Honolulu High-Capacity Transit Corridor Project
Alternatives Evaluation Results Report

December 1, 2006

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Acronyms Used in this Document

AA	Alternatives Analysis
DTS	Department of Transportation Services
FTA	Federal Transit Administration
HOV	High Occupancy Vehicle
O&M	Operation and Maintenance
OMPO	O‘ahu Metropolitan Planning Organization
ORTP	O‘ahu Regional Transportation Plan
TSM	Transportation System Management
UH	University of Hawai‘i

Optimum Alternatives

Several options were evaluated within the Managed Lane and Fixed Guideway Alternatives. Over the course of the analysis presented in Chapter 3 through Chapter 5, the relative merits of the various operational and alignment options became clear. This section compares the various options and selects the optimum Managed Lane and Fixed Guideway option for comparison between all of the alternatives later in this chapter.

Managed Lane Alternative

Two options were evaluated for the Managed Lane Alternative: a Reversible Option and a Two-direction Option. The Two-direction Option would allow express buses to use the managed lane roadway in both directions throughout the day; however, the difference in transit benefit would be very small. Travel times in the corridor are similar for both options, with each option showing a one or two minute advantage between some locations. Comparison of environmental impacts between the options shows small trade-offs, but neither option is substantially better than the other.

Project costs are the greatest differentiator between the options. At $2.5 billion (in 2006 dollars), the Reversible Option would be nearly 30 percent less expensive than the Two-direction Option. The lower cost and similar performance between the two options results in better cost-effectiveness for the Reversible Option (Table 1). Because the performance differences between the two options would be small, the Reversible Option would offer a better benefit-to-cost ratio; therefore, it would be the optimum Managed Lane option. The evaluation of the Managed Lane Alternative that appears later in this chapter considers the Reversible Option only.

Fixed Guideway Alternative

The various alignment options would provide a range of benefits, impacts, and costs within each corridor section evaluated for the Fixed Guideway Alternative. The alignment options are compared by section below. The comparison results in an optimum alignment of Saratoga Avenue/North-South Road to Farrington Highway/Kamehameha Highway to Aolele Street to Dillingham Boulevard to Nimitz Highway/Halekauwila Street/Kapi'olani Boulevard (Kalaeloa - Airport - Dillingham - Halekauwila combination). The evaluation of the Fixed Guideway Alternative that appears later in this chapter considers this combination of alignments only.

Table 1. Transportation System Costs and Transit User Benefits Compared to No Build

Measure	No Build Alternative	TSM Alternative		Managed Lane Alternative				Fixed Guideway Alternative							
				Two-Direction Option		Reversible Option		Kalaeloa - Salt Lake - North King - Hotel		Kamokila - Airport - Dillingham - King with a Waikīkī Branch		Kalaeloa - Airport - Dillingham - Halekauwila		20-mile Alignment East Kapolei to Ala Moana Center	
		Value	Incremental Change	Value	Incremental Change	Value	Incremental Change	Value	Incremental Change	Value	Incremental Change	Value	Incremental Change	Value	Incremental Change
Annualized Capital Cost (Millions 2006 Dollars)	$43.52	$59.80	$16.28	$335.14	$291.62	$257.87	$214.35	$387.31	$343.79	$445.73	$402.21	$380.66	$337.14	$308.23	$264.71
Year 2030 Systemwide O&M Cost (Millions 2006 Dollars)	$191.90	$234.20	$42.30	$250.90	$59.00	$261.10	$69.20	$248.20	$56.30	$248.60	$56.70	$256.10	$64.20	$250.60	$58.70
Total 2030 Annualized Cost (Millions 2006 Dollars)	$235.42	$294.00	$58.58	$586.04	$350.62	$518.97	$283.55	$635.51	$400.09	$694.33	$458.91	$636.76	$401.34	$558.83	$323.41
Year 2030 Incremental User Benefits (Hours of Benefit)	N/A	N/A	4,325,100	N/A	5,528,500	N/A	5,632,700	N/A	18,770,200	N/A	16,963,900	N/A	18,573,900	N/A	15,153,600
Cost-Effectiveness (Cost per User Benefit)	N/A	N/A	$13.54	N/A	$63.42	N/A	$50.34	N/A	$21.32	N/A	$27.05	N/A	$21.61	N/A	$21.34

N/A = Not Applicable. Transit user benefits are calculated relative to the performance of the No Build Alternative.

