

# **Transportation 2030 Methodology for Conducting Technical Project Evaluation Element of the Prioritization Process**

**CATEGORY 1: HIGHWAY AND INTERCHANGE CAPACITY EXPANSION  
(Widenings, new roads/interchanges, reconstruction, and rehabilitation)**

**1. SAFETY: 20 POINTS**

**a. Accident Frequency:** Determine the number of accidents for three years: 2000 through 2002. Average these three years of data and divide this total by the calculated 2002 VMT in millions for that segment to calculate the number of accidents per 1,000,000 VMT. Facility/location with the highest number of accidents per 1,000,000 VMT will receive 10 points. Projects will be ranked and scored on a relative scale based on percentile rank.

**Source(s):** SHA Accident Records

**Points:** Maximum: 10

For new roads, a similar technique is applied using existing parallel facilities; this would show a "level of need" for the new road.

**b. Accident Severity:** Severe accidents are defined as vehicular collisions with injuries and/or fatalities. Calculate separate totals for the number of injuries and the number of fatalities reported for three years: 2000 through 2002. Multiply the number of fatalities by two and add it to the total number of injuries to determine the Accident Severity. Average accident severity for the three years and then divide this total by the calculated 2002 VMT in millions for that segment to determine accident severity per 1,000,000 VMT. Facility/location with the highest accident severity index will receive 10 points. Remaining projects will be ranked and scored on a relative scale based on percentile rank.

**Source(s):** SHA Accident Records

**Points:** Maximum: 10

For new roads, a similar technique is applied using existing parallel facilities; this would show a "level of need" for the new road.

## **FOR CRITERIA 2 to 5:**

Refinement of simulated data will be reported and will use the NCHRP 255 methodology; where new roads exist, a “short” screenline of parallel facilities will be used. Otherwise, simulated data will be refined on a link basis. The no build network refers to the scenario where 2001 to 2008 projects (Existing and Committed) are built, but Transportation 2030 projects are not, e.g., no new projects after 2008.

### **2. CONGESTION: 15 POINTS**

**Congestion Index:** Determine the maximum hourly volume/capacity (V/C) ratio of the 5 time periods for 2000 and 2030. Projects with the highest V/C will score the maximum number of points. Projects will be ranked and scored on a relative scale based on percentile rank.

**Discussion:** Use no build network for 2030. For new facilities, identify parallel roads for both 2000 and 2030 analysis and provide necessary information.

**Source(s):** BMC Travel Demand Model

**Points:** Maximum: 5 for 2000 (Existing conditions)  
Maximum: 10 for 2030 (Future conditions)

### **3. DEMAND: 15 POINTS**

**Peak Demand:** Determine peak hourly traffic volume on a facility divided by the number of available through lanes of roadway. The project/location with the greatest one-hour volume per through lane receives the maximum points. This measure is for existing and future conditions. Future will use refined simulated volumes, where possible. Projects will be ranked and scored on a relative scale based on percentile rank.

**Source(s):** BMC Travel Demand Model

**Points:** Maximum: 5 for 2000 (Existing conditions)  
Maximum: 10 for 2030 (Future conditions)

### **4. ACCESSIBILITY: 10 POINTS**

**Travel Time Savings:** One measure of mobility is travel time savings. This measure is projected time savings by implementation of the project. Travel time savings is calculated by comparing build and no-build alternatives for 2030. Differences in delay (or time loss) are calculated by adding the delay from the 5 time periods together. The project/location with the greatest travel time savings receives the maximum points. Projects will be ranked and scored on a relative scale based on percentile rank.

**Discussion:** Compare the congested travel times from the 2030 build and no build networks. The time should generally be less in the build network. The difference in time between the 2 networks is a reduction in delay. New roads in the build test will be

compared to parallel facilities. Measure should be in "time savings per mile."

**Source(s):** BMC Travel Demand Model (2030)

**Points:** Maximum: 10

## **5. COST EFFECTIVENESS: 20 POINTS**

**a. Capital Cost Effectiveness:** Determine the capital cost for each project using the BMC project costing methodology. Award the maximum points to the project with the lowest capital cost per Person Miles of Travel (PMT). Projects will be ranked and scored on a relative scale based on percentile rank.

