Draft Final

Initial Evaluation of Alternatives

Technical Memorandum

BROADWAY URBAN CIRCULATOR STUDY

Prepared for

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SUMMARY

This memorandum describes findings from the initial evaluation of alternatives conducted for the Broadway Transit Urban Circulator Study. The evaluation has been reviewed by members of the consultant team, City of Oakland staff, and the Technical Advisory Group (TAG). The final alternatives will be subjected to final evaluation prior to selection of a Locally Preferred Alternative (LPA).

Based on a review of the Draft Initial Evaluation of Alternatives Memo (January 2014), the TAG approved five alternatives for the Phase 2 evaluation. The TAG directed that a follow-up meeting occur with City of Oakland and AC Transit to determine whether the enhanced bus alternative should serve the Brooklyn Basin development. At the follow-up meeting, both agencies concluded that the enhanced bus alternative alignments should be modified to serve the Brooklyn Basin development.

Subsequent meetings and correspondence also occurred with City of Oakland and BART staff to review potential terminus alignments for the streetcar alternatives at the MacArthur BART station. The consultant team also reviewed planning documents prepared for the EBOTS study, which identified transit alternatives along the 40th Street corridor with connections to the MacArthur BART station. It was determined that the alternative alignments that connected to the MacArthur BART station along 40th Street for the Broadway Transit Urban Circulator Study were consistent with both the EBOTS alternatives and the transit loop alignment identified in the West Oakland Specific Plan. It was also determined that at least one feasible streetcar terminus alignment is available at the MacArthur BART station.

Based on the above consultations, the following alternatives are recommended for the Phase 2 final evaluation stage of the study.

- Enhanced Bus Alternatives
  - Brooklyn Basin to 27th Street
  - Brooklyn Basin to MacArthur BART
  - Brooklyn Basin to Rockridge BART
- Streetcar Alternatives
  - Jack London Square Amtrak to 27th Street
  - Jack London Square Amtrak to MacArthur BART

The initial evaluation of alternatives is described in the following pages.

ALTERNATIVES

The seven conceptual alternatives evaluated in this document were developed and refined by consultants, staff, and members of the TAG using an iterative, collaborative process. They include three streetcar alternatives and four bus alternatives, and may briefly be described as:

- Streetcar
  - Jack London Square-27th Street
  - Jack London Square-MacArthur BART
  - Jack London Square-Rockridge BART
- Bus
  - Brooklyn Basin -27th Street
  - Brooklyn Basin -MacArthur BART
  - Brooklyn Basin -Rockridge BART
  - Brooklyn Basin-Uptown Transit Center

The fourth bus alternative, Brooklyn Basin-Uptown Transit Center, is not an alternative that serves the Broadway corridor directly, and thus would only be implemented in combination with one of the other concepts. For purposes of evaluation, however, it has been assessed separately.

The three streetcar alternatives share the intersection of 2nd and Oak streets in Jack London Square as one terminus and are identical in terms of alignment and stop locations through 27th Street and Broadway. The bus alternatives share the Brooklyn Basin development as the southern terminus location. Along Broadway, all alternatives share a similar alignment and stop locations between 2nd Street and 40th Street. The mode and northern terminus of each alternative are the primary differences between them.

Because the alternatives remain highly conceptual at this point, exact locations of stops have not yet been finalized. Table 1 provides a list of preliminary stop locations for each alternative.

Table 1 Alternatives

Streetcar Alternatives	
Jack London Square-27th Street	Oak & 2nd St 2nd St at JLS Amtrak 2nd St & Webster (IB only) Embarcadero & Franklin (OB only) 3rd St & Broadway 8th St & Broadway 11th St & Broadway 14th St & Broadway 17th St & Broadway 20th St & Broadway Grand Ave & Broadway 24th St & Broadway 27th St & Broadway
Jack London Square-MacArthur BART	*Jack London Square-27th Street stops, plus:* 30th St & Broadway Hawthorne & Broadway MacArthur & Broadway 38th St & Broadway Manila & 40th St Webster & 40th St MacArthur BART (opposite plaza)
Jack London Square-Rockridge BART	*Jack London Square-27th Street stops, plus:* 30th St & Broadway Hawthorne & Broadway MacArthur & Broadway 40th St & Broadway 42nd St & Broadway 51st St & Broadway Manila & College Rockridge BART (parking lot)

Enhanced Bus Alternatives	
Brooklyn Basin-27th Street	8th Ave & 6th Ave 5th Ave & Embarcadero Embarcadero @ Landing at JLS Oak & 2nd St 2nd St at JLS Amtrak Embarcadero & Franklin 3rd St & Broadway 8th St & Broadway 11th St & Broadway 14th St & Broadway 17th St & Broadway 20th St & Broadway Grand Ave & Broadway 24th St & Broadway 27th St & Broadway
Brooklyn Basin-MacArthur BART	*Brooklyn Basin-27th Street stops, plus:* 30th St & Broadway Hawthorne & Broadway MacArthur & Broadway 38th St & Broadway Manila & 40th St Webster & 40th St MacArthur BART (opposite plaza)
Brooklyn Basin-Rockridge BART	*Brooklyn Basin-27th Street stops, plus:* 30th St & Broadway Hawthorne & Broadway MacArthur & Broadway 40th St & Broadway 42nd St & Broadway 51st St & Broadway Manila & College Rockridge BART (parking lot)

Brooklyn Basin-Uptown Transit Center	8th Ave & 6th Ave 5th Ave & Embarcadero Embarcadero @ Landing at JLS 3rd St & Madison/Oak Lake Merritt BART 12th St & Madison/Oak Madison & 14th St Harrison & 14th St 14th St & Broadway 17th St & Broadway 19th St & Telegraph (OB only) Uptown Transit Center

In addition to the alignments and stop locations, conceptual cross-sections for configuration of the right-of-way (ROW) have been developed:

- *Lanes*. Circulator vehicles would generally operate in mixed traffic flow in the curb or outside travel lane (or only lane, where there is only one lane each way). Streetcars would operate in the inside or center lane north of Grand Avenue, and there are two variants for streetcar alternatives in the segment between Embarcadero and Grand:
  - Variant A, under which streetcars would operate in the outer lanes; and
  - Variant B, in which they would operate in the inner lanes.

  Under all alternatives, the outside travel lanes would be converted to transit-only use on Broadway between 11th and 20th Streets[1], and both Circulator vehicles and AC Transit buses would operate in these lanes (except under streetcar Variant B). Under all bus alternatives, the existing bicycle lanes on Broadway north of 25th Street would be extended south to Jack London Square (alternately, a wide shared bus and bicycle lane might be substituted).
- *Stops*. Where Circulator vehicles would operate in the outer lanes, sidewalk extensions or "bulb-outs" would be constructed allowing them to proceed after stops without having to merge back into traffic. Where streetcars would operate in the inner lanes, new "island" stops would be constructed where there is no

[1] Taxis would be able to use the lanes, and autos and trucks could use the lanes to turn right or access parking. Some turn movements might have to be restricted in order to ensure that the flow of traffic remained relatively smooth in the remaining traffic lanes.

existing median. On Broadway north of Grand, it is anticipated that stops could be accommodated within the existing median with only minor modifications.

Finally, a conceptual service plan consisting of spans and headways for each time period has been developed. This service plan does not vary by alternative, for either streetcar or bus alternatives. It is shown in Table 2.

Table 2 Service Plan

DAYS	HOURS OF SERVICE	HEADWAY (Frequency in Minutes)
Monday-Thursday	6 a.m.-7 a.m.	15
	7 a.m.-7 p.m.	10
	7 p.m.-10 p.m.	15
Friday	6 a.m.-7 a.m.	15
	7 a.m.-7 p.m.	10
	7 p.m.-1 a.m.	15
Saturday	7 a.m.-1 a.m.	15
Sunday	7 p.m.-10 p.m.	15

EVALUATION FRAMEWORK

Table 3 on the following pages shows the framework used for evaluation. Like the alternatives, the framework was developed by consultants, staff, and members of the TAG using an iterative, collaborative process.

