AURORA CORRIDOR

TRANSPORTATION SOLUTIONS FOR SHORELINE'S MAIN STREET

MULTIMODAL PRE-DESIGN STUDY

CITY OF SHORELINE

CH2MHILL

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MULTIMODAL PRE-DESIGN

STUDY REPORT

TECHNICAL APPENDICES

Prepared for:

CITY OF SHORELINE

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Project Location

Executive Summary

Overview

In 1998, the City of Shoreline began the Aurora Avenue North Multimodal Corridor Study with a federal grant of $300,000. This study is the first phase in the redevelopment of Aurora Avenue North along the segment within the City of Shoreline (see map at left). The City of Shoreline Planning and Development Services Department is the lead agency for the pre-design study phase. The Public Works Department will lead the project through environmental documentation, design engineering, and construction. CH2M HILL is serving as prime consultant. The purpose of the Multimodal Pre-Design Study Report is to serve as a master plan for the proposed improvements to Aurora Avenue North within the City of Shoreline.

Aurora Avenue North is a part of signed State Route 99 (SR 99). Shoreline's three-mile portion of the route extends from the Seattle City limits, north to the King County/Snohomish County border. SR 99 once served as the West Coast's primary north-south route connecting Mexico with Canada. This route now serves local and regional trips within and through Shoreline.

Existing Transportation Conditions

The roadway is currently configured as a five-lane arterial with a continuous two-way left-turn lane for the length of the segment (some channelization is provided at intersections). Property access is defined for only 20 percent of the parcels fronting Aurora Avenue North. The majority of properties along this corridor have continuous shoulder access without defined driveways.

Average daily traffic volumes range from 35,000 to 42,000 vehicles per day. Traffic volumes on this roadway are growing at a rate between 3 and 5 percent per year. Many of the signalized intersections along the corridor are over capacity during the peak commute periods.

Safety conditions along the corridor are among the worst in the state for a facility of its type. 1,500 accidents occurred along the 3-mile segment over the past five years. Washington State Department of Transportation (WSDOT) estimates that this translates to over $61 million in social costs due to the high number of crashes, injuries and fatalities.

In addition to traffic congestion and high accident rates, Aurora Avenue North currently experiences poor pedestrian and transit conditions, and unsightly commercial "strip" development. The City's goals for the project, as stated in their Comprehensive Plan, are to support economic stability along the corridor and provide multimodal transportation services.

Over the past decade, several studies have addressed issues related to the improvement and redevelopment of Shoreline's portion of Aurora Avenue North, including those by King County Transportation Planning, Metro Transit, and the City of Shoreline. These projects have identified market and aesthetic potential for the corridor and evaluated HOV and transit-priority options.

Other related projects that have been coordinated with Aurora Corridor Study are the WSDOT Battery Street to North 145th Street Corridor Study, and the Snohomish County SR 99 Redevelopment Projects.

Community and Agency Involvement Program

The complex and controversial nature of the project necessitated a Community and Agency Involvement Program to enable all interested and affected parties to participate in identification and development of the preliminary preferred alternative. Opportunities for community input to the design were meaningful and frequent. The City conducted a total of 23 meetings with the Citizen's Advisory Task Force, the Interagency Technical Advisory Committee and the general public. A total of 8 project briefings were made to the Shoreline City Council and two to the Shoreline City Planning Commission. Three open houses were held to which the public was invited to gain information and provide input on the project. Also, meetings and briefings were held with local businesses and the Shoreline Chamber of Commerce.

Those who were not able to attend any of the project meetings were kept informed on project developments through citywide mailed announcements, the city web page, city newsletters and the local newspaper.

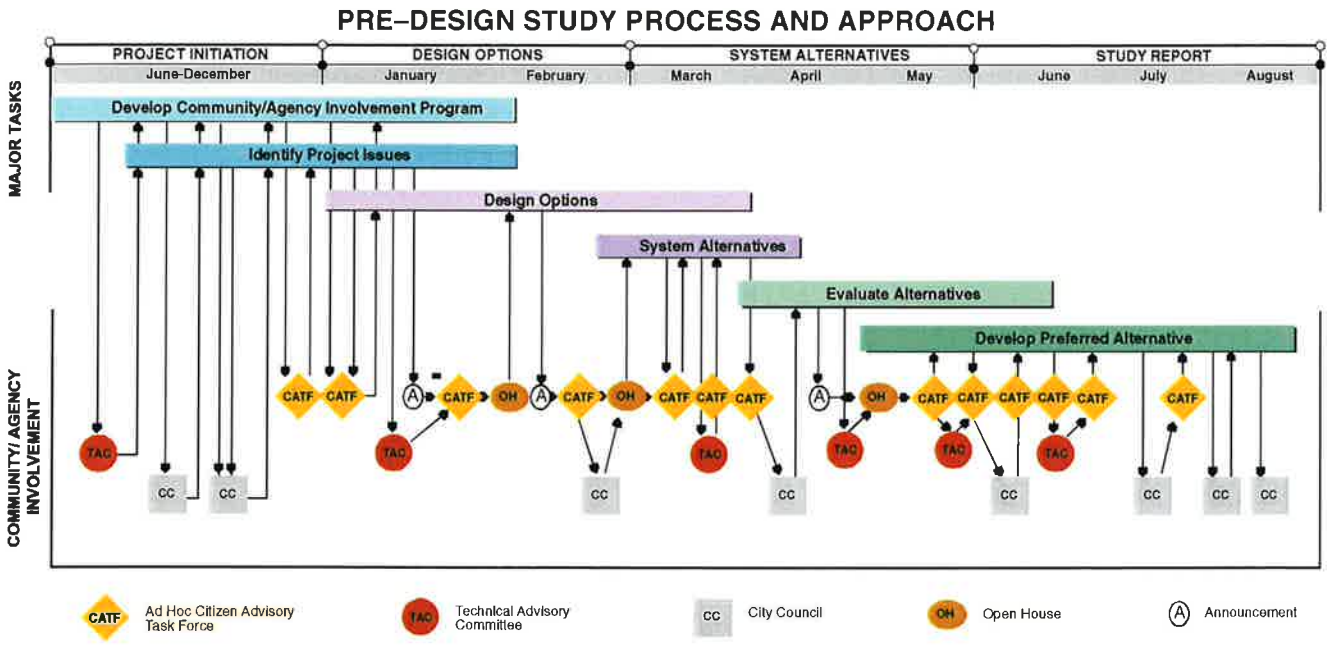
Study Approach

Development of a multi-modal master plan for the reconstruction of Aurora Avenue North through the City of Shoreline required consideration of many difficult issues. The approach to the pre-design study involved a high level of community and agency involvement. The pre-design study process was a collaborative, interdisciplinary and decision-oriented approach that included citizens and agencies as part of the design team. City Staff and Consultant planners and engineers acted more as educators and facilitators than designers. The product of this process is a democratically developed design that has the support of all interests in the corridor.

Features of this process included more frequent and open meetings as part of the Community and Agency Involvement Program, comprehensive agency representation for study oversight, council briefings during each element of the project, and an emphasis on graphical communication to convey technical information related to design options and elements.

The pre-design study process was composed of five major tasks (see Figure 1.3-1). The first of these tasks identified the issues to be addressed with the project. Both advisory groups and the general public provided input on project issues. Some of the most frequent issues raised were safety, neighborhood preservation, and aesthetic improvement. The second major task was developing design options to be combined into design alternatives. Each design option was selected to address the major project issues identified in the first task. Investigations into each of the 12 design options produced a technical memorandum to aid the committees in their consideration of alternatives. Design option investigations included transit and HOV amenities, traffic operations, and right-of-way issues. Using the information gained from the design-option

investigations, and public input from two open houses, the advisory committees defined three distinct design alternatives.



