Title VI Service Equity Analysis:
Core Bus Service, Winter 2022 Service Change

Approval date: February 4, 2022

Prepared with assistance from:
FOURSQUARE INTEGRATED TRANSPORTATION PLANNING
I have received, considered, and approve the Maryland Transit Administration’s Title VI Service Equity Analysis for Core Bus Service, Winter 2022 Core Service Changes.

Holly Arnold, Administrator
Maryland Transit Administration

Date
02/04/2022
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Introduction

This Service Equity Analysis was conducted in accordance with FTA Circular 4702.1B, *Title VI Requirements and Guidelines for Federal Transit Administration Recipients*. The Circular requires, under Title VI of the Civil Rights Act of 1964, that the Maryland Department of Transportation’s Maryland Transit Administration (MDOT MTA) undertake an evaluation of any proposed service change to determine whether it has a discriminatory impact on Title VI protected minority populations or on low-income populations. All service changes are evaluated as to whether they meet or exceed thresholds outlined in the operator’s Major Service Change policy. Service changes qualifying as Major Service Changes are subsequently evaluated for potential discriminatory impacts. Any transit operator with at least 50 vehicles in peak service is required to conduct a Service Equity Analysis on Major Service Changes to this end.

An analysis must be completed and then reviewed and approved by MDOT MTA’s Administrator in accordance with MDOT MTA’s Title VI Program before the change is implemented. Final approved analyses are submitted to the FTA as a part of MDOT MTA’s Title VI Program update submission. In summary, the FTA Circular states that the analysis should include:

- A statement of the agency’s “Disparate Impact” and “Disproportionate Burden” policies and how the public was engaged in developing the policies.
- A clear explanation of how the proposed service changes meets or exceed the operator’s Major Service Change policy. Changes that exceed the Major Service Change policy must be analyzed for Disparate Impact and Disproportionate Burden.
- A description of the public engagement process for setting the Major Service Change policy.
- Documentation of MDOT MTA’s Administrator’s review and approval of the analysis, demonstrating the Administrator’s consideration, awareness, and approval of the Major Service Change policy (Figure 1).
- An analysis that takes into effect any adverse effects related to a Major Service Change. Demonstration that the operator has analyzed service between the existing and proposed service and has considered the degree of adverse effects when planning service changes.
- Description of the data and methodology used in the Service Equity Analysis.
- Overlay maps and tables showing how the proposed service changes would impact minority and low-income populations.
- If a potential Disparate Impact is found on the basis of race, color, or national origin, the operator must only proceed with the project if a clearly demonstrated substantial legitimate justification for the proposed service change is proposed, and there are no alternative proposals – explored by the agency to avoid, minimize, or mitigate potentially discriminatory impacts – that would have a less Disparate Impact on the basis of race, color, or national origin.
Figure 1 | Title VI Policies Approval Signature Page

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND TRANSIT ADMINISTRATION

APPROVAL SIGNATURE PAGE

I hereby acknowledge the receipt of the Maryland Department of Transportation Maryland Transit Administration (MDOT MTA) Title VI Major Service Change Policy Revision, October 2021. I have reviewed and approve this document. I am committed to ensuring that no person is excluded from participation in, or denied the benefits of transit services on the basis of race, color, or national origin, as protected by Title VI according to C 4702.1B Title VI requirements and guidelines for Federal Transit Administration recipients.

Digitally signed by
Holly Arnold
Date: 2023.10.21

Holly Arnold
Acting Administrator

10/21/2021
Date
MDOT MTA Title VI Policies

As part of its overall Program to comply with Title VI, the Maryland Department of Transportation’s Maryland Transit Administration (MDOT MTA) conducts a Service Equity Analysis whenever the agency proposes a Major Service Change. Equity analyses are conducted regardless of whether proposed changes would consist of service increases or service reductions.

While the definition of “Major Service Change” varies slightly by MDOT MTA mode, the Disparate Impact/Disproportionate Burden (DI/DB) thresholds are the same for each mode. However, the thresholds are applied independently for each market when conducting equity analyses. In other words, the percentage of minorities affected by a change in a particular market are compared to the overall percentage of minorities in that market, rather than to the Maryland minority average for the entire statewide service area. For this analysis, the market is MDOT MTA’s Core Bus service area. The Core Bus service category consists of sixty-five (65) fixed-alignment bus routes: forty-four (44) LocalLink, twelve (12) CityLink, and nine (9) Express BusLink routes. The Core Bus service area is defined as all Census Block Groups within three-quarters of a mile (0.75 miles) of MDOT MTA Core Bus stops.

Major Service Change

As described in MDOT MTA’s 2020-2023 Title VI Program, MDOT MTA routinely conducts a Title VI analysis when Major Service Changes are proposed. By Maryland State law (COMAR Transportation Article §7-506), MDOT MTA is required to conduct public hearings prior to the implementation of any of the following service changes:

- Establish or abandon any bus or rail route listed on a published timetable.
- Change bus or rail route alignment listed on a published timetable, unless the change is needed because of temporary construction or changes in the road network.
- Reduce the frequency, number of days, or days of service for a commuter bus or commuter rail route without substituting a comparable level of service, unless the reduction is temporary or a result of:
  - A natural disaster.
  - Weather or other emergency conditions.
  - Schedule adjustments required by third party that operates service on the same right-of-way.
  - Other circumstance beyond the control of the Administration.
- Establish or abandon a rail transit station.

The Code of Maryland does contain one exception: “The Administration may add service on a new alignment branching off of an existing route without holding a public hearing, if the addition of the new alignment does not alter the existing route.”

