Transportation and Land Use Alternatives

June 26, 2019
Town of Washington Grove, McCathran Hall
Tonight’s Agenda

- Zoning and Land Use alternatives
- Transportation analysis and context
- Assumptions (CLRP etc.)
- Local Area Transportation Review (LATR) Analysis
- Standards: HCM and Vissim
- Existing and future conditions
- Next Steps
Prior Meetings

- November 14, 2018: Open House
- May 20, 2019: Existing Transportation Conditions
Project Purpose

Questions Minor Master Plan Amendment Process Should Answer:

1. Are the proposed staging interchanges necessary, feasible, and realistic?

2. Have the 2006 Plan’s transportation recommendations kept pace with best practices and new policy, such as:
   1. Bus Rapid Transit Planning
   2. Vision Zero
   3. Bicycle Master Plan

Staging Sequence: Relocation of the County Service Park

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3 – Remaining Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,540 dus 40%</td>
<td>3,540 dus 55%</td>
<td>6,340 dus 7,000 jobs</td>
</tr>
<tr>
<td>1,570 jobs 22%</td>
<td>2,650 jobs 40%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Before Stage 1</th>
<th>Before Stage 2</th>
<th>Before Stage 3</th>
<th>Build-out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adopt zoning and sectional map amendments</td>
<td>Evaluate need for new school and ask MCPS to program accordingly</td>
<td>Fund library</td>
<td></td>
</tr>
<tr>
<td>Establish TMD</td>
<td>Fund/dedicate one park</td>
<td>Construct elementary school unless MCPS has alternative means to serve children</td>
<td></td>
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<tr>
<td></td>
<td>Evaluate TMAs and intersections for conformance to standards</td>
<td>Fund construction of second local park</td>
<td></td>
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<tr>
<td></td>
<td>Fund Metro Access Partial Interchange</td>
<td>Review all public facilities and determine whether any changes to the Plan are required</td>
<td></td>
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<tr>
<td></td>
<td>Fund MD 355/Gude Drive interchange or other improvements to achieve acceptable service level</td>
<td>Fund Redland Road and Crabbs Branch Way roadway improvements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Planning Board finding to proceed to Stage 2</td>
<td>Fund pedestrian underpass</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Fund area-wide pedestrian and bikeways</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Planning Board finding to proceed to Stage 3</td>
<td></td>
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</tbody>
</table>
2006 Zoning

- New zones for properties surrounding the Metro Station, including the County Service Park (CSP).
- New zone for the Grove Shopping Center.
- Industrial zones for the Crabbs Branch Way office park, MD 355 automotive corridor, Oakmont industrial and vacant properties west of the Grove Shopping Center.
Approved by the Council in 2014, the District Map Amendment (DMA) changed the prior zoning for properties surrounding the Metro Station as well as Crabbs Branch Way office park; Oakmont Avenue industrial area; as well as the MD 355 automotive corridor.

- Single-family residential zoned areas (R-90 and R-200) were retained.
- Future changes for the Planned Development (PD) zoned areas.

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**Shady Grove Minor Master Plan Amendment – Land Use and Transportation Alternatives**

**2014 Zoning**

- Approved by the Council in 2014, the District Map Amendment (DMA) changed the prior zoning for properties surrounding the Metro Station as well as Crabbs Branch Way office park; Oakmont Avenue industrial area; as well as the MD 355 automotive corridor.
- Single-family residential zoned areas (R-90 and R-200) were retained.
- Future changes for the Planned Development (PD) zoned areas.
New Mixed-Use Zones

- **Commercial-Residential Zone (CR):** Intended for larger downtown, mixed-use and pedestrian oriented areas in proximity to transit options such as Metro, light rail and bus.

- **Commercial Residential Town (CRT):** Intended for small downtown, mixed-use, pedestrian-oriented centers and edges of larger, more intense downtowns.

- **Commercial Residential Neighborhood (CRN):** Intended for pedestrian-scale, neighborhood-serving mixed use centers and transitional edges.

- **Employment Office (EOF):** Intended for office and employment activity combined with limited residential and neighborhood commercial uses.

