Mode Analysis Memo

Roosevelt to Downtown High Capacity Transit

Seattle Department of Transportation

October 13, 2015

Mode Analysis Memo

This memorandum compares two high-capacity transit (HCT) modes, Rapid Streetcar (RSC) and Bus Rapid Transit (BRT), identified as alternatives for the Roosevelt to Downtown High Capacity Transit (RDHCT) Corridor under evaluation by the Seattle Department of Transportation (SDOT). The Seattle Transit Master Plan identified the RDHCT Corridor as one that is viable for either RSC or BRT service. In order to plan and design transit service along the corridor, an initial task was the selection of a preferred transit mode based on a qualitative evaluation of modal characteristics. Quantitative analysis, including ridership and cost, was developed after this initial analysis. The following sections define the two transit modes, presents an evaluation framework, and identifies the preferred mode for the RDHCT Corridor.

Types of Service Under Evaluation

RSC and BRT have many similar characteristics regarding their operations and their role in the context of the broader urban public transit system. However, this mode analysis framework seeks to identify and assess the many specific differences that are not initially evident from the description of modes. It is these differences, combined with additional quantitative analysis, that determine the preferred mode choice.

Rapid Streetcar

Streetcar is a rail transit mode that typically operates on tracks running on city streets. RSC includes the operation of modern streetcars on rapid transit lines, featuring limited stops and extensive use of exclusive lanes and/or traffic signal priority. RSC vehicles are generally steel-wheeled low-floor vehicles, powered by electricity supplied through an overhead wire, with articulated sections that can navigate tight turns. Vehicles can be longer than "standard" streetcar lines (like the South Lake Union or First Hill streetcar lines already existing) and thus accommodate loads of up to 251 passengers per coupled vehicle, allowing the RSC to achieve a capacity of upwards of over 3,012 passengers per hour per direction when running at 5 minute headways. Stations are spaced approximately ½ to 1 mile apart, more similar to other HCT modes than local, circulator streetcar functions. Each is generally equipped with premium amenities such as off-board fare collection systems, boarding platforms level with vehicle doors, multiple wide doors to ensure efficient boarding and alighting, and real time arrival signs.

Bus Rapid Transit

BRT is a high quality bus service with features designed to improve performance compared to standard bus service. BRT service employes a variety of different components, which when used in conjuction, are able to provide service quality similar to rail, while still maintaining many of the cost savings and operational flexibilities of bus service. A variety of service components are available to achieve this higher standard of service, most of which are also used to provide RSC service, including dedicated rights-of-way, traffic signal priority, upgraded vehicles, and station amenities. BRT routes are also generally branded as a separate, premium service as compared to traditional buses.

Like traditional buses, BRT uses rubber-tired vehicles. While systems may also retain the diesel or diesel-electric hybrid propulsion systems of standard buses, BRT buses can also run on fully electric catenary lines, as do other electric trolly bus routes in Seattle. Additionally, BRT has many of the same vehicle and operating characteristics as light rail or streetcar. This typically includes the use of low-floored articulated vehicles with plenty of standing room which can accommodate passenger loads of up to 115 passengers, allowing the BRT to achieve a capacity of upwards of 1,380 passengers per hour per direction when running at 5 minute headways.

BRT stations are often modeled after rail platforms, including off-board fare collection systems and level passenger loading to facilitate efficient boarding and alighting. Stations are generally equipped with additional premium amenities such as protection from weather and real time signage. Stations are generally spaced approximately ½ to 1 mile apart, unlike conventional, local bus service with stops every ¼ mile, if not closer.

Important Distinctions Between Modes

While RSC and BRT have many broad similarities regarding their operation and context within an urban transit system, this Mode Analysis drills down on many specific differences between the modes that are not initially evident from their general description. **Table 1** highlights some of the unique advantages of each mode revealed through the mode analysis decision-framework process. It is these and other related detailed mode characteristics that ultimately influence the final modal choice.

Table 1: Unique Mode Advantage by Variable

Criteria	BRT Unique Advantage	RSC Unique Advantage	Overall Advantage
Vehicles	More availability and increased flexibility	Higher capacity	BRT
Fuel/Power	Brief 'off-track' use possible	*N/A*	BRT
Stations	Higher service interoperability	*N/A*	BRT
Service	Greater frequency, reliability, and flexibility	Higher passenger capacity	BRT
Ridership	*N/A*	Higher expected ridership	RSC
Transit Experience	*N/A*	Greater comfort	RSC
Impacts to Other Modes	Greater interoperability with existing modes	Less wear on pavement	BRT
Project Phasing	Smaller minimum segments	*N/A*	BRT
Construction	Simpler construction	*N/A*	BRT
Land Use	Less exterior noise and vibration	May spur greater development	RSC
Costs	Significantly lower capital costs	Slightly lower operating costs	BRT

Decision-Making Framework

The following section details the steps used to develop the qualitative component of the mode analysis decision framework. The SDOT "Technical Working Group," which includes staff from several SDOT divisions, King County Metro, and Sound Transit, oversaw development of the framework, including the identification, evaluation, and weighting of the variables. Each step is noted by the red numbered circles in the accompanying tables. The full evaluation criteria and scoring steps are included in **Appendix A**.

Step 1: *Identify a series of variables that describe the core components of transit service.* As shown in **Table 2**, these variables are relatively easy to define and included:

- Vehicles – Transit vehicle operational characteristics;

- Fuel/Power – Considerations for fuel type, efficiency, and emissions;
- Stations – Station characteristics;
- Service – Service operational characteristics;
- Ridership – Expectations for changes in ridership based on mode choice;
- Transit Experience – Overall customer experience;
- Impacts to Other Modes – Impacts to pedestrians, bicycle, roadways, etc.;
- Project Phasing – Scheduling considerations;
- Construction – Additional construction considerations;
- Land Use – How mode adheres to other development goals; and,
- Costs – Capital, operations, and maintenance costs.

Table 2: Step 1

1 Variable
Vehicles
Fuel/Power
Stations
Service
Ridership
Transit Experience
Impacts to Other Modes
Project Phasing
Construction
Land Use
Costs

Step 2: *Identify subvariables that comprise each of the variable categories*. Defining the list of subvariables was a complicated process; some were interdependent, some were mutually exclusive, and the level of distinction between modes varied greatly. In total, 118 subvariables, between five and thirty per variable, were identified for evaluation. A sample of several subvariables within the "Vehicles" variable is shown in **Table 3**.

Table 3: Steps 2 through 4

Variable	2 Subvariable	3 Relative Importance
Vehicles	Seated Capacity	High
Vehicles	Turning Radii Restrictions	High
Vehicles	Left- and Right-Side Boarding	Medium
~~Vehicles~~	~~Driver Security (separated compartment)~~	~~Low~~

4 Eliminate

Performance Measure-Based Analysis of Modes

After defining a complete list of variables and subvariables, as described in the previous section, the framework was used to evaluate the differences between BRT and RSC.

Step 3: *Rank the overall importance of each subvariable on a five tiered scale.* In order to identify the most important and defining subvariables, each subvariable was rated on a scale with five levels of importance – Very Low, Low, Medium, High, and Very High. **Table 3** shows the level of importance rating assigned to four sample subvariables.

