Mobility monitor

Transportation Data

Monitoring today, for tomorrow.

This issue

Vehicle Kilometres Travelled in Calgary

December 2010
Issue #37

The Vehicle Kilometres Travelled (VKT) indicator

The VKT indicator is one of the performance indicators that is widely used in literature as a common measure of roadway use. It is used in estimating congestion and can provide a general measure of the level of economic activity in a city. The VKT indicator reflects the link between land use and transportation. Land uses (home, job, school, day care, retail, etc.) that are further away from each other result in longer trip lengths and inevitably lead to more traffic on the streets and more vehicle kilometres travelled. In addition, this indicator can be used for transportation greenhouse gas (GHG) emissions and air quality calculations.

Transportation Data division (The City of Calgary, Transportation Planning) has developed a methodology regarding the calculation of vehicle kilometres travelled within Calgary's city limits based on observed traffic volumes. A process has been established that measures travel demand over time based on readily available, observed traffic data.

DEFINITION
Daily vehicle kilometres travelled are calculated by multiplying the observed 24-hour average annual weekday traffic volumes by the single centre-line length of the primary roadways within city limits only.

It means that Daily VKT include all weekday travel on Calgary streets by not only Calgarians but all visitors and commuters from the region. It also includes all commercial travel (passengers and goods) on Calgary roadways.

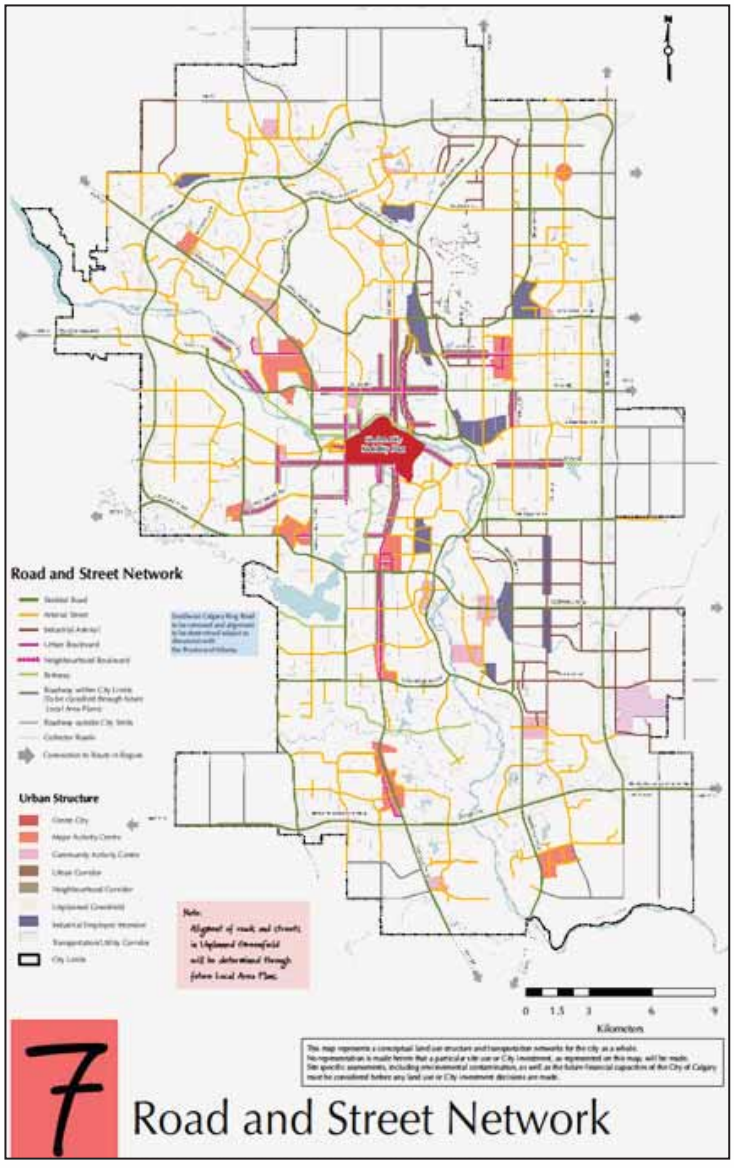
Residential Streets are not used in the VKT calculation because of traffic volume variations throughout the city on these roadways. Traffic counts on residential roadways are usually carried out as part of a targeted study for a specific area, such as part of traffic calming studies, crosswalk warrants or other special studies and do not provide comprehensive data for reliable estimation of VKT on Residential Streets.