<table>
<thead>
<tr>
<th>CR Zones</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRT 2.0, C 1.0, R 1.5, H 60</td>
</tr>
<tr>
<td>CRT sets the uses and some requirements</td>
</tr>
<tr>
<td>2.0 means the building floor ratio (FAR) is a maximum of two times the size of the lot</td>
</tr>
<tr>
<td>C 1.0 is the maximum commercial FAR within the total 2.0 FAR</td>
</tr>
<tr>
<td>R 1.5 is the maximum residential floor area within the total 2.0 FAR</td>
</tr>
<tr>
<td>H 60 is the maximum building height—60 feet</td>
</tr>
</tbody>
</table>
Zoning Types and Procedures

**Euclidean/Base Zone:** These zones are applied after the Master Plan is approved via the Sectional Map Amendment (SMA) process.

- Existing examples: Single-family residential (R-90, R-200) and mixed-use zones (CR and CRT).

**Floating Zone:** A flexible zone that is used for a designated purpose, but whose location is to be determined in the future as part of a Local Map Amendment (LMA).

- Examples: Planned Development (PD)
  - Park Overlook and Derwood Station (PD-2)

**Methods of Development: Standard and Optional**

Standard Method: Specific development
The Optional Method: Must provide public benefits from at least the number of benefit categories and for at least the minimum number of points.
# New Mixed-Use Zones: Public Benefits

<table>
<thead>
<tr>
<th>Major Public Facilities</th>
<th>Connectivity and Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transit Proximity</td>
<td>Transit Access Improvement</td>
</tr>
<tr>
<td>Connectivity and Mobility</td>
<td>Streetscape Improvement</td>
</tr>
<tr>
<td>Advance Dedication</td>
<td>Trip Mitigation</td>
</tr>
<tr>
<td>Minimum Parking</td>
<td>Way Finding</td>
</tr>
<tr>
<td>Neighborhood Services</td>
<td></td>
</tr>
<tr>
<td>Public Parking</td>
<td></td>
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<tr>
<td>Through-Block Connection</td>
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</table>

## Diversity of Uses and Activities

<table>
<thead>
<tr>
<th>Adaptive Buildings</th>
<th>Live/Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care Centers</td>
<td>Moderately Priced Dwelling Units</td>
</tr>
<tr>
<td>Dwelling Unit Mix</td>
<td>Small Business Opportunities</td>
</tr>
<tr>
<td>Enhanced Accessibility for the Disabled</td>
<td></td>
</tr>
</tbody>
</table>

## Quality of Buildings and Site Design

<table>
<thead>
<tr>
<th>Architectural Elevations</th>
<th>Public Open Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exceptional Design</td>
<td>Structured Parking</td>
</tr>
<tr>
<td>Historic Resource Protection</td>
<td>Tower Step-Back</td>
</tr>
<tr>
<td>Public Art</td>
<td></td>
</tr>
</tbody>
</table>

## Protection and Enhancement of the Natural Environment

<table>
<thead>
<tr>
<th>Building Lot Terminations</th>
<th>Transferable Development Rights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cool Roof</td>
<td>Tree Canopy</td>
</tr>
<tr>
<td>Energy Conservation and Generation</td>
<td>Vegetated Area</td>
</tr>
<tr>
<td>Habitat Preservation and Restoration</td>
<td>Vegetated Roof</td>
</tr>
<tr>
<td>Recycling Facility Plan</td>
<td>Vegetated Wall</td>
</tr>
<tr>
<td>Building Reuse</td>
<td></td>
</tr>
</tbody>
</table>

### Table

<table>
<thead>
<tr>
<th>Zone</th>
<th>Tract Size or Maximum Total FAR</th>
<th>Public Benefit Points (Min)</th>
<th>Number of Public Benefit Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRT</td>
<td>&lt;10,000 sq.ft. or &lt;1.5 Max FAR</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>&gt;10,000 sq.ft. or &gt;1.5 Max FAR</td>
<td>50</td>
<td>3</td>
</tr>
<tr>
<td>CR</td>
<td>&lt;10,000 sq.ft or &lt;1.5 Max FAR</td>
<td>50</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>&gt;10,000 sq.ft. or &gt;1.5 FAR</td>
<td>100</td>
<td>4</td>
</tr>
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</table>
# Land Use Alternatives

