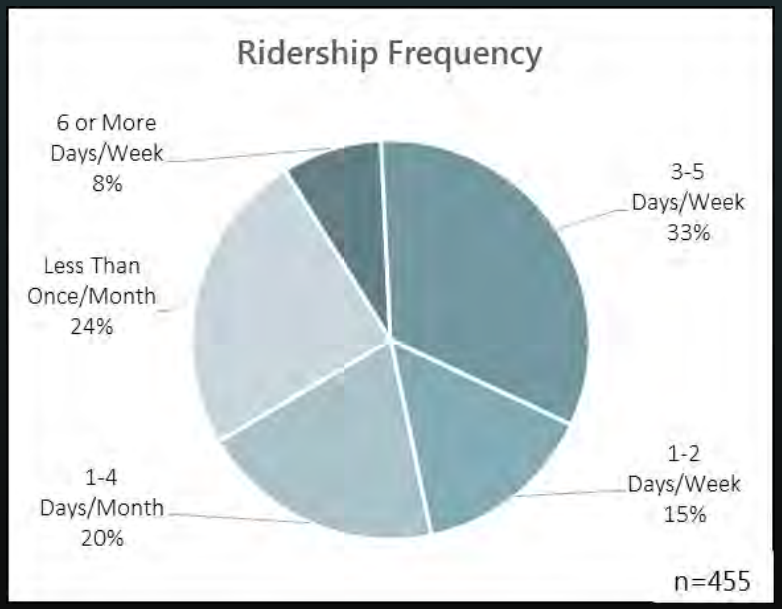
Satisfaction with Existing Service	
Attribute	Average Score
Driver courtesy	4.55
Overall safety of START	4.50
Overall satisfaction	4.44
Convenience of bus stops	4.42
Ease in planning trip	4.31
Service area covered	4.28
Service frequency	4.22
Start time of service	4.13
End time of service	3.94

Desired New START Route/Service		
	Number of Respondents	Percent of Respondents
Service to Rafter J	8	19%
Service South of Jackson	6	14%
Service to the Airport	5	12%
Increase Service Frequency	4	9%
Service North of Jackson	4	9%
Change Service	3	7%
Service to GTNP	3	7%
Service to Wilson	3	7%
New Bus Stops	4	9%
Service to Melody Ranch	2	5%
Other	5	12%
Total	**47**	**109%**

Desired Change for How START Operates		
Change	Number of Respondents	Percent of Respondents
Extend Service Hours	28	32%
Increase Service Frerquency	27	31%
Improve On-Time Performance	22	25%
Bus/Bus Stop Improvements	8	9%
Positive Comment About START	7	8%
More Direct/Express Service	3	3%
Additional Bus Stops	3	3%
Improve App	2	2%
Improve Driver Professionalism	2	2%
Other	7	8%
Total	**109**	**125%**

Online Community Survey Results

- 641 total responses
  - 97% English, 3% Spanish
- 72% of respondents currently ride START
- 24% of respondents who ride START, ride less than once per month
- Most popular reasons for riding START are to avoid driving, for the environment, and to avoid traffic



Reason for Riding		
Reason	Number of Respondents	Percent of Respondents
Avoid Driving	229	50%
For the Environment	201	44%
Avoid Traffic	154	34%
Save Money on Driving	147	32%
Save Money/Time on Parking	144	32%
More Convenient	100	22%
No Car Available	65	14%
No Driver's License	27	6%
Winter Skiing/Working at Teton Village	23	5%
Other	41	9%
Total	**1,131**	**247%**

Online Community Survey Results

- Of respondents who ride START
  - 96% ride during the winter season
  - 60% ride the Village Route

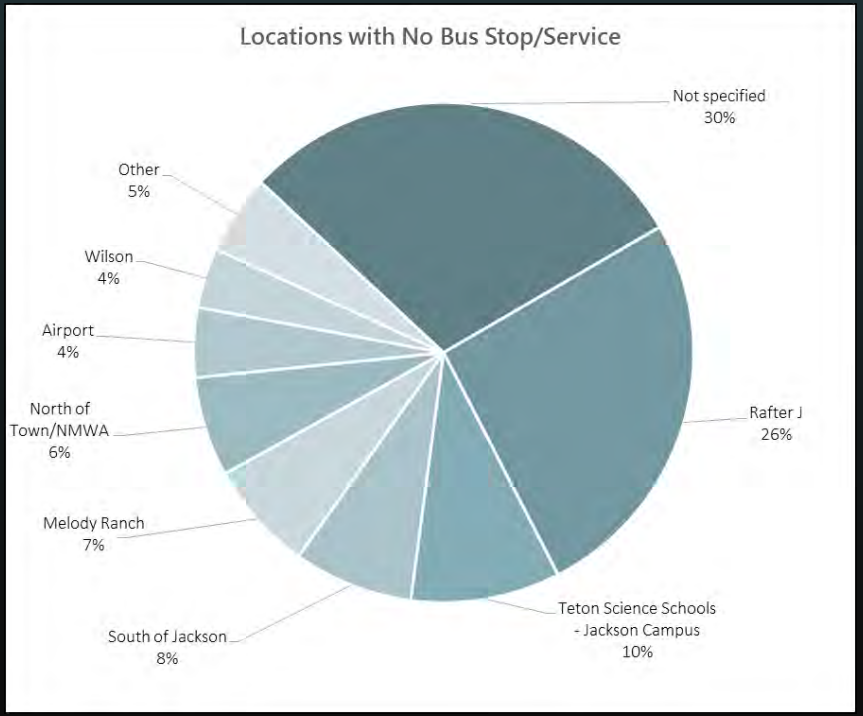
Riding By Season		
Season	Number of Respondents	Percent of Respondents
Spring	221	49%
Summer	218	48%
Fall	212	47%
Winter	433	96%
Total	**1,084**	**241%**

Riding By Route		
Season	Number of Respondents	Percent of Respondents
Green Line	263	60%
Town Shuttle	196	44%
Teton Valley	94	21%
Star Valley	42	10%
Total	**595**	**135%**

Online Community Survey Results

- No bus stop/service, schedule times don't work, and prefer other mode of travel were the top reasons for why respondents don't current ride START.
- Most frequent locations with no bus stop/service: not specified (30%), Rafter J (26%), Teton Science Schools (10%), and south of Jackson (8%)

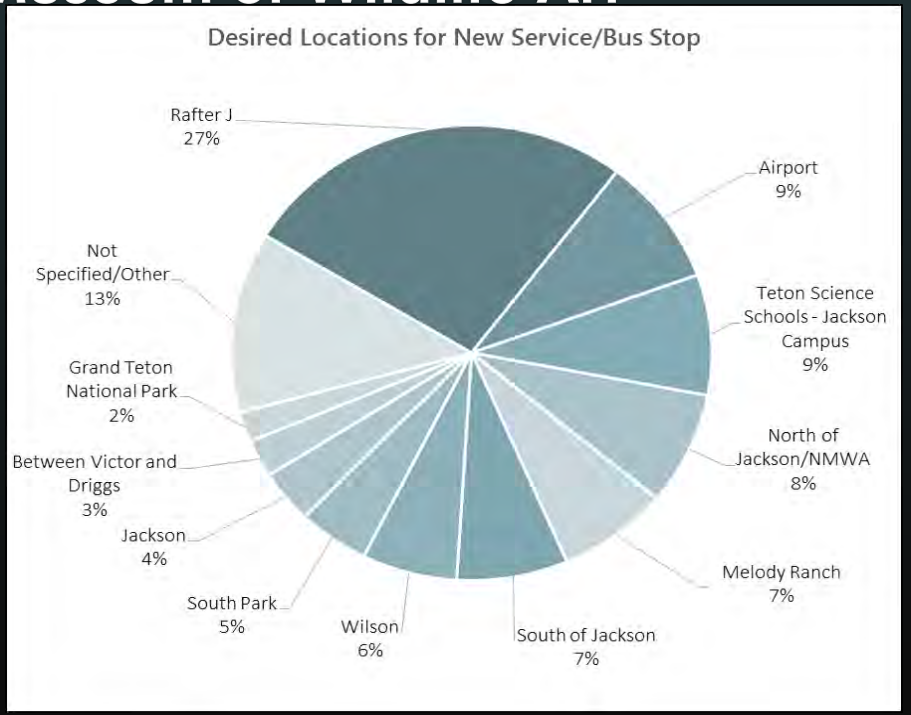
Why don't you ride START?		
Reason	Number of Respondents	Percent of Respondents
No bus stop/service	155	67%
Schedule times don't work	46	20%
Prefer other mode of travel	30	13%
Bus takes too long/inconvenient	25	11%
Don't need to/choose not to use START	12	5%
Need better frequency	12	5%
Bus and connection between buses isn't reliable	10	4%
Travel with baby/children	7	3%
Bus is too crowded	5	2%
No weekend service	5	2%
Better rider materials	3	1%
Other	6	3%
Total	**316**	**136%**