Section I. Kapolei to Fort Weaver Road

In Section I, the Saratoga Avenue/North-South Road alignment would be of greatest benefit to transit riders, allowing walking access to the greatest number of transit riders in 2030. Also, by providing a park-and-ride and bus transfer station in Kalaeloa, it would provide better connections to 'Ewa Beach than either the Kapolei Parkway/North-South Road or Kamokila Boulevard/Farrington Highway alignment. The Kamokila Boulevard/Farrington Highway alignment would provide the fewest benefits to transit riders.

Considering environmental factors, the Saratoga Avenue/North-South Road alignment would have the fewest noise impacts. Overall, fewer social and environmental impacts would occur in Section I than in other portions of the corridor, and the alignments are not greatly differentiated by other elements of the environment.

The Geiger Road/Fort Weaver Road alignment would be the most expensive at $850 million. The Saratoga Avenue/North-South Road and Kapolei Parkway/North-South Road alignments are in the middle at $820 million and $790 million, respectively. The Kamokila Boulevard/Farrington Highway alignment would be the least expensive at $670 million.

Because the Saratoga Avenue/North-South Road alignment would provide the best transportation and environmental benefits, while ranking in the middle of the cost range, it would be the best alignment option within Section I.

Section II. Fort Weaver Road to Aloha Stadium

No comparison is made in this section because only one alignment along Farrington and Kamehameha Highways was identified as a feasible option.

Section III. Aloha Stadium to Middle Street

In Section III, the Makai of the Airport Viaduct and Aolele Street alignments would provide the greatest benefits to transit riders. The fewest number of riders would use the Mauka of the Airport Viaduct alignment.

The greatest number of noise impacts within the entire study corridor would occur along the Salt Lake Boulevard alignment. Fewer properties would need to be acquired for the Aolele Street alignment than by the Makai of the Airport Viaduct alignment.

The Salt Lake Boulevard Alignment would be the least expensive, followed by the Aolele Street alignment.

Because the Aolele Street alignment would provide the best transportation benefit and would be the second-least-expensive option, it would be the best alignment option within Section III.

Section IV. Middle Street to Iwilei

A greater number of transit riders would use the Dillingham alignment compared to the North King Street alignment.

The Dillingham alignment would require more property acquisitions; however, fewer would be residential parcels. More noise impacts would occur and a greater number of potentially historic properties is located along the North King Street alignment.

When connecting to the Section III alignments at Nimitz Highway, the Dillingham alignment would cost less at $400 million than the North King Street alignment at $450 million.

The Dillingham alignment would be the best alignment option within Section IV.

Section V. Iwilei to UH Mānoa

Section V is the most complex area within the study corridor. The Beretania Street/South King Street alignment would serve substantially fewer transit riders than the other alignments.

The Hotel Street/Kawaiaha‘o Street/Kapi‘olani Boulevard alignment would require acquisition of the greatest number of residential parcels and affect a greater number of cultural practices and the greatest number of burials of any alignment within the study corridor.

The King Street Tunnel alignment is the most expensive alignment within the study corridor at $1.9 billion. The Queen Street alignment would be least expensive at $1.15 billion, followed by the Halekauwila Street alignment at 1.23 billion.

While the Waikīkī Branch would provide considerable additional benefits to transit riders and have environmental consequences comparable to the other alignments considered, it would add $350 million to the cost of the project.

