Contract price adjustment for cost fluctuation: infrastructure contracts

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Instructions for contract price adjustment using either a NZ Transport Agency index alone or the bitumen volume-based method

The NZ Transport Agency publishes standard methods for contract price adjustment for cost fluctuation. Adjustments are either calculated using an index alone or by using both an index and the NZ Transport Agency bitumen cost adjustment series. This second method is known as the Bitumen volume-based method.

This document explains how to use both the index alone based method and the bitumen volume-based method.

The Transport Agency Procurement manual (refer sections 6.6 and 7.6 Contracts) provides guidelines on contract price adjustment for cost fluctuation in infrastructure contracts.
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More information

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2. CONTRACT PRICE ADJUSTMENT METHODS

This document explains how to use either an index alone based method or the bitumen volume-based method.

The bitumen volume-based method usually employs a two-part process. It uses both a Transport Agency index and the NZ Transport Agency bitumen cost adjustment series.

Using this second method to calculate the amount of a monthly adjustment payment both the value of works delivered and the volume of residual bitumen (litres) applied during the month are required. The nominated index is applied to the value of work, and the bitumen cost adjustment series to the volume of bitumen.

The bitumen cost adjustment series is a monthly series, but Transport Agency indexes are quarterly.

Contract price adjustment payments are calculated monthly.

The formula for calculating contract price adjustment is fully described in section 4. It takes the general form:

\[ C = CI + CB \]

where:

- \( C \) = contract price adjustment
- \( CI \) = index-based part
- \( CB \) = bitumen volume-based part

Where a contract specifies that the two part bitumen volume-based method will be used then the above formula takes its full general form \( C = CI + CB \).

Where a contract specifies that contract price adjustment will employ an index alone then the above formula reduces to \( C = CI \).

A contract may specify use of the bitumen volume-based method, but without the use of an index. In this case the above formula reduces to \( C = CB \).

The web-based Adjuster tool calculates both \( CI \) and \( CB \). It can therefore calculate \( C = CI + CB \), but equally can be used to calculate \( C = CI \) alone or \( C = CB \) alone.

Throughout this document, including in the worked example in Appendix 6, the full two-part process is generally assumed, i.e. \( C = CI + CB \).

3. USING THE WEB-BASED ADJUSTER TOOL

Monthly cost adjustment calculations are best performed using the web-based Adjuster tool. It is designed to be used by either contractors or purchasers. You can access the Adjuster from the procurement page on the Transport Agency’s website.
How the Adjuster calculates the monthly contract cost fluctuation adjustment is set out in section 4. To use the Adjuster you need to register as a user, follow the steps set out here to input basic contract information plus monthly contract data, and know how to use the single figure output, the cumulative cost fluctuation adjustment, in a progress payment claim – see section 7.

### 3.1 Registering as a user

Go to the Adjuster and register as a user. The Adjuster identifies users by their email address.

#### 3.2 Changing your profile

Select Profile from the menu to change your profile, ie to change your email address.

Please note that email addresses have been blanked out in the screen shots shown below.
3.3 Creating a contract

Create a contract by using the Create a contract button, found near the top right of the home page screen. Fill in the form shown below, including choosing the correct Adjustment index from the drop down list. For guidance on establishing a value for the Proportion of value to be indexed (P) see section 5. Select the Create a contract button.
You will be the sole owner of this contract information and all subsequent information you enter about this contract. Users whom you choose to share this contract with will have read-only access to it.

### 3.4 Adding a new adjustment record

You will need to enter data for every month in which work is done. Having selected the contract from the *My contracts* list, select *Add a new adjustment record*, fill in the form below and *Save*.

#### Payment adjustment records

<table>
<thead>
<tr>
<th>Date</th>
<th>Total value of work 1</th>
<th>Total bitumen volume 3</th>
<th>Total adjustment 7</th>
<th>Update date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov 2014</td>
<td>100,000.00</td>
<td>10,000</td>
<td>-546.00</td>
<td>20 Feb 2017</td>
</tr>
<tr>
<td>Dec 2014</td>
<td>200,000.00</td>
<td>20,000</td>
<td>-1,136.00</td>
<td>20 Feb 2017</td>
</tr>
</tbody>
</table>

Make sure the month automatically chosen by the Adjuster is correct.

### 3.5 Using the monthly Adjuster output

Each month the Adjuster gives a cumulative total cost fluctuation adjustment figure, which is the sum of the adjustments shown for all months. In the example screen shot below, the figure is $52,296.54. This cumulative cost fluctuation adjustment is transferred directly to the progress claim – see section 7.
3.6 Sharing contracts with other users

You can share a contract with other people. They will be able to see all of the information about the contract, but will not be able to change the data. The Adjuster will send them an email containing a link. They will need to log in or register if they do not already have an account.

To share a contract, select it from the My contracts list and use the Share button. Enter the email address of the person with whom you wish to share the contract.
3.7 Letting the Adjuster take care of changes in the data used in calculations

Most months the total cost fluctuation adjustment output from the Adjuster will be an interim value - see section 8. The Adjuster takes care of the fact that the index value for a particular month will not be published until up to five months after the month’s end.

The Adjuster will also manage changes in an adjustment record. If the supplier and purchaser agree that an adjustment record for a particular month needs to be altered, for example by changing either the Total value of work to date or the Total bitumen volume to date, then the adjustment record for that month can be edited. See section 3.9.

3.8 Keeping a record of each month’s Adjuster output

Use the Download PDF button to take a snapshot of input data and output from the Adjuster used in a progress claim.

The Download PDF button is visible once you have selected a particular contract from the My contracts list.

Standard contract conditions will demand that records, to support progress claims, be kept for a defined period. A monthly pdf download will likely be required to be kept for this purpose.

3.9 Editing previously entered data

Select the contract you wish to change from the My contracts list. You will then be able to use the Edit button to change any of the basic contract data. The Adjuster will immediately recalculate the adjustment figures for all months based on the new information.
Having selected a particular contract from *My contracts* you will also be able to edit any previously entered adjustment record. Click on the date for the month that you wish to edit. Again, once the changes you make have been saved, the Adjuster will recalculate.

### 3.10 Archiving a contract

The *My contracts* list has two list options – *Active* and * Archived *.

Having brought up a particular contract from the *My contracts* list, you can move it from the *Active* to the * Archived* list using the *Archive* button.

This facility will allow you to limit the *Active* list to those contracts that are of immediate interest. Once a contract has been archived it can be *Un-archived* and thus brought back into the *Active* list.

![Contracts](image)

### 3.11 Changing the ownership of a contract

You may share the contracts you create with other users, giving them read-only access, but there can be only one owner of a contract.

If you wish to relinquish ownership, select the contract from the *My contracts* list and use the *Change owner* button. The Adjuster requires you to enter the new owner’s email address. If you wish to relinquish ownership, but still wish to view the contract, you will need to tick the *Share with me* checkbox.
3.12 Using the Adjuster with an index alone (C = CI)

Some contracts will specify that contract price adjustment is to be based on the use of an index alone.

When creating the contract enter a value for the *Proportion of value to be indexed (P)* of 100% When adding a new adjustment record for a particular month, enter a zero, ‘0’, for the *Total bitumen volume to date*. The Adjuster will use the zeros entered for total bitumen volume and return a value of zero for CB, the bitumen volume-based part.
3.13 Using the Adjuster for bitumen cost fluctuation alone (C = CB)

Some contracts will specify that contract price adjustment is to be based on the bitumen volume-based part of the adjustment formula alone.

