# Information Item

**DATE:** March 4, 2019

**TO:** Transportation Advisory Board

**PREPARED BY:** Joe Barbeau, Senior Planner (651-602-1705)
Steve Peterson, Manager of Highways and TAB/TAC Process (651-602-1819)

**SUBJECT:** Sensitivity Analysis of the 2018 Regional Solicitation Measures

This information item presents a sensitivity analysis of the scoring measures used in the 2018 Regional Solicitation. The analysis repeats what was completed after the 2014 and 2016 Regional Solicitations and helps to point to any needed changes to scoring measures for the next Regional Solicitation (2020). If potential changes are needed, then Council staff will work with TAC Funding & Programming to propose any changes.

In this analysis, measures were evaluated on how they impacted application rankings, which ultimately contribute to which projects were funded. The key findings of this analysis include the following:

1. Across most application categories (e.g., Transit Expansion), measures with higher point values such as transit usage tended to have had a larger impact on application rankings. This suggests that these higher point value measures are generally performing as intended.
2. There are a small number of measures (e.g., housing performance) that are having little to no impact on the application ranking and changes may be proposed for the 2020 Regional Solicitation to make the measure more meaningful (see Strategies for Underperforming Measures).
3. In 2016, one of the key obstacles to differentiation was scoring outliers (e.g., when one project scored 100 points on a measure and the rest of the applications only scored one or two points, rendering the measure meaningless) as staff identified 18 measures as outliers. The analysis for 2018 identifies only three measures as outliers in 2018. This improvement was the result of enabling scoring committees to adjust for outliers.

## Evaluation Method

There are between 9 and 16 measures per application category. For instance, crashes reduced by the project is a scoring measure in the Roadway Expansion application category. Each of these measures was assigned a point value that was based largely on the results of the Regional Solicitation Evaluation and Redesign in 2013 and 2014. Then, submitted applications were scored on each of the measures. These sub-scores are added up to a total score out of 1,100 possible points. Projects were then awarded funding based on the total points relative to the other projects submitted in the same application category.

Tables 1 through 10 present the measures used to evaluate each application category. Each measure is presented with three statistics:

1. Number of applications that would change their ranked order if the measure was removed
2. Number of applications that would move above or below the TAB-approved funding line if the measure was removed
3. Standard deviation, or a measure of how clustered or spread out application scores are for that measure

### *Impact on Ranked Order when a Measure is Removed*

The primary gauge for evaluating a measure's actual impact in the 2018 Regional Solicitation is how many applications change their rank position within an application subcategory if that measure is removed. Measures that have a large impact on how the applications score relative to each other have more potential to affect a funding decision.

### *Impact on the Funding Line when a Measure is Removed*

Changes in ranked order sometimes cause an application to move above or below the TAB-approved funding line, the frequency of which is also indicated in the tables. However, it is important to note that funding line movement tends to be a fairly arbitrary statistic moving forward, as that line is not predictable. Further, it is not a given that the flipping of two applications across that line would have resulted in funding the application that moved up (or not funding the application that moved down), as point spread, geographic impacts, federal request amounts, and federal funding requests could move funding from one category to another.

### *Standard Deviation*

To further explore the potential for a measure to contribute to an application's funding decision, each measure's standard deviation is calculated. Higher standard deviations usually suggest scores that are widely spaced, though it is possible for outliers to skew standard deviations. Lower standard deviations indicate score clustering. Standard deviation also depends on the number of points allocated to a measure, with higher-value measures expected to have generally higher standard deviations.

## Findings

### *Overall Findings*

Overall, the measures create differentiation, as intended.

The 2016 sensitivity analysis identified three under-performing measures worth exploring, the first two of which were addressed with changes to the 2018 application:

- Risk Assessment Work Sheet (part of the scoring in 9 of the 10 application categories): This measure provided little differentiation in most categories in the 2016 Regional Solicitation. For 2018, the measure was changed to capture fewer, more impactful elements. This change seems to have made a minor difference, as standard deviations have only increased by modest amounts (i.e., less than ten) in most categories.
- Deficiencies and Safety (Multi-Use Trails and Pedestrian Facilities): In 2016, both measures (A. Barriers/Gaps and B. Deficiencies/Safety) for each category saw very high scores overall, with only one of the measures (4B, Multiuse Trails) seeing fewer than half of the maximum points for any application. In 2018, 4B became a differentiator, changing the ranking of eight out of 12 applications. In the Multi-Use Trails category, 4A became more impactful, as evidenced by its standard deviation increasing from 9 to 21.
- Housing Performance Score (all application categories): No meaningful change occurred in this measure, as it is based on housing accommodation scores generated by the Council's Community Development Department. Due to cities having similar performance scores, the scores tend to be high. This is particularly true in the transit categories, for which projects tend to be located in Minneapolis or St. Paul, each of which have perfect housing performance scores.