Three alignments rank poorly in the areas of transportation benefits, environmental consequences, and costs. The Beretania Street/South King Street alignment provides poor transit benefits. The Hotel Street/Kawaiaha‘o Street/Kapi‘olani Boulevard alignment would create substantial environmental impacts compared to the other alignments. The King Street Tunnel/Waimanu Street/Kapi‘olani Boulevard alignment would cost over $500 million more than the least expensive alignment.

The remaining alignments, Nimitz Highway/Queen Street/Kapi‘olani Boulevard and Nimitz Highway/Halekauwila Street/Kapi‘olani Boulevard would have similar transportation benefits. The Queen Street alignment would have somewhat greater negative visual impact because the narrow available right-of-way would require a stacked alignment in the Downtown area and because it would cross between Hale Auhau and the rest of the Hawai‘i Capital Historic District.

The Nimitz Highway/Halekauwila Street/Kapi'olani Boulevard alignment would be the best alignment option within Section V. The Waikīkī Branch is not included because of the cost that it would add to the project.

Twenty-mile Alignment

The FTA guidance recommends evaluation of one or more options of various lengths within the study corridor to provide intermediate-cost alternatives within an AA.

Several portions of the corridor could be selected within the Kalaeloa - Airport - Dillingham - Halekauwila Alignment; however, the 20-mile Alignment should be able to provide substantial benefit to transit users independent of the remainder of the system under long-range consideration. Identified funding sources may be reasonably expected to generate approximately $3.6 billion to support the project.

The project that would serve as much of the study corridor as practical and provide the greatest user benefit within $3.6 billion would be the section that begins at one station makai of UH West O'ahu and continues Koko Head following Farrington Highway/Kamehameha Highway to Aolele Street and Dillingham Boulevard, and then continues elevated following Nimitz Highway to Ala Moana Center.

Goals and Objectives

Seven project goals were developed to address the transportation needs identified in the study corridor. The project has several objectives related to each of the project goals (Table 2).

Table 2. Project Goals and Objectives

Goal	Objectives
Improve Corridor Mobility	Reduce corridor travel times
	Improve corridor travel time reliability[1]
	Provide convenient, attractive, and effective transit service within the corridor
	Provide transit corridor travel times competitive with auto travel times
	Connect major trip attractors/generators within the corridor[1]
	Maximize the number of persons within convenient access range of transit
	Provide safe and convenient access to corridor transit stations[1]
Encourage Patterns of Smart Growth and Economic Development	Encourage transit-oriented development in existing and new growth areas
	Utilize corridor land use policies/opportunities related to economic development
	Support economic development of major regional economic centers
Find Cost-Effective Solutions	Provide solutions with benefits commensurate with their costs
	Provide solutions that meet the project purpose and needs while minimizing total costs
	Improve transit operating efficiency
Provide Equitable Solutions	Distribute costs and benefits fairly across different population groups[1]
	Avoid disproportionate impacts on low income and minority population groups
	Provide effective transit options to transit-dependent communities
Develop Feasible Solutions	Ensure the cost of building, operating, and maintaining the alternative is within the range of likely available funding
	Develop a feasible alternative in terms of constructability and ROW availability
Minimize Community and Environmental Impacts	Minimize impacts on natural and cultural resources
	Minimize the effect on homes and businesses
	Minimize disruption to traffic operations[1]
	Minimize conflicts with utilities
	Minimize construction impacts
	Minimize impacts to the community and community amenities
	Reduce energy consumption
	Minimize impacts to future development
Achieve Consistency with Other Planning Efforts	Achieve consistency with adopted community, regional, and state plans

[1]This objective was considered during project development, but is not evaluated in the comparison of alternatives.

Effectiveness at Meeting Goals and Objectives

Improve Corridor Mobility

The No Build and TSM Alternatives would continue to serve the study corridor with bus service. Transit would serve 6.1 percent of daily trips for the No Build Alternative and 6.4 percent of daily trips with the TSM Alternative. Daily vehicle miles traveled and vehicle hours of delay, a measure of time lost to traffic congestion, would increase substantially compared to today. During the a.m. peak-period, travel times on transit would remain similar to today or decrease slightly because of increased transit service, while auto travel times would increase in the corridor. Transit reliability would continue to be affected by roadway conditions.

