

## 26. Environmental Justice

### 26.1. Chapter Overview

#### 26.1.1. Introduction

The following analysis was performed to map areas of potential Environmental Justice (EJ) concern<sup>1</sup> and to determine whether the new or relocated SDEIS elements of the Preferred Alternative may disproportionately affect minority and/or low-income populations. No impacts to these target populations were anticipated in Tenafly under the DEIS Preferred Alternative. Consequently, the change in terminus does not affect the impact to minority or low-income populations. The following revisions occur within portions of the study area where minority and/or low-income populations are found:

- Englewood Route 4 Station parking and VBF: new development would co-locate the parking deck and the vehicle base facility (VBF) to the east of the alignment.
- Revision to Englewood Town Center Station: the Englewood Town Center Station has been relocated to the area north of Palisade Avenue.
- Ridgefield Station: The number of properties proposed for acquisition was reduced from five to one, but the one property to be acquired contains uses that cater to and employ members of a minority community.

Comments submitted during the DEIS comment period expressed positive support for the inclusion of cultural diversity, such as minority and/or low-income populations, as community attributes, specifically in Englewood. This SDEIS reanalysis, therefore, only addresses the changes to the Preferred Alternative, as well as the incorporation of updated US Census data.

#### 26.1.2. Summary of Findings of the DEIS and the SDEIS

The demographic pattern described in the DEIS for the study area is relatively unchanged, with pronounced concentrations of minority populations and low-income populations located in proximity to the right-of-way. The SDEIS is operationally similar to the DEIS, and would use an existing rail corridor. Proposed station locations were selected to minimize the number of property acquisitions and displacements and to be receptive to the needs of local communities. None of the property acquisitions proposed in association with the SDEIS would result in the loss of a community resource particularly important to low-income or minority residents, such as health clinics, childcare facilities, and government and social services uses. Though impacts may result under the Preferred Alternative in minority and/or low-income communities throughout the corridor, particularly in terms of noise, these impacts are not disproportionate among minority or low-income populations. It is expected that target populations would share equally with the general population in the benefits that would be generated by the proposed project, and may find the improved access to employment opportunities a particularly welcome benefit, particularly if they are without access to personal automobiles.

## 26.2. Methodology

The following EJ assessment describes the findings of affected communities relative to their minority status and income. In order to assess for the potential presence of disproportionate impacts,

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<sup>1</sup> Executive Order 12898, *Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations*, dated February 11, 1994, directs all federal agencies to ensure that their actions do not have a “disproportionately high and adverse human health or environmental effect on minority populations or low-income populations.” Existing socio-economic data were collected and analyzed to inform the Environmental Justice (EJ) impact analysis, in compliance with Executive Order 12898.

interrelationships between the identified concentrations of minority and low-income individuals and the proposed project's adverse impacts were qualitatively assessed.

Data on race/ethnicity, median household income, and poverty were compiled from the US Census Bureau's American Community Survey five-year estimates, covering the period 2007 to 2012. To determine the "project corridor" population for the study area, a compilation of census tract and block group data was identified. Minority populations, pursuant to US Department of Transportation's (DOT) *Order to Address Environmental Justice in Minority Populations and Low-Income Populations*, include Black, Hispanic or Latino, Asian, American Indian and Alaskan Native, and Native Hawaiian or Pacific Islander. For the purposes of this analysis, minority populations included Black or African-American, Asian, Other Race, and Hispanic or Latino of any race, including White. The total minority population was calculated as the full population minus non-Hispanic/Latino White persons.

Pursuant to Executive Order 12898, areas with high minority populations can be identified where the minority population exceeds 50 percent or the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population. For this SDEIS reanalysis, FTA determined that the minority population is meaningfully greater than the average in the surrounding jurisdictions if it is 10 percentage points higher than the jurisdiction with the lowest percent of that EJ population. The lowest percentage of minority population is 37.5 percent of the total population in Bergen County. The addition of 10 percentage points creates a threshold of 47.5 percent; therefore, any US Census block group with a minority population over 47.5 percent is identified as an EJ area.

