Supports Item No. 4
P&E Committee Agenda
September 20, 2007

CITY OF **VANCOUVER**

ADMINISTRATIVE REPORT

Report Date: August 30, 2007
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TO: Standing Committee on Planning and Environment

FROM: General Manager of Engineering Services

SUBJECT: Expansion of the Bicycle Count Program

RECOMMENDATION

THAT expansion of the Bicycle Count Program be implemented as described in this report, at an estimated cost of $50,000 to be provided from the 2007 Bicycle Network Program Capital Budget to support the continued monitoring and development of the City's Bicycle Network.

COUNCIL POLICY

In 1997, Council approved the City of Vancouver Transportation Plan that emphasized the need to develop more bikeways and ranked cyclists as a second priority after pedestrians.

In 1999, Council approved the 1999 Bicycle Plan: Reviewing the Past, Planning the Future, which identified future bicycle facilities and initiatives.

In July 2002, Council adopted the Downtown Transportation Plan to improve downtown accessibility and liveability by creating a balanced transportation system.

In April 2005, Council approved the Community Climate Change Action Plan that identified the critical importance of encouraging and supporting active transportation, if Vancouver is to meet its greenhouse gas reduction target for 2012.

PURPOSE

The purpose of this report is intended to provide Council with an update to the Bicycle Count Program. This includes current counting techniques, progress of the pilot project for automated counts, and further expansion of the Bicycle Count Program.

BACKGROUND

The City of Vancouver 1999 Bicycle Plan identified action items within the four fundamental "E's" of cycling (Engineering, Education, Enforcement and Encouragement). The action items were reported out in detail in the report "1999 Bicycle Plan: Reviewing the Past, Planning the Future" and subsequently in the 2006 Update Report.

Action item 5 defines that a bicycle counting program be implemented using both automated and manual methods to better determine bicycle volumes along the bikeways and other streets, and to further refine the peak hour factor for cyclists.

In July, 2006, Council approved a pilot project for automated bicycle counts.

DISCUSSION

Cycling is now the fastest growing mode of transportation in the City of Vancouver. Over 50,000 bike trips are made each day and, during the morning peak period, 2,700 bike trips are destined to the downtown core. In the past ten years, Vancouver's Bicycle Network has more than doubled in size from 80km to 178km of constructed bicycle facilities. The expanded network has increased the demand to monitor the bikeways.

Monitoring bicycle movements is an important step to help guide decisions on where to develop new facilities and how to improve existing ones. Bicycle count data will also help validate assumptions on bicycle volumes as well as document bicycle use before and after new bike facilities are constructed.

The future of the Bicycle Count Program relies on multiple components that are presented within this report. These components include automated counting systems, permanent counting stations, and a defined count methodology.

Existing Count Process

Bicycle Counts

In 1993, manual bicycle counts were integrated into the City of Vancouver's existing traffic count program. Manual counts provide information about the number of cyclists passing through an intersection during the peak hours for vehicle traffic (from 7:00 to 9:00 a.m. and from 3:30 to 5:30 p.m.). Although this method is very accurate it requires significant staff resources to regularly monitor all the bicycle facilities.

Staff have completed a review of one of Vancouver's most popular commuter cycling facilities, the Adanac Bikeway. The findings for the Adanac bikeway are very informative and having similar data and monitoring for all bikeways within the City would be of great value. On the Adanac Bikeway, bicycle counts were completed at key locations along the route and compared to historical data (see Figure 1). Trends are easily evident and two key points should be noted:

1. Bicycle usage at each count location has been increasing over time, and
2. Volume of cyclists increases towards the downtown core.

