Passengers United

Centering Accessibility in Bus Stop Planning: A Data-Driven Framework

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Jack Nierenberg

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Executive Summary

In its bus network redesigns, the MTA has been consolidating bus stops with the aim of improving bus speeds. In the Queens Bus Network Redesign alone, nearly 1,800 bus stops were removed across the borough. However, these stop removals have created significant challenges for riders with mobility impairments by making many essential origins and destinations, such as grocery stores, healthcare facilities, and community services, more difficult to access. This poses an even greater equity issue for mobility-impaired riders who are transit-dependent.

Our prior analysis supports concerns raised by riders that the MTA lacked a clear and consistent methodology for its stop consolidation efforts. Now, with the Brooklyn Bus Network Redesign underway, a new and holistic stop spacing method is necessary to center the needs of the most dependent riders and ensure that proper existing conditions studies are done.

To address this issue, we developed the Comprehensive Bus Stop Accessibility Index (CBSAI), a data-driven framework designed to evaluate the accessibility of bus stops and inform planning decisions. The CBSAI was developed in consultation with leading transportation planning practitioners, disability experts, and everyday bus riders. It is based on key observational factors that affect the ability of mobility-impaired bus riders to travel to and from bus stops, wait comfortably and safely, and board or alight buses.

The CBSAI evaluates stops based on their proximity to essential origins and destinations, as well as the physical conditions that affect their safety and mobility. Through its dual rating system, the framework combines both qualitative and quantitative data to provide measurable, interpretable, and actionable results.

We urge the MTA and NYC DOT to adopt the CBSAI in both their small- and large-scale bus planning initiatives, including the Brooklyn Bus Network Redesign. Doing so can help ensure compliance with the Americans with Disabilities Act (ADA) while fostering more equitable and accessible outcomes for the riding public.

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- Professor Carrie Long, AICP

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Introduction

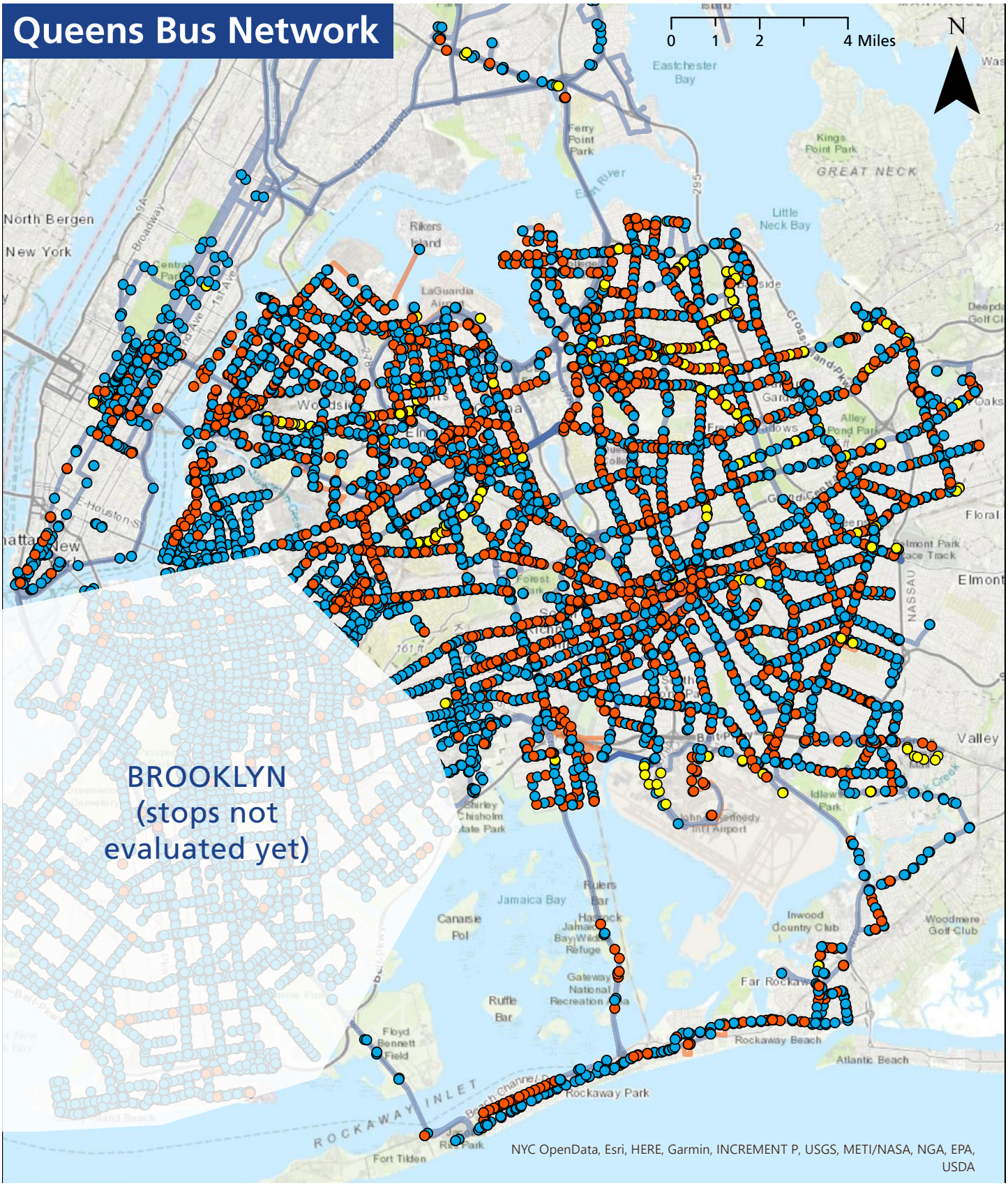
Bus stop consolidation, also called "bus stop balancing," has become an established part of the MTA's bus network redesign efforts. In theory, bus stop consolidation increases overall bus speeds by reducing how frequently buses have to stop, and, in turn, improves passenger trip times. However, this ideal conflicts with the needs of those with mobility impairments, including older adults, people with disabilities, and others who have difficulty walking the extra distance to their bus stops. In the Staff Summary for the Queens Bus Network Redesign, launched in the summer of 2025, the MTA (2024) stated that its bus stop consolidation efforts for the plan "[balanced] the need to improve travel times with the need to serve our riders with mobility limitations." However, no methodology to justify this claim is provided in the MTA's other public documents for the plan.

In my previous report, *Evaluating Bus Stop Removals in Queens using a Data-Driven Approach to Accessibility* (hereinafter referred to as "Phase 1"), which served as an independent audit of the Queens Bus Network Redesign's elimination of nearly 1,800 bus stops across the borough, it was confirmed that many vital destinations, such as schools, grocery stores, healthcare facilities, and community services, have become more difficult for those who rely on them the most to reach. This has led many bus riders to question whether the MTA's planning team conducted site evaluations of each bus stop and its conditions before deciding whether to eliminate it.

In Phase 1 of this project, the Bus Stop Accessibility Index (BSAI), a data-driven framework to understand and assess the accessibility of bus stops based on a variety of observational factors, was developed. It was initially created in an effort to restore the most critical bus stops in Queens based on the greatest need for riders. Data were collected through site evaluations along three bus corridors, which were determined based on public comments from the planning process. From our analysis of the stop data, which were compared to Census demographic data, nine areas were identified for prioritized stop restoration. The findings also support many riders' suspicions that existing conditions studies of each bus stop were not conducted during the planning process.

However, the BSAI showed its limitations early in the analysis process. As it was a means of combining both qualitative and quantitative data into a single rating system, it provided a very general understanding of whether a stop is accessible, as well as what makes a stop more or less accessible than others. But the simplicity of the index, which was intentional so the data would be easy to collect, compromises how accurate an understanding can be gained from it. With the next iteration of the Brooklyn Bus Network Redesign underway, it has become necessary to refine the BSAI so that "it better reflects how the conditions of each stop, as well as their proximity to essential origins and destinations, affect riders" (Phase 1).

In Phase 2 of this project, I introduce the Comprehensive Bus Stop Accessibility Index (CBSAI), a new, holistic method of evaluating the accessibility of bus stops that builds on the previous BSAI but addresses riders' needs and lived experiences much more effectively. My team and I propose that the MTA and NYC Department of Transportation (NYC DOT) adopt this method for all bus stop-related planning projects, as well as the planning process for the Brooklyn Bus Network Redesign, starting with its next version. First, I will explain the CBSAI — its factors, how data are collected, and how the results are calculated — and how each of those differs from the BSAI. Second, I will use an example from Queens to demonstrate how the CBSAI yields interpretable and actionable results. Lastly, I will explain how the CBSAI can best be adopted for the Brooklyn Bus Network Redesign to ensure compliance with the Americans with Disabilities Act (ADA) by addressing the needs of the borough's over 300,000 disabled commuters.



