M-NCPPC SSP UPDATE
TRANSPORTATION IMPACT STUDY
TECHNICAL WORKING GROUP (TISTWG)
MEETING #5
January 27, 2020
AGENDA

1. Introductions

2. Project Scope Overview

3. Vision Zero Integration into LATR

4. Alternative Policy Area Tests

5. Discussion and TISTWG Input

6. TISTWG Schedule and Next Steps
SCOPE OVERVIEW

• LATR Test – local traffic conditions (subdivision review)
  • **Project goal:** Incorporate Vision Zero Action Plan objectives

• Policy Area Test – area-wide traffic impacts (master/sector plan review only)
  • **Project goal:** Better reflect increased travel mode alternatives (as opposed to traditional Level of Service [LOS] metrics)
TECH COMPONENT A: VISION ZERO INTEGRATION

Task 1: Stakeholder Outreach

Task 2: Literature Review

Task 3: Beta-testing of Alternative Methods in Montgomery County

Task 4: Development of Recommendations
TECH COMPONENT A: VISION ZERO INTEGRATION

Task 3: Beta-testing of Alternative Methods in Montgomery County

- Review beta-test outcomes
BETA-TEST LOCATION

Creekside at Cabin Branch
CREEKSIDE AT CABIN BRANCH

2017 LATR Guidelines

Clarksburg Policy Area – Yellow

328 Residential Dwelling Units
• 122 single family detached units
• 206 townhomes
2017 LATR GUIDELINES

• Modal Adequacy Tests
  o Motor Vehicle Adequacy
    ▪ Mitigation to meet delay thresholds
  o Pedestrian system adequacy
    ▪ Not required
  o Bicycle system adequacy
    ▪ Not required
  o Transit system adequacy
    ▪ Not required
• Pedestrian, Bicycle, and Transit Impact Statement
• Conclusions
DATA REQUIREMENTS

• Planned development
  o Land use – trip generation and trip assignment
  o Site access
• Transportation network
  o Existing road network
  o Planned and programmed improvements
  o Non-auto transportation facilities
• Traffic volumes
  o Existing traffic counts
  o Pipeline developments – trip generation and trip assignment
  o Total future traffic forecasts
CONCLUSIONS (1 OF 3)

1. All study intersections currently operate within the acceptable congestion standard for the Clarksburg policy area (CLV of 1,425 or 71 seconds per vehicle for the proposed roundabout at the Clarksburg Road/West Old Baltimore Road intersection), during the weekday AM and PM peak hours.

2. The three (3) pipeline developments are expected to generate 3,525 AM peak hour trips and 4,577 PM peak hour trips upon completion.

3. Under background conditions without the site development, all of the study area intersections and the proposed roundabout would continue to operate at acceptable CLVs and average vehicular delays, during both the AM and PM peak hours.
4. The **proposed development is expected to generate** 288 AM peak hour and 365 PM peak hour person trips, 186 AM peak hour and 235 PM peak hour auto driver vehicle trips, 8 AM peak hour and 9 PM peak hour transit trips, 17 AM peak hour and 21 PM peak hour non-motorized (bicycle) trips, and 25 AM peak hour and 30 PM peak hour pedestrian trips.

5. **Vehicular access** to the site is to be provided via a driveway connecting to Clarksburg Road at a point aligning with Dowitcher Way, and via a connection to Old Clarksburg Road that will act as an emergency vehicle access.

6. All of the study intersections and the proposed roundabout **would continue to operate with acceptable CLVs and average delays** during both the AM and PM peak hours with full buildout of the project and the proposed improvements.
CONCLUSIONS (3 OF 3)

7. The site is served by a connected network of pedestrian and bicycle facilities. Transit service is available as RideOn Route 73 has stops along Clarksburg Road and provides bus service to the Shady Grove Metrorail Station.

8. The proposed site development passes the adequate public facilities LATR tests for the required motor vehicle adequacy.