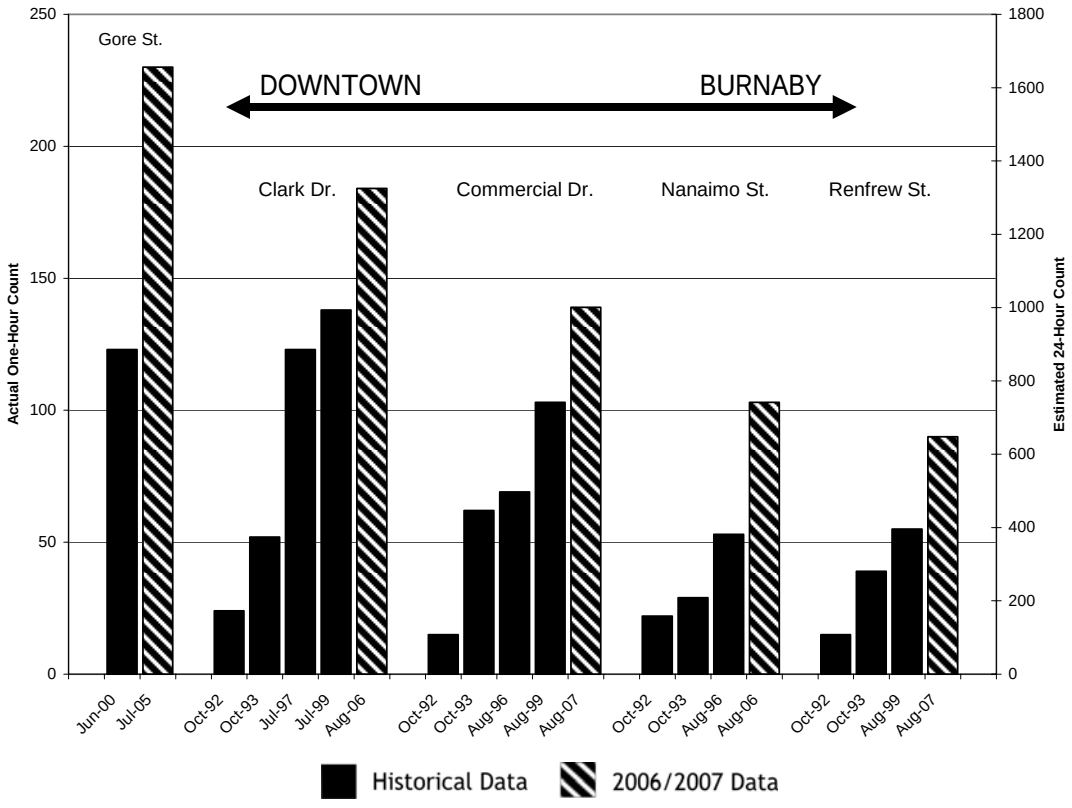

Figure 1: ADANAC BIKEWAY – One - Hour East and Westbound Bicycle Volumes

Vehicle Counts

Much of the bicycle network within the City of Vancouver occurs on local residential streets. With the development of cycling facilities along these residential streets there often is a concern raised regarding the potential for motor vehicle shortcutting. To address this concern, traffic calming is included on most routes to both deter and, at key locations, divert motor vehicles. These changes to the street network help to discourage use of these routes by motor vehicles other than for the purposes of providing local access. Through monitoring of these routes, staff will be able to identify any areas that may need to be further protected with additional and perhaps more restrictive traffic calming measures to discourage vehicle use.

Vehicle counts were taken at several locations along the Adanac Bike route and these findings are shown in Figure 2. Recent counts show a favourable trend where an overall reduction in motor vehicle volumes has been observed.

