BALTIMORE BIG JUMP SHARED USE PATH PILOT PROJECT EVALUATION

FINAL REPORT

December 2020

Brandon M. Scott
Mayor

DEPARTMENT OF TRANSPORTATION
BALTIMORE CITY

BALTIMORE BIG JUMP SHARED USE PATH
PILOT PROJECT EVALUATION FINAL REPORT

Prepared for City of Baltimore Department of Transportation

December 2020

TOOLE DESIGN

Toole Design Project Team

Fred S. Lippert, PLA
Kathleen Hayes, PLA
Barbara Mosier, PE, PTOE
Emily Koehle, PE
Sheila Borkar, PE
Dan Goodman, AICP
Jared Draper, AICP
Alexa Heidrich
Kerry Aszklar
Arthur Cashwell
Galen Omerso
Hugh Kelley

Cover photo by Side A Photography

Contents

Executive Summary

Conceived as a pilot demonstration project, the Baltimore Big Jump Shared Use Path (SUP) was envisioned as a protected path that would provide a direct, safe, and comfortable connection between the geographically separated neighborhoods of Reservoir Hill and Remington. Installed in 2018, this shared use path on Druid Park Lake Drive continues to provide a safe and comfortable connection for people walking and biking, strategically using flexible and low-cost materials that allow "on-the-fly" adjustments. Findings from analysis of this pilot project, including community feedback, support installing it as a permanent solution.

Background

Originally a two-lane residential street, Druid Park Lake Drive once facilitated easy access between the Park and its adjacent neighborhoods. Mid-century roadway expansions continued the pattern of racist transportation planning and policy decisions of the time with the construction of Druid Hill Expressway and Jones Falls Expressway (I-83), both of which served to segregate existing Black and Jewish communities from the park.

Today, the Jones Falls waterway, the MTA Light RailLink tracks, and I-83, with its associated interchange ramps, all present a formidable barrier for those attempting to travel between the two neighborhoods by foot, bike, or wheelchair.

The project repurposes one eastbound travel lane for walking and biking across the Jones Falls waterway, the MTA Light RailLink tracks, and the Jones Falls Expressway/I-83.

The inequity of inadequate pedestrian facilities in the Druid Lake Park Drive corridor is compounded by the fact that a large percentage of households in Reservoir Hill are without access to a personal motor vehicle. The lack of multimodal facilities and public transit in the Druid Lake Park Drive corridor combined with Reservoir Hill residents' lack of access to personal motor vehicles underscores the transportation mode disparity in this corridor and illustrate the need for high quality, equitable transportation options linking Reservoir Hill and Remington that do not require the use of a personal motor vehicle.

Findings and Recommendations Support Making the Big Jump Permanent

ADDRESSES HISTORICAL INJUSTICE TO LOCAL COMMUNITIES

- Without the Big Jump SUP, the existing connection between the Reservoir Hill and Remington neighborhood presents a hostile environment with no ADA-compliant route for anyone attempting to travel outside of a motor vehicle.
- The lack of a direct public transit connection combines with Reservoir Hill's higher than City-wide average of households without access to a motor vehicle to reveal a transportation option disparity and limiting factor on those residents' economic opportunities.
- The Big Jump SUP enables greater access to jobs for local communities, improves health benefits through better access to parks, and ultimately delivers transportation investment that centers racial justice.

PROVIDES CRITICAL MULTIMODAL CONNECTIVITY WITHOUT IMPACTING MOTOR VEHICLE MOBILITY

- Crash data was analyzed before and after the introduction of the Big Jump SUP, and a reduction of total crashes was observed suggesting that fewer vehicle travel lanes had a net-positive safety effect for all users in the corridor.
- An important topic for further study is the frequency of near misses, which are more common than collisions and have a significant influence on on subjective feelings of safety. Fostering a high level of perceived safety is necessary to attract and retain Big Jump SUP users.
- High volumes of motor vehicle traffic during the peak periods kept average speeds in the corridor close the posted speed limit, however outside these times, excessive speeds, at nearly twice the limit, were observed, necessitating further speed reduction countermeasures.

Overall, 87% of the 174 survey respondents valued the Big Jump Shared Use Path and believed it should be made permanent. (Source: Side A Photography)

- Travel time data from four different periods was analyzed to see if the reduction in vehicle travel lanes (capacity) resulted in an unacceptable increase in travel time through the corridor (delay). The reduction in capacity was found to have no significant travel time impact on neighboring streets, communities, or parallel routes.
- The Big Jump SUP achieves BCDOT's stated goal of increasing pedestrian and bicycle mobility by reducing users' traffic stress via the SUP's physical separation from motor vehicles; by limiting the amount of detour required via the most direct route between neighborhoods; and by improving accessibility for users of wheelchairs and other mobility devices.

MOVING FORWARD

- Institute permanent design changes that include improving the street design to build upon the ADA accessibility achievement, providing for physical separation between cars and people, formalizing the functional width of the path, minimizing SUP users' exposure to traffic at intersections, and implementing additional traffic calming measures on Druid Park Lake Drive to make a more cohesive non-motorized route for people.
- Establish specific performance measures for the Big Jump SUP, in alignment with aligned with BCDOT goals for the Big Jump SUP, as well as broader City transportation goals as set forth in Baltimore City Code, Article 26–Subtitle 40 Complete Streets, and the Baltimore City Complete Streets Design Manual.
- Establish ongoing data collection and monitoring for tracking against performance measures.

BIG JUMP SHARED USE PATH: PURPOSE AND CONTEXT

PROJECT PURPOSE

Conceived as a pilot/demonstration project, the Baltimore Big Jump Shared Use Path (SUP) was envisioned as a protected path that would provide a safe and comfortable connection between the geographically separated neighborhoods of Reservoir Hill and Remington. The Jones Falls waterway, the MTA Light RailLink tracks, and the Jones Falls Expressway/Interstate 83 (I-83), with its associated interchange ramps, all combine to present a formidable barrier for those attempting to travel between the two neighborhoods without the aid of a motor vehicle. Further hampering neighborhood connectivity is the lack of a pedestrian route that is compliant with the Americans with Disabilities Act (ADA) on both existing bridges that traverse I-83 on West 28th and 29th Streets.

To address this connectivity problem, a collaboration among Baltimore City Council members, community and advocacy groups, and the Baltimore City Department of Transportation (BCDOT) sought and received grant funding from the Big Jump Project, a program developed by the national organization People for Bikes. The Big Jump Project provides funding and technical expertise to assist communities in undertaking demonstration projects where strategic infrastructure connections are leveraged to provide increased transportation options to make those communities better places to live, work, and play.

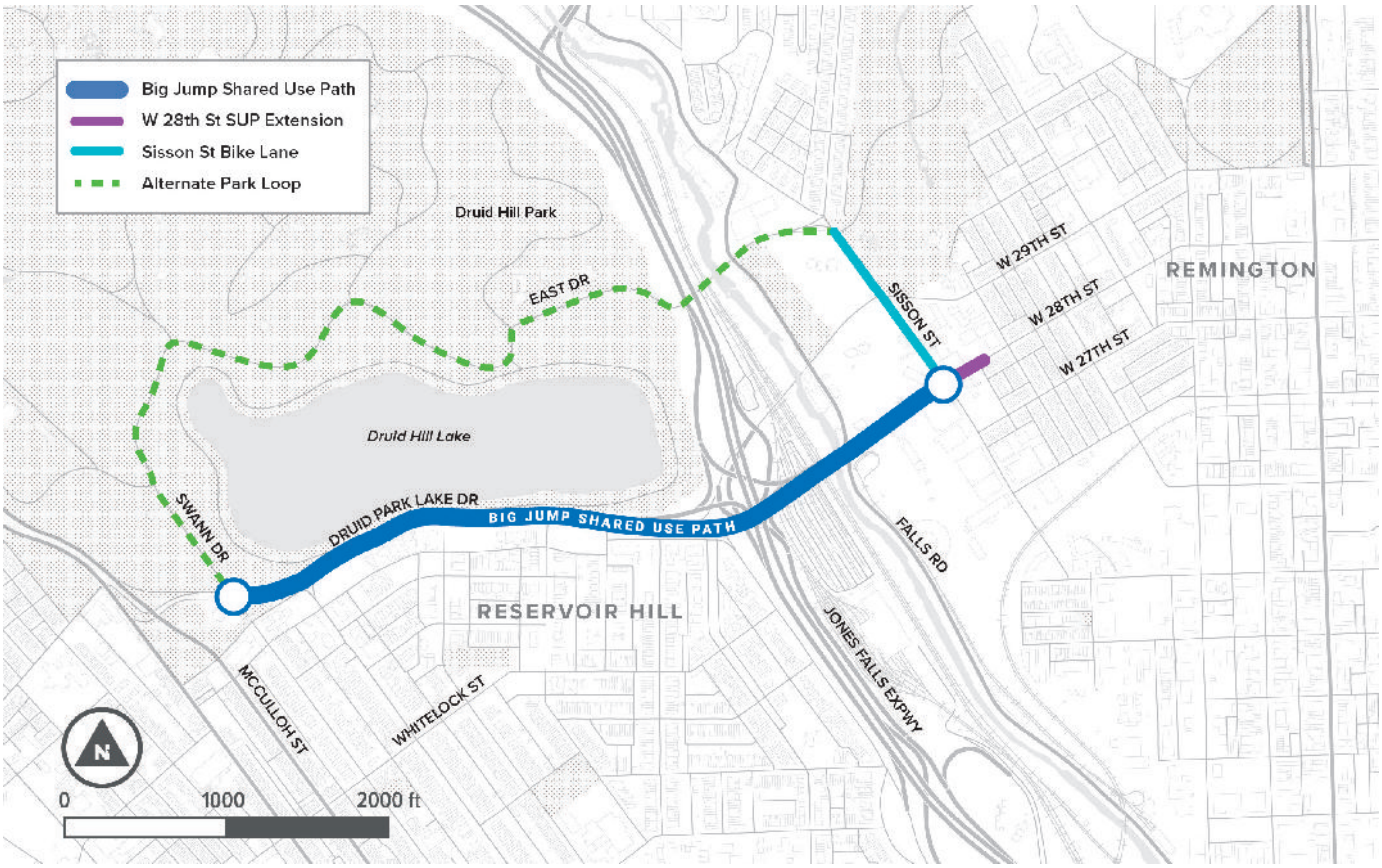
A Non-ADA compliant pedestrian bridge crosses over the Druid Park Lake Drive ramp to Mt. Royal Terrace and the signed route to access I-83 South. (Source: Toole Design)

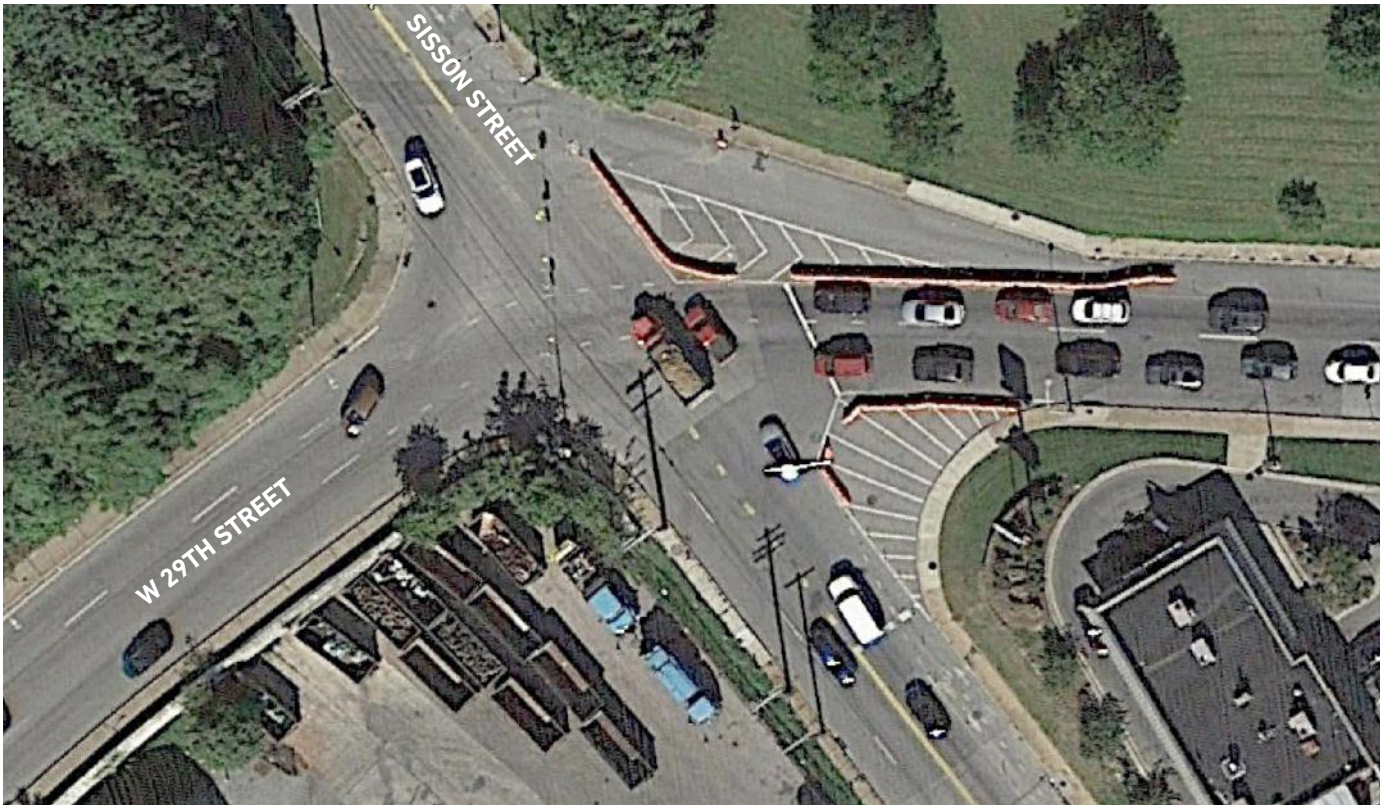
Through the combined planning effort of local community organizers and advocates, City Council representatives, and the project team at BCDOT, a route was selected for

the Baltimore Big Jump SUP that would re-purpose a motor vehicle travel lane on Druid Park Lake Drive and the W. 28th Street bridge as a 10- to 12-foot wide, two-way shared use path. Given the demonstration/pilot nature of the project, the team recognized the need for material choices that would allow for "on-the-fly" adjustments and the ability to respond to changing conditions as the pilot progressed. The water-filled traffic channelization barriers selected to retrofit the existing roadway were intended to provide a path without creating substantial changes to roadway drainage, employ readily available materials, and provide a high level of protection from motor vehicles.

