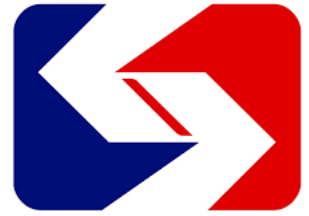


NORRISTOWN HIGH SPEED LINE - KING OF PRUSSIA EXTENSION



INDEPENDENT COST ESTIMATE REPORT



Prepared By:



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SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY

**NORRISTOWN HIGH SPEED LINE
KING OF PRUSSIA EXTENSION**

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INTRODUCTION

SEPTA is planning to construct a line extension on the Norristown High Speed Line. The extension will originate between the Hughes Park & DeKalb Street Stations and the line will continue through the King of Prussia Mall, ending at First Ave. at the Valley Forge casino. The designer of the project, HNTB Corporation, has prepared an estimate of the construction cost of the project. SEPTA has contracted with Michael Baker International, Philadelphia, to support the project management efforts. This includes the review of the 15% design and creation of an independent cost estimate. Michael Baker International, in conjunction with Pennoni Associates and KCI Associates, has prepared an independent cost estimate in support of the SEPTA KOP document submission.

MBI, Pennoni, & KCI have been provided with the following documents to conduct the estimate review:

- 15% Design Submission drawings dated 09/30/2019 prepared by HNTB Corporation
- AECOM/HNTB Corporation KOP Project Cost Estimate
- SEPTA Real Estate Department Support

MBI, Pennoni, & KCI have used the following steps/methodology to provide the estimate:

- Review the 15% design drawings and related documents to develop an understanding of the scope of the project.
- Develop a list of project elements that should be included in the estimate.
- Review the estimate to be sure that all elements on the drawings have been included in the estimate.
- Provide a review to determine major cost elements or specific items that have a significant impact on the total estimate cost.
- Check the quantities and pricing for major cost elements and comment on their contribution to the overall estimate.
- Identify the existing estimate against the construction period for accurate escalation to the construction midpoint.
- Assemble the construction elements in the FTA estimating categories to be used in the FTA document evaluation.
- Based on the above steps, the team will provide an independent total estimated cost as an independent assessment of the project for use in the advancement of the project through the 15% design phase.

The estimate is based on the following assumptions:

- Construction on the project will start in 2023 and end in 2026
- Reconfiguration of ten PECO transmission towers

- The prices for the various line items were based on:
 - Recent SEPTA projects
 - Recent projects in PA
 - Recent rail projects of similar sizes
 - Quotes from SEPTA Departments
 - Real Estate
 - Vehicles
 - RS Means Quotes
 - A combination of the above

The following items are not included in the estimate:

- Hazardous material (No Hazardous Material is indicated)
- Operation and maintenance costs
- Inspections provided by the owner

Michael Baker International (MBI) has no control over the cost of labor, materials, equipment, market escalation or deflation, contractors' or subcontractors' methods of determining prices, competitive bidding or market conditions. Its opinions of probable construction cost contained herein are made based on MBI's qualifications and experience. These opinions represent its best judgments made on the basis of familiarity with the construction industry and experience as professional construction consultants. However, MBI cannot and does not guarantee that bids, proposals, or construction cost will not vary from estimated costs.

EXECUTIVE SUMMARY

After a review of the 15% design drawings and additional follow-up notes from SEPTA, the MBI, Pennoni, & KCI team recommends that the Estimated Construction Cost be approximately \$2.08 billion as shown in the attached Independent Cost Estimate summary table. The overall project was broken down into 20 sections to provide more granular estimates, which were then summed up into the summary table. As a result, the "unit costs" are weighted averages from across all sections. It should be noted that since the project is only in the 15% design phase, significant allocated contingencies were provided for each line item as well as an overall unallocated contingency of 20%.

MAJOR COST ELEMENTS REVIEW

The following elements of the estimate have a significant impact on the overall estimate cost. The estimates are based on historical data, recent relevant projects, quotes, and general experience from industry experts. Below is a breakdown and brief description of the most significant costs.

1. Trackwork

- a. The quantities for the new track were based on the 15% design drawings and include direct fixation and ballasted track. Most of the track runs on elevated track and the aerial structures comprise most of the costs for guideway and track elements, coming in at about \$296 million.
- b. Approximately \$80 million will be needed for the cut and fill section of the tracks through the PECO right-of-way. This includes the excavation, secant walls, t-walls, soil removal, guideway, and bracings. There is approximately 1375 RTF of cut and secant walls and 325 RTF of fill and T-walls.

2. Real Estate

- a. SEPTA's Real Estate department reviewed the project and estimated that all real estate costs (including legal, permitting, and contingencies) will be about \$120 million.

3. Temporary Facilities and Indirect Costs

- a. All cost estimates for bonds, mobilization/demobilization, temporary fencing, submittals, shop drawings, access road, staging, and all other temporary structures and all indirect costs will total about \$100 million for the project.