### *Roadways Findings*

Within the Roadways categories, the "Role in the Regional Transportation System and Economy" introduced some new measures in 2018. Added measures awarded points for the Regional Truck Corridor Study, the Principal Arterial Intersection Study, and the Congestion Management Safety Plan. These measures generally provided differentiation expected with their point values.

For the Roadway Expansion and Roadway Reconstruction / Modernization / Spot Mobility application categories, the measures were roughly as difference-making as expected.

The Traffic Management Technologies application category only received three applications and no conclusions are able to be made.

Conclusions were also difficult to draw for the Bridge application category, as there were only eight projects submitted, which included two pairs of tied scores. The tied scores reduce the number of ranking changes.

### *Transit/Travel Demand Management (TDM) Findings*

As expected, the two transit application categories saw the most impact in their 350- and 325-point Usage measures (Measure 2). In Transit Expansion, eight of the nine applications scored 50 points out of 50 in Risk Assessment, with the other scoring 43. In addition, five of the nine measures did not change the ranked order of any projects. Though four of these measures are worth less than 100 points and the fifth was impacted by an outlier.

### *Bicycle/Pedestrian Findings*

In the Multiuse Trails and Bicycle Facilities application category, each of the 10 measures changed the ranking of at least 20 of the 40 applications. While the Pedestrian Facilities application category did not show any irregularity, the Public Engagement Process measure in the Safe Routes to School application category showed almost no impact, as every application scored at least 35 out of 45 points for a standard deviation of 4.

## Strategies for Underperforming Measures

While this does not seem to be a significant issue for the 2018 Regional Solicitation, for lower impact measures or measures that are not distinguishing scores as intended, there are several strategies that can be employed:

- Do nothing
- Change the number of points allocated to the measure
- Change the measure
- Change the measure's scoring guidelines or applicant instructions
- Convert the measure to a required qualification instead of a scoring measure
- Remove the measure

**Table 1. Summary of Roadway Expansion Measure Performance (17 applications submitted).**

| Criteria | # | Measures | Max Points | # of applications: Rank order changed | # of applications: Crossed funding line* | St. dev. | Outliers (None) |
|---|---|---|---|---|---|---|---|
| *Regional Role* | 1A | Congestion/PA Intersection Study | 80 | 11 | **1** | 20 | |
| | 1B | Connection to Total Jobs and Manufacturing/Distribution Jobs | 50 | 12 | 0 | 16 | |
| | 1C | Regional Truck Corridor Study | 80 | 10 | 0 | 31 | |
| *Usage* | 2A | Daily person throughput | 110 | **13** | 0 | 33 | |
| | 2B | Forecast 2040 average daily traffic | 65 | **13** | **1** | 17 | |
| *Equity / Housing* | 3A | Socio-Economic | 30 | 9 | 0 | 9 | |
| | 3B | Housing Performance Score | 70 | 14 | **1** | 16 | |
| *Infra.* | 4A | Date of construction | 40 | 11 | **1** | 10 | |
| *Congestion / Air Quality* | 5A | Vehicle delay reduced | 100 | 10 | **1** | 32 | |
| | 5B | Kg of emissions reduced | 50 | 11 | 0 | 15 | |
| *Safety* | 6 | Crashes reduced | **150** | 8 | 0 | **53** | |
| *Multimodal* | 7 | Transit, bicycle, or pedestrian project elements and connections | 100 | **13** | **1** | 30 | |
| *Risk Assess.* | 8 | Risk Assessment Form | 75 | 10 | 0 | 13 | |
| *Cost Effect.* | 9 | Cost Effectiveness | 100 | 9 | **1** | 23 | |
| **TOTAL** | | | **1,100** | | | **155** | |

**The number indicates projects that moved above the funding line. For each such instance, another project moved below the funding line. This is the case on Tables 1-10.*

| Key: | **Rank order changed:** How many applications changed their ranked order by including that measure | **Crossed funding line:** How many applications would have flipped across the TAB-approved funding line by including that measure | **St. dev.** Standard deviation, a measure of how clustered or spread out application scores are |
|---|---|---|---|

Comments: Most measures were impactful, with all measures impacting the ranking of at least 8 out of 17 applications. It would be difficult to suggest that any measures are underperforming, though the most valuable measure (6) did change the rankings on the fewest projects.