◕ **1** All bus stops in Queens, including the nearly 1,800 that were eliminated in the Queens Bus Network Redesign (red).

A Major  Gap

for accessibility

Bus stop consolidation is typically employed as a means of addressing a fundamental tradeoff in bus network planning: that between bus speeds and the walking distance to and from bus stops (also known as the first- and last-mile connection). Shorter spacing between stops results in slower overall bus speeds but minimizes the first- and last-mile distance. On the other hand, with longer distances between stops, buses stop less frequently, resulting in faster overall bus speeds but requiring passengers to walk greater distances to their bus stops. These bus speeds are generally associated with passenger trip times, which increase or decrease accordingly (so faster buses result in faster travel times, and vice versa).

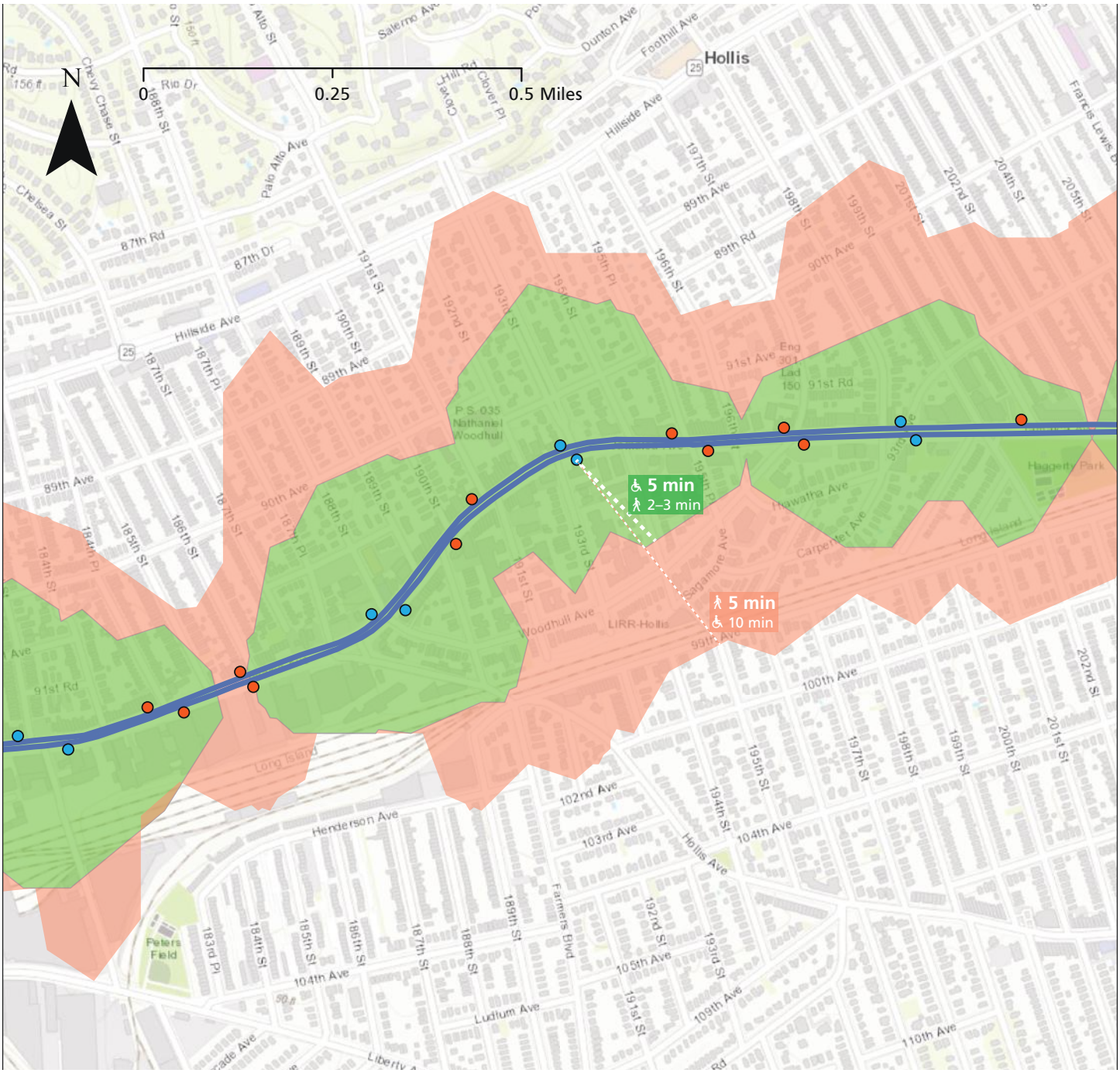
These generalizations omit an array of considerations, which include buses skipping empty stops, buses having to stop at red lights between stops, and other factors that affect how much time riders save by stops being spaced farther apart. However, a key consideration that goes beyond just time savings is riders' abilities to complete their first- and last-mile connections. While longer first- and last-mile distances may be considered an inconvenience for able-bodied riders, they often determine whether people with mobility impairments and other disabilities, including older adults, can access their buses at all, and if so, how easily.

Mobility disabilities come in a variety of forms, from experiencing pain walking to relying on a wheelchair to move around, but it is common for people with mobility impairments to travel more slowly than able-bodied people. Figure 2 illustrates this disparity for those with mobility impairments based on calculations of their average walking speeds by Dewar (2002, as cited in Federal Highway Administration, 2006). In some cases, the increase in first- and last-mile distances and travel times caused by stop removals has been significant enough to create substantial access gaps.

The MTA has demonstrated an understanding of the general tradeoffs associated with bus stop spacing, which are illustrated on the "About Bus Network Redesigns" page of its website. Just below that illustration, the target average stop spacings are listed, in feet, for each route type (Local, Limited, etc.). But no explanations are provided about *how* these ideal spacings account for the needs of bus riders with mobility impairments. Similarly, the MTA's documents and publications for the Queens Bus Network Redesign, including the Title VI and Equity Analyses, make no mention of riders' first- and last-mile connections, nor do they justify how the needs of mobility-impaired riders were addressed in the plan.

Meanwhile, in the first Draft Plan for the Brooklyn Bus Network Redesign, the MTA (2022) offered a general idea of its bus stop spacing methodology. Instead of solely aiming to match a target spacing, the planning team mentioned its use of "multiple criteria," which include "route type […], distance from the previous stop, proximity to key destinations and transfer points, senior population and population with disabilities, ADA-accessible stop conditions, and existing bus stop conditions (e.g., shelters, benches, or other amenities)" (p. 22). While this is a step forward, it still does not mention a framework to evaluate stops or justify their removal based on these criteria.

Having a data-driven approach to facilitate the decision-making process is crucial for achieving equitable outcomes for those who are most vulnerable and transit-dependent. Several studies, including Sisk et al. (2022) and Firestine & Murrell (2024), suggest a correlation between transit dependency, transit access, and food insecurity. The same can be inferred for access to healthcare, congregate programs, and other vital services. This underscores the mounting importance of a holistic framework for analyzing bus stops, surrounding origins and destinations, and the conditions that affect people's ability to reach them.



◕ **2** First- and last-mile distances along a section of Jamaica Avenue, using a 5-minute walkshed (3 mph for able-bodied riders and 1.5 mph for mobility-impaired bus riders) from stops that were kept intact during the redesign. Note: This illustration simplifies actual first- and last-mile distances and travel times, which vary by rider.

Introducing the Comprehensive Bus Stop Accessibility Index (CBSAI)

The Comprehensive Bus Stop Accessibility Index (CBSAI) is a new framework for understanding and evaluating the accessibility of bus stops. It was developed in consultation with leading transportation practitioners, disability experts, and everyday bus riders in New York and nationwide. The CBSAI is centered around several observational criteria that affect riders' abilities to access stops, wait at them with ease, and board or alight buses from the stops. These are what the Brooklyn Center for the Independence of the Disabled refers to as ***pathways*** — the pathway between one's origin and the bus stop, between the shelter and the bus, etc., and factors that could block those pathways for people with greater mobility needs. In addition to the stop's proximity to essential origins and destinations (such as medical facilities, grocery stores, and supportive housing), the CBSAI evaluates walking conditions to the stop, the presence of a bus shelter with seating, whether wheelchair users can board easily, as well as any obstructions or safety hazards along the way. All of these factors in the CBSAI, which are also consistent with existing literature on bus and pedestrian infrastructure design, including National Academies of Sciences, Engineering, and Medicine (2014), directly impact riders' ability to ride buses in the first place.