When creating the contract enter any value for the Proportion of value to be indexed (P) and choose any adjustment index. When adding a new adjustment record, for a particular month, enter a zero, ‘0’, for the Total value of work to date. The Adjuster will then calculate a value of zero for CI, the index-based part.

3.14 Using the Adjuster when the basis of adjustment changes during the contract term

Some contracts will specify that the basis for contract price adjustment will change at some point in the term of the contract. For example, a term service maintenance and renewal contract may specify that for the first 12 months adjustment will be based on bitumen volume alone (C = CB) but from the end of the first year indexation will also be employed (C = CI + CB).

Create a separate contract in the Adjuster for each of these phases of the contract. Using the example quoted a C = CB contract would be created for the first year and for the second and subsequent years, a C = CI + CB contract would be created. For this second contract the Total value of work to date entered each month would be the total value since the beginning of the second year.

Alternatively, for the example quoted, a single contract could be created, but for the first 12 months the Total value of work to date would be entered as zero. From the beginning of the second year of
the contract the *Total value of work to date* entered would be the total value since the beginning of the second year.

### 3.15 Using the Adjuster with two indexes

Two indexes may be used when the costs incurred to deliver work are not of a single type.

*Appendix 1 – Calculating contract cost fluctuation adjustments using two indexes* describes the calculation process using two indexes. *Appendix 3* provides a model schedule to the conditions of contract using two indexes.

The cost fluctuation adjustment ‘C’ will have up to three components – \( C = (C_{IA} + C_{IB}) + CB \). To calculate these three components using the Adjuster it will be necessary to create two separate contracts, splitting the cost of the contract works between the two. For example the first contract set up in the Adjuster may be used to calculated \( C_{IA} + CB \), and the second contract could be used to calculate \( C_{IB} \).

### 3.16 Viewing index values in the Adjuster

To see the values for an index, or the bitumen cost adjustment series, that the Adjuster ‘looks up’, select *Help* from the *Menu* dropdown list, then select *Index & and bitumen series values*.

### 3.17 Deleting your Adjuster account

Select *Profile* from the menu. Use the *Delete my account* button to remove your profile and all the contracts you have created. If you have shared a contract with another user, and then delete your account, that other user will no longer be able to see the contract.

If you accidentally delete your account then contact the Transport Agency. The administrator may be able to recover your profile and contracts.
4. CALCULATING THE CONTRACT COST FLUCTUATION ADJUSTMENT

The formula used to calculate the amount of the month’s adjustment, up or down, takes the general form $C = CI + CB$

Where:

- $C$ = Cost fluctuation adjustment for the month under consideration
- $CI$ = Value $\times (P/100) \times (I/I' - 1)$ ….(See Note 1)
- $CB$ = Volume $\times (Bit - Bit')$ …..(See Note 1)
- Value = Value of work completed during the month under consideration but without deduction for retentions and excluding the cost fluctuation adjustment (See Note 2)
- $P$ = The Proportion of value to be indexed expressed as a percentage (See Note 3)
- $I/I'$ = The value of the nominated index for the month under consideration divided by the value of the index for the month during which tenders closed
- Volume = Volume of residual bitumen applied during the month under consideration (litres) (See Note 4)
- $Bit$ = Value of the NZ Transport Agency Bitumen cost adjustment series for the month under consideration, published on the Transport Agency website
- $Bit'$ = Value of the NZ Transport Agency Bitumen cost adjustment series for the month during which tenders closed, published on the Transport Agency website

Note 1: ‘CI’ uses the change in the nominated index to adjust for fluctuation in costs. ‘CB’ uses the residual bitumen volume applied plus the change in the bitumen cost adjustment series to adjust for fluctuation in the cost of bitumen.

Note 2: This will not include the value of work which is not to be adjusted for cost fluctuation. For example if a variation or work under a prime cost sum is valued at current prices then this would not be included.

Note 3: The proportion of value to be indexed ($P$) is usually 100% in the $C = CI$ case and is irrelevant in the $C = CB$ case. When the full bitumen volume-based method is used, the $C = CI + CB$ case, ‘$P$’ will usually be the proportion of costs excluding bitumen. It will be calculated by dividing an estimate of the cost of plant, labour and materials, excluding bitumen supply, by an estimate of all costs – namely of plant, labour and all materials including bitumen supply. ‘$P$’ will normally be determined by the principal and advised to tenderers through the request for proposals document, so they can assess its impact before finalising their tender price. It will normally be fixed for the duration of the contract. This proportion will vary from contract to contract depending on the scope of the contract works.

Note 4: Residual bitumen is the non-volatile fraction of the bitumen binder that remains in service after evaporation. Volume is measured at 15 degrees Celsius.

Note that the above description of the contract price adjustment calculation process assumes that one index is to be used. Two indexes may be used when the costs incurred to deliver work are not of a single type – for example a construction contract could include structures plus other ‘general’ road construction. The two indexes may thus be the NZ Transport Agency structures index (costs excluding bitumen) and the NZ Transport Agency construction index (costs excluding bitumen).
5. ESTABLISHING A VALUE FOR ‘P’

Where no index is to be used, the C = CB case, then ‘P’ is not used in calculations. When creating a contract in the Adjuster any value can therefore be entered for ‘P’.

Where an index alone is to be used, the C = CI case, then ‘P’ will usually be 100%.

Where the full bitumen volume-based method is used, the C = CI + CB case, ‘P’ will usually be the proportion of costs excluding bitumen. This will need to be determined.

Some purchasers will have limited data to help determine a value for ‘P’. Discussions with contractors who are likely to tender for contracts will help. The now-superseded NZ Transport Agency revised reseal (2001) index implied a figure of 60% by giving a weight of 0.4 to one of its input indexes, the NZ Transport Agency bitumen index. In the absence of reliable information from which to determine a more accurate value for ‘P’, it would be reasonable to adopt a value of 60% for a typical reseals contract. However, this assumption, though reasonable in 2012, can be expected to become less accurate with time.

6. DETERMINING THE VOLUME OF RESIDUAL BITUMEN SUPPLIED IN THE MONTH

Under the bitumen volume-based method, either the C = CI + CB case or the C = CB case, the contract price adjustment will depend on the volume of bitumen supplied.

Bitumen supply will usually be included in scheduled items for each type of surfacing and paid for on the basis of the road surface area sealed, resealed or paved, and there will be no specific ‘bitumen’ item. This needs to be borne in mind when considering the precision required in measuring the volume of bitumen supplied.

Contract documents need to specify how the volume of residual bitumen will be calculated and agreed each month. Purchasers may choose to ask tenderers to describe a proposed method in their response to the request for proposals to then be discussed and agreed between the parties before work commences.

7. USING THE ADJUSTER OUTPUT IN PROGRESS PAYMENT CALCULATIONS

Each month the Adjuster will be used to calculate the cumulative cost fluctuation adjustment.