Step 4: *Eliminate all subvariables rated Very Low or Low from further consideration*. These particular subvariables were not deemed important enough to be included in the final mode analysis scoring. **Table 3** shows the subvariable "Driver Security (Separated Compartment)" being eliminated from further consideration due to its "Low" rating. Only nine subvariables were deemed to have a "Low" or "Very Low" rating, leaving 109 subvariables for further evaluation.

Step 5: *Define the desired characteristics for each subvariable*. An optimal qualitative value judgment for each subvariable was assigned, for which several examples are shown in **Table 4**. For most subvariables, the desired characteristic was an intuitive and easily measurable value judgment (e.g. higher seated capacity is superior to lower capacity). However, a few subvariables did not have an easily identifiable desired metric. (e.g. a higher platform height is not superior to a lower height as long as the platform can match up with vehicle loading height). Furthermore, it is important to note that many of the subvariables are interrelated (e.g. simpler construction leads directly to lower capital costs).

Table 4: Steps 5 through 7

Variable	Subvariable	5 Desired Characteristic	6 Difference between modes?
Vehicles	Seated Capacity	Higher capacity	Yes
Vehicles	Turning Radii Restrictions	Greater turning flexibility	Yes
~~Vehicles~~	~~Left- and Right-Side Boarding~~	~~Dual side doors~~	~~No~~

7 Eliminate

Step 6: *Identify differences, or lack thereof, between the two modes for each subvariable*. Subvariables considered identical or without any significant difference were identified as such. As shown in the example in **Table 4**, the "Seated Capacity" and "Turning Radii Restrictions" subvariables were identified as having differences between to the two modes. The "Left- and Right- Side Boarding" subvariable was identified as not having any significant difference between the two modes because both BRT and RSC vehicles can be equipped with dual-side doors.

Step 7: *Eliminate subvariables with no difference between modes*. As shown in the example in **Table 4**, the "Left- and Right- Side Boarding" subvariable was eliminated from further consideration because there was no significant difference between the modes. Of the remaining 109 subvariables, 52 subvariables were eliminated for this reason, leaving 57 subvariables for further consideration.

Step 8: *Assess the relative modal advantages for each subvariable*. For each subvariable determined to have a difference between the modes, an additional qualitative assessment was assigned regarding which mode held the advantage and the magnitude of the advantage (minimum or maximum). In the end, 57 subvariables were identified as being both important and having one mode with a distinct advantage over the other. **Table 5** shows assigned ratings for two subvariables within the Vehicles variable. It identifies RSC as having a minimal advantage over BRT regarding "Seated Capacity" and BRT having a maximum advantages over RSC regarding "Turning Radii Restrictions."

Table 5: Step 8

Variable	Subvariable	8 Desired Characteristic
Vehicles	Seated Capacity	Min RSC
Vehicles	Turning Radii Restrictions	Max BRT

Step 9: *Tabulate the results for all variables.* The final step in the process was to identify the overall importance and advantage for the eleven variables, based on the average of the remaining relevant subvariables (57 total). A summary of overall advantage for each variable as well as a brief description of some of the unique advantages of each mode are compared in **Table 6.** A more detailed summary comparing the two modes is shown in the **Results** section below.

Table 6: Summary of Results

Criteria	BRT Unique Advantage	9 RSC Unique Advantage	Importance	Overall Advantage
Vehicles	More availability and increased flexibility	Higher capacity	Medium	Max BRT
Fuel/Power	Brief 'off-track' use possible	N/A	Low	Min BRT
Stations	Higher service interoperability	N/A	High	Max BRT
Service	Greater frequency, reliability, and flexibility	Higher passenger capacity	High	Min BRT
Ridership	N/A	Higher expected ridership	Very High	Max RSC
Transit Experience	N/A	Greater comfort	Medium	Min RSC
Impacts to Other Modes	Greater interoperability with existing modes	Less wear on pavement	Medium	Min BRT
Project Phasing	Smaller minimum segments	N/A	Medium	Max BRT
Construction	Simpler construction	N/A	Medium	Max BRT
Land Use	Less exterior noise and vibration	May spur greater development	High	Min RSC
Costs	Significantly lower capital costs	Slightly lower operating costs	Very High	Max BRT

Results

Vehicles are of ***Medium*** importance because even though they play an important role in defining the project and each vehicle type has unique advantages, both would adequately meet the overall project needs by providing a safe, efficient, and comfortable ride with adequate capacity. RSC provides for additional interior capacity, including seats, standing room, and space for wheelchairs. It also offers increased vehicle configuration capabilities, including coupling an additional car to the trainset during peak periods. BRT vehicles have greater operational flexibility. Their ability to operate without fixed rail and for brief periods without overhead catenary lines means it will be easier to remove them from service during breakdowns and for them to pass roadway obstructions. Furthermore, BRT vehicles' interoperability with Seattle's large existing fleet of electric trolleybuses provides for greater operational flexibility and economies of scale. Their smaller size means lighter-weight vehicles with fewer turning radii restrictions. The procurement process is generally simpler, with availability for an increased number of vendors and shorter delivery schedules. BRT also requires less specialized driver training as compared to RSC. The overall greater flexibility of BRT leads to a rating of ***Max BRT advantage***.

<u>Fuel/Power</u> is of ***Low*** importance. Since both modes will be powered via overhead electric catenary lines, the fuel and power characteristics of BRT and RSC are mostly the same. It is also possible for both vehicles to have a secondary motor for limited off-wire movement. BRT does have one potential advantage in that rubber tires do not have to stay on a designated track and can travel on any pavement, allowing for greater operational flexibility. This minor increase in operational flexibility leads to a rating of ***Min BRT advantage***.

<u>Stations</u> are of ***High*** importance because they constitute a considerable cost and play an important role in defining the project. Differences in station design requirements can contribute to meaningful project alternatives. BRT buses will be somewhat shorter, allowing for shorter platforms and increased flexibility for platform placement. Because of more similar operating characteristics, it may be possible for station interoperability with standard buses. This increase in design flexibility leads to a rating of ***Max BRT advantage.***

<u>Service</u> is of ***High*** importance because these characteristics define the product that will be provided to the public and how it improves mobility. When operating at equivalent headways, RSC has a higher overall passenger capacity due to its larger vehicles. However, estimates do not show that BRT buses could be overcapacity based on forcasted demand. Conversely, BRT has greater frequency and flexibility. Because of its ability to run off-track, buses can be removed from service to prevent vehicle bunching or can be added at more points along the corridor when demand spikes, such as during special events. While BRT's operating characteristics do offer some unique advantages, RSC's greater capacity leads to a rating of only ***Min BRT advantage.***

<u>Ridership</u> is of ***Very High*** importance because it is so closely tied to the core goals of the project: to provide a high capacity transit service to meet the travel needs of Seattle travelers today and in the future. Current travel demand modeling suggests that RSC has the potential to attract a larger ridership, leading to a rating of ***Max RSC advantage.***