3 Pathways: first/last mile, waiting at the stop with ease, and boarding/alighting the bus.

Factors in the Comprehensive Bus Stop Accessibility Index

1. Stop Accommodations
2. Subsidized and Supportive Housing
3. Essential Services and Transit Connections
4. Width of Sidewalk At Stop
5. Width of Sidewalk Surrounding Stop
6. Condition of Sidewalk
7. Easy Boarding
8. Immediate Obstructions and Safety Hazards

From BSAI (Phase 1)

- 8 factors posed as yes/no questions with specific criteria and careful observations required for each
- Written component necessary to clarify answers for most questions
- Single Accessibility Rating calculated based on yes/no answers to each question, but not the written clarifying information
- Accessibility Rating merges factors that may conflict with each other
- Results interpretable based on both overall Accessibility Rating and answers to each yes/no question

to CBSAI (Phase 2)

- Builds on the 8 observational factors from the BSAI, but instead incorporates specific information as subfactors
- Written component is optional, but no longer vital since the clarifying details are embedded into lists of options to select from
- Dual rating system that incorporates specific information and separates conflicting factors
- Dual rating system that incorporates specific information and separates conflicting factors
- Results interpretable based on both Accessibility Ratings and selections for each subfactor

StopScan

StopScan is a web application that is designed to streamline the data collection and entry process for volunteers conducting site evaluations of each stop. Initially created during Phase 1, StopScan enables volunteers to easily locate their stops, enter data directly into the dataset, and access project resources, all within a single interface. It allows volunteers to contribute without requiring desktop software or experience working with raw datasets. All that is needed is a computer or mobile device that can connect to the internet. This allows for volunteers to gather data in real time from bus stops without having to complete additional steps afterwards.

StopScan also includes a detailed handbook, as well as a print "Transfer Form" for those unable to access the Data Entry Portal. Volunteers are trained to use both data entry methods.

4 StopScan.

Factors in the CBSAI

1 Stop Accommodations

Does the stop have a bus shelter with seating?

Pathway: Waiting at stop

This factor specifically addresses the presence of a bus shelter, which protects riders from the elements (rain, snow, heat, wind, etc.), and seating for riders to use while they wait for the bus. Seating is particularly important for riders with mobility impairments, who may experience difficulty or discomfort standing for extended periods of time. Leaning benches do not count as benches because they do not allow for people to sit fully.

Subfactors

1.1 Bus shelter with bench/seating
1.2 Bus shelter without seating OR with leaning bench instead
1.3 Bench/seating but no shelter
1.4 Neither a bus shelter nor a bench/seating (OR leaning bench only)

◕ **5** Typical bus shelter with seating in New York City.

2

Subsidized and Supportive Housing

Is the stop within 250–300 feet (1 street block or ⅓–½ an avenue block) of any subsidized and/or supportive housing?

Pathway: First/last mile

This factor considers a stop's proximity to housing or living accommodations with high concentrations of lower-income residents, older adults, and people with disabilities or health conditions, all of whom are more likely to be transit-dependent.

Subfactors

2B
Type of Facility

- 2.0 More than 1 facility nearby
- 2.1 Public housing project
- 2.2 Concentrated affordable housing
- 2.3 Homeless shelter
- 2.4 Nursing home
- 2.5 Assisted living facility *(includes group homes)*
- 2.6 Other subsidized or supportive housing

2C
Proximity to Stop

- 2.7 Within 250–300 feet (1 street block or ⅓–½ an avenue block), same side of street
- 2.8 Within 250–300 feet (1 street block or ⅓–½ an avenue block), across the street **2D required →**
- 2.9 On the cross street only, on the next street block over OR the rest of the avenue block
- 2.10 On the street the bus route is on only, on the next block over **2D required →**

2D
Crosswalk Safety
(only required if 2.8 or 2.10 are true)

- 2.8.1 Wide and/or busy street or corridor
- 2.8.2 Crosswalk is marked
- 2.8.3 Crosswalk has pedestrian signals
- 2.8.4 Crosswalk has accessible pedestrian signals (APS)

3 Essential Services and Transit Connections

Is the stop within 250–300 feet (1 street block or ⅓–½ an avenue block) of any essential services or transit connections?

Pathway: First/last mile

This factor considers a stop's proximity to essential services that people rely on regularly, as well as transfer opportunities necessary to complete their trips.

Subfactors

3B Type of Facility

- 3.0 More than 1 facility
- 3.1 Medical/healthcare facility or clinic *(e.g., hospitals, clinics, dialysis, rehab, therapy)*
- 3.2 Pharmacy
- 3.3 Center for people with disabilities *(provides congregate programs)*
- 3.4 Senior center / Community services *(provides congregate programs)*
- 3.5 Food pantry or soup kitchen
- 3.6 Grocery store / Supermarket
- 3.7 Discount store
- 3.8 School, daycare, or other educational facility
- 3.9 Government office or benefit service *(Social Security, SNAP, DMV, municipal buildings and disability-specific non-profits)*
- 3.10 Library or community center
- 3.11 Financial or postal service *(bank, post office, etc.)*
- 3.12 Laundromat
- 3.13 Park or recreation center *(this also includes YMCAs, JCCs, etc.)*
- 3.14 Place of worship
- 3.15 Other essential service
- 3.16 Transfer to other transit (non-parallel bus, subway, commuter rail, etc.) **3C required →**

3D Proximity to Stop

- 3.17 Within 250–300 feet (1 street block or ⅓–½ an avenue block), same side of street
- 3.18 Within 250–300 feet (1 street block or ⅓–½ an avenue block), across the street **3E required →**
- 3.19 On the cross street only, on the next street block over OR the rest of the avenue block
- 3.20 On the street the bus route is on only, on the next block over **3E required →**

3C
Type and Accessibility of Transfer (only required if 3.16 is true)

- 3.16.1 Transfer to non-parallel bus
- 3.16.2 Transfer to subway
- 3.16.3 Transfer to commuter rail ADA-Accessible Entrances/Exits
- 3.16.4 At least 1 elevator or ramp per direction
- 3.16.5 Less than 1 elevator or ramp per direction
- 3.16.6 No elevators or ramps

3E
Crosswalk Safety (only required if 3.18 or 3.20 are true)

- 3.18.1 Wide and/or busy street or corridor
- 3.18.2 Crosswalk is marked
- 3.18.3 Crosswalk has pedestrian signals
- 3.18.4 Crosswalk has accessible pedestrian signals (APS)

4 

Width of Sidewalk At Stop

Is the sidewalk AT THE STOP wide enough for someone with a disability or mobility impairment (regardless of whether they rely on a mobility device) to easily traverse it?

Pathways: First/last mile, Waiting at stop

In order for a sidewalk to be ADA-compliant, it must have a minimum width of 36 inches, or 3 feet. This factor concerns whether the sidewalk at a stop (which is either determined by the length of the bus pad or, if there is no bus pad, about 50–100 feet before the bus stop sign) is wide enough to be ADA-compliant.

Subfactors

4.1 Sidewalk at least 36 inches (3 feet) wide
4.2 Sidewalk less than 36 inches (3 feet) wide

5 

Width of Sidewalk Surrounding Stop

Is the sidewalk ON THE BLOCK SURROUNDING THE STOP wide enough for someone with a disability or mobility impairment (regardless of whether they rely on a mobility device) to easily traverse it?

Pathways: First/last mile, Waiting at stop

Similar to Factor 4, this factor concerns whether the sidewalk on the block surrounding the stop meets ADA minimum width requirements.

Subfactors

5.1 Sidewalk at least 36 inches (3 feet) wide
5.2 Sidewalk less than 36 inches (3 feet) wide

6 Condition of Sidewalk

Is the sidewalk at the stop, on the block surrounding the stop, and/or the crosswalk necessary to access the stop even, level, and well-maintained?

Pathway: First/last mile

This factor considers whether any conditions exist on the sidewalk and/or crosswalk necessary to access the stop that could pose a risk for pedestrians with limited mobility or obstruct their path.

Subfactors

6A Type of Issue

- 6.0 No issues
- 6.1 Crack in sidewalk
- 6.2 Unevenness
- 6.3 Protruding sidewalk flags
- 6.4 Slant of sidewalk beyond 2% sidewalk width
- 6.5 Steep hill or hilly terrain
- 6.6 Other non-temporary obstruction or hazard preventing mobility

6B Location of Issue

- 6.7 Sidewalk at stop
- 6.8 Sidewalk on block surrounding stop
- 6.9 Crosswalk necessary to access stop
- 6.10 No issues

7 Easy Boarding

Does the stop have enough room for the bus to board as close to the curb as possible and, when necessary, deploy the ramp onto the sidewalk for riders with mobility devices to get on or off without their path being obstructed?

Pathway: Boarding/alighting

Being able to board or alight a bus should be a prerequisite for any bus stop, and this factor evaluates whether the conditions at the stop support it for the most vulnerable riders.

Subfactors

- 7.1 Bus can approach the curb and deploy the ramp AND mobility-impaired rider can board easily
- 7.2 Bus cannot approach the curb and/or deploy the ramp AND/OR mobility-impaired rider cannot board easily

8 Immediate Obstructions and Safety Hazards

Is the stop in an unsafe location?

