I. Introduction

With the goal of providing better data with which to inform funders, practitioners and advocates for child care in Philadelphia, The Reinvestment Fund's Policy Solutions (TRF) group has undertaken an analysis designed to estimate the supply of and demand for child care in the city of Philadelphia. We present the results of this work in two ways:

(1) A report offering an overview of the project and a set of observations and findings that the Foundation and other stakeholders can use in their deliberations around a variety of childcare policy matters in Philadelphia (e.g., funding, improving access to high quality child care).
(2) An online database and mapping tool, based on TRF's PolicyMap, that will allow users to view, map, and generate custom reports on the supply of, demand for, and shortage in the supply of child care (www.childcaremap.org).

Using a variety of data sources, each with some inadequacy or inconsistency, we were able to create an estimate of the supply of and demand for child care in Philadelphia. With the supply and demand estimated, we then estimated the relative and absolute shortage in total, certified, and high quality[1] supply. The project's Advisory Group vetted all of the data, statistical and spatial methods and deemed the results an accurate portrait of child care in Philadelphia.[2] This project was funded by the William Penn Foundation (Foundation).

II. Purposes of the analysis

The specific purposes of the analyses undertaken are:

- To estimate the supply of and demand for child care in Philadelphia with particular attention paid to the quality of care and access to public transportation. Our supply and demand estimates also allow for a preference for child care near where one lives or where one works.
- To describe the geography of inequality—should it exist—with attention paid to income/poverty, race/ethnicity, and a variety of standard area designations (e.g., zip code, councilmanic district, neighborhood).
- To build a foundation of information upon which to base objective and rigorous planning around child care.
- To develop an online tool, based on TRF's PolicyMap, for use by various stakeholders, including policymakers and consumers of child care, to make strategic investment decisions and selections among the available options for children.

[1] For the purposes of this report, certified supply indicates that a child care provider is included in the database of providers maintained by Pennsylvania's Office of Child Development and Early Learning (OCDEL). High quality child care is defined as providers who have attained a three or four STAR rating in the Keystone STARS program. Keystone STARS (**S**tandards, **T**raining/Professional Development, **A**ssistance, **R**esources and **S**upport) is a program of the Commonwealth of Pennsylvania established in 2002 to set standards for childcare centers and to provide resources and requisite technical assistance to improve the overall quality of child care, pre-school and school-age care programs in Pennsylvania. [http://www.portal.state.pa.us/portal/server.pt/community/keystone_stars/20985]

[2] The Advisory Group contained representation from: the Foundation, United Way of Greater Philadelphia and Southern New Jersey, Public Citizens for Children and Youth, Delaware Valley Association for the Education of Young Children, Public Health Management Corporation, Child Care Information Services of Philadelphia, City of Philadelphia (various offices and agencies), United States Census Bureau, School District of Philadelphia, Brightside Academy, Nonprofit Finance Fund and TRF.

TRF completed research designed to respond to these objectives through a variety of means (described in Appendix I).

III. Observations on the Distribution of Supply, Demand and Shortages

To highlight the full picture of child care in Philadelphia, it is useful to show where the supply is located throughout the city (including the demographic and economic characteristics of areas) and then look at the demand along the same dimensions. It is then possible to show the geography of the shortage in supply versus demand and to understand the populations for which the gap is most concerning. What is immediately evident is that the highest levels of supply and demand often occur in the same places; this is what you might expect in a reasonably well functioning marketplace. But, places with the largest shortages in supply and demand may also have some of the highest levels of supply that are still inadequate to meet the high level of demand. What follows is a detailed description of the places in Philadelphia with the most supply, demand, and the largest shortages.

A. Supply

Across the city of Philadelphia, TRF estimates the total supply of child care (certified and uncertified) was 100,806 seats. Of those, 70,200 seats (70%) were certified and 30,606 were uncertified. Of the certified seats, 14,637 were rated STAR 3 or STAR 4 according to the Keystone STARS performance standards; 31,134 (30.9% of total and 44.4% of certified seats) had STAR 1 or STAR 2 ratings, and 24,429 (24.2% of total and 34.8% of certified seats) did not have a STAR rating. (Table 1)

Table 1: Estimated Total Supply of Child Care

Estimated Supply of Childcare	Total Seats	% of All Seats	% of Certified Seats
Total Seats	100,806		
Certified	70,200	69.6%	
High Quality (STAR 3 / STAR 4)	14,637	14.5%	20.9%
STAR 1 / STAR 2	31,134	30.9%	44.4%
No STAR Level	24,429	24.2%	34.8%
Not Certified	30,606	30.4%	

It should be noted, however, that these estimated numbers may not represent the actual supply available to those seeking child care. These estimates are derived from the occupancy capacity of the building. The enrollment capacity of the center may depend on other factors, like staffing levels and waiting list size. Furthermore, as we discuss in Appendix I, there is currently no available information on enrollment at each center, meaning that it is impossible to know how many open seats exist at any particular time. We therefore considered these estimates representative of the maximum potential supply of child care if every center were to enroll to its capacity.

Appendix II to this report presents maps of the supply of childcare capacity and establishments across the city of Philadelphia. Figure 1 is a map of the geographic distribution of estimated capacity of all kinds; Figure 2 presents the total estimated certified capacity as listed by the Pennsylvania Office of Child Development and Early Learning (OCDEL); Figure 3 shows only estimated capacity in STAR 3- or STAR 4-rated centers. Figures 1 through 3, although shaded by block groups, represent capacity within ½ mile of each block group's border. The purpose of this "buffering" of capacity is to understand (and display graphically) how much child care is *at or near* a particular location. Because each block group contains its capacity plus capacity around it, the overall total contains substantial duplication. It is also important to note that these maps are on very different scales. That is necessary because the *total capacity* is substantially greater than the *certified capacity*, which is greater than the *high quality capacity*. (Appendix VI Figures 14 through 16 present maps of the total, certified and STAR 3 or STAR 4 capacity on a consistent scale.)

Across the city, the total capacity is highest in Center City, West Philadelphia, South Philadelphia (West of Broad Street) and Germantown/Nicetown. Lower levels of capacity are across the Northeast (Lower and Upper) and the Northwest (inclusive of Mt. Airy, Chestnut Hill, Roxborough, Manayunk and Andorra); Southwest Philadelphia also has a substantial number of areas with low levels of supply.

Figure 2 is limited to supply in certified (OCDEL) centers and it shows a slightly different pattern, although the areas of least coverage tend to be quite similar as observed in the prior map. Figure 3 denotes the high quality capacity. Herein you get a slightly different picture. Areas such as the Northeast (in part) manifest low total and certified supply, but that which is there tends to be higher quality. Similarly, parts of the Northwest do not have substantial supply, but that which is there tends to be of higher quality.

Figure 4 represents the geographic location of all known childcare sites; the data source of each site is denoted by the color of the marker. It points to the relative paucity of centers in Northeast Philadelphia and parts of Northwest Philadelphia. Certified centers are shown on Figure 5. There we observe, again, a dearth of centers in Northeast Philadelphia and parts of Northwest as well. STAR 3- and STAR 4-rated centers are scattered across the city, with a discernible pattern along transit lines and main arterials (e.g., SEPTA's Broad Street line and Market-Frankford El as well as Route 1).

Table 2 in the report shows the level of supply for block groups organized according to a variety of demographic characteristics. Looking first at the overall supply, low poverty areas were more likely to have a lower supply of childcare slots relative to the rest of the city. In fact, 43% of the lowest poverty block groups were in the very low (bottom 10%) or low categories of supply (10th to 30th percentiles) versus only 9% of the highest poverty block groups. Of the highest poverty block groups, 44% had high or very high supply. Block groups that were predominantly African American were much more likely to have high levels of supply when compared to predominantly non-African American block groups.

About 50% of the block groups with 75%+ African American populations were in the high supply categories versus 14% of the block groups with African American populations of 10% or less. Finally, the overall supply of child care is concentrated in areas that are located close to public transportation. About 50% of the block groups within a quarter mile of a train stop were classified as high supply while only 8% of the block groups more than a mile from trains stop were similarly classified.

Figure 5 shows all certified sites found in the OCDEL database; the certified supply of child care follows a very similar pattern as the overall supply. It is concentrated in areas that are poorer and predominantly African American. Certified childcare supply is also generally located closer to public transportation.

Figure 6 represents all STAR 3- or STAR 4-rated centers. Overall, higher quality childcare slots are concentrated in poorer block groups and those with high concentrations of African Americans. Areas closer to public transportation also have higher concentrations of high-quality child care slots versus areas further from public transportation.

Table 2: Demographic/Economic Characteristics of Areas for Total, Certified and STAR-3 or STAR-4 Rated Center Supply

	Block Group Supply Level					
	Very Low Supply	Low Supply	Moderate Supply	High Supply	Very High Supply	Total
All Supply						
(1) <10% Family Poverty	17.3%	25.6%	35.1%	14.3%	7.7%	100.0%
(2) 10% - 20% Family Poverty	11.9%	23.0%	36.1%	19.3%	9.8%	100.0%
(3) 20% - 40% Family Poverty	3.6%	18.5%	45.4%	22.1%	10.4%	100.0%
(4) >40% Family Poverty	1.3%	7.5%	47.6%	29.1%	14.5%	100.0%
(1) <10% African American	28.2%	32.1%	25.5%	11.2%	3.0%	100.0%
(2) 10-25% African American	13.1%	28.1%	38.7%	13.6%	6.5%	100.0%
(3) 25-50% African American	4.6%	23.5%	52.6%	13.3%	6.1%	100.0%
(4) 50-75% African American	0.0%	23.5%	48.5%	16.2%	11.8%	100.0%
(5) 75-90% African American	2.2%	6.6%	39.0%	30.9%	21.3%	100.0%
(5) 90-100% African American	0.3%	5.4%	45.0%	33.3%	15.9%	100.0%
(1) Distance to Nearest Train Stop 0.00_0.25 Mi	3.2%	9.5%	40.3%	27.1%	19.9%	100.0%
(2) Distance to Nearest Train Stop 0.25_0.50 Mi	6.8%	13.6%	40.1%	26.2%	13.4%	100.0%
(3) Distance to Nearest Train Stop 0.50_0.75 Mi	7.0%	23.8%	38.7%	21.5%	8.9%	100.0%
(4) Distance to Nearest Train Stop 0.75_1.00 Mi	12.9%	22.6%	43.5%	17.2%	3.8%	100.0%
(5) Distance to Nearest Train Stop > 1 Mi	21.9%	31.5%	38.8%	5.0%	2.7%	100.0%
Certified Supply						
(1) <10% Family Poverty	17.3%	26.6%	36.1%	14.5%	5.4%	100.0%
(2) 10% - 20% Family Poverty	11.5%	23.8%	37.3%	16.0%	11.5%	100.0%
(3) 20% - 40% Family Poverty	4.2%	17.1%	43.1%	25.5%	10.1%	100.0%
(4) >40% Family Poverty	0.9%	6.6%	46.7%	27.8%	18.1%	100.0%
(1) <10% African American	27.6%	30.3%	30.9%	8.8%	2.4%	100.0%
(2) 10-25% African American	15.1%	22.6%	39.7%	13.1%	9.5%	100.0%
(3) 25-50% African American	3.6%	23.0%	47.4%	20.9%	5.1%	100.0%
(4) 50-75% African American	0.7%	19.1%	50.0%	17.6%	12.5%	100.0%
(5) 75-90% African American	2.2%	9.6%	36.0%	34.6%	17.6%	100.0%
(5) 90-100% African American	0.3%	11.1%	42.3%	29.7%	16.5%	100.0%
(1) Distance to Nearest Train Stop 0.00_0.25 Mi	4.1%	9.0%	38.9%	28.5%	19.5%	100.0%
(2) Distance to Nearest Train Stop 0.25_0.50 Mi	6.0%	14.2%	38.4%	27.8%	13.6%	100.0%
(3) Distance to Nearest Train Stop 0.50_0.75 Mi	7.0%	20.9%	42.7%	20.5%	8.9%	100.0%
(4) Distance to Nearest Train Stop 0.75_1.00 Mi	12.4%	23.1%	47.3%	13.4%	3.8%	100.0%
(5) Distance to Nearest Train Stop > 1 Mi	22.7%	34.2%	34.6%	5.8%	2.7%	100.0%
High Quality Supply						
(1) <10% Family Poverty	19.4%	18.3%	38.7%	16.3%	7.3%	100.0%
(2) 10% - 20% Family Poverty	15.2%	17.6%	42.6%	19.7%	4.9%	100.0%
(3) 20% - 40% Family Poverty	9.2%	17.6%	40.3%	23.8%	9.0%	100.0%
(4) >40% Family Poverty	1.8%	12.3%	42.3%	24.7%	18.9%	100.0%
(1) <10% African American	31.5%	10.6%	35.5%	15.8%	6.7%	100.0%
(2) 10-25% African American	12.6%	15.1%	38.7%	14.6%	19.1%	100.0%
(3) 25-50% African American	9.7%	11.2%	46.4%	22.4%	10.2%	100.0%
(4) 50-75% African American	5.9%	23.5%	29.4%	27.2%	14.0%	100.0%
(5) 75-90% African American	4.4%	27.2%	27.9%	32.4%	8.1%	100.0%
(5) 90-100% African American	3.0%	21.0%	52.0%	19.2%	4.8%	100.0%
(1) Distance to Nearest Train Stop 0.00_0.25 Mi	7.2%	8.1%	40.7%	24.0%	19.9%	100.0%
(2) Distance to Nearest Train Stop 0.25_0.50 Mi	9.5%	13.9%	37.3%	24.0%	15.3%	100.0%
(3) Distance to Nearest Train Stop 0.50_0.75 Mi	15.9%	18.2%	39.1%	20.5%	6.3%	100.0%
(4) Distance to Nearest Train Stop 0.75_1.00 Mi	17.2%	20.4%	42.5%	17.7%	2.2%	100.0%
(5) Distance to Nearest Train Stop > 1 Mi	16.5%	25.0%	43.5%	13.5%	1.5%	100.0%

Average supply is examined in Table 3, which shows the average amount of child care for all census block groups and those block groups differentiated by: (1) percent of the block group's families in poverty; (2) percent African American; (3) ratio of income to area median income; (4) distance to the nearest train stop. Data in Table 3 must be interpreted very carefully, because block groups are

"buffered" to account for areas within ½ mile of each block group's border Some selected observations from this table:[3]

Table 3: Average Supply of Child Care by the Demographic and Economic Characteristics of Areas

Poverty / Race / Income / Distance	Average Total Supply Within 1/2 Mile of BG	Average Number of Childcare Facilities in BG	Average Certified (OCDEL) supply Within 1/2 Mile of BG	Percent of Supply that is Certified	Average Number of Cert'd Sites in BG	Average Capacity in 3-4 STARS Sites Within 1/2 Mile of BG	Percent of Total Supply Within 1/2 Mile of BG that is High Quality	Percent of Cert'd Within 1/2 Mile of BG that is High Quality
All BG	1606	2.2	1147	71.4%	1.4	227	14.1%	19.8%
(1) <10% Family Poverty	1361	1.9	936	68.8%	1.1	195	14.3%	20.8%
(2) 10% - 20% Family Poverty	1518	2.1	1086	71.5%	1.3	195	12.8%	18.0%
(3) 20% - 40% Family Poverty	1752	2.6	1268	72.4%	1.7	239	13.6%	18.8%
(4) >40% Family Poverty	2003	2.5	1487	74.2%	1.8	306	15.3%	20.6%
(1) <10% African American	1031	1.1	719	69.7%	0.6	180	17.5%	25.0%
(2) 10-25% African American	1397	1.7	1040	74.4%	1.1	262	18.8%	25.2%
(3) 25-50% African American	1520	2.2	1116	73.4%	1.4	248	16.3%	22.2%
(4) 50-75% African American	1740	2.8	1289	74.1%	2	267	15.3%	20.7%
(5) 75-90% African American	2139	3.6	1525	71.3%	2.4	260	12.2%	17.0%
(6) 90-100% African American	2080	2.9	1444	69.4%	1.9	210	10.1%	14.5%
(1) Low Income < (50% AMI)	2207	2.5	1631	73.9%	1.7	346	15.7%	21.2%
(2) Low-Middle Income (50% - 80% AMI)	1826	2.5	1329	72.8%	1.6	261	14.3%	19.6%
(3) Middle Income (80% - 100% AMI)	1645	2.3	1186	72.1%	1.6	217	13.2%	18.3%
(4) High Income (80% - 100% AMI)	1305	2	901	69.0%	1.2	177	13.6%	19.6%
(1) Distance to Nearest Train Stop 0.00_0.25 Mi	2059	2.6	1471	71.4%	1.6	328	15.9%	22.3%
(2) Distance to Nearest Train Stop 0.25_0.50 Mi	1848	2.3	1333	72.1%	1.5	276	14.9%	20.7%
(3) Distance to Nearest Train Stop 0.50_0.75 Mi	1601	2.2	1145	71.5%	1.5	204	12.7%	17.8%
(4) Distance to Nearest Train Stop 0.75_1.00 Mi	1372	2.2	973	70.9%	1.4	168	12.2%	17.3%
(5) Distance to Nearest Train Stop > 1 Mi	1050	1.8	736	70.1%	1.1	140	13.3%	19.0%

In column 2 of Table 3, we see that the high poverty areas have, on average, a larger number of childcare slots within ½ mile of their block groups. By far, the highest numbers of childcare slots within ½ mile of the block group are found in and around predominantly African American areas. Consistent with the poverty pattern, the highest numbers of childcare slots are found within ½ mile of lower income (less than 50% of Area Median Income) areas. Finally, block groups within a quarter mile of a train stop had nearly twice as many child care slots, on average, as block groups more than a mile from a train stop.

