



Using the SPC Regional Travel Demand Model to Analyze Changes in Transit Service

Presented to: *University Center for Social and Urban Research, University of Pittsburgh*

Presented by: *Kathleen Colbert-Gibson and Chuck Imbrogno*

December 7, 2012



AGENDA

- *Who is SPC?*
- *Regional Travel Demand Model*
- *Transit Specifications for the Regional Travel Demand Model*
- *Model Applications for Transit Case Study – PAAC 2012 Service Cuts*
- *Questions and Answers*





SPC is designated as:

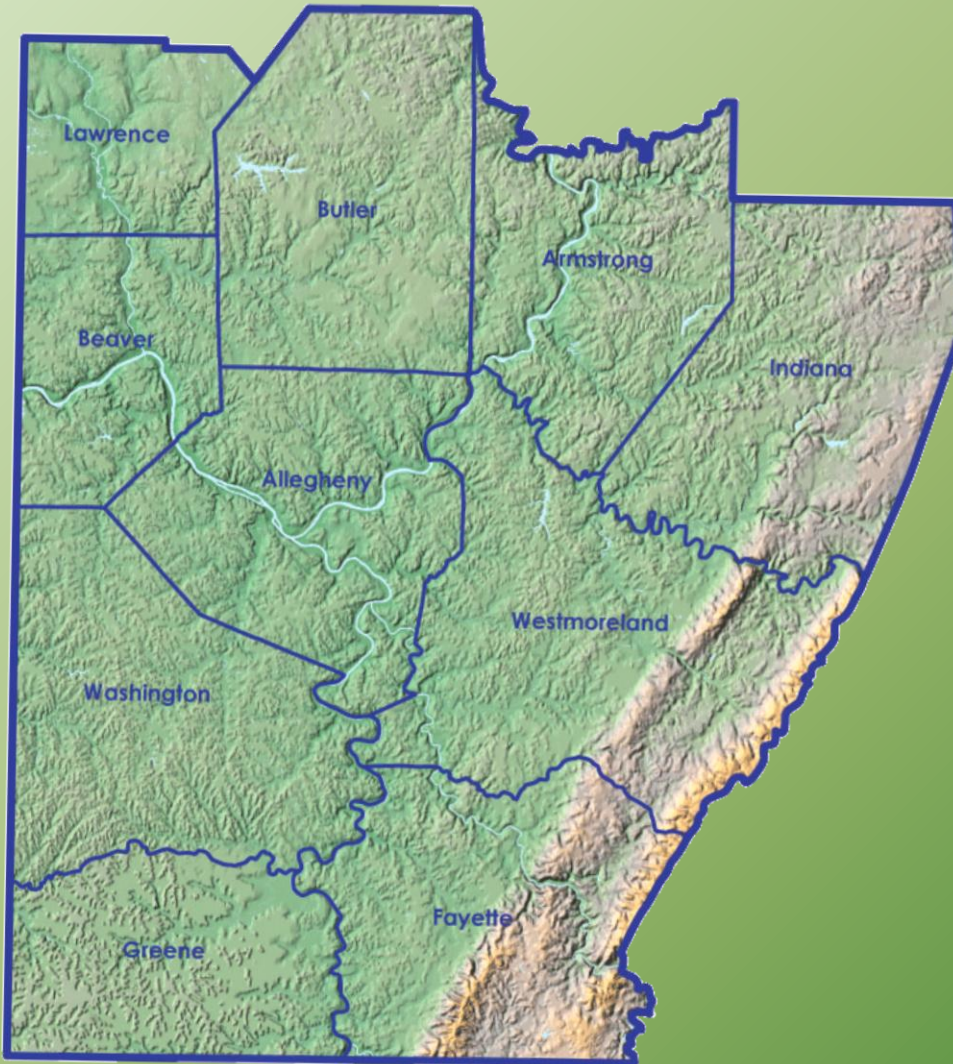
- MPO ~ Metropolitan Planning Organization
 - US Department of Transportation
 - PA Department of Transportation

- LDD ~ Local Development District
 - US Appalachian Regional Commission
 - PA Department of Community and Economic Development

- EDD ~ Economic Development District
 - US Department of Commerce, Economic Development Administration



MPO/LDD/EDD for 10-County Region

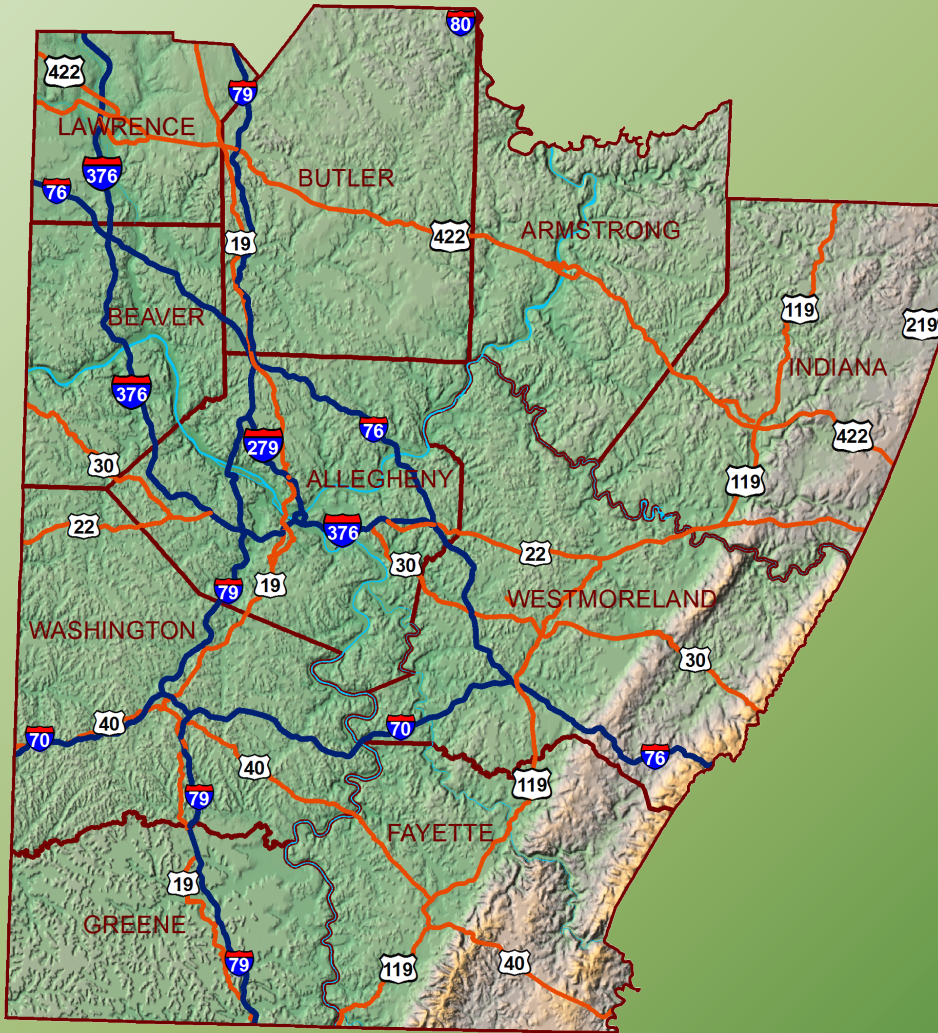


SPC Region Factoids:

- Total Land Area = 711 sq miles
- Total Population = 2.6 million
- Total Employment = 1.5 million
- Municipalities = 551
- School Districts = 125