The Baltimore Big Jump SUP extends east along Druid Park Lake Drive beginning at Madison Avenue and continuing across the W. 28th Street bridge to the intersection with Sisson Street where it presents two options to users: Continue northeast on W. 28th Street, a SUP protected by water-filled barriers extends to Atkinson Street where users can then travel one block south to W. 27th Street to continue eastbound towards the north-south protected bicycle lane on Maryland Avenue; Continue northwest on Sisson Street, a pop-up

Figure 1. The Big Jump Shared Use Path





Water-filled barriers installed at the intersection of Sisson Street and W. 29th Street reduce the roadway width of W. 29th Street, provide a refuge area and shorten the crossing distance of W. 29th Street. (Source: Google Earth)

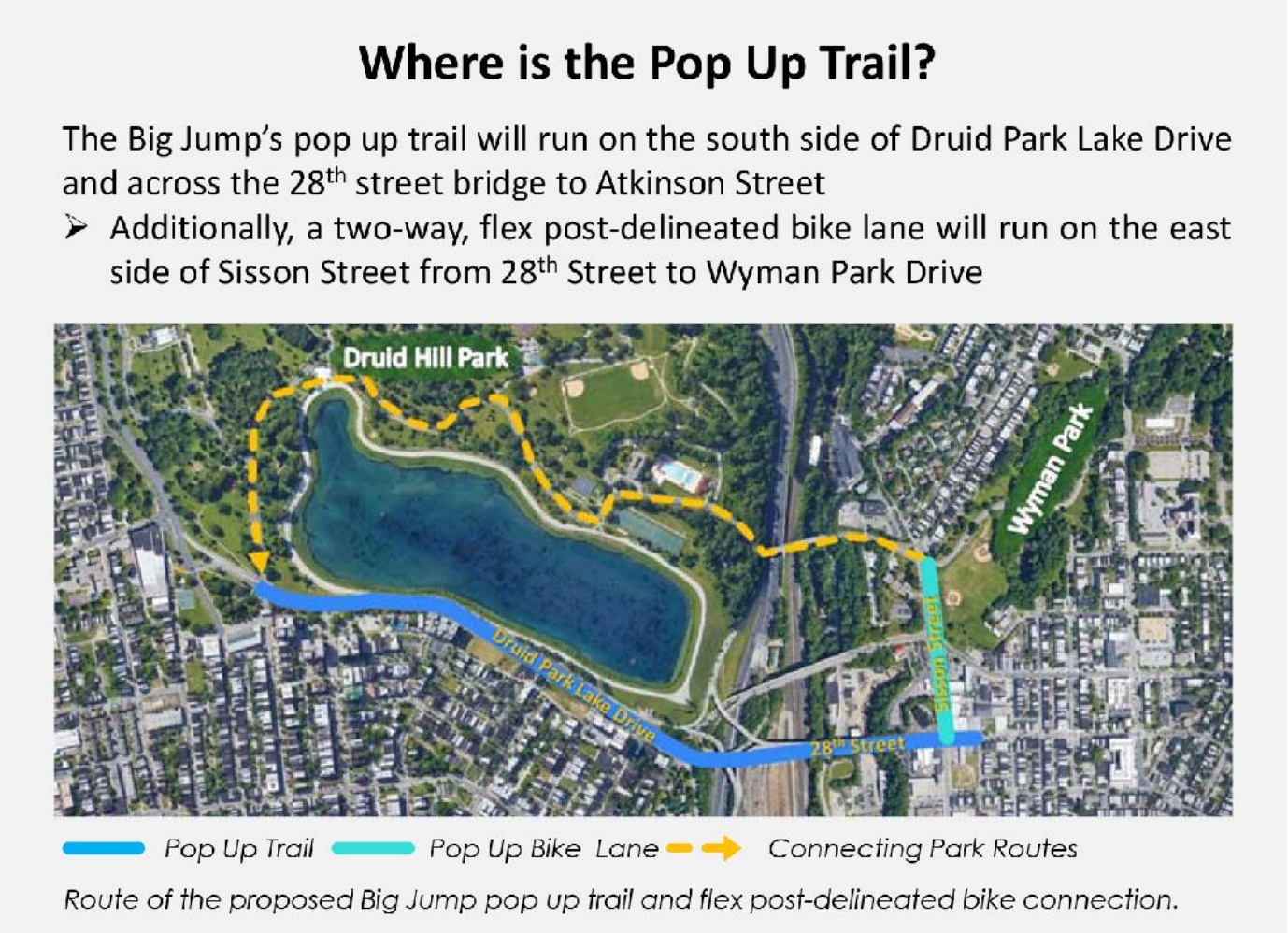
two-way bike lane protected by surface mounted flex posts extends to Wyman Park Drive. Along this path, water-filled barriers installed at the intersection of Sisson Street and W. 29th Street reduce the roadway width of W. 29th Street, provide a refuge area for users waiting to cross W. 29th Street, and shorten the overall crossing distance across W. 29th for non-motorists from approximately 150 feet to 50 feet.

The route selected for the Baltimore Big Jump SUP coordinates with on-going work by Baltimore City Department of Public Works' (DPW) Druid Lake Reservoir project. This DPW project is installing underground water tanks at Druid Lake Reservoir, and its work necessitates extended motor vehicle travel lane closures on Druid Park Lake Drive, as well as the closure of portions of the Park Loop, a recreation path that made a circuit around the reservoir. The route for the Big Jump SUP makes use of these anticipated disruptions to provide a new ADA-accessible route for people walking, running, biking, and using scooters or wheelchairs between the Reservoir Hill and Remington neighborhoods, as well as an alternate for the disrupted Park Loop via the Sisson Street and Wyman Park Drive connection back to the park.

Public messaging about the purpose and need for the Baltimore Big Jump SUP began with two community meetings in late April 2018. Construction began in early summer of the same year, and the Baltimore Big Jump SUP was fully operational by the end of June. In August 2018, the new Big Jump SUP was celebrated with an on-site block party that featured group bike rides, walking tours, food, music, and family-friendly activities. In the Fall of 2019, BCDOT implemented traffic signal adjustments, barrier modifications, and additional safety treatments to refine and improve mobility for all modes. Today, over two years since its opening, the Big Jump SUP remains operational.

Materials developed by BCDOT for the community meetings included a location map showing the Big Jump SUP route (blue), the Sisson Street pop up bike lane (green), and the alternate Park Loop (yellow).

Figure 2. BCDOT Promotional Materials Illustrating the Location of the Big Jump SUP



Route of the proposed Big Jump pop up trail and flex post-delineated bike connection.

HISTORICAL CONTEXT

Druid Park Lake Drive, which serves as host to the largest section of the Big Jump SUP, was originally designed as a two-lane residential street with easy access to Druid Hill Park. Residents of Reservoir Hill could cross Druid Park Lake Drive on foot to enjoy the park or continue over the Wyman Park Drive bridge into Remington.[1]

Today, Druid Park Lake Drive joins with portions of Reisterstown Road, Auchentoroly Terrace, McCulloh Street, and Druid Hill Avenue to form a multi-lane, motor vehicle focused commuter corridor that runs the length of the western and southern edges of Druid Hill Park with few intersections or crossings into the park.

The corridor's modern incarnation as a commuter focused, high-speed, motor vehicle prioritized roadway began with the opening of the Druid Hill Expressway project in 1948.[2] Despite opposition from the local community at the time, the expressway project moved forward and set the tone for the subsequent travel lane expansions in following years. The completion in 1963 of the Jones Falls Expressway (I-83) further contributed to the transformation of the corridor into a highway-like roadway and created additional barriers between the neighborhoods of Reservoir Hill and Remington. These roadway expansions effectively cut off the surrounding working class Jewish and Black neighborhoods from one of West Baltimore's largest public amenities, Druid Hill Park, to prioritize faster motor vehicle commute times[3] for predominantly white suburban residents.

The creation of these expressways precisely follows a pattern found in many major U.S. cities where racist transportation planning and policy decisions during the creation of the Interstate Highway System have had a significantly negative and lasting impact on poor and minority communities.[4] Along with the 1950s-era federally funded interstate highway system, the federal government subsidized the creation of suburbs with racially restrictive covenants that combined with racially discriminatory lending practices such as redlining to restrict not only Black Americans' home choices, but their economic upward mobility. Furthermore, urban renewal efforts from the 1930s through the 1970s resulted in the displacement and destruction of Black neighborhoods to make way for new or

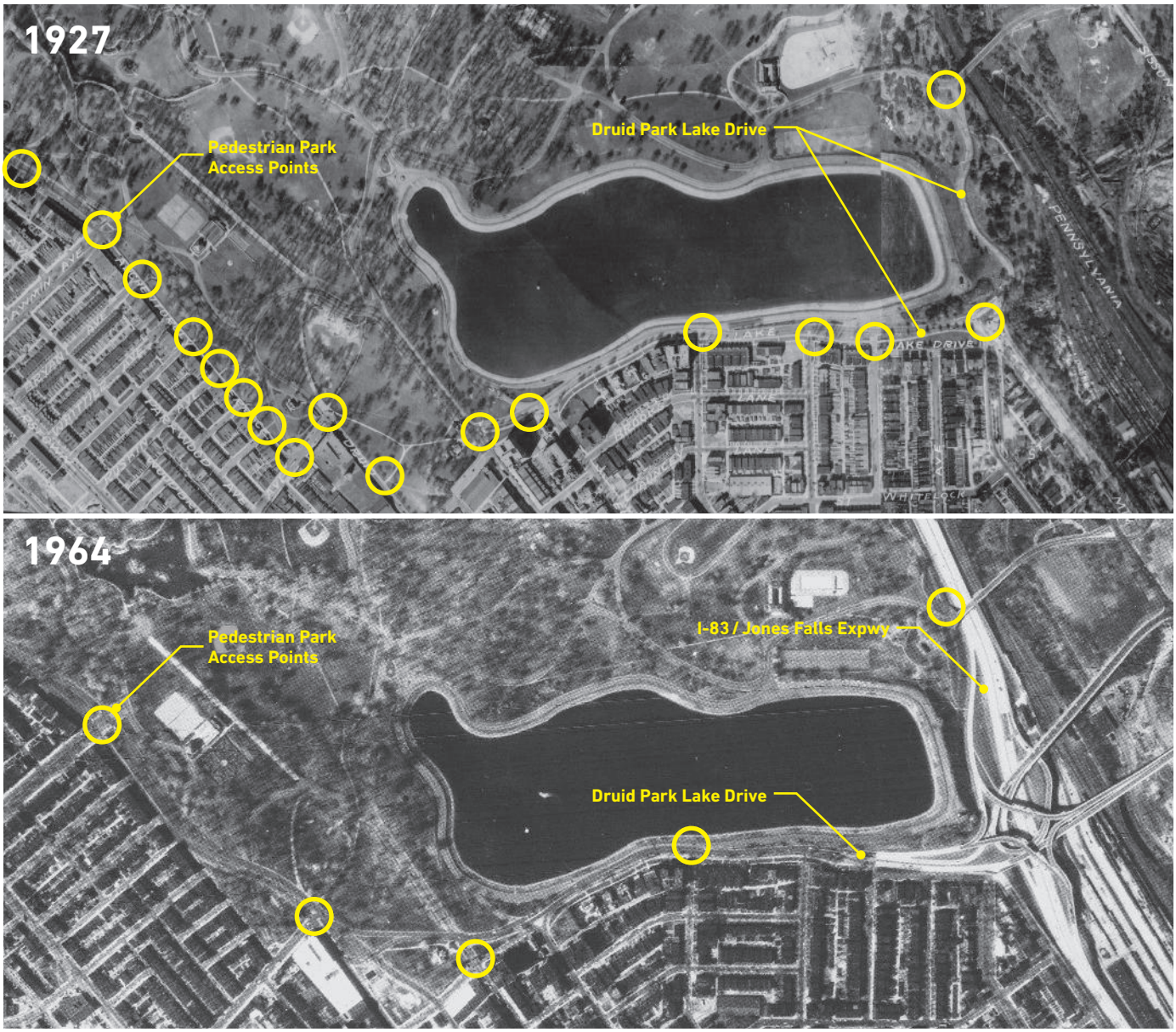
1. Holt, Alex. "Baltimore's 'Big Jump' path aims to bridge highways and historic wrongs." *Greater Greater Washington*, November 21, 2019. https://ggwash.org/view/74806/baltimores-big-jump-links-people-across-transportation-highway-neighborhoods

2. Hindman, Daniel. "Right a past wrong by opening access to Druid Hill Park." *Baltimore Sun*, October 19, 2017, https://www.baltimoresun.com/opinion/op-ed/bs-ed-op-1020-druid-hill-expressway-20171017-story.html

3. Leon F. Pinket III, letter to the Editor, *Baltimore Sun*, July 5, 2018, https://www.baltimoresun.com/opinion/readers-respond/bs-ed-rr-druid-accessible-letter-20180705-story.html

4. Karas, David. "Highway to Inequity: The Disparate Impact of the Interstate Highway System on Poor and Minority Communities in American Cities." (2015).

Figure 3. The Transformation of Druid Lake Park Drive Between 1927 and 1964



Aerial Photographs from 1927 (top) and 1964 (bottom) depict park-side roadway expansions and the creation of the interstate highway. In 1927, Druid Park Lake Drive was a two-lane park-front street which wound around the south and east sides of Druid Lake, and numerous pedestrian access points offered connections between the surrounding neighborhoods and Druid Hill Park. By 1964, Interstate 83 had been built and Druid Park Lake Drive had been transformed into a multi-lane arterial that cut through the southwest corner of Druid Hill Park, cutting off park access to neighborhood residents. (Source: Johns Hopkins University Sheridan Libraries)

widened roadways. Even neighborhoods that were not destroyed were subjected to isolation, increased segregation, and disinvestment.[5]

The structural racism imbued in these past transportation projects and policy-driven residential patterns is a legacy that continues to affect the wealth disparities between people of color and white, non-Hispanic people by limiting people of color's access to jobs as a result of unequal availability of high-quality, reliable, and safe transportation.[6]

THE DRUID PARK LAKE DRIVE CORRIDOR TODAY

The cumulative effect of roadway expansions in the Druid Park Lake Drive corridor include a loss of pedestrian access from Reservoir Hill to Druid Hill Park, and the creation of a hostile environment for anyone attempting to travel outside of a motor vehicle between the Reservoir Hill and Remington neighborhoods.

Today the existing pedestrian connection between Reservoir Hill and Remington on the W. 28th Street bridge, aside from the Big Jump SUP, consists of a four and a half-foot wide sidewalk with a non-ADA compliant pedestrian bridge over Mount Royal Terrace. The Mount Royal Terrace pedestrian bridge's stairs, drainage channels, and non-ADA hand railings make it impossible to navigate with a wheelchair or mobility device, and the bridge terminates abruptly at the western end into curbside parallel parking with no continuing sidewalk, crosswalk, or ramp (ADA or otherwise).

The inequity of inadequate pedestrian facilities in the Druid Lake Park Drive/28th Street corridor is compounded by the fact that a large percentage of households in Reservoir Hill are without access to a personal motor vehicle. The Baltimore Neighborhood Indicator Alliance's Vital Signs 18 report indicates that 40.9 percent of households in the Penn North/Reservoir Hill Community Statistical Area fall into this category compared to the Baltimore City average of 28.9 percent.[7] This limits Reservoir Hill residents' access to the important economic opportunities available in the neighborhoods of Remington, Old

5. Lieb, Emily. 'White man's lane': Hollowing out the highway ghetto in Baltimore. Elfenbein, J., Nix, E., & Hollowak, T. (Eds.). Philadelphia, PA: Temple University Press (2011)

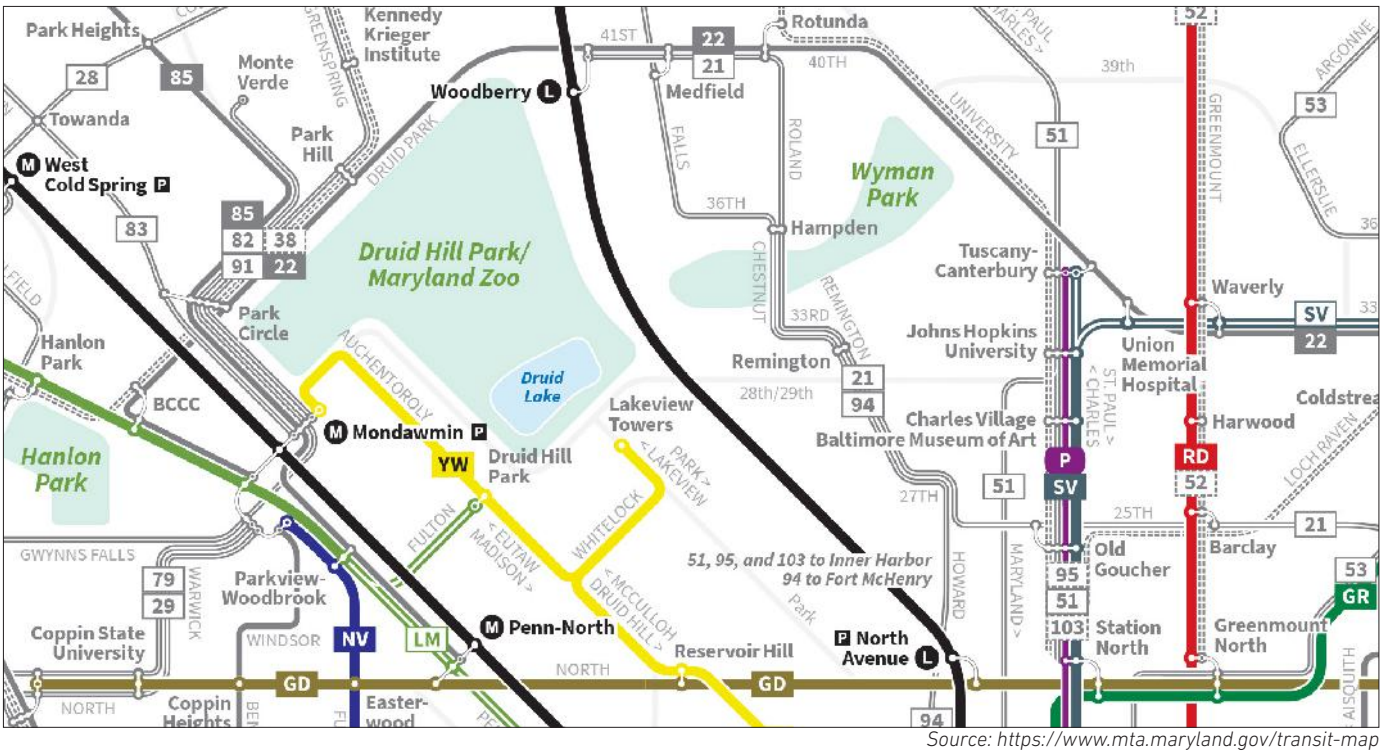
6. The Urban Institute, The Unequal Commute, Examining Inequities in Four Metro Areas' Transportation Systems. https://www.urban.org/features/unequal-commute, accessed 27 October 2020.