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Residential</th>
<th>Non-Residential</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Existing</strong></td>
<td>3,289 dwelling units</td>
<td>4.68 million sq.ft</td>
</tr>
<tr>
<td><strong>Scenarios</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sector Plan Buildout</td>
<td>5,451 dwelling units</td>
<td>1.69 million sq.ft</td>
</tr>
<tr>
<td>Alternative No. 1</td>
<td>6,269 dwelling units</td>
<td>2.13 million sq.ft</td>
</tr>
</tbody>
</table>
Land Use Alternatives

**Purpose:** To establish what are the capacities for the transportation network and public schools impact.

- Long-term in nature (2040)

**Analysis:**

- Neighborhood by neighborhood
- Existing zoning
- New zones, such as the Commercial Residential (CR) and Employment Office (EOF), do add complexity.
- Approved or Pipeline Development
  - Shady Grove Station and Townes at Shady Grove

**Results:**

- Estimates or forecasts; not recommendations
Land Use Alternatives

Alternative 1
- Increases development, up to 2 FAR for most of the properties in the Metro North and Metro South neighborhoods.
  - 1.5 FAR for the WAMTA East and the Grove Shopping Center
- Land use mix is primarily residential (70%); non-residential is lower.
- Retains Shady Grove Station redevelopment approval.
- Retains existing residential communities; office and industrial parks; and MD 355 automotive corridor.
Transportation Review Process for Master Plans

- Build year for Plan Amendment is 2040
- Synchro Delay model generates County assessment “Standard”
- VISSIM not typically used
  - Employed for Plan Amendment to assess BRT operations along MD 355

1. Travel Demand Model
   generates expected number of vehicles on road segments in plan area

2. Synchro Delay Model
   generates average number of seconds of delay per vehicle traveling through study each intersection

3. VISSIM Delay Model
   generates a finer grained look at intersections; used for locations where BRT is planned

Identify Recommendations and Mitigations
2040 Modeling Assumptions

- Growth in all County Planning Areas per Regional Forecast; additional growth in recently approved Planning Areas
- Completion of county projects shown within Regional Constrained Long Range Plan
  - Buildout of all BRT lines
  - I-270 assumes two additional toll lanes (not High-Occupancy Toll lanes)
  - Does not assume I-270/Gude HOT/toll lane interchange
- Does not assume interchange at MD 355 and Gude Drive
- Completion of Crabbs Branch Way – Amity Drive Connection
What is delay?

- Each vehicle has to wait a certain period of time during peak hour before moving through an intersection.
- Each approach to the intersection has a different amount of delay.
- The County uses overall average intersection delay as its modeling standard.

<table>
<thead>
<tr>
<th>Direction</th>
<th>Vehicles</th>
<th>Delay per Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastbound</td>
<td>10</td>
<td>25 seconds/vehicle</td>
</tr>
<tr>
<td>Westbound</td>
<td>25</td>
<td>40 seconds/vehicle</td>
</tr>
<tr>
<td>Southbound</td>
<td>100</td>
<td>55 seconds/vehicle</td>
</tr>
<tr>
<td>Northbound</td>
<td>50</td>
<td>50 seconds/vehicle</td>
</tr>
</tbody>
</table>

Average Intersection Delay: 50 seconds/vehicle

Most Impactful Approach: Southbound
Least Impactful Approach: Eastbound

SOUTHBOUND: \( \frac{100}{185} \times 55 \text{ sec/veh} = 29.73 \text{ sec/veh} \)
EASTBOUND: \( \frac{10}{185} \times 25 \text{ sec/veh} = 1.35 \text{ sec/veh} \)
NORTHBOUND: \( \frac{50}{185} \times 50 \text{ sec/veh} = 5.41 \text{ sec/veh} \)
WESTBOUND: \( \frac{25}{185} \times 40 \text{ sec/veh} = 13.51 \text{ sec/veh} \)
Study Intersections & Policy Area Congestion Standards

- 19 study intersections
- Three (3) policy areas with different congestion standards:
  - Shady Grove Metro Station Area (orange): 120 seconds/vehicle
  - Rockville City (red): 63 seconds/vehicle
  - Derwood (blue): 59 seconds/vehicle
Existing Conditions Delay

