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## **Chapter 8.0 Evaluation of Alternatives**

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### **8.1 Introduction**

Chapter 8 provides an evaluation of the No Action and Action Alternatives, including the recommended LPA and its design options. Each recommended LPA design option would reduce specific impacts of the recommended LPA by modifying a portion of the recommended LPA alignment. The remainder of the recommended LPA would be unchanged. Either or both design options could be applied to the recommended LPA as a minimization strategy. Descriptions of each alternative and recommended LPA design option are in Chapter 2.

The evaluation focuses on information presented in the preceding chapters of the DEIS that distinguishes the alternatives and recommended LPA design options from each other; this information is most relevant for assessing the benefits, costs, and environmental consequences of the alternatives and recommended LPA design options against the purpose and need for the proposed Project. The results are intended to inform the identification of an environmentally preferable alternative under NEPA.

Tables 8-2.1 and 8-4.1 summarize the results of the quantitative and qualitative analyses for each alternative and recommended LPA design option. Each table is organized to compare quantities for the recommended LPA design options with the recommended LPA quantities. The quantities for the recommended LPA design options are shown as the differences (greater or less than) compared to the recommended LPA. If there is no difference in quantity compared to the recommended LPA, the code “ND” (no difference) is used.

### **8.2 Effectiveness in Meeting the Purpose and Need**

As presented in Chapter 1, the purpose of the Project is to provide faster, more reliable public transit service to the King of Prussia area that:

- Offers improved transit connections to the area from communities along the existing Norristown High Speed Line, Norristown and Philadelphia;
- Improves connectivity between defined key destinations within the King of Prussia area; and
- Better serves existing transit riders and accommodates new transit patrons.

The following discussions analyze the effectiveness of the No Action and Action Alternatives in achieving the intended purpose for the Project. Table 8-2.1 lists the factors used in this analysis.

The results of this analysis, which are summarized in Section 8.4.2, indicate that while each Action Alternative would provide faster, more reliable public transit service to, from and within the transportation study area, performance varies among the alternatives for the following factors: travel time savings, ridership increase, rate of mode shift, parking capacity, and access to jobs, parks, and community facilities. The recommended LPA would perform as well as or

better than the other Action Alternatives in these factors by providing the most transit travel time savings for existing bus riders (217,000 travel hours annually) and close to the highest travel time savings for existing automobile travelers who shift to using the Project (2.0 million hours annually), the highest ridership increase (increase of 9,500 average weekday riders on the NHSL), increase in transit parking capacity (1,470 spaces), access to jobs (15 million square feet), number of parks served (5) and access to community facilities (7). SEPTA selected the recommended LPA for the combination of these factors, comparatively fewer natural and social environment impacts compared to the other Action Alternatives, and achievement of factors related to broad acceptance by key stakeholders and political leaders: ease of implementing new zoning, avoiding US Route 202 and using 1<sup>st</sup> Avenue; Section 8.4.2 summarizes the performance of the Action Alternatives in regard to these factors.

### **8.2.1 The Need for Faster, More Reliable Public Transit Service to the Area**

As described in Section 1.2.5, existing bus and shuttle services are the only transit options for access to the King of Prussia Mall and other destinations in the transportation study area. Existing bus and shuttle riders are subject to the same delays from roadway congestion as motorists in their own vehicles. The key destinations of the King of Prussia Mall, the King of Prussia Business Park and the Valley Forge National Historical Park are underserved by the existing bus and shuttle services.

#### **No Action Alternative**

The No Action Alternative will not provide faster, more reliable public transit service to, from or within the transportation study area. As reported in Sections 3.1.3.1 and 3.2.3.1, existing roadway-based transit service problems related to on-time performance, reliability and travel times will be worse by 2040 as traffic congestion and delays increase as a consequence of foreseeable growth and development.

#### **Action Alternatives**

Each Action Alternative<sup>1</sup> would provide faster, more reliable public transit service, with varying degrees of effectiveness. As described in Sections 2.7 and 3.1.3.2, each Action Alternative would provide a faster transit ride with more frequent service and less wait time than traveling by bus. For example, service from 69th Street Transportation Center would be every 10 minutes during peak periods and every 20 minutes at all other operating times. This planned service rate contrasts with existing bus service, which has peak period frequencies of 25-30 minutes (routes 99, 123, 124 and 125) and 60 minutes (routes 92 and 139). In some cases, such as for future travel from 69th Street Transportation Center to King of Prussia Mall, the Project would eliminate the existing average 10 minute wait time for the transfer to bus.

In addition for future travel, the Project would eliminate the need for existing and new transit riders to experience low on-time performance rates of bus service, which are below SEPTA's standard of 80%. By operating on its own rail corridor and not in mixed traffic on roadways, each

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<sup>1</sup> Ridership forecasting, in terms of linked transit trips and transit boardings, travel time and mode shift modeling analyses were not completed for the recommended LPA design options. However, the PA Turnpike North/South Option and 9/11 Memorial Avoidance Option would perform similarly to the recommended LPA.

Action Alternative would eliminate the extra travel time experienced by existing bus service operating on congested roadways, such as on the Schuylkill Expressway, as well as the unpredictability of travel time because of variable travel conditions on roadways.

Annual average 2040 transit travel time savings with the Project varies by Action Alternative as shown in Table 3-1.9 and its discussion in Section 3.1.3.2. Travel time savings was calculated by ELGP according to DVRPC's year 2040 ridership projections. Specifically, travel time savings was first calculated on a daily basis by factoring the total number of forecasted daily passenger trips; then an annualization factor was applied to the daily figure, representing the average number of travel days per year, to arrive at annual travel time savings. As shown in Table 8-2.1, the recommended LPA (PECO/TP-1<sup>st</sup> Ave.) is the most effective in achieving this Project need with 217,000 transit travel hours saved per year compared to the No Action Alternative. Performance of the recommended LPA design options would be similar to the recommended LPA. PECO-1<sup>st</sup> Ave. is the second most effective at 186,000 transit hours saved per year. The least effective is the US 202-N.Gulph Action Alternative with 104,000 transit hours saved per year compared with the No Action Alternative. Transit travel time savings by the remaining Action Alternatives fall in between the second and least effective Action Alternatives.

Annual average 2040 travel time savings would also benefit existing automobile travelers who switch to the Project. As shown in Table 8-2.1, each Action Alternative would reduce automobile passenger travel time by 1.7 to 2.1 million hours per year depending on the Action Alternative. The factors affecting travel time are the number and location of station stops in the transportation study area, provision for park-and-ride facilities, the length of each Action Alternative and the type of service offered by a particular train. The PECO/TP-N. Gulph Action Alternative and the recommended LPA would provide the most reduction in hours per year at 2.1 and 2 million hours saved annually, respectively. The US 202 Action Alternatives and PECO-1<sup>st</sup> Avenue are the second and third ranked performers, at 1.8, 1.7 and 1.4 million hours saved annually, respectively.

## **8.2.2 The Need for Improved Transit Connections To, From and Within the King of Prussia-Valley Forge Area**

Existing NHSL riders must transfer to bus service to reach the key destinations within the transportation study area (Section 1.4.2). For example, existing NHSL riders from Philadelphia to destinations within the transportation study area must use three different transit services to make the trip (SEPTA's Market-Frankford Line, the NHSL, and then bus). Existing SEPTA bus services provide connections between some destinations in the transportation study area, but not all key and other destinations are served by transit (Section 3.1.2.1).

**Table 8-2.1: Performance of Alternatives – Purpose and Need**

Factors		No Action Alternative	Action Alternatives				
			PECO-1 <sup>st</sup> Ave.	PECO/TP-1 <sup>st</sup> Ave. (recommended LPA) (c)	PECO/TP-N. Gulph	US 202-1 <sup>st</sup> Ave.	US 202-N. Gulph
<b>Purpose and Need</b>							
S	Increases average weekday NHSL ridership by 2040(a) (Section 3.1.3)	0	+8,500	+9,500	+9,500	+7,500	+7,500
S	Average weekday transit boardings at Project stations (a) (Section 3.1.3)	0	4,952	5,297	5,376	4,192	4,106
	Reduces peak period transit travel time per trip (b) (Section 3.1.3)	0	-26 minutes to King of Prussia Mall from Center City Philadelphia (total travel time: 53 minutes) -23 minutes to King of Prussia Mall from Norristown Transportation Center (total travel time: 15 minutes) -9 minutes to King of Prussia Mall from 69th Street Transportation Center (total travel time: 35 minutes) -38 minutes to King of Prussia Business Park from Center City Philadelphia (total travel time: 59 minutes) -23 minutes to King of Prussia Business Park from Norristown Transportation Center (total travel time: 21 minutes) -12 minutes to King of Prussia Business Park from 69th Street Transportation Center (total travel time: 41 minutes) -27 minutes to Center City Philadelphia from King of Prussia (total travel time: 48 minutes) (b)				
	Reduces transit travel time by shift to the Project (thousands of annual trip hours)(b) (Section 3.1.3)	0	186	217	182	153	104
	Reduces automobile travel time by shift to the Project (millions of annual trip hours)(b) (Section 3.1.3)	0	1.7	2.0	2.1	1.8	1.7
	Serves defined key destinations (King of Prussia Mall, King of Prussia Business Park and Valley Forge National Historical Park) as well as other destinations (Section 2.2)	Requires bus routes to serve the 3 key destinations	Yes	Yes	Yes	Yes	Yes
S	Increases percent of transit trips in transportation study area (a) (Section 3.1.3)	0	+1.3%	+1.5%	+1.5%	+1.4%	+1.3%
	Changes the number of auto-based trips per day in the DVRPC region in 2040 (Section 3.1.3)	0	-5,614	-6,342	-6,123	-5,343	-5,106

Factors	No Action Alternative	Action Alternatives				
		PECO-1 <sup>st</sup> Ave.	PECO/TP-1 <sup>st</sup> Ave. (recommended LPA) (c)	PECO/TP-N. Gulph	US 202-1 <sup>st</sup> Ave.	US 202-N. Gulph
Changes the number of park-and-ride trips per day in the DVRPC region in 2040 (Section 3.1.3)	0	+2,670	+2,827	+2,831	+1,592	+1,580
Changes the number of walk-to-transit trips per day in the DVRPC region in 2040 (Section 3.1.3)	0	+2,943	+3,514	+3,792	+3,750	+3,526
Increases transit parking capacity in Project study area (Section 2.3)	No	Yes	Yes	Yes	Yes	Yes
Connects to bus and shuttle services, changes to bus and shuttle services are likely (Section 3.1.3)	No	Yes	Yes	Yes	Yes	Yes
S Connects to bicycle and pedestrian network; accommodation at proposed stations (Section 3.3.3)	No	Yes	Yes	Yes	Yes	Yes
S Accesses study area jobs (non-residential square feet (millions) within ½-mile of proposed station areas) (Section 8.2.2)	No change	14.9	15.0	14.2	14.5	13.7
Accesses community facilities (number of facilities within ½ mile of proposed station areas) (Section 4.6.3)	No change	3	7	7	10	10
Accesses parks (number of parks within ½ mile of proposed station areas) (Section 4.6.3)	No change	5	5	4	5	4
S Number of proposed station areas within Upper Merion Township's Mixed Use (KPMU) zoning district (Section 4.2.3)	0	2	2	1	2	1

Notes: Green shading indicates key public concerns; S = key stakeholder issue; (a) DVRPC Tier 3 Forecast, Run Dates 4/3/15 and 6/2/15, rounded to the nearest 500. (b) ELGP, 2015, *Understanding the Impacts of SEPTA's Proposed King of Prussia Rail Project*.

(c) PA Turnpike North/South Option and 9/11 Memorial Avoidance Option would have similar performance to the recommended LPA.

Source: AECOM, 2016.

### 8.2.2.1 No Action Alternative

The No Action Alternative will not improve transit connections to and within the transportation study area. As described in Section 1.4.2, of the six existing bus routes, three serve only the King of Prussia Mall and not the other two key transportation study area destinations (King of Prussia Business Park and Valley Forge National Historical Park). Two of the six routes serve the US Route 202 area and one serves the Henderson Road area. Thus, depending on the bus route, riders must transfer among the bus routes access destinations. One or more transfers from rail to bus, or among bus routes adds travel time and adds inconvenience to transit system use. Rail riders will continue to travel outside the transportation study area to NHSL or Regional Rail line stations; no increase in study area parking capacity for transit users is planned with the No Action Alternative.

