

4 EVALUATION OF ALTERNATIVES

4.1 EVALUATION

Evaluation of the six alternatives was performed with a combination of qualitative and quantitative measures. An evaluation matrix, similar in format to the sample shown in **Table 4-1**, was used to describe the performance of each alternative related to each of the evaluation measures. Within each column the alternatives were compared and assigned a high, medium or low performance rating relative to the other alternatives.

This is demonstrated in the sample matrix in **Table 4-1**, which shows descriptive text for each alternative (rows) related to its performance in each of several evaluation measures (columns). In the gray area beneath the descriptive text there is a performance rating for each box. A high performance is designated by a full (dark) circle, medium performance by a half circle and low performance by an empty (white) circle.

Note that adding up the total number of high, medium and low performance ratings received by each alternative will only provide an overview of the alternatives. It will not identify the LPAs. The final selection of the LPAs depends on which characteristics are felt to be the most important and how each alternative helps to address the most pressing needs of the region. Public feedback played a large role in the selection of LPAs.

Table 4-1: Sample Evaluation Matrix

Alternative	Travel Time Reductions	Changes to Existing Choices	Connectivity to other Transp. Services	Connectivity to Key Destinations	Capital Costs (2006 \$)	O&M Costs (2006 \$)	Ridership	Use of Existing Facilities	support/complement TOD	Public Support
Alternative 1	1 minute saved by using this alternative instead of other existing options	Duplicates existing service	Does not provide transfer opportunities to other transit services	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text
<i>Rating</i>	○	○	○	○	○	○	○	○	○	○
Alternative 2	3 minutes saved by using this alternative instead of other existing options	Partially duplicates existing service	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text
<i>Rating</i>	○	○	◐	◑	◐	◐	◐	◐	◐	◐
Alternative 3	10 minutes saved by using this alternative instead of other existing options	Provides a more reliable, direct route to downtown	Connects to all existing rail services and is fed by numerous local bus routes	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text
<i>Rating</i>	◐	◐	◑	◐	○	◐	◑	◐	◑	◐
Alternative 4	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text	Descriptive text
<i>Rating</i>	○	○	○	○	○	◐	○	◐	○	○

The evaluation of the six alternatives used twelve evaluation categories:

- **Travel Time Savings on New Transit Services versus Existing Transit Services (in year 2025 traffic conditions)** – This category assesses how well each alternative helps to improve transit service quality, one of the needs identified in the ECTS. It identifies the time that would

be saved by traveling from end to end on each new service rather than traveling between the same locations on the existing transit services. This includes only in-vehicle time, not wait time or access time. Travel times assumed the projected traffic conditions in the year 2025. Since the new services are almost entirely on exclusive rights-of-way, they would not be significantly affected by traffic congestion, whereas most of the existing services would be affected.

- **Travel Time Savings on New Transit Services versus Driving (in year 2025 traffic conditions)** – This category assesses how well each alternative helps to improve transit choices and provide alternatives to driving, one of the needs identified in the ECTS. It identifies the time that would be saved by traveling from end to end on each new service rather than traveling between the same locations by driving a private automobile. This includes only in-vehicle time, not wait time or access time. Travel times assumed the projected traffic conditions in the year 2025. Since the new services are almost entirely on exclusive rights-of-way, they would not be significantly affected by traffic congestion, whereas driving a private automobile would be affected. It is important to note that in general, transit is slower than driving alone because of its need to make multiple stops, whereas someone driving alone makes no stops prior to their destination. Because of this, travel time savings of zero in this category is in fact a respectable outcome, and a service that saves time over driving is noteworthy.
- **Changes to Existing Transit Choices** – This category assesses how well each alternative helps to improve transit choices and provide alternatives to driving, one of the needs identified in the ECTS. It evaluates what improvements a rider would experience once the proposed new service is in place. Possible outcomes include more direct service, more travel options, a change in the number of transfers necessary or increased reliability of a service.
- **Major Connections to Other Transit Services** – This category assesses how well each alternative meets one of the needs identified through public outreach: Provide a Convenient, Continuously Linked Transit Network. It assesses how well the proposed transit alternative helps to form a connected transit network and allows convenient transfers with other services.
- **Exclusive Guideway Service to Oakland** – This category assesses how well each alternative helps to provide a convenient, continuously linked transit network, another need identified in the ECTS. Service to Oakland was specifically identified as a need during the ECTS, primarily because Oakland is the second largest job center in Southwestern Pennsylvania. The current transit network is configured in a hub-and-spoke arrangement, with the hub being in the Golden Triangle Area. This forces many Oakland-bound riders to travel to the Golden Triangle before transferring to Oakland. This category identifies whether the new services provide a one-seat ride to Oakland and how well they distribute passengers within Oakland.
- **Exclusive Guideway Service to Other Destinations** – This category assesses how well each alternative helps to provide a convenient, continuously linked transit network, a need identified in the ECTS. It assesses the extent to which the proposed alternatives provide service to major destinations within the study area (with the exception of Oakland, which is evaluated separately in the previous category).
- **Projected Daily Transit Boardings** – This category assesses the expected utilization of each proposed alternative to determine the effectiveness of the service and the potential benefit to the region.
- **Capital Cost (in 2006 Dollars)** – This category assesses the cost to construct each alternative. All costs are in 2006 dollars. When assessing the performance of an alternative it is important

to take into consideration that more expensive alternatives are often more difficult to fund, but that within reason, a higher investment in a system often yields a more reliable and productive system. The balance between too little and too much investment is one that relies strongly on local preferences and local priorities.

