

Lower Rio Grande Valley-Tamaulipas Border Master Plan



Appendix E Criteria Definitions and Scoring Metric

Plan Maestro Fronterizo Lower Rio Grande Valley – Tamaulipas Border Master Plan

Criteria Scoring Metrics

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Capacity / Congestion Category

Road and Interchange Projects

1. Increase in number of lanes

An increase in the number of lanes is a measure of added road capacity. In the case of a new road or interchange project, the final number of lanes equals the increase in the number of lanes. The higher the number of added lanes, the higher the added road capacity. The road and interchange projects will thus be scored as follows:

Increase in Number of Lanes	Score
No change	0.00
Full shoulder (minimum 8 feet)	0.25
Additional left turn lane	0.50
2 lanes	0.75
More than 2 lanes (or create overpass)	1.00

2. Improvement in level of service

An improvement in the LOS measures a change in congestion experienced. Typically, LOS of E or F is considered congested, while a LOS of A – D is considered acceptable. The higher the change in LOS achieved (e.g., from LOS F to LOS A or B), the higher the score assigned. The road and interchange projects will thus be scored as follows:

		To LOS					
		F	E	D	C	B	A
Change from LOS	F	0	0.3	0.7	1	1	1
	E	-	0	0.3	0.7	1	1
	D	-	-	0	0.3	0.7	1
	C	-	-	-	0	0.3	0.5
	B	-	-	-	-	0	0.3
	A	-	-	-	-	-	0

3. Number of Ports-of-Entry (POE) served

This criterion measures how many POEs are served by a proposed project by directly connecting to the POE or by connecting to a POE road. The higher the number of POEs served (directly or indirectly), the higher the score assigned. The road and interchange projects will thus be scored as follows:

Number of POEs Served	Score
1	0.25
2	0.50
3	0.75
More than 3	1.00

4. Connectivity

Connectivity describes the extent to which urban forms permit (or restrict) movement of people or vehicles in different directions. Connectivity is generally considered a positive attribute of an urban design, as it permits ease of movement and avoids severing neighborhoods. Thus, better connectivity will provide smoother flow of traffic and help alleviate problems associated with traffic congestion. The road and interchange projects will thus be scored as follows:

Connectivity	Score
No Connectivity	0.00
Gap Closure	0.25
New Connection/ Location	0.5
Relief Route/Loop	1.0

Rail Projects

1. Increase in Number of Tracks

An increase in the number of rail tracks is a measure of added rail capacity. In the case of new rail tracks, the final number of tracks equals the increase in the number of tracks. The higher the number of added tracks, the higher the added rail capacity. A distinction will be made to reflect whether capacity is added to rail track or rail yards.

Rail Track Projects will be scored as follows:

Increase in Number of Tracks	Score
No change	0.00
Relocation	0.33
Add 1 track	0.67
Add 1 track + Relocation	1.00

Rail Yard Projects will be scored as follows:

Increase in Number of Tracks	Score
0	0.0
Between 0 and 5	0.5
More than 5	1.0

2. Average Delay Time

Travel delay is experienced when the actual speed falls below the posted speed for an existing rail facility. The greater the travel delay, the greater the need to address the problem and therefore it should take precedence over other projects that are less affected by the particular problem. Rail projects will thus be scored as follows:

Existing Delay Time	Value
No delay	0.00
0-6 hours	0.25
6-12 hours	0.50
12-18 hours	0.75
More than 18 hours	1.00

3. Alleviates Congestion Locally (within same county (US) or municipality (Mx))

The alleviate congestion locally criterion is a qualitative criterion that indicates how a given rail project will affect rail and vehicle traffic congestion within the same county (US) or municipality (Mx). Alleviate local congestion is determined by the proposed rail project's impact on removing rail traffic from developed areas and by eliminating rail crossings. The more rail traffic that is removed from developed areas and the higher the number of rail crossings eliminated, the higher the assigned score. Rail projects will thus be scored as follows:

		Eliminates Rail Crossings		
		No	Some	All
Relocation of Rail Traffic	No	0.00	0.25	0.50
	Some	0.25	0.50	0.75
	All	0.50	0.75	1.00

The project sponsor will need to describe in detail to the study team the impact of the project on removing rail traffic from developed areas and in eliminating rail crossings in the county or municipality.