Pathways: First/last mile, Waiting at stop, Boarding/alighting

This factor concerns whether a stop has any location-based issues that could compromise the safety of riders, especially older adults and riders with disabilities.

Subfactors

8A Type of Immediate Obstruction and/or Safety Hazard

8.0 No immediate obstructions/safety hazards
8.1 Stop located in a driveway
8.2 Stop requires crossing a driveway, bike lane, or busy road to access (no traffic signals, signs, etc.) *(this would be true if the stop is located on an island that requires crossing a bike lane to access)*
8.3 No proper lighting/poor visibility
8.4 Other immediate obstruction/safety hazard

8B Risk/ Implications for Riders

8.5 High/immediate risk at stop *(e.g., the stop is right in front of an auto shop and cars are parked right on the sidewalk)*
8.6 High/immediate risk, all directions to/from stop *(e.g., two busy driveways surrounding the stop)*
8.7 High/immediate risk, at least 1 direction to stop *(e.g., a busy driveway at the eastern end of the stop, but none at the western end)*
8.8 Moderate risk at stop *(e.g., the stop is in the middle of a driveway for a single-family house)*
8.9 Moderate risk, all directions to stop *(e.g., the stop requires crossing a lightly-used bike lane to access)*
8.10 Moderate risk, at least 1 direction to stop *(e.g., the stop is next to a residential driveway on one side only)*
8.11 Unsafe at certain times of day *(e.g., no proper lighting at night)*
8.12 No safe mobility at all (Dealbreaker for the stop) *(e.g., the stop requires crossing the street to access and there's no crosswalk)*

Accessibility Ratings

The CBSAI combines both qualitative and quantitative data to provide information for each stop that is easily measurable, interpretable, comparable across stops, and closely aligns with riders' lived experiences. Results are generated for both the stop's overall accessibility and each factor in the CBSAI, which allows for more specific takeaways based on stops' results alone, as well as from further spatial analysis. For the stop's overall accessibility, each factor is weighed based on its implications for transit-dependent and mobility-impaired riders in two key categories. The **Essential Origins and Destinations (EOD)** Accessibility Rating reflects the stop's vitality based on its proximity to facilities that riders depend on. The **Pathway Conditions (PCD)** Accessibility Rating reflects the specific conditions that affect riders' ability to complete each of the three pathways — the first or last mile, waiting at the stop, and boarding or alighting the bus — safely and easily based on factors that go beyond proximity. Both the EOD and PCD ratings should be interpreted together, along with each CBSAI subfactor, to gain an accurate and actionable understanding of the stop and the associated conditions that affect its accessibility.

Both the EOD and PCD ratings are calculated automatically in StopScan to reduce the risk of confirmation bias in the results. StopScan's output includes both the EOD and PCD ratings, as well as each CBSAI subfactor that explain each.

Essential Origins and Destinations (EOD) Accessibility Rating

0 Least accessible based on proximity to essential origins and destinations

EOD = 0 is common in suburban and/or residential zones.

5+ Most accessible based on proximity to essential origins and destinations

Note: EOD > 5 should be interpreted as 5.

Pathway Conditions (PCD) Accessibility Rating

≤0 Least accessible; pathway conditions create the greatest barriers to safe and easy mobility

5 Most accessible; pathway conditions best support safe and easy mobility

Behind the CBSAI

Each factor and subfactor in the CBSAI is carefully weighed for both the EOD and PCD ratings to ensure they are easily interpretable, actionable, and most closely reflect the needs and lived experiences of everyday bus riders, especially those with mobility impairments. This rating system was developed based on conversations with disability advocates, transportation practitioners, and everyday bus riders — all of whom offered a diverse range of perspectives and insights that helped shape a more inclusive system.

First, each CBSAI subfactor was weighed within the context of its larger factor. Then, each CBSAI factor was weighed against each other in the whole index to balance the subfactors that make up the PCD rating.

The EOD rating is only determined based on Factors 2 and 3, which concern the stop's proximity to subsidized and supportive housing, essential services, and transit connections. The PCD rating, on the other hand, covers all factors in the CBSAI. Because of this, the calculations for the EOD and PCD ratings are substantially different, even though both ratings are on a scale of 0 to 5. While the EOD rating simply involves multiplication of each weighted factor by 4 to balance it on the 0–5 scale, the PCD rating is calculated by taking the range of possible sums of each subfactor (the maximum it could be minus the minimum it could be), subtracting the minimum possible sum from the actual sum (from the subfactors that are selected), dividing that difference by the range, and then multiplying by 5.

1 Stop Accommodations

5% Overall PCD Accessibility Rating

While bus shelters and seating are important for mobility-impaired riders while they wait at stops, they do not directly affect their ability to get to/from the stop or ride the bus.

Subfactor		PCD Weight (Balanced)	Rationale
1.1	Bus shelter with bench/seating	+100% **(0.025)** * Weight within factor	Ideal circumstance.
1.2	Bus shelter without seating OR with leaning bench instead	–25% **(–0.00625)**	There's no place to sit for those who need it, but the shelter still provides protection from the elements, as well as a structure to lean against if necessary. Not ideal.
1.3	Bench/seating but no shelter	0% **(0)**	The protection from the elements a shelter provides is not there, but those who need it can still sit down while they wait for the bus.
1.4	Neither a bus shelter nor a bench/seating (OR leaning bench only)	–100% **(–0.025)**	Non-ideal circumstance.

2 Subsidized and Supportive Housing

10% Overall PCD Accessibility Rating (combined with Factor 3)

Although each stop serves one direction, riders almost usually make round trips, making street crossings unavoidable.

Subfactor		EOD Weight (Balanced)	PCD Weight (Balanced)	Rationale
2.0	Multiple facilities	+25% **(1.0)** * Weight within factor		This is added onto the weight for the highest-ranking subfactor (so if there were both affordable housing and a nursing home, the 0.25 would be added onto the 1.00 for the presence of the nursing home. Having more than one facility improves the accessibility of the stop, but not by enough to diminish the value of one essential facility by doubling the rating.
2B. Type of Facility				
2.1	Public housing project	+90% **(3.6)**		There's a high concentration of transit-dependent seniors and other mobility-impaired residents in NYC's public housing developments.
2.2	Concentrated affordable housing	+80% **(3.2)**		There's a high concentration of transit-dependent residents, including those with greater mobility needs, but they're not always as concentrated as they are in public housing.
2.3	Homeless shelter	+95% **(3.8)**		Those living in the shelter system are likely to be transit-dependent, and over half of them have physical and/or mental disabilities.
2.4	Nursing home	+100% **(4.0)**		These have very high concentrations of older adults and others with serious health complications. These facilities also have workers, such as physicians and aides, who are responsible for the care of these residents. Traveling can be difficult for these residents, so their mobility needs should be prioritized.
2.5	Assisted living facility	+100% **(4.0)**		These have very high concentrations of older adults and/or people with moderate to severe disabilities and/or health complications. These facilities also have workers, such as nurses, aides,

Subfactor		EOD Weight (Balanced)	PCD Weight (Balanced)	Rationale
				and counselors, who are responsible for the care of these residents. Traveling can be particularly difficult for these residents, so their mobility needs should be prioritized.
2.6	Other subsidized or supportive housing	Assign based on what it's closest to		
2C. Proximity to Stop				
2.7	Within 250–300 feet (1 street block or ⅓–½ an avenue block), same side of street	0% **(0.0)**		Ideal range to minimize first/last mile for both directions of the bus route(s).
2.8	Within 250–300 feet (1 street block or ⅓–½ an avenue block), across the street	0% **(0.0)**	–90% **(–0.09)**	Ideal range to minimize first/last mile for both directions of the bus route(s). Still, crossing the street can be difficult for some, hence the penalty for the PCD rating, not the EOD rating.
2.8.1	Wide and/or busy street or corridor		–10% **(–0.1)**	Further penalty for increased risk while crossing.
2.8.2	Crosswalk is marked		+38% **(0.38)**	Penalty reduction — marked crosswalks improve safety.
2.8.3	Crosswalk has pedestrian signals		+38% **(0.38)**	Penalty reduction — pedestrian signals improve safety.
2.8.4	Crosswalk has accessible pedestrian signals (APS)		+44% **(0.44)**	Penalty reduction — pedestrian signals improve safety. If 2.8.2 (presence of crosswalk markings) is also true, the crosswalk penalty is eliminated nearly completely if the street is not wide/busy.
2.9	On the cross street only, on the next street block over OR the rest of the avenue block	–10% **(–0.4)**		Slight penalty for distance, but still taking into account the stop's significance for riders who use the facility.
2.10	On the street the bus route is on only, on the next block over	–50% value of selected subfactor in 2B		Penalty for distance and street crossing, which is greater because the stop can be relocated closer to improve accessibility.

