

# Enhanced Bus Service Analysis

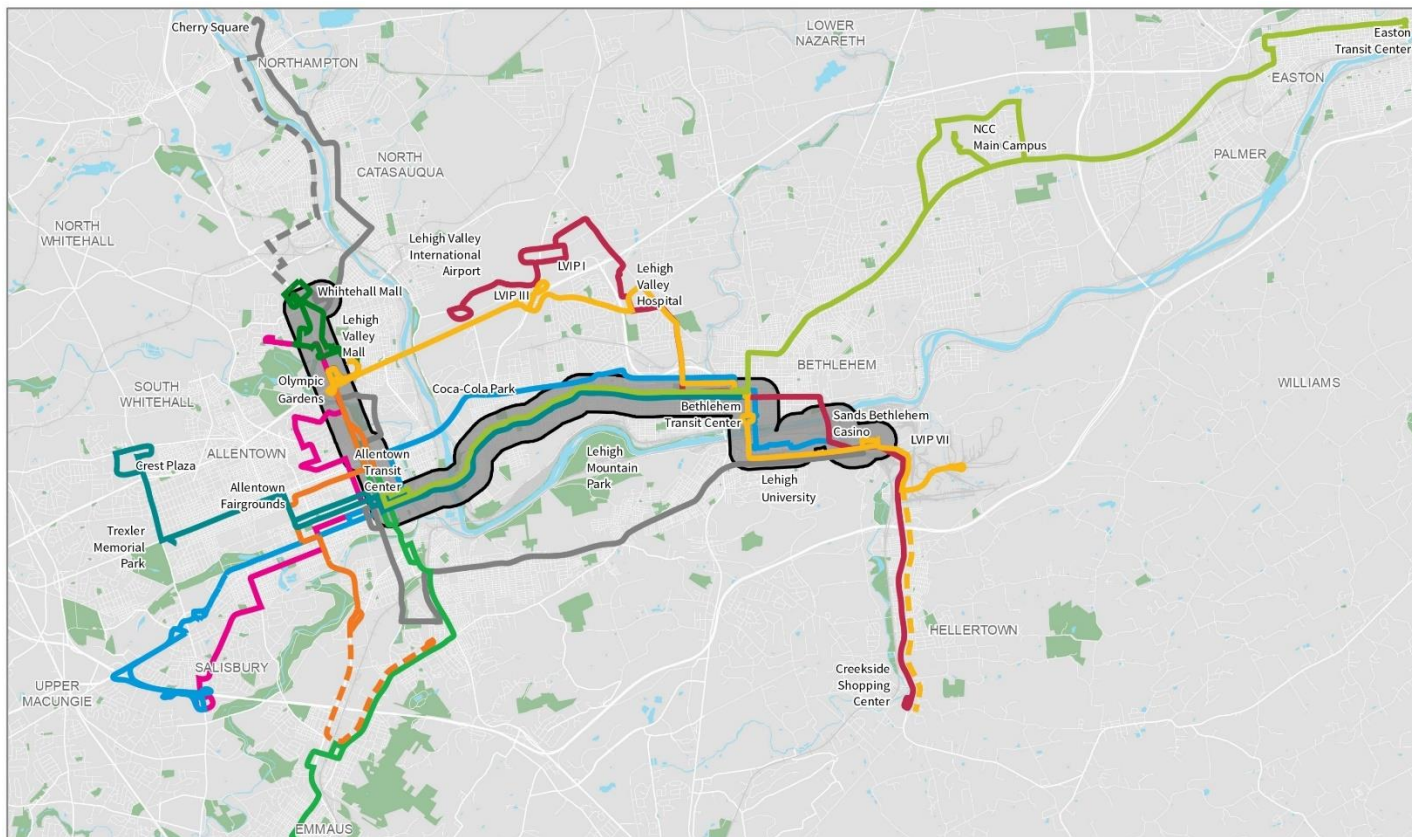
July 27, 2016



FOURSQUARE INTEGRATED  
TRANSPORTATION PLANNING

# Existing Conditions

# EBS 1 Corridor Study Routes



## EBS 1 CORRIDOR STUDY ROUTES

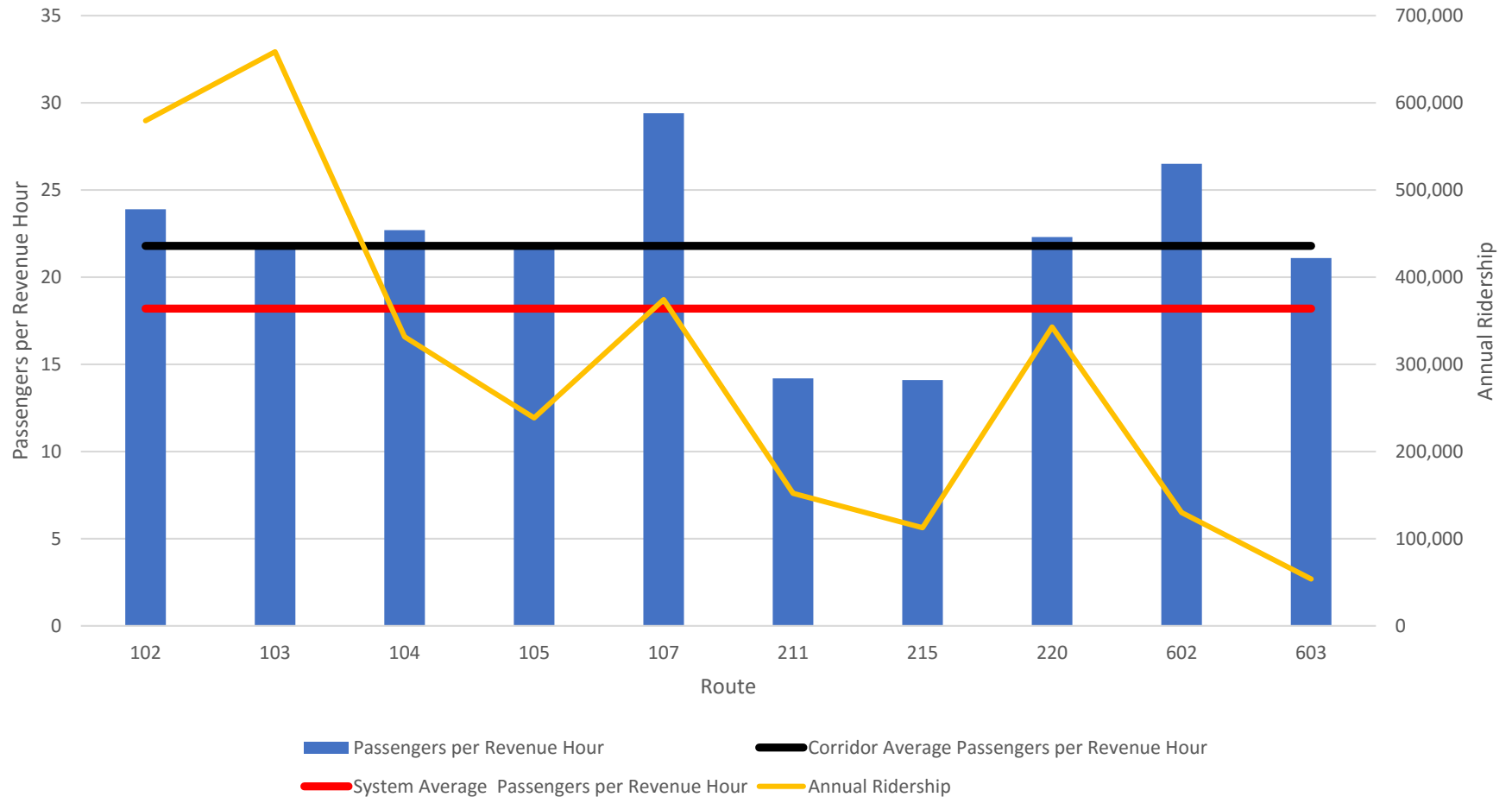
### LANta EBS 1 Corridor Study routes



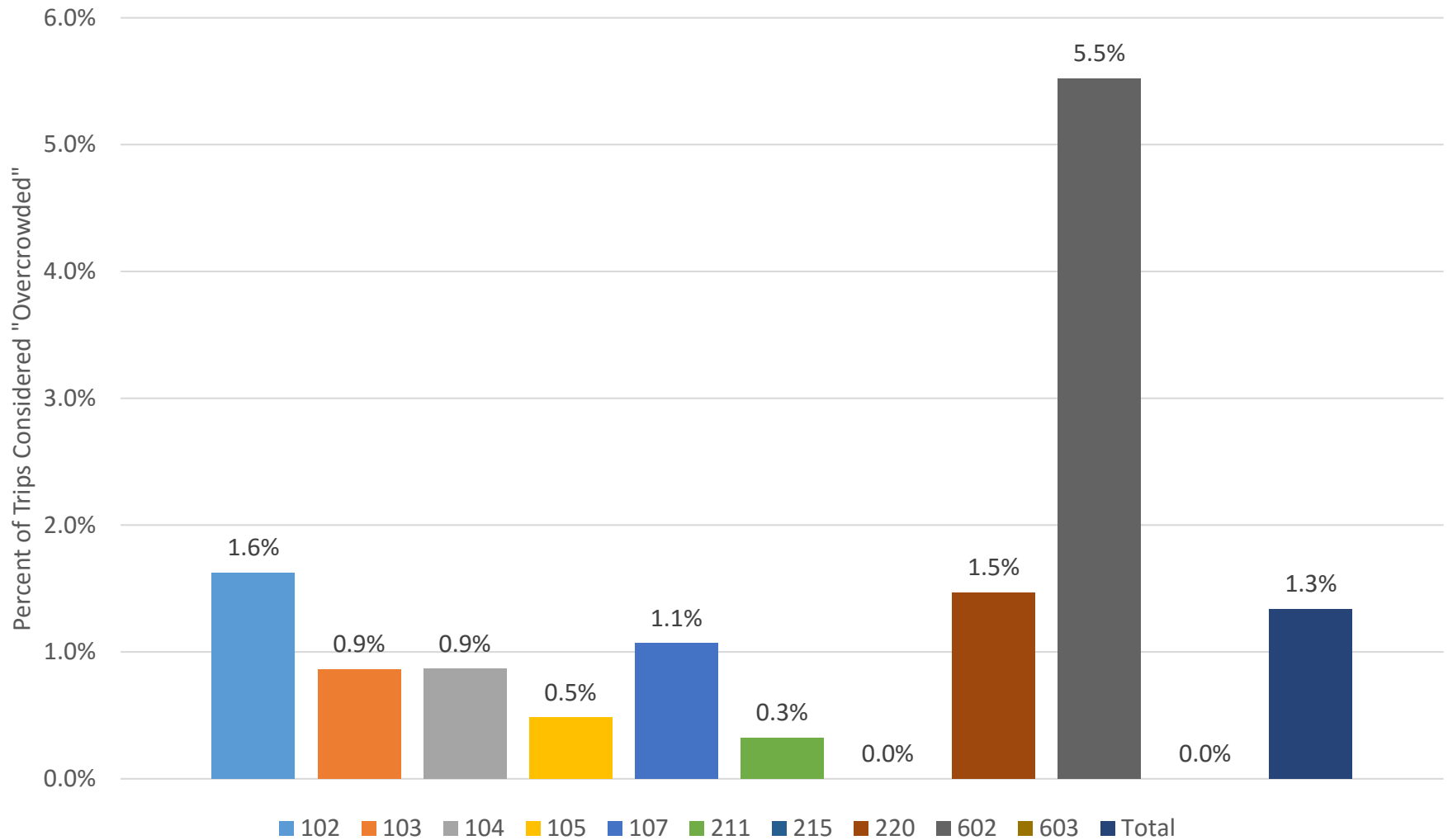
# Level of Service

Route	Service	Weekday Span	Peak Frequency	Off-peak Frequency	Saturday Span	Saturday Frequency	Sunday Span	Sunday Frequency
<b>102</b>	Mon-Sun	5:10 AM - 11:27 PM	30	60	5:30 AM - 11:12 PM	60	9:29 AM - 8:06 PM	60
<b>103</b>	Mon-Sun	5:05 AM - 11:30 PM	30	60	5:05 AM - 11:30 PM	60	9:10 AM - 6:47 PM	60
<b>104</b>	Mon-Sun	5:29 AM - 10:48 PM	30	60	5:45 AM - 10:48 PM	60	9:30 AM - 6:30 PM	60
<b>105</b>	Mon-Sun	5:50 AM - 10:43 PM	60	60	5:51 AM - 10:23 PM	60	9:45 AM - 6:35 PM	60
<b>107</b>	Mon-Sun	5:35 AM - 11:37 PM	60	60	5:35 AM - 11:37 PM	60	8:15 AM - 7:37 PM	60
<b>211</b>	Mon-Sat	5:46 AM - 8:10 PM	60	60	5:46 AM - 8:10 PM	60	---	---
<b>215</b>	Mon-Sat	6:15 AM - 6:40 PM	60	60	6:15 AM - 6:40 PM	60	---	---
<b>220</b>	Mon-Sat	5:35 AM - 12:12 AM	60	60	5:35 AM - 12:12 AM	60	---	---
<b>602</b>	Mon-Sun	6:25 AM - 9:40 PM	30	30	6:25 AM - 9:40 PM	30	10:20 AM - 6:15 PM	30
<b>603</b>	Mon-Sun	6:45 AM - 6:21 PM	60	60	9:30 AM - 5:59 PM	60	---	---