Regional Roadway Facts

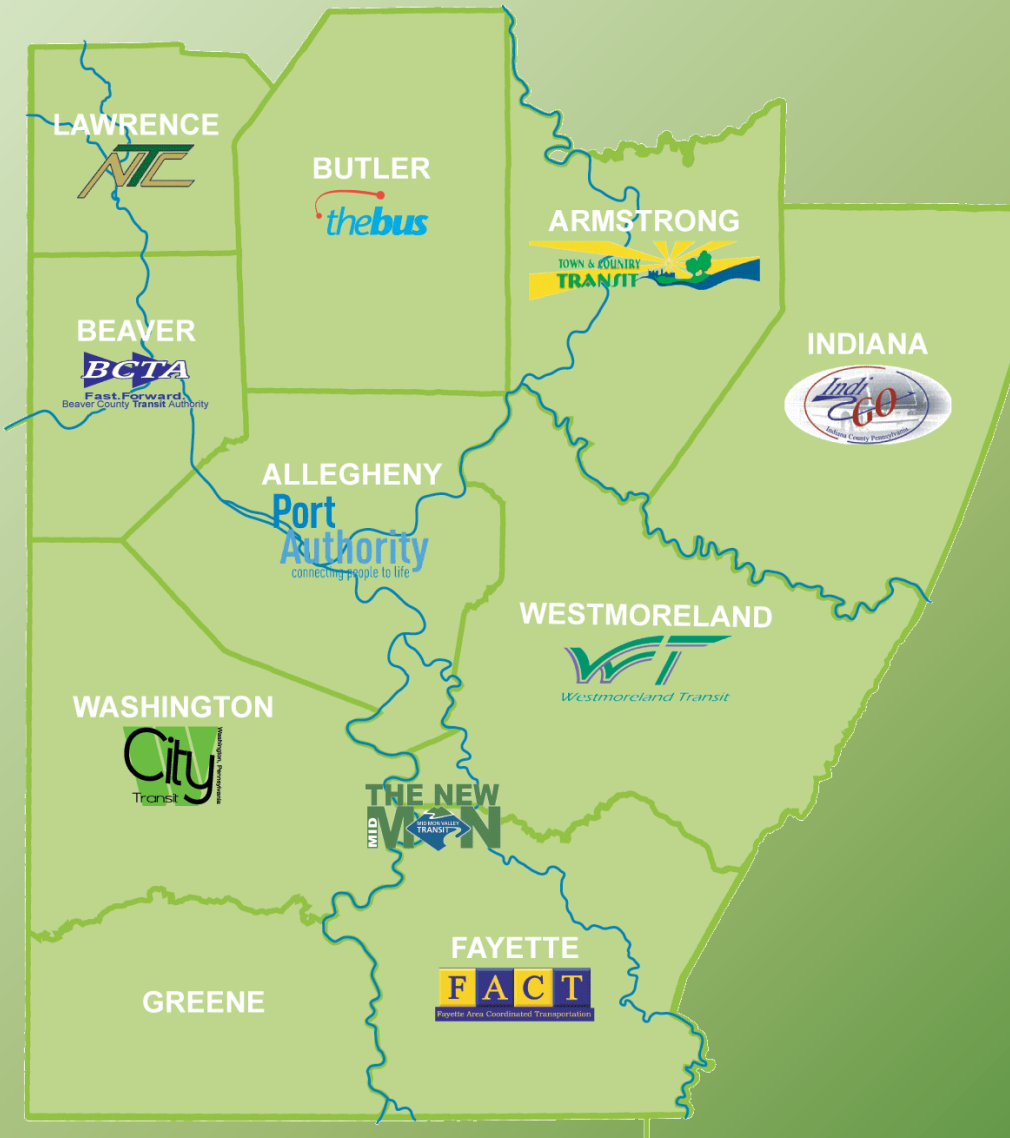


- 3 PennDOT Districts
- 25,500 miles - Roadway
 - 7,900 miles - State-owned
 - 15,800 miles - Locally-owned
 - 585 miles - Toll roads
- 54.8 million Vehicle Miles Traveled (Daily)
 - 38.6 million - State-owned
 - 12.7 million - Locally-owned
 - 3.1 million - Toll roads

(PennDOT Bureau of Planning and Research, March 2012)



Regional Public Transit Facts



- 10 Fixed Route Service Providers

- 67 Mil Transit Boardings (2010)
- 34 Mil Revenue Vehicle Miles (2010)
- 2.4 Mil Revenue Vehicle Hours (2010)
(PennDOT Bureau of Public Transportation, April 2012)