7. Vital Signs 18, Penn North/Reservoir Hill Community Profile, Sustainability Indicator, https://bniajfi.org/community/Penn%20North_Reservoir%20Hill/, accessed on 8 October 2020.

Goucher, Hampden, and Charles Village/Barclay, which maintain a higher number of businesses[8] and therefore employment opportunities than found in Reservoir Hill.

Public transit access is similarly limited. The MDOT Maryland Transit Administration's (MTA) BaltimoreLink bus service does not currently provide a direct neighborhood to neighborhood connection between Reservoir Hill and Remington via either LocalLink (regular neighborhood service) or CityLink (high frequency, 24-hour service).

Figure 4. MTA BaltimoreLink Geographic System Map



Source: https://www.mta.maryland.gov/transit-map

The lack of multimodal facilities and public transit in the Druid Lake Park Drive corridor combined with Reservoir Hill residents' lack of access to personal motor vehicles underscores the transportation-mode disparity in this corridor and illustrate the need for high quality, equitable transportation options linking Reservoir Hill and Remington that do not require the use of a personal motor vehicle.

8. Vital Signs 18, Penn North/Reservoir Hill, Medfield/Hampden/Woodberry/Remington, Greater Charles Village/Barclay Community Profiles, Workforce and Economic Development Indicator, https://bniajfi.org/community/Penn%20North_Reservoir%20Hill/, https://bniajfi.org/community/Medfield_Hampden_Woodberry_Remington/, https://bniajfi.org/community/Greater%20Charles%20Village_Barclay/, accessed on 27 October 2020.

BIG JUMP SHARED USE PATH: PURPOSE AND CONTEXT KEY POINTS

PROJECT PURPOSE

- Conceived as a demonstration/pilot project where strategic infrastructure connections are leveraged to provide increased transportation options for people not using a motor vehicle.
- Low-cost, scalable material choices and treatments for delineating the path were intended to allow BCDOT to make "on-the-fly" adjustments, respond to changing roadway conditions as the pilot progressed while providing a high degree of safety for users.
- The route provides a replacement for the Park Loop around Druid Lake disrupted by DPW's reservoir project, provides a safe and comfortable connection between Reservoir Hill and Remington, and introducdes an ADA-accessible route between them.

HISTORICAL CONTEXT

- Druid Park Lake Drive, originally designed as a two lane residential street that allowed easy access from the adjacent neighborhoods, would drastically change character with the roadway expansion projects in the 1940's (Druid Hill Expressway) and 1960's (Jones Falls Expressway/I-83).
- These roadway expansions prioritized white suburban residents' commute times and effectively cut off Jewish and Black neighborhoods from Druid Hill Park following a nation-wide pattern of racist transportation planning and policy decisions.
- These racist transportation and planning decisions, often characterized under the guise of urban renewal, combined to restrict Black American's economic upward mobility and subject Black neighborhoods to isolation, increased segregation, and disinvestment.

DRUID PARK LAKE CORRIDOR TODAY

- Without the Big Jump SUP, the existing connection between the Reservoir Hill and Remington neighborhood presents a hostile environment with no ADA-compliant route for anyone attempting to travel outside of a motor vehicle.
- The lack of a direct public transit connection combines with Reservoir Hill's higher than City-wide average of households without access to a motor vehicle to reveal a transportation option disparity and limiting factor on those residents' economic opportunities.

SUMMARY OF CONDUCTED PUBLIC OUTREACH

PUBLIC MEETINGS

BCDOT conducted two public meetings for the Big Jump SUP project: April 23, 2018 at the Greenmount School and April 26, 2018 at the Beth Am Synagogue. Notifications of the meetings were mailed and sent electronically at least two weeks prior to each meeting, and robocalls were made days before the meeting dates. Community groups along with local and state elected officials were personally alerted to the time and location of the meetings. At the meetings, BCDOT presented three large format boards[1] that provided information on several aspects of the Big Jump pilot including:

- The context of the project and how it fit within the broader BCDOT vision of providing safe and comfortable streets that will allow more of Baltimore's residents and visitors of all ages and ability levels to meet some of their travel needs on foot or by bike.
- The alignment and design of the shared use path, noting how it would physically separate and protect users from motor vehicle traffic.
- The intersection changes and new operations, as well as how people walking and biking were anticipated to use the facility alongside motorists navigating the new traffic patterns created.

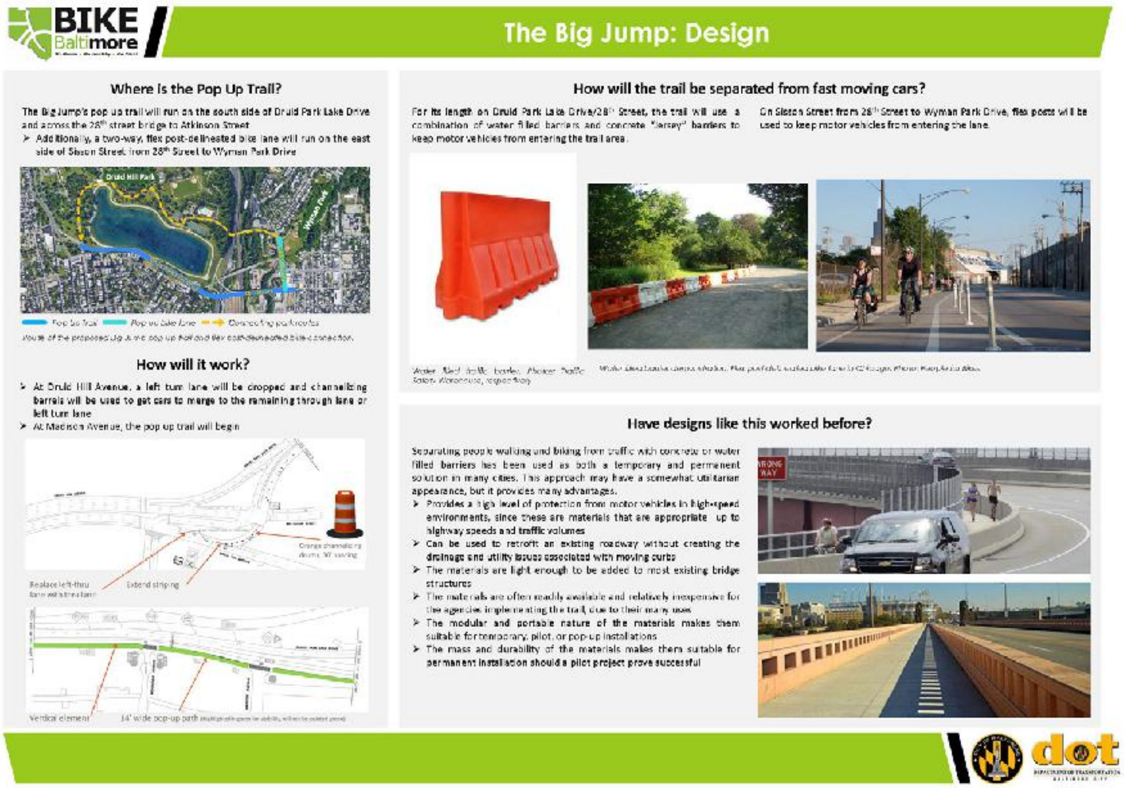
Comments on the project were taken at the meetings and an email address was provided for further comments. Each council member whose district the project passes through expressed their support for The Big Jump SUP prior to the launch of the project. Additional support for the project was provided by several organizations including:

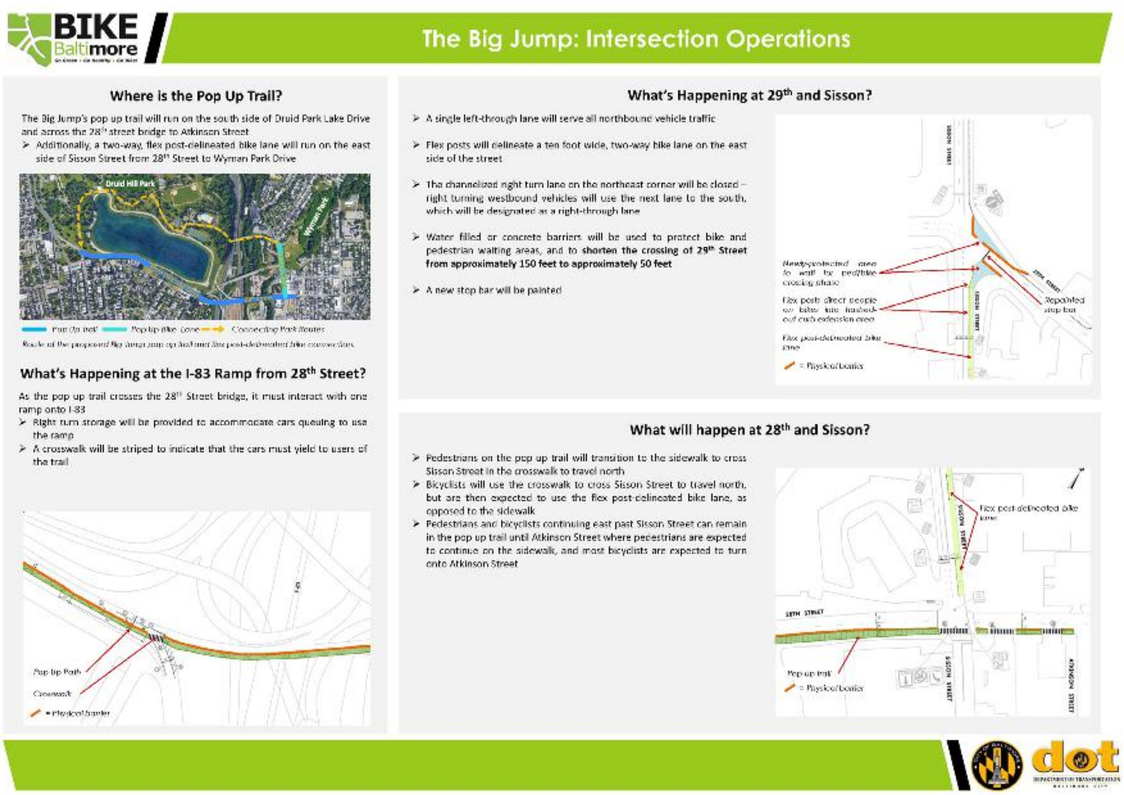
- Beth Am Synagogue
- Greater Remington Improvement Association
- Mount Royal Community Development Corporation

1. Baltimore City Department of Transportation Big Jump Project Boards, https://transportation.baltimorecity.gov/sites/default/files/Big%20Jump%20Boards_4_23.pdf, accessed 30 Nov 2020.

- Mayor's Bicycle Advisory Commission (MBAC)
- Old Goucher Community Association
- Reservoir Hill Improvement Council

Figure 5. Large Format Boards Developed by BCDOT for Public Meetings


BIKE Baltimore
The Big Jump: Design
Where is the Pop Up Trail?
The Big Jump's pop up trail will run on the south side of Druid Park Lake Drive and across the 28th street bridge to Atkinson Street
➢ Additionally, a two-way, flex post-delineated bike lane will run on the east side of Sisson Street from 28th Street to Wyman Park Drive
Druid Hill Park
Wyman Park
How will it work?
➢ At Druid Hill Avenue, a left turn lane will be dropped and channelizing barrels will be used to get cars to merge to the remaining through lane or left turn lane
➢ At Madison Avenue, the pop up trail will begin
Replace left-thru lane with thru lane
Extend striping
Vertical element
14' wide pop-up path
How will the trail be separated from fast moving cars?
For its length on Druid Park Lake Drive/28th Street, the trail will use a combination of water filled barriers and concrete "Jersey" barriers to keep motor vehicles from entering the trail area.
On Sisson Street from 28th Street to Wyman Park Drive, flex posts will be used to keep motor vehicles from entering the lane.
Have designs like this worked before?
Separating people walking and biking from traffic with concrete or water filled barriers has been used as both a temporary and permanent solution in many cities. This approach may have a somewhat utilitarian appearance, but it provides many advantages.
➢ Provides a high level of protection from motor vehicles in high-speed environments, since these are materials that are appropriate up to highway speeds and traffic volumes
➢ Can be used to retrofit an existing roadway without creating the drainage and utility issues associated with moving curbs
➢ The materials are light enough to be added to most existing bridge structures
➢ The materials are often readily available and relatively inexpensive for the agencies implementing the trail, due to their many uses
➢ The modular and portable nature of the materials makes them suitable for temporary, pilot, or pop-up installations
➢ The mass and durability of the materials makes them suitable for permanent installation should a pilot project prove successful
dot

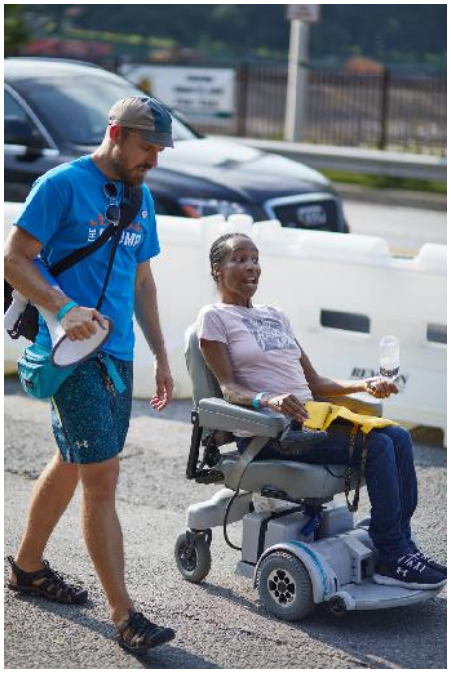

BIKE Baltimore
The Big Jump: Intersection Operations
Where is the Pop Up Trail?
The Big Jump's pop up trail will run on the south side of Druid Park Lake Drive and across the 28th street bridge to Atkinson Street
➢ Additionally, a two-way, flex post-delineated bike lane will run on the east side of Sisson Street from 28th Street to Wyman Park Drive
Druid Hill Park
Wyman Park
What's Happening at the I-83 Ramp from 28th Street?
As the pop up trail crosses the 28th Street bridge, it must interact with one ramp onto I-83
➢ Right turn storage will be provided to accommodate cars queuing to use the ramp
➢ A crosswalk will be striped to indicate that the cars must yield to users of the trail
Pop Up Path
Crosswalk
= Physical barrier
What's Happening at 29th and Sisson?
➢ A single left-through lane will serve all northbound vehicle traffic
➢ Flex posts will delineate a ten foot wide, two-way bike lane on the east side of the street
➢ The channelized right turn lane on the northeast corner will be closed – right turning westbound vehicles will use the next lane to the south, which will be designated as a right-through lane
➢ Water filled or concrete barriers will be used to protect bike and pedestrian waiting areas, and to shorten the crossing of 29th Street from approximately 150 feet to approximately 50 feet
➢ A new stop bar will be painted
Newly-protected area to wait for ped/bike crossing phase
Flex posts direct people on bikes into hashed-out curb extension area
Flex post-delineated bike lane
Repainted stop bar
= Physical barrier
What will happen at 28th and Sisson?
➢ Pedestrians on the pop up trail will transition to the sidewalk to cross Sisson Street in the crosswalk to travel north
➢ Bicyclists will use the crosswalk to cross Sisson Street to travel north, but are then expected to use the flex post-delineated bike lane, as opposed to the sidewalk
➢ Pedestrians and bicyclists continuing east past Sisson Street can remain in the pop up trail until Atkinson Street where pedestrians are expected to continue on the sidewalk, and most bicyclists are expected to turn onto Atkinson Street
Flex post delineated bike lane
28TH STREET
SISSON STREET
ATKINSON STREET
Pop up trail
= Physical barrier
dot

BIG JUMP BLOCK PARTY

26 August 2018

Bikemore, Baltimore City's local bicycle and livable streets advocacy group, re-purposed a vacant lot at the intersection of Linden Avenue and Druid Park Lake Drive to host a block party celebrating the opening of the Big Jump SUP with food, music, interactive art, group bike rides, walking tours, and family friendly activities in August of 2018. The block party represented both a celebration for those who worked hard to see the concept become reality and a means by which to introduce the benefits of the SUP to a wider community audience.