Key differences from 2016: No outliers; down from four. Measure 6 went from the most projects changing rank order in 2016 to the fewest in 2018.

**Sorted by Max Points**

| # | Measure | Max Pts | Rank Change | Cross Line | St. Dev |
|---|---|---|---|---|---|
| 6 | Crashes reduced | **150** | 8 | 0 | 32 |
| 2A | Throughput | 110 | **13** | 0 | 33 |
| 7 | Multimodal | 100 | **13** | **1** | 30 |
| 5A | Vehicle Delay | 100 | 10 | **1** | 32 |
| 9 | Cost Effectiveness | 100 | 9 | **1** | 23 |
| 1A | Congestion/PA | 80 | 11 | **1** | 20 |
| 1C | Reg. Truck Study | 80 | 10 | 0 | 31 |
| 8 | Risk Assessment | 75 | 10 | 0 | 13 |
| 3B | Housing | 70 | 14 | **1** | 16 |
| 2B | Forecast ADT | 65 | **13** | **1** | 17 |
| 5B | Emissions | 50 | 11 | 0 | 15 |
| 1B | Connection to Jobs | 50 | 12 | 0 | 16 |
| 4 | Construction date | 40 | 11 | **1** | 10 |
| 3A | Equity | 30 | 14 | **1** | 9 |

**Table 2. Summary of Roadway Reconstruction / Modernization / Spot Mobility Measure Performance (15 applications submitted).**

| Criteria | # | Measures | Max Points | # of applications: Rank order changed | # of applications: Crossed funding line | St. Dev. | Outliers (see below) |
|---|---|---|---|---|---|---|---|
| *Regional Role* | 1A | Congestion/PA Intersection Study/CMSP* | 65 | 11 | 0 | 23 | |
| | 1B | Connection to Total Jobs and Manufacturing/Distribution Jobs | 40 | 7 | 1 | 14 | |
| | 1C | Reg. Truck Corridor Study Tiers | 65 | 10 | 1 | 25 | |
| *Usage* | 2A | Daily person throughput | 110 | 7 | 0 | 32 | |
| | 2B | Forecast 2040 average daily traffic | 65 | 9 | 1 | 15 | |
| *Equity / Housing* | 3A | Socio-Economic | 30 | 2 | 0 | 8 | |
| | 3B | Housing Performance Score | 70 | 5 | 0 | 18 | |
| *Infrastructure Age* | 4A | Date of construction | 50 | 7 | 0 | 9 | |
| | 4B | Geometric, structural, or infrastructure deficiencies | 100 | **12** | 1 | 19 | |
| *Congestion / Air Quality* | 5A | Vehicle delay reduced | 50 | 9 | 1 | 15 | A |
| | 5B | Kg of emissions reduced | 30 | 8 | 1 | 10 | B |
| *Safety* | 6 | Crashes reduced | **150** | 9 | 1 | **47** | |
| *Multimodal* | 7 | Transit, bicycle, or pedestrian project elements and connections | 100 | 7 | 0 | 21 | |
| *Risk Assess.* | 8 | Risk Assessment Form | 75 | 8 | 1 | 12 | |
| *Cost Effect.* | 9 | Cost Effectiveness | 100 | 9 | **2** | 24 | |
| **TOTAL** | | | **1,100** | | | **138** | |

**Congestion Management and Safety Plan*

Comments: No particularly surprising results.

Measures with outliers:

A. 5A. Top application scored 50. Second ranked application scored 40. Others scored from 0 to 14.
B. 5B. Top two applications scored 30. Others scored from 0 to 11.

Key differences from 2016: The most notable difference is that 15 applications were submitted in 2018, versus 34 in 2016. Standard deviations followed a nearly identical pattern as in 2016.

