



# Department of Highways

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# Who is District 3?

- Designs, builds and maintains a network of safe transportation facilities for citizens and travelers in Southcentral Kentucky
- 10 Counties
- 275 Employees
- 2,482 roadway miles / 5,742 lane miles





# Who is District 3?



Only state operated ferry boat

## Welcome Center (Rest Area)





# Programs

- Capital Projects – widening, new routes, reconstructions, interchanges
- Asset Management – bridges and pavements
- General Maintenance – mowing, snow & ice, striping, signs, repairs, permits
- Rural & Municipal Aid – rural secondary, flex funds, emergency funds





# Asset Management





# General Maintenance





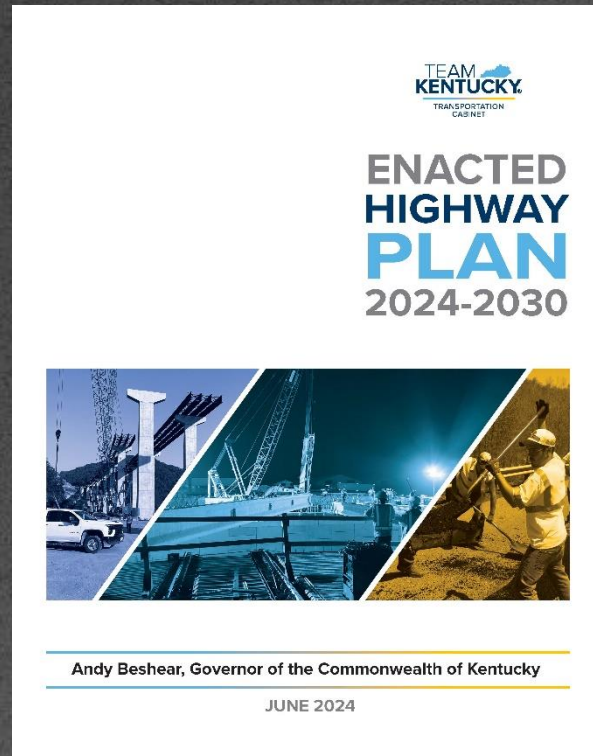
# General Maintenance





# Highway Plan Projects

<https://maps.kytc.ky.gov/activehighwayplan/2024-Enacted-Highway-Plan> | KYTC





# Prioritization

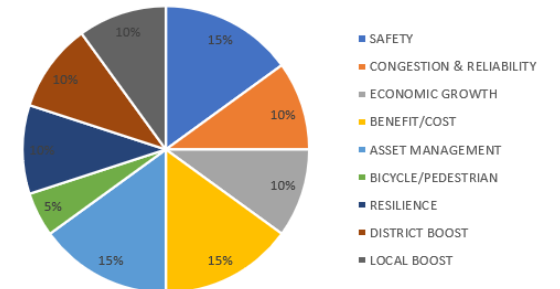
## ***SHIFT Kentucky Ahead***

### Strategic Highway Investment Formula for Tomorrow

- KYTC created a data-driven, objective approach to set priorities for spending available dollars
- Combines objective measures (quantitative) with insights of local, regional leaders (qualitative)



| Component                | Weight |
|--------------------------|--------|
| SAFETY                   | 15     |
| CONGESTION & RELIABILITY | 10     |
| ECONOMIC GROWTH          | 10     |
| BENEFIT/COST             | 15     |
| ASSET MANAGEMENT         | 15     |
| BICYCLE/PEDESTRIAN       | 5      |
| RESILIENCE               | 10     |
| SUBTOTAL                 | 80     |
| DISTRICT BOOST           | 10     |
| LOCAL (ADD/MPO) BOOST    | 10     |
| TOTAL                    | 100    |



# Congestion+Reliability Formulas

Statewide Score = Congestion Score (CS)

Regional Score = Congestion Score (CS)

CS = (Congestion Cost) + (Unreliability Cost)

Congestion Cost = VHD X VOT

Unreliability Cost = BT X AADT X VOT X RR

| Functional Class | Mobility Score                          |
|------------------|---|
| Interstates      | $(CS)^{\dagger}_{\text{Scaled}}$        |
| Other Freeway    | $95\% * (CS)^{\dagger}_{\text{Scaled}}$ |
| Other Principal  | $90\% * (CS)^{\dagger}_{\text{Scaled}}$ |
| Minor Arterial   | $85\% * (CS)^{\dagger}_{\text{Scaled}}$ |
| Major Collector  | $80\% * (CS)^{\dagger}_{\text{Scaled}}$ |
| Minor Collector  | $75\% * (CS)^{\dagger}_{\text{Scaled}}$ |
| Local Road       | $70\% * (CS)^{\dagger}_{\text{Scaled}}$ |

| Measure           | Description  | Source  |
|-------------------|--|---|
| VHD               | Vehicle Hours of Delay   | 2020-2021 HERE link-referenced speed data or HERS-ST speed model                  |
| BT                | Buffer Time; extra time budgeted above the normal to arrive at destination on time | 2020-2021 HERE link-referenced speed data or Random Forest percentile speed model |
| VOT               | Value of time; $VOT_{\text{car}} = 19.86$ , $VOT_{\text{truck}} = 36.055$          | SHRP2 study C11   |
| Reliability Ratio | Reliability ratio; $RR_{\text{car}} = 0.8$ , $RR_{\text{truck}} = 1.16$            | SHRP2 study C11   |