Because the Council on Environmental Equality (CEQ) does not suggest a threshold to be used in identifying low-income populations, poverty guidelines from the US Department of Housing and Urban Development (HUD) were used. HUD defines poverty as 80 percent or less of a county's median household income. For purposes of uniformity, as the project corridor bisects two counties, the New Jersey state median income of \$71,637 was multiplied by 80 percent, generating a low-income benchmark of \$57,310. US Census block groups and municipalities with median household incomes of \$57,310 or those with percentages of population below the poverty level greater than the State average of 9.9 percent were identified as EJ areas.

## **26.3. Environmental Review**

### **26.3.1. Existing Conditions**

Six municipalities and seven proposed station areas comprise the project corridor study area, which is defined as the area within one-half mile of the rail alignment. US Census data was compared to data for the State of New Jersey, counties, and municipalities within the study area, and the project corridor study area as a whole, to identify those areas with a high percentage of minority populations and low-income populations. Figure 26-1 shows the US Census block groups with 47.5 percent or more minority residents (as described above in 26.2 Methodology). Figure 26-2 shows the US Census block groups with median incomes less than \$57,310 or percentage of poverty of greater than 9.9 percent.

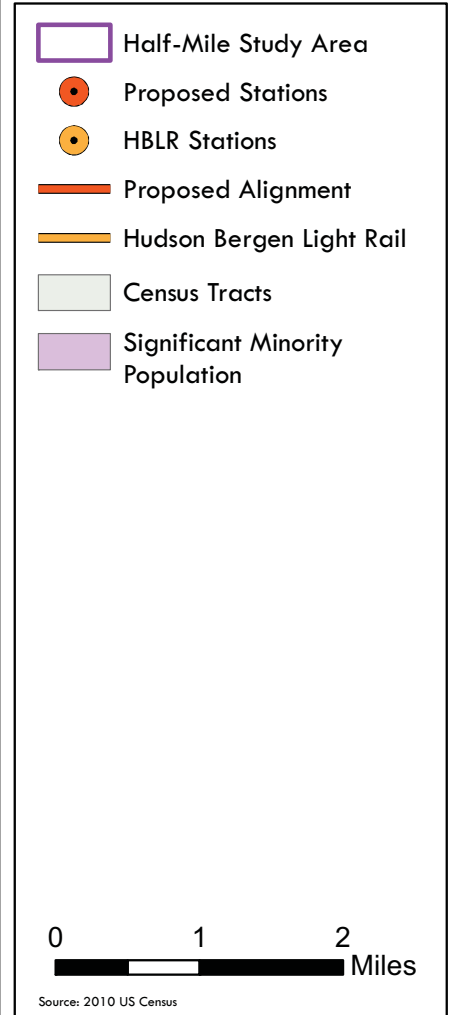
### **26.3.2. Potential Impacts and Mitigation**

#### *26.3.2.1. No Build Alternative*

There are no changes to the impacts associated with the No Build Alternative as compared with the DEIS.