The No Action Alternative will not change existing connections between transit, bicycle and pedestrian networks in the transportation study area; the No Action Alternative will not change existing access to transportation study area jobs, community facilities or parks.

### 8.2.2.2 Action Alternatives

Each Action Alternative and recommended LPA design option would improve transit connections to and within the transportation study area. As described in Section 3.1.3.2, each Action Alternative and recommended LPA design option would connect to the three key transportation study area destinations (King of Prussia Mall, King of Prussia Business Park and Valley Forge National Historical Park) as well as other destinations.

Regarding other factors reported in Table 8-2.1, Project stations and park-and-ride facilities in the transportation study area would improve the ability of residents and other travelers to walk to stations or park at a rail transit facility in the transportation study area as opposed to traveling to access rail transit. Each Action Alternative and recommended LPA design option would perform similarly in providing connections to the bicycle and pedestrian network in the transportation study area and for accommodating bicyclists and pedestrians at proposed stations.

Each Action Alternative and recommended LPA design option would provide the same number of stations in Upper Merion Township's KPMU zoning district.

Differences in the performance of the Action Alternatives and the recommended LPA design options are due to the number and location of proposed station areas within one-half mile of



Conceptual rendering of what the recommended LPA could look like at the King of Prussia Mall.

Source: Bergmann Associates, PC, 2016.

jobs, community facilities and parks. For example, as shown in Table 8-2.1, the recommended LPA and the recommended LPA design options would provide access to the most jobs and parks, but the Action Alternatives using US Route 202 (US 202-1<sup>st</sup> Ave. and US 202-N. Gulph) would provide access to the highest number of community facilities. However, the recommended LPA is also a good performer in community facilities access.

Implementing any one of the Action Alternatives or recommended LPA design options would result in changes to existing bus and shuttle services in the transportation study area. As described in Section 3.1.3.2, bus and shuttle service routes and destinations would be modified to eliminate service redundancies with the Project and to complement Project service. For example, bus stops on some routes would be modified to serve proposed Project station areas.

### **8.2.3 The Need to Better Serve Existing Transit Patrons and Accommodate New Patrons**

Despite the limitations of the six existing bus routes and an increasingly congested roadway network, the market for improved transit service as an alternative to travel by personal automobile to, from and within the transportation study area has grown in recent years as described in Section 3.1.3.2. DVRPC's Project ridership and mode shift projections indicate a future market exists for the Project:

- Average weekday ridership: 7,500 to 9,500 increase in ridership on the NHSL by 2040 depending on the Action Alternative (Table 8-2.1);
- Average weekday boardings: 10 to 13 percent increase by 2040 in transportation study area depending on the Action Alternative (Table 3-1.6 and Section 3.1.3.2); and
- Mode shift: 1.3-1.5 percent shift from automobile-based trips to transit by 2040 depending on the Action Alternative (Section 3.1.3.2).

#### **8.2.3.1 No Action Alternative**

The No Action Alternative will not better serve existing transit patrons or accommodate new patrons. Forecasted growth and foreseeable development in the transportation study area through 2040, as described in Sections 1.2.7 and 1.4.3, will place more demands on the transportation system than it can accommodate. Those demands for transit are demonstrated by the DVRPC's study area forecasted transit boardings prepared for the Project (Section 3.1.3.2). Despite the limitations of the six existing bus routes and an increasingly congested roadway network, the market for improved transit service as an alternative to travel by personal automobile to, from and within the transportation study area will continue to grow as described in Section 3.1.3.2. Adding buses to the transit system serving the transportation study area to meet future demand is not a viable solution as it is not possible to overcome the existing roadway congestion problem (Section 2.1.1).

#### **8.2.3.2 Action Alternatives**

Each Action Alternative and recommended LPA design option would better serve existing transit patrons and accommodate new patrons. As described in Sections 8.2.1 and 8.2.2, each Action Alternative and recommended LPA design option would provide direct rail transit service to the

transportation study area and eliminate existing problems associated with traveling by existing bus services. Existing transit patrons would be able to use the Project to travel to the transportation study area without having to transfer to bus. Bus riders would be able to switch to rail travel for a faster, more reliable ride.

Each Action Alternative and recommended LPA design option would also provide additional transit service capacity beyond what SEPTA can accommodate today despite rationalizing bus services. As described in Section 2.7, for example, service from the 69th Street Transportation Center would be every 10 minutes during peak periods and every 20 minutes at all other operating times. This planned service level contrasts with existing bus service that has peak period frequencies of 25-30 minutes (routes 99, 123, 124 and 125) and 60 minutes (routes 92 and 139). More frequent transit service means more transit service capacity than in the existing or 2040 No Action condition.

Regarding growth in average weekday ridership on the NHSL by 2040, the recommended LPA, and the PECO/TP-N. Gulph Action Alternative would have the highest ridership increase (9,500 average weekday trip increase<sup>2</sup>) because of the number and location of proposed stations with park-and-ride facilities in relation to trip-generating land uses. The provision for stations at the King of Prussia Mall, Business Park and particularly the Henderson Road area is responsible for the highest ridership increase among the Action Alternatives. The PECO-1<sup>st</sup> Ave. Action Alternative would have slightly less ridership increase (8,500 trips) because of the single station at the front of the King of Prussia Mall. Despite having the highest number of station areas, Action Alternatives with the lowest increase in ridership are the US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives; this is because the developed commercial US Route 202 corridor does not provide the opportunity for land of sufficient size to accommodate a park-and-ride facility at a proposed station area (Section 2.3).

Regarding average weekday boardings (number of times a person enters a transit vehicle for a trip) with the Project in the transportation study area, the DVRPC model results indicate that the recommended LPA, and the PECO/TP-N. Gulph Action Alternative would generate the highest number of boardings (approximately 5,300). This is the result of the location of proposed stations at King of Prussia Mall, the King of Prussia Business Park and Henderson Road area and because of the provision of park-and-ride facilities in the King of Prussia Business Park and Henderson Road areas. The PECO-1<sup>st</sup> Ave. Action Alternative would generate fewer boardings (approximately 4,900) because of the single King of Prussia Mall station area. The US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives would generate the fewest average weekday boardings (approximately 4,100) because of the absence of a park-and-ride facility at the eastern endpoint of the Action Alternatives and ridership forecasts for the US Route 202 stations that are relatively lower than the ridership forecasts at the Henderson Road station area.

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<sup>2</sup> Ridership, boarding, and mode shift forecasts have not been prepared for the recommended LPA design options. Since the recommended LPA design options involve relocating only a small portion of the guideway, the recommended LPA with either the PA Turnpike North/South Option and/or the 9/11 Memorial Avoidance Option is expected to have similar ridership, boarding, and mode shift forecasts as that forecasted for the recommended LPA. If one or both recommended LPA design options advance along with the recommended LPA, SEPTA will have the forecasts prepared.

Mode shift analysis results indicate that the Project would attract new riders (up to 1.5 percent) that switch from automobile-based travel. Each Action Alternative would reduce auto-based trips and increase the number of trips using park-and-ride facilities and walking to transit stations. Among the alternatives, the recommended LPA would provide the most reduction in automobile-based trips per day (6,342) because of the locations of Project stations. The PECO/TP-N. Gulph Action Alternative and the recommended LPA would provide the most increase in park-and-ride trips (2,831 and 2,827, respectively). The US 202-1st Ave. Action Alternative would provide the most increase in walking trips to transit (3,750) because of the locations of Project stations along the commercial area of US Route 202.

### **8.3 Considering Benefits and Impacts**

In considering the Action Alternatives, the recommended LPA design options and the No Action Alternative, SEPTA is considering potential benefits and impacts of each on the transportation, built and natural environments, which are reported in the DEIS. In addition to considering the technical data developed during the DEIS process, SEPTA's is also considering public, stakeholder and agency input. A summary of public, stakeholder and agency input is provided in this section.

#### **8.3.1 Public Input**

As described in Chapter 7, public engagement has been important to the alternatives development and evaluation process. Study area residents and other members of the public have shown support as well as non-support for the Project. Supporters cite the following benefits of new transit service in their community and to the region: supports existing and future economic growth in terms of access to jobs, shopping, tourism, development and long-term economic well-being; potentially increases property values; provides alternative transportation that is reliable, convenient, senior-friendly, and accessible; increases accessibility to destinations within and outside the King of Prussia/Valley Forge area, particularly Philadelphia; reduces roadway congestion; reduces personal transportation costs; and provides additional parking for transit users.

Non-supporters are concerned about Project costs and funding, emphasizing the need to focus public expenditures on other basic infrastructure improvement priorities. Non-supporters feel the Project would not benefit them; the Project does not reflect the needs of the people who live in the area, it would create negative impacts to residents; and current bus services need to be better used. Other key issues heard from study area residents include:

- Noise and vibration impacts to residential properties
- Residential impacts and property values
- Visual and residential privacy impacts
- Property acquisitions and potential displacements
- Parking at stations and park-and-ride facilities
- Potential for sinkholes
- Safety

- Traffic during construction
- Changes in bus routes

SEPTA considered all public input during alternatives development and the DEIS, and it has worked to address community concerns through alignment and infrastructure refinement to avoid or minimize impacts and provide local benefits. Key issues and concerns expressed by the public are indicated by green shading in Tables 8-2.1 and 8-4.1 as well as in the text by “(P).” As the Project advances, SEPTA will continue to work with the community to address issues related to design to avoid or minimize and mitigate negative impacts to the extent reasonably feasible. For example, SEPTA will further consider the minimization and mitigation strategies identified in the DEIS as ways to reduce or eliminate the potential for property acquisitions, noise and visual impacts.

### **8.3.2 Agency and Stakeholder Input**

As described in Chapter 7, and because of the many challenges to providing new rail transit infrastructure in a developed area, FTA and SEPTA engaged with local officials, regulatory agencies, and certain designated “key” stakeholders during alternatives development and the DEIS. In this study, the key stakeholders are Upper Merion Township; the KOP-BID; Montgomery County; the GVFTMA; the DVRPC; the Pennsylvania Turnpike Commission; PennDOT; Simon Properties, owners of the King of Prussia Mall; PECO; and Norfolk Southern. FTA and SEPTA understand that public, agency, and stakeholder input and support are essential to achieving a Project that balances the need for improved transit service within the King of Prussia/Valley Forge area while addressing as many community concerns and issues as is reasonably feasible.

Through agency and stakeholder participation, SEPTA shared Project information and obtained input and comments that are valuable to the alternatives screening and evaluation process. For example, through its Agency Coordinating Committee, SEPTA received input from the US Army Corps of Engineers and Pennsylvania Historical and Museum Commission that protect Waters of the US and historic properties, respectively, through federal laws and regulations that are applicable to the Project. Input from these and other regulatory entities has helped SEPTA evaluate the potential for the No Action Alternative, the Action Alternatives and the recommended LPA design options to impact parks, air quality, threatened and endangered species, wetlands, waterways, historic properties and archaeological sites. Section 8.4.2 indicates how each Action Alternative and recommended LPA design option performs in regard to potential impacts on these resources.

At the point when SEPTA completed technical analysis of the Action Alternatives, the agency met with a group of “Core” stakeholders to help SEPTA identify the most important factors for determining a recommended LPA for the DEIS. The Core Stakeholders are entities that lead land use planning and transportation decision-making processes in the transportation study area, including Upper Merion Township, the KOP-BID, Montgomery County Planning Commission, the DVRPC, and the GVFTMA. In a series of two work sessions on August 18, 2015 and September 16, 2015, the group considered the technical analysis results for the Action Alternatives, public and stakeholder input regarding the potential benefits and impacts of the alternatives, and other factors the Core Stakeholders group identified during the sessions.