- Fixed Bus Routes
- Light Rail Transit
- Inclines

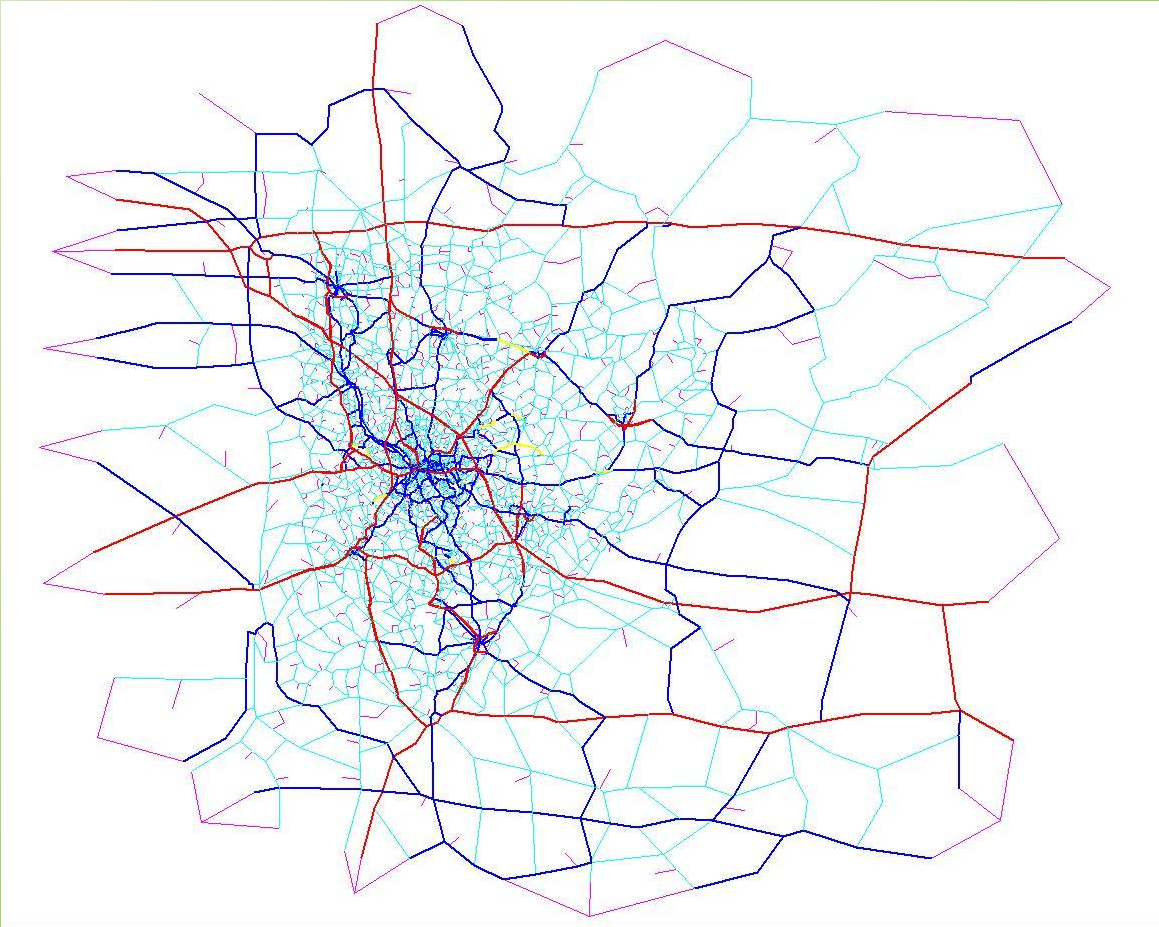




Typical Day in the SPC's Models/Data Analysis Section



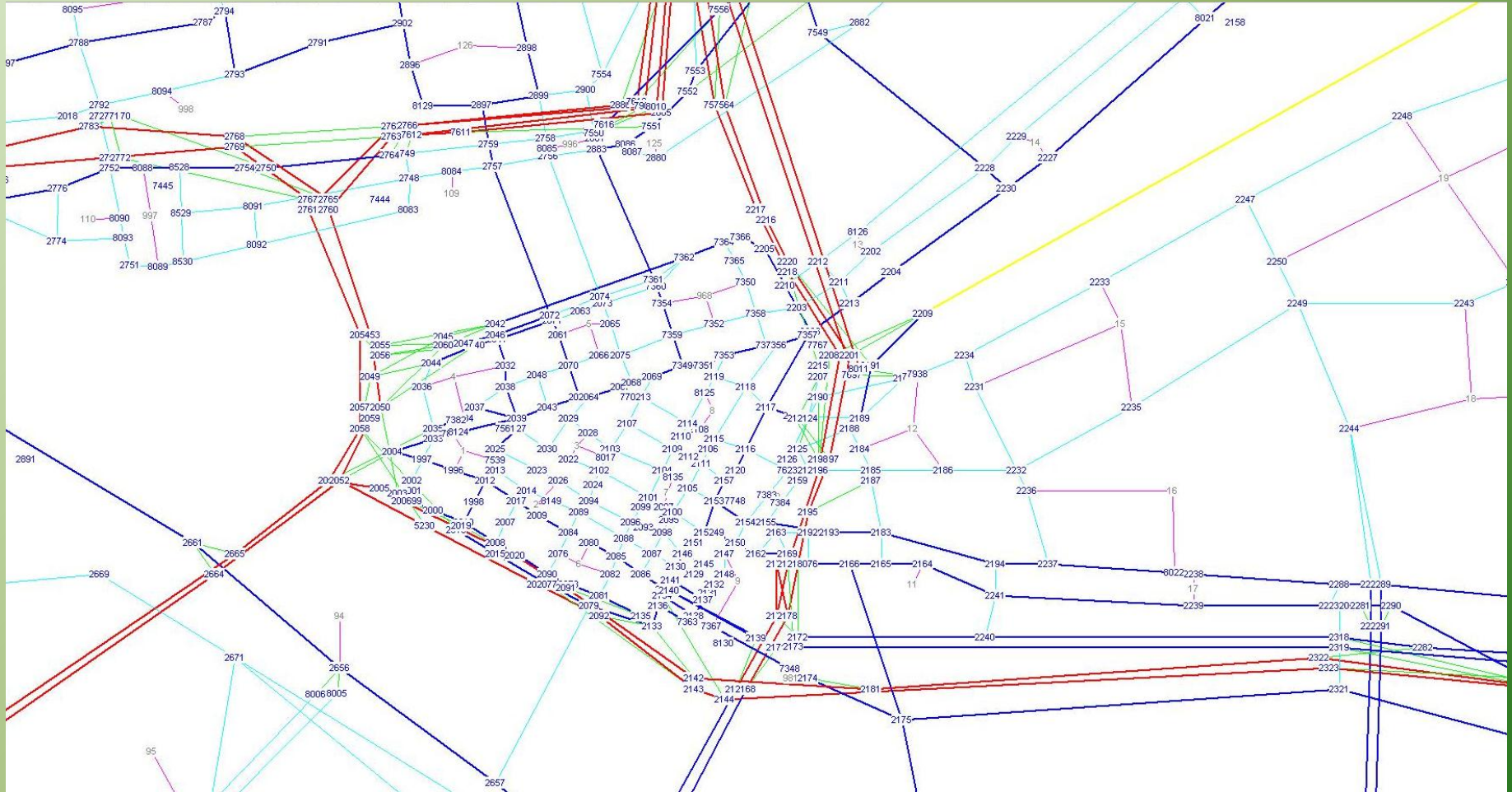
Regional Travel Demand Model



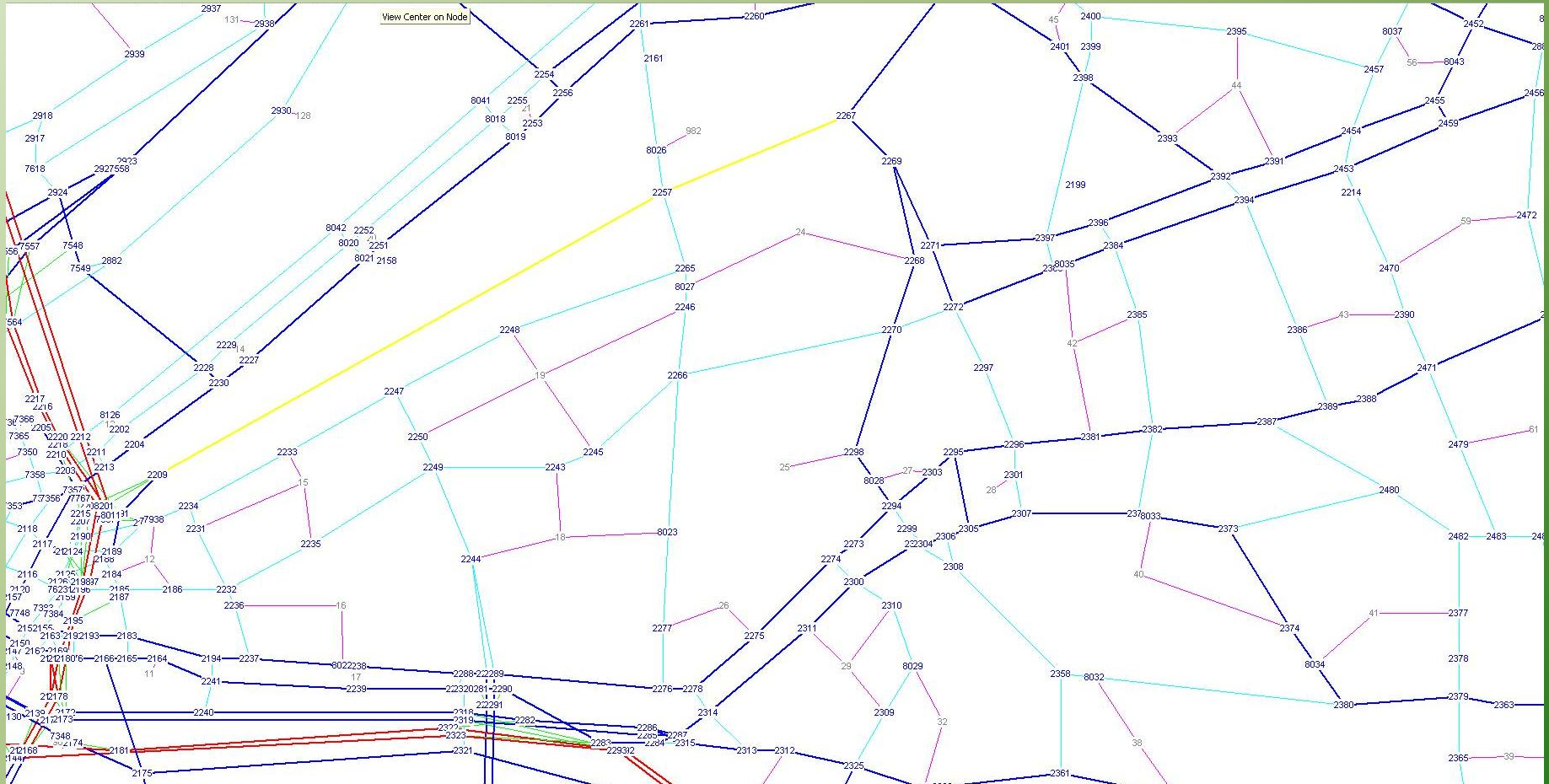
- Citilabs TP+ software
- 10-County Region
- Highway Network consists of:
 - 1,150 **Traffic Analysis Zones**
 - 23,000 **Links**
 - 9,400 **Nodes**



