Date: September 28, 2021

Date of Meeting: September 17, 2021

Meeting Location: Video conference

Work Order Number: 32189-005

Project: Howard County Complete Streets

Meeting Description: Complete Streets Implementation Team Meeting #22

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Introduction

The purpose of the Complete Streets Implementation Team (CSIT) meeting was to review the Chapter 5 revisions, any outstanding Chapter 2 comments, and the schedule.

Bryan Townsend welcomed attendees and reviewed the agenda. Leah Kacanda introduced Tim Snow from WRA to the team.

Review of Chapter 5 Revisions (traffic studies)

Leah walked the group through revisions to Chapter 5. She noted that a markup of the Chapter was distributed in advance of the meeting along with the comment log for chapter 5, ordered by section. She recommended reviewing the revisions alongside a review of the comment log. Specific revisions are noted in the attached meeting materials. Questions and comments from members of the CSIT on those revisions are included in these minutes.

Leah asked County staff whether they preferred to receive traffic study reports as hard copies or digitally. Chris Eatough replied that the County is interested in collecting digital copies so that data can be compiled for future use. Since digital transmission is expected it should be mentioned in Chapter 5. Bryan clarified that the current manual requires 5 hard copies and asked whether those should still be provided in addition to a digital copy. Staff will provide feedback on report format after reviewing the revised chapter.

Leah noted that one of the items that may be included in a traffic study is “analysis for additional turn lanes, acceleration and deceleration lanes,” and there was a request to amend the clause to include “...and their impact on pedestrian and bicyclist safety and comfort.” Kris Jagarapu suggested it may be appropriate to include each clause as a separate bullet point. Leah asked Kris if any additional text was needed beyond the proposed language. Kris replied that some additional language may be necessary for clarity.

Leah introduced one of the largest revisions for Chapter 5, which is the new bicycle Level of Traffic Stress (LTS) criteria proposed by Chris that was reviewed by the CSIT at the September meeting. Multiple comments were received expressing concern that that signalized intersections are classified as LTS 1 (lowest stress). Leah shared that Dr. Peter Furth, one of the authors of the LTS methodology, is actively working on improving the LTS methodology for evaluating intersections. Because of the concern expressed by members of the CSIT regarding the use of the current LTS methodology for evaluating intersections coupled with the future changes in the methodology, the language and tables relating evaluating LTS at intersections was struck. Leah noted that LTS will still be used to evaluate corridors and identify gaps in the low-stress bicycle network. The LTS tables have been updated to be dynamic tables as opposed to static images, although the content has not changed.

Bryan provided an overview of changes to the intersections section. Additional clarity was provided on how bicyclists interface with roundabouts based on the conversations had at the September CSIT meetings. The preferred treatment is to provide a bicycle ramp so that bicyclists can travel on a sidewalk or shared use path to traverse the roundabout. Chris suggested adding some additional language to clarify that bicyclists can ride in the roadway with traffic to traverse the roundabout if they prefer.

Leah noted that a new references section is provided at the end of Chapter 5, and asked John Seefried to review the references to ensure that they refer to the appropriate version of the document.

Review of comments received on Chapter 2 (street design)

Bryan provided an overview of how the selection of a design vehicles and a control vehicle dictates the type of turning radius that should be provided. A design vehicle is a vehicle that regularly makes a turn, while a control vehicle is a vehicle that only occasionally makes a turn. The AASHTO Green Book provides a standard set of vehicles that can be used as a reference by designers. Designing streets for larger vehicles like trash trucks, school buses, and snow plows results in larger turning radii. Occasionally, even larger vehicles such as fire trucks and tractor trailers need to be able to navigate turns.
Bryan shared that the design of roundabouts illustrates the difference between a design vehicle and control vehicle. Passenger vehicles can traverse a roundabout within the asphalt portion of the roadway, while larger vehicles travel up over the truck aprons of roundabouts, which are located at the inside of the turn. In residential neighborhoods, truck aprons are not provided, but firetrucks can use the entire roadway width (including the oncoming lane) when making a turn. This is because low volume residential streets are designed to accommodate the fire truck as a control vehicle.