Flow chart of pre-design study process

Study Alternatives

The advisory committees collaborated to develop three design alternatives for evaluation in determining the preliminary preferred alternative. These design alternatives represented a range of concepts from a regional, high-capacity focus, to a local focus with limited expansion in capacity.

The first of these alternatives (Alternative 1) kept the roadway in its existing configuration with the addition of sidewalks, landscaping, and urban design amenities. This alternative also included some on-street parking pockets, bus pullouts, and queue-bypass lanes at intersections to separate buses from general congestion.

The second alternative (Alternative 2) added a business access and transit lane in each direction, sidewalks, landscaping, and urban design amenities. In addition, the existing two-way left-turn lane was converted to a focused left-turn and pedestrian-refuge area that includes some landscaping. This alternative also included additional signalized intersections and pedestrian crossings.

The third alternative (Alternative 3) proposed converting Aurora Avenue North from a major urban arterial to a limited-access expressway. In this alternative, frontage roads would provide local access, while access to and from Aurora Avenue North would be restricted to interchanges located along the segment. These intersections would be grade separated, as would pedestrian crossings.

Evaluation of Alternatives

The three design alternatives were evaluated against 13 criteria relating to environmental, economic, mode-choice and traffic operations factors. Criteria included, for example, funding feasibility, water quality implications and pedestrian safety improvement. Each alternative was assigned a rating for each criterion. The results of the evaluation found that Alternative 2 would be most easily funded. Alternative 1 was found to be slightly better than Alternative 2 for economic development, based on access issues. Alternative 2 was slightly more costly than Alternative 1($48M for Alternative 1 vs. $52M for Alternative 2), and Alternative 3 has costs three times that of Alternative 2. Alternative 1 creates significant traffic spillover onto parallel north and south streets, while Alternative 2 maintains a distribution similar to existing conditions.

Transit benefits are most significant in Alternative 2, especially in measures of travel time and reliability. Transit travel time along the segment with Alternative 2 is expected to average 12 minutes versus 23 minutes with Alternative 1. In terms of schedule reliability, Alternative 2 would achieve an average schedule variation of less than one minute, while Alternative 1 would vary, on average, up to five minutes. Alternative 2 provides the safest pedestrian environment and best traffic operation.

Public input received at an open house favored Alternative 2 slightly more than Alternative 1, and gave little support to Alternative 3. The Citizen's Advisory Task Force and the Interagency Technical Advisory Committee unanimously supported Alternative 2, with enhancements to improve that design concept.

Preliminary Preferred Alternative

The results of the pre-design study process is a Preliminary Preferred Design Alternative that the Citizen's Advisory Task Force has recommended to the City Council for advancement into preliminary design engineering and environmental review. This alternative is based on Alternative 2 with added enhancements. It provides a balance between regional and local movements, and between modes. The Preliminary Preferred Alternative will be studied for both NEPA and SEPA compliance.

The Preliminary Preferred Design Alternative was developed based on input from the Citizen's Advisory Task Force, the Interagency Technical Advisory Committee, the general public, and the results of the comparative evaluation of alternatives. The proposed design concept achieves many of the City of Shoreline's goals for the project and achieves a balance between right-of-way and business impacts, pedestrian and traffic improvements, aesthetics, transit operations, and construction cost. It proposes to provide two general-purpose lanes in both northbound and southbound directions, and a business-access and transit lane, also in both directions. Center, focused left- and u-turn lanes will be provided along with pedestrian crossings with center refuge areas. Additional intersection improvements are also recommended. The Preliminary Preferred Design Alternative maintains acceptable traffic operations for the future, provides a system to support pedestrian safety and walkability, significantly improves transit operations and improves appearance over existing conditions.

On August 23, 1999 the Shoreline City Council voted unanimously to accept the recommendation of the Citizen's Advisory Task Force and provided direction to move the project into Preliminary Engineering and Environmental Review to commence in the fall of 1999.

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1.0 Introduction

The Aurora Avenue North Multi-modal Corridor Project spans the City Limits of Shoreline, from Seattle to the south, to the Snohomish County line to the north. The project will be completed in phases. The work summarized in this report represents Phases 1 and 2. The purpose of Phases 1 and 2 were to prepare a preliminary preferred design (Phase 1) and to begin the process of securing funding (Phase 2) for future phases of the project. Phase 3, environmental study and preliminary engineering, will follow directly upon the Shoreline City Council's approval of the results of this study.

The pre-design study has enabled the City with the assistance of the consultant team to work with the community and agencies to develop a preliminary preferred concept for roadway design that meets the needs of all users. This was achieved using a context-sensitive design process that facilitated identification of community and agency issues and used them to "set the context" for design development.

Context-sensitive design is "thinking beyond the pavement." As part of the process, citizens become the designers and transportation planners. Engineers were challenged to think not only of technical design considerations, but also of the community values the design will support. The design alternatives addressed issues such as pedestrian access and safety, aesthetics and urban design/landscaping, improved security and safety through illumination, transit amenities and operations, stormwater management, traffic capacity and operations, access management, right-of-way acquisition, utility undergrounding, preservation of neighborhoods, and integration with the future interurban trail.

2.0 Study Purpose, Goals and Objective

The Aurora Corridor Multi-modal Pre-design Study Process and appointment of the Citizen's Advisory Task Force are City Council initiatives. This Pre-Design study is the next step in implementing the City's Comprehensive Plan and specifically the Aurora Corridor Sub-Area plan that was completed in 1997. The Comprehensive Plan, adopted in November 1998, identified future land uses along the corridor and set some general guidance for the Pre-Design Study.

2.1 Study Purpose

The purpose of the Pre-Design Study is to arrive at a recommended conceptual street design for the Aurora Corridor from N 145th Street to N 205th Street in Shoreline through a comprehensive process that includes community, business and agency involvement and thorough technical analysis.

2.2 Study Goals

The Citizen's Advisory Task Force adopted the following list of goals for the study:

- Arrive at a preferred design concept that will improve the safety of all users along and across the corridor.
- Involve the public and the adjacent property and business owners in the decision process to allow adequate consideration of all needs along the corridor.
- Identify opportunities to enhance pedestrian safety in the interim until project is complete.
- Arrive at a preferred design concept that will enhance the attractiveness of alternate modes such as transit, carpools and bicycles to increase the use of these modes by the public.
- Arrive at a roadway design concept that optimizes the safe and efficient movement of people and goods.
- Arrive at a preferred design concept that meets both the short- and long-term transportation needs of users including property access.
- Arrive at a preferred design concept that maintains a balance between the functional role of Aurora Avenue as a regional arterial and as Shoreline's "Main Street".
- Arrive at a preferred design concept that can support both local and regional economic development objectives by stimulating interest in reinvestment or redevelopment of underdeveloped property along the corridor.
- Arrive at a preferred design concept that will improve the street aesthetics, environment and land use to make the Avenue comfortable and attractive to people.
- Arrive at a preferred design concept that can support the City of Shoreline Comprehensive Land Use Plan.
- Arrive at a preferred design concept that can preserve the character of adjacent neighborhoods along the corridor including the avoidance of traffic diversion from Aurora Avenue North.
- Arrive at a preferred design concept that has the flexibility to allow different characteristics and features along the corridor.

2.3 Study Objectives

The Citizen's Advisory Task Force along with City Staff and the Consultant Team worked towards the following objectives during the course of this Study.

Develop a preferred Aurora Corridor Multi-modal Design Concept and guidelines to enable the City of Shoreline and its project partners to pursue funding opportunities for completion of the project.