- 0%-25% capacity used
- 26%-50% capacity used
- 51%-75% capacity used
- 76%-100% capacity used
- Over 100% capacity used
Future Conditions Delay
2006 Plan Build-Out (2040)

- 0%-25% capacity used
- 26%-50% capacity used
- 51%-75% capacity used
- 76%-100% capacity used
- over 100% capacity used
Future Conditions Delay Plan Amendment Build-Out (2040)

- 0%-25% capacity used
- 26%-50% capacity used
- 51%-75% capacity used
- 76%-100% capacity used
- over 100% capacity used
### Top 10 Crossing Locations and Existing Pedestrian Delay

<table>
<thead>
<tr>
<th>Crossing Location</th>
<th>Approach Crossings</th>
<th>Morning Pedestrian Delay (seconds)</th>
<th>Afternoon Pedestrian Delay (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Crossing MD-355 at King Farm Boulevard (north side)</td>
<td>211</td>
<td>63.9</td>
<td>63.9</td>
</tr>
<tr>
<td>2. Crossing MD-355 at King Farm Boulevard (south side)</td>
<td>117</td>
<td>63.9</td>
<td>63.9</td>
</tr>
<tr>
<td>3. Crossing Redland Road at Somerville Drive (west side)</td>
<td>82</td>
<td>42.9</td>
<td>42.9</td>
</tr>
<tr>
<td>4. Crossing Somerville Drive at Redland Road (north side)</td>
<td>77</td>
<td>12.4</td>
<td>12.4</td>
</tr>
<tr>
<td>5. Crossing MD-355 at Redland Road (north side)</td>
<td>71</td>
<td>63.9</td>
<td>63.9</td>
</tr>
<tr>
<td>6. Crossing Shady Grove Road at MD-355 (west side)</td>
<td>70</td>
<td>53.5</td>
<td>63.9</td>
</tr>
<tr>
<td>7. Crossing Crabbs Branch Way at Redland Road (north side)</td>
<td>68</td>
<td>33.7</td>
<td>40</td>
</tr>
<tr>
<td>8. Crossing MD-355 at Redland Road (south side)</td>
<td>64</td>
<td>63.9</td>
<td>63.9</td>
</tr>
<tr>
<td>9. Crossing Gaither Road at King Farm Boulevard (south side)</td>
<td>64</td>
<td>32.2</td>
<td>32.2</td>
</tr>
<tr>
<td>10. Crossing Shady Grove Road at Gaither Road (east side)</td>
<td>58</td>
<td>38.9</td>
<td>43.3</td>
</tr>
</tbody>
</table>
### Existing Speeds

**Shady Grove Road**

- **13 hour studies, from 6:00am to 7:00pm**

<table>
<thead>
<tr>
<th>Location</th>
<th>Posted Speed</th>
<th>Percent Speeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shady Grove Road between Briardale Road and Epsilon Drive</td>
<td>45 miles per hour</td>
<td>48% northbound, 48% southbound</td>
</tr>
<tr>
<td>Shady Grove Road between Oakmont and Crabbs Branch Way</td>
<td>40 miles per hour</td>
<td>56% northbound, 42% southbound</td>
</tr>
</tbody>
</table>

**Spot Speed Study Locations**

- Crash Involving Nonmotorist
- Severe Injury Crash
- Fatal Crash
- All Crashes
Shady Grove Road – Existing

120’ Right-of-Way (100’ cartway) to remain

Existing Posted Speed: 45 miles per hour
Shady Grove Road – Proposed

120’ Right-of-Way (100’ cartway) to remain

**Target Speed 35 mph:** potential downgrade from major highway to arterial

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**Prop. Shady Grove Road btwn Briardale & Midcounty**

- **Lane Diet:** 11’ outer lane, 10’ center lane, 10’ inner lane, and 12’ turn lanes (maintained)

- **1’ gutter**

- **1.5’ gutters**

- **Use flexipave/porous material between mature trees to extend walkable area; allow for inward jog to provide buffer from traffic where possible will require some re-grading**

- **Existing median is maintained to reduce project costs/construction impacts/stormwater reconstruction**

- **Extend curb 5.5’ into existing cartway, providing for a 10’ sidepath along NB side of road**

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*Made with Streetmix*
### Existing Speeds Crabbs Branch Way