<u>Transit Experience</u> is of ***Medium*** importance because even though it is important in attracting ridership and meeting customer travel needs, both modes would adequately meet the overall project needs by providing a safe and comfortable ride. While BRT offers a high quality, comfortable passenger experience, RSC vehicles are generally able to provide additional comfort by providing additional seating and standing room, less vertical and horizontal movement, and less interior vehicle noise and vibration. These differences lead to a rating of ***Min RSC advantage.***

<u>Impacts to Other Modes</u> is of ***Medium*** importance because even though the new transit line must operate in the context of other modes, to some degree all transit modes are designed with consideration for shared public space. One disadvantage of RSC is because of its rail trackway, additional care must be made to bicycles crossing the guideway, and parallel separation of bikes from streetcars is required. Because it does not involve the integration of rail vehicles, BRT will have fewer impacts on the existing vehicle movements along the runningway, including emergency vehicles, general traffic, and other transit vehicles. The integration of BRT signal systems is also simplier and cheaper than those for RSC, as they can run in conjunction with existing traffic signals instead of on a separate, specialized network. It will also create more opportunities for interoperability with standard bus service along the corridor. However, the weight of large articulated buses operating on the roadway will create additional wear and tear, likely leading to increased pavement repair. Nonetheless, because of its multiple advantages, these differences lead to a rating of ***Min BRT advantage.***

Project Phasing is ***Medium*** importance because even though it is a critical aspect of the project implementation process, it will not have a significant impact on the final project outcome. Due to simplified construction and operating characteristics, minimum construction and operating segments are smaller for BRT. BRT also provides the possibility of providing off-guideway service. These advantages lead to a rating of ***Max BRT advantage.***

Construction is of ***Medium*** importance because even though it is a critical aspect of the project implementation process, it will not have a significant impact on the final project outcome. BRT offers a generally simpler construction scheme, much of which is due to the installation of trackwork not being required. Benefits include less space for construction staging, a shorter construction period, less special equipment, and a simplified traffic control plan. Construction is also expected to create less noise and vibration impacts. RSC does not have any known benefits as to constructability. These advantages lead to a rating of ***Max BRT advantage.***

Land Use is of ***High*** importance because it defines the overall urban context of the corridor and impacts future ridership. Due to the perceived desirability and permanence of RSC, its implementation may spur more new development and increase overall property values as compared to BRT. In the long run, the public's acceptance of BRT as a high quality transit mode and the permanence of BRT stations and runningway may in time remove this advantage. One note is that BRT operation is generally quieter than RSC due to the use of rubber tire vehicles. These differences lead to a rating of ***Min RSC advantage.***

Costs are of ***Very High*** importance given funding for construction and operation of transit service is limited; a primary project goal is to meet project needs as cost-effectively as possible. BRT will require less overall capital costs. Acquisition of buses is expected to be less costly than streetcars; trackwork is not required for operation; and, less additional maintenance facility space will be required. It is also assumed BRT will require fewer catenary stations and could more easily use existing power substations along existing trolleywire-operated segments. RSC does have some cost savings related to overall operating costs, mostly stemming from the efficient operating characteristics of steel-wheeled vehicles. These differences lead to a rating of ***Max BRT advantage***.

Selected Mode

As shown in **Table 6** and the preceding paragraphs, RSC has advantages for three variables, while BRT has advantages in the remaining eight. Concerning the two variables rated as being of Very High importance, RSC has an advantage with Ridership while BRT has an advantage in Costs. Even though both RSC and BRT are viable for the corridor, ***BRT is selected as the preferred mode*** due to its advantages in more variable categories and minimal disadvantage in others.

Appendix A: Mode Analysis Tables

	1	2	3	5	6		8
#	**Variable**	**Sub-Variables**	**Relative Importance**	**Desired Characteristic**	**RSC Characteristic**	**BRT Characteristic**	**Advantage**
1	Vehicles	Low Floor	High	Lower floor			No Advantage
2	Vehicles	Wide Doors	Low	Wider doors			No Advantage
3	Vehicles	Multi-door	High	More doors			No Advantage
4	Vehicles	Left- and Right-Side Boarding	Medium	Dual side doors			No Advantage
5	Vehicles	Seated Capacity	High	Higher capacity	Higher Capacity	Lower Capacity	Min RSC
6	Vehicles	Standing Capacity	High	Higher capacity	Higher Capacity	Lower Capacity	Min RSC
7	Vehicles	Wheelchair Capacity	Medium	Higher capacity	Higher Capacity	Lower Capacity	Min RSC
8	Vehicles	Bicycle Capacity	Medium	Higher capacity			No Advantage
9	Vehicles	Vehicle Flexibility (# of cars, configuration)	Medium	More flexible	More Flexible	Less Flexible	Min RSC
10	Vehicles	Availability (multiple vendors, delivery time)	Medium	More availability	Less Available	More Available	Max BRT
11	Vehicles	Local Historical Usage	Very Low	More historical usage			No Advantage
12	Vehicles	Advertisement Space	Very Low	More space			No Advantage
13	Vehicles	Vehicle Weight	Medium	Lower Weight	Higher Weight	Lower Weight	Max BRT
14	Vehicles	Vehicle Height	Low	Shorter	Higher Height	Lower Height	Min BRT
15	Vehicles	Vehicle Use on Other Routes	High	More Flexible	Less Flexible	More Flexible	Max BRT
16	Vehicles	Operations Without Fixed Rail	High	More Flexible	Less Flexible	More Flexible	Max BRT
17	Vehicles	Operations Without Catenary	High	More flexible	Less Flexible	More Flexible	Min BRT
18	Vehicles	Special Driver Training	Medium	Less required training	More Training	Less Training	Min BRT
19	Vehicles	Removal of Breakdowns	High	More Flexible	Less Flexible	More Flexible	Max BRT
20	Vehicles	Ability to Pass Roadway Obstructions	High	More Flexible	Less Flexible	More Flexible	Max BRT
21	Vehicles	Turning Radii Restrictions	High	Greater turning flexibility	Less Flexible	More Flexible	Max BRT
22	Vehicles	Grade Limitations	Medium	More grade flexibility			Max BRT
23	Vehicles	Accelleration/Decelleration Characteristics	Medium	Smother ride			No Advantage
24	Vehicles	Sudden Braking Characteristics	Medium	Smother ride			No Advantage
25	Vehicles	Transit Driver Visibility	Medium	Greater visibility			No Advantage
26	Vehicles	Driver Security (separated compartment)	Low	More security			No Advantage
27	Vehicles	Vehicle Overhaul/Replacement Schedule	High	Less maintenance	More Replacement	Less Replacement	Min BRT
28	Vehicles	Regulatory Agency Oversight	Medium	Less oversight			No Advantage
29	Vehicles	Unique Safety/Operation/Other Requirements	Medium	Fewer unique requirements			No Advantage
30	Vehicles	Layover Requirement	Medium	Fewer requirements	More Requirements	Fewer Requirements	Min BRT
31	Fuel/Power	Emissions	High	Fewer emissions			No Advantage
32	Fuel/Power	Consumption	High	Less fuel consumption			No Advantage
33	Fuel/Power	Costs (Fuel or electricity)	Medium	Lower costs			No Advantage
34	Fuel/Power	Range limitations of Fuel/Power	Medium	Greater range	Lower range	Greater range	Min BRT
35	Fuel/Power	Regeneration of Electricity	Low	Higher regeneration	Less regeneration	More regeneration	Min BRT
36	Fuel/Power	Catenary Placement	High	More flexibility	More Flexible	Less Flexible	Min BRT
37	Stations	HCT Amenities (fare collection, branding, etc)	High	More amenities			No Advantage
38	Stations	Platform Length	Medium	Appropriate platform based on demand	Longer platform	Shorter platform	Min BRT
39	Stations	Platform Width	Medium	Thinner required platform			No Advantage
40	Stations	Platform Loading Height	High				No Advantage
41	Stations	Loading Gap between Vehicle & Platform	Medium	Thinner gap			No Advantage
42	Stations	Placement Limitations (distance from curve,etc)	Low	Fewer limitations	More limitations	Fewer limitations	Min BRT
43	Stations	Interoperability With Other Routes	Very High	Greater interoperability	Less interoperability	Greater interoperabilit	Max BRT
44	Stations	Ease of Pedestian/ADA Access	High	Improved access			No Advantage
45	Stations	Loading Pad Design	Medium				No Advantage
46	Stations	Future Station Expansion	Medium	Ability to expand without relocating			No Advantage
47	Service	Preferred Alignment & Potential Expansion	Medium	Fewer Alignment Limitations	More Limitations	Fewer Limitations	Min BRT
48	Service	Dedicated Runningway	Very High	Able to operate in dedicated runningway			No Advantage
49	Service	Mixed Flow Runningway	High	Able to operate in Mixed Flow	Decreased mixed flo	Increased mixed flow (	Min BRT
50	Service	Center Runningway	Medium	Increased center runningway			No Advantage
51	Service	Curb Runningway	Medium	Decreased curb runningway			No Advantage
52	Service	Station Spacing	High				No Advantage
53	Service	Speed	Very High	Higher speed			No Advantage
54	Service	Reliability	Very High	Higher reliability	Lower reliability	Higher reliability	Min BRT
55	Service	Frequency	High	Higher frequency	Lower frequency	Higher frequency	Min BRT
56	Service	Span	High	Higher span			No Advantage
57	Service	Capacity	Very High	Higher capacity	Higher capacity	Lower capacity	Min RSC
58	Service	Travel Time	Very High	Shorter travel time			No Advantage
59	Service	Throughput Capacity	High	Greater throughput	Greater throughput	Lower throughput	Min RSC
60	Service	Dwell Time	High	Shorter dwell time			No Advantage
61	Service	Deadhead Time	High	Shorter deadhead time			No Advantage
62	Service	Vehicle Bunching	Medium	Less vehicle bunching	More vehicle bunchi	Less vehicle bunching	Min BRT
63	Service	Add Non-Scheduled/Special Events Vehicles and (	Medium	More flexibility	Less flexibility	More flexibility	Max BRT
64	Service	Modify Service for Incidents or Construction	High	More flexibility	Less flexibility	More flexibility	Max BRT
65	Service	Incorporate Limited Service	Low	More flexibility	Less flexibility	More flexibility	Max BRT