The Managed Lane Alternative would provide transit service similar to the TSM Alternative, only with an additional roadway facility for express service in a portion of

the corridor. Transit would serve 6.4 percent of daily trips, similar to the TSM Alternative. Daily vehicle miles traveled and vehicle hours of delay, a measure of time lost to traffic congestion, would increase substantially compared to today and would be similar to the No Build Alternative. During the a.m. peak-period, travel times on transit would be similar to the No Build Alternative. Transit reliability would continue to be affected by roadway conditions when operating outside of the managed lane.

The Fixed Guideway Alternative would provide a new transit option for reliable transit travel in the study corridor. Transit would serve 7.7 percent of daily trips for the Full-corridor Alignment and 7.4 percent of daily trips with the 20-mile Alignment. During peak-periods, the transit share would be even higher, with 16.2 percent of home-based work trips served by transit for the Full-corridor Alignment and 15.2 percent with the 20-mile Alignment. Daily vehicle miles traveled and vehicle hours of delay, a measure of time lost to traffic congestion, would be less than for the No Build Alternative. Daily vehicle miles traveled would be 3.4 percent less for the Full-corridor Alignment and 3.1 percent less with the 20-mile Alignment. Daily vehicle hours of delay would be 18 percent less for the Full-corridor Alignment and 11 percent less with the 20-mile Alignment; this represents a substantial reduction in traffic congestion compared to the No Build Alternative in 2030. During the a.m. peak-period, travel times on transit would be substantially reduced for several travel routes compared to the No Build Alternative.

Encourage Patterns of Smart Growth and Economic Development

The No Build and TSM Alternatives would continue to serve the study corridor with bus service. Neither alternative would provide concentrations of transit service that would serve as a nucleus for transit-oriented development.

The Managed Lane Alternative would provide similar transit service to the TSM Alternative, with an additional roadway facility for express service in a portion of the corridor. It would not further encourage smart growth compared to the TSM Alternative. Daily vehicle miles traveled would be greater for the Managed Lane Alternative than for any other alternative.

The Fixed Guideway Alternative is the only alternative that would include new stations providing reliable high-capacity transit at locations zoned for new development or suitable for redevelopment. With supportive regulations, substantial transit-oriented development could be served by the Fixed Guideway Alternative. Because the Full-corridor Alignment would better serve Kapolei, it would provide more opportunity for smart growth and transit-oriented economic development than the 20-mile Alignment.

Find Cost-Effective Solutions

User benefits have been defined by FTA as a measure of transit user time savings calculated in comparison to the TSM Alternative. The Managed Lane Alternative would provide approximately 2 million hours of user benefits annually at an annualized incremental cost compared to the TSM Alternative of approximately $225 million (Table 3). This reflects a cost of approximately $103 per hour of transit user benefit gained. The Fixed Guideway Alternative would provide approximately 16 and 12 million hours of

user benefits annually at an annualized incremental cost of approximately $343 and $265 million for the Full-corridor Alignment and 20-mile Alignment, respectively (Table 3). This reflects a cost of between $22 and $23 per transit user benefit gained with the Fixed Guideway Alternative. The Fixed Guideway Alternative is approximately four times as effective at providing transit user benefits per annualized incremental dollar cost as the Managed Lane Alternative.