**Discussion:** PMT is derived by determining the refined VMT on a project and calculating a regional occupancy and applying that factor to the VMT. The regional occupancy factor from the BMC Year 2000 Travel Demand Model is 1.34<sup>1</sup>. Determine the number of vehicle trips (less truck, commercial vehicle, and X-X trips) and then multiply this total by the link mileage and the occupancy factor. Then calculate PMT by adding this total to the calculated truck, commercial vehicle, and X-X VMT.

**Source(s):** BMC Travel Demand Model (2030)  
BMC project costing methodology (based on MDOT Revised Costing Methodology)

**Points:** Maximum: 10

**b. Operating and Maintenance Cost Effectiveness:** Determine the operating and maintenance cost for every project using the BMC project costing methodology. Award the maximum points to the project with the lowest operating and maintenance cost per Person Miles of Travel (PMT). Projects will be ranked and scored on a relative scale based on percentile rank.

**Source(s):** BMC Travel Demand Model (2030)  
BMC project costing methodology (based on MDOT Revised Costing Methodology)

**Points:** Maximum: 10

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<sup>1</sup> The regional occupancy factor is determined from the BMC Travel Demand Model by determining the number of Baltimore Region person and vehicle trips. The occupancy factor is calculated by dividing the number of person trips by the number of vehicle trips.

## **6. CONNECTIVITY: 12 POINTS**

**a. Roadway** – Assess project status as part of the National Highway System (NHS). If project is part of the NHS, award the maximum number of points. If the project provides direct access to the NHS or is a Freight/Transit Intermodal connector, award half the maximum number of points. If project is neither part of the NHS, nor is a Freight/Intermodal connector, award 0 points.

**Source(s):** NHS Map  
Freight/Transit Intermodal Connector Map  
Transportation 2030 Candidate Projects Map

**Points:** Maximum: 4

**b. Freight** – Award the maximum number of points if the truck percentage using the roadway segment is greater than 10% or the project provides direct access to BWI Airport or the Port of Baltimore. Award half the maximum number of points if the project has a truck percentage greater than 5%, but less than 10%. Award no points if the project has a truck percentage of less than 5%.

**Source(s):** BMC Travel Demand Model (2030)  
Transportation 2030 Candidate Projects Map

**Points:** Maximum: 4

**c. Transit** – Award the maximum number of points if the project provides significant enhancement to bus or rail service in the project area. Award half the maximum number of points if the project provides some enhancement to bus or rail service in the project area. Award no points if the project provides little or no enhancement to bus or rail service in the project area.

**Source(s):** Transportation 2030 Candidate Projects Map  
MTA Service Map  
Local Transit Service Maps

**Points:** Maximum: 4

## **7. ENVIRONMENT: 8 POINTS**

**a. Air Quality Benefit** – Assess the impact of TDM component (HOV facility, Park N' Ride, ITS, roundabout, ramp metering, reversible lanes, bicycle/pedestrian, etc.) of project on air quality. If project contains significant TDM benefits on Air Quality, award the maximum number of points. If project contains some TDM Air Quality benefits, assign score on an integer scale from 1 to 4 so that projects can receive 1, 2, 3, or 4 points. If project contains no TDM components, award 0 points.

**Source(s):** BMC Staff

**Points:** Maximum: 5

**b. Natural Resources** – Assess project relationship to ecologically significant lands using the GreenPrint program as a guide on an integer scale from 0 to 3 so that projects can receive 0, 1, 2, or 3 points.

**Source(s):** GreenPrint Program  
BMC Staff

**Points:** Maximum: 3

<b>HIGHWAY AND INTERCHANGE CAPACITY EXPANSION CATEGORY</b> <b>TOTAL MAXIMUM POINTS = 100</b>
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**CATEGORY 2: TRANSIT - RAIL AND BUS RAPID TRANSIT PROJECTS  
(Public Transportation Projects)**

**1. SAFETY: 5 POINTS**

**Safety** – Assess the impact of the project on roadway, transit, pedestrian, and bicycle safety. Examples of safety provisions include dualization, grade separation, dedicated right-of-way, bicycle lockers, sidewalks, etc. Award points on a 0 to 5 integer scale so that projects can receive 0, 1, 2, 3, 4, or 5 points.