Bryan shared the Montgomery County, MD draft Complete Streets Design Guide which identifies a standard design vehicle of a SU-30, or a 30-foot box truck, and a control vehicle is a fire truck. Montgomery County also identifies three standard curb radii of 10 feet, 15 feet, and 25 feet, depending on the street type, although they do not apply to streets with curb extensions. To evaluate the appropriate curb radii for Howard County, a preferred design vehicle and control vehicle will have to be identified and evaluated for each of the new street types. Different street types may also have different design and control vehicles.

Jennifer White commented that the design vehicle should be small enough to slow vehicular turning speeds and support pedestrian safety. She recommended that the team take a deeper look at Montgomery County’s Design Manual for guidance. She advocated for the smallest possible design vehicle. Bryan shared that the County’s smallest radius in the current manual is 25 feet. This process will establish new turning radii for each of the street types, as different roadways will have different geometries.

Carl Gutschick shared that his staff used AutoTURN software to evaluate some different design vehicles on residential sized streets where the curb to curb distance is 24 feet. He noted that with the 25 foot radius that is currently in the manual, the only vehicle that can turn while staying in its lane is a full sized passenger vehicle. He went on to list the radii he tested and the corresponding crossing distance for pedestrians:

- 0 radius – 24 foot crosswalk length
- 25 foot radius – 38 foot crosswalk length
- 35 foot radius (allows trash truck to stay in lane) – 48 foot crosswalk length
- 45 foot radius (allows standard school bus to stay in lane) – 60 foot crosswalk length
- 65 foot radius (allows for intermediate tractor-semitrailer combination to stay in lane) – 90 foot crosswalk length

Carl noted that his preference for low volume streets such as Neighborhood Yield Streets would be to accommodate full sized passenger vehicles with the turning radius and allow larger vehicles to use the full street width to maintain a short crossing distance of 38 feet.

Bryan thanked Carl for the detailed information and shared that the County is going through a similar exercise. He noted that minor curb offsets, such as on street parking with curb extensions at intersections, can require a higher radius than when there is no offset. Carl observed that the curb radii diagram used in the Montgomery County Complete Streets Design Guide implies that the crosswalk would be outside of the curb fillet (or curved part of the curb), which would mean that the bigger the radius the further the crosswalks would be from the intersection. Bryan replied that the drawings are diagrammatic, and that crosswalks would likely be placed within the curb fillet to avoid a large setback.

Kris Jagarapu shared that Howard County uses tandem trash trucks that already encroach into the other travel lane when turning in residential neighborhoods with a radius of 25’. He noted that a smaller radius might result in trash trucks jumping the curb, putting pedestrians waiting on the corner to cross at greater risk. Bryan replied that the team would use AutoTURN software to evaluate how specific County vehicles could navigate the new street types.

Jessica Bellah noted that the data from Carl is helpful and asked the group if a maximum pedestrian crossing distance has been established to provide guidance for when a pedestrian refuge island is appropriate. She noted that it is uncomfortable for pedestrians to have to cross 4 or 5 lanes of traffic. Jessica asked for clarification on why curved curb radii are used instead of a flat corner which might be able to accommodate the wheel base of vehicles and keep pedestrians out of danger. Bryan replied that a given vehicle can only make so sharp of a turn, and the
path of the vehicle helps set an appropriate curb radius. Even with a flat corner, the point where the vehicle's wheels impact the curb would be the same as if it were curved. The curved radius also gives drivers guidance about how to position their vehicle through the turn. Carl added that it is common practice to avoid sharp breaks in a curb line, because if a vehicle hits a sharp corner it can be dangerous.