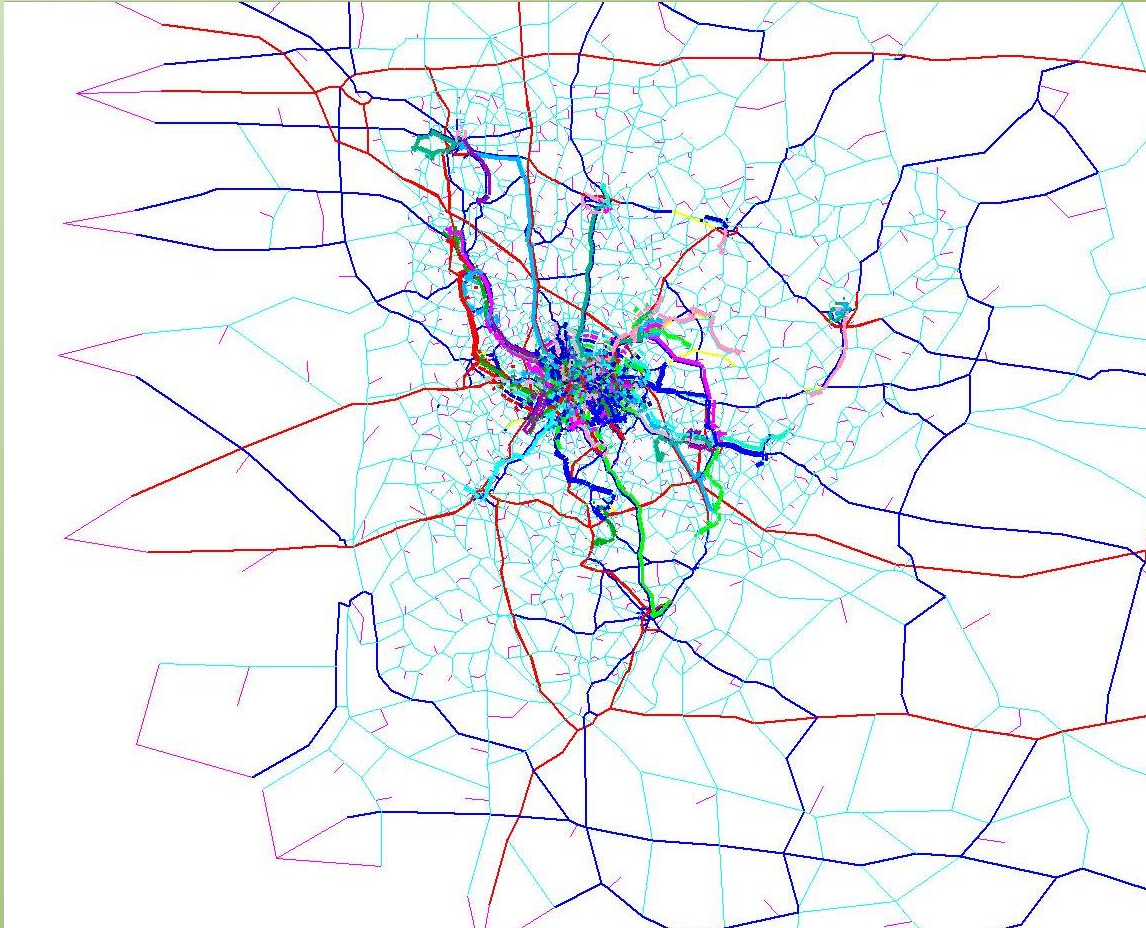
Travel Demand Model - Downtown



Travel Demand Model - Oakland



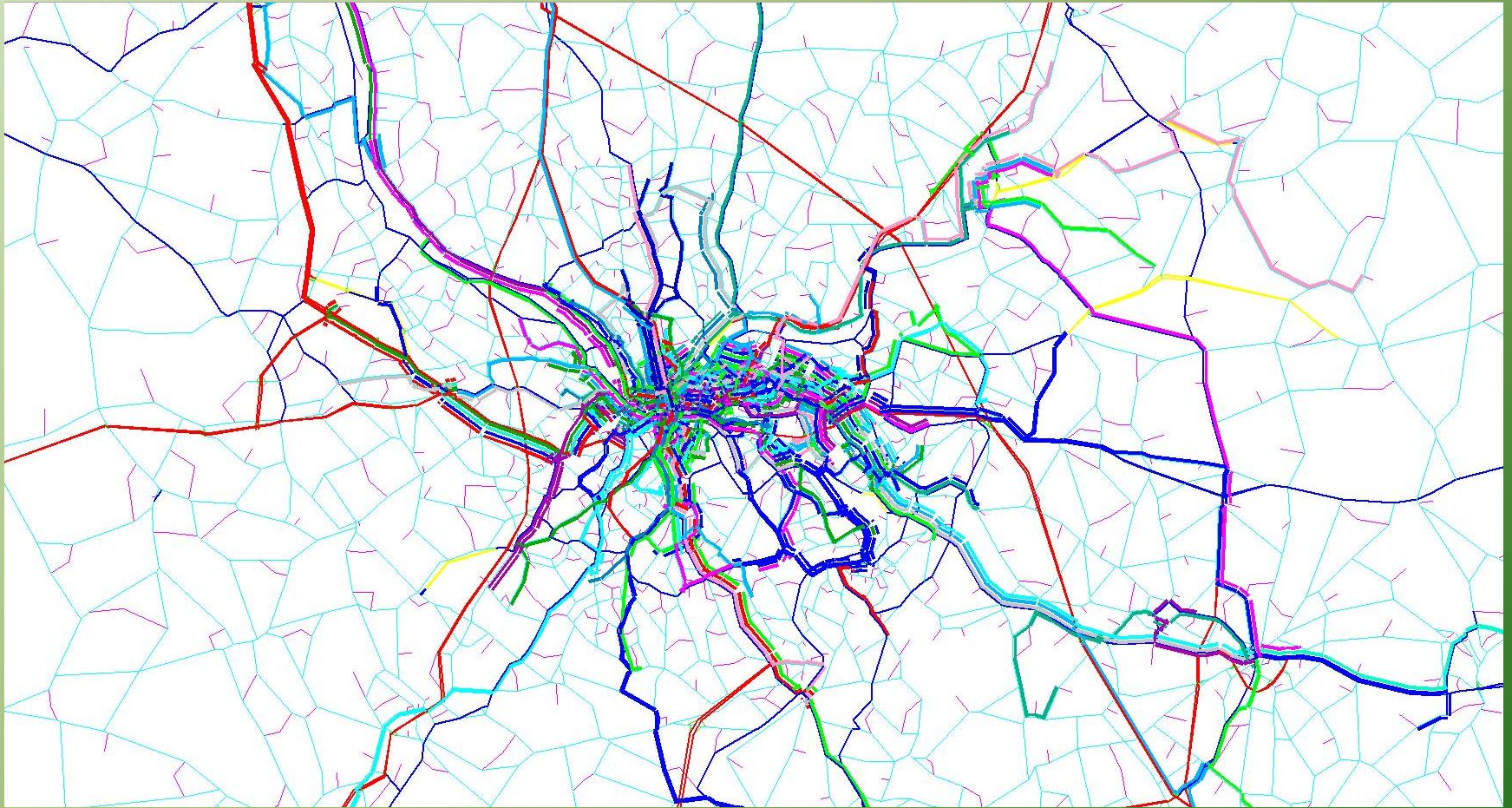
Travel Demand Model with Transit Lines



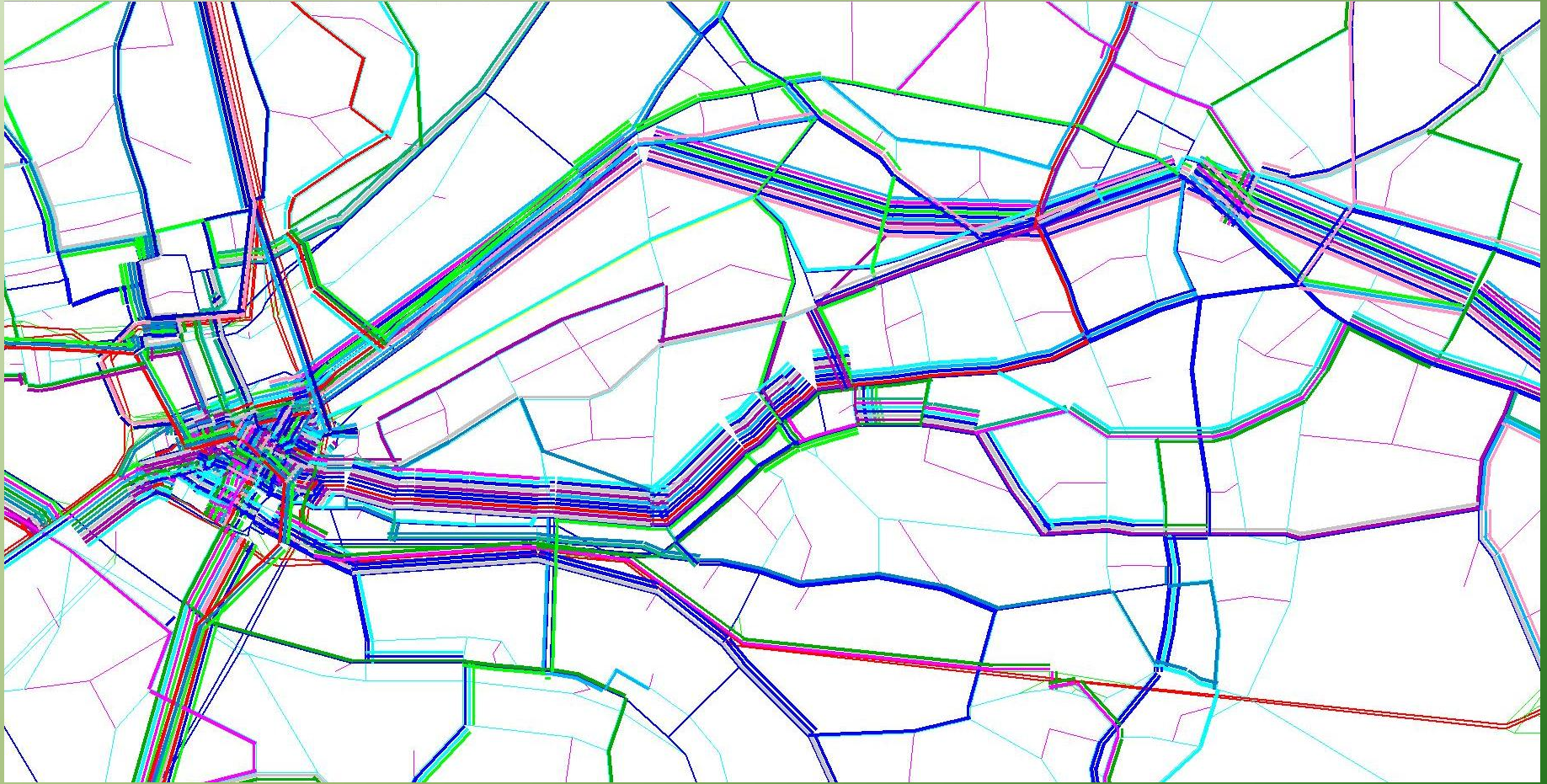
- 129 Active Routes
- 10 Fixed Route Providers
- 30 + park and ride lots
- Peak and off-peak travel
- Access via car, walk, transfer



