



## Summary of Transportation Modeling Efforts Associated with Land Use Scenarios

### NOTE:

The methodology described in this report was used for the plan's original adoption in 2008 as well as the update of the Transportation Element in 2013.



URS was responsible for the transportation modeling associated with the land use scenarios developed in the comprehensive planning process of Allegheny Places. The following describes the methodology and summarizes the results of the modeling effort.

To analyze the transportation implications of various proposed land use scenarios on the roadway system, a traffic modeling methodology was established that worked in conjunction with the Southwestern Pennsylvania Commission's (SPC) transportation model. SPC provided its current highway network files, as well as data files and trip tables related to their current socio-economic forecast, Cycle 7. With these files a comparison between the proposed land use scenarios and SPC's land use forecast could be performed as well as providing a base from which the proposed land use scenarios could be projected.

As part of their modeling process, SPC translated their socio-economic forecast into trips, which may use various modes of travel. The trips, called productions and attractions, represent all of the trips that are generated by and attracted to the residences and/or employment in a zone. For vehicle trips, SPC developed vehicle trip tables that were imported into their highway network to generate a traffic forecast. The trip tables are organized by traffic analysis zones, or TAZs. A TAZ is an area, usually representing a municipality or part of a municipality, for which SPC develops its socio-economic forecast and trip tables. SPC has broken Allegheny County into 465 separate TAZs.

The traffic modeling methodology developed to analyze the Comprehensive Plan forecast for each proposed land use scenario followed the SPC process very closely. In order to replicate the SPC modeling process, the proposed land use scenarios had to be converted into a format that would fit into SPC's process. ArcGIS was used to associate the spatial distribution of residences and employment areas in the scenario to the TAZs developed by SPC.

The association of the proposed land use scenario to the TAZ enabled the proposed land use scenarios to be examined for differences from the land use forecast projected by SPC. The housing and employment projected for each TAZ in the Comprehensive Plan forecast was compared to SPC's Cycle 7 forecast. A factor was developed to relate the SPC Cycle 7 forecasted housing to the Comprehensive Plan forecasted housing in each TAZ. Also, another factor was developed to relate the employment in each TAZ between the two forecasts. The housing factors and the employment factors for each of the 465 TAZs were compiled into a matrix.

The factors matrix was used to adjust the productions and attractions in the SPC Cycle 7 trip tables. The new factored trip table now reflected the Comprehensive Plan forecast, in that the trips were altered for the housing and employment for that particular land use scenario. This process was repeated for each of the proposed land use scenarios.

In addition to trip tables, a highway network is needed to generate a traffic forecast. The current highway network used by SPC was obtained. It was decided that any transportation project that was included on SPC's Transportation Improvement Program (TIP) would be coded in the highway network. Once the highway network was updated, the new factored trip table could be used with it to generate a traffic forecast for each land use scenario.

The following Allegheny Places Land Use Scenarios were used in the modeling effort:

- Trend Scenario
- Good Old Places
- Hot New Places
- River Places
- Transit Places
- Blended
- Composite
- Final

The Trend scenario was modeled with and without the Mon Fayette Expressway. Based on the results, it was decided to model the rest of the scenarios with the Mon Fayette Expressway included the roadway network.

Measures of Effectiveness were identified to compare the 2005 base year with the plan horizon year of 2025. These performance measures included the following items:

- **Fuel Consumption (Gal.)**
- Lane Miles @ Level of Service A-D
- Lane Miles @ Level of Service E-F
- **Total Lane Miles**
- **Total Delay (Hours)**
- Delay @ Level of Service A-D (Hours)
- **Delay @ Level of Service E-F (Hours)**
- **Total Vehicle Hours Traveled (VHT)**



- Vehicle Miles Traveled (VMT) @ Level of Service A-D
- **Vehicle Miles Traveled (VMT) @ Level of Service S E-F**
- **Total Vehicle Miles Traveled (VMT)**
- Average Speed

Table 1 contains a summary of the measures, which includes the bolded items above. Traffic volumes for average weekday traffic (AWDT) were identified for 19 corridors throughout Allegheny County to determine how volumes on certain corridors would be affected by the development patterns which comprise each scenario. Table 2 shows the corridor and location along the corridor where the volume was recorded.

Accessibility to activity centers was also determined from the modeling effort. The number of households and jobs within 30 minutes of each activity center is shown in Tables 3 and 4.

Transit ridership was estimated for each scenario by using the applying the 2000 Census Journey-to-Work data by municipality to SPC's Population Forecast. The daily ridership information is shown in Table 5.

This information was important in the evaluation of scenarios and helpful in the identification of transportation projects to include in Allegheny Places.