With respect to certified child care (OCDEL), column 4 shows the supply within ½ mile of a block group. We observe that certified supply is substantially greater in and around areas with higher rates of poverty. It is similarly higher in and around predominantly African American areas and low-income areas. Not only is it more present in these areas, but the percent of all child care that is certified within ½ mile of a block group (column 5) shows that certified care is, on average, more plentiful in and around higher poverty areas and low-income areas. However, with respect to race, we observe that the percent of the supply that is certified is lowest in and around areas where 90% or more of the

[3] Note that these summaries speak primarily to supply, not demand. Further, the data show supply within ½ mile of block groups based on their demographic/economic profile. There is "duplication" in this table because ½ mile areas associated with a few contiguous block groups will certainly overlap. What this means is that you cannot add across categories; you can however compare those block groups based on their demographic/economic profile.

population is African American and where 10% or less of the population is African American. Stated differently, block groups with moderate African American populations (that is, bock groups where African American population represents between 10% and 75% of the population) have the highest proportion of certified slots relative to the total slots.

With respect to access to high quality child care (i.e., centers that are in OCDEL and have either a STAR 3 or STAR 4 rating); as a percent of the total supply (column 8), we observe that the share of high quality child care within ½ mile of a block group is higher in high poverty areas. It is also higher in lower income areas. We observe that the percent of all child care that is high quality is substantially lower within ½ mile of predominantly African American areas than it is areas that did not have significant African American populations. There is a similar, albeit more extreme, pattern if the base is OCDEL sites as opposed to total sites (column 9). There is however, no substantial difference within ½ mile of areas based on racial composition—although supply in and around areas that are 10% or less African American is substantially lower, on average.

B. Demand

We estimated demand in this analysis, in part, by allocating 33% of the children of working parents to the block group where a parent works. This means that, all else being equal, demand will be lower in areas that are primarily residential and higher in block groups that are employment destinations. We started with the 101,503 children under the age of five who lived in the city of Philadelphia according to the 2010 census. We estimated that there are 9,927 children who reside within the city who traveled to child care located near a parent's place of work outside of the city, and 15,697 children who reside outside the city and who travel with parents to their workplace in the city. This yields a total estimated demand for 107,820 childcare seats. As with the supply estimate, it is impossible to model the actual demand for child care, because information on which children enroll and which do not is unavailable. Therefore, this estimate represents the maximum potential demand for child care in the city of Philadelphia. This same computation is repeated for each block group in Philadelphia, taking cognizance of both resident children and children in households where the working parent(s) take their children with them to their work location block groups (inside or outside of the city) (Figure 7). In some ways, demand follows a very similar pattern to supply. Poorer areas are much more likely to be in the high demand categories than areas with smaller poverty populations.

Table 4 shows the level of demand for block groups by different demographic characteristics. About 48% of the low poverty block groups were in the low and very low demand categories compared to 8% of the high poverty block groups. Conversely, almost 46% of the high poverty block groups were in the high and very high demand categories.

Block groups with small African American populations were more likely to be in the low demand categories. About 50% of the block groups with an African American population of 10% or less were in the low or very low demand categories. At the same time, 25% of these block groups were in the high or very high demand categories. Predominantly African American block groups tended to be in the

moderate and high demand category. More than half (55%) of the 90% or more African American block groups were in the moderate demand category. Finally, with respect to the distance to public transit, in general block groups closest to train stops tended to be in the higher demand categories, while block groups further from train stops tended to be in the very low, low, or moderate categories.

Table 4: Demographic/Economic Characteristics of Areas for Levels of Demand

	Block Group Level of Demand					
	Very Low Demand	Low Demand	Moderate Demand	High Demand	Very High Demand	Total
(1) <10% Family Poverty	18.5%	29.8%	30.8%	10.5%	10.3%	100.0%
(2) 10% - 20% Family Poverty	9.8%	19.7%	41.0%	23.4%	6.1%	100.0%
(3) 20% - 40% Family Poverty	4.5%	14.6%	48.5%	26.1%	6.4%	100.0%
(4) >40% Family Poverty	0.4%	7.5%	46.3%	28.2%	17.6%	100.0%
(1) <10% African American	21.2%	27.3%	26.4%	11.2%	13.9%	100.0%
(2) 10-25% African American	6.5%	11.1%	38.2%	23.1%	21.1%	100.0%
(3) 25-50% African American	6.6%	6.6%	32.7%	38.3%	15.8%	100.0%
(4) 50-75% African American	5.9%	19.1%	47.8%	24.3%	2.9%	100.0%
(5) 75-90% African American	5.9%	23.7%	41.5%	25.9%	3.0%	100.0%
(6) 90-100% African American	6.3%	25.2%	55.3%	11.7%	1.5%	100.0%
(1) Distance to Nearest Train Stop 0.00_0.25 Mi	10.0%	13.1%	38.5%	16.7%	21.7%	100.0%
(2) Distance to Nearest Train Stop 0.25_0.50 Mi	9.3%	16.3%	39.2%	21.0%	14.2%	100.0%
(3) Distance to Nearest Train Stop 0.50_0.75 Mi	9.6%	18.2%	40.1%	25.2%	7.0%	100.0%
(4) Distance to Nearest Train Stop 0.75_1.00 Mi	7.5%	19.4%	50.5%	20.4%	2.2%	100.0%
(5) Distance to Nearest Train Stop > 1 Mi	13.5%	33.5%	34.6%	15.0%	3.5%	100.0%

C. The Relative Shortage of Child Care

The review of both the supply and demand for child care in Philadelphia shows that in many cases the block groups that exhibit the highest demand often have the highest level of supply. Similarly, places with the lowest level of supply also have the lowest demand for services. If you put this in the context of child care as a *market* and that supply will generally rise to meet (effective) demand, these findings indicate that this market is, overall, working as you might expect. However, just because the market is, overall, seemingly close to where you might expect it to be, it does not mean that every area of the city will have an ample supply. Accordingly, we estimate two measures of shortage: relative and absolute. Relative shortage represents those areas of the city where the market is not working properly and there is a shortage in childcare services, given the amount of demand assuming that the market does not provide a seat for every child. Absolute shortage is, as the name implies, a circumstance where the amount of demand is greater than the amount of supply. (For a graphical representation, see Appendix IV). We calculated the relative and absolute shortage for the overall supply, the certified supply, and the high quality supply.

1. Relative Shortage in Total Supply

As can be seen in Figure 8, the areas with the largest relative shortage are concentrated in the Northeast part of the city, around the Delaware River Wards (Port Richmond and Fishtown) and in parts of Southwest and South Philadelphia. The neighborhood-based tables in Appendix VII confirm

these observations. For instance, Port Richmond shows an average demand for 1,430 slots, which is significantly higher than the 311 of slots available within ½ mile of the average block group.

The poorest parts of the city typically have high demand and high supply; they are also not typically the places with the largest relative childcare shortages. In fact, as seen in Table 5, 37% of the lowest poverty block groups were in the high shortage categories versus only 17% of the highest poverty block groups. Consistent with the finding that the Northeast section of the city – an area where, generally speaking, the African American population comprises a low percentage of the total population - has the greatest shortages, block groups that are predominantly non-African American were much more likely to have overall childcare shortages than predominantly African American block groups. Of block groups with less than 10% African American population, 56% were in the high shortage category versus 2% of the block groups where 90% or more of the population is African American. Finally, neighborhoods that were furthest from train stops were the least well served by the childcare market and had the largest shortages in service given the demand (Table 5).

2. Relative Shortage in Certified Supply

Figure 9 shows the shortages of certified childcare supply in the city of Philadelphia. The Mt. Airy, Point Breeze, and North Central sections of the city show significant shortages in certified supply while not having shortages in the overall supply. Interestingly, while generally exhibiting large shortages in the overall supply, most of the Northeast, particularly the Lower Northeast, has the amount of certified child care that you would expect based on the level of demand. So, despite being generally underserved, what child care exists is certified.

Like the overall supply, the communities that are significantly underserved by the childcare market tend to have lower poverty rates (Table 5). However, these block groups tend to be in areas that are either predominantly non-African American or predominantly African American. Additionally, block groups closest to the train were more likely to have shortages while those block groups greater than a mile from the nearest train station were more likely to have what you might expect, or even surpluses.

3. Relative Shortage in High Quality Supply

Figure 10 shows that the pattern of shortage in the high quality childcare supply is different than the overall or certified supply. Neighborhoods like Roxborough/Manayunk, Chestnut Hill, the Lower Northeast, Strawberry Mansion, and Port Richmond all showed significantly greater shortages in high quality supply. This would indicate that the certified spots in those areas are much less likely to have STAR 3 or STAR 4 ratings than you might expect considering the level of demand and the number of certified slots. This means that these communities have limited high quality options and the Keystone STARS program might consider them for concentrated efforts.

Low poverty areas were more likely to have shortages in high quality child care than high poverty areas. Predominantly African American block groups were much more likely to have a high quality

supply shortage than one might expect given the demand and amount of certified supply in these places.

Table 5: Demographic/Economic Characteristics of Areas for Shortage in Total, Certified and STAR 3- or STAR 4-Rated Child Care

	Block Group Shortage Level					
	Much Larger than Expected Shortage	Larger than Expected Shortage	Expected Shortage	Less than Expected Shortage	Much Less than Expected Shortage	Total
All Supply Shortages						
(1) <10% Family Poverty	14.5%	22.8%	33.5%	20.4%	8.9%	100.0%
(2) 10% - 20% Family Poverty	12.3%	23.0%	35.7%	19.3%	9.8%	100.0%
(3) 20% - 40% Family Poverty	5.9%	17.9%	44.5%	20.2%	11.5%	100.0%
(4) >40% Family Poverty	3.5%	13.2%	52.0%	20.7%	10.6%	100.0%
(1) <10% African American	23.0%	32.4%	37.6%	7.0%	0.0%	100.0%
(2) 10-25% African American	14.1%	31.7%	46.7%	7.0%	0.5%	100.0%
(3) 25-50% African American	10.7%	28.6%	42.3%	14.8%	3.6%	100.0%
(4) 50-75% African American	2.2%	17.6%	53.7%	13.2%	13.2%	100.0%
(5) 75-90% African American	2.2%	6.6%	37.5%	30.1%	23.5%	100.0%
(5) 90-100% African American	0.3%	1.8%	32.7%	42.6%	22.5%	100.0%
(1) Distance to Nearest Train Stop 0.00_0.25 Mi	3.6%	14.9%	42.1%	24.9%	14.5%	100.0%
(2) Distance to Nearest Train Stop 0.25_0.50 Mi	7.4%	12.3%	43.6%	25.3%	11.4%	100.0%
(3) Distance to Nearest Train Stop 0.50_0.75 Mi	8.6%	20.2%	40.1%	22.2%	8.9%	100.0%
(4) Distance to Nearest Train Stop 0.75_1.00 Mi	12.9%	21.0%	42.5%	15.6%	8.1%	100.0%
(5) Distance to Nearest Train Stop > 1 Mi	18.8%	34.2%	31.2%	8.8%	6.9%	100.0%
Certfied Supply Shortages						
(1) <10% Family Poverty	11.7%	24.2%	27.8%	19.6%	16.7%	100.0%
(2) 10% - 20% Family Poverty	8.6%	20.9%	38.9%	19.3%	12.3%	100.0%
(3) 20% - 40% Family Poverty	9.8%	15.4%	48.7%	21.0%	5.0%	100.0%
(4) >40% Family Poverty	8.4%	15.9%	54.2%	20.7%	0.9%	100.0%
(1) <10% African American	8.2%	23.6%	20.6%	22.1%	25.5%	100.0%
(2) 10-25% African American	5.5%	17.6%	31.2%	30.7%	15.1%	100.0%
(3) 25-50% African American	5.6%	19.5%	41.0%	29.7%	4.1%	100.0%
(4) 50-75% African American	7.4%	15.4%	41.9%	30.9%	4.4%	100.0%
(5) 75-90% African American	17.6%	10.3%	55.1%	14.7%	2.2%	100.0%
(5) 90-100% African American	15.3%	23.7%	57.1%	3.6%	0.3%	100.0%
(1) Distance to Nearest Train Stop 0.00_0.25 Mi	11.3%	28.5%	45.7%	11.8%	2.7%	100.0%
(2) Distance to Nearest Train Stop 0.25_0.50 Mi	9.3%	22.1%	42.2%	21.5%	4.9%	100.0%
(3) Distance to Nearest Train Stop 0.50_0.75 Mi	10.6%	18.1%	44.3%	27.0%	0.0%	100.0%
(4) Distance to Nearest Train Stop 0.75_1.00 Mi	9.1%	14.5%	46.8%	15.6%	14.0%	100.0%
(5) Distance to Nearest Train Stop > 1 Mi	10.8%	17.3%	25.4%	21.9%	24.6%	100.0%
High Quality Supply Shortages						
(1) <10% Family Poverty	13.7%	20.0%	31.3%	18.1%	16.9%	100.0%
(2) 10% - 20% Family Poverty	11.1%	22.1%	38.5%	18.9%	9.4%	100.0%
(3) 20% - 40% Family Poverty	9.2%	19.0%	44.3%	21.6%	5.9%	100.0%
(4) >40% Family Poverty	1.8%	18.5%	54.6%	22.9%	2.2%	100.0%
(1) <10% African American	21.5%	20.9%	22.1%	12.7%	22.7%	100.0%
(2) 10-25% African American	10.6%	20.6%	37.2%	21.1%	10.6%	100.0%
(3) 25-50% African American	9.2%	17.3%	44.4%	21.9%	7.1%	100.0%
(4) 50-75% African American	5.9%	27.2%	27.9%	33.1%	5.9%	100.0%
(5) 75-90% African American	2.9%	20.6%	57.4%	16.9%	2.2%	100.0%
(5) 90-100% African American	3.3%	16.8%	54.7%	21.3%	3.9%	100.0%
(1) Distance to Nearest Train Stop 0.00_0.25 Mi	4.5%	25.3%	43.0%	19.0%	8.1%	100.0%
(2) Distance to Nearest Train Stop 0.25_0.50 Mi	6.5%	21.0%	46.0%	19.9%	6.5%	100.0%
(3) Distance to Nearest Train Stop 0.50_0.75 Mi	13.2%	18.2%	46.0%	18.2%	4.3%	100.0%
(4) Distance to Nearest Train Stop 0.75_1.00 Mi	13.4%	21.0%	33.3%	28.0%	4.3%	100.0%
(5) Distance to Nearest Train Stop > 1 Mi	13.5%	15.4%	26.5%	17.3%	27.3%	100.0%

D. The Absolute Shortage of Child Care

While examining the relative shortage is necessary for understanding the parts of the city that are underserved by the childcare market vis-à-vis their level of demand and what the market generally provides, it is also useful to look at where the demand for child care is significantly larger than the supply, what we call the absolute shortage. As previously noted, the absolute shortage is calculated by subtracting the estimated demand from the estimated supply. If demand is higher than supply, the result will be negative and represent an overall shortage; if the result is positive, then there is more supply in a particular place than demand. As we discussed in an earlier section, we estimated an overall demand for approximately 108,000 slots and a supply of approximately 101,000 slots. Overall, this translates into an absolute shortage across the city of 7,000 childcare slots.