# Northern Branch Minority Populations

Figure 26-1

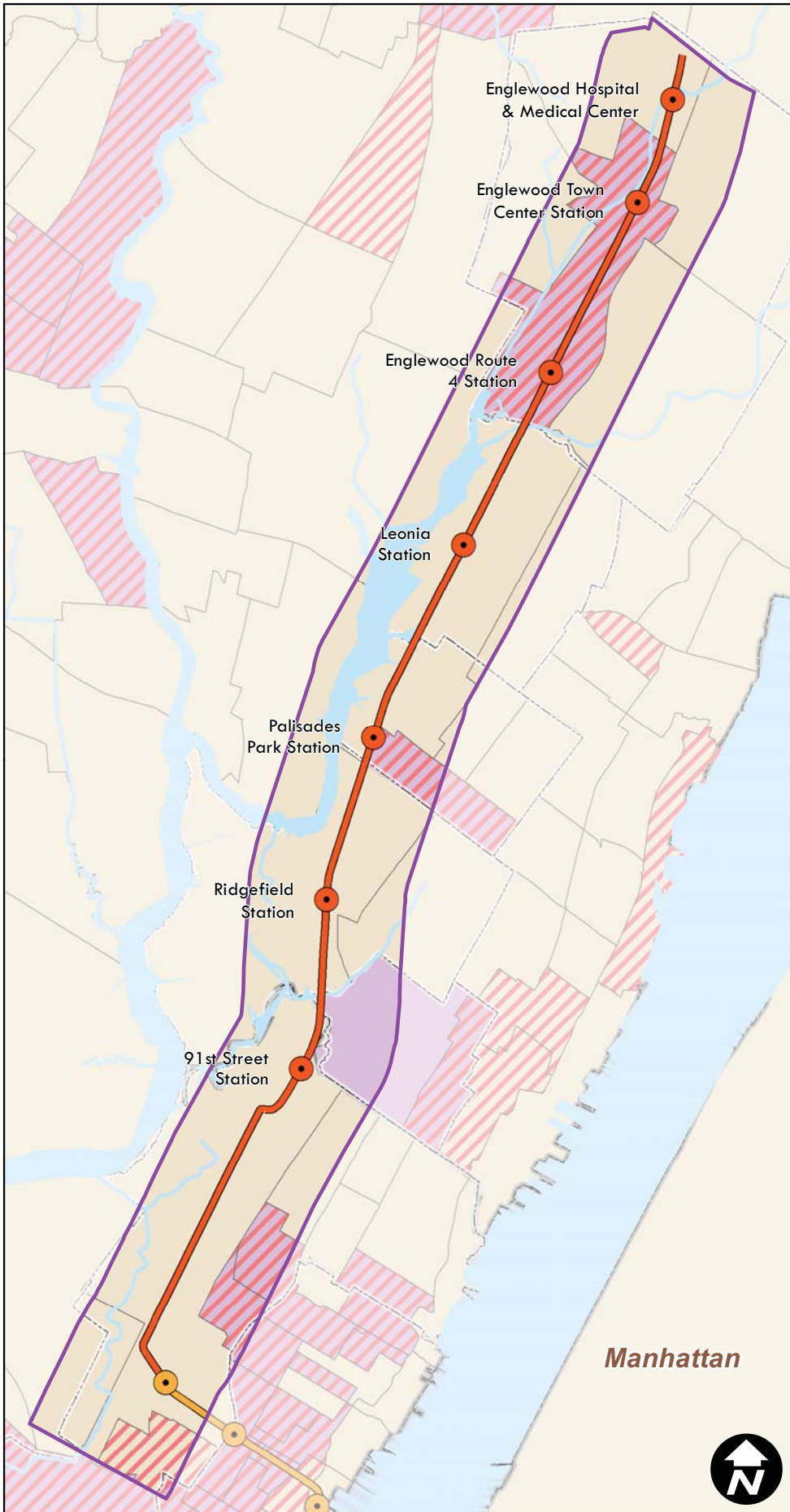
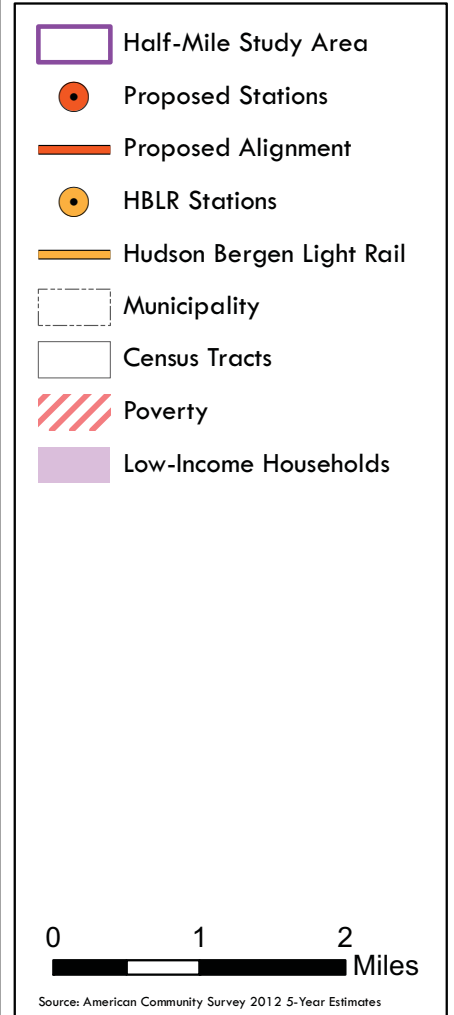


Manhattan



# Northern Branch Low-Income Populations

Figure 26-2



## 26.3.2.2. Preferred Alternative

Following is a description of revisions to the Preferred Alternative relative to concentrations of minority and/or low-income populations in the half-mile project corridor study area.