Table 3 Evaluation Framework

Principles		Objectives		Criteria	Methodologies and Data Sources	
					Initial Evaluation	**Final Evaluation**
A	Improve the quality of transit service in the corridor.	A1	Provide reliable service that is relatively free of delay.	Estimated variability in peak travel times	Qualitative assessment based on conceptual designs and existing traffic	See initial
		A2	Ensure adequate capacity to serve existing and future demand.	Throughput	Quantitative analysis based on vehicle capacity	See initial
		A3	Enhance awareness of transit services.	Visibility of infrastructure and potential for public understanding of service	Qualitative assessment based on conceptual designs and existing transit network	See initial
		A4	Leverage and integrate existing transit investments.	Potential to increase network connectivity and provide “first/last mile” connections to and from transit nodes	Qualitative assessment based on conceptual designs and existing transit network	See initial
		A5	Contribute to the utility and efficiency of the overall transit system within the corridor.	Potential impacts on demand for and cost-effectiveness of other services/opportunities to reconfigure impacted services	Qualitative assessment based on conceptual designs and existing transit network	See initial
B	Provide safe, multimodal travel options.	B1	Minimize conflicts between transit and other modes.	Opportunities for physical conflicts between users	Qualitative assessment based on conceptual designs and existing and proposed street configurations	See initial
		B2	Increase overall capacity for “person movement” (rather than vehicle movement) within the corridor.	Estimated peak hour capacity of all vehicles along alignment	Quantitative analysis based on conceptual designs and existing and proposed street configurations	See initial
C	Support economic and community development.	C1	Support transit-oriented development consistent with local and regional policies.	Potential impact of project on type, form and scale of adjacent developments	Qualitative assessment based on conceptual designs and service levels	Qualitative assessment based on Economic Development and Real Estate Market analysis
		C2	Improve access to retail and other businesses.	Multimodal access to businesses/impacts of design on businesses	Qualitative assessment based on conceptual designs and service levels	See initial
		C3	Preserve and enhance the character of and quality of life in existing neighborhoods.	Potential to contribute to identity and perceived quality of districts	Qualitative assessment based on placemaking opportunities	See initial
D	Support environmental sustainability and enhanced public health.	D1	Reduce emissions of CO2 and other harmful pollutants.	Estimated decrease in number of vehicle miles traveled	Qualitative assessment based on projected ridership (see Objective F1 for methodology)	Qualitative assessment based on projected ridership (from projections)
E	Enhance social equity.	E1	Improve access to jobs and social services for communities of concern.	Numbers of low-income, ethnic minority and zero-car households within one-quarter mile of stops	Quantitative analysis based on U.S. Census data	See initial

Principles		Objectives		Criteria	Methodologies and Data Sources	
					Initial Evaluation	**Final Evaluation**
F	Deliver a project that is cost-effective, feasible, and has community support.	F1	Prioritize projects that would be cost-effective to build and operate.	Estimated capital and operating cost per rider	Estimated capital cost (based on length of alignment and typical cost per mile for similar projects) ÷ estimated annual boardings (based on existing boardings at adjacent stops plus typical ridership impacts of similar projects) Estimated annual operating cost (based on estimated number of revenue service hours and estimated cost per hour, using local bus costs and typical streetcar "premiums" or addt'l mode-specific costs) ÷ estimated annual place-miles (estimated annual revenue service miles x vehicle capacity)	Estimated capital cost (from projections) ÷ estimated annual boardings (from projections) See initial
		F2	Prioritize projects with a viable operator and administrative structure.	Potential willingness of existing organizations/potential for new organization to administer and operate	Qualitative assessment	Qualitative assessment based on System Management analysis
		F3	Prioritize projects with the potential to earn widespread community acceptance.	Likely level of support from community members, community leaders and policy makers	Qualitative assessment	See initial
		F4	Prioritize projects with a realistic phasing and funding plan.	Potential for phased implementation (based on viability of individual phases)	Qualitative assessment based on conceptual designs, including alignments, stop locations and right-of-way configurations	See initial

ESTIMATES

The framework relies on and required development of a number of quantitative datasets, including:

- Estimated throughput
- Estimated ridership
- Numbers of low-income, ethnic minority and zero-car households within one-quarter mile of proposed stops
- Estimated capital costs
- Estimated operating costs

The estimates and the methodologies used to arrive at them are described below. Additional details can be found in the appendix.

Throughput

This measure refers to "person movement," or the potential throughput of a transportation corridor in terms of the number of *people* that can be accommodated, rather than vehicles. This is an important distinction to make when evaluating transit projects, which by replacing relatively space-inefficient vehicles (autos and trucks) with more efficient ones (buses and railcars) will always serve to increase the carrying capacity of all vehicles in corridor, even if the number of vehicles is reduced, for example by designating existing traffic lanes as transit-only.

While increases in transit service will always increase the theoretical capacity of a roadway, in practice, capacity is limited by the amount of service to be provided, which in turn is partly a function of demand. So, too, however, is the non-hypothetical capacity of a roadway limited by existing and projected traffic demand. For this reason, analyses of capacity should consider whether a proposal would, in fact, move more people.

All alternatives being evaluated as part of this project would designate two of the four existing travel lanes on Broadway between 11th and 20th streets as transit-only, reducing traffic capacity by roughly half. Analysis indicates that existing Average Daily Traffic (ADT) in this segment can reasonably be accommodated using two through lanes[2], and excess traffic capacity is available on parallel streets. For this reason, reservation of the remaining two lanes on Broadway for transit should increase the effective capacity of the corridor, as more transit service could be reliably accommodated.

All transit alternatives would also provide the same volume of service. The differences between alternatives, then, would ultimately be a function of vehicle size – streetcars can carry roughly as twice as many passengers as the largest buses. Vehicle capacities are shown in Table 4. Once again, these figures represent seated and standing capacity on a United Streetcar vehicle and a New Flyer 2200 model bus (although other 60-foot articulated buses would have similar capacity).

Table 4 Vehicle Capacity

Streetcar	Bus
115	78

[2] Broadway-Valdez redevelopment would increase traffic volumes on this segment of Broadway.

Ridership

For the final evaluation, ridership will be estimated using Fehr & Peers' Direct Ridership Model (DRM). For the initial evaluation, ridership was estimated more conceptually using the following methodologies[3]:

- For streetcars, ridership was estimated based on per-mile figures for the three existing modern streetcar lines in the United States, in Portland, Oregon and Tacoma and Seattle, Washington. These figures were then adjusted based on existing land uses in the Broadway corridor, and low and high ends of a range were defined for each alternative. Note that because local data were not available to use as baselines, streetcar ridership estimates are intentionally conservative given the early stage of analysis and the conceptual methodology -- "high-end" figures are based on ridership rates similar to the Seattle streetcar line, which has the lowest boarding rates of the three modern streetcar lines.
- For buses, estimates could be based on existing ridership on AC Transit buses. Total average numbers of weekday boardings at each stop, on all routes, were first calculated[4]. "New riders[5]" for each alternative were then calculated using elasticities, or percentage increases in ridership assumed for various types of service improvements. The elasticities were based on research and professional judgment. Factors to which they were applied included increased service levels, travel time savings, improved connectivity, improved reliability, and enhanced public understanding and awareness of the service. While this is a standard approach for conceptual estimation of ridership, estimates should be understood to be sketch-level[6].

Estimated weekday average ridership (rounded to the nearest thousand) is shown in Table 5.

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[3] It should be noted that one bus and one streetcar alternative will be recommended for further evaluation. For this reason, it is appropriate to use different methodologies for bus and streetcar alternatives as part of the initial evaluation.

[4] Data for Route 12 were unavailable. However, this route operates relatively infrequently.

[5] Because Circulator service would replace B shuttle service, B ridership was not included in the calculations of existing ridership at each stop. "New riders," then, should be understood to be riders who are not currently using AC Transit service.

[6] Because no service exists along much of the Lake Merritt alternative's alignment, and because much of the purpose of the alternative is to serve future development at Brooklyn Basin, estimation of ridership using this methodology would be highly problematic. For this reason, numbers of new riders have been estimated by comparing the alternative to the remaining bus alternatives on the basis of existing and planned land uses.

Because the ridership-estimation methodologies were based on recent ridership counts, all estimates are "year of estimate" (2013) and thus do not take account potential impacts from future development. The high end of the range of ridership estimates for the three enhanced bus alternatives along Broadway reflects the addition of 900 riders that shifted from existing AC Transit lines to the Broadway B shuttle.