- 13 hour studies, from 6:00am to 7:00pm

<table>
<thead>
<tr>
<th>Location</th>
<th>Posted Speed</th>
<th>Percent Speeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crabbs Branch Way between Shady Grove Road and Gramercy Boulevard</td>
<td>35 miles per hour</td>
<td>52% northbound 58% southbound</td>
</tr>
<tr>
<td>Crabbs Branch Way between Gramercy Boulevard and Redland Road</td>
<td>35 miles per hour</td>
<td>62% northbound 84% southbound</td>
</tr>
<tr>
<td>Crabbs Branch Way between Redland Road and Indianola Drive</td>
<td>35 miles per hour</td>
<td>58% northbound 64% southbound</td>
</tr>
<tr>
<td>Crabbs Branch Way between Indianola Drive and Montana Drive</td>
<td>35 miles per hour</td>
<td>46% northbound 60% southbound</td>
</tr>
</tbody>
</table>
Crabbs Branch Way — Per Existing Striping

80’ Right-of-Way (50’ cartway) to remain

Existing posted speed: 35 miles per hour
Crabbs Branch Way – Option 1

80’ Right-of-Way (50’ cartway) to remain

25 mph target speed consistent with County Urban Road Code for arterial; only 5 access points for 2,400’ segment

Prop. 1 Crabbs Branch Way btwn Redland & Indianola

- Restripe lanes accurately, inclusive of gutter pan; left-turning occurs from inner lane
- Curb maintained; storm drain extensions not required
- Existing mid-block crossings maintained
- Add flexipave between existing trees to widen existing sidewalk
- New center vegetation to slow traffic
- Add flexipave between existing trees to widen existing sidewalk
Crabbs Branch Way – Option 2

80’ Right-of-Way (50’ cartway) to remain

25 mph target speed consistent with County Urban Road Code for arterial; only 5 access points for 2,400’ segment
Shady Grove Sector Plan Amendment - Land Use and Transportation Alternatives

**Crabbs Branch Way – Option 3**

80' Right-of-Way (50' cartway) to remain

**25 mph target speed** consistent with County Urban Road Code for arterial; only 5 access points for 2,400’ segment

**Prop. 3 Crabbs Branch Way btwn Redland & Indianola**

- add flexipave btwn ex. trees to widen existing sidewalk
- new center vegetation to slow traffic
- ex. trees replaced or replanted in smaller panel; retaining wall added on eastern side to accommodate grade for 9’ sidewalk
- restripe lanes accurately, inclusive of gutter pan; left-turning occurs from inner lane
- existing mid-block crossings maintained
- curb maintained; storm drain extensions not required
Crabbs Branch Way – Option 4

80’ Right-of-Way (50’ cartway) to remain

25 mph target speed consistent with County Urban Road Code for arterial; only 5 access points for 2,400’ segment

Prop. 4 Crabbs Branch Way btwn Redland & Indianola

- Restripe lanes to 10’, inclusive of gutter pan; left turns must be made from through lanes; overall crossing distance reduced; however, no central median
- Maintain existing curb location; on-street facility contraflow facility provided with substandard widths
- Add flexipave between trees to widen existing sidewalk
Bus Rapid Transit
VISSIM Modeling

- Modeled four different BRT scenarios along MD 355 and Gaither Road & King Farm Boulevard (CCT):
  - 2006 Plan Buildout – Curb Running & Median Running
  - Plan Amendment – Curb Running & Median Running

- Used signal timing from State/MCDOT BRT study

- Roughly comparable delay results for curb running and median running alternatives

- Modeling suggests vehicle delay MD 355 and Gude Drive and MD 355 and Shady Grove Road spill back, impacting other intersections along corridor
Next Modeling Scenario

- Will test potential network changes, including:
  - Increased Non-Auto Drive Mode Split to 50%
  - Changes to free flow speed on Shady Grove Road and Crabbs Branch Way
  - Lane reduction at Crabbs Branch Way between Redland Road and Indianola Drive
  - Changes to accommodate BRT access around station area through provision of dedicated lane
  - Mitigation at MD 355 and Shady Grove Road, MD 355 and Gude Drive, and other locations, as necessary
Next Steps

September 2019

- Community Feedback on Draft Recommendations
- Briefing to the Planning Board
Q&A

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