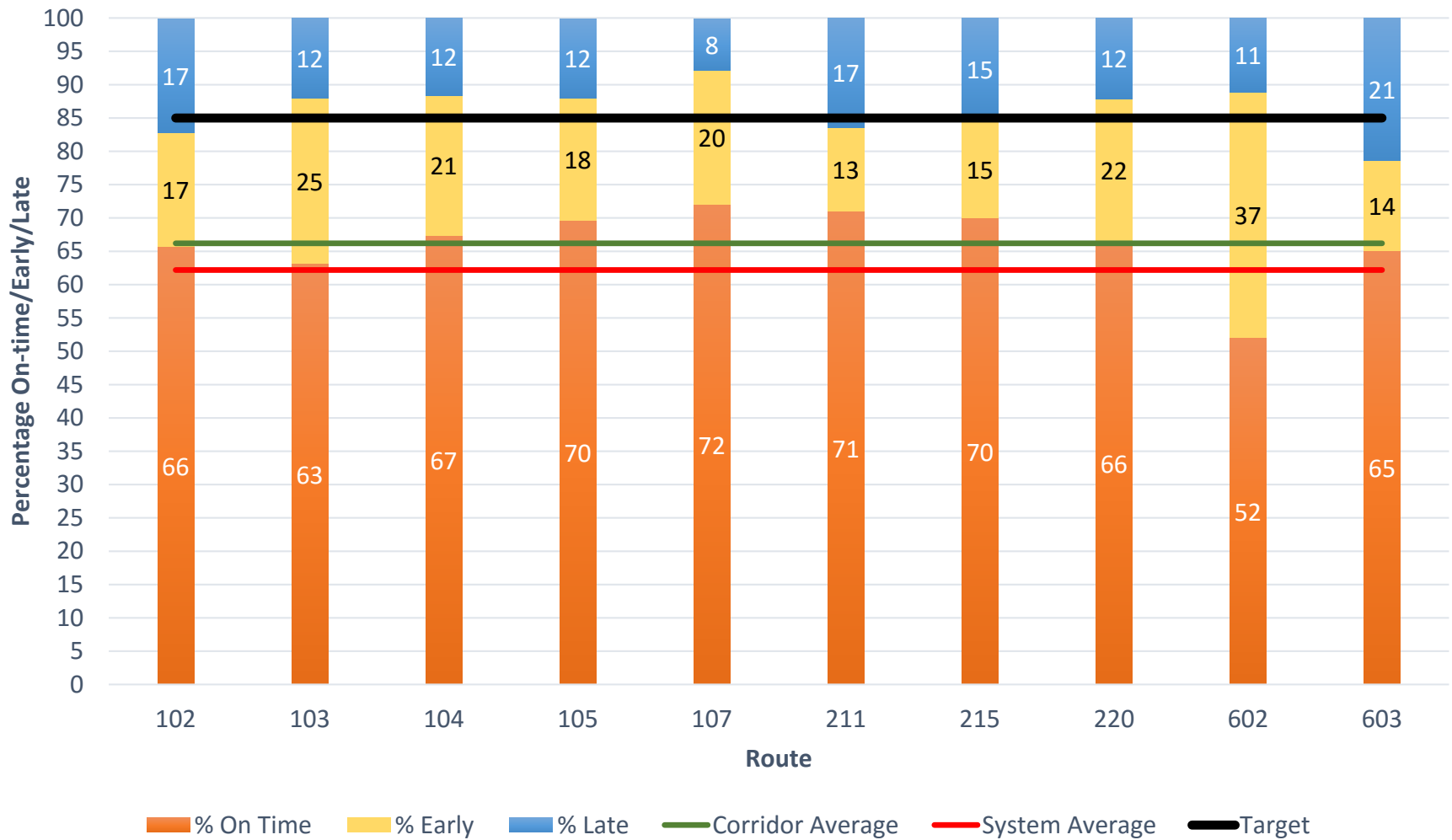
# Ridership



# Passenger Loads



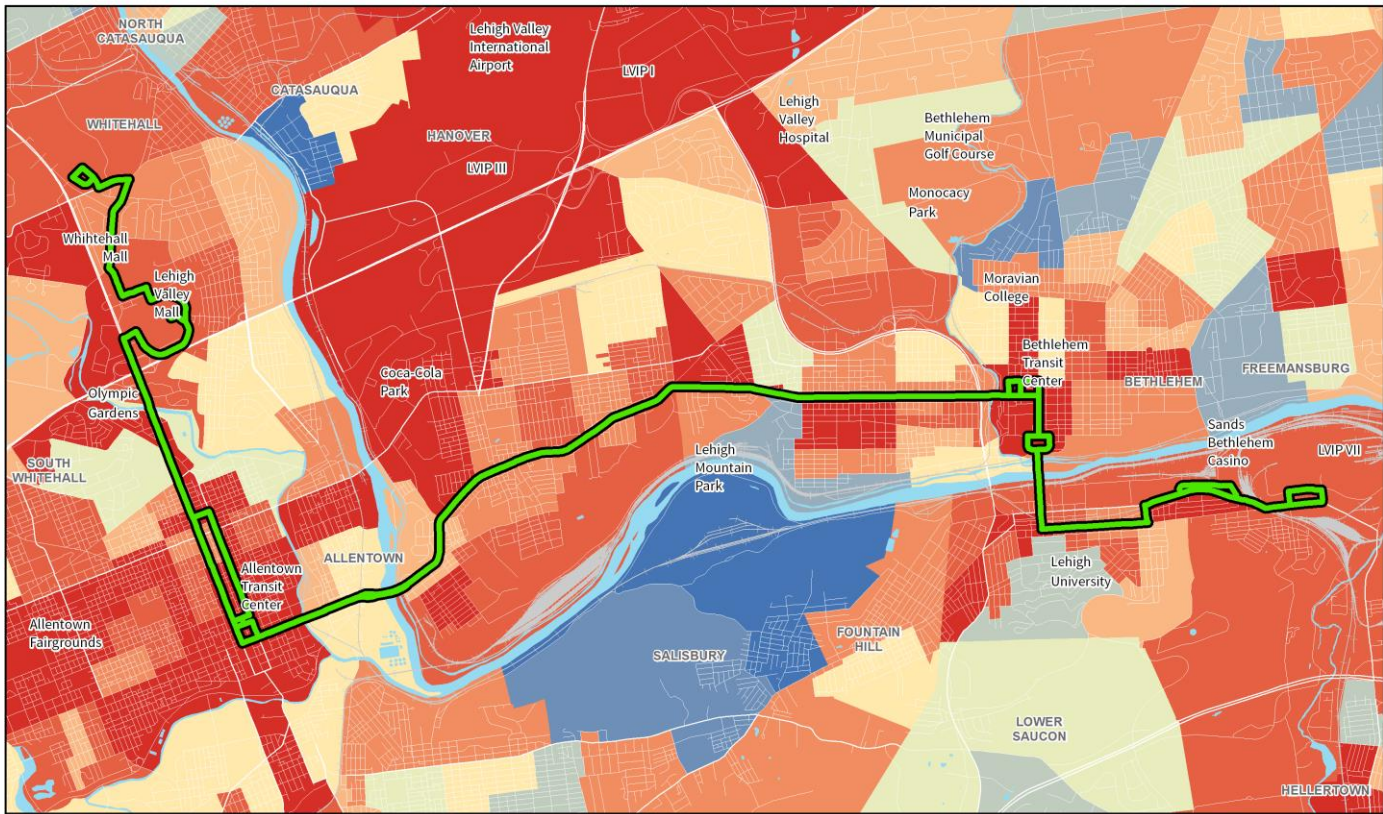
# On-time Performance



# Market Analysis

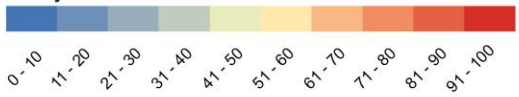


# All Day Propensity



**ALL DAY  
PROPENSITY**

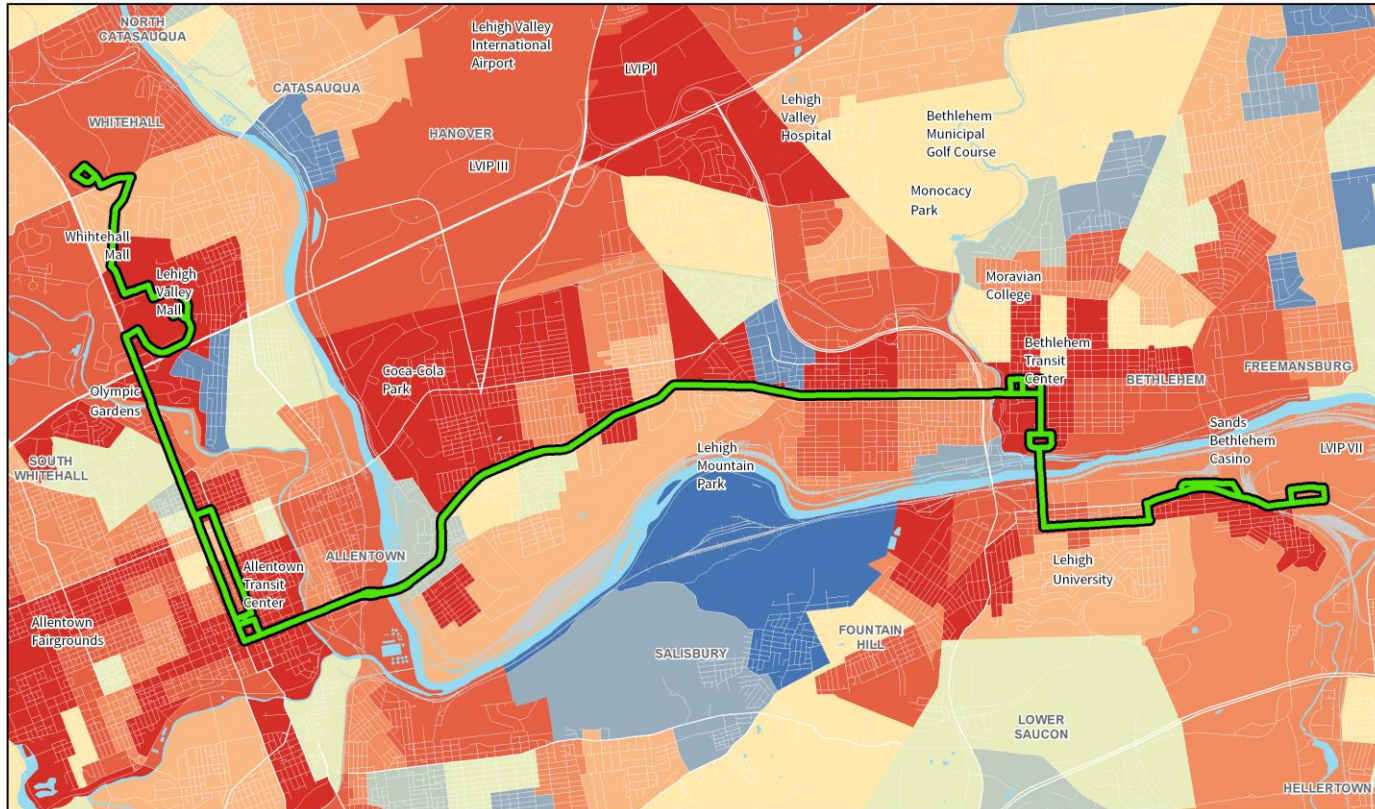
**All Day Service Score**



Initial EBS Corridor

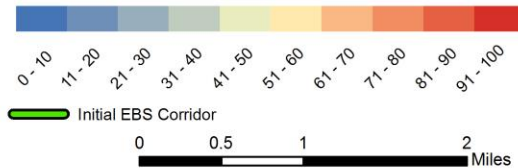


# Peak Hour Propensity



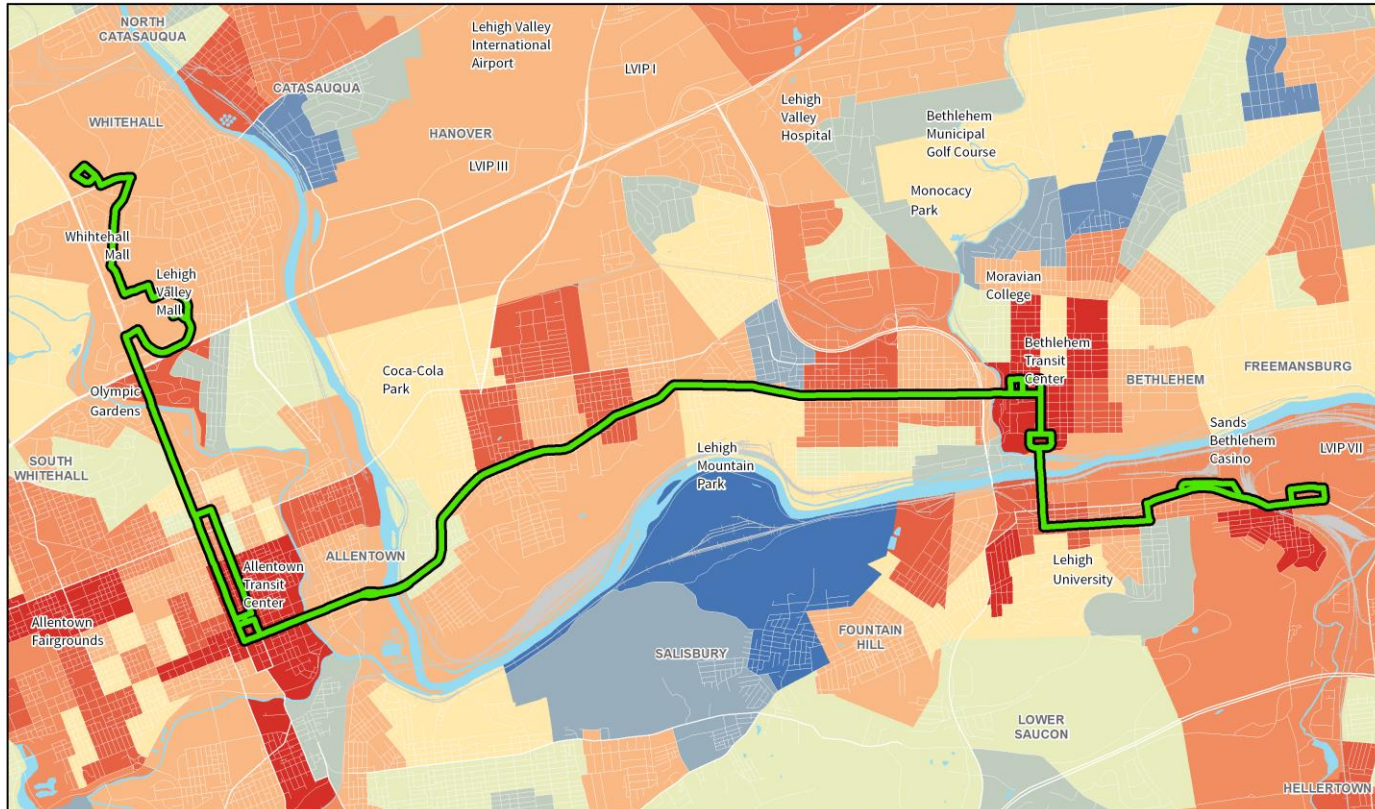
**PEAK HOUR  
PROPENSITY**

**Peak Hour Service Score**



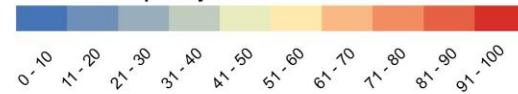


# Multimodal Propensity



**MULTIMODAL  
PROPENSITY**

**Multimodal Propensity Score**

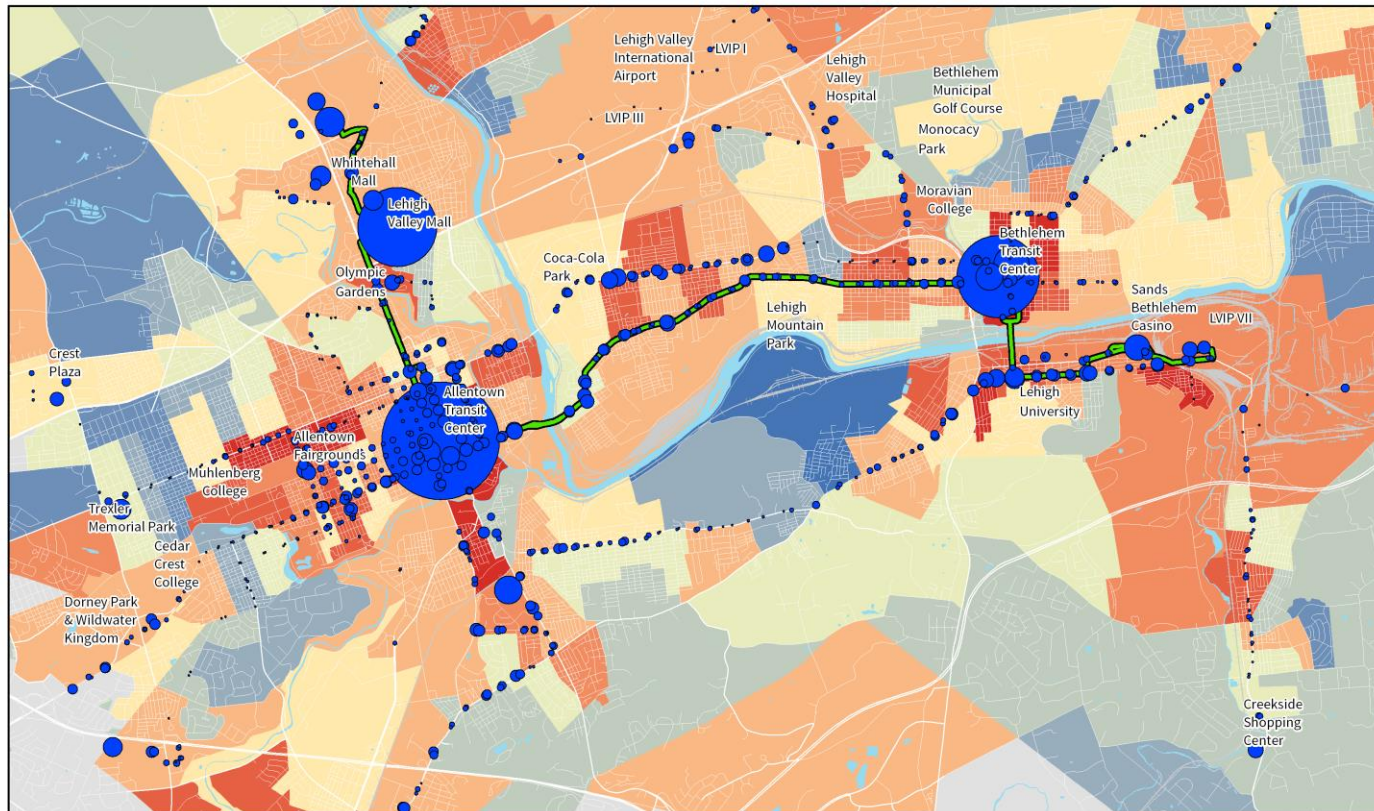


Initial EBS Corridor



# Recommendations

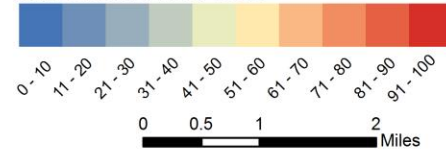
# EBS 1 Corridor



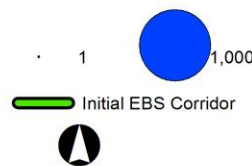
- The market analysis confirmed that the proposed EBS 1 alignment is the best option for maximizing benefit to riders.
