

Quantitative Evaluation

A concurrent numerical evaluation was also used to complement the qualitative evaluation. The approach is an additive model in which each alternative was assigned a single score representing the overall value of the alternative relative to the other alternatives. This methodology has been used in EA studies.

The numerical evaluation methodology applied the following major steps:

1. A relative weight was assigned to each of the eight factors out of 100 points. This weight was determined by a team of specialists. The team of specialists had representatives present from transportation, planning, and environmental disciplines.
Public input on the importance of the evaluation criteria and indicators was collected via comment sheets, work books, and discussions during the public information centres held in November 2007 and January 2008.
2. Within each category, the individual criteria were assigned weights by the respective specialist, for a total of 100 points.
3. Within each criterion, individual indicators were also assigned a weight out of 100.
4. For each indicator, the alternatives were assessed with respect to their performance, by assigning a rating between 1 and 10. The alternative that achieved the best performance for that indicator was assigned a rating of 10. The remaining alternatives were assigned ratings of less than 10, to be reflective of the relative performance of the alternatives with respect to the best alternative.

For indicators with quantitative measures which reflected the relative performance of the alternatives, the following formulas were used:

- Where a high value was less preferred (example, number of homes affected) the following formula was used:
 $10 - [10 \{ (\text{indicator value} - \text{minimum value}) / \text{maximum value} \}]$
- Where a high value was most preferred (example, degree of conformity with official plans) the following formula was used:
 $10 (\text{indicator value} / \text{maximum value})$

The use of the above formulae for quantitative indicators enabled the team of specialists to systematically, objectively, and consistently determine the appropriate performance rating for the alternatives. Where the indicators had qualitative measures they were translated into a numeric value using the following scale:

- Low = 1
 - Low-Medium = 3
 - Medium = 5
 - Medium-High = 7
 - High = 10
5. The performance ratings were multiplied by the indicator weights, criteria weights, and factor weights, and then summed for each alternative to arrive at a total score for each alternative. The scores represent the relative value of the alternatives. The alternative with the highest score therefore theoretically represents the best alternative.
 6. The analyses were undertaken, using weights established by:
 - The Team of Specialists
 - Individual members of the Team of Specialists
 - Specialists for each factor
 - Public input