Table 3. Incremental Cost per Hour of Transportation System User Benefits Compared to TSM Alternative

Measure	TSM Alternative	Managed Lane Alternative		Fixed Guideway Alternative			
				Full-corridor Alignment		20-mile Alignment East Kapolei to Ala Moana Center	
		Value	Incremental Change compared to TSM	Value	Incremental Change compared to TSM	Value	Incremental Change compared to TSM
Annualized Capital Cost (2006 Dollars)	$59,797,000	$257,868,000	$198,073,000	$380,658,000	$320,863,000	$308,228,000	$248,433,000
Year 2030 Systemwide O&M Cost (2006 Dollars)	$234,200,000	$261,100,000	$26,900,000	$256,100,000	$21,900,000	$250,600,000	$16,400,000
Total 2030 Annualized Cost (2006 Dollars)	$293,997,000	$518,968,000	$224,973,000	$636,758,000	$342,763,000	$558,828,000	$264,833,000
Year 2030 Incremental User Benefits (Hours of Benefit)	N/A	N/A	2,191,900	N/A	15,504,500	N/A	11,638,500
Cost Effectiveness (Cost per Hour of User Benefit)	N/A	N/A	$102.64	N/A	$22.11	N/A	$22.75

N/A = Not Applicable. User benefits are calculated relative to the performance of the TSM Alternative.

Provide Equitable Solutions

The No Build and TSM Alternatives generally maintain the status quo, serving transit-dependent communities with bus service that is increasingly affected by traffic congestion.

Transit use would increase somewhat with the Managed Lane Alternative; however, it would not substantially improve service or access to transit for transit-dependent communities, as buses that use existing HOV facilities would be routed to the managed lane facility but would continue to be affected by congestion in other parts of their routes. Arterial congestion would increase in the study corridor with the Managed Lane Alternative, making bus access to the managed lanes less reliable.

The Fixed Guideway Alternative would provide a new travel option to all travelers in the study corridor. The substantial concentration of transit-dependent communities would have access to reliable transit in the study corridor, and shortened bus routes serving transit stations would provide more reliable service because their routes would be shorter and less affected by islandwide congestion. Also, overall congestion, as measured in daily hours of traffic delay, would be less for the Fixed Guideway Alternative than for any of the other alternatives. The Full-corridor Alignment would provide proportionately greater benefit than the 20-mile Alignment.

Develop Feasible Solutions

The No Build and TSM Alternatives do not include major construction. Both the Managed Lane and Fixed Guideway Alternatives include areas where construction would be difficult, but neither one would rely on extreme or unproven construction methods. In general, the managed lane structure is wider, requiring larger foundations, and would disturb more traffic lanes during construction. It also includes construction of ramps to H-1 and H-2; maintenance of traffic during construction is more complex when working on a freeway. In the vicinity of the airport, placement of the roadway sections would be difficult because of limited working space and high-voltage transmission lines mauka of the H-1 viaduct. Nimitz Highway has sufficient space, but traffic volumes, particularly truck volumes are high and construction would require closure of the contra-flow lane.

For the Fixed Guideway Alternative, construction in the ʻEwa area would be relatively simple. Between the Waiawa Interchange and the airport area, construction issues would be similar to the Managed Lane Alternative, except the magnitude of impacts would be less because the foundation and working space requirements are less. In the vicinity of the airport, construction along Aolele Street would be substantially easier than it would be for the Managed Lane Alternative. High-voltage transmission lines and limited working space are concerns along Dillingham Boulevard, but lower traffic volumes compared to Nimitz Highway partially compensate for these challenges. In the Downtown to UH Mānoa area, underground utilities and traffic congestion would present challenges, but they would not be any more difficult than those for construction of the segment from Pearl City to Downtown. Limited working space on Kona Street would slow construction, but it would be manageable.

Minimize Community and Environmental Impacts

The No Build and TSM Alternatives would generate no direct environmental impacts; however, they would also not generate any environmental benefits.

The Managed Lane Alternative would require a moderate number of displacements and would affect a moderate number of potentially historic structures, as well as one recreational facility. It would generate the greatest amount of air pollution, require the greatest amount of energy for transportation use, and would result in the largest number of transportation noise impacts. It would provide little community benefit, as it would not provide substantially improved transit access to the corridor.