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#	Variable	Sub-Variables	Relative Importance	Desired Characteristic	RSC Characteristic	BRT Characteristic	Advantage
66	Service	Mean Distance Between Breakdowns	Medium	Greater distance			No Advantage
67	Service	ITS/TSP Architecture & Protocol Requirements	Medium	Fewer requirements			No Advantage
68	Service	Special/Extra Signal Equipment	Medium	Fewer requirements	More requirements	Fewer requirements	Min BRT
69	Service	Interoperability with Existing ITS Equipment	Low	Greater interoperability			No Advantage
70	Ridership	Existing Service Ridership	Very High	Higher ridership	Higher ridership	Lower ridership	Min BRT
71	Ridership	Shifted Riders (existing from other routes)	Very High	Higher ridership			No Advantage
72	Ridership	New Riders	Very High	Higher ridership			No Advantage
73	Ridership	Future Ridership (long-term)	Very High	Higher ridership			No Advantage
74	Ridership	Disadvantaged/Targeted Populations	Very High	Higher ridership			No Advantage
75	Ridership	Transfers from Other Services	Very High	Higher transfers	Easier Transfer	Harder transfers	Min BRT
76	Transit Experience	Vehicle Comfort (space, seats, standing room)	High	Greater comfort	Greater comfort	Less comfort	Min RSC
77	Transit Experience	Vertical and Horizontal Movement	Medium	Less movement	Less movement	More movement	Min RSC
78	Transit Experience	Vehicle Vibration	Medium	Less vibration	Less vibration	More vibration	Min RSC
79	Transit Experience	Ambient Noise	Medium	Less noise	Less noise	More noise	Min RSC
80	Transit Experience	Security	Medium	Greater Security			No Advantage
81	Transit Experience	Lighting	Medium	More lighting			No Advantage
82	Impacts to Other Modes	On-Street Parking	High	Fewer impacts			No Advantage
83	Impacts to Other Modes	Driveways/Access Management	Medium	Fewer impacts			No Advantage
84	Impacts to Other Modes	Loading/Unloading Zones	Medium	Fewer impacts			No Advantage
85	Impacts to Other Modes	Pedestrian Facilites/Crossings	High	Fewer impacts			No Advantage
86	Impacts to Other Modes	Bicycle Faciliites/Crossings	High	Fewer impacts			Min BRT
87	Impacts to Other Modes	Impede ADA Mobility	High	Fewer impacts			Min BRT
88	Impacts to Other Modes	Emergency Vehicles	Medium	Fewer impacts	More impacts	Fewer impacts	Max BRT
89	Impacts to Other Modes	General Traffic Movements	Medium	Fewer impacts	More impacts	Fewer impacts	Min BRT
90	Impacts to Other Modes	Roadway Design/Degredation/Replacement	High	Fewer impacts	More impacts	Fewer impacts	Min RSC
91	Impacts to Other Modes	Existing Service Interoperability Along Runningwa	High	Greater interoperability	Less interoperability	Greater interoperabilit	Max BRT
92	Impacts to Other Modes	Severity of Collisions (weight and decell)	High	Less severe			No Advantage
93	Impacts to Other Modes	Change in VMT	High	Lower VMT			No Advantage
94	Impacts to Other Modes	Congestion Levels	High	Less congestion			No Advantage
95	Impacts to Other Modes	Automobile Speed	High	Greater speed			No Advantage
96	Project Phasing	Minimum Construction Segments	High	Smaller minimum	Greater minimum	Smaller minimum	Min BRT
97	Project Phasing	Minimum Operating Segment	High	Smaller minimum	Greater minimum	Smaller minimum	Min BRT
98	Project Phasing	Minimum Vehicle Requirement	High	Smaller minimum			No Advantage
99	Project Phasing	Cost Implications of Phased vs. Full	Medium	Smaller difference			No Advantage
100	Project Phasing	Provide Service Off Runningway	Medium	Greater flexibility	Less flexibility	Greater flexibility	Min BRT
101	Construction	Special Equipment Required	Medium	Less equipment	More equipment	Less equipment	Max BRT
102	Construction	Length of Time	Medium	Shorter time	Longer time	Shorter time	Max BRT
103	Construction	Staging Space Required	Medium	Shorter spacing	Longer spacing	Shorter spacing	Min BRT
104	Construction	Traffic Control Plans	Medium	Simplier plans	More complex plans	Simplier plans	Min BRT
105	Construction	Sound	High	Less noise	More noise	Less noise	Min BRT
106	Construction	Vibration	High	Less vibration	More vibration	Less vibration	Min BRT
107	Land Use	Spur New Development (currently unplanned)	High	Spur more development	Spur more developm	Spur less development	No Advantage
108	Land Use	Serve Planned Development Based on Zoning	High	Higher correspondence to plan			No Advantage
109	Land Use	Impact to Property Value	High	Higher increase in property values	Higher increase in pr	Lower increase in prop	No Advantage
110	Land Use	Visual/Aesthetics	Medium	Better Visual/Aesthetics			No Advantage
111	Land Use	Noise/Vibration Receptors	High	Less Noise Impact	More Noise Impact	Less Noise Impact	Min BRT
112	Costs	Capital Costs	Very High	Lower costs	Higher costs	Lower costs	Max BRT
113	Costs	Operating Costs	Very High	Lower costs	Lower costs	Higher costs	Min RSC
114	Costs	Maintenance Costs	Very High	Lower costs	Higher costs	Lower costs	Max BRT
115	Costs	Farebox Recovery	High	Greater revenue			No Advantage
116	Costs	Cost vs. Service Characteristic (rev hr, etc)	High				No Advantage
117	Costs	Maintenance Facility Expansion	High	Less expansion	More expansion	Less expansion	Min BRT
118	Costs	Catenary Substations	High	Fewer required	More required	Fewer required	Max BRT