Images from the Big Jump SUP Block Party. (Source: Bikemore)



SUMMARY OF CONDUCTED PUBLIC OUTREACH KEY POINTS

- Mailed notifications and robocalls were conducted in advance of two public meetings to introduce the project, share the route it would follow and elements of the design, and discuss intersection design and operational changes
- Comments were taken at both public meetings and the two City Councilpersons whose districts host the Big Jump SUP were supportive of the project as were multiple stakeholder community organizations.
- Upon installation, a Big Jump Block party with food, music, group bike rides, and walking tours was hosted at the intersection of Linden Avenue and Druid Park Lake Drive to celebrate the opening of the SUP and further introduce the benefits to a wider community audience.

Volunteers install wayfinding signage and logos for the Big Jump SUP (Source: Graham Coreil-Allen)

PUBLIC IMPRESSIONS

BIG JUMP SHARED USE PATH PUBLIC SURVEY

The Baltimore City Department of Transportation and the Baltimore Bike Program undertook this user survey as part of a post-installation assessment of the Big Jump Shared Use Path pilot project. The purpose of the survey was to gather public input as to whether the Big Jump Shared Use Path should be made permanent, and what, if any, modifications would improve it.

The target user group included the residents of the two neighborhoods linked by the Big Jump SUP, Reservoir Hill and Remington, as well as residents of other nearby neighborhoods, and persons who live outside of the immediate vicinity but travel along the Big Jump corridor.

Methodology

The Big Jump Shared Use Path User Survey was authored by Toole Design in coordination with Baltimore Bike Program staff. The online survey was published on SurveyGizmo.com on February 20th, 2020 and it was available until June 15th, 2020. The online survey was promoted through the distribution of fliers and door hangers in the Reservoir Hill and Remington neighborhoods.

In addition to the online survey, an identical paper version was also created for in-person data collection. All responses received via the paper version were then entered into the online survey by BCDOT.

The survey asked participants about their travel habits in the Big Jump SUP corridor, such as how often they travel along the Big Jump corridor, their typical modes of travel, and their perceived level of safety along the corridor, whether walking, bicycling, or driving. The complete questionnaire is provided in Appendix 1.

BIG JUMP SURVEY

Dates open
February 20–June 15, 2020

Responses
174 total, 140 complete (80%)

Zip codes represented
20708, 21043, 21207, 21209, 21210, 21211, 21213, 21215, 21216, 21217, 21218, 21224, 21229, 21230, 21239, 21717

Gender
52% Female, 42% Male, 6% decline to answer

Ethnicity
53% White, 30% Black/ African American, 2% Hispanic/Latinx, 15% decline to answer

174 persons responded to the survey, with 140 providing complete responses.

Promotional flyer for the Big Jump Shared Use Path Survey.

Key Results

TRIPS AND MODES

Survey respondents cited the types of trips they most often made along the Big Jump SUP corridor to include social/recreational (78%), errands (67%), and commuting (51%). The modes they employ in a typical week include driving (77%), biking/scooting (35%) and walking/rolling (32%).

A closer look at each of the modes:

Walk/Roll—of those who walk/roll on the Big Jump Shared Use Path, 6% do so daily, 21% a few times a week, 28% a few times a month.

- Of those who do use the Big Jump SUP to Walk/roll, a majority feel somewhat to very safe. 17% said they do not feel safe. Reasons given for not feeling safe included
- Too much adjacent motor vehicle traffic

- Malfunctioning pedestrian crossings
- Excessive motor vehicle speeds
- Lack of maintenance to the Big Jump SUP water barriers
- Perception that water barriers do not provide adequate protection from motor vehicle traffic

Bike/Scoot—Of those who bike/scoot on the Big Jump Shared Use Path, 2% do so daily, 17% a few times a week, 27% a few times a month.

- When asked to identify what type of rider they are, 41% said they were comfortable riding on quiet streets with bike lanes; 27% said they were only comfortable where they could ride separate from motor vehicle traffic; and 22% said they were comfortable riding in all conditions, even without bike lanes.
- Of those who ride on the Big Jump SUP, most felt somewhat to very safe, with 10% saying that they did not feel safe. Reasons given for not feeling safe were the same as those given for not feeling safe when walking.

Drive—Of those who drive on the Druid Park Lake Drive and 28th Street Bridge Corridor, 25% do so daily, 36% a few times a week, 33% a few times a month.

- Those who drive mostly felt somewhat to very safe, but 16% stated that they did not feel safe. By far the most common reason why respondents said they did not feel safe driving along Druid Park Lake Drive is excessive speeds of drivers. Most stated that this is a long-standing problem pre-dating the Big Jump SUP, though a few respondents felt that the Big Jump SUP has made it worse.
- Responses were nearly split 50-50 as to whether drivers had ever detoured onto other streets to avoid the Big Jump area. Most commonly, drivers diverted down Druid Hill Avenue or another Reservoir Hill neighborhood street to North Avenue. A few detoured through the park. Some drivers noted that these were detours that they had taken to avoid rush hour traffic before the Big Jump SUP pilot was installed.

SHOULD THE BIG JUMP BE MADE PERMANENT?

The ultimate objective of the Big Jump Shared Use Path User Survey was to gauge public opinion regarding making the Big Jump a permanent shared use path facility providing and accessible route along Druid Park Lake Drive and across the W. 28th Street

Bridge. According to the results 87% of participants value the Big Jump SUP and believe it should be made permanent. Despite this overwhelmingly positive result, most participants had issues with the Big Jump SUP as it currently exists. Several trends emerged in the responses of both Big Jump SUP supporters and detractors:

- Excessive motor vehicle speeds along Druid Park Lake Drive deter people from using the Big Jump SUP
- Lack of maintenance deters people from using the Big Jump SUP
- The perception that the water-filled plastic barriers offer inadequate protection from motor vehicle traffic
- Concern that a new facility—the Big Jump SUP—is being proposed in lieu of maintaining and repairing the existing pathways and hardscape along Druid Park Lake Drive

Public Impressions Conclusions

A facility such as the Big Jump SUP is needed to provide a safer, ADA-accessible, multimodal connection between the neighborhoods to the east and west sides of the Jones Falls Valley. The existing W. 28th Street bridge fails to provide this connection because:

- The narrow sidewalk on the south side of the bridge provides inadequate passing room for users
- The pedestrian bridge over Mount Vernon Terrace does not meet ADA standards, including the use of a ramp on one side of the bridge leading to stairs on the other side
- There is no accommodation for multimodal transport, such as scooters or bicycles

The barriers should be upgraded to a material that offers greater protection, but it is not enough to simply replace them with concrete barriers. The Big Jump SUP will only be successful if it is implemented as part of a larger network that provides connections into the heart of the neighborhoods of Reservoir Hill and Remington.

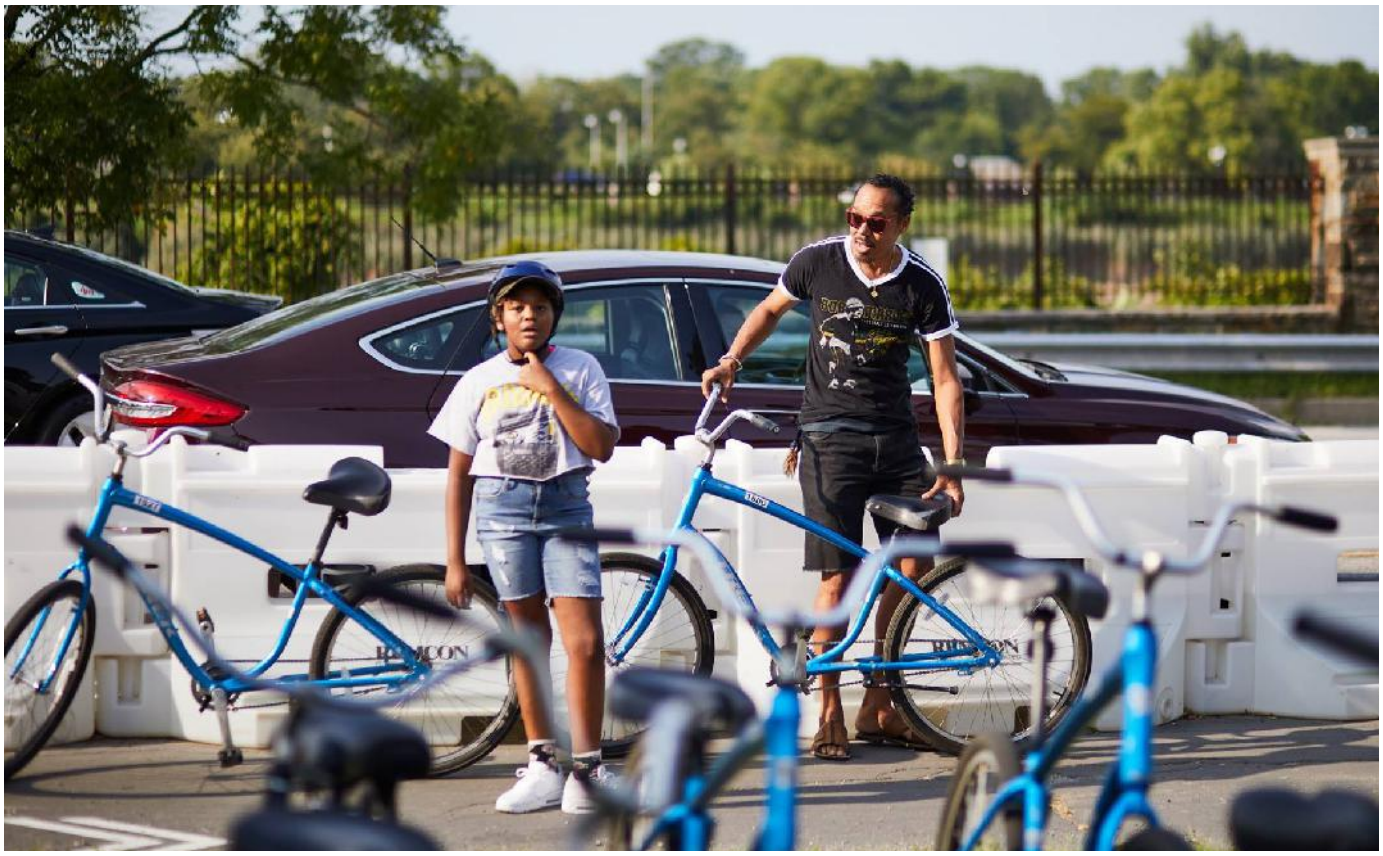
The project should take into consideration the existing pathways and sidewalks in the corridor along the south side of Druid Park Lake Drive. These neglected assets should be renovated and included as part of the larger streetscape and multimodal transportation system along the corridor.

Public outreach will be enhanced by highlighting how the Big Jump SUP mirrors best practices and successful outcomes from other cities.

PUBLIC IMPRESSIONS KEY POINTS

- BCDOT undertook a post-installation survey both online and distributed on paper to gather public input on whether the Big Jump SUP should be made permanent and what, if any, modifications would improve it.
- 174 Survey respondents cited the types of trips they most often made along the Big Jump SUP corridor to include social/recreational (78%), errands (67%), and commuting (51%) using these modes: driving (77%), biking/scooting (35%) and walking/rolling (32%).
- 87% of participants believe the Big Jump SUP should be made permanent despite respondents noting that their use of the SUP is deterred by motor vehicle speeds, lack of maintenance, and the perception that the barriers do not provide adequate protection.

Block Party goers enjoying the Big Jump SUP (Source: Bikemore)



The Big Jump SUP: a facility for all ages and abilities (Source: Side A Photography)

PERFORMANCE EVALUATION

Beyond providing a safer and more comfortable connection for people walking and biking between Reservoir Hill and Remington, BCDOT established specific goals for the Big Jump SUP pilot project that would assist in evaluating the success of the SUP and determining the feasibility of permanent adoption as part of the Druid Park Lake Drive/28th Street corridor. This Performance Evaluation section has been organized around these goals established by BCDOT. The goals for the Big Jump SUP were as follows:

1. To increase safety for road users, regardless of their chosen transportation mode. (Safety Analysis)
2. To limit changes to motor vehicle mobility to tolerable levels. (Motor Vehicle Mobility Analysis)
3. To increase pedestrian and bicycle mobility by (Pedestrian & Bicycle/Scooter* Mobility Analysis):

    a. Reducing these users' stress caused by adjacent traffic

    b. Limiting the amount of detour required of people walking and biking

    c. Improving accessibility for users of wheelchairs and other mobility devices

*At the time of this project's inception, the City's Dockless Vehicle program had not yet been launched.

Data collected specifically for the Big Jump SUP project was limited, therefore this evaluation employed additional data from the following sources:

- Baltimore City Department of Transportation crash data
- Maryland Open Data Portal crash data
- University of Maryland Center for Advanced Transportation Technology Laboratory (CATT) Regional Integrated Transportation Information System (RITIS) speed and travel time data

SAFETY ANALYSIS

Examining the BCDOT's project goals sequentially, the issue of safety is rightfully at the forefront. Currently, multiple design guides, manuals, and policies provide the nominal design standards that influence the safety benefits by which the Big Jump SUP should be evaluated. Since the Big Jump SUP was created from re-purposing a motor vehicle travel lane, this evaluation relies heavily on three important sources of design standards:

- The American Association of State Highway Transportation Officials (AASHTO) Policy on Geometric Design of Highways and Streets (Green Book),
- AASHTO Guide to the Development of Bicycle Facilities, and
- The Manual on Uniform Traffic Control Devices (MUTCD).

Additionally, any rights-of-way project that involves facilities such as sidewalks, shared use paths, and street crossings must be "accessible to and usable by individuals with disabilities" per the Americans with Disabilities Act of 1990 (ADA), and this evaluation draws upon the enforceable accessibility standards set forth in the 2010 ADA Standards for Accessible Design. The design criteria for the construction and alteration of facilities covered by law were developed by the U.S. Access Board and are known as the ADA Accessibility Guidelines (ADAAG). These guidelines serve as the basis for standards that are maintained by the U.S. Department of Justice and the U.S. Department of Transportation and are the minimum criteria for designing public right-of-way space.

The intended users of the Big Jump SUP are considered vulnerable transportation facility users. In other terms, they are users who are unprotected by an outside shield and are most at risk in traffic. This report considers both objective safety (use of a quantitative measure that is independent of the observer) and perceived safety (perception of how safe a person feels while using the facility), as both measures can significantly influence whether and how often people use the Big Jump SUP.