9. The pedestrian, bicycle and transit adequacy tests are not required as part of this LATR since the site will generate fewer than 50 transit, bicycle, or pedestrian trips during the peak hours.
Vision Zero Impact Statement

• To ensure development is executed in a way that better aligns with Vision Zero principles, all LATR studies must include a Vision Zero Impact Statement that describes:
  o Any segment of the high injury network located on the development frontage.
  o Crash analysis for the development frontage.
  o An evaluation of the required sight distance for all access points.
  o Identification of conflict points for drivers, bicyclists, and pedestrians and a qualitative assessment of the safety of the conflict.
  o A speed study including posted, operating, design, and target speeds.
  o Any capital or operational modifications required to maximize safe access to the site and surrounding area, particularly from the Vision Zero Toolkit.
• Mitigation recommendations from the capacity-based adequacy determination must align with the Vision Zero Impact Statement and Pedestrian and Bicycle Impact Statement.
• Ensure Vision Zero resources accurately reflect conditions on the development frontage.
HIGH INJURY NETWORK

There are no segments of the high injury network in the vicinity of the development frontage.
CRASH ANALYSIS

• Opposite direction sideswipe and single vehicle crash in which the driver struck a guardrail or barrier.
• Based on this crash data, the limited number of crashes do not indicate an existing crash pattern.
SIGHT DISTANCE

• Per the Montgomery County Sight Distance Evaluation Form, the required sight distance in each direction is 325’.
• The sight distance was evaluated for drivers turning left or right out of the Site Access Driveway onto Clarksburg Road.
  o Curvature of the roadway
  o Street trees, signs, or other roadside objects
• Ensuring there is adequate sight distance will allow drivers to exit the driveway and get up to speed on Clarksburg Road and do not interfere with drivers on Clarksburg Road.
• The sight distance is met in both directions at this location.
VEHICLE-VEHICLE CONFLICTS

Legend
- Entering Movement
- Exiting Movement
- Other Vehicular Movement
  - Diverging Conflict
  - Merging Conflict
  - Crossing Conflict
VEHICLE-PEDESTRIAN CONFLICTS

Legend
- Blue: Entering Movement
- Red: Exiting Movement
- Black: Other Vehicular Movement
- Green: Pedestrian Movement
- Circle: Vehicle/Pedestrian Conflict

Driveway

Clarksburg Rd

Dowitcher Way
VEHICLE-BICYCLE CONFLICTS

Legend
- Blue: Entering Movement
- Red: Exiting Movement
- Gray: Other Vehicular Movement
- Green: Bicycle Movement
  - ●: Conflict unique to bicycles
  - ○: Conflict in common with motor vehicles
SPEEDS

Clarksburg Road
• Posted speed limit: 40mph
• Operating speed (hypothetical)
  o Average: 38mph
  o 85\textsuperscript{th} percentile: 44mph
• Design speed: 45mph
• Target speed: Not identified
Based on the information presented in this Vision Zero Impact Statement the following treatments were identified that may be applied in the Creekside at Cabin Branch study area.

- Advance Stop / Yield Markings
- Curb Extensions
- Crossing Islands
- High-Visibility Crosswalks
- Pedestrian Hybrid Beacons
- Posted Speed Limit (Target Speeds/School Speed Zones)
- Raised Crossings
- Rectangular Rapid Flashing Beacons
- Street Trees for Traffic Calming
CONCLUSIONS

Add to the list of conclusions

9. Based on data collected in the Vision Zero Impact Statement, additional treatments from the Vision Zero Toolkit should be installed to address the conflicts for pedestrians crossing Clarksburg Road and bicyclists continuing on Clarksburg Road. Treatments that should be considered are listed in the Vision Zero Impact Statement.
ALTERNATIVE 2

- Includes options that can be implemented in the short term and options for future implementation that use tools that are still in development
- All tests are required if the development produces > 50 peak-hour weekday person trips

- Motor Vehicle System
  - Reduce the estimated number of crashes based on predictive safety performance functions or number of conflict points
  - Existing capacity test