The following list includes the other factors the group determined should be taken into consideration when identifying a recommended LPA:

- Redevelopment/development potential
- Ease of developing and adopting new transit-supportive zoning
- Access to jobs, number of jobs in station areas
- Large employer access
- Private sector potential (contributions)
- Tourism access (VFNHP and King of Prussia Mall)
- Access to pedestrian facilities, trails
- Changing visual character of a corridor/gateway
- Broad acceptance by key stakeholders/political leaders
- Residents' preferences vs. others (non-residents)
- Construction impacts in terms of traffic and access to property
- Possible future extension opportunity
- Number of stations or station potential

With these three categories of information (technical data, public input and other factors), the Core Stakeholders group identified the factors they feel are most important and should guide the decision on a recommended LPA. To arrive at these factors, the group used an interactive process by which each entity in the group selected and prioritized the factors they think are most important for decision-making. Then the results of the entities were combined into a group result with the factors having the most importance to the entire group prioritized. With the combined list in hand, the group then examined the list and determined that it accurately represents what the group feels are the most important factors in determining a recommended LPA (indicated by an "S" code in Section 8-4.2):

- Redevelopment potential and ease of implementing new transit-supportive zoning (number of station areas within KPMU zoning district)
- Access to jobs (number of jobs in station areas)
- Number of full acquisitions – residential
- Potential for visual impacts
- Number of project trips (ridership)
- Capital costs
- O&M costs

On-going agency and stakeholder coordination resulted in additional considerations to help SEPTA distinguish among the alternatives and contribute to selecting the recommended LPA (also indicated by an "S" code in Section 8-4.2):

- Core Stakeholders identified the degree to which an Action Alternative would support economic development and site-specific redevelopment/development potential as being important to realizing future land use and development planning goals.
- Core Stakeholders identified the importance of the Project in providing access to land within the Project study area with relative ease of implementing new transit-supportive zoning.

- Limited support comes from Upper Merion Township Board of Supervisors and the public for the US Route 202 alternatives because of concerns regarding short-term construction impacts to traffic and utilities and long-term visual impacts to US Route 202 as “Main Street.”
- While PECO is willing to consider an alignment along the north side of its right-of-way, the PECO-1<sup>st</sup> Ave. Action Alternative has limited support from Core Stakeholders and the public because of visual impacts on adjacent residences and the direct impact to Kingwood Road Park.
- Core Stakeholders favor the PECO/TP-1<sup>st</sup> Ave. Action Alternative as it 1) best serves the Business Park area, 2) provides two station areas in Upper Merion’s KPMU zoning district, and 3) would be compatible with the multi-modal vision for 1<sup>st</sup> Avenue, which is an entryway to the Business Park.
- Simon Properties and KOP-BID favor an alignment behind the King of Prussia Mall.
- PA Turnpike Commission is willing to consider an alignment along and within its right-of-way.

## 8.4 Comparative Analysis

In this section, the Action Alternatives, the recommended LPA design options and the No Action Alternative are compared with each other using the categories and factors considered in the DEIS: purpose and need (Section 8.2), key public concerns (Section 8.3.1), agency and stakeholder factors including factors governed by federal laws and regulations such as wetlands (Section 8.3.2), and technical factors (this section). Supporting documentation for the findings described in this section are provided in other sections of the DEIS. For example, Chapters 2 and 3 explain how and why the Action Alternatives and recommended LPA design options differ in abilities to provide station areas and park-and-ride facilities, and increase transit ridership, respectively.

Table 8-4.1 summarizes the results of the quantitative and qualitative analyses for each alternative. “P&N” in the code column indicates the factor relates to the Project purpose and need. A “P” in the code column indicates key public concerns; factors coded with an “S” are the most important factors identified by the Core Stakeholders; and factors coded “A” are important factors identified by agencies.

Table 8-4.1 is organized to compare quantities for the recommended LPA design options with the recommended LPA quantities. The quantities for the recommended LPA design options are shown as the differences (greater or less than) compared to the recommended LPA. If there is no difference in quantity compared to the recommended LPA, the code “ND” (no difference) is used.

### Public and Stakeholder Input

The following coding is provided in Table 8-4.1 to indicate public and stakeholder input:

**P:** key public concerns (text)

**S:** most important factors identified by Core Stakeholders

**A:** important factors identified by agencies

The results in this table show that for some factors such as “Reduces peak period transit travel time per trip,” the Action Alternatives and recommended LPA design options would perform similarly, while for others, such as “Number of parks served,” they would perform differently. How well each alternative would perform compared to the others varies from factor to factor. No single alternative would perform best or worst in all categories and factors. For this reason, a closer look at the results is needed to determine which alternative best balances Project benefits and impacts.

#### **8.4.1 No Action Alternative**

As described in Section 8.2, the No Action Alternative will not achieve the Project purpose and need. It is the worst performer in the category “broad acceptance by key stakeholder and political leaders” and generally performs poorly among other factors. The No Action Alternative will not change transit services currently in the transportation study area. As a result, it will not increase transit access to study area jobs, community facilities, or Upper Merion Township’s KPMU zoning district in the King of Prussia Business Park (S). In addition, the No Action Alternative will not support the Core Stakeholders’ preference for rail transit service along 1<sup>st</sup> Avenue or Simon Properties’ and the KOP-BID’s preferences for providing a rail transit station at the King of Prussia Mall (S). While the No Action Alternative supports the Upper Merion Board of Supervisors’ and the public’s preferences to not use US Route 202 as well as supports Core Stakeholders’ and the public’s preference by not using the PECO right-of-way west of the PA Turnpike (S, P), these benefits are outweighed by the negative factors.

The No Action Alternative will not increase transit ridership (S, P) or reduce transit travel time, and it will not increase transit parking capacity in the transportation study area (P). The No Action Alternative will increase annual O&M costs for bus transit services in 2040 to \$13.3 million (S, P).

In regard to other factors, the No Action Alternative will only be partly consistent with local and regional plans and partly support economic development (S, P) because transit service improvements are not part of the No Action Alternative. The No Action Alternative will have low to no visual impacts (S, P) as a result of planned transportation projects, but it will not reduce VMT or benefit air quality (S). The No Action Alternative may have localized noise impacts (S, P) near planned transportation project work areas, and it will not reduce fuel costs incurred by the traveling public or road and pavement costs.

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**Table 8-4.1: Summary of Benefits and Impacts**

Resource	Codes	Factor	No Action Alternative	Benefits and Impacts of Action Alternatives						
				PECO- 1 <sup>st</sup> Ave.	Recommended LPA and its Design Options			PECO/TP-N. Gulph	US 202-1 <sup>st</sup> Ave.	US 202-N. Gulph
					PECO/TP-1 <sup>st</sup> Ave.	PA Turnpike North/South Option	9/11 Memorial Avoidance Option			
Transportation and Safety Effects (Chapter 3)	P&N	<ul style="list-style-type: none"> <li>Serves defined key destinations (King of Prussia Mall, King of Prussia Business Park and Valley Forge National Historical Park) as well as other destinations (Section 3.1.3)</li> </ul>	Requires bus routes to serve the 3 key destinations	Yes	Yes	ND	ND	Yes	Yes	Yes
	P&N, P, S	<ul style="list-style-type: none"> <li>Increases average weekday transit ridership on the NHSL by 2040 (Section 3.1.3)</li> </ul>	0	+8,500	+9,500	ND	ND	+9,500	+7,500	+7,500
	P&N, P, S	<ul style="list-style-type: none"> <li>Average weekday transit boardings at Project stations in 2040 (Section 3.1.3)</li> </ul>	0	4,952	5,297	ND	ND	5,376	4,192	4,106
	P&N	<ul style="list-style-type: none"> <li>Reduces peak period transit travel time per trip (Section 3.1.3)</li> </ul>	0 minutes	-26 minutes to King of Prussia Mall from Center City Philadelphia (total travel time: 53 minutes) -23 minutes to King of Prussia Mall from Norristown Transportation Center (total travel time: 15 minutes) -9 minutes to King of Prussia Mall from 69th Street Transportation Center (total travel time: 35 minutes) -38 minutes to King of Prussia Business Park from Center City Philadelphia (total travel time: 59 minutes) -23 minutes to King of Prussia Business Park from Norristown Transportation Center (total travel time: 21 minutes) -12 minutes to King of Prussia Business Park from 69th Street Transportation Center (total travel time: 41 minutes) -27 minutes to Center City Philadelphia from King of Prussia (total travel time: 48 minutes)						
		<ul style="list-style-type: none"> <li>Uses dedicated guideway in Project study area (travel time reliability factor) (Section 3.1.3)</li> </ul>	No	Yes	Yes	ND	ND	Yes	Yes	Yes
	P&N	<ul style="list-style-type: none"> <li>Reduces transit travel time by shift to the Project (thousands of hours saved annually) (Section 3.1.3)</li> </ul>	0	-186	-217	ND	ND	-182	-153	-104
	P&N	<ul style="list-style-type: none"> <li>Reduces automobile travel time by shift to the Project (millions of hours saved annually) (Section 3.1.3)</li> </ul>	0	-1.7	-2.0	ND	ND	-2.1	-1.8	-1.7
	P&N, P, S	<ul style="list-style-type: none"> <li>Increases percent of transit trips in transportation study area compared to No Action in 2040 (Section 3.1.3)</li> </ul>	0 (2040 No Action transit share is 2.3%)	+1.3%	+1.5%	ND	ND	+1.5%	+1.4%	+1.3%
	P&N	<ul style="list-style-type: none"> <li>Changes the number of auto-based trips per day in DVRPC region in 2040 (Section 3.1.3)</li> </ul>	0	-5,614	-6,342	ND	ND	-6,123	-5,343	-5,106
	P&N	<ul style="list-style-type: none"> <li>Changes the number of park-and-ride trips per day in DVRPC region in 2040 (Section 3.1.3)</li> </ul>	0	+2,670	+2,827	ND	ND	+2,831	+1,592	+1,580
	P&N	<ul style="list-style-type: none"> <li>Changes the number of walk-to-transit trips per day in DVRPC region in 2040 (Section 3.1.3)</li> </ul>	0	+2,943	+3,514	ND	ND	+3,792	+3,750	+3,526
		<ul style="list-style-type: none"> <li>Number of trains per peak hour in transportation study area on 2040 (Section 2.7)</li> </ul>	0	6 - King of Prussia to 69th Street Transportation Center 3 - King of Prussia to Norristown Transportation Center						
		<ul style="list-style-type: none"> <li>Frequency of rail transit service in transportation study area in 2040 (minutes) (Section 3.1.3)</li> </ul>	No rail transit service	10 minutes, peak period 20 minutes, non-peak periods						
P&N, P	<ul style="list-style-type: none"> <li>Increases transit parking capacity in transportation study area (Section 2.3)</li> </ul>	No	Yes	Yes	ND	ND	Yes	Yes	Yes	

Resource	Codes	Factor	No Action Alternative	Benefits and Impacts of Action Alternatives						
				PECO- 1 <sup>ST</sup> Ave.	Recommended LPA and its Design Options			PECO/TP-N. Gulph	US 202-1 <sup>ST</sup> Ave.	US 202-N. Gulph
					PECO/TP-1 <sup>ST</sup> Ave.	PA Turnpike North/South Option	9/11 Memorial Avoidance Option			
	P&N	Connects to bus and shuttle services; changes to bus and shuttle services are likely (Section 3.1.3)	No	Yes	Yes	ND	ND	Yes	Yes	Yes
		Maintains or improves most key roadway intersection levels of service in 2040 with mitigation (Section 3.2.3)	No	Yes	Yes	ND	ND	Yes	Yes	Yes
	P&N	Connects to bicycle and pedestrian network, accommodation at proposed stations (Section 3.3.3)	No	Yes	Yes	ND	ND	Yes	Yes	Yes
		Non-residential property acquisitions could impact parking (Section 3.4.3)	No	Yes	Yes	ND	ND	Yes	Yes	Yes
		Avoids impacts to active freight and heavy rail corridors (Section 3.5.3)	Yes	Yes	Yes	ND	ND	Yes	Yes	Yes
	P	Safety is considered in conceptual design (Section 3.6.3)	Yes	Yes	Yes	ND	ND	Yes	Yes	Yes
Land Use Patterns and Consistency with Plans (Section 4.2)		Consistent with Township and County land use plans (Section 4.2.3)	Partly	Yes	Yes	ND	ND	Yes	Yes	Yes
	P&N, S	Accesses study area jobs (non-residential square feet (millions) within ½ mile of proposed station areas) (Section 8.2.2)	No change	14.9	15.0	ND	ND	14.2	14.5	13.7
	P&N	Accesses community facilities (number of facilities within ½ mile of proposed station areas) (Section 4.4.3)	No change	3	7	ND	ND	7	10	10
		Potential for construction easements to temporarily change land use, access and parking on affected properties (Section 4.2.3)	Yes	Yes	Yes	ND	ND	Yes	Yes	Yes
	P&N, S	Number of proposed station areas within Upper Merion Township's Mixed Use (KPMU) zoning district (Section 4.2.3)	0	2	2	ND	ND	1	2	1
	P	Potential to affect private property values as a result of direct or proximity effects (Section 4.3.3)	Yes	Yes	Yes	ND	ND	Yes	Yes	Yes
		Potential for temporary changes in access to businesses during construction (Section 4.3.3)	Yes	Yes	Yes	ND	ND	Yes	Yes	Yes
Community Cohesion and Facilities (Section 4.4)		Avoids splitting or fragmenting residential or business communities (Section 4.4.3)	Yes	Yes	Yes	ND	ND	Yes	Yes	Yes
		Preserves access across existing transportation and utility rights-of-way (Section 4.4.3)	Yes	Yes	Yes	ND	ND	Yes	Yes	Yes
	P	Number of community facility properties directly impacted (Section 4.4.3)	Unknown	1	3	ND	-1	3	3	3
	P	Number of adjacent community facilities (potential for proximity visual and noise impacts) (Section 4.4.3)	Unknown	1	4	ND	ND	5	5	4

