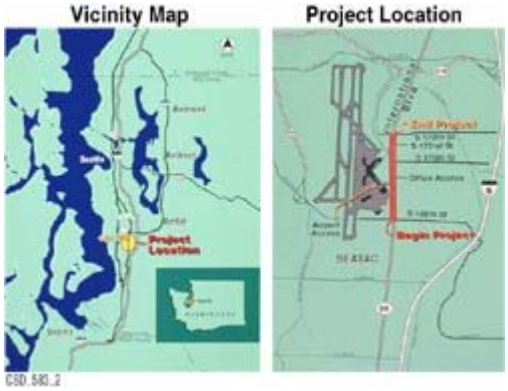
Washington SR 99
International Boulevard

Setting

The International Boulevard project is located within the City of SeaTac in King County, Washington (see Figure 1). King County, which includes the City of Seattle, is the most populous county in Washington. The City of SeaTac, incorporated in 1990, has an area of roughly 16 square miles and a population of about 23,000. Seattle-Tacoma (Sea-Tac) Inter-national Airport is located within the SeaTac city limits.



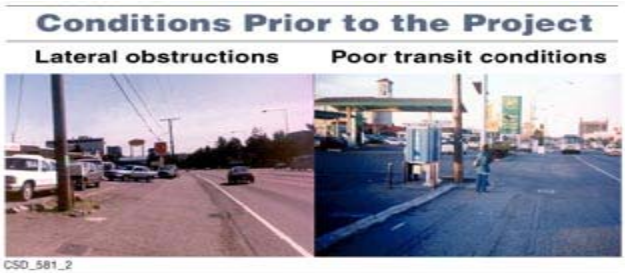
The newly incorporated City developed Comprehensive and Transportation Plans that established land use goals and proposed transportation facility improvements. The City was designated as an urban center under the State's Growth Management Act and under that designation was identified for substantial increases in the development density along the City's existing commercial corridor. This development follows the International Boulevard corridor. Existing land uses include some of the region's largest motels, Sea-Tac International Airport, office towers, airport-related rental car and park-and-fly facilities, and other retail uses. The Transportation Plan proposed expansion of International Boulevard to increase traffic capacity and improve pedestrian access.

International Boulevard is a major north/south arterial that serves local and regional traffic within the City of SeaTac, Washington (see Figure 2). International Boulevard, is part of signed State Route 99 (SR 99) which spans three counties and over 50 miles from South Snohomish County to North Pierce County. Prior to the construction of the Interstate System, SR 99 was a major Pacific coast route spanning Washing-ton, Oregon, and California. Today, that portion of SR 99 within the Puget Sound region serves as a regional link between cities and as a major route to Sea-Tac Airport, with access to the terminal and airport parking. It is also a part of the State's urban arterial system, and has been designated as a National Highway of Significance, as well as an emergency evacuation route.

Average 1992 daily traffic volumes on International Boulevard varied from 31,600 vehicles per day (vpd) at South 170th Street to over 40,000 vpd at South 188th Street, with the highest daily traffic volumes (over 42,000 vpd) occurring directly adjacent to the airport entrance.

Problem to be Solved

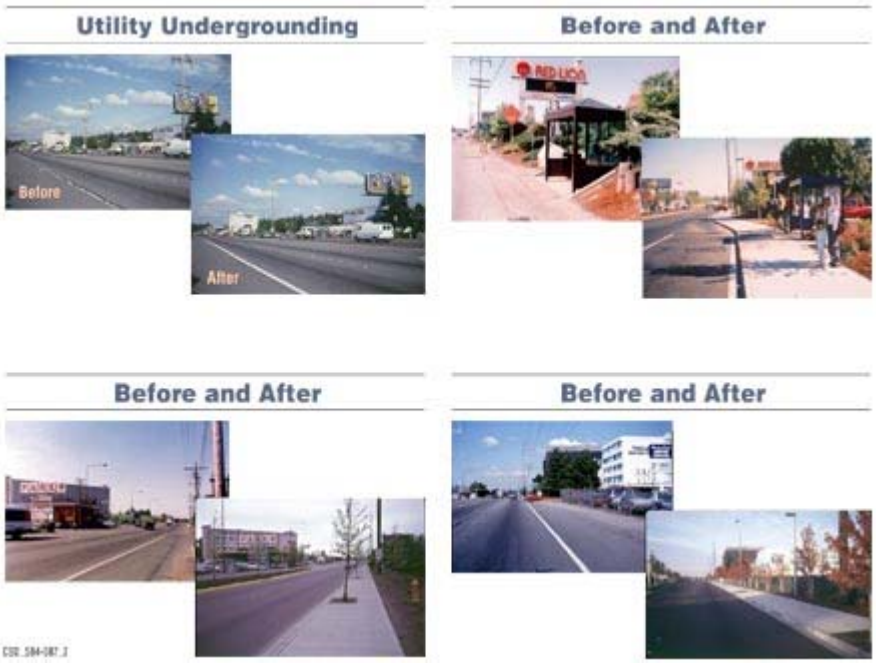
The project described in this case study is the first of these seg-ments, from South 188th Street to South 170th Street. This section of International Boulevard fronts Sea-Tac Airport. Sea-Tac Airport and International Boulevard serve as a gateway to the United States and Puget Sound region for many visitors from around the world. International Boulevard has experienced significant traffic congestion, substantive safety problems, inadequate pedestrian facilities, and unsightly commercial strip development. Solutions to the transportation problems were sought that would promote and enhance re-development of the corridor as an attractive gateway.