Figure 11 (Appendix V) shows the absolute shortage for the total supply in child care across the city of Philadelphia. These shortages are highest in the major employment centers (Center City, University City, near Philadelphia International Airport), along the River Wards (Kensington and Port Richmond), and throughout Northeast Philadelphia. There are also absolute shortages in overall supply in pockets of the eastern part of North Philadelphia.

The absolute shortage in certified child care slots is exhibited in Figure 12. The largest shortages in certified slots are concentrated in Center City, around the University of Pennsylvania, throughout Northeast Philadelphia, and east of Broad Street in North Philadelphia. Figure 13 maps the high quality childcare centers over the absolute shortage in high quality childcare seats. These shortages follow a similar pattern as the total supply shortages, though the number of areas with very high levels of shortage is higher. The shortage in high quality child care seems particularly acute in Center City, the far Northeast, Strawberry Mansion, North Philadelphia, in the River Wards, and in Southwest Philadelphia.

E. The Absolute Shortage of Child Care and Poverty

When thinking about how childcare shortages impact particular populations and what interventions might be most effective in alleviating those impacts, it is helpful to see the shortages within the context of other factors. Figures 17, 18, and 19 (Appendix VI) are colored in four different ways to show how the absolute shortage in child care interacts with family poverty. Red areas are those that have high shortages and high to very high poverty (light red to dark red, respectively). Purple areas are those with lower poverty and large to very large shortages (light purple to dark purple, respectively). Blue areas have lower absolute shortages, but high to very high levels of family poverty (light blue to dark blue, respectively). Finally, yellow areas have neither high family poverty rates nor large absolute shortages in child care.

All three figures have inset maps of three areas offering an opportunity for closer examination. The first neighborhood, Strawberry Mansion, is in the north central part of Philadelphia, west of Broad Street. Approximately 86% percent of its population is African American and 61% of households earn

less than $25,000 annually. About 33% of all families live below the poverty line and nearly 25% live in deep poverty (less than 50% of the federal poverty level). Across the entire neighborhood, there are 21 certified childcare providers with a capacity of 246 slots but zero STAR 3- or STAR4-rated centers. The total demand for child care in Strawberry Mansion is 1,091 seats.

The River Wards (Kensington and Port Richmond) are more diverse racially—48% of residents identify themselves as white, 25% identify themselves as African American. In all, about 40% of the residents of this neighborhood identify themselves as being of Hispanic origin. The Kensington section of this area has high poverty (50% of families are below the poverty line) while Port Richmond has a significantly lower family poverty rate of 16%. Within the River Wards, there are 18 certified childcare providers with a capacity of 880 seats. There is only one high quality provider with a capacity of 74 slots. The demand in this area is estimated at 3,867 seats.

Finally, the Oxford Circle area is also quite racially diverse: 52% of its population is white, 23% is African American, and 16% report Hispanic heritage. Poverty rates are lower in Oxford Circle than in the other two neighborhoods (21% of families live below the poverty line and only 6% live in deep poverty). There are 18 certified childcare providers with a capacity of 484 slots. Two of those certified providers are high quality, with a capacity of 228 slots. Oxford Circle has a total estimated demand for 1,194 slots.

Figure 17 shows the absolute shortage in the total supply of child care as it relates to poverty. In Strawberry Mansion, there are several high poverty areas with significant shortages, but most of the neighborhood is characterized by high poverty census block groups, but lower shortages in overall supply. Oxford Circle shows a mixture of block groups in every category, though the general trend is toward an overall shortage in a neighborhood with somewhat lower poverty than the other two neighborhoods. Finally, Kensington shows both high poverty and high shortage areas.

Figure 18 shows the absolute shortage in certified supply. In all three of the neighborhoods we have highlighted, the number of block groups with significant shortages increases. In Strawberry Mansion, this growth is in high poverty areas as indicated by an increase in the block groups colored red. In both Oxford Circle and Kensington, the increased shortage appears in block groups that exhibit high levels of poverty and in those that do not.

The trend toward increasing shortage continues when we look at the supply of high quality child care in Figure 19. All three target neighborhoods exhibit high levels of deficit regardless of the level of poverty, which is indicative of an overall shortage of high quality child care throughout the city.

IV Conclusion

The shortage analysis suggests that, in general, the market for child care is functioning reasonably well; overall we do not find a substantial gap between supply of child care and demand for that care. While there is not a substantial overall child care shortage, there is a substantial shortage of certified child care (which represents 69.6% of total supply) and high quality child care (14.5%).

We do not find—as we do in other spheres of social and economic life —a general pattern of inequitable access for areas that are racially or ethnically isolated or have high concentrations of lower income people. Stated differently, in general there is no pattern to suggest that predominantly African American areas are at any greater disadvantage than predominantly non-African American areas. Similarly we do not find a generalized pattern to suggest that areas with concentrated poverty are less well served than areas of low poverty. However, we do find that there are areas of Philadelphia where the supply of child care, especially certified and high quality care, falls short of demand and many of those areas have high concentrations of poverty and/or are predominantly African American. Areas with absolute or relative shortages that are home to people for whom poverty is a daily challenge are important to identify because residents in those communities have less financial capacity to overcome the extant gap. When poverty and race/ethnicity isolation combine in an area, the impact of the gap is especially troubling from a public policy perspective.

Appendix I:
Data sources and Methods

Data Sources

Unfortunately, there is no single data source that would permit us to adequately model the supply and quality of child care—nor is there a single source of data that indicates the demand for childcare services. Even where we do have data on supply, our Advisory Group considers those figures estimates at best. And where we have data on demand, it does not tell us which children are in child care, which are in child care near where their parents live, or which are in child care near where their parents work. We therefore have to statistically estimate both the supply of and demand for child care by combining several datasets to best approximate both sides of the supply/demand equation.

TRF used the following data to approximate supply. The amount of information contained in each database varies considerably, and they are listed in order of the dataset with the most information to the least information:

- Pennsylvania Office of Child Development and Early Learning (OCDEL) database (June 2013, updates quarterly)—Includes all 1,888 state-certified childcare centers in Philadelphia. The database includes information on the location, capacity, Keystone STARS (Standards, Training/Professional Development Assistance, Resources, and Support) quality rating, and the presence of certain types of programs (Head Start, Pre-K, or school age).
- Philadelphia School District Head Start and Partner Sites (September 2013, updates annually)—Includes data from 50 locations that were not in OCDEL. It includes location and enrollment information.
- PA Department of Education (PDE) License and Enrollment data for Pre-K (June 2013, updates annually)—Enrollment data from 45 Pre-K programs in Philadelphia that were not in the OCDEL database. It includes enrollment information only.
- National Establishment Time Series (NETS) (2011, updates annually)—Includes 803 establishments listed under the Standard Industrial Code (SIC) “8351-Child Daycare Services” in the historical listing of all business establishments in Philadelphia. These 803 establishments are not in the OCDEL data.
- InfoUSA (circa 2012, ongoing updates)—Contains only location information for 190 centers not in any other database.
- Head Start (circa 2013, updates annually)—Locations of 128 Head Start centers.

For demand, we relied primarily on various releases of data from the U.S. Census Bureau. TRF acquired or aggregated all databases to the census block group level:

- U.S. Census Bureau Decennial Census (circa 2010, updates every 10 years)—Counts of children age four years and under.
- U.S. Census Bureau American Community Survey (ACS) (2007 – 2011 five-year sample, updates annually)—Information on the destination of workers with children under the age of five.
- Longitudinal Employer Household Dynamics (LEHD) (2011, updates annually)—Detailed information on the origin and destination of workers.

Brief Summary of Methods

Supply

When developing a measure of the supply of child care, it is necessary to ensure that you have an unduplicated count of centers and a reasonable estimation of the capacity of those centers. To arrive at an unduplicated count of childcare providers, we geocoded the locations of childcare centers in each of the datasets listed above and identified providers in the same location. We eliminated duplicates so as not to inflate supply from double counting centers. We began with 1,888 centers listed in OCDEL as the baseline. The Pennsylvania Department of Education (PDE) Pre-K enrollment file added 45 sites, the Philadelphia School District enrollment file added 50 sites, NETS data added another 803, InfoUSA added 190, and finally, 128 Head Start programs that did not appear in any other database were included.

Only two of the datasets acquired (OCDEL and the PDE enrollment file) included capacity or enrollment information for childcare programs.[4] It was therefore necessary to estimate the capacity of programs contained exclusively in other databases. While the NETS database did not include capacity information, it did provide information on the number of employees and total annual revenues of childcare centers. Using the full set of information (capacity, number of employees, total revenues, etc.) for the 448 records that appeared in both the OCDEL and NETS databases, TRF developed an algorithm that estimates the capacity of centers listed only in the NETS database. After looking at the number of employees, total revenues, and even characteristics of the area where the childcare center is located, TRF determined that the best predictor of the capacity of a childcare center in NETS was the number of employees. Each employee in a childcare center in the NETS data equaled roughly five available seats. The InfoUSA database contained only information on the location of childcare centers. Upon further investigation of these sites through the internet and phone calls, we determined that the 190 centers exclusively in this database were generally small, single employee operations. Therefore, we estimated a capacity of five for these centers.

Demand

Measurement of demand begins with the census 100% count data release of children under five. These data represent the resident population of children in the relevant age group. However, one of the primary goals of this project was to determine what demand looked like if you assumed that parents want child care close to their home or if they prefer child care near their place of work. The census data can be used to determine where children live, but understanding where the parents of those children work is a bit more complex. While the LEHD data has information on the origin (i.e., residence) and destination of every worker in Philadelphia, it does not tell us how many of those workers have children who need care, or whether those workers prefer bringing their children with them on their commute to work or using child care near their homes.

[4] The OCDEL capacity includes spaces for all ages not just pre-K.

The ACS 5-year sample individual level file has detailed information on the composition of the household, but compared to LEHD, less specific data on where people work. Using the ACS, we were able to determine that 18% of workers who work in Philadelphia but live outside the city – in the metropolitan area - have children under five; that compares to 12% of the workers who live and work in the city. However, just because these workers have children does not mean they need child care or that they would bring their children close to their place of work for care.

To better estimate the number of children who travel to their parents' place of work for child care, we turned to two studies:

- A report from the U.S. Census Bureau using the Survey of Income and Program Participation (SIPP) showed that 42% of households with a working mother use child care within their own home, meaning that 58% seek care outside of their home.[5]
- A report on the childcare arrangements of working parents in Cook County Illinois found that 31% of parents with children in care have arrangements located on their way to work. However, 25% have arrangements that take them further away from work.[6]

Based upon the findings, we tested three different allocations of children to their parents' place of work: 10%, 33%, and 50%. The preponderance of the research evidence along with the model fit statistics for the statistical model indicated that the 33% allocation was the best representation and it was used to allocate children to their parents' place of work for childcare demand. So, for any particular block group, demand is comprised of the children under five-years-old who live there, minus 33% of the children of the parents who work in another block group, plus 33% of the children of parents who work in that block group.

Shortage

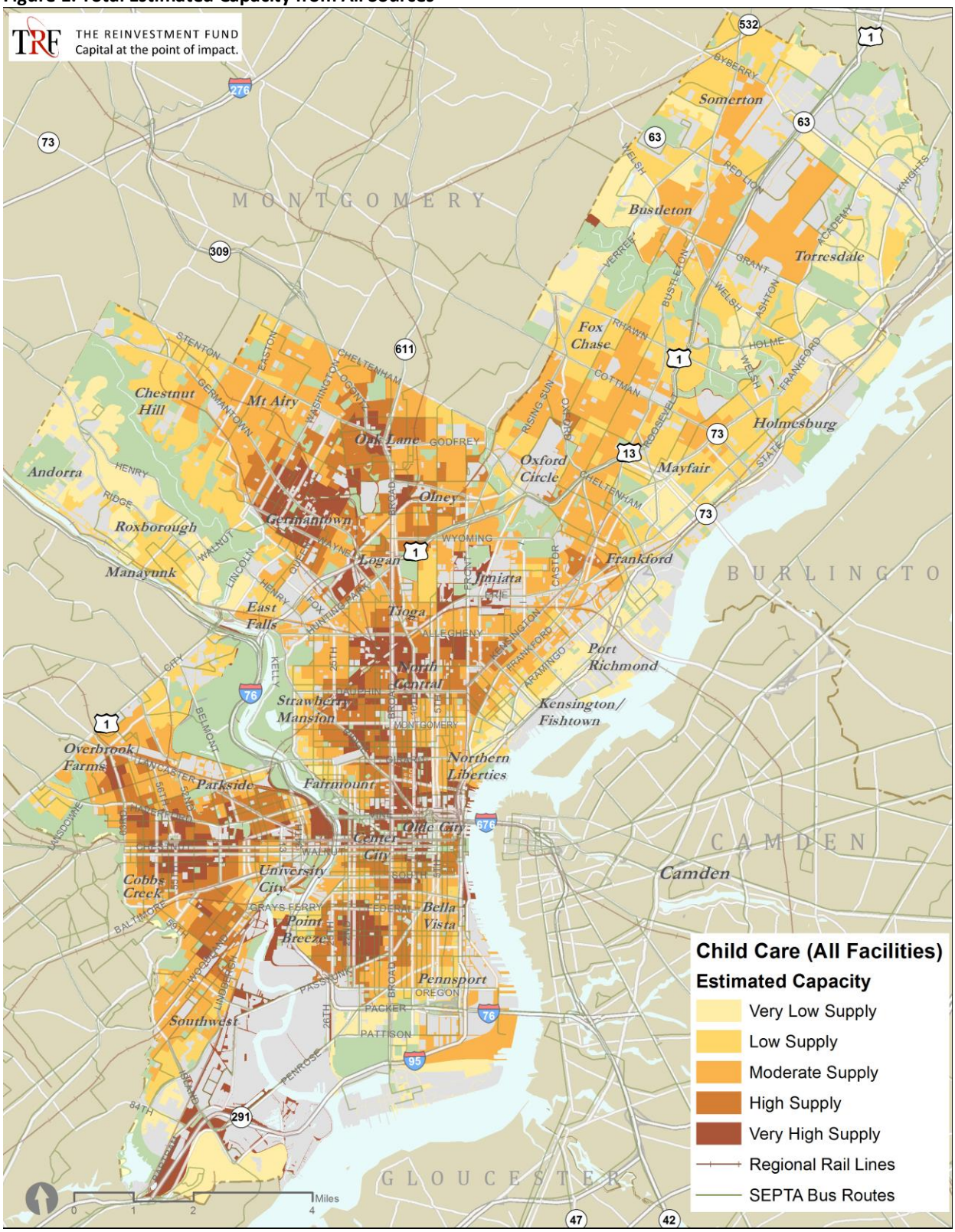
After estimating both the supply and demand for child care, the final step is to model places where shortages exist in childcare coverage vis-à-vis the demand for those services. We calculated this measure in two ways: an *absolute shortage* and a *relative shortage*. The absolute shortage is the raw difference between supply and demand. The relative shortage is a measure that makes statistical adjustments for existing shortages in the market. Absolute and relative shortages were subdivided to offer specific shortage measures for total supply, certified supply and high quality supply (defined as centers with a STAR 3 or STAR 4 rating). Every census block group in Philadelphia therefore has multiple supply and shortage measures. Each of the shortage measures is instructive of the nature of the required programmatic or investment activity (e.g., invest in getting existing uncertified supply certified, upgrade existing certified supply, create new high quality supply).