The following example, a C = CI + CB case, shows how to use that adjustment figure in a progress payment calculation.
A contractor has a simple resealing contract that has two items in the schedule. The priced schedule from the contractor’s winning tender looks like this:

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 Grade X chip sprayed bitumen reseals (including the cost of bitumen)</td>
<td>m2</td>
<td>150,000</td>
<td>6.50</td>
<td>975,000</td>
</tr>
<tr>
<td>2.0 Grade Y chip sprayed bitumen reseals (including the cost of bitumen)</td>
<td>m2</td>
<td>230,000</td>
<td>7.00</td>
<td>1,610,000</td>
</tr>
</tbody>
</table>

Tender price 2,585,000

After four months the schedule used for the progress claim looks like this:

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 Grade X chip sprayed bitumen reseals (including the cost of bitumen)</td>
<td>m2</td>
<td>80,000</td>
<td>6.50</td>
<td>520,000</td>
</tr>
<tr>
<td>2.0 Grade Y chip sprayed bitumen reseals (including the cost of bitumen)</td>
<td>m2</td>
<td>90,000</td>
<td>7.00</td>
<td>630,000</td>
</tr>
</tbody>
</table>

Total to date (to be cost adjusted) 1,150,000

Total bitumen volume applied to the end of the month litres 180,000

Cumulative cost fluctuation adjustment 44,542

Total value of items not to be cost adjusted (e.g. variations) XXX,XXX

TOTAL to date for claim 1,194,542

The total value of work to date, shaded yellow, and the total bitumen volume to date, also shaded yellow, will have been entered into the Adjuster. The output from the Adjuster, the cumulative cost fluctuation adjustment ($44,542), is shown shaded red.

The PDF download from the Adjuster, which shows the cumulative cost fluctuation adjustment to the end of month four, looks like this:
After five months the schedule used for the progress claim looks like this:

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 Grade X chip sprayed bitumen reseals (including the cost of bitumen)</td>
<td>m²</td>
<td>100,000</td>
<td>6.50</td>
<td>650,000</td>
</tr>
<tr>
<td>2.0 Grade Y chip sprayed bitumen reseals (including the cost of bitumen)</td>
<td>m²</td>
<td>100,000</td>
<td>7.00</td>
<td>700,000</td>
</tr>
</tbody>
</table>

**Total value of work to the end of the 5th month (to be cost adjusted)** 1,350,000

**Total bitumen volume applied to the end of the month** 215,000

**Cumulative cost fluctuation adjustment** 52,297

**Total value of items not to be cost adjusted (eg variations)** YYY,YYY

**TOTAL to date for claim** 1,402,297

Again the total value of work to date ($1,350,000) and the total bitumen volume to date (215,000 litres) will have been entered into the Adjuster which will have calculated the cumulative cost fluctuation adjustments ($52,297).

Note that items not subject to cost fluctuation adjustment, eg variations need to be shown separately.

**8. THE ADJUSTER CALCULATES INTERIM ADJUSTMENT VALUES**

A Model cost fluctuation adjustment schedule to conditions of contract is included in this document – see Appendix 2. This model schedule includes a clause 9 which states that:

*Where the index for the quarter has not yet been published, interim payments will be made on the basis of the index for the most recent quarter for which an index is available. A correction to the interim payment will be made following the publication of the applicable index and will be processed with subsequent progress payments.*

The Adjuster uses the most recently published index value and the most recently published NZ Transport Agency bitumen cost adjustment series value to calculate the total adjustment value for a particular month until the correct values for that month have been published.

The Adjuster automatically manages the issue created by the fact that the index value applicable to a particular month may not be published until up to five months after the end of that month. The publication of a new quarterly index value therefore will typically change the previous total adjustment values for the last five months.

One of the consequences of this lag in the publication of the correct index value for a particular month is that the final cumulative cost fluctuation adjustment figure for a contract may not be known until five months after all contract work is completed.

To learn when the latest index values have been published you can subscribe to the Transport Agency’s index values and procurement policy update service.

This interim payments approach is consistent with NZS3910 Conditions of contract for building and civil engineering construction, Appendix A cost fluctuation adjustment by indexation. It is similarly consistent with the approach taken in NZS3915, NZS3916 and NZS3917.
APPENDIX 1 – CALCULATING CONTRACT COST FLUCTUATION ADJUSTMENTS USING TWO INDEXES

This Appendix is based on Section 4 Contract price adjustment for cost fluctuation: infrastructure contracts. Section 4 assumes that one index is used in the calculation of contract price adjustments, here two indexes are used, referred to as Index(A) and Index(B).

Two indexes may be used when the costs incurred to deliver work are not of a single type – for example a construction contract could include structures plus other ‘general’ road construction. Index(A) may thus be the NZ Transport Agency structures index (costs excluding bitumen) and Index(B) the NZ Transport Agency construction index (costs excluding bitumen).

Two options are described reflecting different approaches to the use of two indexes. In Option A it is envisaged that a fixed percentage of the ‘Value’ will be indexed using Index(A) and different fixed percentage will be indexed using Index(B). In Option B it is envisaged that a schedule is used for the purpose of making progress claims and that the schedule has been divided between items to be indexed using Index(A) and items to be indexed using Index(B). Common items, for example preliminary and general items, may be divided on some agreed percentage split basis.

Option A
The formula used to calculate the amount of the month’s adjustment, up or down, takes the general form C=Cl+CB.

Where:

C = Cost fluctuation adjustment for the month under consideration
Cl = CI_A + CI_B = Value x (P_A/100) x (I_A/I_A’ – 1) + Value x (P_B/100) x (I_B/I_B’ – 1) ... (See Note 1)
CB = Volume x (Bit – Bit’) ...............(See Note 1)
Value = Value of work completed during the month under consideration but without deduction for retentions and excluding the cost fluctuation adjustment (See Note 2)
P_A = The proportion of Value to be indexed using Index(A) expressed as a percentage (See Note 3)
P_B = The proportion of Value to be indexed using Index(B) expressed as a percentage (See Note 3)
I_A/I_A’ = The value of Index(A) for the month under consideration divided by the value of the Index(A) for the month during which tenders closed
I_B/I_B’ = The value of Index(B) for the month under consideration divided by the value of the Index(B) for the month during which tenders closed
Volume = Volume of residual bitumen applied during the month under consideration (litres) (See Note 4)
Bit = Value of the NZ Transport Agency Bitumen cost adjustment series for the month under consideration, published on the Transport Agency website
Bit’ = Value of the NZ Transport Agency Bitumen cost adjustment series for the month during which tenders closed, published on the Transport Agency website
Note 1: ‘CI’ uses the changes in Index(A) and in Index(B) to adjust for fluctuation in costs other than in the cost of bitumen. ‘CB’ uses the residual bitumen volume applied plus the change in the bitumen cost adjustment series to adjust for fluctuation in the cost of bitumen.

Note 2: This will not include the value of work which is not to be adjusted for cost fluctuation. For example if a variation or work under a prime cost sum is valued at current prices then this would not be included.

Note 3: PA will usually be calculated by dividing an estimate of the cost of plant, labour and materials that are Index(A) ‘type’ costs, excluding bitumen supply cost, by an estimate of all costs – namely of all plant, labour and all materials including bitumen supply.

PB will be determined in a similar way. It will relate to that part of the work to be indexed using Index(B).

PA and PB will normally be determined by the principal and advised to tenderers through the request for proposals document, so they can assess the impact before finalising their tender price. PA and PB will normally be fixed for the duration of the contract. These proportions will vary from contract to contract depending on the scope of the contract works.