- Pedestrian System
  - Existing – ADA compliance
  - Acceptable pedestrian level of comfort or no gaps in pedestrian access routes within 500 feet of the site, or to transit stops within 1,000 feet

- Bicycle System
  - Existing test – low levels of traffic stress within 750 feet of the site

- Transit System
  - Existing capacity test – peak load level of service
MOTOR VEHICLE SYSTEM

Reduce the estimated number of crashes based on predictive safety performance functions or reduce the number of conflict points

- Future traffic forecasts using 2017 LATR Guidelines process
- Safety performance function methodology: under development
- Number of conflict points
  - Conflict points identified for drivers, bicyclists, and pedestrians
  - Sum of the volumes at each of the conflict points involving a trip to or from the development site
SITE ACCESS DRIVEWAY
VEHICLE/VEHICLE CONFLICTS

Legend
- Entering Movement
- Exiting Movement
- Other Vehicular Movement
  - Diverging Conflict
  - Merging Conflict
  - Crossing Conflict
SITE ACCESS DRIVEWAY
VEHICLE/PEDESTRIAN CONFLICTS

Legend
- Entering Movement
- Exiting Movement
- Other Vehicular Movement
- Pedestrian Movement
- Vehicle/Pedestrian Conflict
SITE ACCESS DRIVEWAY VEHICLE/BICYCLE CONFLICTS

Legend
- Entering Movement
- Exiting Movement
- Other Vehicular Movement
- Bicycle Movement
  - Conflict unique to bicycles
  - Conflict in common with motor vehicles
## CONFLICT CALCULATION

### VEHICLE/VEHICLE

#### Interchange

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## CONFLICT CALCULATION

VEHICLE/PEDESTRIAN, VEHICLE/BICYCLE

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<th>Intersection</th>
<th>With Development - AM Peak</th>
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<tr>
<td></td>
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<tr>
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<td>East x-walk</td>
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<tr>
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<td>West x-walk</td>
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Fehr Peers DC, Toole Design
M-NCPCC SSP Update
## CONFLICT COMPARISON

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<tr>
<th>Intersection</th>
<th>Conflict Type</th>
<th>Background AM &amp; PM Peak Hour Conflicts</th>
<th>With Development AM &amp; PM Peak Hour Conflicts</th>
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<td>Clarksburg Rd at West Old Baltimore Rd</td>
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<td>9,162</td>
<td>9,620</td>
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<tr>
<td></td>
<td>Vehicle-Pedestrian</td>
<td>3,866</td>
<td>4,084</td>
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<td>Vehicle-Bicyclist</td>
<td>5,384</td>
<td>5,678</td>
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<td><strong>18,412</strong></td>
<td><strong>19,382</strong></td>
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<td>Clarksburg Rd at Driveway Access</td>
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<td>Vehicle-Pedestrian</td>
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<td>Vehicle-Bicyclist</td>
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<td><strong>Total</strong></td>
<td><strong>9,996</strong></td>
<td><strong>15,759</strong></td>
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<td>Clarksburg Rd at Broadway Ave</td>
<td>Vehicle-Vehicle</td>
<td>6,596</td>
<td>7,411</td>
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<tr>
<td></td>
<td>Vehicle-Pedestrian</td>
<td>4,650</td>
<td>5,272</td>
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<td></td>
<td>Vehicle-Bicyclist</td>
<td>5,640</td>
<td>6,455</td>
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<td><strong>Total</strong></td>
<td><strong>16,886</strong></td>
<td><strong>19,138</strong></td>
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<td><strong>Total</strong></td>
<td></td>
<td><strong>45,294</strong></td>
<td><strong>54,279</strong></td>
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</table>
PEDESTRIAN SYSTEM

- ADA compliance
- Acceptable pedestrian level of comfort or no gaps in pedestrian access routes within 500 feet of the site, or to transit stops within 1,000 feet
BICYCLE SYSTEM

• Low levels of traffic stress within 750 feet of the site
TRANSIT SYSTEM

No stops exist within 1,000 feet of the site

• Discuss the feasibility of adding a bus stop at the Site Access Driveway
CONCLUSIONS (1 OF 2)

From Existing Study:

1. The three (3) pipeline developments are expected to generate 3,525 AM peak hour trips and 4,577 PM peak hour trips upon completion.