**Minority Populations**

Population characteristics are described below and summarized in Table 26-1. The table illustrates that all categories of minority residents are distributed across the entire study area, both at the project corridor and municipal levels. When aggregated, the total combined percentages of all minority residents at the project corridor study area level compare similarly with the figures at the municipal level, all of which are above 47.5 percent. In terms of concentrations of minority residents, African-American residents are the predominant minority race in Englewood, with residential levels above 30 percent at both the block group and municipal level. Hispanic or Latino (of any race) residents are the predominant minority community in North Bergen. In Ridgefield, Palisades Park, and Leonia, Asians are the predominant minority community at both the municipal and US Census block group level.

**Table 26-1: Study Area Population Characteristics (Percent of Total Population)**

| Geographic Area   | Total Population | White only   | Black or African-American only | Asian only   | Other Race <sup>1</sup> | Hispanic or Latino (of any race) <sup>2</sup> | Minority     |
|---|------------------|--------------|--------------------------------|--------------|-------------------------|---|--------------|
| New Jersey  | 8,791,894        | 59.3%        | 12.8%                          | 8.2%         | 2.0%                    | 17.7%   | 40.7%        |
| Bergen County   | 905,116          | 62.5%        | 5.2%                           | 14.4%        | 1.8%                    | 16.1%   | 37.5%        |
| Hudson County   | 634,266          | 30.8%        | 11.2%                          | 13.2%        | 2.5%                    | 42.2%   | 69.2%        |
| <b>Municipalities</b>   |                  |              |                                |              |                         |   |              |
| North Bergen  | 60,773           | 22.0%        | 1.8%                           | 6.3%         | 1.5%                    | 68.4%   | 78.0%        |
| Fairview  | 13,835           | 35.7%        | 2.1%                           | 4.4%         | 3.1%                    | 54.6%   | 64.3%        |
| Ridgefield  | 11,032           | 47.3%        | 0.9%                           | 29.0%        | 1.5%                    | 21.4%   | 52.7%        |
| Palisades Park  | 19,622           | 21.5%        | 1.4%                           | 57.6%        | 1.2%                    | 18.2%   | 78.5%        |
| Leonia  | 8,937            | 44.1%        | 1.9%                           | 34.9%        | 2.4%                    | 16.7%   | 55.9%        |
| Englewood   | 27,147           | 31.2%        | 30.8%                          | 8.0%         | 7.5%                    | 27.5%   | 68.8%        |
| <b>Total</b>  | <b>141,346</b>   | <b>28.4%</b> | <b>7.3%</b>                    | <b>17.2%</b> | <b>1.9%</b>             | <b>45.3%</b>                                  | <b>71.6%</b> |
| <b>Project Corridor Study Area</b>  |                  |              |                                |              |                         |   |              |
| North Bergen  | 27,346           | 19.9%        | 1.4%                           | 4.5%         | 1.2%                    | 73.0%   | 80.1%        |
| Fairview  | 3,955            | 43.3%        | 2.0%                           | 12.9%        | 2.5%                    | 39.3%   | 56.7%        |
| Ridgefield  | 7,282            | 42.9%        | 0.8%                           | 32.3%        | 1.7%                    | 22.4%   | 57.1%        |
| Palisades Park  | 12,169           | 16.6%        | 1.3%                           | 60.4%        | 0.8%                    | 20.9%   | 83.4%        |
| Leonia  | 7,885            | 42.6%        | 1.9%                           | 36.8%        | 2.3%                    | 16.5%   | 57.4%        |
| Englewood   | 25,015           | 29.0%        | 31.6%                          | 8.0%         | 2.5%                    | 28.8%   | 71.0%        |
| <b>Total</b>  | <b>83,652</b>    | <b>27.4%</b> | <b>10.4%</b>                   | <b>19.5%</b> | <b>1.7%</b>             | <b>40.9%</b>                                  | <b>72.6%</b> |
| <i>Notes:</i>   |                  |              |                                |              |                         |   |              |
| <sup>1</sup> "Other" includes residents of American Indian, Alaskan Native, Native Hawaiian and Other Pacific Islander, as well as those respondents who did not identify with any listed racial groups (White, Black, Asian) or who indicated that they are of more than one race defined in the Census. |                  |              |                                |              |                         |   |              |
| <sup>2</sup> The Hispanic category consists of those respondents who classified themselves in one of the several Hispanic Origin categories in the Census survey. People of this ethnic group may be of any race i.e. White, Black, Asian and Other.  |                  |              |                                |              |                         |   |              |