Because existing statutes already regulate when MDOT MTA must conduct public hearings prior to service change implementation, the Title VI Major Service Change definition was established to incorporate these existing elements, and to also include other elements that are in the spirit of the protections afforded under Title VI.
The following service changes are exempt from the Major Service Change policy:

- Seasonal service changes.
- Creation, modification, or discontinuation of a demonstration route within the first 12 months of operation (however, Code of Maryland requirements will still apply).
- Diversions, frequency changes, or span modifications due to local events, construction, weather, and emergencies.
- Outages due to planned and/or unplanned maintenance, inspections, or repairs.
- Emergency service changes, including changes in routes or service frequencies, which may be necessitated due to a disaster, which severely impairs public health or safety, changes in access to public streets, or the ability of MDOT MTA equipment to travel on public streets. Emergency service changes may be implemented immediately without a public hearing provided that a finding identifying the circumstances under which the change is being taken is made by the Administrator and a subsequent public hearing is held and equity analysis is conducted, if the temporary change is to remain in effect longer than 12 months.

Title VI service equity analyses are only required if Major Service Changes are proposed. MDOT MTA’s Title VI Major Service Change policies are defined by fixed route mode. For the Core Bus market, the definition of a Major Service Change is as follows:

- Alteration of a route’s revenue miles or revenue hours on a given service day by twenty-five percent (25.00%) or more, including establishment or abandonment of a route.
- Alteration of a route’s revenue miles or revenue hours on a given service day by a cumulative twenty-five percent (25.00%) or more over one service year.
- Change to the span of service on a route by ninety (90) minutes or more on a given service day.
- Addition or removal of at least fifteen percent (15.00%) of a route’s bus stops on a given service day.
- Cumulative alteration of at least fifteen percent (15.00%) of total Core Bus system revenue miles or revenue hours in a given service change.

Disparate Impact and Disproportionate Burden
MDOT MTA’s policies for Disparate Impact and Disproportionate Burden adhere to FTA standards. When assessing a proposed service change for a potential Disparate Impact or Disproportionate Burden, changes to routes or fares are assessed cumulatively.

Disparate Impact (DI) refers to a facially neutral policy or practice that disproportionately affects members of a group identified by race, color, or national origin. A Disparate Impact occurs when the difference between minority riders and non-minority riders affected by a proposed fare or service change is ten percent (10.00%) or greater.

Disproportionate Burden (DB) refers to a neutral policy or practice that disproportionately affects low-income populations more than non-low-income populations. A Disproportionate Burden occurs when the difference between low-income riders and non-low-income riders affected by a proposed fare or service change is ten percent (10.00%) or greater.

Major Service Change, Disparate Impact, and Disproportionate Burden Policy Outreach
From October through December 2019, MDOT MTA conducted an extensive public engagement effort to solicit feedback on policies for evaluation of service and fare changes. Each meeting followed the same format: MDOT MTA provided a presentation discussing an overview of Title VI and evaluation of service and fare changes; a comparison of previous versus
proposed Major Service Change policies for each mode; a proposal for Disparate Impact and Disproportionate Burden thresholds, including examples of how each are employed in Equity Analyses; and time for questions, answers, and general feedback. Outreach efforts are summarized below.

Community Based Organizations
MDOT MTA, staff and consultants, held both in-person and virtual (webinar) focus groups with representatives from and constituents of community-based organizations in the agency’s service area. To encourage attendance, MDOT MTA sent an email blast to hundreds of representatives from organizations in the Baltimore region (for the in-person presentation) and from organizations outside the Baltimore region (for the virtual presentation).

In-Person Focus Group
The in-person community-based organization focus group consisted of a breakfast meeting held on October 16, 2019. Representatives from the following organizations were in attendance:

- People Encouraging People
- The League for People with Disabilities
- Laurel Armory Anderson & Murphy Community Center
- Governor's Office of Community Initiatives (GOCI)
- Bon Secours Hospital
- St. Peter's Adult Learning Center.

Webinar Focus Group
The virtual webinar community-based organization focus group consisted of a webinar presentation held on October 16, 2019. Representatives from the following organizations were in attendance:

- The ARC Central Chesapeake Region
- Accessible Resources for Independence
- The Arc of Frederick County
- The Arc of Prince George's County
- Athelas Institute
- Howard County Office of Workforce Development
- Anne Arundel Workforce Development Corporation.

MARC Riders Advisory Council
MDOT MTA presented proposed policies to the MDOT MTA MARC Riders Advisory Council at their regular meeting on November 14, 2019.

Citizens Advisory Committee
MDOT MTA presented proposed policies to the MDOT MTA Citizens Advisory Committee at their regular meeting on November 19, 2019.

Citizens Advisory Committee on Accessible Transportation
MDOT MTA presented proposed policies to the MDOT MTA Citizens Advisory Committee on Accessible Transportation at their regular meeting on November 21, 2019.
Online Survey
To obtain final feedback on proposed policies, MDOT MTA conducted an online survey from November 21, 2019 through December 21, 2019. Supplemented by reference material (a PDF) outlining proposed Major Service Change, Disparate Impact, and Disproportionate Burden policies, the survey asked participants to provide the following:

- Insight on whether theoretical service changes should qualify as “major.”
- Insight on whether proposed Disparate Impact and Disproportionate Burden policies were appropriate.
- Any additional feedback.

The survey was sent by email to various community-based organizations and promoted through MDOT MTA’s website and social media. The survey received a total of 14 responses.

