

Downtown-Uptown-Oakland-East End Bus Rapid Transit Project Pittsburgh, Pennsylvania Land Use

September 2018

1. Land Use

The Federal Transit Administration (FTA) evaluates land use ratings for Capital Investment Grant Small Starts projects primarily based on quantitative measures of existing conditions. This includes population and employment within a metropolitan area and Central Business District (CBD), population and employment densities along the corridor and around station areas proposed, and provisions for affordable housing. Additional information on these existing conditions for the Downtown-Uptown-Oakland-East End Bus Rapid Transit (BRT) Project are included in the Land Use tab of the Reporting Template.

Key indicators that the FTA considers in making land use rating determinations from the Downtown-Uptown-Oakland-East End BRT land use template are summarized in **Table 1** below.

Table 1: Land Use Summary

Indicator ¹	Total
Metropolitan Area Population	2,358,060
Metropolitan Area Employment	1,486,452
CBD Total Employment	159,704
Corridor Population	88,959
Corridor Employment	258,546
Average Corridor Population Density	8,995 persons/square mile
Average Corridor Employment Density	26,142 jobs/square mile
Ratio of Affordable Housing Units*	1.45
CBD Typical Parking Cost per Day	\$16.02
CBD Spaces per Employee	0.14

**Refers to proportion of legally binding affordability restricted housing units in the corridor compared to the same measure within the county or counties that the project travels through.*

¹ Population and employment data along the corridor was provided by the Metropolitan Planning Organization’s Transportation Analysis Zone data; American Community Survey Census tracts were used to provide housing unit data; National Housing Preservation Database Data was used to provide affordable housing data; Parking garage is maintained by the Pittsburgh Downtown Partnership and provided by the City of Pittsburgh.

In addition to these metrics, the FTA also requests specific supporting information related to existing corridor and station area development and character, parking supply, affordable housing, and existing station area pedestrian facilities. This document provides further details on these criteria. The 40 new station locations were grouped into 10 clusters of stations for this Land Use analysis. This is due to the proximity of some of the stations locations, which would be less than one mile apart. This is consistent with the methodology described in the Section 5309 Reporting Instructions, which can be found in Appendix A. The four existing stations on the Martin Luther King, Jr., East Busway are not included in the Land Use analysis since they will not be constructed as part of this project.

1.1. Corridor and Station Area Character and Development

The Downtown-Uptown-Oakland-East End BRT Project is located within the dense urban core of downtown Pittsburgh. The route will connect Downtown Pittsburgh, the city's academic and health care hubs in Oakland, and some of the densest residential neighborhoods along in the city's East End. The project will serve a heavily developed, high-density corridor, with a diverse mix of commercial, office, residential, education, and retail uses.

Within the corridor, existing land uses include office buildings, universities, retail stores/services, government services, single- and multi-family residential (including affordable housing), museums, libraries, performing arts centers, hospitals and other medical facilities, parking lots, parks, auditoriums, religious institutions, sports facilities, and a mainline railroad. Some vacant land is also located within the corridor and concentrated between the city's two major hubs of employment (Downtown and Oakland) in the Uptown neighborhood. This neighborhood has high potential for redevelopment and is being targeted in the City of Pittsburgh's economic development efforts. **Figure 1** provides an overview map of existing land uses within the corridor and surrounding area.

The corridor is comprised primarily of commercial, medical, educational, and government uses. Many properties are mixed-use, with residential dwellings above commercial storefronts. As the corridor extends further east along the East Busway as well as the Highland Park and Squirrel Hill BRT Branches, there is a greater concentration of dense residential land use. This is complemented by medium-density commercial and office. Throughout the corridor, existing land uses are supportive of transit investment. Additionally, a series of bus routes currently operate on and adjacent to the corridor.

1.1.1. Population, Employment, and Housing Characteristics

Population density is concentrated along the corridor and makes the corridor area ripe for transit use. **Figure 2** shows population density within and adjacent to the corridor. As of 2015, the total population of the City of Pittsburgh is 302,407² in a land area of 55.8 square miles, equaling an overall population density of 5,373 persons per square mile. Of this number, 88,959 (29.7 percent) people reside within 0.5 miles of the proposed station areas, which is a combined total area of 9.9 square miles. This equates to a population density of 8,985 persons per square mile in areas 0.5 miles from the station areas and future improvements.

² Source: US Census QuickFacts Population Estimate, July 1, 2018 Regional Forecast Estimates by Traffic Analysis Zones. Southwestern Pennsylvania Commission (SPC). 2015.

Figure 1: Land Use

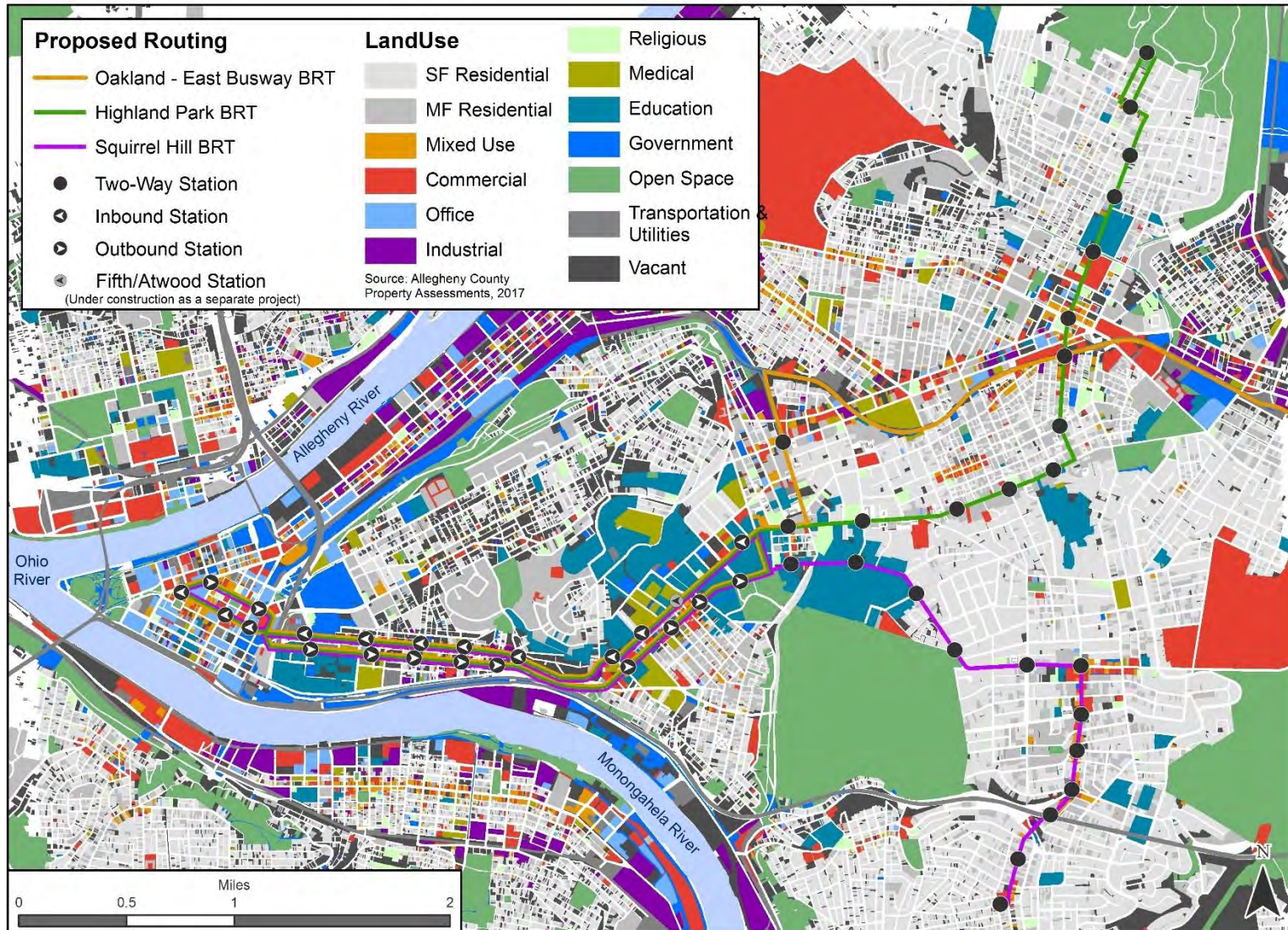
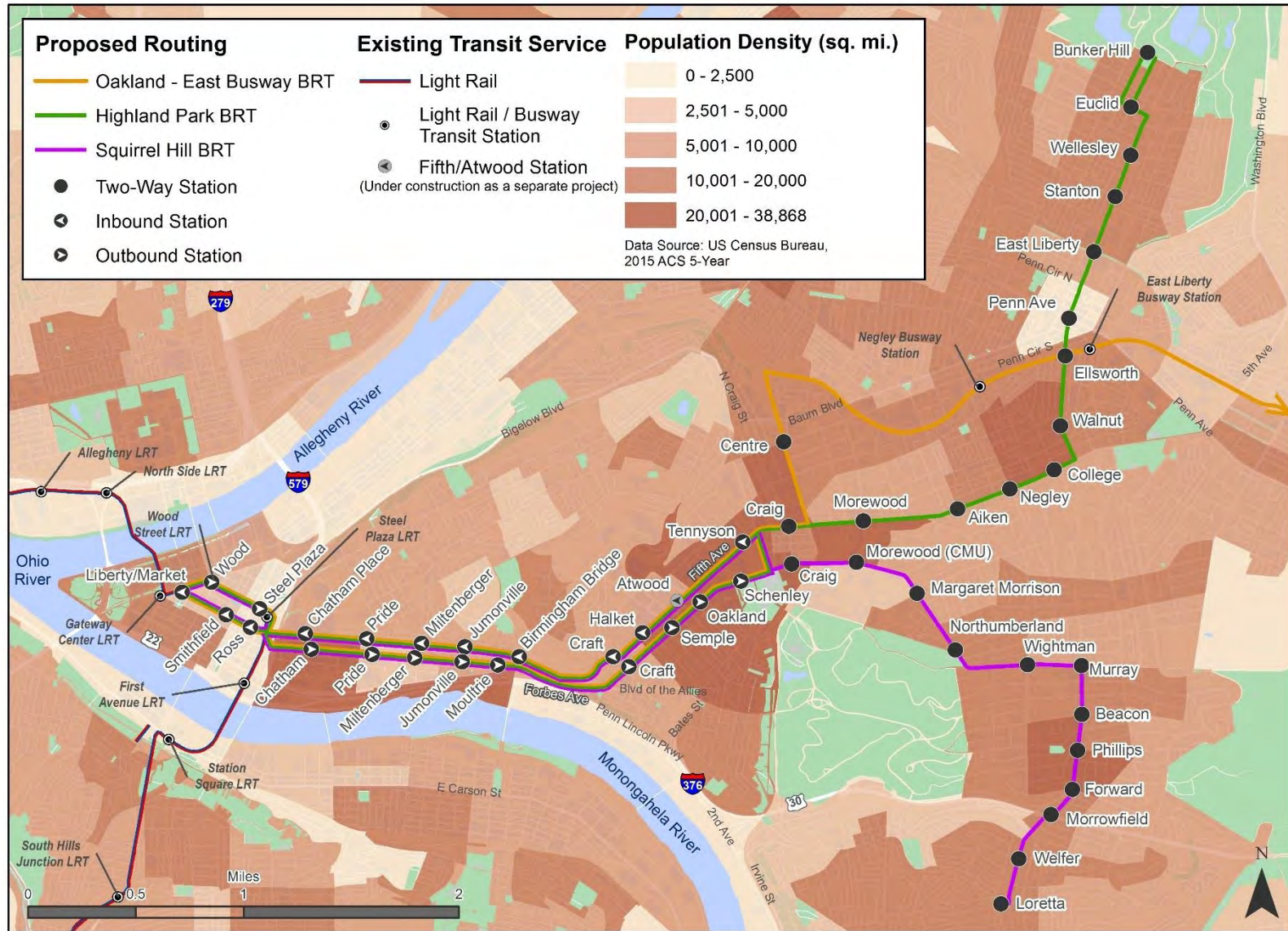


Figure 2: Population Density (2015)



The total number of housing units within Allegheny County is 589,681 with 62,973 (10.7 percent) units located within 0.5 miles of the station areas. **Figure 3** shows housing unit density within and adjacent to the corridor. Housing density is higher in the western portion of the BRT Core and along the Highland Park BRT Branch. Along the Squirrel Hill BRT Branch, housing density increases as the branch moves further south.

Figure 4 shows employment density within and adjacent to the corridor. According to Southwestern Pennsylvania Commission (SPC) forecast estimates, approximately 389,459 jobs were located in the City of Pittsburgh in 2015, equaling an employment density of 6,980 jobs per square mile.³ Employment in the project corridor is 258,546, which is more than 66 percent of the total employment within the City of Pittsburgh. The corridor employment density is approximately 26,142 jobs per square mile, with concentrated employment located within the urban core area of the corridor. Additional employment centers in the region are located along the corridor within the Highland Park BRT Branch, indicating the continued growth of employment further east of the urban core area. While less concentrated employment exists along the Squirrel Hill BRT Branch, the continued growth in population within this portion of the corridor has resulted in additional mixtures of land uses, including multi-family residential and commercial/retail centers, along the branch that are supportive of transit investment.

1.1.2. Major Trip Generators

Regional attractors are located near stations along the corridor, including major universities, health care facilities, cultural venues and sports arenas, as well as neighborhood commercial, retail, and community facilities. These major trip generators are described in **Table 2** and their locations are shown in **Figure 5**. Transit investment will address travel demands in the corridor that result from the current trip generators.

In addition to the major trip generators within the corridor, the Downtown-Uptown-Oakland-East End BRT Project will connect passengers to regional destinations through major transit hubs. The project will restructure and enhance connectivity for the eight existing bus routes within Downtown Pittsburgh, Oakland, and East End neighborhoods (61A, 61B, 61C, 61D, 71A, 71B, 71C, and 71D), as well as the P3 route, which connects Oakland to the East Busway, helping to form a network of frequent, well-connected, and high-capacity transit services.

³ Source: SPC Cycle 10a forecast adopted by the Commission on June 27, 2016.

