WHAKATANE DISTRICT COUNCIL
SEAL EXTENSION POLICY

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1 INTRODUCTION

1.1 Whakatane District Council - Seal Extension Policy – Revised (September 2009)

The WDC has a total road network of 901.50 km in the Whakatane District, of which 697.11 km is sealed and 204.39 km is unsealed road. The unsealed roads hierarchy includes Special Purpose Roads (SP), Arterial/Collector Roads, Local through Roads or link Roads and Local Roads No Exit.

As at the 30 June 2009 the lengths of unsealed roads are apportioned as follows:

<table>
<thead>
<tr>
<th>Road Hierarchy</th>
<th>Sealed</th>
<th>Unsealed</th>
<th>Subtotal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Purpose</td>
<td>36.06</td>
<td>44.42</td>
<td></td>
<td>80.48</td>
</tr>
<tr>
<td>Arterial - Rural</td>
<td>110.20</td>
<td>0</td>
<td>110.18</td>
<td>123.45</td>
</tr>
<tr>
<td>Arterial/Collector - Urban</td>
<td>13.26</td>
<td>0</td>
<td>13.26</td>
<td>123.45</td>
</tr>
<tr>
<td>Collector - Rural</td>
<td>35.03</td>
<td>0</td>
<td>35.03</td>
<td>60.79</td>
</tr>
<tr>
<td>Collector - Urban</td>
<td>25.76</td>
<td>0</td>
<td>25.76</td>
<td>60.79</td>
</tr>
<tr>
<td>Local Through Road (Link) Rural</td>
<td>265.56</td>
<td>86.36</td>
<td>351.99</td>
<td>398.53</td>
</tr>
<tr>
<td>Local Through Road (Link) Urban</td>
<td>46.61</td>
<td>0</td>
<td>46.61</td>
<td>398.53</td>
</tr>
<tr>
<td>Local Road No Exit - Rural</td>
<td>121.77</td>
<td>73.56</td>
<td>195.38</td>
<td>238.26</td>
</tr>
<tr>
<td>Local Road No Exit - Urban</td>
<td>42.87</td>
<td>0.59</td>
<td>42.93</td>
<td>238.26</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>697.11</td>
<td>204.39</td>
<td></td>
<td>901.50</td>
</tr>
</tbody>
</table>

1.2 Purpose and Application of a Seal Extension Policy

In February 2006 the Council adopted a Seal Extension Policy and Seal Extension Schedule. From 2006 to present, the Council has made minor amendments to the policy. In May 2008 the Council as a part of the Council’s Annual Plan process resolved that the current policy (and amendments) be reviewed to take cognisance of environmental and social factors affecting unsealed roads including road use for special purposes, dust drift from adjacent unsealed roads, and land use.

The Seal Extension Policy was developed as a decision making and management tool for the following purposes:

- To assist the Council in the prioritisation of seal extension requests received each year as part of the Council’s Annual Plan process and three yearly in the development of the Council’s Long Term Council Community Plan (LTCCP)
- To assist in the development of the Council’s Roading Forward Works Programme.
- To assist with the application for funding from NZTA for seal extension works on Special Purpose Roads.
- To assist the Council’s Planning Department on making decisions on the taking of Development Contributions for residential developments adjacent to unsealed roads.
2 COMPONENTS OF THE SEAL EXTENSION POLICY

The Whakatane District Council’s Seal Extension Policy is calculated by evaluating two major components that contribute a total score of 100 points. The two components are detailed and weighted as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weighted Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Exposure</td>
<td>60</td>
</tr>
<tr>
<td>Economic Evaluation</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

Each component comprises a number of factors and steps that are included in calculating the final score and prioritisation of each section of unsealed road within the Seal Extension Schedule as depicted in the following diagram:
2.1 Component 1 - Community Exposure (CE)

Community Exposure Component contributes 60/100 of the total points applicable to the seal extension policy.

The Community Exposure Component comprises 4 factors detailed as follows:

<table>
<thead>
<tr>
<th>No</th>
<th>Factor</th>
<th>Elements</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dust Nuisance Houses and Places of Work</td>
<td>Length of unsealed road</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic Data Total and Equivalent Car Units (ECU)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Houses and Places of Work Dust Points</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic Factor</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Dust Nuisance Travel Discomfort</td>
<td>Effect of dust nuisance on road users travelling to residence on an unsealed road.</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Community Importance</td>
<td>Access of community facilities on and school bus routes on unsealed roads.</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>Roading Hierarchy</td>
<td>Priority of the road on the Roading Hierarchy as defined in the District Plan</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>60</td>
</tr>
</tbody>
</table>

2.1.1 Factor 1 - Calculating Dust Nuisance Houses and Places of Work

The calculation of the Dust Nuisance Houses and Places of Work is calculated by applying the four elements detailed as follows:

Element 1 - Length of Unsealed Road

The length of unsealed road is determined by subtracting the end measurement from the start measurement of the section of unsealed road. The length is determined in kilometres (km) eg 980m is 0.98 km.