The Fixed Guideway Alternative would require more displacements and affect more potentially historic structures, as well as three park or recreational facilities. It would result in fewer transportation noise impacts than the Managed Lane Alternative.

Visual impacts for the Fixed Guideway Alternative would be less than those for the Managed Lane Alternative in areas where both alternatives would include structures, but the Fixed Guideway Alternative would extend beyond the area of the Managed Lane Alternative. The visual impacts of the 20-mile Alignment would be less than for the Full-corridor Alignment because the area of effect would be less.

The Fixed Guideway Alternative would generate the least air pollution and require the least energy for transportation. It would provide improved connections between communities, employment, and services in the corridor. The benefits of the Full-corridor Alignment would be somewhat greater than those for the 20-mile Alignment.

Achieve Consistency with Other Planning Efforts

All alternatives are generally consistent with Local, District, and State plans. The Fixed Guideway Alternative best serves the areas of O'ahu that are designated for future growth and development. The Fixed Guideway Alternative is the only alternative that is consistent with regional transportation system planning defined in the *2030 O'ahu Regional Transportation Plan* (OMPO, 2006a).

Comparison of Benefits and Consequences among the Alternatives

Table 4 compares each of the alternatives in relation to the project goals and objectives. The Fixed Guideway Alternative performs the best when considering all of the objectives related to the goal of improving corridor mobility. The Full-corridor Alignment provides additional transportation benefits relative to the 20-mile Alignment; however, the 20-mile Alignment is more effective at providing improved mobility than any of the other three alternatives.

In relation to encouraging patterns of smart growth and economic development, the No Build, TSM, and Managed Lane Alternatives generally maintain existing transit service patterns and methods. None of these alternatives would provide concentrations of transit

service that would serve as a nucleus for transit-oriented development. The Fixed Guideway Alternative would include new stations providing reliable high-capacity transit at locations zoned for new development or suitable for redevelopment. The Full-corridor Alignment would provide the greatest opportunity for smart growth, but considerable opportunities also would occur with the 20-mile Alignment.

The Fixed Guideway Alternative is substantially more cost-effective than the Managed Lane Alternative when the respective cost per transit user benefit relative to the TSM Alternative are compared (Table 3).

The Fixed Guideway Alternative best meets the goal of providing equitable solutions. The Full-corridor Alignment would best serve transit-dependent populations, but the 20-mile Alignment would serve the majority of those served by the Full-corridor Alignment.

The No Build and Fixed Guideway Alternatives are financially feasible considering reasonably certain funding sources. The No Build Alternative would continue bus service using existing funding mechanisms. The TSM Alternative would require a limited amount of additional funds, but the source of those funds is not defined. Because the implementing legislation prohibits the GET surcharge from being used to fund existing transit systems, it would not be available to fund the TSM Alternative. The Managed Lane Alternative has no defined funding source. Because it would be open to general purpose vehicles, neither the GET surcharge nor FTA funds could be used for its construction. The toll revenues would cover only 23 percent of the total debt service and the remaining 77 percent would need to come from other sources that are not available at this time. The 20-mile Alignment for the Fixed Guideway Alternative could be funded with a combination of expected GET revenues and FTA New Starts funds. There is more uncertainty in funding of the Full-corridor Alignment. Additional local or FTA funds beyond those that have specifically been identified would be required for completion of the Full-corridor Alignment.

The alternatives range widely in relation to community and environmental impacts. The No Build and TSM Alternatives would have little direct effect on existing resources; however, they also would not offer community or environmental benefits. The Managed Lane Alternative would require acquisition of private property, generate the highest levels of air and water pollution, consume the greatest amount of transportation energy, and create the greatest number of noise impacts. The Fixed Guideway Alternative would require the greatest number or property acquisitions and have the greatest number of utility conflicts, but it would also provide a new safe transportation connection between communities in the corridor. The small amount of on-street parking taken by the Fixed Guideway Alternative would be more than compensated by the resulting reduction in corridor parking demand as a consequence of fewer automobile trips. It would provide the greatest environmental benefits related to air and water pollution and energy consumption.