Note 4: Residual bitumen is the non-volatile fraction of the bitumen binder that remains in service after evaporation. Volume is measured at 15 degrees Celsius.

Option B
The formula used to calculate the amount of the month’s adjustment, up or down, takes the general form C=CI+CB.

Where:

\[ C = \text{Cost fluctuation adjustment for the month under consideration} \]

\[ CI = \text{Value(A)} \times \left( \frac{P_A}{100} \right) \times \left( \frac{I_A}{I_A'} - 1 \right) + \text{Value(B)} \times \left( \frac{P_B}{100} \right) \times \left( \frac{I_B}{I_B'} - 1 \right) \] (See Note 1)

\[ CB = \text{Volume} \times (\text{Bit} - \text{Bit'}) \] (See Note 4)

Value(A) = Value of work completed during the month under consideration that is to be indexed using Index(A) but without deduction for retentions and excluding the cost fluctuation adjustment (See Note 2)

Value(B) = Value of work completed during the month under consideration that is to be indexed using Index(B) but without deduction for retentions and excluding the cost fluctuation adjustment (See Note 2)

\[ P_A = \text{The proportion of Value(A) to be indexed using Index(A) expressed as a percentage} \] (See Note 3)

\[ P_B = \text{The proportion of Value(B) to be indexed using Index(B) expressed as a percentage} \] (See Note 3)

\[ I_A/I_A' = \text{The value of Index(A) for the month under consideration divided by the value of the Index(A) for the month during which tenders closed} \]

\[ I_B/I_B' = \text{The value of Index(B) for the month under consideration divided by the value of the Index(B) for the month during which tenders closed} \]

Volume = Volume of residual bitumen applied during the month under consideration (litres) (See Note 4)
Bit = Value of the NZ Transport Agency Bitumen cost adjustment series for the month under consideration, published on the Transport Agency website

Bit’ = Value of the NZ Transport Agency Bitumen cost adjustment series for the month during which tenders closed, published on the Transport Agency website

Note 1: ‘CI’ uses Value(A) plus Value(B) and the changes in Index(A) and in Index(B) to adjust for fluctuation in costs other than in the cost of bitumen. ‘CB’ uses the residual bitumen volume applied plus the change in the bitumen cost adjustment series to adjust for fluctuation in the cost of bitumen.

Note 2: Neither Value(A) nor Value(B) will include the value of work which is not to be adjusted for cost fluctuation. For example if a variation or work under a prime cost sum is valued at current prices then this would not be included.

Note 3: PA will usually be calculated by dividing an estimate of the cost of plant, labour and materials that together make up Value(A), namely the Index(A) ‘type’ costs, excluding bitumen supply cost, by an estimate of all Index(A) type costs – namely of all plant, labour and all materials including bitumen supply

For example, if Index(A) is the ‘NZ Transport Agency structures index (costs excluding bitumen)’, and the ‘structures’ part of the contract cost does not include any bitumen supply then PA would usually be set at 100%

PB will be determined in a similar way. It will relate to that part of the work to be indexed using Index(B).

PA and PB will normally be determined by the principal and advised to tenderers through the request for proposals document, so they can assess the impact before finalising their tender price. PA and PB will normally be fixed for the duration of the contract. These proportions will vary from contract to contract depending on the scope of the contract works.

Note 4: Residual bitumen is the non-volatile fraction of the bitumen binder that remains in service after evaporation. Volume is measured at 15 degrees Celsius.
Approved organisations are encouraged to use the appropriate model schedule presented here, without alteration, to help ensure efficient application of contract price adjustment for cost fluctuation. The model schedules are written so as to be consistent with the method as set out in this document and with use of the web-based Adjuster tool.

They have been written as a schedule to NZS 3910 *Conditions of contract for building and civil engineering construction* and terminology has been chosen to align with that standard. Section 12 *Payments* of NZS3910 includes contract requirements in relation to cost fluctuations. Section 12.8 *Cost fluctuations* provides for use of either the provisions of Appendix A or as ‘otherwise provided for in the Special Conditions’. When this schedule is used with NZS3910 it will need to be referred to in the Special Conditions of contract. The same provisions are found in section 12 in NZS3915, NZS3916 and NZS3917.

The formula for calculating contract price adjustment is fully described in [section 4](#). It takes the general form:

\[ C = CI + CB \]

Where:

- \( C \) = contract price adjustment
- \( CI \) = index-based part
- \( CB \) = bitumen volume-based part

There are three possible contract situations: \( C = CI \) or \( C = CI + CB \) or \( C = CB \). A model schedule for each of these three cases is presented below.

Where the schedule text needs to be tailored to the actual contract it is shaded in yellow. Further alteration of the text will not normally be required.

**Model schedule case 1: \( C = CI \)**

In this case an index alone is used. It is therefore not an application of the bitumen volume-based method.

This case will apply where the volume of bitumen to be supplied under the contract is small. It may be used, for example, for a maintenance or bridge construction contract using an index appropriate to the type of work.

The text of the model schedule follows:

**Schedule – cost fluctuation adjustment**

1. The provisions of this schedule shall apply when provided for in the Special Conditions.
2. Subject to the remainder of this schedule, the amounts payable by the principal to the contractor under the contract shall be adjusted up or down by amounts calculated in accordance with the following formula:

\[ C = \text{Value} \times \left( \frac{I}{I'} - 1 \right) \]

where:

- \( C \) = cost fluctuation adjustment for the month under consideration
- \( \text{Value} \) = value of work completed during the month under consideration taken from the Payment Schedule but without deduction for retentions and excluding the cost fluctuation adjustment
- \( \frac{I}{I'} \) = the value of the index defined in Clause 3 for the month under consideration divided by the value of the index for the month during which tenders closed.

3. The index shall be the << index name>> published on the NZ Transport Agency website.

4. Cost fluctuation provisions shall be applied from the commencement of the contract period. **<< OR Cost fluctuation adjustment for months 1 to 12 of the contract period shall be deemed = $Nil.>>**

5. Cost fluctuations are calculated on a monthly basis.

6. For the purpose of calculating the cost fluctuation adjustment in Clause 2, any daywork, prime cost sums, variations and other payment items which are based on actual cost, or current prices and any advances shall be excluded from the value of work completed.

7. The contractor shall not be entitled to claim cost fluctuation adjustment for work completed after the due date for completion greater than that which would apply had the work been completed on the due date for completion.

8. The index values to be used in the calculation of the cost fluctuation in Clause 2 shall be those first published by the Transport Agency for the appropriate quarter.

9. Where the index for the quarter has not yet been published, interim payments will be made on the basis of the index for the most recent quarter for which an index is available. A correction to the interim payment will be made following the publication of the applicable index and will be processed with subsequent progress payments.

10. If at any time any of the Statistics New Zealand indexes which are inputs into the Transport Agency index(es) referred to in Clause 2 or later clauses are no longer published, or if the basis of any index is materially changed, the adjustment shall thereafter be calculated by using such other input index, or in such other manner as will fairly reflect the changes as previously measured by that index.

**Model schedule case 2: C = CI + CB**

Where a contract includes supply of a significant volume of bitumen and has a longer term, of say 12 months or more, then providing for cost fluctuation adjustment for both bitumen supply and costs excluding bitumen will usually be appropriate. Longer term contracts which include reseals will usually fit this case.