**Sorted by Max Points**

| # | Measure | Max Pts | Rank Change | Cross Line | St. Dev |
|---|---|---|---|---|---|
| 6 | Crashes | **150** | 9 | 1 | **47** |
| 2A | Throughput | 110 | 7 | 0 | 32 |
| 9 | Cost Effect. | 100 | 9 | **2** | 24 |
| 4B | Deficiencies | 100 | **12** | 1 | 19 |
| 7 | Multimodal | 100 | 7 | 0 | 21 |
| 8 | Risk | 75 | 8 | 1 | 12 |
| 3B | Housing | 70 | 5 | 0 | 18 |
| 1A | Con/PA/CMS | 65 | 11 | 0 | 23 |
| 2B | Forecast ADT | 65 | 9 | 1 | 15 |
| 1C | Truck Study | 65 | 10 | 1 | 25 |
| 4A | Construction Date | 50 | 7 | 0 | 9 |
| 5A | Delay reduced | 50 | 9 | 1 | 15 |
| 1B | Jobs | 40 | 7 | 1 | 14 |
| 5B | Emissions | 30 | 8 | 1 | 10 |
| 3A | Equity | 30 | 2 | 0 | 8 |

**Table 3. Summary of Traffic Management Technologies Measure Performance (3 applications)**

| Criteria | # | Measures | Max Points | # of applications: Rank order changed | # of applications: Crossed funding line | St. Dev. | Outliers (None) |
|---|---|---|---|---|---|---|---|
| *Regional Role* | 1A | Functional Classification | 50 | 0 | 0 | 0 | |
| | 1B | Reg. Truck Corridor Study Tiers | 50 | 0 | 0 | 14 | |
| | 1C | Integration with existing systems | 50 | 0 | 0 | 0 | |
| | 1D | Coordination with Other Agencies | 25 | 0 | 0 | 6 | |
| *Usage* | 2A | Daily person throughput | 85 | 0 | 0 | 11 | |
| | 2B | Forecast 2040 average daily traffic | 40 | 0 | 0 | 6 | |
| *Equity / Housing* | 3A | Socio-Economic | 30 | 0 | 0 | 10 | |
| | 3B | Housing Performance Score | 70 | 0 | 0 | 2 | |
| *Infra Age* | 4 | Infrastructure Age | 75 | 0 | 0 | 10 | |
| *Congestion / Air Quality* | 5A | Vehicle delay reduced | **150** | **2** | 0 | 36 | |
| | 5B | Kg of emissions reduced | 50 | 0 | 0 | 0 | |
| *Safety* | 6A | Crashes reduced | 50 | **2** | **1** | 26 | |
| | 6B | Safety Issues | **150** | **2** | **1** | **50** | |
| *Multimodal* | 7 | Transit, bicycle, or pedestrian project elements and connections | 50 | 0 | 0 | 10 | |
| *Risk* | 8 | Risk Assessment Form | 75 | **2** | 0 | 30 | |
| *Cost Effect* | 9 | Cost Effectiveness | 100 | **2** | **1** | 29 | |
| **TOTAL** | | | **1,100** | | | 39 | |

Comments: Given the low number of applications (3) very little can be gleaned.

Key differences from 2016: No key differences are evident, given the minimal number of applications.

| Sorted by Max Points # | Measure | Max Pts | Rank Change | Cross Line | St. Dev |
|---|---|---|---|---|---|
| 6B | Safety Issues | **150** | **2** | **1** | **50** |
| 5A | Vehicle delay reduced | **150** | **2** | 0 | 36 |
| 9A | Cost Effectiveness | 100 | **2** | **1** | 29 |
| 2A | Throughput | 85 | 0 | 0 | 11 |
| 4 | Infrastructure Age | 75 | 0 | 0 | 10 |
| 8 | Risk Assessment | 75 | **2** | 0 | 30 |
| 3B | Housing | 70 | 0 | 0 | 2 |
| 1A | Functional Class | 50 | 0 | 0 | 0 |
| 1B | Truck Study | 50 | 0 | 0 | 14 |
| 1C | Integration w/Systems | 50 | 0 | 0 | 0 |
| 6A | Crashes reduced | 50 | **2** | **1** | 26 |
| 7 | Multimodal | 50 | 0 | 0 | 10 |
| 5B | Emissions | 50 | 0 | 0 | 0 |
| 2B | Forecast ADT | 40 | 0 | 0 | 6 |
| 3A | Equity | 30 | 0 | 0 | 10 |
| 1D | Coordination/Agencies | 10 | 0 | 0 | 6 |