- **Operating and Maintenance Costs (in 2006 Dollars)** – This category assesses the annual cost to operate and maintain each alternative. Costs are in 2006 dollars. Although the total dollar amounts are significantly lower than for capital costs, it is important to remember that these costs reoccur annually for the life of the system. As is the case with capital costs, more expensive systems are more difficult to fund, but if the service is well designed and efficient, a higher investment often yields greater benefits.
- **Use of Existing Facilities** – This category identifies whether each alternative makes use of existing transportation resources, which can have economic and environmental benefits. In some cases using existing transportation infrastructure can reduce the construction cost of an alternative. When existing rights-of-way or building structures are available for use by the alternative, it can reduce the amount of construction or ground preparation to be done while building the alternative. Unfortunately, the reverse can also be true if the infrastructure is available, but a price must be negotiated, as is often the case with rights-of-way that are still in use. The use of existing infrastructure can also have environmental benefits by reducing the need to build over otherwise undisturbed land.
- **Potential for Transit Oriented Development** – Transit Oriented Development (TOD) is development that is centered around transit facilities and encourages use of transit, bicycles or walking rather than focusing on the use of automobiles for mobility. This type of development is created with a human scale, not an automobile scale and includes extensive pedestrian amenities. It is also oriented so that building entrances face major pedestrian paths or transit stations, not parking lots. The existence or commitment to creating TOD is a criterion that the Federal Transit Administration also reviews when deciding which public transit projects should receive New Starts funding. This category rates the potential for the proposed transit investments to be surrounded by transit oriented-development, regardless of whether that development is spurred by the transit investment or is pre-existing.
- **Public Support** – Public Support is a critical component of the selection of an LPA. This category rates the response of the public, stakeholders and elected officials to the proposed transit investments. An alternative must have the support of the public it would serve to be selected as a Locally Preferred Alternative, as public support affects not only the potential for ridership once the system is constructed, but also the potential for funding to be made available for the construction, operating and maintenance of the service.

The evaluation of the six ECTS-TA alternatives is shown in **Table 4-2** through **Table 4-6** (similar to the sample shown in **Table 4-1**). To the right of each table is an explanation of the rankings within each category. Following the four tables is a summary (**Table 4-7**) which shows only the rankings without the accompanying text for an overview of the alternatives.

Table 4-2: Evaluation of Alternatives - Improved Transit Service Quality and Alternatives to Driving

	Segment for Comparison	Need: Improve Transit Service Quality			Need: Improve Transit Choices and Provide Alternative to Driving		
		Transit Travel Time Reduction vs. Existing Transit Services			2025 Transit Time vs. Estimated Highway Time (minutes)		Changes to Existing Transit Choices
		Minutes:	Percent:	Versus:	Minutes:	Percent:	
Allegheny Valley Commuter Rail	New Ken. ² - Pittsburgh ³ :	10 - 15	15 - 23%	Rt. 78A	3-8	7-18%	<ul style="list-style-type: none"> Supplements existing bus routes with exclusive guideway service – increased speed, capacity and more direct route to Pittsburgh Introduces a transfer (to bus shuttle) not required of riders on the existing PAAC Route 78A. Will have feeder bus service to stations
East Busway Extension	Monroeville - Pittsburgh (skip-stop):	33	49%	Rt. 67A ⁴	-6	-21%	<ul style="list-style-type: none"> Additional Connectivity to Monroeville – new bus routes New exclusive transit guideway – faster access for 5 PAAC routes and some WCTA routes to East Busway, Oakland and Downtown Pittsburgh from Monroeville, East Pittsburgh and Braddock Reduces route lengths in mixed traffic Currently the exclusive guideway can be accessed in Swissvale, Wilksburg or Oakland for Downtown Pittsburgh trips
	Monroeville - Oakland:	-4	-13%	Rt. 68A ⁵	-12	-43%	
NS Commuter Rail	Greensburg - Pittsburgh:	16	20%	1F (WCTA)	0	0%	<ul style="list-style-type: none"> Replaces WCTA route 1F with exclusive guideway service – increased speed and capacity, more direct route to Pittsburgh. Introduces a transfer not required of riders on the existing WCTA Route 4 to reach Oakland. Will have feeder bus service to stations
Mon Valley Light Rail	McKeesport - Pittsburgh:	14	28%	Rt. 56C	3	8%	<ul style="list-style-type: none"> Supplements existing bus routes with fixed guideway service – increased speed and capacity More direct service from Mon Valley to Downtown Pittsburgh, Oakland and the northern Allegheny Valley shore.
	McKeesport - Oakland:	23	50%	Rt. 61C	12	34%	
	Etna - Pittsburgh:	6	30%	Rt. 1A	4	22%	
Spine Line Light Rail	Pittsburgh - Wilksburg:	17	43%	Rt. 61A	-4	-21%	<ul style="list-style-type: none"> Replaces most existing bus routes between Oakland and Downtown Pittsburgh, a highly congested area New exclusive guideway service within Oakland Supplements existing bus routes to Downtown Pittsburgh and Oakland from Squirrel Hill or Hazelwood and Homestead.
	Pittsburgh - Homestead:	0 ⁶	0%	Rts. 53F&H	-4	-20%	
	Oakland - Wilksburg:	9	45%	Rt. 61A	7	39%	
	Oakland - Homestead:	10	45%	Rt. 61C	5	29%	
	Oakland - Pittsburgh:	3-4	20-25%	Rt. 61A ⁷	2	14%	
Oakland BRT	Oakland - Pittsburgh:	varies	5%	Current bus route travel times	Not determined		<ul style="list-style-type: none"> Increased travel speed and reliability through transit signal priority, improved fare collection or other methods. Routes affected: PAAC 28X, 54C, 59U, 61A, 61B, 61C, 67A, 67C, 67E, 67F, 67G, 67H, 67J, 71C, 71D, 77C, 78C, 84A, 84B, 100, 500, EBA, WCTA 4.
					TBD		