3 Essential Services and Transit Connections

10% Overall PCD Accessibility Rating (combined with Factor 3)

Although each stop serves one direction, riders almost usually make round trips, making street crossings unavoidable.

Subfactor		EOD Weight (Balanced)	PCD Weight (Balanced)	Rationale
3.0	Multiple facilities	+25% **(1.0)** * Weight within factor		This is added onto the weight for the highest-ranking subfactor (so if there were both a senior center and a laundromat, the 0.25 would be added onto the 1.00 for the presence of the senior center. Having more than one facility improves the accessibility of the stop, but not by enough to diminish the value of one essential facility by doubling the rating.
3B. Type of Facility				
3.1	Medical/healthcare facility or clinic	+100% **(4.0)**		Healthcare is a necessity, and people with disabilities and health conditions are more likely to routinely use these facilities. Easy access is an absolute must.
3.2	Pharmacy	+95% **(3.8)**		Provides medications and other vital health items. People with disabilities and health conditions are more likely to rely on these, so it is critical to prioritize their mobility needs.
3.3	Center for people with disabilities	+100% **(4.0)**		Provides congregate programs for people with varying types of disabilities. They rely on these services and often struggle to get around, so their mobility needs should be prioritized.
3.4	Senior center / Community services	+100% **(4.0)**		Provides congregate programs for older adults and others with various disabilities, health conditions, and other circumstances. They rely on these services and often struggle to get around, so their mobility needs should be prioritized.
3.5	Food pantry or soup kitchen	+90% **(3.6)**		Provides emergency nutrition for cost-burdened community members, many of whom are older and/or transit-dependent. However, they're typically open for just a few hours, not throughout the day.

Subfactor		EOD Weight (Balanced)	PCD Weight (Balanced)	Rationale
3.6	Grocery store / Supermarket	+95% **(3.8)**		Critical to access food, especially for cost-burdened community members. Transit is often how grocery stores are accessed, especially for those unable to walk long distances. Food insecurity is determined, at least in part, by one's ability to access grocery stores, so stops near them should be left intact.
3.7	Discount store	+80% **(3.2)**		Provides items that people, especially those who are lower-income and/or cost-burdened, need on a fairly regular basis.
3.8	School, daycare, or other educational facility	+85% **(3.4)**		Required destination daily, and many students rely on transit to get to/from school. Punctuality is critical for both students and staff, including those with greater mobility needs.
3.9	Government office or benefit service	+80% **(3.2)**		Necessary to fulfill government-related functions, such as renewing an ID or receiving or renewing benefits, such as SNAP. Also necessary to receive disability services by government agencies and/or nonprofits.
3.10	Library or community center	+65% **(2.6)**		Open to the public, and for some, necessary to access the internet and other resources. Provides space for community members to use and gather in.
3.11	Financial or postal service	+60% **(2.4)**		Necessary for many, especially those who are not technically literate or lack access to smartphones and/or the internet to access their finances or send/receive mail. However, both are used less frequently and more flexibly.
3.12	Laundromat	+60% **(2.4)**		Necessary for those without in-unit washers and dryers. Heavy loads of laundry can make the first/last mile difficult, especially for those who already have greater mobility needs.
3.13	Park or recreation center	+45% **(1.8)**		Access to green space, fitness and recreation improves health outcomes and quality of life.

Subfactor		EOD Weight (Balanced)	PCD Weight (Balanced)	Rationale
3.14	Place of worship	+45% **(1.8)**		Meaningful for those who use it and come together there. Community events are often hosted in such settings. However, it's typically only used weekly.
3.15	Other essential service	Assign based on what it's closest to		
3.16	Transfer to other transit (non-parallel bus, subway, commuter rail, etc.)	+100% **(4.0)**		Critical for riders to continue their trips and reach their destinations.
3.16.1	Transfer to non-parallel bus	0% **(0.0)**		Necessary where subways do not run. All buses have ADA-accessible entrances.
3.16.2	Transfer to subway	0% **(0.0)**		Higher-capacity than buses and often used for longer/interborough trips.
3.16.3	Transfer to commuter rail	–5% **(–0.2)**		Used primarily for trips beyond city limits. Fares are more expensive and not integrated with OMNY. Trains run less frequently than subways.
3.16.4	At least 1 elevator or ramp per direction	0% **(0.0)**		Ideal circumstance, but elevators need to be in working condition.
3.16.5	Less than 1 elevator or ramp per direction	–15% **(–0.6)**		
3.16.6	No elevators or ramps	–20% **(–0.8)**		
3D. Proximity to Stop				
3.17	Within 250–300 feet (1 street block or ⅓–½ an avenue block), same side of street	0% **(0.0)**		Ideal range to minimize first/last mile for both directions of the bus route(s).
3.18	Within 250–300 feet (1 street block or ⅓–½ an avenue block), across the street	0% **(0.0)**	–90% **(–0.09)**	Ideal range to minimize first/last mile for both directions of the bus route(s). Still, crossing the street can be difficult for some, hence the penalty for the PCD rating, not the EOD rating.
3.18.1	Wide and/or busy street or corridor		–10% **(–0.1)**	Further penalty for increased risk while crossing.
3.18.2	Crosswalk is marked		+38% **(0.38)**	Penalty reduction — marked crosswalks improve safety.

Subfactor		EOD Weight (Balanced)	PCD Weight (Balanced)	Rationale
3.18.3	Crosswalk has pedestrian signals		+38% **(0.38)**	Penalty reduction — pedestrian signals improve safety.
3.18.4	Crosswalk has accessible pedestrian signals (APS)		+44% **(0.44)**	Penalty reduction — pedestrian signals improve safety. If 3.18.2 (presence of crosswalk markings) is also true, the crosswalk penalty is eliminated nearly completely if the street is not wide/busy.
3.19	On the cross street only, on the next street block over OR the rest of the avenue block	–10% **(–0.4)**		Slight penalty for distance, but still taking into account the stop's significance for riders who use the facility.
3.20	On the street the bus route is on only, on the next block over	–50% value of selected subfactor in 3B		Penalty for distance and street crossing, which is greater because the stop can be relocated closer to improve accessibility.

4 Width of Sidewalk At Stop

7.5% Overall PCD Accessibility Rating

The sidewalk width is critical in determining whether pedestrians with mobility devices can get through, or whether others can walk comfortably. Together, Factors 4 and 5 comprise 15% of the overall PCD rating.

Subfactor		PCD Weight (Balanced)	Rationale
4.1	Sidewalk at least 36 inches (3 feet) wide	+100% **(0.025)** * Weight within factor	Ideal circumstance.
4.2	Sidewalk less than 36 inches (3 feet) wide	–100% **(–0.025)**	Non-ideal circumstance.

5 Width of Sidewalk Surrounding Stop

7.5% Overall PCD Accessibility Rating

Same rationale as Factor 4. Together, Factors 4 and 5 make up 15% of the overall PCD rating.

Subfactor		PCD Weight (Balanced)	Rationale
5.1	Sidewalk at least 36 inches (3 feet) wide	+100% **(0.025)** * Weight within factor	Ideal circumstance.
5.2	Sidewalk less than 36 inches (3 feet) wide	–100% **(–0.025)**	Non-ideal circumstance.

6 Condition of Sidewalk

22.5% PCD Accessibility Rating

The condition of the sidewalk has a direct impact on whether someone with a mobility impairment can access the bus stop safely, and, for someone who uses a wheelchair, whether they can access the stop at all.

Subfactor		PCD Weight (Balanced)	Rationale
6A. Type of Issue			
6.0	No issues	+100% **(0.025)** * Weight within factor	Ideal circumstance.
6.1	Crack in sidewalk	0% **(0)**	Lowest risk (can most easily be traversed), but still a noticeable issue.
6.2	Unevenness	–35% **(–0.0394)**	Can pose a significant challenge for wheelchair users, as well as a tripping hazard for others walking, particularly older adults and others with disabilities.
6.3	Protruding sidewalk flags	–75% **(–0.0844)**	Prevents someone with a wheelchair from continuing and poses a serious tripping hazard for others with mobility and other disabilities.
6.4	Slant of sidewalk beyond 2% sidewalk width	–15% **(–0.0169)**	Could pose a hazard for wheelchair users, who may need to put in more effort to avoid veering into the street. Could also pose a tripping hazard for others walking.
6.5	Steep hill or hilly terrain	–5% **(–0.0056)**	Can make the first/last mile difficult for some, particularly older adults and others who may be frailer.
6.6	Other non-temporary obstruction or hazard preventing mobility	Assign based on what it's closest to	
6B. Location			
6.7	Sidewalk at stop	100% of 6A	Inevitable issue.
6.8	Sidewalk on block surrounding stop	90% of 6A	Only an issue if it gets in the way of the first/last-mile connection.
6.9	Crosswalk necessary to access stop	95% of 6A	Inevitable issue, but can be avoided to some small extent.
6.10	No issues	No change	

7 Easy Boarding

20% Overall PCD Accessibility Rating

Being able to board the bus as a mobility-impaired rider should be a prerequisite. However, this factor does not directly involve problems that could jeopardize riders' safety.