[5] Laughlin, Lynda. 2013. *Who's Minding the Kids? Child Care Arrangements: Spring 2011*. Current Population Reports, P70-135. U.S. Census Bureau, Washington, DC.

[6] Illinois Action for Children, *Getting There: Cook County Parents' Commute to Child Care and Work,* June 2012.

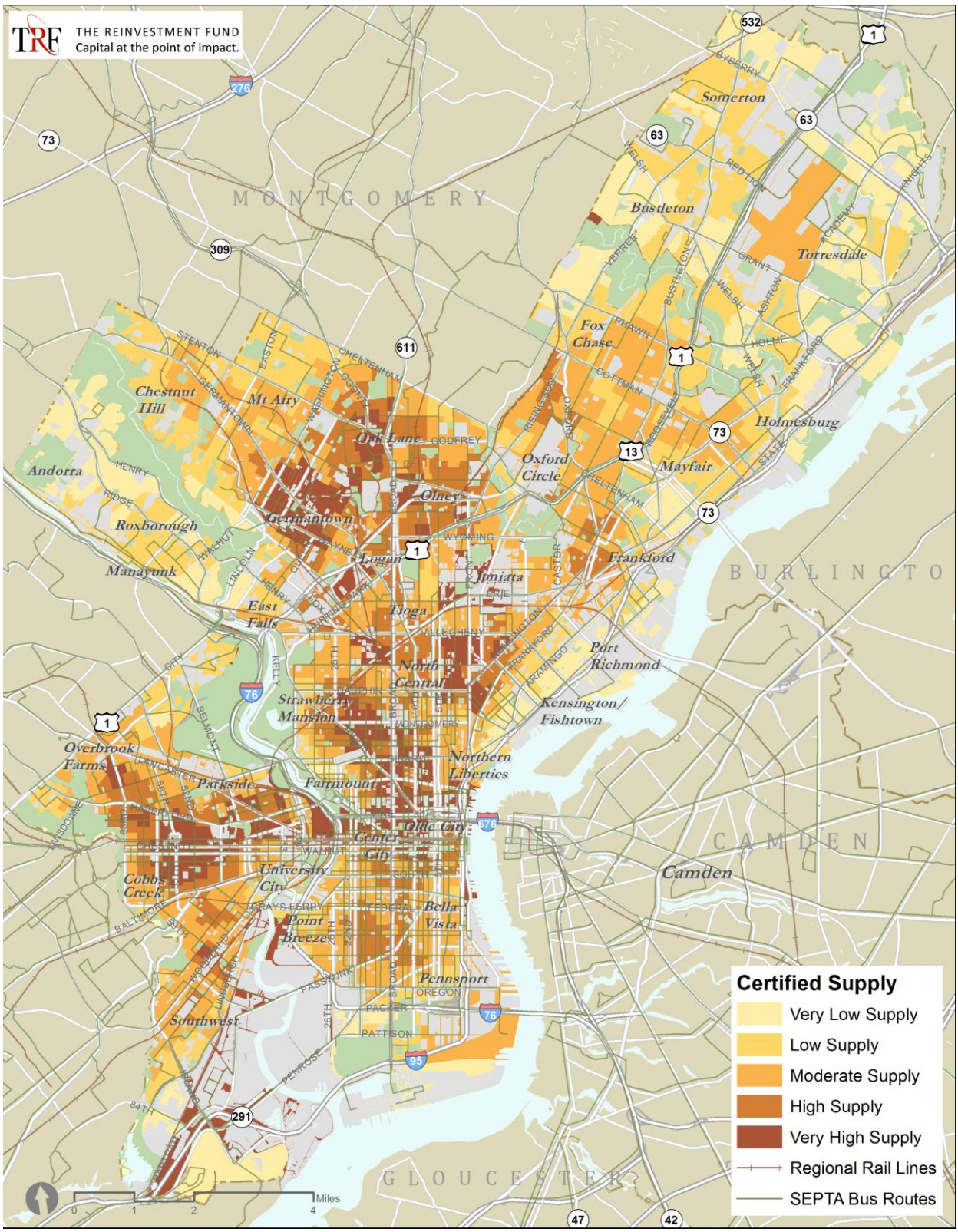
Appendix II:
Maps of Childcare Supply

Figure 1: Total Estimated Capacity from All Sources



Very Low Supply = 10th Percentile or Less; Low Supply = 10th-30th Percentile; Moderate Supply = 30th-70th Percentile; High Supply = 70th-90th Percentile; Very High Supply = 90th-100th Percentile

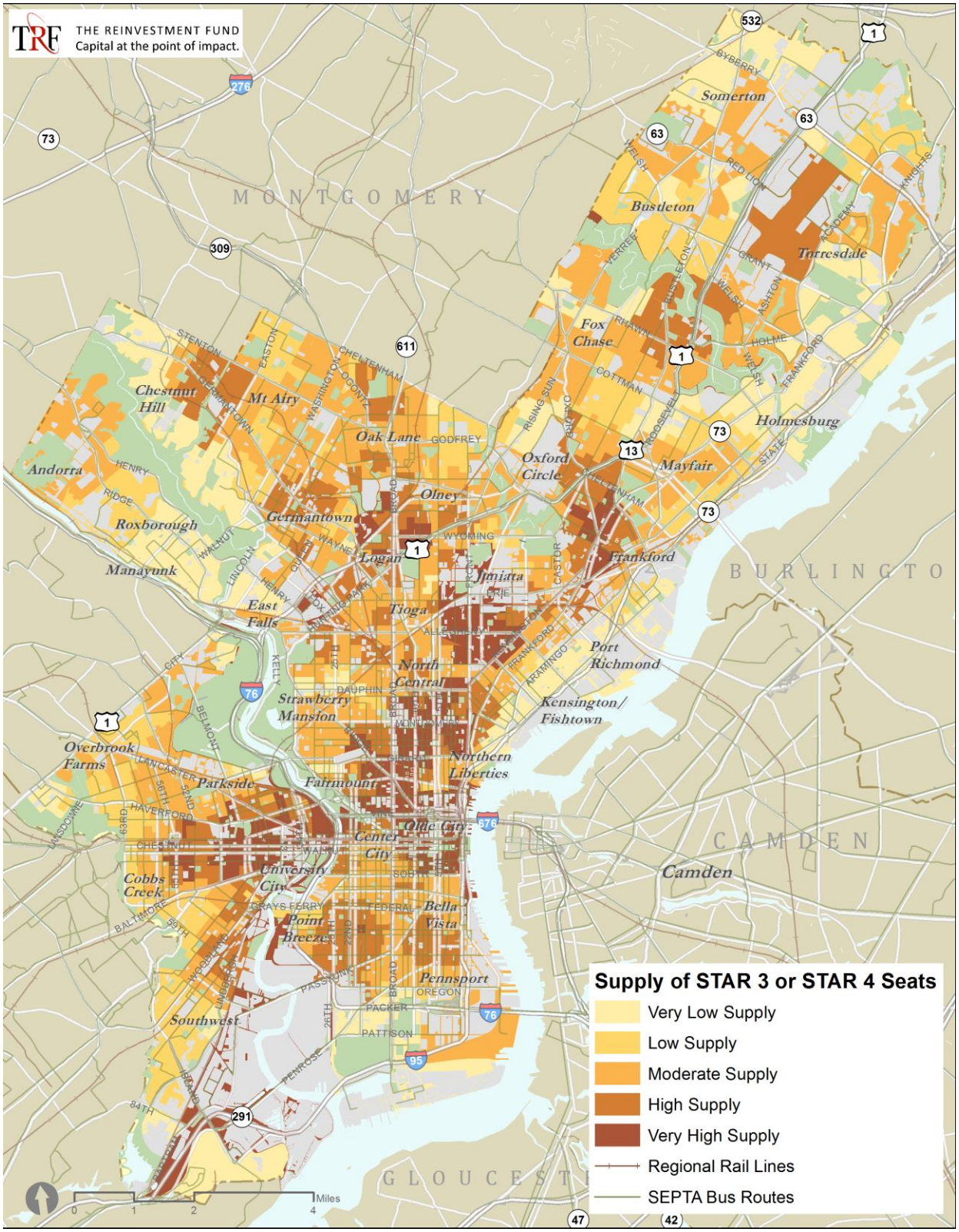
Figure 2: Total Estimated Capacity of Certified (OCDEL) Sites



Very Low

Supply = 10th Percentile or Less; Low Supply = 10th-30th Percentile; Moderate Supply = 30th-70th Percentile; High Supply = 70th-90th Percentile; Very High Supply = 90th-100th Percentile

Figure 3: Estimated High quality (STAR 3- or STAR 4-Rated) Capacity



Very Low Supply = 10th Percentile or Less; Low Supply = 10th-30th Percentile; Moderate Supply = 30th-70th Percentile; High Supply = 70th-90th Percentile; Very High Supply = 90th-100th Percentile

Figure 4: Universe of Child Care Sites

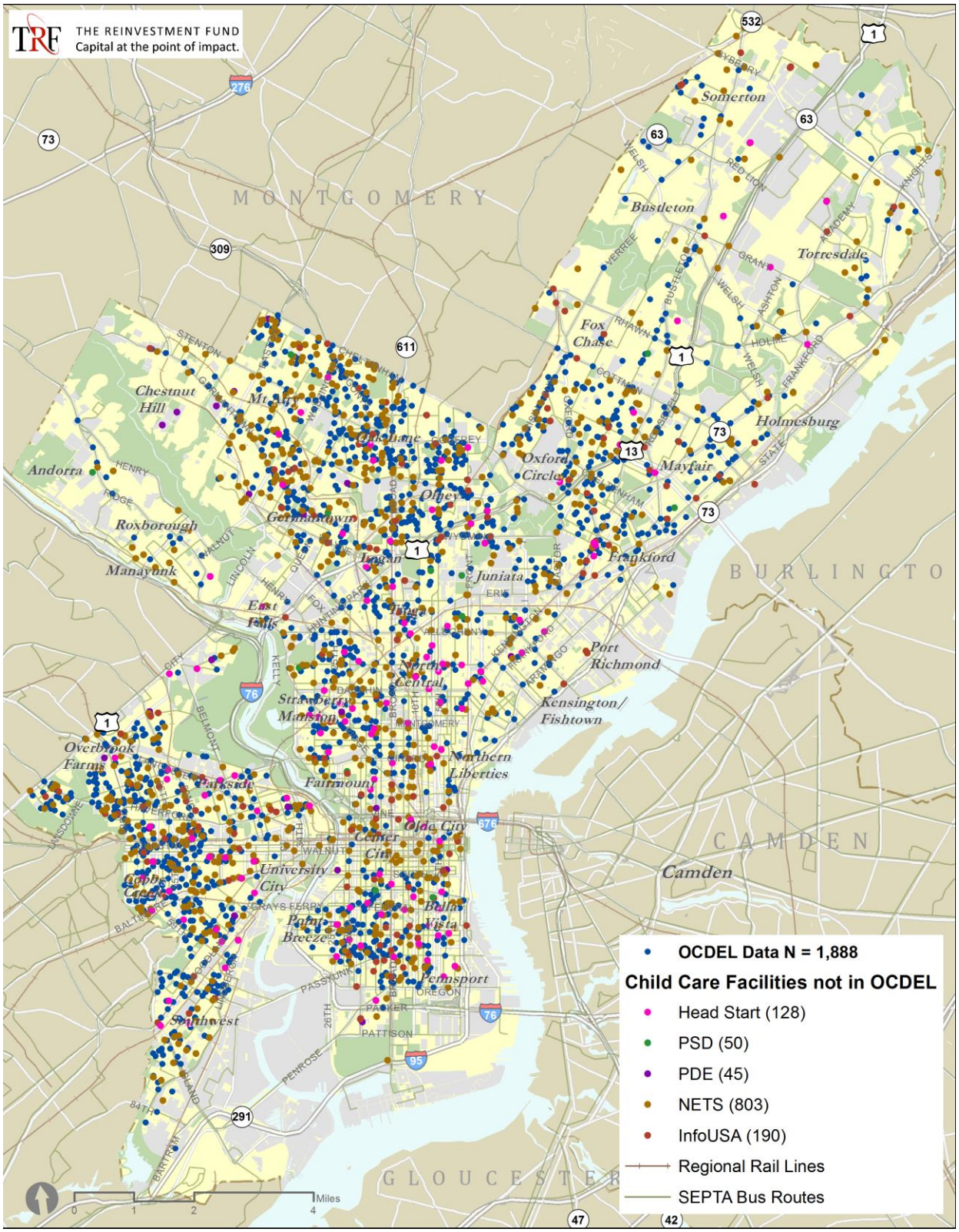


Figure 5: All Certified Sites (OCDEL)