Develop Interlocal/interagency cooperation with the Washington State Department of Transportation (WSDOT) and King County Metro based on the preferred multi-modal design concept and guidelines to enable partnerships in project development.

Conduct a comprehensive public involvement process that provides opportunity for meaningful input for: business, neighborhood and community organizations, individual business and property owners, the general public, transit agencies, WSDOT and other agencies with jurisdiction.

Each of these objectives was successfully met.

3.0 Community and Agency Involvement Program

3.1 Overview

Development of a multi-modal master plan for the reconstruction of Aurora Avenue North through the City of Shoreline will require consideration of many complex issues. The outcome of this plan will positively affect quality of life and support the land use plan for this corridor. Because of the complex and potentially controversial nature of the project, the Community and Agency Involvement Program (CAIP) was conceived to enable interested and affected parties to participate in developing the plan. Multiple opportunities for community input were provided. Emphasis was also placed on communicating information on technical elements of the plan.

A systematic approach was used to develop the preliminary preferred design concept, beginning with consideration of community and agency concerns and issues and identifying design options. Several corridor system alternatives were developed and evaluated based on the merits of those alternatives. Incremental input and decisions were made sequentially as the work progressed, leading to a consensus for the preliminary preferred alternative. An important aspect of the approach was to keep participants from jumping to conclusions on solutions prior to consideration of facts, options, alternatives and evaluation results. The City and consultant staffs served as facilitators of the involvement/decision-making process.

The CAIP included both the community and agencies in the decision process because both are important to building a consensus. The community, which includes adjacent business and property owners as well as the general public, is very interested in the outcome of this project. At the same time, there are many federal, state and local agencies that also have a stake in the outcome. Many of these also have some authority and jurisdiction regarding the corridor plan. Examples of agencies critical to this process include WSDOT (which shares jurisdiction for SR99); transit agencies (which operate transit services on Aurora Avenue); utility companies (which provide utility services in the corridor); funding agencies (which must assure this project meets funding criteria); and environmental regulatory agencies (which enforce environmental legislation). Therefore, both groups must be included in the decision process concurrently so that the city can establish and confirm that this plan can be implemented. A record of the Community and Agency Involvement Program can be found in Appendix A.

3.2 Target Audiences

The project will include a comprehensive CAIP that will use multiple outreach strategies. The CAIP will actively encourage all stakeholders to participate in the project. Identified stakeholder groups include:

- business owners
- neighborhood residents
- community organizations
- individual business and property owners along the corridor
- the general public
- local, state and federal agencies
- adjacent jurisdictions
- utility providers

3.3 Program Elements

The CAIP included a number of elements to ensure broad involvement throughout the course of the project. These were:

- Continuous participation of the advisory committees
- Scheduled presentations to the and city council and planning commission
- Three open house events for the general public
- Meetings with property owners within the study area
- Newsletters and open house announcements were distributed to landowners, business owners and interested parties
- Canvassing by the Citizen's Advisory Task Force prior to each open house.
- Regular press releases were distributed to neighborhood associations, community groups, and the local media

3.4 Citizen's Advisory Task Force

The Ad-Hoc **Citizen Advisory Task Force (CATF)** consists of Shoreline residents, business owners and other community members who have an interest in the project or own property within the study area. In addition to CATF meetings, the City and the consultant team attended a series of smaller meetings with property owners within the study area organized by the Aurora Corridor Business Group of the Shoreline Chamber of Commerce. The CATF meetings were facilitated by the City and Consultant to collect input and receive direction. This input was used to establish design issues and options, develop alternatives, identify criteria and evaluate alternatives. The CATF was represented at City Council meetings where presentation of the study overview, discussion of design issues and presentation of the preferred alternative were made. On September 23, 1998 the Shoreline City Council unanimously approved the CATF's recommended design concept for Aurora Avenue.

The representation on the CATF is as follows:

- 5 positions representing business or property owners along Aurora.
- 1 position representing the Shoreline Chamber of Commerce.
- 3 positions representing neighborhoods along the corridor.
- 2 "at-large" positions.
- 1 position representing transportation special interests (transit, bicycles, ADA).

3.5 Interagency Technical Advisory Committee

The **Interagency Technical Advisory Committee (ITAC)** consists of staff from transportation agencies or neighboring jurisdictions. Agencies that participated include WSDOT, King County Transportation Planning and METRO Transit, City of Lynnwood, City of Edmonds, RTA, Community Transit, SEATRANS, and Seattle City Light. The Washington Department of Fish and Wildlife and the Washington State Department of Natural Resources also participated. This group met periodically during the project to advise Shoreline staff and the consultant team on technical design issues. The ITAC reviewed and provided comments on design options and the development of alternatives.

3.6 Policy Advisory Committee

The **Policy Advisory Committee (PAC)** will consist of regional administrators from agencies that can advise the City on policy issues. It is anticipated that WSDOT, the City of Shoreline, the City of Seattle and King County/Metro will be represented when the PAC convenes during the preliminary engineering process. The PAC will be available, if necessary, to help resolve inter-agency conflicts relating to development of the corridor plan.

3.7 Open Houses

Three open houses were held over the course of the project. These events were advertised in local media and on the City's web site. Public announcements were sent to over 3,000 addresses prior to each. The open houses presented project information and were designed to encourage questions and comments through a number of interactive techniques that included small group design workshops, informal ballots, prioritization games, and comment sheets. City Staff and the Consultant Team were on hand at each of the Open Houses to answer the public's questions.

FIGURE 3.7-1. Photograph of open house

Open House 1: Initiation of Aurora Corridor Pre-design Study

The purpose of the first open house was to present the scope and schedule for the study, introduce the CATF; and to confirm issues and concerns relating to developing corridor design options.

Open House 2: Identify Design Options

The second open house provided an opportunity for the public to comment on design options prior to the development of the system alternatives. The open house participants reviewed design options and provided input. Input was also obtained on criteria used to evaluate conceptual design alternatives. Comments from this open house were used in the development of the three system alternatives.

Open House 3: Review Evaluation and Develop Preferred Alternative

The purpose of the third and final open house was to review and comment on results from the evaluation of alternatives, receive public opinion on a preferred alternative, and identify favorite elements related to all of the alternatives. Comments from this open house were considered by the advisory committees, City staff and the consultant team to identify develop and refine the preferred alternative that will be presented to City Council and the Planning Commission for their approval.

3.8 Council Briefings

The City Council (CC) was briefed on aspects of the project five times, including a joint meeting with the Planning Commission (PC). Council met at the outset of the project to select the CATF,

had an opportunity to comment on design options and system alternatives, and provided input on the evaluation of alternatives before accepting the CATF's recommendation of a preferred alternative. The CATF's recommendation for a preferred design concept was unanimously accepted by the Council on August 23, 1999.

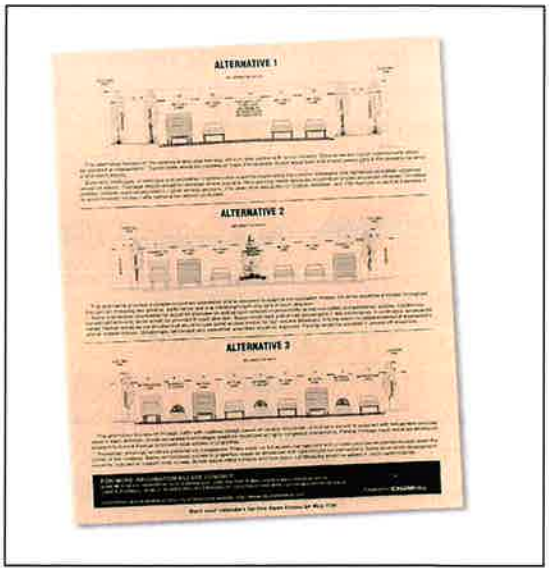


FIGURE 3.9-1. Image of Newsletter announcement

3.9 Newsletters and City Web Site

Newsletter announcements were disseminated throughout the course of the study. The announcements included information about the project and dates/locations of open houses and meetings. Formal announcements and meeting materials were mailed out to study committee participants prior to each scheduled meeting. In addition to newsletter announcements, the City posted information regarding the project on its web site and distributed press releases about the project to the local newspapers. During the course of the project, several articles appeared in the Shoreline Enterprise and the local Korean weeklies.

