
# Appendix G – Project Scoring Methodology

Kingsport 2045 Long Range Transportation Plan

Kingsport Metropolitan Transportation Planning Organization

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# Project Scoring Methodology

This appendix documents the project scoring for the Kingsport Metropolitan Transportation Planning Organization (MTPO) 2045 Long Range Transportation Plan (LRTP). The project scoring is consistent with a performance-based planning process that evaluates the individual LRTP potential roadway/freight projects to help inform the project selection. The highest scoring projects represent projects most likely to best address the MTPO's established LRTP goals and objectives. As such, the project team took the approach that the highest scoring projects would be among the first projects to be programmed, or attempted to be programmed, as part of the LRTP fiscally constrained plan.

## Identification of Potential Projects

Potential projects were identified after reviewing the 2040 LRTP and the results of the technical analysis (existing conditions and future year needs) for the 2045 LRTP update. Public input, in the form of surveys and online mapping, helped inform the identification of issues and priority projects within the Kingsport MPA. A list of potential projects was then developed for the 2045 LRTP. This list of projects was then scored using the project scoring methodology.

## Project Scoring Methodology

The project team identified 20 scoring measures that were applied to each project. The measures were grouped into six categories as summarized in **Table 1**. Each category was also assigned a weight (shown in the yellow circles). A project, in theory, could receive a maximum of 100 points. The weighting of the projects was kept consistent with the 2040 LRTP and was presented to the Kingsport MTPO Executive Board. A brief description of each measure, including how the measure was scored, follows this table. Appendix H includes the results of the project scoring.

**Table 1. Scoring Measures**

**25 Safety**

- Measure #1 (10 points) – Number of vehicle crashes
- Measure #2 (5 points) – Number of bike/pedestrian crashes
- Measure #3 (10 points) – Fatal and serious injury vehicle crashes

**20 Operational Efficiency**

- Measure #4 (5 points) – Existing LOS addressed
- Measure #5 (5 points) – Future LOS addressed
- Measure #6 (2 points) – Traffic signal project and / or incorporates new technology
- Measure #7 (5 points) – Creates parallel facility / system redundancy
- Measure #8 (3 points) – Difference between existing and projected future volumes

**10 Accessibility**

- Measure #9 (3 points) – Population growth surrounding project (2018 - 2045)
- Measure #10 (3 points) – Employment growth surrounding project (2018 - 2045)
- Measure #11 (4 points) – Improves connectivity of system

**15 Active Transportation**

- Measure #12 (5 points) – Non-motorized demand near project
- Measure #13 (5 points) – Number of above average EJ and underserved populations touched by project
- Measure #14 (5 points) – Pedestrian Level of Traffic Stress (LTS) and Bicycle LTS

**10 Environmental**

- Measure #15 (5 points) – Number of challenging areas the project touches (floodplains, historical areas, steep slopes, and parks)
- Measure #16 (5 points) – Project improves capacity without widening or adding new facility

**20 Economic**

- Measure #17 (5 points) – Percent of trucks in existing network
- Measure #18 (5 points) – Within 1/2 mile of identified economic development nodes
- Measure #19 (5 points) – Job access score
- Measure #20 (5 points) – Improves access to identified tourist destinations

# Description of Scoring Measures

Each of the scoring measures is described in the following. This includes a brief description of each measure, the analysis that was applied to calculate the score for each measure, and the thresholds that correspond to the project scoring.

Measure #1 – Number of Vehicle Crashes (possible 10 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| The number of vehicle crashes helps to identify potential areas within the MPA that have safety concerns. Furthermore, this analysis helps support safety performance measures (PM 1) and ultimately helps the Kingsport MTPO prioritize projects that have the potential to address safety concerns, and improve overall safety for the traveling public. | A 200 ft buffer was established around each project location in GIS and all crashes located within that buffer were counted and assigned to that project for scoring. | < 50 crashes – score of 1<br>50 - 100 crashes – score of 4<br>100 - 150 crashes – score of 6<br>150 - 200 crashes – score of 8<br>> 200 crashes – score of 10 |

Measure #2 – Number of Bike/Pedestrian Crashes (possible 5 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| The number of bicycle/pedestrian crashes helps to identify potential areas within the MPA that have safety concerns. Furthermore, this analysis helps support Safety performance measures (PM 1) and ultimately helps the Kingsport MTPO prioritize projects that have the potential to address safety concerns, and improve overall safety for the traveling public, including those users who choose to walk or bike within the region. | A 200 ft buffer was established around each project location in GIS and all bike/pedestrian crashes located within that buffer were counted and assigned to that project for scoring. | 0 crashes – score of 0<br>1 - 2 crashes – score of 3<br>> 2 crashes – score of 5 |