4. Stations

- a. The five stations will vary in size and complexity, but the line-item estimate for each station includes everything in the station except for the tracks and track-support structures, which were included in the "Guideway: Aerial Structures" line. The average cost per station is approximately \$19.4 million each (including allocated contingency), with the station at First and Moore being the most expensive.

5. Parking Garages

- a. The basis for the estimate for parking garages were from recent SETPA projects, including the recent, similarly-sized Conshohocken Garage estimate. While the different projects vary in size, the suggested estimate for a multi-story garage is about \$48,000 per space (including allocated contingency).
- b. The original plan called for a single 500-space multi-story parking garage at the First and Moore Station. However, during follow-up meetings, SEPTA requested that the estimate account for a second 500-space multi-story parking garage at Henderson Road Station.

6. Contingency

- a. Normally, a 20-25% design contingency would be appropriate for a 15% design; however, due to the complexity and scale of the project, separate allocated and unallocated contingencies were added to the estimate. The individual allocated contingencies were applied to each line item. The range for these allocated contingencies was between 20% to 35%, and the weighted average allocated contingency was 24.8%. On top of this, the 20% unallocated design contingency was applied, adding on an additional \$282 million to the project.

7. Escalation

- a. Since construction is not estimated to start until 2023, the cost estimate, in 2019 dollars, was escalated until the construction mid-point, 2025. The estimated inflation for the 6-year period from 2019 to 2025 is 3.5% per year.

INDEPENDENT COST ESTIMATE

MAIN WORKSHEET - BUILD ALTERNATIVE

(Rev.21, June, 2019)

SEPTA
Norristown High Speed Line - King of Prussia Extension
15% Design

Today's Date **9/16/20**
Yr of Base Year \$ 2019
Yr of Revenue Ops 2026

	Quantity	Units	Unit Cost (Weighted Average)	Allocated Contingency	Unit Cost + All. Contingency	Total Cost (000)	Total Cost with All. Contingency (000)
10 GUIDEWAY & TRACK ELEMENTS (route miles)						\$328,447	\$423,131
10.01 Guideway: At-grade exclusive right-of-way	0		\$ -	0.0%	\$ -	\$0	\$0
10.02 Guideway: At-grade semi-exclusive (allows cross-traffic)	0		\$ -	0.0%	\$ -	\$0	\$0
10.03 Guideway: At-grade in mixed traffic	0		\$ -	0.0%	\$ -	\$0	\$0
10.04 Guideway: Aerial structure	14912		\$ 15,272.75	30.0%	\$ 19,855	\$227,747	\$296,071
10.05 Guideway: Built-up fill	57802		\$ 25.00	30.0%	\$ 33	\$1,445	\$1,879
10.06 Guideway: Underground cut & cover	0		\$ -	0.0%	\$ -	\$0	\$0
10.07 Guideway: Underground tunnel	0		\$ -	0.0%	\$ -	\$0	\$0
10.08 Guideway: Retained cut or fill	6088		\$ 9,989.43	30.0%	\$ 12,985	\$60,816	\$79,054
10.09 Track: Direct fixation	31172		\$ 700.00	20.0%	\$ 840	\$21,820	\$26,184
10.10 Track: Embedded	0		\$ -	0.0%	\$ -	\$0	\$0
10.11 Track: Ballasted	18588		\$ 511.49	20.0%	\$ 614	\$9,508	\$11,409
10.12 Track: Special (switches, turnouts)	16		\$ 444,468.94	20.0%	\$ 533,363	\$7,112	\$8,534
10.13 Track: Vibration and noise dampening	0		\$ -	0.0%	\$ -	\$0	\$0
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)						\$135,786	\$163,700
20.01 At-grade station, stop, shelter, mall, terminal, platform	1		\$ 7,456,567.00	25.0%	\$ 9,320,709	\$7,457	\$9,321
20.02 Aerial station, stop, shelter, mall, terminal, platform	5		\$ 16,129,953.20	20.0%	\$ 19,355,944	\$80,650	\$96,780
20.03 Underground station, stop, shelter, mall, terminal, platform	0		\$ -	0.0%	\$ -	\$0	\$0
20.04 Other stations, landings, terminals: Intermodal, ferry, trolley, etc.	0		\$ -	0.0%	\$ -	\$0	\$0
20.05 Joint development	0		\$ -	0.0%	\$ -	\$0	\$0
20.06 Automobile parking multi-story structure	1000		\$ 40,000.00	20.0%	\$ 48,000	\$40,000	\$48,000
20.07 Elevators, escalators	12		\$ 640,000.00	25.0%	\$ 800,000	\$7,680	\$9,600
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS						\$32,000	\$40,000
30.01 Administration Building: Office, sales, storage, revenue counting	0		\$ -	0.0%	\$ -	\$0	\$0
30.02 Light Maintenance Facility	0		\$ -	0.0%	\$ -	\$0	\$0
30.03 Heavy Maintenance Facility	0		\$ -	0.0%	\$ -	\$0	\$0
30.04 Storage or Maintenance of Way Building	1		\$ 32,000,000.00	25.0%	\$ 40,000,000	\$32,000	\$40,000
30.05 Yard and Yard Track	0		\$ -	0.0%	\$ -	\$0	\$0
40 SITEWORK & SPECIAL CONDITIONS						\$152,796	\$193,424
40.01 Demolition, Clearing, Earthwork	7		\$ 1,625,228.00	20.0%	\$ 1,950,274	\$11,377	\$13,652
40.02 Site Utilities, Utility Relocation	16		\$ 1,756,250.00	35.0%	\$ 2,370,938	\$28,100	\$37,935
40.03 Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	7		\$ 471,714.29	20.0%	\$ 566,057	\$3,302	\$3,962
40.04 Environmental mitigation, e.g. wetlands, historic/archeologic, parks	7		\$ 357,428.57	20.0%	\$ 428,914	\$2,502	\$3,002
40.05 Site structures including retaining walls, sound walls	29560		\$ 98.83	30.0%	\$ 128	\$2,921	\$3,798
40.06 Pedestrian / bike access and accommodation, landscaping	19796		\$ 160.30	20.0%	\$ 192	\$3,173	\$3,808
40.07 Automobile, bus, van accessways including roads, parking lots	13		\$ 1,726,346.15	20.0%	\$ 2,071,615	\$22,443	\$26,931
40.08 Temporary Facilities and other indirect costs during construction	20		\$ 3,948,895.96	27.0%	\$ 5,016,796	\$78,978	\$100,336
50 SYSTEMS						\$96,832	\$116,199
50.01 Train control and signals	6		\$ 5,041,666.67	20.0%	\$ 6,050,000	\$30,250	\$36,300
50.02 Traffic signals and crossing protection	0		\$ -	0.0%	\$ -	\$0	\$0