Table 4. Effectiveness of Alternatives at Meeting Goals and Objectives in the Year 2030

Objective	Evaluation Measure	Alternative 1 No Build Alternative	Alternative 2 TSM Alternative	Alternative 3 Managed Lane Alternative	Alternative 4: Fixed Guideway Full-corridor Alignment	Alternative 4: Fixed Guideway 20-mile Alignment East Kapolei to Ala Moana Center
Reduce corridor travel times	Reduction in transit travel times	-	9% reduction	3% reduction	14% reduction	17% reduction
	Total daily transit travel time savings (person hours)	-	14,000	18,000	60,000	49,000
	Reduction in daily vehicle hours of travel delay	-	2% reduction	1% increase	18% reduction	11% reduction
Improve corridor travel time reliability	Miles of alternative's alignment in exclusive right-of-way	0	0	16 miles	28 miles	20 miles
Provide convenient, attractive and effective transit service within the corridor	Increase in transit mode share	-	5% increase	7% increase	26% increase	21% increase
	Total daily transit trips	232,100	243,100	244,400	294,100	281,900
	Total daily new riders	-	11,900	16,400	60,700	49,000
	Reduction in daily vehicle trips	-	10,200	14,900	59,600	48,000
Provide transit corridor travel times competitive with auto travel times	Comparison of transit with auto travel times	22% increase	12% increase	19% increase	5% increase	2% increase
Maximize the number of persons within convenient access range of transit	Employees within one-half mile of stations	0	0	0	443,800	315,900
	Population within one-half mile of stations	0	0	0	364,400	214,400
Encourage transit-oriented development in existing and new growth areas	Potential for transit-oriented development	○	○	○	●	◕
Integrate transit with designated higher density development areas	Degree to which the alternative serves existing and planned higher density developments	○	○	○	◕	◑
Support economic development of major regional economic centers	Thousands of residents within 30 minutes travel by transit to Downtown Honolulu	215	219	218	235	226
	Thousands of residents within 30 minutes travel by transit to Kapolei	67	82	99	109	98
Provide solutions with benefits commensurate with their costs	Incremental annualized cost per user benefit (compared to TSM Alternative)	N/A	N/A	$102.64	$22.11	$22.75
Provide solutions that meet the project purpose and need while minimizing total costs	Total capital costs (2006 dollars)	0	0	$2.6 billion	$4.6 billion	$3.6 billion
	Annual operation and maintenance costs	$192 million	$234 million	$261 million	$256 million	$251 million
	Incremental annualized cost per new rider(compared to TSM)	N/A	N/A	$562	$22	$22
Improve transit operating efficiency	Operating cost per transit passenger mile	$0.35	$0.40	$0.47	$0.33	$0.35
Avoid disproportionate impacts on low income and minority population groups	Full or partial acquisitions to low income and minority communities	0	0	17	60	54
Provide effective transit options to transit-dependent communities	Number of transit trips originating from transit-dependent communities	56,000	57,200	58,000	60,300	59,800
The cost of building, operating, and maintaining the alternative is within the range of likely available funding	Degree to which the amount of funding required to build the alternative system is attainable	●	●	○	◑	●
	Proposed share of total project costs from sources other than New Starts Section 5309 funds	100%	100%	100%	66%	82%
	Ability to operate and maintain the transit system after it is built	●	◑	◑	◕	◕
Construction of the alternative is feasible in terms of constructability and ROW availability	High rating = standard construction/low degree of risk and known available ROW Low rating = unique or difficult construction/high degree of risk and ROW availability uncertain or doubtful	●	●	◑	◑	◕
Minimize impacts on natural and cultural resources	Use of land including natural areas and parklands	0	0	2	3	3
	Proximity to historic resources	0	0	30	82	70

