

Exhibit B

Cumulative Impact Assessment of the North Brooklyn Pipeline Project

Applied Economics Clinic

Prepared on behalf of

Sane Energy and Alliance for a Green Economy

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Executive Summary

In 2019, National Grid filed a rate case under New York Department of Public Service Docket 19-G-0309 and Docket 19-G-0310 to recoup costs for the **Metropolitan Reliability Infrastructure (MRI)** project, a five-phase fossil fuel infrastructure project that began construction in Spring 2017, and the Vaporizer 13/14 project for additional liquified natural gas vaporizers at **Greenpoint Energy Center**. While many components of the MRI project have been completed, some components are currently under review in National Grid's rate case proceeding, including the Phase 5 expansion of fossil fuel infrastructure in the Bushwick and East Williamsburg neighborhoods and the Vaporizer 13/14 project at Greenpoint Energy Center which would add additional gas supply.

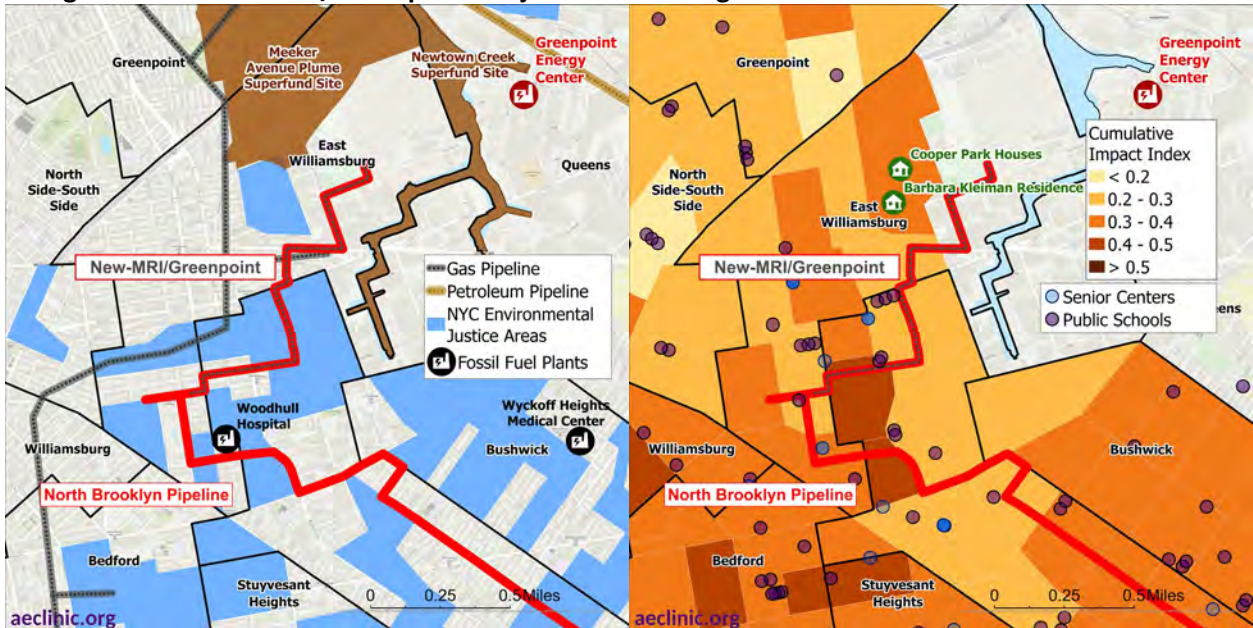
The Phase 5 expansion of fossil fuel infrastructure and the Vaporizer 13/14 project at the Greenpoint Energy Center (together called "New MRI/Greenpoint" in this report) create a multi-pronged set of threats to already-overburdened communities in Brooklyn. Several communities surrounding the New MRI/Greenpoint infrastructure are designated as environmental justice areas by New York City and face disparate housing, financial, and health-related vulnerabilities (see ES-Figure 1). Facilities cited in close proximity to the proposed fossil-fuel infrastructure include public housing, a homeless shelter, public schools and senior centers. The "New MRI/Greenpoint" construction will add on to burdens faced by these communities including close proximity to existing environmental risks such as fossil-fuel pipelines and two Superfund Sites.

Based on a review of measures used in impact assessment guidance and in existing cumulative impact assessments of similar scope and data availability, AEC has created four composite indices that represent the cumulative stresses experienced by Brooklyn communities. The results of AEC's cumulative impact index indicate that there are significant, existing socioeconomic burdens in the East Williamsburg/Bushwick neighborhoods that will house the New-MRI/Greenpoint project and new risks created by the New-MRI/Greenpoint project will exacerbate existing burdens among residents, placing these communities at further risk for pollution exposure and adverse health impacts like asthma and other respiratory diseases.

This report highlights the context into which National Grid's new infrastructure would be added—one in which vulnerable families are already overwhelmed with environmental and financial risks and burdens. The context matters. Approval of the MRI pipeline Phase 5 and Vaporizers 13/14 at Greenpoint Energy Center would add new risks, new stresses, new uncertainties. The local community needs a clear accounting of what these new risks are: A detailed risk assessment including uncertainty analysis to establish possible future scenarios for dangers to human health and safety caused by accident, error or just the inevitable risks of transporting, housing and processing toxic and combustible substances. What schools, homes, families, public facilities would be in the path of leaks? What impacts will residents face during project construction? A clear, detailed accounting of potential harms under a range of potential future circumstances (intended and unintended), made publicly to community members and other stakeholders is essential to good decision making regarding all infrastructure projects. In the case of National Grid's MRI and Vaporizer 13/14, the need for transparent information on risks and harms is both urgent and critical, and—for an accurate understanding of community burdens—must be presented in the context of the existing vulnerability experienced by the local community.



ES-Figure 1. The New-MRI/Greenpoint Projects and Existing Burdens



Note: Detail maps zoomed in to the census tract level show the area closest to the proposed New-MRI/Greenpoint in grey indicating that these blocks are industrial and not residential and therefore are not included in public data sets on demographic data, housing, or health impacts.



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I. Introduction

In 2019, Brooklyn Union Gas Company (“KEDNY”) and Keyspan Gas East Corporation (“KEDLI”), doing business as National Grid, filed a rate case under New York Department of Public Service (NY DPS) Docket 19-G-0309¹ and Docket 19-G-0310² to recoup costs for the Metropolitan Reliability Infrastructure (MRI) project, a five-phase fossil fuel infrastructure project that began construction in Spring 2017 and the Vaporizer 13/14 project for additional liquified natural gas (LNG) vaporizers at Greenpoint Energy Center.³ National Grid claims the MRI project will improve the safety, reliability, and efficiency of gas supply movements in Brooklyn⁴ while the Vaporizer 13/14 project is needed to meet customer peak demand during the coldest days of the winter.⁵

“New-MRI/Greenpoint”

New-MRI: Phase 5 of the MRI project which expands existing fossil fuel infrastructure through Williamsburg.

Greenpoint: Additional fossil gas units (Vaporizer 13/14) to be added to the Greenpoint Energy Center.

According to National Grid, Phases 1 through 4 of the MRI project, including the contentious seven-mile pipeline expansion in northern Brooklyn, commonly referred to as the North Brooklyn Pipeline,⁶ are complete and in service. Phase 5 of the project, an expansion of fossil fuel infrastructure into Bushwick and East Williamsburg is under review in the current rate case along with the Vaporizer 13/14 project which, in contrast with the MRI project, would add additional gas supply (see Figure 1).⁷

¹ NY Pub. Serv. Comm. Docket No. 19-G-0309. *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of The Brooklyn Union Gas Company d/b/a National Grid NY for Gas Service*. Submitted by The Brooklyn Union Gas Company.

² NY Pub. Serv. Comm. Docket No. 19-G-0310. *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of KeySpan Gas East Corp. d/b/a National Grid for Gas Service*. Submitted by KeySpan Gas East Corp. dba Brooklyn Union of L.I.

³ Connolly, C. April 1, 2021. *Re: Request for Additional Information DEC ID# 2-6101-00071/00024 Greenpoint Energy Center*. Available at: <https://greenpointenergycenter.com/wp-content/uploads/2021/09/Greenpoint-Response-to-C.-Nichols-at-DEC-re-RFAI.pdf>.

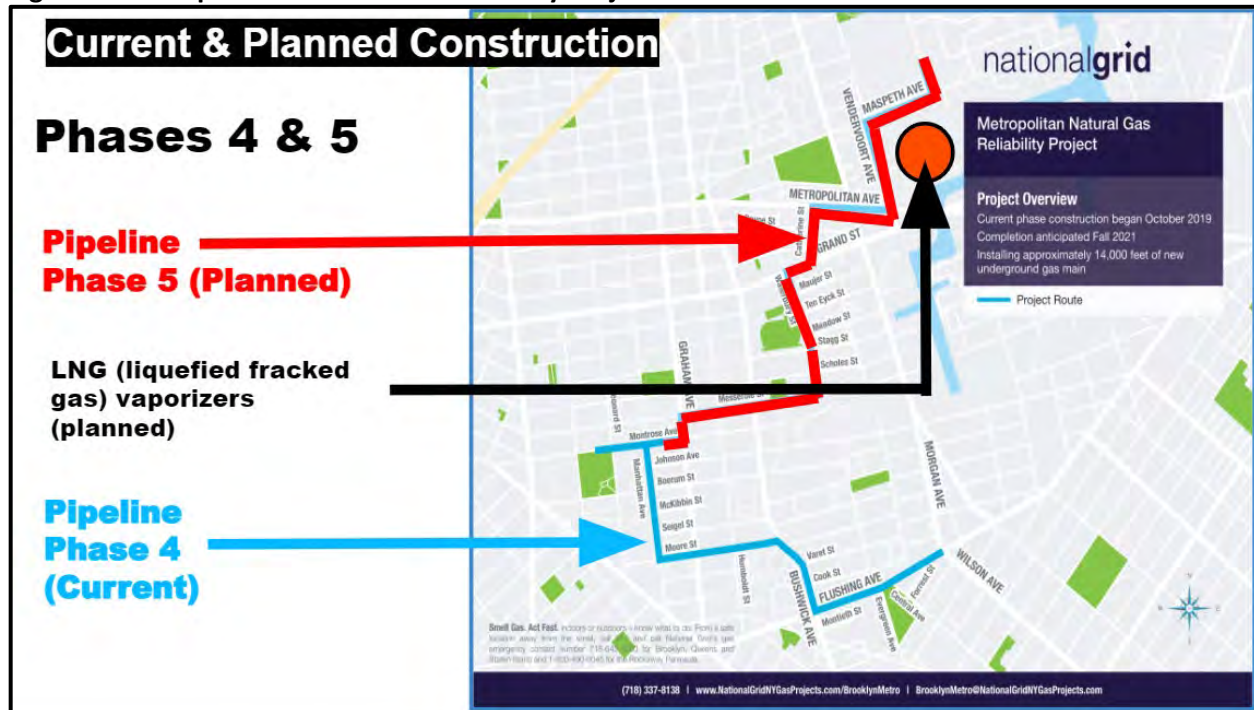
⁴ Quinn, A. October 26, 2021. “EPA Will Investigate North Brooklyn Pipeline Approval: Activists.” Patch. Available at: <https://patch.com/new-york/bed-stuy/epa-will-investigate-north-brooklyn-pipeline-approval-activists>.

⁵ Connolly, C. April 1, 2021. *Re: Request for Additional Information DEC ID# 2-6101-00071/00024 Greenpoint Energy Center*.

⁶ Moran, G. February 11, 2022. “‘A Slap in the Face’: Pipeline Violates Civil Rights, Say New Yorkers.” *The Guardian*. Available at: <https://www.theguardian.com/us-news/2022/feb/11/brooklyn-pipeline-violates-black-lation-civil-rights-new-york>.

⁷ See Connolly, C. April 1, 2021. *Re: Request for Additional Information DEC ID# 2-6101-00071/00024 Greenpoint Energy Center*.

Figure 1. Metropolitan Natural Gas Reliability Project



Reproduced from: No BKP. 2022. Metropolitan Reliability Infrastructure Project [PowerPoint]. Available at: https://docs.google.com/presentation/d/1kEYutRq3iXBm8zRJS1t3emrnCU9VHDIbpn1c8BA3KY/edit#slide=id.g8668f71fdf_0_2. Slide 16

While National Grid does not discuss these projects together as a whole, and has stated that they are independent of one another,⁸ this AEC report assesses the cumulative impact of both Phase 5 of the MRI project and Greenpoint Vaporizer 13/14 project as new fossil fuel infrastructure that, together, pose significant risks for already overburdened communities in North Brooklyn.

Phase 5 of the MRI project and the additional vaporizers at Greenpoint Energy Center have been halted, temporarily, due to public opposition but are still on the table. In this report, we refer to already-constructed MRI (Phases 1-4) and existing Greenpoint Energy Center fossil fuel infrastructure together as the “North Brooklyn Pipeline” project, and to Phase 5 of the MRI together with the Vaporizer 13/14 project (housed at the Greenpoint Energy Center) as “New-MRI/Greenpoint” (see Figure 2, note: Greenpoint Energy Center is located in East Williamsburg, Brooklyn. Coordinates for the facility were plotted using GIS software and resulted in a slightly offset icon in AEC’s maps).

According to No North Brooklyn Pipeline campaigners, New Yorkers want an end to new gas pipelines and are concerned about the economic, safety, and environmental impacts of the expansion of gas transmission further into Brooklyn.⁹ Opponents of the project assert that it violates the 2019 *New York*

⁸ Ibid.

⁹ No North Brooklyn Pipeline. n.d. “About.” Available at: <https://www.nonbkpipeline.org/about>.



Figure 2. The North Brooklyn Pipeline and the New-MRI/Greenpoint



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Data source: North Brooklyn Pipeline line segment provided by the FracTracker Alliance. See: Fraczek, K. and Edelstein, K. 2020. "New Yorkers Mount Resistance Against North Brooklyn Pipeline." FracTracker Alliance. Available at: <https://fractracker.org/2020/05/new-yorkers-resistance-against-north-brooklyn-pipeline/>



*Climate Leadership and Community Protection Act (CLCPA)*¹⁰—which mandates the reduction of New York State greenhouse gas emissions by at least 85 percent by 2050—and will contribute to negative health outcome in areas already fighting health disparities.¹¹ Brooklyn residents, environmental groups, advocacy organizations, and elected officials—including the Sane Energy Project, the Frack Outta Brooklyn Coalition, North Brooklyn Extinction Rebellion, Sunrise NYC, Brownsville Green Justice, Mi Casa Resiste, State Senator Julia Salazar, and former Mayor Bill de Blasio—have all expressed strong opposition to the project in the form of a unified campaign, rallies, marches, formal complaints to the Environmental Protection Agency (EPA), and direct actions that have successfully blocked the proposal’s progress.¹² Ultimately, efforts to halt the project have been unsuccessful to-date.¹³

The North Brooklyn Pipeline itself begins in Brownsville/East New York, passes through Ocean-Hill and Bushwick, and ends in East Williamsburg, creating disproportionate disruptions in Brooklyn’s predominantly Black, Indigenous, and People of Color (BIPOC) neighborhoods, many of which are designated by New York City as environmental justice areas (defined below in Section II),¹⁴ while circumventing neighborhoods with a higher concentration of white residents (see Figure 3).¹⁵ Phase 5 begins at the terminal end of the existing North Brooklyn Pipeline, crossing through the neighborhoods of Bushwick and East Williamsburg, and ends at the Greenpoint terminal adjacent to the Greenpoint Energy Center. In addition, the Greenpoint terminal, the end location for the pipeline expansion to the Greenpoint Energy Center, is also the site of one of the nation’s largest oil spills, which began in 1950 after a sewer explosion but remained undetected until 1978.¹⁶ The effects of the spill are still being remediated today.¹⁷

¹⁰ NY Senate Bill S6599. 2019. (“An Act to amend the environmental conservation law, the public service law, the public authorities’ law, the labor law and the community risk and resiliency act, in relation to establishing the New York state climate leadership and community protection act.”) Available at:

<https://legislation.nysenate.gov/pdf/bills/2019/S6599>.

¹¹ Pereira, S. April 16, 2021. “National Grid is Building a Natural Gas Pipeline Through North Brooklyn. But Do We Need It?” *Gothamist*. Available at: <https://gothamist.com/news/national-grid-building-natural-gas-pipeline-through-north-brooklyn-do-we-need-it>.

¹² (1) Ibid. (2) No North Brooklyn Pipeline. N.d. “About.” (3) Democracy Now. October 27, 2020. “Climate Activists Arrested in NYC After Shutting Down Construction of North Brooklyn Pipeline.” Available at: https://www.democracynow.org/2020/10/27/headlines/climate_activists_arrested_in_nyc_after_shutting_down_construction_of_north_brooklyn_pipeline. (4) Pereira, S. February 18, 2020. “Activists Demand National Grid Halt Project to Extend a Fracked Gas Pipeline Through North Brooklyn.” *Gothamist*. Available at: <https://gothamist.com/news/national-grid-fracked-gas-pipeline-brooklyn-protest>.

¹³ (1) National Grid. “Construction Update: January 15, 2021.” Available at: <https://nationalgridgasprojectsny.com/brooklynmetro/news/construction-update-january-15-2021/>; (2) National Grid. June 2021. “Metropolitan Natural Gas Reliability Project.” Available at: <https://nationalgridgasprojectsny.com/brooklynmetro/>.