DATA SOURCE

The main source of data is the GIS database consisting of single line length of primary roadways and a 24-hour average weekday traffic volume on those segments.

Primary roadways

Under the current Calgary Transportation Plan 2009 classification, primary roadways consist of Roads (Skeletal Roads) and Streets (Arterial Streets, Parkways, Urban Boulevards, Neighbourhood Boulevards and Industrial Arterials). All primary roadways within city limits are included in the VKT calculation regardless of the ownership (e.g., provincial).

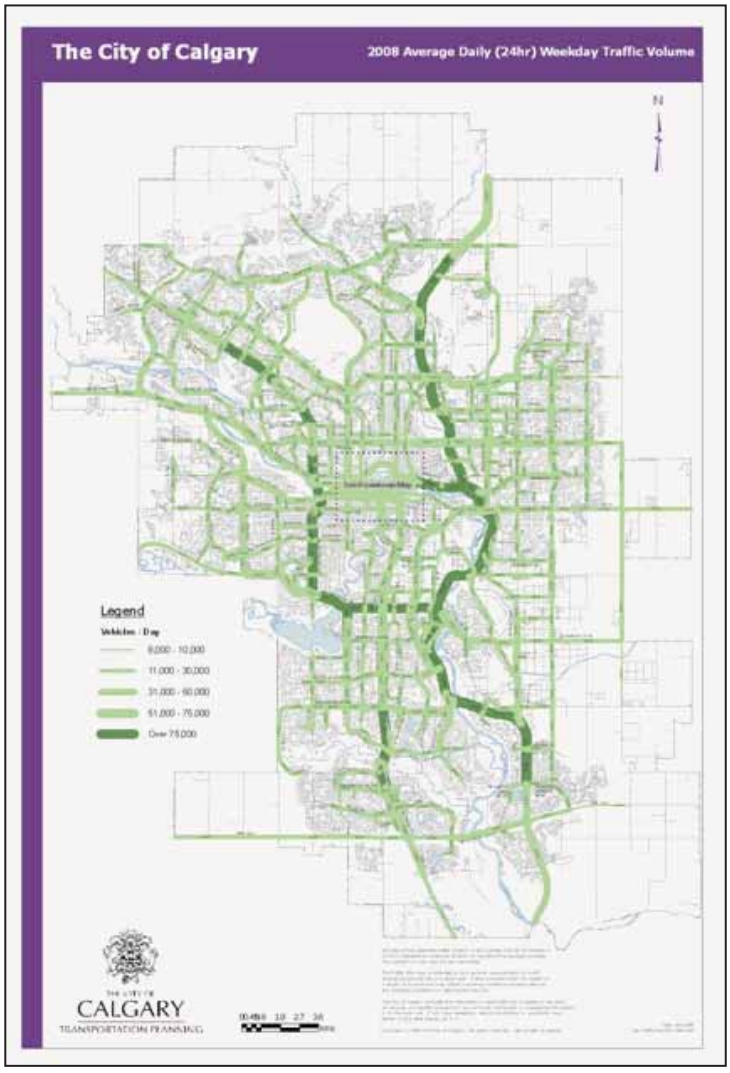


Average daily (24hr) weekday traffic volume

The main source for traffic volume data is the Flow Map GIS database. This database uses all of the traffic count data:

- manual intersection 6-hour traffic counts
- short-term automatic 24-hour counts, and
- permanent traffic counting station counts.