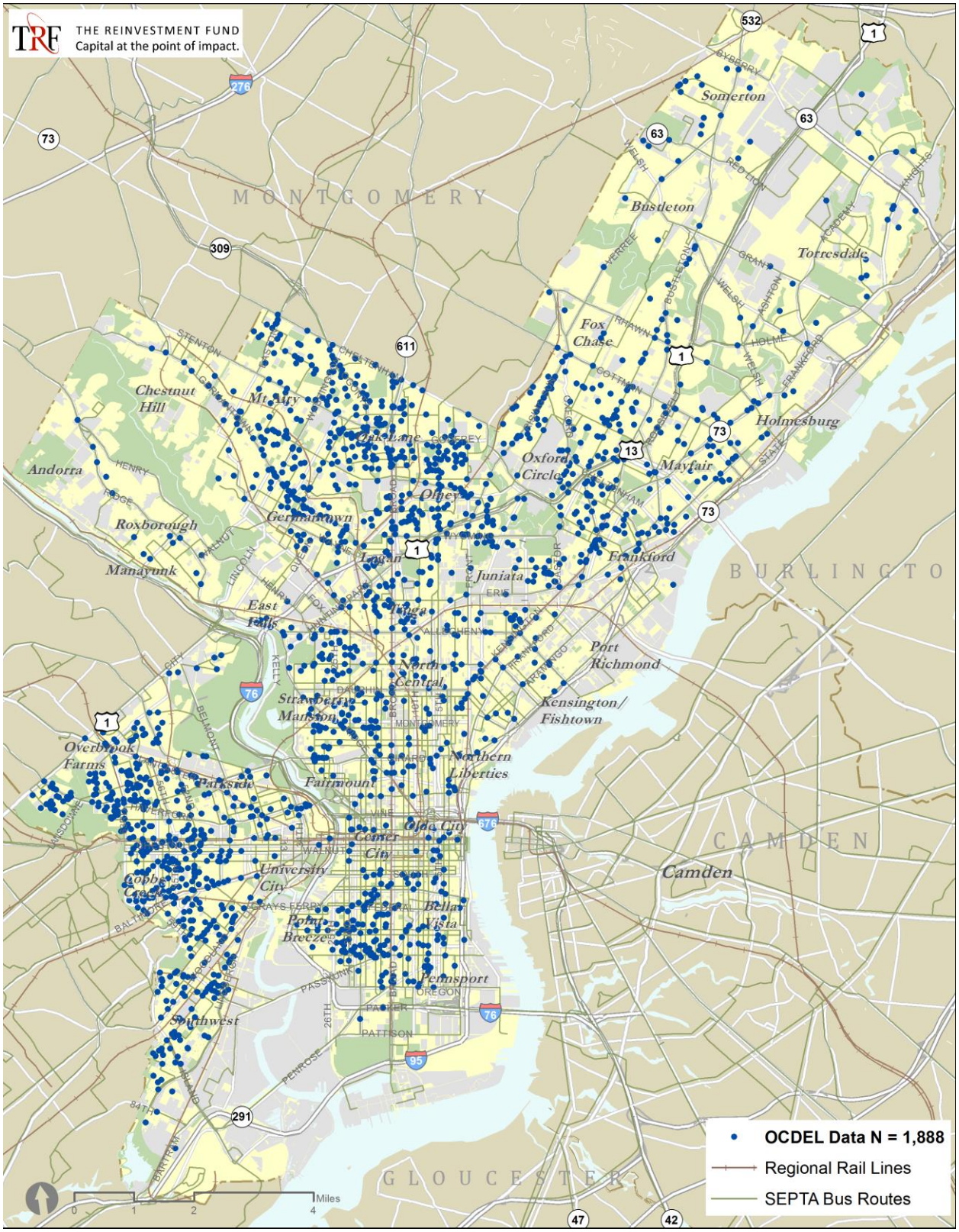
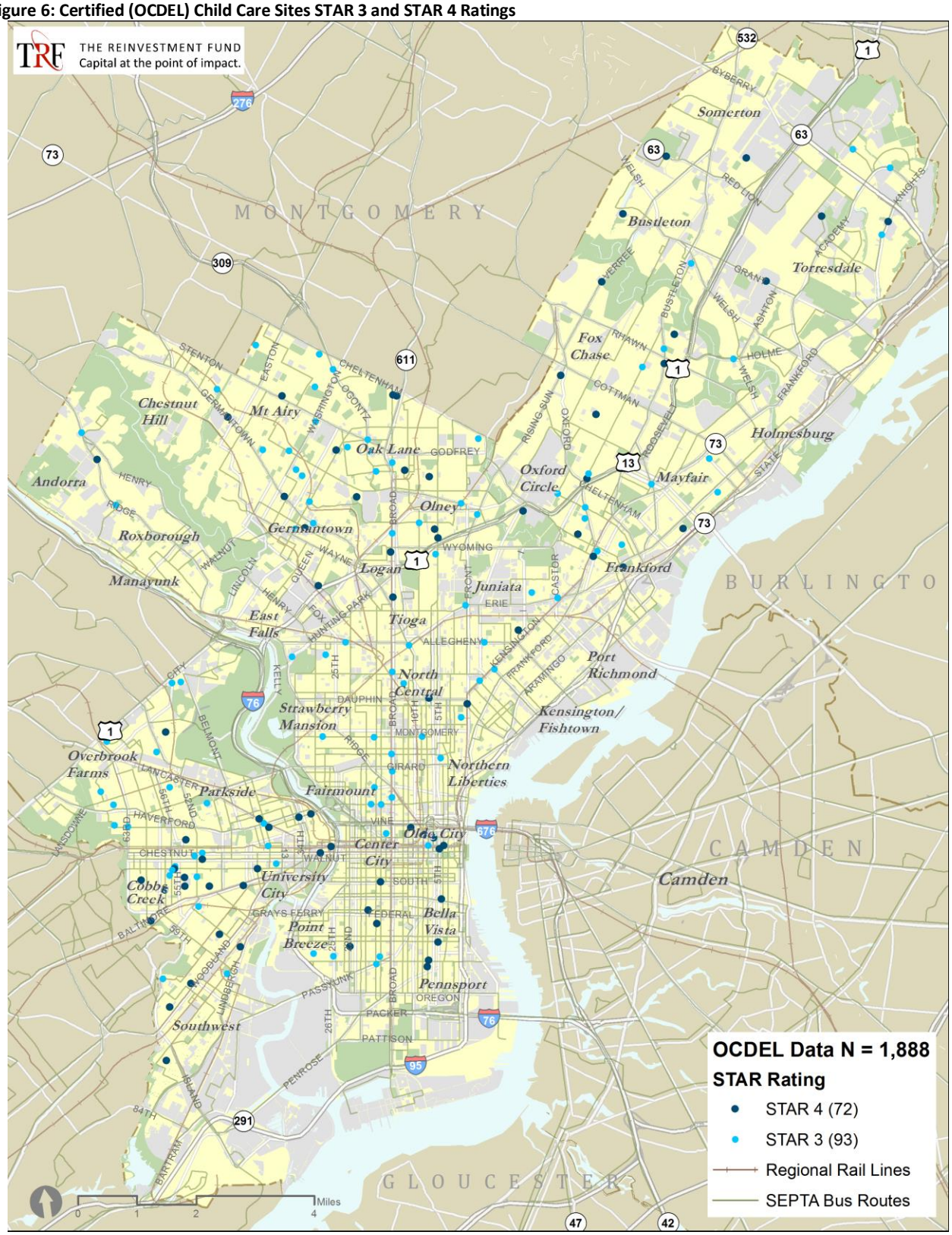


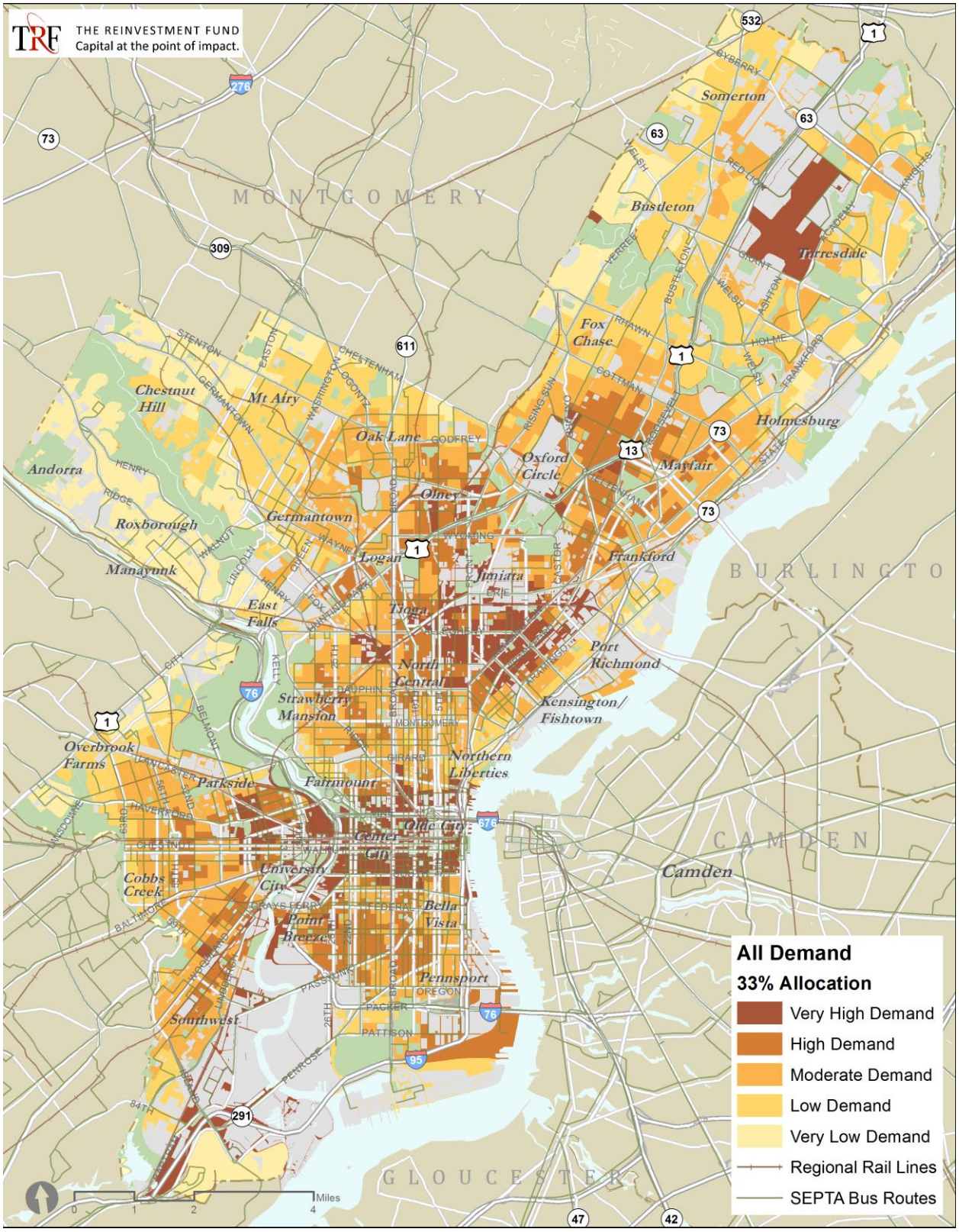
Figure 6: Certified (OCDEL) Child Care Sites STAR 3 and STAR 4 Ratings



Appendix III:

Map of Childcare Demand

Figure 7: Demand (33% of Children Allocated to their Parents' Place of Work)

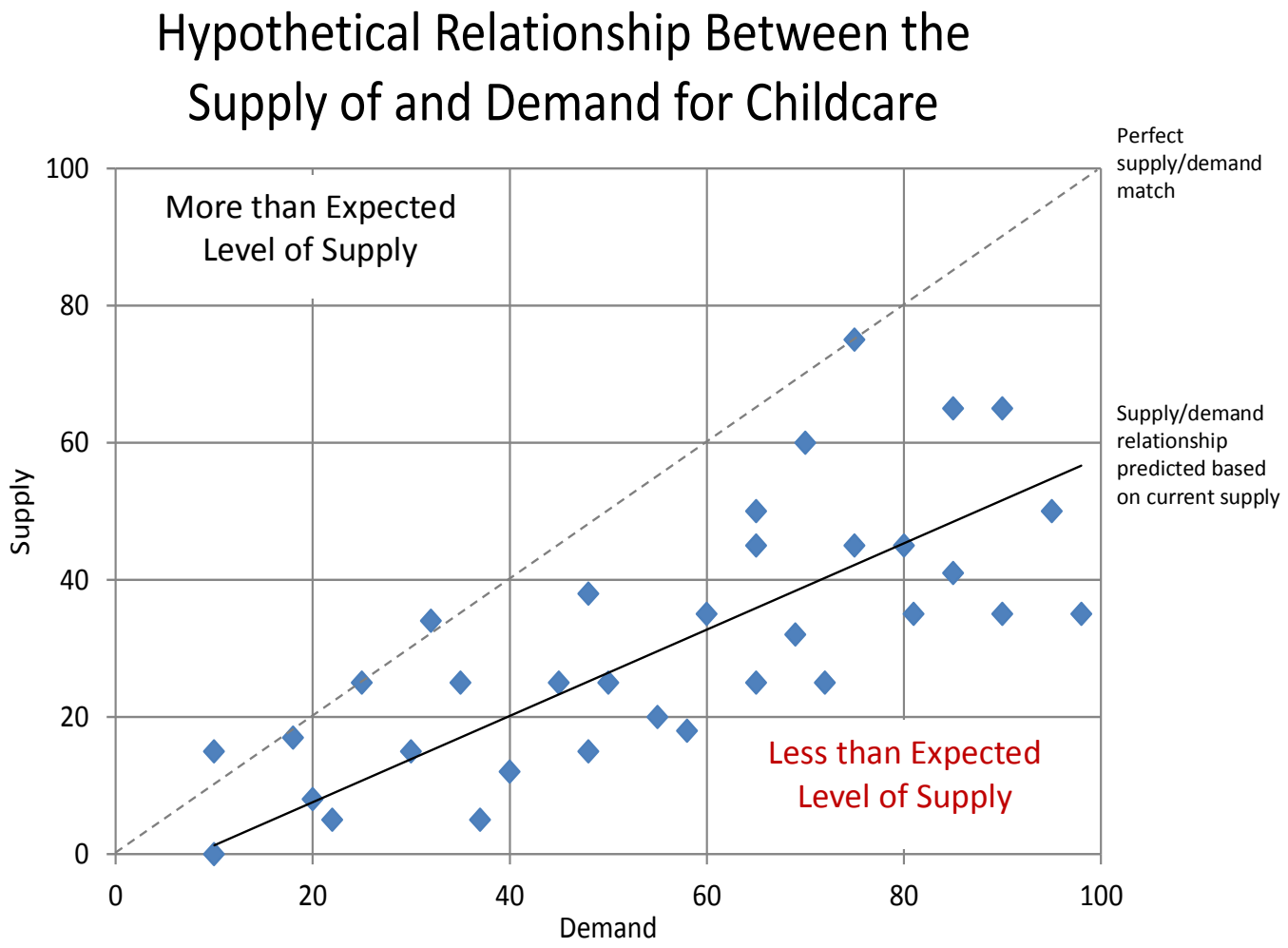


Very Low Demand = 10th Percentile or Less; Low Demand = 10th-30th Percentile; Moderate Demand = 30th-70th Percentile; High Demand = 70th-90th Percentile; Very High Demand = 90th-100th Percentile

Appendix IV:

Approaches to Understanding Supply/Demand Shortage

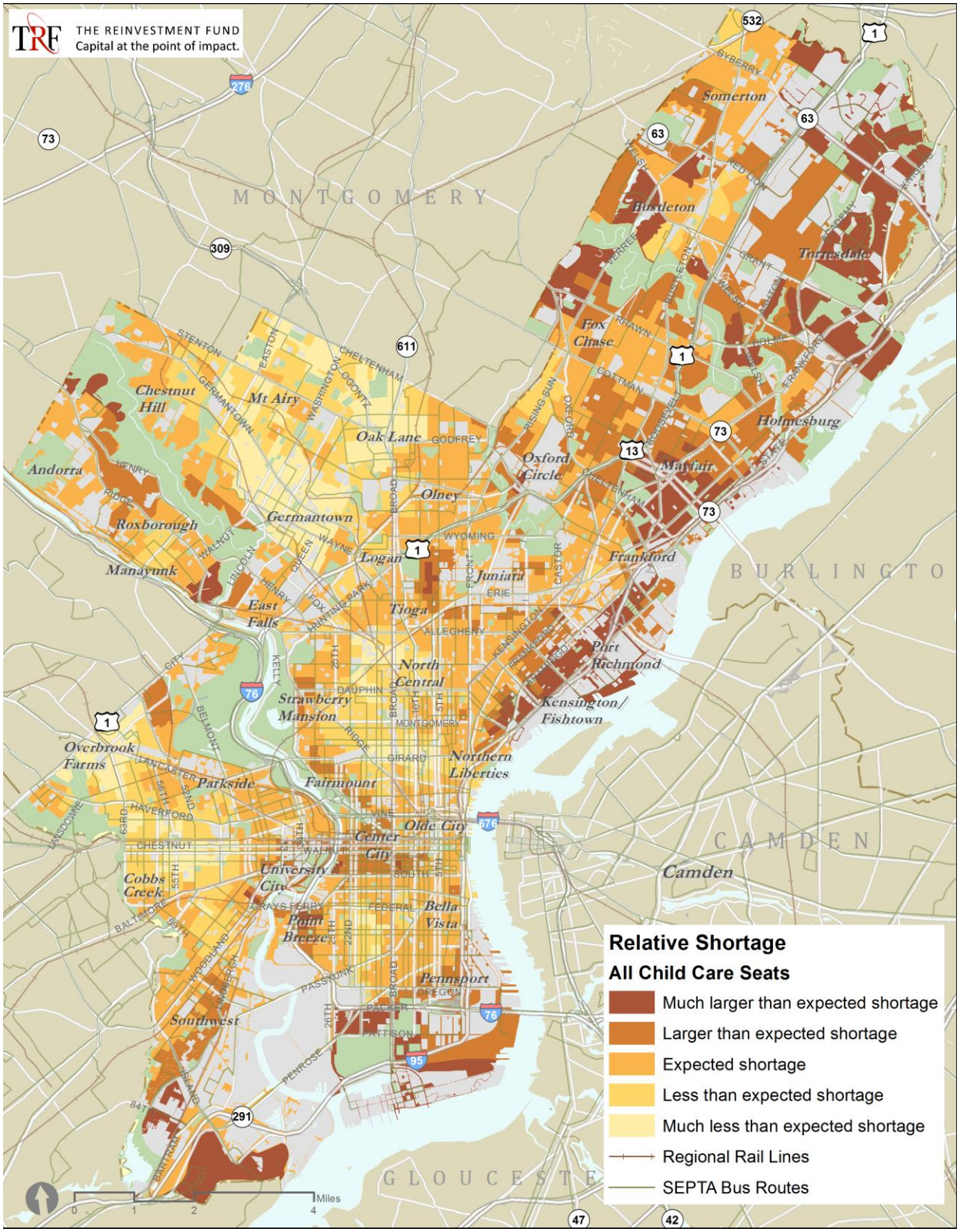
Note that each blue diamond within the chart represents a hypothetical block group as described by its demand for childcare and its supply.