Source: U.S. Bureau of Census, American Community Survey 5-year estimates, 2007-2012

Changes to the Preferred Alternative altered the location of three improvements relative to identified minority populations: First, Englewood Route 4 Station parking and VBF would be developed on only



the east side of the Northern Branch. Second, the Englewood Town Center Station would involve the acquisition of property in the downtown to construct a double track and a new park and the parking area east of the alignment between Palisade and Demarest Avenue would be reconfigured to maintain the current number of parking spaces while improving circulation. Lastly, the property acquisition proposed to develop Ridgefield Station was reduced from five parcels to one; however, the one parcel to be taken will remove a strip mall containing uses catering to the Korean Community.

Permanent impacts associated with the proposed Englewood improvements include localized traffic near the new station sites for Englewood Route 4 and Englewood Town Center, as well as an increase in noise along the alignment resulting from the operation of rail vehicles. These impacts would be no greater than those experienced by non-minority members of the general population who also reside in significant numbers in close proximity to proposed station sites and the right-of-way, such as through Leonia. The impacts and benefits associated with the proposed project would accrue across the entire population of the project corridor study area. Generally, benefits resulting from the implementation of transit service along the Northern Branch and subsequent adverse impacts associated with construction would be distributed uniformly across the approximately 10-mile corridor, which includes minority and general populations.

The potential acquisition of the lot containing the Hanyang Mart strip mall in Ridgefield (Block 3501 Lot 1) represents a loss of a commercial resource specializing in goods and services specific to the Korean community, which is the predominant Asian minority group in Ridgefield and neighboring Palisades Park. Broad Avenue through Palisades Park and Ridgefield is characterized by a mixture of large commercial strip malls and mixed-used commercial/residential uses. Within 3000 feet both north and south of the Hanyang Mart, there are 23 commercial or community service uses with Korean language signage, including two dentists, a pharmacy, a karaoke restaurant, and two hair salons/barber shops. In addition, within 3000 feet south of the Hanyang Mart complex there are two large grocery markets: Super H Mart and International Cash & Carry. Super H Mart, much like the Hanyang Mart complex, includes a food-court/restaurant and some retail. As a result, although the acquisition of the Hanyang Mart complex will represent an economic loss to the property owner and result in job displacement of employees, the loss of the retail complex does not represent the loss of a unique resource for the Korean community or create a hardship in the access to these resources.

Additionally, it is important to note that the selection of Block 3501 Lot 1 was a function of its location proximate to the existing Northern Branch rail alignment, roadway access, and other proposed station locations along the alignment. Block 3501 Lot 1 can be directly accessed from Hendricks Causeway and Remsen Place, enabling commuter access to the Ridgefield Station without adding to congestion on Broad Avenue. A more southern location would not permit this type of access and would require travel on Broad Avenue for eastbound drivers. This is a benefit to the community as Broad Avenue is a heavily traveled and congested arterial.