2. The proposed development is expected to generate 288 AM peak hour and 365 PM peak hour person trips, 186 AM peak hour and 235 PM peak hour auto driver vehicle trips, 8 AM peak hour and 9 PM peak hour transit trips, 17 AM peak hour and 21 PM peak hour non-motorized (bicycle) trips, and 25 AM peak hour and 30 PM peak hour pedestrian trips.

3. Vehicular access to the site is to be provided via a driveway connecting to Clarksburg Road at a point aligning with Dowitcher Way, and via a connection to Old Clarksburg Road that will act as an emergency vehicle access.

4. All the study intersections and the proposed roundabout would continue to operate with acceptable CLVs and average delays during both the AM and PM peak hours with full buildout of the project and the proposed improvements.
CONCLUSIONS (2 OF 2)

New Conclusions:

5. The proposed development is expected to **increase the number of conflicts** that occur at the Site Access Driveway, Old Baltimore Road, and Broadway Avenue. Treatments have been identified to **mitigate the additional conflicts**.

6. **Pedestrian access** to the site is to be provided via a sidewalk on the northwest side of Clarksburg Road and a sidepath on the southeast side of Clarksburg Road which also provides access for bicyclists.

7. **Bicycle access** is also to be provided through conventional bike lanes and a sidepath on Clarksburg Road. Upon completion of these facilities, the proposed development site passes the adequate public facilities LATR test for the required pedestrian and bicycle system adequacy.

8. Transit service is available as RideOn Route 73 has stops along Clarksburg Road and provides bus service to the Shady Grove Metrorail Station. There are **currently no transit stops within 1,000 feet of the development site**.
# POLICY AREA TESTS

<table>
<thead>
<tr>
<th>Metric</th>
<th>Modes Addressed</th>
<th>Analysis Scale</th>
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<tr>
<td></td>
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<td>Transit</td>
</tr>
<tr>
<td><strong>1. Accessibility</strong></td>
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<td>Accessibility</td>
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<td>✓</td>
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<td><strong>2. Mobility &amp; Environment</strong></td>
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<tr>
<td>Person Throughput</td>
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<tr>
<td>Travel Times</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>VMT per Capita</td>
<td>✓</td>
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<tr>
<td>Non-Auto Driver Mode Share</td>
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POLICY AREA TESTS
BETA TEST APPLICATION

• Test application of metrics in a Policy Area context to understand process
• Present illustrative results (County, Policy Area; 2010 & 2040)
  • Will consider updating for 2015 values if time allows
• Threshold approaches:
  o No worse than existing
  o Bring up “lagging” areas to “exemplary” areas
  o Set aspirational goals, e.g.,
    o Full buildout of bike master plan
    o Some fraction of 100% low-stress connectivity
AUTO/TRANSIT ACCESSIBILITY

**What?** Number of jobs accessible within 45 minutes by auto (or transit)

**How?** Travel/4 Model

**Where?** TAZ level
   Population-weighted average to County or Policy Area

**Why?** Indicates accessibility to destinations
   Can demonstrate accessibility tradeoff of increased density of development, increased congestion, and transportation network changes
# AUTO/TRANSIT ACCESSIBILITY