The following is a summary of the transportation problems to be addressed:

Safety Problems

Accident rates for mid-block segments were as high as 4.9 accidents per million vehicle miles for the section between South 188th Street and the Airport Access. Approximately 55 percent of the accidents in the corridor are property damage only; the remaining 45 percent are injury acci-dents. There were two fatal accidents in the corridor during the period between 1990 and 1993. A number of the more serious crashes involved pedestrians. Other crash problems were associated with the lack of access control along the corridor and the strip commercial development.



Congestion and Mobility Problems

The level of service (LOS) for the existing p.m. peak hour for five key intersections ranged from B to F in the project corridor. The corridor is well-served by transit. Prior to the project, there were ten transit stops within the project limits (five northbound and five southbound). Only three of the ten transit stops provided a shelter for transit users.

Significant design constraints included limited existing right-of-way (100 feet), and substantial underground and overhead utilities.

Stakeholders

- SeaTac Community Planning Department
- International Boulevard Committee
- Washington State Department of Transportation (WSDOT)
- King County/Metro Transit (Metro)
- Port of Seattle

- Puget Power
- General public

CSD/CSS Approach

Stakeholders were able to obtain funding for improvements to the corridor. The amount of the funding available for design, construction, and right-of-way was $7.3 million. Restrictions on the limit of funds were available meant that the project had a tight schedule, with an advertising for bids required within 15 months from beginning of the project development process.

Initial funding was based on a plan that envisioned widening International Boulevard to a seven-lane cross-section, including sidewalks. Concurrent with initial planning, the City of SeaTac's Department of Community Development was working with a citizen and business advisory committee, the International Boulevard Corridor Advisory Committee, (IBC Committee), to develop a land use plan for the corridor, which also included urban design and transportation infrastructure considerations. The City assigned the IBC Committee a responsibility to review the development of the street design.

Other major stakeholders for the project included WSDOT, Metro, and the Port of Seattle. Each made financial contributions to the construction budget. WSDOT had partial jurisdiction for this project given their responsibility and authority for geometric design and safety for SR 99. WSDOT's concerns focused on their recently adopted statewide Access Management Plan, which called for reconstruction projects along state routes to meet specified access management standards. Metro was concerned about the speed and reliability of transit services along SR 99. Because SR 99 is a primary access route to Sea-Tac Airport, the Port of Seattle was concerned about increasing the capacity of the roadway.

The schedule, number of stakeholders with different interests, and complexity of the project required close coordination and a comprehensive but focused planning process. The process was designed to identify issues and needs, develop alternatives, and evalu-ate and establish the preferred alternative. The alternative selected (presented in detail in the next section) included a center, raised median and other access management measures. Information on the planning work was provided at two open houses and in citywide news-letters. This initial effort was completed in May 1994 with the adoption of the plan at a City Council meeting.

Opposition to the plan surfaced after the City Council had acted to adopt it, when meetings were held with individual property own-ers to discuss right-of-way needs and property interface designs. The IBC Committee included some representatives from adjacent businesses.

A series of meetings with property owners and WSDOT was held over several months to develop solutions to property owner concerns regarding reduced access. Generally, the concepts developed consisted of various configurations for mid-block median breaks to enable partial or full access movements. Driveway consolidations were also considered, along with joint access between properties. Ultimately, a final public hearing was held to review the need for access management and the alternative access concepts that had been discussed with property owners throughout the summer, and to get City Council adoption of the access concepts that would be integrated into the final design. This hearing resulted in a majority consensus on acceptable access concepts, although a small number of property owners were not satisfied with the final plan.

Design Flexibility and Application of Design Criteria

The project design development process included consideration of three build alternatives and a no-build alternative. The alternatives included five-, six-, and seven-lane configurations for the roadway. The alternatives represented a spectrum of possible traffic improvements for International Boulevard. All alternatives provided sidewalks for pedestrians and widened curb lanes to accommodate bicycles and transit. Optional design features were also developed that could be incorporated into any one of the three build alternatives. The design options included either a raised, landscaped center median or a median consisting of a continuous two-way, left-turn lane. Alternative capacity improvements, HOV/transit

treatments, access management measures, non-motorized mode options, signal system improvements, utility modifications, illumination concepts, and landscaping treatments were also developed.

Many of the design challenges on the International Boulevard project are described below, and discussed as to how they were accommodated.

Public and agency opinions regarding capacity needs ranged from reducing the number of lanes and emphasizing local access to widening the arterial to seven or more lanes provide additional regional capacity. Limited construction funding and right-of-way constraints made cost-efficiency an important consideration. Decisions were made to add an HOV lane in the p.m. peak flow direction (southbound), add approach lanes at congested intersections, incorporate access management measures, improve the signal system, and enhance facilities for transit and non-motorized modes.