The following existing weekday boarding data is provided for reference purposes.

- Broadway B Shuttle – 2,400
- AC Transit Route 51A (Rockridge BART to 8th Street segment) – 4,910

Table 5 Estimated Weekday Riders (Streetcar) and New Riders (Bus)

Alternatives	New Riders
Streetcar	
Jack London Square-27th Street	2,700-3,700
Jack London Square-MacArthur BART	3,900-5,700
Jack London Square-Rockridge BART	4,200-6,400
Bus	
Brooklyn Basin-27th Street	2,200-3,100
Brooklyn Basin-MacArthur BART	3,600-4,500
Brooklyn Basin-Rockridge BART	3,400-4,300
Brooklyn Basin-Uptown Transit Center	1,500

Low-Income, Ethnic Minority and Zero-Car Households

In order to evaluate social equity and environmental justice impacts of the alternatives, maps were developed illustrating numbers of ethnic minority individuals, low-income[7] households, and zero-car households in U.S. Census block groups and tracts within one-quarter mile of the alignments[8]. These maps served as a basis for qualitative assessment, and can be found in Appendix B.

[7] Based on the MTC regional standard of 200 percent of the federally defined poverty level.

[8] The framework called for analysis within one-quarter mile of stops. However, stops are spaced relatively closely together, and research indicates that the typical walkshed for high-quality transit may be closer to one-half mile. For this reason, analysis has been conducted for the corridor rather than individual nodes.

Capital Costs

As with ridership, capital costs were estimated for streetcar and bus alternatives using different methodologies. This is because for streetcar projects, a number of variables must be factored into cost estimates, while the bus alternatives would be much simpler, with just two major cost drivers (vehicles and amenities at stops).

- Streetcar costs were estimated primarily on the basis of costs for similar projects. Average costs per route mile were calculated for 16 streetcar projects recently completed, under construction or in later stages of development within the United States. These costs were then averaged ($50.6 million[9]), an inflation factor based on the 2013 Construction Cost Index (CCI) for Oakland (117.0) was added, and each figure was rounded in order to define lower ($50 million per mile) and upper ($60 million per mile) bounds of a range. $5 million was added to the cost of each project in order to account for a condition unique to Oakland, the presence of a cut-and-cover subway beneath much of the right-of-way. The $50-60 million per mile range should be understood to include transit-related elements of the project, and not complete reconstruction of the right-of-way.
- For bus projects, a review of average bus costs per mile for various project components was conducted. The TAG directed that a "high level of investment" should be assumed for the enhanced bus alternatives that includes advanced vehicle technology, stops, and guideway enhancements. The cost estimates reflect a low value of $10 million per mile and a high value of $20 million per mile.

Estimated costs are shown in Table 6.

[9] Of the 16 projects, 14 had per-mile costs within 20 percent of the average, and nine had costs within 10 percent of the average.

Table 6 Estimated Capital Costs

Alternative	Capital Cost (Millions)	
	Low	High
Streetcar		
Jack London Square-27th Street	$109	$130
Jack London Square-MacArthur BART	$184	$220
Jack London Square-Rockridge BART	$217	$259
Bus		
Brooklyn Basin -27th Street	$31	$62
Brooklyn Basin -MacArthur BART	$46	$92
Brooklyn Basin -Rockridge BART	$53	$106
Brooklyn Basin-Uptown Transit Center	$18	$22

Operating Cost

Operating costs were estimated, first, by calculating the annual hours of revenue service required to operate each alternative (this process is described under "Place-Miles"). Operating costs per hour were then estimated based on AC Transit's 2011 National Transit Database (NTD) cost of $169.01 and research into the difference between bus and streetcar operating costs in Seattle (where streetcar costs were 40 percent higher than bus in 2011, according to NTD) and Portland (where streetcars were 60.3 percent higher). Based on this research, costs of $180 per hour for buses and $270 per hour for streetcars were applied. Costs are shown in Table 7.

Table 7 Estimated Annual Operating & Maintenance (O&M) Costs

Alternative	O&M Costs (Millions)
Streetcar	
Jack London Square-27th Street	$4.2
Jack London Square-MacArthur BART	$6.5
Jack London Square-Rockridge BART	$7.7
Bus	
Brooklyn Basin -27th Street	$4.4
Brooklyn Basin -MacArthur BART	$5.5
Brooklyn Basin -Rockridge BART	$6.6
Brooklyn Basin-Uptown Transit Center	$3.2

EVALUATION

Evaluations for each of the 16 objectives can be found in the following pages. For each objective, criteria and factors are first identified. Ratings and their rationale are then provided for each alternative. Ratings are on a scale of 1 to 5, with 1 representing lowest-performing and 5 highest-performing (in cases where ratings are proportional to numeric values, for example ridership, values of 1 and/or 5 may not be assigned). For streetcar alternatives, Variant A has been assumed as a "base" configuration; where application of Variant B would impact performance, this has been identified. Note that while one streetcar and one bus alternative will be advanced for final evaluation, streetcar and bus alternatives have been compared to one another in all cases except those involving ridership, for which different methodologies were used for streetcar and bus alternatives.

A Improve the quality of transit service in the corridor

A1 Provide reliable service that is relatively free of delay.

Criteria: Estimated variability in peak travel times = Qualitative assessment based on conceptual designs and existing traffic.

Rationale:

Factors considered in evaluation:

- All alternatives will reduce variability in travel times somewhat from existing conditions due to delay-reduction strategies that will be implemented as part of all alternatives (e.g. bus bulbs).
- Streetcar alternatives will be more vulnerable to delay than bus alternatives because streetcars cannot move laterally, and therefore cannot avoid traffic incidents blocking the path of travel such as double-parked vehicles or vehicles involved in a collision.
- Review of Google data regarding peak-period traffic congestion suggests that congestion is generally relatively evenly distributed along each alignment. However, opportunities for delay would be greater in segments in which there is only one lane of traffic in each direction, including Embarcadero, streets other than Broadway in the Jack London Square area, streets within the MacArthur Transit Village and College Avenue. In these segments, but most notably on College where traffic volumes are highest, streetcars would be particularly susceptible to delay (as would buses, although to a lesser extent).
- Conversely, the Brooklyn Basin bus alternative would use three-lane one-way streets on which there is very little potential for delay for much of its alignment.
- The longer the route, the more potential for schedule variability as delays "cascade," or are compounded by ever-later arrivals due to increased dwell time from additional passengers waiting at each stop.
- Streetcar alternatives operating in the center lane can generally avoid delay better than those operating in the side lane, where double-parking may occur. However, streetcars would experience less delay under ROW Variant A, side-running between Embarcadero and Grand, than Variant B, center-running. This is because between 11th and 20th Streets, the curb lane would be designated transit-only under all alternatives. Under Variant B, streetcars could not operate in or benefit from this lane, and furthermore, there would be greater traffic volumes and more congestion in the center lane than now exists. For the purposes of this evaluation, ratings have been assigned on the basis of Variant A[10].

[10] Variant B would not result in greater delay than Variant A if transit-only lanes were not implemented. By the same token, Variant A and all bus alternatives would experience greater delay if transit lanes were *not* implemented.

Table 8 Estimated Variability in Peak Travel Times

Alternatives	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	4	Shortest alignment, and includes only a brief constrained segment. However, streetcars more susceptible to delay than buses.
Jack London Square-MacArthur BART	3	Slightly longer alignment.
Jack London Square-Rockridge BART	1	Longest alignment, and College Ave segment likely to be major source of delay.
Bus		
Brooklyn Basin-27th Street	5	Buses are better able to avoid traffic-related delay than streetcars.
Brooklyn Basin-MacArthur BART	4	Slightly longer alignment.
Brooklyn Basin-Rockridge BART	2	Longest alignment, and College Ave segment likely to be major source of delay.
Brooklyn Basin-Uptown Transit Center	5	See at top.

A Improve the quality of transit service in the corridor

A2 Ensure adequate capacity to serve existing and future demand.

Criteria: Throughput

Rationale:

- Based on vehicle capacities shown in Table 4.
- Throughput for each alternative was translated into a score of 1-5 based on assigning a score of 5 to the highest capacity alternative and a 0 to zero capacity and evenly distributing scores 1-5 between the two (i.e. capacity 0-25 = 1; capacity 25-50 = 2, etc.).