**Source(s):** BMC Staff

**Points:** Maximum: 5

**2. CONGESTION: 15 POINTS**

**Congestion:** Assess the impact of the candidate project in reducing 2030 AM peak period congestion. Calculate the increase in ridership due to the project and divide by the project length in miles to determine ridership per mile. Refer to 2030 level of service congestion maps and Skycomp data to estimate the project's effects on AM peak period congestion. The Project with the highest number of riders per mile, combined with proximity to congested corridors during the 2030 AM peak, will receive 15 points. Candidate rail projects will be ranked and scored on a relative scale based on percentile rank.

**Source(s):** BMC Travel Demand Model (2030 Build and No Build) and BMC staff analysis.

**Points:** Maximum: 15

**3. DEMAND: 20 POINTS**

**Demand:** Forecast average number of daily riders per mile of candidate rail facility in the year 2030. Data will be generated from BMC's travel demand model based on the network of existing and committed transportation projects. The project with the highest number of riders per mile will receive 20 points. Candidate rail projects will be ranked and scored on a relative scale based on percentile rank.

**Source(s):** BMC Travel Demand Model (2030)

**Points:** Maximum: 20

**4. ACCESSIBILITY: 20 POINTS**

**a. Job Accessibility:** Estimate the increase in number of jobs accessible within a 45 minute commuter shed. The Project with the largest increase receives the maximum score. Projects will be ranked and scored on a relative scale based on percentile rank.

**Source(s):** BMC staff analysis

**Points:** Maximum: 10

**b. Modal Shift:** Estimate the amount of trips shifted from highway to transit as a result of the project. Refer to 2030 level of service congestion maps and Skycomp data. The Project with the largest increase receives the maximum score. Projects will be ranked and scored on a relative scale based on percentile rank.

**Source(s):** BMC staff analysis

**Points:** Maximum: 10

## **5. COST EFFECTIVENESS: 20 POINTS**

**a. Capital Cost Effectiveness:** Calculate capital cost effectiveness by dividing estimated capital construction costs (provided by the submitting agency) by the number of daily riders forecast for 2030. Project with the highest rider/cost ratio will receive 10 points. Candidate rail projects will be ranked and scored on a relative scale based on percentile rank.

**Source(s):** BMC Travel Demand Model

**Points:** Maximum: 10

**b. Operating And Maintenance Cost Effectiveness:** Calculate operating and maintenance cost effectiveness by dividing estimated costs (provided by the submitting agency) by the number of daily riders forecast for 2030. Project with the highest rider/cost ratio will receive 10 points. Candidate rail projects will be ranked and scored on a relative scale based on percentile rank.

**Source(s):** BMC Travel Demand Model

**Points:** Maximum: 10

## **6. CONNECTIVITY: 15 POINTS**

**a. Activity Centers** – New transit line projects receive three points if Baltimore CBD is connected and up to two points for every other major activity center directly connected, e.g., Columbia, as defined by the Prioritization Transit Activity Center Methodology. If project is a line extension, project receives points for all activity centers on the entire line. Project can receive a maximum of 5 points.

**Source(s):** Activity Centers List

**Points:** Maximum: 5

**b. Intraregional Transit** – Project receives 1 point for every intraregional rail or bus rapid transit line directly served and ½ point for every MTA or local bus line directly served. Project can receive a maximum of 5 points.

**Source(s):** Transportation 2030 Candidate Projects Map  
MTA Service Map  
Local Transit Service Maps

**Points:** Maximum: 5

**c. Interregional Transit** – Project receives 2 points each for direct service to BWI airport, AMTRAK, or the cruise ship terminal. Project receives 1 point for every MARC station or interregional bus terminal, e.g., Baltimore Travel Plaza, directly connected.