Facility Design

The Big Jump SUP was designed as a demonstration/pilot project, and the material choices reflected the need to allow for selective adjustments and the ability to respond to changing conditions as the pilot progressed. The water-filled traffic channelization barriers selected to retrofit the existing roadway were intended to provide a separated path without creating substantial changes to roadway drainage, employ readily available materials, and provide a high level of protection from motor vehicles. However, the choice of

plastic water-filled barriers contributed to the perception of a lack of safety among some users. As noted in the Public Impressions section, several respondents to the Big Jump SUP User Survey stated that they did not feel entirely safe using the Big Jump and were concerned that the water-filled barriers provided inadequate protection from motor vehicle traffic. Damage to the barriers from crash impacts often contributed to this perceived inadequacy. Ongoing maintenance of the water-filled barriers, i.e., keeping water-levels high enough to provide the necessary weight to function as a barrier, was also a contributing factor in the damage/failure depicted in the photographs.

Damaged Water-filled Traffic Channelization Barriers. (Source: Peter Jackson)

The demonstration/pilot nature of the project also resulted in some SUP crossings at busy streets that felt unsafe to users, especially at Mount Royal Terrace. The roadway's design at the intersection of Druid Park Lake Drive where motorists turn right onto Mount Royal Terrace is more akin to a freeway ramp than a neighborhood street. A large-radius slip lane allows motor vehicle drivers to make the right turn with minimal slowing. The turning radius onto, and crossing distance across, Mount Royal Terrace were not initially altered for the project, requiring Big Jump SUP users to navigate an 80-foot crossing thereby exposing them to potential conflicts with high-speed, turning traffic. A subsequent modification to mitigate this condition was installed in an attempt to reduce the speed at which turning vehicles could make the right turn on to Mount Royal Terrace. Using a product known as CurbRail™ by DezignLine™, these surface mounted steel rails with reflective posts for visibility were installed by BCDOT to function as a protective curb extension and to lower motor vehicle turning speeds but they were quickly damaged, reducing their effectiveness.

Unsurprisingly, survey respondents often cited this specific intersection as feeling very unsafe. In the words of one respondent, "Crossing at the top of Mount Royal Terrace is like taking your life in your hands every time [as] people FLY off Druid Park Lake Drive."

Big Jump SUP crossing at Mount Royal Terrace. (Source: Toole Design)

Another safety concern is the configuration of stormwater inlets in a number of locations along Big Jump SUP. The grates on eight of the inlets run parallel to the flow of traffic, and they present a tire-catching hazard for bicycles and scooters, as well as wheelchairs and other mobility devices. As one of the objectives of the Big Jump SUP was to rapidly implement a facility without altering existing roadway drainage, relocating these inlet grates was outside the scope of the pilot project. However, they are a safety issue that should be addressed with the simple modification of adding a bicycle-safe grates.

Examples of unsafe storm-sewer grates along the Big Jump SUP. (Source: Google Earth)

Speed in Corridor

Considering the history of the Druid Hill Expressway's creation, it comes as no surprise that a common complaint of residents adjacent to the corridor is that traffic speeds are too high. Enabling motor vehicles to travel at high speed with few intersections or crossings that interrupt the traffic flow was precisely the goal of the expressway's construction. However, as noted in the History and Context section, the decades of federal policies, standards, and roadway expansion projects have resulted in not only a corridor that is dangerous for all people using it, the corridor has a disproportionately negative affect on the neighborhoods surrounding Druid Hill Park in general and on people of color specifically.

The posted speed limit in the corridor is 30 miles per hour (mph). Analysis of the RITIS data revealed that while traffic volume during the AM/PM peak travel periods kept average speeds in the corridor close to the posted limit, maximum speeds recorded outside of the peak period far exceeded the posted limit with speeds reaching 48 to 60 mph. The routine damage to the water-filled barriers further corroborates the excessive non-peak speeds recorded in the corridor and the need for additional traffic calming measures.

For people on foot, or riding a bicycle or scooter, the likelihood of surviving a crash decreases significantly as speeds increase above 25 mph. The fact that excessive speed is a deadly problem on U.S. roadways has been acknowledged in a powerful study produced by the National Transportation Safety Board (NTSB) where they call into question the practice of setting speed limits via the 85th percentile method and its unintended consequence of creating artificially high speed limits.[1] The study further links speed reduction and ultimately crash avoidance to how the road is designed, managed, and used. Instead of designing roads that encourage speeding and relying on enforcement when the posted speed limits are exceeded, roads should be designed to encourage safer, slower speeds in the first place.

A Big Jump SUP user rides past freeway-scaled signs along Druid Park Lake Drive. (Source: Side A Photography)

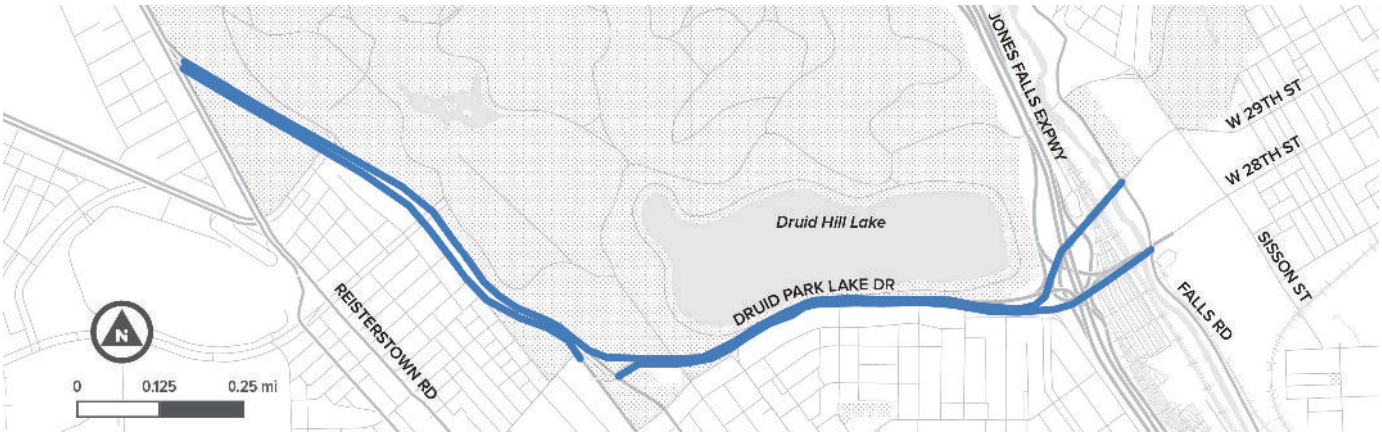
Further contributing to the excessive speeds is the condition of having the I-83 on/off ramp interchanges at W. 28th / W.29th Streets feeding into the Druid Park Lake Drive corridor. This combines with the already limited roadway crossings into Druid Hill Park and presents drivers with a highway-like context that encourages high speed. Even the signage directing drivers to I-83 is scaled in size for highway-like speeds, improperly communicating that this is a roadway where one should not expect to encounter pedestrians or other non-motorized users.

1. Safety Study: Reducing Speeding-Related Crashes Involving Passenger Vehicles. NTSB/SS-17/01 PB2017-102341 National Transportation Safety Board. Adopted July 25, 2017. https://www.ntsb.gov/safety/safety-studies/Documents/SS1701.pdf

Table 1. Druid Park Lake Drive Recorded Speeds (MPH)

	Pre-Install		Immediate Post-Install		Later Post-Install		Post Adjustments	
	Average	Max	Average	Max	Average	Max	Average	Max
Druid Park Lake Drive	21.84	58	21.76	60	22.51	48	23.03	51

Figure 6. Data Collection Segment on Druid Park Lake Drive



The RITIS data collected examined four separate time periods in relation to the Big Jump SUP pilot to understand how the introduction of the facility affected driver behavior in terms of speed. The data revealed that roadway changes represented by the Big Jump SUP had the expected effect of initially lowering average speeds. However, by the time drivers became accustomed to this change, speeds not only returned to pre-installation levels, they even exceeded them. Managing traffic speed is an important aspect of achieving walkability and safety and therefore, additional countermeasures should be considered as an integrated approach to entire corridor, not only the section containing the Big Jump SUP.

Crashes in Corridor

The USDOT National Highway Traffic Safety Administration's recent data provides the sobering impetus for improving the safety of our transportation system for all users but most especially for pedestrians and pedalcyclists. In their National Center for Statistics and Analysis report on fatal motor vehicle crashes for 2018, they found that while overall fatalities decreased in 2018 over 2017 deaths, pedestrian fatalities saw a 3.4 percent increase and recorded the highest number since 1990 (6,482 fatalities). Correspondingly,

Travel lane reduction on Druid Lake Park Drive (Source: Toole Design.)

pedalcyclist fatalities increased by 6.3 percent and also recorded the highest number since 1990 (859 fatalities).[2]

A recent study published in the Transportation Research Record found that streetscape design is increasingly seen as a means by which to reduce collision potential through smaller, more enclosed urban streetscapes that encourage slower, less risky driving behavior.[3] While traditional roadway safety engineering promotes widening and removing obstacles from roadside "clear zones", this contrasting framework of "human-scaled" streetscapes which are smaller and more narrowly enclosed by buildings and/or trees, have shown a lower crash severity than larger, more open streetscapes. The study's findings indicate that street tree planting and in-fill development can serve as safety countermeasures while simultaneously assisting in meeting livability goals such as walkability, high quality public spaces, and increased urban forest canopy. Additionally, other research

2. National Center for Statistics and Analysis. (2019, October). 2018 fatal motor vehicle crashes: Overview. (Traffic Safety Facts Research Note. Report No. DOT HS 812 826). Washington, DC: National Highway Traffic Safety Administration.

3. Harvey, C., & Aultman-Hall, L. (2015). Urban Streetscape Design and Crash Severity. Transportation Research Record, 2500(1), 1–8. https://doi.org/10.3141/2500-01

has shown that in many cases improvements to facilities specifically designated for vulnerable road users, such as people riding bikes, also improve safety conditions for motorists operating near them.[4]

For the Big Jump SUP pilot project, a streetscape partially approximating the more enclosed streetscape described in the study was achieved by using water-filled barriers to remove one motor vehicle travel lane and narrow the remaining motor vehicle travel lane. An examination of crash data provided by BCDOT, as well as additional crash data obtained from the State of Maryland Open Data Portal, found a correlation between the installation of the Big Jump SUP and a reduction in the recorded number of crashes in the study area. This suggests that even the mild application of some of the study's principles (e.g. reduced streetscape width contributing to reduced crash propensity) represented by the introduction of the Big Jump SUP had a positive effect in lowering overall crashes.

To compare crash patterns in the vicinity of the Big Jump SUP, the total number of recorded crashes before and after installation were plotted on two heat maps. Data from 2018, the year in which the Big Jump SUP was installed, is excluded, thereby allowing for comparison of crashes in the study corridor both prior to the introduction of the Big Jump SUP and after the Big Jump SUP had become a familiar and expected condition in the roadway. Each heat map represents crashes recorded during an 18-month time period: The "before" map is inclusive of data from January 2016 through June 2017 (415 total depicted); The "after" map is inclusive of data from January 2019 through June2020 (403 total depicted).

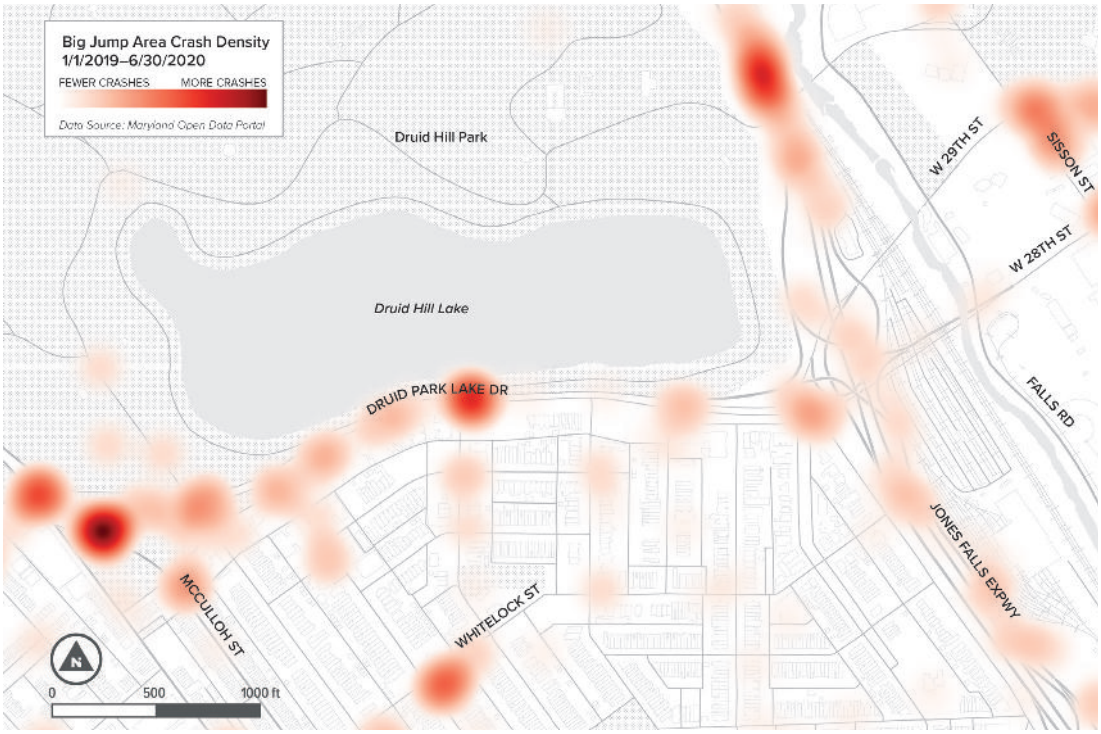
An important note to the "after" map date range is that it includes a period where the COVID-19 public health emergency produced traffic and behavioral patterns that diverged from historical trends seen during previous economic downturns in a manner contrary to the expected. The USDOT National Highway Traffic Safety Administration's Special Report found that the second quarter of 2020 saw an increase in the traffic fatality rate despite the sharp reduction in vehicle miles traveled (VMT) due to COVID-19 restrictions and guidelines.[5] The Special Report attributed this unexpected increase in the fatality rate to several factors including higher average travel speeds on less congested roadways by drivers engaging in more risk-taking behaviors known to result in fatal crashes. The reduction in reported crashes in the Big Jump SUP corridor during a period that included this COVID-19 influenced divergence further validates the positive effect the SUP had on the corridor.

4. Sanders, R. L. We Can All Get Along: The Alignment of Driver and Bicyclist Roadway Design Preferences in the San Francisco Bay Area. Transportation Research Part A: Policy and Practice, Vol. 91, 2016, pp. 120-133.

5. Wagner, E., Atkins, R., Berning, A., Robbins, A., Watson, C., & Anderle, J. Examination of the Traffic Safety Environment during the second quarter of 2020: Special report (Report No. DOT HS 813 011). National Highway Traffic Safety Administration, 2020.

Figure 7. Big Jump Area Crash Density Pre-Installation

Figure 8. Big Jump Area Crash Density Post-Installation



While the reduction in reported crashes is a positive development associated with the introduction of the Big Jump SUP, it is important to note that studies have shown that near misses are more common than collisions and therefore a lack of crashes does not indicate that there are no incidents.[6] Furthermore, various studies have found that bicycle and pedestrian crashes, even those involving motor vehicles, tend to be underreported.[7,8] Thus, the data on perceived safety of the Big Jump SUP, as provided by the survey respondents, provides important insight into areas where people felt unsafe and where additional attention should be paid to design for improved user safety.

Eutaw Street slip lane across the Big Jump SUP. (Source: Left, Google Earth; Right, Toole Design)

Taken together, both the crash data and respondent survey highlight the need for improved geometric design considerations for the Big Jump SUP at intersections such as Linden Avenue, Mount Royal Terrace, and Sisson Street amongst others. The design of intersections should consider how bicyclists and other users navigate the approach, departure, and crossing of the intersection to reduce conflicts and the risk of injury for all users in the event of a crash. Specific intersection design objectives should include:

1. Minimizing exposure to conflicts

2. Reducing speeds at conflict points

6. Sanders, R. L. Perceived Traffic Risk for Cyclists: The Impact of Near Miss and Collision Experiences. Accident Analysis and Prevention, Vol. 75, 2015, pp. 26-34.