¹⁴ A more detailed discussion of NYC EJ areas is below, see: New York City environmental justice areas

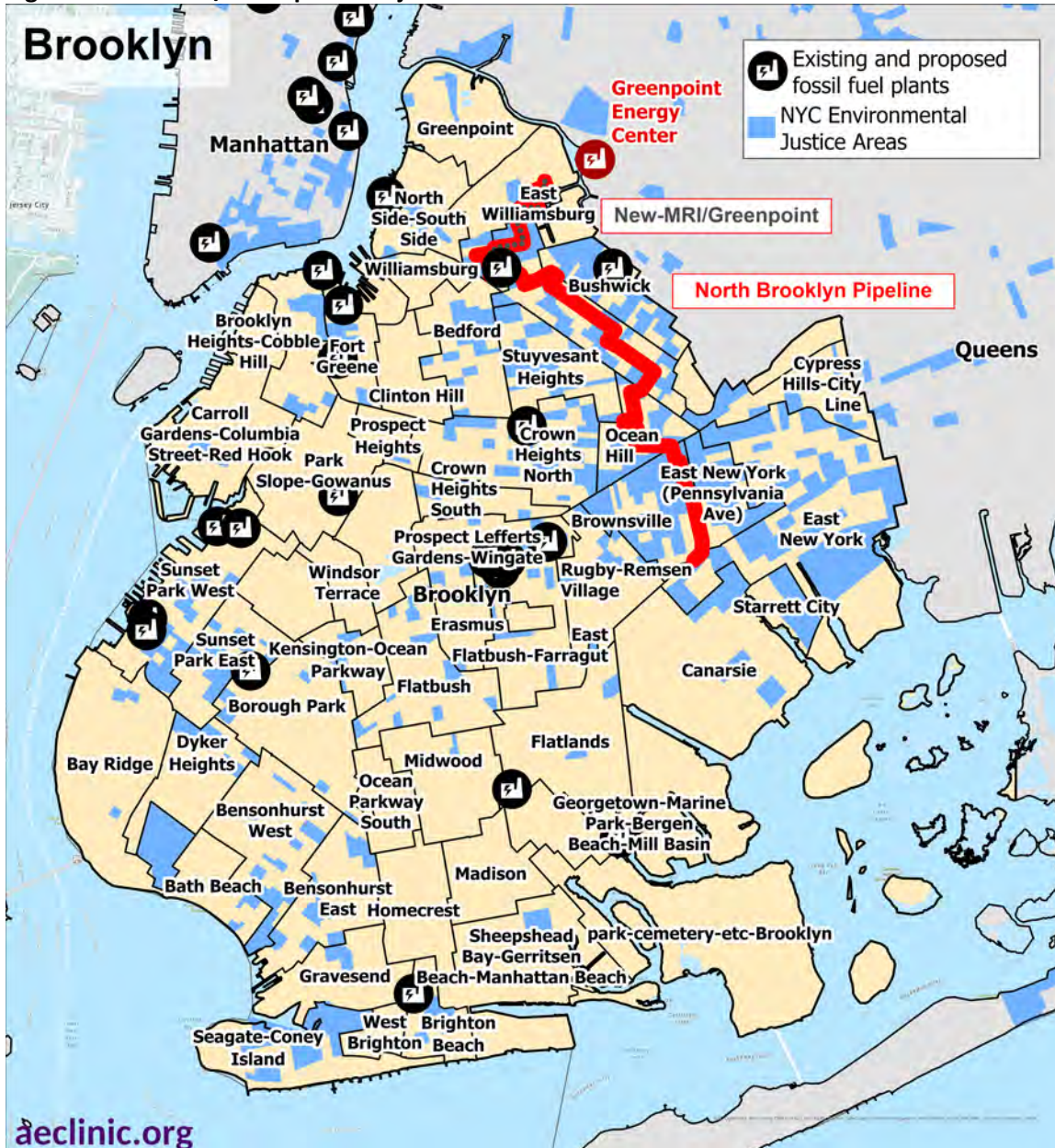
¹⁵ No North Brooklyn Pipeline. n.d. “About.”

¹⁶ Newtown Creek Alliance. n.d. “Greenpoint Oil Spill.” Available at: <http://www.newtowncreekalliance.org/greenpoint-oil-spill/>.

¹⁷ NYS Dep’t of Env’t Conservation. July 14, 2021. “Greenpoint Petroleum Remediation Project Status.” Available at: <https://www.nysdecgreenpoint.com/ProjectStatus.aspx>.



Figure 3. New-MRI/Greenpoint Project and Environmental Justice Areas



Data source: (1) U.S. Census Bureau. 2020. American Community Survey 5-Year Estimates [Tables: B03002_001E, C17002_001, H002001]; (2) U.S. Energy Information Administration (EIA). 2020. Form EIA-860 detailed data with previous form data (EIA-860A/860B). Available at: <https://www.eia.gov/electricity/data/eia860/>; (3) North Brooklyn Pipeline line segment provided by the FracTracker Alliance. See: Fraczek, K. & Edelstein, K. 2020. "New Yorkers Mount Resistance Against North Brooklyn Pipeline." FracTracker Alliance. Available at: <https://fractracker.org/2020/05/new-yorkers-resistance-against-north-brooklyn-pipeline/>

The Williamsburg, Bushwick and Greenpoint neighborhoods can ill afford another environmental burden given their already-overburdened status: Not only are residents in these neighborhoods more likely to be BIPOC and low-income than in other Brooklyn neighborhoods and are therefore ill-equipped to shoulder the rate hikes to pay for the New-MRI/Greenpoint project, but they also shoulder existing environmental



burdens. For example, Bushwick hosts a range of industrial activities—including a waste transfer station and cement plants—and associated heavy, diesel truck traffic that creates local air pollution and increases incidence of respiratory problems like asthma.¹⁸ In East Williamsburg, about half the neighborhood is comprised of the East Williamsburg Industrial Park and neighbors the Brooklyn-Queens Expressway¹⁹ and levels of air pollution are high relative to Brooklyn or New York City as a whole.²⁰

II. Environmental Justice Area Definitions in New York State

In New York State, there are two state-wide definitions of environmental justice areas and one New York City definition: (1) The potential environmental justice areas (PEJAs) definition designates about half of the State’s census block groups as PEJA; (2) the preliminary and proposed disadvantaged communities (DACs) definitions designate 15 to 35 percent of the State’s census block groups as DACs; and (3) New York City has a city-wide environmental justice area definition similar to that of the preliminary DAC definition. All three definitions consider race/ethnicity and median household income in their definitions.

Potential Environmental Justice Areas (PEJAs)

More broadly than the New York City definition for environmental justice areas, the New York Department of Environmental Conservation (NYDEC) defines **potential environmental justice areas** as U.S. Census block groups²¹ with 250 to 500 households where:

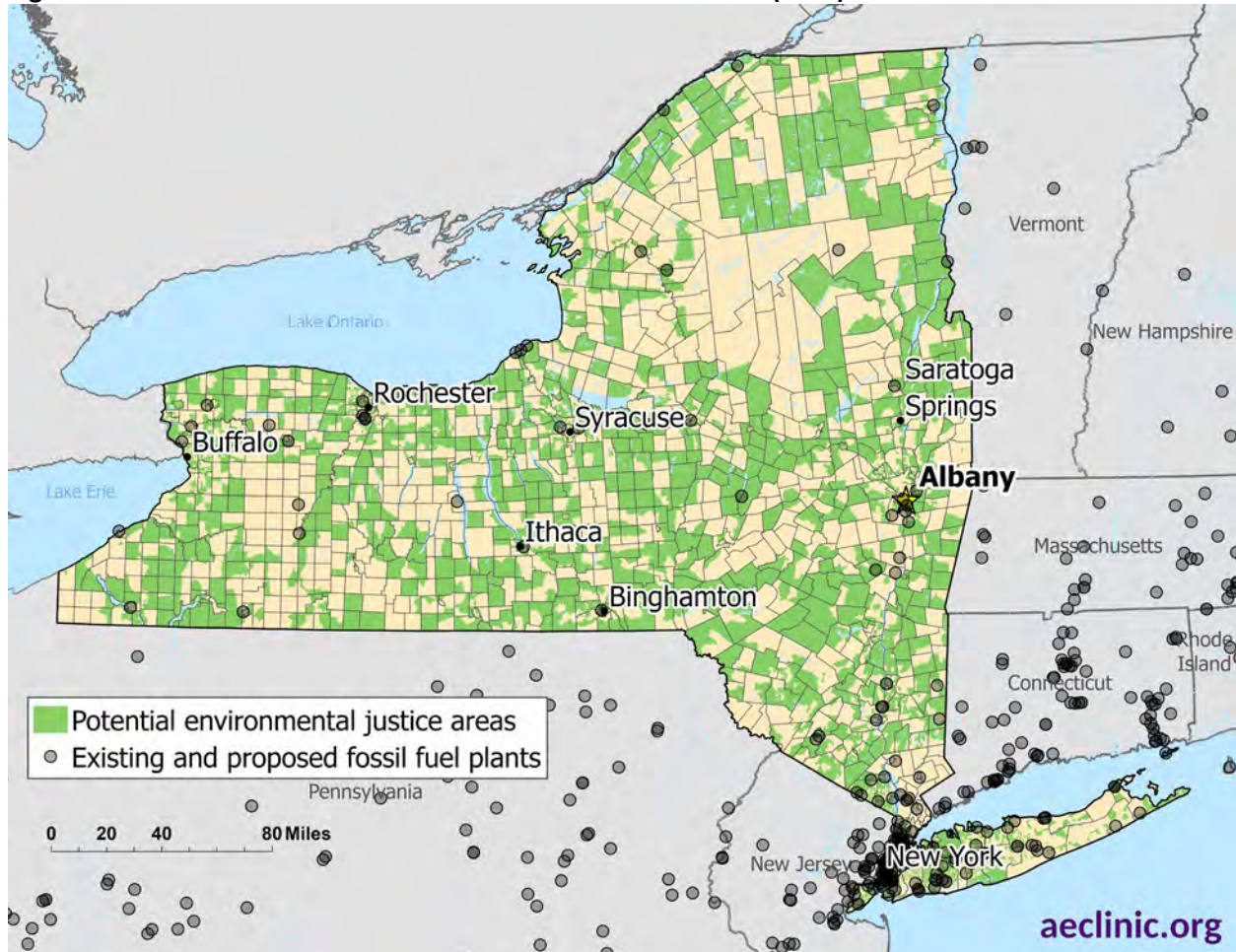
¹⁸ Pontecorvo, E. June 12, 2020. “Bike Messengers: A small pipeline poses big questions about the future of natural gas in New York.” Available at: <https://grist.org/energy/a-bike-ride-through-brooklyn-traces-the-path-of-national-grids-proposed-pipeline/>.

¹⁹ Lasky, J. June 22, 2022. “East Williamsburg, Brooklyn: A ‘Gritty, Industrial Vibe,’ With Pliable Borders.” Available at: <https://www.nytimes.com/2022/06/22/realestate/east-williamsburg-brooklyn-a-gritty-industrial-vibe-with-pliable-borders.html>.

²⁰ NYC Health. 2018. “Greenpoint and Williamsburg.” Available at: <https://www1.nyc.gov/assets/doh/downloads/pdf/data/2018chp-bk1.pdf>.

²¹ The U.S. Census Bureau defines block groups as divisions of census tracts that contain between 600 and 3,000 people. See: U.S. Census Bureau. n.d. “Glossary.” Available at: https://www.census.gov/programs-surveys/geography/about/glossary.html#par_textimage_4.

Figure 4. New York State Potential Environmental Justice Areas (PEJA)



Data source: (1) U.S. Census Bureau. 2020. ACS 5-Year Estimates [Tables: B03002_001E, C17002_001, H002001]; (2) U.S. EIA. 2020. Form 860 data. Available at: <https://www.eia.gov/electricity/data/eia860/>

- 52.42 percent or more of the population in an urban area (or 26.28 percent or more of the population in a rural area) identifies as members of what NYDEC refers to as a “minority group,”²² and/or
- 22.82 percent or more of the population have a median household income below the federal poverty level (for example, the federal poverty level for a family of four was \$26,500 in 2020²³).²⁴

²² New York City defines “minority group” as populations that identify as Hispanic, African American or Black, Asian and Pacific Islander or American Indian. See: NYC Local Law Chapter 10, Section 1(3) (2017). *Environmental Justice*. Available at: <https://codelibrary.amlegal.com/codes/newyorkcity/latest/NYCAAdmin/0-0-0-1689>.

²³ U.S. Census Bureau. 2020. “Poverty Thresholds by Size of Family and Number of Children” [Workbook]. Poverty Thresholds. Available at: <https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html>

²⁴ NYS Dep’t of Env’t Prot. n.d. “Maps & Geospatial Information System (GIS) Tools for Environmental Justice.” Available at: <https://www.dec.ny.gov/public/911.html>.



Census block groups are more condensed in urban areas, as compared to suburban or rural areas, because there are significantly more housing units and people per square mile. There are 7,403 PEJAs in New York State (see Figure 4).

Disadvantaged Communities

In 2019, New York State passed the Climate Leadership and Community Protection Act,²⁵ which requires State agencies to allocate funding to Disadvantaged Communities (DACs) to reduce pollution exposure and prevent increased pollution levels. The Climate Justice Working Group is tasked with establishing criteria for defining DACs and has released draft criteria, which rely on 45 indicators of environmental burdens, climate risk, health vulnerabilities, and population characteristics to identify DACs.²⁶ Until those definitions are finalized, New York State identifies disadvantaged communities as any census block group where:

- Median household income is less than or equal to 50 percent of the Area Median Income (AMI) of the county and located within a PEJA²⁷; and/or
- Households located within New York State Opportunity Zones²⁸—census tracts with a poverty rate of at least 20 percent and a median family income less than or equal to 90 percent of the county median family income.²⁹

Combining PEJAs that have a median household income that is less than or equal to 50 percent of the AMI and/or are located in New York State Opportunity Zones, there are 2,166 Disadvantaged Communities in New York State (or 14 percent of New York census block groups; see Figure 5), many of which are in New York City (see Figure 6).

²⁵NYS. n.d. “Our Climate Act.” Available at: <https://climate.ny.gov/Our-Climate-Act>.

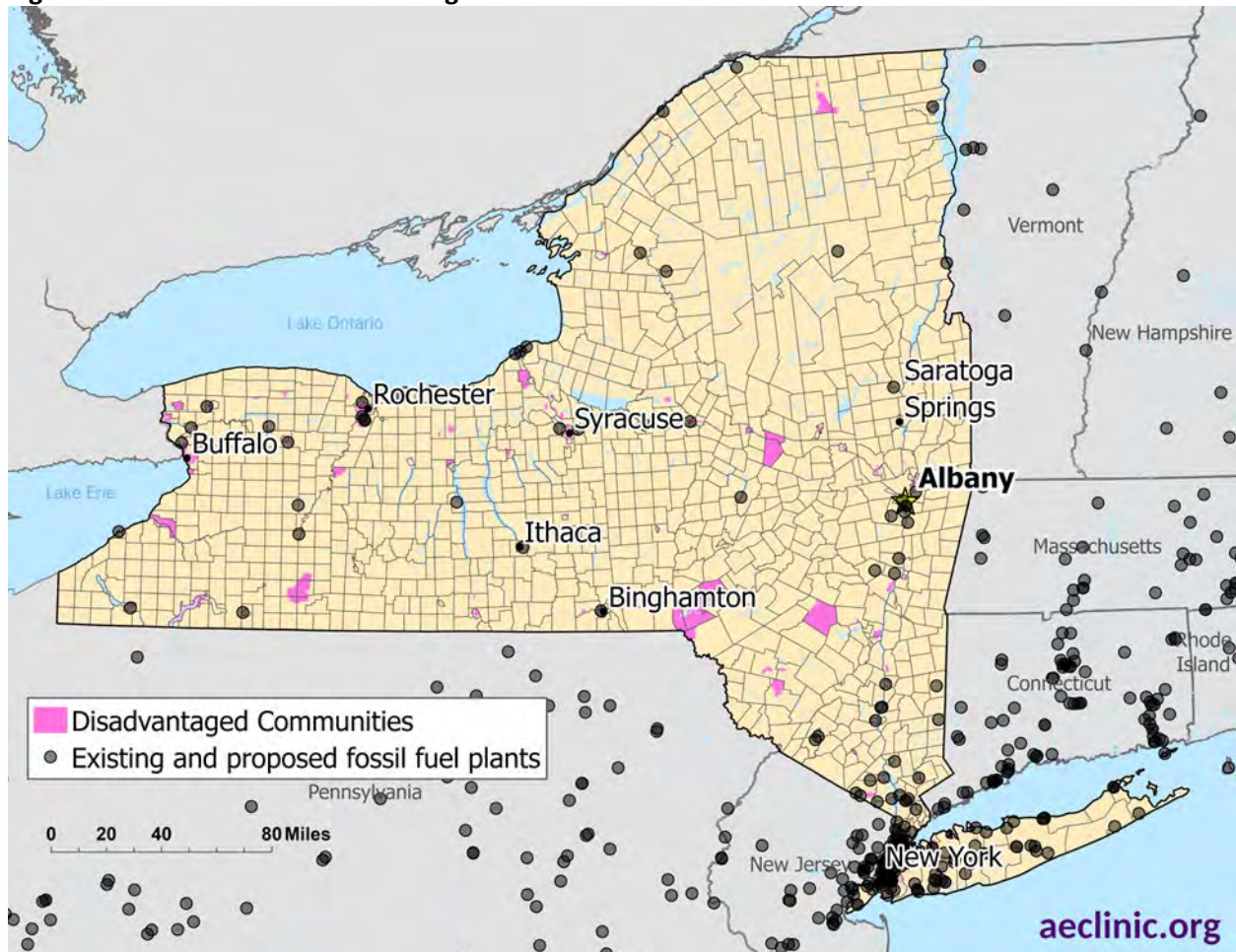
²⁶ NYS. 2022. “Draft Disadvantaged Communities Criteria.” Available at: <https://climate.ny.gov/Our-Climate-Act/Disadvantaged-Communities-Criteria>.

²⁷ NYS Dep’t of Env’t Prot. n.d. “Maps & Geospatial Information System (GIS) Tools for Environmental Justice.”

²⁸ NYS. n.d. “Opportunity Zone Program.” *Empire State Development*. Available at: <https://esd.ny.gov/opportunity-zones>.

²⁹ NYSERDA. n.d. “Disadvantaged Communities.” Available at: <https://www.nyserda.ny.gov/ny/disadvantaged-communities>.

Figure 5. New York State Disadvantaged Communities



Data source: (1) U.S. Census Bureau. 2020. *American Community Survey 5-Year Detailed Estimates* [Tables: B17026_002E, S1903_C01_001, B19013_001E, B03002_001E, C17002_001, H002001] (2) U.S. EIA. 2020. Form 860 data. Available at: <https://www.eia.gov/electricity/data/eia860/>

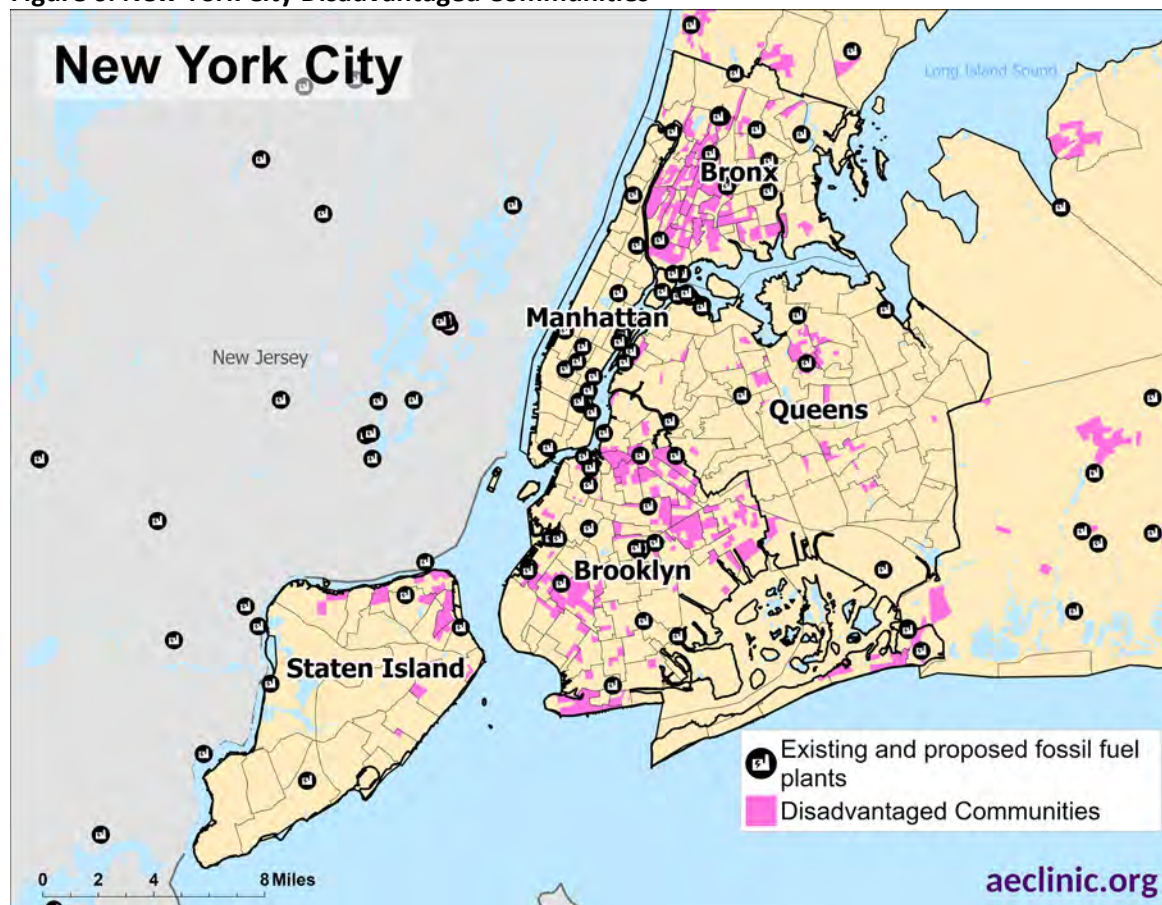
If approved, the draft DAC criteria, shown in pink/purple in Figure 7 below, would identify 35 percent of New York State census block groups as DACs and would increase the share of DAC census block groups in Brooklyn from 25 percent according to the current DAC criteria (shown in blue/purple in Figure 7 below and termed “Preliminary DAC”) up to 39 percent of Brooklyn census block groups (shown in pink/purple in Figure 7 below).³⁰ The purple area represents the overlap between the current DAC criteria and new, draft DAC criteria.