Port-of-Entry (POE) Projects

1. Increase in Number of Fully Operational Lanes/Rail Tracks

An increase in the number of fully operational lanes/rail tracks is a measure of added POE capacity. In the case of new POE projects, the final number of fully operational lanes equals the increase in the number of fully operational lanes/rail tracks. The higher the number of added fully operational lanes, the higher the added POE capacity. POE projects will thus be scored as follows:

Increase in Number of Fully Operational Lanes	Score
No change	0.00
Double-stacked booth	0.20
+1	0.33
+2	0.67
+3 or more	1.00

* Double stacked booths and new lanes can be additive.

2. Improve Throughput through the Use of Technology

Secure lanes (i.e., Fast or SENTRI lanes) facilitate the throughput of different modes thereby enhancing the capacity of the POE. POE projects will thus be scored as follows:

Use of Technology	Score
No improvement	0.0
Other technology (LED, etc.)	0.5
Advanced lane technology (Ready, FAST, SENTRI)	1.0

3. Alleviates Congestion

The alleviate congestion criterion indicates how a planned POE project will affect congestion. A 2011 baseline would be established by calculating the average regional waiting time. The expected wait times as a result of the proposed/planned project for existing crossings and new crossings will also be calculated. The criterion will be measured as the ratio between the expected wait times relative to the regional waiting times (i.e., baseline). The POE projects will thus be scored as follows:

Expected Wait Time Relative to the Baseline Data	Score
No Impact	0.0
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

4. Increase in Number of Modes Served

The increase in modes served criterion captures the ability of the planned POE project in facilitating the handling of additional modes at the POE. The more additional modes served at the POE, the higher the score assigned. The POE projects will thus be scored as follows:

Increase in Modes Served	Score
No change	0.00
1 additional mode	0.33
2 additional modes	0.67
3 additional modes	1.00

Marine Ports

1. Vessel Size

Cargo ships are categorized partly by capacity, partly by weight, and partly by dimensions (often with reference to the various canals and canal locks they fit through). Planned projects that can accommodate larger vessels provide more utility and therefore are assigned higher scores. Planned port projects will be scored as follows:

Vessel Size Accommodation	Score
No increase	0.00
Barges	0.25
General vessels	0.50
PANAMAX	0.75
Post PANAMAX	1.00

2. Channel Capacity

The importance of channel capacity as a criterion is largely a function of the type of vessel and goods handled by a port. Vessels can be either filled to their weight capacity (in which case channel depth is important) or to their volume capacity (in which case channel width and turning basin size may be more important). This criterion measures the added depth secured by a proposed port project.

Added Depth	Score
Less than 4 feet	0.4
4-6 feet	0.6
6-8 feet	0.8
8 or more feet	1.0

3. Number of docks

A dock is a structure or group of structures involved in the handling of boats or ships, usually on or close to a shore. The higher the number of available docks, the higher the capacity of a marine port. A higher number of additional docks would imply added capacity and therefore higher scores will be assigned to such projects. Therefore, planned marine port projects will be scored as follows for this criterion:

Additional Number of Docks	Score
0	0.00
1	0.50
2	0.75
3	0.75
4+	1.00

Demand Category

Road and Interchange Projects

1. Increase in Average Annual Daily Traffic (AADT)

Annual Average Daily Traffic (AADT) is a measure of travel demand or usage of a facility and is calculated by dividing the total annual vehicle traffic by 365 days. An increase in the AADT is a measure of the demand satisfied or additional usage of the facility. In the case of new road or interchange projects, the final AADT equals the increase in AADT. The increase in AADT will be calculated as the difference between the expected AADT in 2030 and the current AADT. The higher the increase in AADT, the higher the demand satisfied or additional usage of the facility. The road and interchange projects will thus be scored as follows:

Change in AADT	Score
No change	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

(*) Please refer to Appendix 1 for the definition of quartile.

