



## **CITY OF KIRKLAND**

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### **MEMORANDUM**

**To:** Kirkland City Council

**From:** Kirkland Transportation Commission, Dan Fisher, Chair

**Date:** October 3, 2006

**Subject:** Intelligent Transportation Systems (ITS) in the City of Kirkland

### RECOMMENDATION

Hire a consultant to prepare an ITS plan that will be our blueprint for the coordinated implementation of ITS in Kirkland. The plan would include project descriptions, phasing, priorities, and cost estimates based upon the objectives listed in this report. Funding from the Capital Improvement Program budget would be used to hire the consultant.

### BACKGROUND

During the past twenty years, various Intelligent Transportation Systems (ITS) applications have been implemented in Washington State, at a regional level by the Department of Transportation, and, at a local level, by several jurisdictions. Cities such as Seattle and Bellevue developed their systems in the late 80's. Most recently, King County, Issaquah and Redmond have initiated efforts to develop theirs. Kirkland, on the other hand, has not aggressively pursued implementation of ITS.

There is, however, growing interest in the development of ITS in Kirkland as a cost-effective means to alleviate congestion, inform drivers and citizens about traffic conditions, provide faster response to traffic incidents, and to support traffic enforcement. The Transportation Commission and City Council agreed that ITS is a topic worthy of consideration, in particular there is a need to identify ITS opportunities in Kirkland. This will be especially important if the pending annexation proceeds. Therefore, as part of its 2006-2007 work plan, the Commission has prepared this report. There are four sections in it:

- *Objectives*: key points to be considered as an ITS strategy is pursued in Kirkland.
- *ITS in Kirkland*: a look at we have done to date in Kirkland with regard to ITS.
- *Potential Applications*: a review of broad ITS categories and their benefits.
- *Next Steps*: thoughts and recommendations on implementation.

## *OBJECTIVES*

In general, the main objective of ITS is to use advanced technology to optimize traffic conditions. Advanced technology includes, for example, communication networks (fiber optic/wireless), specialized software tools, and many different types of equipment.

Given Kirkland's size, specific needs, budget constraints and particular approach to transportation problem solving, not all available ITS tools/applications maybe appropriate. Therefore, in developing an ITS strategy, the following objectives and principles should be considered:

Learn from others: The fact that Kirkland has not been as aggressive as other cities in pursuing ITS applications allows us to take advantage of others' experience of what works most effectively. It also allows us to save the cost of intermediate technology developments that have been eventually replaced as the technology has further advanced.

Be regional: Any ITS application that is put in place by Kirkland should be compatible on a regional basis. ITS in Kirkland should take advantage of regional opportunities and systems to minimize the need to develop specialized applications.

Communications are key: Look for opportunities to install communication networks in connection with other projects. Communication links between traffic signal controllers and an office location (traffic control center) to provide real time conditions should be a high priority. This would also allow Kirkland to link to adjacent jurisdictions to solve cross-jurisdictional traffic issues.

ITS is operations based: The overall purpose for installing ITS applications is to improve traffic conditions for users by better managing the existing transportation infrastructure. In addition, ITS should improve the operations of the transportation system. The observable improvements include reduced arterial travel time and improved responses to incidents.

Driver information: A major function of ITS is informing drivers about traffic conditions within and outside Kirkland using a variety of delivery techniques. This provides information to travelers so that they can make more informed choices about whether to make a trip and when they do make the trip, how long they should allow for it. This can apply to multiple modes.

ITS optimizes capacity: ITS should be used to optimize existing capacity by using it as efficiently as possible. This is particularly important in an environment where capacity is expensive and difficult to expand.