Figure 3: Housing Unit Density (2015)

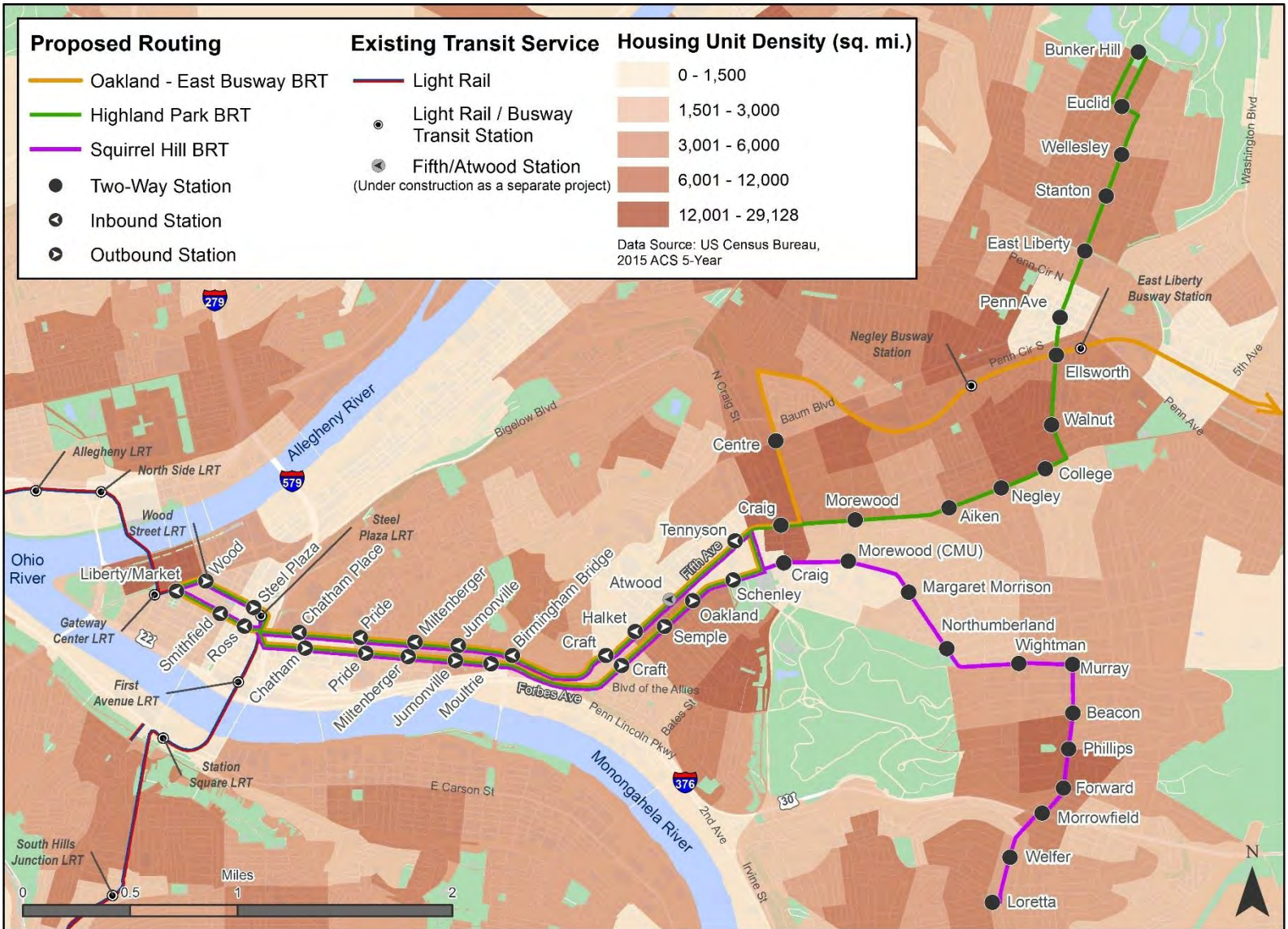


Figure 4: Employment Density (2015)

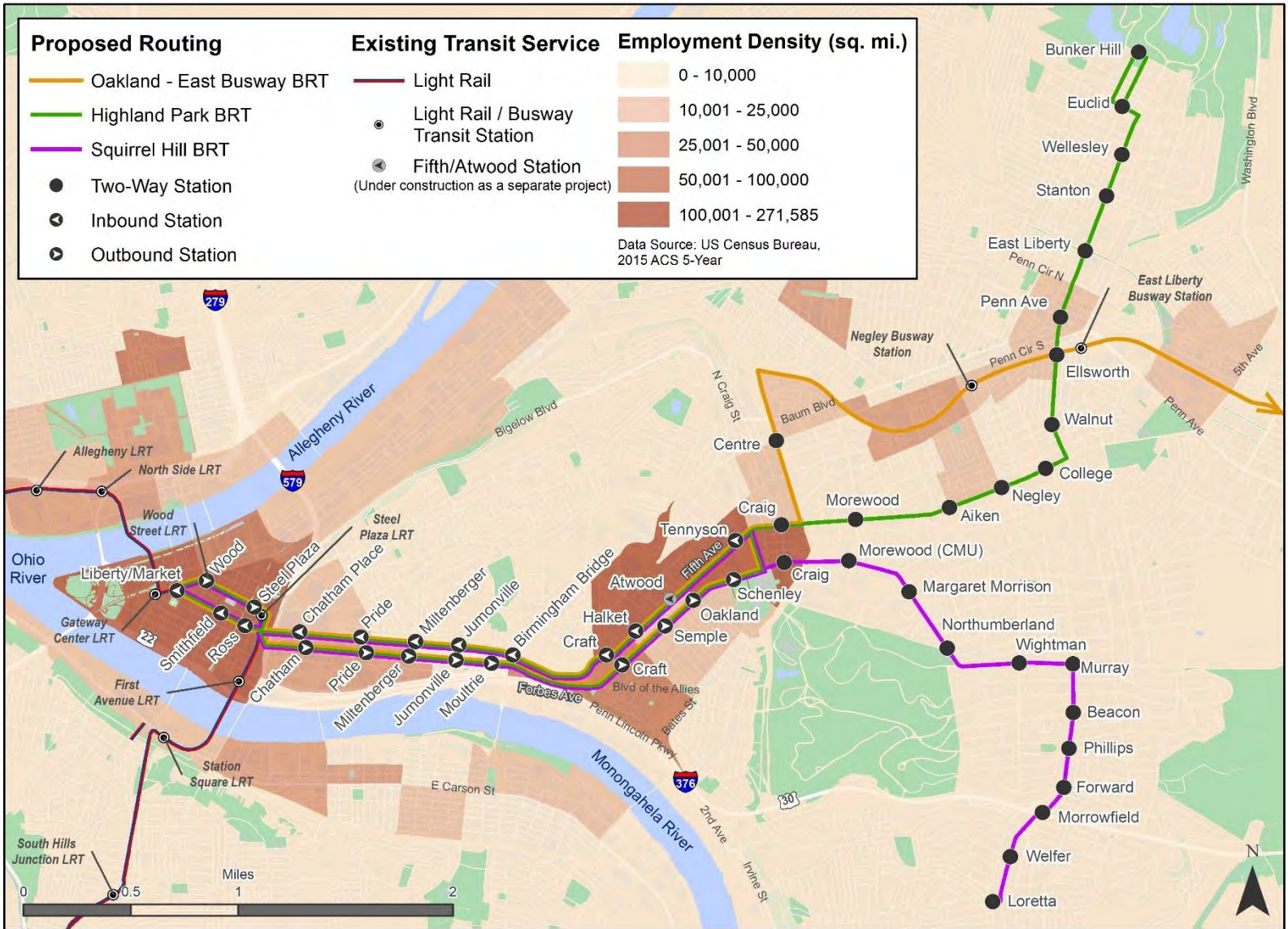


Figure 5: Major Trip Generators

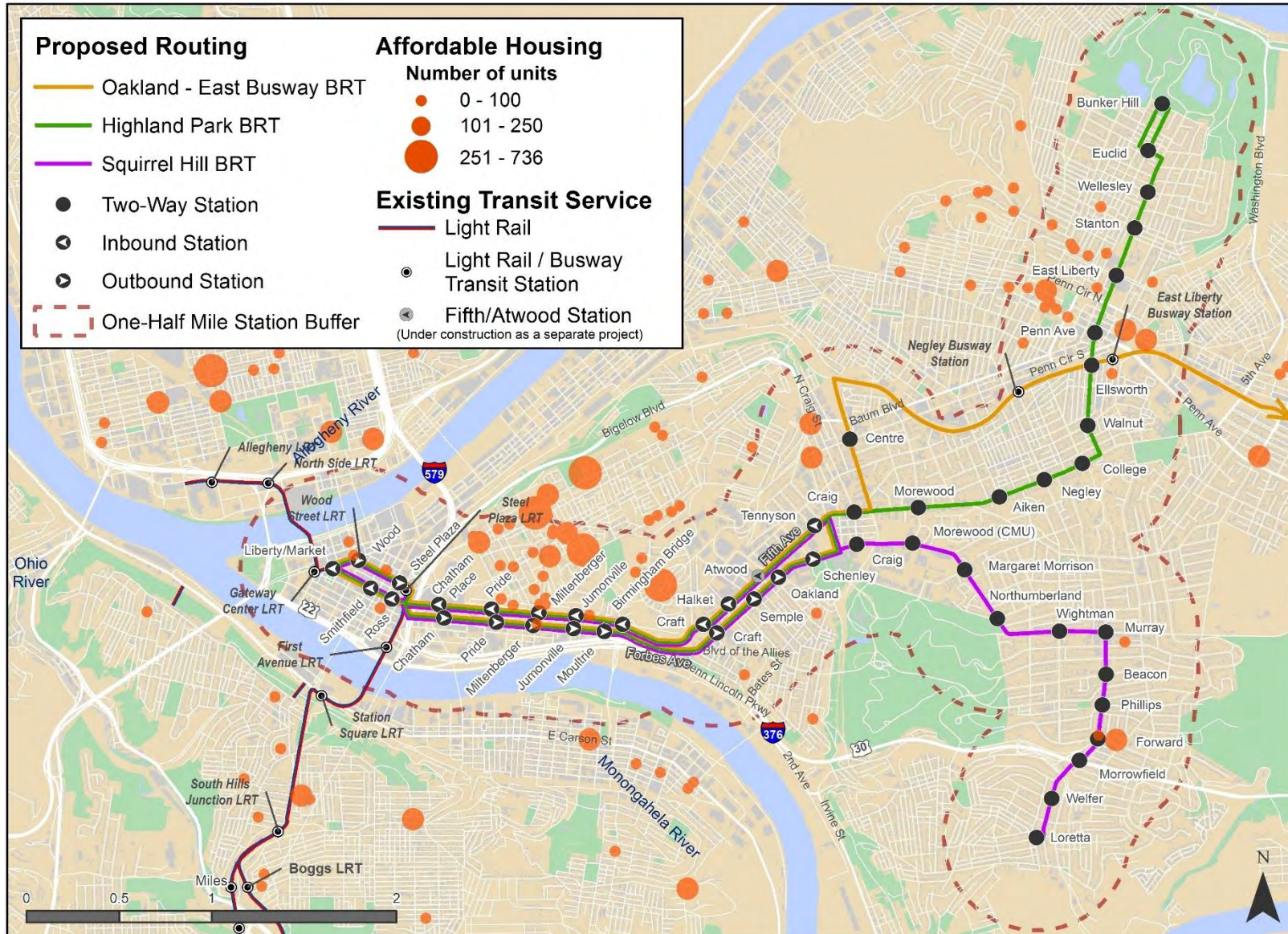






















Table 2: Major Trip Generators




Map #	Generator	Description	Photo
1	Duquesne University	Duquesne University is a private Catholic university with over 10,000 students.	 <p>Source: www.duq.edu</p>
2	University of Pittsburgh	The University of Pittsburgh is a public university with nearly 35,000 students.	 <p>Source: Wikipedia. Photo by Crazypaco</p>
3	Carnegie Mellon University	Carnegie Mellon University is a leading private research university with more than 13,000 students.	 <p>Source: Wikipedia. Photo by Dluu</p>
4	Chatham University	Chatham University is a small private university with over 2,200 students.	 <p>Source: www.chatham.edu</p>
5	Pittsburgh Theological Seminary	Pittsburgh Theological Seminary is a small Presbyterian seminary founded in 1794. Its 2015 enrollment was 249.	 <p>Source: Wikipedia. Photo by TiconderogaCCB</p>




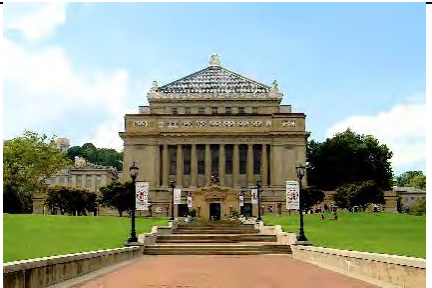
Map #	Generator	Description	Photo
6	Carlow University	Carlow University is a private liberal arts university with more than 2,000 students.	 <p>Source: www.carlow.edu</p>
7	Point Park University	Point Park University is a liberal arts university and performing arts conservatory in Downtown Pittsburgh with approximately 4,000 students.	 <p>Source: www.commons.wikimedia.org. Photo by J. James</p>
8	Magee-Womens Hospital of University of Pittsburgh Medical Center (UPMC)	Magee-Womens Hospital of UPMC specializes in treating women, and has 321 beds and records over 20,000 admissions annually.	 <p>Source: www.ccm.pitt.edu</p>
9	UPMC Mercy Hospital	UPMC Mercy Hospital is part of the UPMC system and has 404 beds.	 <p>Source: Wikipedia. Photo by Crazypaco</p>
10	Pittsburgh Veterans Affairs (VA) Hospital	The Pittsburgh VA Hospital is a major medical and surgical care facility that serves the Veteran population in the tristate area of Pennsylvania, Ohio, and West Virginia. The hospital has 742 beds and employs approximately 1,300 people.	 <p>Source: go-gba.org</p>