2. Percentage of Trucks

The percentage of trucks is the share of the AADT that are trucks and is an indicator of the importance of the road or interchange to goods movement. The higher the percentage of trucks, the higher the importance of the road or interchange to goods movement. The road and interchange projects will thus be scored as follows:

Percentage of Trucks	Score
No change	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

(*) Please refer to Appendix 1 for the definition of quartile.

3. Multiple Mode Demand (expressed public demand for alternative mode)

The road and interchange projects will receive a score considering the expressed public demand for an alternative mode facilitated by the proposed project. The road and interchange projects will be scored as follows:

Additional Modes	Score
No	0.0
Yes	1.0

The project sponsor will need to describe in detail to the study team the expressed public demand for additional modes and how it materialized or was expressed.

4. Estimated Demand at 20 Years

The estimated demand is calculated based on the initial demand and a certain growth rate that is typical for a certain geographic region. The growth rate is often determined based on historical data. Planned projects that have a higher forecasted demand should be prioritized as they would provide higher utility as they will cater to a bigger population than others. Therefore, such projects need to be assigned relatively higher scores. The road and interchange projects will thus be scored as follows:

Estimated Demand	Score
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

(*) Please refer to Appendix 1 for the definition of quartile.

Rail Projects

1. Increase in Average Annual Daily Rail Cars (AADRC)

Average Annual Daily Rail Cars (AADRC) is a measure of rail demand or usage of a rail facility and is calculated by dividing the total annual number of rail cars by 365 days. An increase in the AADRC is a measure of the demand satisfied or additional usage of the rail facility. In the case of new rail projects, the

final AADRC equals the increase in AADRC. The increase in AADRC will be calculated as the difference between the expected AADRC in 2030 and the current AADRC. The higher the increase in AADRC, the higher the demand satisfied or additional usage of the facility. The rail projects will thus be scored as follows:

Increase in AADRC	Score
No change	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

(*) Please refer to Appendix 1 for the definition of quartile.

2. Cross-border tonnage by rail

This criterion measures the current total tonnage of goods moved by rail across the border. The higher the total tonnage moved by rail across the border, the higher the score assigned. The rail projects will thus be scored as follows:

Current Tonnage by Rail	Score
No data	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

(*) Please refer to Appendix 1 for the definition of quartile.

3. Multiple Mode Demand (expressed public demand alternative mode)

The rail projects will receive a score considering the expressed public demand for an alternative mode facilitated by the proposed project. The rail projects will thus be scored as follows:

Additional Modes	Score
No	0.0
Yes	1.0

The project sponsor will need to describe in detail to the study team the level of expressed public demand for additional modes and how it materialized or was expressed.

4. Additional Hours of Interchange

Hours of interchange are a measure of the length of time it takes to interchange rail cars between multi-national railroads at a POE. Planned rail projects that provide additional hours of interchange at an existing or new crossing score points for the number of additional hours they provide.

Additional Hours	Value
0 hours	0.00
0-4 hours	0.50
>4-12 hours	1.00

Port-of-Entry Projects

1. Increase in Average Annual Daily Crossings (AADC)

Average Annual Daily Crossings (i.e., vehicles, pedestrians, and commercial vehicles) is a measure of travel demand or usage of the POE and is calculated by dividing the total annual crossings by 365 days. An increase in the average annual daily crossings (AADC) is a measure of the demand satisfied or additional usage of the POE. The relative increase in the AADC for new crossings will be calculated as the ratio between the expected AADC in 2030 and the 2011 total number of crossings. The relative increase in the AADC for existing crossings will be calculated as the ratio between the additional crossings in 2030 and the 2011 total number of crossings. The planned POE projects will be scored as follows:

Relative Increase	Score
No data	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

(*) Please refer to Appendix 1 for the definition of quartile.

2. Multiple Mode Demand

The POE projects will receive a score considering the expressed public demand or support for a new mode facilitated by the proposed project. The POE projects will be scored as follows:

Additional Modes	Score
No	0.0
+1	0.25
+2	0.50
+3	0.75
4+	1.00

The project sponsor will need to describe in detail to the study team the level of expressed public demand for additional modes and how it materialized or was expressed.