Online Community Survey Results

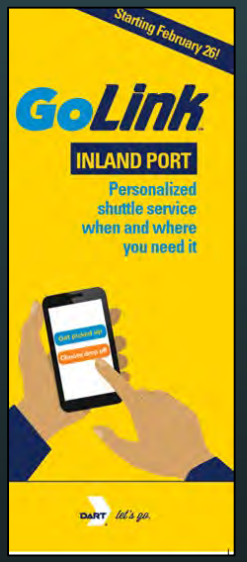
- More frequent service, more direct/express service, and new service/bus stops were the top reasons for how to get respondents to start riding START or ride more often
- Most desired new service/bus stop locations: Rafter J (27%), Airport (9%), Teton Science Schools (9%), and north of Jackson/National Museum of Wildlife Art

What would get you to start riding START or ride START more often?	Number of Respondents	Percent of Respondents
More Frequent Service	274	47%
More Direct/Express Service	231	40%
New Service/Bus Stop	187	32%
Later Service Hours	187	32%
More Park-N-Ride Locations	164	28%
Earlier Service Hours	82	14%
Schedule Change of Existing Service/Improve Connections Between Routes	14	2%
Weekend Service	10	2%
Additional Buses to Reduce Overcrowding	9	2%
Better Buses/Bus Improvements/More Bike Racks	8	1%
Improve On-Time Performance	7	1%
Improve Rider Materials/Information/Phone App/On-Board Wifi	9	2%
More Mid-Day Service	5	1%
Other	14	2%
Total	**1,201**	**206%**



Emerging Mobility – Microtransit Basics

- What is it?
  - Form of demand response transit using a smartphone app to match trip requests in real-time to dynamic/flexible routes
- What are critical success factors?
  - Smaller service area, usually connected with transit center, with urban, near urban density
  - Ability to group trips to/from key destination at similar times
  - Fare structure that balances convenience and ridership
  - Marketing
- Operational considerations
  - Can be contracted turn-key or agency operated with technology
  - Productivity is generally lower than fixed-route bus (3-6 passengers per hour) and may cost more per hour due to need for multiple vehicles
  - Smaller vehicles such as vans or even small electric shuttles



Emerging Mobility – Microtransit Case Study: Mountaineer

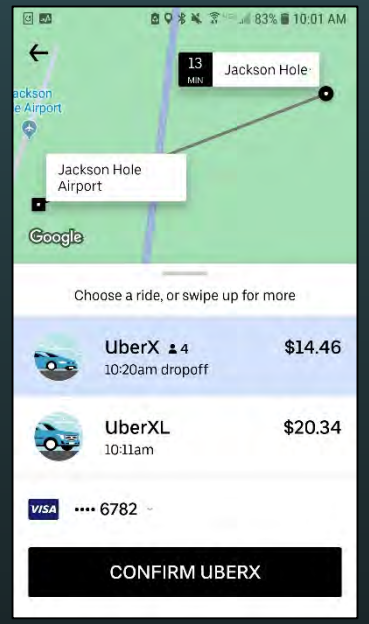
- Operates in Squaw Valley and Alpine Valley, connecting condos with base areas
  - Service area of approx. 2.5 miles long by half mile wide
- Operated by Downtowner, Inc.
- 2018/19 season stats:
  - 81,367 rides
  - 8,600 service hours
  - 9.5 passengers/hour
  - Fleet of eight vans, going to 10 vans for 2019-2020
- Free to rider
  - Paid, in part, through a one percent assessment on lift tickets sold on-site and one percent assessment on lodging rentals
- 2019-2020 Budget = $600k

April 2019
Passengers: 10,497
Rides: 6,198
Average rating (out of 5): 4.97
Average wait time: 4:16
Rides shared: 37%

Season To Date (Dec 1 - Apr 30)
Passengers: 81,367
Rides: 43,432
Average rating (out of 5): 4.96
Average wait time: 8:32
Rides shared: 53%

Emerging Mobility – TNC Partnerships

- Usually used to enhance existing service
  - First mile, last mile
  - Extend paratransit service area/hours
- Subsidy limits and eligibility must be defined
- Can be lower upfront cost
- Works best for short trips, usually non-work, in non-rural areas
- Accessibility and drug testing must be addressed
- Risk with lack of control over service consistency, availability, fares, ridership/trip data
- May not be eligible for federal funding
- Success not guaranteed
- Need enough supply of drivers online



Emerging Mobility – Mobility Hubs

- Seamless, interconnected
- Technology-focused
  - Single-point, app-based ticketing and trip planning
  - Real-time information, across modes
  - Smart infrastructure
- Evolving concept that takes dedicated space and bike-ped environment

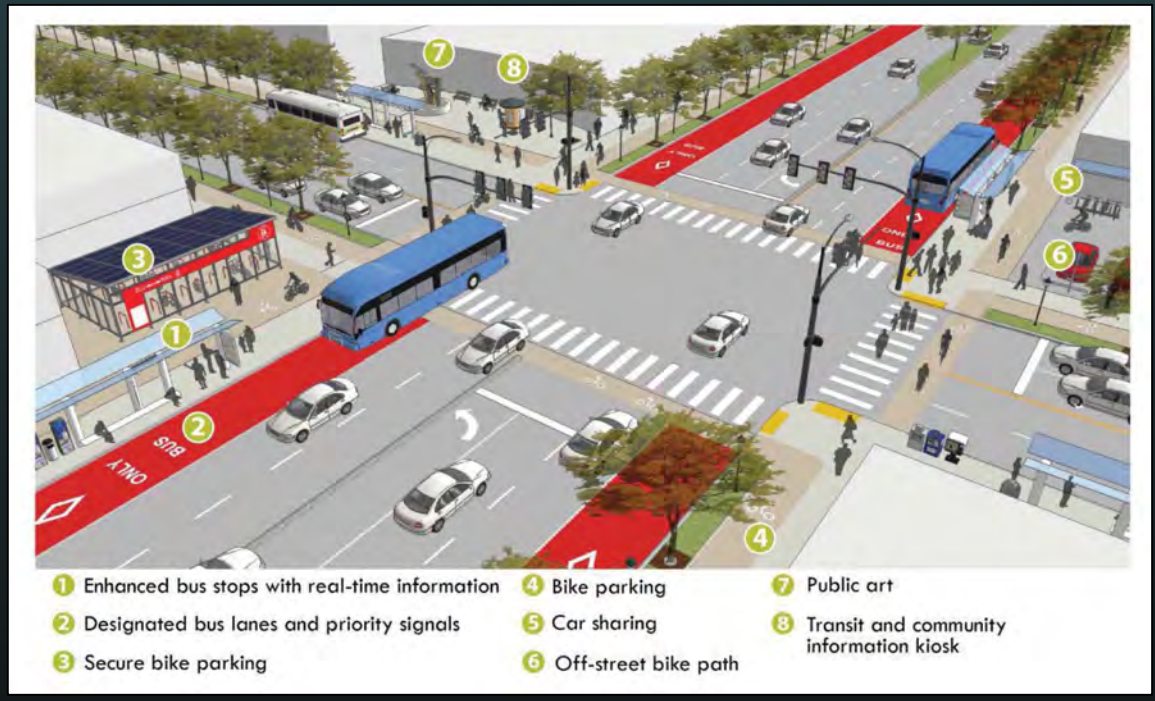


Image Credit: City of Boulder, CO
(https://bouldercolorado.gov/goboulder/north-boulder-mobility-hub)