Resource	Codes	Factor	No Action Alternative	Benefits and Impacts of Action Alternatives							
				PECO- 1 <sup>st</sup> Ave.	Recommended LPA and its Design Options				PECO/TP-N. Gulph	US 202-1 <sup>st</sup> Ave.	US 202-N. Gulph
					PECO/TP-1 <sup>st</sup> Ave.	PA Turnpike North/South Option	9/11 Memorial Avoidance Option				
Property Acquisitions and Displacements (Section 4.5)	P	Number of potential partial property (parcel) acquisitions (Section 4.5.3)	Unknown	59 Residential 46 Commercial 15 Other 120 Total	24 Residential 46 Commercial 14 Other 84 Total	-24 Residential ND Commercial -1 Other -25 Total	ND Residential +1 Commercial -1 Other ND Total	24 Residential 30 Commercial 15 Other 69 Total	2 Residential 95 Commercial 7 Other 104 Total	2 Residential 69 Commercial 8 Other 79 Total	
	P, S	Number of potential full property (parcel) acquisitions (Section 4.5.3)	Unknown	4 Residential 4 Commercial 4 Other 12 Total	4 Residential 4 Commercial 3 Other 11 Total	-4 Residential ND Commercial ND Other -4 Total	ND Residential ND Commercial +1 Other +1 Total	4 Residential 4 Commercial 2 Other 10 Total	19 Residential 4 Commercial 2 Other 25 Total	19 Residential 4 Commercial 1 Other 24 Total	
Parks, Recreational Land, and Open Space (Section 4.6) Historic and Archeological Resources (Section 4.7)	S	Potential number of parks directly impacted or crossed (Section 4.6.3)	Unknown	2 impacts - Kingwood Road Park, PECO Easement; 1 crossed: Chester Valley Trail Extension	0 impacts; 1 crossed: Chester Valley Trail Extension	ND	ND	0 impacts; 1 crossed: Chester Valley Trail Extension	0 impacts; 1 crossed: Chester Valley Trail Extension	0 impacts; 1 crossed: Chester Valley Trail Extension	
	P&N	Accesses parks (number of parks within ½ mile of proposed station areas) (Section 4.6.3)	0	5	5	ND	ND	4	5	4	
	S	Potential for proximity effects on parks (number and names of potentially affected parks) (Section 4.6.3)	Unknown	2 - Kingwood Road Park, PECO Easement	1 - Chester Valley Trail Extension	ND	ND	1 - Chester Valley Trail Extension	1 - Chester Valley Trail Extension	1 - Chester Valley Trail Extension	
		Potential number and names of historic property impacts (Section 4.7.3)	Unknown	3 - Philadelphia and Western Railway (NHSL); PA Turnpike: Delaware River Extension; American Baptist Churches, USA Mission Center	3 - Philadelphia and Western Railway (NHSL); PA Turnpike: Delaware River Extension; American Baptist Churches, USA Mission Center	ND	ND	5 - Philadelphia and Western Railway (NHSL); PA Turnpike: Delaware River Extension; PA Turnpike: Philadelphia Extension; GE Space Technology Center; American Baptist Churches, USA Mission Center	3 - Philadelphia and Western Railway (NHSL); PA Turnpike: Delaware River Extension; American Baptist Churches, USA Mission Center	5 - Philadelphia and Western Railway (NHSL); PA Turnpike: Delaware River Extension; PA Turnpike: Philadelphia Extension; GE Space Technology Center; American Baptist Churches, USA Mission Center	
	S	Adverse effects on historic properties as defined by Section 106? (Section 4.7.3)	Unknown	No	No	ND	ND	No	No	No	
		Potential for archaeological sites in the Project study area is low? (Section 4.7.3)	Unknown	Yes	Yes	ND	ND	Yes	Yes	Yes	

Resource	Codes	Factor	No Action Alternative	Benefits and Impacts of Action Alternatives						
				PECO- 1 <sup>st</sup> Ave.	Recommended LPA and its Design Options			PECO/TP-N. Gulph	US 202-1 <sup>st</sup> Ave.	US 202-N. Gulph
					PECO/TP-1 <sup>st</sup> Ave.	PA Turnpike North/South Option	9/11 Memorial Avoidance Option			
	P, S	<ul style="list-style-type: none"> <li>Potential for visual impacts? (Section 4.8.3)</li> </ul>	Yes	Yes	Yes.	Yes, but potential impacts on residences is reduced by alignment shift	Yes, but potential impacts on 9/11 Memorial is reduced by alignment shift	Yes	Yes	Yes
Air Quality (Section 4.9)	S	<ul style="list-style-type: none"> <li>Benefits air quality due to reduced weekday peak vehicle miles traveled in 2040 (Section 4.9.3)</li> </ul>	No	-7,150 (-0.45%)	-6,484 (-0.41%)	ND	ND	-7,298 (-0.46%)	-7,166 (-0.45%)	-7,945 (-0.50%)
Noise and Vibration (Section 4.10)	P, S	<ul style="list-style-type: none"> <li>Potential number of noise impacts (Category 2 = where people sleep such as residences; Category 3 = daytime institutional or office use) (Section 4.10.3)</li> </ul>	Unknown	66 Category 2 3 Category 3	33 Category 2 2 Category 3	-29 Category 2 ND Category 3	ND Category 2 -1 Category 3	32 Category 2 2 Category 3	29 Category 2 3 Category 3	28 Category 2 3 Category 3
	P, S	<ul style="list-style-type: none"> <li>Potential number of vibration impacts (Category 2 = where people sleep such as residences; Category 3 = daytime institutional or office use) (Section 4.10.3)</li> </ul>	Unknown	0 Category 2 1 Category 3	3 Category 2 0 Category 3	-3 Category 2 ND Category 3	ND Category 2 ND Category 3	3 Category 2 0 Category 3	0 Category 2 0 Category 3	0 Category 2 0 Category 3
Natural Resources (Section 4.11)	P	<ul style="list-style-type: none"> <li>Potential risk regarding underlying geologic conditions (Section 4.11.3)</li> </ul>	Yes	Yes – similar to other Action Alternatives	Yes – similar to other Action Alternatives	ND	ND	Yes – similar to other Action Alternatives	Yes – similar to other Action Alternatives	Yes – similar to other Action Alternatives
		<ul style="list-style-type: none"> <li>Amount of potential soil disturbance and change in amount of impervious surfaces (acres) (Section 4.11.3)</li> </ul>	Unknown	12.9	9.8	ND	ND	11.0	3.9	4.9
	S	<ul style="list-style-type: none"> <li>Amount of potential forest disturbance (potential for impact to a State-endangered plant (*)) (Section 4.11.3)</li> </ul>	Unknown	2.9	5.4	-1.1	-1.5	3.7	2.8*	1.1*
		<ul style="list-style-type: none"> <li>Amount of potential field disturbance (acres) (Section 4.11.3)</li> </ul>	Unknown	8.0	3.5	ND	ND	3.5	0.0	0.0
	A	<ul style="list-style-type: none"> <li>Amount of waterways and floodplains potentially affected (acres) (Section 4.11.3)</li> </ul>	Unknown	0	0	ND	ND	0	0	0
	A, S	<ul style="list-style-type: none"> <li>Amount of potential wetlands disturbance (acres) (Section 4.11.3)</li> </ul>	Unknown	0.05	0.05	ND	ND	0.05	0.05	0.05
Contaminated Materials and Hazardous Waste (Section 4.12)		<ul style="list-style-type: none"> <li>Number of areas of contaminated materials concern within the proposed limits of disturbance (Section 4.12.3)</li> </ul>	Unknown	27	25	ND	ND	13	35	23

Resource	Codes	Factor	No Action Alternative	Benefits and Impacts of Action Alternatives						
				PECO- 1 <sup>ST</sup> Ave.	Recommended LPA and its Design Options			PECO/TP-N. Gulph	US 202-1 <sup>ST</sup> Ave.	US 202-N. Gulph
					PECO/TP-1 <sup>ST</sup> Ave.	PA Turnpike North/South Option	9/11 Memorial Avoidance Option			
Utilities and Energy Use (Section 4.13)		Number of potential conflicts with PECO transmission towers (Section 4.13.3)	0	12	8	ND	ND	8	0	0
		Reduces annual automobile vehicle miles traveled (million miles) (Section 4.13.3)	Increase in VMT likely	-16.1	-17.5	ND	ND	-18.4	-16.1	-14.6
		Reduces annual bus vehicle miles traveled (thousands of miles) (Section 4.13.3)	0	-57	-86	ND	ND	-82	-128	-128
		Annual cost savings for motor vehicle fuel (Section 4.13.3)	Increase in cost likely	Similar to recommended LPA	-\$2.6 to -\$3.2 million	ND	ND	Similar to recommended LPA	Similar to recommended LPA	Similar to recommended LPA
		Annual reduction in road and pavement maintenance costs (2015\$) (Section 4.13.3)	Increase in cost likely	Similar to recommended LPA	\$350,000 to \$430,000	ND	ND	Similar to recommended LPA	Similar to recommended LPA	Similar to recommended LPA
Environmental Justice (Section 4.14)		Disproportionately high and adverse effects on environmental justice populations? (Section 4.14.3)	Unknown	No	No	ND	ND	No	No	No
Irreversible and Irretrievable Commitment of Resources (Section 4.15)		Permanent commitment of natural, material and financial resources? (Section 4.15.3)	Yes	Yes	Yes	ND	ND	Yes	Yes	Yes
		Permanent, positive employment, earnings and output effects to King of Prussia (Section 4.15.2)	Unknown	900 to 1,500 new jobs annually 17,000 to 29,000 new employees over 20 years \$79.1 million to \$132.6 million in earnings annually \$1.6 to \$2.7 billion in labor income over 20 years \$540 million to \$946 million to assessed values of real estate over 20 years \$12.8 million to \$22.4 million in new property tax revenues annually						
Draft Section 4(f) Evaluation (Chapter 5)		Number of protected properties potentially permanently used (Section 5.3)	Unknown	5	3	ND	ND	5	3	5
Indirect and Cumulative Impacts (Chapter 6)		Potential for indirect and cumulative effects (Chapter 6)	Yes	<ul style="list-style-type: none"> <li>Enhances and encourages development and redevelopment processes near station areas</li> </ul> Incremental cumulative effects						