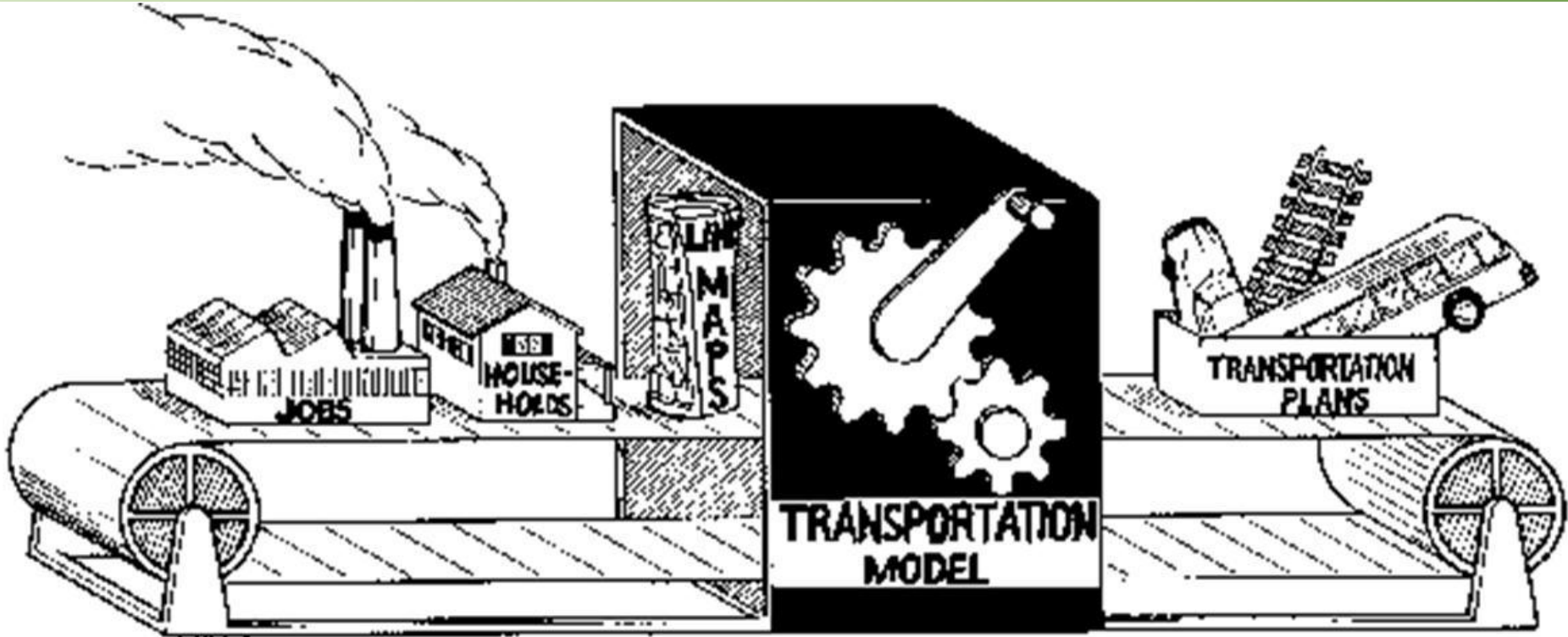
Travel Demand Model with Transit Lines



Travel Demand Model with Transit Lines



Regional Travel Demand Model



Travel Demand Model

Model Input - Transit

- Route Name
- Locational Data (Links and Nodes)
- Mode
- Owner
- Frequency
- Support Links (Walk Access, Park and Ride Access)
- Park and Ride Lots (TAZs served)





Travel Demand Model

Model Output - Transit

- Line Time
- Line Distance
- Boardings by Mode
- Passenger Miles
- Passenger Hours
- Park and Ride Lot Usage
- Zone-to-Zone Transit Trips/Mode Share
- System-wide, Corridor, Route Segment, Time Period





Model Applications

- Capital Investments
(MAGLEV, Park and Ride Lot, Commuter Rail)
- Service Planning
(Routing, Schedules, Fares, Mode Split, Strikes)
- Construction Impacts
(Project, Program)
- Air Quality Conformity/
Greenhouse Gas Emissions





Analysis of the Port Authority of Allegheny County Proposed 2012 Service Cuts





April 2012 PAAC Action

The Port Authority ... **reluctantly approved the deepest transit service cuts in its 48-year history**... scheduled to take effect **September 2** if the governor and Legislature fail to provide additional funding.

It would be ...**the third reduction in six years**and leave the region with ...**less than half of the transit service that existed before the cuts.**

Post-Gazette, April 27, 2012





Proposed Changes

- Eliminating 46 of 100 bus routes
- Dropping service to 18 PNR Lots (2,800 parking spaces)
- Reducing service on 54 bus routes, the “T” and the Monongahela & Duquesne Inclines




CURRENT SYSTEM

CURRENT SYSTEM
NOVEMBER 2011

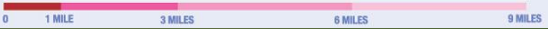
ROUTES

- 1. 1
- 2. 2
- 3. 3
- 4. 6
- 5. 7
- 6. 8
- 7. 11
- 8. 12
- 9. 13
- 10. 14
- 11. 15
- 12. 16
- 13. 17
- 14. 18
- 15. 19L
- 16. 20
- 17. 21
- 18. 22
- 19. 24
- 20. 26
- 21. 27
- 22. 20X
- 23. 29
- 24. 31
- 25. 36
- 26. 38
- 27. 39
- 28. 40
- 29. 41
- 30. 43
- 31. 44
- 32. 48
- 33. 51
- 34. 51L
- 35. 52L
- 36. 53
- 37. 53L
- 38. 54
- 39. 56
- 40. 57
- 41. 59
- 42. 59
- 43. 60
- 44. 61A
- 45. 61B
- 46. 61C
- 47. 61D
- 48. 63
- 49. 64
- 50. 65
- 51. 67
- 52. 68
- 53. 69
- 54. 71
- 55. 71A
- 56. 71B
- 57. 71C
- 58. 71D
- 59. 74
- 60. 75
- 61. 77
- 62. 78
- 63. 79
- 64. 81
- 65. 82
- 66. 83
- 67. 86
- 68. 87
- 69. 88
- 70. 89
- 71. 91
- 72. 93
- 73. BLUE
- 74. BLUE
- 75. G2
- 76. G3
- 77. G31
- 78. Incline
- 79. O1
- 80. O5
- 81. O12
- 82. P1
- 83. P2
- 84. P3
- 85. P7
- 86. P10
- 87. P12
- 88. P13
- 89. P16
- 90. P17
- 91. P67
- 92. P68
- 93. P69
- 94. P71
- 95. P76
- 96. P78
- 97. RED
- 98. Y1
- 99. Y46
- 100. Y46
- 101. Y47
- 102. Y49

LEGEND

-  Service Routes
-  Route Numbers
-  End of the Route
-  Limited Service
-  Light Rail - Surface
-  Light Rail - Subway
-  Stations
-  Park and Ride Lots

DISTANCES





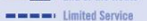
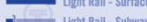


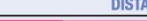

PortAuthority

WEEKDAY PROPOSED SYSTEM

WEEKDAY PROPOSED SYSTEM

- ROUTES**
1. 1
 2. 16
 3. 18
 4. 19
 5. 13
 6. 15
 7. 16
 8. 19L
 9. 24
 10. 27
 11. 28X
 12. 31
 13. 36
 14. 38
 15. 39
 16. 41
 17. 48
 18. 51
 19. 51L
 20. 54
 21. 56
 22. 57
 23. 59
 24. 61A
 25. 61B
 26. 61C
 27. 61D
 28. 65
 29. 67
 30. 71
 31. 71A
 32. 71B
 33. 71C
 34. 71D
 35. 75
 36. 77
 37. 81
 38. 82
 39. 83
 40. 86
 41. 87
 42. 88
 43. 91
 44. BLUE
 45. BLUE
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-  Light Rail - Subway
-  Stations
-  Park and Ride Lots