3.10 Study Process Diagram and Program Schedule

The following figure details the several major tasks involved in the study, the role of each advisory group in the major tasks and the interrelationship between them. A total of thirteen meetings were held with the CATF, six with the ITAC, and eight project presentations were made to the City Council.

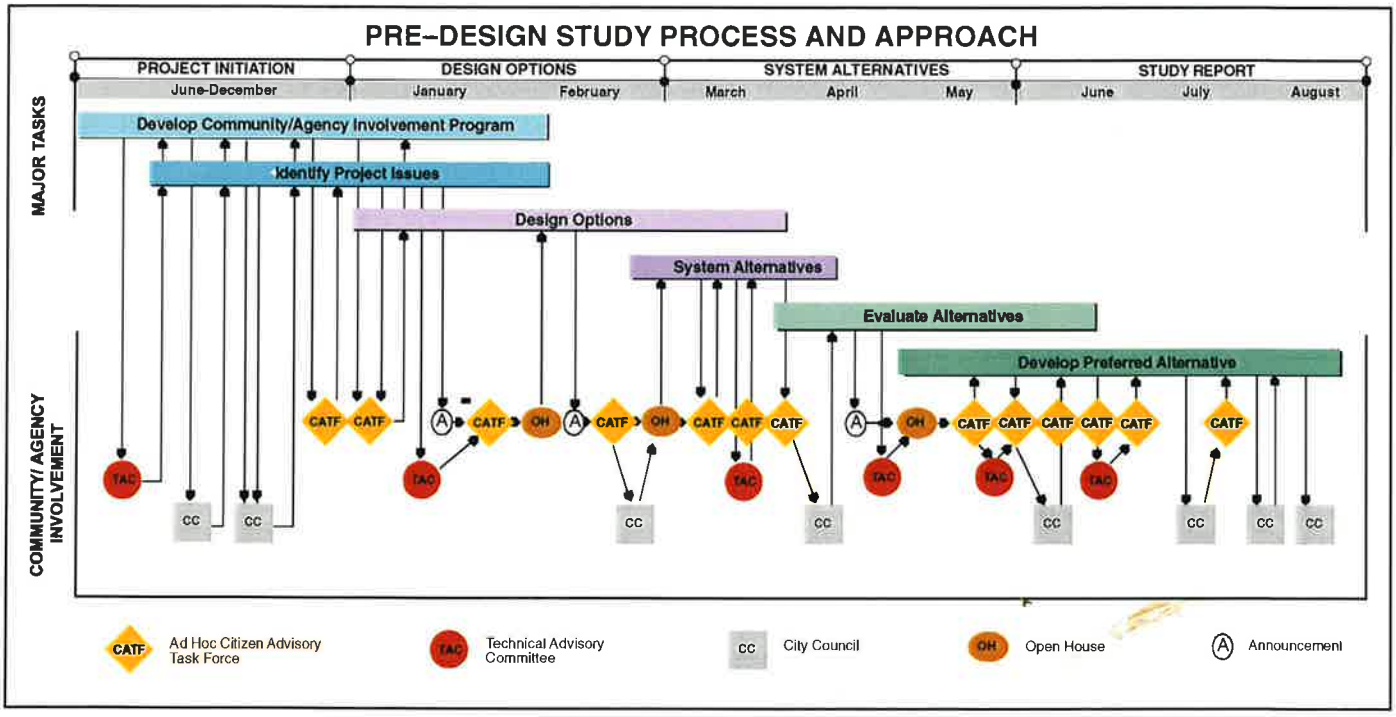


Figure 3.10-1 Pre-design Study Process and Schedule

4.0 Prior Studies (Comp Plan, Subarea Plan and Pedestrian Safety Report)

Over the past 10 years, several studies have been performed for Aurora Avenue North that provide policy and direction for this design process. These studies have ranged from preliminary design of transit facilities, to land use and aesthetic preference studies. They have been led by King County, WSDOT and the City of Shoreline.

4.1 City of Shoreline Comprehensive Plan

Adopted November 23, 1998

Vision Statements Element

The preferred image for the future of the City of Shoreline includes a variety of establishments, as well as themed centers that would service the community along major arterials. The City also envisions a very pedestrian-friendly environment that includes sidewalks, street trees, and crosswalks. The vision for the City's transportation system includes providing local and regional access to and from home, shopping, recreation, and work.

A set of Framework Goals are set for the City of Shoreline in 2015. These goals take into account the growing population of the city and aim to enhance the quality of life of residents by two important measures: providing economic stability and improved multi-modal transportation systems.

Introduction Element

Shoreline is a very popular area due to its central location. The city has experienced increasing population and employment rates since early in the century. This increase will continue, especially along Aurora Avenue, which serves as a major link for numerous establishments. With this growth, the amount of large tracts of developable land will become limited, and will pose a problem to the growing population.

Land Use Element

An *Aurora Corridor SubArea Study* was prepared to explore land use alternatives for Shoreline's Comprehensive Plan. The study emphasized evaluation of economic feasibility for each alternative, as well as implementing guidelines to make certain that improvements are made. It also specified land use designations for community business, regional business, and mixed uses along the corridor.

In addition to the subarea study, goals were set to increase economic developments and improve current street conditions. To achieve this, the "commercial strip" type of retail areas will be converted to "themed" centers that are more pedestrian friendly and provide access to transit. Some of the adopted policies include creating recreational parks, emphasizing walkways and sidewalks, creating a transit center, seeking shuttle service for the corridor, redesigning and improving intersections, and protecting family neighborhoods from the effects of the corridor through design standards.

Transportation Element

One intent of the Comprehensive Plan is to improve the quality of life of Shoreline citizens through transportation. The transportation unit as a whole is currently not up to standard in many areas. A major concern of citizens is the increase in through traffic in residential areas. Also of concern are issues of safety, congestion relief, improved transit service, and general

appearance of Aurora Avenue. There is a general feeling to upgrade its system to urban street standards.

Before improvements can be discussed, the Growth Management Act (GMA) points out specific information that must be used when evaluating the transportation plan. One GMA indicator is level of service (LOS) for all arterials. The LOS standard adopted by the City is the zonal average system. Each of five subsections of the City are analyzed separately and compared with the standard LOS, which differs by zone. Mitigation is done on most intersections within the zone that do not meet the standard. The City may find intersections that are exempt from this standard including those that are too expensive to mitigate or those that currently have good transit service or special transit provisions.

The GMA also requires a transportation system to achieve concurrency. This is a check to verify that the system will continue to meet LOS standards while accommodating new developments. If this does not occur within six years, the development may be terminated until the transportation system is improved, or both the development and the system maybe modified, or the LOS standards may be changed.

Under these GMA guidelines, improvements to upgrade Aurora Avenue include adding right turn lanes or bus bays at many intersections, using transit-only ramps to and from I-5, and creating a center turn lane (between Stone Way and Meridian Ave.) In addition, the transportation system should show improvements in the City's traffic safety issues by providing safer pedestrian accommodations, such as creating crosswalks and signalizing intersections, re-channeling roads, and re-constructing sidewalks to include curbs and gutters.