Note: ○ = Lowest benefit or greatest impact, ● = Highest benefit or least impact

Objective	Evaluation Measure	Alternative 1 No Build Alternative	Alternative 2 TSM Alternative	Alternative 3 Managed Lane Alternative	Alternative 4: Fixed Guideway Full-corridor Alignment	Alternative 4: Fixed Guideway 20-mile Alignment East Kapolei to Ala Moana Center
Minimize the effect on homes and businesses	Number of full or partial acquisitions of residential or commercial parcels	0	0	31	90	79
Minimize disruption to traffic operations	Degree of physical roadway impacts	●	●	◕	◔	◑
Minimize conflicts with utilities	Degree to which utilities need to be relocated (relocation cost)	0	0	$220 million	$530 million	$460 million
Minimize construction impacts	Daily vehicle miles traveled impacted by construction of the alternative	-	-	670,000	631,000	524,000
	Impact to access to businesses and residences during construction	●	●	◑	○	◔
	Duration of construction impacts	-	-	6 to 8 years	8 to 10 years	7 to 9 years
Minimize impacts to community and community amenities	Community facilities/resources affected	0	0	0	8	5
	Impacts to parking	◔	◑	◑	●	◕
	Number of noise impacts to residences	0	0	260	200	170
	Visual impacts/view corridors affected	●	◕	◔	○	◔
Reduce energy consumption	Reduction in regional transportation-related energy consumption	N/A	◕	○	●	◕
Achieve consistency with adopted plans	Degree of consistency with adopted plans	◑	◑	◑	●	◕

Note: ○ = Lowest benefit or greatest impact, ● = Highest benefit or least impact

All alternatives are generally consistent with Local, District, and State plans. The Fixed Guideway Alternative best serves the areas of O'ahu that are designated for future growth and development. It is also the only alternative that is consistent with regional transportation system planning defined in the *2030 O'ahu Regional Transportation Plan* (OMPO, 2006a).

The general public in Honolulu is very concerned about transportation. In the *Honolulu Advertiser* Hawai'i Poll conducted in June 2006, traffic was identified by most respondents as the most important issue currently facing Hawai'i (Honolulu *Advertiser*, 2006). While preparing the *2030 O'ahu Regional Transportation Plan*, OMPO conducted a telephone survey of O'ahu residents to gauge public reaction to transportation solutions (OMPO, 2006b). More than 50 percent of the respondents said that they would use rapid transit regularly or occasionally.

Scoping conducted for the Honolulu High-Capacity Transit Corridor Project also indicated broad interest and a majority of support for the project. The majority of comments received during scoping related to a preference for one of the alternatives or a proposed modification to one of the alternatives. These comments are documented in the *Honolulu High-Capacity Transit Corridor Project Scoping Report* (DTS, 2006d). As a result of public comments, moderating the growth in traffic congestion was added to the purpose and need, a second Managed Lane option was added, and the presentation of the Fixed Guideway Alternative was changed.

Important Trade-offs

The greatest trade-off among the alternatives is between the transportation benefit provided and the cost to implement the alternative. The TSM Alternative provides little benefit, but it does so at a very low cost. The Managed Lane Alternative provides slightly more benefit, but at a substantial cost. While the Fixed Guideway Alternative would have the highest cost, it is also the only alternative that would provide a substantial transportation benefit, measured both by the benefit to transit users and in the reduction in congestion compared to the No Build Alternative.

Other trade-offs are related to environmental and social resources. Again, the No Build and TSM Alternatives would provide few benefits, but also would have the least number of impacts. The Managed Lane Alternative would require property acquisitions, have visual and noise impacts, and affect historic and cultural resources along its alignment. The Fixed Guideway Alternative generally would have similar but reduced environmental effects compared to the Managed Lane Alternative, but they would extend for a greater distance in the corridor. These environmental impacts should be compared to the benefits of reduced air and water pollution and energy consumption and the increased social connectivity provided by the system.