3.2 Need Category: Improved Reliability (Roadway)

Performance Measure: Level of Travel Time Reliability (LOTTR)

What it Means: Number of hours where the ratio of longer (80th percentile) travel times to "normal" (50th percentile) travel time exceeds 50%. A higher number indicates less reliable travel.

Applicable VTrans Travel Market: CoSS, RN

Identification of Needs

- Data Sources
  - ~~Observed speed~~: INRIX
  - ~~Traffic volume: VDOT Traffic Monitoring System~~
- Year of analysis: ~~2018~~
- Period of analysis: A 14-hour period between 6 a.m. and 8 p.m. on weekdays and weekend days.
- Calculations
  1. ~~Develop VMT utilizing average traffic volume for each weekday and weekend day hour between 6 a.m. and 8 p.m.~~
  2. ~~Join vehicle miles traveled (VMT) data with segments with available speed data with INRIX TMCs.~~
  3. Gather ~~average speed~~ for each ~~measured roadway~~ segment for each hour of weekday and weekend day in the year of analysis.
  4. Calculate the ratio of the 80th percentile travel times (equivalent of the 20th percentile slowest speeds) to the 50th percentile (median speed) for each weekday and weekend day hour between 6 a.m. and 8 p.m. for the year of analysis. This ratio is referred to as LOTTR.
  5. ~~Count the number of weekday and weekend day hours between 6 a.m. and 8 p.m. where the LOTTR exceeds 1.5.~~
  6. Calculate the weighted average of weekday and weekend LOTTR. First, multiply weekday LOTTR by 5/7 (i.e. weekdays/ all days). Second, multiply weekend LOTTR by 2/7 (i.e. weekend days/ all days). Sum the two figures.
  7. **Threshold for Need for Improved Reliability:** Roadway segments where the average weekday and weekend day LOTTR is greater than 1.5 ~~for~~ are identified as those with a VTrans Mid-term Need for Improved Reliability.

4.2.2 Prioritization within Improved Reliability (Roadway) Need Category

Applicable VTrans Travel Market: CoSS, RN

Utilized for: Establishing Statewide Priority Locations (based on CoSS Needs) and Construction District Priority Locations (based on RN Needs)

Two criteria, Severity and Magnitude, are utilized to categorize VTrans Mid-term Needs for Improved Reliability (Roadway) as *Very High, High, Medium,* and *Low* in the following manner.

Severity of VTrans Mid-term Need for Improved Reliability (Roadway)

- Source data: Hourly weekday and weekend level of travel time reliability (LOTTR) values used to establish VTrans CoSS and RN needs for reliability improvements
- Calculations
  - Calculate the weighted sum of LOTTR, which is the cumulative total of all average LOTTR values > 1.5 over the period from 6AM – 8PM, weighted by day of the week.
  - *weighted sum = 5/7 × (sum of weekday LOTTR > 1.5) + 2/7 × (sum of weekend LOTTR > 1.5)*

Magnitude of VTrans Mid-term Need for Improved Reliability (Roadway)

- Source data:
  - VDOT Traffic Engineering Division - Annual Average Daily Traffic (AADT) data
- Calculations
  - If AADT for a segment is null or 0, populate ADT with the following values based on the roadway segment's functional classification:
    - Interstate: 82,400
    - Interstate Ramp: 16,800
    - Other Freeways and Expressways: 48,600
    - Other Freeways and Expressways Ramp: 16,800
    - Other Principal Arterial: 33,500
    - Other Principal Arterial Ramp: 16,800
    - Minor Arterial: 19,300
    - Minor Arterial Ramp: 16,800
    - Major Collector: 16,800
    - Major Collector Ramp: 16,800
    - Minor Collector: 13,800
    - Local: 5,300
    - error: 5,300
    - NA: 5,300

Consideration of Severity and Magnitude Criteria

- Severity (LOTTR values) x Magnitude (AADT)

Prioritizing within Improved Reliability (Roadway) Need Category

Prioritization within this VTrans Mid-term Needs Category occurs in the following manner:

- Sort the product of the multiplication in descending order and assign the following values based on mileage to develop statewide and for each VDOT Construction District *Very High, High, Medium,* and *Low* categorizations for Need for Improved Reliability.
  - *Very High* (Score 7): Top 5% of the total mileage
  - *High* (Score 6): 5.001%–10%
  - *High* (Scores 5): 10.001%–15%
  - *Medium* (Score 4): 15.001%–20%
  - *Medium* (Score 3): 20.001%–25%
  - *Low* (Score 2): 25.001%–50%
  - *Low* (Score 1): Bottom 50.001%–100%

If RN Need for Improved Reliability has fewer than 20 total miles of Needs in a VDOT Construction District, the following method is used:

- Sort the multiplication in descending order and assign the following values based on mileage:
  - *Very High* (Score 7): Top 0–5 miles
  - *High* (Score 6): 5.001–10 miles
  - *High* (Scores 5): 10.001–15 miles
  - *Medium* (Score 4): 15.001–20 miles