- The EBS 1 corridor will connects all of the highest ridership areas in the Lehigh Valley.

## TOTAL RIDERSHIP STUDY ROUTES

### Multimodal Propensity Score

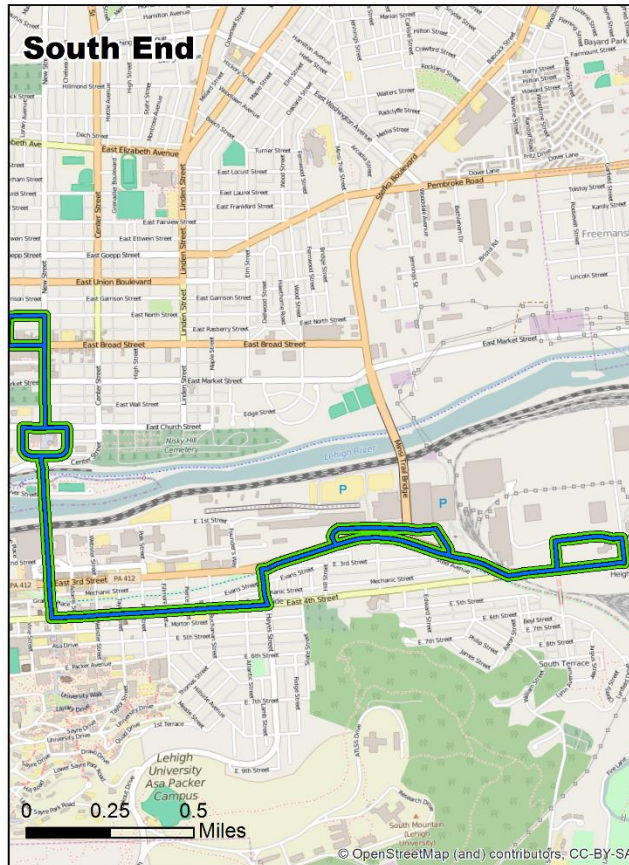
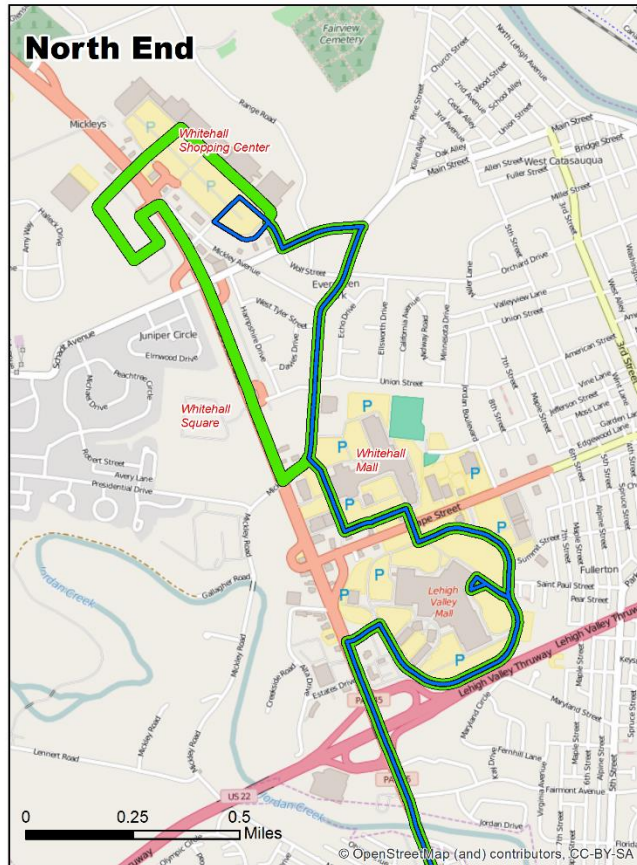


### Stop Ridership Activity





# EBS1 Corridor



## Recommendation Description

- The market analysis found no significant reason to alter the planned connections of the EBS1 corridor.
- The northern terminus (White Hall Shopping Center) would be served using Mickley Road, following the local route alignments, in order to avoid congestion along MacArthur Road (Route 145).
- The southern terminus (Sands Casino & LVIP VII) will be served using 4<sup>th</sup> Street to access the area.
- Proposed service
  - Weekdays: 5am – 12pm; 15 min peak/30-min off-peak
  - Saturday: 6am – 11pm; 30-min
  - Sunday: 8am – 6pm; 30-min