DISTANCES

0 1 MILE 3 MILES 6 MILES 9 MILES

PortAuthority

MARCH • 2012

CURRENT SYSTEM

CURRENT SYSTEM

NOVEMBER 2011

ROUTES

- 1. 1
- 2. 2
- 3. 3
- 4. 6
- 5. 7
- 6. 8
- 7. 11
- 8. 12
- 9. 13
- 10. 14
- 11. 15
- 12. 16
- 13. 17
- 14. 18
- 15. 19L
- 16. 20
- 17. 21
- 18. 22
- 19. 24
- 20. 25
- 21. 27
- 22. 28X
- 23. 29
- 24. 31
- 25. 38
- 26. 38
- 27. 39
- 28. 40
- 29. 41
- 30. 43
- 31. 44
- 32. 48
- 33. 51
- 34. 51L
- 35. 52L
- 36. 53
- 37. 54
- 38. 56
- 39. 57
- 40. 58
- 41. 59
- 42. 60
- 43. 61A
- 44. 61B
- 45. 61C
- 46. 61D
- 47. 63
- 48. 64
- 49. 65
- 50. 67
- 51. 68
- 52. 69
- 53. 71
- 54. 71A
- 55. 71B
- 56. 71C
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- 59. 75
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- 92. P69
- 93. P71
- 94. P74
- 95. P76
- 96. P78
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LEGEND

- Service Routes
- Route Numbers
- End of the Route
- Limited Service
- Light Rail - Surface
- Light Rail - Subway
- Stations
- Park and Ride Lots

DISTANCES



PortAuthority

NOVEMBER • 2011

WEEKDAY PROPOSED SYSTEM

7 Routes Lost
**05, 4, 7, 11,
 14, 17, 18**

3 Routes Lost
P10, P13, 2

20 Routes Lost
**P12, P16, P17,
 P67, P68, P69,
 P71, P76, P78,
 58, 60, 63, 64,
 68, 69, 74, 78
 79, 89, 93**

4 Routes Lost
G3, 20, 21, 22

8 Routes Lost
Y45, 40, 43, 44, 52L, 53, 53L, 60

4 Routes Lost
G31, 26, 29, 38

WEEKDAY PROPOSED SYSTEM

- ROUTES**
- 1.
 - 2.
 - 3.
 - 12
 - 13
 - 15
 - 16
 - 19L
 - 24
 - 27
 - 28X
 - 31
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 - 39
 - 41
 - 48
 - 51
 - 51L
 - 54
 - 56
 - 57
 - 59
 - 61A
 - 61B
 - 61C
 - 61D
 - 65
 - 67
 - 71
 - 71A
 - 71B
 - 71C
 - 71D
 - 75
 - 77
 - 81
 - 82
 - 83
 - 86
 - 87
 - 88
 - 91
 - 94
 - 95
 - 96
 - 97
 - 98
 - 99
 - 01
 - 012
 - P1
 - P2
 - P3
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 - Y49

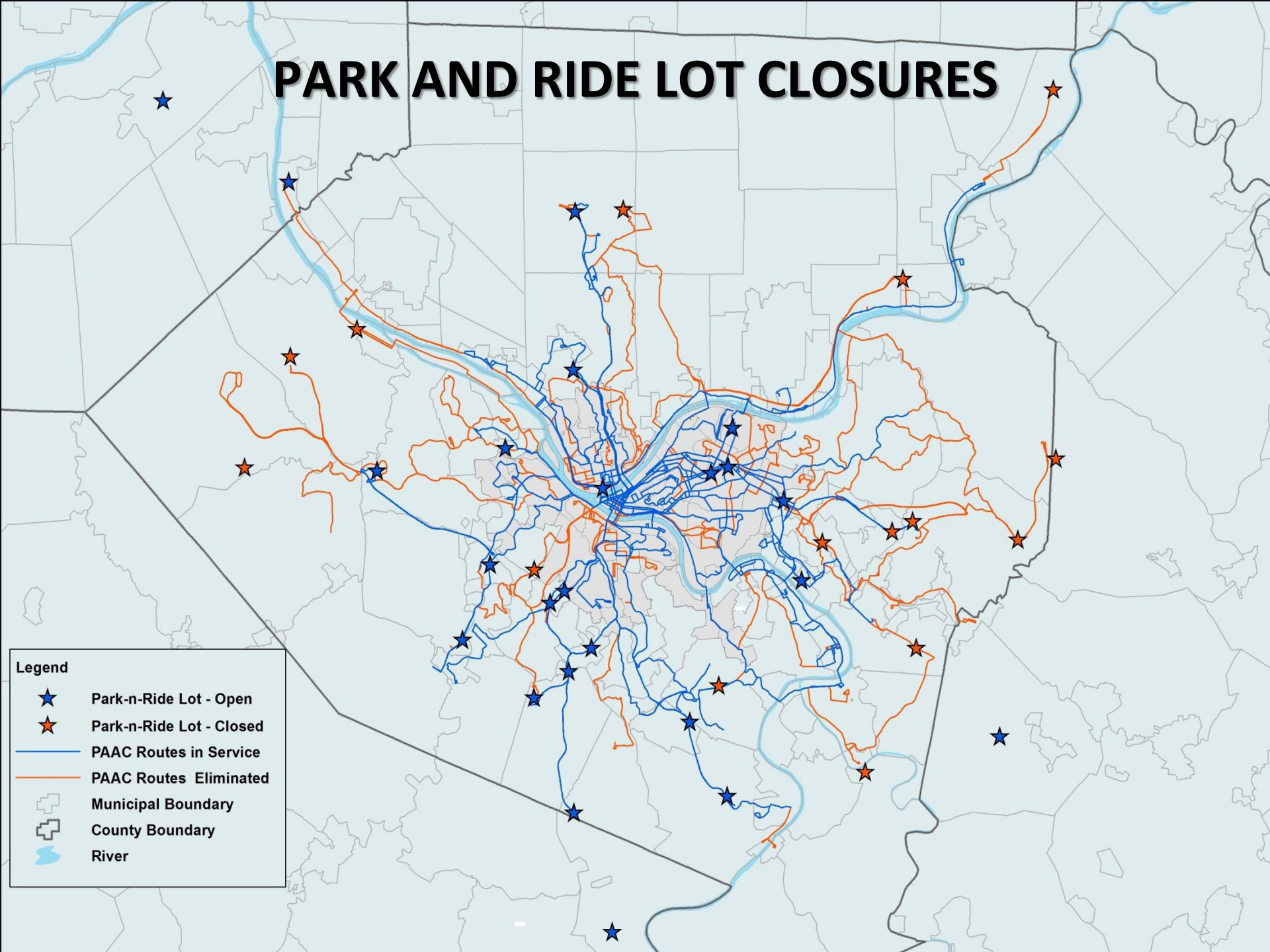
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- Stations
- Park and Ride Lots

DISTANCES

0 1 MILE 3 MILES 6 MILES 9 MILES

PARK AND RIDE LOT CLOSURES





Impact Analysis

- **SPC Regional Travel Demand Model**
- **Two Scenarios**
 - Before Transit Cuts
 - After Transit Cuts
- **Assumptions**
 - Headways for peak and non-peak trips adjusted on operational routes
 - North Shore Connector in service
 - Catchment areas for select park and ride lots expanded
 - Added automobile trips analyzed as peak hour trips
 - No adjustments to non-PAAC routes



Analysis Results

Regional Level

- **18.9% Drop in Daily Transit Person Trips**
(from 159,800 to 129,600 trips)



- **18.5% Drop in Daily Transit Boardings**
(from 214,300 to 174,600 riders)