Appendix V:

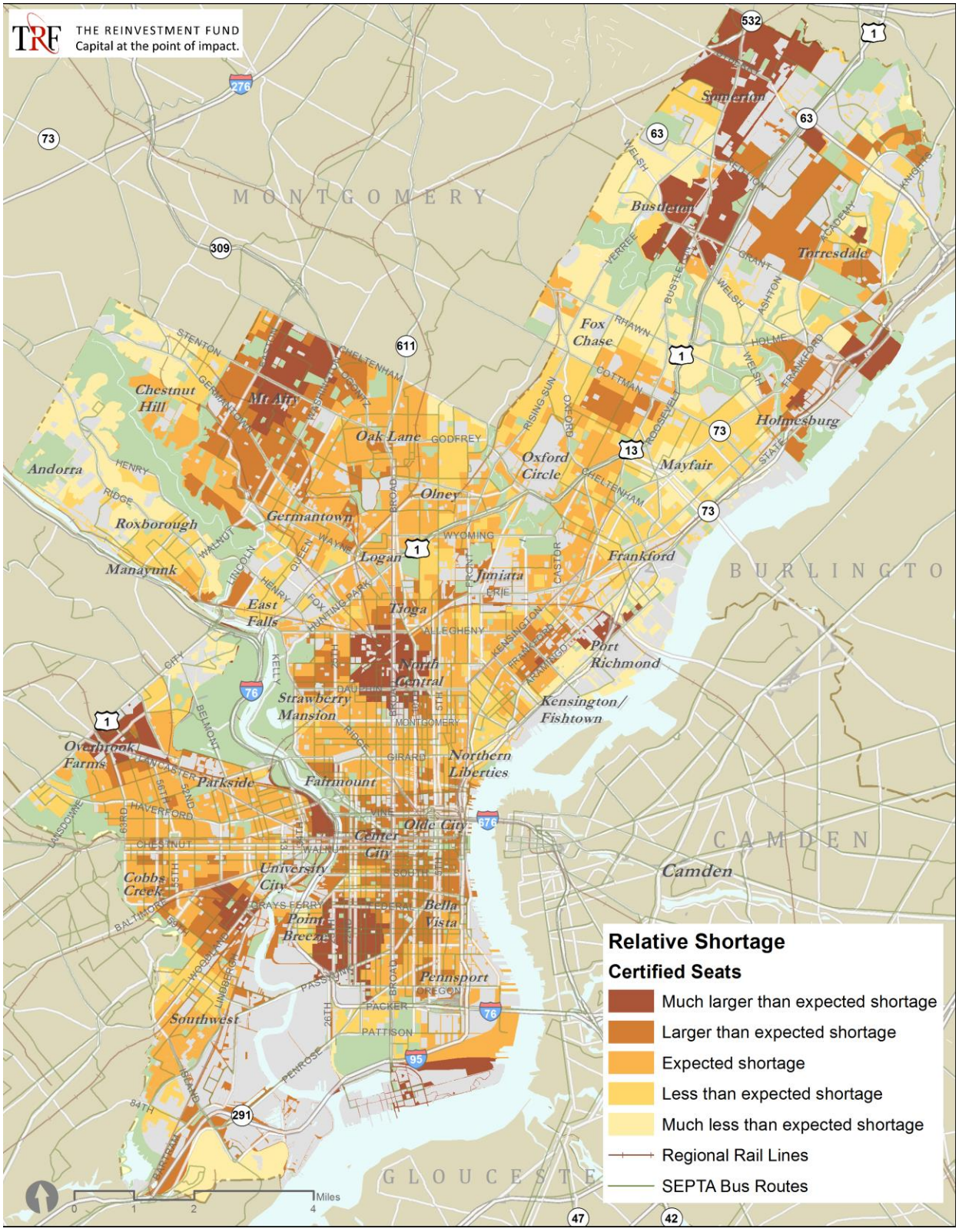
Maps of Childcare Shortage

Figure 8: Larger/Less than expected shortage of Overall Child Care Supply



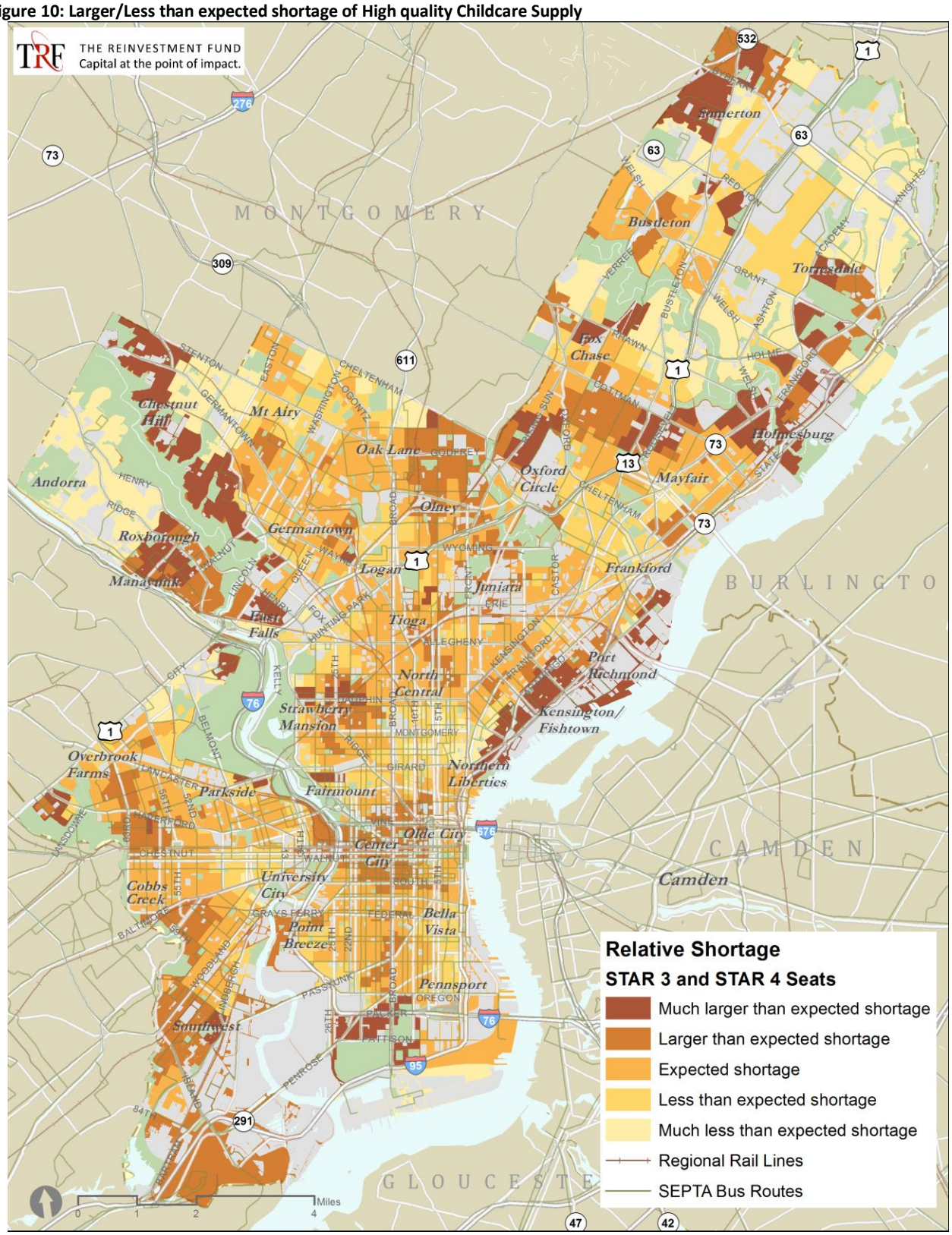
Much larger than expected = 10th Percentile or Less; Larger than expected = 10th-30th Percentile; Expected = 30th-70th Percentile; Less than expected = 70th-90th Percentile; Much less than expected = 90th-100th Percentile

Figure 9: Larger/Less than expected shortage of Certified Childcare Supply



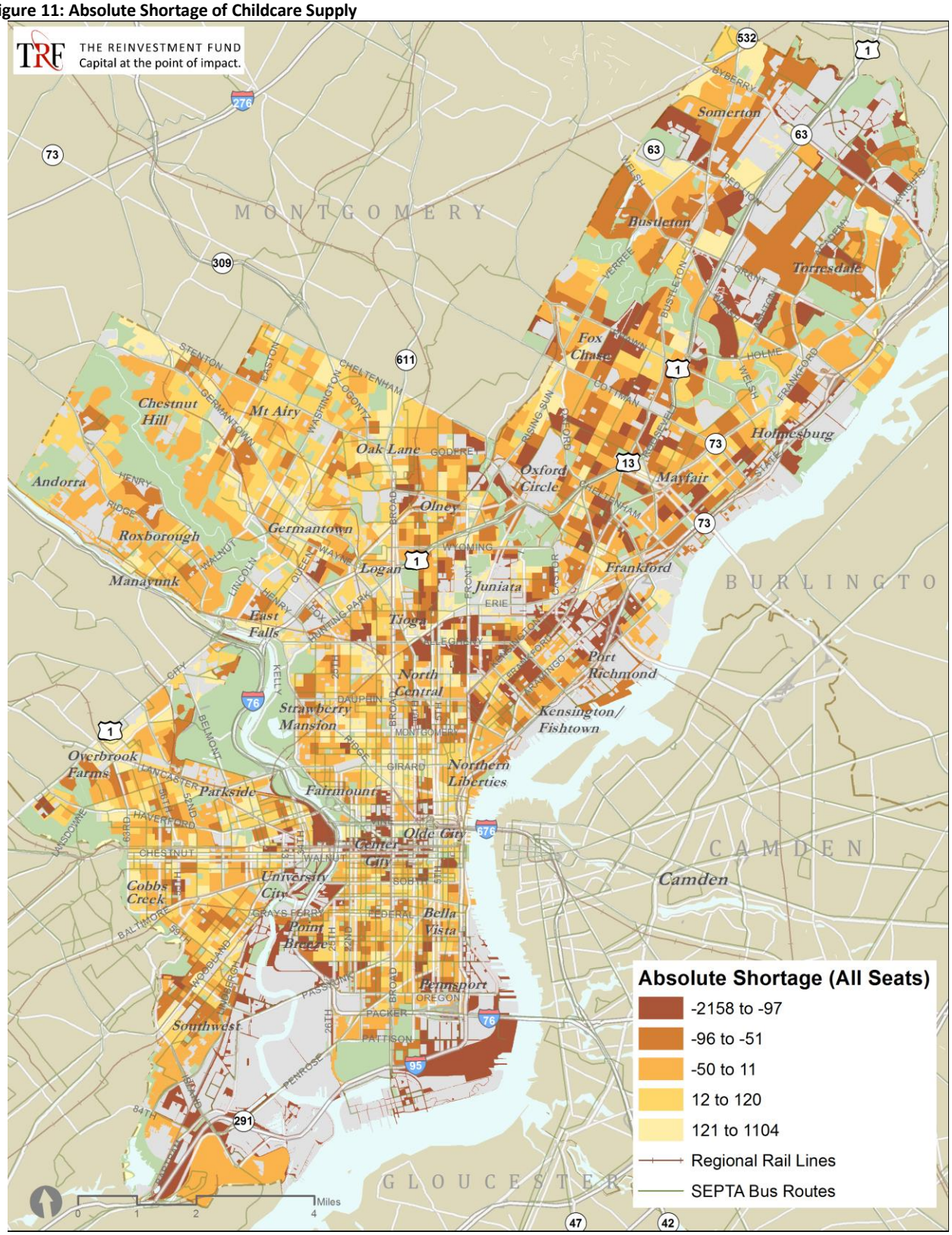
Much larger than expected= 10th Percentile or Less; Larger than expected= 10th-30th Percentile; Expected= 30th-70th Percentile; Less than expected = 70th-90th Percentile; Much less than expected = 90th-100th Percentile