Transit Travel Time Reduction versus Existing Transit Services:

The alternatives that received a high rating in this category were the Norfolk Southern Commuter Rail, the Mon Valley Light Rail and the Spine Line Light Rail. Each would reduce transit travel times by a minimum of 20 percent, with some routes experiencing decreases of as much as 45-50 percent.

The Allegheny Valley Commuter Rail and East Busway Extension alternatives are both rated slightly lower, as medium. The Allegheny Valley Commuter rail still produces a significant amount of travel time savings (10-15 minutes), but in terms of percentage, this is slightly lower than the three alternatives that were rated as high performance. The East Busway alternative showed excellent travel time savings compared to non-busway routes (49 percent), but when compared to routes that use the existing busway, it is actually slower, therefore it could not receive a high rating. Since the current 68A travels in mixed traffic, its speed and reliability decrease as congestion increases. Therefore, in future years service on the extended East Busway may be faster. East Busway service could also be faster by making fewer stops, but ridership would likely decrease accordingly.

The only alternative to receive a low rating in transit travel time savings was the Downtown Pittsburgh to Oakland BRT alternative. Specific travel times were not determined for individual routes in this system, but it was assumed that they would each see a 5 percent reduction in travel time. Although beneficial, a 5 percent reduction is a noticeably smaller reduction than in the other alternatives.

Travel Time Reduction versus year 2025 Highway Travel Times:

The Allegheny Valley Commuter Rail Alternative, the Mon Valley Light Rail and trips to Oakland on the Spine Line Alternative were all high performers in this category. Each of these alternatives reached travel time savings around 20 percent or greater. When compared to driving times, this is a noteworthy accomplishment, as the nature of transit (multiple stops) versus driving (one stop) means that automobile travel times are often faster unless considerable roadway congestion is experienced or the transit service has a more direct route.

All other alternatives – East Busway Extension, Norfolk Southern Commuter Rail and Spine Line trips to Downtown Pittsburgh – achieved no travel time reduction versus driving. They received a low performance rating.

Changes to Existing Transit Choices:

All six alternatives would make beneficial changes to the existing transit choices, therefore none rated lower than medium. The high rated alternatives – East Busway Extension, Norfolk Southern Commuter Rail and the Spine Line were those that would make enough improvement to replace existing services. The medium rated alternatives – Allegheny Valley Commuter Rail, Mon valley Light Rail and Oakland BRT – were those that would only be able to supplement the existing transit services.

² Allegheny Valley Commuter Rail travel time is shown only as far east as New Kensington, rather than the alternative's terminus of Arnold, for consistency between highway and transit travel times. Existing PAAC Route 78A does not travel to Arnold.

³ In all descriptions, Pittsburgh refers to Downtown Pittsburgh, in or near the Golden Triangle

⁴ Route 67A does not travel on a busway

⁵ Route 68A travels on a busway for part of its route

⁶ Routes 53F and H only reach 8th and Ann Streets, they do not enter into the Waterfront development, where the Spine Line Homestead alternative would terminate. To make a reasonable comparison of travel times, one minute was added to the bus travel time to account for access time from its current route to the Waterfront.

⁷ This assumes 4-5 minutes of the 20 minute travel time shown in the Route 61A schedule between timepoints Forbes/Craig and Forbes/Stanwix would be traveling into Downtown Pittsburgh beyond the terminus of the light rail alternative at Steel Plaza.