Marine Ports

1. Increase in Total Annual Tonnage

Tonnage is a measure of the size or cargo carrying capacity of a ship. It is used in reference to the weight of a ship's cargo; specifically referring to a calculation of the volume or cargo volume of a ship. The higher the total tonnage moved by marine vessels, the higher the score assigned. The planned marine projects will thus be scored as follows:

% Increase in Tonnage	Score
0	0.00
0-5	0.33
>5-10	0.67
Greater than 10	1.00

2. Multiple Mode Demand

The planned marine projects will receive a score considering the expressed public demand or support for a new mode facilitated by the proposed project. The marine projects will be scored as follows:

Additional Modes	Score
No	0.0
Yes	1.0

The project sponsor will need to describe in detail to the study team the level of expressed public demand for additional modes and how it materialized or was expressed.

3. Increase in Cross-Border Tonnage

This criterion measures the increase in total tonnage of goods moved by marine vessels destined for cross-border movement. The higher the increase in total tonnage moved by marine vessels destined for cross border movement, the higher the score assigned. The marine projects will thus be scored as follows:

% Increase in Tonnage	Score
0	0.00
>0-<=2	0.33
>2-<=5	0.67
Greater than 5	1.00

Cost Effectiveness / Project Readiness Category

All Projects

1. Cost Effectiveness (\$/Capacity Criterion)

The cost effectiveness criterion is defined as the public cost (i.e., project cost – private participation, \$) of the project per lane-mile (for roads and interchanges), per track-mile (for rail projects), per number of booths (for POE projects), and per vessel size (for marine ports). The higher the cost effectiveness (i.e., lower the value), the higher the score assigned. Projects will thus be scored as follows:

Cost Effectiveness	Score
No change	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

(* Please refer to Appendix 1 for the definition of quartile.

2. Cost Effectiveness (\$/Demand Criterion)

The cost effectiveness criterion is defined as the public cost (i.e., project cost – private participation, \$) of the project divided by change in AADT (for roads and interchanges), by the change in AADRC (for rail projects), by the change in number of fully operationally booths (for POE projects), and by the change in

tonnage (for marine ports). The higher the cost effectiveness (i.e., lower the value), the higher the score assigned. Projects will thus be scored as follows:

Cost Effectiveness	Score
No change	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

(*) Please refer to Appendix 1 for the definition of quartile.

3. Land Availability

The land availability criterion is a measure of the available land or the necessary funds for the land. The project sponsor will need to describe in detail to the study team and justify that the required land or funding for the land for the project is available. The projects will be scored as follows:

Land Availability	Score
No Land Availability	0.00
Low Land Availability (< 50%)	0.33
Medium Land Availability (50% to 80%)	0.67
High Land Availability / No Land Needed (>80%)	1.00

4. Partially Funded Project

Available project funding can be considered a measure for project readiness. A planned project that has **allocated/secured** a relatively higher proportion of the **total** project budget is more likely to be completed and should therefore be assigned a higher score. The projects will be scored as follows:

Funding Secured (% of Project Budget)	Score
No Funding	0.00
0 to <=25%	0.25
>25 to <=50%	0.50
>50 to <=75%	0.75
>75 to <=100%	1.00

5. Phase of Project Development

There are a number of phases in project development: conceptual, preliminary feasibility (includes cost of project, acreage, etc.), planning/programming, all environmental permits in hand (local/state/federal), greater than 80% ROW in hand, local/state/federal permits in hand, or project is ready to go. This is thus another measure of project readiness. A higher score will be assigned to projects that have reached certain levels of maturity as opposed to those that are in the conceptual phase. The projects will be scored as follows:

Phase of Project Development	Score
Conceptual	0.00
Preliminary feasibility (includes cost of project, acreage, etc.)	0.25
Planning/Programming	0.50
All environmental permits in hand (Local/State/Federal)	0.75
>80% ROW in hand, Local/State/Federal Permits in hand	1.00

Safety Category

Road and Interchange and Rail Projects

1. Accident Rate per mile

The annual accident rate per mile criterion is a measure of the “level of safety” experienced on a given facility. The higher the accident rate per mile on an existing facility, the higher the need for a project to improve the “level of safety” on the facility and the higher the score assigned. In the case of a new project the accident rate per mile on a parallel and similar road, interchange or rail facility, respectively will be used. The road and interchange and rail projects will be scored as follows:

Accident Rate per mile	Score
No Data	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

(*) Please refer to Appendix 1 for the definition of quartile.