Emerging Mobility: E-Bikes and E-Scooters (Micro-Mobility)

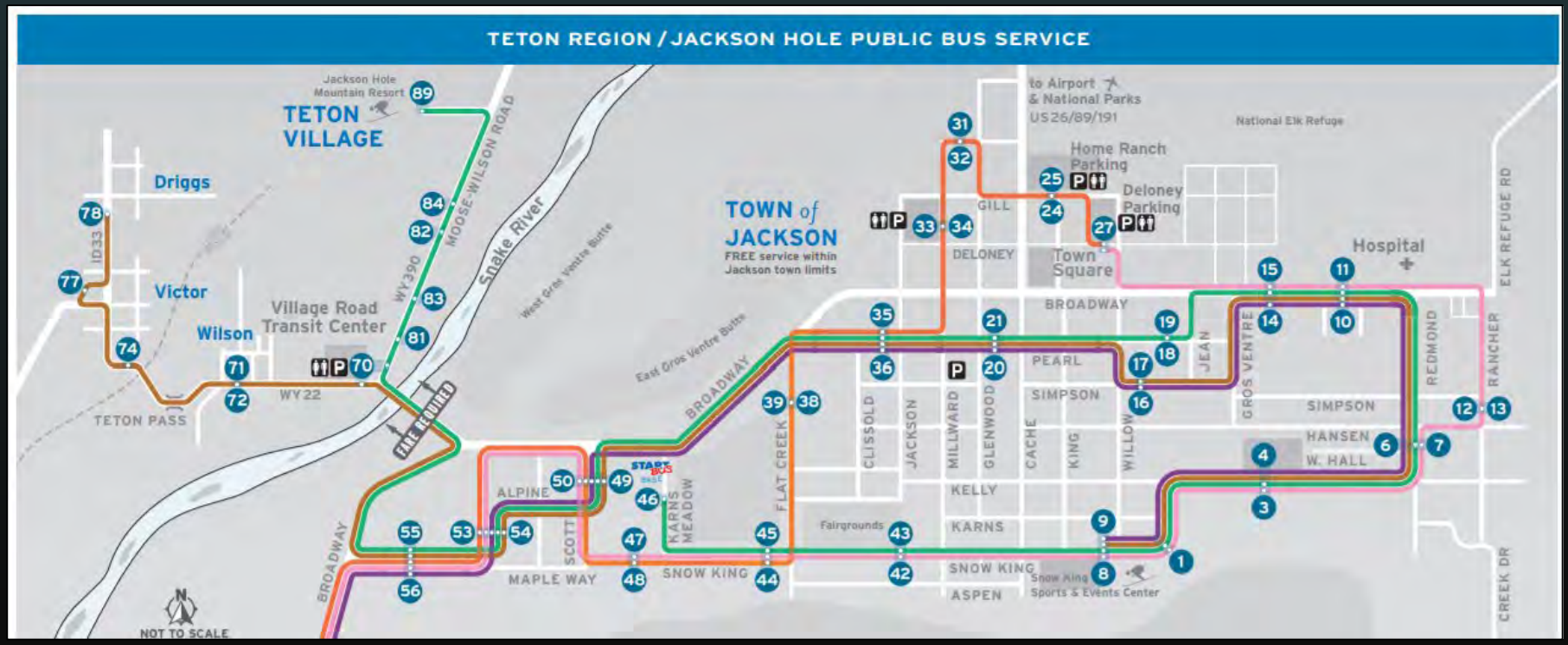
- E-bikes
  - Electric-assist bikeshare bikes
  - In Park City, e-bikes connect with battery electric buses
- Scooters
  - Recently surpassed bikeshare in total trips
  - Create right-of-way and safety challenges
  - Not many in mountain resorts… yet

Emerging Mobility: Bus on Shoulder, Bus Rapid Transit

- Bus Rapid Transit (BRT)
  - Dedicated lane or corridor that is quicker than car travel with transit priorization
  - Limited stops with train style platforms, unique bus design
  - 15 minute or less headways
  - Mountain resort example – VelociRFTA: Glenwood Springs to Aspen, CO, and Park City Silver Line on SR224
- Bus on shoulder
  - Uses existing or slightly expanded shoulder at least 11' wide
  - Buses bypass traffic by using shoulder combined with transit prioritization
  - Creates operational efficiency and motivation to use the bus
  - Much cheaper than BRT systems

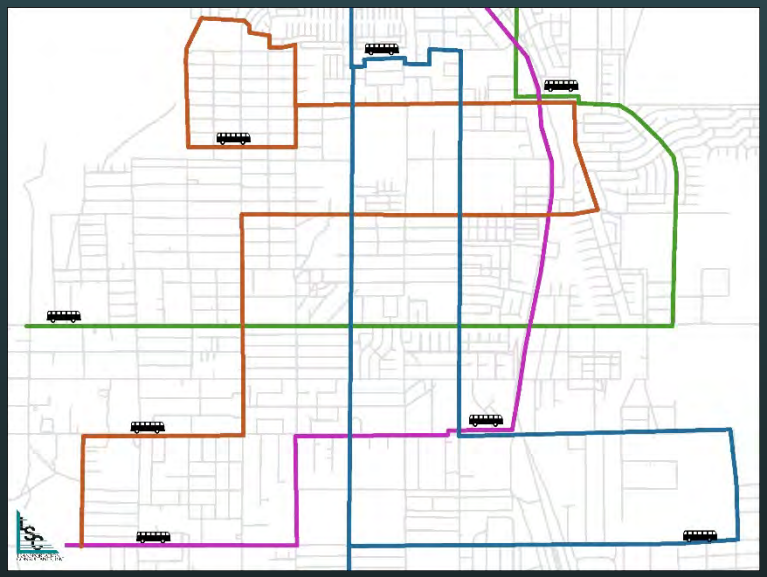
Transit Planning 101

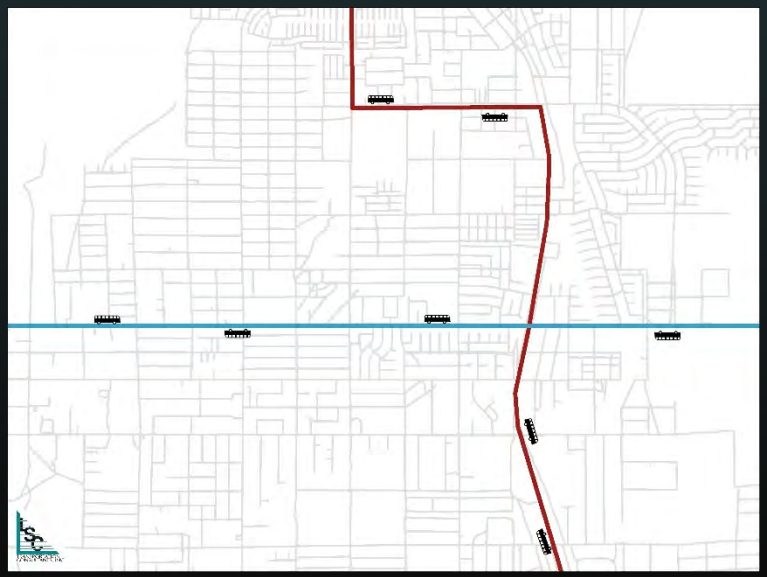
- Service goal
  - Serve more area or move more people?
  - Invest in existing routes or invest in new routes?
- Route structures
- Ridership factors
- Transit supporting factors
- Trade-offs