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	Quantity	Units	Unit Cost (Weighted Average)	Allocated Contingency	Unit Cost + All. Contingency	Total Cost (000)	Total Cost with All. Contingency (000)
50.03 Traction power supply: substations	3		\$ 7,500,000.00	20.0%	\$ 9,000,000	\$22,500	\$27,000
50.04 Traction power distribution: catenary and third rail	42675		\$ 350.00	20.0%	\$ 420	\$14,936	\$17,924
50.05 Communications	68007		\$ 285.21	20.0%	\$ 342	\$19,396	\$23,275
50.06 Fare collection system and equipment	6		\$ 1,375,000.00	20.0%	\$ 1,650,000	\$8,250	\$9,900
50.07 Central Control	1		\$ 1,500,000.00	20.0%	\$ 1,800,000	\$1,500	\$1,800
Construction Subtotal (10 - 50)						\$745,862	\$936,455
60 ROW, LAND, EXISTING IMPROVEMENTS						\$120,000	\$120,000
60.01 Purchase or lease of real estate	1		\$ 120,000,000.00	0.0%	\$ 120,000,000	\$120,000	\$120,000
60.02 Relocation of existing households and businesses	0		\$ -	0.0%	\$ -	\$0	\$0
70 VEHICLES (number)						\$36,000	\$42,000
70.01 Light Rail	6		\$ 6,000,000.00	16.7%	\$ 7,000,000.00	\$36,000	\$42,000
70.02 Heavy Rail					\$ -	\$0	\$0
70.03 Commuter Rail					\$ -	\$0	\$0
70.04 Bus					\$ -	\$0	\$0
70.05 Other					\$ -	\$0	\$0
70.06 Non-revenue vehicles					\$ -	\$0	\$0
70.07 Spare parts					\$ -	\$0	\$0
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)				33.5%		\$249,864	\$313,712
80.01 Project Development				3.0%		\$22,376	\$28,094
80.02 Engineering				10.0%		\$74,586	\$93,645
80.03 Project Management for Design and Construction				2.5%		\$18,647	\$23,411
80.04 Construction Administration & Management				10.0%		\$74,586	\$93,645
80.05 Professional Liability and other Non-Construction Insurance				3.5%		\$26,105	\$32,776
80.06 Legal; Permits; Review Fees by other agencies, cities, etc.				2.0%		\$14,917	\$18,729
80.07 Surveys, Testing, Investigation, Inspection				1.5%		\$11,188	\$14,047
80.08 Start up				1.0%		\$7,459	\$9,365
Subtotal (10 - 80)						\$1,151,725	\$1,412,167
90 UNALLOCATED CONTINGENCY				20.0%		\$230,345	\$282,433
Subtotal (10 - 90)						\$1,382,070	\$1,694,600
100 FINANCE CHARGES					\$ -	\$0	\$0
Total Project Cost (10 - 100)						\$1,382,070	\$1,694,600
Allocated Contingency as % of Base Yr Dollars w/o Contingency				22.61%			
Unallocated Contingency as % of Base Yr Dollars w/o Contingency				24.52%			
Total Contingency as % of Base Yr Dollars w/o Contingency				47.14%			
Unallocated Contingency as % of Subtotal (10 - 80)				20.00%			
Escalation from 2019 to 2025 (Construction Mid-Point)				3.50%		\$316,846.98	\$388,496.12
Total Project Cost with Estimate						\$1,698,917	\$2,083,096