**MoDOT Reviewer’s Checklist for Transportation Impact Analyses**

June 2020

Every HCS model submitted to MoDOT will be reviewed by a member of MoDOT staff using the following checklist. The purpose of sharing this checklist is to assist those submitting models to MoDOT in reviewing their own work prior to submitting.

When using this checklist to review a model, a checkmark () should be used to signify items the reviewer deems acceptable. If an item does not apply to the model being reviewed, the reviewer should leave a checkmark in the “N/A” column. If an item applies to the model being reviewed but is deemed unacceptable or in need of adjustment, the reviewer should leave the check boxes next to that item blank and should address the issues with that item in their comments at the end of the checklist.

The items in this checklist accompany **Section 5.2.1** in MoDOT’s *TIA Guidance Manual*. Modelers and reviewers should refer to this section if they need clarification on MoDOT’s best practices regarding HCS.

**MoDOT HCS Model Reviewer’s Checklist**

Project Name: Click or tap here to enter text.

Modeler/Agency-Consultant: Click or tap here to enter text.

Model Reviewer/Agency-Consultant: Click or tap here to enter text.

Date of Model Submittal/Review: Click or tap here to enter text.

|  |  |  |  |
| --- | --- | --- | --- |
| **HCS Review** | | | |
| **Model Element** | **Description** | **Check** | **N/A** |
| General Facility Information (Varied Module Application) | Check that the facility’s identifying Name, Description, Analyst, Jurisdiction, Time Period Analyzed and/or other appropriate identifying information are correct. The Description should include the analysis year, peak hour being studied, and appropriate scenario in the description. Be sure that the time period or duration is explicitly stated somewhere (i.e., if it is a PM peak hour from 5:00 to 6:00 or a longer PM period from 4:00 to 7:00)  **Description Example:** 2020, PM Peak Hour (5:00 – 6:00), BYNB, Signal ID # 4001 |  |  |
| Area Type is set to CBD (Central Business District) if appropriate (CBD is characterized by high parking turnovers, narrow short‑block roadways, and high pedestrian activity). |  |  |
| Analysis period is set to a default value of 0.25 hour (15 minutes). |  |  |
| Check that Peak Hour Factor (PHF) either matches traffic data or uses 0.92 |  |  |
| Laneage, movements, and direction orientation should match signal plans, design files, or field conditions |  |  |
| General Traffic Inputs  (Varied Module Application) | Check that traffic volumes match count data or balanced volume estimates (depending on what has been agreed upon for the project) |  |  |
| Facility geometry, storage length, and other facility attributes are accurate relative to signal plans, design files, or field conditions |  |  |
| Use field data, signal plans, and/or MoDOT TMS data to ensure that all grades are reasonable (refer to **Table 15** in MoDOT’s *TIA Guidance Manual* for general information on grade). |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **HCS Review (Continued)** | | | |
| **Model Element** | **Description** | **Check** | **N/A** |
| General Traffic Inputs  (Varied Module Application) | **Heavy Vehicle Percentage:** Use field data or heavy vehicle estimates from the [MoDOT AADT Map](https://www.modot.org/traffic-volume-maps) **1**. Otherwise, use the HCM recommended default of 3%. |  |  |
| **Free Flow Speed (FFS):** Check that the free flow speed uses field data (85th percentile speed) if available. Otherwise, check that the free flow speed is the speed limit or safe, legal speed anticipated at the location. The free flow speed can be estimated up to 5 mph above the speed limit. Use 25 mph for driveways and loop ramps and 35 mph for typical ramps. |  |  |
| **Speed Limit:** Check that the speed limit value is the speed limit or safe, legal speed anticipated at the location. Use 25 mph for driveways and loop ramps and 35 mph for typical ramps. |  |  |
| Ensure that the arrival type is reasonable (arrival type is the quality of traffic progression as it approaches the intersection under evaluation. Ranges from 1 to 6 with 1 = poor progression and 6 = exceptional progression). Check that if a value other than the default value of 3 is used that it is documented and justified. |  |  |
| Review that the Driver Population (driver familiarity) adjustments are appropriate for the location. The level of driver familiarity is used to adjust the Speed and Capacity Adjustment Factors. Values range from all familiar (heavy commuter traffic) to all unfamiliar (heavy tourist traffic). |  |  |
| Streets Module | Verify that intersection control type and data are properly entered. |  |  |
| Check that signal phasings, timings, coordination, and other parameters match signal plans. |  |  |
| Overlaps between conflicting traffic movements are avoided. |  |  |
| If there is a bus stop within 250’ of the intersection, then check that the number of buses per hour is set to data collected or a reasonable default value. 12 bus stops per hour is considered typical in a CBD and 2 buses per hour is typical for a non-CBD. |  |  |
| Check that Parking settings are reasonable. Select side (L, R, or L+R) if there is on-street parking and the number of parking maneuvers per hour that occur adjacent to a movement group and within 250 feet upstream of the stop line. |  |  |

**1** **Disclaimer:** MoDOT’s interactive AADT map shows volumes at some locations that are associated with actual count data and some data that are estimated volumes (not based on count data). If the analyst has any data concerns, then please contact the MoDOT TMS unit.