Element 2 - Traffic Data (ECU)

The Traffic Data points are determined by adding the AADT (actual vehicle counts) and the HCV component (HCV component being the actual vehicle count x3 to recognise that a large vehicle generates the dust equivalent of 3 cars) to determine the ECU element.

\[ ECU = AADT + HCVs \] x3
Element 3 - Total House and Places of Work Dust Points (DP)

The Total House and Places of Work Dust Points are determined adding the points derived from Steps 1-3 detailed as follows:

*Step 1*

Residential Houses < 100m from the Unsealed Road (multiplied by a factor of 15) – number of houses within the section of road divided by the length of unsealed road in kilometres and multiplied by 15.

*Step 2*

Residential Houses100–300m from Unsealed Road (multiplied by a factor of 5) – Number of houses within the section of road divided by the length of unsealed road in km and multiplied by 5.

*Step 3*

Number of places of work including dairy shed or commercial premises within 300m of the unsealed road (multiplied by a factor of 5) – Number of places of work within the section of road divided by the length of the unsealed road in km and multiplied by 5.

\[
DP = \frac{\text{Residential houses } < 100m \times 15 + \text{residential houses } 100-300m \times 5 + \text{places of work } 0-300m \times 5}{\text{Length of unsealed road (km)}}
\]

Element 4 - Traffic Points (TP)

The Traffic Points are determined by the Total ECU$s divided by 200 (maximum AADT expected on any rural road) multiplied by 100.

\[
TP = \frac{(\text{Total ECU}s (N))}{200 \text{ VPD (Max)}} \times 100
\]
Calculating Factor 1 – Calculating the Dust Nuisance - Houses and Places of Work (HPW) 20/60

Factor 1 contributes 20 of the 60 points allocated to the Community Exposure total score. This factor is calculated as follows:

\[ HPW = \frac{(DP \times TP)}{100} \times 0.20 \]

(max of 20 points)

2.1.2 Factor 2 – Calculating the Dust Nuisance on Travel Discomfort (TD)

Calculating the Travel Discomfort involves a calculation of the two elements being the number of houses to be accessed on the section of unsealed road and the length of the unsealed road.

Dust Nuisance Travel Discomfort acknowledges the discomfort caused by dust to the residents who travel on the road by attributing a score that recognises both the number of dwellings on the section of unsealed road and the distance having to be travelled on the length of unsealed road ie the greater the number of dwellings and the greater the length of unsealed road the greater the score to a maximum of 50.

The points for length of road are calculated as follows:

<table>
<thead>
<tr>
<th>Distance of unsealed road travelled</th>
<th>Travel Discomfort Factor</th>
<th>Score (Maximum Combined score is 50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discomfort Factor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance of dwellings from the seal end x number of dwellings</td>
<td>0-1km</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1-2km</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>2-3 km</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>3-4 km</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>4-5 km</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>5-6 km</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>6-7 km</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>7-8 km</td>
<td>16</td>
</tr>
</tbody>
</table>
Calculating Factor 2 – Calculating the Dust Nuisance-Travel Discomfort (TD) 10/60

Factor 2 contributes 10 of the 60 points allocated to the Community Exposure total score. This factor is calculated as follows:

\[
TD = \frac{\text{Total Score}}{50} \times 10 \text{ (max of 10 points)}
\]

2.1.3 Factor 3 – Calculating the Dust Nuisance on Community Importance (CI)

Calculating the Community Importance involves a calculation based on whether there are any community facilities or a designated bus route on the section of unsealed roads.

Community Importance acknowledges the discomfort caused by dust on either a Community facility or the use of a school bus on a section of unsealed road.

A community facility is attributed 100 score and a school bus is attributed 50 score to a maximum of 150.

Calculating Factor 3 – Calculating the Dust Nuisance - Community Importance (CI) 20/60

Factor 3 contributes 20 of the 60 points allocated to the Community Exposure total score. This factor is calculated as follows:

\[
CI = \frac{\text{Community Facilities score + School Bus Route score}}{150} \times 20
\]

2.1.4 Factor 4 – Calculating the Roading Hierarchy (RH)

Calculating the Roading Hierarchy involves a calculation based on the classification of a road in the District Plan. Classifications include Arterial/ Collector, Local Through Road (link) or Local Road No Exit.