Chris clarified that there are many benefits to having smaller curb radii, and that every jurisdiction that has adopted a Complete Streets policy is having these discussions. Smaller radii result in a smaller crossing distance for pedestrians, allow for the crosswalk to be placed closer to the intersection, and reduce vehicular speed because drivers must slow down to navigate the turn. He reminded the group that speed reduction is a primary tenant of the Complete Streets policy but acknowledged that design and control vehicles must be accommodated.

Bryan shared that Montgomery County’s approach to intersection design assumes that passenger vehicles should be able to negotiate a turn at 10 mph, and larger vehicles at 5 mph. Chris asked whether AutoTURN can accommodate different speeds. Bryan replied that speeds can be adjusted, and it is also possible to assume vehicles can turn their wheels from stop, although that is not likely to occur in navigating an intersection. Bryan thanked Kris for the comment about keeping pedestrians behind the curb line safe from turning vehicles, and that the AutoTURN analysis will be used to keep vehicles within the pavement.

Kris noted that Montgomery County has not yet implemented any of their efforts in the field and expressed concern with vehicles encroaching into the opposing travel lane when turning from a side street onto a main street. He clarified that encroachment is acceptable on low-volume side streets.

Kris Jagarapu mentioned that they have not seen any of Montgomery County’s efforts implemented in the field yet, and that Howard County currently uses different types of radius for larger vehicles. Kris expressed that their concern would be with approaching vehicles in the opposing travel lane causing a head-on collision. Tom Auyeung agreed that sharpening turns causes vehicles to slow down, which is acceptable on residential streets because volumes are low but may result in rear end collisions on major and minor collectors where volumes and speeds are higher. Acceleration and deceleration lanes may be necessary to accommodate vehicles slowing to make turns. He also noted vehicles slowing to make turns may negatively impact the capacity of the roadway. If vehicles do not travel at an appropriate low speed through the turn, it may result in head-on collisions when they travel into the oncoming lane.

Carl clarified that Design Manual revisions will allow curb ramps to be within the radius of the curb. Bryan replied that it is important that pedestrians are visible to drivers, which often means keeping crosswalks close to intersections.

Bryan provided an overview of design speed and target speed, including what speed management measures have been included to achieve target speeds. He shared a Federal Highway Administration (FHWA) chart that lists factors that can influence target speed. The Design Manual will provide Designers with a menu of options they can use to achieve target speeds along a roadway, noting that guidance would also be provided as to which treatments are appropriate for different roadway types. He noted that landscaping and on-street parking provide a sense of enclosure that can help maintain speeds, as well as traffic calming measures like raised center median islands. As just discussed, smaller curb radii will also support target speeds along a roadway. Wherever possible, the posted speed should match the target speed. Bryan noted that channelized right-turn lanes are discouraged in the current draft of the Design Manual, and the Designer must demonstrate why they are necessary before incorporating the feature into a design. The FHWA chart also notes that the superelevation of a roadway may lead to higher travel speeds. Where block lengths are shorter, signal timing can be used to slow speeds.

Bryan listed some of the design elements that flow from design speed, including minimum (but not maximum) horizontal curvature. He clarified that the use of minimum radius curves in developing a horizontal layout is not required and is often not possible. Speed management measures such as chicanes use much tighter geometries than street curvature, providing a better opportunity for horizontal deflection and speed control.

Bryan explained that superelevation is the banking of a roadway typically used on higher speed roads to help vehicles navigate turns. Most county roads in Howard County are not superelevated, since it is normally a technique...
used on freeways and higher classification roadways. Maximum vertical grade is also dictated by the design speed, but it usually has little effect on operating speeds. Design speed effects all the elements of sight distance, including at intersections, when stopping, and when passing. A sight distance analysis allows the Designer to evaluate whether a driver turning off a side street can see a pedestrian and whether that pedestrian can see the vehicle. Larger sight distance values (as a result of a higher design speed) can have safety benefits. Higher design speeds also dictate roadway safety elements such as the size of the clear zone, or grassy area adjacent to a roadway, whether a guardrail is necessary, and the length of the guardrail. The target speeds associated with the new Street Types are a little bit lower than the functional classification of streets in the County to facilitate Complete Streets. Revisions will address how lower target speeds relate to design speeds.