Table 4-3: Evaluation of Alternatives - Convenient, Continuously Linked Transit Network

Need: Convenient, Continuously Linked Transit Network			
	Major Connections to Other Transit Services	Exclusive Guideway Service to Oakland	Exclusive Guideway Service to Other Destinations
Allegheny Valley Commuter Rail	<ul style="list-style-type: none"> WCTA Routes in New Kensington to Avonmore, Mills Mall Business/Research Park and Penn State New Kensington and several PAAC Routes along corridor Local and regional transit routes in Downtown Pittsburgh serving most neighboring counties - requires walking or bus shuttle transfer from Strip District 	<ul style="list-style-type: none"> No direct service to Oakland Transfer to Oakland possible in Downtown Pittsburgh via shuttle bus or walking transfer to local bus routes (non-exclusive guideway) 	<p><u>Direct Service:</u></p> <ul style="list-style-type: none"> Strip District, Allegheny Valley Options to bring the service farther into Downtown Pittsburgh (11th St.) Optional routing to Penn Station via Brilliant Branch Potential extension east to Armstrong County <p><u>Via Transfer:</u></p> <ul style="list-style-type: none"> Downtown Pittsburgh via shuttle bus Many other regional destinations via transfer to other transit services in Downtown Pittsburgh – by walking or bus shuttle in Downtown Pittsburgh
	●	○	●
East Busway Extension	<ul style="list-style-type: none"> All East Busway Routes Local and regional transit routes serving Allegheny and most neighboring counties from Penn Station Amtrak and Greyhound intercity services 	<ul style="list-style-type: none"> Extended reach of exclusive guideway Oakland service to Braddock, East Pittsburgh and Monroeville – one Oakland busway station, but continuing service on Oakland local roads without transfer (non-exclusive guideway) 	<p><u>Direct Service:</u></p> <ul style="list-style-type: none"> Monroeville/Monroeville Mall area, East Pittsburgh, Braddock, Wilksburg, Oakland and Downtown Pittsburgh. <p><u>Via Transfer:</u></p> <ul style="list-style-type: none"> Many other regional destinations accessible via transfer to other transit services in Downtown Pittsburgh or other East Busway stations
	●	●	●
NS Commuter Rail	<ul style="list-style-type: none"> Connection with several WCTA routes in Greensburg/Route 30 Corridor East Busway routes from Wilksburg Local and regional transit routes serving Allegheny and most neighboring counties from Penn Station Amtrak and Greyhound intercity services 	<ul style="list-style-type: none"> No direct service to Oakland Transfer to Oakland possible in Downtown Pittsburgh via transfer to local bus routes (non-exclusive guideway) 	<p><u>Direct Service:</u></p> <ul style="list-style-type: none"> Greensburg, Jeannette, Irwin, Trafford, East Pittsburgh, Wilksburg and Downtown Pittsburgh. Possible extension to Latrobe <p><u>Via Transfer:</u></p> <ul style="list-style-type: none"> Many other regional destinations accessible via transfer to other transit services in Downtown Pittsburgh, Greensburg and Wilksburg
	●	○	●
Mon Valley Light Rail	<ul style="list-style-type: none"> Cross-platform transfers to South Hills and North Shore “T” service Local and regional bus routes from Mon Valley, Hazelwood, Homestead, Oakland and Downtown Pittsburgh transfer points 	<ul style="list-style-type: none"> Direct access to Oakland from Mon Valley – two Oakland stations in CMU area Cross-platform transfer to Oakland possible at proposed 31st Street Station via McKeesport Branch – two Oakland stations 	<p><u>Direct Service:</u></p> <ul style="list-style-type: none"> Etna /northern Allegheny Valley, McKeesport / Mon Valley, Strip District and Downtown Pittsburgh Carrie Furnace and Hazelwood development sites <p><u>Via Transfer:</u></p> <ul style="list-style-type: none"> North Shore - Mon Valley connection – cross platform transfer South Hills and North Shore – cross-platform transfer Many other regional destinations accessible via transfer to other transit services in Downtown Pittsburgh
	●	●	●
Spine Line Light Rail	<ul style="list-style-type: none"> Through-service to North Shore Cross-platform transfers to South Hills “T” Local and regional bus routes from Downtown Pittsburgh and Oakland transfer points East Busway routes from Wilksburg & Downtown Pittsburgh 	<ul style="list-style-type: none"> Direct access to Oakland – stations in several Oakland locations 	<p><u>Direct Service:</u></p> <ul style="list-style-type: none"> Downtown Pittsburgh, North Shore, Hill District, Wilksburg and/or Homestead, the Waterfront and Homestead development sites <p><u>Via Transfer:</u></p> <ul style="list-style-type: none"> South Hills connection – cross platform transfer Many other regional destinations accessible via transfer to other transit services in Downtown Pittsburgh
	●	●	●
Oakland BRT	<ul style="list-style-type: none"> Local and regional bus routes from Downtown Pittsburgh and Oakland transfer points, as well as other major locations along each of the routes. 	<ul style="list-style-type: none"> Direct access to Oakland – stations in several Oakland locations 	<p><u>Direct Service:</u></p> <ul style="list-style-type: none"> Downtown Pittsburgh <p><u>Via Transfer:</u></p> <ul style="list-style-type: none"> South Hills, North Shore, East Busway destinations Many other regional destinations accessible via transfer to other transit services in Downtown Pittsburgh
	●	●	●