	1	2	3	5	6		8
#	**Variable**	**Sub-Variables**	**Relative Importance**	**Desired Characteristic**	**RSC Characteristic**	**BRT Characteristic**	**Advantage**
1	Vehicles	Low Floor	High	Lower floor			No Advantage
3	Vehicles	Multi-door	High	More doors			No Advantage
4	Vehicles	Left- and Right-Side Boarding	Medium	Dual side doors			No Advantage
5	Vehicles	Seated Capacity	High	Higher capacity	Higher Capacity	Lower Capacity	Min RSC
6	Vehicles	Standing Capacity	High	Higher capacity	Higher Capacity	Lower Capacity	Min RSC
7	Vehicles	Wheelchair Capacity	Medium	Higher capacity	Higher Capacity	Lower Capacity	Min RSC
8	Vehicles	Bicycle Capacity	Medium	Higher capacity			No Advantage
9	Vehicles	Vehicle Flexibility (# of cars, configuration)	Medium	More flexible	More Flexible	Less Flexible	Min RSC
10	Vehicles	Availability (multiple vendors, delivery time)	Medium	More availability	Less Available	More Available	Max BRT
13	Vehicles	Vehicle Weight	Medium	Lower Weight	Higher Weight	Lower Weight	Max BRT
15	Vehicles	Vehicle Use on Other Routes	High	More Flexible	Less Flexible	More Flexible	Max BRT
16	Vehicles	Operations Without Fixed Rail	High	More Flexible	Less Flexible	More Flexible	Max BRT
17	Vehicles	Operations Without Catenary	High	More flexible	Less Flexible	More Flexible	Min BRT
18	Vehicles	Special Driver Training	Medium	Less required training	More Training	Less Training	Min BRT
19	Vehicles	Removal of Breakdowns	High	More Flexible	Less Flexible	More Flexible	Max BRT
20	Vehicles	Ability to Pass Roadway Obstructions	High	More Flexible	Less Flexible	More Flexible	Max BRT
21	Vehicles	Turning Radii Restrictions	High	Greater turning flexibility	Less Flexible	More Flexible	Max BRT
22	Vehicles	Grade Limitations	Medium	More grade flexibility			Max BRT
23	Vehicles	Accelleration/Decelleration Characteristics	Medium	Smother ride			No Advantage
24	Vehicles	Sudden Braking Characteristics	Medium	Smother ride			No Advantage
25	Vehicles	Transit Driver Visibility	Medium	Greater visibility			No Advantage
27	Vehicles	Vehicle Overhaul/Replacement Schedule	High	Less maintenance	More Replacement	Less Replacement	Min BRT
28	Vehicles	Regulatory Agency Oversight	Medium	Less oversight			No Advantage
29	Vehicles	Unique Safety/Operation/Other Requirements	Medium	Fewer unique requirements			No Advantage
30	Vehicles	Layover Requirement	Medium	Fewer requirements	More Requirements	Fewer Requirements	Min BRT
31	Fuel/Power	Emissions	High	Fewer emissions			No Advantage
32	Fuel/Power	Consumption	High	Less fuel consumption			No Advantage
33	Fuel/Power	Costs (Fuel or electricity)	Medium	Lower costs			No Advantage
34	Fuel/Power	Range limitations of Fuel/Power	Medium	Greater range	Lower range	Greater range	Min BRT
36	Fuel/Power	Catenary Placement	High	More flexibility	More Flexible	Less Flexible	Min BRT
37	Stations	HCT Amenities (fare collection, branding, etc)	High	More amenities			No Advantage
38	Stations	Platform Length	Medium	Appropriate platform based on demand	Longer platform	Shorter platform	Min BRT
39	Stations	Platform Width	Medium	Thinner required platform			No Advantage
40	Stations	Platform Loading Height	High				No Advantage
41	Stations	Loading Gap between Vehicle & Platform	Medium	Thinner gap			No Advantage
43	Stations	Interoperability With Other Routes	Very High	Greater interoperability	Less interoperability	Greater interoperabilit	Max BRT
44	Stations	Ease of Pedestrian/ADA Access	High	Improved access			No Advantage
45	Stations	Loading Pad Design	Medium				No Advantage
46	Stations	Future Station Expansion	Medium	Ability to expand without relocating			No Advantage
47	Service	Preferred Alignment & Potential Expansion	Medium	Fewer Alignment Limitations	More Limitations	Fewer Limitations	Min BRT
48	Service	Dedicated Runningway	Very High	Able to operate in dedicated runningway			No Advantage
49	Service	Mixed Flow Runningway	High	Able to operate in Mixed Flow	Decreased mixed flo	Increased mixed flow	Min BRT
50	Service	Center Runningway	Medium	Increased center runningway			No Advantage
51	Service	Curb Runningway	Medium	Decreased curb runningway			No Advantage
52	Service	Station Spacing	High				No Advantage
53	Service	Speed	Very High	Higher speed			No Advantage
54	Service	Reliability	Very High	Higher reliability	Lower reliability	Higher reliability	Min BRT
55	Service	Frequency	High	Higher frequency	Lower frequency	Higher frequency	Min BRT
56	Service	Span	High	Higher span			No Advantage
57	Service	Capacity	Very High	Higher capacity	Higher capacity	Lower capacity	Min RSC
58	Service	Travel Time	Very High	Shorter travel time			No Advantage
59	Service	Throughput Capacity	High	Greater throughput	Greater throughput	Lower throughput	Min RSC
60	Service	Dwell Time	High	Shorter dwell time			No Advantage
61	Service	Deadhead Time	High	Shorter deadhead time			No Advantage
62	Service	Vehicle Bunching	Medium	Less vehicle bunching	More vehicle bunchi	Less vehicle bunching	Min BRT
63	Service	Add Non-Scheduled/Special Events Vehicles and (	Medium	More flexibility	Less flexibility	More flexibility	Max BRT
64	Service	Modify Service for Incidents or Construction	High	More flexibility	Less flexibility	More flexibility	Max BRT
66	Service	Mean Distance Between Breakdowns	Medium	Greater distance			No Advantage
67	Service	ITS/TSP Architecture & Protocol Requirements	Medium	Fewer requirements			No Advantage
68	Service	Special/Extra Signal Equipment	Medium	Fewer requirements	More requirements	Fewer requirements	Min BRT
70	Ridership	Existing Service Ridership	Very High	Higher ridership	Higher ridership	Lower ridership	Min BRT
71	Ridership	Shifted Riders (existing from other routes)	Very High	Higher ridership			No Advantage
72	Ridership	New Riders	Very High	Higher ridership			No Advantage
73	Ridership	Future Ridership (long-term)	Very High	Higher ridership			No Advantage
74	Ridership	Disadvantaged/Targeted Populations	Very High	Higher ridership			No Advantage