Fall 2021 Outreach on Revised Policy
During Fall 2021, MDOT MTA elected to revise its Core Bus Major Service Change policy to account for systemwide changes, cumulative changes over one year, and changes to bus stops that could trigger a Major Service Change. MDOT MTA presented the proposed policy changes to its citizen advisory committees for their feedback and conducted three virtual public meetings at different times of the day to ensure accessibility for the public. The new Major Service Change policy was approved in October 2021.

The following public outreach efforts occurred for this update to MTA’s Major Service Change Policy, prior to Administrator review, consideration, and approval of a finalized new policy:

- July 8, 2021 - MARC Riders’ Advisory Council Meeting
- July 13, 2021 – Title VI Subcommittee Meeting
- Joint Subcommittee of MTA’s Citizen’s Advisory Committee and MTA’s Citizen’s Advisory Committee for Accessible Transportation
- July 14, 2021 – Citizens Advisory Committee Meeting
- July 15, 2021 – Citizens Advisory Committee for Accessible Transportation Meeting
- September 20, 2021 – Virtual Public Meeting
- September 21, 2021 – Virtual Public Meeting
- September 22, 2021 – Virtual Public Meeting.
Service Equity Analysis

METHODOLOGY

All Winter 2022 service changes were evaluated to ascertain which changes met the criteria of MDOT MTA’s Major Service Change definition. MDOT MTA’s Major Service Change Policy was initially developed for the agency’s 2020-2023 Title VI Program and revised in October 2021. Currently, the policy defines Core Bus Major Service Changes as follows:

- Alteration of a route’s revenue miles or revenue hours on a given service day by twenty-five percent (25.00%) or more, including establishment or abandonment of a route.
- Alteration of a route’s revenue miles or revenue hours on a given service day by a cumulative twenty-five percent (25.00%) or more over one service year.
- Change to the span of service on a route by ninety (90) minutes or more on a given service day.
- Addition or removal of at least fifteen percent (15.00%) of a route’s bus stops on a given service day.
- Cumulative alteration of at least fifteen percent (15.00%) of total Core Bus system revenue miles or revenue hours in a given service change.

MDOT MTA analyzes the potential for a Disparate Impact or Disproportionate Burden through Service Equity Analyses based on cumulative proposed service changes. This Service Equity Analysis first reviewed the proposed service increases and service reductions for each effect, for each time period, and for each affected Census Block Group. Sums of impacted populations and households were also analyzed (by metric and time period, for all affected Census Block Groups) to determine if proposed Major Service Changes would result in a potential Disparate Impact or Disproportionate Burden.

To evaluate whether proposed service changes could result in a Disparate Impact or Disproportionate Burden, this Service Equity Analysis employed the methodology first developed for the BaltimoreLink full-system redesign service equity that occurred in 2017. This methodology was reviewed by the Federal Transit Administration (FTA) on a conference call and web presentation with MDOT MTA that was held on March 17, 2016. On the call, MDOT MTA understood the methodology to be “properly documented” per FTA requirements.

In lieu of a route-level analysis, this methodology employs a level-of-service based analysis at the Census Block Group level, analyzing changes at each stop. This methodology was selected for use in this Service Equity Analysis given the number and diversity of changes occurring within this singular change, and to allow for an analysis of all changes that would constitute an adverse effect. MDOT MTA has determined that discontinuation of service, significant reductions in frequency, and/or significant reductions in the span of service could have adverse effects on minorities and low-income populations.

Based on MDOT MTA’s Major Service Change policy and definition of adverse effects, three types of service changes were analyzed at the Census Block Group level for this Service Equity Analysis: span of service, trip frequency, and total service addition or discontinuation.

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1 March 17, 2016 conference call and web presentation participants included Bart Plano, Kevin Quinn, and Marjorie Nesbitt of MTA; Lynn Bailey, Jonathan Ocana, Aida Douglas, Kathleen Zubrzycki, and Jay Fox of FTA; and Shana Johnson and Katie List of Foursquare ITP.
Data Sources

For this analysis, the primary data source was the U.S. Census American Community Survey (ACS) five-year estimates from 2015 to 2019, measured at the Census Block Group level. Geographic data provided by MDOT MTA was used to determine the service areas for the current Core Bus Network.

For the Disparate Impact (minority) analysis, the ACS table utilized was Table B03002, “Hispanic or Latino Origin by Race.” To determine the percentage of the population that is minority for the service area, total population estimates and minority population estimates (total population minus non-Hispanic White population) for block groups were used along with bus stop point data and route line data within R, a software environment for statistical computing.

Using R, a three-quarter mile buffer was placed around each CityLink, LocalLink, and Express BusLink bus stop affected by a Major Service Change. Census Block Groups containing either partially or wholly within the service area were used when calculating the effects of service changes on a Census Block Group.

For the Disproportionate Burden (low-income) analysis, the ACS table utilized was Table B19001, “Household Income in the Past 12 Months (In 2018 Inflation-Adjusted Dollars).” To determine the percent of low-income households for the Core Bus service area, the total number of households and the total number of households reporting incomes of $44,999 or less (aggregate of all income categories under $45,000)² for block groups were used along with bus stop point data and route line data within R.

Using R, a three-quarter mile buffer was placed around each CityLink, LocalLink, and Express BusLink bus stop affected by a Major Service Change. Census Block Groups containing either partially or wholly within the service area were used when calculating the effects of service changes on a Census Block Group.