**Table 4. Summary of Bridges Measure Performance (8 applications submitted).**

| Criteria | # | Measures | Max Points | # of applications: Rank order changed | # of applications: Crossed funding line | St. Dev. | Outliers (None) |
|---|---|---|---|---|---|---|---|
| *Regional Role* | 1A | Distance to nearest parallel bridge | 100 | 2 | 0 | 33 | |
| | 1B | Connection to Total Jobs and Manufacturing/Distribution Jobs | 30 | 3 | **1** | 11 | |
| | 1C | Daily heavy commercial traffic | 65 | 0 | 0 | 5 | |
| *Usage* | 2A | Daily person throughput | 100 | 2 | 0 | 24 | |
| | 2B | Forecast 2040 average daily traffic | 30 | 3 | 0 | 7 | |
| *Equity / Housing* | 3A | Socio-Economic | 30 | 0 | 0 | 10 | |
| | 3B | Housing Performance Score | 70 | 2 | 0 | 22 | |
| *Infrastructure Condition* | 4A | Bridge sufficiency rating | **300** | **5** | **1** | **61** | |
| | 4B | Load-posting | 100 | 0 | 0 | 46 | |
| *Multimodal* | 5 | Transit, bicycle, or pedestrian project elements and connections | 100 | 3 | 0 | 32 | |
| *Risk Assessment* | 6 | Risk Assessment Form | 75 | 0 | 0 | 10 | |
| *Cost Effectiveness* | 7 | Cost Effectiveness | 100 | 2 | **1** | 36 | |
| **TOTAL** | | | **1,100** | | | **136** | |

Comments: With only eight applications submitted, and two pairs of tied scores, conclusions are difficult to draw.

Key differences from 2016: None.

| Sorted by Max Points # | Measure | Max Pts | Rank Change | Cross Line | St. Dev |
|---|---|---|---|---|---|
| 4A | Sufficiency rating | **300** | **5** | **1** | **61** |
| 1A | Distance to Parallel | 100 | 2 | 0 | 33 |
| 4B | Load-posting | 100 | 0 | 0 | 46 |
| 7 | Cost Effectiveness | 100 | 2 | **1** | 36 |
| 2A | Throughput | 100 | 3 | 0 | 24 |
| 5 | Multimodal | 100 | 3 | 0 | 32 |
| 6 | Risk Assessment | 75 | 0 | 0 | 10 |
| 3B | Housing | 70 | 2 | 0 | 22 |
| 1C | Heavy Commercial | 65 | 0 | 0 | 5 |
| 2B | Forecast ADT | 30 | 3 | 0 | 7 |
| 1B | Connection to Jobs | 30 | 3 | **1** | 11 |
| 3A | Equity | 30 | 0 | 0 | 10 |

**Table 5. Summary of Transit Expansion Measure Performance (9 applications submitted).**

| Criteria | # | Measures | Max Points | # of applications: Rank order changed | # of applications: Crossed funding line | St. Dev. | Outliers (see below) |
|---|---|---|---|---|---|---|---|
| *Regional Role* | 1A | Connection to Jobs and Educational Institutions | 50 | 0 | 0 | 16 | |
| | 1B | Average number of weekday transit trips connected to the project | 50 | 0 | 0 | 14 | |
| *Usage* | 2 | New Annual Riders | **350** | **6** | 0 | **113** | |
| *Equity / Housing* | 3A | Socio-Economic | 130 | 3 | **1** | 45 | |
| | 3B | Housing Performance Score | 70 | 0 | 0 | 6 | |
| *Emissions Reduction* | 4 | Total emissions reduced | 200 | 3 | **1** | 74 | |
| *Multimodal* | 5 | Bicycle and pedestrian elements and connections | 100 | 2 | **1** | 21 | |
| *Risk Assessment* | 6 | Risk Assessment Form | 50 | 0 | 0 | 2 | |
| *Cost Effectiveness* | 7 | Cost Effectiveness | 100 | 0 | 0 | 32 | A |
| **TOTAL** | | | **1,100** | | | **189** | |

Comments: Measure 2 proved to be a key differentiator, as six of nine applications changed rank with its removal.

Measures with outliers:

A. 7. Top application scored 100. Others scored from 3 to 8.

Key differences from 2016: In 2016, Measure 2 was minimally impactful (two rank-order changes; no funding line crosses) thanks to the presence of an outlier. The 2018 result showing six applications out of nine changing order is more indicative of the measure's weight.