Table 9 Estimated Number of Place-Miles

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	5	Vehicle capacity of 115.
Jack London Square-MacArthur BART	5	Vehicle capacity of 115.
Jack London Square-Rockridge BART	5	Vehicle capacity of 115.
Bus		
Brooklyn Basin-27th Street	4	Vehicle capacity of 78.
Brooklyn Basin-MacArthur BART	4	Vehicle capacity of 78.
Brooklyn Basin-Rockridge BART	4	Vehicle capacity of 78.
Brooklyn Basin-Uptown Transit Center	3	Vehicle capacity of 63.

A Improve the quality of transit service in the corridor

A3 Enhance awareness of transit services.

Criteria: Visibility of infrastructure and potential for public understanding of service = Qualitative assessment based on conceptual designs and existing transit network

Rationale:

- Streetcars will have the most visible infrastructure and generally speaking, rail transit is a more "legible" and more widely understood than bus transit.
- However, bus alternatives would include higher-visibility stops than is typical for bus stops.
- Longer services will have higher visibility because more people will have the opportunity to see the transit improvement; however, the length of the route at some point could undermine its uniqueness.
- Serving major, well-known anchors/destinations and/or transit hubs such as BART stations increases public understanding of services. Similarly, alternatives operating on major boulevards/avenues and passing major institutions and trip destinations maximize visibility.

Table 10 Visibility of Infrastructure and Potential for Public Understanding of the Service

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	4	Streetcar = high visibility; however, one end not at major destination/transit hub.
Jack London Square-MacArthur BART	5	Streetcar = high visibility; longer route beginning and ending at major destination/transit hub.
Jack London Square-Rockridge BART	4	Streetcar = high visibility; longer route beginning and ending at major destination/transit hub; length of route undermines its uniqueness.
Bus		
Jack London Square-27th Street	2	Bus = less visible infrastructure; one end not at major destination/transit hub.

Alternative	Initial Evaluation	Rationale
Jack London Square-MacArthur BART	4	Bus = less visible infrastructure; beginning and ending at major destination/transit hub.
Jack London Square-Rockridge BART	3	Bus = less visible infrastructure; beginning and ending at major destination/transit hub; length of route undermines its uniqueness.
Brooklyn Basin-Uptown Transit Center	1	Bus = less visible infrastructure; generally not operating on major streets and one end not at major destination/transit hub[11].

[11] It has been assumed for purposes of evaluation that the Brooklyn Basin-Uptown Transit Center alternative would not be implemented prior to at least partial completion of the Brooklyn Basin project, a high-density, high-visibility redevelopment.

A Improve the quality of transit service in the corridor

A4 Leverage and integrate existing transit investments.

Criteria: Potential to increase network connectivity and provide "first/last mile" connections to and from transit nodes = Qualitative assessment based on conceptual designs and existing transit network

Rationale:

All alternatives significantly improve transit connectivity, especially "first/last mile" connections; this is one of the primary benefits of this project.

Connections between major regional transit hubs (BART, Uptown Transit Center at 20th Street, and Oakland-Alameda Ferry) the following destinations/neighborhoods considered:

- Jack London Square
- Old Town/Downtown/Uptown Oakland
- Pill Hill
- Upper Broadway/51st & Broadway
- Lower College Avenue
- Chinatown
- Warehouse District
- Brooklyn Basin

Table 11 Potential to increase network connectivity and provide "first/last mile" connections

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	3	Connects BART to Jack London Square and Downtown Oakland to ferry.
Jack London Square-MacArthur BART	5	Connects BART to Jack London Square and Downtown Oakland to ferry; connects Pill Hill and Broadway-Valdez to two BART stations.
Jack London Square-Rockridge BART	4	Connects BART to Jack London Square and Downtown Oakland to ferry; connects Pill Hill and Broadway-Valdez to BART; and connects 51st/Broadway and Lower College to BART. However,

Alternative	Initial Evaluation	Rationale
		does not connect to MacArthur BART, which is closest BART station for parts of Pill Hill and upper Broadway. (There is also less service at Rockridge than at MacArthur or downtown BART stations.)
Bus		
Brooklyn Basin-27th Street	3	Connects BART to Jack London Square and Downtown Oakland to ferry.
Brooklyn Basin-MacArthur BART	5	Connects BART to Jack London Square and Downtown Oakland to ferry; connects Pill Hill and Broadway-Valdez to two BART stations.
Brooklyn Basin-Rockridge BART	4	Connects BART to Jack London Square and Downtown Oakland to ferry; connects Pill Hill and Broadway-Valdez to BART; and connects 51st/Broadway and Lower College to BART. However, does not connect to MacArthur BART, which is closest BART station for parts of Pill Hill and upper Broadway. (There is also less service at Rockridge than at MacArthur or downtown BART stations.)
Brooklyn Basin-Uptown Transit Center	5	Connects BART station to Chinatown, Warehouse District and Brooklyn Basin.

A Improve the quality of transit service in the corridor

A5 Contribute to the utility and efficiency of the overall transit system within the corridor.

Criteria: Potential impacts on demand for and cost-effectiveness of other services/opportunities to reconfigure impacted services = Qualitative assessment based on conceptual designs and existing transit network

Rationale:

- Where alignments overlap with existing services, alternatives will reduce demand on those services (even if overall demand is increased), making those services less cost-effective to operate (unless they are reduced or reconfigured).
- Depending on alignment,, however, some alternatives may present opportunities to replace existing transit services in a way that improves both service and cost-effectiveness.
- Because they are less maneuverable than buses, streetcars may impact existing services by impeding their efficient operation, especially in Downtown Oakland where there is a high concentration of AC Transit bus service.

Table 12 Potential impacts on demand for and cost-effectiveness of other services/ opportunities to reconfigure impacted services

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	3	Most of alignment is redundant with existing AC Transit services; however, it overlaps with only short segments of each route. Furthermore, as the shortest alignment it would have the least impact on other services.
Jack London Square-MacArthur BART	1	By overlapping with a long segment of AC Transit Line 51, this alignment could have a major impact on the ridership and cost-effectiveness of that service.
Jack London Square-Rockridge BART	5	Because it extends to Rockridge BART, the 51A terminus, this line could serve as a replacement for the Oakland segment of that route (the Downtown Oakland-to-Fruitvale segment would be viable on its own).
Bus		
Brooklyn Basin-27th Street	3	Most of alignment is redundant with existing AC Transit services; however, it overlaps with only short segments of each route. Furthermore, as the shortest alignment it would have the least impact on other services.
Brooklyn Basin-MacArthur BART	1	By overlapping with a long segment of AC Transit Line 51, this alignment could have a major impact on the ridership and cost-effectiveness of that service.
Brooklyn Basin-Rockridge BART	5	Because it extends to Rockridge BART, the 51A terminus, this line could serve as a replacement for the Oakland segment of that route (the Downtown Oakland-to-Fruitvale segment would be viable on its own).

Alternative	Initial Evaluation	Rationale
Brooklyn Basin-Uptown Transit Center	5	There is currently no service along much of the alignment. Notably, it could serve an important future connection between Brooklyn Basin and Lake Merritt BART.

B Provide safe, multimodal travel options.

B1 Minimize conflicts between transit and other modes.

Criteria: Opportunities for physical conflicts between users = Qualitative assessment based on conceptual designs and existing and proposed street configurations

Rationale:

- Increasing transit service increases the potential for conflicts with other modes. The greater the number of vehicles operating along a route, the greater the potential for conflict.
- Streetcars may cause greater number of conflicts than buses for several reasons:
  - Streetcars cannot change direction to avoid a cyclist or another vehicle.
  - Streetcar tracks present a hazard for cyclists, as tires can get stuck in "flanges," or gaps between tracks and pavement.
  - The presence of streetcar tracks may deter motorists from operating in that lane, increasing conflicts in remaining lanes.
- Conflicts are reduced where there are lanes dedicated to one or more modes. While all alternatives include transit-only lanes on Broadway between 11th and 20th streets, the bus alternatives would extend the existing bicycle lanes on Broadway south of 25th Street to Jack London Square.
- There is a greater potential for intermodal conflicts in street segments where there is just one travel lane in each direction, such as on College Avenue. Here, safety might be a concern, as motorists stopped behind streetcars might be tempted to pull into the opposite lane in order to pass.