Metropolitan Transportation Plan

The Metropolitan Transportation Plan (MTP) is a long-range plan that is updated every three years to respond to the concerns of the region. It takes into consideration many legislative mandates (Transportation Efficiency Act for the 21st Century [TEA-21], Clean Air Amendments, GMA) and the policies of the city, county, and state.

There are currently four important areas of concern including the need for additional capacity at intersections and roadways, improved transit service, a better system for non-motorized commuters, and upgraded access to and from the City. But Shoreline is missing tools that could help in addressing these concerns. For instance, there is the lack of street design standards and also a need for a dedicated revenue stream to fund transportation improvements. Even so, goals have been established to alleviate these issues and improve the City.

The first goal is to develop an efficient street and roadway system that maximizes capacity and accommodates all types of users. Shoreline's anticipated population growth will cause further congestion, especially along Aurora Avenue, and in order for the City to manage this, an upgraded street system is needed. The benefits of an efficient highway will affect delivery trucks, public transit, through traffic, and Shoreline residents. Adopted policies that will help achieve this goal include promoting adequate road capacity for access to home and businesses, maintaining the Comprehensive Plan levels of service, minimizing the number of driveways on arterial streets, optimizing street designs, preserving rights-of-way for all future modes of transportation, and minimizing parking on roadways to increase capacity.

With the expected population growth, it is clear that alternative modes of transportation will be needed. Therefore, the second goal of the City is to provide citizens with increased transit coverage and improved mobility options. Residents of the City have expressed concerns for

more transit service in the east-west direction, and also more service at non-peak times of the day, such as midday and weekends. Also of concern are the areas of the City that are not at all accessible by transit. Shoreline has accepted the following policies to seek improved transit service. They include providing transit options for work and non-work trips, improving local transit service within the City, enhancing transit along Aurora Avenue so that it remains a primary transit corridor, ensuring safe park and ride lots with adequate capacity in relation to demand, and allowing these lots to participate in joint-use parking. Another important policy adopted is one that would require future projects to consider having transit stop and/or bus pullout upgrades, and work with transit agencies to improve attractiveness of the area.

The third goal for the City of Shoreline is to develop a safe, connective system for pedestrians and bicyclists. The main area of improvement would be well-maintained sidewalks and wider bike lanes to create links throughout the City. This would encourage alternative modes of transportation and hopefully alleviate some of the roadway congestion. Many residents experience mobility challenges and therefore it is extremely important that sidewalks are in excellent condition to control hazardous situations. To prevent these problems, some appropriate policies associated with pedestrians include placing high priority on sidewalks that will connect popular destinations such as schools, bus stops and shopping, constructing sidewalks on both sides of an arterial, installing mid-block crossings, establish pedestrian signals at intersections, and developing off-street pedestrian trails. Other policies related to bicyclists include encouraging safe or protected bike routes and lanes, incorporating bicycle-friendly designs in future improvement projects, and accommodating bicyclists in the design and construction of roadways.

The final goal is to coordinate transportation developments with neighboring cities and regional partners. A primary concern of Shoreline citizens is the possibility that the City will become just a "pass-through" city. Because of it's unique location between major growth areas and near state highways, much of that traffic spills over into the City streets. Shoreline must take a more active role in deciding what happens to the surrounding roadways because changes to I-5, SR-104, SR-523, and SR-522 will affect traffic in and around the City. Helpful policies adopted to achieve this goal include developing interlocal ties and coordinating joint projects with neighboring jurisdictions, working with Washington State Department of Transportation and City of Seattle to explore improvement projects, and most importantly pursuing enhancements to highways through or bordering the City. This includes general capacity increases and HOV lanes so that they will be able to accommodate the volume of traffic. It also includes pedestrian improvements between cities such as illumination, sidewalks, and interconnected signals.

Economic Development Element

As previously expressed, one intent of the Comprehensive Plan is to improve the quality of life in Shoreline through economic growth. Economic development ideas that could enhance the climate in the City include providing a more complete range of services, professional jobs, and recreation so that citizens will not have to travel elsewhere, encouraging current businesses to upgrade in service and appearance, enhancing commercial areas by design guidelines, and directing public works to improve certain areas. These changes could result in important improvements such as strengthening the economy along Aurora Avenue, creating a City identity, and increasing the attractiveness to the investment community.

Currently, the City has 82 plots of land that could be redeveloped. The speculated potential opportunities consist of retail, office, hotel, and cinema projects. Retail opportunities include

entertainment and recreation establishments. Also included are "big box" retail type areas, one of which exists on Aurora Avenue at Costco, Home Depot and the other large discount shops. Office opportunities could comprise of government, medical, dental, insurance, and real estate institutions. These offices would primarily serve the community. Hotel opportunities would include full service hotels or motels, complete with conference rooms and restaurants. These establishments would be smaller and have closer ties to the community. Finally, a cinema opportunity could include a multi-screen movie theater to serve the City.

In addition to these possibilities, there is a set of formal goals for maintaining dependable infrastructure in the community related to new developments. Policies include encouraging business districts to improve their appearance (streets, sidewalks, lighting, signage, landscaping), creating effective traffic and pedestrian links, and undergrounding all utilities.

Community Design Element

The residents of Shoreline are concerned that new transportation and economic developments will not "fit" into the community. The goals of this element are to enhance the visual aspect while providing functional improvements. Examples and policies adopted to attain this goal are having shared driveways, continuous pedestrian connections and other pedestrian related amenities, separation of residential and commercial areas, and shared community open spaces.

4.2 Aurora Corridor Subarea Plan

April, 1997

Existing Conditions

Aurora Avenue is one of the most traveled north-south paths in the region. Much of its volume is through traffic, and although it is such a popular route, there is little in terms of transportation enhancements. There is poor definition between streets, parking lanes, and parking lots, which then leaves even worse outlining for pedestrian walkways. There are no bus or HOV lanes, hardly any sidewalks, and the overall safety of the area is poor because of high vehicle speeds, insufficient lighting, and crosswalks that are few and far between.

Proposed Improvements

One future plan for Aurora Avenue is to increase capacity to seven lanes, including HOV lanes. The route is also considered for "intelligent vehicle systems" which allows transit vehicles to affect traffic signals such that they will have priority at the intersection. Transit hubs will also be designated to enhance commuter convenience. There will be curb, gutter, and sidewalks constructed in certain areas to improve the pedestrian environment. These are just part of the developments suggested to allow traffic to run more safely and smoothly, and to maintain the attractiveness of this route.

Preliminary Concepts

In order to alleviate some of the problems on Aurora Avenue, a set of eleven redevelopment projects were composed to improve the City of Shoreline as a whole. These projects took into consideration improvements to transportation, land use, residential and community spaces, and urban design components. The projects also considered special opportunity sites or prime locations within the City in which development could occur. The various project alternatives were then evaluated with respect to pedestrians, transit and traffic, and safety measures to name a few.

Three Alternatives

From the previous eleven project alternatives, three were selected as possible future scenarios. These include No Action, Special Projects, and Downtown.

No Action

This alternative would result in basically the same traffic accommodations and operations that are present today, with a few enhancements. Curbs, gutters, and sidewalks would be constructed over time. Express bus service would increase, with a possibility of adding HOV lanes, along Aurora Avenue. An Interurban Trail would likely be constructed to encourage non-motorized (pedestrians, bicycles) means of transportation within the City of Shoreline, with connections to neighboring establishments also considered.