Resource	Codes	Factor	No Action Alternative	Benefits and Impacts of Action Alternatives						
				PECO- 1 <sup>st</sup> Ave.	Recommended LPA and its Design Options			PECO/TP-N. Gulph	US 202-1 <sup>st</sup> Ave.	US 202-N. Gulph
					PECO/TP-1 <sup>st</sup> Ave.	PA Turnpike North/South Option	9/11 Memorial Avoidance Option			
Preliminary Cost Estimates (Chapter 8)	P	▪ Preliminary capital cost estimate for Project (\$ billions) (Section 8.6.2)	\$0	\$1.17	\$1.08	ND	ND	\$1.19	\$1.02	\$1.12
	P	▪ Preliminary annual NHSL operations and maintenance cost estimate (\$ millions) (Section 8.6.2)	\$13.3	+\$9.7	+\$9.6	ND	ND	+\$9.7	+\$9.8	+\$9.8
	P	▪ Preliminary annual operations and maintenance cost estimate – net growth (rail and bus) (\$ millions) (Section 8.6.2)	\$0.5	\$5.1	\$4.9	ND	ND	\$4.9	\$4.9	\$5.2
Broad Acceptance by Key Stakeholders and Political Leaders (Chapter 8)	P, S	▪ Supports Upper Merion Supervisors and public preferences to not use US Route 202? (Section 8.4)	Yes	Yes	Yes	ND	ND	Yes	No	No
	P, S	▪ Supports Core Stakeholders and public preferences to not use PECO west of PA Turnpike? (Section 8.4)	Yes	No	Yes	ND	ND	Yes	Yes	Yes
	S	▪ Supports Core Stakeholders preferences to use 1 <sup>st</sup> Avenue? (Section 8.4)	No	Yes	Yes	ND	ND	No	Yes	No
	S	▪ Supports Simon Properties/KOP-BID preference to be aligned behind the King of Prussia Mall? (Section 8.4)	No	No	Yes	ND	ND	Yes	Yes	Yes
	S	▪ PA Turnpike is willing to consider an alignment in their ROW? (Section 8.4)	Not applicable	Yes	Yes	ND	ND	Yes	Yes	Yes

Notes: ND = no difference compared to the recommended LPA; P&N = Factor relates to the Project purpose and need; P = Factor identified as important by the public; S = Factor identified as important by stakeholders; A = Factor identified as important by agencies  
 (a) Source: Economy League of Greater Philadelphia; (b) Values in 2014 dollars; (c) Cost estimates would be developed in the FEIS for the recommended LPA design options if one or both is selected for further study.

### 8.4.2 Action Alternatives

This section presents a summary of performance for Action Alternative and recommended LPA design option. Following the summary is a more detailed description of performance organized by factor.

The performance of the recommended LPA, the other Action Alternatives and the recommended LPA design options varies depending on the specific factor considered. None of the alternatives would perform the best in all factors. Thus, there is a need to look more closely at the data, particularly at those data where the alternatives would perform differently. In addition, there is a need to look at the performance of the alternatives in terms of other considerations that were made during the alternatives evaluation and DEIS process. These other considerations are primarily qualitative and were applied by SEPTA as a complement to the quantitative data. They include the following:

- Safety
- Land Use
- Community Cohesion
- Broad Acceptance by Key Stakeholders and Political Leaders
  - Supports economic development and site-specific redevelopment/development potential
  - Ease of implementing new transit-supportive zoning
  - Preference to not use US Route 202
  - Preference to not use the PECO corridor west of the PA Turnpike
  - Preference to use 1<sup>st</sup> Avenue
  - Preference to be aligned behind the King of Prussia Mall
  - Opinions of transportation facility owners (PA Turnpike Commission, PennDOT, Upper Merion Township, Montgomery County), PECO and Simon Property Group (King of Prussia Mall)

**Summary of findings by Action Alternative** – The performance of each Action Alternative and recommended LPA design option in regard to the categories and factors presented in Table 8-4.1 is summarized below. The Action Alternatives and recommended LPA design options would perform equally well in transportation and safety effects, and land use and economic development, number of potential full commercial property acquisitions, potential impacts to historic properties, air quality and cost. Therefore, these categories and factors are not included in the summaries below.

- **PECO-1<sup>st</sup> Ave. Action Alternative**

Purpose and need: The PECO-1<sup>st</sup> Ave. Action Alternative would perform as well as the recommended LPA in increasing transit parking capacity (P), access to jobs (S) and number of parks served. It would perform less well than the recommended LPA in travel

time savings (186 thousand annual travel hours) and ridership increase (increase of 8,500 average weekday riders on the NHSL) (S, P) because of the relatively long length of the alignment and a combination of proposed station locations in areas that would draw fewer riders. It would be the least well performing among the Action Alternatives in the number of community facilities accessed (3) because fewer community facilities are within station areas compared to other Action Alternatives.

Other factors (natural and built environment): The PECO-1<sup>st</sup> Ave. Action Alternative would perform better than the other Action Alternatives in the least number of community facilities potentially impacted (1) (P) (Section 4.4.3). It would perform less well than the other Action Alternatives in the relatively high number of partial residential (59) (S, P) and parks (2) acquisitions, proximity impacts to parks including parks crossed (1) (S), high visual impacts (S, P), relatively high amount of soil disturbance (12.9 acres), fields impacts (2.9 acres), and number of potential PECO transmission tower conflicts (12). The PECO-1<sup>st</sup> Ave. Action Alternative would have more potential areas of contaminated materials and hazardous materials concern (27) and less energy savings (16 million vehicle miles annually) than other Action Alternatives. Compared with the recommended LPA, the PECO-1<sup>st</sup> Ave. Action Alternative would have fewer impacts on forests (2.9 acres) (S) because less forested area occurs along the proposed alignment. PECO-1<sup>st</sup> Ave. would have no potential to impact the State-endangered plant. However, compared with the recommended LPA, the PECO-1<sup>st</sup> Ave. Action Alternative potentially would impact more properties protected by Section 4(f) (5).

Broad acceptance by key stakeholders and political leaders: The PECO-1<sup>st</sup> Ave. Action Alternative would perform as well as the recommended LPA in redevelopment potential (S) (Section 4.3.3.2) and ease of implementing new zoning (S) as measured by the number of Project stations within the KPMU zoning district (Section 8.4.2), avoiding use of US Route 202 (S, P) and using 1<sup>st</sup> Avenue (S) (Section 8.3.2). It would be the least well performing among the Action Alternatives because it would use the PECO corridor west of the PA Turnpike (S, P) and would be aligned in front of the King of Prussia Mall (S) (Section 8.3.2).

- **PECO/TP-1<sup>st</sup> Ave. Action Alternative (recommended LPA)**

Purpose and need: The recommended LPA would perform better than the other Action Alternatives in the combination of the following factors: travel time savings (217 thousand annual travel hours), ridership increase (increase of 9,500 average weekday riders on the NHSL) (S, P), increase in transit parking capacity (P), access to jobs (15 million square feet) (S) and number of parks served (5) because of the relatively short length of the proposed alignment, a combination of station locations that would capture the highest combination of resident and worker riders among the Action Alternatives, and provision of two park-and-ride facilities (Table 8-4.1). In regard to number of community facilities accessed (7), the recommended LPA would perform better than the PECO-1<sup>st</sup> Ave. Action Alternative, but less well than the US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives because more community facilities are along or near US Route 202 (Section 4.4.3).

Other factors (natural and built environment): As summarized in Table 8-4.1, the recommended LPA would perform better than some Action Alternatives in: the number of partial and full residential acquisitions (24 and 4, respectively) (S, P), least numbers of parks impacted or crossed (0 and 1, respectively) (S), and visual impacts (S, P). It would perform as well as some other Action Alternatives in: community facility impacts (3) (P), air quality benefits (S), potential noise impacts (S, P) wetlands impacts (0.05 acres) (S) and areas of contamination concern (25). Compared with the PECO-1<sup>st</sup> Ave., PECO/TP-N. Gulph and US 202-N. Gulph Action Alternatives, the recommended LPA potentially would impact fewer properties protected by Section 4(f) (3). The recommended LPA would have no impact on the State-endangered plant. The recommended LPA would perform least well among the Action Alternatives in the amount of forest impacts (5.4 acres) (S).

Broad acceptance by key stakeholders and political leaders: The recommended LPA would be a best performer among the Action Alternatives in the combination of the following factors: number of Project stations within the KPMU zoning district (S), avoiding use of US Route 202 (S, P), avoiding use of PECO west of the PA Turnpike (S, P), using 1<sup>st</sup> Avenue (S), and being aligned behind the King of Prussia Mall (S). It would perform the same or better than the other Action Alternatives in each factor in this category.

- **PA Turnpike North/South Option (for recommended LPA)**

Purpose and need: As summarized in Table 8-4.1, the PA Turnpike North/South Option is anticipated to perform similarly to the recommended LPA in the combination of the following factors: travel time savings, and ridership increase (S, P). Similar to the recommended LPA, it would increase transit parking capacity (P), access to jobs (15 million square feet) (S) and number of parks served (5) because of the relatively short length of the proposed alignment, a combination of station locations that would capture the highest combination of resident and worker riders among the Action Alternatives and the 9/11 Memorial Avoidance Option, and provision of two park-and-ride facilities. In regard to number of community facilities accessed (7), the PA Turnpike North/South Option would perform better than the PECO-1<sup>st</sup> Ave. Action Alternative, but less well than the US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives because more community facilities are within US Route 202 station areas.

Other factors (natural and built environment): The PA Turnpike North/South Option is anticipated to perform better than the other Action Alternatives and the 9/11 Memorial Avoidance Option in potentially requiring no full or partial residential acquisitions. It would perform similarly to the recommended LPA in the number of partial and full commercial acquisitions (46 and 4, respectively) (S, P), least number of parks impacted or crossed (0 and 1, respectively) (S), number of potential PECO utility tower conflicts, and potential impacts to properties protected by Section 4(f) (3). The PA Turnpike North/South Option would have less visual impacts compared with the recommended LPA (S, P). It

performs as well as some other Action Alternatives in: community facility impacts (3) (P), air quality benefits (S), potential noise impacts (S, P) and wetlands impacts (0.05 acres) (S). Compared to the recommended LPA, the PA Turnpike North/South Option would potentially impact less forest (4.3 acres) (S). However, it potentially would impact more area of these resources than the PECO-1<sup>st</sup> Ave., US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives (S), and the 9/11 Memorial Avoidance Option. The PA Turnpike North/South Option would have no impact on the State-endangered plant.

Broad acceptance by key stakeholders and political leaders: Also similar to the recommended LPA, the PA Turnpike North/South Option would be a best performer among the Action Alternatives in the combination of the following factors: number of Project stations in the KPMU zoning district (S) because it would be aligned along 1<sup>st</sup> Avenue rather than N. Gulph Road where Upper Merion Township is focusing its land use and planning efforts for future redevelopment, avoiding use of US Route 202 (S, P), avoiding use of PECO west of the PA Turnpike (S, P), using 1<sup>st</sup> Avenue (S), and being aligned behind the King of Prussia Mall (S). It would perform the same or better than the other Action Alternatives in each factor in this category.

- **9/11 Memorial Avoidance Option (for recommended LPA)**

Purpose and need: As summarized in Table 8-4.1, the 9/11 Memorial Avoidance Option is anticipated to perform similarly to the recommended LPA and better than the other Action Alternatives in the combination of the following factors: travel time savings and ridership increase (S, P). Similar to the recommended LPA, it would increase in transit parking capacity (P), access to jobs (15 million square feet) (S) and number of parks served (5) because of the relatively short length of the proposed alignment, a combination of station locations that would capture the highest combination of resident and worker riders among the Action Alternatives, and provision of two park-and-ride facilities. In regard to number of community facilities accessed (7), and similar to the recommended LPA, the 9/11 Memorial Avoidance Option would perform better than the PECO-1<sup>st</sup> Ave. Action Alternative, but less well than the US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives because more community facilities are within US Route 202 station areas (Section 4.4.3).

Other factors (natural and built environment): Similar to the recommended LPA and as summarized in Table 8-4.1, the 9/11 Memorial Avoidance Option would perform better than some Action Alternatives in: the number of partial and full residential acquisitions (24 and 4, respectively) (S, P), least number of parks impacted or crossed (0 and 1, respectively) (S), visual impacts (S, P) and potential number of PECO utility tower conflicts. It performs as well as some other Action Alternatives in: community facility impacts (3) (P), air quality benefits (S), potential noise impacts (S, P) and wetlands impacts (0.05 acres) (S). The 9/11 Memorial Avoidance Option would potentially impact less forest than the

recommended LPA (3.9 acres) and the PA Turnpike North/South Option, but more than the PECO-1<sup>st</sup> Ave., US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives (S). Compared with the recommended LPA, the 9/11 Memorial Avoidance Option potentially would impact the same number of properties protected by Section 4(f) (3). The 9/11 Memorial Avoidance Option would have no impact on the State-endangered plant.