Subfactor		PCD Weight (Balanced)	Rationale
7.1	Bus can approach the curb and deploy the ramp AND mobility-impaired rider can board easily	0% **(0)** * Weight within factor	Ideal circumstance.
7.2	Bus cannot approach the curb and/or deploy the ramp AND/OR mobility-impaired rider cannot board easily	–100% **(–0.2)**	Non-ideal circumstance.

8 Immediate Obstructions and Safety Hazards

27.5% Overall PCD Accessibility Rating

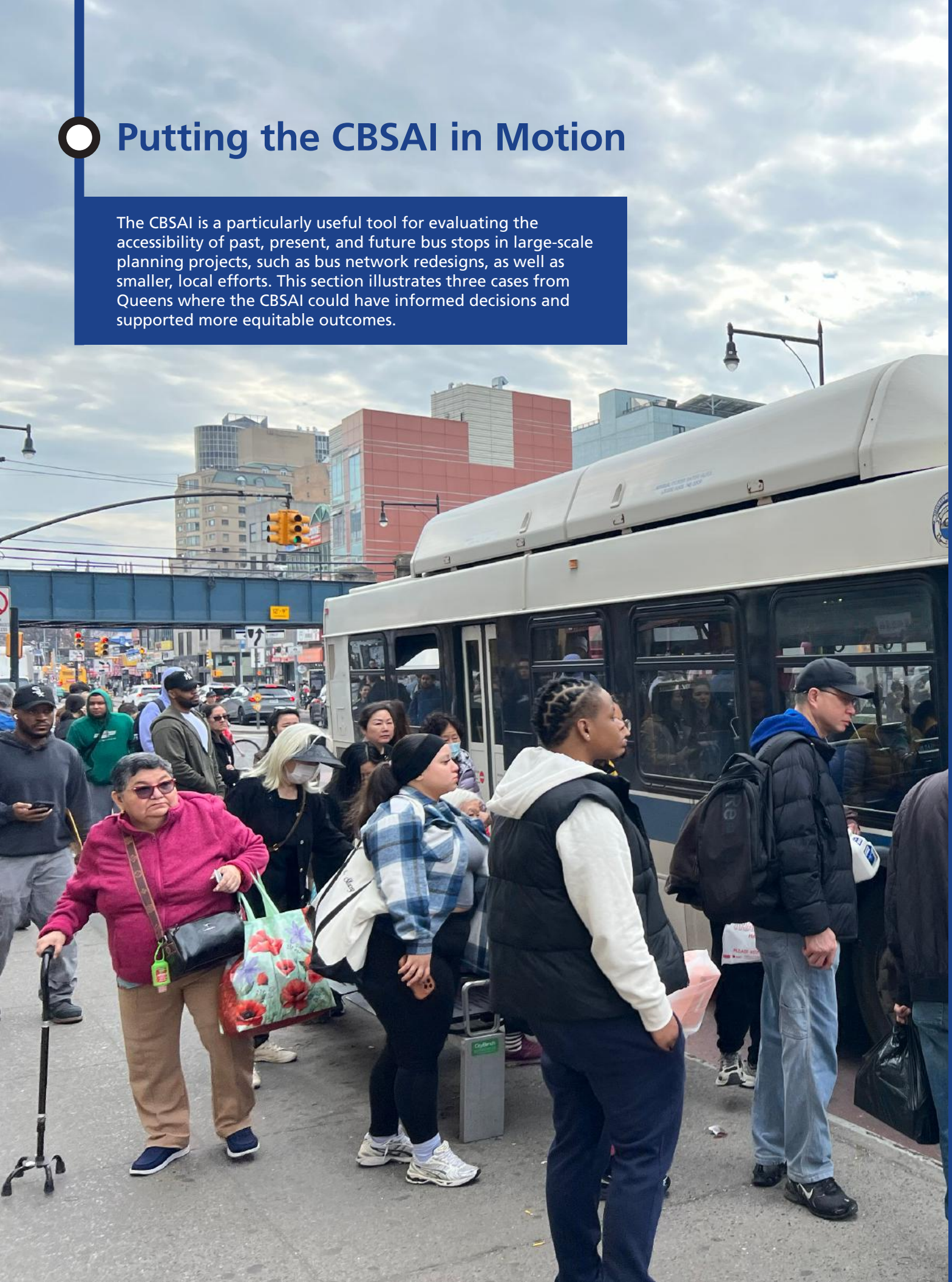
Being able to access the bus safely is critical, and location-based issues can directly affect both riders' safety and their ability to ride the bus at all.

Subfactor		PCD Weight (Balanced)	Rationale
8A. Type of Immediate Obstruction and/or Safety Hazard			
8.0	No immediate obstructions/safety hazards	0% **(0)** * Weight within factor	Ideal circumstance.
8.1	Stop located in a driveway	No weight	
8.2	Stop requires crossing a driveway, bike lane, or busy road to access (no traffic signals, signs, etc.)		
8.3	No proper lighting/poor visibility		
8.4	Other immediate obstruction/safety hazard		
8B. Risk/Implications for Riders			
8.5	High/immediate risk at stop	–100% **(–0.275)**	Greatest risk for riders waiting at the stop, as well as a potential obstruction to access the stop.
8.6	High/immediate risk, all directions to/from stop	–95% **(–0.2613)**	Greatest risk for riders walking to/from the stop.
8.7	High/immediate risk, at least 1 direction to stop	–60% **(–0.165)**	Greatest risk for riders walking to/from the stop from at least one particular direction, but not from the other(s).

Subfactor		PCD Weight (Balanced)	Rationale
8.8	Moderate risk at stop	–50% **(–0.1375)**	Lower risk for riders waiting at the stop, but the risk still exists.
8.9	Moderate risk, all directions to stop	–50% **(–0.1375)**	Lower risk for riders walking to/from the stop than heavy car traffic, but the risk still exists.
8.10	Moderate risk, at least 1 direction to stop	–25% **(–0.0688)**	Greatest risk for riders walking to/from the stop from at least one particular direction, but a clearer pathway still exists.
8.11	Unsafe at certain times of day	–65% **(–0.1788)**	Particularly problematic for those traveling at certain times of the day, but not for others traveling at different times of the day.
8.12	No safe mobility at all (Dealbreaker for the stop)	–500% **(–1.375)** PCD rating becomes negative	Dealbreaker for the stop. If one cannot access the stop safely at all, what value do the other CBSAI factors have?

Putting the CBSAI in Motion

The CBSAI is a particularly useful tool for evaluating the accessibility of past, present, and future bus stops in large-scale planning projects, such as bus network redesigns, as well as smaller, local efforts. This section illustrates three cases from Queens where the CBSAI could have informed decisions and supported more equitable outcomes.

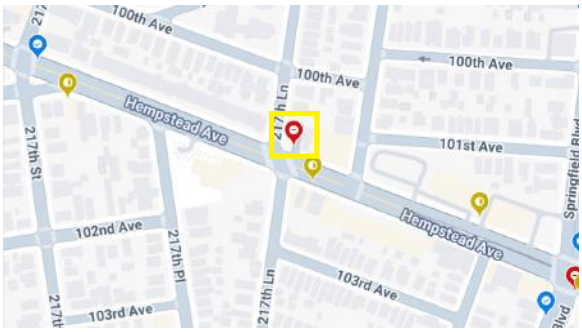


Case 1: Bus Stop Elimination
Hempstead Avenue, Queens Village

◕ **6** Hempstead Avenue and 217th Lane. Source: Google Street View.

Hempstead Avenue is a mixed-use corridor in residential Queens Village, a neighborhood located near the Queens-Nassau border. The former westbound Q110 bus stop at the near side of Hempstead Avenue and 217th Lane (highlighted in Figure 6) was eliminated in the Queens Bus Network Redesign. It was one of the nine areas designated for prioritized stop restoration in Phase 1 of this project for four reasons. First, this stop served an area with a high share of residents with mobility disabilities, according to the American Community Survey (see Phase 1, page 28). Second, it was the only stop in the immediate vicinity that had a bus shelter with seating. Third, it served a laundromat across the street. Fourth, the eastbound stop across the street (now served by the Q82 Rush route) was kept intact. It is also worth noting that many of the residential and commercial properties along Hempstead Avenue have active driveways — a potential risk factor for pedestrians.

We can use the CBSAI to compare the eliminated stop to its nearest westbound neighbors — Springfield Boulevard to the east and 217th Street to the west — and ascertain whether the neighboring stops are more accessible than the eliminated stop, as well as what factors go into their accessibility. In doing so, we can determine the vitality of this stop and, based on that, whether it should remain a priority to be restored.