Development of Block 3501 Lot 1 also minimizes the loss of businesses and residential uses otherwise required to accommodate access to the Northern Branch in Ridgefield if Block 3501 Lot 1 were not developed as the station location. The block bounded by Edgewater Avenue, Oritan Avenue, River Street, and the Northern Branch is not large enough to accommodate the station and required parking. The block bounded by Oritan Avenue, Edgewater Avenue, River Street, and Broad Avenue is of sufficient size for the parking facility, but the station itself would still need to be placed adjacent to the tracks, requiring acquisition of both blocks and displacement of at least 11 businesses with walk-up access, one multi-story professional building with multiple business suites, and residential occupants living on the second floor of the mixed-used buildings fronting Broad Avenue.

The acquisition of the Hanyang Mart complex represents the least adverse impact overall to the community, balancing the benefit of access to the Northern Branch with the loss of active uses. The

acquisition and development of the site with a light rail station will provide convenient access to a transportation alternative currently lacking within the community. The light rail service would provide efficient connection between Ridgefield and potential employment locations and cultural resources elsewhere in Hudson County, and it would help arrest the congestion on area roadways by diverting commuters from cars to the light rail. The types of uses lost through acquisition of the proposed station site are available within ½ mile of the proposed station site. Lastly, as detailed in Chapter 5, other communities within the Northern Branch corridor will experience property acquisition and loss of active uses as a function of the need to provide access to the Northern Branch: eight businesses will be acquired in Palisades Park and 13 will be acquired in Englewood. As a result, the acquisition of Block 3501, Lot 1 does not represent a high and disproportionate impact to the Korean community.

### **Low-Income Populations**

Table 26-2 illustrates the median household income and percent of the population below the poverty level for the State of New Jersey, each county and municipality in the study area, and the project corridor study area as a whole. North Bergen and Fairview are the only two municipalities identified within the project corridor study area (\$49,909 and \$53,784, respectively) and at the municipal level (\$52,307 and \$44,229, respectively) below the state low-income threshold of \$57,310.

**Table 26-2: Study Area Economic Characteristics**

| <b>Geographic Area</b>  | <b>Median Household Income<sup>1</sup></b> | <b>Low-Income<sup>2</sup></b> | <b>Percent of Population Below Poverty Level<sup>3</sup></b> | <b>Greater Percentage than State Average<sup>4</sup></b> |
|---|--|-------------------------------|--|--|
| <b>New Jersey</b>   | <b>\$71,637</b>                            | --                            | <b>9.9%</b>  | --   |
| <b>Bergen County</b>  | <b>\$84,255</b>                            | No                            | <b>6.6%</b>  | No   |
| <b>Hudson County</b>  | <b>\$58,722</b>                            | No                            | <b>15.7%</b>   | Yes  |
| <b>Municipalities</b>   |  |                               |  |  |
| North Bergen  | \$52,307                                   | Yes                           | 16.6%  | Yes  |
| Fairview  | \$44,229                                   | Yes                           | 15.4%  | Yes  |
| Ridgefield  | \$62,191                                   | No                            | 4.7%   | No   |
| Palisades Park  | \$57,937                                   | No                            | 13.5%  | Yes  |
| Leonia  | \$72,195                                   | No                            | 8.9%   | No   |
| Englewood   | \$69,557                                   | No                            | 11.6%  | Yes  |
| <b>Average</b>  | <b>\$59,736</b>                            | No                            | <b>11.8%</b>   | Yes  |
| <b>Project Corridor Study Area</b>  |  |                               |  |  |
| North Bergen  | \$49,909                                   | Yes                           | 11.6%  | Yes  |
| Fairview  | \$53,784                                   | Yes                           | 5.2%   | No   |
| Ridgefield  | \$65,894                                   | No                            | 3.5%   | No   |
| Palisades Park  | \$62,423                                   | No                            | 12.4%  | Yes  |
| Leonia  | \$75,428                                   | No                            | 8.8%   | No   |
| Englewood   | \$85,251                                   | No                            | 10.3%  | Yes  |
| <b>Average</b>  | <b>\$65,448</b>                            | No                            | <b>8.6%</b>  | No   |
| Notes: <sup>1</sup> The project corridor median income was calculated by taking the weighted averages of the median household incomes of the census block groups within the project corridor. |  |                               |  |  |
| <sup>2</sup> Low-income is defined as median household income equal to or less than \$57,310, which represents 80% of the State of New Jersey median household income of \$71,637.            |  |                               |  |  |
| <sup>3</sup> The U.S. Bureau of Census using its established income thresholds for poverty levels defines poverty levels.   |  |                               |  |  |
| <sup>4</sup> The state average of persons below the 2010 federal poverty guidelines was reported as 9.9 percent for the State of New Jersey.  |  |                               |  |  |