² During development of the 2020-2023 Title VI Program update, thresholds for “low-income” were set separately for each MDOT MTA mode service area using the U.S. Housing and Urban Development (HUD) FY2019 median family income limits summary as well as American Community Survey 2013-2017 Five-Year estimates. First, the average household size within the service area of each mode was determined and rounded to the nearest whole number. Second, for each mode, the average rounded household size was referenced against area median family income for the “very low (50 percent)” income limits within the Baltimore-Columbia-Towson, MD Metropolitan Statistical area. Third, to match with Census and survey income limit divisions, this figure was rounded to the nearest income division (break point) identified in U.S. Census Table B19001, “Household Income in the Past 12 Months.” For the Core Bus service area, the low-income threshold is $44,999.
Adverse Effects

Table 1 summarizes service changes categorized as significant enough to potentially result in an adverse effect (via a service increase or service reduction) by MDOT MTA.

Table 1 | Service Changes Potentially Leading to Adverse Effects

<table>
<thead>
<tr>
<th>Service Change Type</th>
<th>Service Increase Threshold</th>
<th>Service Reduction Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Span of Service</td>
<td>Span of bus service in a Census Block Group is proposed to increase by 90 minutes or more in a service day.</td>
<td>Span of bus service in a Census Block Group is proposed to decrease by 90 minutes or more in a service day.</td>
</tr>
<tr>
<td>Trip Frequency (Measured in Buses per Hour; Assessed on Peak/Off-Peak Basis)</td>
<td>Trip frequency in a Census Block Group is proposed to increase by 25 percent or more in a service day.</td>
<td>Trip frequency in a Census Block Group is proposed to decrease by 25 percent or more in a service day.</td>
</tr>
<tr>
<td>New Service/Service Discontinuation</td>
<td>New service in a Census Block Group (where there previously was none).</td>
<td>Service discontinuation in a Census Block Group.</td>
</tr>
</tbody>
</table>

For each service change type, an appropriate time period was used when conducting a Service Equity Analysis:

- Span of Service changes (as measured by span of service available in a day) were analyzed for Weekdays, Saturdays, and Sundays.
- Trip Frequency (as measured in buses per hour) was measured during Weekday peak times, Weekday off-peak times, Saturdays, and Sundays.
- Service Discontinuation/New Service was analyzed for Weekdays, Saturdays, and Sundays.

A stop was counted as an “Addition of New Service” only when the stop did not have service in the baseline GTFS feed and will have service in the proposed system. Likewise, a stop was counted as a “Service Discontinuation” when the stop had service in the baseline GTFS feed and will not have service in the proposed system. Stops analyzed for New Service/Service Discontinuation were not considered for Disparate Impacts or Disproportionate Burdens when analyzing changes to span of service or trip frequency.

WINTER 2022 SERVICE CHANGES

MDOT MTA’s Winter 2022 service changes, effective Sunday, February 6, 2022, include changes to the Core Bus network that are divided into six categories: runtime changes, service changes, schedule (frequency) changes, trip changes, school trip changes, and bus stop/timepoint changes. Per MDOT MTA’s Major Service Change policy, which qualifies Major Service Changes based on changes from the previous service pick as well as from one year prior to the current service pick, this Service Equity Analysis employed the following two approaches to examine the service change impacts on minority populations and low-income households:

- Year-over-year change: Winter 2021 service pick compared to Winter 2022 service pick.
- Pick change: Fall 2021 service pick compared to Winter 2022 service pick.

Changes qualifying as Major Service Changes under MDOT MTA’s Title VI Program are listed in Table 2 (Winter 2021 compared to Winter 2022: Weekday); Table 3 (Fall 2021 compared to Winter 2022: Weekday); Table 4 (Fall 2021 compared to Winter 2022: Saturday), and Table 5 (Fall 2021 compared to Winter 2022: Sunday). Service changes made to Saturday schedules from Winter 2021 to Winter 2022, and to Sunday schedules from Winter 2021 to 2022, did not qualify as Major Service Changes.
# Weekday Service Changes

## Table 2 | Weekday Year Over Year Change: Winter 2021 Pick Compared to Winter 2022 Pick

<table>
<thead>
<tr>
<th>Impacted Route</th>
<th>Change Description</th>
<th>Existing Service</th>
<th>Proposed Service</th>
<th>Major Service Change Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>LocalLink 75</td>
<td>Changes in trip frequency. Weekday trip frequency modified during the peak from 20 minutes to 35 minutes; and during the evening/late-night hours from 60-70 minutes to 45-60 minutes. Change in trips. One new weekday southbound and northbound trip added.</td>
<td>Daily Revenue Miles: 1,306</td>
<td>Daily Revenue Hours: 65.50</td>
<td>Daily Revenue Miles: 1,540</td>
</tr>
<tr>
<td>CityLink Blue</td>
<td>Change in runtime. Running time modifications on Weekdays, Saturdays, and Sundays.</td>
<td>Daily Revenue Miles: 2,064</td>
<td>Daily Revenue Hours: 188.95</td>
<td>Daily Revenue Miles: 2,414</td>
</tr>
</tbody>
</table>
### Table 3 | Weekday Pick Change: Fall 2021 Pick Compared to Winter 2022 Pick

<table>
<thead>
<tr>
<th>Impacted Route</th>
<th>Change Description</th>
<th>Existing Service</th>
<th>Proposed Service</th>
<th>Major Service Change Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Daily Revenue Miles</td>
<td>Daily Revenue Hours</td>
<td>Daily Span of Service (Hours)</td>
</tr>
<tr>
<td>LocalLink 63</td>
<td>Change in route navigation at Tradepoint Atlantic site. Route changes regarding how MDOT MTA buses navigate the private Tradepoint Atlantic property (originally made on August 30, 2021) will become permanent, with an additional leg of the trip to serve Finishing Mill Road and the new Amazon MTN6 facility.</td>
<td>1,159</td>
<td>78.53</td>
<td>24.17</td>
</tr>
<tr>
<td>Express BusLink 163</td>
<td>Change in route navigation at Tradepoint Atlantic site. Route changes regarding how MDOT MTA buses navigate the private Tradepoint Atlantic property (originally made on August 30, 2021) will become permanent, with an additional leg of the trip to serve Finishing Mill Road and the new Amazon MTN6 facility.</td>
<td>1,797</td>
<td>98.47</td>
<td>22.43</td>
</tr>
</tbody>
</table>
## Saturday Service Changes