Broad acceptance by key stakeholders and political leaders: Also similar to the recommended LPA, the 9/11 Memorial Avoidance Option would be a better performer among the Action Alternatives in the combination of the following factors: number of Project stations in the KPMU zoning district (S) because it would be aligned along 1<sup>st</sup> Avenue rather than N. Gulph Road where Upper Merion Township is focusing its land use and planning efforts for future redevelopment, avoiding use of US Route 202 (S, P), avoiding use of PECO west of the PA Turnpike (S, P), using 1<sup>st</sup> Avenue (S), and being aligned behind the King of Prussia Mall (S). It would perform the same or better than the other Action Alternatives and the PA Turnpike North/South Option in each factor in this category.

- **PECO/TP-N. Gulph Action Alternative**

Purpose and need: As summarized in Table 8-4.1, The PECO/TP-N. Gulph Action Alternative would perform as well as the recommended LPA in ridership increase (increase of 9,500 average weekday trips on the NHSL) (S, P), increase in transit parking capacity (P) and number of community facilities accessed (7). It would perform less well than the recommended LPA in travel time savings (182 thousand annual travel hours), access to jobs (14.2 million square feet) (S) and number of parks served (4) because the proposed alignment is slightly longer and fewer job-generating uses and parks occur within the PECO and N. Gulph station areas.

Other factors (natural and built environment): The PECO/TP-N. Gulph would perform better than the recommended LPA in the least number of potential partial commercial acquisitions (30) and fewest areas of contaminated materials concern (13). It would perform as well as the recommended LPA in the number of partial residential acquisitions (24) (S, P), number of full residential acquisitions (4) (S, P), number of full park acquisitions (0), visual impacts (S, P), fields impacted (3.5 acres), wetlands affected (0.05 acres) (S) and number of potential PECO tower conflicts (8) (Table 8-4.1). The PECO/TP-N. Gulph Action Alternative would not be a least well performing alternative for any factor or category. Compared with the other Action Alternatives and recommended LPA design options, the PECO/TP-N. Gulph Action Alternative would have more or less impacts on resources than the other Action Alternatives on community facilities (3) (P), partial property acquisitions (S, P), full property acquisitions (S, P), natural resources (S), number of PECO transmission tower conflicts (8), and energy savings in terms of bus miles (82 thousand miles annually) (Table 8-4.1). Compared with the recommended LPA, the PECO/TP-N. Gulph Action Alternative potentially would

impact more properties protected by Section 4(f) (5). The PECO/TP-N. Gulph Action Alternative would have no impact on the State-endangered plant.

Broad acceptance by stakeholders and political leaders: The PECO/TP-N. Gulph Action Alternative would perform as well as the recommended LPA in avoiding use of US Route 202 (S, P), avoiding the PECO corridor west of the PA Turnpike (S, P) and being aligned behind the King of Prussia Mall (S). It would perform less well than the recommended LPA in the number of Project stations within the KPMU zoning district (S) because it would be aligned along N. Gulph Road rather than 1<sup>st</sup> Avenue where Upper Merion Township is focusing its land use and planning efforts for future redevelopment. The PECO/TP-N. Gulph Action Alternative would be the least well performing alternative among the Action Alternatives and recommended LPA design options because it would not use 1<sup>st</sup> Avenue (S).

- **US 202-1<sup>st</sup> Ave. Action Alternative**

Purpose and need: The US 202-1<sup>st</sup> Ave. Action Alternative would perform better than the recommended LPA in access to community facilities (10) because more facilities are located within Project station areas on US Route 202. It would perform as well as the recommended LPA in number of parks served (5). It would perform less well than the recommended LPA and recommended LPA design options in travel time savings (153 thousand annual travel hours), ridership increase (increase of 7,500 average weekday riders on the NHSL) (S, P), increase in transit parking capacity (P) and access to jobs (14.5 million square feet) (S) because despite the relatively higher number of stations, a relatively lower number of jobs are within proposed station areas, and only one park-and-ride facility can be provided.

Other factors (natural and built environment): The US 202-1<sup>st</sup> Ave. Action Alternative would perform better than the recommended LPA in number of potential partial residential property acquisitions (2) (S, P), amount of soil disturbance (3.9 acres), amount of forest and potential threatened and endangered species habitat impacts (2.8 acres) (S), amount of fields affected (0), least number of potential PECO tower conflicts (0) and energy savings in bus VMT (128 thousand miles annually). It would perform as well as the recommended LPA in the number of community facilities impacted (3) (P), number of parks impacted or crossed (0 and 1, respectively), visual impacts (S, P), wetlands impacts (0.05 acres) (S), potential areas of contaminated materials concern (35) and impacts to properties protected by Section 4(f) (3). The US 202-1<sup>st</sup> Ave. Action Alternative would perform least well in potential visual and noise impacts on community facilities (5) (P), number of partial commercial property acquisitions (95), and number of full residential acquisitions (19) (S, P). It would also perform less well than the recommended LPA and recommended LPA design options in reduction in automobile VMT (16.1 million miles annually).

Broad acceptance by key stakeholders and political leaders: The US 202-1<sup>st</sup> Ave. Action Alternative would perform as well as the recommended LPA in the number of Project stations within the KPMU zoning district (S), avoiding the PECO corridor west of the PA Turnpike (S, P), using 1<sup>st</sup> Avenue (S), and being aligned behind the King of Prussia Mall

(S). It would be a least well performing Action Alternative because it would use US Route 202 (S, P).

- **US 202-N. Gulph Action Alternative**

Purpose and need: The US 202-N. Gulph Action Alternative would perform better than the recommended LPA in access to community facilities (10) because more facilities are within Project Station areas along US Route 202. It would perform less well than the recommended LPA and recommended LPA design options in travel time savings (104 thousand travel hours annually), ridership increase (increase of 7,500 average weekday trips on the NHSL) (S, P), increase in transit parking capacity (P), access to jobs (13.7 million square feet) (S) and number of parks served (4) because despite having a high number of station areas, the relatively longer length of the proposed alignment, the ability to provide only one park-and-ride facility and relatively fewer jobs and parks in station areas impact the performance of this alternative.

Other factors (natural and built environment): As The US 202-N. Gulph Action Alternative would be primarily aligned in existing roadways, it would perform better than the recommended LPA in potential partial residential acquisitions (2) (S, P), amount of soil disturbance (4.9 acres), amount of forest and potential threatened and endangered species habitat impacts (1.1 acres) (S), fields affected (0), number of PECO tower conflicts (0) and reduction in bus VMT (128 thousand annual miles). It performs as well as the recommended LPA in community facilities impacts (3) (P), number of parks impacted or crossed (0 and 1, respectively), visual impacts (S, P), wetlands impacts (0.05 acres) (S), and potential areas of contaminated materials concern (23). As land uses along the portions of US Route 202 and N. Gulph Road that would be used by the US 202-N. Gulph Action Alternative are primarily commercial and because the alignment would be longer than that of the recommended LPA, the US 202-N. Gulph Action Alternative would perform less well than the recommended LPA and recommended LPA design options in higher visual and noise impacts on adjacent community facilities (5) (P), a greater number of partial commercial acquisitions (69), and less reduction in automobile VMT (14.6 thousand annual miles). Compared with the recommended LPA, the US 202-N. Gulph Action Alternative potentially would impact more properties protected by Section 4(f) (5).

Broad acceptance by key stakeholders and political leaders: The US 202-N. Gulph Action Alternative would perform as well as the recommended LPA in the number of Project stations in the KPMU zoning district (S), avoiding the PECO corridor west of the PA Turnpike (S, P), and being aligned behind the King of Prussia Mall (S). It would perform less well than the recommended LPA and recommended LPA design options in ease of implementing new zoning (S) because it would not be aligned along 1<sup>st</sup> Avenue. The US 202-N. Gulph Action Alternative would be a least well performing Action Alternative because it would use US Route 202 (S, P) and would not use 1<sup>st</sup> Avenue (P).

**Purpose and need** – While each Action Alternative would provide faster, more reliable public transit service to, from and within the transportation study area, the recommended LPA is the best performer, providing the most transit travel time savings (217,000 travel hours annually)

and close to the highest travel time savings for existing automobile travelers who shift to using the Project (2.0 million hours annually). In 2040 as shown in Table 3-1.9 and described in Section 3.1.3.2, each Action Alternative would reduce travel times:

- The transit travel time savings for trips to the King of Prussia Mall from Center City, Norristown Transportation Center and 69th Street Transit Center in Upper Darby would be approximately 26, 23 and 9 minutes, respectively. Travel times among the Action Alternatives would vary as indicated in Table 3-1.9. For existing transit travelers, the shift to using the recommended LPA would save the most travel time (217,000 hours per year); the next highest annual travel time saver (186,000 hours per year) for transit riders would be the PECO-1<sup>st</sup> Ave. Action Alternative followed by the US 202-1<sup>st</sup> Ave. Action Alternative (156,000 hours annually). The Action Alternative having the lowest annual travel time savings (104,000 hours per year) for transit riders would be the US 202-N. Gulph Action Alternative.
- For existing automobile drivers, the shift to using the recommended LPA or the PECO/TP-N. Gulph Action Alternative would save the most travel time (2.0 or 2.1 million hours annually) for travel to and from the transportation study area. The next highest annual travel time saver (1.8 million hours annually) would be the US 202-1<sup>st</sup> Ave. Action Alternative. The Action Alternatives having the lowest annual travel time savings (1.7 million hours annually) would be the PECO-1<sup>st</sup> Ave. or US 202-N. Gulph Action Alternatives.

The recommended LPA and the PECO/TP-N. Gulph Action Alternative would provide the highest ridership increase (increase of 9,500 average weekday trips on the NHSL and approximately 5,300 boardings in the transportation study area) (S, P). Each would attract higher ridership than the other Action Alternatives because the proposed alignments would enable stations to be placed in areas that draw the most transit riders: Henderson Road, the King of Prussia Mall and the King of Prussia Business Park. Ridership increase would also be higher because two park-and-ride facilities would be provided at the alignment end points, thereby providing the highest increase in transit parking capacity (P) in the transportation study area for residents and others who cannot walk or bike to rail transit stations. This benefit relates to residents and travelers currently having to drive to search for parking at stations along existing rail transit lines where existing facilities are often at capacity.

By comparison, the PECO/1<sup>st</sup> Ave. Action Alternative would attract less ridership increase (increase of 8,500 average weekday trips on the NHSL and 4,952 boardings in the transportation study area), and the US 202 Alternatives would attract the least ridership increase (increase of 7,500 average weekday trips on the NHSL and approximately 4,100 boardings in the transportation study area). In the US 202 Action Alternatives, DVRPC's ridership modeling indicates that fewer riders would be drawn to destinations where stations are proposed along US Route 202 compared with the draw to station areas of the better performing alternatives. Also, the single park-and-ride facility provision in the US 202 Action Alternatives (Section 2.3) contributes to less ridership increase.

DVRPC's 2040 mode shift analysis, discussed in Section 3.1.3.2, complements the ridership increase data. The analysis forecasted changes in the numbers of trips by automobile, by transit

using a park-and-ride facility, and transit trips by walking to a transit station. In this analysis, a trip is defined as travel from one point to another; a trip-end is the end point of a trip (origin or destination). Although each Action Alternative would reduce auto-based trips and increase the number of trips using park-and-rides and walking to transit stations, differences in the rate of mode shift were identified: approximately 1.5 percent for the recommended LPA and the PECO/TP N. Gulph Action Alternative; 1.4 percent for the US 202-1st Ave. Action Alternative; and 1.3 percent for the PECO-1st Ave. and US 202-N. Gulph Action Alternatives. These mode shift rates may seem small, but each Action Alternative would increase the transit mode share by 57 to 65 percent compared to the No Action Alternative, with the recommended LPA and the PECO/TP-N. Gulph Action Alternative having the highest rates of increase.