◕ **7** Map of Hempstead Av with bus stops. Source: StopScan/Google Maps.

StopScan Results

West Neighboring Stop **Hempstead Avenue / 217th Street** WB Near	Eliminated Stop **Hempstead Avenue / 217th Lane** WB Near	East Neighboring Stop **Hempstead Avenue / Springfield Blvd** WB Far
EOD Rating: **0** PCD Rating: **3.88**	EOD Rating: **4.2** PCD Rating: **3.31**	EOD Rating: **5** PCD Rating: **3.79**
Contributing Factors:	**Contributing Factors:**	**Contributing Factors:**
1.4 Neither a bus shelter nor a bench/ seating (OR leaning bench only) 4.2 Sidewalk less than 36 inches wide 5.2 Sidewalk less than 36 inches wide 6.0, 6.10 No issues (sidewalk cond.) 7.1 Bus can approach the curb and deploy the ramp AND mobility-impaired riders can board easily 8.0 No immediate obstructions/safety hazards	1.1 Bus shelter with bench/seating 3.0 More than 1 facility 3.12 Laundromat, 3.7 Discount store 3.18 Within 250–300 feet, across the street 3.18.1 Wide and/or busy street or corridor, 3.18.2 Crosswalk is marked, 3.18.3 Crosswalk has pedestrian signals 4.1 Sidewalk at least 36 inches wide 5.1 Sidewalk at least 36 inches wide 6.1 Crack in sidewalk 6.7 Sidewalk at stop 7.1 Bus can approach the curb and deploy the ramp AND mobility-impaired riders can board easily 8.2 Stop requires crossing a driveway, bike lane, or busy road to access (no traffic signals, signs, etc.) 8.7 High/immediate risk, at least 1 direction to stop	1.4 Neither a bus shelter nor a bench/ seating (OR leaning bench only) 3.0 More than 1 facility 3.6 Grocery store / Supermarket, 3.16 Transfer to other transit 3.16.1 Transfer to non-parallel bus 3.17 Within 250–300 feet, same side of street 4.1 Sidewalk at least 36 inches wide 5.1 Sidewalk at least 36 inches wide 6.0, 6.10 No issues (sidewalk cond.) 7.1 Bus can approach the curb and deploy the ramp AND mobility-impaired riders can board easily 8.2 Stop requires crossing a driveway, bike lane, or busy road to access (no traffic signals, signs, etc.) 8.7 High/immediate risk, at least 1 direction to stop

Based on these results, the following can be said about these three bus stops:

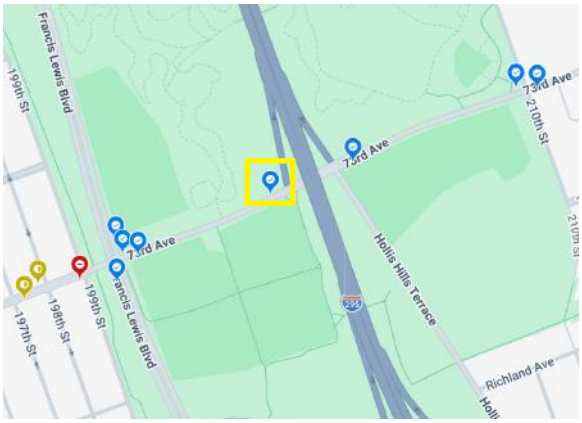
- The Pathway Conditions ratings are fairly similar for all three stops, indicating that they adequately support safe mobility, but the factors that yield these ratings differ more between the 217th Lane and 217th Street stops than the 217th Lane and Springfield Boulevard stops.
- The stops at 217th Lane and Springfield Boulevard both serve multiple essential commercial establishments, and thus they are more accessible based on their proximity to them, as indicated by their Essential Origins and Destinations ratings.
- The active driveways at the 217th Lane and Springfield Boulevard stops pose safety hazards getting to/from the crosswalks, which the 217th Street stop does not have.
- At all three of these stops, buses have enough room to approach the curb and deploy the wheelchair ramp, and mobility device users have enough room to board.

Therefore, it is safe to conclude that, based on the CBSAI results and contextual information about the area, the Springfield Boulevard stop is, in general, more vital than the 217th Lane stop. Nonetheless, the 217th Lane stop is still vital enough for restoring it to be a priority based on its proximity to both the laundromat and the discount store, as well as its similar pathway conditions. The 217th Street stop is not a satisfactory alternative because, even though it has a slightly higher Pathway Conditions rating, the sidewalk is too narrow and the essential services at 217th Lane are too far away to be reflected in the stop's Essential Origins and Destinations rating.

Case 2: Bus Stop Addition
73rd Avenue, Cunningham Park

◕ **8** Site of new Q88 bus stop at 73rd Av & Clearview Expressway exit ramp. Source: Google Street View.

The Queens Bus Network Redesign did not only involve bus stop consolidation; in fact, some bus stops were added along existing routes. But just how beneficial are these added stops? One example is along 73rd Avenue in Cunningham Park, which separates Fresh Meadows from Oakland Gardens. A westbound stop was added along the Q88 route, which runs along this stretch of 73rd Avenue, just past the Clearview Expressway (I-295) exit ramp. Based on the map alone, it seems that this stop serves to address a gap in stop coverage, expanding access to westbound Q88 service for park users and visitors. However, a site evaluation of the stop using the CBSAI would suggest a different conclusion.



◕ **9** Map with stops on 73rd Av in Cunningham Park. Source: StopScan/Google Maps.

StopScan Results

Added Stop
73rd Avenue / Clearview Expwy WB Far

EOD Rating: **1.8**

PCD Rating: **–4.67**

Contributing Factors:

1.4 Neither a bus shelter nor a bench/seating (OR leaning bench only)
3.13 Park or recreation center
3.18 Within 250–300 feet, across the street
3.18.1 Wide and/or busy street or corridor
4.1 Sidewalk at least 36 inches wide
5.1 Sidewalk at least 36 inches wide
6.0, 6.10 No issues (sidewalk conditions)
7.2 Bus cannot approach the curb and/or deploy the ramp AND/OR mobility-impaired riders cannot board easily
8.2 Stop requires crossing a driveway, bike lane, or busy road to access (no traffic signals, signs, etc.)
8.12 No safe mobility at all (Dealbreaker for the stop)

For Comparison
73rd Avenue / Hollis Hills Terrace EB Far

EOD Rating: **1.8**

PCD Rating: **4.09**

Contributing Factors:

1.4 Neither a bus shelter nor a bench/seating (OR leaning bench only)
3.13 Park or recreation center
3.17 Within 250–300 feet, same side of street
4.1 Sidewalk at least 36 inches wide
5.1 Sidewalk at least 36 inches wide
6.1 Crack in sidewalk
7.1 Bus can approach the curb and deploy the ramp AND mobility-impaired riders can board easily
8.0 No immediate obstructions/safety hazards

The StopScan results above compare the added westbound stop to its eastbound counterpart at the far side of Hollis Hills Terrace (on the other side of the Clearview Expressway). Based on these results, the following can be said about these three bus stops:

- The sidewalk at the westbound stop is wide enough to be ADA-compliant, as is its eastbound counterpart.
- The sidewalk at the westbound stop is even, level, and well-maintained.
- Both the westbound and eastbound stops are within 200 feet of an entrance to the park.

However, there is no crosswalk at all between the westbound stop and the park entrance, and, as a result, no safe pathway exists between the two. This is an example of a "dealbreaker" stop, which is denoted by a negative Pathway Conditions rating. Other favorable conditions are outweighed when riders cannot access the stop (or nearby destinations from the stop) without jeopardizing their safety, or if the stop cannot be accessed at all. In this case, because there is no way to get between the stop and the only destination around it (the park entrance), the benefits of the sidewalk at the stop being wide, even, level, and well-maintained are nullified.

Solutions to a dealbreaker stop, which are subjective for each, may include either relocating the stop to a location where the issue does not exist or creating a safe pathway, such as a crosswalk to bridge the gap. In this case, there is a park entrance right across the street, and a series of baseball fields are located right past this entrance. Therefore, there are two logical solutions to this dealbreaker stop. The first is to add a crosswalk at the Clearview Expressway off-ramp intersection so bus riders can enjoy the stop location's close proximity to the baseball fields. The second is to relocate the stop to the near side of the Clearview Expressway on-ramp intersection — right across from the stop's eastbound counterpart — where a signalized crosswalk already exists. There are benefits and drawbacks to each option, and those should be weighed carefully when deciding between them.