In contrast to current DAC criteria—which are limited to income- and race-based designations alone and fail to capture the full scope of communities who are disproportionately burdened by environmental

³⁰ Hennessey, Y. March 10, 2022. “New York State Proposes to Designate 35 Percent of State Census Tracts as Disadvantaged Communities Under the CLCPA.” Barclay Damon LLP. Available at: <https://www.barclaydamon.com/alerts/new-york-state-proposes-to-designate-35-percent-of-state-census-tracts-as-disadvantaged-communities-under-the-clcpa>.

hazards from industrial pollution—the new draft DAC criteria put forth by the Climate Justice Working Group include a diverse array of indicators across environmental, demographic, socioeconomic, and health-related outcomes in order to encapsulate a broader range of the community-level stressors and conditions that create DACs. Environmental indicators include burdens such as vehicle traffic, concentrations of pollutants including fine particulate matter and benzene, proximity to Superfund sites, oil facilities, power plants and other polluting facilities, and climate vulnerabilities like flood risk or extreme heat projections.³¹ The criteria also include health-related burdens—such as premature death count, hospitalization and emergency room visit rates for various conditions, and the share of residents who lack health insurance—as well as a robust set of socioeconomic items such as housing cost burden, energy burden, and internet access.³²

Figure 6. New York City Disadvantaged Communities



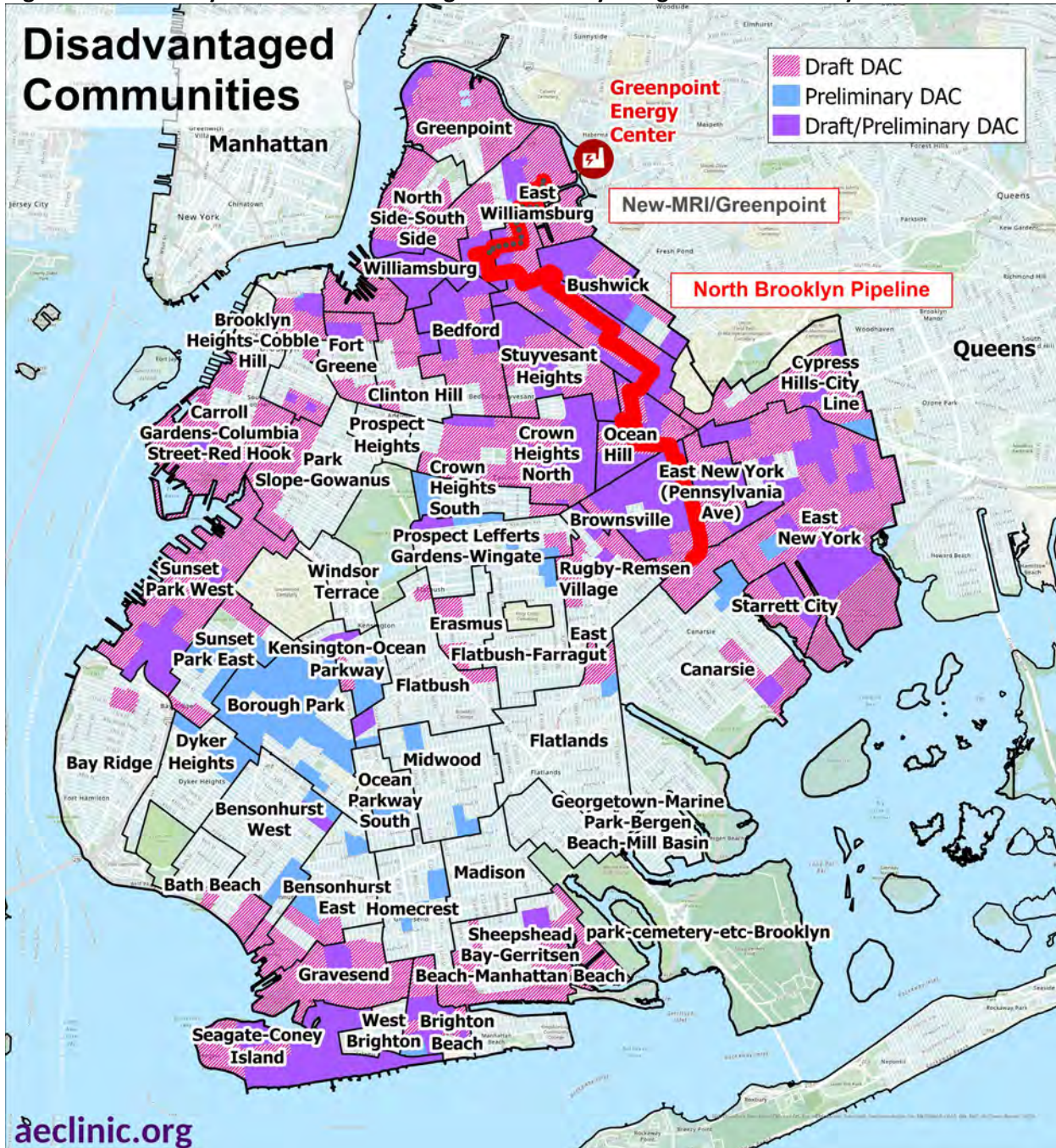
Data source: (1) U.S. Census Bureau. 2020. ACS 5-Year Estimates [Tables: B17026_002E, S1903_C01_001, B19013_001E, B03002_001E, C17002_001, H002001] (2) U.S. EIA. 2020. Form 860 data. Available at: <https://www.eia.gov/electricity/data/eia860/>

³¹ NYS. 2022. “Draft Disadvantaged Communities Criteria.”

³² Ibid.



Figure 7. Preliminary and Draft Disadvantaged Community Designations in Brooklyn



Data source: (1) U.S. Census Bureau. 2020. ACS 5-Year Estimates [Tables: B17026_002E, S1903_C01_001, B19013_001E, B03002_001E, C17002_001, H002001]. (2) North Brooklyn Pipeline line segment provided by the FracTracker Alliance.

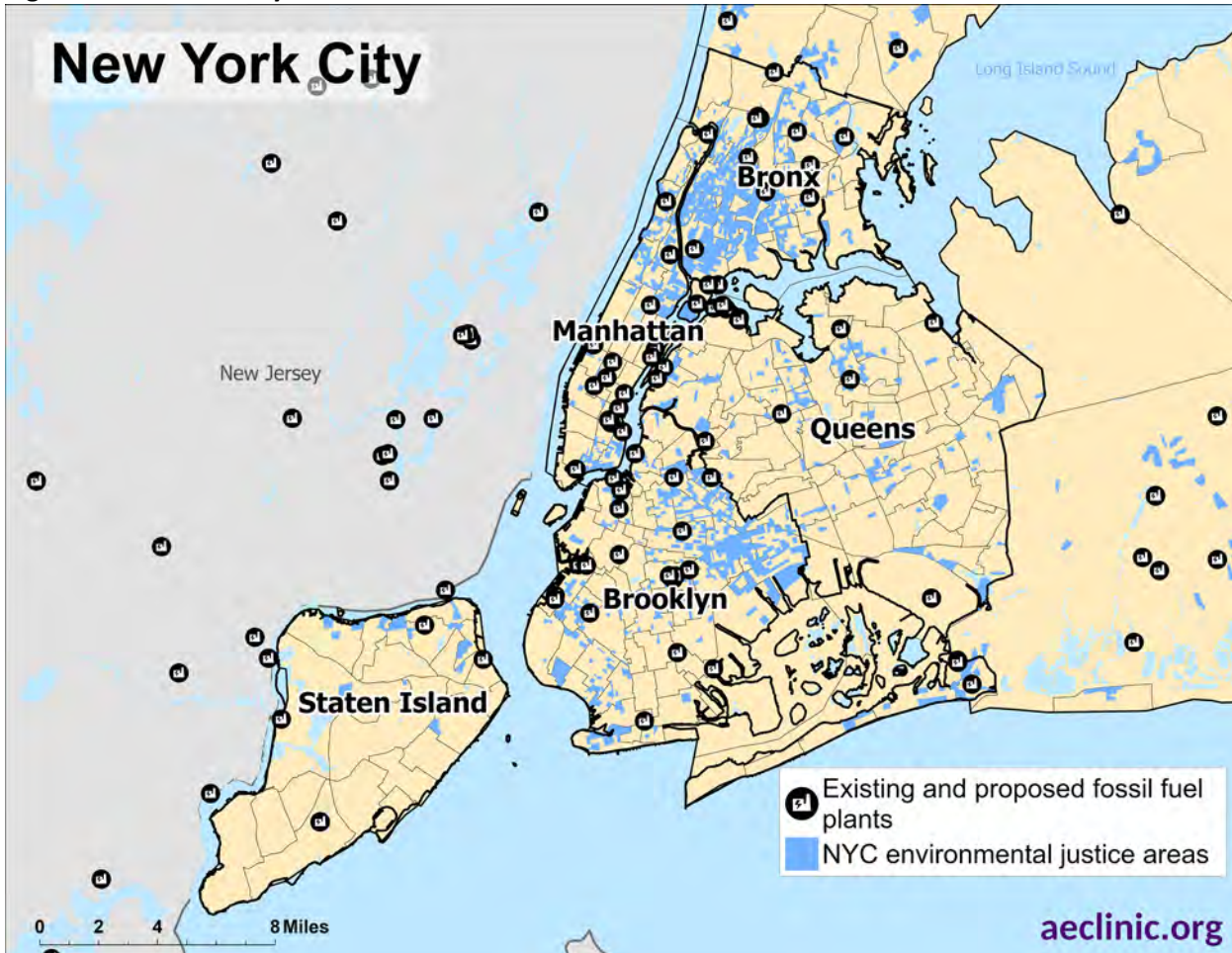
New York City Environmental Justice Areas

In 2017, New York City Mayor Bill de Blasio signed two pieces of legislation codifying environmental justice into the City’s decision-making process, Local Law 60 and Local Law 64:



- **Local Law 60** required New York City government officials to facilitate environmental justice research in the City, including identifying communities that suffer the most from environmental burdens and communities that benefit the least from the City's green investments. Findings from this research will be summarized in the City's *Environmental Justice for All* report.³³
- **Local Law 64** mandated the creation of an Environmental Justice Advisory Board composed of advocates, researchers, and public health officials to develop a City-wide environmental justice plan, in collaboration with City agencies and impacted communities.³⁴

Figure 8. New York City Environmental Justice Communities



Data sources: (1) U.S. Census Bureau. 2020. ACS 5-Year Estimates [Tables: B17026_002E, S1903_C01_001, B19013_001E, B03002_001E, C17002_001, H002001] (2) U.S. EIA. 2020. Form 860 data. Available at: <https://www.eia.gov/electricity/data/eia860/>

³³ NYC Mayor's Office of Climate & Environmental Justice. n.d. "Environmental Justice." Available at: <https://www1.nyc.gov/site/sustainability/our-programs/environmental-justice.page>.

³⁴ Ibid.



Together, these laws define **New York city environmental justice areas** as any census block group where:

- 51.1 percent of the total population identifies as members of a minority group; and/or,
- 23.59 percent or more of the population lives below the federal poverty level (see Figure 8).³⁵

III. Baseline Equity Analysis

The impact of the New-MRI/Greenpoint project on the Bushwick and East Williamsburg neighborhoods depends not only on the physical, social, and cultural effects of project construction but also on the existing set of risks and stressors that influence communities' vulnerability to a new source of stress. AEC's baseline equity analysis of Brooklyn neighborhoods serves to evaluate community demographics to inform the cumulative impact assessment as it pertains to the project.

Nearby neighborhoods face disproportionate disadvantages

The expansion of fossil fuel infrastructure adds to a multi-pronged set of threats to already-overburdened communities in Brooklyn. Currently, Brooklyn residents share their home with several fossil fuel plants and long stretches of petroleum and fossil gas infrastructure. The New-MRI/Greenpoint project runs directly through the Bushwick and Williamsburg neighborhoods of Brooklyn (see Figure 9). Bushwick and Greenpoint/Williamsburg house a high concentration of BIPOC and immigrant residents and face high rates of poverty (see Table 1). The proximity of the New-MRI/Greenpoint infrastructure to these communities puts them at increased risk of adverse health impacts from methane gas leaks, air pollution, and greenhouse gas emissions.

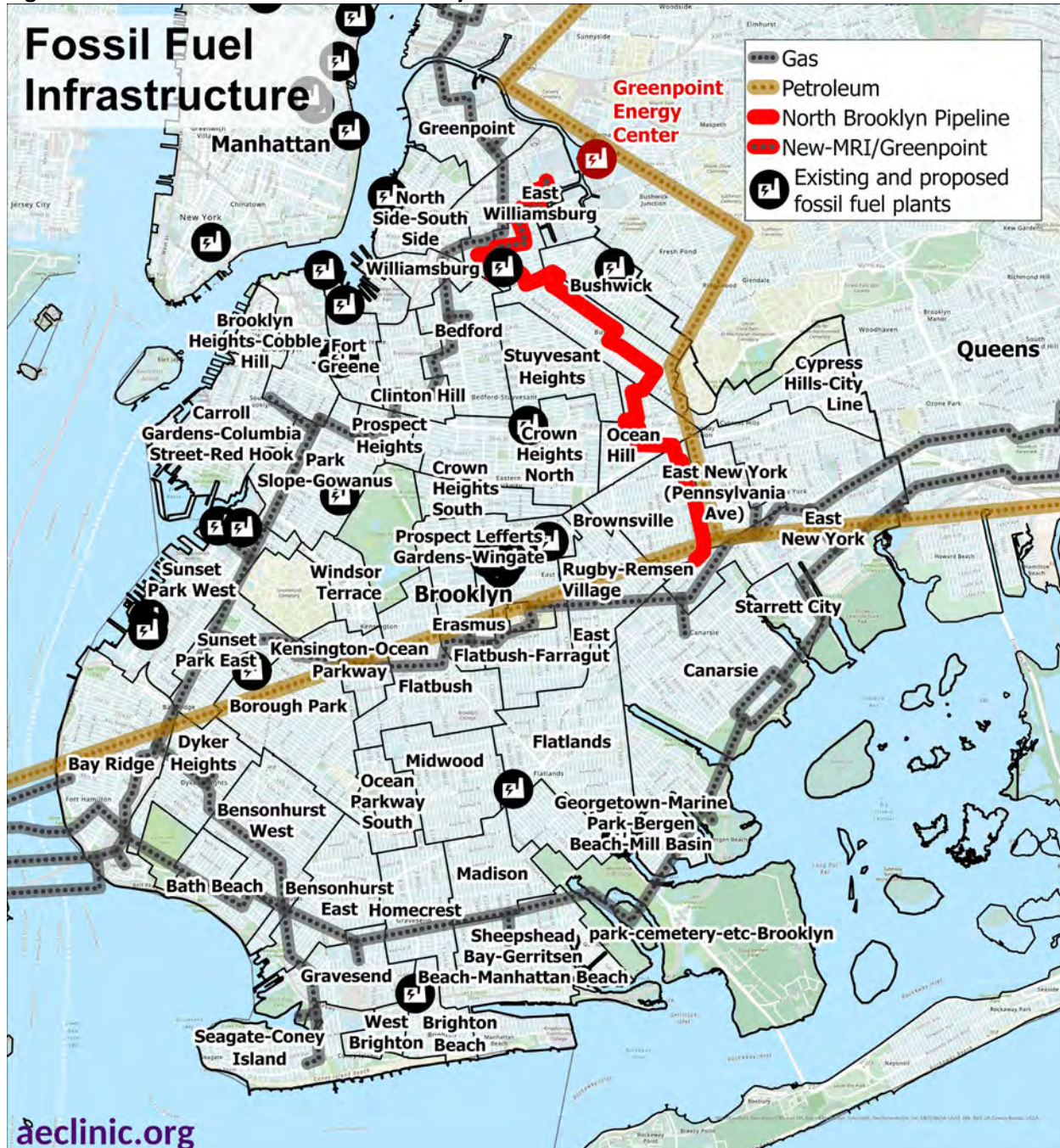
In Williamsburg, there are neighborhoods right next to the pipeline in which children represent more than 40 percent of the population, compared to 23 percent in Brooklyn as a whole.³⁶ The New-MRI/Greenpoint project, and in particular, the addition of two new vaporizer units at Greenpoint Energy Center, will exacerbate the existing environmental threats and health hazards already experienced by Bushwick and Greenpoint/Williamsburg, including increased pollution due to vehicle traffic, gas flaring from the LNG facility, methane releases from pipeline imperfections and facility incidents, and the associated health-related consequences.

³⁵ NYC Local Law Chapter 10, Section 1(3) (2017). *Environmental Justice*.

³⁶ U.S. Census Bureau. 2021. American Community Survey (ACS) 1-Year Estimates Subject Tables [DP05]. Available at: https://data.census.gov/cedsci/table?q=population&g=0600000US3604710022,3606144919,3608160323_1600000US3651000&tid=ACSDP1Y2021.DP05.