Each Action Alternative and recommended LPA design option would improve transit connections to bus services and bicycle and pedestrian networks; each would provide the same number of stations in Upper Merion's KPMU zoning district (S). Where alternatives' performance differs, the recommended LPA and the PECO-1<sup>st</sup> Ave. Action Alternative would provide access to the most jobs (S). Alternatives that would use 1<sup>st</sup> Avenue, including the recommended LPA and the recommended LPA design options, also would provide access to the most parks, while the US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives would provide access to the most community facilities.

The recommended LPA, the recommended LPA design options and the PECO-1<sup>st</sup> Ave. Action Alternative would be the best performers compared to the other alternatives in terms of stations located in areas having the highest square footage of non-residential land uses, most access to jobs (S) and highest support for economic development (S). The PECO/TP-N. Gulph and US 202-1<sup>st</sup> Ave. Action Alternatives would be less well performing for access to jobs because less square footage of non-residential land uses occurs in the N. Gulph Road and US 202 station areas. The US 202-N. Gulph Action Alternative is the least well performing Action Alternative for access to jobs because of the relatively low square footage of non-residential uses around proposed station areas.

**Transportation and Safety Effects** – Each Action Alternative and recommended LPA design option would perform similarly in safety planning (P) (Section 3.6.3), maintaining or improving key roadway intersection levels of service with Project mitigation near Project park-and-ride facilities (Section 3.2.3), providing connections to the pedestrian and bicycle network (S), and avoiding impacts to active freight and heavy rail lines (Section 3.5.3).

**Land use and economic development** – Each Action Alternative and recommended LPA design option would perform similarly in consistency with broad land use planning, local and regional plans, and supporting economic development (S) (Sections 4.2.3 and 4.3.3).

**Community Facilities** - Each Action Alternative and recommended LPA design option would perform similarly by avoiding splitting or fragmenting residential or business communities and preserving access across existing transportation and utility rights-of-way (Section 4.4.3). The PECO-1<sup>st</sup> Ave. Action Alternative would have the fewest number of potential direct impacts (one impact) on community facilities compared with the other Action Alternatives (two to three each) (P). The number of adjacent community facilities potentially affected by Project noise and visual change is highest for the US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives (5 each) and

lowest with the PECO-1<sup>st</sup> Ave. Action Alternative (1) (P). The recommended LPA and the recommended LPA design options would potentially have visual and noise impacts on four community facilities.

**Property acquisition and displacements** – As described in Section 4.5.3, the PA Turnpike North/South Option would potentially require no full residential property acquisitions (0), if implemented without the 9/11 Memorial Avoidance Option. The PECO-1<sup>st</sup> Ave. Action Alternative, the recommended LPA, the recommended LPA design options and the PECO/TP-N. Gulph Action Alternative would potentially require four full residential property acquisitions (S, P) because less additional ROW would be needed compared to the ROW needs for the US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives (19 each). Potential full acquisitions of commercial properties are similar among the Action Alternatives and the recommended LPA design options (four each). Only the PECO-1<sup>st</sup> Ave. Action Alternative would have a potential full acquisition of a park (Kingwood Road Park).

The number of potential partial residential property impacts is highest for the PECO-1<sup>st</sup> Ave. Action Alternative (59) and lowest for the US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives (2 each) (P). Partial commercial property acquisitions would be highest for the US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives (95 and 69, respectively) and lowest for the PECO/TP-N. Gulph Action Alternative (30). The PECO-1<sup>st</sup> Ave. Action Alternative would directly impact or cross the most parks (2 and 1, respectively), while the other Action Alternatives including the recommended LPA and the recommended LPA design options would have fewer (1 each).

**Parks, recreational land and open space** – Each Action Alternative and recommended LPA design option, except the PECO-1<sup>st</sup> Ave. Action Alternative, would cross one park property (the Chester Valley Trail Extension) (S) (4.6.3), while the PECO-1<sup>st</sup> Ave. Action Alternative potentially would impact two additional park properties (Kingwood Road Park and PECO Easement).

**Historic and Archaeological Resources** – As described in Section 4.7.3, each Action Alternative and recommended LPA design option would have no adverse impact on historic properties (P). The potential to encounter archaeological sites in the transportation study area is similarly low among each Action Alternative and recommended LPA design option.

**Visual and aesthetic resources** – As described in Section 4.8.3, Action Alternatives and recommended LPA design options other than the PECO-1<sup>st</sup> Ave. Action Alternative, including the recommended LPA, would have potential for visual impacts because of the number of adjacent residential properties and the developed character of the corridor (S, P). The PECO-1<sup>st</sup> Ave. Action Alternative has the potential for visual impacts on more residences (S, P) because it would be aligned adjacent to more residential properties (59) than the other Action Alternatives and would change the open space character of the PECO corridor.

**Air Quality** – Each Action Alternative, including the recommended LPA and the recommended LPA design options, would benefit air quality as a result of reducing annual VMT (S) (Section 4.9.3).

**Noise and Vibration** – Each Action Alternative and recommended LPA design option has the potential to cause noise and vibration impacts in the transportation study area (S, P) (Section 4.10.3). Mitigation to minimize or eliminate potential noise and vibration impacts is warranted.

**Natural resources** – As described in Section 4.11.3, the US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives would have the least amount of soil disturbance (3.9 and 4.9 acres, respectively) because each would use the most amount of already developed roadway corridor. PECO-1<sup>st</sup> Avenue would cause the most soil disturbance (12.9 acres) and most amount of impact on fields (8.0 acres). The recommended LPA and the PA Turnpike North/South Option would potentially have the most forest impacts (5.4 and 4.3 acres each). For this reason, it also would have the potential for the most impacts on threatened and endangered species habitat while the US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives would have the least potential (2.8 and 1.1 acres, respectively) (S). Each Action Alternative and recommended LPA design option would have similar potential impacts to wetlands (0.05 acre). None of the Action Alternatives or recommended LPA design options would directly impact waterways and floodplains as the concept design of the proposed elevated guideway would span these natural features (S).

**Hazardous and Contaminated Materials** - The US 202-1<sup>st</sup> Ave. Action Alternative would have the potential to encounter the highest number of potential areas of contaminated and hazardous materials concerns (35) while the PECO/TP-N. Gulph Action Alternative would have the least potential (13) (Section 4.12.3). The recommended LPA, the recommended LPA design options, the PECO-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives potentially would have fewer potential areas of contaminated materials concern (25, 25, 27 and 23, respectively).

**Utilities** - The US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives would avoid potential conflicts with PECO utility towers. The PECO-1<sup>st</sup> Ave. Action Alternative would have the highest potential for conflicts with PECO towers (12) because more of the alignment is in the PECO corridor than any other alternative (Section 4.13.3). The recommended LPA, the recommended LPA design options and the PECO/TP-N. Gulph Action Alternative would have fewer potential conflicts with PECO towers (8).<sup>3</sup>

**Energy Use** - The recommended LPA, the recommended LPA design options and the PECO/TP-N. Gulph Action Alternative would reduce the most automobile VMT per year (17.5 to 18.4 million miles annually) while the US 202/N. Gulph Action Alternative would reduce the least VMT (14.6 million miles annually) (Section 4.13.3). However, the US 202-1<sup>st</sup> Ave. and US 202-N. Gulph Action Alternatives would reduce the most bus VMT per year (128 thousand miles) compared to the PECO-1<sup>st</sup> Ave. Action Alternative which would reduce the least bus VMT (57 thousand miles). Potential savings in fuel costs for automobile use and road and pavement maintenance costs are similar among the Action Alternatives and recommended LPA design options.

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<sup>3</sup> SEPTA recognizes the likelihood for utilities to be present along transportation corridors the Action Alternatives would use, such as US Route 202, PA Turnpike, 1<sup>st</sup> Avenue and N. Gulph Road. As the Project advances, SEPTA will identify and evaluate potential Project effects on all utilities in coordination with utility owners.

**Broad Acceptance by Key Stakeholders and Political Leaders** – As described in Section 4.3.3.2 and quantified by the factor “number of station areas within Upper Merion Township’s Mixed-Use KPMU zoning district,” each Action Alternative and recommended LPA design option would encourage redevelopment potential (S, P) in the transportation study area. However, 48 percent more re-developable land is within ½ mile of the 1<sup>st</sup> & Moore and 1<sup>st</sup> Avenue East stations (approximately 494 acres) compared to stations on N. Gulph Road (approximately 334 acres). The recommended LPA and its design options, the PECO-1<sup>st</sup> Ave. and US 202-1<sup>st</sup> Ave. Action Alternatives would serve the 1<sup>st</sup> Avenue area with the highest area of redevelopment potential, while the PECO/TP-N. Gulph and US 202-N. Gulph Action Alternatives would serve the N. Gulph Road area which has less redevelopment potential.

Alternatives that would not use N. Gulph Road, including the recommended LPA and the recommended LPA design options, would perform best in providing access to the King of Prussia Business Park, the area that the Township views as potentially being easier to implement new transit-supportive zoning than other areas (S). The 1<sup>st</sup> Avenue area and other areas within the KPMU zoning district will be relatively easier areas for the Township to implement transit-supportive zoning compared to other areas, such as along N. Gulph Road, because of the existing KPMU designation for mixed use development in the Business Park. The KPMU zoning designation of the 1<sup>st</sup> Avenue corridor and the King of Prussia Business Park indicates that these are areas that Upper Merion Township is focusing on for future economic development and redevelopment. The recommended LPA, the recommended LPA design options and other Action Alternatives that would use 1<sup>st</sup> Avenue would support Upper Merion’s goals by providing rail transit access to that portion of the study area having a relatively higher potential for redevelopment and ease of new transit-supportive zoning compared to Action Alternatives that would use N. Gulph Road.

As described in Section 8.3.2, Action Alternatives that would not use US Route 202, including the recommended LPA and the recommended LPA design options, would support stakeholder and public preferences to not use US Route 202 (S, P). Only the PECO-1<sup>st</sup> Ave. Action Alternative does not support stakeholders’ preference to use a corridor other than the PECO corridor west of the PA Turnpike (S, P); the PECO-1<sup>st</sup> Ave. Action Alternative also is the only Action Alternative that does not support stakeholders’ preference to be aligned behind the King of Prussia Mall (S). Action Alternatives that would use 1<sup>st</sup> Avenue, including the recommended LPA and the recommended LPA design options, support stakeholders’ preference to use 1<sup>st</sup> Avenue (S). Each Action Alternative, including the recommended LPA and the recommended LPA design options, would cross or use a portion of the PA Turnpike’s ROW (S).

Upper Merion Township supports SEPTA’s study to provide new rail transit service to the transportation study area as well as SEPTA’s process for planning the Project. The Township’s support is documented by the 2011 Resolution (Appendix B) and is backed by its *2020 Vision Plan* and *2005 Land Use Plan*, which describe a future that includes growth in use of public transportation service as integral to reducing roadway congestion and achieving future economic development benefits for people who live and work in the area. The KOP-BID echoes Upper Merion’s support with a focus on revitalizing the Business Park and other commercial areas in a manner that can be served by rail transit. Montgomery County and DVRPC show support for the Project in their plans: *Montco 2040: A Shared Vision* and *Connections 2040*:

*Plan for Greater Philadelphia*, respectively. Providing new rail transit service also helps to achieve the mission of the GVFTMA in their pursuit of transportation demand management.

## **8.5 Environmentally Preferred Alternative**

The CEQ requires a NEPA document to specify the alternative that is considered to be environmentally preferable (Section 1505.2(b)). CEQ defines an environmentally preferable alternative as the alternative that will cause the least damage to the natural and built environment. Since it is rare in an alternatives evaluation that one alternative will exhibit only benefits and no impacts, identifying an environmentally preferable alternative typically involves considering the trade-offs between benefits and impacts.

In this DEIS, the alternatives evaluation considered how responsive each alternative is to the Project purpose and need, as well as what benefits and impacts each alternative potentially would have on the natural and built environment. Input from the public, agencies and stakeholders provided considerable insight into this evaluation process. Earlier sections of this chapter summarize the results of the alternatives evaluation.