Coverage vs. Frequency

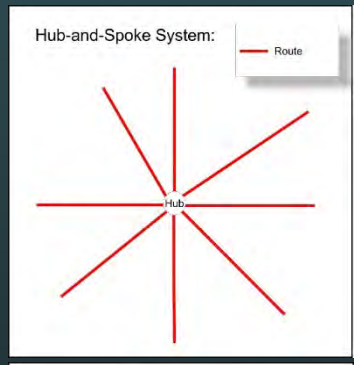
- Coverage
  - More routes that service more areas with overall lower level of service (less hours, less frequency)
  - Provides more equitable service geographically, but less overall ridership
  - More circuitous routes that get riders closer to destination, but are much slower than driving
- Frequency aspects
  - Fewer routes with more service (more hours, higher frequency)
  - Serves fewer geographic areas
  - More targeted, direct connections that come closer to driving time
- START Bus is more oriented towards Frequency overall, except within Town of Jackson boundary, where service has more Coverage

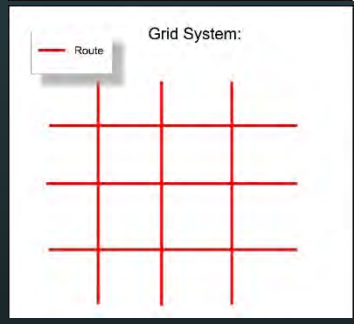


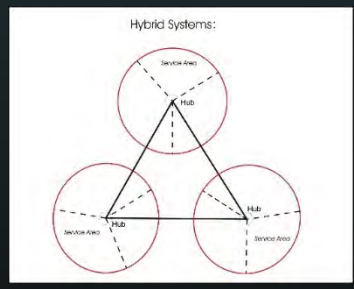


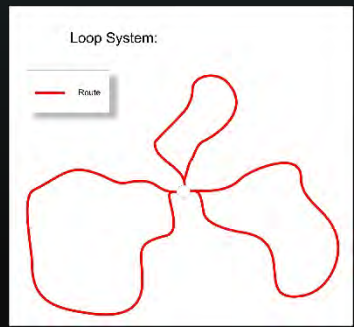
Types of Route Structures

- Hub and spoke (radial)
  - Multiple routes connecting at a single point, usually at a coordinated time (pulsed)
  - Most common in small urban areas, as well as resort systems
- Grid
  - Multiple routes operating on a grid network
  - Most common in large urban areas where destinations and riders are along corridors
- Multi-hub(hybrid)
  - Multiple hub-spoke systems linked by express routes or rail lines
  - Used where there are multiple activity centers, separated by long distances
- Loop
  - Used in coverage systems where it isn't possible to run bus in both directions
  - Requires riders to ride the loop, wasting time
- START has aspects of all of these but could benefit from a hub and spoke design for Town of Jackson, depending on route design



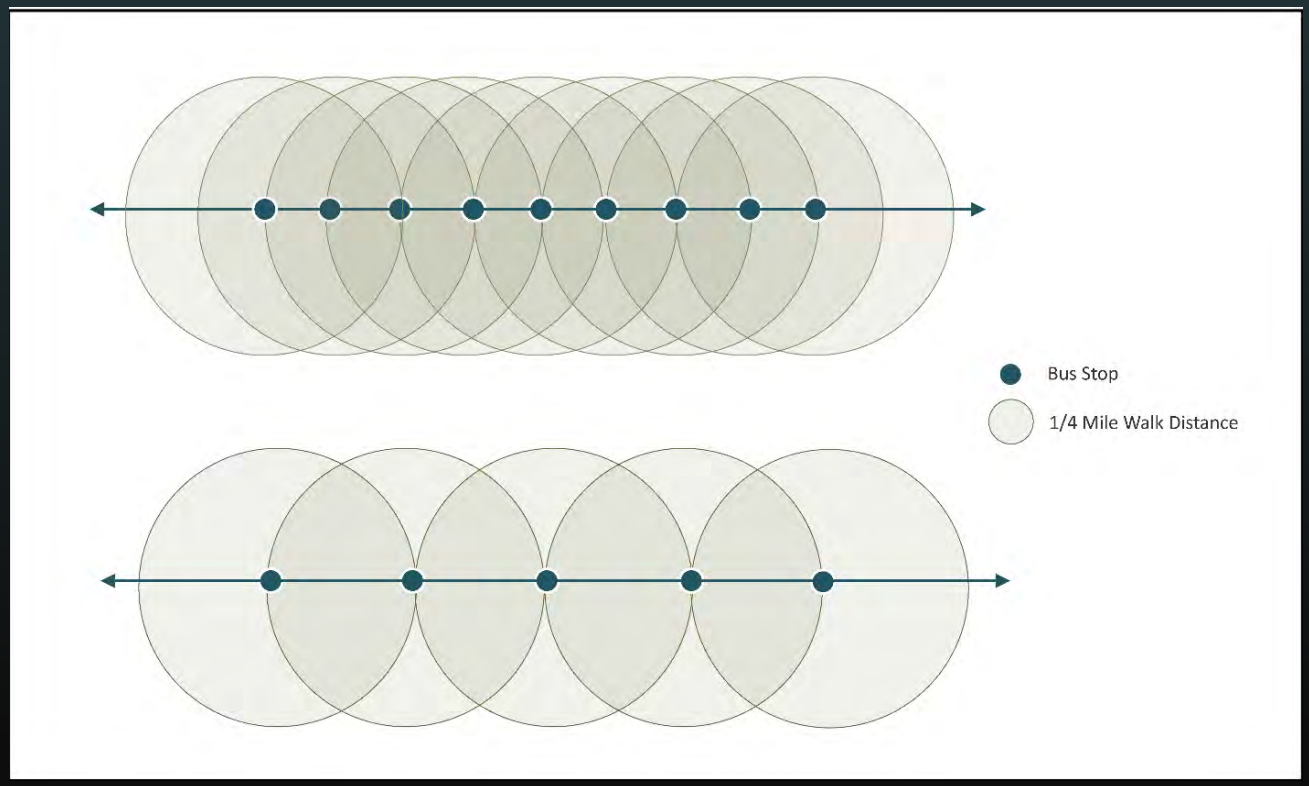






Bus Stop Spacing

- Fewer stops = quicker bus operation but more walking
- More stops = slower bus operation but less walking
- START bus stop spacing is close to industry standard for local routes within Jackson – if express service were added, # of stops should be reduced