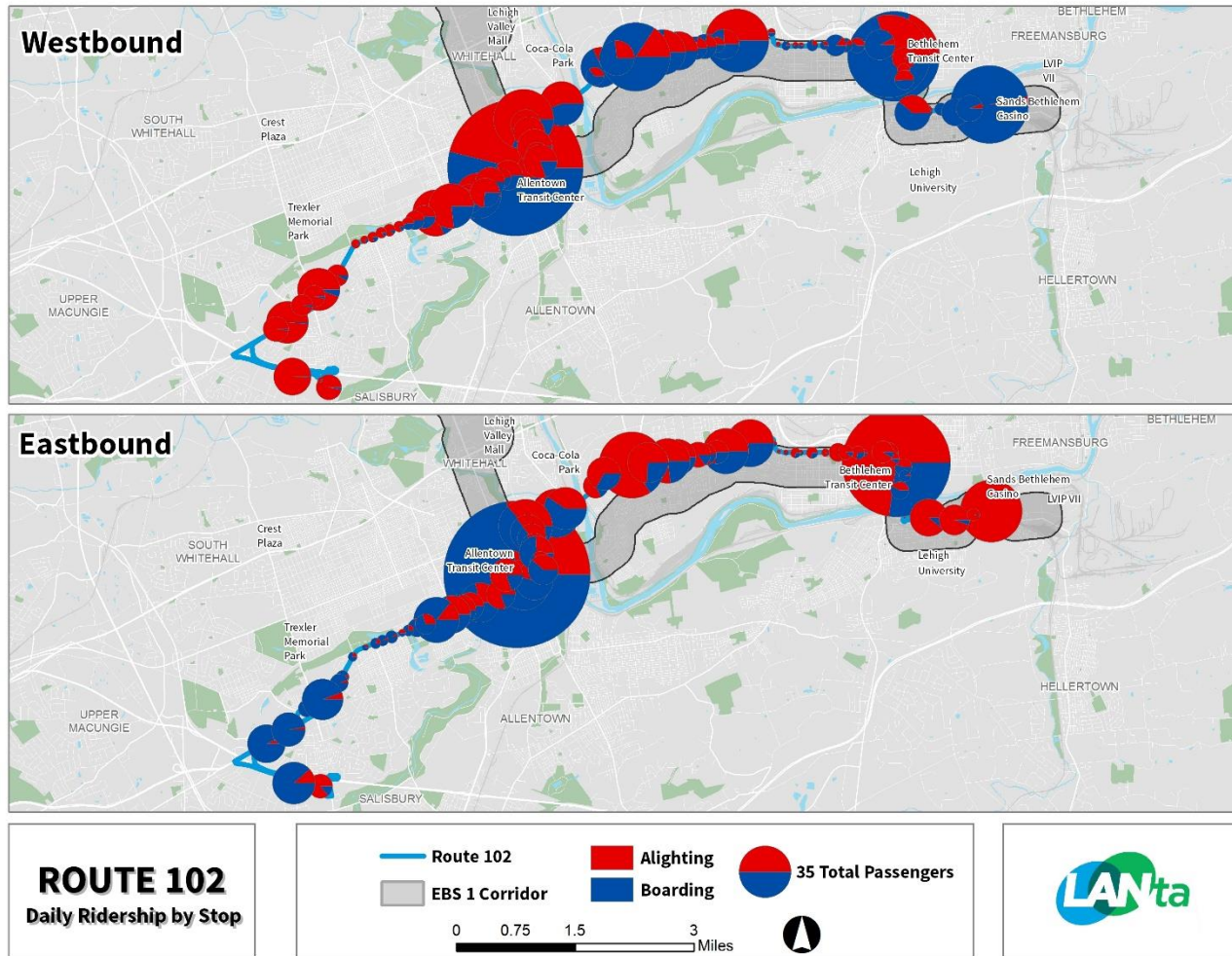
**EBS1  
ALIGNMENT**

Initial EBS 1 Alignment

Proposed EBS 1 Alignment



# Route 102



## Route Description

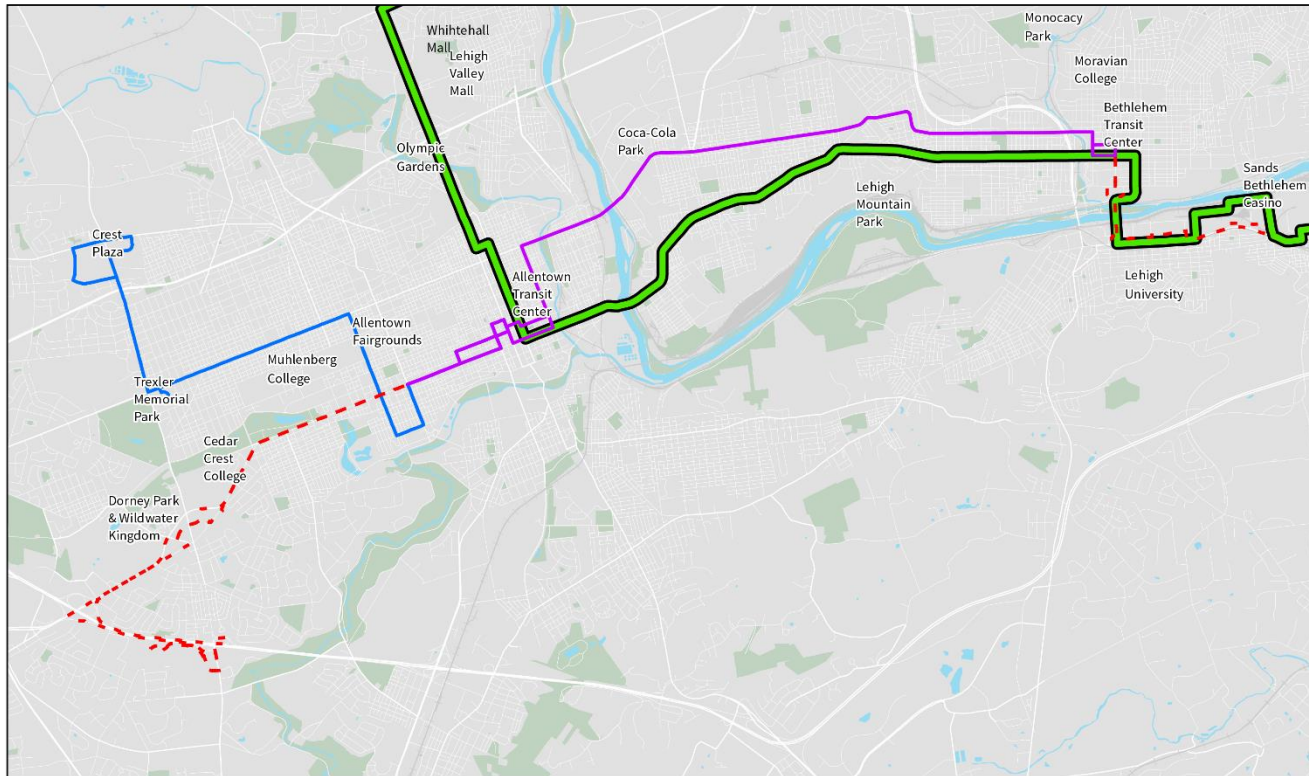
- Second highest annual ridership in system (580,000 pax annually, 24 pax/hr).
- Connects Lehigh Valley Mall, Allentown Transit Center, Bethlehem Transit Center (via W Union Blvd) and Sands Casino
- 10% of ridership activity occurs west of the St Luke's Hospital, 9% of ridership activity occurs east of the BTC

## Ridership Through Major Activity Centers

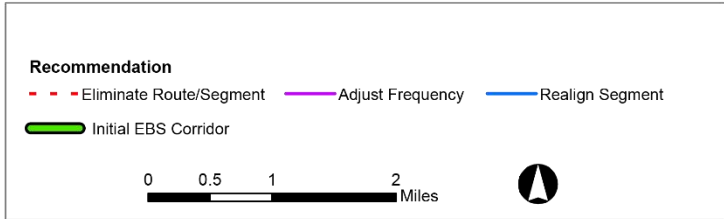
	Throughput Ridership	% of Directional Boardings
<b>Westbound</b>		
Bethlehem Transit Center	70	10%
Allentown Transit Center	142	20%
St Luke's Hospital	100	14%
<b>Eastbound</b>		
St Luke's Hospital	92	13%
Allentown Transit Center	47	7%
Bethlehem Transit Center	56	8%



# Route 102 Recommendation



**INITIAL  
ROUTE 102  
RECOMMENDATION**



## Recommendation Description

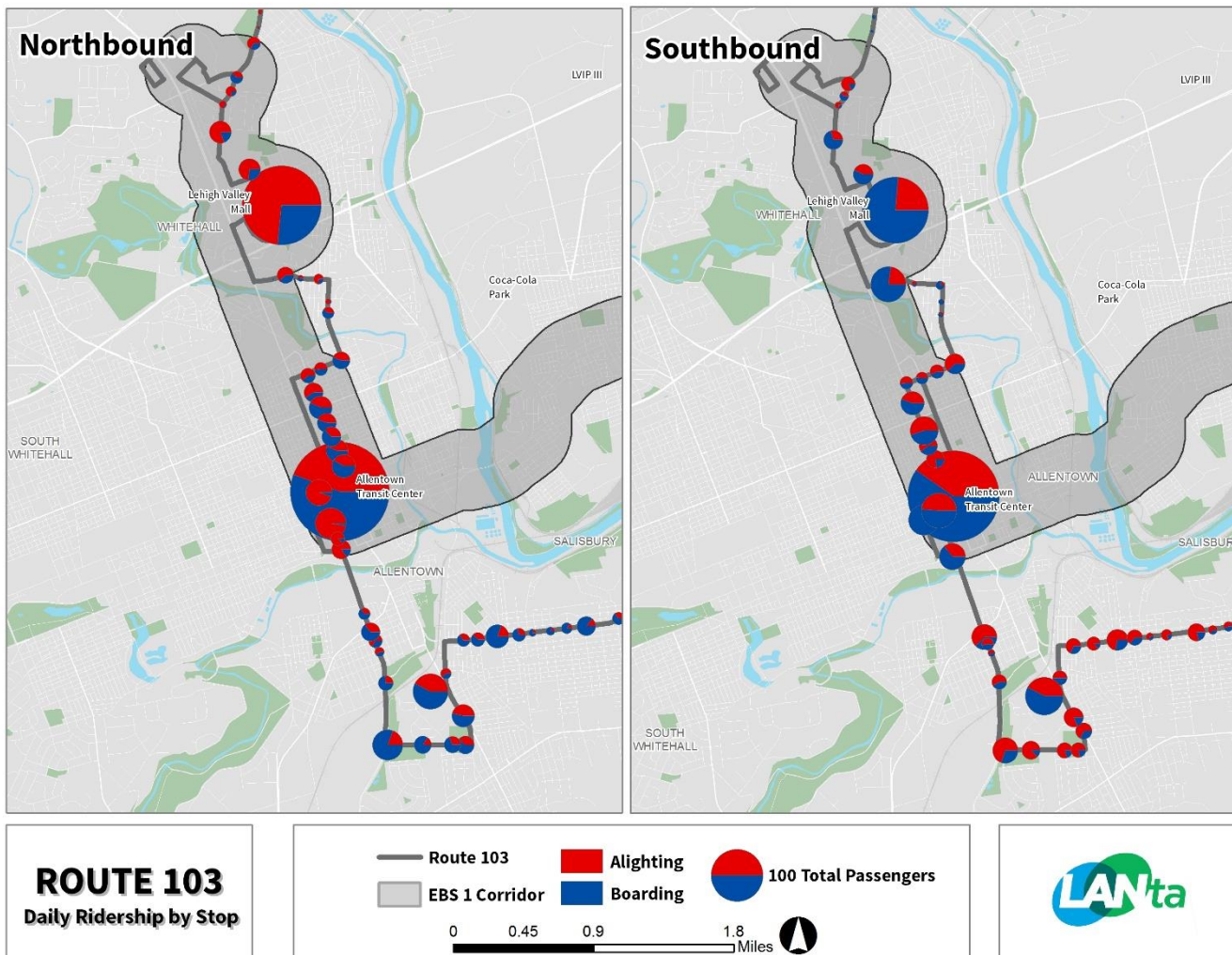
- Eliminate segment between the Bethlehem Transit Center and Sands Bethlehem Casino due to overlap with EBS 1.
- Realign segment west of the Allentown Transit Center to provide service to Crest Plaza via Tilghman St.
- Increase frequency to 30-minutes all day

## Ridership Impacts

- Frequency reduced from 30 minutes to 60 minutes on parts of Hamilton Street and to the Lehigh Valley Hospital, which will now be served by Routes 322 and 211 only.
- No direct connection west of the ATC (St Luke's Hospital, Lehigh Valley Hospital) to east of the BTC (Lehigh University, Sands Bethlehem Casino)



# Route 103



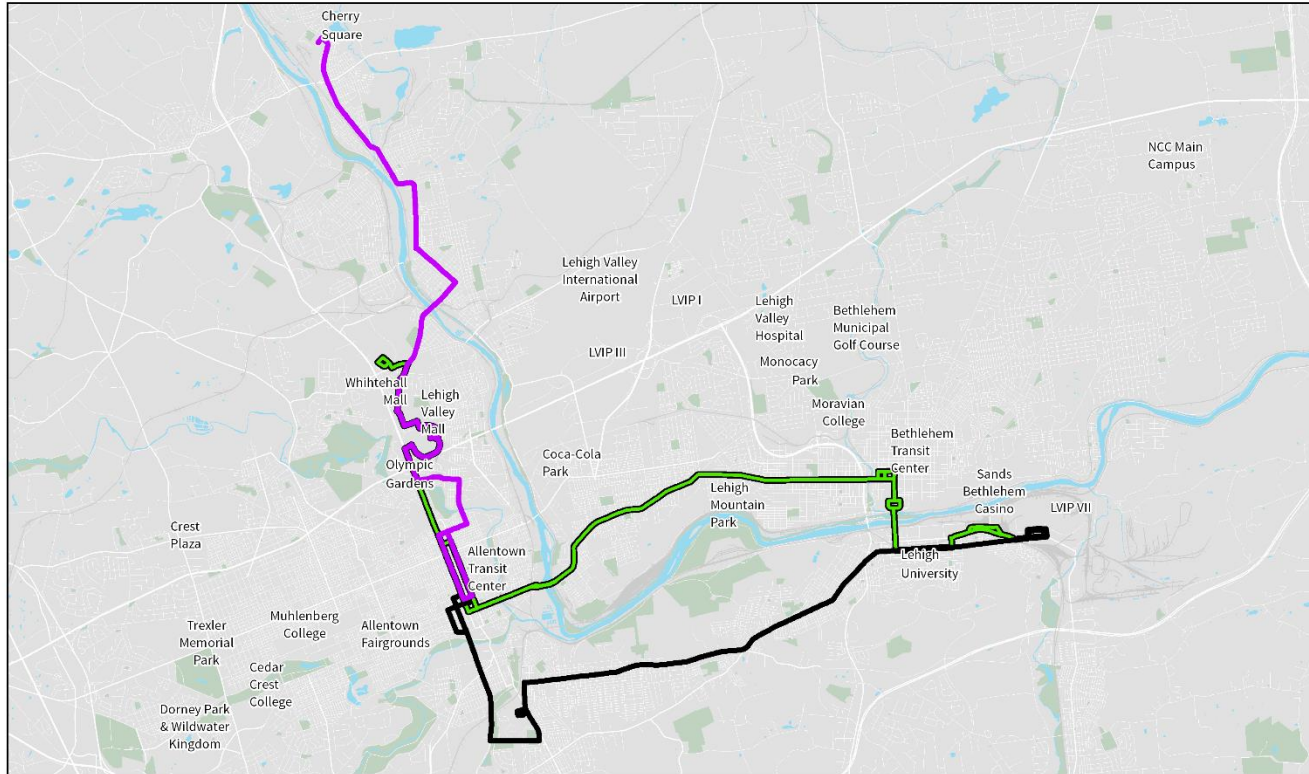
## Route Description

- Highest annual ridership in system (660,000 pax annually, 22 pax/hr).
- 10% of ridership activity occurs north of Whitehall Mall, 40% of ridership activity occurs between the ATC and Whitehall Mall

## Ridership Through Major Activity Centers

	Throughput Ridership	% of Directional Boardings
<b>Northbound</b>		
Allentown Transit Center	35	4%
Lehigh Valley Mall	72	9%
<b>Southbound</b>		
Lehigh Valley Mall	44	6%
Allentown Transit Center	61	8%

# Route 103 Recommendation

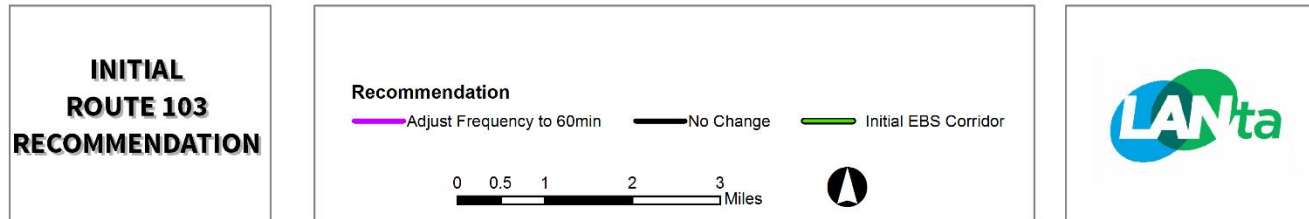


## Recommendation Details

- Short turn the route at the Allentown Transit Center every other trip during peak hours.
  - Maintain 30 min peak frequency between the Allentown Transit Center and Bethlehem Transit Center.
  - Reduce peak frequency to 60 min between the Allentown Transit Center and Cherry Square.