	1	2	3	5	6		8
#	Variable	Sub-Variables	Relative Importance	Desired Characteristic	RSC Characteristic	BRT Characteristic	Advantage
75	Ridership	Transfers from Other Services	Very High	Higher transfers	Easier Transfer	Harder transfers	Min BRT
76	Transit Experience	Vehicle Comfort (space, seats, standing room)	High	Greater comfort	Greater comfort	Less comfort	Min RSC
77	Transit Experience	Vertical and Horizontal Movement	Medium	Less movement	Less movement	More movement	Min RSC
78	Transit Experience	Vehicle Vibration	Medium	Less vibration	Less vibration	More vibration	Min RSC
79	Transit Experience	Ambient Noise	Medium	Less noise	Less noise	More noise	Min RSC
80	Transit Experience	Security	Medium	Greater Security			No Advantage
81	Transit Experience	Lighting	Medium	More lighting			No Advantage
82	Impacts to Other Modes	On-Street Parking	High	Fewer impacts			No Advantage
83	Impacts to Other Modes	Driveways/Access Management	Medium	Fewer impacts			No Advantage
84	Impacts to Other Modes	Loading/Unloading Zones	Medium	Fewer impacts			No Advantage
85	Impacts to Other Modes	Pedestrian Facilites/Crossings	High	Fewer impacts			No Advantage
86	Impacts to Other Modes	Bicycle Faciliites/Crossings	High	Fewer impacts			Min BRT
87	Impacts to Other Modes	Impede ADA Mobility	High	Fewer impacts			Min BRT
88	Impacts to Other Modes	Emergency Vehicles	Medium	Fewer impacts	More impacts	Fewer impacts	Max BRT
89	Impacts to Other Modes	General Traffic Movements	Medium	Fewer impacts	More impacts	Fewer impacts	Min BRT
90	Impacts to Other Modes	Roadway Design/Degredation/Replacement	High	Fewer impacts	More impacts	Fewer impacts	Min RSC
91	Impacts to Other Modes	Existing Service Interoperability Along Runningwa	High	Greater interoperability	Less interoperability	Greater interoperabilit	Max BRT
92	Impacts to Other Modes	Severity of Collisions (weight and decell)	High	Less severe			No Advantage
93	Impacts to Other Modes	Change in VMT	High	Lower VMT			No Advantage
94	Impacts to Other Modes	Congestion Levels	High	Less congestion			No Advantage
95	Impacts to Other Modes	Automobile Speed	High	Greater speed			No Advantage
96	Project Phasing	Minimum Construction Segments	High	Smaller minimum	Greater minimum	Smaller minimum	Min BRT
97	Project Phasing	Minimum Operating Segment	High	Smaller minimum	Greater minimum	Smaller minimum	Min BRT
98	Project Phasing	Minimum Vehicle Requirement	High	Smaller minimum			No Advantage
99	Project Phasing	Cost Implications of Phased vs. Full	Medium	Smaller difference			No Advantage
100	Project Phasing	Provide Service Off Runningway	Medium	Greater flexibility	Less flexibility	Greater flexibility	Min BRT
101	Construction	Special Equipment Required	Medium	Less equipment	More equipment	Less equipment	Max BRT
102	Construction	Length of Time	Medium	Shorter time	Longer time	Shorter time	Max BRT
103	Construction	Staging Space Required	Medium	Shorter spacing	Longer spacing	Shorter spacing	Min BRT
104	Construction	Traffic Control Plans	Medium	Simplier plans	More complex plans	Simplier plans	Min BRT
105	Construction	Sound	High	Less noise	More noise	Less noise	Min BRT
106	Construction	Vibration	High	Less vibration	More vibration	Less vibration	Min BRT
107	Land Use	Spur New Development (currently unplanned)	High	Spur more development	Spur more developm	Spur less developmen	No Advantage
108	Land Use	Serve Planned Development Based on Zoning	High	Higher correspondence to plan			No Advantage
109	Land Use	Impact to Property Value	High	Higher increase in property values	Higher increase in pr	Lower increase in prop	No Advantage
110	Land Use	Visual/Aesthetics	Medium	Better Visual/Aesthetics			No Advantage
111	Land Use	Noise/Vibration Receptors	High	Less Noise Impact	More Noise Impact	Less Noise Impact	Min BRT
112	Costs	Capital Costs	Very High	Lower costs	Higher costs	Lower costs	Max BRT
113	Costs	Operating Costs	Very High	Lower costs	Lower costs	Higher costs	Min RSC
114	Costs	Maintenance Costs	Very High	Lower costs	Higher costs	Lower costs	Max BRT
115	Costs	Farebox Recovery	High	Greater revenue			No Advantage
116	Costs	Cost vs. Service Characteristic (rev hr, etc)	High				No Advantage
117	Costs	Maintenance Facility Expansion	High	Less expansion	More expansion	Less expansion	Min BRT
118	Costs	Catenary Substations	High	Fewer required	More required	Fewer required	Max BRT