Roading Hierarchy Factor acknowledges the importance of a road within the roading hierarchy and the impact that the section of unsealed road will have on the network. The roading hierarchy is determined by the District Plan. Roads are categorised according to their primary function ie Special Purpose, Arterial, Collector and Local through road and Local No Exit Road.
<table>
<thead>
<tr>
<th>Sub-Component</th>
<th>Roading Hierarchy Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial/ Collector Road</td>
<td>100</td>
</tr>
<tr>
<td>Local Through Road (Link)</td>
<td>40</td>
</tr>
<tr>
<td>Local Road No Exit</td>
<td>10</td>
</tr>
</tbody>
</table>

**Calculating Factor 4 – Calculating the Dust Nuisance - Roading Hierarchy (RH) 10/60**

Factor 4 contributes 10 of the 60 points allocated to the Community Exposure Element. This factor is calculated as follows:

\[
\text{RH} = \frac{\text{Roading Hierarchy Factor}}{100} \times 10
\]

**Calculating Component 1 – Community Exposure (CE) 60/100 Total Score**

\[
\text{CI} = \text{HPW} + \text{TD} + \text{CI} + \text{RH}
\]

### 2.2 Component 2 – Economic Assessment (EA)

Economic Assessment Component contributes 40/100 of the total points applicable to the Seal Extension Policy.

The evaluation of the Economic Assessment of an unsealed section of road is detailed in the NZTA benefit cost ratio assessment as defined in the Economic Evaluation Manual Volume 1 and is based on 8 percent discount rate and a 30 year evaluation period.
The BCR formula is:

**Calculating the Benefit Cost Ratio of the Project (BCR)**

\[
BCR = \frac{TTCS + (VOC + CO_2) + ACC + SEB}{\text{Cost of Seal Ext – Cost of maintenance only}}
\]

- **TTCS** is Travel Time Cost Savings
- **VOC** is Vehicle operating costs Savings
- **CO2** is Carbon Dioxide reduction benefit Savings
- **ACC** is the Accident Cost Savings
- **SEB** is Seal Extension Benefit including productivity gains and comfort

The Benefit Cost Ratio (BCR) set to a maximum point of 4 and is derived by assessing the travel time cost savings, the vehicle operating cost savings, the CO₂ reduction benefit savings, the accident cost savings, the annual productivity gains and comfort; the road management costs (Capital and operational) and Financial contributions. The cost of the road is a major factor in deriving the BCR of an unsealed road. It is acknowledged that the higher the cost of construction of a road the lower the BCR ratio. The cost of construction is offset by Development Contributions and or government subsidies, therefore any road that receives a contribution/subsidy results in a lower construction costs and a higher BCR. The NZTA subsidies are applicable to all Special Purpose Roads either by way of the SP Subsidy rate of 75 percent or the T Funding Rate of 88 percent.

**Calculating Component 2 – Economic Assessment**

The following formula is used to calculate Component 2

\[
EA = \frac{(BCR) \times 40}{4}
\]
3 DEFINITIONS

3.1 Eligibility of Roads for Seal Extensions

- **Ownership of Road** – Only formed roads that are currently owned and maintained by the Council are considered for seal extension works.

- **Sealing of Maori Roads** – Maori Road lines may be eligible, on Council's express approval, if a formal application is received from the Iwi and legal provision is made for uninhibited present and future public access to the road.

- **Known Changes in Use Patterns / Impacts** - All roads that have had a known significant change in use / impact during a 12 month period shall be reassessed prior to the finalisation of the Annual Seal Extension Forward Works Programme. Changes may result from a new residential subdivision, place of work or recognised community facility. Logging or cyclical activities are excluded

- **Legal Status of the Road** – Seal extensions will only proceed on roads that have a legal status. Any section of road which is in dispute will be resolved prior to any works being undertaken. Should legalisation prove difficult then the next highest scoring road section will be undertaken.

- **Roads Not Servicing Residential Properties** – Roads that do not service residential properties will be excluded unless funding from NZTA or Development Contributions is available.

- **Use of Development Contributions** – Development Contributions are recognised drivers for expediting a seal extension. Where Development Contributions are less than 50 percent of the total cost of the works then the Council will carry out the work within an agreed prescribed period of time or refund the Development Contribution.

3.2 Maximum Length of Road to be Sealed within a Financial Year

Within reason and where practicable a maximum of two (2) Km of road will be sealed within a financial year.

3.3 Community Exposure

Dust exposure afflicted on a property, residents, a place of work or a community facility.