7. Lopez, D. S, D. B. Sunjaya, S. Chan, S. Dobbins, and R.A. Dicker. Using Trauma Center Data to Identify Missed Bicycle Injuries and Their Associated Costs. Journal of Trauma and Acute Care Surgery, Vol. 73, No. 6, 2012, pp. 1602-1606.

8. Stutts, J. C., and W.W. Hunter. Injuries to Pedestrians and Bicyclists: An Analysis Based on Hospital Emergency Department Data. FHWA-RD-99-078. Federal Highway Administration, U.S. Department of Transportation, Washington, DC, 1997.

3. Communicating the right-of-way priority

4. Providing adequate sight distance

5. Creating intuitive transitions to other facilities.

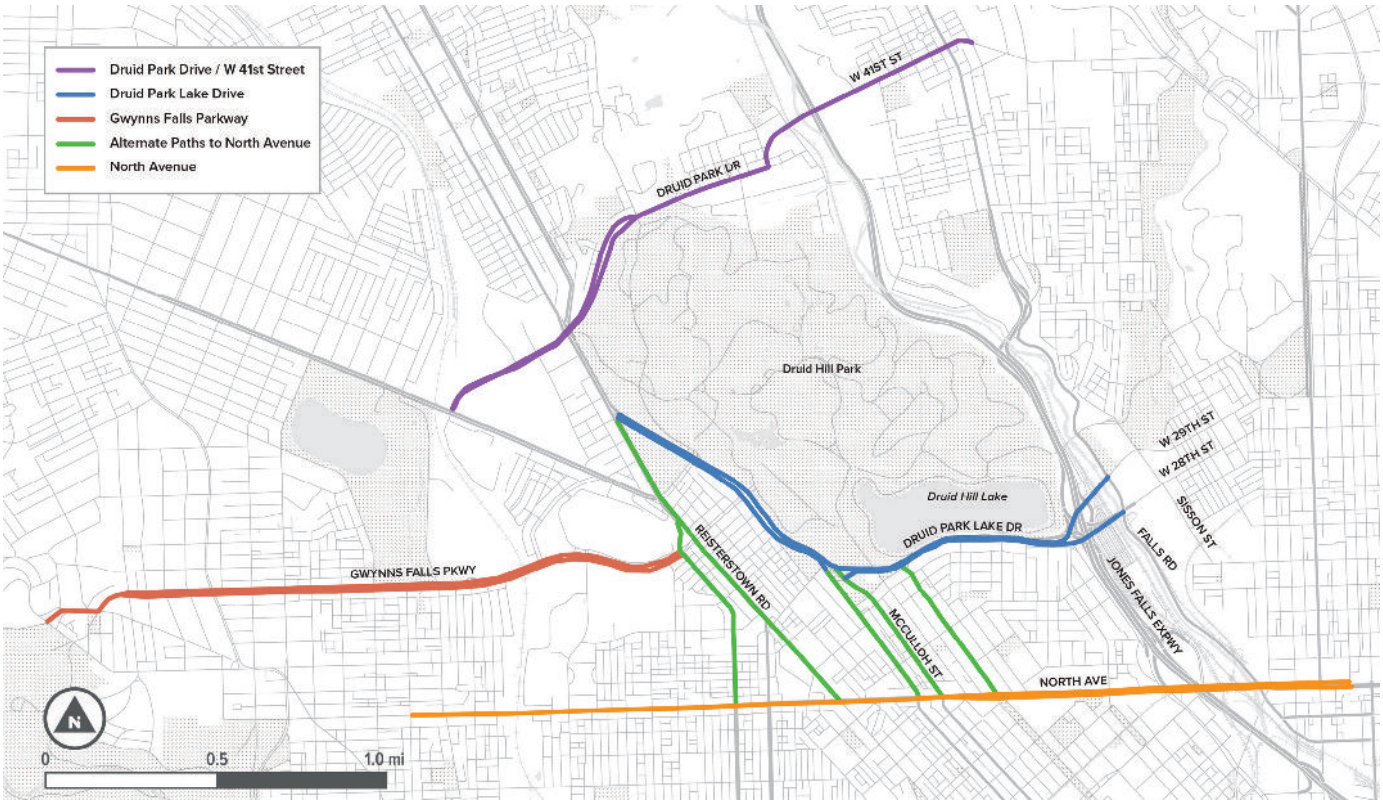
A prime example of where four out of five of these objectives could be achieved with minimal effort would be the elimination of the slip lane on Eutaw Street that permits motorists to make a high speed right turn across the Big Jump SUP onto Druid Park Lake Drive. Despite the intersection control in the form of a stop sign, the slip lane geometry is such that it provides inadequate sight distance, directs motorists' attention away from approaching westbound users of the Big Jump SUP, and creates confusion as to who has the right-of-way priority.

MOTOR VEHICLE MOBILITY ANALYSIS

BCDOT's second goal for the Big Jump SUP was to limit changes to motor vehicle mobility to tolerable levels. To evaluate this, travel time data was collected at varying segments along the Big Jump SUP corridor and alternate routes. The travel time data was obtained from the RITIS system, and is based on anonymized vehicle probe data gathered from a variety of sources such as mobile navigation apps and devices, freight tracking systems, and other data aggregated through the RITIS system and provided as comprehensive travel times by roadway segment.

The traffic data was examined to see if the reduction of vehicular capacity in the Big Jump SUP corridor along Druid Lake Park Drive and 28th Street caused a significant increase in congestion, which would result in a marked increase in travel times. Traffic data from alternate routes near the Big Jump SUP corridor, such as Druid Hill Drive/41st Street, MD-140, and North Avenue, was also analyzed to see if there was an increase in travel times. Such an increase would indicate a change in driver behavior, signaling that alternate routes were being used to avoid driving in the Big Jump SUP corridor. Table 2 and Figure 9 show the routes selected for data collection.

Figure 9. Corridors Selected for Traffic Data Collection



When any roadway change takes place, there is a period of adjustment as drivers learn which lane they need to use, and generally make route decisions. In addition to the introduction of the Big Jump SUP, there were adjustments made to improve the overall integration of the SUP into the corridor. In September 2019, adjustments to signal operations at the western end of Druid Lake Park Drive and water-filled channelization barriers at McCulloh Street were undertaken to improve motor vehicle mobility. In order to capture these changes, multiple time periods after the installation of the Big Jump SUP were included in the data studied here. Table 3 shows the four time periods for which data was collected from the RITIS system, as well as the interval beginning and ending dates and times.

Table 2. Corridors Selected for Data Collection

Corridors	Included Study Segments
Big Jump SUP Corridor	■ Druid Park Lake Drive: Eastbound and Westbound ■ Auchentoroly Terrace/Druid Hill Avenue (MD-129): Northbound and Southbound ■ W 28th Street: Eastbound
Druid Park Drive / 41st Street	■ Druid Park Drive / 41st Street: Eastbound and Westbound
Alternate Paths to North Avenue	■ Eutaw Place: Northbound ■ Liberty Heights Avenue: Northbound ■ McCulloh Avenue (MD-129): Northbound ■ Druid Hill Avenue (MD-129): Southbound ■ Reisterstown Road (MD-140): Eastbound and Westbound ■ Monroe Street: Southbound ■ Pennsylvania Avenue: Northbound and Southbound
Gwynns Falls Parkway	■ Gwynns Falls Parkway: Eastbound and Westbound
North Avenue	■ North Ave (US-1): Northbound and Southbound

Table 3. Periods and Intervals of Data Collection

Collection Period	Interval Begin	Interval End
Pre-Install: Period before The Big Jump Project was installed	April 8, 2018, 00:00	April 14, 2018, 23:59
Immediate Post-Install: Period immediately after the installation	June 3, 2018, 00:00	June 9, 2018, 23:59
Later Post-Install: Period 12 months after the installation	April 7, 2019, 00:00	April 13, 2019, 23:59
Post Adjustments: Period after the DOT's adjustments.	October 20, 2019, 00:00	October 26, 2019, 23:59

The following sections detail the travel times for each study segment in Table 2, for each of the time periods listed in Table 3. There are some locations where full data was not available for all time periods.

Big Jump SUP Corridor

The Big Jump SUP begins at Madison Avenue and extends east along Druid Park Lake Drive until it crosses I-83 on the W. 28th Street bridge. The data analyzed included an extended corridor starting from Liberty Heights Avenue following along Auchentoroly Terrace/Druid Hill Avenue (MD-129) to McCulloh Street and continuing on Druid Park Lake Drive/28th and 29th Street bridges as shown in Figure 9 (in blue) and labeled Druid Park Lake Drive. An increase in travel times along Druid Park Lake Drive would indicate that the Big Jump SUP was adversely effecting traffic flow through this corridor. The data shows, however, that travel times remained the same or decreased along most segments of the corridor. Only the travel times along eastbound Druid Park Lake Drive revealed an increase (36 seconds).

Table 4. Big Jump SUP Corridor

Extents		Average Distance (miles)	Travel Time (minutes)			
			Pre-Install	Immediate Post-Install	Later Post-Install	Post Adjustments
Druid Park Lake Drive						
EB	McCulloh St (MD-129) to Falls Rd	0.8	1.5	1.5	2.0	2.1
WB	Falls Rd to McCulloh St (MD-129)	0.8	1.9	1.9	2.1	1.8
Auchentoroly Terrace / Druid Hill Avenue (MD-129)						
NB	Druid Park Lake Drive to Liberty Heights Ave	0.9	2.2	2.3	2.1	2.2
SB	Liberty Heights Ave to Druid Park Lake Drive	0.8	2.8	2.6	2.7	2.7

Druid Park Drive / W 41st Street

Druid Park Drive / W 41st Street is an alternate route located to the north of the Big Jump SUP corridor for east-west travel across I-83/Jones Falls Expressway. An increase in travel time along this corridor would indicate that drivers were using this route as a means of avoiding the Big Jump SUP corridor. Although pre-installation data was not available, the average travel time from Immediate Post-Installation in June 2018 to Post-Adjustments in October 2019 remained largely consistent, indicating that the Big Jump SUP has had little to no impact on this route.

Table 5. Druid Park Drive / W 41st Street

	Extents	Average Distance (miles)	Travel Time (minutes)			
			Pre-Install	Immediate Post-Install	Later Post-Install	Post Adjustments
EB	Reisterstown Rd to Falls Rd	1.46	–	4.4	4.4	4.7
WB	Falls Rd to Reisterstown Rd	1.45	–	4.7	4.5	5.0

Gwynns Falls Parkway

Gwynns Falls Parkway is a major commuter route connecting neighborhoods in west Baltimore City, as well as western suburbs, through the Big Jump corridor, and ultimately to I-83. Travel times on both eastbound and westbound Gwynns Falls Parkway decreased from Pre-Installation in April 2018 through Post-Adjustment in October 2019, indicating that the installation of the Big Jump SUP had no negative effect and the changes shown here are due to unrelated factors.

Table 6. Gwynns Falls Parkway

	Extents	Average Distance (miles)	Travel Time (minutes)			
			Pre-Install	Immediate Post-Install	Later Post-Install	Post Adjustments
EB	Windsor Mills Rd to N Monroe St	1.74	6.1	5.9	5.9	5.5
WB	Auchentoroly Terrace to Windsor Mills Rd	1.97	7.0	7.1	7.4	6.1

Alternate Routes to North Avenue

This study segment examined several potential alternate routes that drivers might use to avoid all or part of the Big Jump SUP corridor. Only one route, northbound MD-140 (Reisterstown Rd) between Fulton Avenue and Swann Drive, showed an increase in travel time of around 36 seconds. All other routes either showed a decrease in travel time or stayed the same, indicating the Big Jump SUP has little to no impact on these alternate routes.

Table 7. Alternate Routes to North Avenue

Extents		Average Distance (miles)	Travel Time (minutes)			
			Pre-Install	Immediate Post-Install	Later Post-Install	Post Adjustments
Eutaw Place						
NB	North Ave to Druid Park Lake Dr	0.44	1.6	1.5	1.4	1.6
McCulloh Street (MD-129)						
NB	North Ave to Druid Park Lake Dr	0.45	1.8	1.6	1.7	1.6
Druid Hill Avenue (MD-129)						
SB	Druid Park Lake Dr to North Ave	0.44	1.5	1.3	1.4	1.3
Reisterstown Road (MD-140)						
EB	Liberty Heights Ave to Fulton Ave	0.51	1.9	1.9	2.1	1.9
WB	Fulton Ave to Swan Dr	0.77	2.2	2.8	2.8	2.8
Monroe Street						
SB	Gwynns Falls Pkwy to North Ave	0.53	-	1.80	1.80	1.69
Pennsylvania Avenue						
NB	North Ave to Fulton Ave	0.30	-	1.42	1.30	1.30
SB	Fulton Ave to North Ave	0.30	-	1.49	1.26	1.14

North Avenue

North Avenue is an alternate east-west route located to the south of the Big Jump SUP. Although officially designated a part of north- and southbound US Route 1, North Avenue runs east-west, offering a connection across I-83/Jones Falls Expressway. Travel times along this route decreased for northbound/eastbound travel from Poplar Grove Street to Saint Paul Street, and it remained constant for southbound/westbound travel between the same extents. This indicates that the Big Jump SUP had no negative impacts on this route.

Table 8. North Avenue (US-1)

Extents		Average Distance (miles)	Travel Time (minutes)			
			Pre-Install	Immediate Post-Install	Later Post-Install	Post Adjustments
EB	Poplar Grove St to St Paul St	2.72	11.7	12.4	11.1	10.3
WB	St Paul St to Poplar Grove St	2.72	11.1	12.8	11.0	11.0

PEDESTRIAN AND BICYCLE/SCOOTER MOBILITY

No single performance measure can tell a complete story. To be most effective, performance measures must be selected thoughtfully and in connection with a community's goals and objectives. Thus, evaluating BCDOT's stated goal to improve mobility for people walking, using wheelchairs, riding bicycles, and other mobility devices (scooters, etc.) solely on the performance measure of ***volume***, or the measured (i.e., counted) number of these users in a specified area for a designated period of time[9] would inadequately account for the full range of potential community benefits provided by the Big Jump SUP, such as the increased connectivity for pedestrians and bicyclists.

As noted in the Project History and Context section, the W. 28th Street bridge lacks a modern, ADA-accessible pedestrian route and had no bicycle facility of any kind prior to the introduction of the Big Jump SUP. The higher percentage of Reservoir Hill households without access to a personal motor vehicle, the lack of direct public transit connection between Reservoir Hill and Remington, and the greater economic/employment opportunities in Remington provide the primary reasons for establishing a high quality, equitable connection that does not require the use of a motor vehicle.

According to the FHWA Guidebook for Developing Pedestrian and Bicycle Performance Measures, connectivity of the transportation network for people walking, using wheelchairs, riding bicycles, and other mobility devices is especially important since disconnected networks require people to walk or bike farther, which requires more time and effort. Likewise, connected routes must also be accessible to people with disabilities. Connectivity is generally framed by distance and directness, comfort and perception of safety, convenience, and appropriate infrastructure.

In recognition of this, BCDOT refined their criteria for evaluating the goal of improving mobility for these users by focusing on the following three areas:

- Reducing these users' stress caused by adjacent traffic
- Limiting the amount of detour required of people walking and biking
- Improving accessibility for users of wheelchairs and other mobility devices

9. FHWA-HEP-16-037 Guidebook for Developing Pedestrian and Bicycle Performance Measures, 2016, https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/performance_measures_guidebook/pm_guidebook.pdf

Reducing These Users' Stress Caused by Adjacent Traffic

Proximity to motor vehicle traffic is a significant source of stress and discomfort for bicyclists, and for good reason. Crash and fatality risks rise sharply for vulnerable users when motor vehicle speeds exceed 25 mph. Furthermore, as motorized traffic volumes increase above 6,000 vehicles/day, it becomes increasingly difficult for motorists and bicyclists to share roadway space. Research indicates motorists feel more comfortable operating on streets where bicyclists are separated from motor vehicle traffic.[10]

Concrete vertical separation of a two way bicycle facility in Portland, Oregon (source: Jonathan Maus/BikePortland)

The forthcoming update to the AASHTO Guide to the Development of Bicycle Facilities notes that the perceived safety of bicycling can be a formidable barrier to bicycling. The AASHTO Guide cites research that has found a significant relationship between how safe and comfortable people feel bicycling, whether and how often they bicycle, their preferences for facility types, and the provision of those facilities. [11,12,13]

By providing a physical separation in the form of plastic water-filled channelization barriers, the Big Jump SUP creates the minimum level of safety required for users to feel comfortable. However, as noted in the Public Impressions and Safety Analysis sections, the damage incurred by the plastic barriers over the course of the two-year existence

10. Sanders, R. L. We Can All Get Along: The Alignment of Driver and Bicyclist Roadway Design Preferences in the San Francisco Bay Area. Transportation Research Part A: Policy and Practice, Vol. 91, 2016, pp. 120-133.