Major Connections to Other Transit Services:
All of the six alternatives are reasonably well integrated with the remainder of the region’s public transportation network. All have been designed with modifications to local bus routes to provide transfer opportunities where reasonable. Additionally, connections to East Busway routes are available from the East Busway Extension, the Norfolk Southern Commuter Rail and the Spine Line Light Rail alternatives. Similarly, service to the North Shore and the South Hills is available on the Mon Valley Light Rail and Spine Line alternatives. All alternatives received a rating of medium, except for the Spine Line, which was the only alternative to provide transfer or through service opportunities to the East Busway, the North Shore and the South Hills combined. It therefore received a high rating.

Exclusive Guideway Service to Oakland:
Since service to Oakland in particular was mentioned as a priority for the region during public outreach meetings, it was assessed separately from access to other regional destinations. High performance alternatives in this category were those that serve Oakland at multiple stops in both the east and west ends of the area. The three alternatives that received a high rating in this category were the East Busway Extension, the Spine Line Light Rail and the Downtown Pittsburgh to Oakland BRT.

One level lower was the Mon Valley Light Rail Alternative, which serves only the eastern end of Oakland. Low performing alternatives were the two commuter rail alternatives, which do not provide direct service to Oakland.

Exclusive Guideway Service to Other Destinations:
All six alternatives extended exclusive guideway service to new areas and therefore rated as at least medium performance in this category. The Allegheny Valley Commuter Rail was not rated as high performance because it does not reach the heart of the Golden Triangle. The East Busway Extension only extends exclusive guideway a short distance and therefore remained a medium-performance alternative. Additionally, it is uncertain how much, if any exclusive guideway the Downtown Pittsburgh to Oakland BRT will include, therefore it remained a medium-performance alternative. The remaining three alternatives all reach the heart of the Golden Triangle and very congested areas like Oakland, the Route 30 corridor and the northern Allegheny shore. They all received a high performance rating.

Table 4-4: Evaluation of Alternatives- Cost Effectiveness

	Daily Transit Boardings	Capital Cost (2006\$\$)	Operating and Maintenance Costs (2006\$\$)
Allegheny Valley Commuter Rail	1,900	\$140 - 170 M	\$ 6.4 M
	<u>Enhanced Alternative:</u> 6,700	<u>Enhanced Alternative:</u> \$270 - 330 M	<u>Enhanced Alternative:</u> \$10.9 M
	○ (Regular) ● (Enhanced)	●	●
East Busway Extension	41,500 (on entire Busway)	<u>To Monroeville:</u> \$390 - 480 M	<u>To Monroeville:</u> \$14.1 M
	●	<u>To East Pittsburgh:</u> \$240 - 300 M	<u>To East Pittsburgh:</u> Costs not determined
	● (to Monroeville) ● (to East Pittsburgh)	●	●
NS Commuter Rail	4,400	\$190 - 230 M	\$15.8 M
	<u>Enhanced Alternative:</u> 8,800	<u>Enhanced Alternative:</u> \$250 - 300 M	<u>Enhanced Alternative:</u> \$20.0 M
	●	●	●
Mon Valley Light Rail	34,700 Total	\$1,200 - 1,400 M	\$24.4 M
	<u>Single branch from Pittsburgh:</u> 14,900 – Etna 19,800 – McKeesport	<u>Single branch from Pittsburgh:</u> \$400 - 490 M to Etna \$930 - 1,100 M to McKeesport Continued deferment of the North Shore Connector's Convention Center Branch would increase the cost of this alternative by the amount of that connection.	<u>Single branch from Pittsburgh:</u> \$ 4.7 M to Etna \$19.5 M to McKeesport
	● (Etna) ● (McKeesport)	● (Etna) ○ (McKeesport)	● (Etna) ● (McKeesport)
Spine Line Light Rail	39,400 (Wilkinsburg) 35,700 (Homestead)	\$2,700 - 3,200 M (Wilkinsburg) \$2,000 - 2,400 M (Homestead)	\$ 14.5 M (Wilkinsburg) \$27.9 M (Homestead)
	<u>Underground to Oakland Only:</u> Has not been evaluated	<u>to Oakland Only:</u> \$1,500 - 1,900 M (underground) \$650 - 800 M (at-grade)	
	<u>At-Grade to Oakland Only:</u> Has not been evaluated		
	●	○ (Underground) ● (at-Grade)	●
Oakland BRT	5,900 above current ridership levels (total for all routes)	Costs not evaluated	Costs not evaluated
	●	TBD	TBD

Daily Transit Boardings:

With the exception of the Allegheny Valley Commuter Rail's standard alternative, all alternatives seemed to produce reasonable ridership estimates for the type of service they would provide and therefore received at least a medium performance rating in this category. Although the commuter rail alternatives show overall lower ridership than the light rail alternatives, this does not indicate poor performance; it is merely indicative of the different service types. The commuter rail services make fewer stops and concentrate their service in the peak periods with limited off-peak service. In contrast, the light rail alternatives make many stops and operate much more frequently throughout the day. Accordingly, the standard Allegheny Valley commuter rail alternative seemed to have only a low performance.