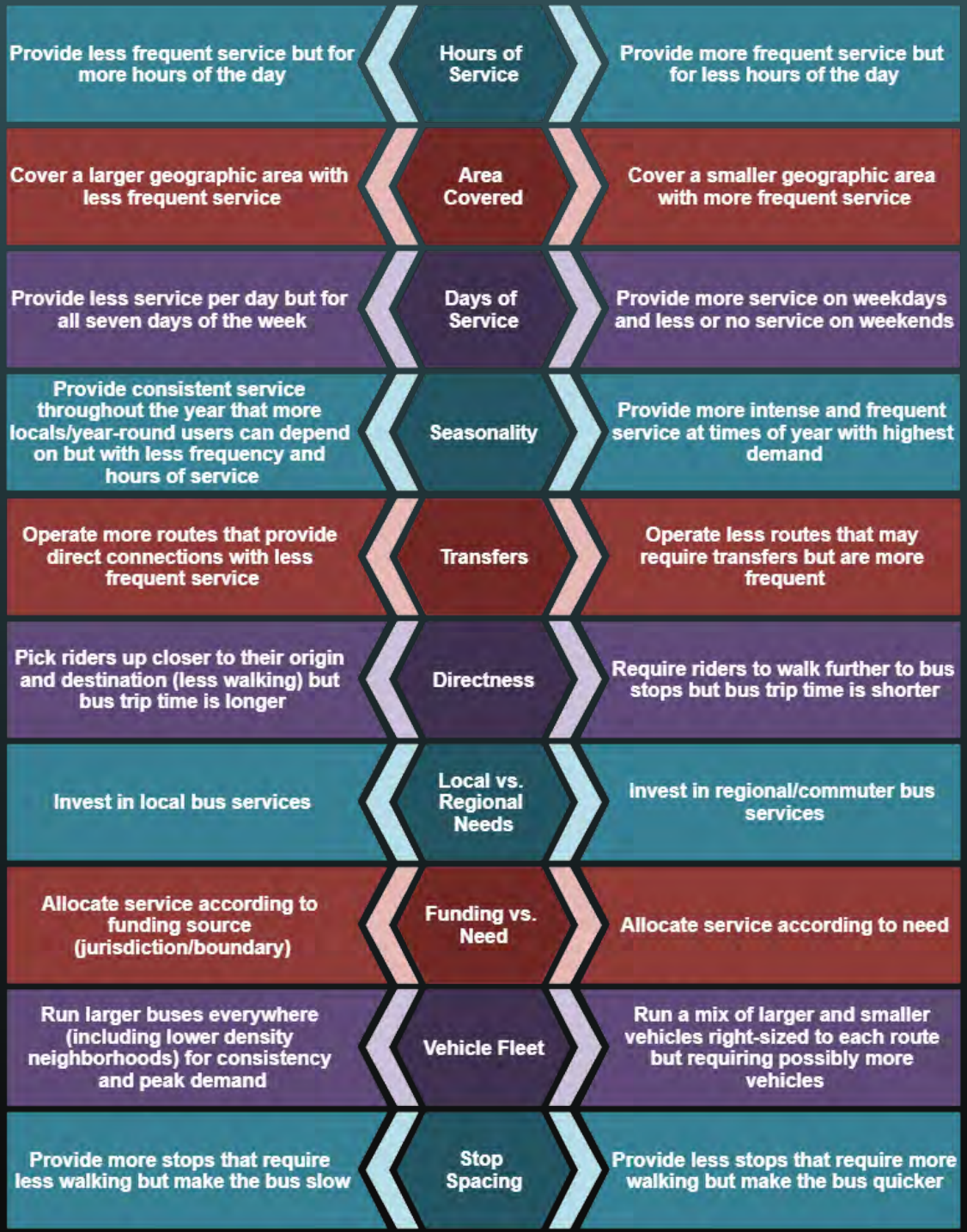


Service Type and Service Distribution

- Choice between:
  - Investing in local services vs. regional services
  - Putting service where the demand is vs. where the funding is coming from
- START currently:
  - Focuses on local services over commuter services
  - Provides much higher winter service than summer
  - Doesn't have a policy on service allocation

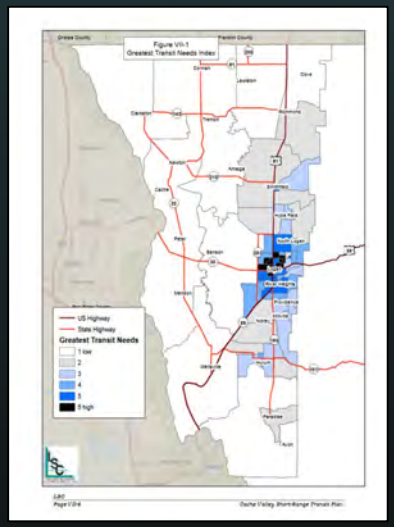
Transit Planning Trade-Offs

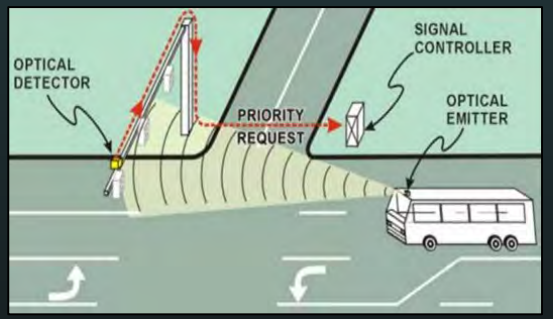
(AKA you can't have it all!)



Supportive Factors for High Quality Transit

- Safe, interesting walking and biking environment
- Density and clustering of key destinations
- Mixed land use with residential easily linked to services and employment
- Technology
  - Trip planning, real-time info
- Parking management
  - Discourage driving, incentivize bus, especially for long-term parking





System Alternatives

- #1: Expand System Coverage by Adding New Routes
- #2: Maximize Fixed Route Frequency with Microtransit
- #3: Maximize Fixed Route Frequency without Microtransit
- #4: Reduce Regional Traffic Congestion, BRT/HOV
- #5: Balanced Approach

Assumptions

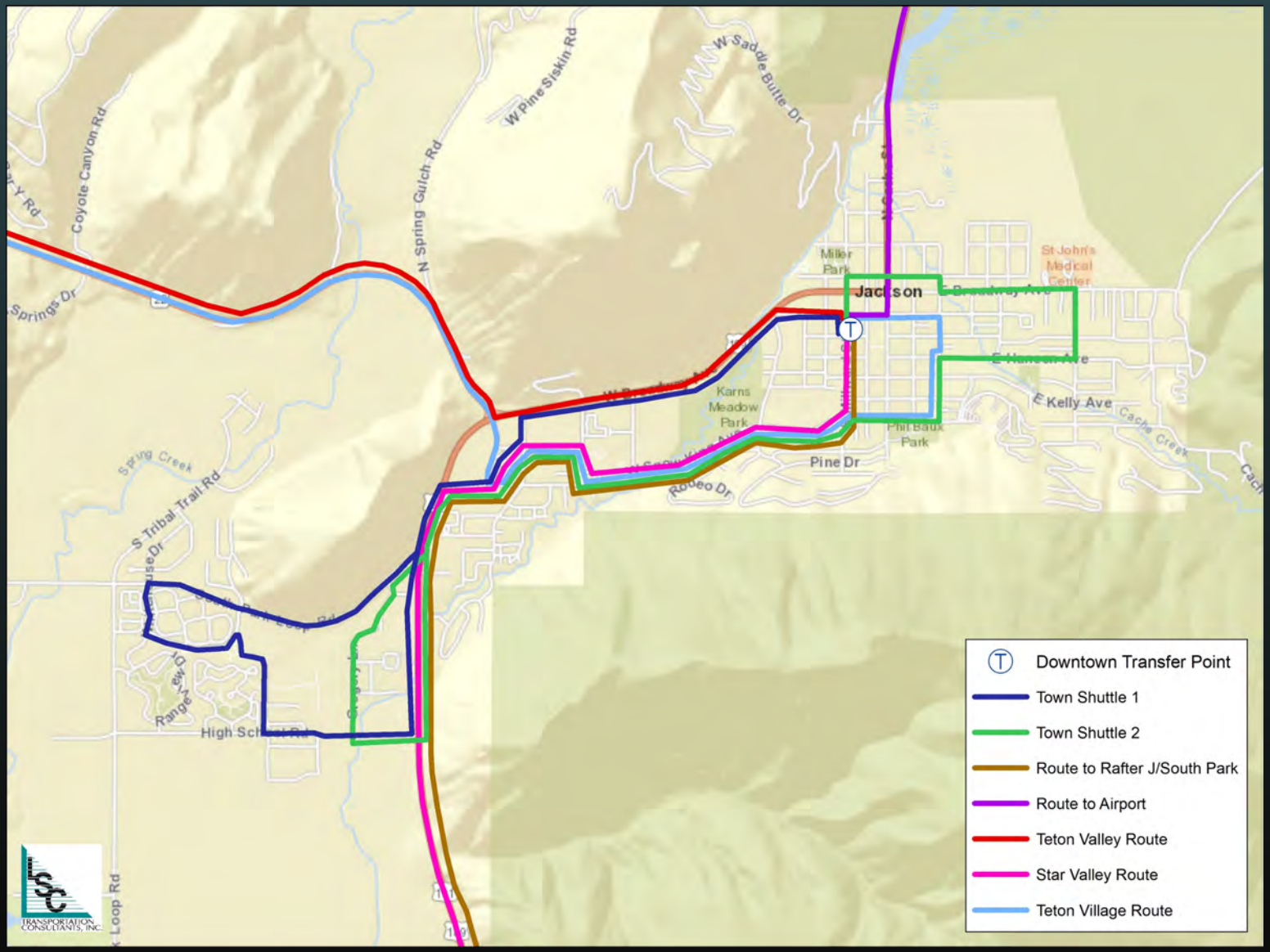
- ITP guides work
  - But goals may be unrealistic
- Flat, or low growth (<10%) funding
  - But we still will include a wish list for the final
- More focus on how routes operate within Teton County and Town of Jackson
  - But commuter service increases are included in some alternatives
- BRT infrastructure questionable for time horizon of this study (through 2025)
  - But it would help all options and benefits will be analyzed
- Current organizational structure, funding, partners

Caveats

- These are only PRELIMINARY ideas to solicit input and feedback
- Don't get hung up on the lines on the map – they are not meant to be set in stone
- A central downtown transfer point is envisioned but exact location is TBD
- Final plan will be phased over time
- New routes may start with a modest level of service
- No alternative is "take it or leave it" – ideas and concepts can be mixed and matched

System Alternative #1

Expand System Coverage by Adding New Routes



System Alternative #1

Expand System Coverage by Adding New Routes

Description of change under this System Alternative

- This alternative focuses on adding new routes, while keeping existing routes largely the same. Town Shuttles and Teton Village routes would need to operate more efficiently to gain hours that would be shifted to new services.