**Sorted by Max Points**

| # | Measure | Max Pts | Rank Change | Cross Line | St. Dev |
|---|---|---|---|---|---|
| 2 | New Riders | **350** | **6** | 0 | **113** |
| 4 | Emissions | 200 | 3 | **1** | 74 |
| 3A | Equity | 130 | 3 | **1** | 45 |
| 5 | Multimodal | 100 | 2 | **1** | 21 |
| 7 | Cost Effect. | 100 | 0 | 0 | 32 |
| 3B | Housing | 70 | 0 | 0 | 6 |
| 1A | Jobs/Edu | 50 | 0 | 0 | 16 |
| 1B | Trips | 50 | 0 | 0 | 14 |
| 6 | Risk Assessment | 50 | 0 | 0 | 2 |

**Table 6. Summary of Transit Modernization Measure Performance (10 applications submitted).**

| Criteria | # | Measures | Max Points | # of applications: Rank order changed | # of applications: Crossed funding line | St. Dev. | Outliers (see below) |
|---|---|---|---|---|---|---|---|
| *Regional Role* | 1A | Connection to Jobs and Educational Institutions | 50 | 3 | 0 | 16 | A |
| | 1B | Average number of weekday transit trips connected to the project | 50 | 2 | 0 | 15 | |
| *Usage* | 2 | Total existing annual riders | **325** | **8** | 0 | **122** | |
| *Equity / Housing* | 3A | Socio-Economic | 105 | 2 | 0 | 40 | |
| | 3B | Housing Performance Score | 70 | 2 | 0 | 3 | |
| *Emissions Reduction* | 4 | Description of emissions reduced | 50 | 3 | 0 | 18 | |
| *Service and Customer Improvements* | 5 | Project improvements for users | 200 | 4 | 0 | 84 | |
| *Multimodal* | 6 | Bicycle and pedestrian elements and connections | 100 | 6 | 0 | 27 | |
| *Risk* | 7 | Risk Assessment Form | 50 | 3 | 0 | 14 | |
| *Cost Effect.* | 8 | Cost Effectiveness | 100 | 5 | 0 | 34 | |
| **TOTAL** | | | **1,100** | | | **249** | |

Comments: Consistent with expectations, Measure 2 is the most impactful measure both in terms of changing rank order and standard deviation. No measure pushed any projects across the funding line, because the top-four (funded) projects scored at least 327 more points than the bottom-six (unfunded) projects, which is larger than the maximum score in any one measure.

Measures with outliers:

A. 1A. Top application scored 50. Second-ranked application scored 26. Others scored from 1 to 6.

Key differences from 2016: in 2016, one outlier project reduced remaining scores and, therefore, the spread among the scores. In 2018, a clear gap (327 points) is present and serves as the funding line.

**Sorted by Max Points**

| # | Measure | Max Pts | Rank Change | Cross Line | St. Dev |
|---|---|---|---|---|---|
| 2 | Existing Riders | **325** | **8** | 0 | **122** |
| 5 | User Improvements | 200 | 4 | 0 | 84 |
| 3A | Equity | 105 | 2 | 0 | 40 |
| 6 | Multimodal | 100 | 6 | 0 | 27 |
| 8 | Cost Effectiveness | 100 | 5 | 0 | 34 |
| 3B | Housing | 70 | 2 | 0 | 3 |
| 1A | Jobs/Edu | 50 | 3 | 0 | 16 |
| 1B | Trips | 50 | 2 | 0 | 15 |
| 4 | Emissions | 50 | 3 | 0 | 18 |
| 7 | Risk Assessment | 50 | 3 | 0 | 14 |

**Table 7. Summary of Travel Demand Management Measure Performance (13 applications submitted).**

| Criteria | # | Measures | Max Points | # of applications: Rank order changed | # of applications: Crossed funding line | St. Dev. | Outliers (None) |
|---|---|---|---|---|---|---|---|
| *Regional Role* | 1 | Ability to capitalize on existing regional transportation facilities and resources | **200** | 8 | **1** | 40 | |
| *Usage* | 2 | Users | 100 | 6 | **1** | 22 | |
| *Equity / Housing* | 3A | Socio-Economic | 80 | 4 | 0 | 25 | |
| | 3B | Housing Performance Score | 70 | 2 | 0 | 7 | |
| *Congestion Reduction / Air Quality* | 4A | Congested roadways | 150 | 7 | 0 | 31 | |
| | 4B | VMT reduced | 150 | 9 | **1** | **52** | |
| *Innovation* | 5 | Project innovations and geographic expansion | **200** | **10** | **1** | 51 | |
| *Risk Assessment* | 6A | Technical capacity of organization | 25 | 2 | 0 | 4 | |
| | 6B | Continuation of project after initial federal funds are expended | 25 | 6 | 0 | 10 | |
| *Cost Effectiveness* | 7 | Cost Effectiveness | 100 | 0 | 0 | 26 | |
| **TOTAL** | | | **1,100** | | | **120** | |

Comments: Measure 5 was the most impactful measure, due in part to the 200, 100, and 75-point maximums for new programs, replication of programs, and expansion of programs, respectively.

Key differences from 2016: None.