Figure 9. Fossil Fuel Infrastructure in Brooklyn



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Data source: (1) U.S. EIA. 2020. Petroleum Product Pipelines. Available at: https://www.eia.gov/maps/layer_info-m.php. (2) U.S. EIA. Natural Gas Interstate and Intrastate Pipelines. Available at: https://www.eia.gov/maps/layer_info-m.php. (3) North Brooklyn Pipeline line segment provided by the FracTracker Alliance.



Table 1. Key Demographics of Brooklyn Neighborhoods

Neighborhood	Population	Unemployed	Below Poverty Line	BIPOC Population
Bensonhurst/Bath Beach	186,324	4%	17%	60%
Bay Ridge/Dyker Heights	138,787	4%	14%	49%
Bedford-Stuyvesant	144,695	5%	21%	78%
Borough Park/Kensington/Ocean Parkway	155,082	3%	27%	28%
Brighton Beach/Coney Island	95,823	3%	24%	42%
Brooklyn Heights/Fort Greene	176,530	4%	15%	48%
Brownsville/Ocean Hill	104,146	7%	31%	93%
Bushwick	114,272	5%	26%	78%
Canarsie/Flatlands	204,871	3%	9%	78%
Park Slope/Carroll Gardens/Red Hook	79,138	4%	8%	34%
Crown Heights North/Prospect Heights	132,336	5%	18%	68%
Crown Heights South/Prospect Lefferts/Wingate	82,956	5%	16%	75%
East Flatbush/Farragut/Rugby	164,650	4%	15%	97%
East New York/Starrett City	183,355	5%	25%	96%
Flatbush/Midwood	103,921	3%	16%	55%
Sheepshead Bay/Gerritsen Beach/Homecrest	167,736	3%	13%	33%
Greenpoint/Williamsburg	167,493	4%	22%	34%
Sunset Park/Windsor Terrace	161,123	4%	19%	70%

Data source: U.S. Census Bureau. 2020 ACS 5-Year Estimates [Tables: DP05, S1701, B03003, S2301]



In addition, Bedford-Stuyvesant, Bushwick, and Greenpoint/Williamsburg include some of Brooklyn's poorest, most unemployed, and least white neighborhoods (see Table 1). About 22 percent of households in Greenpoint/Williamsburg earn incomes that are below the federal poverty line,³⁷ three percentage points higher than the Brooklyn average of 19 percent.³⁸ In contrast, the wealthier and whiter neighborhoods of Brooklyn Heights, Bay Ridge/Dyker Heights, and Park Slope are distanced and shielded from the harms associated with the project.

Population

Not only does the New-MRI/Greenpoint project harm already overburdened Brooklyn residents within the Bedford-Stuyvesant, Bushwick, and Greenpoint/Williamsburg neighborhoods, but it also threatens high numbers of residents and their quality of life. New York City's five boroughs—Brooklyn, Manhattan, Queens, Staten Island, and The Bronx—are home to 8.5 million people;³⁹ Brooklyn is the City's most populated borough with 2.7 million residents, 64 percent of whom are BIPOC;⁴⁰ almost 40 percent of the borough's population are immigrants, half of whom are naturalized citizens.⁴¹ Areas of Brooklyn with the greatest population include the neighborhoods of Williamsburg and Bedford-Stuyvesant (see Figure 11), both of which are among the neighborhoods nearest to the planned Phase 5 construction.

Demographic characteristics and distributions of outcomes across Brooklyn's neighborhoods are dynamic and subject to processes of population growth, decline, and change due to ongoing gentrification and migration, as well as public health crises like the COVID-19 pandemic. Between 2010 and 2020, Brooklyn's population grew an average of 0.9 percent each year, faster than New York City as a whole (0.7 percent), but slower than the United States average (1.4 percent).⁴² In addition to population growth, there has also been population change: Brooklyn has experienced significant gentrification since 2000, whereby wealthy and white newcomers have displaced mostly Black, longer-time residents and communities across the Borough, most notably in Brooklyn Heights and Bedford-Stuyvesant—both near the New-MRI/Greenpoint infrastructure—and Crown Heights.⁴³ While Brooklyn grew more than any other New York City borough between 2010 and 2020 (9.1 percent), the population of New York City and all of its five boroughs shrank due to the devastating impact of the COVID-19 pandemic starting in 2020. Across all boroughs of New York City, Brooklyn experienced the second steepest drop in population (-3.5 percent) from 2019 to 2020,

³⁷ For example, the federal poverty level for a family of four was \$26,500 in 2020. See: U.S. Census Bureau. 2020. "Poverty Thresholds by Size of Family and Number of Children" [Workbook]. Poverty Thresholds.

³⁸ U.S. Census Bureau. 2020. ACS 5-Year Estimates Subject Tables [Table: S1701]. Available at: <https://data.census.gov/table?q=poverty&g=0600000US3604710022&tid=ACSST5Y2020.S1701>.

³⁹ U.S. Census Bureau. July 1, 2021. "QuickFacts: New York City, New York". Available at: <https://www.census.gov/quickfacts/newyorkcitynewyork>

⁴⁰ U.S. Census Bureau. 2021 ACS 1-Year Estimates Subject Tables [DP05].

⁴¹ Census Reporter. 2021. "Nativity and Citizenship Status in the United States." Available at: https://censusreporter.org/data/table/?table=B05001&geo_ids=06000US3604710022&primary_geo_id=06000US3604710022

⁴² U.S. Census Bureau. 2020 ACS 5-Year Estimates Detailed Tables [B01003].

⁴³ Chronopoulos, T. 2020. "'What's Happened to the People?' Gentrification and Racial Segregation in Brooklyn." *Journal of African American Studies* 24: 549-572. Available at: <https://link.springer.com/article/10.1007/s12111-020-09499-y>



indicating a particular susceptibility to the impacts of COVID-19; Manhattan experienced the steepest drop (-6.9 percent).⁴⁴

Income

The median household income of Brooklyn residents is \$67,600 per year, fourth lowest out of New York City's five boroughs (see Table 2).⁴⁵ While half of Brooklyn's households earn more than \$67,600 per year and half less, the reality is a wide range of vastly disparate experiences: 19 percent of Brooklyn residents' incomes were below the federal poverty level⁴⁶ as of 2021,⁴⁷ but 27 percent of the borough's full-time working residents made more than \$100,000 per year.⁴⁸

Table 2. Median Household Income in New York City by Borough

NYC Borough	Bronx	Brooklyn	Manhattan	Queens	Staten Island
Household Median Income (\$2021)	\$43,000	\$68,000	\$84,000	\$73,000	\$86,000

Data source: U.S. Census Bureau. 2021 ACS 1-Year Estimates Subject Tables [S1903].

The neighborhoods at closest proximity to New-MRI/Greenpoint project are Bedford-Stuyvesant, Bushwick, and Greenpoint/Williamsburg. In contrast, households with less fossil fuel infrastructure—on average—have markedly higher median incomes than those that have more, including Bedford-Stuyvesant, Bushwick, and Greenpoint/Williamsburg (see Figure 10). In addition, the Bushwick neighborhood has both a higher population density and a higher share of households living below the poverty line compared to other Brooklyn neighborhoods (see Figure 11 and Figure 12).

⁴⁴ (1) Program on Applied Demographics, Cornell Jeb E. Brooks School of Public Policy. March 2022. *2021 County and Economic Development Regions Population Estimates*. Available

at: <https://pad.human.cornell.edu/papers/downloads/V2021highlights.pdf>; (2) Clarke, et. al. May 2022. *Recent Trends and Impact of COVID-19 in Brooklyn*. Prepared by the Office of the State Deputy Comptroller for the City of New York. Available at: <https://www.osc.state.ny.us/files/reports/osdc/pdf/report-2-2023.pdf>

⁴⁵ U.S. Census Bureau. 2021 ACS 1-Year Estimates Subject Tables [S1903].

⁴⁶ The Census Bureau uses a set of money income thresholds that vary by family size and composition to determine a poverty level. If a family's income is below the threshold, they are considered below the poverty line. For example, the poverty threshold for a family of five is \$33,148, so the total household income would have to be at or below this level to be considered impoverished. More information can be found on the Census Bureau website:

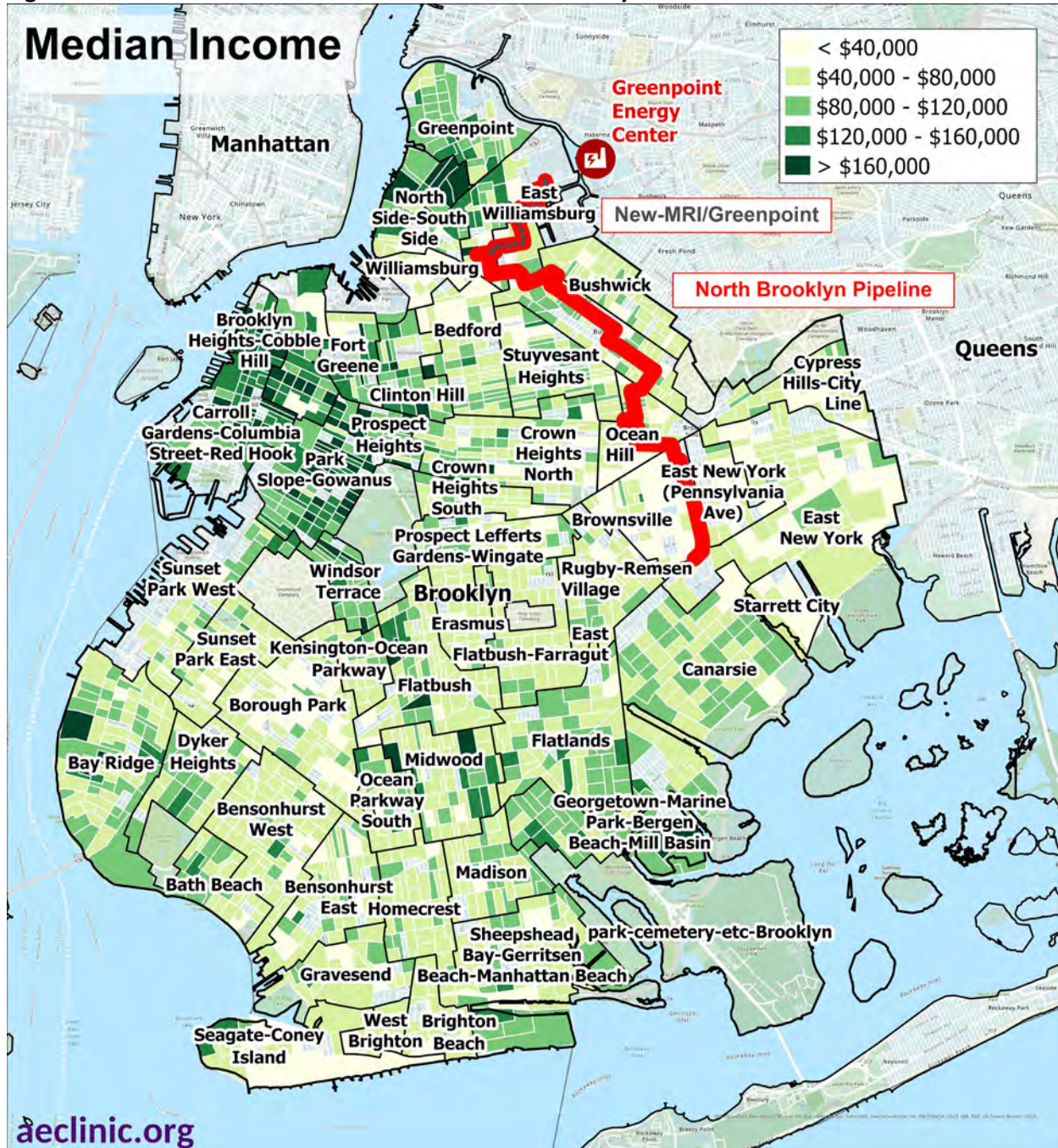
<https://www.census.gov/topics/income-poverty/poverty/guidance/poverty-measures.html>.

⁴⁷ U.S. Census Bureau. 2021 ACS 1-Year Estimates Subject Tables [S1701].

⁴⁸ U.S. Census. 2021 ACS 1-Year Estimates Subject Tables [S2001].



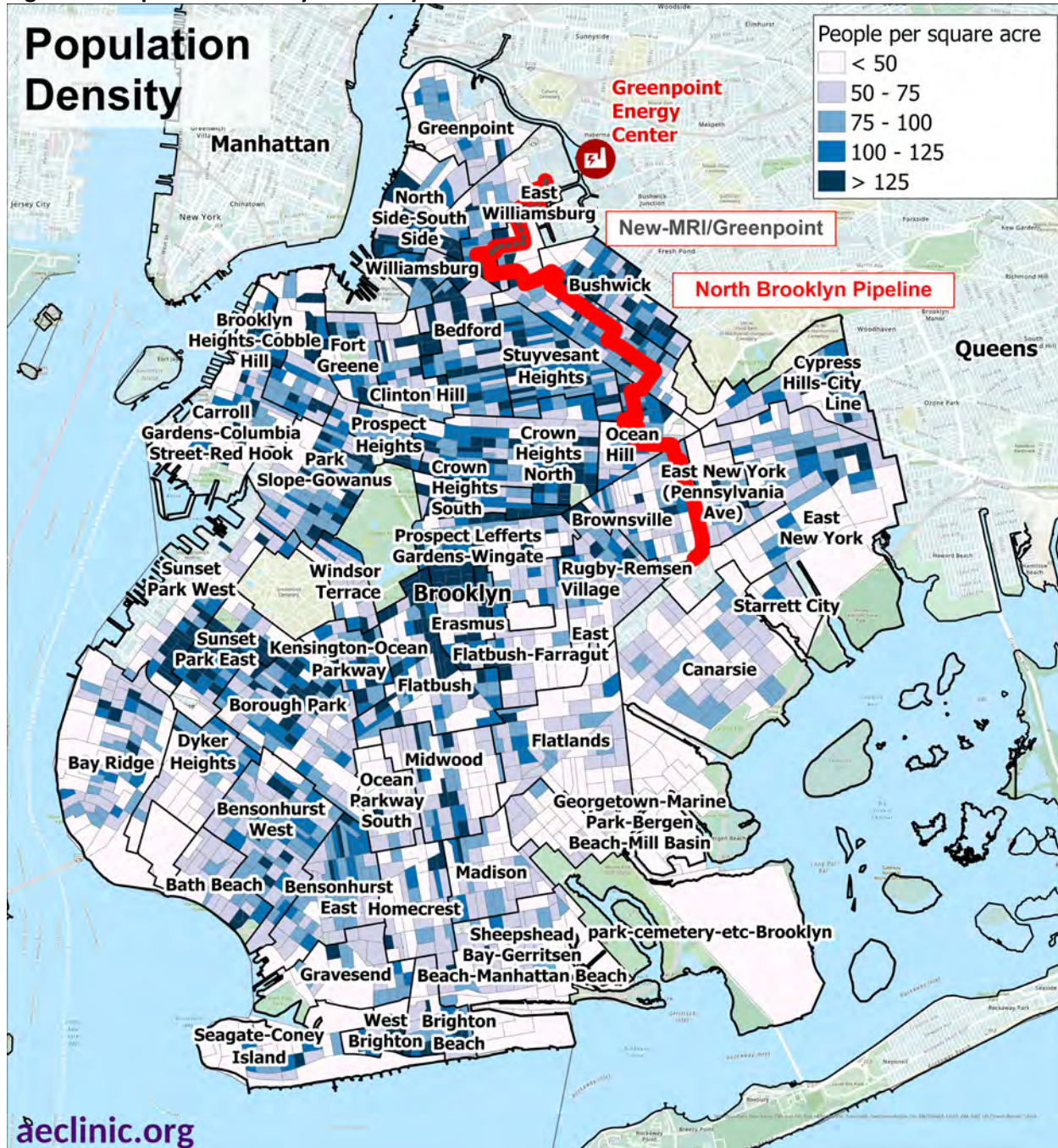
Figure 10. Median Household Income Distribution in Brooklyn



Data source: U.S. Census Bureau. 2020. ACS 5-Year Estimates [Table DP05].



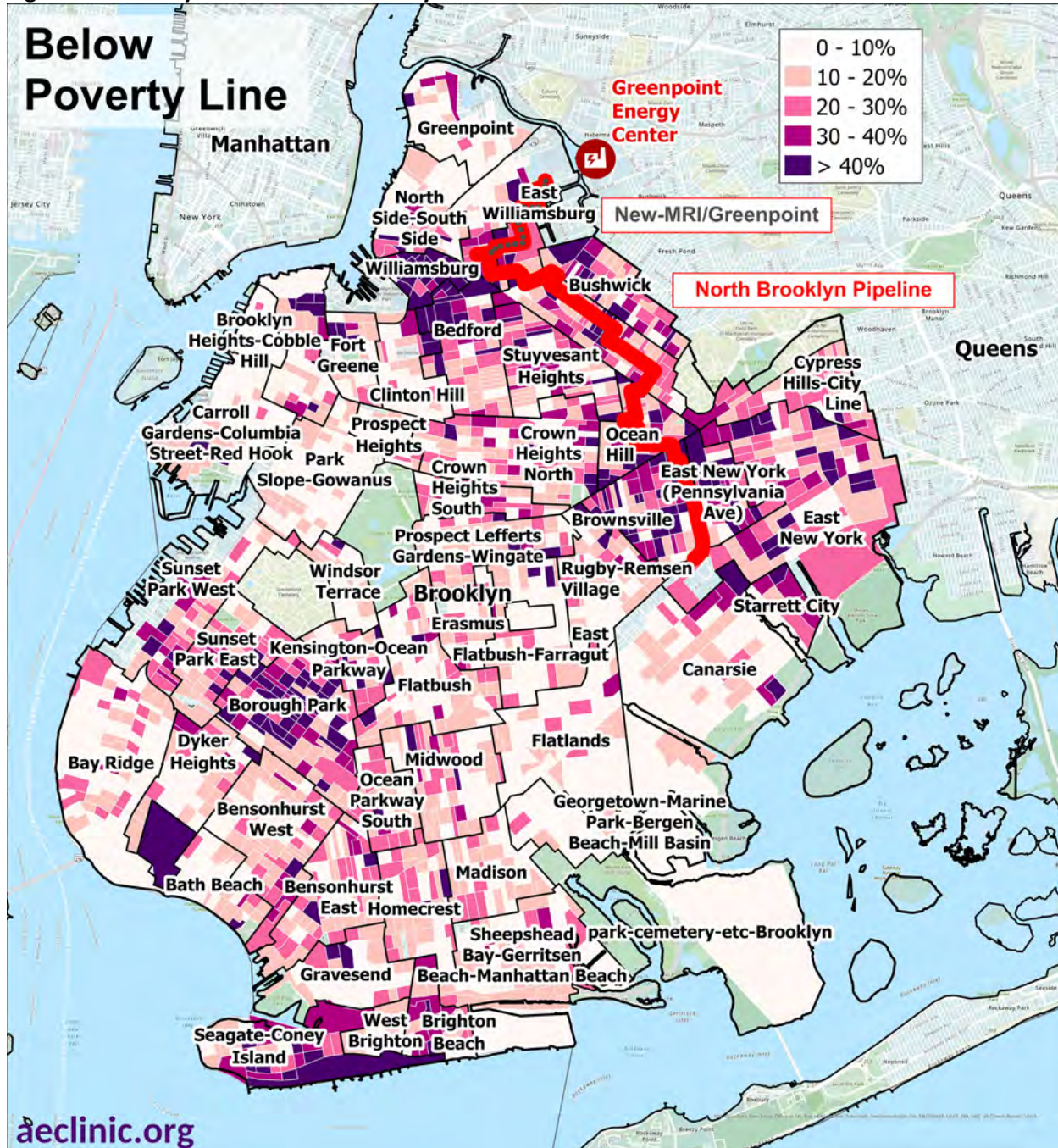
Figure 11. Population Density in Brooklyn



Data source: (1) U.S. Census Bureau. 2020 ACS 5-Year Estimates [Table DP05]; (2) North Brooklyn Pipeline line segment provided by the FracTracker Alliance.