The text of the model schedule follows:

**Schedule – cost fluctuation adjustment**

1. The provisions of this schedule shall apply when provided for in the Special Conditions.
2. Subject to the remainder of this schedule, the amounts payable by the principal, to the contractor under the contract shall be adjusted up or down by amounts calculated in accordance with the following formula:

\[ C = CI + CB \]

where

- \( C \) = cost fluctuation adjustment for the month under consideration
- \( CI \) = \[ (\text{Value} \times \left( \frac{P}{100} \right) \times \left( \frac{I}{I'} - 1 \right) \]
- \( CB \) = \[ \text{Volume} \times (\text{Bit} - \text{Bit'}) \]

and

- \( \text{Value} \) = value of work completed during the month under consideration taken from the payment schedule but without deduction for retentions and excluding the cost fluctuation adjustment
- \( P \) = the proportion of value to be indexed. It is fixed for the duration of the contract and has a value of \( Z\% \) <<specify the value of \( Z\% \>>
- \( I/I' \) = the value of the index defined in Clause 3 for the month under consideration divided by the value of the index for the month during which tenders closed
- \( \text{Volume} \) = volume of residual bitumen binder applied during the month under consideration (litres) taken from the payment schedule. Residual bitumen is the non-volatile fraction of the bitumen binder that remains in service after evaporation. Volume is measured at 15 degrees Celsius
- \( \text{Bit} \) = value of the NZ Transport Agency Bitumen cost adjustment series for the month under consideration, published on the Transport Agency website
- \( \text{Bit'} \) = value of the NZ Transport Agency Bitumen cost adjustment series for the month during which tenders closed, published on the Transport Agency website.

3. The index shall be the NZ Transport Agency reseals index (costs excluding bitumen) published on the Transport Agency website

OR

The index shall be << another index named here>>.

4. Cost fluctuation provisions shall be applied from the commencement of the contract period. << OR Cost fluctuation shall be applied from the commencement of the contract period except that for months 1 to 12 of the contract period CI shall be deemed = $Nil. >>

5. Cost fluctuations are calculated on a monthly basis.

6. For the purpose of calculating the cost fluctuation adjustment in Clause 2, any daywork, prime cost sums, variations and other payment items which are based on actual cost, or current prices and any advances shall be excluded from the value of work completed.

7. The contractor shall not be entitled to claim cost fluctuation adjustment for work completed after the due date for completion greater than that which would apply had the work been completed on the due date for completion.

8. The index values to be used in the calculation of the cost fluctuation in Clause 2 shall be those first published by the Transport Agency for the appropriate quarter.

9. Where the index for the quarter has not yet been published, interim payments will be made on the basis of the index for the most recent quarter for which an index is available. A correction
to the interim payment will be made following the publication of the applicable index and will be processed with subsequent progress payments.

10. If at any time any of the Statistics New Zealand indexes which are inputs into the Transport Agency index(es) referred to in Clause 2 or later clauses are no longer published, or if the basis of any index is materially changed, the adjustment shall thereafter be calculated by using such other input index, or in such other manner as will fairly reflect the changes as previously measured by that index.

11. If at any time any of the inputs into the NZ Transport Agency bitumen cost adjustment series referred to in Clause 2 or later clauses are no longer published, or if the basis of the NZ Transport Agency bitumen cost adjustment series is materially changed, the adjustment shall thereafter be calculated by using such other inputs, or in such other manner as will fairly reflect the changes as previously measured by the NZ Transport Agency bitumen cost adjustment series.

Model schedule case 3: \( C = CB \)

Where a contract includes supply of a significant volume of bitumen and has a short term, of say 12 months or less, then providing for cost fluctuation adjustment for bitumen supply alone may be appropriate.

The text of the model schedule follows:

Schedule – cost fluctuation adjustment

1. The provisions of this schedule shall apply when provided for in the Special Conditions.

2. Subject to the remainder of this schedule, the amounts payable by the principal, to the contractor under the contract shall be adjusted up or down by amounts calculated in accordance with the following formula:

\[ C = \text{Volume} \times (\text{Bit} - \text{Bit}') \]

Where

- \( C \) = cost fluctuation adjustment for the month under consideration
- \( \text{Volume} \) = volume of residual bitumen binder applied during the month under consideration (litres) taken from the payment schedule. Residual bitumen is the non-volatile fraction of the bitumen binder that remains in service after evaporation. Volume is measured at 15 degrees Celsius
- \( \text{Bit} \) = value of the NZ Transport Agency Bitumen cost adjustment series for the month under consideration, published on the Transport Agency website
- \( \text{Bit}' \) = value of the NZ Transport Agency Bitumen cost adjustment series for the month during which tenders closed, published on the Transport Agency website.

3. Cost fluctuation provisions shall be applied from the commencement of the contract period.

4. Cost fluctuations are calculated on a monthly basis.

5. The contractor shall not be entitled to claim cost fluctuation adjustment for work completed after the due date for completion greater than that which would apply had the work been completed on the due date for completion.

6. If at any time any of the inputs into the NZ Transport Agency bitumen cost adjustment series referred to in Clause 2 or later clauses are no longer published, or if the basis of the NZ Transport Agency bitumen cost adjustment series is materially changed, the adjustment shall
thereafter be calculated by using such other inputs, or in such other manner as will fairly reflect the changes as previously measured by the *NZ Transport Agency bitumen cost adjustment series*. 
APPENDIX 3 - MODEL COST FLUCTUATION ADJUSTMENT SCHEDULE TO CONDITIONS OF CONTRACT USING TWO INDEXES

The following is an edited version of Appendix 2. It refers to the two indexes as Index(A) and Index(B).

Two indexes may be used when the costs incurred to deliver work are not of a single type - for example a construction contract could include structures plus other ‘general’ road construction. Index(A) would be the NZ Transport Agency structures index (costs excluding bitumen) and Index(B) the NZ Transport Agency construction index (costs excluding bitumen).

Two options are described reflecting different approaches to the use of two indexes. In Option A it is envisaged that a fixed percentage of the ‘Value’ will be indexed using Index(A) and a different fixed percentage will be indexed using Index(B). In Option B it is envisaged that a schedule will be used for the purpose of making progress claims and that the schedule will be divided between items to be indexed using Index(A) and items to be indexed using Index(B). Common items, for example any preliminary and general items, may be divided on some agreed percentage split basis.

Approved organisations are encouraged to use the model schedule presented here, without alteration, to help ensure efficient application of contract price adjustment for cost fluctuation. The model schedule is written so as to be consistent with the method as set out in this document and with use of the web-based Adjuster tool.

It has been written as a schedule to NZS 3910 Conditions of contract for building and civil engineering construction and terminology has been chosen to align with that standard. Section 12 Payments of NZS3910 includes contract requirements in relation to cost fluctuations. Section 12.8 Cost fluctuations provides for use of either the provisions of Appendix A or as ‘otherwise provided for in the Special Conditions’. When this schedule is used with NZS3910 it will need to be referred to in the Special Conditions of contract. The same provisions are found in section 12 in NZS3915, NZS3916 and NZS3917.

The formula for calculating contract price adjustment is fully described in section 4. It takes the general form:

\[ C = CI + CB \]

Where:

- \( C \) = contract price adjustment
- \( CI \) = index-based part
- \( CB \) = bitumen volume-based part

In this case \( CI = CIA + CIB \) reflecting the fact that two indexes are to be used.