2. Diversion of Non-Radioactive Hazardous Materials

This criterion is a qualitative measure of whether a proposed / planned road, interchange, or rail project aids in diverting non-radioactive hazardous materials from populated areas or resources vital to these areas. The project sponsor will need to describe in detail to the study team how the proposed / planned project diverts non-radioactive hazardous materials from populated areas or resources vital to these areas. The road, interchange, and rail projects will be scored as follows:

Diversion of Hazmat	Score
No	0.00
Yes	1.00

Port-of-Entry (POE) and Marine Projects

1. Diversion of Commercial Traffic

In the case of new POE projects the criterion will measure if commercial traffic is diverted out of urban areas, in the case of existing POEs the criterion will analyze if measures will be taken to have a clear and physical separation by traffic type (bicycle, trucks, pedestrians, and POVs), and in the case of marine projects whether commercial traffic is diverted to the marine mode.

New POE projects will be scored as follows:

Diversion of Traffic from Urban Areas	Score
No	0.00
Yes	1.00

Existing POE projects will be scored as follows:

Separation by Traffic Type	Score
No separation	0.00
Separation of 1 mode	0.25
Separation of 2 modes	0.50
Separation of 3 modes	0.75
Separation of more than 3 modes	1.00

Marine projects:

Diversion of Traffic	Score
No	0.00
Yes	1.00

2. Safe Handling of Hazardous Materials

This criterion is a qualitative measure of whether a planned POE or marine project is prepared to handle an emergency / contingency involving hazardous materials, such as a spill. The project sponsor will need to describe in detail to the study team how the planned POE or marine project will handle possible eventualities involving hazardous materials. The POE or marine projects will be scored as follows:

Handling of Hazmat	Score
Not Prepared	0.00
Prepared	1.00

Regional Impacts Category

All Projects

1. Wider Geographic Impacts

This criterion attempts to measure the wider geographic impacts of proposed/planned projects, i.e., local, regional, statewide, or bi-national. The wider the geographic impact, the higher the score assigned.

Wider Geographic Impacts	Score
No impact	0.00
Local impact (within 1 county)	0.25
Regional impact (more than 1 county)	0.50
Statewide impact (more than 2 counties)	0.75
Bi-national impact (Mexico and U.S.A.)	1.00

2. General Development

General development impacts of planned projects may refer to a project's **annual** impact on the general quality of life and economic climate of a region. It can involve multiple aspects including the development of human capital, critical infrastructure, regional competitiveness and the enhancement of trade, and safety. The project sponsor will need to describe in detail to the study team how the proposed project impacts the socio-economic characteristics of the area. The projects will thus be scored as follows:

General Development	Score
No benefit (< \$250,000 / year)	0.00
Minor benefit (\$250,000 - \$500,000/ year)	0.33
Moderate benefit (>\$500,000 - \$1 million/ year)	0.67
Major benefit (>\$1 million/ year)	1.00

Bi-national Coordination

Port-of-Entry (POE) Projects

1. Bi-national Coordination Criteria

This criterion assesses whether the binational components of a project have been taken into account. We can assess the extent of binational coordination by determining whether a given project: 1) has been formally discussed by both governments at the federal level and marked by federal milestones including exchange of official documents; 2) is being coordinated via the Binational Bridges and Border Crossings Group (BBBXG), and other fora as appropriate; 3) has been submitted to the U.S. Department of State for a U.S. Government Presidential Permit (or submitted as an application for an amendment of an existing Presidential Permit), and accepted as a complete application; and/or 4) is included on the twelve month action plan of the bilateral Executive Steering Committee on 21st Century Border Management.