Figure 12. Poverty Distribution in Brooklyn



Data source: U.S. Census Bureau. 2020. ACS 5-Year Estimates [Table S1701].



The concentration of fossil fuel infrastructure in lower-income communities is, unfortunately, not unusual. According to a recent article in the journal *GeoHealth*, fossil fuel pipelines are disproportionately co-located with U.S. counties experiencing greater “social vulnerability,” defined as “an integrated measure of a community’s capacity to prepare for, deal with, and recover from pollution, natural disasters, and other hazards. [Social vulnerability] takes into account demographic details about a community (e.g., racial composition, age distribution) and other socioeconomic information.”⁴⁹

In addition, a 2017 study by the National Association for the Advancement of Colored People and Clean Air Task Force found that fossil fuel companies prioritize development in areas with lower transaction costs and “take advantage” of communities that lack political power, or in other words, lower-income neighborhoods with a high percentage of BIPOC residents.⁵⁰ As a result, socially vulnerable communities are disproportionately exposed to air pollution and the resulting environmental and health hazards, compared to the overall population.⁵¹

Race and ethnicity

More than half of Brooklyn’s population identifies as Black, Indigenous, and people of color (BIPOC),⁵² with 30 percent of Brooklyn’s residents identifying as Black and 20 percent identifying as Latinx or Hispanic (see Figure 13).⁵³ More than one-third (36 percent) of Brooklyn’s population is foreign-born;⁵⁴ the largest concentrations of immigrants in Brooklyn are within the Northeast Brooklyn communities that surround the New-MRI/Greenpoint project, including Bushwick and Greenpoint/Williamsburg.

⁴⁹ Emanuel, R.E., et al. 2021. “Natural Gas Gathering and Transmission Pipelines and Social Vulnerability in the United States.” *GeoHealth* 5(6): 1-12. Available at: <https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2021GH000442>.

⁵⁰ Fleischman, L., and M. Franklin. 2017. *Fumes Across the Fence Line*. Clean Air Task Force and the National Association for the Advancement of Colored People. Available at: https://www.catf.us/wp-content/uploads/2017/11/CATF_Pub_FumesAcrossTheFenceLine.pdf. p.6

⁵¹ Hajat, A., C. Hsia, and M.S. O’Neill. 2015. “Socioeconomic Disparities and Air Pollution Exposure: A Global Review.” *Current Environmental Health Reports* 2(4): 440-450. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4626327/>

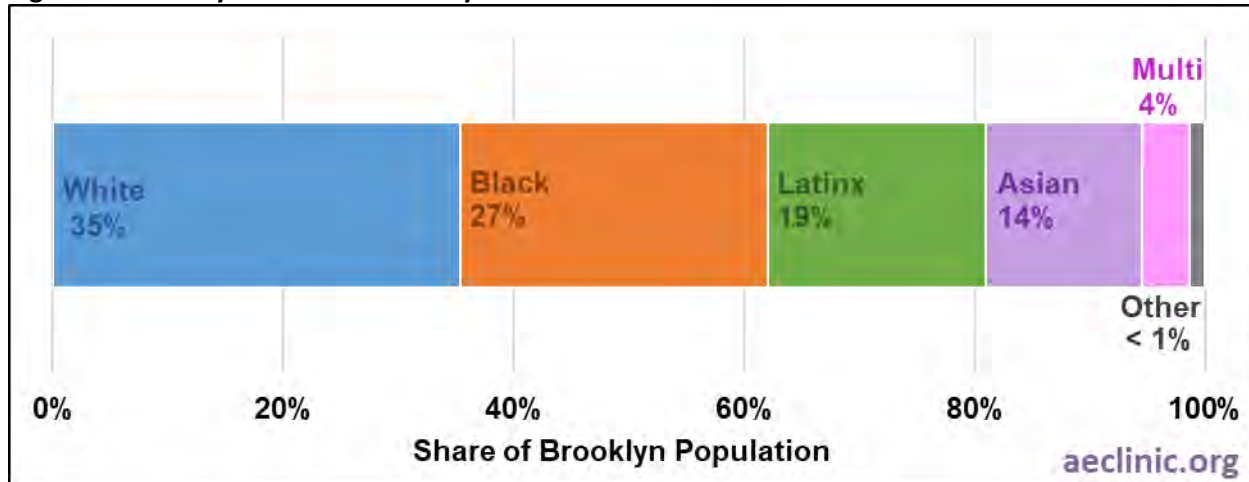
⁵² “BIPOC” refers to Black, Indigenous, and people of color. The term “BIPOC” uses person-first language and is preferred alternative to the terms “minority” or “marginalized” because these terms can lack humanity, suggest inferiority, or reinforce bias. However, “BIPOC” is an umbrella term and **should not** be used for individuals or smaller racial or ethnic groups where more specific language is appropriate. Sources: (1) HUES Book Box. n.d. “Stop Saying ‘Minority’ and ‘POC.’ Switch to ‘BIPOC’ Instead.” Available at: <http://www.huesbookbox.com/articles/educational/stop-saying-the-words-minority-and-poc-switch-to-bipoc-instead-heres-why>.

(2) Raypole, C. November 9, 2021. “BIPOC: What it Means and Why it Matters.” *Healthline*. Available at: <https://www.healthline.com/health/bipoc-meaning>.

⁵³ U.S. Census Bureau. 2021. ACS 1-Year Estimates Subject Tables [S0601].

⁵⁴ U.S. Census Bureau. 2020. ACS 5-Year Estimates [B05002].

Figure 13. Brooklyn Race and Ethnicity in 2020



Data source: U.S. Census Bureau. 2020 DEC Redistricting Data [P2].

Note: Individuals that identified as “White Alone” are included in the “White” category shown here, the category “Latinx” here is a simplification for all individuals who identified as “Hispanic and/or Latino,” regardless of race, in the Decennial Census.

The areas of Brooklyn with the highest average incomes tend to have the largest shares of white residents, and the relatively poorer neighborhoods of Brooklyn—including Bushwick, Bedford-Stuyvesant, Ocean Hill, Brownsville, and East New York—are also the borough’s most non-white neighborhoods (see Figure 15). These lower-income and predominately non-white neighborhoods include the same neighborhoods through which the New-MRI/Greenpoint infrastructure is planned (i.e., Bushwick and Bedford-Stuyvesant), which are neighborhoods at the greatest risk of environmental health impacts from the project.

Housing

Widely varying housing prices and income inequality are mutually reinforcing issues: As lower-income residents are limited in their choice of housing to units with lower rents, these communities are segregated in pockets of Brooklyn that are disproportionately vulnerable to the health and social costs of pollution. For instance, research published in the journal *Nature Scientific Reports* in June 2022 found that federally assisted public housing developments are disproportionately sited in neighborhoods with greater exposure to air pollution.⁵⁵ Faced with rising property values and increasing costs of building maintenance, the owners of nearly one-third of New York City’s Mitchell-Lama housing units—private housing units intended for rental and cooperative housing for middle-income households—have opted out of their commitment to maintain affordable housing, further constraining the City’s affordable housing supply for renters.⁵⁶

⁵⁵ See Chakraborty, J., et al. 2022. “Air pollution exposure disparities in US public housing developments.” *Nature Scientific Reports* 12. Available at: <https://www.nature.com/articles/s41598-022-13942-3>.

⁵⁶ American Council for an Energy-Efficient Economy (ACEEE). 2021. *Leading by Example: How Multifamily Real Estate Companies Approach Energy Management and Savings*. Available at: https://www.aceee.org/sites/default/files/pdfs/leading_by_example_2-9-21.pdf. p.2



In contrast, wealthier residents can afford to live in higher-value housing in neighborhoods that are relatively shielded from the environmental health impacts of pollution from fossil fuel infrastructure (see Figure 16). This dynamic exacerbates existing inequities by concentrating affordable housing units within neighborhoods experiencing the greatest environmental health costs and concentrating these costs on the residents least able to afford them.

Rent and mortgage payments are just one of several living expenses for Brooklyn residents: Another cost that creates and reinforces inequities within and across neighborhoods is that of energy bills. Research published by the New York City Mayor's Offices of Sustainability and Economic Opportunity revealed that as of 2017, Brooklyn housed the largest number of energy-burdened households across the City's five Boroughs, with 193,391 households (or roughly 19 percent of Brooklyn's households) paying more than 6 percent of their monthly income in energy bills.⁵⁷ Low-income customers are disproportionately exposed to the risk of service shutoffs: A 2020 poll found that 13 percent of low-income U.S. households could not pay an energy bill in the prior month.⁵⁸ The same poll also found that households who could not pay their energy bills were more likely to be low-income households, BIPOC households, households with at least one member above the age of 65, households with at least one disabled member, and households requiring electronic medical devices.⁵⁹

According to a 2021 report by the American Council for an Energy-Efficient Economy (ACEEE), housing providers in New York receiving subsidies to maintain affordable rents for low- and moderate-income tenants often have limited funds for operating expenses; the ACEEE study also reports that energy efficiency upgrades in these housing units can help limit energy and upgrade costs.⁶⁰ In this vein, the New York State Affordable Multifamily Energy Efficiency Program offers incentives to affordable multifamily buildings for the installation of energy-efficient technology and equipment.⁶¹ In addition, the New York City Housing Authority provides access to community solar subscriptions through its ACCESSolar program, and the City "requires city-supported community solar to provide direct bill discounts to low-income residents."⁶²

⁵⁷ NYC Mayor's Office of Sustainability and Mayor's Office of Economic Opportunity. 2019. *Understanding and Alleviating Energy Cost Burden in New York City*. Available at:

<https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/EnergyCost.pdf>. p.4

⁵⁸ Konisky, D. & S. Carley 2020. *Survey of Household Energy Insecurity in Time of COVID*. O'Neill School of Public and Environmental Affairs at Indiana University. Available at: https://oneill.indiana.edu/doc/research/energy-insecurity-survey-june-2020.pdf?_ga=2.256794316.617866999.1592234109-1468293896.1585660132. p.2

⁵⁹ Ibid.

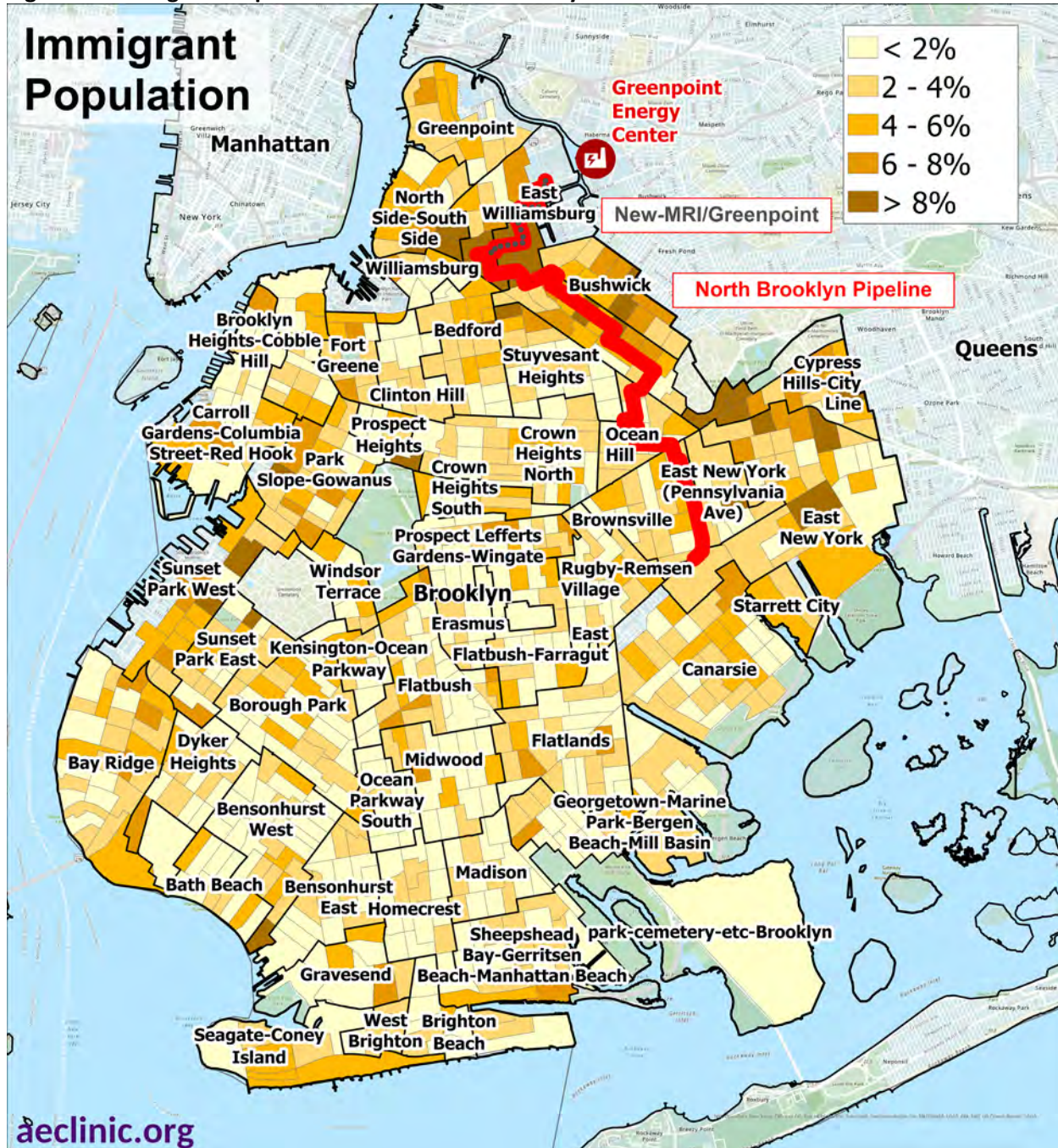
⁶⁰ ACEEE. 2021. *Leading by Example: How Multifamily Real Estate Companies Approach Energy Management and Savings*. p.2

⁶¹ NYSERDA. n.d. "New York State Affordable Multifamily Energy Efficiency Program." Available at: <https://www.nyserda.ny.gov/All-Programs/Low-to-moderate-Income-Programs/LMI-Stakeholder-Resources-New-Efficiency-New-York/NYS-Affordable-Multifamily-Energy-Efficiency-Program>.

⁶² ACEEE. September 2021. "State and Local Policy Database: New York City." Available at: <https://database.aceee.org/city/new-york-city-ny>.



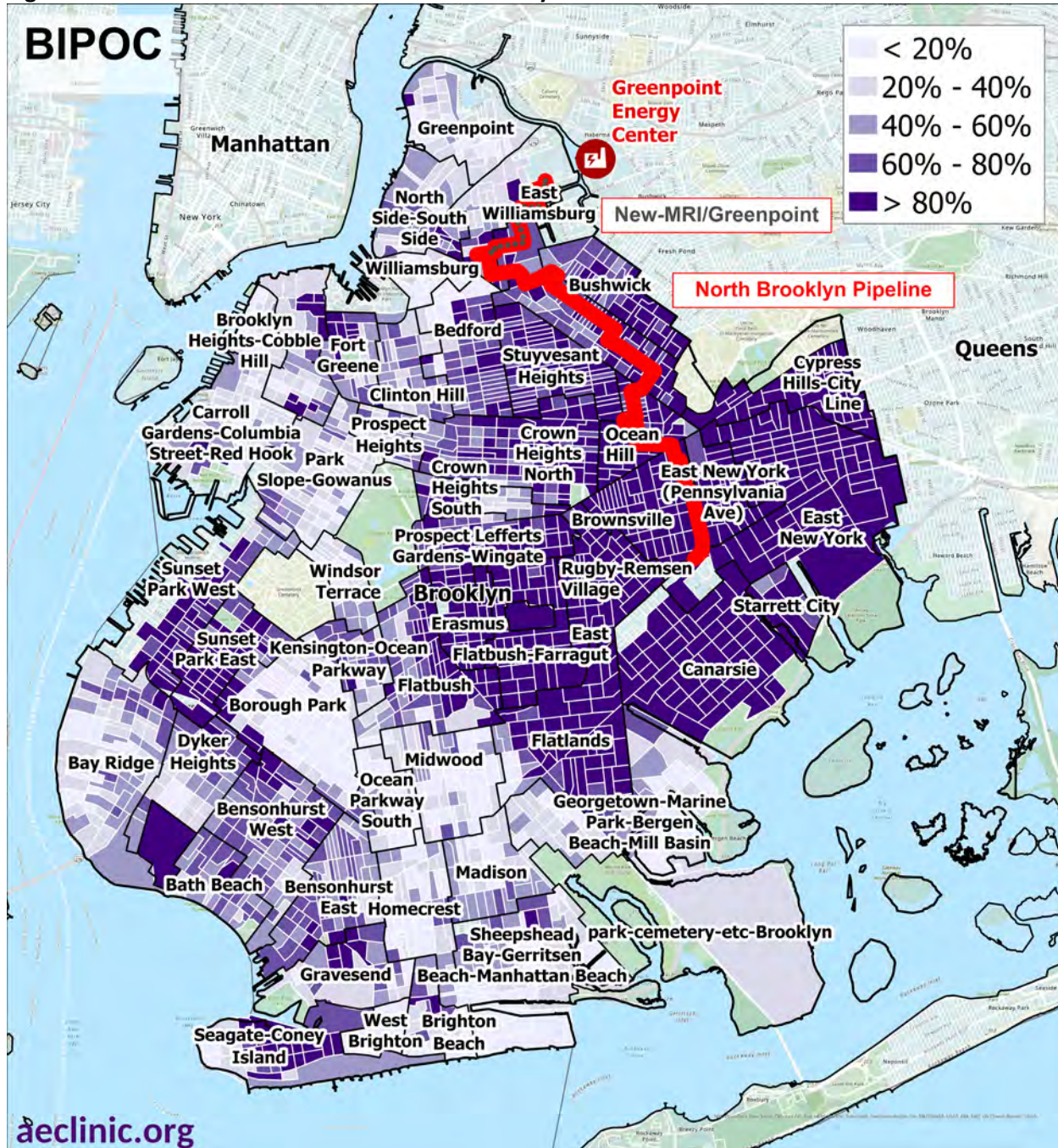
Figure 14. Immigrant Population Distribution in Brooklyn



Data source: U.S. Census Bureau. 2020. ACS 5-Year Estimates [B05002].