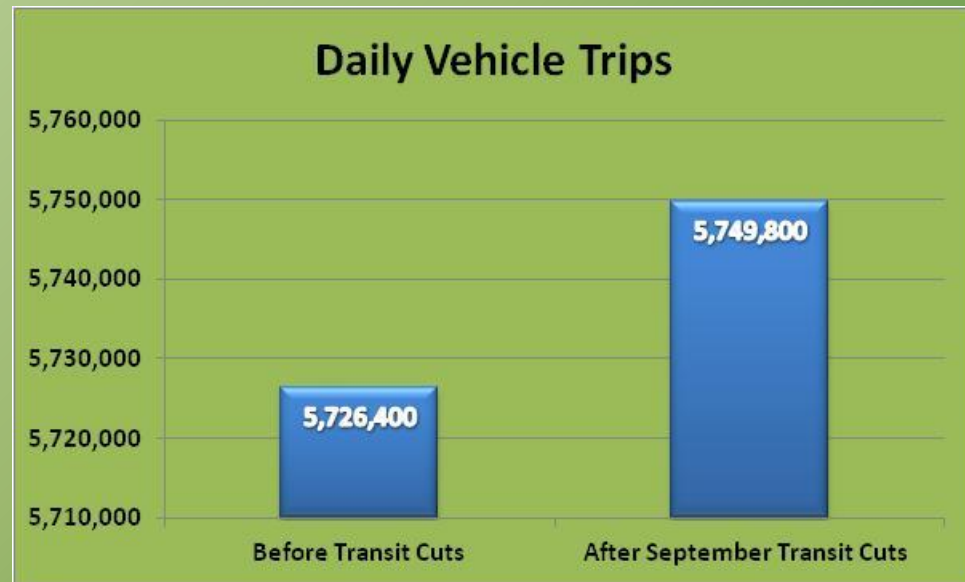




Analysis Results

Regional Level

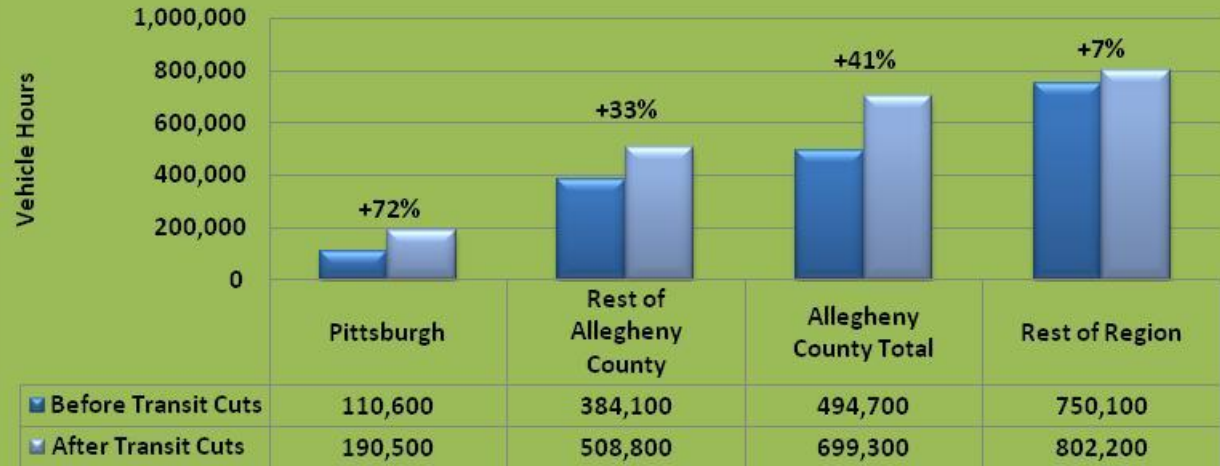
- Daily auto trips increase by 23,400 from 5,726,400 (*less than 1% change*)



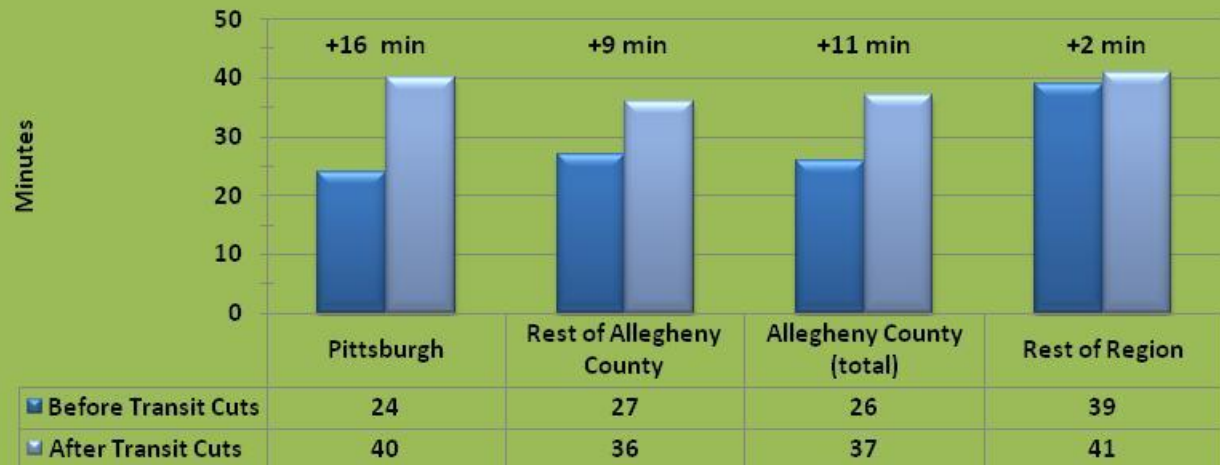
Analysis Results

City/County Level

Peak Period Vehicle Hours Traveled



Peak Period Travel Time (Average)



Analysis Results

Downtown Pittsburgh

- Daily Transit Person Trips into the CBD drop by 15,700 from 75,700 trips (20.7%)
- Daily Auto Trips into the CBD increase by 12,300 from 157,600 trips (7.8%)

Oakland

- Daily Transit Person Trips to Oakland drop by 2,700 from 19,200 trips (14.2%)
- Daily Auto Trips to Oakland increase by 2,200 trips from 114,500 trips (2.0%)

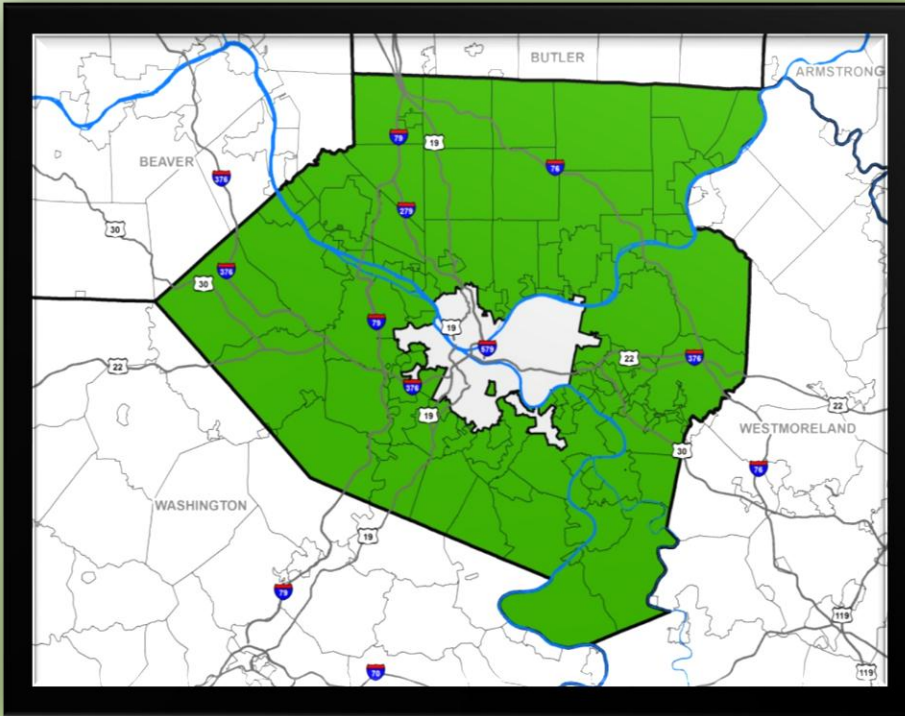


Downtown Pittsburgh and Oakland

Change in Peak Period Travel Time (Increase in Minutes)



Allegheny County (outside of Pittsburgh)