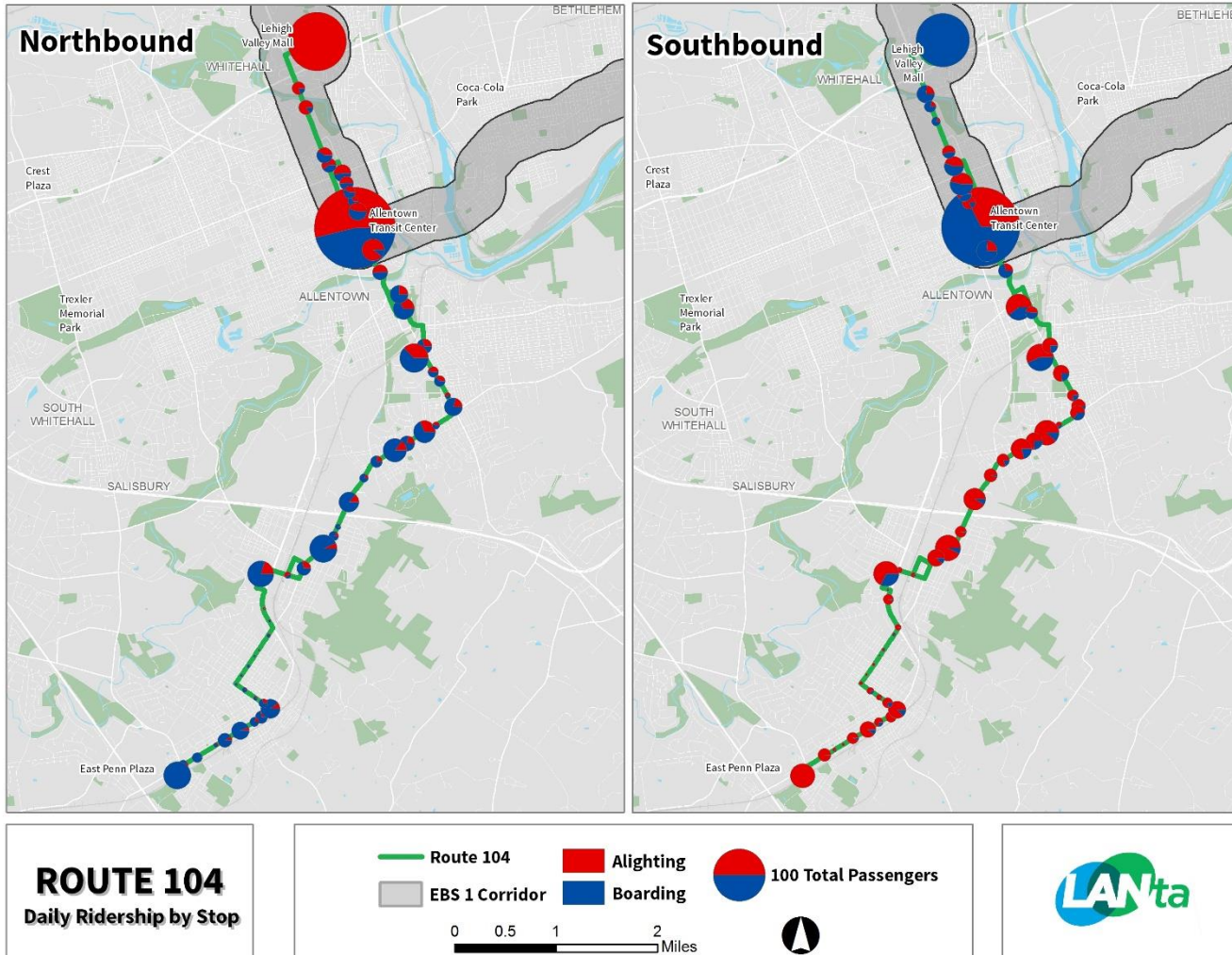
## Ridership Impacts

- 110 pax/day ( or approximately 7 pax/hour) use service between Cherry Square and Whitehall Mall.





# Route 104



## Route Description

- Ranked seventh in annual ridership in the system (330,000 pax annually, 23 pax/hr).
- The Allentown Transit Center and Lehigh Valley Mall are major nodes.

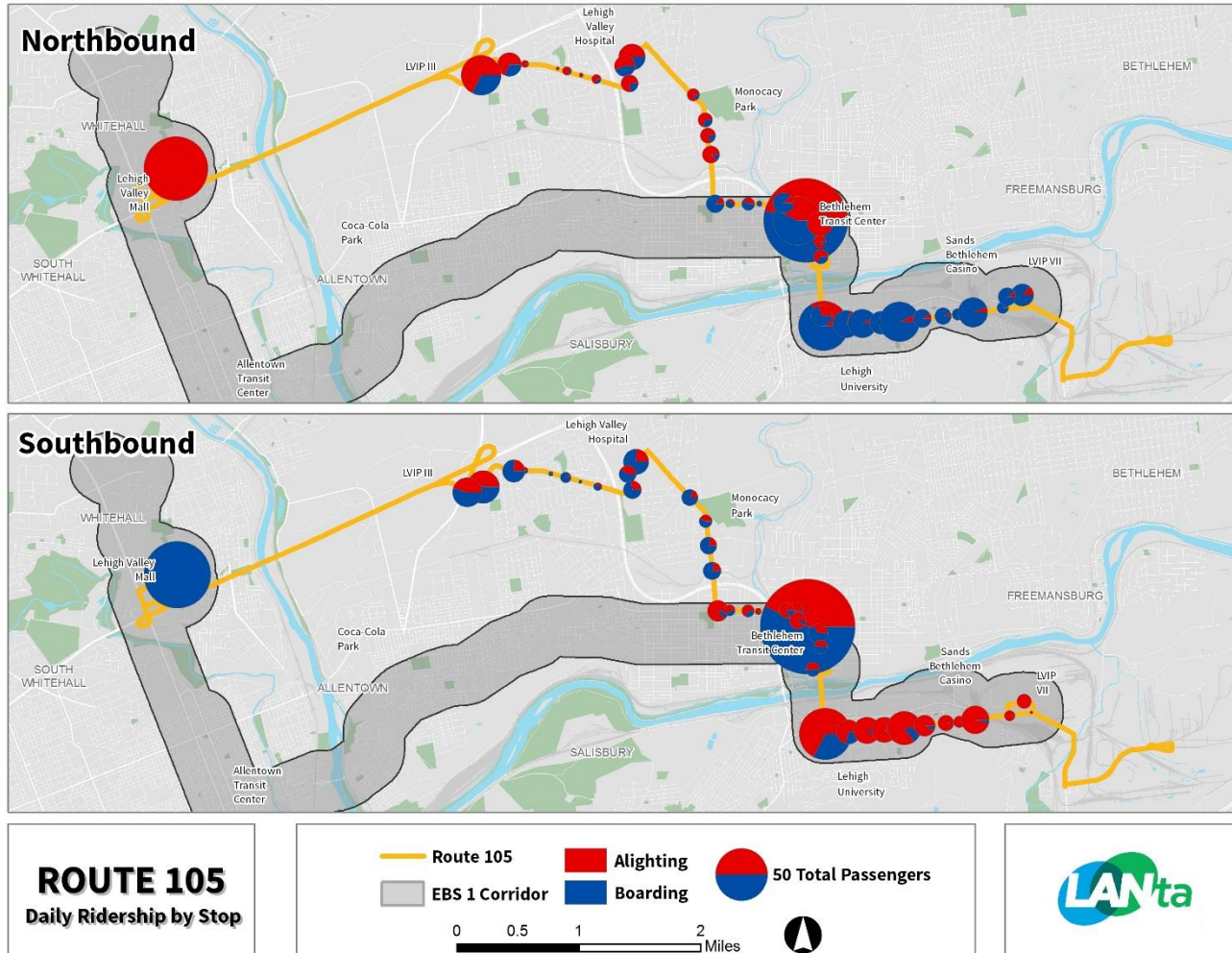
## Ridership Through Major Activity Centers

	Throughput Ridership	% of Directional Boardings
<b>Northbound</b>		
Allentown Transit Center	39	10%
<b>Southbound</b>		
Allentown Transit Center	39	10%

## Recommendation

- No change

# Route 105



## Route Description

- Ranked eighth in annual ridership in the system (240,000 pax annually, 22 pax/hr).
- 31% of ridership activity occurs north of Union Blvd & 8<sup>th</sup> Ave, 2% of ridership activity occurs south of LVIP VII

## Ridership Through Major Activity Centers

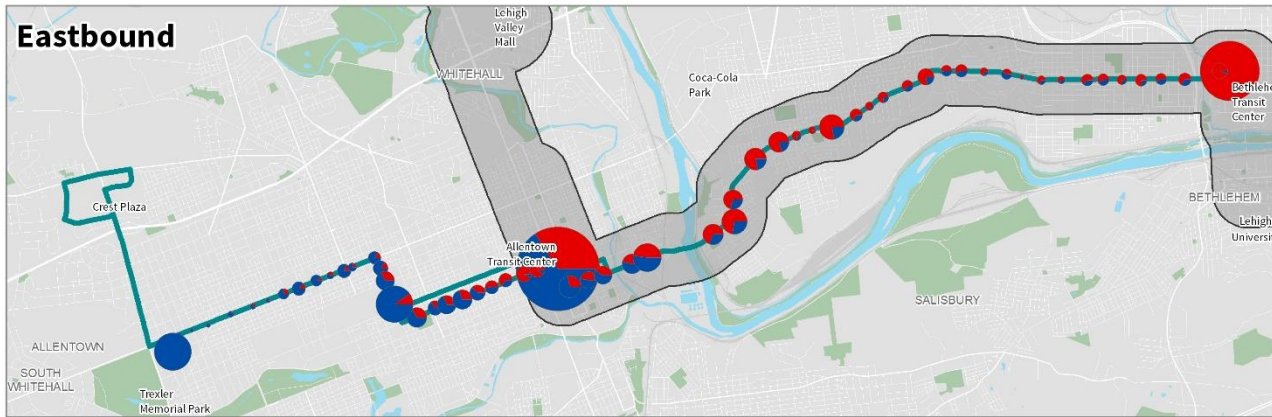
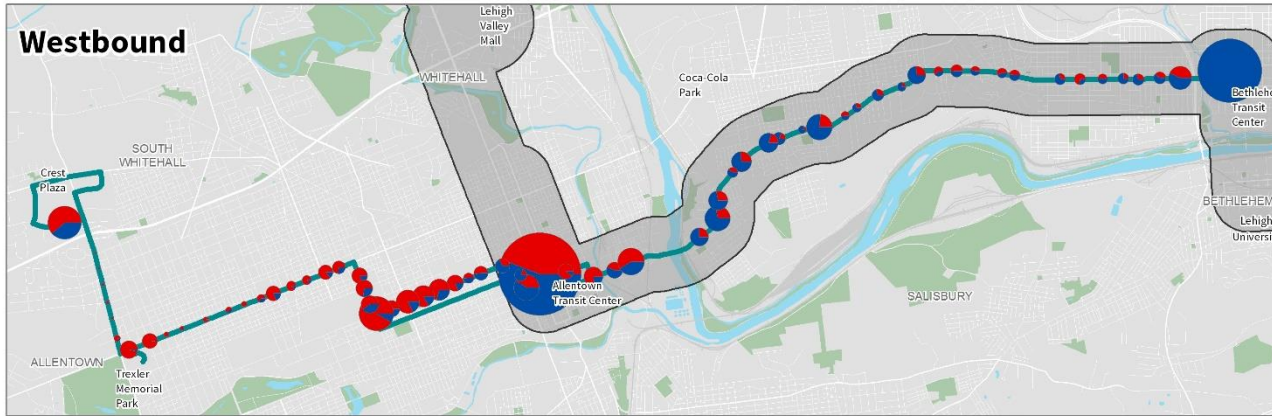
	Throughput Ridership	% of Directional Boardings
<b>Northbound</b>		
LVIP VII	7	3%
Bethlehem Transit Center	48	17%
Lehigh Valley Hospital	117	40%
<b>Southbound</b>		
Lehigh Valley Hospital	97	34%
Bethlehem Transit Center	23	8%
LVIP VII	34	12%