Bryan provided additional detail on the use of superelevation. The current language in the manual notes that “Streets with target speeds of 30 mph or greater may be superelevated,” however the provision of superelevation is not prescriptive. A lot of nuance and engineering judgement comes into play when determining when and how to provide superelevation. The Green Book notes that not providing superelevation on lower classification roads where speeds are lower than 45 mph is not detrimental to motorists.

Chris asked the Department of Public Works (DPW) how superelevation is currently used on County roads. Tom replied that the County does not often use superelevation, except in instances where there is not sufficient right of way to accommodate a flat curve. He noted that in icy conditions, superelevation may cause cars traveling at low speeds or stopped to slide. Bryan noted that states with little snow tend to use higher superelevation rates. The Maryland State Highway Administration typically uses a maximum superelevation rate of 6%, although 4% can be more appropriate in urban contexts.

Chris noted that superelevation also has a negative impact on Complete Streets because it supports higher travel speeds, but DPW’s current approach to superelevation means that it is a relative non-issue as it relates to Complete Streets. Kris observed that the draft version includes 8% maximum superelevation rate and asked that this portion be removed. Bryan agreed, since the only locations typically designed to an 8% max. superelevation rate in Maryland is on freeway loop ramps.

Bryan provided an overview of how signal progression can be used to support target speed. Signals can be timed to match target speed/posted speed, however there are only a few locations in Howard County where signalized intersections are located close enough together that this tool would work, so it may not be necessary to include as a tool in the Design Manual. NACTO guidance states that intersections should be within 0.25 miles of one another for signal progression to be an effective tool for controlling vehicular speed. Kris asked whether this information was being presented for informational purposes only. Bryan confirmed that the information was being presented for discussion.

Bryan moved on to Section 2.3.3.d and e which relate to cul-de-sacs and tee-turnarounds which were discussed at the September CSIT meeting. Bryan suggested that the design details included in Volume IV be left they are in the current Design Manual. None of the members of the CSIT objected.

Bryan shared that there is a discrepancy between guidance provided in Volume III and Volume IV of the Design Manual regarding how driveways are treated off the end of a tee-turnaround. A request was made to update Volume IV to match with Volume III. Kris suggested that driveways should not be permitted off the top of the tee. Bryan noted that the detail requires a dead-end barricade at the top of the T. Kris pointed out that many tee-turnarounds accommodate an extension of the roadway which creates challenges for snow removal. Often, cars park within the ends of the tee since it appears to provide parking to street users. When vehicles park in the ends of the tee, it can no longer be used by vehicles that need to turn around, such as a trash truck or snow plow.

Carl noted that Volume IV prohibits driveways around the entire tee-turnaround, not just along the legs. He noted that there are two uses of tee-turnarounds, both as a temporary end of a road and for low-volume streets that don’t warrant a cul-de-sac. He asserted that it is sometimes necessary to accommodate driveways within the tee-turnaround, even if it just on the top of the “tee” in the guardrail area to facilitate snow removal. Guidance would be better than a prohibition. Kris asked Carl whether the tee-turnaround would be located at the end of a parcel. Carl
replied that if the tee is at the end of an access street, there may be additional lots located off the top of the tee. Bryan provided an example of this situation in Elkridge on Mill River Court. Kris noted this presents an issue because residents must bring their trash and recycling down into the tee. The presence of parked cars in addition to cans often requires the trash truck drivers to back all the way out. Chad Edmondson provided another example in Talbots Woods Court, where a shared driveway is located off the end of the tee and two driveways are located off the top of the tee. Kris noted that temporary tee-turnarounds are appropriate since there is the potential for further development in the future.