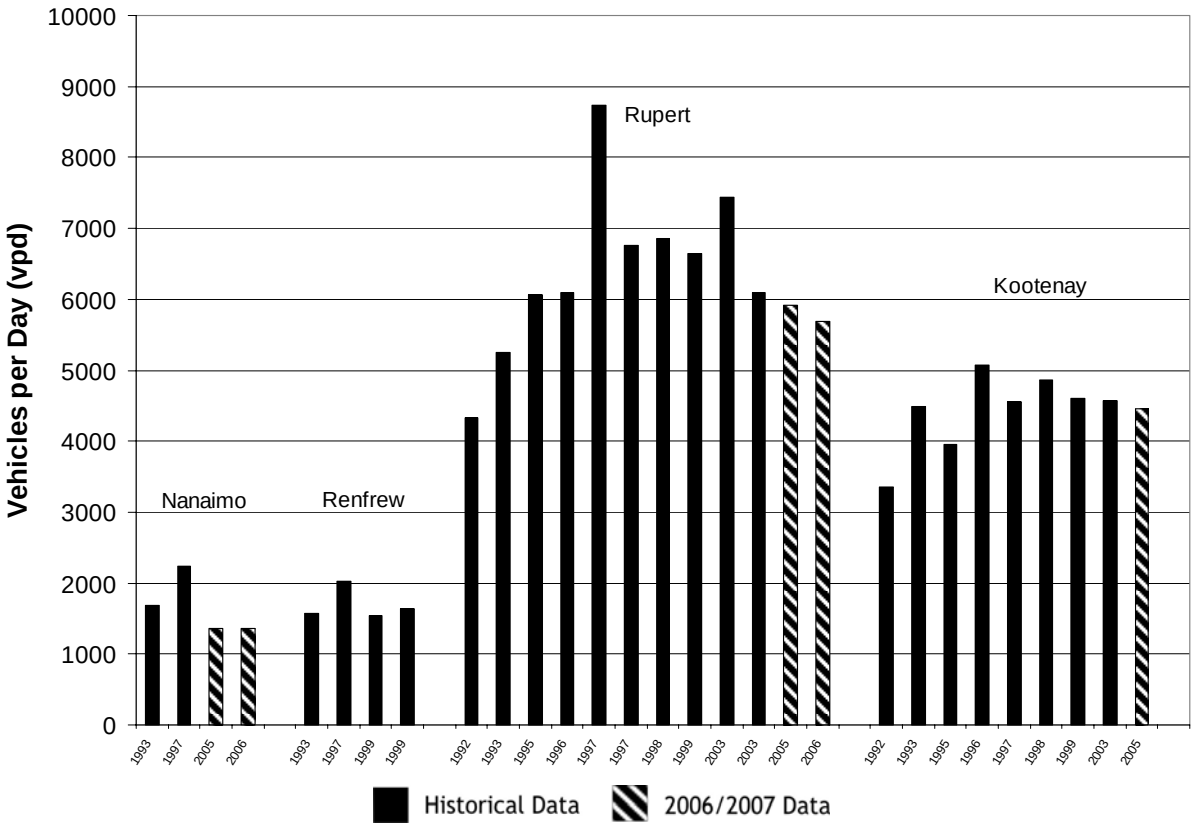

Figure 2: Two-way Vehicle Volumes at various locations along the Adanac Bikeway

Ongoing collection of data relating to bicycle and vehicle usage of greenways and bikeways is vital to ensure the continued success of these facilities. To that end, the following monitoring program should be fully implemented within the bicycle program.

Automated Counting Systems

On July 18, 2006, Council approved a pilot project for automated bicycle counts. This project allows data collection on a continual basis and can provide information on daily and seasonal variations. In order to monitor the City's rapid growth of bicycle usage, automated counters can effectively operate with minimal human intervention or supplemental costs.

Staff have been in contact with numerous suppliers that have provided detailed information on the technologies available. Such technologies include infrared sensors, pneumatic tubes, inductive loops, and low frequency radio waves; each with their own benefit, these counters allow data to be collected for a variety of applications.

Suppliers have provided contacts from municipalities that currently use automated counting systems. Through direct communication with these municipalities, namely the City of Montreal and the City of Odense in Denmark, information on the reliability and accuracy of each counter can be gathered. Staff have also established trial periods that will allow customized testing to achieve optimal functionality. Proposed locations and technologies used for the trial period are outlined in Appendix A.

Automatic counts are generally less accurate than manual counts, so it is recommended that manual counts still be performed periodically. Implementation of automated counting systems will provide essential data to help staff continue to complete the City's Bicycle Network as a safe and convenient environment for cyclists.

Bicycle Count Methodology

Further expansion of the Bicycle Count Program relies on gathering consistent and comparable data, therefore a bicycle count methodology has been adopted for all major bikeways within the City.

There are 3 key benefits for gathering count information:

1. Network Planning
2. Seasonal and Daily Trends
3. Conditions Analysis

To obtain these statistics, a counting method and schedule is critical to help identify factors that may influence results. The complete methodology is outlined in Appendix B.

FINANCIAL IMPLICATIONS

To support the continued monitoring and development of the City's Bicycle Network, $50,000 from the 2007 Bicycle Network Program Capital Budget will be allocated for the costs of manual counts.