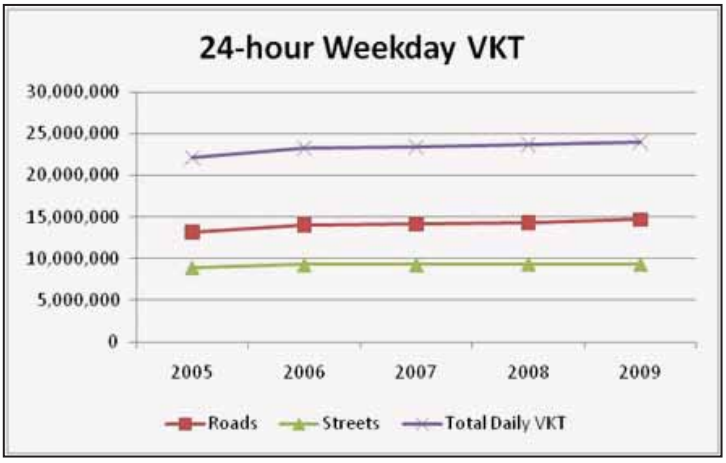
As the Flow Map database represents average daily, weekday traffic volumes, adjustment factors are developed from the permanent traffic counting stations and automatic 24-hour counts. Those adjustment factors are then applied to the six-hour manual counts to represent 24-hour volumes.



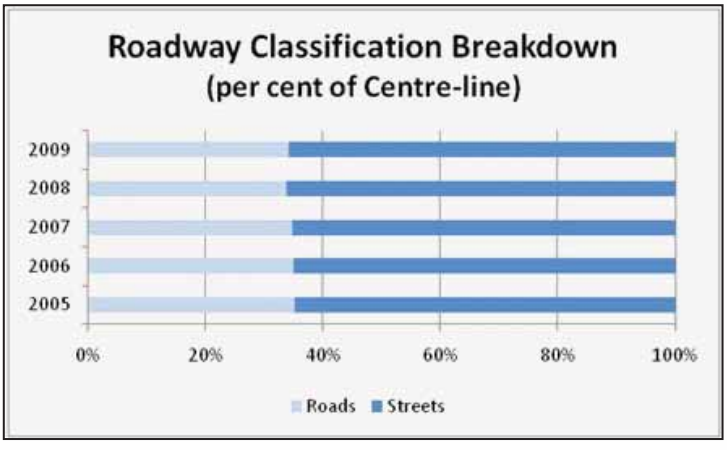
KEY FINDINGS:

Daily and annual VKT show a consistent growth over the past five years. Annual VKT per capita show a decline after 2007.

The figure below shows a growth of 11 per cent in the daily VKT on Skeletal Roads and almost constant VKT on Streets over the five-year period. This is expected, as the largest traffic volumes are observed on the Skeletal Roads, especially Deerfoot Trail where the total traffic volume on all segments within city limits increased by 22 per cent from 2005 to 2008.



In 2009, the total centre-line length of primary roadways was comprised of 34 per cent Skeletal Roads and 66 per cent Streets.



Out of all daily vehicle kilometres travelled, 61 per cent occurred on Skeletal Roads. On average, one kilometre of Skeletal Roads centre-line carried more than 50,500 vehicles per day. During the same period, the average traffic volume per one km of Streets was 16,700 vehicles per day in 2009.

Annual vehicle kilometres travelled

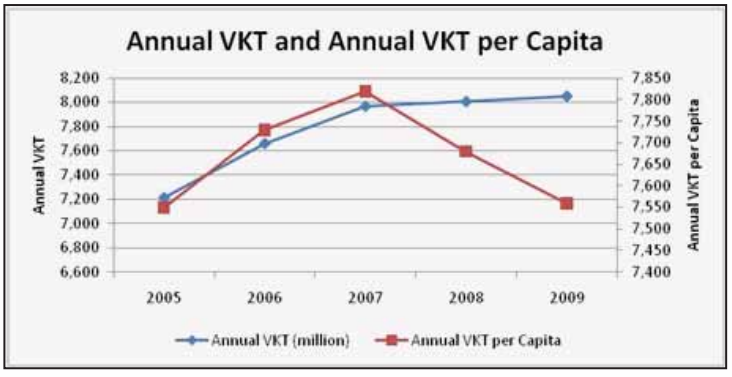
DEFINITION

Annual vehicle kilometres travelled are calculated by multiplying daily VKT with a daily-to-annual conversion factor for each year.

The daily to annual factor is calculated based on data from 31 permanent count stations located across the city. By using data from permanent count stations, the daily-to-annual factor takes into account traffic volume variations on weekends and statutory holidays on Calgary roadways.