Where the schedule text needs to be tailored to the actual contract it is shaded in yellow. Further alteration of the text will not normally be required.
**Model schedules**

The text of the two model schedules follow:

**Option A**

**Schedule – cost fluctuation adjustment**

1. The provisions of this schedule shall apply when provided for in the Special Conditions.
2. Subject to the remainder of this schedule, the amounts payable by the principal, to the contractor under the contract shall be adjusted up or down by amounts calculated in accordance with the following formula:

\[
C = (C_{IA} + C_{IB}) + CB
\]

where

- **C** = cost fluctuation adjustment for the month under consideration
- **C_{IA}** = \[ Value \times (P_{A} / 100) \times (IA/IA' - 1) \]
- **C_{IB}** = \[ Value \times (P_{B} / 100) \times (IB/IB' - 1) \]
- **CB** = \[ Volume \times (Bit - Bit') \]

and

- **Value** = value of work completed during the month under consideration taken from the payment schedule but without deduction for retentions and excluding the cost fluctuation adjustment
- **P_{A}** = the proportion of value to be indexed using Index(A). It is fixed for the duration of the contract and has a value of Y% <<specify the value of Y%>>
- **P_{B}** = the proportion of value to be indexed using Index(B). It is fixed for the duration of the contract and has a value of Z% <<specify the value of Z%>>
- **IA/IA'** = the value of Index(A) defined in Clause 3 for the month under consideration divided by the value of Index(A) for the month during which tenders closed
- **IB/IB'** = the value of Index(B) defined in Clause 3 for the month under consideration divided by the value of Index(B) for the month during which tenders closed
- **Volume** = volume of residual bitumen binder applied during the month under consideration (litres) taken from the payment schedule. Residual bitumen is the non-volatile fraction of the bitumen binder that remains in service after evaporation. Volume is measured at 15 degrees Celsius
- **Bit** = value of the NZ Transport Agency Bitumen cost adjustment series for the month under consideration, published on the Transport Agency website
- **Bit'** = value of the NZ Transport Agency Bitumen cost adjustment series for the month during which tenders closed, published on the Transport Agency website.

3. Index(A) shall the << index named here>> and Index(B) shall the << index named here>>. Both indexes are published on the Transport Agency website.
4. Cost fluctuation provisions shall be applied from the commencement of the contract period.  
   \[ OR Cost fluctuation shall be applied from the commencement of the contract period except that for months 1 to 12 of the contract period both C_{IA} and C_{IB} shall be deemed = $Nil. \]
5. Cost fluctuations are calculated on a monthly basis.
6. For the purpose of calculating the cost fluctuation adjustment in Clause 2, any daywork, prime cost sums, variations and other payment items which are based on actual cost, or current prices and any advances shall be excluded from the value of work completed.

7. The contractor shall not be entitled to claim cost fluctuation adjustment for work completed after the due date for completion greater than that which would apply had the work been completed on the due date for completion.

8. The index values to be used in the calculation of the cost fluctuation in Clause 2 shall be those first published by the Transport Agency for the appropriate quarter.

9. Where the index for the quarter has not yet been published, interim payments will be made on the basis of the index for the most recent quarter for which an index is available. A correction to the interim payment will be made following the publication of the applicable index and will be processed with subsequent progress payments.

10. If at any time any of the Statistics New Zealand indexes which are inputs into the Transport Agency index(es) referred to in Clause 2 or later clauses are no longer published, or if the basis of any index is materially changed, the adjustment shall thereafter be calculated by using such other input index, or in such other manner as will fairly reflect the changes as previously measured by that index.

11. If at any time any of the inputs into the NZ Transport Agency bitumen cost adjustment series referred to in Clause 2 or later clauses are no longer published, or if the basis of the NZ Transport Agency bitumen cost adjustment series is materially changed, the adjustment shall thereafter be calculated by using such other inputs, or in such other manner as will fairly reflect the changes as previously measured by the NZ Transport Agency bitumen cost adjustment series.

Option B
Schedule – cost fluctuation adjustment

1. The provisions of this schedule shall apply when provided for in the Special Conditions.

2. Subject to the remainder of this schedule, the amounts payable by the principal, to the contractor under the contract shall be adjusted up or down by amounts calculated in accordance with the following formula:

\[
C = (\text{ClA} + \text{ClB}) + \text{CB}
\]

where

\[
\begin{align*}
C & = \text{cost fluctuation adjustment for the month under consideration} \\
\text{ClA} & = \left[ \text{Value}(A) \times \left( \frac{P_A}{100} \right) \times \left( \frac{I_A}{I_A'} - 1 \right) \right] \\
\text{ClB} & = \left[ \text{Value}(B) \times \left( \frac{P_B}{100} \right) \times \left( \frac{I_B}{I_B'} - 1 \right) \right] \\
\text{CB} & = \left[ \text{Volume} \times \left( \frac{\text{Bit}}{\text{Bit}'} - 1 \right) \right]
\end{align*}
\]

and

\[
\text{Value}(A) = \text{value of work completed during the month under consideration for those items in the payment schedule that are to be indexed using Index(A) but without deduction for retentions and excluding the cost fluctuation adjustment}
\]

\[
\text{Value}(B) = \text{value of work completed during the month under consideration for those items in the payment schedule that are to be indexed using Index(B) but without deduction for retentions and excluding the cost fluctuation adjustment}
\]
Contract price adjustment for cost fluctuation: infrastructure contracts

\[ P_A = \text{the proportion of Value(A) to be indexed using Index(A). It is fixed for the duration of the contract and has a value of } Y\% \text{ specify the value of } Y\%. \]

\[ P_B = \text{the proportion of Value(B) to be indexed using Index(B). It is fixed for the duration of the contract and has a value of } Z\% \text{ specify the value of } Z\%. \]

\[ I_A / I_A' = \text{the value of Index(A) defined in Clause 3 for the month under consideration divided by the value of Index(A) for the month during which tenders closed} \]

\[ I_B / I_B' = \text{the value of Index(B) defined in Clause 3 for the month under consideration divided by the value of Index(B) for the month during which tenders closed} \]

\[ \text{Volume} = \text{volume of residual bitumen binder applied during the month under consideration (litres) taken from the payment schedule. Residual bitumen is the non-volatile fraction of the bitumen binder that remains in service after evaporation. Volume is measured at 15 degrees Celsius} \]

\[ \text{Bit} = \text{value of the } NZ \text{ Transport Agency Bitumen cost adjustment series for the month under consideration, published on the Transport Agency website} \]

\[ \text{Bit'} = \text{value of the } NZ \text{ Transport Agency Bitumen cost adjustment series for the month during which tenders closed, published on the Transport Agency website.} \]

3. Index(A) shall the \( << \text{index named here} >> \) and Index(B) shall the \( << \text{index named here} >> \). Both indexes are published on the Transport Agency website.

4. Cost fluctuation provisions shall be applied from the commencement of the contract period.

\( << \text{OR Cost fluctuation shall be applied from the commencement of the contract period except that for months 1 to 12 of the contract period both CIA and CIB shall be deemed } = $Nil. >> \)

5. Cost fluctuations are calculated on a monthly basis.

6. For the purpose of calculating the cost fluctuation adjustment in Clause 2, any daywork, prime cost sums, variations and other payment items which are based on actual cost, or current prices and any advances shall be excluded from the value of work completed.