## Recommendation

- No change



# Route 107



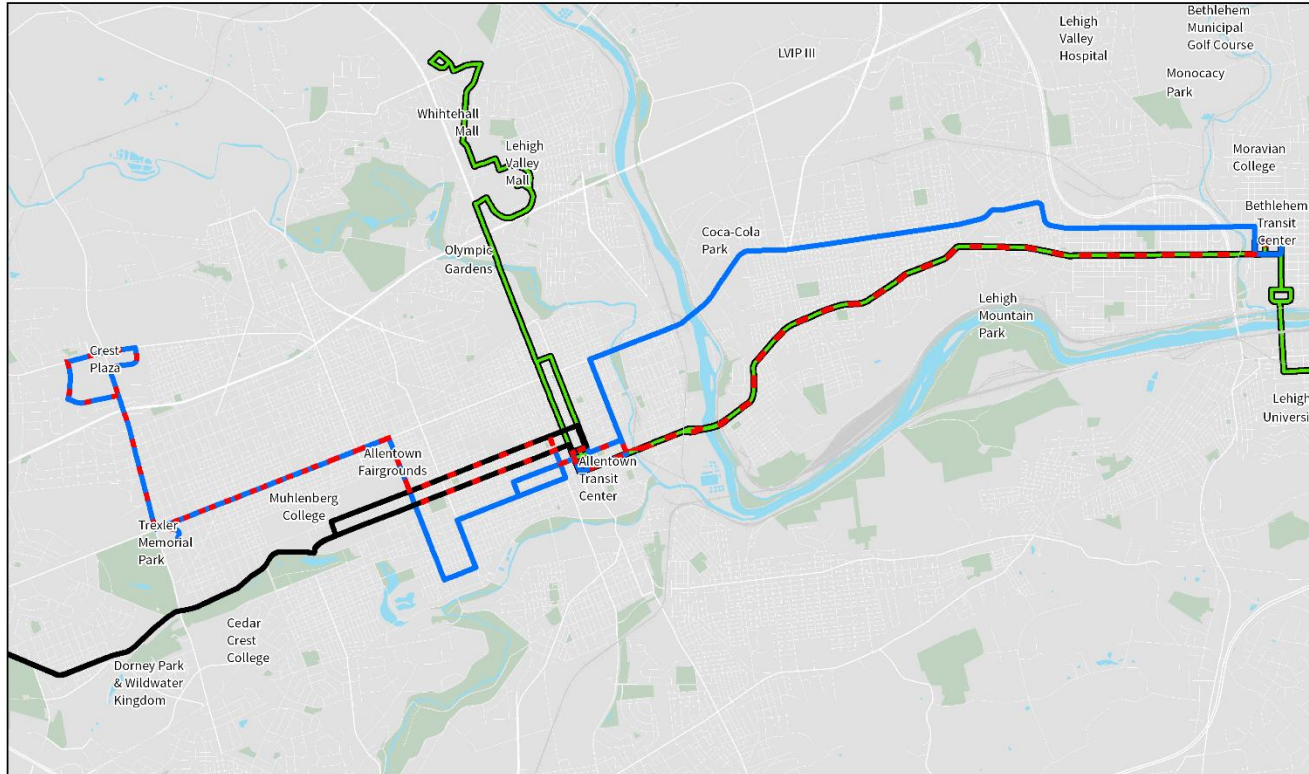
## Route Description

- Ranked third in annual ridership in the system (374,000 pax annually, 29 pax/hr).
- 44% of the ridership activity occurs west of the ATC

## Ridership Through Major Activity Centers

	Throughput Ridership	% of Directional Boardings
<b>Westbound</b>		
Allentown Transit Center	92	18%
Lehigh Valley Hospital	157	31%
<b>Eastbound</b>		
Lehigh Valley Hospital	93	18%
Allentown Transit Center	55	31%

# Route 107 Recommendation



**INITIAL  
ROUTE 107  
RECOMMENDATION**

## Recommendation

- ■ Eliminate 107

## Service Replacements

- EBS1
- Existing 213
- Proposed 102

0 0.5 1 2 Miles



## Recommendation Details

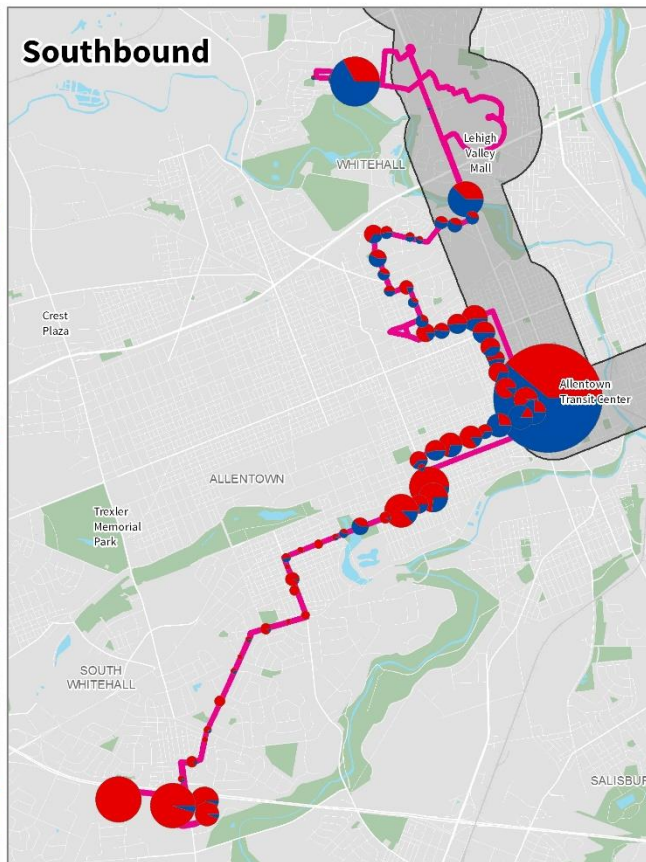
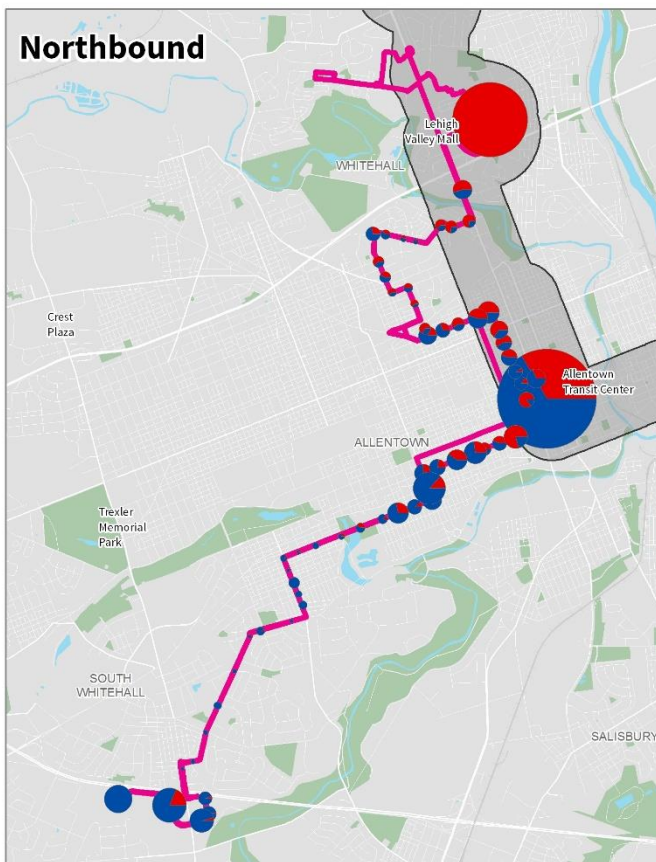
- Eliminate route

## Ridership Impacts

- Service between Crest Plaza and the Allentown Transit Center is replaced by realigned Route 102.
- Span of service would be reduced on Chew Street/ Turner Street (still served by Route 213).



# Route 211



## ROUTE 211 Daily Ridership by Stop



## Route Description

- Ranked 11th in annual ridership in the system (152,000 pax annually, 14 pax/hr).

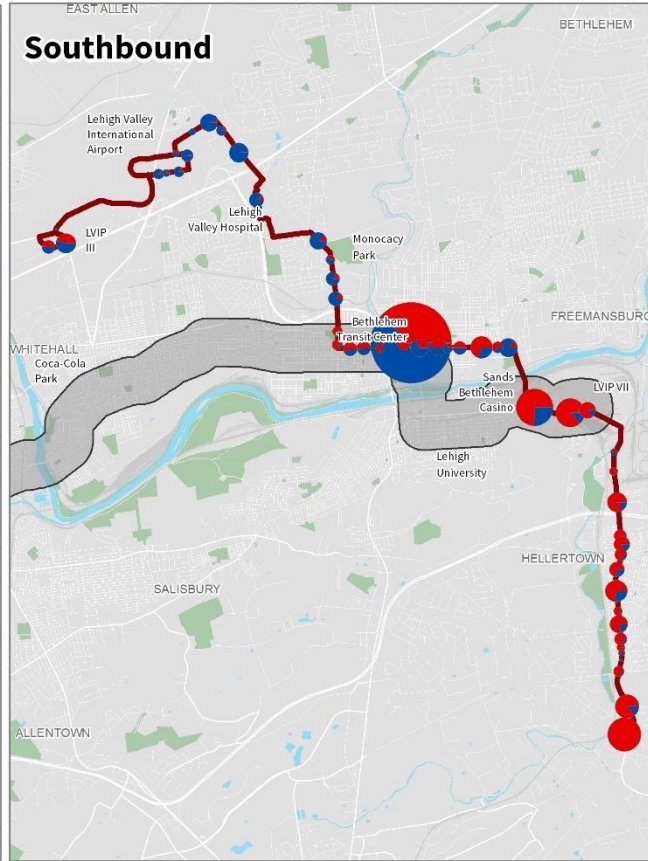
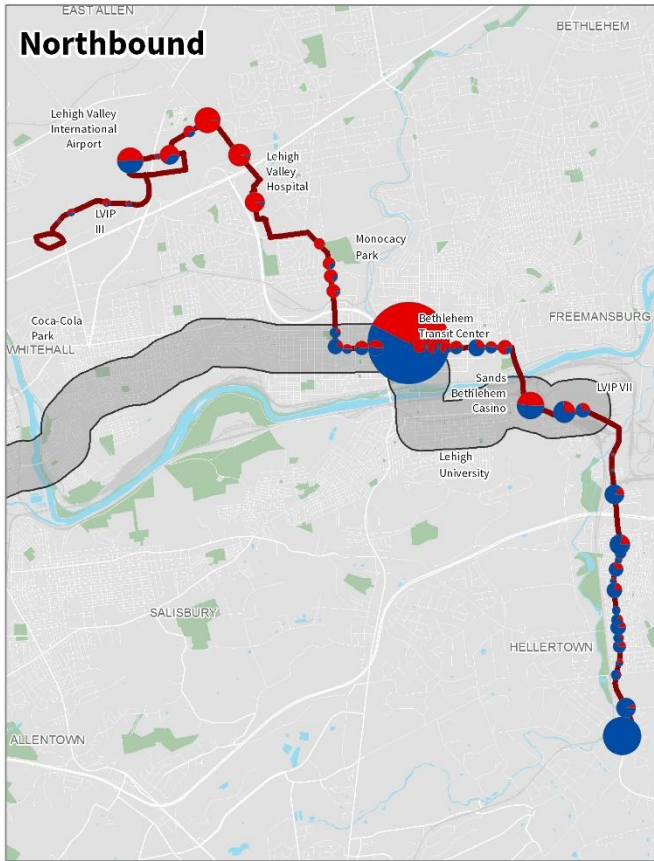
## Ridership Through Major Activity Centers

	Throughput Ridership	% of Directional Boardings
<b>Northbound</b>		
Allentown Transit Center	21	8%
<b>Southbound</b>		
Allentown Transit Center	3	2%

## Recommendation

- No change.
- Needed to maintain service to Lehigh Valley Hospital.

# Route 215



**ROUTE 215**  
Daily Ridership by Stop



## Route Description

- Ranked 15th in annual ridership in the system (112,000 pax annually, 14 pax/hr).
- Important feeder route to the EBS 1 corridor, especially from Hellertown.