Map #	Generator	Description	Photo
11	UPMC Presbyterian Hospital and Clinics	UPMC Presbyterian Hospital is an adult medical-surgical hospital and designated as a Level 1 Regional Trauma Center. The hospital has 1,482 beds and nearly 60,000 admissions annually. The Western Pennsylvania Psychiatric Institute and other clinics are also located on the UPMC Oakland campus.	 <p>Source: insideupmc.upmc.com</p>
12	UPMC Shadyside Hospital and Clinics	Founded in 1866, UPMC Shadyside Hospital is a tertiary care facility with 520 beds. The hospital employs a medical staff of nearly 1,000 physicians. Hillman Cancer Center and other clinics are also located on the UPMC Shadyside campus.	 <p>Source: www.upmc.com</p>
13	Petersen Events Center	The Petersen Events Center is a 12,508-seat arena on the University of Pittsburgh campus that hosts men's and women's basketball games, as well as concerts and other events.	 <p>Source: www.peterseneventscenter.com</p>
14	Fitzgerald Field House	Fitzgerald Field House is the athletic venue on the campus of the University of Pittsburgh, with a 4,122-seat capacity.	 <p>Source: Wikipedia. Photo by TheZachMorrisExperience</p>
15	PPG Paints Arena	With 19,758 seats, this multi-purpose arena at the eastern fringe of Downtown Pittsburgh serves as home to the Pittsburgh Penguins, and hosts numerous other sports and entertainment events.	 <p>Source: Wikipedia. Photo by Jleedev</p>



Map #	Generator	Description	Photo
16	A.J. Palumbo Center	The Palumbo Center is a 4,406-seat arena in Uptown that hosts the Duquesne University basketball, volleyball, and wrestling programs, as well as concerts, boxing matches, and other events.	 <p>Source: Wikipedia. Photo by Greenstrat</p>
17	David L. Lawrence Convention Center	Located in downtown Pittsburgh near the Allegheny River, the convention center has hosted thousands of conferences and events since its opening in 2003.	 <p>Source: Wikipedia. Photo by TheZachMorrisExperience</p>
18	Highland Park, Pittsburgh Zoo, and PPG Aquarium	Highland Park is a large public park at the north end of the neighborhood of the same name. It contains the Pittsburgh Zoo and PPG Aquarium, a 77-acre facility that houses over 4,000 animals and hosted approximately 1 million visitors in 2015.	 <p>Source: Wikimedia Commons. Photo by Christopher Rice</p>
19	Schenley Park and Phipps Conservatory	Schenley Park is a 300-acre public park in the Oakland, Greenfield, and Squirrel Hill neighborhoods. The Phipps Conservatory is a botanical garden with the first and only Leadership in Energy and Environmental Design Platinum-certified greenhouse.	 <p>Source: www.phipps.conservatory.org</p>
20	Point State Park	Also known as The Point, this is a 36-acre park in Downtown Pittsburgh where the Allegheny and Monongahela rivers meet to form the Ohio River. The park contains Fort Pitt and Fort Duquesne, two of the oldest structures in the city.	 <p>Source: Wikipedia. Photo by John</p>

Map #	Generator	Description	Photo
21	Pittsburgh Center for the Arts	Founded in 1945, this facility serves as a non-profit arts center.	 <p>Source: Wikipedia. Photo by Daderot</p>
22	Carnegie Music Hall	The 1,950-seat music hall located in the building houses the Carnegie Museums of Art and Natural History and the Carnegie Library of Pittsburgh along Forbes Avenue in Oakland.	 <p>Source: Wikipedia. Photo by HoboJones</p>
23	Benedum Center for the Performing Arts	Originally built in 1928 as a movie theatre, it now functions as a concert hall and performing arts center.	 <p>Source: Wikipedia. Photo by PerryPlanet</p>
24	Heinz Hall for Performing Arts	Heinz Hall is a performing arts center and concert hall that holds 200 performances every year. It is located in downtown Pittsburgh and has a 2,676-seat capacity.	 <p>Source: trustarts.org</p>
25	O'Reilly Theater	Located in Downtown Pittsburgh, the theatre has 650 seats and hosts 235 performances a year.	 <p>Source: Wikipedia. Photo by PerryPlanet</p>

Map #	Generator	Description	Photo
26	Byham Theatre	Originally built in 1903 and renovated in 1991, the theatre hosts variety of performing arts and has a seating capacity of 1,300.	 <p data-bbox="1003 520 1339 541">Source: Wikipedia. Photo by Doug Kerr</p>
27	The Manor Theatre	The newly renovated Manor Theater is one of the oldest and best-known movie theaters in Pittsburgh.	 <p data-bbox="1003 856 1312 879">Source: www.boringpittsburgh.com</p>
28	Kelly-Strayhorn Theater	The Kelly-Strayhorn Theater is located in the East Liberty neighborhood and has a capacity of 350.	
29	The Carnegie Library of Pittsburgh	The main branch of the Carnegie Library of Pittsburgh, Pittsburgh's public library system, is located in the Oakland neighborhood.	 <p data-bbox="1003 1493 1349 1516">Source: Wikipedia. Photo by Shizzy9989</p>

Map #	Generator	Description	Photo
30	Trinity Cathedral	Trinity Cathedral is located downtown and serves as the cathedral for the Episcopal Diocese of Pittsburgh.	 <p data-bbox="1003 617 1333 642"><i>Source: http://www.episcopalpgh.org</i></p>
31	St. Paul's Cathedral	St. Paul's Cathedral serves as the cathedral for the Roman Catholic Diocese of Pittsburgh.	 <p data-bbox="1003 1052 1284 1073"><i>Source: Wikipedia. Photo by Dlu</i></p>
32	Carnegie Museums of Art and Natural History and Carnegie Library Main Branch	Two of four Carnegie Museums, the Museums of Art and Natural History were founded in 1896 and are located on Forbes Avenue near the Carnegie Mellon campus. The Museum of Art features more than 30,000 objects on display, and the Museum of Natural History is one of the top five ranked natural history museums in the United States. In addition, the Carnegie Library Main Branch is located on this campus and is the largest branch in the system.	 <p data-bbox="1003 1409 1284 1434"><i>Source: Wikipedia. Photo by Dlu</i></p>
33	Soldier and Sailor's Memorial Hall	The Soldier and Sailor's Memorial Hall is the only memorial dedicated to honoring all branches of military service in the United States. The building contains a museum and a 2,300-seat auditorium.	 <p data-bbox="1003 1772 1312 1793"><i>Source: Wikipedia. Photo by Willjay</i></p>

Map #	Generator	Description	Photo
34	Fort Pitt Museum and Block House	Located within Point State Park in Downtown Pittsburgh, the Fort Pitt Museum and Block House is an indoor/outdoor museum and includes the Fort Pitt Blockhouse, which is the oldest extant structure in Western Pennsylvania.	 <p>Source: heinzhistorycenter.org</p>
35	East Side Retail Shopping Complex	East Side is a large mixed retail development located along Centre Avenue (formerly Penn Circle South) at Highland Avenue in the East Liberty neighborhood.	 <p>Source: Google Street View</p>
36	The Village of East Side	The Village of East Side is a large shopping center along Penn Avenue in the East Liberty neighborhood.	 <p>Source: Google Street View</p>
37	Squirrel Hill Business District	Centered at the intersection of Forbes Avenue and Murray Avenue, the business district features several blocks of a wide variety of businesses. In addition to hosting the Jewish Community Center and the Squirrel Hill Branch of the Carnegie Library of Pittsburgh, the district also hosts events such as the outdoor Squirrel Hill Night Markets.	 <p>Source: www.uncoversquirrelhill.com</p>
38	Oakland Commercial District	The Oakland Commercial District runs primarily along Fifth and Forbes avenues. The district contained 462 businesses with 26,119 employees in 2016, and provides small business grants and a façade improvement program.	 <p>Source: URA, www.pittsburghpa.gov</p>
39	Bryant Street Commercial District	The Bryant Street Commercial District is located in the Highland Park neighborhood. The district contained 67 businesses and 444 employees in 2011. Major industries include educational services, health care and social assistance, and retail.	 <p>Source: URA – www.ura.org</p>

Map #	Generator	Description	Photo
40	Allegheny County Courthouse	The courthouse in Downtown Pittsburgh was built in 1888, and is designated a National Historic Landmark due to its being designed by noted architect, Henry Hobson Richardson and its importance as an example of the Romanesque Revival style of architecture.	 <p>Source: Wikipedia. Photo by Dlu</p>
41	Pittsburgh City-County Building	Located across the street from the courthouse in Downtown Pittsburgh, the City-County Building contains more than 500,000 square feet of floor space over 10 stories.	 <p>Source: Wikipedia. Photo by Dlu</p>

1.2. Station Area Development Character

Station locations were selected to maximize ridership, provide opportunities for transit-oriented development, and minimize impacts to the surrounding communities. The Downtown-Uptown-Oakland-East End BRT Project includes a total of 40 new stations along the corridor. Due to the proximity of these stations, stations within one mile of each other were grouped together to form 10 station “clusters”. The clusters are used to describe land use mixes and the pedestrian environment around station areas. It should be noted that the four existing East Busway stations were not included in the land use analysis since they are existing stations. See **Figure 6** for a map of the station cluster areas.

The cluster with the highest population density is Cluster 10, which is in the North Oakland neighborhood, as well as sections of the Shadyside and Bloomfield neighborhoods. Cluster 3, which consists of parts of several Oakland neighborhoods, also has a high population density, mostly driven by the student population in this area. Clusters 7 and 8 in the neighborhoods of Shadyside, East Liberty, and Highland Park are areas with high population density. Cluster 10 and Cluster 7 have the highest housing density measures of the clusters. The Squirrel Hill South neighborhood (Cluster 6) has higher housing density and lower population density than other clusters in the corridor, indicating that this area has “room to grow.”

The highest employment density is within Cluster 1, the Downtown Pittsburgh area. The next highest levels are within Clusters 3 and 10, making up the Oakland neighborhoods. Again, these are the areas with major universities and medical centers. The East Liberty neighborhood (Cluster 8) also has a high level of employment density; this area has grown through mixed use development as many jobs in East Liberty are retail jobs. **Table 3** provides the population, housing, and employment density of each of the station clusters.

Table 3: Station Cluster Summary

Station Cluster	Population Density (residents/²mi)	Housing Density (units/²mi)	Employment Density (jobs/²mi)
Cluster 1	4,037	2,378	161,570
Cluster 2	9,567	1,628	14,248
Cluster 3	12,189	2,406	27,875
Cluster 4	6,737	1,909	8,587
Cluster 5	8,396	4,782	3,604
Cluster 6	7,889	12,018	1,635
Cluster 7	11,363	16,611	7,146
Cluster 8	10,551	3,922	12,279
Cluster 9	5,918	6,921	1,451
Cluster 10	14,988	20,618	26,111

Source: U.S. Census Bureau, 2015 5-Year ACS Estimates

Detailed aerial photos of the station clusters in each of these sections are provided from **Figure 7** to **Figure 16**.

Station area descriptions utilize scores on pedestrian and transit access from Walk Score, a private company that provides online walkability services and apartment search tools. The website’s flagship product is a large-scale, public access walkability index that assigns a numerical walkability score to any addresses across the United States. The website also features a similar transit score. Both scores are on a scale of 1 to 100.

