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Technical Guide for the Architectural, Engineering and Related Services Price Index, 2025

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Technical Guide for the Architectural, Engineering and Related Services Price Index, 2025

1 Introduction

The Architectural, engineering and related services price index (AESPI) measures the quarterly change in the price of various types of architectural, engineering, and surveying and mapping services in Canada. The AESPI is an indicator of economic activity within the Architectural, engineering and related services industry, and a tool for performance evaluation, cost monitoring, contract assessment and benchmark comparisons. It is also used by the Canadian System of Macroeconomic Accounts to arrive at estimates of real value added for the industry and to measure changes in productivity.

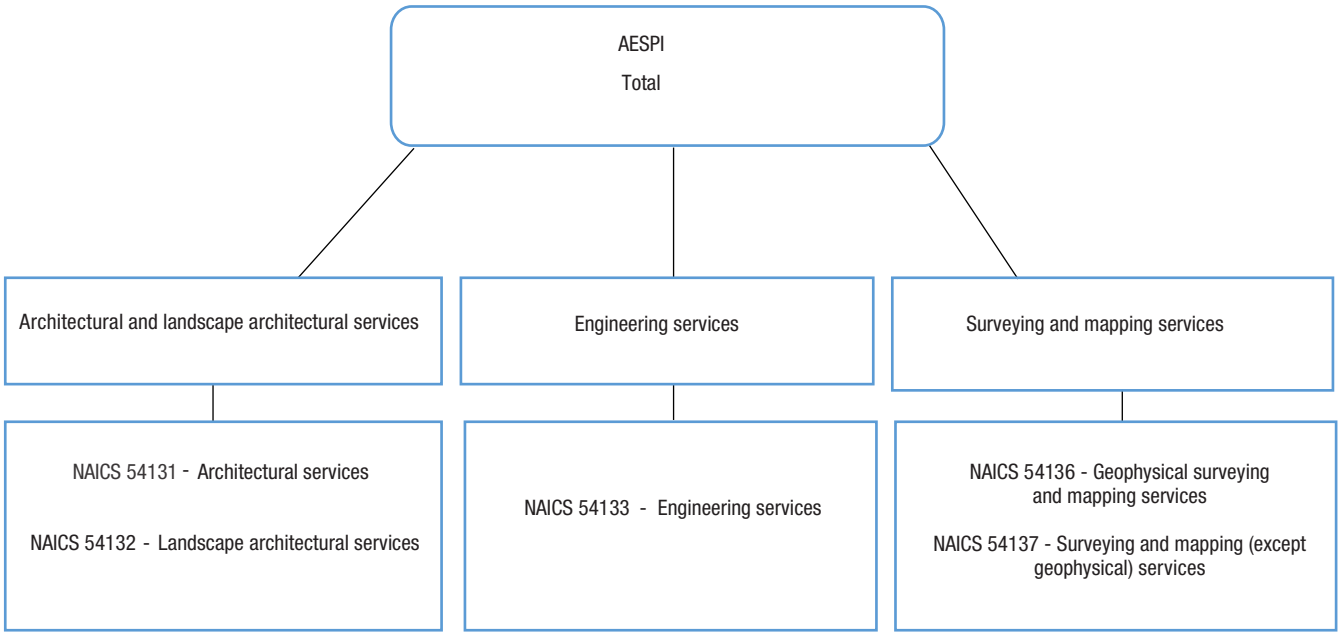
The Architectural, engineering and related services industry's North American Industry Classification System (NAICS) 5413 includes establishments that provide services in structure design, drafting, building inspection, landscape design, surveying and mapping, laboratory and on-site testing, and interior, industrial, graphic and other specialized design services.

For the purposes of the AESPI, services are classified into one of five industries:

- NAICS 54131: Architectural services
- NAICS 54132: Landscape architectural services
- NAICS 54133: Engineering services
- NAICS 54136: Geophysical surveying and mapping services
- NAICS 54137: Surveying and mapping (except geophysical) services

The AESPI is an aggregation of these five service industries. An aggregation for Architectural and landscape architectural services is created by pooling data for both NAICS 54131 and NAICS 54132 (for each establishment separately). A second aggregation is created for Surveying and mapping services by pooling NAICS 54136 and NAICS 54137. Data for each service industry are collected separately in a questionnaire.