#	Variable	Sub-Variables	Relative Importance	Desired Characteristic	RSC Characteristic	BRT Characteristic	Advantage
	1	2	3	5	6		8
5	Vehicles	Seated Capacity	High	Higher capacity	Higher Capacity	Lower Capacity	Min RSC
6	Vehicles	Standing Capacity	High	Higher capacity	Higher Capacity	Lower Capacity	Min RSC
7	Vehicles	Wheelchair Capacity	Medium	Higher capacity	Higher Capacity	Lower Capacity	Min RSC
9	Vehicles	Vehicle Flexibility (# of cars, configuration)	Medium	More flexible	More Flexible	Less Flexible	Min RSC
10	Vehicles	Availability (multiple vendors, delivery time)	Medium	More availability	Less Available	More Available	Max BRT
13	Vehicles	Vehicle Weight	Medium	Lower Weight	Higher Weight	Lower Weight	Max BRT
14	Vehicles	Vehicle Height	Low	Shorter	Higher Height	Lower Height	Min BRT
15	Vehicles	Vehicle Use on Other Routes	High	More Flexible	Less Flexible	More Flexible	Max BRT
16	Vehicles	Operations Without Fixed Rail	High	More Flexible	Less Flexible	More Flexible	Max BRT
17	Vehicles	Operations Without Catenary	High	More flexible	Less Flexible	More Flexible	Min BRT
18	Vehicles	Special Driver Training	Medium	Less required training	More Training	Less Training	Min BRT
19	Vehicles	Removal of Breakdowns	High	More Flexible	Less Flexible	More Flexible	Max BRT
20	Vehicles	Ability to Pass Roadway Obstructions	High	More Flexible	Less Flexible	More Flexible	Max BRT
21	Vehicles	Turning Radii Restrictions	High	Greater turning flexibility	Less Flexible	More Flexible	Max BRT
22	Vehicles	Grade Limitations	Medium	More grade flexibility			Max BRT
27	Vehicles	Vehicle Overhaul/Replacement Schedule	High	Less maintenance	More Replacement	Less Replacement	Min BRT
30	Vehicles	Layover Requirement	Medium	Fewer requirements	More Requirements	Fewer Requirements	Min BRT
34	Fuel/Power	Range limitations of Fuel/Power	Medium	Greater range	Lower range	Greater range	Min BRT
35	Fuel/Power	Regeneration of Electricity	Low	Higher regeneration	Less regeneration	More regeneration	Min BRT
36	Fuel/Power	Catenary Placement	High	More flexibility	More Flexible	Less Flexible	Min BRT
38	Stations	Platform Length	Medium	Appropriate platform based on demand	Longer platform	Shorter platform	Min BRT
42	Stations	Placement Limitations (distance from curve,etc)	Low	Fewer limitations	More limitations	Fewer limitations	Min BRT
43	Stations	Interoperability With Other Routes	Very High	Greater interoperability	Less interoperability	Greater interoperabilit	Max BRT
47	Service	Preferred Alignment & Potential Expansion	Medium	Fewer Alignment Limitations	More Limitations	Fewer Limitations	Min BRT
49	Service	Mixed Flow Runningway	High	Able to operate in Mixed Flow	Decreased mixed flo	Increased mixed flow (	Min BRT
54	Service	Reliability	Very High	Higher reliability	Lower reliability	Higher reliability	Min BRT
55	Service	Frequency	High	Higher frequency	Lower frequency	Higher frequency	Min BRT
57	Service	Capacity	Very High	Higher capacity	Higher capacity	Lower capacity	Min RSC
59	Service	Throughput Capacity	High	Greater throughput	Greater throughput	Lower throughput	Min RSC
62	Service	Vehicle Bunching	Medium	Less vehicle bunching	More vehicle bunchi	Less vehicle bunching	Min BRT
63	Service	Add Non-Scheduled/Special Events Vehicles and (	Medium	More flexibility	Less flexibility	More flexibility	Max BRT
64	Service	Modify Service for Incidents or Construction	High	More flexibility	Less flexibility	More flexibility	Max BRT
65	Service	Incorporate Limited Service	Low	More flexibility	Less flexibility	More flexibility	Max BRT
68	Service	Special/Extra Signal Equipment	Medium	Fewer requirements	More requirements	Fewer requirements	Min BRT
70	Ridership	Existing Service Ridership	Very High	Higher ridership	Higher ridership	Lower ridership	Min BRT
75	Ridership	Transfers from Other Services	Very High	Higher transfers	Easier Transfer	Harder transfers	Min BRT
76	Transit Experience	Vehicle Comfort (space, seats, standing room)	High	Greater comfort	Greater comfort	Less comfort	Min RSC
77	Transit Experience	Vertical and Horizontal Movement	Medium	Less movement	Less movement	More movement	Min RSC
78	Transit Experience	Vehicle Vibration	Medium	Less vibration	Less vibration	More vibration	Min RSC
79	Transit Experience	Ambient Noise	Medium	Less noise	Less noise	More noise	Min RSC
86	Impacts to Other Modes	Bicycle Faciliites/Crossings	High	Fewer impacts			Min BRT
87	Impacts to Other Modes	Impede ADA Mobility	High	Fewer impacts			Min BRT
88	Impacts to Other Modes	Emergency Vehicles	Medium	Fewer impacts	More impacts	Fewer impacts	Max BRT
89	Impacts to Other Modes	General Traffic Movements	Medium	Fewer impacts	More impacts	Fewer impacts	Min BRT
90	Impacts to Other Modes	Roadway Design/Degredation/Replacement	High	Fewer impacts	More impacts	Fewer impacts	Min RSC
91	Impacts to Other Modes	Existing Service Interoperability Along Runningwa	High	Greater interoperability	Less interoperability	Greater interoperabilit	Max BRT
96	Project Phasing	Minimum Construction Segments	High	Smaller minimum	Greater minimum	Smaller minimum	Min BRT
97	Project Phasing	Minimum Operating Segment	High	Smaller minimum	Greater minimum	Smaller minimum	Min BRT
100	Project Phasing	Provide Service Off Runningway	Medium	Greater flexibility	Less flexibility	Greater flexibility	Min BRT
101	Construction	Special Equipment Required	Medium	Less equipment	More equipment	Less equipment	Max BRT
102	Construction	Length of Time	Medium	Shorter time	Longer time	Shorter time	Max BRT
103	Construction	Staging Space Required	Medium	Shorter spacing	Longer spacing	Shorter spacing	Min BRT
104	Construction	Traffic Control Plans	Medium	Simplier plans	More complex plans	Simplier plans	Min BRT
105	Construction	Sound	High	Less noise	More noise	Less noise	Min BRT
106	Construction	Vibration	High	Less vibration	More vibration	Less vibration	Min BRT
111	Land Use	Noise/Vibration Receptors	High	Less Noise Impact	More Noise Impact	Less Noise Impact	Min BRT
112	Costs	Capital Costs	Very High	Lower costs	Higher costs	Lower costs	Max BRT
113	Costs	Operating Costs	Very High	Lower costs	Lower costs	Higher costs	Min RSC
114	Costs	Maintenance Costs	Very High	Lower costs	Higher costs	Lower costs	Max BRT
117	Costs	Maintenance Facility Expansion	High	Less expansion	More expansion	Less expansion	Min BRT
118	Costs	Catenary Substations	High	Fewer required	More required	Fewer required	Max BRT