11. Dill, D. and McNeil, N. Revisiting the Four Types of Cyclists. In *Transportation Research Record 2587*. TRB, National Research Council, Washington, DC, 2016.

12. Handy, S.L., Y. Xing, and T.J. Buehler. Factors Associated with Bicycle Ownership and Use: A Study of Six Small U.S. Cities. *Transportation*, Vol. 37, No. 6, 2010, pp. 967-985.

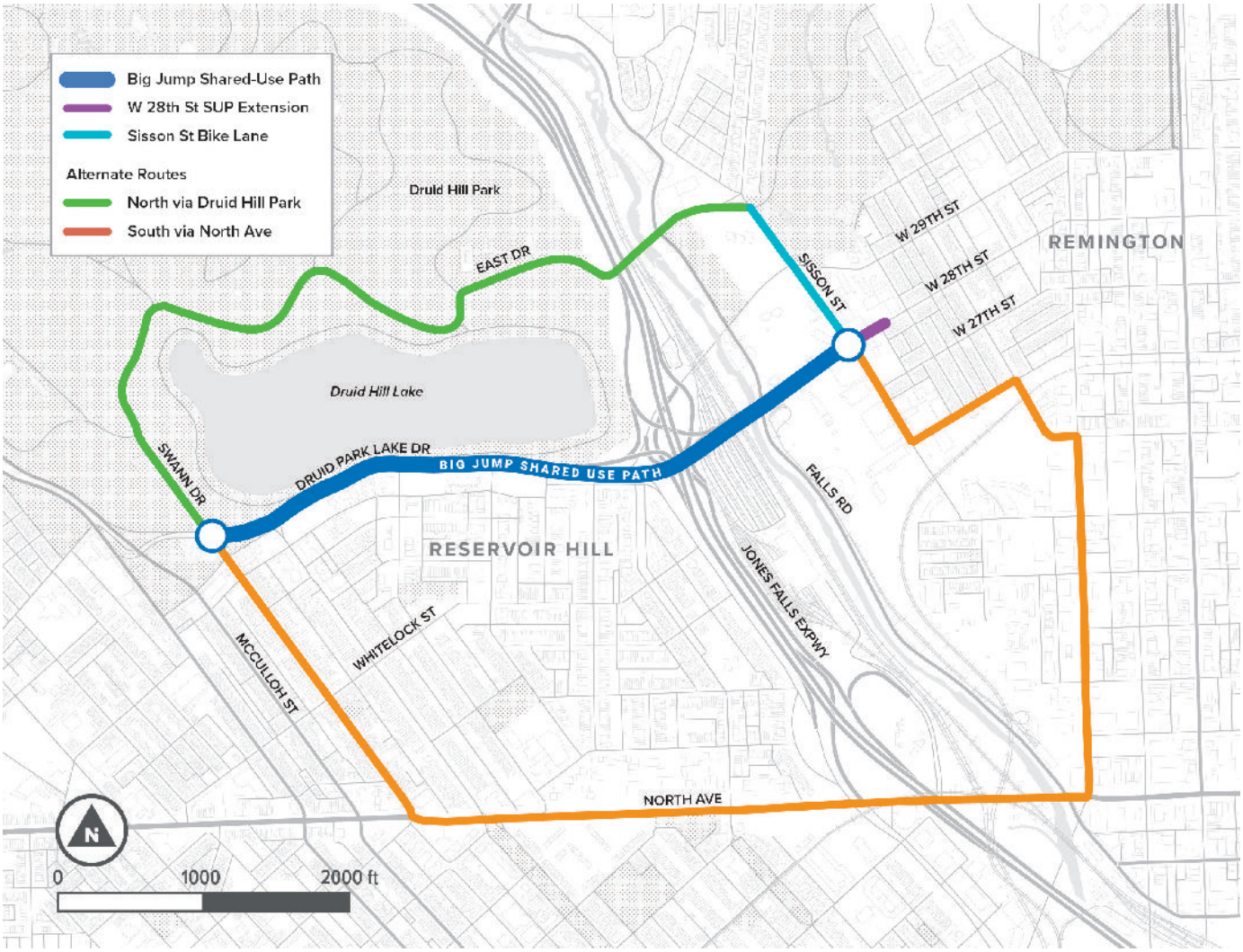
13. Winters, M., G. Davidson, D. Kao, and K. Teschke. Motivators and Deterrents of Bicycling: Comparing Influences on Decisions to Ride. Transportation, Vol. 38, No. 1, 2010, pp. 153–168.

of the Big Jump SUP, has negatively impacted the perceived safety of the facility. A more substantial form of physical separation would improve both the perceived and objective safety of users of the Big Jump SUP. Potential treatments could range in scale from concrete jersey barriers in constrained locations, such as on the W. 28th Street bridge, to a full re-design of the roadway along Druid Park Lake Drive to provide a grade-separated, landscape buffered side-path.

Limiting the Amount of Detour Required of People Walking and Biking

Research shows that shorter distances between destinations and increased density and mixing of population, employment centers, schools, parks, transit stops, retail, and housing

Figure 10. Big Jump SUP and Alternate Routes



result in higher numbers of people walking and bicycling for utilitarian, commuting, and recreational purposes, while longer distances between destinations and barriers such as steep topography and limited crossings of interstates or bodies of water result in lower numbers of people choosing to walk or bicycle.[14,15]

The Big Jump SUP provides a direct, relatively flat route between the Reservoir Hill and Remington neighborhoods at 0.9 miles from Swann Drive to Sisson Street. Without the Big Jump SUP, neighborhood connectivity is hampered due to the lack of ADA-compliant routes or bicycle facilities on the existing bridges that traverse I-83. The only existing connections that negotiate the I-83 divide between Reservoir Hill and Remington are indirect routes either to the north through Druid Hill Park using the East Drive / Wyman Park Drive bridge, or to the south via North Avenue.

The North route (green) travels through Druid Hill Park and negotiates the geographical and interstate barrier via the Wyman Park Drive bridge. While this route increases the distance to 1.5 miles between the start and end points of the Big Jump SUP, the route also has more challenging topography than the direct route created by the Big Jump SUP. In addition, the park is closed from dusk until dawn which limits this route's viability as an effective transportation option that serves the broadest range of users. This would disproportionately impact the needs of late-shift or service industry workers, who, according to the American Public Transportation Association's 2019 study, bear a higher transportation cost burden and have fewer public transportation options.[16]

The South route (orange) travels south along McCulloh Street to make use of the North Avenue bridge to negotiate the geographic and interstate barrier. This route more than doubles the total distance users must traverse measuring 2.25 miles from Swann Drive to Sisson Street and therefore represents an unacceptable amount of detour.

Improving Accessibility for Users of Wheelchairs and Other Mobility Devices

Built in the early 1960s when transportation projects were focused primarily on motor vehicle concerns, it is surprising that the W. 28th Street bridge and associated I-83 interchange made provisions for pedestrian accommodation at all. Unfortunately, the existing

14. Schneider, R. J., H. Lingqian, and J. Stefanich. Development of a neighborhood commute mode share model using nationally-available data. *Transportation*, 2017, pp. 1-21.

15. Saelens, B. E., J.F. Sallis, and L. D. Frank. Environmental Correlates of Walking and Cycling: Findings from the Transportation, Urban Design, and Planning Literatures. *Annals of Behavioral Medicine*, Vol. 25, No. 2, 2003, pp. 80-91.

16. APTA, Supporting Late-Shift Workers, Their Transportation Needs and the Economy, September 2019, https://www.apta.com/wp-content/uploads/APTA_Late-Shift_Report.pdf, accessed on 9 October 2020

sidewalks on the W. 28th Street bridge and the pedestrian bridge over Mount Royal Terrace are completely inadequate in providing for the modern requirements established by the civil rights law, Americans with Disabilities Act, which mandates that persons with disabilities may access the public right of way without discrimination.

As noted in the History and Context section, the Big Jump SUP has begun to mitigate these existing inadequacies and now provides a route that is usable and approaching full ADA-compliance. While the Big Jump SUP may have right-of-way, utility, or other constraints that limit the ability to fully meet accessibility guidelines, further efforts should be undertaken to design and construct an accessible facility to the maximum extent feasible.

The accessible design of the Big Jump SUP offers people using wheelchairs and mobility devices a direct, accessible connection between the Reservoir Hill and Remington neighborhoods for the first time since creation of I-83/JFX. (Source: Side A Photography/Bikemore)

As previously discussed, the reliance on one performance measure taken in isolation, such as volume, may not adequately capture the full accounting of benefits a facility provides. There is no better illustration of this fact than discussions of accessibility, where the number of people accommodated is less critical than providing the means to accommodate them in the first place. With this understanding, some accounting for facility usage can assist in validating the selected alignment's desirability as a route of travel.

In September 2018, roughly three months following the installation of the Big Jump SUP, a volunteer-led effort conducted a traditional weekday commute-hour (7-9 AM / 4-6 PM) count of bicycle users of the SUP over three weekdays. Despite the fact that the SUP had only recently been installed and was assumed to be primarily used during the traditional commute-hour, the count did indicate that the facility is a desirable route of travel,

Figure 11. Dockless Vehicle Trips in the Big Jump Area, August–November 2019

recording a total of 46 riders in the mornings and 33 riders in the afternoons. This is the only Big Jump SUP user count conducted to-date.

In early 2019, the BCDOT Dockless Vehicle (scooter) program began to ramp up and the various vendors began supplying BCDOT with usage data. This evaluation used the scooter data provided to serve as a reference point to indicate facility use and connectivity. While not a perfect indicator, scooters can serve as a proxy for understanding the desirability and ease of use of the facility for other users who rely on wheels such as medical mobility device users or people using wheelchairs. With close to 8,000 scooter trips across the Big Jump SUP, this data shows a strong preference towards the SUP routing by a factor of 10-15 times over the next nearest crossing at the East Drive / Wyman Park Drive bridge.

PERFORMANCE EVALUATION KEY POINTS

SAFETY ANALYSIS

- Americans with Disabilities Act of 1990 (ADA) requires that projects in the right-of-way require adherence to accessibility standards set forth in the 2010 ADA Standards for Accessible Design.
- Objective safety and perceived safety are measures considered in this evaluation and can significantly influence whether and how often people use the Big Jump SUP.

FACILITY DESIGN

- Objective safety issues exist, such as the ability of motorists to make high speed turns across the Big Jump SUP at Mount Royal Terrace or the Eutaw Street slip lane as well

A scooter user riding on the Big Jump SUP (Source: Brian O'Doherty)

as bicycle tire-catching stormwater inlet grates, and can be addressed through design improvements.

- Ongoing maintenance issues with traffic separation barriers and the damage to them can pose both an objective and perceived safety issue that can be addressed through a combination of improved operational and design improvements.

SPEED IN CORRIDOR

- High volumes of motor vehicle traffic during the peak periods kept average speeds in the corridor close the posted speed limit, however outside these times, excessive speeds, at nearly twice the limit, were observed.
- A recent NTSB study acknowledged the deadly problem that excessive speeds present on U.S. roadways and linked speed reduction to designing roads that encourage safer, slower speeds in the first place.
- Speed data analyzed revealed that while roadway changes associated with Big Jump SUP had an initial speed calming effect, driver familiarity with SUP resulted in speeds returning and then exceeding pre-installation levels necessitating further speed reduction countermeasures.

CRASHES IN CORRIDOR

- A recent study by the journal TRR found that more human-scaled streetscapes which are smaller and more narrowly enclosed by trees or buildings have shown a lower crash severity and can be seen as safety countermeasures that simultaneously improve livability goals.
- Crash data was analyzed for both before and after the introduction of the Big Jump SUP and a reduction of total crashes was observed suggesting that the SUP's mild application of the study's principle, eg, reduced streetscape width contributing to reduced crash propensity, had a positive effect.
- Studies have shown that near misses are more common than collisions and therefore data on perceived safety, as collected through the respondent survey, can highlight areas that need improved geometric design.

MOTOR VEHICLE MOBILITY ANALYSIS

- Travel time data was analyzed for varying segments along the corridor hosting the Big Jump SUP and alternate routes to see if the reduction in vehicle travel lanes (capacity) would result in an unacceptable increase in travel times.
- Four time periods were examined to account for before installation of the SUP, immediately after, a period after increased driver familiarity, and a period after BCDOT adjustments for improved motor vehicle mobility and SUP user safety.
- Motor vehicle travel time along southbound Auchentoroly Terrace/MD-129 leg (from Liberty Heights Ave to Druid Park Lake Drive) decreased by 6 seconds while eastbound Druid Park Lake Drive leg (from McCulloh St to Falls Rd) revealed an increase of 36 seconds resulting in an overall corridor travel time increase of 30 seconds.

PEDESTRIAN AND BICYCLE/SCOOTER MOBILITY

- Proximity to motor vehicle traffic is a significant source of stress and discomfort for bicyclists and a significant relationship exists between how safe people feel bicycling and their choice and frequency of doing so, thereby a more substantial barrier separating SUP users and motor vehicle traffic recommended to achieve both perceived and objective safety.
- The Big Jump SUP provides a direct, relatively flat route between the Reservoir Hill and Remington neighborhoods and achieves BCDOT's goal of limiting the amount of detour required of people walking and biking whereas alternate routes present an unacceptable increase in detour distance or have restricted hours of use (park operating hours closure).
- BCDOT's Dockless Vehicle (scooter) program serves as a useful proxy for evaluating BCDOT's goal of improving accessibility for wheelchair users and other mobility devices and an analysis of that program's data has shown a strong preference towards the using the Big Jump SUP's crossing of I-83 versus the nearest crossing at the East Drive/Wyman Park Drive bridge by 10-15 times.

FINDINGS AND RECOMMENDATIONS

FINDINGS

Historical Injustice to Local Communities

Many of the deleterious effects on the Black and Jewish neighborhoods resulting from the creation of Druid Hill Expressway were accurately predicted by concerned neighborhood voices in the 1940s. Those negative effects would be further compounded by the completion of the Jones Falls Expressway and the connecting interchange in the 1960s. The present condition of the Druid Lake Park Drive corridor as well as the corridor along the western edge of Druid Hill Park not only create a formidable barrier preventing safe and comfortable access to the park, these roads prioritize motor vehicle travel and speed to such an extent that any east-west connectivity by persons outside of a motor vehicle is strictly limited to the most able-bodied, as there is no provision for an ADA-accessible route in lieu of the Big Jump SUP. Furthermore, the isolation, increased segregation, and resulting disinvestment that these motor vehicle-centered projects enabled in the surrounding neighborhoods continues to affect the economic upward mobility of people of color to this day.

The Big Jump SUP begins the process of ameliorating these conditions by:

- providing an alternative vision for how roadway space in this corridor can be reallocated to support a broader range of mobility options
- enables greater access to jobs for local communities
- improved health benefits through better access to parks
- ultimately delivers transportation investment that centers racial justice

Provides Critical Multimodal Connectivity

Prior to its installation, three factors made the Big Jump SUP alignment a logical route choice: the lack of an ADA-accessible pedestrian route, no bicycle facilities, and no direct public transit between the Reservoir Hill and Remington neighborhoods. Additionally, the planned reservoir upgrade and resulting disruptions to the Druid Hill Lake's recreational

loop trail provided the opportunity to test the feasibility of implementing a more multimodal approach to the corridor.