Table 13 Opportunities for physical conflicts between users

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	4	Streetcars create greater potential for conflict than buses. This is the shortest alignment, requiring the fewest additional transit vehicles.
Jack London Square-MacArthur BART	3	Streetcars create greater potential for conflict than buses.
Jack London Square-Rockridge BART	2	Streetcars create greater potential for conflict than buses. This is the longest alignment, requiring the greatest number of additional transit vehicles. The College Ave segment is also highly constrained.
Bus		
Brooklyn Basin-27th Street	5	Buses create less potential for conflict than streetcars. This is the shortest alignment, requiring the fewest additional transit vehicles.
Brooklyn Basin-MacArthur BART	4	Buses create less potential for conflict than streetcars.
Brooklyn Basin-Rockridge BART	3	Buses create less potential for conflict than streetcars. This is the longest alignment, requiring the greatest number of additional transit vehicles. The College Ave segment is also highly constrained.
Brooklyn Basin-Uptown Transit Center	5	This alignment is only slightly longer than 27th St., and would require the same number of vehicles.

B Provide safe, multimodal travel options.

B2 Increase overall capacity for "person movement" (rather than vehicle movement) within the corridor.

Criteria: Estimated peak hour capacity of all vehicles along alignment = Quantitative analysis based on conceptual designs and existing and proposed street configurations

Rationale:

- Service levels are equivalent for streetcar and bus alternatives and streetcars carry twice as many passengers as buses, therefore all streetcar alternatives will increase capacity for "person movement" more than bus alternatives.
- Alternatives with longer routes and higher total levels of service would provide greater capacity.

Table 14 Estimated peak hour capacity of all vehicles along alignment

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	3	Buses are lower-capacity than streetcars. Shortest alignment.
Jack London Square-MacArthur BART	4	Buses are lower-capacity than streetcars.
Jack London Square-Rockridge BART	5	Buses are lower-capacity than streetcars. Longest alignment.
Bus		
Brooklyn Basin-27th Street	1	Streetcars are higher-capacity than buses. Shortest alignment.
Brooklyn Basin-MacArthur BART	2	Streetcars are higher-capacity than buses.
Brooklyn Basin-Rockridge BART	3	Streetcars are higher-capacity than buses. Longest alignment.
Brooklyn Basin-Uptown Transit Center	4	This alignment is only slightly longer than 27th St.

C Support economic and community development.

C1 Support transit-oriented development consistent with local and regional policies.

Criteria: Potential impact of project on type, form and scale of adjacent development potential = Qualitative assessment based on conceptual designs and service levels

Rationale:

- Fundamentally, improved transit service increases the "location value" of properties by enhancing access. The value is often greatest for properties that have development or redevelopment potential, since they can be designed to benefit from the access. Service improvements may include increased levels of service as well as improvements such as increased reliability and connectivity.
- Studies show that developers see public infrastructure as a sign of public commitment to a corridor and that this has the potential to increase their interest in development in an area. The higher the level of public investment the higher the likelihood of development along a corridor, transit quality, market factors and ease of getting entitlement being equal.
  - All alternatives have some potential to increase the likelihood of development along the corridor because they represent increased public investment/commitment.
  - However, streetcars are more visible and the permanency of rail infrastructure represents both a more permanent access improvement as well as a higher level of public commitment than bus infrastructure. Streetcars also indicate a more "urban" condition and therefore could spur denser development than bus alternatives.
- Market strength and availability of development (or redevelopment) sites are the two biggest factors in development decisions; therefore alternatives that connect to locations with stronger markets and available building sites (vacant or prime for redevelopment) have the highest potential of attracting new development.
  - Jack-London Square is a moderately strong market in Oakland with relatively good availability of potential development sites.
  - Old Oakland is a somewhat weaker market with relatively good availability of development sites.
  - The Downtown Oakland office core is a strong market with little site availability.
  - Uptown Oakland is a strong market in Oakland with relatively good availability of sites.

- Broadway-Valdez is a somewhat weaker market area that offers some major development opportunities; it also has been extensively studied by the City of Oakland and is a high priority for development for the City.
- MacArthur BART and Temescal represent a moderate but strengthening market with some opportunity sites.
- Rockridge is a strong market with little site availability.
- Warehouse District/Chinatown is a weaker market with good site availability.

Table 15 Potential impact of project on type, form and scale of adjacent developments

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	4	Streetcars provide greater support for development than buses.
Jack London Square-MacArthur BART	5	Provides support to additional markets including Broadway-Valdez and Temescal/MacArthur. Also establishes new connectivity between MacArthur BART and Broadway corridor.
Jack London Square-Rockridge BART	4	Provides support to additional markets; however, does not establish new connections.
Bus		
Jack London Square-27th Street	3	Buses do not provide same level of support for development as streetcars.
Jack London Square-MacArthur BART	4	Provides support to additional markets including Broadway-Valdez and Temescal/MacArthur. Also establishes new connectivity between MacArthur BART and Broadway corridor.
Jack London Square-Rockridge BART	3	Provides support to additional markets; however, does not establish new connections.
Brooklyn Basin-Uptown Transit Center	4	Serves major new development, therefore increases likelihood of increasing the momentum of this

Alternative	Initial Evaluation	Rationale
		development and magnifying its impact.

C Support economic and community development.

C2 Improve access to retail and other businesses.

Criteria: Multimodal access to businesses/impacts of design on businesses = Qualitative assessment based on conceptual designs and service levels

Rationale:

- All alternatives improve multimodal access to businesses; the longer the route, the more businesses benefit.
- Streetcars would provide greater capacity and would attract more riders than buses, effectively improving access for business owners.

Table 16 Multimodal access to businesses/impacts of design on businesses

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	3	Streetcars will generate more activity than buses. Shortest alignment.
Jack London Square-MacArthur BART	4	Streetcars will generate more activity than buses.
Jack London Square-Rockridge BART	5	Streetcars will generate more activity than buses. Longest alignment.
Bus		
Brooklyn Basin-27th Street	2	Buses will generate less activity than streetcars. Shortest alignment.
Brooklyn Basin-MacArthur BART	3	Buses will generate less activity than streetcars.
Brooklyn Basin-Rockridge BART	4	Buses will generate less activity than streetcars. Longest alignment.
Brooklyn Basin-Uptown Transit Center	3	This alignment is only slightly longer than 27th St. However, it could greatly improve access to retail establishments at Brooklyn Basin.

C Support economic and community development.

C3 Preserve and enhance the character of and quality of life in existing neighborhoods.

Criteria: Potential to contribute to identity and perceived quality of districts = Qualitative assessment based on placemaking opportunities

Rationale:

- Investments in transit will tend to improve neighborhood access, amenity and quality of life.
- The longer the route, the greater the number of districts that will benefit.
- Streetcars have greater potential to enhance the identity and perceived quality of districts due to their increased visibility and "cache." However, there is a risk that they may contribute to gentrification and displacement in disadvantaged communities.
- As designed, bus alternatives would contribute to neighborhood character through custom-designed, highly visible stops (which might potentially include community-specific public art).

Table 17 Potential to contribute to identity and perceived quality of districts

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	4	Because the alignment does not generally serve low-income areas, addition of streetcar service should have a largely positive impact on communities.
Jack London Square-MacArthur BART	5	Longer alignment benefits larger area.
Jack London Square-Rockridge BART	4	Rockridge is an affluent community in which transit would have less transformative potential.
Bus		
Brooklyn Basin-27th Street	3	Shortest alignment.
Brooklyn Basin-MacArthur BART	4	Longer alignment benefits larger area.
Brooklyn Basin-Rockridge BART	3	Rockridge is an affluent community in which transit would have less transformative potential.
Brooklyn Basin-Uptown Transit Center	4	While short, this alignment serves low-income communities in eastern areas of Downtown Oakland that could benefit from public investment.

D Support environmental sustainability and enhanced public health.

D1 Reduce emissions of CO2 and other harmful pollutants.