### Table 4 | Saturday Pick Change: Fall 2021 Pick Compared to Winter 2022 Pick

<table>
<thead>
<tr>
<th>Impacted Route</th>
<th>Change Description</th>
<th>Existing Service</th>
<th>Proposed Service</th>
<th>Major Service Change Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Daily Revenue Miles</td>
<td>Daily Revenue Hours</td>
<td>Daily Span of Service (Hours)</td>
</tr>
<tr>
<td>LocalLink 63</td>
<td><strong>Change in route navigation at Tradepoint Atlantic site.</strong> Route changes regarding how MDOT MTA buses navigate the private Tradepoint Atlantic property (originally made on August 30, 2021) will become permanent, with an additional leg of the trip to serve Finishing Mill Road and the new Amazon MTN6 facility.</td>
<td>997</td>
<td>66.30</td>
<td>23.38</td>
</tr>
<tr>
<td>Express BusLink 163</td>
<td><strong>Change in route navigation at Tradepoint Atlantic site.</strong> Route changes regarding how MDOT MTA buses navigate the private Tradepoint Atlantic property (originally made on August 30, 2021) will become permanent, with an additional leg of the trip to serve Finishing Mill Road and the new Amazon MTN6 facility.</td>
<td>1,642</td>
<td>89.93</td>
<td>22.45</td>
</tr>
</tbody>
</table>
### Sunday Service Changes

#### Table 5 | Sunday Pick Change: Fall 2021 Pick Compared to Winter 2022 Pick

<table>
<thead>
<tr>
<th>Impacted Route</th>
<th>Change Description</th>
<th>Existing Service</th>
<th>Proposed Service</th>
<th>Major Service Change Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Daily Revenue</td>
<td>Daily Revenue</td>
<td>% Revenue Miles Change</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Miles</td>
<td>Hours</td>
<td>Miles</td>
</tr>
<tr>
<td>LocalLink 63</td>
<td>Change in route navigation at Tradepoint Atlantic site. Route changes regarding</td>
<td>1,017</td>
<td>67.80</td>
<td>23.38</td>
</tr>
<tr>
<td></td>
<td>how MDOT MTA buses navigate the private Tradepoint Atlantic property</td>
<td>Daily Span of</td>
<td>Daily Span of</td>
<td>Daily Revenue Miles Change</td>
</tr>
<tr>
<td></td>
<td>(originally made on August 30, 2021) will become permanent, with an additional</td>
<td>Service</td>
<td>Service</td>
<td>% Revenue Hours Change</td>
</tr>
<tr>
<td></td>
<td>leg of the trip to serve Finishing Mill Road and the new Amazon MTN6 facility.</td>
<td>Daily Revenue</td>
<td>Daily Revenue</td>
<td>Span of Service Change</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hours</td>
<td>Hours</td>
<td>Hours</td>
</tr>
<tr>
<td>Express BusLink 163</td>
<td>Change in route navigation at Tradepoint Atlantic site. Route</td>
<td>1,642</td>
<td>89.42</td>
<td>24.43</td>
</tr>
<tr>
<td></td>
<td>changes regarding how MDOT MTA buses navigate the private Tradepoint Atlantic</td>
<td>Daily Span of</td>
<td>Daily Span of</td>
<td>Major Service Change Test</td>
</tr>
<tr>
<td></td>
<td>property (originally made on August 30, 2021) will become permanent, with an</td>
<td>Service</td>
<td>Service</td>
<td>Test</td>
</tr>
<tr>
<td></td>
<td>additional leg of the trip to serve Finishing Mill Road and the new Amazon</td>
<td>Daily Revenue</td>
<td>Daily Revenue</td>
<td>% Revenue Miles Change</td>
</tr>
<tr>
<td></td>
<td>MTN6 facility.</td>
<td>Hours</td>
<td>Hours</td>
<td>Hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Daily Span</td>
<td>Daily Span</td>
<td>(In Minutes)</td>
</tr>
</tbody>
</table>
SUMMARY

Service Area Demographics
In the Core Bus service area, minorities make up approximately fifty-five percent (54.7%) of the overall population within three-quarters of a mile (0.75mi) of MDOT MTA Core Bus stops. After applying MDOT MTA’s Disparate Impact policy, the threshold for a Disparate Impact is approximately sixty-five percent (64.7%) (fifty-five percent (54.7%) system-wide, plus ten percent (10.00%)) for service reductions, and approximately forty-five percent (44.7%) (fifty-five percent (54.7%) system-wide, minus ten percent (10.00%)) for service increases.

Low-income households make up approximately thirty-four percent (34.2%) of the households within three-quarters of a mile (0.75mi) of MDOT MTA Core Bus stops. After applying MDOT MTA’s Disproportionate Burden policy, the threshold for a Disproportionate Burden is forty-four percent (44.2%) (thirty-four percent (34.2%) plus ten percent (10.0%)) for service reductions and twenty-four percent (24.2%) (thirty-four percent (34.2%) minus ten percent (10.0%)) for service increases.

MDOT MTA thresholds for Disparate Impact and Disproportionate Burden are summarized in Table 6.