Figure 6: Station Clusters with One-Half Mile Buffer

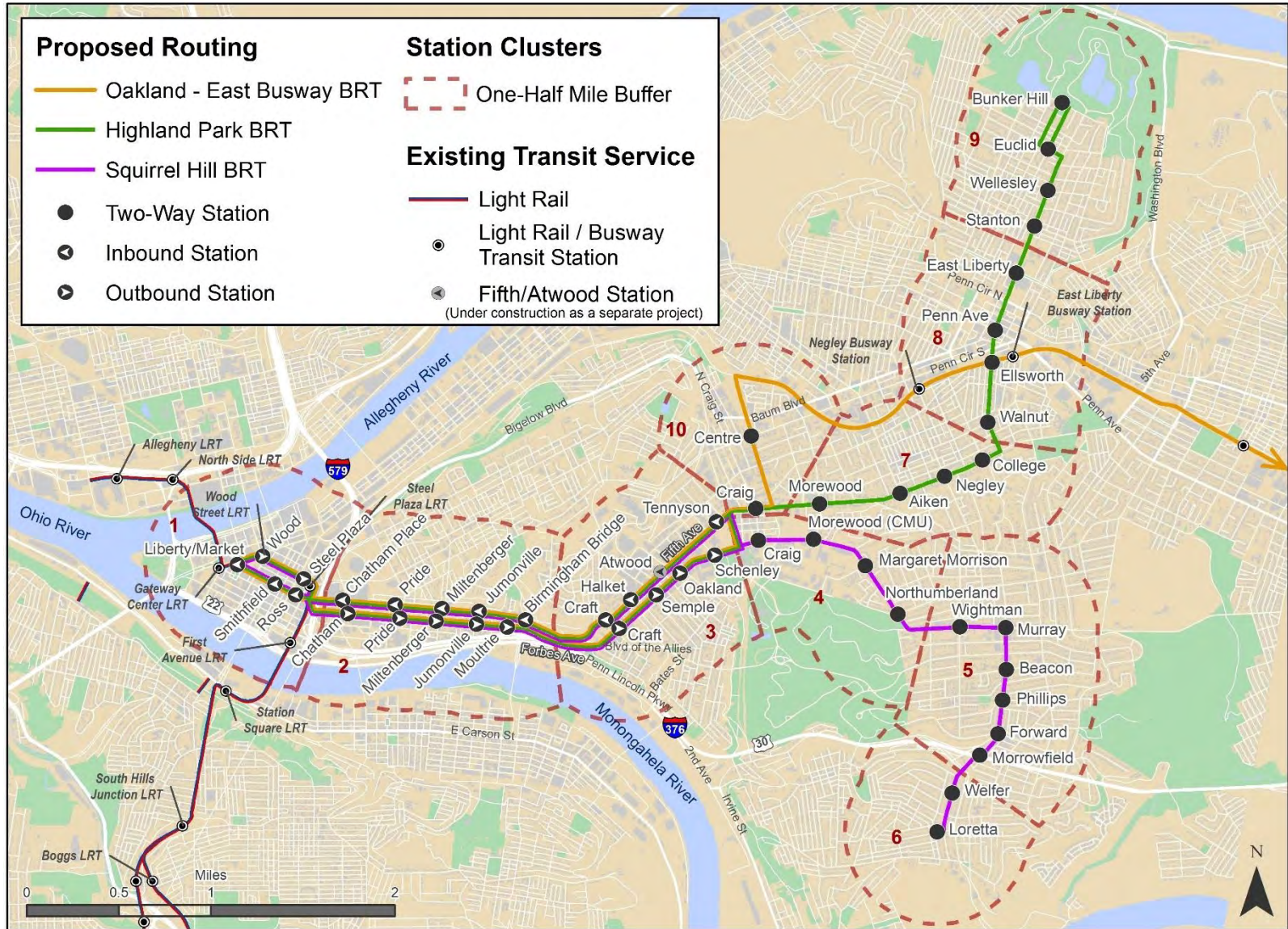


Figure 7: Cluster 1 Detailed Aerial

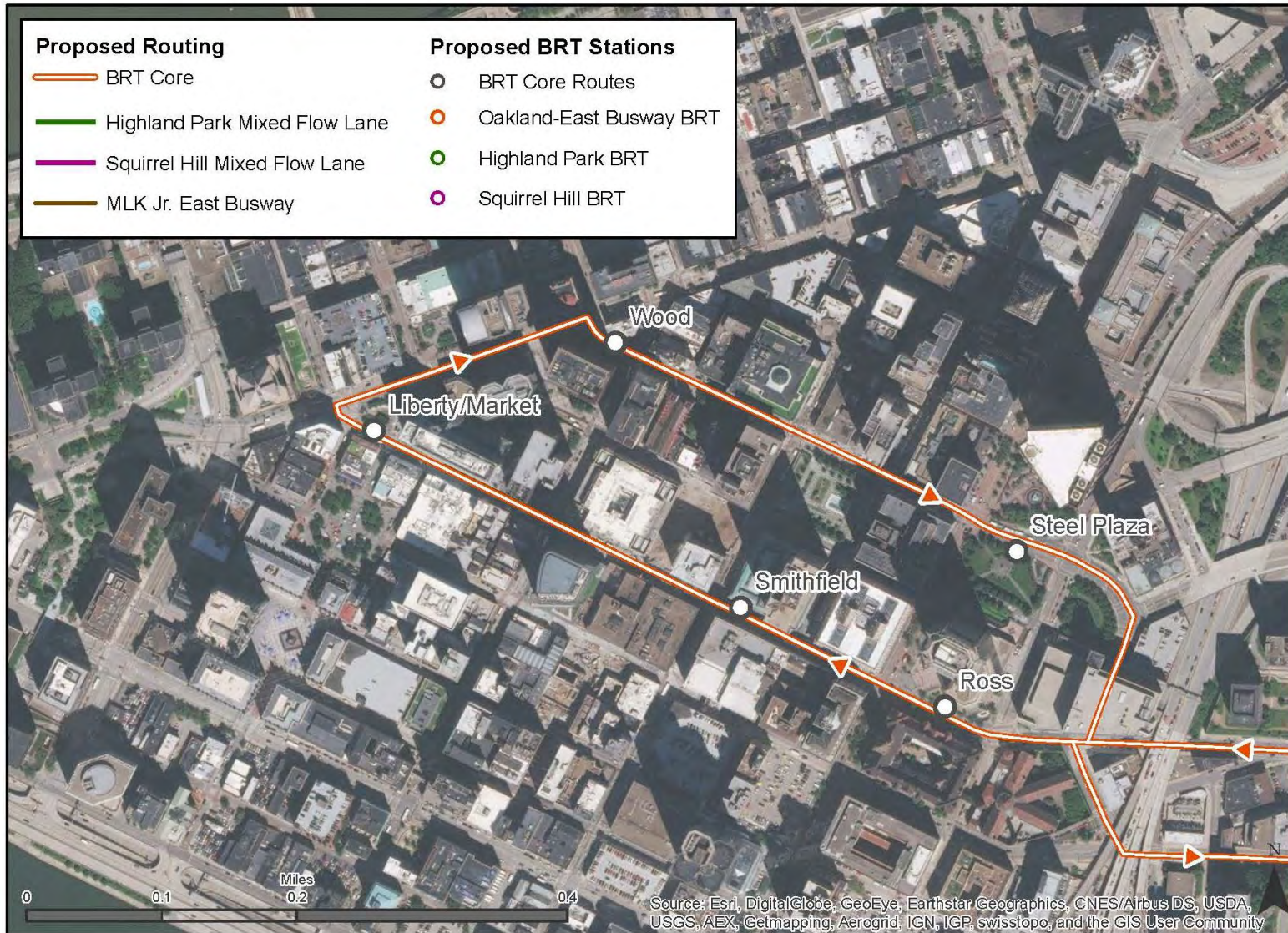


Figure 8: Cluster 2 Detailed Aerial

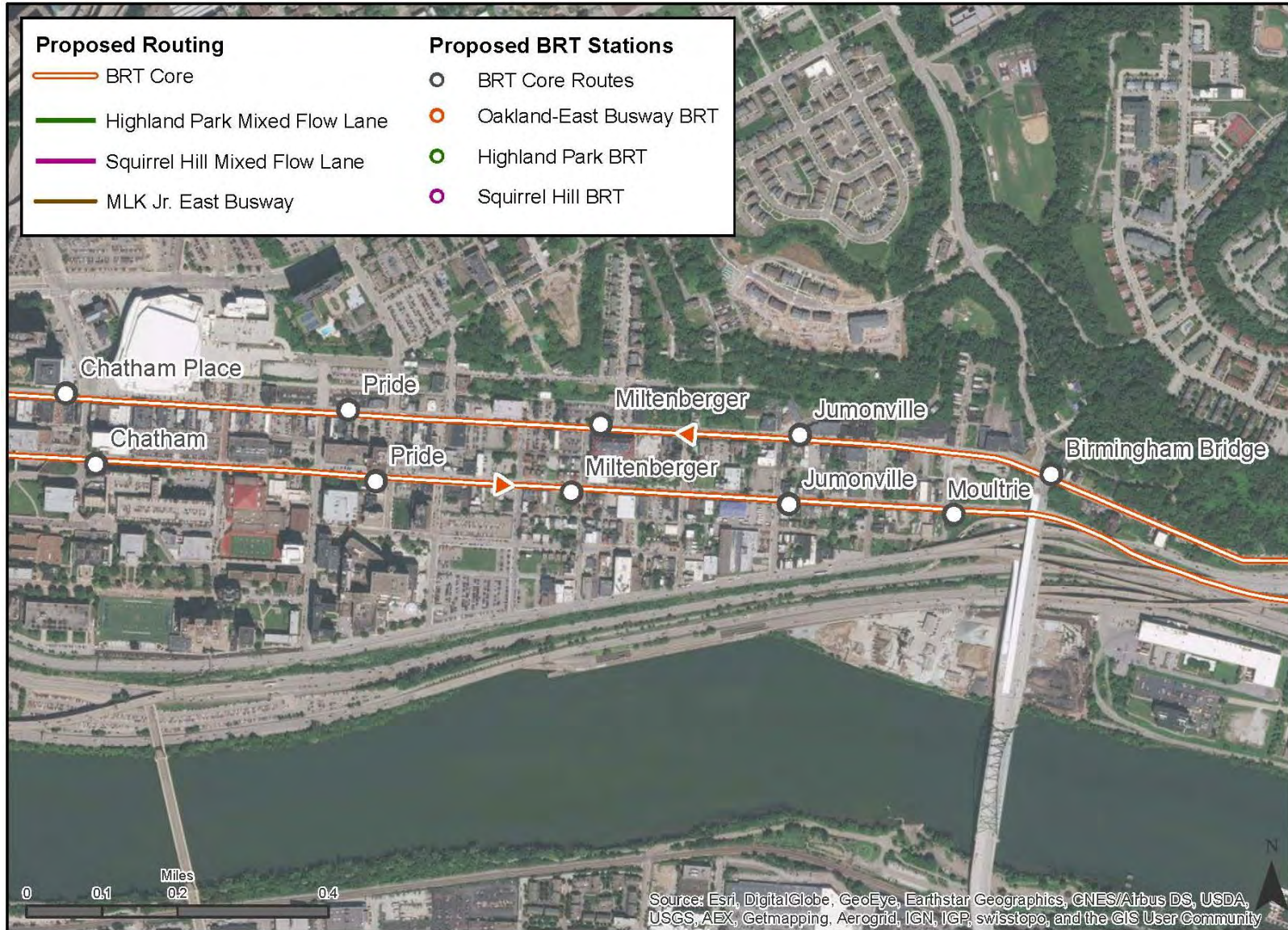


Figure 9: Cluster 3 Detailed Aerial



Figure 10: Cluster 4 Detailed Aerial



Figure 11: Cluster 5 Detailed Aerial

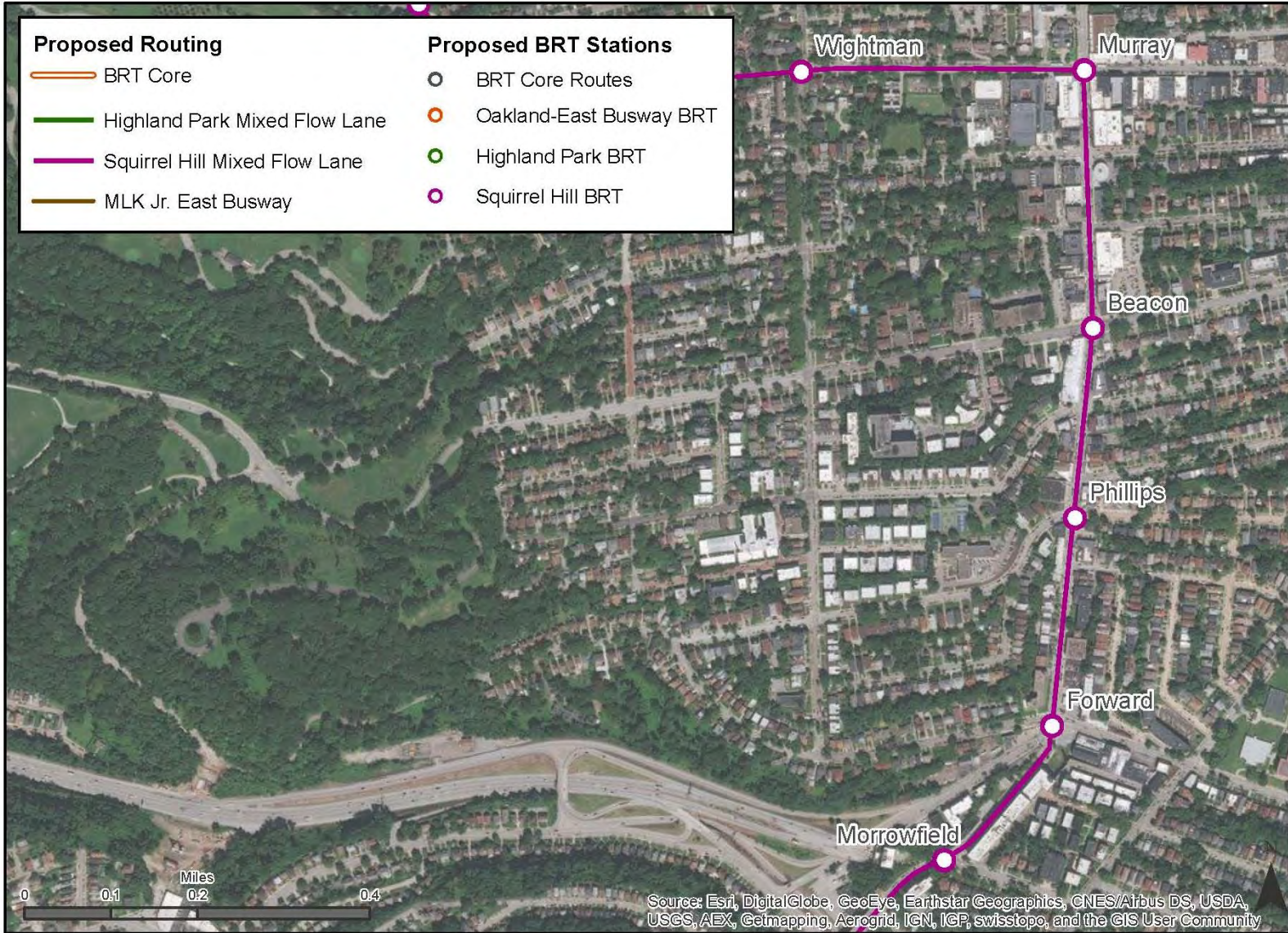


Figure 12: Cluster 6 Detailed Aerial



Figure 13: Cluster 7 Detailed Aerial

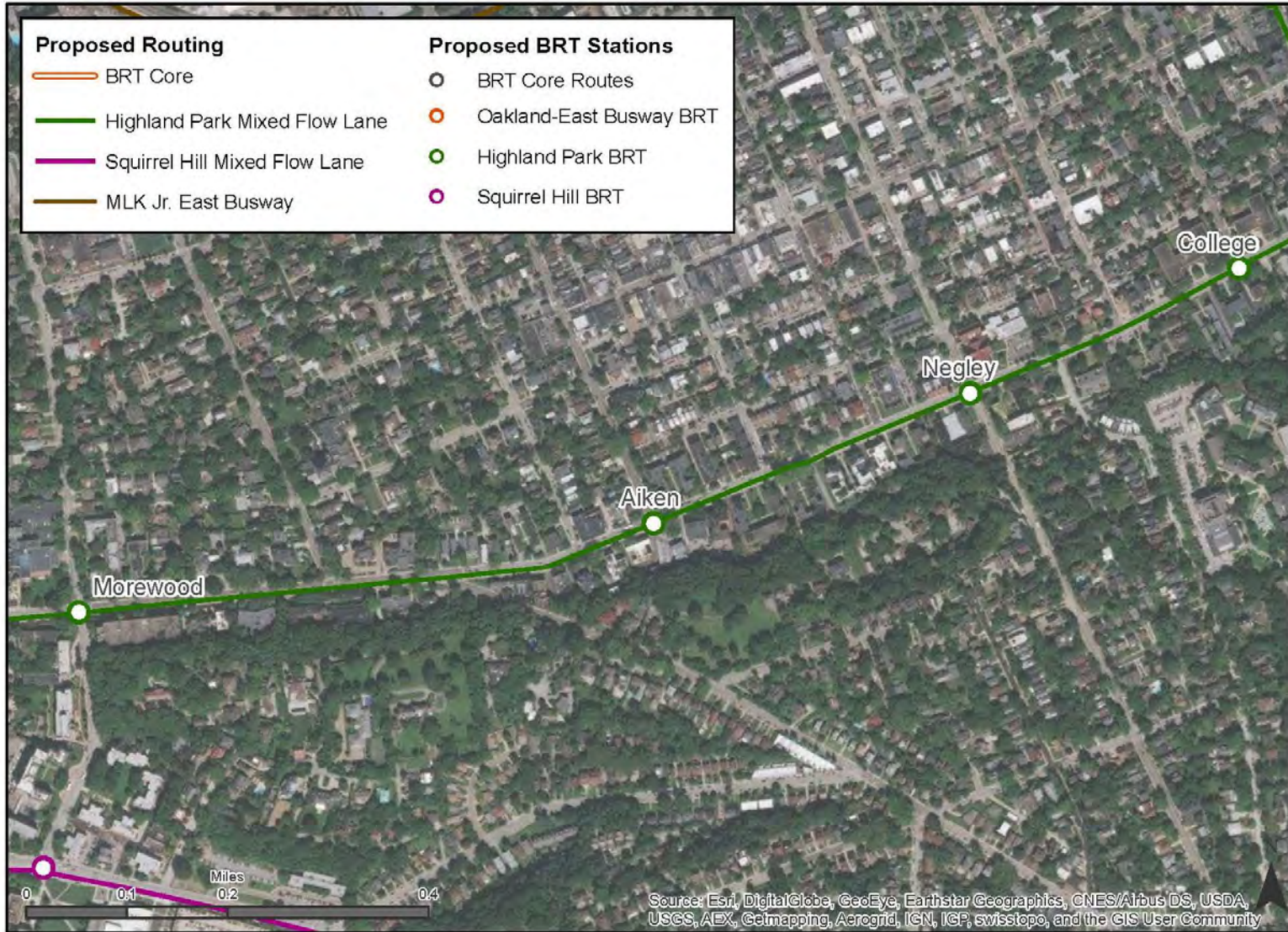


Figure 14: Cluster 8 Detailed Aerial

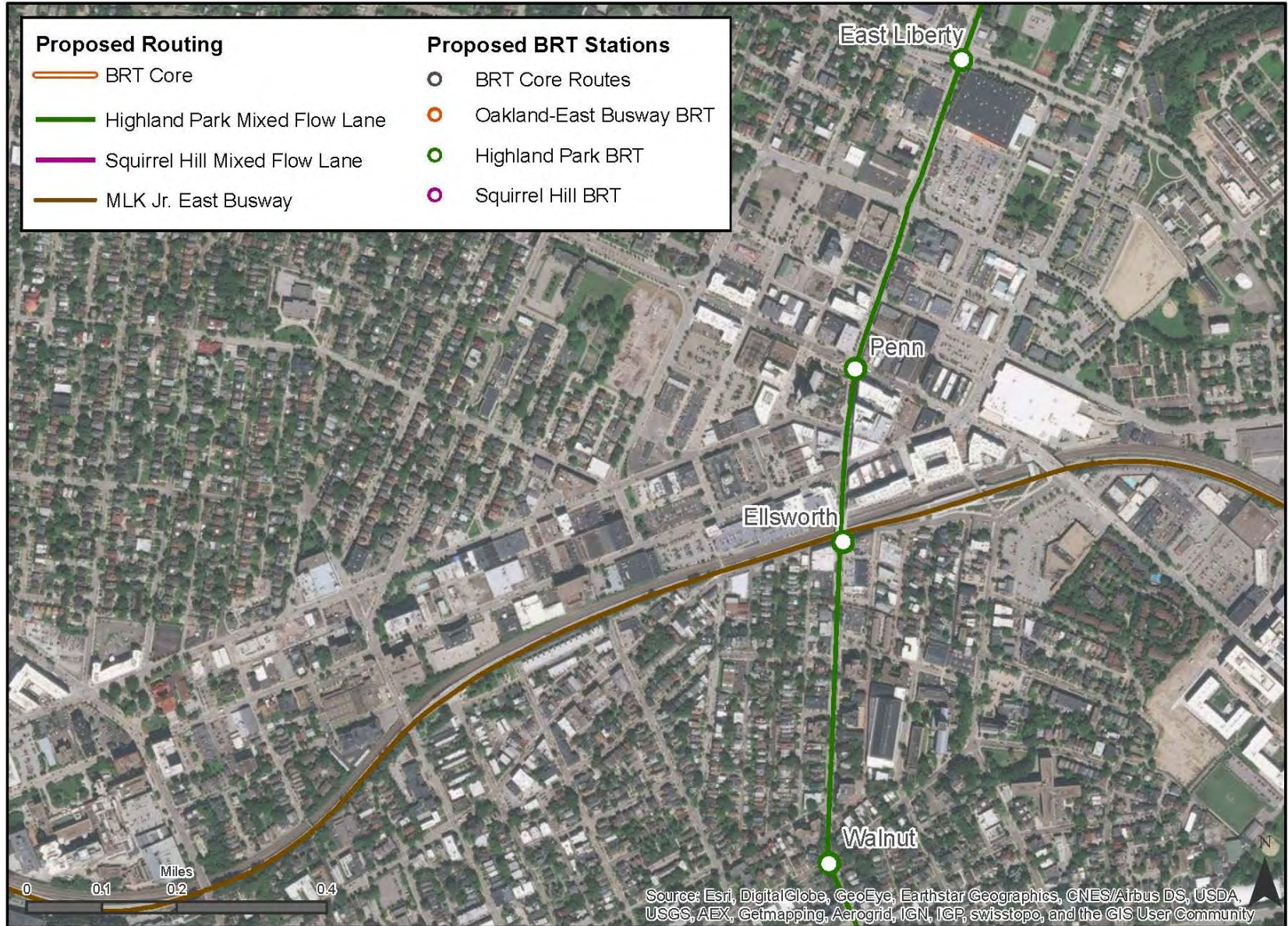


Figure 15: Cluster 9 Detailed Aerial

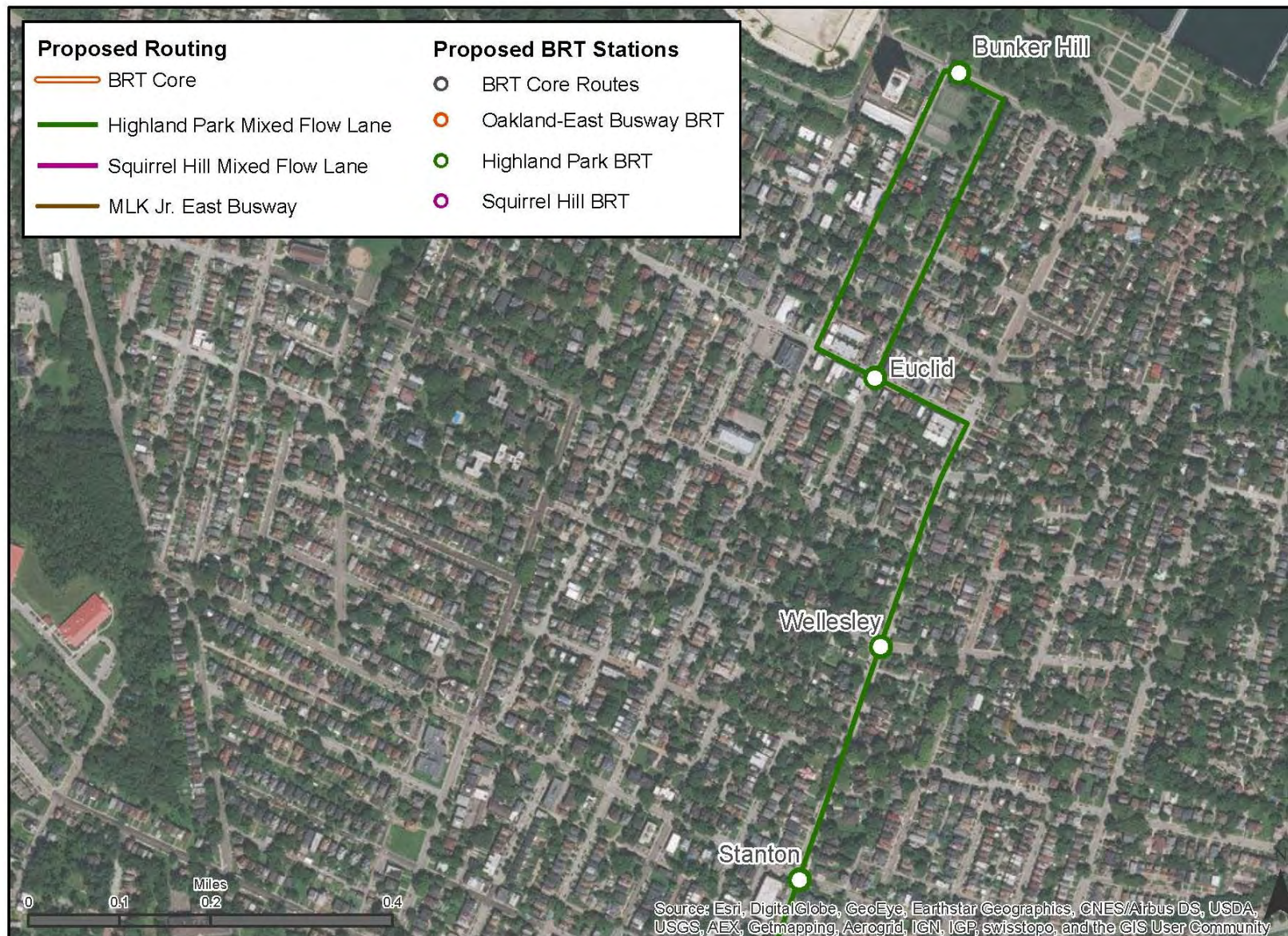