- **Discomfort Factor** – The discomfort factor is the dust nuisance caused by airborne dust on a community. The dust nuisance is exacerbated by natural wind and increased air flow as a result of vehicles driving on an unsealed road. The dust nuisance is evaluated according to the proximity of residential houses, place of work, and community facilities / activity to unsealed section of road.
• **Community Facility / Activity** – A community facility / activities include schools, school bus routes, marae, community halls, urupa and cemeteries, formal recreation areas and sports grounds, car parks. A school bus using an unsealed section of road is recognised as a community activity.

• **Road Hierarchy** – Roads are categorised according to their primary function ie Special Purpose, Arterial, Collector and Local through road and Local No Exit Road. The roading hierarchy is defined in the WDC District Plan.

### 3.4 Traffic Data

Traffic Data determines the Impact of traffic movements on unsealed roads. The Traffic Data is established by combining the Average Annual Daily Traffic (AADT) and the Heavy Vehicle Movements (HVM) to get the Equivalent Car Unit (ECU).

- **AADT** – Annual Average Daily Traffic is recorded on a 5 yearly frequency (top 12 roads are assessed annually or when a change in use is recorded) utilising an approved traffic counter which is left in situ for 1 – 2 weeks. The AADT for the top 12 ranking road sections are reassessed annually.

- **HCV** - Heavy Commercial Vehicle movements are recorded as the vehicle movements of a vehicle with a gross vehicle mass greater than 3.5 tonne vehicle/axles. The HCV is incorporated by multiplying the heavy commercial vehicle movements by 3 (a Heavy Vehicle is considered to generate the dust of 3 cars).

- **ECU** – Equivalent Car Unit is calculated by the addition of the AADT count and the adjusted HVM count.

### 3.5 Economic Evaluation

Economic evaluation is defined by NZTA benefit cost ratio assessment as detailed in the Economic Evaluation Manual Volume 1 and is based on 8 percent discount rate and a 30 year evaluation period. The ratio is calculated by dividing the net present road user benefits by the net present increase in roading costs.

Benefit Cost Ratio is calculated on the following:

- **Vehicle Operating Costs** - projected vehicle operating costs before and after the seal extension (fuel, repairs, maintenance, additional costs owing to roughness of road and speed fluctuations).

- **Road Management Costs** – projected cost of the construction costs plus the difference in the maintenance costs over a 30 year period.

- **Financial Contributions** - Effect of Development Contributions and / or ratepayer / community funding.

- **Accident Costs** – Accident cost savings are a function of predicted numbers of accidents and unit accident costs.
• **Annual Productivity Gains** – Annual productivity gains are defined in the NZTA – Economic Evaluation Manual as $50/km/year for beef and sheep farms, $150/km/year for dairy farms and $300/km/year for horticultural land.

3.6 Miscellaneous Definitions

• **NZTA** – New Zealand Transport Authority

• **Special Purpose Road** – Special Purpose Roads are those roads that were accepted as such under Section 104 of the Transit New Zealand Act 1989 (now renamed as the Government Powers Act 2008).

• **Special Purpose Road Sealing Priority** – Waikaremoana Road sealing will commence after the completion of Ruatahuna Road.

• **Community Transport Funding or T Funding** – The community Transport Fund is a new fund within the National Transport Programme (NLTP) to provided targeted funding assistance for approved organisations to meet historic transport needs of established communities in areas of high economic deprivation.

• **Roading Network** – Is the total network of roads both sealed and unsealed and associated facilities including footpaths, street lights, signage etc.

• **Formed Road** – Road either sealed or unsealed that is maintained by the roading authority.
## 4 WORKING EXAMPLE