# Crash History 2024




## Crash History Safety Measure (CHSM)




$$CHSM_{\dagger scaled} = \left( 44.5\% * \sum EEC_{KAB,alt} \right) + \left( 44.5\% * \sum EB_{KAB} \right) + \left( 5.5\% * \sum EEC_{co} \right) + \left( 5.5\% * \sum EB_{co} \right)$$




| Measure         | Description   | Summary Method   | Source             |
|-----------------|---|--|--------------------|
| EEC_KAB,<br>ALT | Excess Expected Severe Crashes, Alternate Calculation | Expected Severe Crashes – (2/3)*Predicted Severe Crashes | Crash Database HIS |
| EB_KAB          | Expected Severe Crashes                               | Empirical-Bayes Adjustment of Observed Severe Crashes    | Crash Database HIS |
| EEC_CO          | Excess Expected Minor Crashes                         | Expected Minor Crashes – Predicted Minor Crashes         | Crash Database HIS |
| EB_CO           | Expected Minor Crashes                                | Empirical-Bayes Adjustment of Observed Minor Crashes     | Crash Database HIS |




# Roadway Characteristics

Use usRAP to calculate Star Rating and replace formula for Roadway Characteristics.

  
  
  
16.23

  
  
  
NA

  
  
  
NA

  
  
  
NA

Star Ratings

Chart

Standard cross sections

Roadside

Mid-block

Intersections

Flow

VRU facilities and land use

Speeds

Roadside severity - driver-side distance

0 to <1m

Roadside severity - driver-side object

Safety barrier - concrete

Roadside severity - passenger-side distance

0 to <1m

Roadside severity - passenger-side object

Safety barrier - concrete

Shoulder rumble strips

Present

Paved shoulder - driver-side

Narrow (>= 0m to < 1.0m)

Paved shoulder - passenger-side

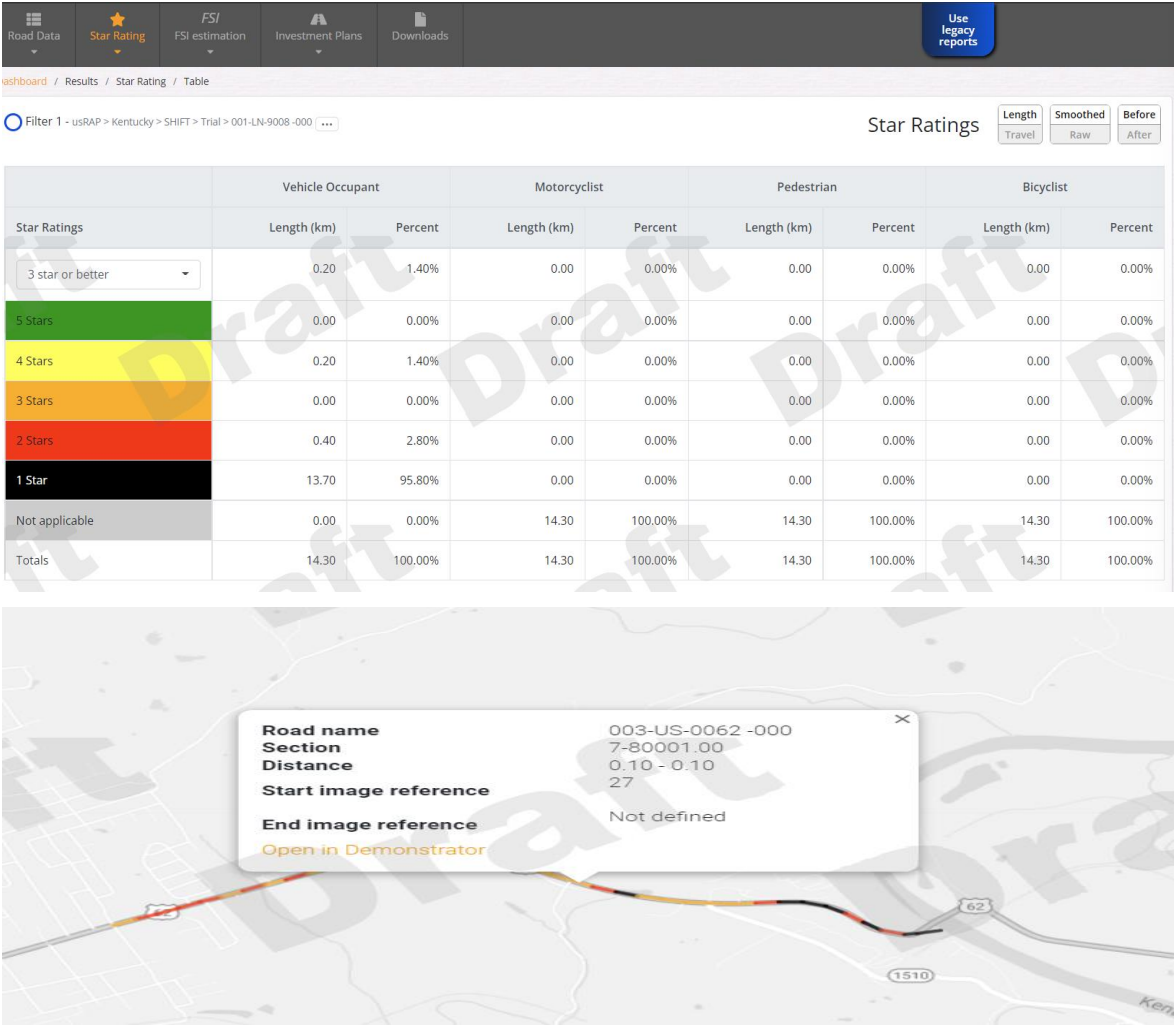
Narrow (>= 0m to < 1.0m)