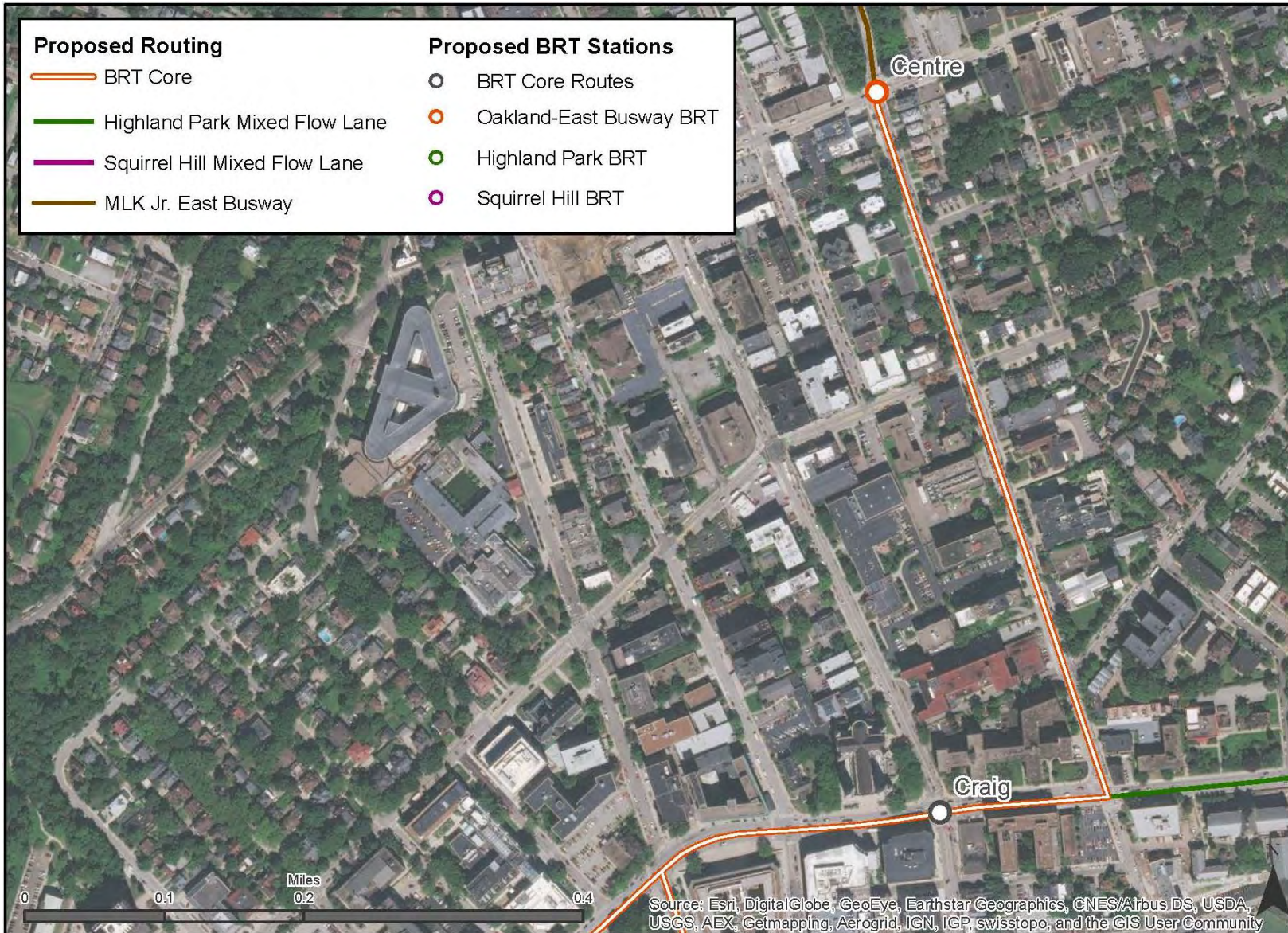


Figure 16: Cluster 10 Detailed Aerial

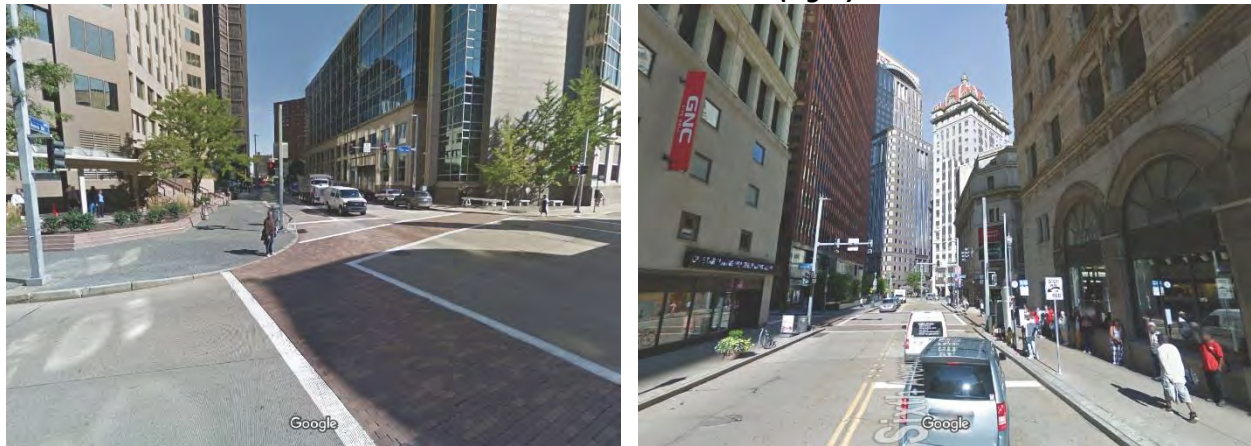


1.2.1. Cluster 1: Liberty/Market, Wood, Steel Plaza, Smithfield, and Ross Stations

The Liberty/Market, Wood, Steel Plaza, Smithfield, and Ross stations are in Downtown Pittsburgh, the city’s CBD and one of the region’s most vibrant areas. Buildings in this area range from historic brick structures to modern and contemporary buildings of varying heights, materials, and architectural character. Downtown has high levels of foot traffic: 110,000 workers spend their working days in greater Downtown. Additionally, entertainment venues attracted 13.4 million visitors in 2016 (Pittsburgh Downtown Partnership).