## Ridership Through Major Activity Centers

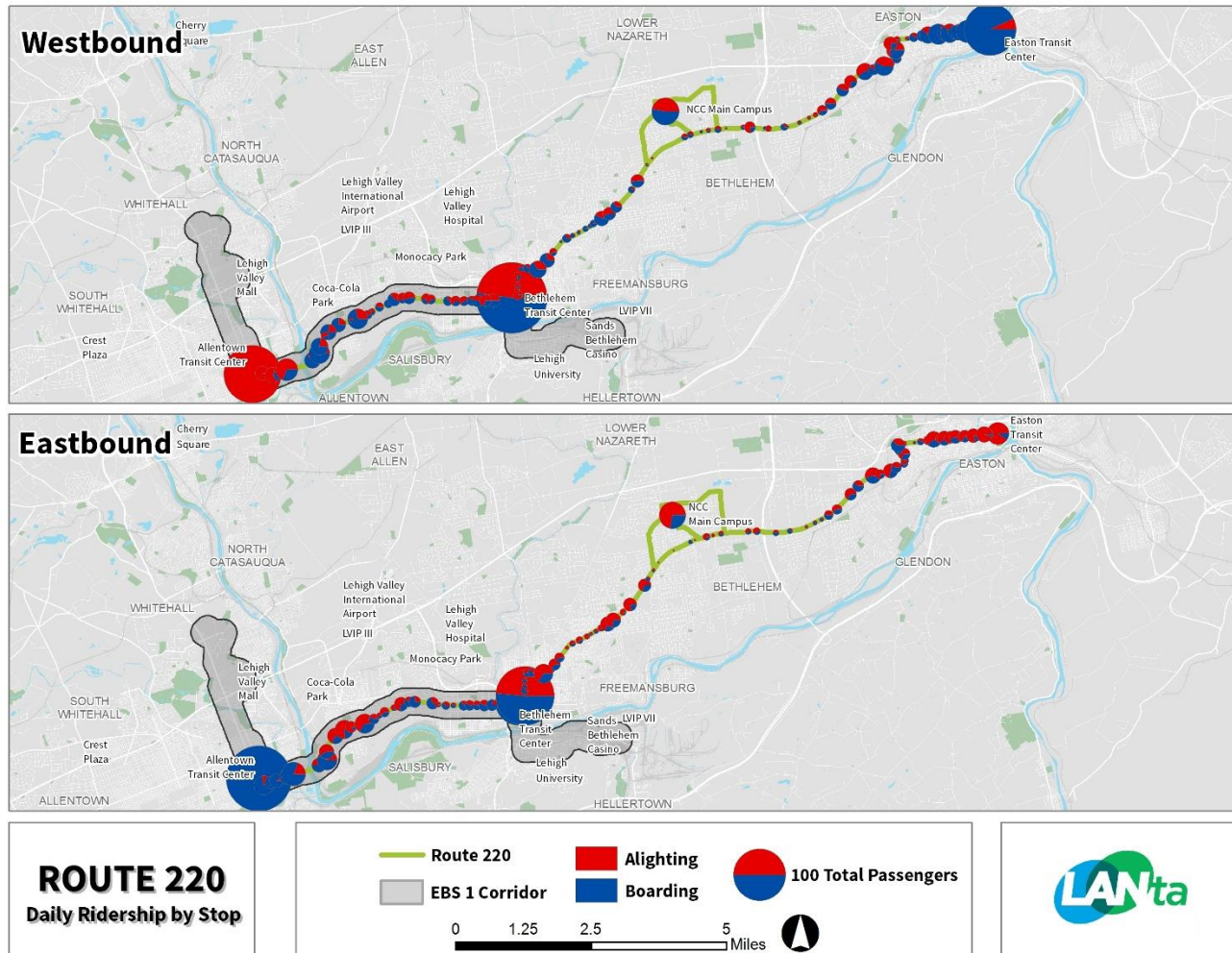
	Throughput Ridership	% of Directional Boardings
<b>Northbound</b>		
LVIP VII	51	30%
BTC	6	3%
<b>Southbound</b>		
BTC	20	14%
LVIP VII	29	19%

## Recommendation

- No change



# Route 220



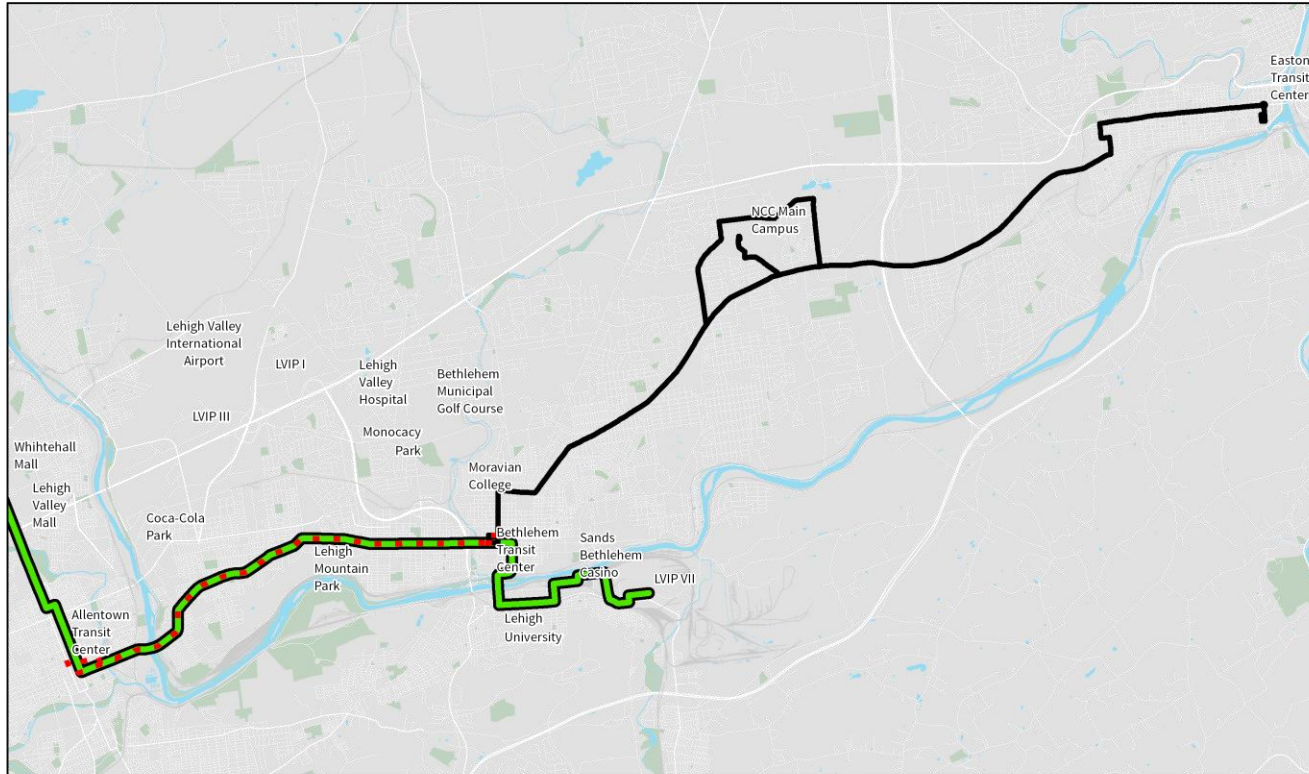
## Route Description

- Ranked fourth in annual ridership in the system (343,000 pax annually, 22 pax/hr).
- 54% of ridership activity occurs north of the BTC

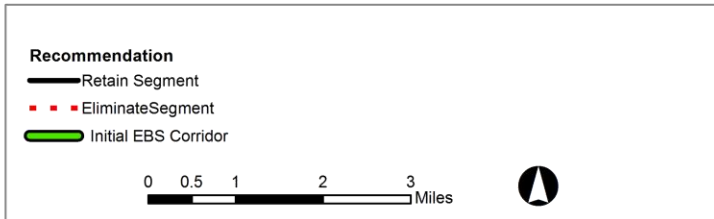
## Ridership Through Major Activity Centers

	Throughput Ridership	% of Directional Boardings
Westbound		
Bethlehem Transit Center	50	10%
Eastbound		
Bethlehem Transit Center	134	28%

# Route 220 Recommendations



**INITIAL  
ROUTE 220  
RECOMMENDATION**



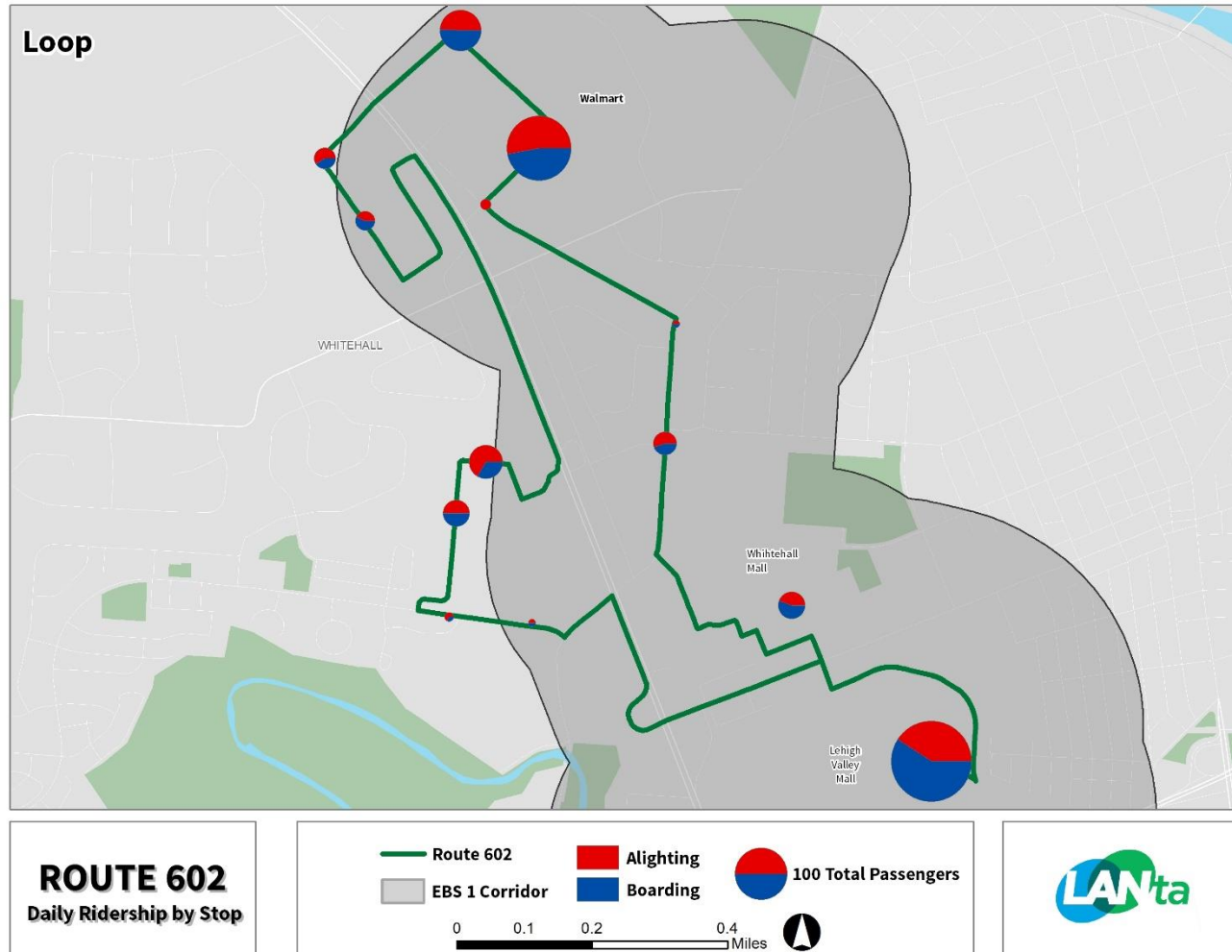
## Recommendation Description

- Eliminate segment between the Allentown Transit Center and BTC.
- Maintain 60 minute frequency between the Easton Transit Center and the Bethlehem Transit Center.

## Ridership Impacts

- 19% of riders forced to transfer.
- 48% of riders will be able to use the EBS instead of the 220.

# Route 602

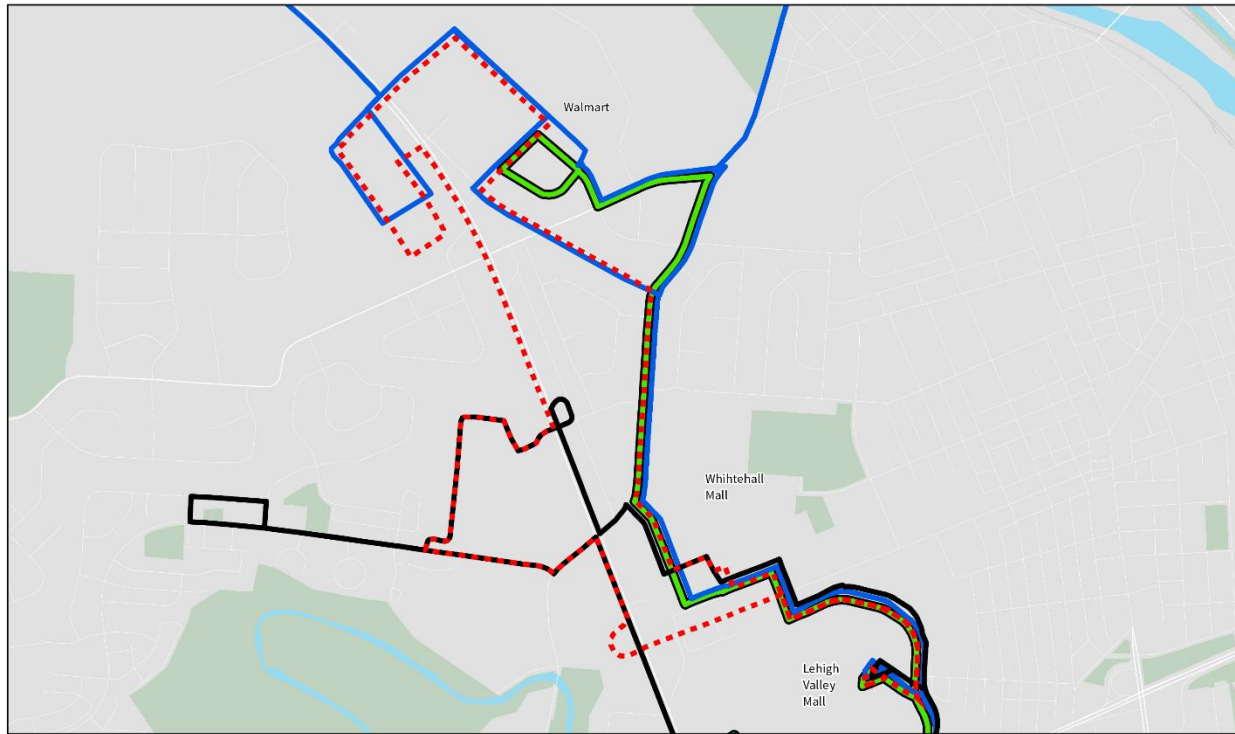


## Route Description

- Circulator route that connects multiple shopping centers including Lehigh Valley Mall, Whitehall Mall, Whitehall Shopping Center, MacArthur Towne Center and Whitehall Square
- Ranked 16th in annual ridership in the system (130,000 pax annually, 27 pax/hr).