Figure 10: Larger/Less than expected shortage of High quality Childcare Supply



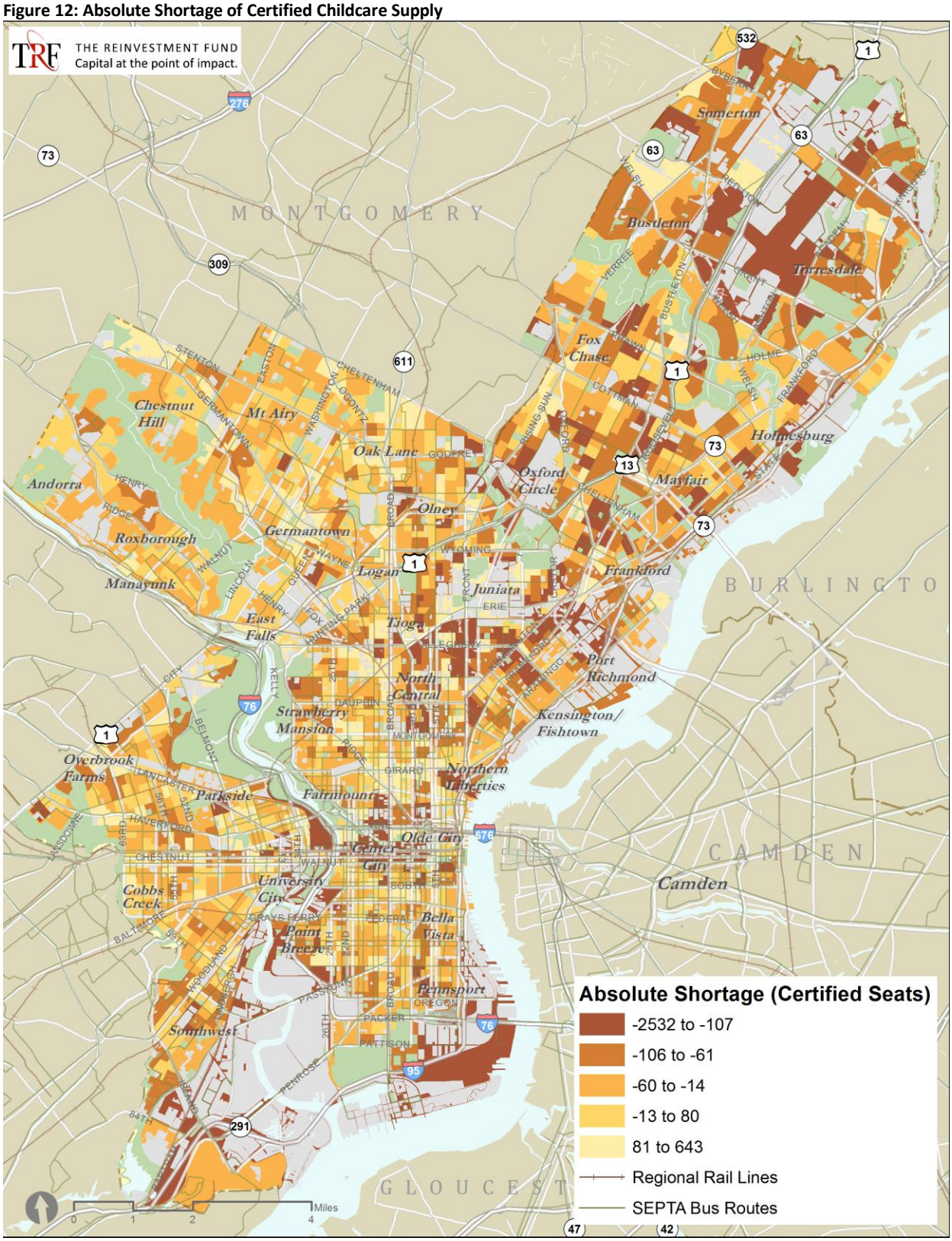
Much larger than expected= 10th Percentile or Less; Larger than expected= 10th-30th Percentile; Expected= 30th-70th Percentile; Less than expected = 70th-90th Percentile; Much less than expected = 90th-100th Percentile

Figure 11: Absolute Shortage of Childcare Supply



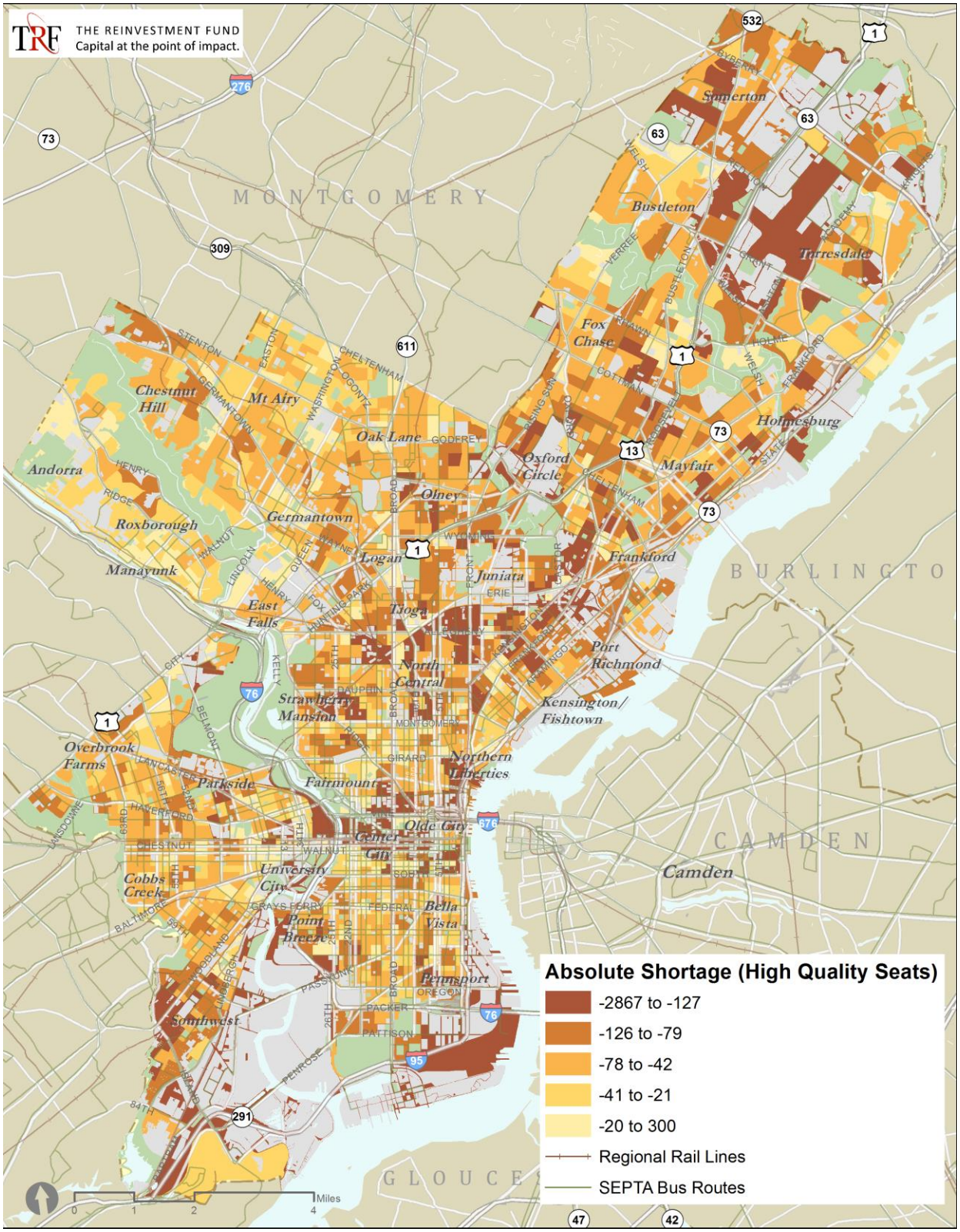
-2158 to -97 seats = 10th Percentile or Less; -96 to -51 seats = 10th-30th Percentile; -50 to 11 seats = 30th-70th Percentile; 12 to 120 seats = 70th-90th Percentile; 121 to 1,104 seats = 90th-100th Percentile

Figure 12: Absolute Shortage of Certified Childcare Supply



-2532 to -107 seats = 10th Percentile or Less; -106 to -61 seats = 10th-30th Percentile; -60 to -14 seats = 30th-70th Percentile; -13 to 80 seats = 70th-90th Percentile; 81 to 643 seats = 90th-100th Percentile

Figure 13: Absolute Shortage of High Quality Childcare Supply



-2867 to -127 seats = 10th Percentile or Less; -126 to -79 seats = 10th-30th Percentile; -78 to -42 seats = 30th-70th Percentile; -41 to -21 seats = 70th-90th Percentile; -20 to 300 seats = 90th-100th Percentile

Appendix VI:

Maps of Childcare Supply

(Consistent Scale)