Table 6 | Service Equity Analysis Metrics

<table>
<thead>
<tr>
<th></th>
<th>Disparate Impact</th>
<th></th>
<th>Disproportionate Burden</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Population</td>
<td>Minority Population</td>
<td>Percent Minority</td>
</tr>
<tr>
<td></td>
<td>1,583,221</td>
<td>865,762</td>
<td>54.7%</td>
</tr>
</tbody>
</table>

Results
To determine whether each proposed service change for each time period could result in a Disparate Impact or Disproportionate Burden, minority population and low-income household percentages were calculated for the sum of all Census Block Groups affected by each proposed service reduction and service increase. Resulting percentages were compared to the corresponding thresholds in Table 6.

By time period, Table 7 and Table 9 respectively display Disparate Impact and Disproportionate Burden results for each proposed service reduction and service increase for the Winter 2021 pick compared to Winter 2022 pick changes. Similarly, Table 9 and Table 10 respectively display Disparate Impact and

3 Service area demographics are recalculated for every Service Equity Analysis based on the service area of the existing Core Bus system, as well as the most recent survey data available from American Community Survey (ACS) 5-Year Estimates. Service area demographics may therefore vary by Service Equity Analysis.
Disproportionate Burden results for each proposed service reduction and service increase for the Fall 2021 pick compared to Winter 2022 pick changes, by time period. Service changes are assessed cumulatively.

MDOT MTA has determined that a potential Disparate Impact and Disproportionate Burden could result from Weekday Peak frequency increases made for Winter 2022 pick changes, when compared to the Winter 2021 pick. The potential Disparate Impact and Disproportionate Burden were discovered through MDOT MTA’s revised Major Service Change Policy, which accounts for cumulative changes over one service year. Changes falling into each category for potential adverse effects – span of service, trip frequency, and new or discontinued service – triggered no potential Disparate Impacts or Disproportionate Burdens when measured for the Winter 2022 pick versus Fall 2021 pick levels of service.

Year Over Year Comparison (Winter 2021 Pick vs. Winter 2022 Pick)

Table 7 | Service Equity Analysis: Disparate Impact – Winter 2021 Pick Compared to Winter 2022 Pick

<table>
<thead>
<tr>
<th>Service Reduction</th>
<th>Weekday (All Day)</th>
<th>Saturday (All Day)</th>
<th>Sunday (All Day)</th>
<th>Weekday Peak</th>
<th>Weekday Off-Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Discontinuation Disparate Impact</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Span of Service Reduction Disparate Impact (by 90 minutes or more)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Trip Frequency Reduction Disparate Impact (by 25 percent or more)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service Increase</th>
<th>Weekday (All Day)</th>
<th>Saturday (All Day)</th>
<th>Sunday (All Day)</th>
<th>Weekday Peak</th>
<th>Weekday Off-Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Service Disparate Impact</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Span of Service Improvement Disparate Impact (by 90 minutes or more)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Trip Frequency Increase Disparate Impact (by 25 percent or more)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
### Table 8 | Service Equity Analysis: Disproportionate Burden – Winter 2021 Pick Compared to Winter 2022 Pick

<table>
<thead>
<tr>
<th>Service Reduction</th>
<th>Weekday (All Day)</th>
<th>Saturday (All Day)</th>
<th>Sunday (All Day)</th>
<th>Weekday Peak</th>
<th>Weekday Off-Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Service Discontinuation</strong> Disproportionate Burden</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Span of Service Reduction</strong> Disproportionate Burden <em>(by 90 minutes or more)</em></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Trip Frequency Reduction</strong> Disproportionate Burden <em>(by 25 percent or more)</em></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service Increase</th>
<th>Weekday (All Day)</th>
<th>Saturday (All Day)</th>
<th>Sunday (All Day)</th>
<th>Weekday Peak</th>
<th>Weekday Off-Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New Service Disproportionate Burden</strong></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Span of Service Improvement</strong> Disproportionate Burden <em>(by 90 minutes or more)</em></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Trip Frequency Increase</strong> Disproportionate Burden <em>(by 25 percent or more)</em></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Pick Over Pick Comparison (Fall 2021 Pick vs. Winter 2022 Pick)

Table 9 | Service Equity Analysis: Disparate Impact – Fall 2021 Pick Compared to Winter 2022 Pick

<table>
<thead>
<tr>
<th>Service Reduction</th>
<th>Weekday (All Day)</th>
<th>Saturday (All Day)</th>
<th>Sunday (All Day)</th>
<th>Weekday Peak</th>
<th>Weekday Off-Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Discontinuation Disparate Impact</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Span of Service Reduction Disparate Impact (by 90 minutes or more)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Trip Frequency Reduction Disparate Impact (by 25 percent or more)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service Increase</th>
<th>Weekday (All Day)</th>
<th>Saturday (All Day)</th>
<th>Sunday (All Day)</th>
<th>Weekday Peak</th>
<th>Weekday Off-Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Service Disparate Impact</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Span of Service Improvement Disparate Impact (by 90 minutes or more)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Trip Frequency Increase Disparate Impact (by 25 percent or more)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
### Table 10 | Service Equity Analysis: Disproportionate Burden - Fall 2021 Pick Compared to Winter 2022 Pick

<table>
<thead>
<tr>
<th></th>
<th>Weekday (All Day)</th>
<th>Saturday (All Day)</th>
<th>Sunday (All Day)</th>
<th>Weekday Peak</th>
<th>Weekday Off-Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Service Reduction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Discontinuation Disproportionate Burden</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>**Span of Service Reduction Disproportionate Burden <em>(by 90 minutes or more)</em></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>**Trip Frequency Reduction Disproportionate Burden <em>(by 25 percent or more)</em></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Service Increase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Service Disproportionate Burden</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>**Span of Service Improvement Disproportionate Burden <em>(by 90 minutes or more)</em></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>**Trip Frequency Increase Disproportionate Burden <em>(by 25 percent or more)</em></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
DISPARATE IMPACT

Based on findings from the analysis above, Table 11 summarizes the absolute number as well as the percentage of impacted minority populations – living within three-quarters of a mile (0.75 miles) of MDOT MTA Core Bus stops – affected by Weekday peak frequency increases as a result of the Winter 2022 service change. When compared to MDOT MTA’s Disparate Impact threshold for service increases, the percentage minority population affected by this service change is relatively lower (one percent (1.0%)), indicating that this service change results in a finding of potential Disparate Impact on minority populations.