Criteria: Estimated decrease in number of vehicle miles traveled = Qualitative assessment based on projected ridership (see Objective F1 for methodology)

Rationale:

- For purposes of evaluation, reduction in VMT is assumed at this stage to be directly proportional to increase in ridership.
- NOTE: Because different methodologies were used to estimate ridership for streetcar and bus alternatives, streetcar alternatives have been compared only to other streetcar alternatives, and bus alternatives have been compared only to other bus alternatives for this objective.

Table 18 Estimated decrease in number of vehicle miles traveled

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	3	Estimated 2,700-3,700 riders per weekday.
Jack London Square-MacArthur BART	4	Estimated 3,900-5,700 riders per weekday.
Jack London Square-Rockridge BART	4	Estimated 4,200-6,400 riders per weekday.
Bus		
Jack London Square-27th Street	3	Estimated 2,200 new transit riders per weekday.
Jack London Square-MacArthur BART	4	Estimated 3,600 new transit riders per weekday.
Jack London Square-Rockridge BART	4	Estimated 3,400 new transit riders per weekday.
Brooklyn Basin-Uptown Transit Center	2	Estimated 1,500 new transit riders per weekday.

E Enhance social equity.

E1 Improve access to jobs and social services for communities of concern.

Criteria: Numbers of low-income, ethnic minority and zero-car households within one-quarter mile of stops = Quantitative analysis based on U.S. Census data

Rationale:

- Larger projects will tend to improve transit service for greater numbers of disadvantaged individuals. However, there may be opportunity costs associated with projects that benefit large numbers of such persons, but *primarily* benefit others. This is especially true if the cost of increased operations in one place reduces the funding available for provision of service elsewhere.
- While fares have not yet been defined for the alternatives, and thus are not part of this analysis, free and discounted fares will be considered as part of this study. Any alternative that provided free or discounted fares to large numbers of people who did not necessarily need them while disadvantaged individuals continued to pay full fare would be problematic from an environmental justice perspective.
- NOTE: Maps illustrating the data used in this analysis can be found in the appendix.

Table 19 Numbers of low-income, ethnic minority and zero-car households within one-quarter mile of stops

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	4	Project would serve relatively high numbers of disadvantaged individuals, but would not effectively serve portions of a cluster of low-income households located north of Grand.
Jack London Square-MacArthur BART	5	Project would serve relatively high numbers of disadvantaged individuals.
Jack London Square-Rockridge BART	4	Project would serve relatively high numbers of disadvantaged individuals, but much of the northern end of the alignment is in more affluent communities with fewer non-white individuals.
Bus		
Jack London Square-27th Street	4	Project would serve relatively high numbers of disadvantaged individuals, but would not effectively serve portions of a cluster of low-income households located north of Grand.
Jack London Square-MacArthur BART	5	Project would serve relatively high numbers of disadvantaged individuals.
Jack London Square-Rockridge BART	4	Project would serve relatively high numbers of disadvantaged individuals, but much of the northern end of the alignment is in more affluent communities with fewer non-white individuals.
Brooklyn Basin-Uptown Transit Center	5	Project would serve relatively high numbers of disadvantaged individuals, but would not effectively serve portions of a cluster of low-income households located north of Grand.

F Deliver a project that is cost-effective, feasible, and has community support.

F1 Prioritize projects that would be cost-effective to build and operate.

Criteria: Estimated capital and operating cost per rider =

Estimated capital cost (based on length of alignment and typical cost per mile for similar projects) ÷ estimated annual boardings (based on existing boardings at adjacent stops plus typical ridership impacts of similar projects)

Estimated annual operating cost (based on estimated number of revenue service hours and estimated cost per hour, using local bus costs and typical streetcar "premiums" or additional mode-specific costs) ÷ estimated annual place-miles (estimated annual revenue service miles x vehicle capacity)

Rationale:

- Capital cost and annual operating cost per passenger were calculated and lowest cost alternatives were scored highest.
- NOTE: Because different methodologies were used to estimate ridership for streetcar and bus alternatives, streetcar alternatives have been compared only to other streetcar alternatives, and bus alternatives have been compared only to other bus alternatives for this objective. The relative cost-effectiveness of final streetcar and bus alternatives will be compared as part of final evaluation.

Table 20 Estimated capital cost per rider

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	4	Estimated capital cost of $29,400 to $48,000 per average weekday rider.
Jack London Square-MacArthur BART	3	Estimated capital cost of $32,300 to $56,400 per average weekday rider.
Jack London Square-Rockridge BART	3	Estimated capital cost of $33,900 to $61,700 per average weekday rider.
Bus		
Brooklyn Basin-27th Street	4	Estimated capital cost of $7,600 to $9,500 per average weekday new transit rider.
Brooklyn Basin-MacArthur BART	3	Estimated capital cost of $7,600 to $9,500 per average weekday new

Alternative	Initial Evaluation	Rationale
		transit rider.
Brooklyn Basin-Rockridge BART	3	Estimated capital cost of per average $8,600 to $10,700 weekday new transit rider.
Brooklyn Basin-Uptown Transit Center	2	Estimated capital cost of $11,700 to $14,500 per average weekday new transit rider.

Table 21 Estimated operating cost per rider

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	3	Estimated annual operating cost of $1,100 to $1,600 per average weekday rider.
Jack London Square-MacArthur BART	3	Estimated annual operating cost of $1,100 to $1,600 per average weekday rider.
Jack London Square-Rockridge BART	3	Estimated annual operating cost of $1,200 to $1,800 per average weekday rider.
Bus		
Brooklyn Basin-27th Street	3	Estimated annual operating cost of $1,400 per average weekday new transit rider.
Brooklyn Basin-MacArthur BART	3	Estimated annual operating cost of $1,200 per average weekday new transit rider.
Brooklyn Basin-Rockridge BART	3	Estimated annual operating cost of $1,600 per average weekday new transit rider.
Brooklyn Basin-Uptown Transit Center	2	Estimated annual operating cost of $2,100 per average weekday new transit rider.

F Deliver a project that is cost-effective, feasible, and has community support.

F2 Prioritize projects with a viable operator and administrative structure.

Criteria: Potential willingness of existing organizations/potential for new organization to administer and operate = Qualitative assessment

Rationale:

- Bus alternatives could relatively easily be administered and operated by an existing provider of bus service.
- Streetcar alternatives, on the other hand, would introduce a new mode requiring new maintenance facilities and procedures, etc. While institutional capacity and willingness to take on the challenge of introducing a new mode might exist, potential operators would nonetheless be presented with logistical challenges.
- Depending on alignment, opportunities may exist for public/private partnerships (including institutions, business organizations or others) to help fund and administer service.
- AC Transit staff have expressed concern that the MacArthur streetcar alternative could negatively impact Line 51A, and this concern may make the agency less willing to operate the service if that alternative were selected.

Table 22 Potential willingness of existing organizations/potential for new organization to administer and operate

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	3	No existing streetcar operators in area.
Jack London Square-MacArthur BART	2	No existing streetcar operators in area; AC Transit staff have also expressed reservations regarding this alternative.
Jack London Square-Rockridge BART	3	No existing streetcar operators in area.
Bus		
Brooklyn Basin-27th Street	4	Many potential operators for bus service, but fewer potential partnership opportunities.
Brooklyn Basin-MacArthur BART	5	Many potential operators for bus service.

Alternative	Initial Evaluation	Rationale
Brooklyn Basin-Rockridge BART	5	Many potential operators for bus service.
Brooklyn Basin-Uptown Transit Center	4	Many potential operators for bus service, but fewer potential partnership opportunities.

F Deliver a project that is cost-effective, feasible, and has community support.

F3 Prioritize projects with the potential to earn widespread community acceptance.

Criteria: Likely level of support from community members, community leaders and policy makers = Qualitative assessment

Rationale:

- Streetcar alternatives should attract some support based on their perceived "cache." However, this may be undermined by concerns about impacts on traffic, merchants and others. In particular, concern about construction impacts may generate opposition from merchants and homeowners, particularly in more affluent communities.
- Bus alternatives should be relatively uncontroversial, although to the extent that there are impacts on parking, or from construction of stops, there may be some opposition, particularly in more affluent communities.