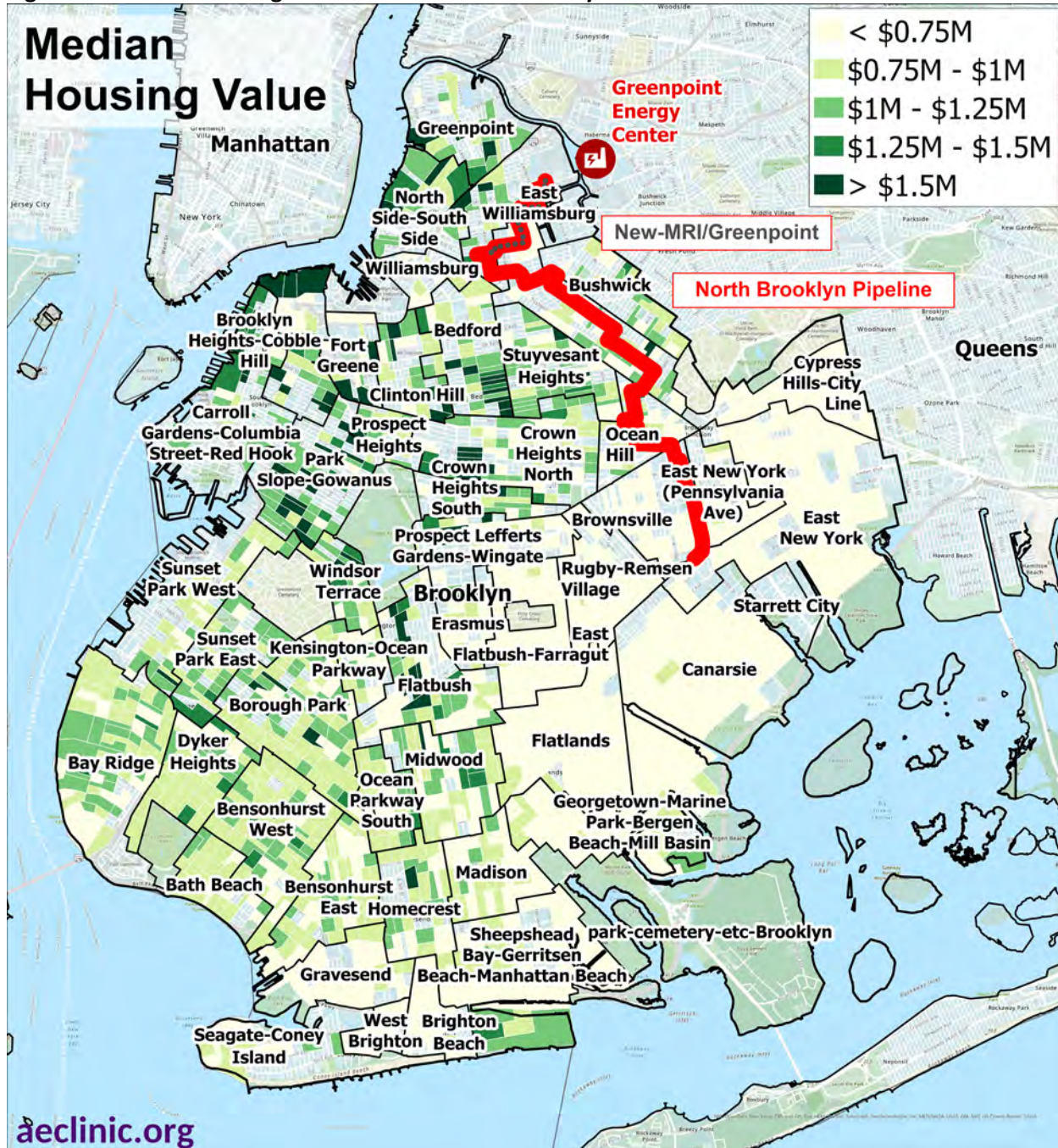
Figure 15. Distribution of BIPOC Residents in Brooklyn



Data source: U.S. Census Bureau. 2020 ACS 5-Year Estimates [Table B03003].



Figure 16. Median Housing Values Distribution in Brooklyn



Data source: U.S. Census Bureau. 2020 ACS 5-Year Estimates [Table B25077].



New-MRI/Greenpoint construction reinforces gas infrastructure and undermines investment in cost efficient electric heat pumps in areas that could benefit most from cost and emissions reductions. Beyond harming Brooklyn’s lower-income residents and those in affordable housing units, New-MRI/Greenpoint infrastructure reinforces inequities in environmental health outcomes among Brooklyn’s unhoused residents. According to an analysis released by the New York City Council, the City had a total of 3,588 unsheltered individuals on the streets and in the subway system on any given night in 2019.⁶³ Brooklyn alone housed 17 percent of individuals on the streets—the second-highest unhoused-on-the-street population across the City’s five Boroughs—and is identified as the borough with the most need for drop-in centers for unhoused residents.⁶⁴

Recent research published in the *International Journal of Environmental Research and Public Health* found that individuals experiencing houselessness in Salt Lake County, Utah, are disproportionately exposed to air pollution-related conditions requiring medical attention.⁶⁵ Similarly, research from Canada has demonstrated that unhoused populations experience higher rates of chronic disease than the general population.⁶⁶ Given the existing disproportionate burdens placed on unhoused populations, the new hazards and harms posed by New-MRI/Greenpoint construction will have a compounding effect and worsen outcomes among already underserved and overlooked unhoused individuals and families.

Health Outcomes

With the completion of the New-MRI/Greenpoint project, East Williamsburg and Bushwick will receive the first and worst exposure to methane gas leaks or any other gas distribution-related incident from Phase 5 of the MRI project. Moreover, the LNG vaporization process taking place at the Greenpoint Energy Center leads to the release of toxic air pollutants, in addition to entailing intensive energy requirements and producing substantial greenhouse gas emissions.⁶⁷ The addition of Vaporizers 13/14 at the Greenpoint Energy Center will increase energy demanded by the facility, increase harmful air pollutants in the area, and release additional greenhouse gas emissions.

National Grid itself has admitted that its proposed expansions to the Greenpoint Energy Center would result in a substantial increase in the emission of 11 different pollutants, including a 63 percent increase in CO₂ emissions and a 46 percent increase in methane emissions, which are linked to major adverse health conditions including asthma, respiratory infection, cardiovascular disease, central nervous system damage,

⁶³ NYC Council Speaker Corey Johnson. 2020. *Our Homelessness Crisis: The Case for Change*. New York City Council. Available at: <http://council.nyc.gov/data/wp-content/uploads/sites/73/2020/01/FINAL-PAPER.pdf>. p. 16

⁶⁴ Ibid. pp. 16, 127

⁶⁵ See DeMarco, A.L., et al. 2020. “Air Pollution-Related Health Impacts on Individuals Experiencing Homelessness: Environmental Justice and Health Vulnerability in Salt Lake County, Utah.” *Int’l J. Env’t Rsch. & Pub. Health* 17(22): 8413. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7697557/>.

⁶⁶ See The Homeless Hub. 2011. *Health of the Homeless and Climate Change*. Available at: https://www.homelesshub.ca/sites/default/files/ClimateChange_Summary.pdf. p.1

⁶⁷ Concerned Health Professionals of New York and Physicians for Social Responsibility. 2022. *Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking (Unconventional Gas and Oil Extraction)* Available at: <http://concernedhealthny.org/compendium/>. pp. 392-404



developmental issues, and cancer.⁶⁸ (For information about current and historical air quality, see the U.S. EPA website.⁶⁹) These health effects will be felt most acutely by the communities in East Williamsburg that immediately neighbor the Greenpoint Energy Center. An increase in customers would create more fossil gas use, leading to even higher emissions levels.

According to a 2016 article in the *Journal of the American Medical Association (JAMA) Internal Medicine*, gas development projects are associated with increased asthma attacks in surrounding communities.⁷⁰ The New-MRI/Greenpoint construction, therefore, may have the effect of inducing greater numbers of asthma attacks in the surrounding neighborhoods, further boosting the asthma prevalence rate and widening the gap in health outcomes between affected neighborhoods and protected ones. Additional research published in *JAMA* has shown that the average cost of an outpatient emergency department visit for asthma is \$1,502; not only is this value multiplicative because patients with chronic asthma are likely to experience multiple emergency room visits, but it also places greater burdens on uninsured, low-income, and older populations—those who are more likely to have to pay for asthma-related medical costs while lacking the financial means to do so.⁷¹

IV. Cumulative Impact Assessment

Impact assessments attempt to quantify the benefits, or disadvantages, of a particular event (i.e., the extension of a gas pipeline) on the health, well-being, and quality of life of those affected. **Cumulative impact assessments** look at the overlap and cross-disparity effects of and on new impacts from the event and existing disparities.⁷² Advocacy groups and decision-makers employ cumulative impact assessments to provide insight on the full set of impacts of a particular policy or project in the context of the real-world circumstances of the people, places and things affected by it. The first step in the cumulative impact assessment process is to identify existing disparities in the distribution of socioeconomic, environmental, and health-related characteristics. With that information in hand, a combined measure can be created to provide a single assessment of the impact of the New-MRI/Greenpoint (Phase 5 and Vaporizers 13/14) project in the context of existing disparities within the community.

Typically, a cumulative impact assessment is performed using a set of indicators to create an index to

⁶⁸ Sane Energy Project, et al. December 28, 2020. *Comments on Permit Application ID 2-6101-00071/00024*. Available at: <https://drive.google.com/file/d/1y5YxH6LjAgEkS0zCyU5apiZ47nnlfvs2/view>. pp. 5, 23-24

⁶⁹ U.S. EPA. 2022. "Pre-Generated Data Files." Available at: https://aqs.epa.gov/aqsweb/airdata/download_files.html

⁷⁰ See Rasmussen, S.G., et al. 2016. "Association Between Unconventional Natural Gas Development in the Marcellus Shale and Asthma Exacerbations." *JAMA Internal Med.* 176(9): 1334-1343. Available at: <https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2534153>.

⁷¹ Wang, T., et al. 2014. "Emergency Department Charges for Asthma-Related Outpatient Visits by Insurance Status." *J. Health Care for the Poor and Underserved.* 25(1): 396-405. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4063557/>

⁷² See Office of Research and Development. 2022. *Cumulative Impacts: Recommendations for ORD Research*. U.S. EPA. Available at: https://www.epa.gov/system/files/documents/2022-01/ord-cumulative-impacts-white-paper_externalreviewdraft-508-tagged_0.pdf. p. 6



estimate cumulative impacts that adds up the effects of multiple impacts. The U.S. Centers for Disease Control and Prevention (CDC)'s Environmental Justice Index, for example, is based on 36 different measures of social vulnerability, environmental burden, and health vulnerability.⁷³ Similarly, EPA's Environmental Justice Screening and Mapping Tool (EJScreen) provides a nationally consistent tool for the cumulative impact assessment of different environmental and demographic indicators.⁷⁴ EJScreen produces user-specified EJ indices for 12 different environmental indicators. For each environmental indicator, users may select two out of the following demographic indicators to construct a unique EJ index for a specific geographic area; demographic indicators include: people of color, low-income, unemployment rate, limited English speaking, less than high school education, under age 5 and over age 64. To be clear, EJScreen does not calculate any one specific EJ index. Rather, it is a tool which allows users to design their own EJ index for different environmental indicators.⁷⁵

Several states have adapted EPA's EJScreen tool to incorporate state-specific considerations into their own assessments.⁷⁶ For example, California's CalEnviroScreen⁷⁷ tool provides census tract-level EJ scores that have been used to assess cumulative burdens in Oakland, California.⁷⁸ Other examples of state-specific screening tools are Minnesota's What's in My Neighborhood⁷⁹ and Center for Earth Energy and Democracy EJ Story Map,⁸⁰ and Maryland's Environmental Justice Screen Tool (MD EJ SCREEN).⁸¹

Methodology

Based on a review of measures used in impact assessment guidance and in existing cumulative impact assessments of similar scope and data availability, AEC uses census tract level data from the U.S. Census 2020 American Community Survey and the CDC PLACES dataset on 21 measures to create four composite

⁷³ McKenzie, B., et al. 2022. "Technical Documentation for the Environmental Justice Index 2022." Centers for Disease Control and Prevention. Available at: <https://www.atsdr.cdc.gov/placeandhealth/eji/docs/EJI-2022-Documentation.pdf>. p. 23

⁷⁴ See U.S. EPA. n.d. "EJScreen: Environmental Justice Screening and Mapping Tool." Available at: <https://www.epa.gov/ejscreen>.

⁷⁵ See U.S. EPA. 2022. "EJ and Supplemental Indexes in EJScreen." Available at: <https://www.epa.gov/ejscreen/ej-and-supplemental-indexes-ejscreen>.

⁷⁶ Zrzavy, A., Blondell, et al. 2022. "Addressing Cumulative Impacts: Lessons from Environmental Justice Screening Tool Development and Resistance." *Environmental Law Institute*. Available at: <https://www.eli.org/sites/default/files/files-pdf/52.10111.pdf>.

⁷⁷ California Office of Environmental Health Hazard Assessment. n.d. "Indicators Overview." CalEnviroScreen. Available at: <https://oehha.ca.gov/calenviroscreen/indicators>.

⁷⁸ City of Oakland. 2020. *Racial equity impact assessment and implementation guide*. 2030 Equitable Climate Action Plan. Available at: Available at: https://cao-94612.s3.amazonaws.com/documents/FINAL_Complete_EF-Racial-Equity-Impact-Assessment_7.3.2020_v2.pdf.

⁷⁹ Minnesota Pollution Control Agency. n.d. "What's in my Neighborhood?" Available at: <https://www.pca.state.mn.us/about-mpca/whats-in-my-neighborhood>.

⁸⁰ Center for Energy & Democracy. n.d. "Twin Cities EJ Story Maps." Available at: <http://ceed.org/ej-story-maps/>.

⁸¹ Maryland Institute for Applied Environmental Health. n.d. "MD EJSCREEN." Available at: <https://www.ceejh.center/md-ejscreen-1>.



indices that represent the cumulative stresses experienced by Brooklyn communities (see Table 3):⁸²

1. **Housing Characteristics Index:** A measure of relative housing vulnerabilities in which Brooklyn neighborhoods with the highest overlap of households with high energy burdens, households living in older homes, the share of renter-occupied homes, and the share of vacant homes, have a higher index value.
2. **Social Vulnerability Index:** A measure of relative social vulnerability in which Brooklyn neighborhoods with the highest overlap of BIPOC populations, limited-English speaking households and areas with a high percentage of older adults, disabled populations, children, residents without health insurance, and/or adults with an education less than a high school diploma have a higher index value.
3. **Financial Burden Index:** A measure of relative financial burden in which Brooklyn neighborhoods with the highest overlap of the share of households receiving income assistance, households living below the poverty line, local unemployment rates, and the share of residents that are not participating in the labor force (i.e., those that are over the age of 16 that are not employed and are not actively looking for work⁸³) have a higher index value.
4. **Health Outcome Index:** A measure of relative health risk in which Brooklyn neighborhoods with the highest overlap of cancer, heart disease, asthma, poor mental health, diabetes, and poor physical health prevalence have a higher index value.

Each of the component index values that make up these composite indices ranges from a low of 0 to a high of 1 (where higher values indicate fewer resources and more vulnerability), based on the range of census tract level data within Brooklyn.

⁸² A note on environmental hazards: According to the U.S. Environmental Protection Agency, there is only one air pollution monitor within Brooklyn. Moreover, air and water pollution are not contained within jurisdiction boundaries: pollutants and emissions travel throughout our atmosphere and watersheds. Therefore, inclusion of an environmental hazard index based on proximity to pollutants and exposure to environmental hazards would not differ substantially across Brooklyn neighborhoods. However, it is important to keep in mind that historically, those who live and work closest to environmental hazards tend to be low-income and BIPOC (see Memo #2: Baseline Equity Analysis for more information).

⁸³ U.S. Census Bureau. n.d. "Labor Force Statistics Glossary." Available at: <https://www.census.gov/topics/employment/labor-force/about/glossary.html>.



Table 3. Summary of Measures Included in Indices

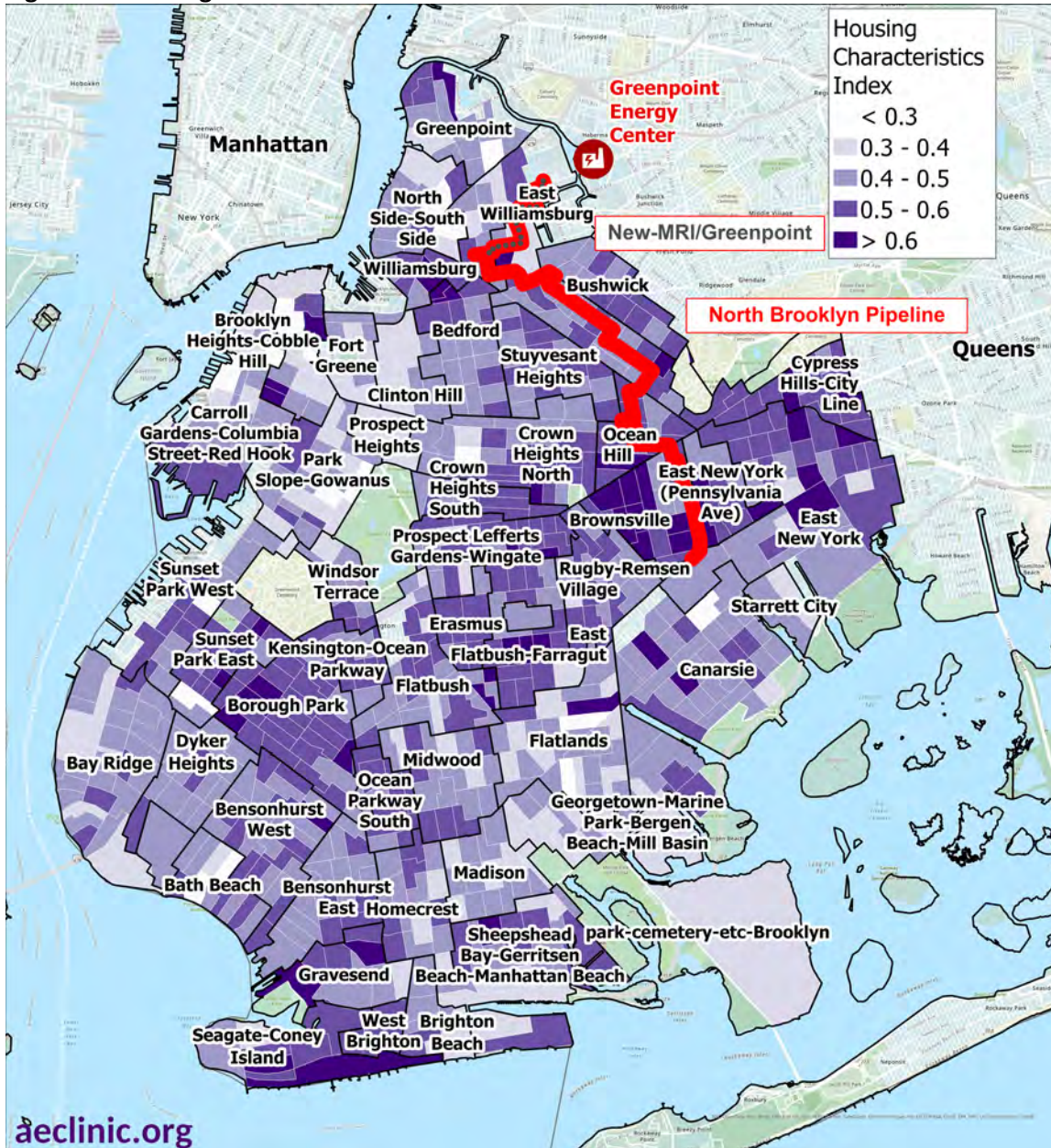
Housing Characteristics Index	
Energy Burden	Average annual share of income spent on energy costs
Older Buildings (built before 1980)	Share of buildings built before 1980
Renters	Share of residents who are renters
Vacancy Rate	Share of housing units that are vacant
Social Vulnerability Index	
BIPOC	Share of Black, Indigenous Peoples, and People of Color
Limited English Speaking Households	Share of households that are limited English speaking
Older adults (65+)	Share of adults aged 65 and older
Disability	Share of residents with a disability
Children (<18)	Share of children aged 17 and younger
No Health Insurance	Share of residents without health insurance
Education (% less than hs)	Share of residents with an education level less than a high school diploma
Financial Burden Index	
Income Assistance	Share of population that receive income assistance
Poverty	Share of residents living in poverty
Unemployment	Share of unemployed residents
Labor Force Non-Participation	Share of residents that are not participating in the labor force
Health Outcome Index	
Cancer	Cancer prevalence
Heart disease	Heart disease prevalence
Asthma	Asthma prevalence
Poor Mental Health	Poor mental health prevalence
Diabetes	Diabetes prevalence
Poor Physical Health	Poor physical health prevalence

Housing Characteristics Index

The Bedford-Stuyvesant, Bushwick, and Greenpoint/Williamsburg neighborhoods show a high overlap of households with high energy burdens, households living in older homes, the share of renter-occupied homes, and the share of vacant homes (see Figure 17).