### **8.5.1 No Action Alternative**

Looking first at the purpose and need analysis in Section 8.2, evaluation of the Action and No Action Alternatives determined that each Action Alternative achieves the purpose and need, but the No Action Alternative will not be effective. As a result, the No Action Alternative will not be a reasonable course of action to address the transit deficiencies in the transportation study area. Without a new transit investment, transportation problems in the study area will worsen by 2040 with lengthening travel times, growth in VMT, on-going connectivity limitations with regard to job and destination access, and continued reliance on the automobile by most travelers. The No Action Alternative will negatively impact economic development potential over time by only supporting the traditional automobile components of Township and County comprehensive and land use plans. The No Action Alternative will not support the foreseeable future-oriented plan components that encourage transit-supportive zoning and redevelopment that requires multi-modal investment.

As described in Section 8.6.2, a comparatively large annual operations and maintenance costs for bus and rail transit services (\$13.3 million) will occur in the No Action Alternative without any improvement in transit service to and within the transportation study area. In addition, growth in VMT, roadway congestion and travel delays will result in no air quality benefit for people living and working in the transportation study area.

### **8.5.2 Action Alternatives**

As described in Section 8.2 and shown in Table 8-4.1, each Action Alternative and recommended LPA design option would achieve the Project purpose and need, with some differences in degree of effectiveness. Each Action Alternative and recommended LPA design option would have potential beneficial as well as negative effects on the natural and built environment. Selection of an environmentally preferable alternative involves considering the trade-offs between benefits and impacts. Because of the varying levels of benefits and impacts among the Action Alternatives and recommended LPA design options described in this chapter,

FTA and SEPTA considered the input received from the public, agencies and stakeholders as a means of determining the factors that are most important for decision-making (Sections 8.3.1 and 8.3.2). The following summarizes the key DEIS findings that support identification of an environmentally preferred alternative:

- Purpose and need: Among the Action Alternatives, the recommended LPA would best achieve the Project purpose and need, performing better than or equal to the other Action Alternatives in all factors that are most important to the public and stakeholders: travel time savings, ridership increase, increase in transit parking capacity, station areas in the KPMU zoning district, and access to jobs, community facilities and parks. The other Action Alternatives would perform less well in regard to some of these most important factors.
- Other factors (natural and built environment): The recommended LPA and the recommended LPA design options would perform better than some Action Alternatives in having the least number of partial and full residential acquisitions, least park impacts, and least visual impacts. Each would perform as well as some other Action Alternatives in: safety, supporting economic development, community facility impacts, historic and archaeological resources impacts, air quality benefits, potential noise impacts and wetlands impacts. The recommended LPA and the recommended LPA design options would perform least well among the Action Alternatives in potentially having the most forest and threatened and endangered species habitat impacts. By comparison, the PECO/TP-N. Gulph Action Alternative would perform similarly to the recommended LPA and the recommended LPA design options in the most important natural and built environment factors. The other Action Alternatives would perform less well than the recommended LPA and the recommended LPA design options in more than one most important factor, such as requiring more partial or full property acquisitions.
- Broad acceptance by key stakeholders and political leaders: Likewise, the recommended LPA and the recommended LPA design options would be the best performers in achieving each of the most important factors in this category: number of Project stations within the KPMU zoning district, cost, avoiding US Route 202, using 1<sup>st</sup> Avenue, avoiding PECO west of the PA Turnpike, and being aligned behind the King of Prussia Mall. The other Action Alternatives would perform less well in regard to some of these most important factors.

Upon consideration of the trade-offs in benefits and impacts among the Action Alternatives and recommended LPA design options, FTA and SEPTA identified the recommended LPA as the environmentally preferable alternative for the Project. It best achieves the purpose and need by performing as well as or better than the other Action Alternatives in each factor. Likewise, it would best achieve the most important factors for broad acceptance by key stakeholders and political leaders. The recommended LPA also would perform as well as or better than the other Action Alternatives in each of the most important natural and built environment factors, except forest and potential threatened and endangered species habitat impacts. Minimization or elimination of these potential impacts will be considered in subsequent engineering and design efforts as well as on-going coordination with the respective agencies.

One or both recommended LPA design options could be applied to the recommended LPA to reduce some of the impacts. For example, the PA Turnpike North/South Option would reduce full residential property acquisitions, eliminate partial residential property acquisitions, and reduce visual impacts on residences. The 9/11 Memorial Avoidance Option would reduce visual impacts on the 9/11 Memorial.



Conceptual rendering of what the recommended LPA could look like along 1<sup>st</sup> Avenue.

Source: Bergmann Associates, PC, 2016.

FTA and SEPTA recognize that public concerns remain and the recommended LPA has the potential for negative impacts as described in this DEIS: visual and noise impacts, property acquisitions and displacements, and natural resources impacts including forest and potential threatened and endangered species habitat impacts. The estimates of potential impacts in the DEIS are preliminary and based on the conceptual level of design undertaken by SEPTA to date. As the Project design advances, SEPTA is committed to refining the design of the locally preferred alternative with the goal of avoiding or minimizing impacts. This process will be undertaken in coordination with agencies, stakeholders and the public, and will include developing mitigation as warranted and reasonably feasible.

## 8.6 Next Steps

### 8.6.1 DEIS and Public Comment Period

The DEIS will be distributed to appropriate local, regional, state, and federal agencies as well as to the general public for a minimum 45-day review and comment period. Public comment on the DEIS will be considered and addressed in the combined FEIS/ROD. A public hearing will be held during the 45-day review period as well. Key agencies, stakeholders and the public have been and will continue to be involved in the Project throughout design and construction through public and agency meetings, and other coordination methods.

### 8.6.2 Preliminary Project Costs and Funding

#### 8.6.2.1 Preliminary Project Costs

Although costs were not used in the comparative assessment of the Action Alternatives, SEPTA developed preliminary capital costs as well as operations and maintenance costs (O&M) for each Action Alternative<sup>4</sup> (Table 8-6.1). FTA standard methods of cost estimating were used,

<sup>4</sup> Cost estimates have not been prepared for the recommended LPA design options. If one or both recommended LPA design options advance along with the recommended LPA, SEPTA will have cost estimates prepared.

including cost categories, a 30 percent contingency, and cost for additional vehicles. The Action Alternatives are preliminarily estimated to cost \$1.0 to \$1.2 billion (2015 dollars) depending on the alternative. The estimates assume existing state of the art construction technology would be used as well as other standard procurement, productivity and construction conditions, such as typical Montgomery County weather conditions. A three percent future annual escalation was assumed.

For the purposes of the O&M estimates in Table 8-6.1, year 2014 dollars were used, escalating from actual SEPTA 2012 operating costs for rail and bus. These estimates factored in total rail and bus costs because SEPTA expects changes to bus services in the transportation study area with the Project in operation. Bus service changes are expected to reduce SEPTA's total future bus operating costs. Specifically, SEPTA's total rail O&M cost would increase by approximately \$10 million for each Action Alternative, but total annual bus O&M cost savings would be reduced to approximately \$5 million. This change would result in an overall annual net O&M cost increase for SEPTA to operate bus and rail services with the Project of approximately \$5 million. More detail on this O&M cost analysis can be found in the 2015 *Operating & Maintenance Cost Model Results for KOP Rail*, prepared by LTK Engineering Services.

**Table 8-6.1: Preliminary Capital and O&M Costs**

Categories and Factors		No Action Alternative	Action Alternatives				
			PECO-1 <sup>st</sup> Ave.	PECO/TP-1 <sup>st</sup> Ave. (recommended LPA)	PECO/TP-N. Gulph	US 202-1 <sup>st</sup> Ave.	US 202-N. Gulph
S	Preliminary Capital Cost for Project (\$ billions) (a)	\$0	\$1.17	\$1.08	\$1.19	\$1.02	\$1.12
S	Preliminary Annual NHSL O&M Cost (\$ millions) (b)	\$13.3	+\$9.7	+\$9.6	+\$9.7	+\$9.8	+\$9.8
S	Preliminary Annual O&M Net Growth (rail and bus) (\$ millions) (b)	\$0.5	\$5.1	\$4.9	\$4.9	\$4.9	\$5.2

Notes: Green shading indicates key public concerns; S = key stakeholder issue; un = unknown; (a) source: Economy League of Greater Philadelphia; (b) Values in 2014 dollars.

Source: LTK, 2016, Operating and Maintenance Cost Model Results.

### 8.6.2.2 Project Funding

#### **SEPTA'S CAPITAL PROGRAM FUNDING**

SEPTA is the nation's sixth-largest public transit agency and the primary public transit provider in the greater Philadelphia region. SEPTA was created by the Pennsylvania state legislature in 1964 and is an instrumentality of the Commonwealth of Pennsylvania. SEPTA's multimodal network serves a 2,200 square-mile region with a population exceeding four million people.

SEPTA's FY2017 capital budget is approximately \$550 million with a total twelve-year program of \$7.3 billion. The funding comes 60% from the Commonwealth of Pennsylvania, 38% through federal grants, and 2% through local contributions. Funds are allocated to projects that will advance strategic objectives, bring assets to a state of good repair, meet SEPTA's financial obligations, and implement system improvements to enhance transit service.

Pennsylvania's Act 89 of 2013 provided a comprehensive transportation funding solution for the Commonwealth of Pennsylvania. The funding is indexed to inflation and has no legislative expiration. New revenues for transportation were generated through uncapping the Oil Company Franchise Tax (OCFT), adjusting various fees for inflation, and surcharges on traffic tickets. The Fixing America's Surface Transportation (FAST) Act, the existing five-year federal transportation funding authorization, has also provided greater confidence about levels of federal funding. This long-term, dedicated funding source is allowing SEPTA to address its state-of-good-repair backlog through the "Rebuilding for the Future" initiative.

### **CAPITAL FUNDING STRATEGY**

Building large-scale transit projects typically requires transit agencies to combine multiple funding types (e.g. grants and loans) and sources (federal, state, regional, local and/or private), and it appears likely that this Project will require the same. SEPTA is planning to pursue Project funding through the FTA's Capital Investment Grant program (also known as "New Starts") and will consider other federal support as available. The remainder of Project funding must come from non-federal sources—state, regional, local and other sources.

### **FEDERAL FUNDING SOURCES**

SEPTA will apply to FTA's "New Starts program", which is a discretionary, multi-year program authorized by the U.S. Congress to fund major transit capital investments. Applicants must complete a series of steps working with FTA and meet certain eligibility requirements. Projects are then rated and competitively recommended for funding. Successful applicants can expect to receive approximately half of the project cost through this program.

The U.S. Department of Transportation also offers other, smaller grant programs which may serve to fund smaller aspects of the project, and financing tools which can be used to leverage state, regional and local sources of funding.

### **STATE, REGIONAL AND LOCAL FUNDING SOURCES**

State, regional and local partners have been fundamentally important to the Project planning process and they will be essential in helping SEPTA develop a funding plan. SEPTA regularly works with the State and five Southeastern Pennsylvania counties during its annual Capital and Operating budget processes; together, they have a long history of working to meet the Region's transportation needs.

The remaining Project cost that would not be covered by FTA's New Starts grant will require a combination of State, regional and local funding sources. Looking forward and in advance of developing the Project's required twenty-year financial plan over the next few years, SEPTA will

continue to work with area stakeholders on defining a set of funding sources. SEPTA expects to discuss traditional methods of funding new transportation projects, more directed user fees, land value capture, as well as right-of-way contributions.

### **PRIVATE FUNDING SOURCES**

Attracting private sources of funding from commercial entities that benefit from the Project will be an important aspect of funding. Transportation investments can have benefits to commercial property in and around proposed station areas; SEPTA expects to pursue contributions in and around Project station areas.

### **LOOKING AHEAD**

A number of milestones must be met by SEPTA and its partners to move the Project forward and comply with the “New Starts” program. During the Project Development phase of “New Starts,” a two-year process which will run concurrently with the FEIS/ROD, SEPTA and its partners will develop a twenty-year financial plan that will document the commitment of 30% of the non-“New Starts” funds. The financial plan and commitment of funds are a necessary milestone for entrance into the “New Starts” Engineering phase. To leave the Engineering phase and receive a Full Funding Grant Agreement, FTA's commitment to provide multi-year Federal funds, SEPTA will need to update the twenty-year financial plan and show the commitment of all the non-“New Starts” funds.