The East Busway Extension and the Spine Line Light Rail, both seemed to have high ridership levels. The Spine Line Light Rail alternative was elevated to a high performance rating. The East Busway Extension, however, retained a medium performance rating because much of that ridership would be on trips that would only use the existing portion of busway between the Golden Triangle and Swissvale.

Capital Cost (2006 dollars):

As was stated previously, a high-cost alternative increases the difficulty of obtaining funding, but within limits, sometimes provides a greater return on the investment. Therefore, although for the purposes of this analysis, a high-cost alternative will receive a low performance rating and a low-cost alternative will receive a high performance rating, these ratings should be viewed with an understanding of what benefits would result from each investment. However, given the limited funding available for these projects, it was considered appropriate to give a low rating to a high-cost alternative for which the cost might limit the region's ability to construct it.

The alternatives that received a low performance rating are those whose capital costs are in excess of one billion dollars. This includes the McKeesport Branch of the Mon Valley Light Rail alternative and all Spine Line alternatives that travel underground (the full alternatives to Wilkinsburg and Homestead, plus the shortened subway alternative between the Golden Triangle and Oakland).

The low-cost alternatives, which received a high performance rating, are the two commuter rail alternatives in both regular and enhanced form and the East Busway Extension Alternative only as far as East Pittsburgh. Each of these had costs of approximately \$300 million or less.

Aside from the Downtown Pittsburgh to Oakland BRT, for which costs were not evaluated, the remaining alternatives had capital costs that were between the high and low extremes and therefore received a medium performance rating. Those alternatives are the East Busway Extension to Monroeville, the Etna branch of the Mon Valley Light Rail and the at-grade version of the Spine Line Light Rail alternative to Oakland.

Operating and Maintenance Costs (2006 dollars):

As was the case with capital costs, the operating and maintenance costs were rated assuming that a higher dollar amount would be more difficult to obtain and would therefore receive a low performance rating. These, like capital costs, should be reviewed with an understanding of the benefits that would result from that investment.

Aside from the Downtown Pittsburgh to Oakland BRT, for which costs were not evaluated, most alternatives seemed to generate operating and maintenance costs that were reasonable for the service provided. Therefore, with the exception of the Allegheny Valley Commuter Rail and the Etna branch of the Mon Valley Light Rail, all alternatives received a medium performance rating. The Allegheny Valley Commuter rail and the Etna branch would generate very low operating and maintenance costs and therefore received a high performance rating.

Table 4-5: Evaluation of Alternatives - Existing Resources and Community Coordination

	Existing Facilities	Potential for Transit Oriented Development at Stations		
Allegheny Valley Commuter Rail	<ul style="list-style-type: none"> AVR ROW is intact, with space for extra track ROW owner interested in CR/freight agreement Brilliant Branch may be available for alternate routing Could use existing platform and gazebo in Oakmont. Option to use Amtrak/Penn Station, but requires agreement with Norfolk Southern Original freight station in New Kensington may be owned by city Would require new maintenance facility 	Arnold – Good New Kensington – Excellent Oakmont – Excellent (already TOD) Verona – Good Sandy Creek Road – Poor	Washington Boulevard – Poor 62 nd Street – Good (concept plan exists) 40 th Street – Excellent (concept plan exists) 16 th Street – Good	
East Busway Extension	<ul style="list-style-type: none"> NS ROW intact, but requires agreement with NS and Union RR NS not opposed, but no commitment or terms of agreement Potential to connect to the Mon-Fayette or Tri-Boro Expressways. Discussed begun with PA Turnpike Commission, but further coordination required. Adds roadway next to tracks, does not use existing tracks Monroeville Mall - possibility of joint use of parking lot. 	Braddock – Good East Pittsburgh – Good Monroeville – Good		
NS Commuter Rail	<ul style="list-style-type: none"> NS ROW intact, but requires agreement with railroad RRs not opposed, but no commitment or terms of agreement Would use Greensburg and Pittsburgh Amtrak Stations, possibly Wilksburg Station. Need to analyze whether additional tracks would be needed to accommodate passenger trains. Extension option would use Latrobe Station Would require new maintenance facility 	Greensburg – Excellent (already TOD) Jeannette – Good Irwin – Fair/Good Trafford – Fair/Good East Pittsburgh – Good Wilksburg – Excellent (already TOD) Pittsburgh – Excellent (already TOD)		
Mon Valley Light Rail	<ul style="list-style-type: none"> CSX ROW intact but requires agreement with CSX and AVR (AVR leases the line from CSX) AVR ROW intact, with space for extra track 	<u>Trunk:</u> 14th Street – Good 21st Street – Fair/Good 31st Street – Poor	<u>Etna Branch:</u> Millvale – Poor Etna – Fair	<u>McKeesport Branch:</u> Centre Avenue – Excellent (already TOD) CMU – Excellent (already TOD) Greenfield Avenue – Poor Tecumseh Street – Good Glenwood Bridge – Poor Homestead Connection – Poor Rankin – Excellent Braddock – Good McKeesport – Good
Spine Line Light Rail	<ul style="list-style-type: none"> CSX ROW intact, but requires agreement with CSX (Homestead option) and AVR (AVR leases the line from CSX) At grade-option would use city streets 	<u>Trunk:</u> Mellon Arena – Excellent Dinwiddie Street – Excellent Soho Street – Excellent Forbes/Craft – Excellent (already TOD) Forbes/Atwood – Excellent (already TOD)	<u>Homestead Branch:</u> Craig Street – Excellent (already TOD) Greenfield Avenue – Poor Tecumseh Street – Good Glenwood Bridge – Poor Waterfront – Good	<u>Wilksburg Branch:</u> Schenley Plaza – Good Forbes/Morewood – Good Forbes/Murray – Excellent (already TOD) Forbes/Braddock – Good
Oakland BRT	<ul style="list-style-type: none"> Would use city streets It is still undetermined whether a new BRT lane would be created 	Downtown Pittsburgh and Oakland are both already transit-oriented communities		