ENVIRONMENTAL IMPLICATIONS

The expansion of cycling facilities compliments initiatives to encourage sustainable and active modes of transportation. These directions were identified and support the direction of the Community Climate Change Action Plan.

CONCLUSION

Bicycle facilities continue to develop across the region. Monitoring programs now play a vital role in quantifying the growth in use of Vancouver's Bicycle Network. Further expansion of the Bicycle Count Program will provide information on the existing network usage, and will help staff develop future bicycle facilities and improve existing ones.

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Automated Counting Systems

1. Infrared Sensor

Product: Middle Range Pyro by Eco-Counter

Technology: A lens sensitive to the infrared radiation emitted by a human body.

Description: The strict frequency range permits accurate group counts. Infrared cannot distinguish pedestrians from cyclists, therefore being ideal for dedicated bicycle paths only.

Proposed Location: Union St at Hawks Ave

2. Inductive Loop

Product: Zelt inductive loop by Eco-Counter

Technology: A diamond shape inductive loop is installed 2 to 4 cm into the road. When a bicycle passes over, the system detects the electromagnetic signature of each wheel and validates a count.

Description: The most accurate technology which may be installed on shared roads where only bicycles will be counted and motorized vehicles will not.

Proposed Location: Ontario St at W 11th Ave

3. Pneumatic Tubes

Product: Selective pneumatic tube by Eco-Counter

Technology: Two pneumatic tubes are laid on the road perpendicular to the flow of traffic.

Description: When a vehicle goes over the tubes the speed allows the system to determine the distance between axles. Thus, the system is able to distinguish bicycles in vehicle traffic.

Proposed Location: 10th Ave at Yukon St

Bicycle Count Methodology

Scheduling

Discrepancies in count data occur primarily due to time factors. Variations in a daily and yearly cycle are evident and to fully understand trends and peak hour factors, counts must be conducted accordingly.

Peak hour bicycle counts take place during the peak hour for vehicles (from 7:00 to 9:00 a.m. and from 3:30 to 5:30 p.m.). Seasonal variations can be recorded in two ways:

- permanent counters that collect data throughout the entire year
- automatic or manual counts conducted once per season of the year

Counts should only be conducted on Tuesdays, Wednesdays, or Thursdays and not during, or on days adjacent to, holidays. Special scheduled counts may be conducted on other days for specific data collection (i.e. special events & festivals). Other non-scheduled counts may occur for studies such as the One Day One School Program to monitor children cycling to school.

The table below explains each type of counter and how it will be utilized.

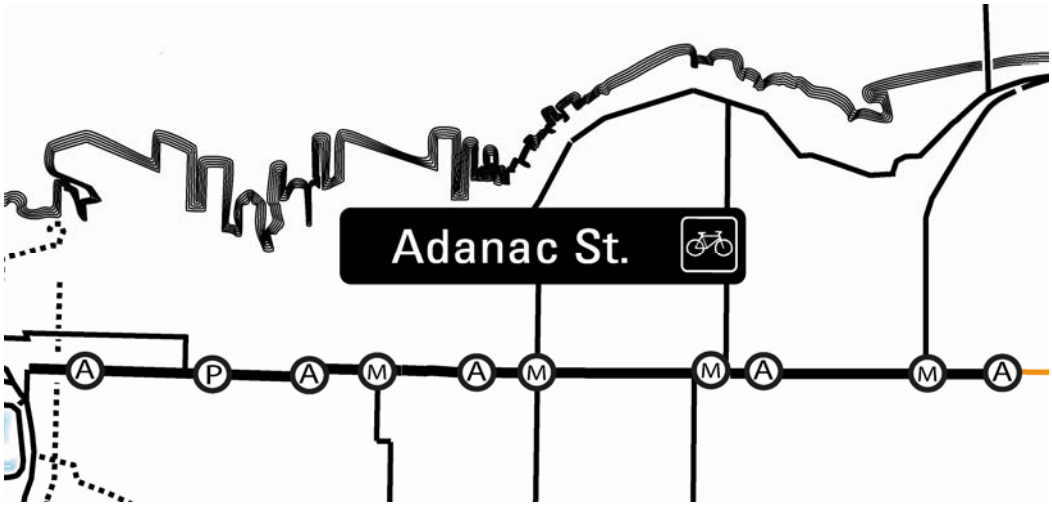
Manual Counts	Manual counts will be conducted during the peak hours of vehicle traffic (from 7:00 to 9:00 a.m. and from 3:30 to 5:30 p.m.). City staff will record all bicycle movements and determine the actual peak hour.
Automated Counts	Automatic counts will be conducted on bikeways between arterials. These counts will be installed for either a 24 or 48 hour period to gather daily variations.
Permanent Counter	One permanent counting station will be installed on each major bikeway within the city. This will gather bicycle facility usage all year round revealing seasonal trends. Likely candidates for permanent counting stations will be the Adanac, Ontario, and 10th Avenue Bikeways