Source: U.S. Bureau of Census, American Community Survey 5-year estimates, 2007-2012

For the total project corridor study area, US Census block group figures for residents in poverty (8.6 percent) are lower than poverty figures at both the aggregate municipal (11.8 percent) and state level (9.9

percent). The percentage of the population living below the poverty level in North Bergen, Palisades Park and Englewood exceed the New Jersey state percentage of 9.9 percent at the project corridor level (refer to Table 26-2). At the US Census tract level, poverty figures in Palisades Park and Englewood are pronounced in areas near the proposed Palisades Park Station and in areas near the proposed Englewood Route 4 and Englewood Town Center Stations. In addition, when aggregated at the US Census tract level, poverty figures exceed the New Jersey State average by 5.5 percent in the south-east portion of North Bergen. Poverty figures also correspond to low-income levels within the same US Census tracts. For example, US Census tracts within Palisades Park and Englewood show median household incomes of \$48,712 and \$54,238, respectively. Both figures are below the New Jersey State median household income of \$57,310. US Census tracts in North Bergen show more pronounced low-income levels (\$34,536).

Within the Northern Branch corridor study area, HUD and the Council on Affordable Housing (COAH) provide housing assistance for low-income persons. Typically, there are two key programs used to provide housing options to low-income, disabled, and elderly populations. Those include public housing and the Housing Choice Voucher Program known as Section 8. Table 26-3 illustrates affordable family housing units within the study area. The majority of affordable housing developments for low-income populations within the study area is in North Bergen on the east side of the alignment, and includes Granton Gardens, Westview Towers, Lawler Towers, Meadow View, and Terrace Apartments. Englewood has the second largest number of low-income housing units along the project corridor and includes Greater Englewood Apartments, located approximately one-half mile east of the Englewood Route 4 Station; John Foti Apartments and Martin Luther King Gardens, located near the Englewood Town Center Station; and Pindle East, located near the Englewood Hospital and Medical Center Station. These areas are within walking and bicycling distance of proposed stations (or the existing Tonnel Avenue Station for the southern North Bergen residents). The proposed stations would include pedestrian elements to increase connectivity and safety, such as crosswalk striping, and bicycle facilities, including bike lanes and bike racks.

**Table 26-3: Study Area Affordable Housing Characteristics**

| <b>Geographic Area</b> | <b>Number of Developments</b> | <b>Units</b> |
|------------------------|-------------------------------|--------------|
| North Bergen           | 5                             | 856          |
| Fairview               | 1                             | 146          |
| Leonia                 | 2                             | 13           |
| Englewood              | 6                             | 512          |
| <b>Total</b>           | <b>14</b>                     | <b>1,527</b> |

*Source: Council on Affordable Housing (COAH) Guide to Affordable Housing in New Jersey, 2015.*

The Northern Branch rail alignment is located adjacent to both high-income and low-income populations consisting of high percentages of people below the poverty level and median household incomes below the state average. Low-income populations would experience similar impacts as those described above for minority populations. Construction impacts would be distributed evenly throughout the corridor and would not disproportionately affect low-income populations. Impacts occurring during construction of proposed station locations would eventually result in a substantial benefit. Both short-term and permanent impacts associated with the project would be equally distributed among members of the general population located near the right-of-way and station sites. As such, project impacts would not be felt disproportionately by low-income populations. These unavoidable impacts would generally not be disproportional to low-income populations since they would occur over the entire alignment.