Table 23 Likely level of support from community members, community leaders and policy makers

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	5	In this corridor, streetcar should generally be viewed favorably.
Jack London Square-MacArthur BART	5	In this corridor, streetcar should generally be viewed favorably.
Jack London Square-Rockridge BART	3	High likelihood of community concerns about impacts along College Ave.
Bus		
Brooklyn Basin-27th Street	4	In this corridor, new transit service should generally be viewed favorably, although bus not as likely as streetcar to generate interest.
Brooklyn Basin-MacArthur BART	4	In this corridor, new transit service should generally be viewed favorably, although bus not as likely as streetcar to generate interest.
Brooklyn Basin-Rockridge	3	Possibility of community concerns

Alternative	Initial Evaluation	Rationale
BART		about impacts along College Ave.
Brooklyn Basin-Uptown Transit Center	4	In this corridor, new transit service should generally be viewed favorably, although bus not as likely as streetcar to generate interest.

F Deliver a project that is cost-effective, feasible, and has community support.

F4 Prioritize projects with a realistic phasing and funding plan.

Criteria: Potential for phased implementation (based on viability of individual phases) = Qualitative assessment based on conceptual designs, including alignments, stop locations and right-of-way configurations

Rationale:

- Due to their higher cost, streetcar projects may require phased construction. There must, then, be a minimum operable segment that could be viable in terms of its ability to both win approval as well as attract riders.
- Some streetcar projects may simply be too expensive to realistically fund, particularly given limitations on federal and other funding sources.
- Bus alternatives are far less expensive to implement, and some capital improvements can be made incrementally while service is in operation (some funding sources available to streetcars, though, may not be available to buses).

Table 24 Potential for phased implementation (based on viability of individual phases)

Alternative	Initial Evaluation	Rationale
Streetcar		
Jack London Square-27th Street	4	This alternative could likely not be effectively phased. However, it is inexpensive relative to remaining streetcar alternatives.
Jack London Square-MacArthur BART	3	27th Street could serve as initial phase of this project. Finding funding for second phase might be slightly greater challenge due to lower ridership potential of northern end of corridor.
Jack London Square-Rockridge BART	2	Cost for this project could exceed federal Small Starts program limit of $250 million. Could be phased, but would likely require three phases, and third phase would have lower ridership potential.

Alternative	Initial Evaluation	Rationale
Bus		
Brooklyn Basin-27th Street	5	Relatively inexpensive project.
Brooklyn Basin-MacArthur BART	4	Relatively inexpensive project, although higher number of stops would increase costs.
Brooklyn Basin-Rockridge BART	4	Relatively inexpensive project, although higher number of stops would increase costs.
Brooklyn Basin-Uptown Transit Center	5	Relatively inexpensive project.

RECOMMENDED LEVEL 2 ALTERNATIVES

Table 25 on the following pages summarizes findings from the evaluation in tabular or matrix format. Numerical ratings are illustrated using shaded circles, with darker shades and larger circles representing stronger performance.

Based on a review of the Draft Initial Evaluation of Alternatives Memo (January 2014), the TAG approved five alternatives for the Phase 2 evaluation. The TAG directed that a follow-up meeting occur with City of Oakland and AC Transit to determine whether the enhanced bus alternative should serve the Brooklyn Basin development. At the follow-up meeting, both agencies concluded that the enhanced bus alternative alignments should be modified to serve the Brooklyn Basin development.

Subsequent meetings and correspondence also occurred with City of Oakland and BART staff to review potential terminus alignments for the streetcar alternatives at the MacArthur BART station. The consultant team also reviewed planning documents prepared for the EBOTS study, which identified transit alternatives along the 40th Street corridor with connections to the MacArthur BART station. It was determined that the alternative alignments that connected to the MacArthur BART station along 40th Street for the Broadway Transit Urban Circulator Study were consistent with both the EBOTS alternatives and the transit loop alignment identified in the West Oakland Specific Plan. It was also determined that at least one feasible streetcar terminus alignment is available at the MacArthur BART station.

Based on the above consultations, the following alternatives are recommended for the Phase 2 final evaluation stage of the study.

- Enhanced Bus Alternatives
    - Brooklyn Basin to 27th Street
    - Brooklyn Basin to MacArthur BART
    - Brooklyn Basin to Rockridge BART
- Streetcar Alternatives
    - Jack London Square Amtrak to 27th Street
    - Jack London Square Amtrak to MacArthur BART

The enhanced bus and streetcar alternatives are shown on figures that following

Table 25 Summary Evaluation

Principles		Objectives		Criteria	Alternatives						
					Streetcar			Enhanced Bus			
					Jack London Square-27th St	Jack London Square-MacArthur BART	Jack London Square-Rockridge BART	Brooklyn Basin-27th St	Brooklyn Basin - MacArthur BART	Brooklyn Basin - Rockridge BART	Brooklyn Basin-Uptown Transit Center
A	Improve the quality of transit service in the corridor.	A1	Provide reliable service that is relatively free of delay.	Estimated variability in peak travel times							
		A2	Ensure adequate capacity to serve existing and future demand.	Throughput							
		A3	Enhance awareness of transit services.	Visibility of infrastructure and potential for public understanding of service							
		A4	Leverage and integrate existing transit investments.	Potential to increase network connectivity and provide "first/last mile" connections to and from transit nodes							
		A5	Contribute to the utility and efficiency of the overall transit system within the corridor.	Potential impacts on demand for and cost-effectiveness of other services/opportunities to reconfigure impacted services							
B	Provide safe, multimodal travel options.	B1	Minimize conflicts between transit and other modes.	Opportunities for physical conflicts between users							
		B2	Increase overall capacity for "person movement" (rather than vehicle movement) within the corridor.	Estimated peak hour capacity of all vehicles along alignment							
C	Support economic and community development.	C1	Support transit-oriented development consistent with local and regional policies.	Potential impact of project on type, form and scale of adjacent developments							
		C2	Improve access to retail and other businesses.	Multimodal access to businesses/impacts of design on businesses							
		C3	Preserve and enhance the character of and quality of life in existing neighborhoods.	Potential to contribute to identity and perceived quality of districts							

Principles		Objectives		Criteria	Alternatives						
					Streetcar			Enhanced Bus			
					Jack London Square-27th St	Jack London Square-MacArthur BART	Jack London Square-Rockridge BART	Brooklyn Basin-27th St	Brooklyn Basin - MacArthur BART	Brooklyn Basin - Rockridge BART	Brooklyn Basin-Uptown Transit Center
D	Support environmental sustainability and enhanced public health.	D1	Reduce emissions of CO2 and other harmful pollutants.	Estimated decrease in number of vehicle miles traveled (streetcar)[12]	○	●	●	–	–	–	–
				Estimated decrease in number of vehicle miles traveled (bus)	–	–	–	○	●	●	○
E	Enhance social equity.	E1	Improve access to jobs and social services for communities of concern.	Numbers of low-income, ethnic minority and zero-car households within one-quarter mile of stops	●	●	●	●	●	●	●
F	Deliver a project that is cost-effective, feasible, and has community support.	F1	Prioritize projects that would be cost-effective to build and operate.	Estimated capital cost per rider (streetcar)	●	●	●	–	–	–	–
				Estimated capital cost per rider (bus)	–	–	–	○	○	○	○
				Estimated operating cost per rider (streetcar)	○	○	○	–	–	–	–
				Estimated operating cost per rider (streetcar)	–	–	–	●	●	●	○
				Estimated operating cost per rider (bus)	–	–	–	●	●	●	○
		F2	Prioritize projects with a viable operator and administrative structure.	Potential willingness of existing organizations/potential for new organization to administer and operate	○	◔	○	●	●	●	●
		F3	Prioritize projects with the potential to earn widespread community acceptance.	Likely level of support from community members, community leaders and policy makers	●	●	○	●	●	○	●
		F4	Prioritize projects with a realistic phasing and funding plan.	Potential for phased implementation (based on viability of individual phases)	●	○	◔	●	●	●	●

[12] Because modeling of VMT impacts has not yet been conducted, ridership has been used as a proxy for VMT at this stage of the evaluation. Additionally, because different methodologies were used to estimate ridership for streetcar and bus alternatives, streetcar alternatives have been compared only to other streetcar alternatives, and bus alternatives have been compared only to other bus alternatives for this objective as well as cost-per-rider criteria.