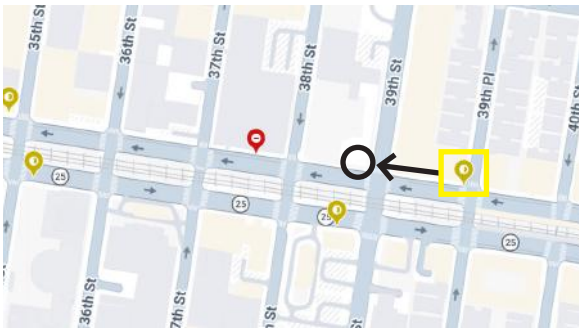
Case 3: Bus Stop Relocation and Redesign
Queens Boulevard, Sunnyside

10 Sunnyside Community Services seniors outside Queens Blvd / 39th Place stop rally against its relocation.

In 2025, bike lanes were added to Queens Boulevard, the central east-west thoroughfare in Queens. In the western part of the borough, where the 7 subway line runs between the east and west lanes, the bike lanes are protected and run on the perimeters of the street. As a result, the bus stops along this stretch of Queens Boulevard are being redesigned as boarding islands in an effort to reduce conflicts between bike traffic and buses.

Additionally, it was decided to relocate the westbound Q32 and Q60 bus stop at the far side of Queens Boulevard and 39th Place one block east to 39th Street and build a boarding island there. The stop was previously located right in front of Sunnyside Community Services, which provides congregate programs for older adults and people with disabilities, among other community members. The former stop was also on the same block as a Dollar Tree, another essential business. Bus riders are now required to cross both a two-way street and an active bike lane in order to access the stop from either Sunnyside Community Services or the Dollar Tree.

The CBSAI can help weigh the implications of this decision on accessibility for older adults and people with disabilities who rely on this stop, as well as any alternatives. Site evaluations were conducted at both the old and new stop locations.



11 Map of Queens Blvd with bus stops. Source: StopScan/Google Maps.

StopScan Results

Former Stop **Queens Boulevard / 39th Place** WB Far **(Curb)**	Relocated Stop **Queens Boulevard / 39th Street** WB Far **(Island)**	Once-Proposed Alternative **Queens Boulevard / 39th Place** WB Far **(Island)**
EOD Rating: **5** PCD Rating: **4.06**	EOD Rating: **3** PCD Rating: **2.19**	EOD Rating: **5** PCD Rating: **2.45–3.57**
Contributing Factors:	**Contributing Factors:**	**Contributing Factors:**
1.4 Neither a bus shelter nor a bench/seating (OR leaning bench only) 3.0 More than 1 facility 3.4 Senior center / Community services, 3.7 Discount store 3.17 Within 250–300 feet, same side of street 4.1 Sidewalk at least 36 inches wide 5.1 Sidewalk at least 36 inches wide 6.5 Steep hill or hilly terrain 6.8 Sidewalk on block surrounding stop 7.1 Bus can approach the curb and deploy the ramp AND mobility-impaired riders can board easily 8.0 No immediate obstructions/safety hazards	1.1 Bus shelter with bench/seating 3.0 More than 1 facility 3.4 Senior center / Community services, 3.7 Discount store 3.20 On the street the bus route is on only, on the next block over 3.18.1 Wide and/or busy street/corridor, 3.18.2 Crosswalk is marked, 3.18.4 Crosswalk has APS 4.1 Sidewalk at least 36 inches wide 5.1 Sidewalk at least 36 inches wide 6.5 Steep hill or hilly terrain 6.8 Sidewalk on block surrounding stop 7.2 Mobility-impaired riders cannot board easily 8.2 Stop requires crossing a bike lane to access (no traffic signals, signs, etc.), 8.4 Other safety hazard 8.7 High/immediate risk, ≥1 dir. to stop	1.1 Bus shelter with bench/seating 3.0 More than 1 facility 3.4 Senior center / Community services, 3.7 Discount store 3.17 Within 250–300 feet, same side of street 4.1 Sidewalk at least 36 inches wide 5.1 Sidewalk at least 36 inches wide 6.5 Steep hill or hilly terrain 6.8 Sidewalk on block surrounding stop *7.1 and 7.2 Both easy boarding scenarios considered* 8.2 Stop requires crossing a driveway, bike lane, or busy road to access (no traffic signals, signs, etc.) 8.9 Moderate risk, all directions to stop

Based on these results, the following can be said about the now-current and former bus stops, as well as an alternative scenario in which a boarding island were built at the former stop location:

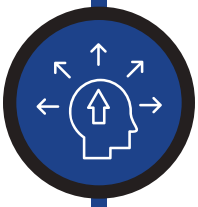
- Although the boarding island introduced a bus shelter with seating, it added a moderate to high safety risk by requiring pedestrians to interact with cyclists and e-cyclists (depending on where they cross the bike lane), therefore canceling out the shelter's improvement to the Pathway Conditions rating.
- The relocation reduced the stop's accessibility based on both the stop's proximity to essential destinations (Sunnyside Community Services) and its pathway conditions.
- The hilly terrain became more of an accessibility barrier with greater first- and last-mile distances.
- The pathway width at the narrowest points on the boarding island (the sides of the shelter) is just 36 inches. Although technically ADA-compliant, it is too narrow to enter the bus from the shelter using the wheelchair ramp (CBSAI Factor 7). Buses can only deploy the ramp if they stop before the shelter.

It is safe to conclude that relocating the bus stop at 39th Place significantly reduced its accessibility for those reliant on Sunnyside Community Services' congregate programs. Therefore, the stop location should've be kept intact at a minimum. The alternative — adding a boarding island at 39th Place — should also not be pursued without interventions to improve safety for pedestrians crossing the bike lane. Such measures include rectangular rapid flashing beacons (RRFBs), rumble strips, bollards, and other traffic calming measures to slow cyclists and e-cyclists down and require them to stop for pedestrians, as they are legally obligated to do. Such measures to protect more vulnerable pedestrians should be added at every stop that requires crossing bike traffic to access.

Adopting the CBSAI
Key Considerations

Site evaluations power the CBSAI.

The CBSAI is powered by data collected through observations of each stop and the conditions around it, which can be done on-site (ideally) or through interactive imagery technology, such as Google Street View, mounted cameras onboard vehicles, or other similarly effective solutions. The MTA and NYC DOT's bus planning teams, as well as any consulting partners involved in a bus stop planning initiative, would be responsible for collecting accessibility data for each bus stop involved through these site evaluations. ***Regardless of the project's scale, these bus stop evaluations should be conducted at the first possible opportunity, ideally before the plan (or a version of it) is released to the public.*** If not completed before public release, they should still be conducted as early as possible.



The results only mean so much on their own.

Even though the Essential Origins and Destinations and Pathway Conditions accessibility ratings are on a scale of 0 to 5, they should always be interpreted in the proper context. This may include the surrounding area, the stops nearby, as well as any particular problem or question to be answered using the CBSAI. An EOD rating of 0, for example, might have a completely different meaning if the stop is located in a suburban residential zone as opposed to a commercial corridor or even a wooded area. The data are supposed to guide planning decisions, not replace contextual judgment. Each CBSAI factor should also be considered and interpreted within its proper context.

It's an investment where everyone wins.

The CBSAI uses a spreadsheet with its calculations embedded into a dataset of all bus stops. Thus, the CBSAI does not require any complex or expensive technology to use. Adopting it and conducting accessibility evaluations of bus stops would modify the planning process using existing resources rather than require a complete overhaul or major capital investment. As a result, the associated costs — which would primarily involve labor — are expected to be modest.

At the same time, the CBSAI's data-driven design can help reduce the risk of ADA-related compliance complications later in the planning and implementation processes, potentially serving as a longer-term cost-saving measure. Additionally, its analytical approach will also help improve both agencies' transparency with stakeholders, including elected officials, community groups, and especially the general public. Overall, if properly implemented and supported by decision-makers and stakeholders, the CBSAI can provide broad benefits for all involved in the planning process.

Conclusion

The tradeoff between bus speeds and accessibility for mobility-impaired riders continues to be oversimplified in the MTA and NYC DOT's bus stop planning initiatives, especially the Bus Network Redesigns. The Comprehensive Bus Stop Accessibility Index (CBSAI) was created to address this critical gap in the MTA and NYC DOT's bus planning processes. By centering the needs and lived experiences of mobility-impaired riders — which very often differ from those of able-bodied riders — the CBSAI adds a long-missing layer of understanding for transportation practitioners and other decision-makers.

By combining qualitative and quantitative observations into a measurable framework, the CBSAI serves not only to inform planning and policy decisions but also to improve both agencies' accountability to the riding public. Accountability is necessary to build trust, which is integral to a planning process aimed at centering riders' needs. By building trust, more equitable and effective outcomes can be achieved.

We urge the MTA and NYC DOT to adopt the CBSAI (if not a similar but equally effective method) for their bus stop planning, placement, and consolidation efforts. The CBSAI is not a complete overhaul of the system, but rather a tool that can easily be implemented using existing resources. But it is also a tool that can change lives for the better.

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Note: The data and CBSAI calculations are current as of the publication of this report.

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