|  |  |  |  |
| --- | --- | --- | --- |
| **HCS Review (Continued)** | | | |
| **Model Element** | **Description** | **Check** | **N/A** |
| Streets Module (Detailed Inputs) | Check that the “Queue Length Percentile” is set to 95. |  |  |
| Review that the number of generations is set to 200. |  |  |
| Ensure that the mutation probability is set to 4%. |  |  |
| Stop Modules (TWSC and AWSC) | Review the reasonableness of the Percent Thrus Using Shared Lane values. Common attributes of this factor include:   * A value of 50% should be used for rural major streets where drivers are less likely to pre-maneuver to the exclusive thru lane prior to the intersection. * A value of 40% should be used in an urban setting where vehicles are familiar with the lane configuration. * A value can be input for an approach with more than one thru lane, though this is not typical to AWSC intersections and TWSC intersection minor approaches. |  |  |
| Review the Major Street Median Storage value. This is the number of minor street vehicles that can refuge in the median during a two‑stage crossing of the major street. Use one vehicle of storage space per 25 feet of median. If undivided, this value is zero. |  |  |
| Review the Short Left-Turn Pocket value. Check the box if no exclusive left turn lane is provided on the major street and it is possible for major street thru or right traffic to be delayed by left turning vehicles waiting for an acceptance gap. If left turn storage is available, enter the number of vehicles in Left-Turn Storage. |  |  |
| Roundabout Module | Typically, MoDOT will analyze roundabouts using SIDRA software, although HCS may be considered for preliminary, coarse analysis. For roundabouts analyzed in HCS, review the following:   * Review the reasonableness of conflicting lanes on entry and exit of a roundabout. * Use the “General” module review categories to check the reasonableness of items such as PHF, analysis time period, and heavy vehicle percentages. * Note that this module is limited to one or two-lane entries, single bypass lanes, no more than two circulating lanes, and no more than four approaches. |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **HCS Review (Continued)** | | | |
| **Model Element** | **Description** | **Check** | **N/A** |
| Highways Module  (Two-Lane) | Check that the Coded Type methodology is appropriate for the analysis. The types are:   * **Passing Constrained:** Length of two-lane highway in which passing in the oncoming lane is either prohibited or negligible due to lack of utilization of the passing zone. * **Passing Zone:** Length of the two-lane highway for which passing in the oncoming lane is permitted and the location provides reasonable accommodation of passing maneuvers. * **Passing Lane:** An added lane is used to break up platoons by allowing for the passage of slower vehicles (the added lane is set to the same direction as the analysis direction). |  |  |
| Highways Module  (Two-Lane and Multi-Lane) | **Segmentation:** Ensure that highway segment lengths are appropriately set per the HCM. Segments should not include all‑way stop, roundabout, or signal-controlled intersections between their endpoints. |  |  |
| **Access point density:** This measure is only applicable if the Measured FFS attribute is not selected. If this is analyzed, check that the number selected is equal to the total number of access points on the analysis segment. Residential driveways and low‑volume side roads / driveways (less than 20 vehicles per day) should not be counted. Driveways inaccessible due to a median do not count as well. |  |  |
| Freeways Module **1** | **Geometric Data:** Check that geometric data values are reasonable. These values include, but are not limited to the following:   * Number of Freeway and/or Ramp Lanes * Measured FFS (directly input value that will be used in analysis) * Base FFS (FFS that will be adjusted based on other geometric attributes such as lane width, right side clearance, or ramp density) * Grade (Refer to **Table 15** in MoDOT’s *TIA Guidance Manual*) * Weaving attributes (e.g. Short Length, Weaving Configuration, Number of Maneuver Lanes, etc.) |  |  |

**1** **Note:** User-specific attributes vary based on Freeway module type (Basic, Merge, Diverge, Weaving, Facility, and Reliability) and based on project-specific needs. For more in-depth information, refer to **Section 5.2.1** and **Appendix C.3** in MoDOT’s *TIA Guidance Manual*.

|  |  |  |  |
| --- | --- | --- | --- |
| **HCS Review (Continued)** | | | |
| **Model Element** | **Description** | **Check** | **N/A** |
| Freeways Module **1** | **Demand Data:** Check that demand data values are reasonable. These values include, but are not limited to the following:   * PHF (either matches traffic data or uses 0.92) * Demand Data (traffic volumes in vehicles per hour) * Total truck percentages |  |  |
| **Adjustment Factors:** Check that adjustment factor values are reasonable. These values include, but are not limited to the following:   * **Speed, Capacity, and Demand Adjustment Factors:** Allows the user to adjust the speed, capacity, or demand for the purpose of calibration or to reflect the impacts of weather, incidents, or work zones (the factors increase or decrease its respective parameter by the ratio applied). This factor should not be adjusted by the user (default value is 1.0). Any adjustments made should be the result of auto-adjustments made in HCS from the selection of other adjustment factors. * **Driver Population:** The level of driver familiarity that is used to adjust the Speed and Capacity Adjustment Factors. * **Weather Type:** Weather events that would influence the Speed Adjustment Factor. * **Incident Type:** Lane or shoulder closures that would influence the Capacity Adjustment Factor. * **Work Zone:** Select this check box if there is a work zone. A work zone will reduce the Speed Adjustment Factor. |  |  |
| Review that the Area Type is selected consistently for the entire corridor. Area Type options include Urban (high development densities or concentrations of population) and Rural (widely scattered development and low housing and employment densities). It is best practice for the entire length of the facility to be assigned the same Area Type value. |  |  |

**1** **Note:** User-specific attributes vary based on Freeway module type (Basic, Merge, Diverge, Weaving, Facility, and Reliability) and based on project-specific needs. For more in-depth information, refer to **Section 5.2.1** and **Appendix C.3** in MoDOT’s *TIA Guidance Manual*.

**Reviewer’s comments:**