Figure 1
Overview of Aggregation Structure for the AESPI

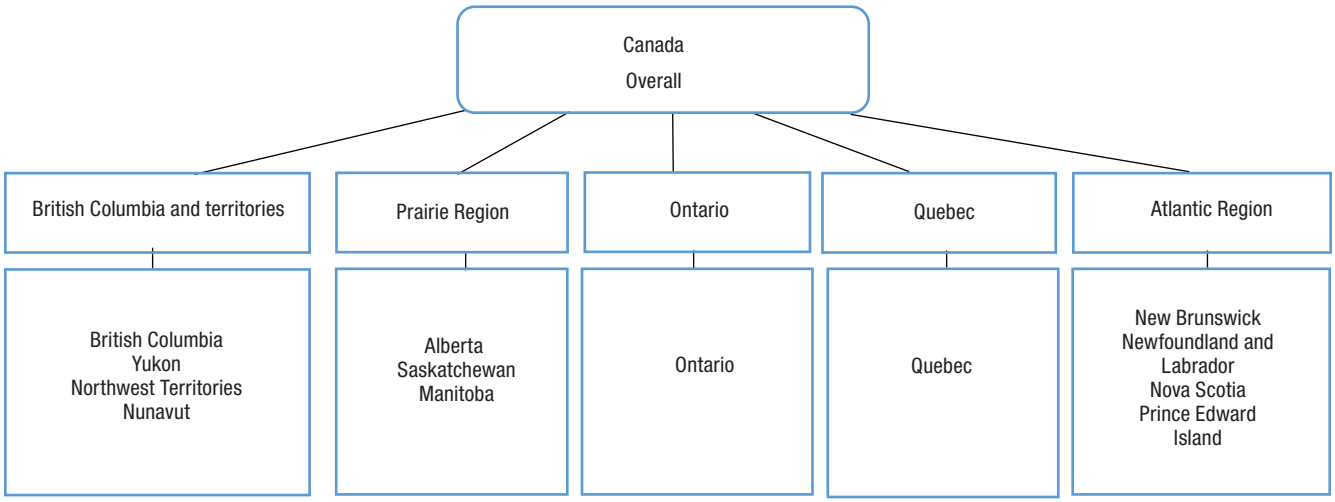


Data collection for the AESPI occurs over an eight-week period beginning on the 15th (or the next business day) of the second month of each calendar quarter.[1]

Indexes are published at the national and regional levels. For each geographic region (British Columbia and territories, Prairie Region, Ontario, Quebec and Atlantic Region), data are published for Architectural and landscape architectural services, Engineering services, Surveying and mapping services, and for the overall aggregated AESPI.

1. For the AESPI, collection for the first quarter (Q1) will start on February 15th or the next business day, where Q1 = January, February and March, and will run over an eight-week long period. This cycle continues for each subsequent quarter.

Figure 2
Overview of Geographic breakdown for the AESPI



To follow the price of a constant-quality service over time, this survey adopts a model-pricing approach. To establish a model contract, respondents are asked to select and specify a contract on which their firm has completed work within the past two years. It should also be representative of the typical work in which their firm engages. Each quarter, respondents are asked to provide estimates for the number of hours (or units) and the charge-out rates that their company would charge for each direct labour level if their company were to bid again on the contract during the particular quarter. This model is intended to capture realistic details of the price components such as cost of direct labour utilized, overhead, profit and other applicable direct costs of a typical project. The objective is to monitor changes in the prices of architectural, engineering, or surveying and mapping services over time.

Appendix A defines key concepts used for constructing the AESPI.

2 Data Sources

2.1 Sampling process

The sampling frame for Architectural, engineering and surveying and mapping services, consists of all establishments on Statistics Canada's Business Register[2] (BR) that are classified to the NAICS 5413. The probability of selection is based on the Sequential Poisson Probability Proportional to Size[3] sampling methodology.

The sample was last updated in 2024 using BR data for 2023. The target population for this survey is all establishments in the Architectural, engineering and related services industry that were classified under the five NAICS codes and in the five regions listed in section 1, excluding all establishments that contributed to the bottom 10% of the total revenue in each service group, province and territory that were excluded from the sampling frame for this survey. The cut-offs were calculated by province / territory,[4] as the size by revenue of the establishments can differ between provinces / territories, even within the same group.

The target sample size for this survey was 700 establishments, which accounts for 55% of the target population. The total sample size was first allocated to each group in two ways: using the number of establishments, and using total group revenue.

2.2 Prices

Data for the AESPI are collected from a quarterly survey of establishments that provide architectural, engineering, or surveying and mapping services during the year in which the sample was selected.

For the purposes of measuring price change, the unit of measure may consist of either an entire contract or a portion of a contract. Since prices will generally be based on a model or estimate rather than actual recurring transactions, service substitutions will be limited.

Substitution will be required if the firm no longer offers services similar to those described when the model contract was originally created. In the event that the original model contract becomes obsolete, the firm may specify a new one. While adjustments can be made from time to time, the model is intended to remain static as long as it remains representative of the typical work in which the firm engages. By holding the characteristics of the model contract constant, this approach allows a constant-quality service price to be calculated. This constant quality price then feeds into the Canadian System of Macroeconomic Account's (CSMA) estimates of constant dollar GDP.

2.3 Revisions

With each release, data for the previous quarter may have been revised. These revisions occur when late data is collected for a previously non-responding establishment. The index is not seasonally adjusted.

2.4 Weights

The weights used for the AESPI come from revenue data stored on Statistics Canada's Business Register. The revenue breakdown is reported as a percentage of an establishment's total revenue allocated to each service industry. These percentages are then applied to the data obtained from the (BR) to derive a value for each service industry by establishment. The three service industries are then weighted together using revenue weights relative to each industry's share in NAICS 5413 to arrive at the AESPI. Weights are updated during a basket update which typically occurs every 5 years.