Figure 17. Housing Characteristic Index



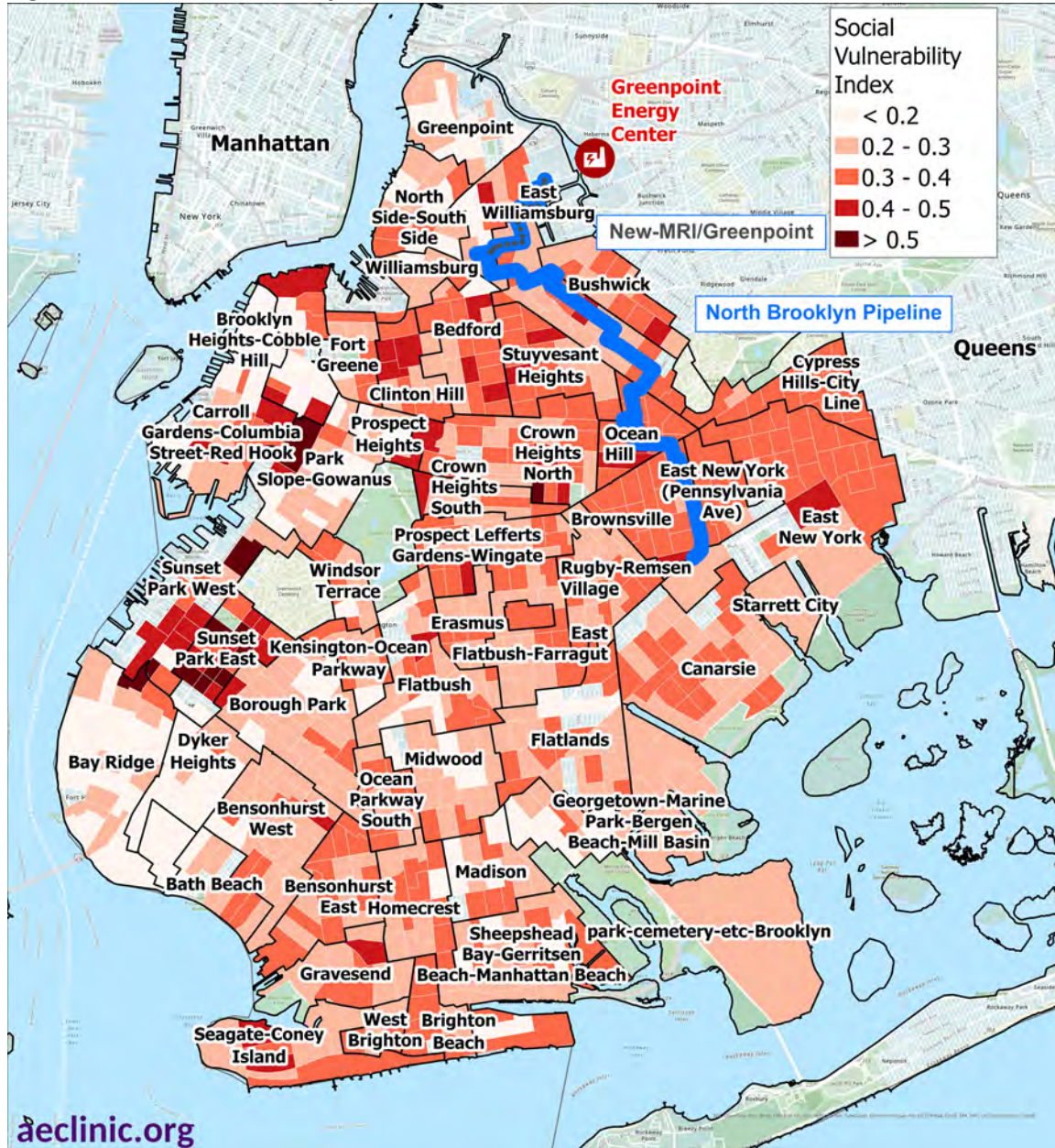
Data source: (1) AEC calculation based on data from the U.S. Census 2020 ACS 5-Year Estimates; (2) North Brooklyn Pipeline line segment provided by the FracTracker Alliance.

Social Vulnerability Index

The Bedford-Stuyvesant, Bushwick, and Greenpoint/Williamsburg areas have substantial overlap of BIPOC populations, limited-English speaking households, older adults, disabled populations, children, residents

without health insurance, and/or adults with an education less than a high school diploma (see Figure 18).

Figure 18. Social Vulnerability Index



Data source: (1) AEC calculation based on data from the U.S. Census 2020 ACS 5-Year Estimates; (2) North Brooklyn Pipeline line segment provided by the FracTracker Alliance.

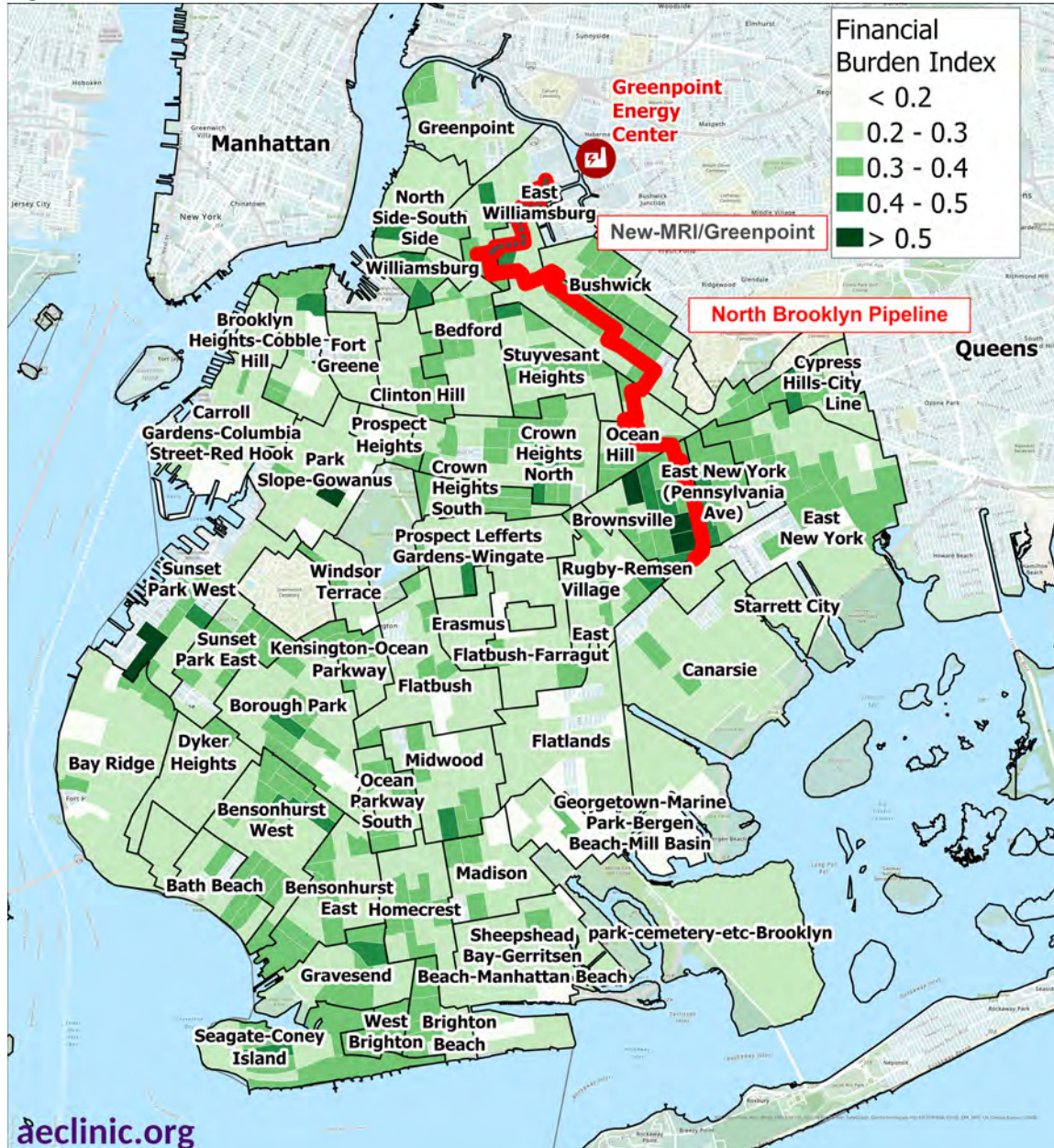
Financial Burden Index

Similarly, the Financial Burden Index results indicate that the Bedford-Stuyvesant, Bushwick, and Greenpoint/Williamsburg neighborhoods have a substantial overlap in the share of households receiving income assistance, households living below the poverty line, local unemployment rates, and the share of



residents that are not participating in the labor force (see Figure 19).

Figure 19. Financial Burden Index



Data source: (1) AEC calculation based on data from the U.S. Census 2020 ACS 5-Year Estimates; (2) North Brooklyn Pipeline line segment provided by the FracTracker Alliance.

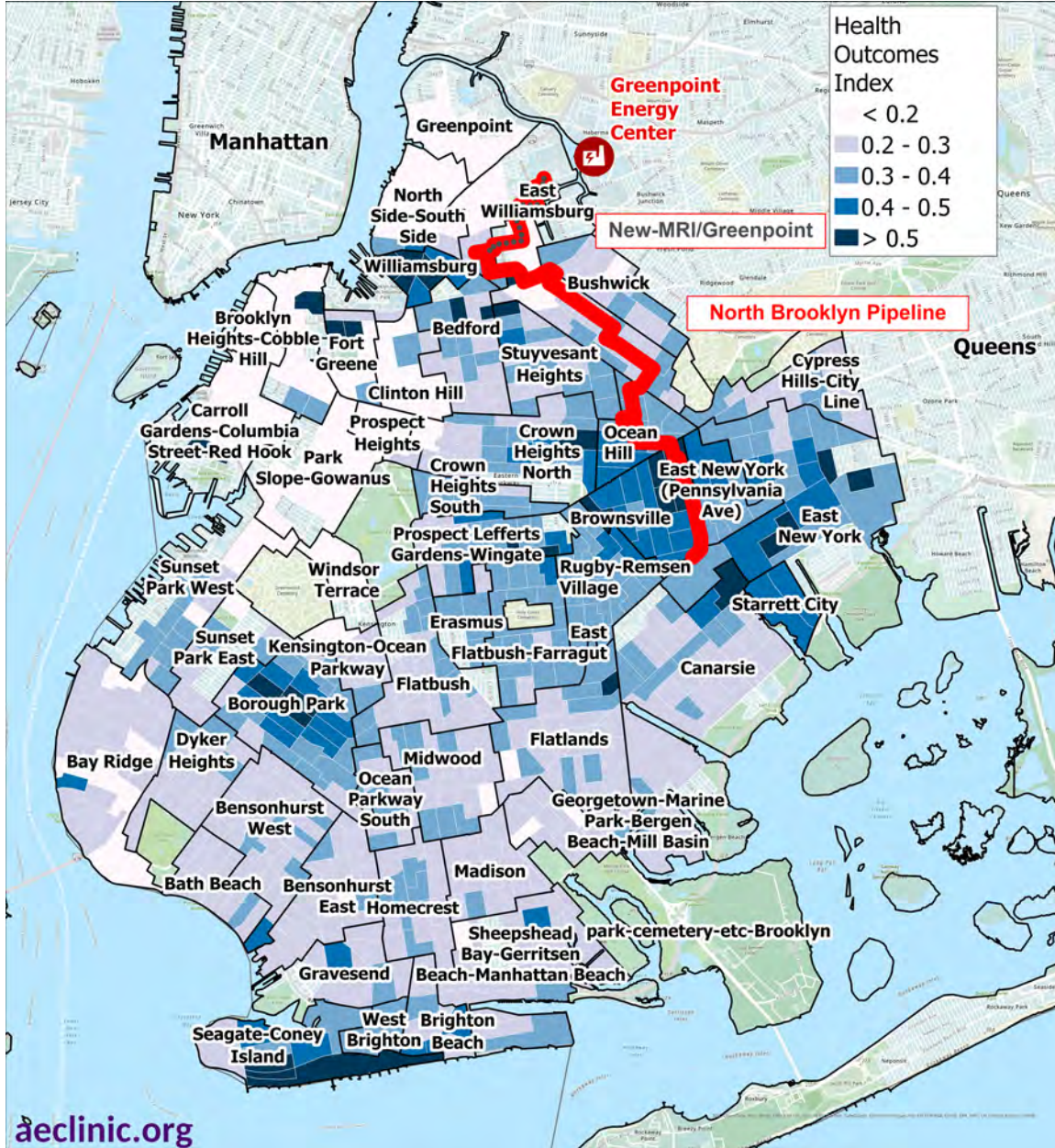
Health Outcome Index

In contrast, the Bedford-Stuyvesant, Bushwick, and Greenpoint/Williamsburg neighborhoods do not appear to have a substantial overlap of adverse health disparities including cancer, heart disease, asthma, poor mental health, diabetes, and poor physical health prevalence, as compared to other Brooklyn



neighborhoods (see Figure 20).

Figure 20. Health Outcome Index



Data source: (1) AEC calculation based on the latest data from PLACES dataset (2020); (2) North Brooklyn Pipeline line segment provided by the FracTracker Alliance.

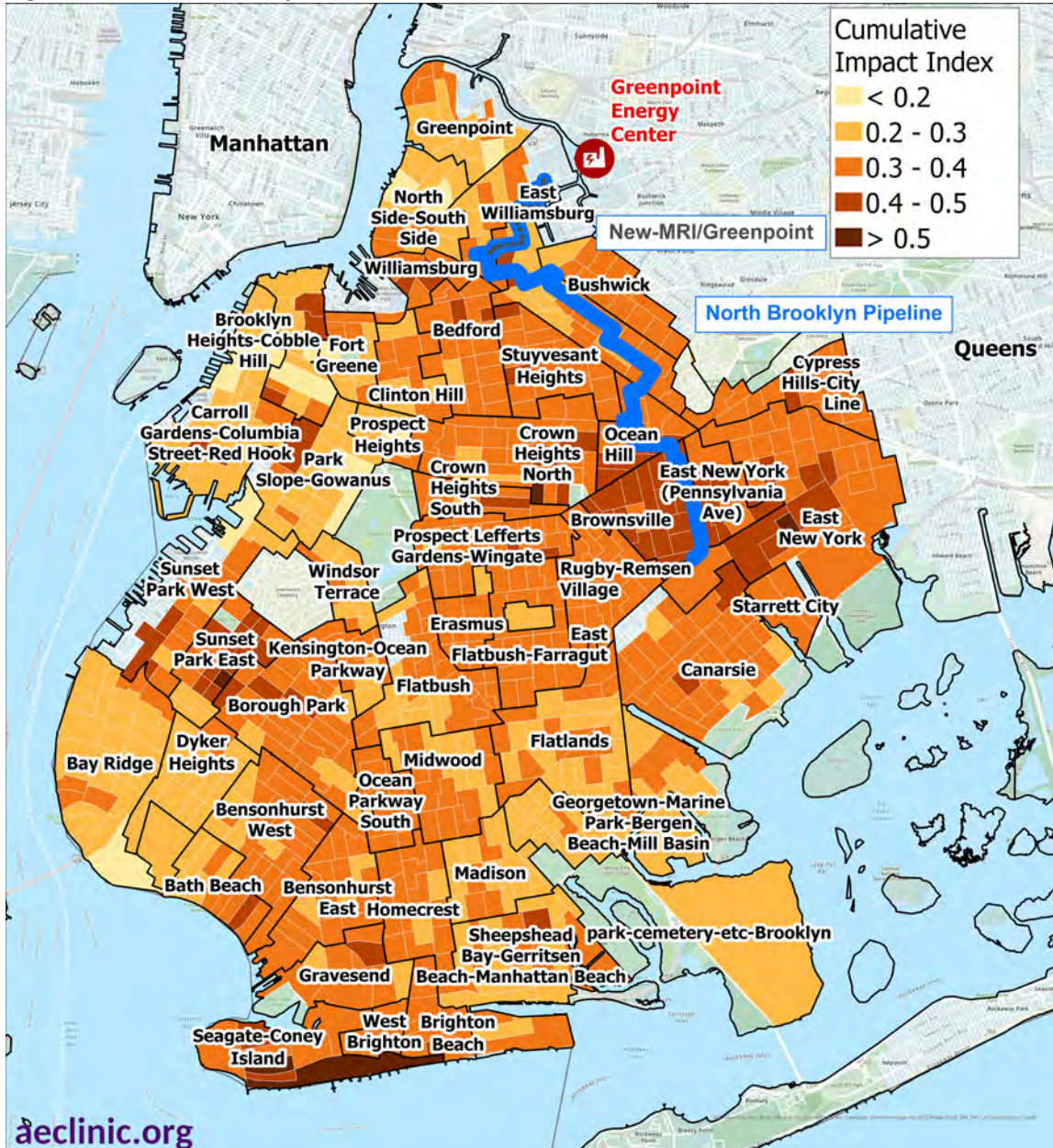
Cumulative Impact Assessment Results

AEC combines the four composite indices from the sections above to calculate an overall Cumulative Impact Index for each census tract in Brooklyn. The Cumulative Impact Index is the simple (unweighted) average of the four component indices: Housing Characteristic Index, Social Vulnerability Index, Financial



Burden Index, and Health Outcomes Index (see Figure 21).