Jessica observed that these issues are created by how lots are platted during the subdivision process and asked how the County handles the transition from public to private roadways. Chad replied that the County wants to efficiently terminate a public road. Tee-turnarounds are used in situations where there is not sufficient space for a cul de sac. Sometimes, this results in usable land being left over, that can only be accessed by a shared driveway off the tee. Jessica asked if guidance could be provided to encourage a more efficient organization of road systems during the development process. Chad replied that a statement about the benefits of a grid system and connectivity have already been added, but in the Talbots Woods Court example, there is a significant grade difference between the subdivision and the adjacent roadway that precludes a grid network. Chris stated that the Design Manual already includes language encouraging the use of grid systems. Leah clarified that this language is in the Traditional Neighborhood Design section of Chapter 2 but noted a cross-reference could be added. Larry Schoen agreed that the Traditional Neighborhood Design (grid system) section should be cross referenced. David Cookson replied that there may need to be changes to the Subdivision Regulations to address this issue and Chad agreed. Larry asked that this topic be added to the list of items that will be considered during the update to Subdivision Regulations.

Bryan shared that there was a request to consolidate the various sections on sight distance including intersection, stopping, and passing sight distance to make the Design Manual more user friendly. Tom responded that the group has no objections to consolidating the section but asked that the way that these topics are organized in the AASHTO Green Book be considered.

Carl commented that this section should also differentiate between target speed and design speed, and that design speed is more appropriate for calculating stopping sight distance. Bryan clarified that stopping sight distance and intersection sight distance are both tools that can be used to evaluate an intersection. Intersection sight distance Establishes whether the driver of a vehicle can see that there is a vehicle coming and make the turn without causing the oncoming vehicle to slow down. Stopping sight distance ensures that an oncoming vehicle has sufficient space to stop if someone pulls in front of them. Carl noted that the current Design Manual includes a provision that allows Designers to use stopping sight distance at the intersection of low-speed, low-volume streets instead of intersection sight distance and asked that provision be retained.

Bryan shared that a section providing guidance on pedestrian and bicycle friendly gates and bollards is being added to Chapter 2. Bollards can be removable if desired, and gates can be opened to accommodate emergency vehicles.

**Schedule**

Bryan provided an update on the schedule, noting that the new detailed schedule includes weekends and Howard County holidays. Leah noted that a copy of the schedule was distributed, and that Volume IV revisions are a new line in the schedule. The goal is to provide a final draft of Chapter 2 on the September 24 for review by the CSIT.

Leah touched on some of the upcoming workshops:

- **Workshop 1** (Thursday, October 14, 7 pm – 8 pm): Introduction to Complete Streets. This workshop will be held in the evening and is appropriate for the general public as it provides an overview of the Design Manual updates and how those updates support Complete Streets in Howard County.

- **Workshop 2**: Technical Overview (Thursday, October 21, 2 pm). This workshop will be held during business hours and is geared toward practitioners who regularly use the Design Manual, although the general public is welcome to attend.
Leah asked that DPW staff and Carl spread the word about this opportunity, and that a flyer will be made available for distribution. Workshops will be recorded. The goal is to post full Design Manual for public review from Friday October 8 through October 28.

Chris mentioned that flyer for the workshops is ready and that it can be distributed starting on Monday, September 20. Leah added that the registration links for the workshops will also be distributed. Larry asked what sort of comments or reaction from the public will be useful. Leah replied that a survey will be developed to collect feedback.

**Next Steps**

Jennifer White asked when members of this group would be receiving a full draft of the Design Manual for review. Bryan noted that the intention is to provide everything a final draft of Chapters 1, 3, 4, and 5 by Friday, October 1. Revisions for Chapter 2 will continue through the first full week of October since comments on Chapter 2 are due on Friday, October 1. Leah added that final edits will be made by Wednesday, October 6 to provide a complete full draft for approval on Friday, October 8.

Action items from this meeting include:

- CSIT members to provide comments on Chapter 5 by Friday, September 24
- WRA to provide final draft of Chapter 2 for review by Friday, September 24

Chris thanked everyone for their participation in the additional meetings and their commitment to providing timely comments.

Leah Kacanda, AICP