What would it do to existing routes?

- Town Shuttles hours and miles would by reduced by 10-20% (reduce coverage in East Jackson and South Park Loop).
- Teton Village Route would have just one variation that is more direct, while still serving some of South and East Jackson.

What would it do for new routes?

- AIRPORT: New fixed-route from downtown Jackson to the airport, operating 4-5 roundtrips per day during winter and summer seasons
- RAFTER J/SOUTH PARK: New fixed-route from downtown Jackson to Rafter J and South Park, operating a few roundtrips AM and PM per weekday.

How would it impact passengers and ease of use?

- For existing routes: It would be a mixed bag - some passengers would find changes to be easier, but many existing passengers would not want to walk further or transfer.
- For new routes: Passengers would find it easier to use START to get around.

What would it do for overall ridership?

- Ridership would likely be less initially - there could be some reduction in ridership among existing riders and new routes would likely have low ridership overall.

What would it do for efficiency and productivity (riders/hr)?

- New routes will likely perform at lower ridership per hour; existing routes likely to remain similar to current productivity

How would traffic and VMT be impacted?

- Very small impact on traffic and VMT.

How would it impact peak bus requirements?

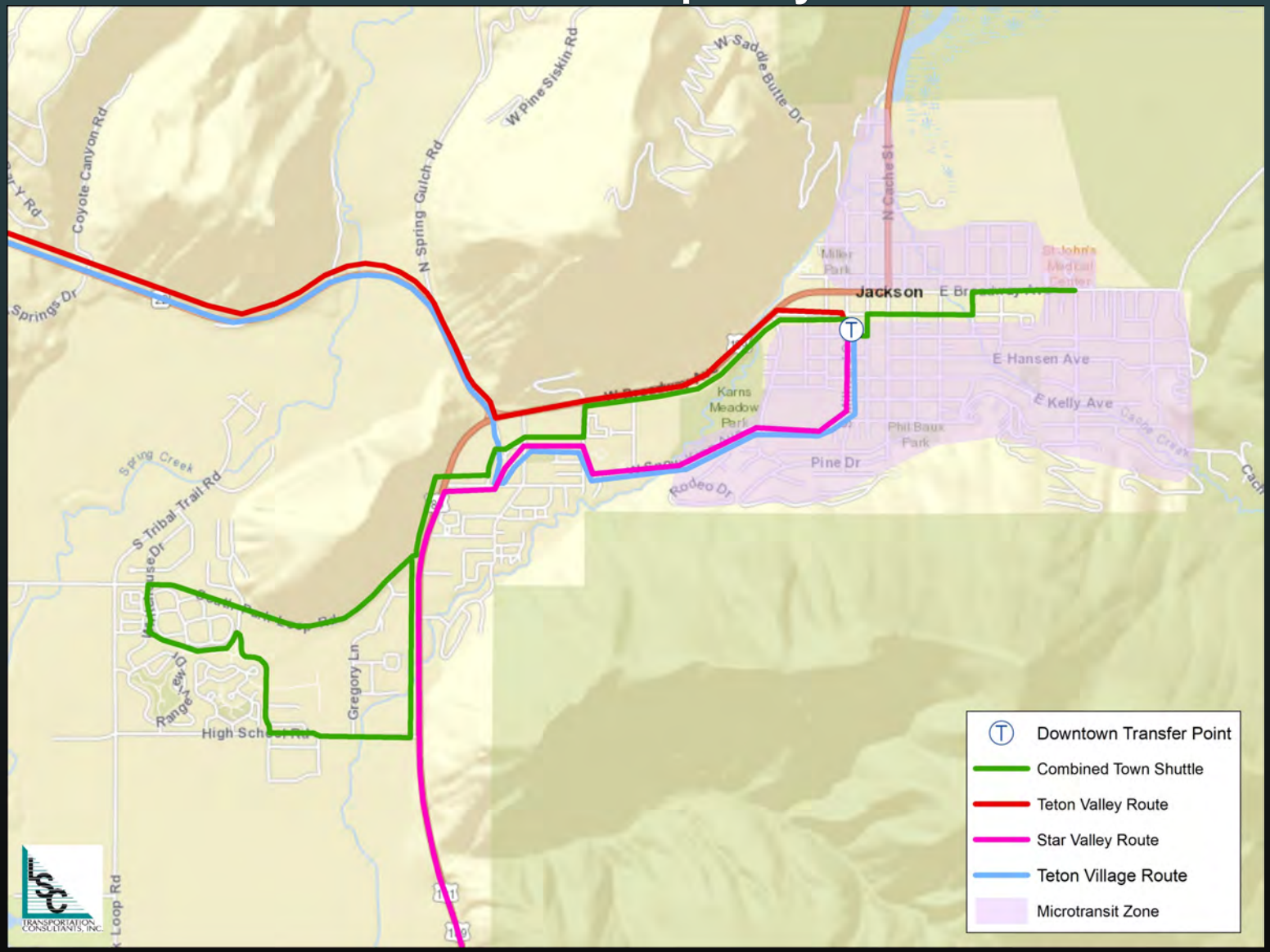
- Requires 2-3 additional small buses for new routes

How easy would it be to implement?

- Need marketing, partnerships, implementation plan, and equipment to operate new routes

System Alternative #2

Maximize Fixed Route Frequency with Microtransit



System Alternative #2

Maximize Fixed Route Frequency with Microtransit

Description of change under this System Alternative

- This alternative increases frequency and directness of existing routes while adding microtransit to fill in gaps in downtown Jackson.

What would it do to existing routes?

- Town Shuttles would be combined into one route with increase to 20-minute peak frequency. With one, direct route, total hours and miles would by reduced by 20-30%. Cost savings would support microtransit.
- Teton Village Route would be more direct to downtown and/or START facility with required transfer to microtransit to make connections in Jackson.

What would it do for new routes?

- MICROTRANSIT: New microtransit service operating around downtown Jackson and connecting East and South downtown areas of Jackson

How would it impact passengers and ease of use?

- For existing routes: Most passengers will like higher frequency and more direct single Town Shuttle Route, but some existing passengers may not want to walk further or transfer to microtransit.
- For new routes: Microtransit has the potential to attract new riders who like convenience and flexibility.

What would it do for overall ridership?

- Ridership would increase overall with more frequent and direct Town Shuttles and convenient microtransit.

What would it do for efficiency and productivity (riders/hr)?

- Efficiency and productivity would increase slightly. Town Shuttles productivity would go up, but microtransit would likely operate at 5-10 passengers per hour.

How would traffic and VMT be impacted?

- Slight improvement in traffic (and VMT reduction) within Jackson-Highway 191 corridor only

How would it impact peak bus requirements?