Treatments to improve the accessibility, speed, and reliability for transit and HOVs included the southbound HOV lane, new bus shelters, bus stop enhancements, and signal design to enable transit signal priority. New guidelines on arterial HOV lane signing and striping, recently established through a regional ad hoc committee, were incorporated into the design.

Pedestrian amenities included sidewalks, decorative lighting at bus zones, sidewalk linkages to adjacent land uses, and two mid-block signalized pedestrian crossings (one of these is combined with a new signalized driveway access). Because this roadway is currently the only north-south route for bicycle travel, Class IV Bikeway lanes were also provided.

All existing and new signals were furnished with NEMA-type controllers to allow integration with the rest of the City's signal system. These signals were interconnected and controlled with an arterial master controller. In addition, the system included equipment to enable signal priority in the future.

The need to relocate utilities due to the road reconstruction and public concern regarding the poor aesthetics of overhead utility lines led to a decision to underground and reconfigure the utilities. Electrical power distribution lines and telephone and television cables were placed underground. Power transmission lines were relocated on new poles at greater spacing. The illumination system was improved to meet current lighting standards. To save money and improve construction coordination, this work was included in the roadway con-struction contract (ordinarily the utility companies construct these improvements).

Aesthetics were improved by planting trees along the sidewalks, special sidewalk paving patterns, a landscaped median, and landscaped transitions with adjacent properties.

The most controversial issue for this project involved implementation of raised medians for access control and safety. The combination of speed (45-mph speed limit), high traffic volume, and number of lanes led to an agreement to replace the center two-way, left-turn lane with a raised median; driveway controls and consolidations were also included. Compromises included the incorporation of U-turn designs into key intersections and the development of two mid-block median openings (one of these was signalized to provide consolidated driveway access).

Stakeholder Involvement

The plan reflected an active and ongoing effort to negotiate solutions and design compromises among the various stakeholders. The final plan included some concepts that did not meet WSDOT standard design approaches. Unusual features included U-turn median openings, provision for landscaping in the median, and a mid-block pedestrian signal. WSDOT was involved in the decision process and understood the required compromises. Land owners compromised as well, accepting access consolidation and the raised median in return for other amenities. The City of SeaTac submitted requests and justifications for several design exceptions to WSDOT and received approval to implement the adopted plan.

Lessons Learned

This project illustrated well that dealing with multiple, conflicting stakeholders within a constrained budget and schedule is possible as long as the key stakeholders understand the problem, have a clear vision of the solution, employ an open and creative process, and commit themselves to compromise. The project also illustrated well that CSD/CSS represents a series of choices, not mandates. Issues of number of lanes, mobility for different users, different ways to treat access safety problems were all looked at from different perspectives.

Many design issues and constraints needed to be addressed during the course of planning and design of the project. The affected community and agencies were actively involved in the development and evaluation of alternatives, and negotiation of modifications to the design. Diverse views of the various community and agency stakeholders needed to be considered. The adopted design was a comprehensive solution to the conditions, and the design incorporated elements of transportation capacity, HOV/transit treatments, access management measures, non-motorized mode improvements, signal system improvements, utility and illumination enhancements, and landscaping improvements.

Specific lessons learned dealt with access management, which is generally the most difficult issue to address in built-up urban arterials. For the International Boulevard project, access management was the single most controversial and challenging aspect of the project.

1. Access management is only one part of the design for reconstruction of an arterial street. Access management measures were integrated into the overall, comprehensive design. Access management measures alone would not have satisfied all of the conditions at hand, including the needs of the community and agency stakeholders.
2. Use of raised medians within the arterial cross-section is only one of the access management tools to be considered. Access management should be considered as a solution to solve traffic safety concerns. Other measures such as driveway designs, controls, reductions, and consolidations should also be emphasized to address safety problems.
3. Inclusion of medians on arterial reconstruction projects has some problems that need to be considered. These include change or reduction of access to some properties and gen-eration of U-turn demand at intersections, which affects safety and traffic capacity. Therefore, it is likely that reconstruction to include a median may only be warranted under certain conditions such as high volumes (e.g. greater than 30 thousand vehicles per day), high speeds (e.g. greater than 40 miles per hour), and multi-lane cross-sections (e.g. greater than four lanes).
4. Medians can provide other benefits (beyond vehicle traffic safety) for a comprehensive design solution. These can include safety for transit, bicycles, and pedestrians. They provide opportunity for landscaping and aesthetic improvements. They can help reduce the amount of impervious surface and thereby reduce the amount of stormwater drainage and detention system requirements.
5. Substantial public education and involvement is needed when considering access management as a part of a major arterial design solution. Business owners are almost always going to oppose these measures at the beginning of the design process. The community and agency stakeholders need to be brought along slowly, first understanding the issues

and prob-lems (such as accident problems), then looking at the solutions (which may include some access management measures).

While good technical guidance is important for agencies to employ, in actual application it is likely that compromises will be needed in order to get agreement to include any access management measures in a typical design problem. In the case of the International Boulevard project, if compromise breaks in the raised median were not identified and accepted, the project may not have been acceptable to the key stakeholders.

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