POE projects will thus be scored as follows:

Forums for Bi-national Coordination	Score
None	0.00
One	0.25
Two	0.50
Three	0.75
Four	1.00

Appendix 1 – Quartiles

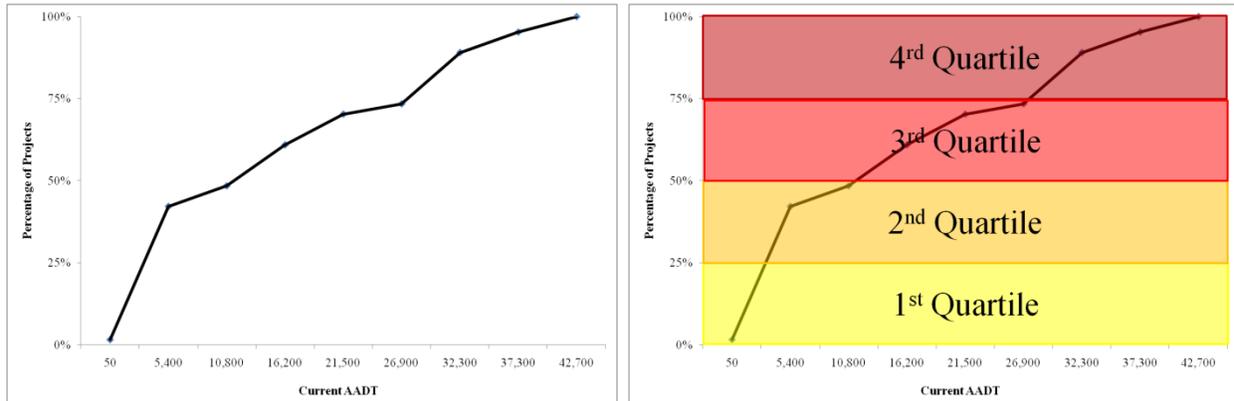
A quartile is a statistical term corresponding to one of three points, that divide a ranked data set into equal groups, each representing a fourth of the data points.

The three points are:

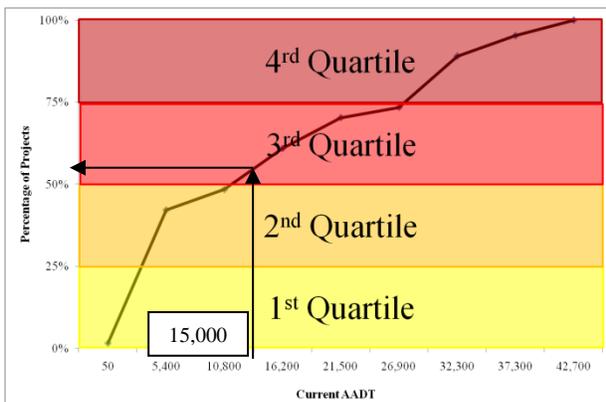
- The 1st Quartile (Q1) or lower quartile is the value in the ranked data set for which 25% of the values are lower and 75% of the values are higher. The Q1 also corresponds to the 25th Percentile.
- The 2nd Quartile (Q2) or median, corresponds to the value in the ranked data set that divides the ranked data in half. The Q2 also corresponds to the 50th Percentile.
- The 3rd Quartile (Q3) or upper quartile is the value in the ranked data set for which 75% of the values are lower and 25% of the values are higher. The Q3 corresponds to the 75th Percentile.

Example – Average Annual Daily Traffic (AADT)

The following figure illustrates the AADT values for 65 projects.



When Q1, Q2, and Q3 are estimated, the data set is divided into 4 sets, corresponding to the data between the 0th and 25th Percentiles, 25th and 50th Percentiles, 50th and 75th Percentiles, and 75th and 100th Percentiles. For the criterion that use quartiles, the projects will be scored depending on which of the four data sets include the project's criteria value. For example, if a project has an AADT of 15,000,



The AADT value will fall within the 3rd data set and consequently a score corresponding to Q3 will be assigned to the proposed project for this criterion.