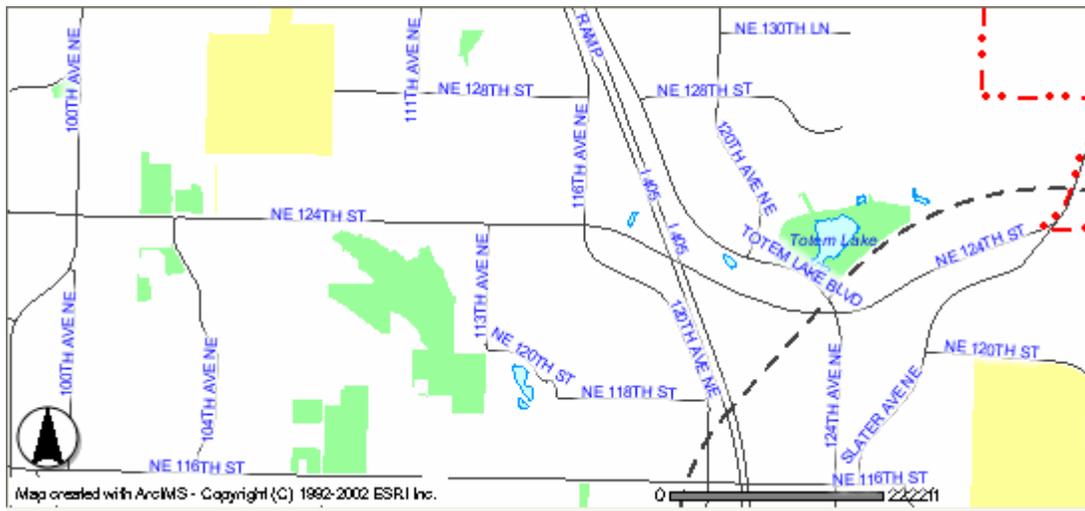
Take a multimodal approach: Consider users of transit, cyclists and pedestrians when planning and implementing ITS.

ITS requires a champion: To ensure implementation, it is important to identify a strong advocate within the City for ITS. An Elected Official or a Member of the Transportation Commission could fill this role. There have been a couple of individuals on the Transportation Commission that have shown a strong interest in filling this role.

Consider economic benefits of projects: Traditionally ITS projects have a very high benefit cost ratio, but any element that is proposed should be carefully considered for economic value.

### *ITS IN KIRKLAND*

The NE 124<sup>th</sup> Street Corridor is the first ITS application on a local arterial street in Kirkland. It has traffic control, monitoring, surveillance capabilities as well as Transit Signal Priority (TSP). The corridor is jointly operated and maintained by King County, WSDOT and Kirkland per Interlocal Agreements signed in 2005.



The corridor is approximately 3.5 miles in length and carries Average Annual Daily Traffic varying from 41,000 (in the vicinity of I-405 Interchange) to 25,000 near/at its west and east termini. The original roadway configuration prior to 1991 was three lanes, but capacity improvements implemented since, the last one occurring in 2003, culminated with its existent five-lane cross section. As capacity increased in the corridor, though, so did traffic. The yearly growth rate in the corridor during the past 15 years has held steady at 3% (the annual traffic growth rate city-wide is about 1%), but there are no more capacity improvements planned for the corridor within the next 20 years (with the exception of some improvements planned for the intersection at 124<sup>th</sup> Ave at NE). ITS is the best available option/tool to manage increasing congestion in the corridor.

What ITS elements do we have at NE 124<sup>th</sup> Street?

- 1) New signal controllers and fiber optic interconnection at ten traffic signals, five of which are Kirkland's, two are owned by King County, and the remaining three (including two ramps ) are owned by WSDOT. The new controllers and fiber interconnection allows the signals to be synchronized.
- 2) Closed Circuit Television (CCTV) cameras at four locations allow King County to control and monitor traffic flow at those locations.
- 3) Transit Signal Priority (TSP) capability (not yet in operation). This provides the capability to extend green time at traffic signals for buses that are running behind schedule.
- 4) Changeable Lane Assignment (CLAS) at the Intersection of 100<sup>th</sup> Ave NE and NE 124<sup>th</sup> Street. This allows one of the exclusive through traffic lanes in the southbound approach of the intersection to be shared by left turners during the morning peak
- 5) System loops at various locations (not in operation yet). Will allow for real-time traffic data to be collected.
- 6) Communication Linkage to King County's Transportation Management Center (TMC) This allows the County to monitor and do the surveillance needed to adjust traffic controls to operate the system at optimum efficiency.