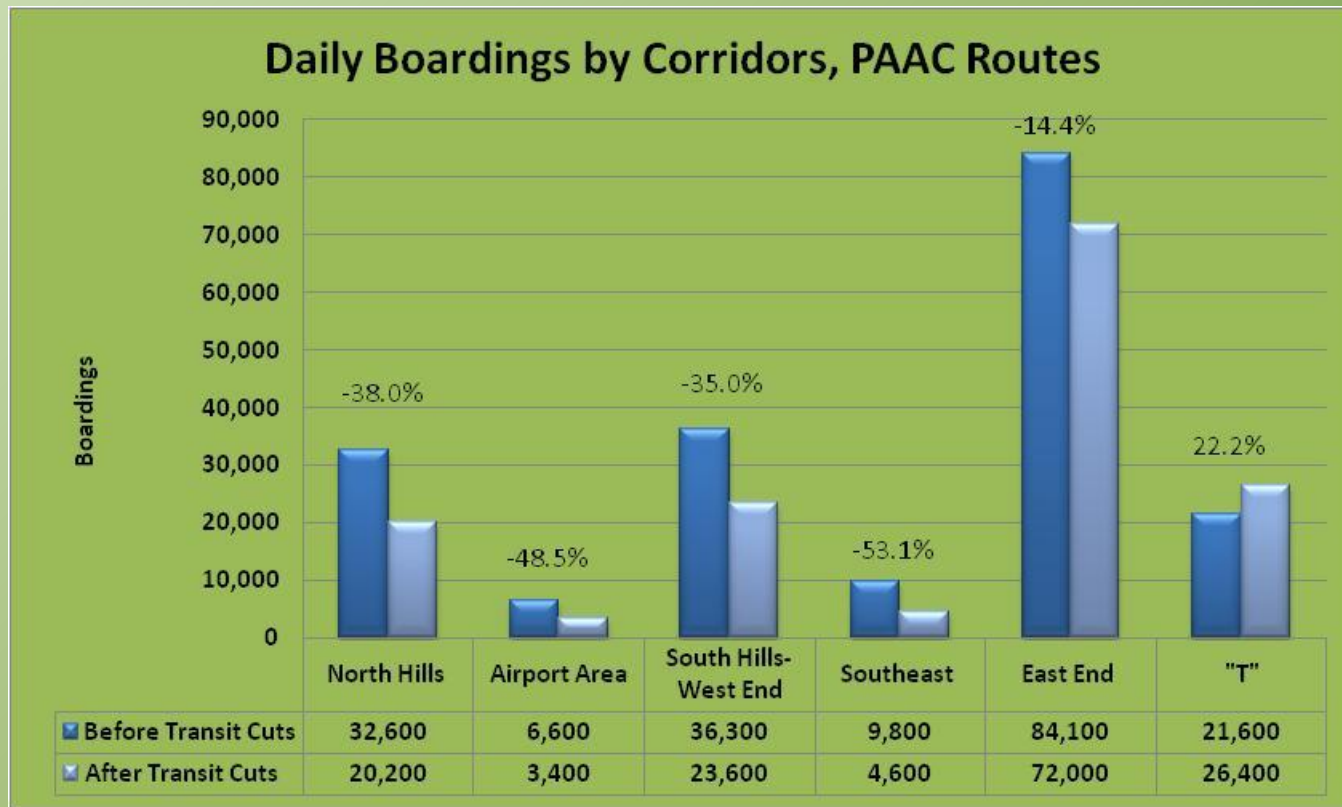


- Daily transit person trips originating in suburban Allegheny County drop by 20,500 from 62,600 trips (32.8%).
- Daily auto trips starting in the suburbs increase by 16,100 from 2,060,100 trips (0.78%).



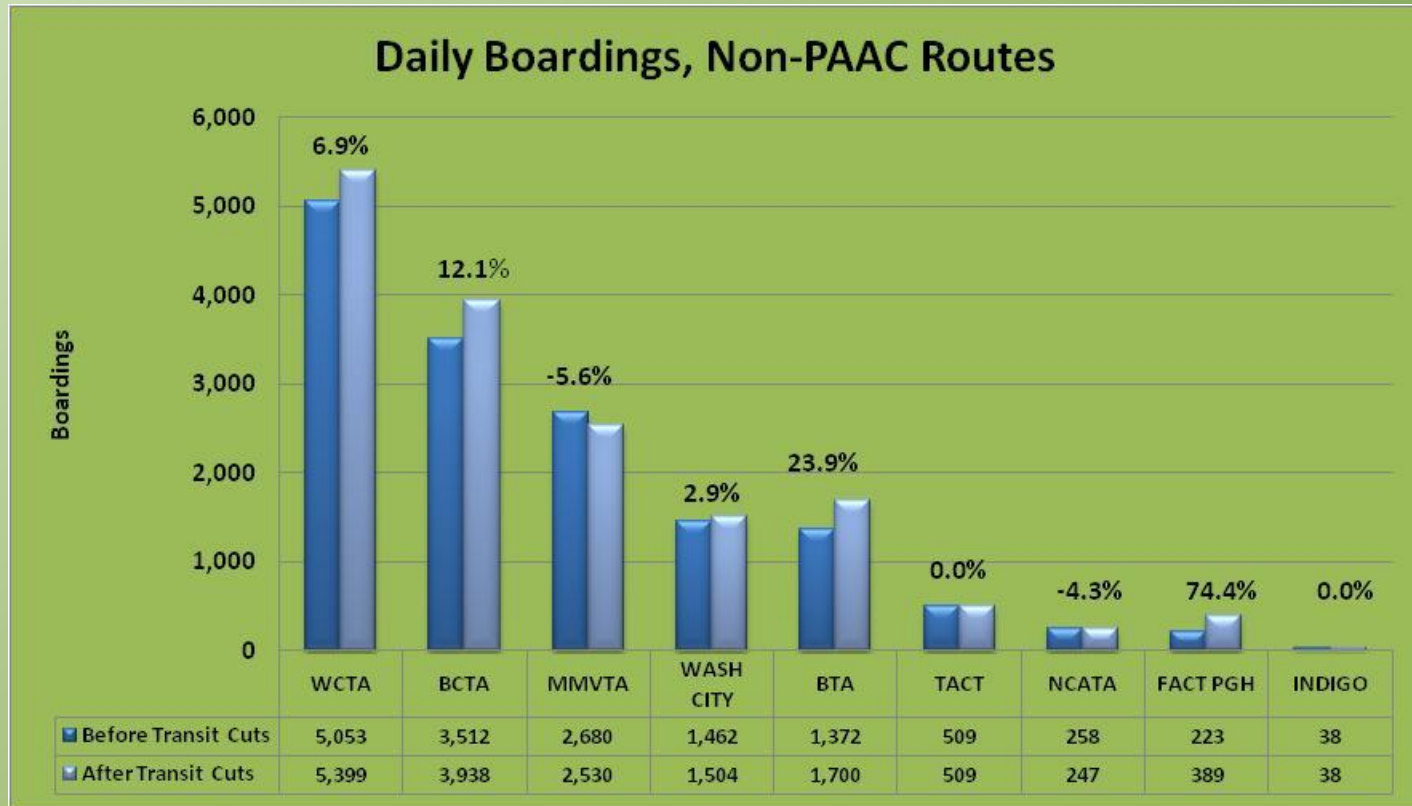
Analysis Results

Changes in Daily Boardings



Analysis Results

Changes in Daily Boardings, Other Transit Providers



Analysis Results

Downtown Pittsburgh Parking

- Downtown parking supply estimated to be **38,000 parking spaces** (off-street parking, excluding Strip District)
- Pittsburgh Public Parking Authority (PPA) manages **8,200 spaces**
- Number of available PPA spaces is roughly **10%** of total spaces on any given day (based on 2011 monthly inventories)

Therefore...

number of available parking spaces
= 3,800

(38,000 x 0.10 = 3,800 spaces)



Analysis Results Downtown Pittsburgh Parking



Garage	4-Jun-12	5-Jun-12	6-Jun-12	7-Jun-12	8-Jun-12
	8:54 AM	8:57 AM	10:06 AM	8:44 am	8:07 am
	Monday	Tuesday	Wednesday	Thursday	Friday
6th and Penn	54	0	0	0	0
9th and Penn	0	0	0	0	0
Convention Center	281	140	0	169	196
Ft Duquesne & Sixth	0	0	0	0	0
General Robinson	0	0	0	0	0
Grant St. Transp. Center	615	617	368	643	566
Northshore Garage	99	92	61	99	111
Smithfield and Liberty	107	0	0	0	0
Theater Square	108	91	0	0	54
Three PNC Plaza	0	0	0	0	41
Town Place (4 Stanwix)	46	0	0	0	0

Garage	7-Dec-12	7-Dec-12	7-Dec-12
	8:08 AM	8:53 AM	10:06 AM
	Friday	Friday	Friday
6th and Penn	80	54	49
9th and Penn	0	0	0
First Ave Station	402	218	N/A
Convention Center	N/A	N/A	N/A
Ft Duquesne & Sixth	0	0	0
General Robinson	119	81	0
Grant St. Transp. Center	745	593	500
Mellon Square	185	164	N/A
Northshore Garage	136	103	91
Oliver	135	56	N/A
Smithfield and Liberty	0	0	0
Theater Square	74	0	0
Three PNC Plaza	0	0	0
Town Place (4 Stanwix)	43	0	0

Source: Pittsburgh Downtown Partnership,
<http://parkpgh.org>



Expectations

- Fewer transit riders
- More cars
- More congestion
- Longer commute times to region's core
- Greater demand for limited downtown Pittsburgh parking spaces
- More competition for fewer park-n-ride lot spaces





Questions

**For more information, contact:
Kathleen Colbert-Gibson
412-391-5590**