**Sorted by max points**

| # | Measure | Max Pts | Rank Change | Cross Line | St. Dev |
|---|---|---|---|---|---|
| 5 | Innovation/Expansion | **200** | **10** | **1** | 51 |
| 1 | Facilities/Resources | **200** | 8 | **1** | 40 |
| 4A | Congestion | 150 | 7 | 0 | 31 |
| 4B | VMT reduced | 150 | 9 | **1** | **52** |
| 7 | Cost Effectiveness | 100 | 0 | 0 | 26 |
| 2 | Users | 100 | 6 | **1** | 22 |
| 3A | Equity | 80 | 4 | 0 | 25 |
| 3B | Housing | 70 | 2 | 0 | 7 |
| 6A | Technical Capacity | 25 | 2 | 0 | 4 |
| 6B | Project continuation | 25 | 6 | 0 | 10 |

**Table 8. Summary of Multiuse Trails and Bicycle Facilities Measure Performance (40 applications submitted).**

| Criteria | # | Measures | Max Points | # of applications: Rank order changed | # of applications: Crossed funding line | St. Dev. | Outliers (none) |
|---|---|---|---|---|---|---|---|
| *Regional Role* | 1 | Identify location of project relative to RBTN | **200** | **38** | 2 | 31 | |
| *Potential Usage* | 2A | Existing population and employment within 1 mile | 150 | 34 | 2 | 31 | |
| | 2B | Snow and Ice Control | 50 | 33 | 2 | 23 | |
| *Equity / Housing* | 3A | Socio-Economic | 50 | 28 | 2 | 9 | |
| | 3B | Housing Performance Score | 70 | 27 | 1 | 16 | |
| *Deficiencies and Safety* | 4A | Gaps closed, barriers removed, and / or improved connectivity between jurisdictions | 100 | 28 | 2 | 21 | |
| | 4B | Deficiencies corrected or safety problems addressed | 150 | 20 | 1 | 16 | |
| *Multimodal* | 5 | Transit or pedestrian elements and connections | 100 | 25 | 2 | 10 | |
| *Risk Assessment* | 6 | Risk Assessment Form | 130 | 33 | **4** | 23 | |
| *Cost Effectiveness* | 7 | Cost Effectiveness | 100 | 31 | 3 | 24 | |
| **TOTAL** | | | **1,100** | | | **91** | |

**Regional Bicycle Transportation Network*

Comments: For the third consecutive cycle, this category has had significant “bunching” of scores near the funding line. This is due at least in part to the number of applications. Measure 6, Risk Assessment, shifted the funding status of eight projects despite only having a standard deviation of 23 points. Each measure changed the rank order of at least 20 applications and no clear cause of the “bunching” problem, aside from volume of applications, is evident.

Key differences from 2016: Measure 4A had a standard deviation of only 9 in 2016 and all applications scored at least 62 out of 100. In 2018 the standard deviation has more than doubled with a scoring point range from five to 100.

**Sorted by Max Points**

| # | Measure | Max Pts | Rank Change | Cross Line | St. Dev |
|---|---|---|---|---|---|
| 1 | RBTN | **200** | **38** | 2 | 31 |
| 2A | Pop/Employment | 150 | 34 | 2 | 31 |
| 4B | Deficiencies | 150 | 20 | 1 | 16 |
| 6 | Risk Assessment | 130 | 33 | **4** | 23 |
| 4A | Gaps/Barriers | 100 | 28 | 2 | 21 |
| 5 | Multimodal | 100 | 25 | 2 | 10 |
| 7 | Cost Effectiveness | 100 | 31 | 3 | 24 |
| 3B | Housing | 70 | 27 | 1 | 16 |
| 2B | Snow/Ice | 50 | 33 | 2 | 23 |
| 3A | Equity | 50 | 28 | 2 | 9 |

**Table 9. Summary of Pedestrian Facilities Measure Performance (12 applications submitted).**

| Criteria | # | Measures | Max Points | # of applications: Rank order changed | # of applications: Crossed funding line | St. Dev. | Outliers (none) |
|---|---|---|---|---|---|---|---|
| *Regional Role* | 1 | Connection to Jobs and Educational Institutions | 150 | **8** | **1** | **50** | |
| *Potential Usage* | 2 | Existing population within ½ mile | 150 | 3 | 0 | 36 | |
| *Equity / Housing* | 3A | Socio-Economic | 50 | 3 | 0 | 15 | |
| | 3B | Housing Performance Score | 70 | 2 | 0 | 21 | |
| *Deficiencies and Safety* | 4A | Barriers overcome or gaps filled | 120 | 2 | 0 | 5 | |
| | 4B | Deficiencies corrected or safety problems addressed | **180** | **8** | **1** | 35 | |
| *Multimodal* | 5 | Transit or bicycle elements and connections | 150 | 6 | **1** | 32 | |
| *Risk Assessment* | 6 | Risk Assessment Form | 130 | 6 | 0 | 31 | |
| *Cost Effectiveness* | 7 | Cost Effectiveness | 100 | 6 | 0 | 46 | |
| **TOTAL** | | | **1,100** | | | **126** | |