**Allegheny County Comprehensive Plan  
Transportation Performance Measures  
Table 1**

	2005	2025								
	Base	Trend with MFE	Trend without MFE	Good Old Places	Hot New Places	River Places	Transit Places	Blended	Composite	Final
Total VMT	24,254,563	42,405,570	42,328,949	32,964,876	33,726,529	32,240,595	36,182,534	37,574,460	38,765,452	38,709,386
VMT @ LOS E-F	4,061,646	18,354,362	19,543,506	9,510,926	8,097,262	9,294,241	13,063,260	12,356,523	14,357,106	14,616,145
Fuel Consumption (Gal.)	1,406,765	2,459,523	2,455,079	1,911,963	1,956,139	1,869,954	2,098,587	2,179,319	2,248,396	2,245,144
Total Lane Miles	4,182	4,328	4,212	4,328	4,328	4,328	4,328	4,328	4,328	4,328
Total Delay (Hours)	35,354	6,905,690	6,969,573	1,286,956	122,749	2,603,913	10,424,079	1,244,491	969,424	1,846,531
Delay @ LOS E-F (Hours)	22,311	3,354,549	3,173,616	1,264,321	96,091	2,577,163	10,388,376	1,205,486	766,623	1,200,054
Total VHT (Hours)	817,345	8,250,690	8,330,890	2,341,610	1,197,796	3,638,618	11,573,000	2,442,580	2,204,982	3,083,103

 = Lowest  
 = Highest  
 = Base Year Higher than Forecast

**Allegheny County Comprehensive Plan  
Transportation Performance Measures  
Table 2 - AWDT by Corridor**

Corridor	Location	Link Between Nodes:	2005		Trend with MFE	Trend without MFE	2025		River Places	Transit Places	Blended	Composite	2025 Final
			Base	Nodes			Good Old Places	Hot New Places					
Parkway West (I-279, SR 22, US 30)	Fort Pitt Tunnels	1689 & 1685	118,900	1664	151,000	153,900	150,300	139,300	148,700	168,400	133,400	140,380	148,100
Parkway West (I-279, SR 22, US 30)	West of I-79	2844 & 7091	95,195	7251 & 2845	201,200	203,000	115,300	149,800	109,600	140,900	120,300	159,900	176,259
PA 60	Pittsburgh International Airport	6878 & 7116	72,100	6880 & 7114	239,300	246,800	73,700	78,500	72,400	83,900	108,400	165,500	187,700
Parkway East (I-376)	Squirrel Hill Tunnels	6816 & 1370	109,000	6815 & 1371	112,600	131,100	113,900	107,300	119,000	117,900	111,400	110,270	106,500
PA 51 (Saw Mill Run Blvd)	Liberty Tunnels	1619 & 1623	40,800	1623 & 1619	44,100	47,800	47,000	43,300	45,100	50,400	46,700	47,630	48,400
PA 28	31st St Bridge	1931 & 3206	44,600	3206 & 1931	73,600	74,800	77,700	78,100	83,500	83,500	92,600	80,920	72,200
PA 885 (Lebanon Church Rd)	PA 51	2604 & 2474	30,000	2604 & 2474	32,000	34,400	34,600	30,000	33,100	35,200	32,200	37,370	32,700
US 19 (Banksville Rd)	Parkway West	1676 & 1682	33,900	1682 & 1676	36,800	38,600	38,800	36,200	37,700	43,800	37,800	37,350	38,900
US 19 Truck (West Liberty Ave)	Liberty Tunnels	1692 & 1695	35,500	1695 & 1692	49,100	48,800	40,700	41,800	40,100	42,200	40,100	43,160	45,800
Liberty Bridge		1618 & 1167	56,500	1168 & 1617	72,000	73,200	74,500	62,800	73,400	69,600	64,800	64,900	70,500
PA 65	McKees Rocks Bridge	1851 & 1861	34,500	1861 & 1851	53,900	54,200	48,100	49,600	48,900	50,000	45,700	48,780	54,200
PA 8	Etna	3222 & 3223	40,500	3222 & 3223	50,500	51,300	55,500	50,500	53,200	55,400	49,100	46,500	49,300
PA 837 (Duquesne Blvd/8th Ave/Carson St)	Kennywood	2448 & 2444	17,700	2444 & 2448	19,300	26,400	15,700	15,400	19,100	17,300	17,400	18,100	17,100
US 30	Westinghouse Bridge	2216 & 2250	20,300	2250 & 2216	22,000	28,100	18,200	16,200	18,800	20,700	20,200	20,890	18,600
PA 121 (Greentree Rd/Cochran Rd)	Parkway West	2697 & 2680	27,600	2680 & 2697	32,000	32,000	32,200	30,100	28,600	30,400	27,700	28,830	26,100
PA 88 (Library Rd)	PA 51	1653 & 1651	19,300	1653 & 1651	23,000	22,600	19,700	20,900	20,500	25,700	23,400	23,930	24,800
Business US 22	Monroeville Mall/Thompson Run Bridge	2057 & 7205	23,700	7205 & 2057	15,800	23,700	15,500	13,500	15,900	10,600	17,300	15,710	15,600
I-79	Neville Island Bridge	3015 & 6531	60,300	6531 & 3017	125,400	127,600	73,200	86,100	75,200	95,900	89,900	99,410	104,700
I-79	Wexford	6532 & 3158	102,200	3158 & 6532	168,900	158,400	124,200	131,700	124,100	146,300	137,900	137,230	144,700
Parkway North (I-279)	McKnight Rd	6578 & 6584	76,200	6578 & 6584	102,400	102,400	96,600	99,200	97,800	97,100	96,000	94,400	101,300