Special Projects

This alternative focuses on special projects, or "turn-around" projects, along Aurora Avenue that are designed to revitalize the community and generate long-term returns. These projects are set at prime locations, and will hopefully attract new investments over time, therefore creating a chain effect for growth.

With this increased growth comes increased vehicle and pedestrian traffic. Some suggestions for managing this would be to have areas designated as "pedestrian-based" or "automobile-served." Each area would have specific accommodations and standards. For example, the "pedestrian-based" areas would include construction of curb, gutter, and sidewalk along Aurora Avenue. There would also be planted medians, planted strips with street trees separating sidewalks from traffic, and pedestrian connections linking various new developments. Parking lots should be located at the rear of new establishments for a friendlier street front atmosphere and shared parking structures or lots are encouraged. Improved signage and crosswalk improvements at key intersections are also projected. This includes markings on the roadway designating a crosswalk, as well as overhead indications to drivers of pedestrian zones.

For "automobile-served" areas, construction of curb, gutter, and sidewalk would occur over time. There is also the possibility for HOV lanes along Aurora Avenue, accompanied with transit facilities such as additional bus pullouts and bus shelters. Intersections would be modified to include proper turning radii, distinctive markings, and adequate illumination.

A major concern of Shoreline citizens is the effect of growth on the residential areas. The increased traffic may influence people to take side streets through neighborhoods to avoid congestion. Within the Special Projects alternative, some recommendations for discouraging traffic through these areas include constructing undulating curbs and traffic circles, full automobile closures, and one-way streets onto Aurora Avenue.

Also, three sky bridges have been proposed at the following locations: North 155th to North 160th (Westminster triangle), North 180th, and North 192nd. These sky bridges may allow safer pedestrian passage and smoother traffic flow.

Downtown

This alternative focuses on one area, a "downtown" area, that would serve as a pedestrian oriented anchor to the community with many different uses. The new developments would be in one section of the Aurora corridor, concentrating on the areas between North 170th and North 185th. Some major issues that affect existing establishments include difficult access, limited visibility, lack of pedestrian linkages, and poor vehicular circulation.

Park blocks within the downtown area would be created to serve as a public space along Aurora Avenue, which will be refurbished with curb, gutter, and sidewalks. These park blocks would include pedestrian paths that are coordinated with newly defined street edges. Also, new signalized intersections along Aurora will aide in creating smaller blocks and more east-west connections across Aurora, which together with marked paving at crosswalks, make this corridor much more pedestrian oriented.

Smaller blocks in the Downtown area will increase access to centers, and allow for improved traffic operations. A continuing major concern of neighborhoods is the possibility that this Downtown traffic will enter residential streets. Measures that may divert traffic from neighborhoods consist of undulating curbs, traffic circles, and one-way or pedestrian-only streets linked to Aurora Avenue.

In terms of street design, there will be planted center medians and planted strips between pedestrian paths and the roadway. One major recommended plan for Aurora Avenue is to increase capacity to seven lanes, including HOV or transit priority lanes. In addition, transit enhancements include a transit center and increased transit efficiency. Intersections would be redeveloped by improving traffic safety, signalization, and vehicular operations. Unique signage is also suggested for crosswalks so that drivers will be prepared for pedestrian zones.

New developments would also need to be pedestrian oriented. Structures should face the roadway, with smaller structures being closer to the street and their parking lots to the rear. Larger structures should be set back from the street edge. Sharing of lots is encouraged, while curbside parking is not.

4.3 City of Shoreline Pedestrian Safety Study

September, 1998

Background

The purpose of the Shoreline Pedestrian Safety study was to identify pedestrian safety concerns and suggest appropriate actions to address these concerns within the two main north/south arterial corridors in the City of Shoreline (15th Avenue NE and Aurora Avenue N).

The results of this study are a set of interim safety improvements for Aurora Avenue that may be included into the final design for the roadway.

Existing Conditions and Safety Concerns

Aurora Avenue N – Entire Corridor

Some of the most important concerns of the area involve lack of pedestrian amenities and inadequate road design. Many of the properties along Aurora Avenue do not have defined driveways or any curbs, gutters, or sidewalks. The only buffer between the property and the highway is a wide paved shoulder that spans the length of the property frontage. Also, there are limited crosswalks causing many pedestrians to cross mid-block and take refuge in the two way left turn lane. When this is combined with limited lighting, high speeds and traffic volumes, and numerous allowable turn movements, the possibility of accidents is very high.

Aurora Avenue N – vicinity of N 152nd Street

This intersection includes a bus stop pair and a popular restaurant. There are many observed crossings in the region of this area, but the nearest signalized crosswalk is three blocks to the North.

Aurora Avenue N – Westminster Way N

This intersection contains a wide right turn with two lanes, which acts more like an off-ramp. It is very difficult for pedestrians to cross here, and there is no signalized intersection nearby.

Aurora Avenue N – vicinity of N 165th Street

This area includes a bus stop pair, a healthcare center, and neighborhoods to the West. There is no crosswalk, but there are shoulders here to accommodate pedestrians and cyclists. There are also empty lots in this area.

Aurora Avenue N – vicinity of N 170th Street

This intersection includes much pedestrian traffic associated with a bus stop pair, and also a neighboring high school. There are also areas of parking on Aurora Avenue related to nearby businesses.

Aurora Avenue N – Ronald Place N (vicinity 17300 block)

This intersection includes a wide right turn onto Ronald Place N. This causes vehicles to turn at high speeds and endanger pedestrians. This street (Ronald Pl. N.) is also used as a short-cut for vehicles to bypass Aurora Avenue traffic.

Aurora Avenue N – Ronald Place N (vicinity 17900 block)

The configuration of this intersection allows high speed left turns onto Ronald Place N. Also, right turning vehicles from Ronald Place actually merge with traffic using the wide shoulder lanes meant for pedestrians and bicyclists.

Aurora Avenue N – vicinity of N 180th Street

This area contains one of the most popular bus stop pairs and related pedestrian crossings.

Aurora Avenue N – N 185th Street / Firlands Way N

This unique intersection has five legs, causing confusion for pedestrians and motorists alike. Although this intersection is signalized, the crosswalk pedestrians use to cross the fifth leg (Firlands Way N) is not signalized.

Aurora Avenue N – vicinity of N 195th Street

There is a bus stop pair at this intersection, as well as many pedestrian crossings. There is a steep driveway on the East of Aurora Avenue, which causes drivers to pull far onto the shoulder, endangering pedestrians, to exit.

Aurora Avenue N – vicinity of N 200th Street

The bus stop pair here is South of the signalized crosswalk and intersection. This results in pedestrians crossing mid-block.

Design Recommendations of the Pedestrian Safety Study

Aurora Avenue N – Entire Corridor - Short Term

There are five main short term improvements for the entire corridor. The first is to reduce the speed limit from 45 mph to 40 mph. With the increase in volume and speed, it is more dangerous for pedestrians and bicyclists. Also, street lights should be installed and mid-block crosswalks should be more visually significant to bring attention to pedestrians. Another improvement would be to apply solid lane lines on approaches to unsignalized crosswalks to prevent vehicles from switching lanes into a crossing area. Finally, decals should be affixed to push buttons at signalized crosswalks to inform pedestrians of the crosswalk operations.