Use of Existing Facilities:

All of the alternatives are currently expected to use existing rights-of-way and existing stations where available. With the exception of the Allegheny Valley Commuter Rail Alternative, the owners of those facilities have not reacted to proposals to use their rights-of-way for transit. The Allegheny Valley Railroad, in contrast, while not yet having made an agreement for the use of its right-of-way, has conveyed a distinct interest in reaching an agreement for operation of the commuter rail service along the AVR right-of-way. For this reason, the Allegheny Valley Commuter Rail alternative was the only alternative to receive a high performance rating in this category.

Potential for Transit Oriented Development at Stations:

The Downtown Pittsburgh to Oakland BRT would serve two areas that are already extremely transit-oriented: Downtown Pittsburgh and Oakland. It received a high rating performance rating in this category. All versions of the Spine Line Light Rail alternative as well as the Norfolk Southern Commuter Rail alternative also received a high performance rating because they would all serve several areas that are already transit oriented as well as several others that have potential for new TOD.

The Allegheny Valley Commuter Rail alternative received a medium performance rating because it would serve some currently transit oriented areas and some with much potential for TOD, but would also have a few stations where the topography would severely limit how well any developments could be oriented to transit riders and pedestrians. Similarly, all three stations on the East Busway Extension alternative have a good potential for TOD, but would be somewhat limited by topography and/or other transportation infrastructure such as adjacent railroads and highways. Therefore the East Busway Extension received a medium performance rating.

The only alternative to receive a low performance rating in this category is the Etna branch of the Mon Valley Light Rail. The station areas for this alternative are severely limited in their development potential by topography and the presence of railroad and highway facilities.

Table 4-6: Evaluation of Alternatives - Public Support

Public Support	
Allegheny Valley Commuter Rail	<ul style="list-style-type: none"> ▪ Rated first or second choice by 126 comment form respondents ▪ Received petitions with 2,368 signatures from residents of Alle-Kiski valley supporting commuter rail service between New Kensington/Arnold and Pittsburgh ▪ Gives transportation options to north Westmorland County and northeast Allegheny County ▪ Fosters economic development ▪ Relatively low cost and time to be up and running ▪ Available train station and parking
	●
East Busway Extension	<ul style="list-style-type: none"> ▪ Rated first or second choice by 27 comment form respondents ▪ Monroeville is the second biggest economic center in Southwestern Pennsylvania ▪ Alleviate traffic congestion on Parkway East
	◐
NS Commuter Rail	<ul style="list-style-type: none"> ▪ Rated first or second choice by 35 comment form respondents ▪ Improves economic opportunities for Westmoreland County ▪ Alleviates congestion in historically congested corridor ▪ Relatively quick to implement ▪ Terminus at Pennsylvania Station is big benefit
	◐
Mon Valley Light Rail	<ul style="list-style-type: none"> ▪ Rated first or second choice by 33 comment form respondents ▪ Mon Valley and Millvale/Etna have concentrated population and development potential ▪ Address current passenger overload on buses between McKeesport and Squirrel Hill/Oakland ▪ Create access to emerging job centers such as Hazelwood
	◐
Spine Line Light Rail	<ul style="list-style-type: none"> ▪ Rated first or second choice by 49 comment form respondents ▪ Oakland is the third largest trip generator in the State ▪ Addresses double hub system of Oakland and Downtown ▪ Important to reduce traffic in Oakland
	◐ (combined rating with Oakland BRT)
Oakland BRT	<ul style="list-style-type: none"> ▪ Rated first or second choice by 49 comment form respondents ▪ Oakland is the third largest trip generator in the State ▪ Addresses double hub system of Oakland and Downtown ▪ Important to reduce traffic in Oakland
	◐ (combined rating with Spine Line Light Rail)

Public Support:

All of the alternatives received at least a moderate amount of public support and minimal opposition. The Allegheny Valley Commuter Rail alternative, however, received a tremendous outpouring of support in the form of several petitions and numerous comment forms, submitted by mail, internet and in person at the public input meetings. The Allegheny Valley Commuter Rail alternative therefore received a high performance rating in this category, while the other alternatives all received a medium performance rating.