# Route 602 Recommendations



## ROUTE 602 RECOMMENDATION

### Recommendation

--- Eliminate 602

### Service Replacements

— Existing 103

— Existing 211

— EBS1

0 0.225 0.45  
Miles



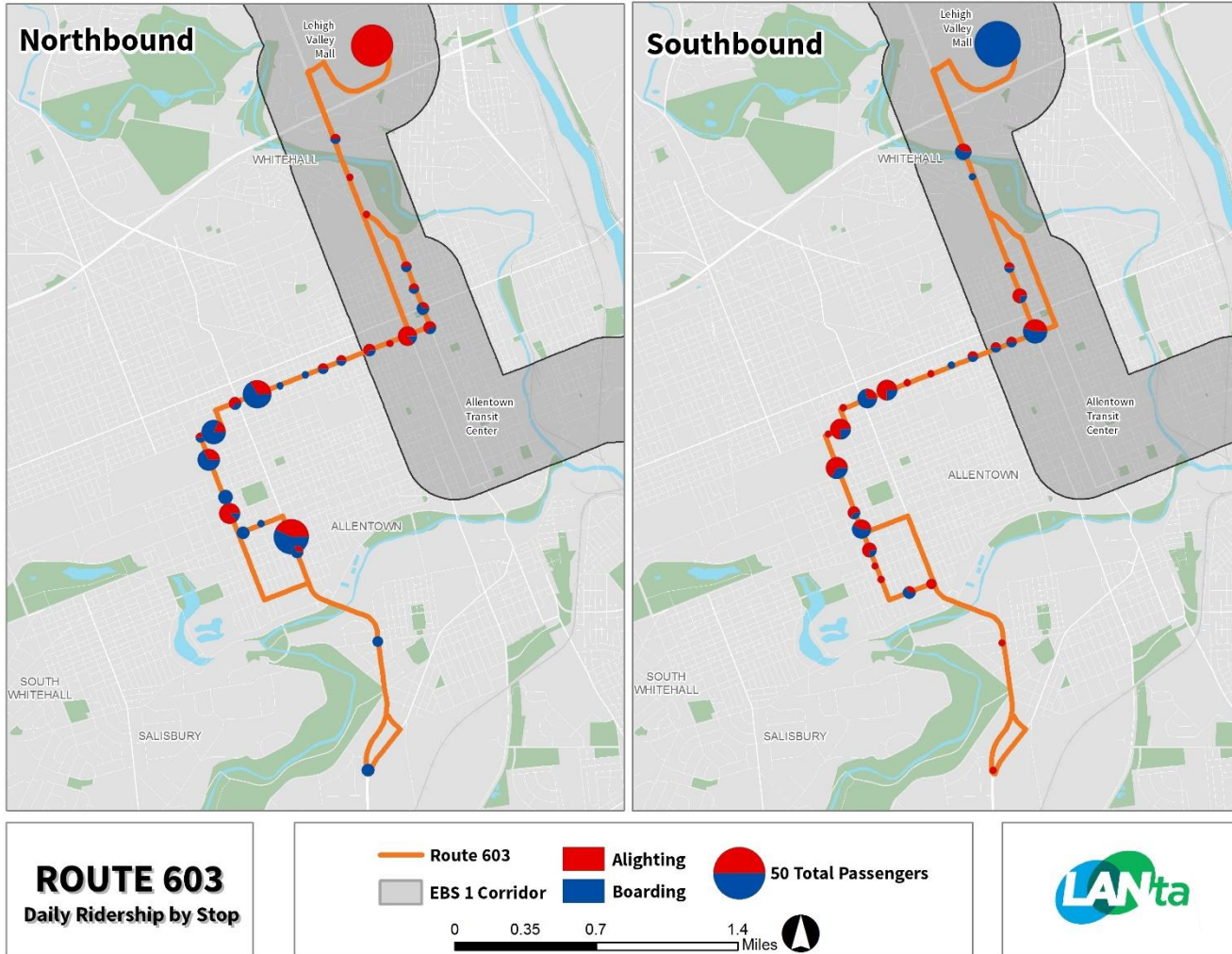
## Recommendation Description

- Eliminate route.

## Ridership Impacts

- The connections between Whitehall Shopping Center, Whitehall Mall and Lehigh Valley Mall will be provided by the proposed EBS 1.
- Sixteen riders will no longer have bus service at their stop.

# Route 603



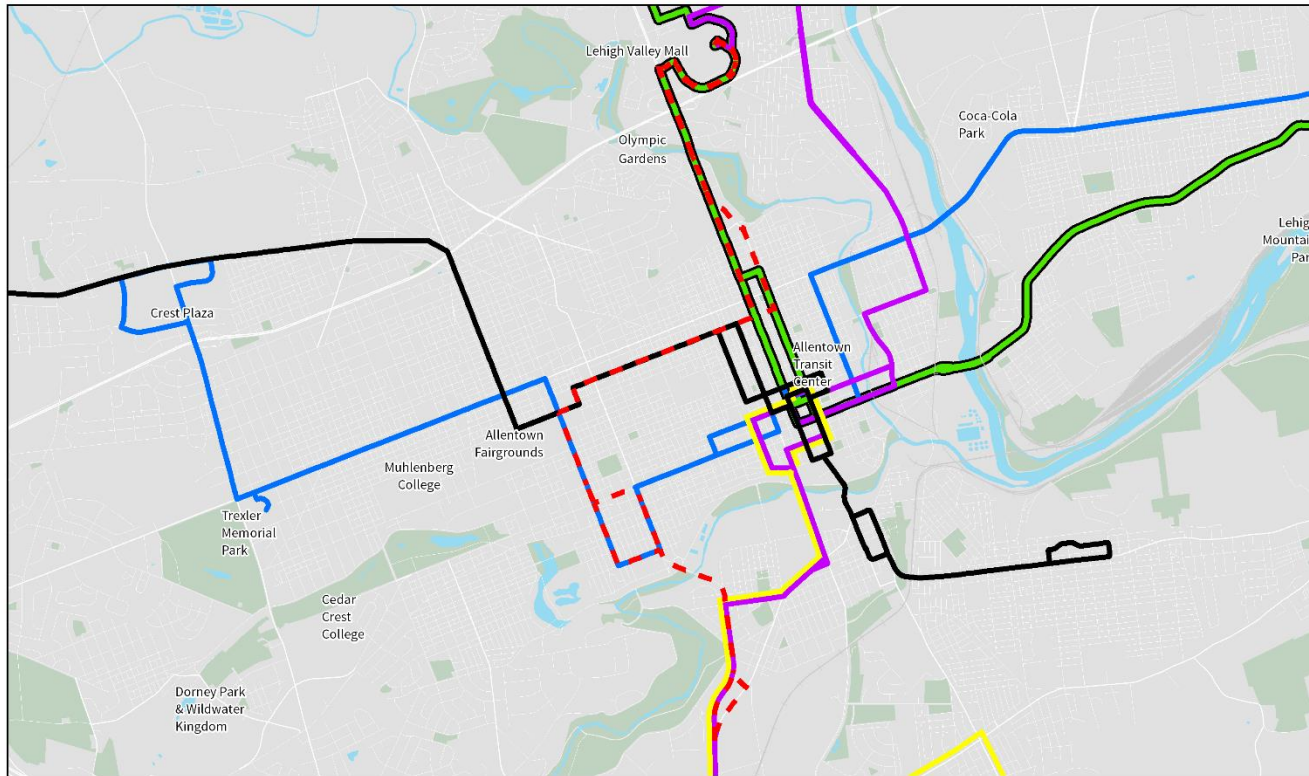
## Route Description

- Ranked 22<sup>nd</sup> (lowest on corridor) in annual ridership in the system (54,000 pax annually, 21 pax/hr).
- 56% of ridership occurs off of the EBS corridor

## Ridership Through Major Activity Centers

	Throughput Ridership	% Ridership
<b>Northbound</b>		
Lehigh Valley Hospital	12	17.6%
7 <sup>th</sup> & Allen St	19	27.9%
<b>Southbound</b>		
7 <sup>th</sup> & Allen St	35	46.1%
Lehigh Valley Hospital	32	42.1%

# Route 603 Recommendations



## ROUTE 603 RECOMMENDATION

### Recommendation

- Eliminate 603

### Service Replacements

- EBS1
- Proposed 102
- Existing 209
- Existing 210
- Existing 323

0 0.5 1  
Miles



## Recommendation Description

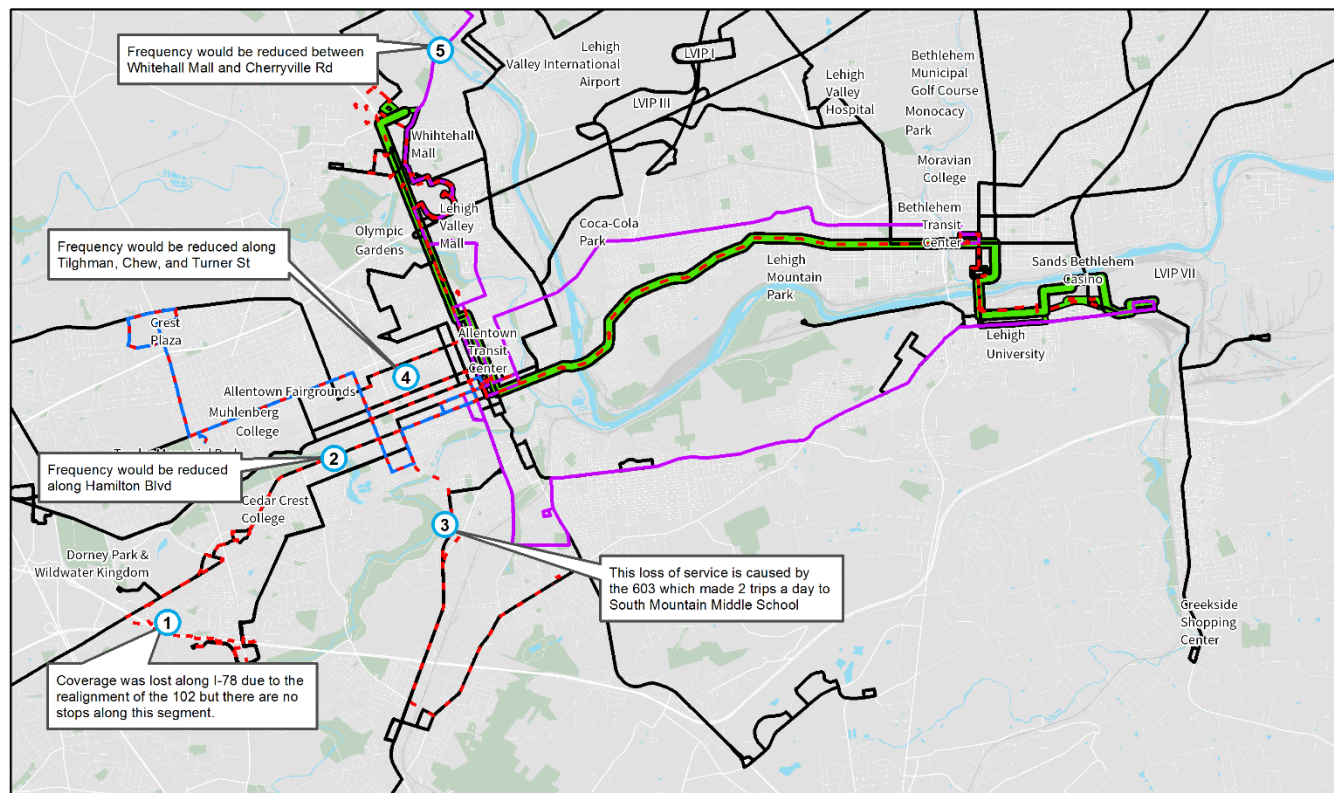
- Eliminate route.

## Ridership Impacts

- Partially replaced by the realigned Route 102.
- Service on Allen St to be provided by Route 209.



# Summary of Recommendations



## Summary

- Eliminate Routes 107 602, and 603.
- Realign Route 102 to replace service along portions of the former Route 107 and Route 603.
- Truncate Routes 103 and 220.
- Loss of service (2 trips per day) to South Mountain Middle School (eliminated Route 603)
- Reduced frequency on Chew Street, Turner Street, Allen Street, Hamilton Street, to Lehigh Valley Hospital, and to Cherry Square.

## INITIAL RECOMMENDATION SUMMARY