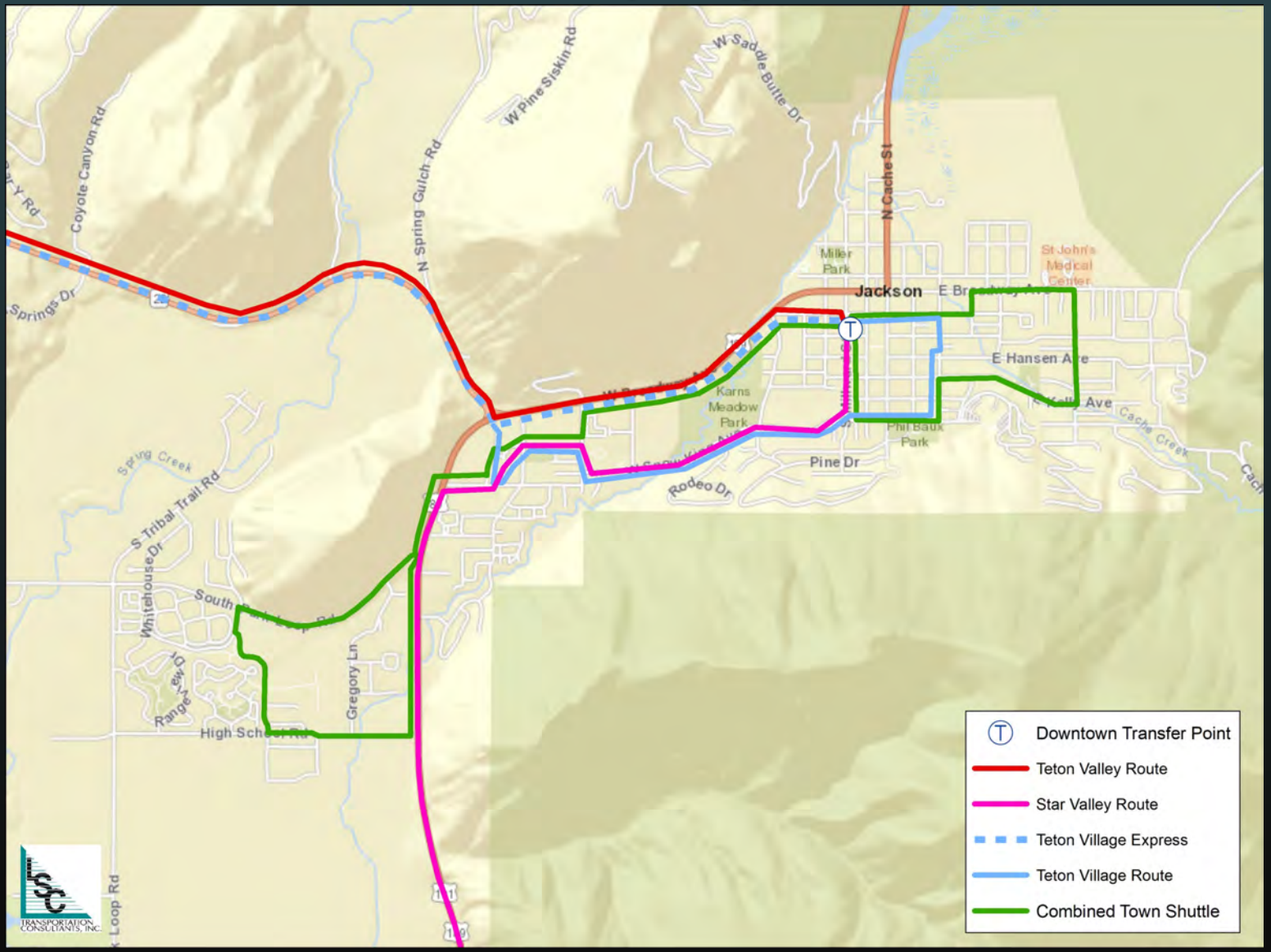
- Requires 2-3 additional small vans for microtransit

How easy would it be to implement?

- Need microtransit operator or technology provider, outreach and marketing for launch of microtransit and Town Shuttle changes.

System Alternative #3

Maximize Fixed Route Frequency without Microtransit



System Alternative #3

Maximize Fixed Route Frequency without Microtransit

Description of change under this System Alternative

- This alternative increases frequency and directness of existing routes without adding any new services such as microtransit. All efficiency savings go to increasing overall service of existing routes.

What would it do to existing routes?

- Town Shuttles would be combined into one route with increase to 15-minute peak frequency. With one, direct route, the savings would all be put into more frequency town shuttle service, as well asTeton Village Express Route and possible commuter enhancements.
- Teton Village Route would be more direct to downtown with addition of an Express Route. This would benefit from bus rapid transit/HOV, bus on shoulder, and transit prioritization.

What would it do for new routes?

- No new routes or services under this alternative.

How would it impact passengers and ease of use?

- For existing routes: Most passengers will like higher frequency and more direct single Town Shuttle Route and additional Teton Village Express service, but some existing passengers may not want to walk further.

What would it do for overall ridership?

- Ridership would increase overall with more frequent and direct Town Shuttles and new Teton Village Express services.

What would it do for efficiency and productivity (riders/hr)?

- Efficiency and productivity would increase significantly.

How would traffic and VMT be impacted?

- Traffic and VMT reduction in 22/390 corridor. Small reduction within Town of Jackson

How would it impact peak bus requirements?

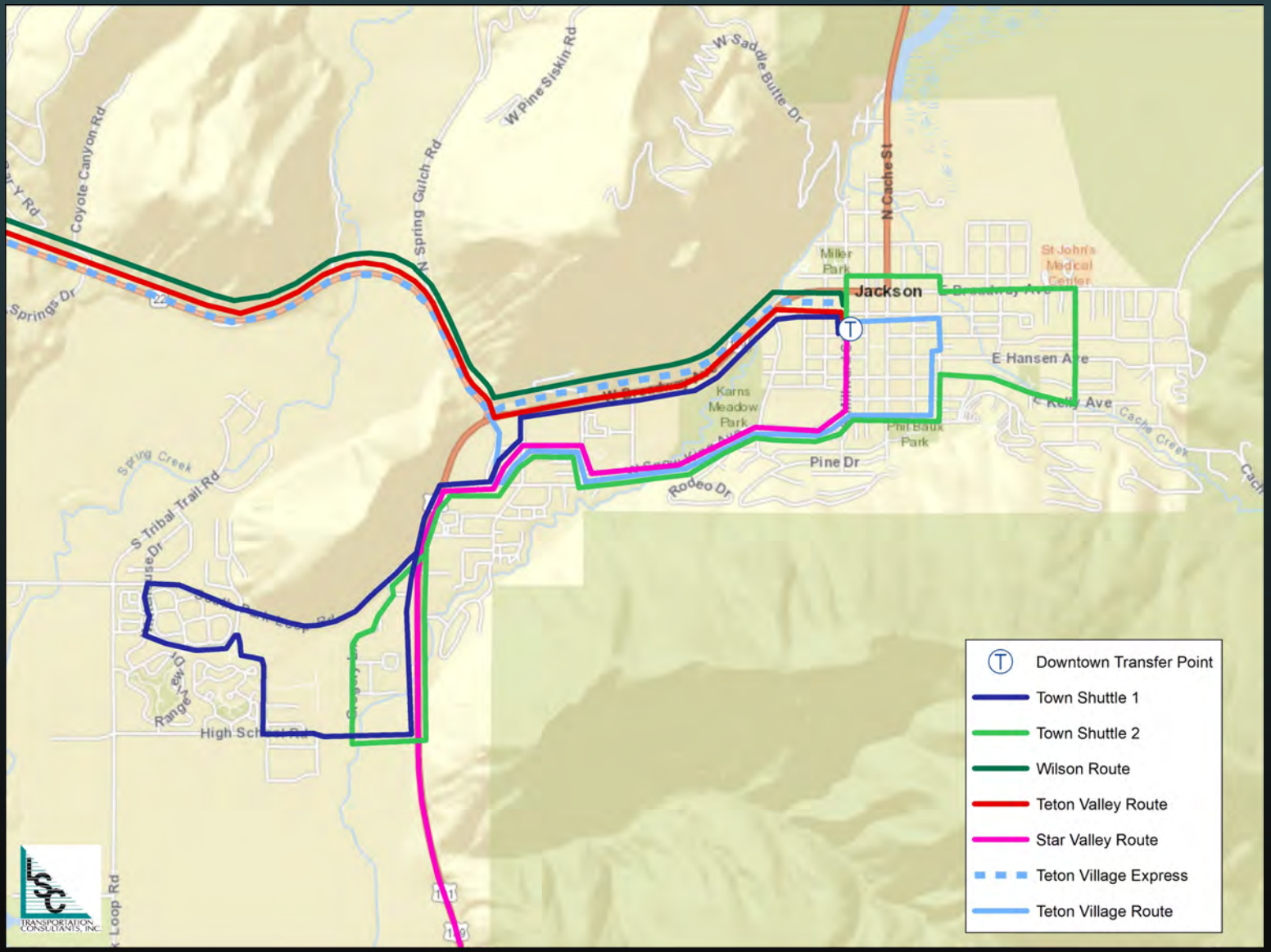
- Would not require any additional vehicles

How easy would it be to implement?