### No 8 Road - Ruatoki

<table>
<thead>
<tr>
<th>Component 1 – Community Exposure 60/100 Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1 - Houses and Places of Work</strong></td>
</tr>
<tr>
<td><strong>Element 1 – Determining the Length of Unsealed Road</strong></td>
</tr>
<tr>
<td>Route Position 620 m (unsealed Section Start) to 1600m (Unsealed Section End) = 980m of road to be sealed.</td>
</tr>
<tr>
<td><strong>Element 2 – Determining Traffic Data</strong></td>
</tr>
<tr>
<td>ECU = 129 (AADT ) + 4 (HCV( 4% of Total Vehicle Counts) (x3))</td>
</tr>
<tr>
<td>ECU = 129 + 15.5 =144.5</td>
</tr>
<tr>
<td><strong>Element 3 – Determining Total Houses and Places of Work Dust Points (DP)</strong></td>
</tr>
<tr>
<td>DP = (Residential houses &lt;100mx15 + residential houses 100-300m x 5 + places of work 0-300m x5) Length of unsealed road (km)</td>
</tr>
<tr>
<td>(4 Residential houses &lt;100mx15) = 60</td>
</tr>
<tr>
<td>(3 residential houses 100-300m x 5) = 15</td>
</tr>
<tr>
<td>(0 places of work 0-300m x5) = 0</td>
</tr>
<tr>
<td>Total Residential Houses and Places of work = 77</td>
</tr>
<tr>
<td><strong>Element 4 - Determining the Traffic Points</strong></td>
</tr>
<tr>
<td>TP = 144.5 (Total ECU’s (N))</td>
</tr>
<tr>
<td>(200 VPD (Max) x 100</td>
</tr>
<tr>
<td>Total Traffic Points = 72</td>
</tr>
<tr>
<td>Calculating Factor 1- Dust Nuisance Houses and Places of Work</td>
</tr>
<tr>
<td>77 (Total Houses and Places of Work Dust Points) x 144.5 (Traffic Factor) x0.20 = 11</td>
</tr>
<tr>
<td>100</td>
</tr>
<tr>
<td><strong>TOTAL HOUSES AND PLACES OF WORK POINTS = 11/20</strong></td>
</tr>
</tbody>
</table>
Component 1 – Dust Nuisance - Community Exposure 60/100 Total Score

Factor 2 – Travel Discomfort

<table>
<thead>
<tr>
<th>$</th>
<th>Distance of unsealed road travelled</th>
<th>Number of Dwellings</th>
<th>Travel Discomfort Factor</th>
<th>Maximum Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discomfort Factor</td>
<td>0-1km</td>
<td>7</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Distance of dwellings from the seal end</td>
<td>1-2km</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>number of dwellings</td>
<td>2-3 km</td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3-4 km</td>
<td>0</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>4-5 km</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>5-6 km</td>
<td>0</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6-7 km</td>
<td>0</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>7-8 km</td>
<td>0</td>
<td>16</td>
<td>0</td>
</tr>
</tbody>
</table>

\[ TDF = \frac{14 \times 10}{50} \text{ (max of 10 points)} \]

TOTAL Travel DISCOMFORT = 2.8 /10

Component 1 – Dust Nuisance - Community Importance 60/100 Total Score

Factor 3 - Community Facility and School Bus Route

\[ CI = \frac{\text{Community Facilities score} + \text{School Bus Route score} \times 20}{150} \]

\[ CI = \frac{100(\text{Urupa}) + 0 \times 20}{150} \]

TOTAL COMMUNITY FACILITY = 13.3/20
Component 1 – Dust Nuisance - Community Importance  60/100 Total Score

Factor 4 – Roading Hierarchy

<table>
<thead>
<tr>
<th>Sub-Component</th>
<th>Impact Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial/ Collector Road</td>
<td>100</td>
</tr>
<tr>
<td>Local Through Road (Link)</td>
<td>40</td>
</tr>
<tr>
<td>Local Road No Exit</td>
<td>10</td>
</tr>
</tbody>
</table>

RH = \(\frac{10 \times \text{Roading Hierarchy Factor}}{100}\)

TOTAL ROADING HIERARCHY = 1/10

Component 1 – Dust Nuisance - Community Importance  60/100 Total Score

Community Importance = Houses and Places of Work + Discomfort Factor + Community Facility and School Bus Route + Roading Hierarchy

11 + 2.8 + 13.3 + 1 = 28.2/60
Component 2 – Economic Assessment (EA) 40/100

Calculating the BCR as per the NZTA Manual

\[
BCR = TTCS + (VOC + CO2) + ACC + SEB
\]

Cost of Seal Ext – Cost of maintenance only

\[
BCR = $81,360 + $110,840 + $0 + $144,099
\]

\[
\text{\$178,335} - \text{\$45,315}
\]

\[
BCR = 2.5
\]

TTCS is Travel Time Cost Savings
VOC is Vehicle operating costs
CO2 is Carbon Dioxide reduction benefits
ACC is Accident Costs
SEB is Seal Extension Benefits including Productivity Gains and Comfort.

Calculating the Economic Assessment

\[
EA = \frac{(BCR) \times 40}{4}
\]

\[
EA = \frac{2.5 \times 40}{4}
\]

\[
EA = 25
\]

Seal Extension Points (SE) /100

Seal Extension Points are calculated by adding the Community Importance and Economic Assessment Totals to obtain a score /100

\[
SE = 28.2 + 25 = 53.2/100
\]