The Big Jump SUP closes a critical gap in the multimodal transportation network and enables the first ADA-accessible connection between these neighborhoods since the inception of the Jones Falls Expressway. The Big Jump SUP's alignment, which makes use of the W. 28th Street bridge, provides the most direct route and thereby least amount of detour for people not using a motor vehicle and does so with the physical separation and width of path that both reduces users' stress from adjacent traffic and improves the users' safety. These points are the basis of a compelling argument for the permanent adoption of the Big Jump SUP and are further supported by Baltimore City Code Article 26, Subtitle 40 Complete Streets,[1] which mandates that Baltimore's transportation system, "to the greatest extent possible, promote walking, biking, and public transit."

The Big Jump SUP achieves BCDOT's stated goal of increasing pedestrian and bicycle mobility in three specific ways:

- reduces users' traffic stress via the SUP's physical separation from motor vehicles
- limits the amount of detour required via the most direct route between neighborhoods
- improves accessibility for users of wheelchairs and other mobility devices

No Significant Impact to Motor Vehicle Mobility

Generally, when a lane is removed from the street network roadway capacity is expected to decrease along with an increase in traffic congestion resulting in significantly increased travel time through the corridor. Analysis of the data comparing periods prior to the facility's installation along with multiple points after installation shows that the Big Jump SUP:

- has had no significant travel time impact on neighboring streets, communities, or parallel routes
- did not adversely affect motor vehicle mobility as neighboring traffic travel times did not drastically increase
- there is no evidence that motor vehicle drivers are significantly changing their routes to avoid using the Big Jump SUP corridor

1. Baltimore City Code Article 26 Surveys, Streets and Highways, Subtitle 40 Complete Streets; https://legislativereference.baltimorecity.gov/city-codes; accessed December 1st, 2020.

More importantly, the data has shown that as motorists became accustomed to the roadway changes presented by the Big Jump SUP, average speeds in the corridor not only returned to pre-installation levels, they exceeded them. While during the peak commute hours, traffic volume kept speeds safely within posted limits, the maximum speeds recorded outside these periods remained excessive and dangerous. This condition was already noted by community residents and acknowledged by BCDOT on their website's Big Jump Project page where they stated:

"The speed of traffic on Druid Park Lake Drive is a well-known community safety concern; thus, a minor increase in total delay, and a moderate reduction in top speed was an anticipated outcome of this project, for the sake of safety improvements."[2]

The analysis of the traffic and crash data corroborates the speed inducing affect that the excess capacity and highway-like context has on motorists indicating the need for further traffic speed management in the corridor. Additionally, the reduction in crash density revealed in the heat map comparison of before and after the installation of the Big Jump SUP, further underscores the improvement in safety achieved for all users of the corridor and speaks to the possibility of even more improvement with greater geometric design changes.

RECOMMENDATIONS

Make the Big Jump SUP Permanent

The Big Jump SUP has met all three goals established by Baltimore City Department of Transportation by providing improved corridor safety for all users, imposing inconsequential changes to motor vehicle mobility in the corridor, and appreciably improving the ability of people to travel between the Reservoir Hill and Remington neighborhoods without the use of a motor vehicle.

Additional benefits of the permanent incorporation of the Big Jump SUP into the Druid Park Lake Drive corridor are:

- The SUP is popular; a majority of survey respondents support making it permanent

2. "Big Jump: Frequently Asked Questions." Baltimore City Department of Transportation, accessed October 29, 2020, https://transportation.baltimorecity.gov/node/15643.

- The SUP begins the process of addressing historical inequities; invests in historically under-resourced neighborhoods
- The SUP improves Baltimore City's adherence to accessibility laws
- The SUP closes a critical gap in the multimodal transportation network thereby contributing towards Baltimore City's goals articulated in the Bike Master Plan and Complete Streets Design Manual

Improve the Facility's Design

Inherent in the nature of any pilot program or test case is the opportunity to identify areas for improvement. In its two-year existence, the Big Jump SUP has revealed specific areas where user's perceived and objective safety could be improved (and thereby increase facility usage) through specific geometric and material design changes:

1. **Build upon the ADA accessibility achievement**: As previously discussed, the Big Jump SUP has provided an ADA-accessible route for the first time since the 1960s completion of the Jones Falls Expressway. Further design enhancements should seek to maximize this accessibility through closer examination of path surface conditions and improvements to all grade-change transitions, along with special emphasis on user visibility at intersections.

2. **Provide improved SUP vertical separation**: In constrained locations such as the W. 28th Street bridge, concrete barriers should be considered. Where space permits, a more in-depth corridor redesign could simultaneously meet livability goals while providing safety countermeasures such as lane reductions and landscaped buffers to separate transportation modes.

3. **Improve the functional width of the SUP**: Addressing tire-catching hazards by replacing stormwater inlet grates with bicycle-safe grates not only improves the facility's safety, it allows for users who have different operating speeds (i.e., bicyclist vs pedestrian vs scooter) the space to comfortably move around/pass each other. A minimum width of 11 feet is required for a two-directional shared use path to allow a bicyclist to pass another path user going the same direction at the same time a path user is approaching from the opposite direction. Where higher use volumes/mix of user types is anticipated, the shared use paths should be a minimum of 14 feet in width or as determined by the FHWA Shared Use Path Level of Service calculator.[3]

3. FHWA. Shared Use Path Level of Service—A User's Guide. FHWA-HRT-05-138. Federal Highway Administration, U.S. Department of Transportation, Washington, DC, 2006.

4. **Minimize SUP users' exposure to traffic at intersections**: Minimizing the speed differential at points where the SUP and roadways intersect along with providing clear messaging regarding right-of-way to all users of the intersection should be examined for all roadway intersections of the SUP alignment and incorporated into any facility redesign. The forthcoming edition of the AASHTO Guide for the Development of Bicycle Facilities provides specific guidance on the design of shared use paths as well as guidance on the current state of practice for the design of protected intersections. Additionally, the following specific actions are recommended:

    a. Eliminate the right turn access from eastbound W. 28th Street/Druid Park Lake Drive onto southbound Mount Royal Terrace that permits high-speed turns across the alignment of the Big Jump SUP

    b. Eliminate the slip lane on Eutaw Place that permits high-speed turns across the alignment of the Big Jump SUP onto eastbound Druid Park Lake Drive and direct all turns to occur at the signalized intersection of these two roadways

    c. Make permanent the curb extensions currently represented by water filled barriers at W. 29th Street and Sisson Street to create a more compact and safer intersection crossing

    d. Eliminate permissive left turns onto Linden Avenue from westbound Druid Park Lake Drive. Provide bicycle signals to deconflict two-way SUP operation with left turning traffic

Implement Additional Traffic Calming Measures on Druid Park Lake Drive

The data analyzed by this evaluation has shown that the installation of the Big Jump SUP did not have enough of a significant mitigating effect on the excessive traffic speeds recorded on Druid Park Lake Drive during non-peak commuting hours. Additional traffic calming measures should be implemented corridor-wide to bring down traffic speeds and restore Druid Park Lake Drive to a parkway condition with accommodations for all users. Additional recommendations to achieve this are as follows:

- Narrow motor vehicle travel lanes to a maximum of 10-foot wide. The Baltimore City Roadway Functional Classification Map designates Druid Park Lake Drive as a principal arterial in which 10-foot widths are permitted per Baltimore City Code Article 26, Subsection 40-29 Lane Widths.

- Reduce Druid Park Lake Drive to a single motor vehicle travel lane in each direction
- Install a landscaped/treed center median with adequately sized pedestrian refuges at crossings to accommodate a diverse range of users from individuals walking to people riding bicycles with trailers
- Provide an 18-foot sidewalk zone, per the Parkway Street Type criteria in the Baltimore City Complete Streets Design Manual, to allow for a wide vegetated buffer between the roadway and pedestrian zone
- Plant street trees to maintain a park-like character along the roadway, as well as provide vertical elements that encourage slower driving speeds
- Remove Freeway/Expressway-scaled signage and replace with the more appropriately scaled signage such as conventional road sign size or as directed by the Manual on Uniform Traffic Control Devices (MUTCD)

Improve Data Collection and Continue to Establish Performance Measures

Establishing specific performance measures for future projects like the Big Jump SUP as well as continued monitoring of projects in place will be critical to quantifying the performance of those projects over time. The performance measures should be aligned with BCDOT goals for the Big Jump SUP, as well as broader City transportation goals as set forth in Baltimore City Code, Article 26–Subtitle 40 Complete Streets and the Baltimore City Complete Streets Design Manual. The foundation of the new Complete Streets Design Manual rests on the establishment of a modal hierarchy framework that prioritizes the safety and accessibility of people as they walk, bicycle and take transit.

Performance measures are critical in identifying projects and investments that provide a high level of benefit. No single measure can fully describe the nuances of the transportation experience across all modes and for all users, therefore it's important to consider multiple measures throughout the project planning process.

The Baltimore City Complete Streets Design Manual outlines performance measures for assessing the City's complete streets

transportation system as a whole, but some of these performance measures are also applicable to project-specific assessments. These include:

1. System Performance

- Crash data year-over-year for all modes of travel separately reported for all crashes, injury crashes, and fatal crashes
- Commute times by mode
- Mode share

2. Program Performance

- Infrastructure built, upgraded, replaced or rehabilitated in each 1-year period, including multimodal, public space, and green infrastructure

The FHWA *Guidebook for Developing Pedestrian & Bicycle Performance Measures* offers seven community goals for transportation: Connectivity, Economic, Environment, Equity, Health, Livability, and Safety. The Guidebook's Performance Measures Toolbox details a broad range of performance measures for pedestrian and bicycle transportation that support these goals. Some of the performance measures most relevant to Big Jump SUP project include:

- Access to Community Destinations
- Access to Jobs
- Adherence to Accessibility Laws
- Connectivity Index
- Facility Maintenance
- Network Completeness
- Route Directness

The Guidebook provides detailed guidance on methods and data to collect for tracking each performance measure and is an excellent resource for deciding what to measure in order to capture the current state of the system, to set targets to improve those measures, and to use the measures to evaluate and compare the effects of proposed projects and policies.

APPENDIX 1: BIG JUMP SHARED USE PATH SURVEY

BIKE Baltimore dot DEPARTMENT OF TRANSPORTATION BALTIMORE CITY

THE BIG JUMP SHARED USE PATH

SHARE YOUR THOUGHTS

WHAT ARE YOUR EXPERIENCES TRAVELING ON DRUID PARK LAKE DR & THE 28TH ST BRIDGE?

Please take this brief survey to share your experiences traveling on Druid Park Lake Drive and the 28th Street bridge. Your feedback will help the City evaluate the success of the Big Jump Shared Use Path and help to inform how it might be improved.

The City created a Shared Use Path, using orange and white barriers, on the south side of Druid Park Lake Drive starting at Madison Avenue and continued the path over the 28th Street bridge to Atkinson Street. The reason this Shared Use Path or pop-up trail was created was to:

1. Better connect the communities of Reservoir Hill and Remington to local businesses, parks, and community amenities.
2. Improve the experience and safety of people walking, jogging, using wheelchairs, and riding scooters or bikes as they travel between the Reservoir Hill and Remington neighborhoods, or along Druid Park Lake Drive.

In this survey we will ask about:

- Your relationship to the Druid Park Lake Drive/28th Street Bridge area
- How you move through this area (walk or use a wheelchair, ride a scooter or bike, or drive a vehicle)
- Your overall thoughts on the Big Jump Shared Use Path
- A few questions about you.

NOW FOR THE QUESTIONS!

YOUR RELATIONSHIP TO DRUID PARK LAKE DRIVE/28TH STREET BRIDGE

1. Where do you live? (select one)
    a. I live in Reservoir Hill or another nearby neighborhood on the west side of I-83
    b. I live in Remington or another nearby neighborhood on the east side of I-83
    c. I live in Baltimore City in a neighborhood outside the vicinity of Druid Park Lake Drive/ 28th Street bridge
    d. I live outside of Baltimore City
    e. Other _____

2. How do you travel along Druid Park Lake Drive/28th Street bridge in a typical week? (select all that apply)
    a. Walk or Roll (with a wheelchair or other mobility device)
    b. Scoot or Bicycle
    c. Car
    d. Other _____

3. What types of trips do you make along Druid Park Lake Drive/28th Street bridge in a typical week? (select all that apply)
    a. Commuting to/from work
    b. Traveling to/from school
    c. Shopping/errands
    d. Social or recreational
    e. Other _____

WALK / ROLL

1. Do you use a wheelchair or other mobility device that helps you get around on Big Jump Shared Use Path?
    a. Yes
    b. No

2. During a typical month, how often do you walk or roll on Big Jump Shared Use Path?
    a. Daily
    b. A few times a week
    c. A few times a month
    d. I do not wall/roll on the Big Jump Shared Use Path

3. When the Big Jump Shared Use Path did not exist, how did you usually travel between the Reservoir Hill and Remington neighborhoods?
    a. I walked/rolled using Druid Park Lake Drive/28th Street bridge
    b. I walked/rolled using a longer route (not using Druid Park Lake Drive/28th Street bridge)
    c. I took a bus/ride share service
    d. I drove a car
    e. I did not make this trip before the Shared Use Path was installed
    f. Other _____

4. How safe from vehicular traffic do you feel walking/using a wheelchair or other mobility device on Big Jump Shared Use Path?
    a. Not Safe
    b. Somewhat Safe
    c. Safe
    d. Very Safe

5. If you answered "Not Safe" above, please share additional information about why or where you do not feel safe. _____

    _____

    _____

SCOOT / BICYCLE

1. If you use a scooter or ride your bicycle, which statement best describes you?
    a. I'm comfortable riding a scooter or bike on any type of street, even without bike lanes
    b. I'm comfortable riding a scooter or bike on slower streets and on streets with bike lanes
    c. I'm only comfortable riding a scooter or bike where I'm separated from motor vehicle traffic, such as on a park trail or physically-protected bike path
    d. Other _____

2. During a typical month, how often do you ride your scooter or bike on Big Jump Shared Use Path?
    a. Daily
    b. A few times a week
    c. A few times a month
    d. I do not scoot/bicycle on the Big Jump Shared Use Path

3. How safe do you feel using a scooter or riding a bike on the Big Jump Shared Use Path?
    a. Not Safe
    b. Somewhat Safe
    c. Safe
    d. Very Safe

4. If you answered "Not Safe" above, please share additional information about why or where you do not feel safe. _____

    _____

    _____

DRIVE A CAR

1. During a typical month, how often do you drive on Druid Park Lake Drive or 28th Street bridge?
    a. Daily
    b. A few times a week
    c. A few times a month
    d. I do not drive on Druid Park Lake Drive or 28th Street bridge

2. How safe do you feel driving on Druid Park Lake Drive or 28th Street bridge?
    a. Not Safe
    b. Somewhat Safe
    c. Safe
    d. Very Safe

3. If you answered "Not Safe" above, please share additional information about why or where you do not feel safe. _____

    _____

    _____

4. Do you ever avoid the Big Jump area by diverting onto other streets?
    a. Yes
    b. No

5. If yes, onto which streets do you divert? _____

    _____

    _____

OVERALL

6. Should people using wheelchairs, riding bikes, using scooters and walking have a protected space that allows them to feel safe along Druid Park Lake Drive and over the 28th Street Bridge?
    a. Yes
    b. No

7. Should the Big Jump Shared Use Path be made into permanent facility to allow people who use wheelchairs, ride bicycles, use scooters, and walk to feel safe while traveling on Druid Park Lake Drive and the 28th Street Bridge?
    a. Yes
    b. Yes, but I would change a few things.
    c. No

1. What improvements/changes to the Big Jump Shared Use Path would you like to see?

_____

_____

_____

_____

_____

_____

ABOUT YOU

1. What is your age?
    a. 24 & Under
    b. 25-39
    c. 40-54
    d. 55 & Over

2. Which gender do you most identify with?
    a. Male
    b. Female
    c. Other
    d. Prefer not to answer

3. Which Race/Ethnicity do you most identify with?
    a. African American / Black
    b. Caucasian / White
    c. Hispanic / Latinx

4. What is the zip code for where you live? _____