Weekday Peak Trip Frequency Increase (Winter 2021 vs. Winter 2022)

Table 11 | Weekday Trip Peak Frequency Changes Disparate Impact Analysis

<table>
<thead>
<tr>
<th>Service Change Type</th>
<th>Non-Minority</th>
<th>Minority</th>
<th>Total Population</th>
<th>Minority Percent of Population</th>
<th>MTA’s DI Threshold for Service Change Type</th>
<th>Meets MTA’s DI Threshold?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip Frequency Reduction⁴</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>More than 64.7%</td>
<td>N/A</td>
</tr>
<tr>
<td>Trip Frequency Increase</td>
<td>20,438</td>
<td>15,834</td>
<td>36,272</td>
<td>43.7%</td>
<td>Less than 44.7%</td>
<td>Yes</td>
</tr>
</tbody>
</table>

⁴ No weekday peak trip frequency reductions are anticipated via the Winter 2022 service change.
DISPROPORTIONATE BURDEN

Based on findings from the analysis above, Table 12 summarizes the absolute number as well as the percentage of low-income households – living within three-quarters of a mile (0.75 miles) of MDOT MTA Core Bus stops – affected by Weekday peak frequency increases as a result of the Winter 2022 service change. When compared to MDOT MTA’s Disproportionate Burden threshold for service increases, the percentage low-income households affected by this service change is relatively lower (less than one percent (0.7%)), indicating that this service change results in a finding of potential Disproportionate Burden on low-income households.

Weekday Peak Trip Frequency Increase/Reduction (Winter 2021 vs. Winter 2022)

Table 12 | Weekday Trip Peak Frequency Changes Disproportionate Burden Analysis

<table>
<thead>
<tr>
<th>Service Change Type</th>
<th>Non-Low-income</th>
<th>Low-income</th>
<th>Total Households</th>
<th>Low-Income Percent of Households</th>
<th>MTA’s DB Threshold for Service Change Type</th>
<th>Meets MTA’s DB Threshold?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip Frequency Reduction</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>More than 44.2%</td>
<td>N/A</td>
</tr>
<tr>
<td>Trip Frequency Increase</td>
<td>10,502</td>
<td>3,219</td>
<td>13,721</td>
<td>23.5%</td>
<td>Less than 24.2%</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Substantial Legitimate Justification for Finding of Disparate Impact

This Service Equity Analysis found that based on the comparison of the Winter 2021 pick level of service to that of the Winter 2022 pick, proposed trip frequency increases during the weekday peak period would result in a Disparate Impact and a Disproportionate Burden. These findings are the result of additional service on LocalLink 75, summarized as follows:

- One weekday southbound and northbound trip each will be added.
- The route’s weekday trip frequency will be modified during the peak period from 20 minutes to 35 minutes, and during the evening/late night hours from 60-70 minutes to 45-50 minutes.
- Some trips will be shifted between the peak and off-peak service periods for the Winter 2022 pick to match shift times at major employers along the route.
- When combined with similar minor service increases on LocalLink 75 that occurred in March 2021, these changes will result in an approximately eighteen percent (18.0%) cumulative increase in revenue miles and a twenty-five percent (25.4%) cumulative increase in revenue hours.

If a potential Disparate Impact is found, FTA Circular 4702.1B requires public transit operators to whether there is a substantial legitimate justification for the policy that resulted in the Disparate Impact(s), and if there are alternatives that could be employed that would have a less discriminatory impact. After considering alternatives, MDOT MTA maintains that the currently proposed service plan is the least discriminatory option for LocalLink 75, and for the Core Bus system. MDOT MTA presents the following reasons to support a substantial legitimate justification:

- Additional service on LocalLink 75 will improve access to distribution center and warehouse jobs in the BWI/I-95 corridor, where employment has increased, especially during the COVID-19 pandemic. Distribution centers in this region play an essential role in the supply chain system. By providing additional service, MDOT MTA is providing additional access to jobs for its service area population.
- LocalLink 75 is currently the only MDOT MTA bus route serving this region, and warrants additional service based on demand. Alternatives are not preferable; for example, diversions of other LocalLink or CityLink routes to this region to accommodate shift times and/or address overcrowding would add additional service to the area, perhaps resulting in additional potential Disparate Impacts (if based upon the demographics of areas in proximity to job centers).
- Additional trips are being provided to coincide with shift times for warehouse jobs. These trips are deemed essential.
- Findings of Disparate Impact and Disproportionate Burden are largely present due to the demographics of the region surrounding the industrial park located on one end of LocalLink 75. Thus, even if a new route were designed to serve this industrial park, the reported minority population and low-income household percentages would likely be quite similar to those reported in this Service Equity Analysis. In other words, in this case, demographic percentages triggering findings of potential Disparate Impacts or Disproportionate Burdens are due to demographic characteristics mainly at job destinations rather than home locations of riders.
- Alternatives to scheduling – such as moving northbound trips earlier to reduce peak service – would reduce riders’ ability to catch the bus when departing from a work shift. While scheduling
changes may mitigate findings of potential Disparate Impacts or Disproportionate Burdens during peak hours, these changes are not viable for this reason.