The performance ratings from **Table 4-2** through **Table 4-6** have been summarized in Table 4-7.

Table 4-7: Summary of Evaluation Characteristics

	Transit Travel Time Reduction	Comparison to Highway Travel Times	Changes to Existing Transit Choices	Major Connection to Other Transit Services	Exclusive Guideway Service to Oakland	Exclusive Guideway Service to Other Destinations	Daily Transit Boardings	Capital Cost (2006\$\$)	Operating and Maintenance Costs (2006\$\$)	Use of Existing Facilities	TOD Potential	Public Support
Allegheny Valley Commuter Rail	◐	●	◐	◐	○	◐	○ (Regular) ◐ (Enhanced)	●	●	●	◐	●
East Busway Extension	◐	○	●	◐	●	◐	◐ (Monroeville) ● (E. Pittsburgh)	◐	◐	◐	◐	◐
NS Commuter Rail	●	○	●	◐	○	●	◐	●	◐	◐	●	●
Mon Valley Light Rail	●	●	◐	◐	◐	●	◐ (Etna) ◐ (McKeesport)	◐ (Etna) ○ (McKeesport)	● (Etna) ◐ (McKeesport)	◐	○ (Etna) ◐ (McKeesport)	◐
Spine Line Light Rail	●	● (to Oakland) ○ (to Pittsburgh)	●	●	●	●	●	○ (Underground) ◐ (At-Grade)	◐	◐	● (Wilksburg) ● (Homestead)	●
Oakland BRT	○	TBD	◐	◐	●	◐	◐	TBD	TBD	◐	●	●

4.2 FINAL RECOMMENDATIONS / LOCALLY PREFERRED ALTERNATIVES

The performance of the six alternatives reveals that most of the alternatives are well suited to addressing the study area's transportation and community needs. Since all of the alternatives performed well overall, the main factors in the selection of LPAs was the public support for each alternative and the costs relative to the public support.

There was overwhelming support for the Allegheny Valley Commuter Rail alternative, which over 126 comment forms from Round 2 ranked as a first or second priority. Petitions with 2,368 signatures were also received in support of this alternative. Although this alternative does have some shortcomings – in particular the lack of direct service to the Golden Triangle and Oakland – there are options available to remedy them, all of which can be addressed in the next phase of study. In addition to the public support, the relatively low costs of this alternative make it more financially feasible than some others.

The East Busway Extension received 27 Round 2 comment forms that ranked it as either a first or second priority. PAAC has already been in discussion with PennDOT and the Pennsylvania Turnpike Authority about the potential for connecting to the Mon-Fayette or Tri-Boro Expressways to the east of East Pittsburgh. Funding also seems likely to be available for the next study phase of this project in the near future.

Significant public support was also received for the Norfolk Southern Commuter Rail alternative, which 35 of the Round 2 comment forms rated as a first or second priority. There are also plans underway for transit oriented development around some of the potential station sites along this alignment and estimated capital costs are in line with similar projects in other cities that recently received funding commitments from the FTA.

The Mon Valley Light Rail alternative performed well in the evaluation, and received a similar amount of public support to that received by the East Busway Extension and the Norfolk Southern Commuter Rail. However, the land use in the Mon Valley is different from that in the other corridors, with many areas still recovering from the loss of industry and population. If implemented at the appropriate time, this project has the potential to improve transportation for residents of the Mon Valley and support revitalization of the area, but only with considerable public support and the collaboration of an array of public and private investors. While it is believed that this project has merit, it appears to be a more appropriate investment when redevelopment efforts have progressed further. Nonetheless, the Etna branch can be considered for review sooner, in conjunction with further analysis of the Allegheny Valley Commuter Rail alternative.

Both the Spine Line and the BRT alternative between Downtown Pittsburgh and Oakland received strong public support. Since these two alternatives serve similar corridors, it will be necessary to determine whether it would be beneficial to implement both or just one of them. Also, because of the high cost of the Spine Line alternative, it will be important to refine the alternative so that it provides the service performance necessary for the congested Oakland area at a cost that the region can afford.

Based on this information, the Locally Preferred Alternatives are:

- Allegheny Valley and Norfolk Southern Commuter Rail – to move ahead in joint study
- East Busway Extension
- Downtown Pittsburgh-Oakland Transit Investment (includes Spine Line and/or BRT)