Saved road sections

Save

You have no saved sections.

Create coding file



# Benefit Cost Formula 2024

$$\frac{B_{TTS} + B_{SAF}}{C_{PROj}}$$

$$B_{SAF} = (SBF_{KAB}/100 * EB_{KAB} * C_{KAB}) + (SBF_{CO}/100 * EB_{CO} * C_{CO})$$

Where ...

$B_{SAF}$  = Safety Benefit in \$

$SBF_{KAB}$  = Safety Benefit Factor for the KAB crashes

$EB_{KAB}$  = EB estimation number of fatal, severe, and minor injury crashes

$C_{KAB}$  = Average cost of fatal, severe, and minor injury crashes

$SBF_{CO}$  = Safety Benefit Factor for the CO crashes

$EB_{CO}$  = EB estimation number of possible injury and property damage only crashes

$C_{CO}$  = Average cost of possible injury and property damage only crashes

SBF (a percentage) needs to be divided by 100 to become a ratio (e.g., 58% becomes 0.58), so the

resulting  $B_{SAF}$  will be in \$

VHB is the source of \$ assumptions used in SHIFT 2022, e.g., \$652,612 for KAB and \$22,799 for CO crash costs (2019 study) KABCO assumptions were \$9.3M, \$538K, \$163K, \$103K, \$9700 keep consistent with SHSP.

Time period for analysis: 5 Years, keep consistent with SHIFT safety crash history method.

# Asset Management Formulas 2024

**Asset Management Measure (AMM) :**

$$\text{AMM} = \text{Max( Pavement, Bridge)}$$

Removed OMS and Criticality (moved to new resilience component)

Scaled - same as before

# Freight Formula

Statewide Score = 10% X Freight Economic Growth Measure (FEGM)

Regional Score = 5%\* X Freight Economic Growth Measure (FEGM)

$$\text{FEGM} = \text{TTTRI} \times ((\text{Freight} \times \text{AADT}) / \text{KHFN\_Factor})^{\dagger} \text{ Scaled}$$

| Measure   | Description  | Data Source   |
|---|--|---|
| TTTRI   | Truck travel time reliability index (same as previously used RRatio)**   | 2020-2021 HERE link-referenced speed data or Random Forest percentile speed model |
| Freight:<br>Statewide: (0.20 X SU + 0.80 X CO)<br>Regional: (0.60 X SU + 0.40 X CO) | Freight Statewide and Regional Factors<br>SU: % Single Unit Trucks; Vehicle Class 4-7<br>CO: % Combo Unit Trucks; Vehicle Class 8-13 | HIS<br>HIS  |
| AADT  | Annualized average daily traffic   | Jackelope   |
| KHFN_Factor:<br>KHFN*V <sub>TR,KHFN-Max</sub>                                       | KHFN: Kentucky Highway Freight Network Tier<br>V <sub>TR,KHFN-MAX</sub> : Max Truck Vol in each KHFN Tier† †                         | HIS   |

# Economic Growth – Regional

- **Step 1:** Measure the access to jobs both with and without the project.
- **Step 2:** Average the access to jobs across the population within a catchment area.
- **Step 3:** Apply an elasticity to determine the resulting change in labor productivity.
- **Step 4:** Weight total change and change for people living in poverty.