The street environment and pedestrian amenities in these station areas are good with excellent sidewalk coverage. The average Walk Score of these station locations is 99, meaning ‘Walker’s Paradise’; the Transit Score is 99, meaning ‘Rider’s Paradise’. Sidewalks within this Cluster vary in width, but generally are in very good condition and are 10 feet wide, minimum.

**Figure 17: Intersection of Fifth Avenue and Ross Street (left)
Sixth Avenue and Wood Street (right)**



Source: Google Street View

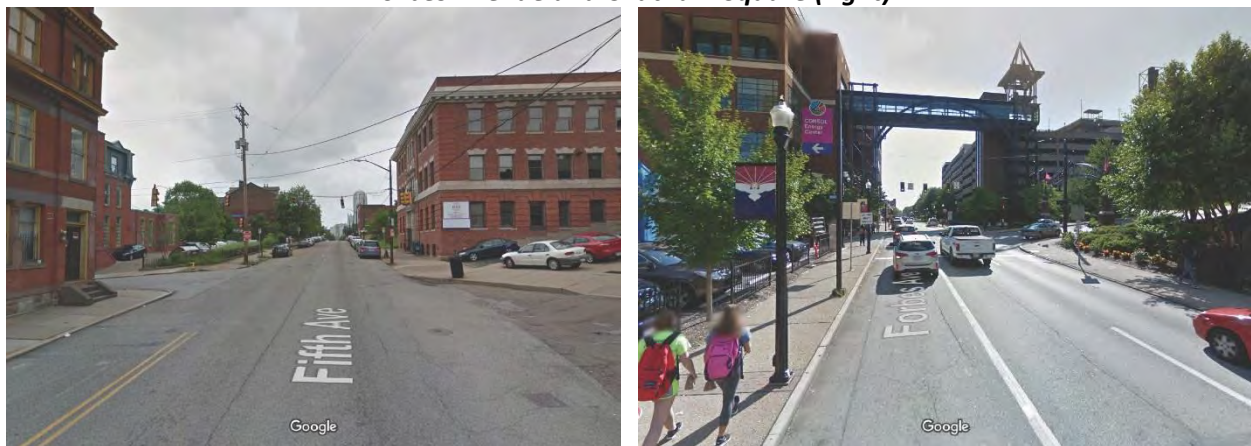
1.2.2. Cluster 2: Chatham Place, Pride, Miltenberger, Jumonville, Moultrie, and Birmingham Bridge Stations

The Chatham Place, Pride, Miltenberger, Jumonville, Moultrie, and Birmingham Bridge stations are bordered by a portion of the CBD as well as the Crawford Roberts, West Oakland, and Terrace Village neighborhoods to the north. To the south, these stations are primarily bordered by the Bluff and Uptown neighborhoods. Cluster 2 features land owned by Duquesne University with classroom and student housing development. Mercy Hospital is also located in Cluster 2. Additionally, multi-family residential units are currently occupied on neighboring streets. Building heights range in size along the corridor. The Chatham Place and Pride Station are located near the PPG Paints Arena, while the Miltenberger station is in the Crawford Roberts and Bluff neighborhoods, the Jumonville, Moultrie, and Birmingham Bridge Stations are in the Crawford Roberts/West Oakland, and Bluff and Uptown neighborhoods.

UPMC Mercy Hospital, government buildings, and educational centers are clustered around the station areas. There is a high opportunity for residential and smaller commercial redevelopment located near the Miltenberger and Jumonville stations. The Moultrie and Birmingham Bridge stations would primarily serve those that are accessing the system from the Birmingham Bridge, which connects South Side Flats neighborhood to Bluff/South Oakland. It will also serve the residential neighborhood located north of Fifth Avenue off Moultrie Street. Again, these neighborhoods are redevelopment areas.

The street environment and pedestrian amenity conditions in these station areas are fair, hence the desire to reconstruct this section of the corridor. Sidewalk widths are generally 10 feet wide; however, most intersections need updated pedestrian crossings to meet ADA standards. The average Walk Score of these station locations is 80, meaning ‘Very Walkable’; the Transit Score is 79, meaning ‘Excellent Transit’.

**Figure 18: Intersection of Fifth Avenue and Jumonville Street (left)
Forbes Avenue and Chatham Square (right)**



Source: Google Street View

1.2.3. Cluster 3: Craft, Halket, Semple, Oakland, Schenley, and Tennyson Stations

The Craft, Halket, Semple, Oakland, Schenley, and Tennyson stations are located in the North, West, and Central Oakland neighborhoods. This Station Cluster has the second highest employment density after the CBD, with major educational and medical institution employees. Cluster 3 is home to the University of Pittsburgh as well as several major health care facilities, including the Pittsburgh VA Hospital, UPMC Presbyterian Hospital, Soldiers & Sailors Memorial, Schenley Plaza, Carnegie Library of Pittsburgh Main Branch, Cathedral of Learning, and Magee Women’s Hospital. There are also sprawling multi-family housing developments to the east of the University of Pittsburgh.

The street environment and pedestrian amenities in these station areas are generally in good condition with continuous sidewalks, most at least 10 feet wide, along Fifth and Forbes Avenues. Along Fifth Avenue between Craft Avenue and Bellefield Avenue, there is a fence between the southern sidewalk and the existing contraflow bus lane. In some locations, there are narrower sidewalk locations, which hinder walkability. In this location, the BRT project will remove the contraflow bus lane on Fifth Avenue and convert that lane to a two-way cycle track, improving the environment for pedestrians. All of the signalized intersections have marked crosswalks and have been updated to meet all ADA standards. The average Walk Score of these station locations is 91 meaning ‘Walker’s Paradise’; the Transit Score is 71, meaning ‘Excellent Transit’.

**Figure 19: Intersection of Fifth Avenue and Tennyson Avenue (left)
Forbes Avenue and Halket Street (right)**



Source: Google Street View

1.2.4. Cluster 4: Craig, Morewood (CMU), Margaret Morrison, and Northumberland Stations

The Craig, Morewood (CMU), Margaret Morrison, and Northumberland stations are located in the North Oakland and Squirrel Hill North neighborhoods. While this Cluster has lower employment and population density than other clusters, it is home to CMU and the Carnegie Museums of Art and Natural History, both major trip generators.

There are continuous sidewalks along the length of Forbes Avenue between Craig Street and Northumberland with wider 10-foot sidewalks closer to Craig Street and narrower five-foot sidewalks at Margaret Morrison and Northumberland streets. There are three signalized intersections on Forbes Avenue in this Cluster: Craig Street, Morewood Avenue, and Margaret Morrison Street. The intersections of Craig Street and Morewood Avenue lack some visual tactile strips, but otherwise have good pedestrian amenities. The intersection of Margaret Morrison Street lacks pedestrian signals, though has ADA crosswalks. The signals at the intersections of Craig Street and Morewood Avenue will be upgraded next year as part of a PennDOT, which will make them ADA compliant. The BRT project will upgrade the signal at Margaret Morrison Street. The average Walk Score of these station locations is 72 meaning ‘Very Walkable’; the Transit Score is 64, meaning ‘Good Transit’.

**Figure 20: Intersection of Forbes Avenue and Craig Street (left)
Forbes Avenue and Margaret Morrison Street (right)**



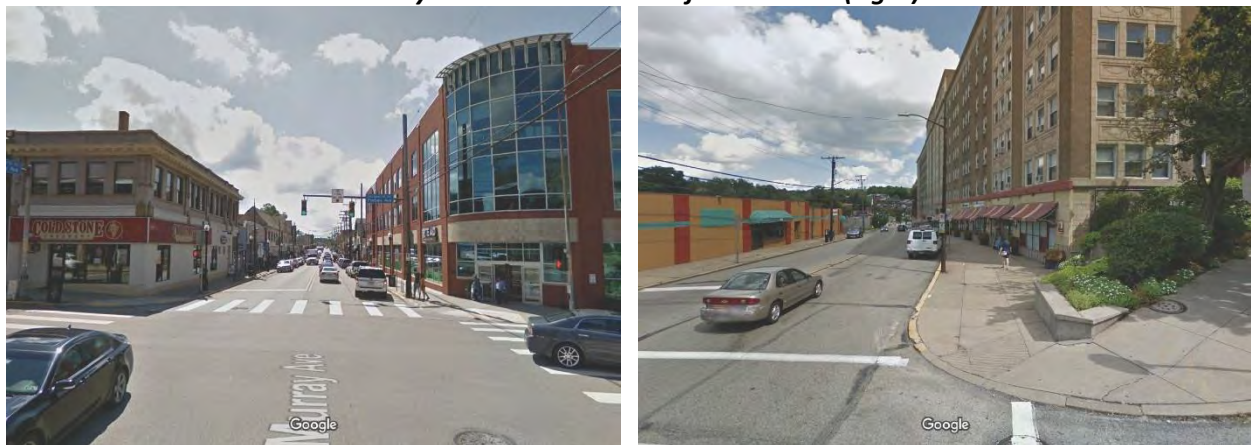
Source: Google Street View

1.2.5. Cluster 5: Wightman, Murray, Beacon, Phillips, Forward, and Morrowfield Stations

The Wightman, Murray, Beacon, Phillips, Forward, and Morrowfield stations are in the Squirrel Hill North and Squirrel Hill South neighborhoods. Though less bustling than Downtown and Oakland, the neighborhood is still vibrant. The architecture is a mix of one- to three-story, low-rise, mixed-use buildings, as shown in **Figure 21**, with some mid-rise residential developments. Neighboring streets are generally comprised of single-family homes. Murray and Forbes business strips, Jewish Community Center, and Squirrel Hill public library branch are all nearby. Commercial development is mostly clustered around key intersections. Buildings in this area range from historic brick structures to modern and contemporary buildings.

The street environment and pedestrian amenities in these station areas have continuous sidewalk coverage in good condition with narrower sidewalks in the residential areas and wider sidewalks in the retail areas. Most signalized intersections are ADA compliant with some lacking visual tactile strips in quadrants. All signalized intersections have pedestrian markings and pedestrian signals. The BRT project will replace the signals at all the signalized intersections along the route and make all crosswalks ADA compliant. The average Walk Score of these station locations is 90 meaning ‘Walker’s Paradise’; the Transit Score is 51, meaning ‘Good Transit’.

**Figure 21: Intersection of Forbes Avenue and Murray Avenue (left)
Murray Avenue and Morrowfield Avenue (right)**



Source: Google Street View

1.2.6. Cluster 6: Welfer and Loretta Stations

The Welfer and Loretta stations are in the Greenfield neighborhood. This area is quieter and less bustling than others along the corridor. The architecture is a mix of one- to three-story, low-rise, mixed-use buildings, as shown in **Figure 22**, with some newer mid-rise residential developments along Murray Avenue. Neighboring streets off the corridor are generally comprised of single-family homes. Commercial development is mostly clustered around key intersections. Buildings in this area range from historic brick structures to modern and contemporary buildings.

The street environment and pedestrian amenities are very similar to that of Cluster 5, with continuous sidewalks in good condition along Murray Avenue. Both station locations are at un-signalized intersections. The signalized intersection at Lilac Street lacks pedestrian signals as well as visual tactile strips, thus out of compliance with ADA standards. The BRT project will upgrade the signal at this intersection, making it ADA compliant. Crosswalks and advanced crosswalk signs will be added at the intersection of Welfer Street. Loretta Street is a four-way stop intersection with crosswalks, but lacks some visual tactile strips at the corners. The average Walk Score of these station locations is 78 meaning 'Very Walkable'; the Transit Score is 47, meaning 'Some Transit'.

**Figure 22: Intersection of Murray Avenue and Loretta Street (left)
Murray Avenue and Welfer Street (right)**



Source: Google Street View

1.2.7. Cluster 7: Morewood, Aiken, Negley, and College Stations

This Cluster is proximate to the University of Pittsburgh, CMU, and major healthcare facilities. As much of the residential development is comprised of large apartment complexes, it has the second highest housing unit density of any cluster along the corridor, with 16,611 units per square mile. As such, this Cluster serves mostly as the residential hub for the major education, healthcare, and job clusters.

Along Fifth Avenue, there are generally four- to five-foot sidewalks continuously along both sides of the roadway in good condition. There are seven signalized intersections within this Cluster, five of which lack pedestrian signals and are not ADA compliant. The other two signals have pedestrian signal heads, but are not ADA compliant because they lack visual tactile strips. This project will replace all signals with pedestrian signals as well as make the intersection ADA compliant. In addition, a signal will be added at the intersection of College Avenue and Fifth Avenue for the station at College Avenue. The average Walk Score of these station locations is 83 meaning ‘Very Walkable’; the Transit Score is 68, meaning ‘Good Transit’.