APPENDIX A

ENHANCED BUS & STREETCAR ALTERNATIVES

Enhanced Bus Alignment Alternatives

BROADWAY URBAN CIRCULATOR STUDY

FEHR PEERS

Streetcar Alignment Alternatives

BROADWAY URBAN CIRCULATOR STUDY

FEHR PEERS

APPENDIX B

Figure APX-1 *Ethnic Minority Individuals Within One-Quarter Mile of Alignments*

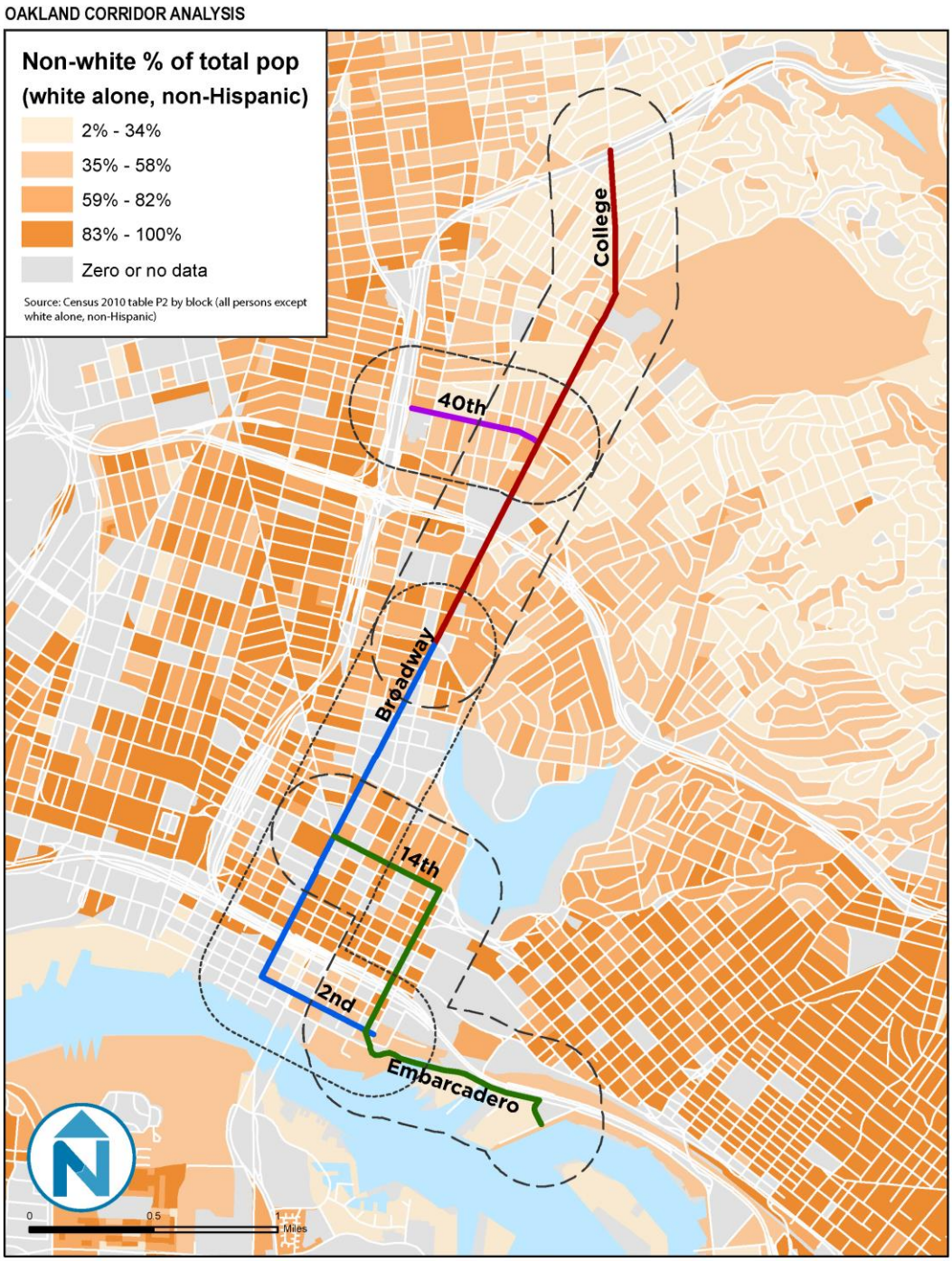

Figure APX-2 *Low-Income Households Within One-Quarter Mile of Alignments*

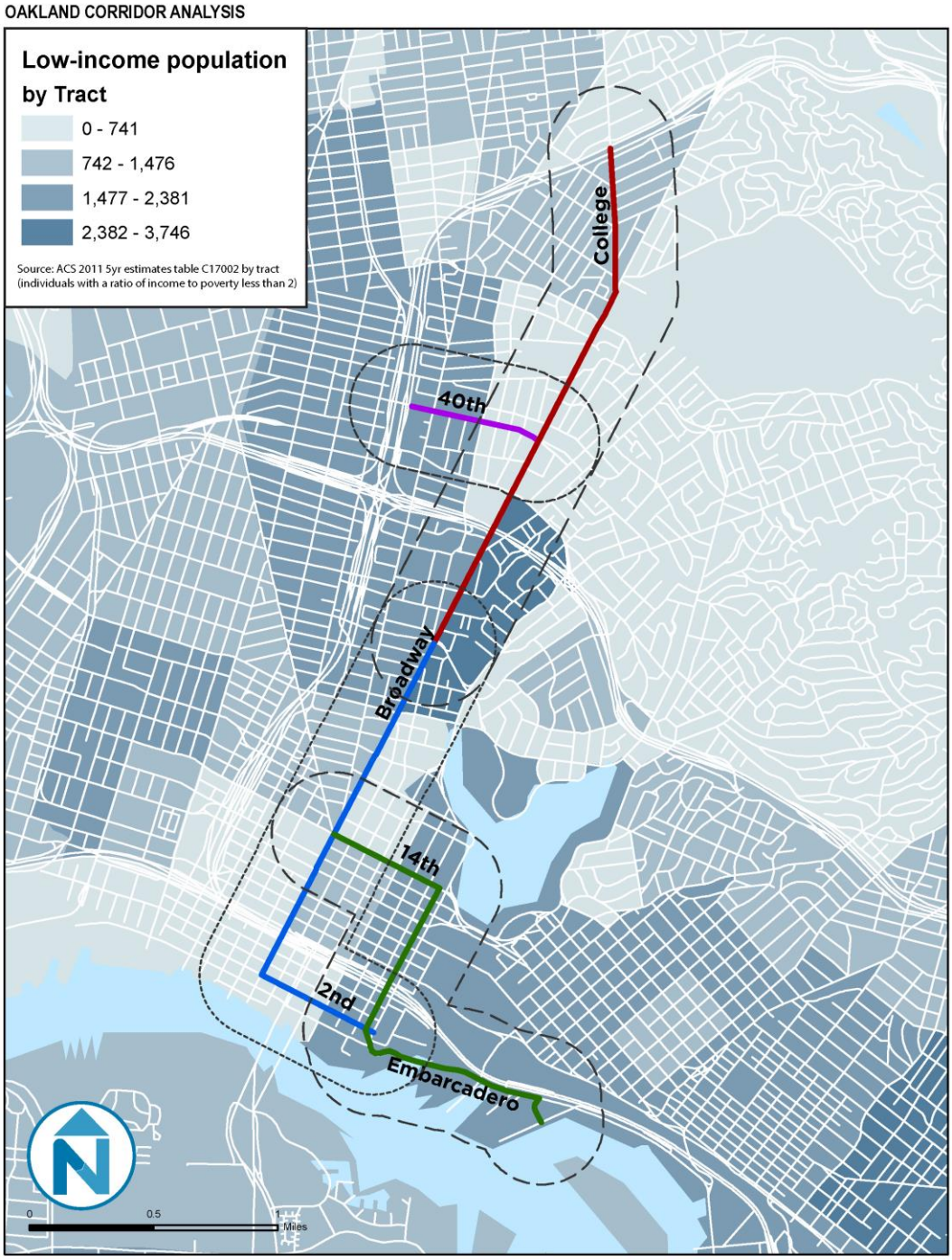

Figure APX-23 Zero-Vehicle Households Within One-Quarter Mile of Alignments