All the elements of the project are already in place, but some of them are not yet functional (TSP and System Loops) as the communication and Software systems are being finalized. The next step will be to connect the Kirkland City Hall/Maintenance with the Project hub located at the intersection of 116<sup>th</sup> Ave NE and NE 124<sup>th</sup> Street. A plan is in place to bring information back to Kirkland City Hall over city-owned fiber using a link which is being constructed as part of the Sound Transit direct access project as it rebuilds 116th Avenue NE. When this is complete, in fall of 2006, real-time information will be available at Kirkland as well as King County. Overall, the project has been well received and has improved traffic flow during the AM peak period.

#### Ongoing ITS Plan/Design on NE 85<sup>th</sup> Street

The NE 85<sup>th</sup> Corridor Improvement Project is in design and it is expected to go out for Bids in December 2006. The project includes TSP and traffic signal equipment upgrades. Recommended elements are signal interconnection from 114<sup>th</sup> Ave NE to 120<sup>th</sup> Ave NE, a wireless interconnection between 114<sup>th</sup> Ave NE and City Maintenance/Engineering Facilities, traffic management software, CCTV and system loops at two locations. Optional Elements for future consideration are wireless interconnection between NE 85<sup>th</sup> Street and the NE 124<sup>th</sup> Street ITS corridor, Dynamic Message Signs and expansion of traffic management software to add local and regional traffic coordination capability.

#### Portable/Fixed Variable Message Signs

Kirkland has one portable variable message sign that is always in high demand for informing motorists about planned construction projects and or events occurring within City limits that may impact traffic flows. In addition, the City has 6 fixed, programmable radar signs that show motorist's actual speed as they traverse the street.

**POTENTIAL APPLICATIONS: A List of ITS Tools for Potential / Increased use in Kirkland**

<b>Category</b>	<b>Elements</b>	<b>Purpose/Benefit</b>
Advanced Traffic Signal Control Systems	Signal Controllers Signal Interconnection Traffic Management Software	Allows for coordination/synchronization of any number of signals in an area. Main benefit is reduced travel time. 10-20% reduction can be obtained.
Traffic Surveillance	Video Image Detection using CCTV Road-based Induction Loop Detectors	Used for Incident Detection and Verification. Also used extensively for measuring high-volume traffic conditions.
Automated Traffic Enforcement	Red-light Monitoring Using 35 mm Wet/Digital Cameras	Reduces the number of red light violators/right angle collisions. Cost may be an issue.
Motorist Information	Portable/Fixed Variable Message Signs – use Fiber Optics and LEDs	Inform motorists while they are on route about traffic conditions; direct them toward other info sources. Benefits are difficult to measure.
Traffic Management	Communication Links to all ITS Field Devices Traffic Management Software Advanced Computer Equipment	Monitor, control the entire ITS System, implement traffic management strategies, communication info to media and the public. Benefits include faster response to incidents, reduction in accident rates, increases in average speeds.
Transit Signal Priority (TSP)	Traffic Signal Interconnection Upgraded Signal Equipment TSP Field Devices Traffic Management Software	Transit travel time reduction, increased transit travel time reliability.
Transit Information Systems: Bus Arrival Time		Inform transit users about next bus arrival time. Usually located at Transit Centers. Increased customer satisfaction.

### *NEXT STEPS*

If approved, the next step in further development of ITS in Kirkland is the preparation of an ITS Implementation Plan. A consultant would be hired to prepare a plan that provides the specific ITS elements that are appropriate for Kirkland. The plan would include project descriptions, phasing, priorities, and cost estimates based upon the objectives presented in the first section of this report. This plan would act as the blueprint for the overall completion of an ITS plan. The plan would help to focus development of an ITS system that can meet the city's objectives. It would also provide valuable documentation and information when applying for potential grant money to help implement these projects. Without such a plan, ITS will continue to be implemented, but implementation will be reactive to opportunities as they arise and the ITS system will not develop according to established city-wide priorities. There would also be increased risk of system incompatibilities. .

We will use \$60,000 from the Capital Improvements Program budget to fund this effort in 2007. We will report back to the City Council on the progress, scope, and schedule of the ITS efforts.