Locations

Each monitored bikeway will be setup to provide comparable data. Regular counter locations should be based on the following criteria:

- automatic counts conducted within 1 km of the entry and exit point
- manual counts will be conducted at all intersecting major bikeways
- automatic counts will be placed between arterials
- permanent counters will, where possible, be placed on off-street paths along the bikeway

The following is an example of counter locations on a major bikeway.



Manual Count Locations	Automatic Count Locations	Permanent Count Location
▪ Woodland Dr. ▪ Lakewood Dr. ▪ Slocan St. / Kaslo St. ▪ Cassier St.	▪ W/O Gore Ave (on Union St.) ▪ W/O Clark Dr. ▪ E/O Commercial ▪ W/O Renfrew St. ▪ E/O Kootenay St.	▪ Hawks Ave (off road path to cul-de-sac)

Bicycle counts are generally higher when conducted closer to the downtown core. To address this trend, cordon counts are recorded specifically to determine the amount of cycling commuters to the downtown area. Cordon counts are strategically setup and detailed information is provided in Appendix C.

Additionally, cordon counts will be expanded to calculate the total amount of incoming regional commuters. Counters will be periodically setup to record the number of cyclists travelling into Vancouver at locations on bikeways that connect to adjacent municipalities.

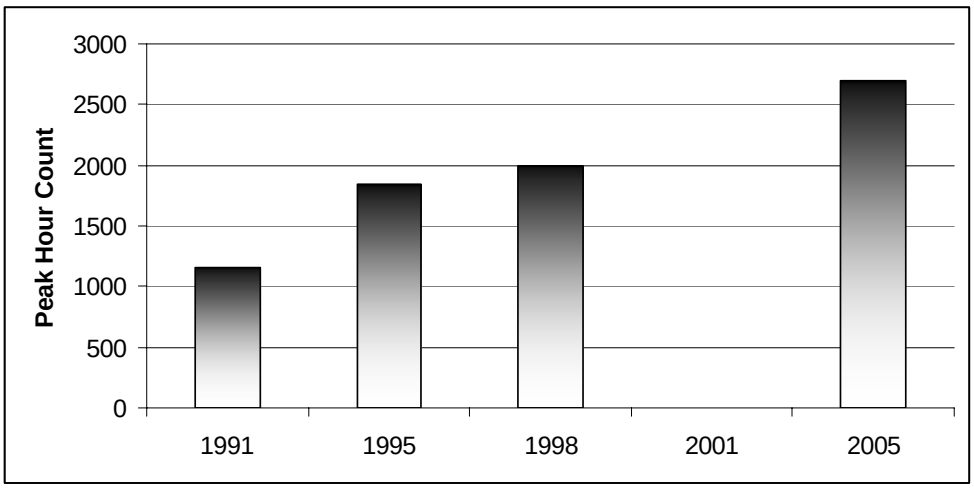
Other Factors

Weather conditions drastically alter count data. While many avid cyclists use the bike facilities all year round, poor conditions will deter some cyclists. City staff will continue to monitor facilities during all weather conditions and, to determine this split, will note each session accordingly.

Construction and temporary closures may affect travel patterns for cyclists. As the construction and bike seasons run concurrently, conditions of the area surrounding the count location should be checked prior to counting. If conditions are not suitable to provide comparable data then the count should be postponed or re-scheduled.

Cordon Counts

Cordon counts will be positioned at locations similar to Gore St. on the Adanac bikeway. The number of commuters to the downtown core can be totalled during the am peak period and compared to previous years, as shown in the graph below.



Previous Year Peak Hour Cordon Count