 = Lowest Future AWDT  
 = Highest Future AWDT  
 = Base Year Higher than Forecast






**Allegheny County Comprehensive Plan  
Transportation Performance Measures  
Table 3 - Households within 30 minutes**

Activity Center	Zone	2025											Final
		Base	Trend with MFE	Trend without MFE	Good Old Places	Hot New Places	River Places	Transit Places	Blended	Composite			
Downtown	7	518,626	486,777	469,563	521,409	524,673	506,994	505,328	502,568	502,924	484,615		
Oakland	27	468,279	446,088	436,588	448,306	472,062	452,569	440,026	456,619	447,973	457,378		
Monroeville	182	400,487	420,838	350,316	422,039	456,537	420,209	396,134	427,125	426,931	435,771		
Wilkinsburg	149	441,857	425,990	395,917	419,030	454,836	404,492	433,399	437,725	437,399	437,725		
South Hills Village	266	350,103	307,700	303,520	327,024	327,174	330,067	272,926	336,130	323,996	313,228		
Allegheny County Airport	237	371,053	408,628	340,578	408,827	416,141	410,559	405,594	414,302	411,064	411,166		
McKeesport	203	299,000	316,405	280,348	308,518	332,292	307,772	290,405	315,569	312,056	316,490		
Robinson	329	370,413	99,871	90,917	351,572	143,671	359,646	59,096	303,756	216,686	149,636		
Pittsburgh International Airport	338	204,064	40,088	39,537	200,023	160,334	202,416	154,091	190,393	109,373	81,706		
Ross Park Mall	349	370,757	261,791	258,025	349,027	334,997	350,392	334,937	350,954	327,498	307,466		
RIDC Park Route 28	398	389,861	362,736	352,815	353,264	376,807	352,455	336,823	348,573	363,502	358,548		
Wexford	384	258,678	186,981	186,693	229,202	223,924	238,786	218,106	228,227	225,712	206,625		
Clairton	246	210,373	231,257	188,579	228,634	246,158	235,767	225,374	230,269	231,598	234,232		

 = Highest Future  
 = Lowest Future  
 = Base Year Higher than Forecast

**Allegheny County Comprehensive Plan  
Transportation Performance Measures  
Table 4 - Employment within 30 Minutes**

Activity Center	Zone	2025											Final
		Base	Trend with MFE		Trend without MFE		Good Old Places	Hot New Places	River Places	Transit Places	Blended	Composite	
Downtown	7	878,876	791,091	776,030	877,784	854,512	858,696	833,699	850,254	819,157	798,157		
Oakland	27	818,871	744,189	733,169	761,901	780,686	771,700	746,603	777,776	758,323	762,738		
Monroeville	182	672,671	693,724	631,661	698,733	728,975	699,743	669,919	696,677	699,578	709,269		
Wilkinsburg	149	732,137	699,825	662,364	689,267	735,173	703,246	677,199	718,519	712,684	712,684		
South Hills Village	266	656,849	588,768	585,540	622,225	619,746	627,048	556,226	633,286	615,258	606,340		
Allegheny County Airport	237	638,257	660,435	594,774	661,283	678,718	670,825	656,170	678,186	674,086	670,158		
McKeesport	203	514,268	542,707	409,369	529,221	559,044	503,752	513,801	533,692	530,429	532,299		
Robinson	329	697,316	265,846	198,410	672,249	391,091	678,333	111,575	617,374	522,359	388,292		
Pittsburgh International Airport	338	487,425	79,058	70,866	452,982	337,931	456,774	256,340	456,635	184,359	140,442		
Ross Park Mall	349	698,788	569,664	568,600	678,582	669,166	680,339	662,316	678,777	656,497	614,831		
RIDC Park Route 28	398	673,290	615,735	606,298	605,644	629,242	609,683	596,123	608,498	617,013	611,812		
Wexford	384	555,464	424,136	421,162	483,261	465,291	507,456	461,786	495,656	478,126	446,566		
Clairton	246	186,447	224,946	168,551	222,683	235,462	226,767	219,971	225,605	228,736	230,484		

 = Highest Future  
 = Lowest Future  
 = Base Year Higher than Forecast



**Allegheny County Comprehensive Plan  
Transportation Performance Measures  
Table 5 - Esimtated Daily Transit Ridership**

	Trend	Good Old Places	Hot New Places	River Places	Transit Places	Blended	Composite	Final
Allegheny Transit Ridership	249,972	262,795	253,243	257,875	266,014	258,638	258,641	259,182