**Figure 23: Intersection of Fifth Avenue and Aiken Avenue (left)
Fifth Avenue and College Street (right)**



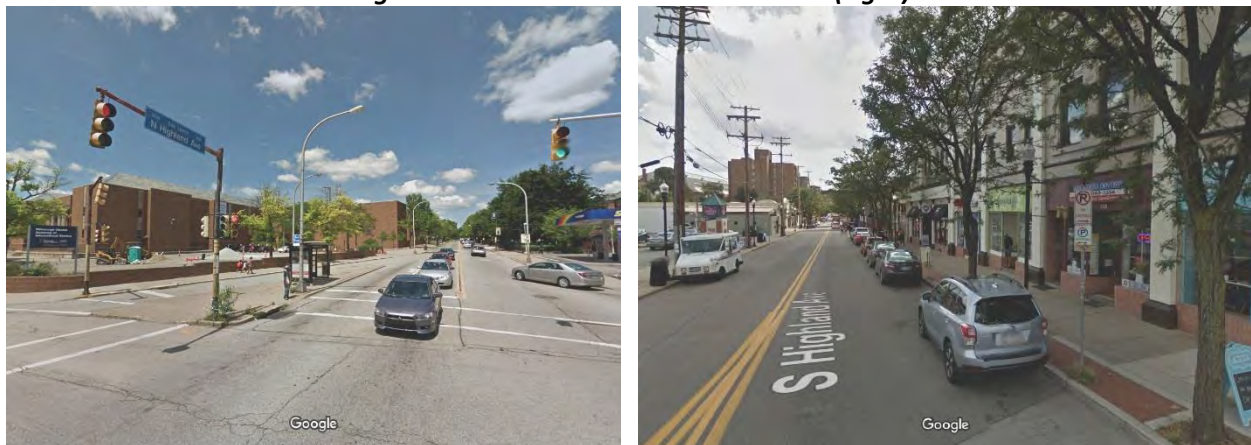
Source: Google Street View

1.2.8. Cluster 8: Walnut, Ellsworth, Penn, and East Liberty Stations

This Cluster has a balanced mix of land uses, and is located within the Shadyside and East Liberty neighborhoods. In recent years, East Liberty has experienced major redevelopment and is reclaiming its historic position as a major activity center in the City of Pittsburgh. It contains higher density, multi-family housing, along with retail and commercial corridors along the stations. The Pittsburgh Center for the Arts is also located in Cluster 8.

Again, there are continuous sidewalks in good condition along both sides of Highland Avenue that are generally five feet wide in the residential areas and widen to eight feet in the retail and commercial areas. There are seven signalized intersections within this Cluster, with three of these intersections with newer signals that are ADA compliant. The other four signals lack pedestrian signals and do not have visual tactile strips. Again, this BRT project will replace or upgrade the signals to make them all ADA compliant. The average Walk Score of these station locations is 92 meaning ‘Walker’s Paradise’; the Transit Score is 68, meaning ‘Good Transit’.

**Figure 24: Intersection of Highland Avenue and East Liberty Boulevard (left)
Highland Avenue and Ellsworth Avenue (right)**



Source: Google Street View

1.2.9. Cluster 9: Stanton, Wellesley, Euclid, and Bunker Hill Stations

The Stanton, Wellesley, Euclid, and Bunker Hill Stations are in the Highland Park neighborhood. The area is quieter and less bustling than others along the corridor. The architecture is a mix of one- to three-story, low-rise, mixed-use buildings, as shown in **Figure 25**. Neighboring streets off the corridor are generally comprised of single-family homes. The Bryant Street Business District, located within the Cluster, includes both neighborhood-serving and destination businesses. Highland Park (the public park) encompasses the northern region of the neighborhood. In addition to various recreational activities, the Pittsburgh Zoo & PPG Aquarium are also located.

Sidewalks along Highland Avenue are generally 10 feet wide along both sides of the street and are in good condition. Sidewalks along Bryant Street, Euclid Avenue, St. Clair Street, and Bunker Hill Street are generally narrower, have a width of five feet, and are also in good condition. There is only one signalized intersection in this Cluster, which is at the intersection of Highland and Stanton avenues. This intersection lacks pedestrian signals and visual tactile strips. The BRT project will replace this signal to make it ADA compliant, and add marked crosswalks and advanced signage at all the un-signalized intersections near station locations. The average Walk Score of these station locations is 67 meaning ‘Somewhat Walkable’; the Transit Score is 46, meaning ‘Some Transit’.

**Figure 25: Intersection of Bunkerhill Street and St. Clair Street (left)
Highland Avenue and Wellesley Avenue (right)**



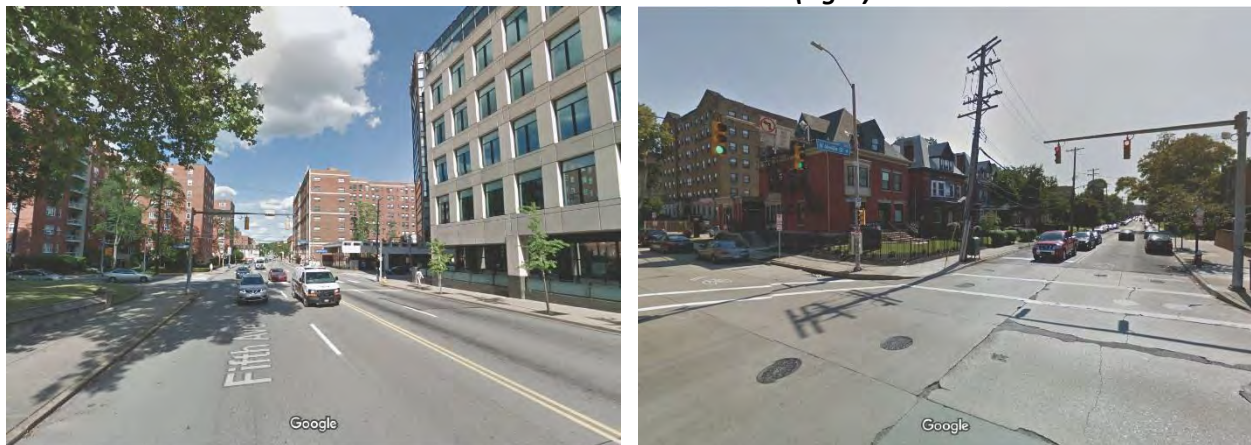
Source: Google Street View

1.2.10. Cluster 10: Craig and Centre Stations

This Cluster has housing density of any other cluster along the corridor, with 20,618 housing units per square mile. The Cluster is located near two major universities, Pittsburgh University and CMU, and is proximate to major healthcare facilities. As such, this Cluster serves as a major residential housing center that supports these facilities and contains a large number of employment centers as well. Centre Avenue (formerly Penn Circle South), a major east-west commercial corridor, intersects with the BRT alignment within this Cluster.

There are continuous sidewalks along both sides of Fifth Avenue and Neville Avenue in this Cluster. The width varies between six to 10 feet and are in good condition. There are four signalized intersections located within this Cluster, two of which do not have pedestrian signals. All of the intersections lack visual tactile strips at some of the crossings. This BRT project will replace all signals and ensure intersections are ADA compliant. The average Walk Score of these station locations is 88 meaning ‘Very Walkable’; the Transit Score is 69, meaning ‘Good Transit’.

**Figure 26: Intersection of Fifth Avenue and Craig Street (left)
Neville Street and Centre Avenue (right)**



Source: Google Street View

1.3. Pedestrian and Bicycle Environment and Facilities

The Pittsburgh Department of Mobility and Infrastructure maintains an active bicycle program, and is currently developing the Pittsburgh Bike Plan to improve the City's quality of life and integrate bicycling into the transportation network. The last bike plan was produced in 1999; this new effort will reflect enhancements to Pittsburgh's bike system, including a bike-share system, bike trail to Washington DC, and protected bike lanes. The Department of Mobility and Infrastructure held Bike Plan Open Houses in July of 2016 and completion of the plan is anticipated for 2019. In 2015, the Mayor of the City of Pittsburgh called for a city-wide policy on Complete Streets and adoption of design guidelines. The City unanimously adopted the Complete Streets policy in November 2016 that will help redesign streets to accommodate all users and improve the pedestrian environment.⁴ Following the adoption of the Complete Streets Policy, the Department of Mobility and Infrastructure is currently working in conjunction with the Department of Public Works to create Complete Streets Design Guidelines for the City of Pittsburgh.

Figure 27 illustrates the robust existing and proposed bicycle facilities within the corridor. There is currently a bicycle lane on Forbes Avenue between Margaret Morrison Street and Schenley Drive. There are marked shared bicycle lane on Forbes Avenue between Schenley Drive and Murray Avenue within the corridor. There is also a marked shared bicycle lane on Highland Avenue between Penn Avenue and Euclid Street. PennDOT will be rehabilitating Forbes Avenue between Bellefield Avenue and Margaret Morrison Street next year, which will also include the addition of permanent bicycle lanes.

The Downtown-Uptown-Oakland-East End BRT project will also add bicycle lanes and cycle tracks within the Uptown and Oakland area. This aligns with the City of Pittsburgh Complete Streets Policy and will enhance multimodal travel along the corridor. These existing and proposed bicycle facilities will improve access to the stations, encouraging multi-modal transit.

Only two of the proposed station locations, both located on Forbes Avenue, are currently accessible via dedicated bicycle facilities. Several other stations along Highland Avenue are accessible via marked shared lanes. Additional facilities that PennDOT plans for implementation next year will improve bicycle connections to multiple stations along Forbes Avenue. Furthermore, the BRT project will add bicycle lanes along Fifth Avenue and Forbes Avenue in Oakland and Uptown. The East Liberty Bicycle Station is also located along the corridor at the intersection of Penn and Centre Avenues.

As indicated in the Cluster write-ups in the previous section, most of the sidewalks along the alignment are in good condition and are continuous on both sides of the street. The pedestrian travel patterns may adjust in response to BRT station locations. To improve pedestrian connectivity around the station areas, this BRT project will upgrade sidewalks near the station entrances, enhancing the existing pedestrian environment and improving the overall appearance of the street for roadway users.

The BRT project will be compliant with ADA standards, which may require modifications at some intersections to include access ramps and visual tactile strips. Further, station designs will implement universal design practices to provide accessible pedestrian access that are ADA compliant.

⁴ The Complete Streets Policy is available at: <http://www.pittsburghpa.gov/dcp/completestreets>

1.4. Affordable Housing Provisions

Pittsburgh has approximately 15,190 affordable housing units citywide. As a whole, Allegheny County has 25,750 affordability restricted housing units based on the National Housing Preservation Database, including 3,981 units within the 0.5-mile radius of the Downtown-Uptown-Oakland-East End BRT station areas. Allegheny County has a total of 589,681 housing units, including 62,973 within 0.5 miles of the station areas. This equals a ratio of 1.45 legally binding affordability restricted housing in the project corridor compared to the proportion in the county through which the project travels. **Figure 28** shows the location of income-restricted housing in the vicinity of the project corridor.

Figure 27: Existing and Proposed Bicycle Facilities

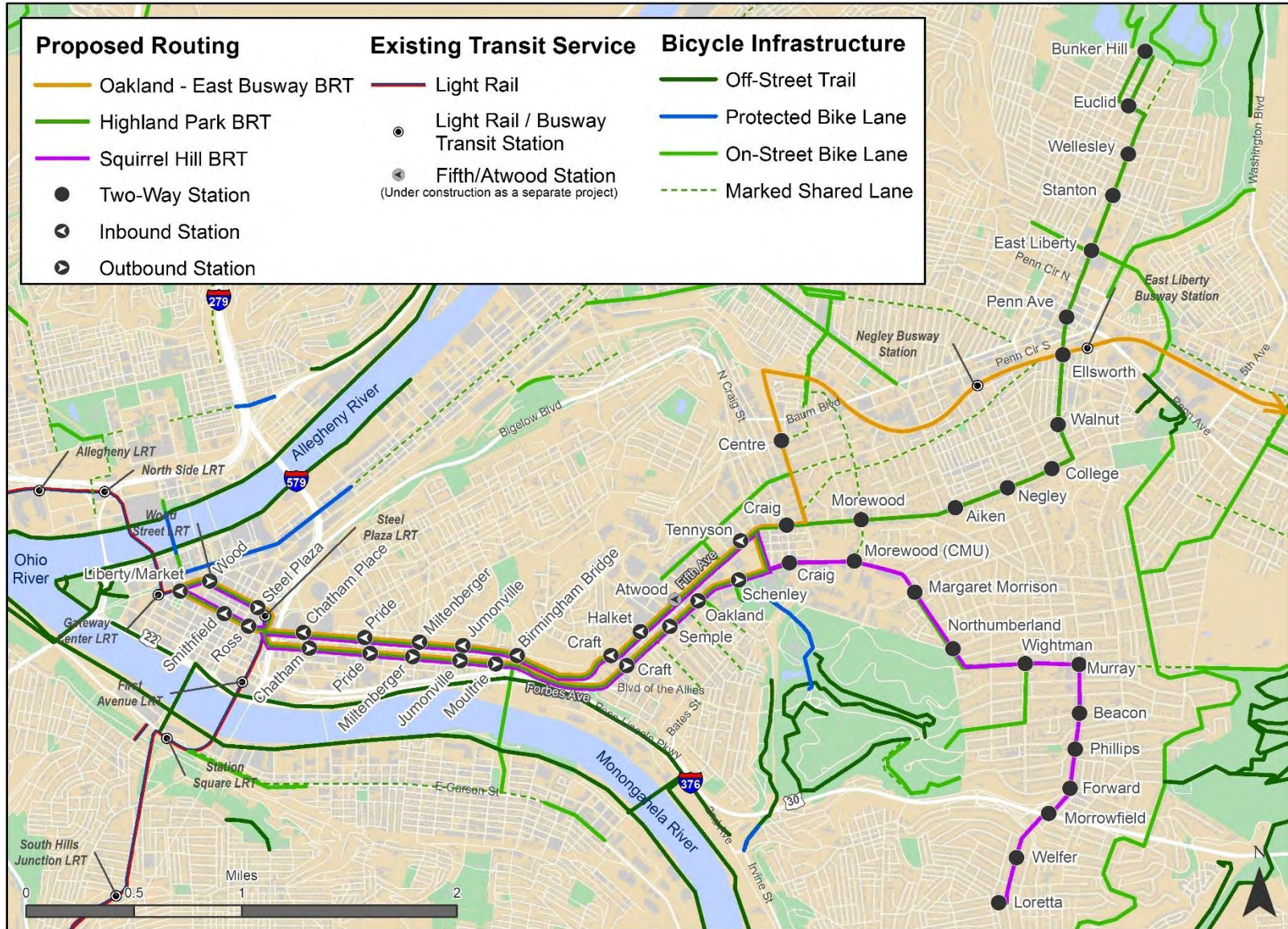
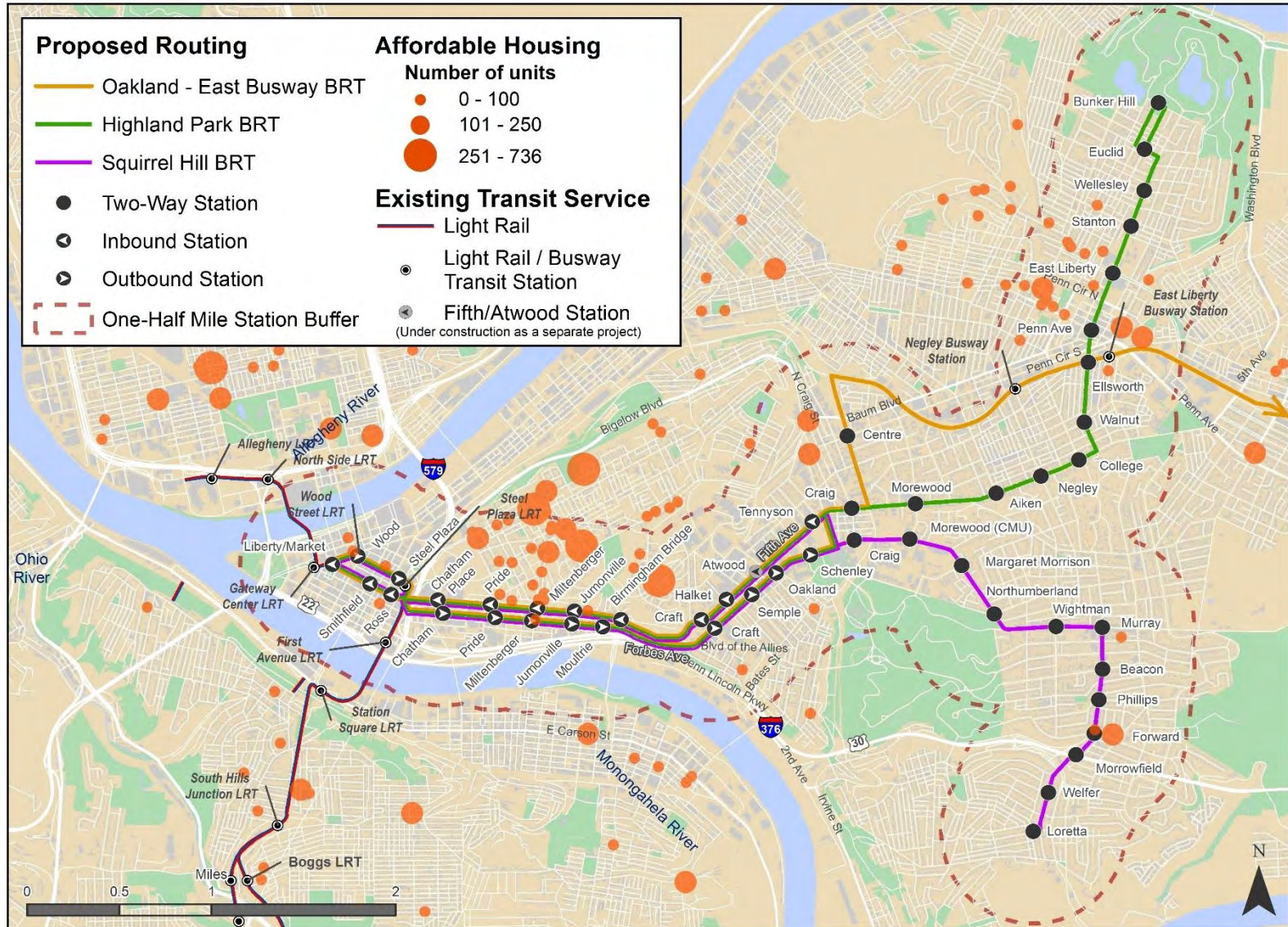