7. The contractor shall not be entitled to claim cost fluctuation adjustment for work completed after the due date for completion greater than that which would apply had the work been completed on the due date for completion.

8. The index values to be used in the calculation of the cost fluctuation in Clause 2 shall be those first published by the Transport Agency for the appropriate quarter.

9. Where the index for the quarter has not yet been published, interim payments will be made on the basis of the index for the most recent quarter for which an index is available. A correction to the interim payment will be made following the publication of the applicable index and will be processed with subsequent progress payments.

10. If at any time any of the Statistics New Zealand indexes which are inputs into the Transport Agency index(es) referred to in Clause 2 or later clauses are no longer published, or if the basis of any index is materially changed, the adjustment shall thereafter be calculated by using such other input index, or in such other manner as will fairly reflect the changes as previously measured by that index.

11. If at any time any of the inputs into the \( NZ \text{ Transport Agency bitumen cost adjustment series} \) referred to in Clause 2 or later clauses are no longer published, or if the basis of the \( NZ \text{ Transport Agency bitumen cost adjustment series} \) is materially changed, the adjustment shall thereafter be calculated by using such other inputs, or in such other manner as will fairly reflect...
the changes as previously measured by the *NZ Transport Agency bitumen cost adjustment series*.

**Note:** Users of the above model schedule need to be aware that the definitions of Value(A) and Value(B) imply that by some means the schedule of prices will be divided between those items to be indexed using Index(A) and those items to be indexed using Index(B). One way to do that would be to include in the contract documents two lists, which show how the price schedule items will be divided. How costs that may be common, for example P&G costs, are to be treated also needs to be addressed in the contract documents.
APPENDIX 4 – INFRASTRUCTURE INDEXES PUBLISHED BY THE TRANSPORT AGENCY

Eight infrastructure indexes are published by the Transport Agency website with other infrastructure procurement tools.

Transport Agency index values for a particular quarter are usually published within 10 weeks of the end of the quarter. For example, the value applicable to works delivered in the quarter ending 30 September will usually be published early in December.

The eight published indexes are listed in the table below.

<table>
<thead>
<tr>
<th>NZ Transport Agency index</th>
<th>Typically used with</th>
<th>Frequency of calculation and index base date</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance index</td>
<td>Local road infrastructure maintenance contracts</td>
<td>Quarterly – September 2016</td>
<td>One of the original 1991 series of indexes. No longer used for state highways contracts</td>
</tr>
<tr>
<td>Construction other than structures index (costs excluding bitumen)</td>
<td>Construction contracts other than contracts for structures</td>
<td>Quarterly – December 2014</td>
<td>Introduced in 2019 to be used with the bitumen volume based method. Designed as a replacement for the 1991 Construction index. The input indexes for labour, staff, materials plus plant &amp; site overheads are not ‘standard’ Statistics NZ indexes but ‘special’ indexes built for this index.</td>
</tr>
<tr>
<td>Construction index</td>
<td>Construction contracts let prior to the introduction of the Construction other than structures index (costs excluding bitumen)</td>
<td>Quarterly – September 2016</td>
<td>One of the original 1991 series of indexes. Values for this index will cease to be published once the older contracts using it have ended.</td>
</tr>
<tr>
<td>Structures index (costs excluding bitumen)</td>
<td>Bridge and other structures construction contracts</td>
<td>Quarterly – December 2014</td>
<td>Introduced in 2019 to be used with the bitumen volume based method. Designed as a replacement for the 1991 Bridge index. The input indexes for labour, staff, materials plus plant &amp; site overheads are not ‘standard’ Statistics NZ indexes but ‘special’ indexes built for this index.</td>
</tr>
<tr>
<td>NZ Transport Agency index</td>
<td>Typically used with</td>
<td>Frequency of calculation and index base date</td>
<td>Comment</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------------</td>
<td>---------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Bridge index</td>
<td>Bridge construction contracts let prior to the introduction of the <em>Structures index (costs excluding bitumen)</em></td>
<td>Quarterly – September 2016</td>
<td>One of the original 1991 series of indexes. Values for this index will cease to be published once the older contracts using it have ended.</td>
</tr>
<tr>
<td>Professional services index</td>
<td>Professional services contracts</td>
<td>Quarterly – September 2016</td>
<td>One of the original 1991 series of indexes</td>
</tr>
<tr>
<td>Network outcomes index (costs excluding bitumen)</td>
<td>State highways network outcomes contracts and local road contracts which include renewals and use the bitumen volume-based method of contract price adjustment</td>
<td>Quarterly – December 2009</td>
<td>Introduced in 2012. Designed specifically for the network outcomes contracts. The input indexes for labour, plant and materials are not ‘standard’ Statistics NZ indexes but ‘special’ indexes built for this index.</td>
</tr>
<tr>
<td>Reseals index (costs excluding bitumen)</td>
<td>Reseals contracts which use the bitumen volume-based method of contract price adjustment</td>
<td>Quarterly – September 2001</td>
<td>Introduced in 2012 but based on the 1991 reseals index and revised to work with the bitumen volume-based method</td>
</tr>
</tbody>
</table>

The above indexes are calculated by the Transport Agency from Statistics NZ indexes. Some of the Statistics NZ input indexes are ‘standard’ publicly available indexes and others are ‘special’ indexes maintained for the Transport Agency by Statistics NZ.

A Transport Agency index value for a particular quarter is calculated by combining input indexes values using the following general formula:

\[ I_q = \text{con} \times (w_1 \times C_1 / C'_1 + \ldots + w_n \times C_n / C'_n) \]

Where \( I_q \) is the index value for a particular quarter, ‘con’ is a constant, usually 1,000, \( w_i \) is the weight applied to the input index value, \( C_i \) is the Statistics NZ input index value for the particular quarter, and \( C'_i \) is the Statistics NZ input index value for the base quarter.

The following table lists the input indexes and the weights applied, for each of the above eight Transport Agency indexes.
<table>
<thead>
<tr>
<th>Input index</th>
<th>1991 Maintenance index</th>
<th>1991 Construction index</th>
<th>1991 Bridge index</th>
<th>1991 Professional services index</th>
<th>Network outcomes index (costs excluding bitumen)</th>
<th>Reseals index (costs excluding bitumen)</th>
<th>Construction other than structures index (costs excluding bitumen)</th>
<th>Structures index (costs excluding bitumen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction PPIQ.SQNEE0000</td>
<td>0.20</td>
<td>0.20</td>
<td>0.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transport storage and ... PPIQ.SQNII0000</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.08</td>
</tr>
<tr>
<td>Road transport PPIQ.SQNII1100</td>
<td>0.05</td>
<td>0.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPI private transport CPIQ.SE907</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.20</td>
</tr>
<tr>
<td>Fuel &amp; oil (all farms fuel index) FPIQ.SEH15</td>
<td>0.10</td>
<td>0.10</td>
<td>0.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labour cost index LCIQ.SG53Z9</td>
<td>0.50</td>
<td>0.40</td>
<td>0.30</td>
<td>0.80</td>
<td></td>
<td></td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Non-metallic mineral product ... PPIQ.SQNCC6100</td>
<td>0.10</td>
<td>0.20</td>
<td>0.35</td>
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<td>Transport Agency plant equipment &amp; overheads PPIQ.SPZNZT19</td>
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### Contract price adjustment for cost fluctuation: infrastructure contracts