	1	2	3	5	6		8
#	Variable	Sub-Variables	Relative Importance	Desired Characteristic	RSC Characteristic	BRT Characteristic	Advantage
5	Vehicles	Seated Capacity	High	Higher capacity	Higher Capacity	Lower Capacity	Min RSC
6	Vehicles	Standing Capacity	High	Higher capacity	Higher Capacity	Lower Capacity	Min RSC
7	Vehicles	Wheelchair Capacity	Medium	Higher capacity	Higher Capacity	Lower Capacity	Min RSC
9	Vehicles	Vehicle Flexibility (# of cars, configuration)	Medium	More flexible	More Flexible	Less Flexible	Min RSC
10	Vehicles	Availability (multiple vendors, delivery time)	Medium	More availability	Less Available	More Available	Max BRT
13	Vehicles	Vehicle Weight	Medium	Lower Weight	Higher Weight	Lower Weight	Max BRT
15	Vehicles	Vehicle Use on Other Routes	High	More Flexible	Less Flexible	More Flexible	Max BRT
16	Vehicles	Operations Without Fixed Rail	High	More Flexible	Less Flexible	More Flexible	Max BRT
17	Vehicles	Operations Without Catenary	High	More flexible	Less Flexible	More Flexible	Min BRT
18	Vehicles	Special Driver Training	Medium	Less required training	More Training	Less Training	Min BRT
19	Vehicles	Removal of Breakdowns	High	More Flexible	Less Flexible	More Flexible	Max BRT
20	Vehicles	Ability to Pass Roadway Obstructions	High	More Flexible	Less Flexible	More Flexible	Max BRT
21	Vehicles	Turning Radii Restrictions	High	Greater turning flexibility	Less Flexible	More Flexible	Max BRT
22	Vehicles	Grade Limitations	Medium	More grade flexibility			Max BRT
27	Vehicles	Vehicle Overhaul/Replacement Schedule	High	Less maintenance	More Replacement	Less Replacement	Min BRT
30	Vehicles	Layover Requirement	Medium	Fewer requirements	More Requirements	Fewer Requirements	Min BRT
34	Fuel/Power	Range limitations of Fuel/Power	Medium	Greater range	Lower range	Greater range	Min BRT
36	Fuel/Power	Catenary Placement	High	More flexibility	More Flexible	Less Flexible	Min BRT
38	Stations	Platform Length	Medium	Appropriate platform based on demand	Longer platform	Shorter platform	Min BRT
43	Stations	Interoperability With Other Routes	Very High	Greater interoperability	Less interoperability	Greater interoperabilit	Max BRT
47	Service	Preferred Alignment & Potential Expansion	Medium	Fewer Alignment Limitations	More Limitations	Fewer Limitations	Min BRT
49	Service	Mixed Flow Runningway	High	Able to operate in Mixed Flow	Decreased mixed flo	Increased mixed flow (	Min BRT
54	Service	Reliability	Very High	Higher reliability	Lower reliability	Higher reliability	Min BRT
55	Service	Frequency	High	Higher frequency	Lower frequency	Higher frequency	Min BRT
57	Service	Capacity	Very High	Higher capacity	Higher capacity	Lower capacity	Min RSC
59	Service	Throughput Capacity	High	Greater throughput	Greater throughput	Lower throughput	Min RSC
62	Service	Vehicle Bunching	Medium	Less vehicle bunching	More vehicle bunchi	Less vehicle bunching	Min BRT
63	Service	Add Non-Scheduled/Special Events Vehicles and (	Medium	More flexibility	Less flexibility	More flexibility	Max BRT
64	Service	Modify Service for Incidents or Construction	High	More flexibility	Less flexibility	More flexibility	Max BRT
68	Service	Special/Extra Signal Equipment	Medium	Fewer requirements	More requirements	Fewer requirements	Min BRT
70	Ridership	Existing Service Ridership	Very High	Higher ridership	Higher ridership	Lower ridership	Min BRT
75	Ridership	Transfers from Other Services	Very High	Higher transfers	Easier Transfer	Harder transfers	Min BRT
76	Transit Experience	Vehicle Comfort (space, seats, standing room)	High	Greater comfort	Greater comfort	Less comfort	Min RSC
77	Transit Experience	Vertical and Horizontal Movement	Medium	Less movement	Less movement	More movement	Min RSC
78	Transit Experience	Vehicle Vibration	Medium	Less vibration	Less vibration	More vibration	Min RSC
79	Transit Experience	Ambient Noise	Medium	Less noise	Less noise	More noise	Min RSC
86	Impacts to Other Mode	Bicycle Faciliites/Crossings	High	Fewer impacts			Min BRT
87	Impacts to Other Mode	Impede ADA Mobility	High	Fewer impacts			Min BRT
88	Impacts to Other Mode	Emergency Vehicles	Medium	Fewer impacts	More impacts	Fewer impacts	Max BRT
89	Impacts to Other Mode	General Traffic Movements	Medium	Fewer impacts	More impacts	Fewer impacts	Min BRT
90	Impacts to Other Mode	Roadway Design/Degredation/Replacement	High	Fewer impacts	More impacts	Fewer impacts	Min RSC
91	Impacts to Other Mode	Existing Service Interoperability Along Runningwa	High	Greater interoperability	Less interoperability	Greater interoperabilit	Max BRT
96	Project Phasing	Minimum Construction Segments	High	Smaller minimum	Greater minimum	Smaller minimum	Min BRT
97	Project Phasing	Minimum Operating Segment	High	Smaller minimum	Greater minimum	Smaller minimum	Min BRT
100	Project Phasing	Provide Service Off Runningway	Medium	Greater flexibility	Less flexibility	Greater flexibility	Min BRT
101	Construction	Special Equipment Required	Medium	Less equipment	More equipment	Less equipment	Max BRT
102	Construction	Length of Time	Medium	Shorter time	Longer time	Shorter time	Max BRT
103	Construction	Staging Space Required	Medium	Shorter spacing	Longer spacing	Shorter spacing	Min BRT
104	Construction	Traffic Control Plans	Medium	Simplier plans	More complex plans	Simplier plans	Min BRT
105	Construction	Sound	High	Less noise	More noise	Less noise	Min BRT
106	Construction	Vibration	High	Less vibration	More vibration	Less vibration	Min BRT
111	Land Use	Noise/Vibration Receptors	High	Less Noise Impact	More Noise Impact	Less Noise Impact	Min BRT
112	Costs	Capital Costs	Very High	Lower costs	Higher costs	Lower costs	Max BRT
113	Costs	Operating Costs	Very High	Lower costs	Lower costs	Higher costs	Min RSC
114	Costs	Maintenance Costs	Very High	Lower costs	Higher costs	Lower costs	Max BRT
117	Costs	Maintenance Facility Expansion	High	Less expansion	More expansion	Less expansion	Min BRT
118	Costs	Catenary Substations	High	Fewer required	More required	Fewer required	Max BRT

Totals:

Variable	Relative Importance	Advantage
Vehicles	Medium	Max BRT
Fuel/Power	Low	Min BRT
Stations	High	Max BRT
Service	High	Min BRT
Ridership	Very High	Max RSC
Transit Experience	Medium	Min RSC
Impacts to Other Modes	Medium	Min BRT
Project Phasing	Medium	Max BRT
Construction	Medium	Max BRT
Land Use	High	Min RSC
Costs	Very High	Max BRT