Figure 28: Affordable Housing



Downtown – Uptown – Oakland – East End Bus Rapid Transit
 Small Starts Application: Land Use

1.5. On-Street and Off-Street Parking

Within the corridor, there is a combination of on-street parking and off-street parking, both metered and unmetered. In the areas of higher employment density, there is generally more off-street parking available as paid parking. In Downtown, Uptown, and Oakland, the off-street parking is mostly parking garages. Within East Liberty, Shadyside, and Squirrel Hill, the off-street parking is mainly surface metered parking near the retail and commercial areas. There is on-street parking allowed along most of the corridor, with a combination of metered and non-metered parking.

1.5.1. Off-Street Surface and Garage Parking

In 2016, a parking study was conducted for the greater Downtown Pittsburgh area, which included the following areas:

- Golden Triangle/Downtown Core: Area bounded by the rivers and I-579
- North Shore: Northern bank of the Allegheny River south of I-279 from the West End Bridge on the west to the Veterans Bridge on the east
- Station Square: Segment of the South Shore between the Liberty Bridge and the Highmark Stadium
- Near Strip District: Area is bounded by 11th Street, the Allegheny River, 21 Street, and Liberty Avenue
- Lower Hill: Comprises the Consol Center Garage and the associated lots on Fifth Avenue, as well as the former Civic Arena site
- Uptown: Area between Boulevard of the Allies, Crosstown Boulevard, Fifth Avenue, and Van Braam Street

The study found that there are approximately 51,858 off-street parking spaces in Greater Downtown, the majority of which are located within the Golden Triangle/Downtown Core. The defined CBD contains 22,541 total off-street parking spaces. This equals 0.14 parking spaces for each of the 159,704 employees in the CBD.

Approximately 64 percent of the spaces are in garages while 36 percent are in surface lots. The majority of the spaces (78 percent) are publicly available spaces, while the others are dedicated, lease-only, or event day parking. **Figure 29** illustrates the daily maximum parking rate varies between \$10 to \$30 per day within the CBD. Rates were averaged on a per space basis, resulting in an average daily parking cost of \$16.04.

As part of the study, the Pittsburgh Parking Authority (PPA) shared data on garage utilization. The PPA represents a considerable proportion of all public parking spaces in the Golden Triangle area (33 percent), which indicates the general trend of available parking. we can use this information to take a closer look of Greater Downtown parking demand trends. Measurements were taken five times a day, every day, for five different months. The analysis showed that the maximum utilization was between 82 to 84 percent, and occurs between 11am and 2pm on Tuesdays, Wednesdays, and Thursdays. Weekends only peak at 42 percent. It should be noted that there is heavy utilization on event days as well.

Figure 29: Daily Maximum Parking Rates in Downtown

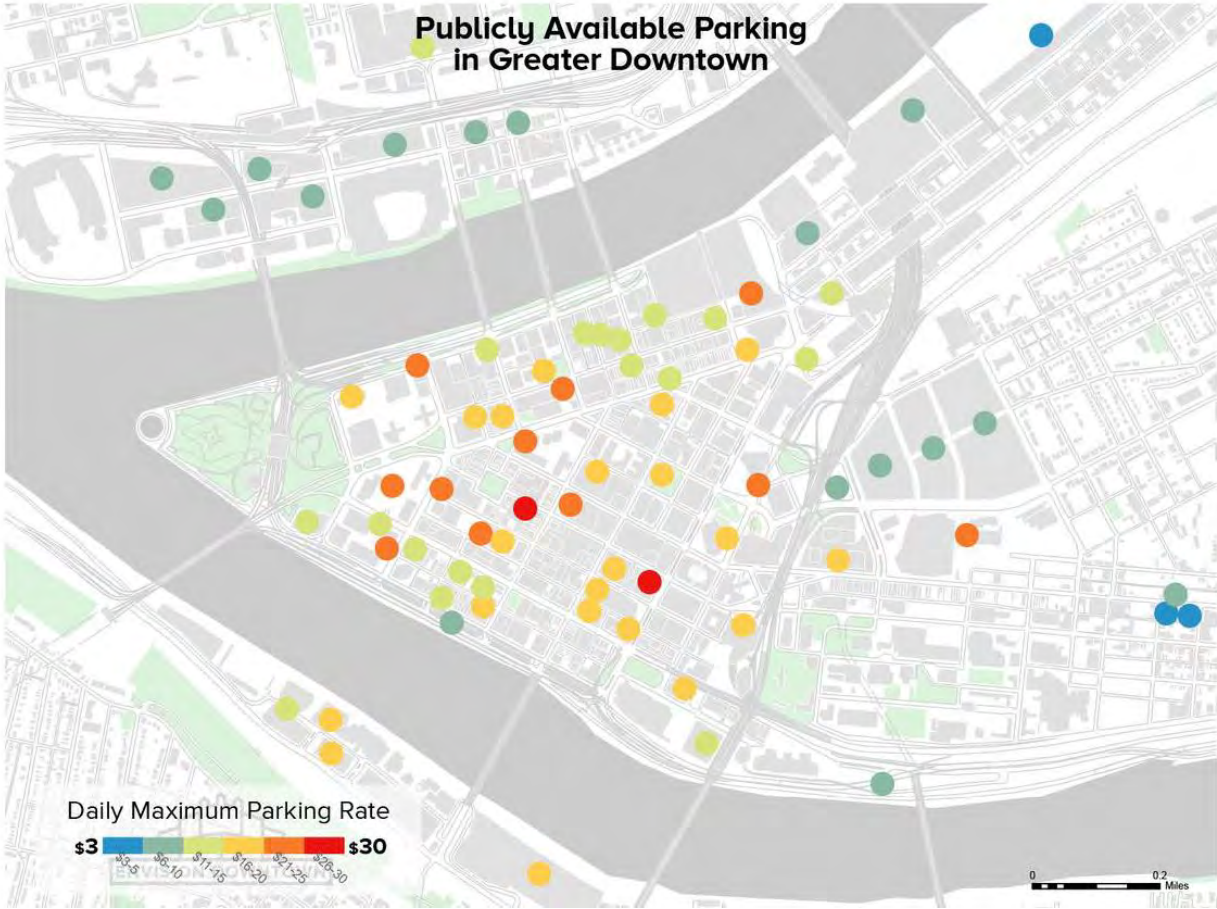


Table 4 illustrates the number of parking garages and surface lots within Oakland; most are privately owned garages for the hospitals, colleges/universities, or hotels. In Oakland, there is only one parking garage that is owned by PPA, which is the Forbes Semple Garage. Daily parking rates range from \$12 to \$22 per day.

Table 4: Station Cluster Summary

Garage	Number of Spaces
UPMC Presbyterian	Unknown
Magee-Womens Hospital of UPMC—Falk Medical Building	Unknown
Kaufmann Medical Building	230 spaces
3501 Forbes Avenue	50 spaces (valet only)
University of Pittsburgh—OC Lot	Unknown
3422 Forbes Avenue	50 spaces (valet only)
Residence Inn	Unknown
University of Pittsburgh	Unknown
Hilton Garden Inn	Valet only
Mckee Pl/Forbes Avenue	70 spaces (private)
Forbes Tower Garage	619 spaces
Forbes Semple Garage	449 spaces
220 Oakland Avenue	30 spaces
UPMC—Forbes Tower Lot	70 spaces
Magee-Womens Hospital of UPMC	340 spaces
Sennott Square Lot	21 spaces
University of Pittsburgh—Sennott Square	Unknown
3959 Fifth Avenue	40 spaces
University of Pittsburgh—Soldiers & Sailors Garage	600 spaces
UPMC University Center	65 spaces
RAND Corporation Building	70 spaces
Carnegie Museums Lot	110 spaces
CMU Dithridge Street Garage	Unknown

Within East Liberty, the PPA maintains six surface parking lots, with a total 563 spaces. These are metered spaces, none of which are located immediately adjacent to the corridor. In 2009, the Urban Redevelopment Authority of Pittsburgh conducted a parking study to evaluate the impact shared parking could have on the revitalization of this area to increase density by redeveloping the surface parking lots.

Within Shadyside, the PPA maintains one garage with 208 spaces and one surface parking lot with 74 spaces. Daily parking rates in this area average \$11 per day. These two facilities are located approximately two blocks north of the corridor along Walnut Street.

The PPA operates five parking facilities within Squirrel Hill with a total of 318 spaces. The facilities are mainly along Murray Avenue, just south of Forbes Avenue or within two blocks of Murray Avenue. The facilities in Squirrel Hill are a combination of surface parking and parking garages, and are all metered parking spaces.

1.4.2. On-Street Parking

As indicated earlier, there is currently on-street parking located along most of the length of the corridor. On-street parking in Downtown, Uptown, Oakland, and parts of East Liberty and Squirrel Hill have metered parking. The majority of the parking within the residential areas is not metered. **Table 5** illustrates the number of on-street parking spaces by Cluster and whether those spaces are metered or not metered. In addition, the table also summarizes the number of parking spaces with the Downtown-Uptown-Oakland-East End BRT project.

Table 5: On-Street Parking

Station Cluster	Current Spaces		Spaces with BRT	
	Metered	Not Metered	Metered	Not Metered
Cluster 1	40	0	10	0
Cluster 2	176	287	45	180
Cluster 3	202	96	155	5
Cluster 4	12	87	0*	78
Cluster 5	198	107	180	104
Cluster 6	27	73	27	60
Cluster 7	0	0	0	0
Cluster 8	78	188	74	180
Cluster 9	0	329	0	313
Cluster 10	41	72	0	68
Total	774	1239	491	988
	2013		1479	

*Loss due to PennDOT project and introduction of bike lane along Forbes Avenue

The number of unmarked parking spaces was estimated by utilizing the length of a block divided by 20 feet per parking space. Driveways were not included in the length of the block. The number of parking spaces are likely overestimated due to fire hydrants as well as bus stop locations, where parking is not allowed.

As a result of adding the BRT project within the corridor, the total number of on-street parking spaces will decrease by 534 spaces. Within Downtown, metered parking would be removed along Liberty Avenue and Fifth Avenue, and one block of Sixth Avenue. Portions of Fifth Avenue may still be available as off-peak parking or loading zones. Within Uptown (Cluster 2), parking will be removed to accommodate the addition of a bike lane along Fifth Avenue and Forbes Avenue. It is also notable that analysis has shown that many unmetered spaces along these roads are currently being used by all-day parkers (i.e. commuters); the City of Pittsburgh is may choose to regulate the spaces that remain with meters or residential permits. In Oakland (Cluster 3), parking will be removed for the addition of the BRT lane as well as the cycle track along Fifth Avenue. The metered parking loss shown in Cluster 4 is actually a result of the PennDOT project being conducted next year with the addition of a bike lane in this section. Cluster 10 (North Oakland) removed metered parking along Fifth Avenue between Bellefield Avenue and Neville Avenue. There will be minimal parking removal along the BRT branches (Clusters 5 through 9) and those removals occur at station locations.

The benefits of removing the on-street parking allows for the addition of bus-only lanes, bicycle lanes, and cycle tracks, as well as bumped-out station locations along the branches.