## COUNTYWIDE RESULTS

<table>
<thead>
<tr>
<th>Year</th>
<th>Total County Jobs</th>
<th>Auto</th>
<th>Transit</th>
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<tbody>
<tr>
<td>2010</td>
<td>506,596</td>
<td>453,772</td>
<td>62,606</td>
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<tr>
<td>2040</td>
<td>724,652</td>
<td>579,181</td>
<td>134,637</td>
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<tr>
<td>Delta</td>
<td>218,055</td>
<td>125,408</td>
<td>72,032</td>
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<tr>
<td>% Delta</td>
<td>43%</td>
<td>28%</td>
<td>115%</td>
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<th>Year</th>
<th>Total Regional Jobs</th>
<th>Auto</th>
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<tbody>
<tr>
<td>2010</td>
<td>3,886,899</td>
<td>1,159,950</td>
<td>134,155</td>
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<tr>
<td>2040</td>
<td>5,542,347</td>
<td>1,230,164</td>
<td>250,179</td>
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<td>Delta</td>
<td>1,655,448</td>
<td>70,214</td>
<td>116,024</td>
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<tr>
<td>% Delta</td>
<td>43%</td>
<td>6%</td>
<td>86%</td>
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### Percent of County Jobs Accessible by:

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<tr>
<th>Year</th>
<th>Auto</th>
<th>Transit</th>
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</thead>
<tbody>
<tr>
<td>2010</td>
<td>90%</td>
<td>12%</td>
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<tr>
<td>2040</td>
<td>80%</td>
<td>19%</td>
</tr>
<tr>
<td>Delta</td>
<td>-10%</td>
<td>6%</td>
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### Percent of Regional Jobs Accessible:

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<tr>
<th>Year</th>
<th>Auto</th>
<th>Transit</th>
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<tbody>
<tr>
<td>2010</td>
<td>229%</td>
<td>26.5%</td>
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<tr>
<td>2040</td>
<td>170%</td>
<td>34.5%</td>
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<tr>
<td>Delta</td>
<td>-59%</td>
<td>8.0%</td>
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</table>
2040 AUTO ACCESSIBILITY RESULTS

Jobs Accessible within 45 Minutes by Auto
- Low = 233,700
- High = 2,847,000
2040 TRANSIT ACCESSIBILITY RESULTS

Jobs Accessible within 45 Minutes by Transit

- Low = 370
- High = 1,297,000
2010 - 2040 CHANGE IN AUTO ACCESSIBILITY

Change in Jobs Accessible within 45 Minutes by Auto
- Red: -419,000
- Orange: 0
- Green: +492,000
2010 - 2040 CHANGE IN TRANSIT ACCESSIBILITY

*Actual range -800 to +329,200
LOW-STRESS BIKE ACCESSIBILITY

What? Number of jobs accessible within 30 minutes by low-stress bike trip ("appropriate for most adults" or "appropriate for most children")

How? ArcMap GIS script network analysis
   Bicycle Master Plan Bike Stress Map (County Only)
   Hard barrier at higher-stress facilities (consider adjusting?)

Where? Census Block level
   Population-weighted average to County or Policy Area

Why? Indicates bike accessibility to destinations in Montgomery County
   Proxy for safe segment and crossing connectivity
LOW-STRESS BIKE NETWORK

- High & Moderate (inappropriate for children & most adults)
- Low (appropriate for most adults)
- Very Low (appropriate for most children)
LOW-STRESS BIKE ACCESSIBILITY EXISTING

Silver Spring / Takoma Park
Silver Spring CBD
Long Branch
Sector Plan
Takoma/Langley

Average Job Access:
12,800
LOW-STRESS BIKE ACCESSIBILITY
EXISTING

*Scale
Relative to
Bike Master Plan
LOW-STRESS BIKE ACCESSIBILITY
BIKE MASTER PLAN BUILD-OUT

Silver Spring / Takoma Park
Silver Spring CBD
Long Branch Sector Plan
Takoma/Langley

Average Job Access:
69,500 (5x)
COMFORTABLE WALK ACCESSIBILITY

What? Number of jobs accessible within 30 minutes by comfortable walk ("very comfortable" or "somewhat comfortable")

How? ArcMap GIS script network analysis
Pedestrian Level of Comfort Map (under development)
Hard barrier at uncomfortable facilities (consider adjusting?)