# Resilience

$$\text{Criticality Score} = [(\text{BC}) + (\text{DT})]$$

| Measure | Description   | Data Source  |
|---------|---|--|
| BC      | The centrality of a road, calculated as the percentage of OD pairs using the road within its 1-hour travel time neighborhood.   | HIS, HERE data,<br>KYSTDM TAZ,<br>Census block group |
| DT      | <p>The importance of the road as detour to other highways with top 5% BC values.</p> $DT_a = \sum_{i=1}^k BC_i \times p_i \times w_i$ <p>where <math>DT_a</math> is the detour score of link <math>a</math>; <math>BC_i</math> is the BC value of the segment <math>i</math> whose detour will include link <math>a</math>; <math>p_i</math> is the percent trips originally using segment <math>i</math> that rerouted through link <math>a</math> when segment <math>i</math> is disrupted; <math>w_i</math> value varies by functional classification: 1 for FC1, 0.95 for FC2, 0.8 for FC3, 0.7 for FC4, 0.5 for FC5, 0.4 for FC6, and 0.2 for FC7.</p> | HIS, HERE data,<br>KYSTDM TAZ,<br>Census block group |

# Bike and Pedestrian

**Bicycle and Pedestrian Score = 0.5 X Bicycle Score +0.5 X Pedestrian Score**

| Bicycle Project   | Pedestrian Project  | Points |
|---|---|--------|
| New bicycle or shared-use path, buffered bicycle lane, separated bicycle lanes, rail-trail, bicycle signalization | New pedestrian multi- or shared-use path, sidewalk or trail   | 5      |
| Seperated or buffered bicycle lane  | Sidewalk improvement (widening, major repair/replacement of discontinuous or poor condition); Trail improvement | 4      |
| Improve bicycle facility (widen bicycle lanes, pave shoulder, extend bicycle lanes...)                            | Crossing island, curb extensions, streetscape, adding enhanced crosswalks                                       | 3      |
| New bicycle lane (no separation)  | Signalization improvements  | 2      |
| Bicycle amenities (parking, signing, etc.); Sharrows  | Wayfinding  | 1      |
| No project defined  | No project defined  | 0      |



# Schedule

| Phases and Timing        | Jan-Apr | May-June | June-July | July-August | Oct-Dec | Spring '26 |  |
|--------------------------|---------|----------|-----------|-------------|---------|------------|--|
| Sponsorship              |         |          |           |             |         |            |  |
| Data Verification        |         |          |           |             |         |            |  |
| Statewide Prioritization |         |          |           |             |         |            |  |
| Regional Prioritization  |         |          |           |             |         |            |  |
| Recommended Highway Plan |         |          |           |             |         |            |  |
| Enacted Highway Plan     |         |          |           |             |         |            |  |

***SHIFT Kentucky Ahead***



# KYTC Mission

To provide a **safe, efficient, environmentally sound and fiscally responsible** transportation system **that delivers economic opportunity and enhances the quality of life in Kentucky.**





## SAFE SYSTEM APPROACH





If hit by a car  
traveling:

● Fatality ● Person survives collision



20 MPH

5%



30 MPH

45%



40 MPH

85%

National Traffic Safety Board (2017) Reducing Speeding-Related Crashes Involving Passenger Vehicles.  
Available from: <https://www.nts.gov/safety/safety-studies/Documents/SS1701.pdf>





# KYTC SAFERoads Solutions





## [Maps/Resources | KYTC](#)

- General Highway Map
- Traffic Counts
- Printable Maps
- Archive Plans



# Contact Us

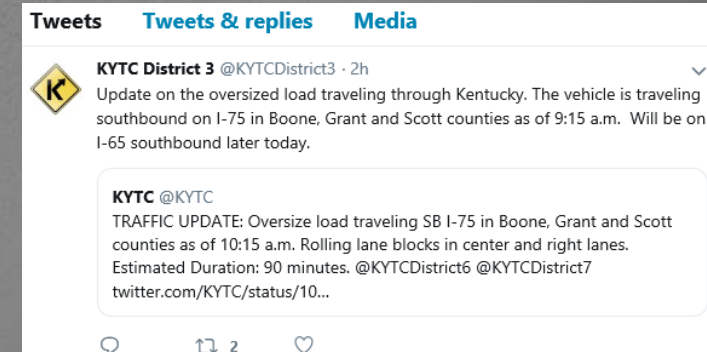
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<https://transportation.ky.gov/Pages/ContactUs.aspx>





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