<table>
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<tr>
<th>Input index</th>
<th>1991 Maintenance index</th>
<th>1991 Construction index</th>
<th>1991 Bridge index</th>
<th>1991 Professional services index</th>
<th>Network outcomes index (costs excluding bitumen)</th>
<th>Reseals index (costs excluding bitumen)</th>
<th>Construction other than structures index (costs excluding bitumen)</th>
<th>Structures index (costs excluding bitumen)</th>
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<tr>
<td>Transport Agency materials PPIQ.SPZNZT13</td>
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<td>Transport Agency plant equipment &amp; overheads PPIQ.SPZNZT14</td>
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</table>
APPENDIX 5 - CALCULATION OF THE NZ TRANSPORT AGENCY BITUMEN COST ADJUSTMENT SERIES

NZ Transport Agency Bitumen cost adjustment series values are calculated monthly and are based on the average monthly:

- spot price for Singapore HSFO 180, published by Platts Asia-Pacific (in USD per tonne), and the exchange rate, published by the Reserve Bank of New Zealand (NZD/USD).

The NZ Transport Agency Bitumen cost adjustment series value for any given month is calculated as follows:

\[
\text{NZ Transport Agency Bitumen cost adjustment series value for the month} = \frac{\text{HSFO 180 value (in USD) for the previous month}}{960} \div \text{exchange rate for the previous month}.
\]

For example, using values published for March 2012 the:

\[
\text{NZ Transport Agency Bitumen cost adjustment series value for April 2012} = \frac{748.414}{960} \div 0.8208 = 0.9498
\]

Points to note about the calculation of the NZ Transport Agency bitumen cost adjustment series are:

1. The unit is dollars per litre of residual bitumen.
2. A lag of one month is used, ie data for the previous month determines the series value for the month.
3. The divisor of 960 converts dollars per tonne to dollars per litre of residual bitumen – it is an approximate average value for the density of bitumen expressed in litres/tonne.
4. The value for a particular month is published within 15 working days of the beginning of that month. For example, the value applicable to works delivered in September will usually be published by 20 September.
5. This formula, including the divisor of 960, was agreed by the sector group formed to develop the bitumen volume-based contract price adjustment method.

The NZ Transport Agency Bitumen cost adjustment series is published by the Transport Agency website with other infrastructure procurement tools.
APPENDIX 6 - WORKED EXAMPLE - USING THE BITUMEN VOLUME-BASED METHOD

This worked example applies the formula presented in section 4. It uses the bitumen volume based method, it is a \( C = C_I + C_B \) case.

The table below presents two lines from an example priced schedule of quantities for a reseals contract under which price adjustments are to be made. The nominated index is the NZ Transport Agency reseals index (costs excluding bitumen).

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprayed bitumen reseals (including the cost of bitumen) - grade X chip</td>
<td>m²</td>
<td>50,000</td>
<td>6.50</td>
<td>325,000</td>
</tr>
<tr>
<td>Sprayed bitumen reseals (including the cost of bitumen) - grade Y chip</td>
<td>m²</td>
<td>30,000</td>
<td>7.00</td>
<td>210,000</td>
</tr>
</tbody>
</table>

A monthly price adjustment is made based on the value of work completed plus the volume of residual bitumen supplied during the month. Two adjustment amounts are calculated and summed.

Calculation of the two amounts proceeds as follows.

Note that it is not necessary to have an item (or items) in the schedule of quantities for residual bitumen (litres) but the monthly quantity of residual bitumen applied is required to calculate the amount of the adjustment.

In this example we assume that the contract was priced (tenders closed) in June 2011. The monthly payment calculations (below) are for work completed in March 2012. The calculations assume that 10,000 m² of reseals under the first item and 6,000 m² under the second item were completed during the month.

The first part of the adjustment calculation uses the NZ Transport Agency reseals index (costs excluding bitumen). The value of \( I/I' \) is calculated from figures taken from the table of index values published on the Transport Agency website with other infrastructure procurement tools.

\[
I/I' = \frac{1443}{1424} = 1.0133
\]

where 1443 and 1424 are values for the NZ Transport Agency reseals index (costs excluding bitumen) for the months of March 2012 and June 2011 respectively. Assuming, for the purposes of this example, that costs excluding bitumen represent 60% of the total cost (i.e. the value of ‘\( P \)’ is 60%) then the amount of this first part of the adjustment is equal to the value of work completed during the month multiplied by \((60/100) \times (1.0133 - 1))\). Calculations are summarised in Table 2 below.
Contract price adjustment for cost fluctuation: infrastructure contracts

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Rate</th>
<th>Amount</th>
<th>I/’</th>
<th>Adjustment</th>
<th>Adjusted amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprayed bitumen reseals (including the cost of bitumen) - grade X chip</td>
<td>M²</td>
<td>10,000</td>
<td>6.50</td>
<td>65,000</td>
<td>1.0133</td>
<td>520.37</td>
<td>65,520.37</td>
</tr>
<tr>
<td>Sprayed bitumen reseals (including the cost of bitumen) grade Y chip</td>
<td>M²</td>
<td>6,000</td>
<td>7.00</td>
<td>42,000</td>
<td>1.0133</td>
<td>336.24</td>
<td>42,336.24</td>
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<tr>
<td><strong>Totals</strong></td>
<td></td>
<td>107,000</td>
<td></td>
<td>856.61</td>
<td>107,856.61</td>
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</tr>
</tbody>
</table>

The second part of the cost fluctuation adjustment (for bitumen supply) is calculated as shown below. The amount of the adjustment depends solely on the volume of bitumen applied plus the relevant *NZ Transport Agency bitumen cost adjustment series* values. It is independent of the contractor’s tendered rates, the cost to the contractor of bitumen supply and how the cost of bitumen supply is included in the tender schedule.

The adjustment for bitumen cost fluctuation = residual bitumen volume applied (litres) X dollar adjustment/litre. The dollar adjustment/litre (for this example) would be $0.0648 = $0.9141 - $0.8493 where the figures of $0.9141 and $0.8493 are from the *NZ Transport Agency bitumen cost adjustment series* for the months of March 2012 and June 2011 respectively published on the Transport Agency website with other infrastructure procurement tools. Assuming, for the purposes of this example, a residual bitumen spray rate (for both the above schedule items) of 1.25 litres/m² then the volume of residual bitumen applied during the month will be (6,000 m² + 10,000 m²) X 1.25 litres/m² = 20,000 litres. Calculations are summarised below.

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Bitumen cost adjustment rate</th>
<th>Adjustment</th>
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<tbody>
<tr>
<td>Adjustment for bitumen volume applied</td>
<td>litres</td>
<td>20,000</td>
<td>0.0648</td>
<td>1,296.00</td>
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</table>

The total adjustment for the month of March 2012 (for all costs, bitumen and non-bitumen) would therefore be $856.61 + $1,296.00 = $2,152.61 and the total amount to be paid for the month including adjustment for work completed under the above two schedule items would be $107,000 + $2,152.61 = $109,152.61. Under a typical contract this would be reduced by a ‘retention’ amount.