### **Mitigation**

The implementation of the Preferred Alternative is not expected to result in environmental justice impacts to minority and/or low-income populations that would be more severe than adverse impacts relative to the general population. None of the properties anticipated to be acquired (refer to Chapter 5: Land Acquisition) represent social service facilities that cater to minority/and or low-income populations. The commercial uses anticipated to be acquired in Ridgefield do serve an ethnic minority, but identical commercial uses are available within about ½ mile of the proposed station location.

Mitigation for traffic would include intersection improvements, additions of turning lanes and signal timing, as described in Chapter 9: Traffic and Parking. To mitigate the majority of noise impacts it is recommended that the municipalities between and including Ridgefield and Northvale request Quiet Zones. NJ TRANSIT would continue to work with the affected communities to encourage their participation and involvement in the public outreach process and to ensure that their concerns are addressed.

### **26.4. Environmental Justice Outreach Plan**

A key component of Environmental Justice is engaging EJ populations as part of the transportation planning process. One of the guiding principles followed by DOT is to ensure the full and fair participation by all potentially affected communities in the transportation decision-making process. Public participation during the preparation of the DEIS was solicited for the Scoping Meeting and the Public Hearings, as well as regular Citizens Liaison Committee meetings. Additionally, project information and contact information has been available on the project website, and staff have had many conversations responding to questions and comments from the local community, including the identified target populations.

DOT also seeks to ensure that communities with “Limited English Proficiency” populations have access to information to the fullest extent feasible and that their participation in providing input into decision-making is encouraged. Spanish and Korean are the dominant non-English languages identified in the study area. As such, advertisements for the Scoping Meeting and the DEIS Public Hearings were placed in the Spanish newspapers, *El Especialito* and *El Nuevo*, and the Korean newspapers, *Korean Bergen News* and *Segye Times*. In addition, the project website includes a notice of the availability of the DEIS and the public hearings in English, Spanish, and Korean.

### **26.5. Summary of Potential Environmental Effects of the DEIS and the SDEIS**

Though impacts may result under the Preferred Alternative in minority and/or low-income communities throughout the corridor, these impacts are not disproportionate among race, origin or low-income populations. Furthermore, the proposed Preferred Alternative would not have any adverse impacts to any social, religious, or cultural facilities that support an Environmental Justice community. Proposed station locations were selected to minimize the number of property acquisitions and displacements and to be receptive to the needs of local communities.

The introduction of passenger rail service along the Northern Branch would generate substantial benefits to the general population as well as low-income and/or minority communities within northeastern Hudson County and southeastern Bergen County. The Preferred Alternative would generate benefits for the project corridor in general by enhancing regional accessibility, improving bus connections, reducing traffic congestion and supporting local economic development plans. Additional benefits specific to the proposed project include increased access to jobs via passenger rail service, and the opportunity for an alternative means of transportation currently not available. Table 26-4 summarizes the beneficial and adverse impacts of the Preferred Alternative on communities along the Northern Branch Corridor. As the

table illustrates, EJ communities are anticipated to be impacted proportionately to non-EJ communities within the study area boundaries.

**Table 26-4: Summary of Impacts Related to Environmental Justice for the Preferred Alternative**

| <b>Impact</b>  | <b>Effects EJ Communities Disproportionately?</b> |
|--|---|
| <b>Beneficial Impacts</b>  |   |
| Improved services for transit-dependent travelers.   | No  |
| Increased intermodality with train, ferry, and bus transit systems.  | No  |
| Increased access to employment centers.  | No  |
| Reduced reliance on automobiles and improved travel time.  | No  |
| Increased safety through intersection and circulation improvements .   | No  |
| Economic development around station sites (transit-oriented development).  | No  |
| Improved regional air quality.   | No  |
| Increased access to local and regional destinations, such as North Bergen Municipal Pool, Overpeck County Park, and the Meadowlands. | No  |
| Increased access to community resources, such as Englewood Hospital and Medical Center and Bergen PAC.                               | No  |
| <b>Adverse Impacts</b>   |   |
| Increased noise along the alignment resulting from the operation of rail vehicles.   | No  |
| Localized traffic near the new station sites.  | No  |
| Localized increase in emissions.   | No  |

Source: Jacobs, 2015.