Aurora Avenue N – Entire Corridor - Long Term

There are eight main long term improvement goals for the corridor. One improvement is to reduce the number of driveways for each property. Another improvement is to reduce the number of locations that allow full left turn access into properties off of Aurora. To maintain access to these properties, U-turn bays would be constructed at the signalized intersections. A third improvement is the installation of curbs, gutters, and sidewalks along Aurora Avenue, in place of the wide shoulder lanes. The next main enhancement is the signalization of current stop-controlled intersections. This not only increases pedestrian safety, but it also helps speed control. In addition, more signalized intersections will result in tighter platoons, therefore causing longer gaps in traffic, and allowing pedestrians a better chance to cross. Another improvement is the narrowing of the roadway section from 60-63 feet to 56-58 feet. A narrower highway will help reduce speed. The next improvement is to install uniform lighting throughout Aurora Avenue. This will aide drivers in seeing pedestrians and also reduce the affects of adjusting to light and dark areas. Another development is to eliminate right turn channels and their surrounding small islands. This will improve the intersection by allowing pedestrians to cross in one single movement, rather than crossing the right turn lane first. The final improvement is to create medians in the center lane. This will prevent left turns into properties and also provide a safer place of refuge for pedestrians crossing mid-block.

Mid-block Improvements

A major recommendation for mid-block improvement is the addition of marked crosswalks. The locations of these crossings have been chosen with consideration to current pedestrian volume, location and demand for nearby bus stops, distance between other crosswalks, and ability to prevent or control left turns. The proposed locations all use the medians in the center lane, which helps pedestrians by allowing them to focus on one direction of traffic at a time. Offset crosswalks could also be utilized so that pedestrians would be able to face approaching traffic before crossing. Also included with each intersection is an overhead pedestrian sign to alert drivers from a distance.

Aurora Avenue N – vicinity of N 152nd Street

This location is recommended to receive a mid-block crossing just South of the intersection along with a pedestrian refuge median, overhead signs, and lighting. Curbs, gutters, and sidewalks are also recommended due to the large number of pedestrians. The existing bus stop would be moved South so that it would coincide with the crossing. Left turns out of the establishments at the intersection would be reduced due to limited sight distances from driveways to pedestrians.

Aurora Avenue N – Westminster Way N

One recommendation for this intersection is the elimination of the wide right turn, which acts as an off-ramp. This would decrease the width of the intersection, and cause vehicles to reduce their speed, making it easier for pedestrians to cross. There is also an abandoned portion of Westminster Way N that the City of Shoreline would like to redevelop into a park area with surrounding sidewalks.

Aurora Avenue N – vicinity of N 165th Street

Improvements at this intersection include a center median for pedestrians, offset crosswalks, handrails, signs overhead, and curbs, gutters, and sidewalks along Aurora Avenue. The driveways associated with this intersection are not greatly affected, but with the offset crosswalk, some coordination with property owners is needed to design a narrower driveway. If coordination is not successful, an alternative recommendation would locate the crossing further South, without offset crossing, and the eastside bus stop would need to be relocated.

Aurora Avenue N – vicinity of N 170th Street

Recommendations at this intersection include a crosswalk just North of 170th. It would also include a center median with overhead signs and streetlights. This intersection would employ right turn only signs at driveways, as well as lanes to accommodate bicycle traffic. A U-turn lane is recommended to allow vehicles to access east and west properties blocked by the median.

Aurora Avenue N – Ronald Place N (vicinity 17300 block)

The recommendation at this intersection is to change the "off-ramp" type turn to a more right angled intersection. This improves the pedestrian situation by shortening the crossing length, it also requires drivers to slow down when approaching the intersection. This recommendation does not alter access to properties, although some parking may be eliminated.

Aurora Avenue N – Ronald Place N (vicinity 17900 block)

A major recommendation here is to change Ronald Place N to a one-way street. This improves the intersection by only allowing right turns onto Aurora. This would also allow the redesign of a more right angled intersection. Pedestrians will have a shorter distance to cross, and vehicles will no longer be able to travel onto Ronald Place N. Curbs, gutters, and sidewalks are also recommended along Aurora Avenue.

Aurora Avenue N – vicinity of N 180th Street

Improvements at this intersection include moving the eastside bus stop to the South side of the intersection, as well as creating a center median for the recommended crosswalk, and overhead signs and street lighting. Left turns exiting N 180th to Southbound Aurora are recommended to be eliminated, while left turns off of Aurora would still be allowed. The median should not disrupt traffic too significantly because of the low volume and the availability of U-turns at further intersections. There is also an alternative recommendation for this intersection, which consists of all the main changes from the original recommendation, only with a shorter center median.

Aurora Avenue N – N 185th Street / Firlands Way N

Recommendations for this five-leg intersection include changing Firlands Way N to a one way street only accessible to Southbound right turns off of Aurora. This recommendation will

eliminate the confusion that motorists and pedestrians experience due to the directions of traffic. Property access would not be greatly affected because there are alternate entrance routes for vehicles to take. Also, pedestrian safety is increased with the decreased speed and increased sight of vehicles turning onto Firlands. An alternative recommendation at this intersection would be to simply signalize the crosswalk.

Aurora Avenue N – vicinity of N 195th Street

One recommendation for this intersection is the addition of a center median, marked offset crosswalk, and overhead signs and streetlights. The East side bus stop would also be moved further South to coincide with the sidewalk. An important recommendation would be to change a housing property driveway into a one-way entrance. This improves safety because drivers who currently exit the property have poor sight distance to the street. All other access though should not be significantly affected because of alternate entrances.

Aurora Avenue N – vicinity of N 200th Street

The only recommendation at this intersection is to move the bus stop on the East side of Aurora closer to the signalized crosswalk. This will encourage users to cross in a marked crosswalk, rather than mid-block.

5.0 Existing Transportation Conditions

5.1 Background and Introduction

Aurora Avenue is a major north/south arterial that serves both local and regional traffic within the City of Shoreline, Washington. Aurora Avenue is a portion of signed State Route 99 (SR-99) that spans from North Pierce County to North Snohomish County. In addition to serving intra-city traffic, the route serves as a regional link between cities in the Puget Sound Region.
The following sections describe the existing physical and operating conditions on Aurora Avenue North. The *Existing Transportation Facilities* section of this report contains information on alignments, intersections, and traffic control. In addition this section presents existing vehicle access and parking, transit facilities and service, and pedestrian facilities. The *Existing Roadway Operations* section presents information on existing vehicular traffic along the corridor. Information includes traffic volume and distribution, intersection level of service, corridor speed and delay, spot speeds, and modal classification. Accident data are also presented in this section including summary by severity and location, high accident locations, and accident distribution by time of day,

5.2 Existing Transportation Facilities

Within the City of Shoreline, Aurora Avenue (Highway 99) extends between N 145th Street (SR 523) to N 205th Street (SR 104), a distance of approximately three miles.

Typical Section

Along this segment, Aurora Avenue North is a five-lane roadway with two general-purpose traffic lanes in each direction and a continuous two-way-left-turn lane in the center. Existing pavement width varies between 55 and 62 feet – allowing for five, standard width (12-foot) traffic lanes. Figure 5.2.1-1., below, depicts a typical cross-section along SR 99 within the City of Shoreline.