Figure 21. Cumulative Impact Index



Data source: (1) AEC calculation; (2) North Brooklyn Pipeline line segment provided by the FracTracker Alliance.

The goal of a cumulative assessment is to identify neighborhood "hotspots" where stressors overlap and vulnerabilities compound, placing greater burdens on those populations and putting them at greater risk of additional stressors. The higher the Cumulative Impact Index score, the greater the need to prioritize that neighborhood in program participation, service delivery, protection from new stressors, and participation



in decision-making regarding addressing societal vulnerabilities and solutions.

The greatest impact of the New-MRI/Greenpoint project will be felt by the most vulnerable communities in the closest proximity within the Bedford-Stuyvesant, Bushwick, and Greenpoint/Williamsburg neighborhoods. The results of AEC's Cumulative Impact Index indicate that social and financial vulnerability and health and housing outcomes are inequitably distributed across Brooklyn's neighborhoods.

V. Existing Impacts and the New MRI/Greenpoint project

Phase 5 of the MRI project and the new Vaporizers 13/14 units at the Greenpoint Energy Center (together called New MRI/Greenpoint project) in this report are planned for construction in neighborhoods that are already exposed to environmental, housing, social, financial, and health-related risks and would be made even more vulnerable by the addition of new fossil fuel infrastructure. This section takes a closer look at the Bedford-Stuyvesant, Bushwick, and Greenpoint/Williamsburg neighborhoods and discusses how existing risks, burdens, and vulnerabilities may be exacerbated by the completion of the New MRI/Greenpoint project.

Existing environmental burdens surrounding the proposed new infrastructure, including Superfund Sites in the Greenpoint/Williamsburg neighborhood, existing gas and petroleum pipelines across North Brooklyn, and the existing Greenpoint Energy Center (Figure 22, note that detail maps zoomed in to the census tract level show the area closest to the proposed New-MRI/Greenpoint in grey indicating that these blocks are industrial and not residential and therefore are not included in public data sets on demographic data, housing, or health impacts). The Meeker Avenue Plume Superfund Site and Newtown Creek Superfund Site are the result of toxic pollutants left behind by defunct oil refineries, petrochemical plants, fertilizer and glue factories, sawmills, and lumber and coal yards, as well as an underground storage dump of old dry-cleaning and metal-degreasing chemicals. The sites are contaminated with chlorinated volatile organic compounds among other carcinogens and life-threatening toxins.⁸⁴

The proposed New MRI/Greenpoint construction also crisscrosses NYC environmental justice communities (those with disparate low-income households and/or BIPOC communities⁸⁵). The Greenpoint/Williamsburg neighborhood of Brooklyn already houses both EJ communities and medical facilities within a quarter mile of Superfund sites. Construction of Phase 5 of the MRI project and Vaporizers 13/14 would compound these risks, adding new burdens on communities that are already overburdened.

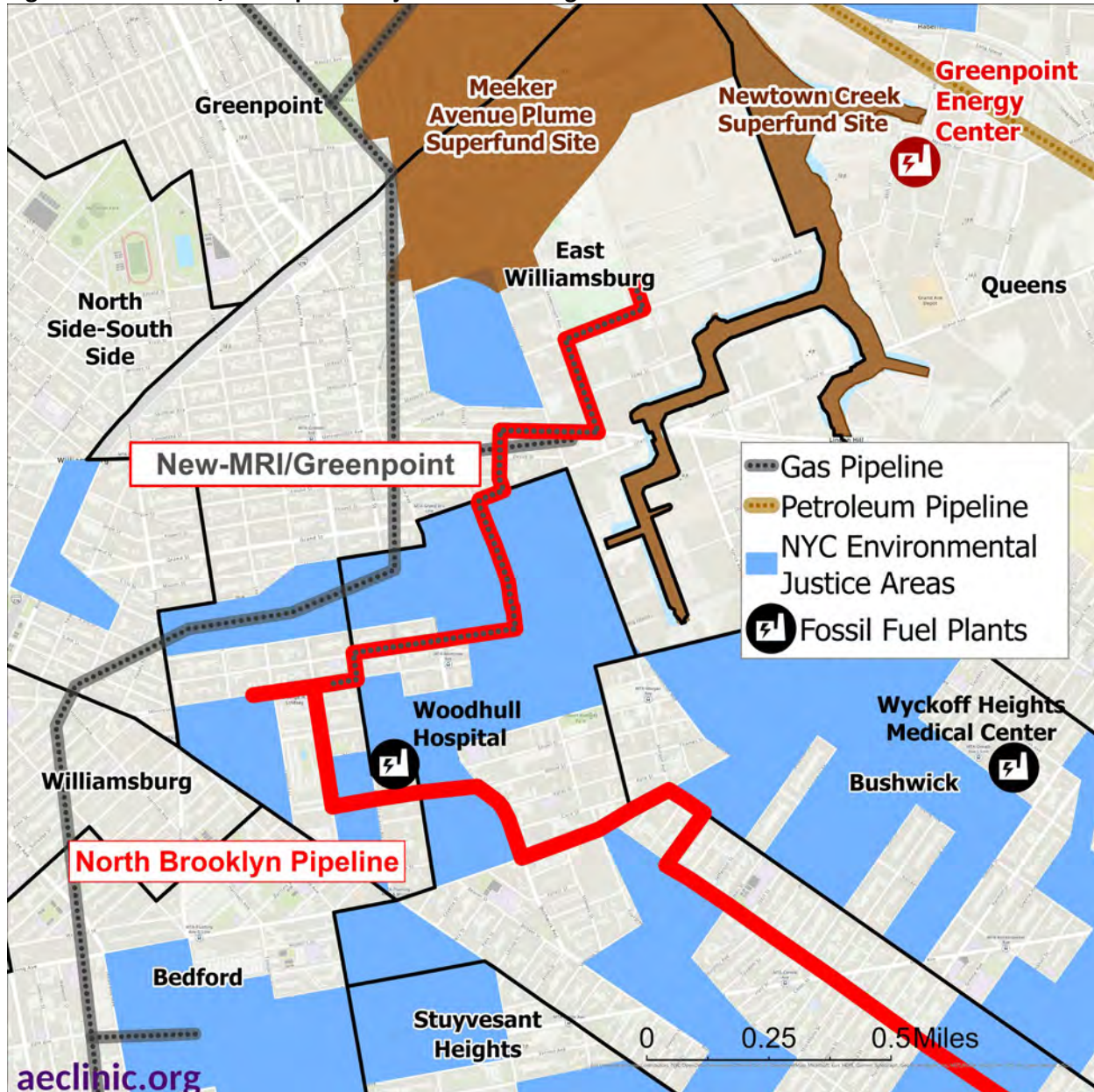
⁸⁴ EPA Superfund Site website, Available at:

<https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=0203407#bkgground> and <https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=0206282#bkgground>; *New York Curbed*. April 5, 2022. "Greenpoint's Newest Superfund Site is Very Residential." Available at: <https://www.curbed.com/2022/04/greenpoint-superfund-site-meeker-avenue-plume.html>.

⁸⁵ See NYC Mayor's Office of Climate & Environmental Justice. n.d. "Environmental Justice."



Figure 22. New-MRI/Greenpoint Projects and Existing Environmental Risks



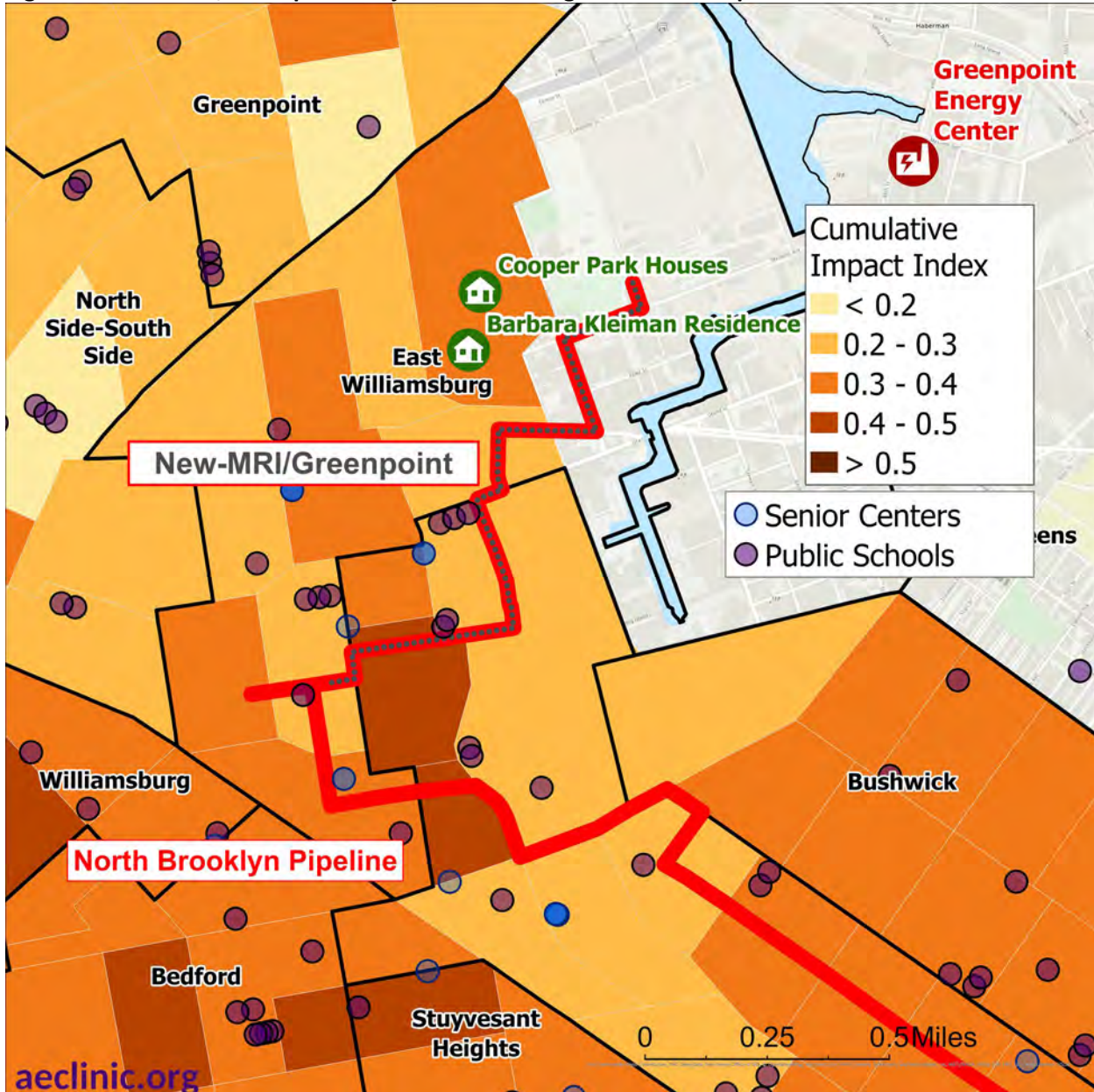
Data sources: (1) Superfund sites: U.S. EPA. 2022. "FAC - Superfund Site Boundaries (EPA)" [Shapefile]. Available at: <https://edg.epa.gov/metadata/catalog/search/resource/details.page?uuid=%7BFC07D75C-8596-434B-B1A6-0688C9CD45B5%7D>; (2) North Brooklyn Pipeline line segment provided by the FracTracker Alliance. Note that detail maps zoomed in to the census tract level show the area closest to the proposed New-MRI/Greenpoint in grey indicating that these blocks are industrial and not residential and therefore are not included in public data sets on demographic data, housing, or health impacts.

The EJ neighborhood closest to the terminus of the planned pipeline and the Greenpoint facility is home to the Cooper Park Houses (public housing) and the Barbara Kleiman Residence (an adult homeless shelter) (see Figure 23). This neighborhood also has a relatively high Cumulative Impact Index, highlighting an overlap of existing vulnerabilities that would be exacerbated by the New-MRI/Greenpoint project. Five



public schools are directly adjacent to the proposed Phase 5 of the MRI project; another four schools and two senior centers are within a quarter mile of Phase 5 (see Figure 23). Both neighborhoods with cumulative vulnerabilities and neighborhoods with unknown or as yet unmeasured vulnerabilities line the proposed path of the New MRI/Greenpoint.

Figure 23. New-MRI/Greenpoint Projects and Existing Cumulative Impacts



Data sources: (1) Senior Centers: New York City Housing Authority. 2017. "Senior Centers" [Shapefile]. NYC OpenData. Available at: <https://opendata.cityofnewyork.us/data/>; (2) Public Schools: U.S. Department of Education. 2019. "School Point Locations" [Shapefile]. NYC OpenData. Available at: <https://data.cityofnewyork.us/Education/School-Point-Locations/ifu-ynrr>; (3) North Brooklyn Pipeline line segment provided by the FracTracker Alliance. Note that detail maps zoomed in to the census tract level show the area closest to the proposed New-MRI/Greenpoint in grey indicating that these blocks are industrial and not residential and therefore are not included in public data sets on



demographic data, housing, or health impacts.

Public housing, a homeless shelter, schools, and senior centers are just blocks from existing Superfund Sites and fossil fuel pipelines. While air pollution data is not available at the resolution of census tracts or other small neighborhoods, research from Columbia University found that the Greenpoint/Williamsburg neighborhoods was at elevated risk for airborne particulate matter (PM 2.5).⁸⁶

In addition to the qualitative disparities between East Williamsburg’s communities closest to Phase 5 of the MRI project and Brooklyn’s more sheltered and shielded neighborhoods, U.S. Census data demonstrate significant quantitative disparities in life expectancy between these communities: As of 2015, the life expectancy of the East Williamsburg neighborhoods immediately surrounding the New MRI/Greenpoint was lower than the Borough- and City-wide averages.⁸⁷ The imposition of additional polluting infrastructure in and near these communities further threatens the health and wellbeing of communities who are already statistically less likely to live as long as those a mile away. East Williamsburg has a dearth of health centers for its residents, and Bedford-Stuyvesant and Bushwick are home to several of the nation’s worst-ranked hospitals, according to analysis from the Leapfrog Group.⁸⁸ Far from offering improved or increased care services to these neighborhoods in need of them, the only investment these communities see is the construction of increased polluting infrastructure that further threatens and compromises their rights to a clean, safe, and healthy life.

The Greenpoint/Williamsburg neighborhood has a higher poverty rate and a higher concentration of immigrants than almost any other area of Brooklyn. The census tracts nearest to the proposed New MRI/Greenpoint construction include some of the most vulnerable populations (children, the elderly, the unhoused, families living in subsidized housing). These residents and households—who already facing daily exposure to egregious risks from Superfund Sites and existing fossil fuel infrastructure—will be on the front lines of new risks from additional fossil fuel infrastructure.

VI. Conclusions and recommendations

Brooklyn’s Greenpoint/Williamsburg neighborhood and, more specifically, the city blocks surrounding National Grid’s proposed Phase 5 extension to the North Brooklyn Pipeline and new Vaporizers 13/14 added to the Greenpoint Energy Center (New-MRI/Greenpoint) are at risk from the cumulative pressures of existing stressors:

- Two Superfund Sites, soil and water polluted with chlorinated volatile organic compounds, and multiple existing fossil fuel pipelines in close proximity.

⁸⁶ Hinsdale, Jeremy. 2016. *State of the Planet*. “By the Numbers: Air Quality and Pollution in New York City.” Available at: <https://news.climate.columbia.edu/2016/06/06/air-quality-pollution-new-york-city/>

⁸⁷ U.S. Department of Health and Human Services. April 21, 2022. “U.S. Life Expectancy at Birth by State and Census Tract – 2010-2015.” Available at: <https://catalog.data.gov/dataset/u-s-life-expectancy-at-birth-by-state-and-census-tract-2010-2015>.

⁸⁸ Culliton, K. November 2, 2017. “Brooklyn Hospitals Among Worst in the Nation, Study Finds.” *Patch*. Available at: <https://patch.com/new-york/bushwick/brooklyn-hospitals-among-worst-nation-study-finds>.



- Greenpoint/Williamsburg has elevated levels of airborne particulate matter raising risks of asthma and other respiratory diseases.
- On average, across the larger Greenpoint/Williamsburg neighborhood, 22 percent of households live below the poverty line. In some census tracts this share is 40 percent or higher.
- The census tracts directly adjacent to the proposed New MRI/Greenpoint have some of the highest shares of BIPOC and immigrant residents in the City.
- The nearest neighborhoods have incomes well below the median for Brooklyn, many with median incomes below \$40,000 (half of households make more than \$40,000 in those census tracts, and half make less).

The 2-mile square area surrounding the proposed New-MRI/Greenpoint construction is home to schools, senior centers, public housing and a homeless shelter—some of these facilities are just steps from the planned path of the Phase 5 pipeline. Many of the census tracts closest to the proposed New-MRI/Greenpoint infrastructure are classified as NYC Environmental Justice areas, with majority minority populations and a quarter of the population living below the poverty line. AEC’s own analysis of cumulative impacts—or the ways in which multiple risks and stressors compound in vulnerable communities—shows high levels of overlapping stressors in the same EJ neighborhoods with schools and housing, children and elders, in direct exposure to new infrastructure construction and at direct risk of spills, releases, or explosions that are always a potential outcome of fossil fuel infrastructure located in residential areas.

All of these conditions and impacts—even before the addition of new fossil fuel infrastructure—result in a deeply diverse neighborhood living with substandard housing, poor health outcomes, low incomes, and high pollution levels. It is in this context in which decisions to site new infrastructure should be made: Who will be impacted? What burdens are they already shouldering?

This report highlights the context into which National Grid’s new infrastructure would be added—one in which vulnerable families are already overwhelmed with environmental and financial risks and burdens. The context matters. Approval of the MRI pipeline Phase 5 and Vaporizers 13/14 at Greenpoint Energy Center would add new risks, new stresses, new uncertainties. The local community needs a clear accounting of what these new risks are: A detailed risk assessment including uncertainty analysis to establish possible future scenarios for dangers to human health and safety caused by accident, error or just the inevitable risks of transporting, housing and processing toxic and combustible substances. What schools, homes, families, public facilities would be in the path of leaks? What impacts will residents face during project construction? A clear, detailed accounting of potential harms under a range of potential future circumstances (intended and unintended), made publicly to community members and other stakeholders is essential to good decision making regarding all infrastructure projects. In the case of National Grid’s MRI and Vaporizer 13/14, the need for transparent information on risks and harms is both urgent and critical, and—for an accurate understanding of community burdens—must be presented in the context of the existing vulnerability experienced by the local community.