Figure 14: Estimated Supply in All Sites

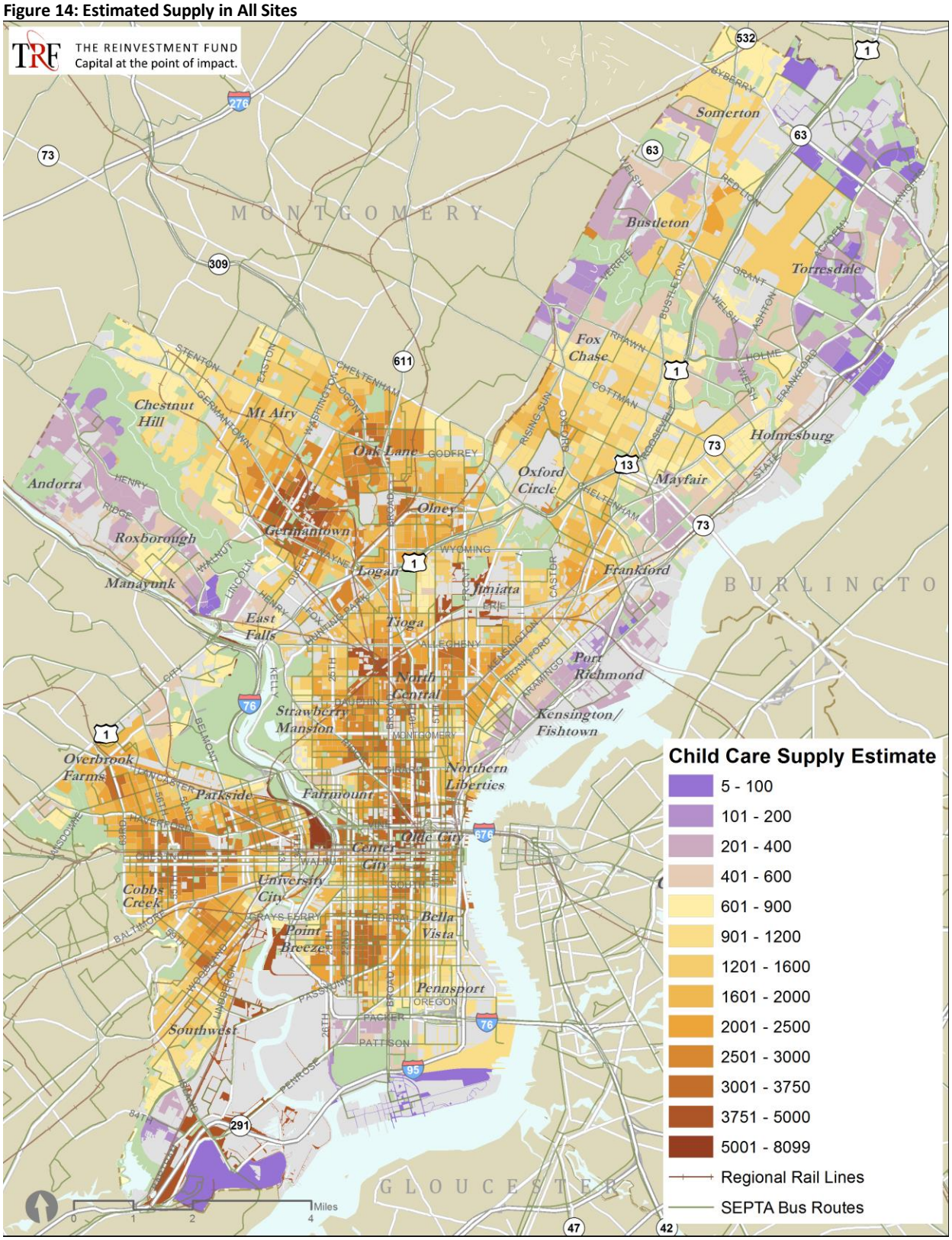


Figure 15: Estimated Supply in Certified Sites

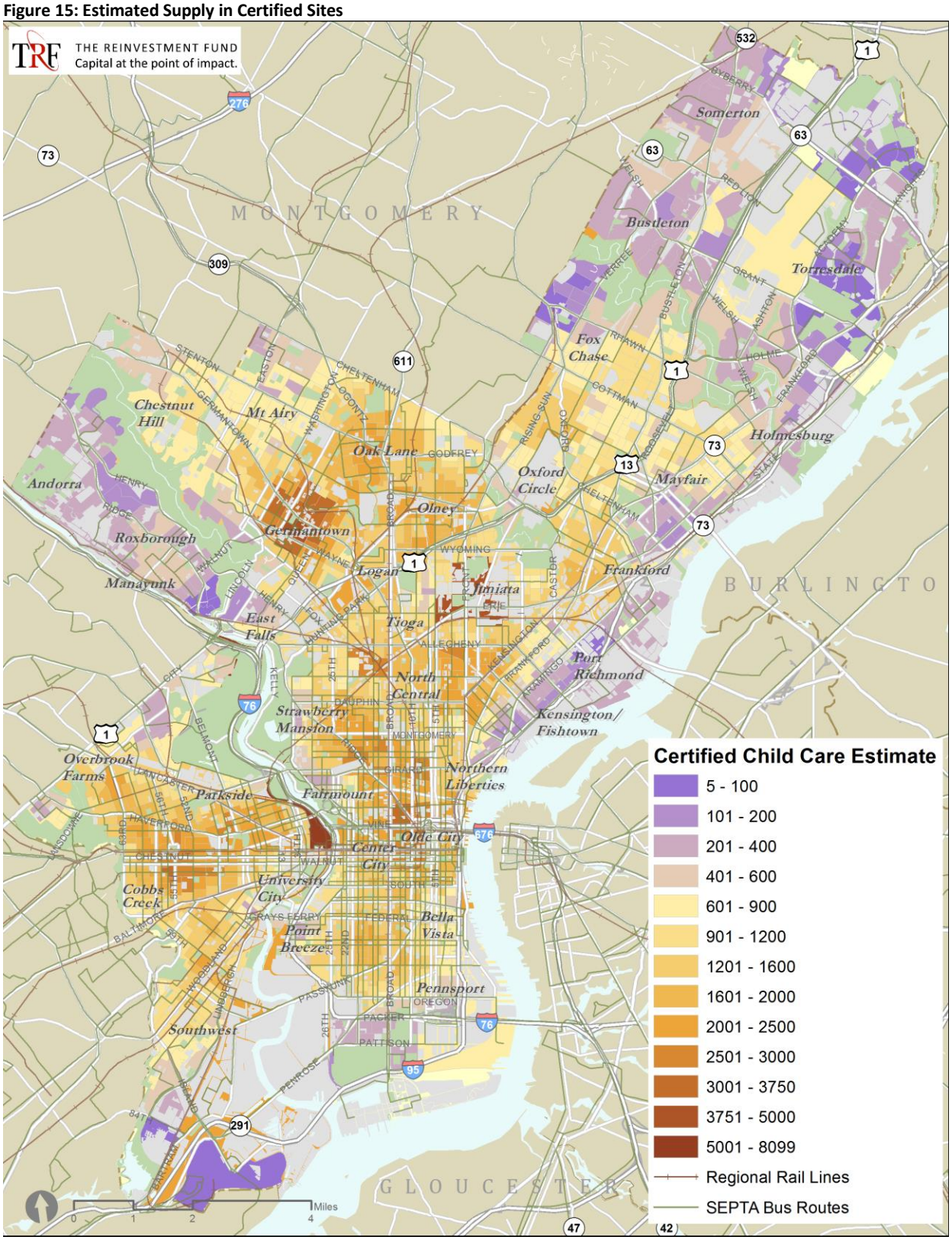


Figure 16: Estimated Supply STAR 3 and STAR 4 Sites

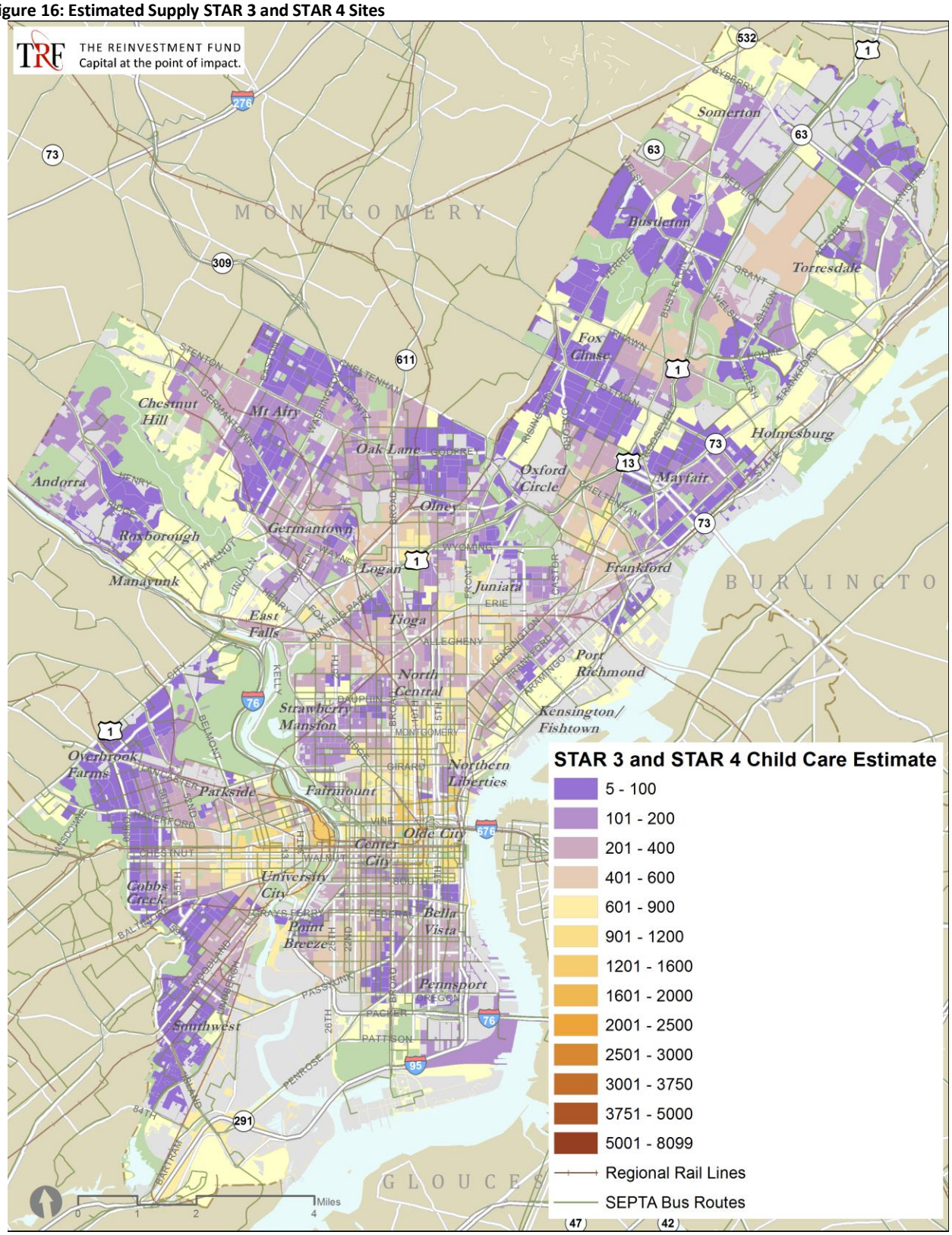


Figure 17: Degree of Absolute Shortage of Total Child Care and Level of Poverty

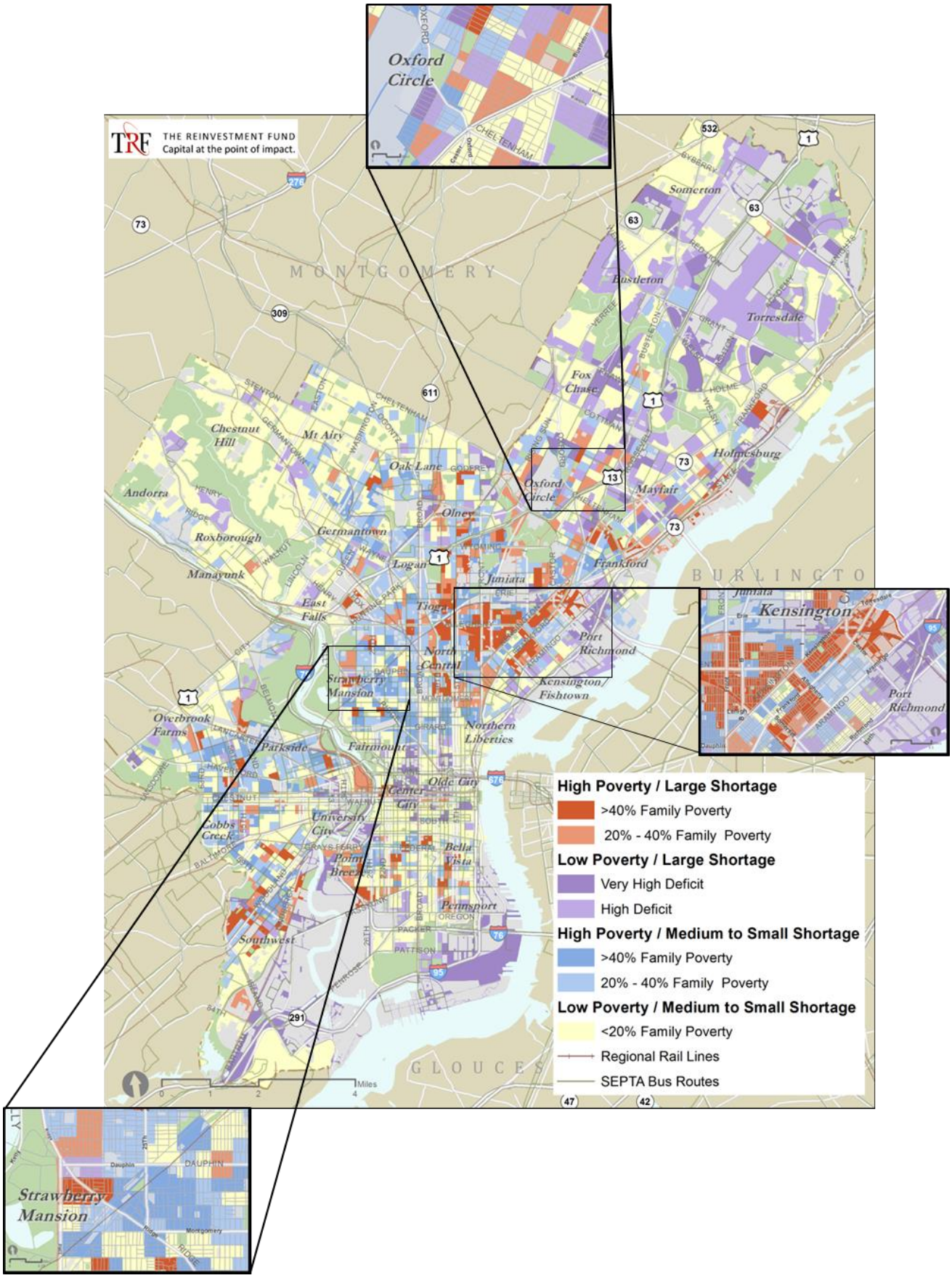


Figure 18: Degree of Absolute Shortage of Certified Child Care and Level of Poverty

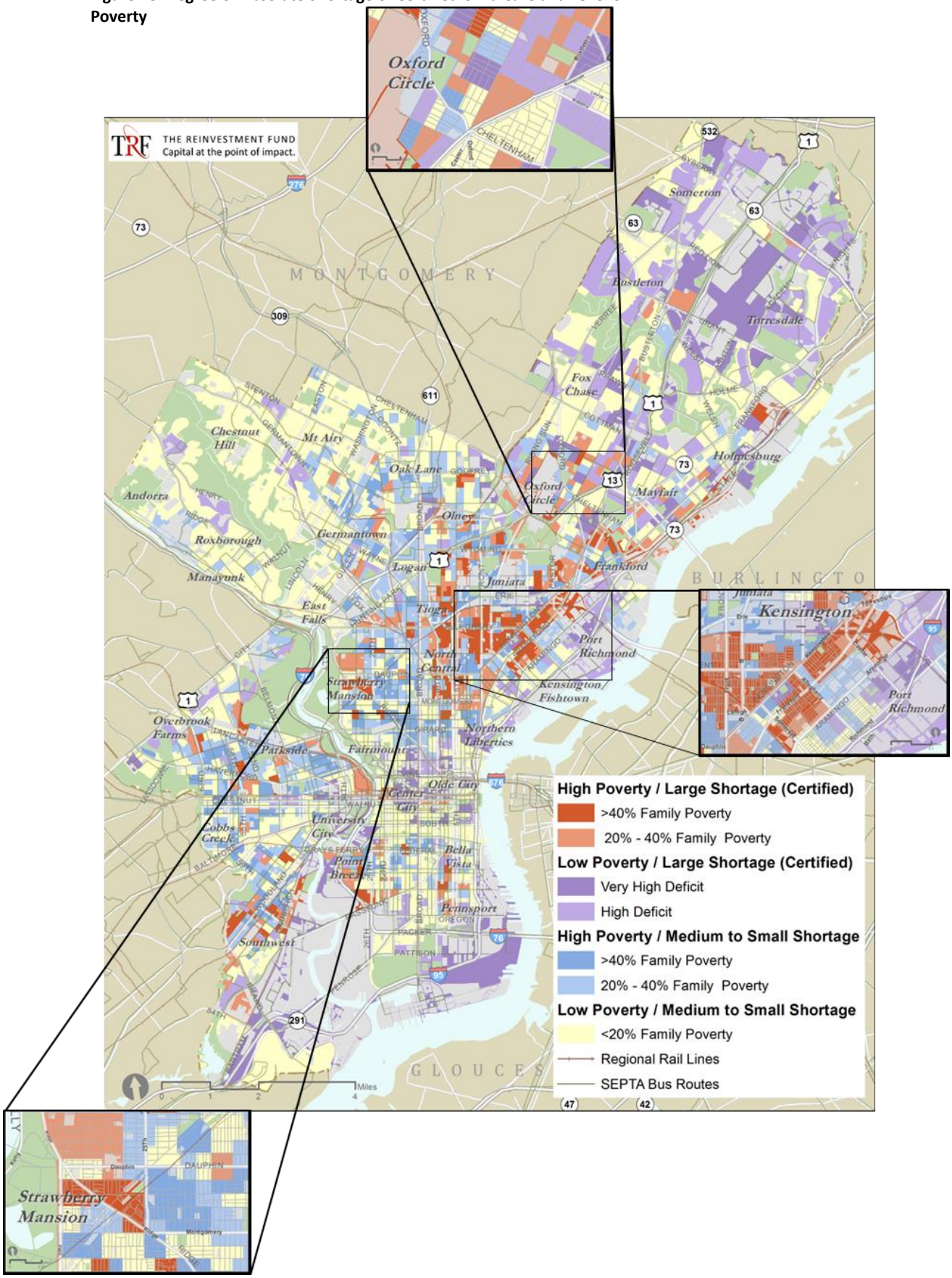
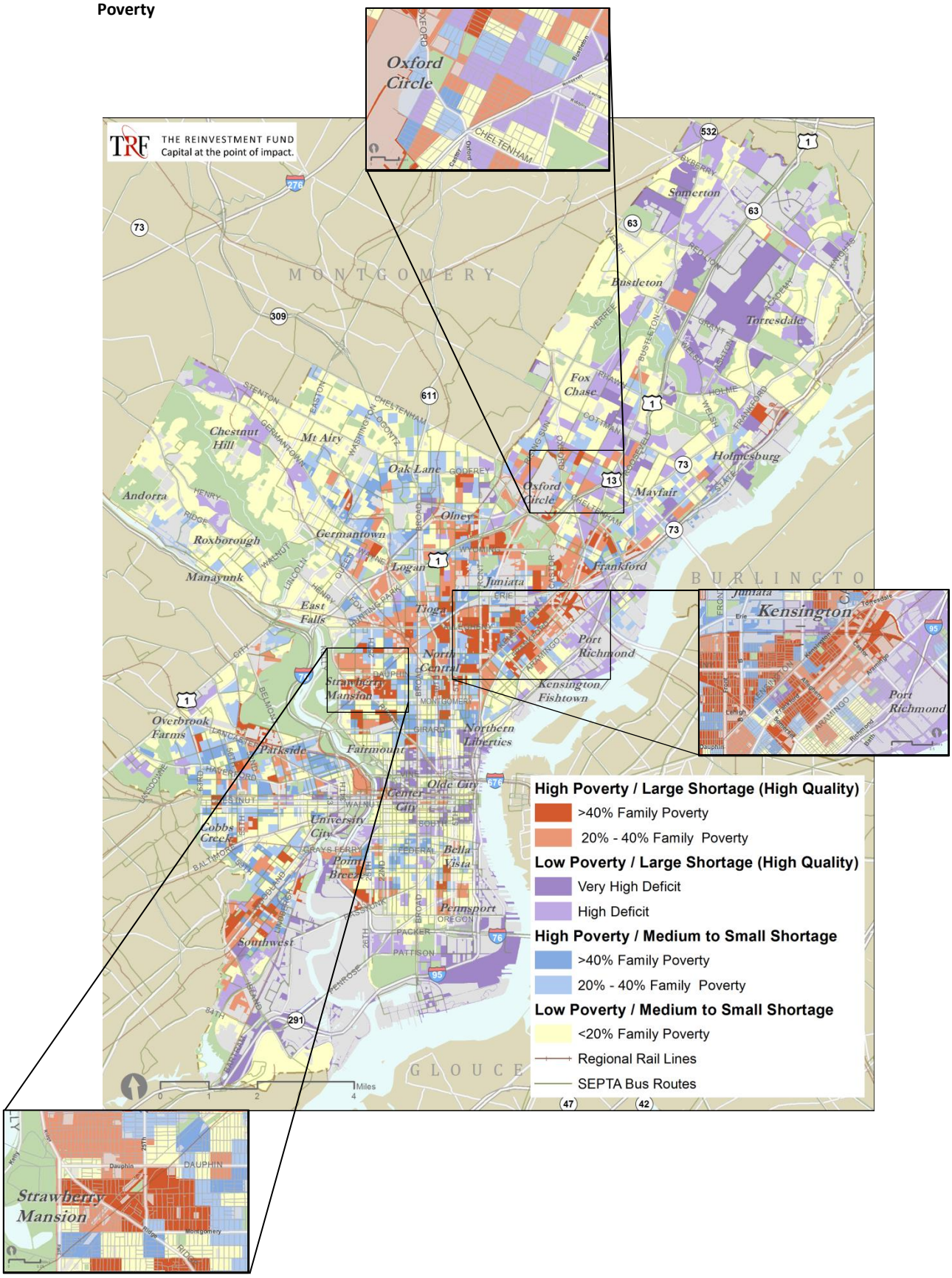


Figure 19: Degree of Absolute Shortage of High Quality Child Care and Level of Poverty



Appendix VII:

Tables of Childcare Supply

(Councilmanic Districts, Neighborhoods and Zip Codes)

This work is supported by a grant from The William Penn Foundation. Other organizations involved in the provision, rating, funding and technical support to childcare organizations around the city of Philadelphia also contributed invaluable subject matter expertise to this effort.

About The Reinvestment Fund

The Reinvestment Fund (TRF), a national leader in the financing of neighborhood revitalization, has invested more than $1.3 billion in mid-Atlantic communities since 1985. As a CDFI, TRF finances projects related to housing, community facilities, supermarkets, commercial real estate and energy efficiency. It also provides public policy expertise by helping clients create practical solutions and by sharing data and analysis via www.policymap.com.