2. The Business Register (BR) is Statistics Canada's continuously-maintained central repository of baseline information on businesses and institutions operating in Canada.
3. The probability of selection for unit i is given by $\pi_i = \frac{nx_i}{\sum_{i=1}^{N} x_i}$, where the sampling frame consists of *N* units, *n* is the desired sample size and x_i is the revenue of unit *i*.
4. Provinces and territories are aggregated into the five geographic regions as shown in section 1, with data published at the regional and national levels.

3 Index Estimation and Aggregation

3.1 Introduction

The AESPI is based on a fixed sample, where a basket of services is fixed and changes in prices for these services are measured over time. The AESPI is calculated for the current period and compared to the base period to measure price change. Estimates are produced by calculating a weighted average of price relatives by industry. The AESPI is a Lowe[5] index, available at the national and regional levels.

3.2 Calculation of elementary aggregates

At the first stage of aggregation, the price relatives are aggregated using an unweighted geometric average to form a price index for each service type (Architectural and landscape architectural services, Engineering services, or Surveying and mapping services), for a particular establishment. For the AESPI, the elementary aggregate is at the establishment, service type and geography level. These initial level aggregations are referred to as elementary price indexes.

3.3 Compilation of upper level aggregated indexes

The elementary price indexes are then aggregated across establishments within each service industry using a weighted arithmetic average known as the Lowe formula. The weights for each industry-level index are price-updated to the price reference period assigned to each architectural, engineering, or surveying and mapping establishment.

The index for industry *j* is given by:

$$I_j^{t/0} = \sum_i s_{j,i}^{0b} \times \frac{p_{j,i}^t}{p_{j,i}^0}$$

If we let:

$p_{j,i}^t$ denote the price for establishment *i*, in industry *j* at period *t*.

$p_{j,i}^0$ denote the price for establishment *i*, in industry *j* at base period 0.

$I_j^{t/0}$ denote the price index for industry *j*.

$s_{j,i}^{0b}$ denote the price-updated weight attributed to each establishment *i,* in industry *j*, where $s_{j,i}^{0b} = \frac{p_{j,i}^0 q_{j,i}^b}{\sum_i p_{j,i}^0 q_{j,i}^b}$

At the highest level of aggregation, the overall index is computed by taking a weighted arithmetic average of the industry level indexes, where the weights are the price-updated revenues attributable to each industry.

For this case, the total AESPI is calculated by:

$$AESPI^{t/0} = \sum_j s_j^{0b} \times I_j^{t/0}$$

5. A price index that measures the proportionate change between periods 0 and t in the total value of a specific basket of goods and services, where the price reference period and quantities are not from the same period.

If we let:

s_j^{ob} denote the price-updated weight attributed to each industry *j*, where $s_j^{0b} = \frac{\sum_i p_{j,i}^0 q_{j,i}^b}{\sum_j \sum_i p_{j,i}^0 q_{j,i}^b}$

3.4 Basket updates

Revenue weights of the establishments are revised on a regular basis to reflect current economic activity. The revenue weights assigned to each establishment at the time of selection remain fixed between basket updates. For the AESPI, this occurs every five years. Basket updates include adjusting revenue weights and updating the sample by adding or removing establishments to ensure that the target population is accurately represented by the index. Prices collected from the new sample will form a new index series using the revised weights.

The basket update occurred with the release of first quarter 2024 data.

With the introduction of a new basket, historical estimates are linked to the new basket by maintaining the same historical quarterly changes. This is done by calculating a link factor for each index series as the ratio of the new index series in the overlap period to the old index series. This link factor is applied to the old index series to bring it up or down to the level of the new index. The overlap period for AESPI is currently the fourth quarter of 2023.

Appendix A: Concepts and definitions for AESPI

Concept	Definition
Base period	The period for which an index is set to 100. The base period for the AESPI is 2018.
Contract	A legally enforceable document recording the agreement of a client and one or more other parties to provide specified goods or services usually during a particular period of time in exchange for specified remuneration (fee).
Direct labour	Total labour cost of all professional, technical and administrative staff of the service provider engaged on a specific project. The hourly billing rate for each level of direct labour classification can be quoted as the direct salary or wage rate, the direct personnel rate or the charge-out rate.
Price	The dollar amount invoiced to a client for a particular contract in a given fiscal year.
Charge-out rate	The price charged per unit in pricing based on working time utilized on a project. Normally this is an hourly rate charged to a client for services. Charge-out rates include overhead and profit in addition to the basic labour costs.
Overhead	Costs relating to the general operation and maintenance of a professional practice that are not billable directly to the project. Total direct labour fees for a project usually cover for these expenses either through a multiplier of direct salary expense or of direct personnel expense.
Target population	All establishments in the Architectural, Engineering and Related Services Industry classified under the following NAICS: 54131, 54132, 54133, 54136, 54137, with all establishments that contributed to the bottom 10% of the total revenue in each service group and province were excluded from the sampling frame.