Comments: The most noteworthy measures in this category, Measures 1 and 4B, changed the rank order of eight applications.

Note that measures 4A and 4B, the two qualitative "Deficiencies and Safety" measures, had very different impacts, as 4A had a standard deviation of only five, versus 35 for 4B. The key difference between these measures may be in the approaches of the scorers.

Key differences from 2016: Measure 4B was far more impactful in 2018 than in 2016.

**Sorted by Max Points**

| # | Measure | Max Pts | Rank Change | Cross Line | St. Dev |
|---|---|---|---|---|---|
| 4B | Deficiencies/Safety | **180** | **8** | **1** | 35 |
| 1 | Jobs/Edu | 150 | **8** | **1** | **50** |
| 2 | Population | 150 | 3 | 0 | 36 |
| 5 | Multimodal | 150 | 6 | **1** | 32 |
| 6 | Risk Assessment | 130 | 6 | 0 | 31 |
| 4A | Gaps/Barriers | 120 | 2 | 0 | 5 |
| 7 | Cost Effectiveness | 100 | 6 | 0 | 46 |
| 3B | Housing | 70 | 2 | 0 | 21 |
| 3A | Equity | 50 | 3 | 0 | 15 |

**Table 10. Summary of Safe Routes to School Measure Performance (8 applications submitted).**

| Criteria | # | Measures | Max Points | # of applications: Rank order changed | # of applications: Crossed funding line | St. Dev. | Outliers (None) |
|---|---|---|---|---|---|---|---|
| *SRST Elements* | 1 | Describe how the project addresses 5 E's* of SRST Program | **250** | **6** | **1** | 32 | |
| *Usage* | 2A | Average share of student population that bikes or walks | 170 | **6** | 0 | **52** | |
| | 2B | Student population within school's walkshed | 80 | N/A** | N/A** | N/A** | |
| *Equity / Housing* | 3A | Socio-Economic | 50 | 0 | 0 | 13 | |
| | 3B | Housing Performance Score | 70 | 2 | 0 | 17 | |
| *Deficiencies / Safety* | 4A | Barriers overcome or gaps filled | 100 | 2 | 0 | 14 | |
| | 4B | Deficiencies corrected or safety or security addressed | 150 | 4 | 0 | 24 | |
| *Public Engagement / Risk Assessment* | 5A | Public engagement process | 45 | 0 | 0 | 4 | |
| | 5B | Risk Assessment Form | 85 | 2 | 0 | 11 | |
| *Cost Effectiveness* | 6 | Cost Effectiveness | 100 | 3 | **1** | 30 | |
| | **TOTAL** | | **1,100** | | | **91** | |

**The 5 Es of Safe Routes to School include Evaluation, Engineering, Education, Encouragement, and Enforcement.*
***Measure 2B was eliminated from scoring when it was discovered that applicants had different interpretations of how to answer the question.*

Comments: Measure 5A did not change any rank placement. Each application scored at least 35 out of 45 points.

Key differences from 2016: None.

**Sorted by Max Points**

| # | Measure | Max Pts | Rank Change | Cross Line | St. Dev |
|---|---|---|---|---|---|
| 1 | 5 E's | **250** | **6** | **1** | 32 |
| 2A | Students that walk/bike | 170 | **6** | 0 | **52** |
| 4B | Deficiencies/Safety | 150 | 4 | 0 | 24 |
| 4A | Gaps/Barriers | 100 | 2 | 0 | 14 |
| 6 | Cost Effectiveness | 100 | 3 | **1** | 30 |
| 5B | Risk Assessment | 85 | 2 | 0 | 11 |
| 2B | Students in walkshed | 80 | N/A | N/A | N/A |
| 3B | Housing | 70 | 2 | 0 | 17 |
| 3A | Equity | 50 | 0 | 0 | 13 |
| 5A | Public engagement | 45 | 0 | 0 | 4 |