Measure #3 – Fatal and Serious Injury Crashes (possible 10 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| The number of crashes resulting in a fatality or serious injury helps identify areas within the MPA that have safety concerns. Furthermore, this analysis helps support Safety performance measures (PM 1) and ultimately helps the Kingsport MTPO prioritize projects that have the potential to improve overall safety for the traveling public. | A 200 ft buffer was established around each project location in GIS and all fatal and serious injury crashes located within that buffer were counted and assigned to that project for scoring. | 0 crashes – score of 0<br>1 - 3 crashes – score of 4<br>4 - 6 crashes – score of 8<br>> 6 crashes – score of 10 |

Measure #4 – Existing Level of Service (LOS) Addressed (possible 5 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| Identifying existing roadway capacity issues helps identify areas within the Kingsport MPA that may require immediate, or short-term transportation investments, to maintain or improve traffic flow/operations. | The volume-to-capacity (V/C) ratios from the 2018 baseline travel demand model results were analyzed for each project. In situations where a project had multiple segments, the highest V/C ratio (or worst LOS) was used for scoring purposes. | C+ (v/c 0.00 to 0.24) – score of 0<br>C+ (v/c 0.25 to 0.49) – score of 1<br>C+ (v/c 0.50 to 0.69) – score of 2<br>D (v/c 0.70 to 0.84) – score of 3<br>E (v/c 0.85 to 0.99) – score of 4<br>F (v/c 1.00 or more) – score of 5 |

Measure #5 – Future LOS Addressed (possible 5 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| Identifying future year (2045) roadway capacity issues helps identify areas within the Kingsport MPA that may require mid- to long-term transportation investments, to maintain or improve traffic flow/operations. | The volume-to-capacity (V/C) ratios from the 2045 Existing + Committed travel demand model results were analyzed for each project. In situations where a project had multiple segments, the highest V/C ratio (or worst LOS) was used for scoring purposes. | C+ (v/c 0.00 to 0.24) – score of 0<br>C+ (v/c 0.25 to 0.49) – score of 1<br>C+ (v/c 0.50 to 0.69) – score of 2<br>D (v/c 0.70 to 0.84) – score of 3<br>E (v/c 0.85 to 0.99) – score of 4<br>F (v/c 1.00 or more) – score of 5 |

Measure #6 – Traffic signal project and/or incorporates new technology (possible 2 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| Identifying projects that include new traffic signals, and/or new technology, can potentially improve the existing flow of traffic and overall traffic operations. ITS applications can also potentially have a positive safety benefit. As such, projects that could include technology elements receive points. | Project team and MTPO staff review. | Yes scored 2<br>No scored 0 |

Measure #7 – Creates parallel facility/system redundancy (possible 5 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| Identifying projects that provide an alternative travel route is important in the event that an adjacent or parallel roadway is closed for an extended period of time. This also supports the LRTP security planning factor. | Project team and MTPO staff review. | Yes scored 5<br>No scored 0 |

Measure #8 – Difference between Existing and Projected Future Volumes (possible 3 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| Analyzing the difference (increase/decrease) in traffic volume helps identify areas that are potentially growing or attracting additional traffic. Project areas showing an increase in volume receive a higher score. | This was calculated by taking the difference between the maximum 2045 model volume (of a model line segment within the project extents) and the 2018 model volume of the same segment. | difference <1,000 scored 1<br>difference 1,000-2,500 scored 2<br>difference > 2,500 scored 3 |

Measure #9 – Population Growth Surrounding Project (2018-2045) (possible 3 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| Identifying areas with higher population growth potentially represents an area that will require transportation improvements to maintain or enhance accessibility, and overall mobility. | Population totals for each project were obtained by summing population data from TAZs (polygons) for those TAZ polygons that intersect the extent of a project line feature, or were within 200 feet of a project point. The population growth was then calculated by subtracting 2018 population totals from the 2045 population totals. | growth <100 scored 1<br>growth 100-500 scored 2<br>growth > 500 scored 3 |

Measure #10 – Employment Growth Surrounding Project (2018-2045) (possible 3 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| Identifying areas with higher employment growth potentially represents an area that will require transportation improvements to maintain or enhance accessibility, and overall mobility. | Employment totals for each project were obtained by summing employment data from TAZs (polygons) for those TAZ polygons that intersect the extent of a project line feature, or were within 200 feet of a project point. The employment growth was then calculated by subtracting 2018 population totals from the 2045 population totals. | growth <100 scored 1<br>growth 100-500 scored 2<br>growth > 500 scored 3 |

Measure #11 – Improves Connectivity of System (possible 4 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| Identifying projects that potentially improve network connectivity, or strengthen the functional classification system, are important to improving traffic operations and enhancing overall accessibility to the traveling public. | Project team and MTPO staff review. | Yes scored 4<br>No scored 0 |