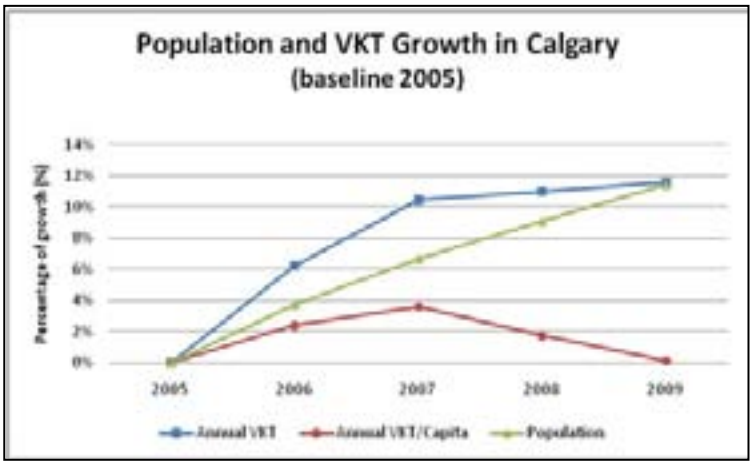
Year	Daily-to-annual factor
2005	326.23
2006	328.69
2007	340.73
2008	337.37
2009	335.16

The annual VKT show a consistent growth (12 per cent from 2005 to 2009). However, from 2007 to 2009, the annual VKT increased only by one per cent, which may have been in response to rising fuel prices in Calgary and increased transit ridership.



Although the annual VKT has a steady increase over the five year period, the 2009 annual VKT per capita is almost the same as the 2005 annual VKT per capita. This is mainly due to population increase of 11 per cent during the same time period, but also due to slower increase in annual VKT, especially from 2007 to 2009.

The figure below shows the relative change in the annual VKT, annual VKT per capita and population growth in relation to the 2005 base year. Annual VKT growth reached a plateau in 2007. Annual VKT per capita decreased after 2007, which may be due to steady population increase, higher fuel prices and/or economic downturn.



Implications

Unknown variables can significantly contribute to a VKT increase or decrease. These can include:

- new economic opportunities or constraints, such as economic boom or downturn
- changes in technology
- a massive change in fuel prices
- differences in environmental awareness, or
- social value changes.

The VKT indicator is widely used to measure automobile dependence. Building intensified developments with a mix of jobs, retail, amenities and homes provides opportunities for more transportation options. Shorter trips to more destinations can make walking, as the most sustainable mode, more attractive. By minimizing the need to travel outside the neighbourhood for daily needs and increasing the convenience of public transit, for example, the automobile dependence can be reduced.

Lower vehicle kilometres travelled provides benefits of reduced congestion, roadway and parking cost savings, transportation safety while improving public health and efficiency of goods movement.

The Municipal Development Plan and Calgary Transportation Plan set a direction for development of an integrated, multi-modal transportation system within complete communities, which in turn, will provide a variety of sustainable mobility options for Calgarians. The VKT indicator should not be used in isolation, but rather with other indicators to provide a comprehensive measure of sustainable mobility.

Sources of information

Data from the City's regular Traffic Count Program were used to calculate daily and annual vehicle kilometres travelled. Traffic flow maps are produced annually and are available on the City's website.

The population data are obtained from the City of Calgary Civic Census.

How accurate and reliable are these data?

How concerned should you be by the potential for error in the data presented in The Mobility Monitor? Traffic on a road can vary by 10 per cent or more from one day to the next.

A change from one year to the next may be due to some random event, such as the weather, accidents or illness. This is why it is wise to look at trends, since changes that are consistent over a long period of time are more likely to be real, and not just the result of random events.

It must be kept in mind that no one source of information can claim to be infallible. Consideration and appropriate weighting of other sources of information is to be encouraged before making decisions.

The Mobility Monitor

As part of the Calgary Transportation Plan (CTP) Implementation Framework, a Monitoring and Reporting Program has been established. The purpose of the Mobility Monitor is to report on strategic trends and events that affect the implementation of the CTP. The Mobility Monitor is produced by the Transportation Data division of Transportation Planning.