Where? Census Block level (limited coverage)
Population-weighted average to Policy Area (or County when complete)

Why? Indicates walk accessibility to destinations in MCounty
Proxy for safe segment and crossing connectivity
COMFORTABLE WALK ACCESSIBILITY

Pedestrian Level of Comfort Legend

- Very Comfortable
- Somewhat Comfortable
- Uncomfortable
- Unacceptable

Pathway Gap
COMFORTABLE WALK ACCESSIBILITY
EXISTING

Silver Spring / Takoma Park
Silver Spring CBD
Long Branch
Sector Plan
Takoma/Langley

Average Job Access:
480
PERSON THROUGHPUT

**What?** Number of people passing through the corridor by auto and transit

**How?** Travel/4 model results
*Consider updating with detailed ops/capacity analysis for key projects

**Where?** Corridor level (segments along corridor)

**Why?** Indicates passengers served
*With ops/capacity analysis, could also provide intersection delay info
PERSON THROUGHPUT RESULTS
AM PK Period EB Veirs Mill Rd
PERSON THROUGHPUT RESULTS
AM PK Period WB Veirs Mill Rd
AUTO/TRANSIT TRAVEL TIMES

**What?** Average travel time per trip (all trips)
Average of trip origins and destinations
Calculated by mode (transit separate from auto)

**How?** Travel/4 Model + custom script

**Where?** TAZ level
Population-weighted average to Policy Area or County

**Why?** Indicates total amount of time spent traveling per trip
Travel time more intuitive measure of burden than intersection delay
## AUTO/TRANSIT TRAVEL TIMES

### COUNTYWIDE RESULTS (MINS)

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<tr>
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<th>2010</th>
<th>2040</th>
<th>Delta</th>
<th>% Delta</th>
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2040 AUTO TRAVEL TIMES (MINUTES)
2040 TRANSIT TRAVEL TIMES (MINUTES)
2010 - 2040 CHANGE IN AUTO TRAVEL TIMES

% Change in Auto Travel Time

-15%

+/-0%

+75%

*Actual range -9% to +50%

*Typical values
2010 - 2040 CHANGE IN TRANSIT TRAVEL TIMES
VEHICLES MILES TRAVELED (VMT) PER CAPITA

What? Daily miles traveled per “service population”
   “service population = population + total employment

How? Travel/4 Model + custom script
   50% of origin VMT + 50% of destination VMT

Where? TAZ level
   Service Population-weighted average to Policy Area or County

Why? Indicates total amount of driving per person
VEHICLES MILES TRAVELED (VMT) PER CAPITA COUNTYWIDE RESULTS

2010: 13.0 VMT per capita
2040: 12.4 VMT per capita
   -0.6 VMT per capita
   -5% countywide
2010 VMT PER CAPITA

VMT per Capita

Low = 9.1
High = 18.6

*Actual range 9.4 to 16.8
2010 – 2040 CHANGE IN VMT PER CAPITA
NON-AUTO DRIVER MODE SHARE*

What? % of non-auto driver trips (HOV + transit + nonmotorized)

How? Travel/4 Model + custom script
Includes origin and destination trip ends

Where? TAZ level
Population-weighted average to Policy Area or County

Why? Indicates use of non-auto modal options

*Results under review
POLICY AREA METRICS – THRESHOLD SETTING

- Calculated metrics countywide and at the policy area level
- Thresholds as context-sensitive (varies by policy area)
- Approaches:
  - No worse than existing
  - Bring up “lagging” areas
  - Set aspirational goals
## TISTWG Schedule

<table>
<thead>
<tr>
<th>Meeting Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>09/09/19</td>
<td>TISTWG Kickoff</td>
</tr>
<tr>
<td>10/07/19</td>
<td>Draft LATR Lit Review and Policy Area Test Options</td>
</tr>
<tr>
<td>11/04/19</td>
<td>Beta Test Plans for LATR and Policy Area Tests</td>
</tr>
<tr>
<td>12/09/19</td>
<td>LATR Data Collection Requirements</td>
</tr>
<tr>
<td>01/27/20</td>
<td>Draft LATR Impact Study Reports Draft Policy Area Beta Test Results</td>
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<tr>
<td>02/27/20</td>
<td>Planning Board Briefing</td>
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