- Relatively easy to implement; requires public outreach and marketing about route changes.

System Alternative #4

Reduced Peak, Regional Traffic Congestion, BRT



System Alternative #4

Reduce Peak, Regional Traffic Congestion, BRT

Description of change under this System Alternative

- This alternative focuses on investments in regional (Teton Village) and commuter routes with goal of reducing traffic.

What would it do to existing routes?

- Town Shuttles hours and miles would need to be reduced to support Teton Village and Commuter route investments.
- Teton Village Route would have more Express versions, more summer service, and plan for bus rapid transit (w/HOV) or bus on shoulder operations between Jackson and Stilson.
- Commuter trips would be added to both Star Valley and Teton Valley

What would it do for new routes?

- WILSON: New fixed-route between Wilson, Stilson P&R and downtown Jackson, 2-3 roundtrips per day, weekdays

How would it impact passengers and ease of use?

- Most passengers would find increased Teton Village Express service and additional commuter service to be a benefit. Town Shuttle changes would be a mixed bag - some passengers would find changes to be easier, but many existing passengers would not want to walk further or transfer.

What would it do for overall ridership?

- Ridership would increase, especially on Teton Village and Commuter routes.

What would it do for efficiency and productivity (riders/hr)?

- Given longer distance of regional and commuter routes, productivity would decrease slightly overall.

How would traffic and VMT be impacted?

- Traffic and VMT would be reduced, especially between Jackson and Stilson Park and Ride.

How would it impact peak bus requirements?

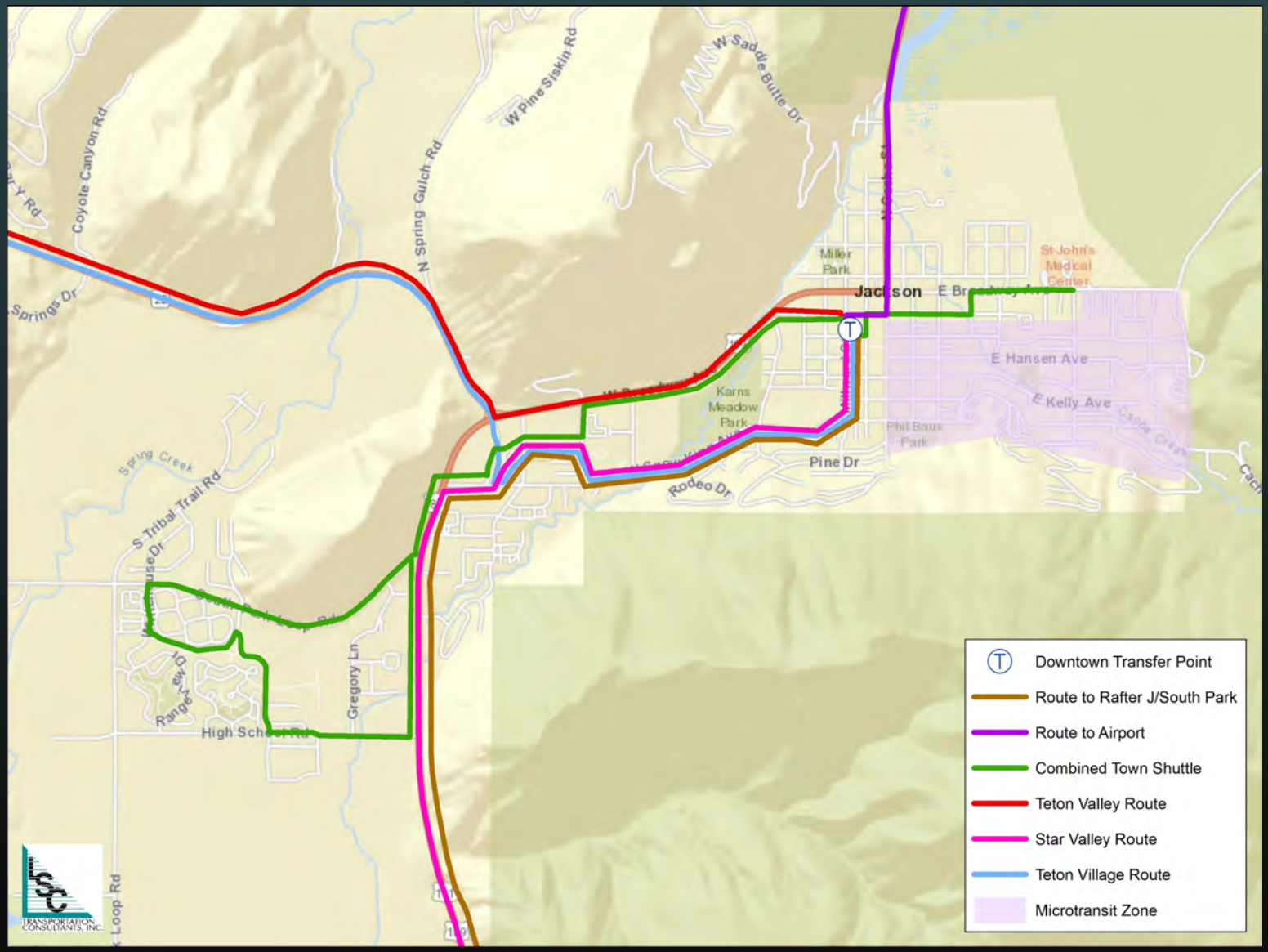
- May require 1-2 new, large buses for Express Routes (60' articulated buses may be needed)

How easy would it be to implement?

- Relatively easy to implement; requires public outreach and marketing about route changes.

System Alternative #5

Balanced Approach



System Alternative #5

Balanced Approach

Description of change under this System Alternative

- This alternative is a little bit of System Alternatives #1-#4

What would it do to existing routes?

- Town Shuttles would be combined into one route with increased frequency and free up hours for other services.
- Teton Village Route would be more direct to downtown and a few more summer Express options would be added to help traffic.
- One new trip would be added to Teton Valley commuter route.

What would it do for new routes?

- AIRPORT: New fixed-route from downtown Jackson to the airport, with 2-3 roundtrips during peak winter and summer season only.
- MICROTRANSIT: Small East Jackson microtransit zone with only one van.
- RAFTER J/SOUTH PARK: New fixed-route from downtown Jackson to Rafter J and South Park, operating a couple of roundtrips AM and PM per weekday.

How would it impact passengers and ease of use?

- For existing routes: Most changes would be a benefit to existing passengers and provide easy use.
- For new routes: Passengers would find it easier to use START to get around.

What would it do for overall ridership?

- Overall ridership may not change much in early years of implementation, but would slowly increase over time.

What would it do for efficiency and productivity (riders/hr)?

- With new routes, investment in commuter routes, and microtransit, overall productivity will likely be less.

How would traffic and VMT be impacted?

- Minimal reduction in overall traffic and VMT.

How would it impact peak bus requirements?

- Requires 1 additional small buses for Airport route and 1 new van for microtransit.

How easy would it be to implement?

- Need microtransit operator or technology provider, outreach, partnerships, and marketing for launch of microtransit, new Airport service, and Town Shuttle changes.

Strategic Questions

1. What is the system goal?
2. Is BRT/HOV or B.o.S. feasible? How do we position this study?
3. What is the top investment priority?
4. Can we achieve the ITP goals? Are they realistic, given funding?
5. What is your favorite alternative? Or what aspects would you like to see combined?