Measure #12 – Non-motorized Demand Near Project (possible 5 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| Identifying projects that intersect or connect to areas with a demand for non-motorized activity helps support the use of alternative modes within the Kingsport MPA. This also supports the MTPO's goal to expand transportation choices. | Project team and MTPO staff review. This analysis incorporates the findings from the recently updated *Kingsport MTPO Regional Bicycle and Pedestrian Plan* to identify non-motorized demand. | Low scored 1<br>Medium scored 3<br>High scored 5 |

Measure #13 – Number of above average Environmental Justice (EJ) and underserved populations touched by project (minorities, low-income, persons with disabilities, and age 65+) (possible 5 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| Identifying projects that potentially impact, and can benefit, EJ populations are important to developing a transportation system that is accessible to all individuals. This supports the MTPO's goal of enhancing quality of life throughout the region. | GIS analysis was used to determine the number of above average EJ and underserved populations. This was identified if a census block group had EJ totals above the county averages for minorities, low-income, persons with disabilities, and age 65 and over. | 1 category encounter scored 1<br>2 category encounters scored 3<br>3+ category encounters scored 5 |

Measure #14 – Pedestrian and Bicycle Level of Traffic Stress (LTS) (possible 5 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| The *Kingsport MTPO Regional Bicycle and Pedestrian Plan* identified bicycle and pedestrian LTS on area roadways. Roadways with a higher LTS represent conditions that are less conducive to walking and biking. As such, these areas receive a higher score as potential non-motorized improvements should be considered to enhance the feasibility of using alternative travel modes. | The bicycle and pedestrian LTS value were determined by using the maximum LTS value encountered within segments comprising a single project extent, or along an identified ancillary route in the event the project was comprised of a partially or solely new location. This value was assigned as the overall LTS value for a project. | LTS Level 1 – scored 1<br>LTS Level 2 – scored 2<br>LTS Level 3 – scored 4<br>LTS Level 4 – scored 5 |

Measure #15 – Number of Challenging Areas a Project Touches (floodplains, historical areas, parks) (possible 5 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| This is a high-level environmental screening that identifies projects that could potentially have resources in the vicinity of the proposed project. This also supports the overall environmental mitigation analysis that was conducted for the LRTP fiscally constrained projects. The fewer number of potential impacts receives a higher score. | A GIS spatial join of park, floodplain, and historic district data (provided by the MTPO) to the linear project extents or within 200 ft of the point projects was utilized to determine what features each project potentially affects. | 0 features affected – scored 5<br>1 feature affected – scored 4<br>2 features affected - scored 3<br>3 features affected – scored 1<br>4 features affected – scored 0 |

Measure #16 – Project Improves Capacity without Widening or Adding New Facility (possible 5 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| Identifying lower cost improvements, or spot improvements such as intersection enhancements, that improve traffic operations have less of an impact on the environment (as opposed to widening a roadway or adding a new facility). As such, these projects receive points. | Project team and MTPO staff review. | Yes scored 5<br>No scored 0 |

Measure #17 – Percent of Trucks in Existing Network (possible 5 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| Identifying the percentage of trucks on area roadways is an indication of the transportation facilities that are accommodating local and/or regional freight movements. Roadways with a higher percentage of trucks receive a higher score. | Percent of trucks in the existing network was determined from the 2018 data by summing the combined units (CU) and signal unit (SU) entries. This resulted in the truck totals which were then compared to the overall AADT to determine the truck percentage. | <2% trucks (scored – 1)<br>2% to 5% trucks (scored – 3)<br>>5% trucks (scored – 5) |

Measure #18 – Within ½-mile of Identified Economic Nodes (possible 5 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| Identifying projects that intersect or connect with an employment area is important to supporting the MTPO's LRTP goal of prosperity. | Project team and MTPO staff review. | Yes scored 5<br>No scored 0 |

Measure #19 – Job Access Score (possible 5 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| Identifying job access for transit use can help identify potential roadways that should be targeted for future investments (to help support transit usage as well as enhancements to connect to bus stops, etc.). | GIS analysis that utilizes the Center for Neighborhood Technology (CNT) dataset for job access. This analysis uses the block group data (tl_2019_bg_loaded) for Job Access Score (emp_ovrll_ndx field) in a spatial join of linear project extents or within 200 ft of point projects. | < 2.0 (scored – 1)<br>2.0 to 3.9 (scored – 2)<br>4.0 to 5.9 (scored – 3)<br>6.0 to 7.9 (scored – 4)<br>> 8.0 (scored – 5) |

Measure #20 – Improves Access to Identified Tourist Destinations (possible 5 points)

| Description | Analysis | Thresholds / Score |
|---|---|---|
| Identifying projects that intersect or connect with an area that could attract tourists ultimately supports the MTPO's LRTP goal to support tourism. Furthermore, enhancing tourism is a planning factor that should be considered in developing the LRTP. | Project team and MTPO staff review. | Yes scored 5<br>No scored 0 |