**Source(s):** Transportation 2030 Candidate Projects Map  
MARC System Map

**Points:** Maximum: 5

## **7. ENVIRONMENT: 5 POINTS**

**a. Air Quality Benefit** – Assess the impact of transit ridership on air quality by analyzing ridership forecasts and expected VMT reduction. If project contains significant Air Quality benefits, award the maximum number of points. If project contains some Air Quality benefits, assign score of 1 or 2 points. If project contains very little or no air quality benefit, award 0 points.

**Source(s):** BMC Travel Demand Model (2030)  
BMC Staff

**Points:** Maximum: 3

**b. Natural Resources** – Assess project relationship to ecologically significant lands using the GreenPrint program as a guide on an integer scale from 0 to 2 so that projects can receive 0, 1, or 2 points.

**Source(s):** GreenPrint Program  
BMC Staff

**Points:** Maximum: 2

<b>TRANSIT CAPACITY EXPANSION CATEGORY</b> <b>TOTAL MAXIMUM POINTS= 100</b>
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### CATEGORY 3: BICYCLE AND PEDESTRIAN PROJECTS

#### **1. DEMAND: 40 POINTS**

Assessment of proximity to large population and employment concentrations as well as locations that generate large numbers of bicycle and pedestrian trips – colleges and universities, public schools, and parks - based on the potential trip market estimated in the 1999 BMC Bicycle Latent Demand Assessment Study. LDS score measures the relative demand. Using the 1999 BMC Bicycle Latent Demand (LDS) Assessment Study, compile the scores of the segments closest to the proposed project. Segments weighted based on length. Projects with the highest LDS receive the most points. For projects that are not located along the study network, the scores from the trip market of nearby segments are to be used.

**Source(s):** 1999 BMC Bicycle Latent Demand (LDS) Assessment Study

**Points:** Maximum: 40

#### **2. TRANSPORTATION NEED: 25 POINTS**

Assessment of degree to which projects meet various bicyclist and pedestrian needs. Projects can receive a maximum of 25 points, based on these criteria developed through the BRTB's Bicycle and Pedestrian Advisory Group:

**a. Eliminates a barrier** such as railroads, freeways, and rivers for bicyclists traveling to major destinations.

**Source(s):** Staff Analysis

**Points:** Maximum: 10 Points.

**b. Completes a missing link** (10 Points if both termini connect to existing facilities, 6 Points if there is only one connection, or it extends a facility, 4 Points if it is an essential core to a new system, 2 points if it is an isolated project with no linkage.)

**Source(s):** Staff Analysis

**Points:** Maximum: 10

**c. Provides access to transit facilities**

**Source(s):** Staff Analysis

**Points:** Maximum: 5

### **3. BIKE/PED STRESS LEVELS: 25 POINTS**

Assessment of perceived safety based on 2003 bicycle and pedestrian suitability research and analysis efforts. Bicycle and Pedestrian Level of Service [BLOS and PLOS] scores were calculated on roadway and sidewalk characteristics that influence comfort of bicyclists and pedestrians, including curb lane width, traffic volume, vehicle speed, pavement condition, and percentage of truck traffic, sidewalk width and buffer width. Segments weighted based on length. Projects with the poorest Bicycle/Pedestrian Level of Service – i.e. the conditions least comfortable for bicyclists – receive the most points. For projects that are not located along the study network, scores from an existing parallel route will be used.

**Source(s):** 2003 Bicycle Level of Service Update / Pedestrian Level of Service Analysis

**Points:** Maximum: 25

### **4. DIRECTNESS 10 POINTS**

Difference between length of proposed facility and the shortest possible route of travel. Projects will be rank ordered according to which ones provide the most direct route and Points will be assigned based on the project's percentile ranking.

**Source(s):** Staff Analysis

**Points:** Maximum: 10

<b>BICYCLE AND PEDESTRIAN CAPACITY EXPANSION CATEGORY</b> <b>TOTAL MAXIMUM POINTS= 100</b>
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