- MDOT MTA’s most recent origin-destination survey data (2018) showed that LocalLink 75 ridership has a relatively higher percentage of riders that identify as people of color (approximately ninety-one percent (91.0%) compared to that of the Core Bus system average (eighty-seven percent (87.0%))). In addition, while MDOT MTA reported the definition of low-income differently during completion of the 2018 study (less than a household income of $25,000), the low-income household percentage of LocalLink 75 was reported in 2018 to be sixty percent (60.0%), compared to fifty-five percent (55.0%) for the entire Core Bus system. Therefore, this route provides an essential connection to jobs for Title VI-protected workers.

This analysis demonstrates that no less discriminatory alternative exists than the one proposed. MDOT MTA plans to proceed with the full Winter 2022 service change.
Service Change Map

Figure 2 overlays routes proposed for Major Service Changes with Census Block Groups that exceed either or both the minority and low-Income service area percentage averages (as described in Table 13). Symbolized Block Groups correspond with the service area surrounding stops proposed for Weekday peak trip frequency increases (from the Winter 2021 pick to the Winter 2022 pick).

Table 13 | Service Reduction and Service Increase Maps – Symbology/Legend Definitions

<table>
<thead>
<tr>
<th>Legend Label</th>
<th>Criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exceeds Minority Threshold</td>
<td>Census Block Group minority population percentage exceeds the service area average (fifty-five percent (54.7%))</td>
</tr>
<tr>
<td>Exceeds Low-Income Threshold</td>
<td>Census Block Group low-income households’ percentage exceeds the service area average (thirty-four percent (34.2%))</td>
</tr>
<tr>
<td>Exceeds Low-Income and Minority Threshold</td>
<td>Census Block Group minority population percentage and low-income households’ percentage both exceed the respective service area averages (fifty-five percent (54.7%) and thirty-four percent (34.2%))</td>
</tr>
</tbody>
</table>
WEEKDAY PEAK TRIP FREQUENCY INCREASE

Figure 2 | Weekday Peak Trip Frequency Increase (Winter 2021 compared to Winter 2022)
Conclusion

MDOT MTA conducted this Service Equity Analysis based on changes to Core Bus service proposed for the Winter 2022 pick period. Per MDOT MTA’s Major Service Change policy, which qualifies Major Service Changes based on changes from the previous service pick as well as from one year prior to the current service pick, this Service Equity Analysis employed the following two approaches to examine the service change impacts on minority populations and low-income households:

- Year-over-year change: Winter 2021 service pick compared to Winter 2022 service pick.
- Pick change: Fall 2021 service pick compared to Winter 2022 service pick.

Based on this analysis, when compared to the Winter 2021 service pick, at bus stops affected by Major Service Changes, potential Disparate Impacts, Disproportionate Burdens, and adverse effects were identified for stop-level changes resulting in at least a twenty-five percent (25.0%) increase to trip frequencies during Weekday peak periods. As reported in Table 14 and Table 15, based on Census data in proximity to affected routes’ bus stops, minority population and low-income household percentages fall just below MDOT MTA’s thresholds for Disparate Impact and Disproportionate Burden (for service improvements), meaning that a potential Disparate Impact and potential Disproportionate Burden were found, primarily as a result of peak hour changes to LocalLink 75.

Table 14 | Trip Frequency Increases Disparate Impact Summary: Weekday Peak Period

<table>
<thead>
<tr>
<th>Service Change Type</th>
<th>Non-Minority</th>
<th>Minority</th>
<th>Total Population</th>
<th>Minority Percent of Population</th>
<th>MTA’s DI Threshold for Service Change Type</th>
<th>Meets MTA’s DI Threshold?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip Frequency Increase</td>
<td>20,438</td>
<td>15,834</td>
<td>36,272</td>
<td>43.7%</td>
<td>Less than 44.7%</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 15 | Trip Frequency Increases Disproportionate Burden Summary: Weekday Peak Period

<table>
<thead>
<tr>
<th>Service Change Type</th>
<th>Non-Low-income</th>
<th>Low-income</th>
<th>Total Households</th>
<th>Low-Income Percent of Households</th>
<th>MTA’s DB Threshold for Service Change Type</th>
<th>Meets MTA’s DB Threshold?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip Frequency Increase</td>
<td>10,502</td>
<td>3,219</td>
<td>13,721</td>
<td>23.5%</td>
<td>Less than 24.2%</td>
<td>Yes</td>
</tr>
</tbody>
</table>

In response to these findings, MDOT MTA prepared a substantial legitimate justification for the Winter 2022 service change, noting that:

- By adding addition LocalLink 75 peak service, MDOT MTA is providing essential additional access to jobs for its service area population.
- LocalLink 75 is currently the only MDOT MTA bus route serving this region, and warrants additional service based on demand.
- Alternatives are not preferable; for example, diversions of other LocalLink or CityLink routes to this region could result in additional potential Disparate Impacts.
• Alternatives to scheduling – such as moving northbound trips earlier to reduce peak service – would reduce riders’ ability to catch the bus when departing from a work shift.
• MDOT MTA’s most recent origin-destination survey data (2018) showed that LocalLink 75 ridership has a relatively higher percentage of riders that identify as people of color and as low-income. Therefore, this route provides an essential connection to jobs for Title VI-protected workers.

This analysis demonstrates that no less discriminatory alternative exists than the one proposed. MDOT MTA plans to proceed with the full Winter 2022 service change.