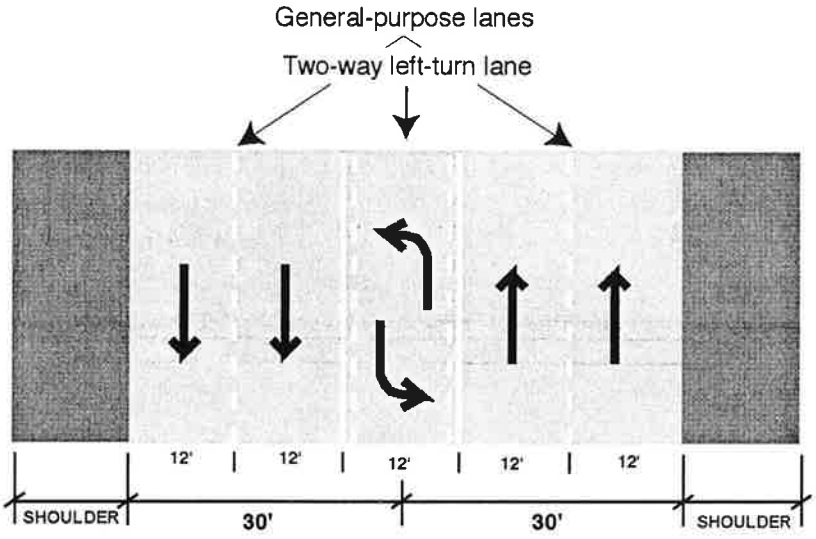


FIGURE 5.2.1-1. Typical Cross-section (existing)

The pavement widens at major intersections to allow for left and right turn lanes. Curb, gutter and sidewalk occur only intermittently and exist along about 20 percent of the segment. Where curb and gutter exist, they define a paved shoulder width of 8 to 10 feet. Otherwise a shoulder width of 6 to 8 feet is typical.

Existing right-of way width is typically 90 feet. However this dimension varies considerably over the length of the project. Between N 155th Street and N. 165th Street the right of way is 110 feet. Between N 185th Street and N 198th Street right-of-way width varies between approximately 106 feet and 120 feet. Except in isolated locations, there is little existing right-of-way available for future widening.

Horizontal Alignment

The alignment of Aurora Avenue through Shoreline is essentially straight, with two angle points of approximately 3 degrees occurring in the vicinity of N 175th Street Several other angle points of 1 degree or less occur along the alignment.

Vertical Alignment

There are two crest vertical curves and two sag vertical curves along the segment. Grades along the segment are generally below 2 percent. A grade of approximately 3 percent occurs between N .145th Street and N 155th Street. The steepest grade on the segment, approximately 4 percent, occurs between N 185th Street and N 192nd Street. The grade in this location causes difficulty for cars exiting the queue southbound at N 185th Street.

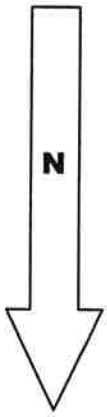
5.3 Crossroads

Aurora Avenue is intersected 26 times along this three-mile segment with roads ranging from local neighborhood collections major arterials providing primary regional access. The highest levels of east-west traffic crossing Aurora are at the signalized crossings of N 145th, N 155th, N 175th, and N 205th Streets. These streets all provide access to I-5. Other signals occur at N 160th, N 185th, N 192nd, and N 200th Streets. Signal spacing varies from 5 blocks (1/4th mile) to 15 blocks. Tables 1 lists signalized intersection locations and distance between them. Table 5.5-1 lists unsignalized intersections and intersection type. Figures 5.4-2A and -2B indicate the location of intersections the corridor and provide a schematic depiction of intersection lane configuration.

5.4 Signalization

The eight signalized intersections within the project limits are generally spaced between one-quarter and three-quarter miles apart. The largest distance between signals is between N 160th Street and N 175th Street. Distances of one-quarter mile occur between N 155th Street and N 160th Street and N 200th and N 205th Streets. Table 5.4-1 provides the milepost location and distance between each signalized intersection.

TABLE 5.4-1. Signalized Intersections (listed from South to North)



Intersection	Location (SRMP)	Distance to Next Signal (feet)
N 145th St.	40.47	2640
N 155th St.	41.0	1320
N 160th St.	41.25	3960
N 175th St.	42.0	2640
N 185th St.	42.5	1584
N 192nd St.	42.8	2376
N 200th St.	43.25	1320
N 205th St.	43.5	---

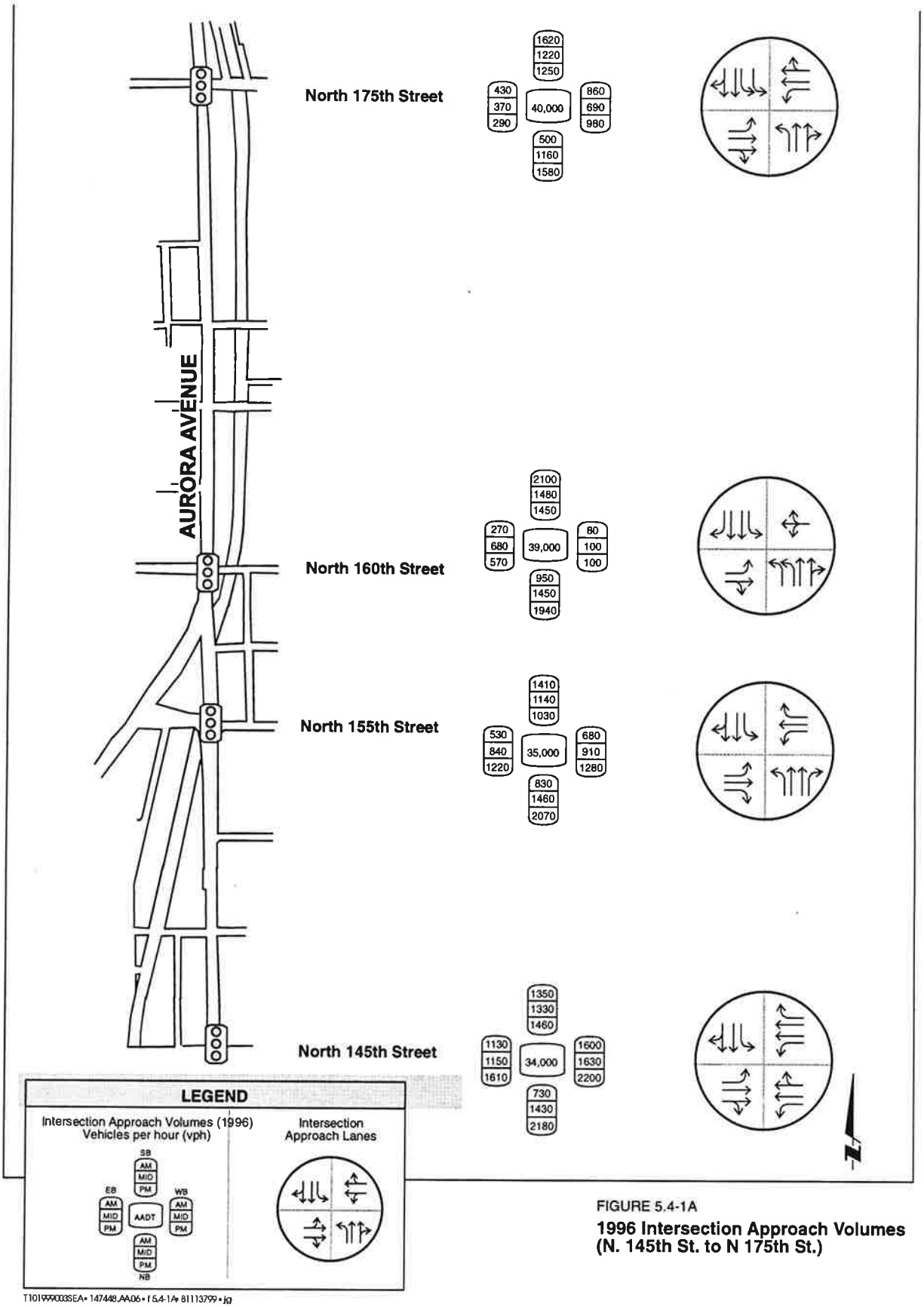


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FIGURE 5.4-1A

1996 Intersection Approach Volumes (N. 145th St. to N 175th St.)

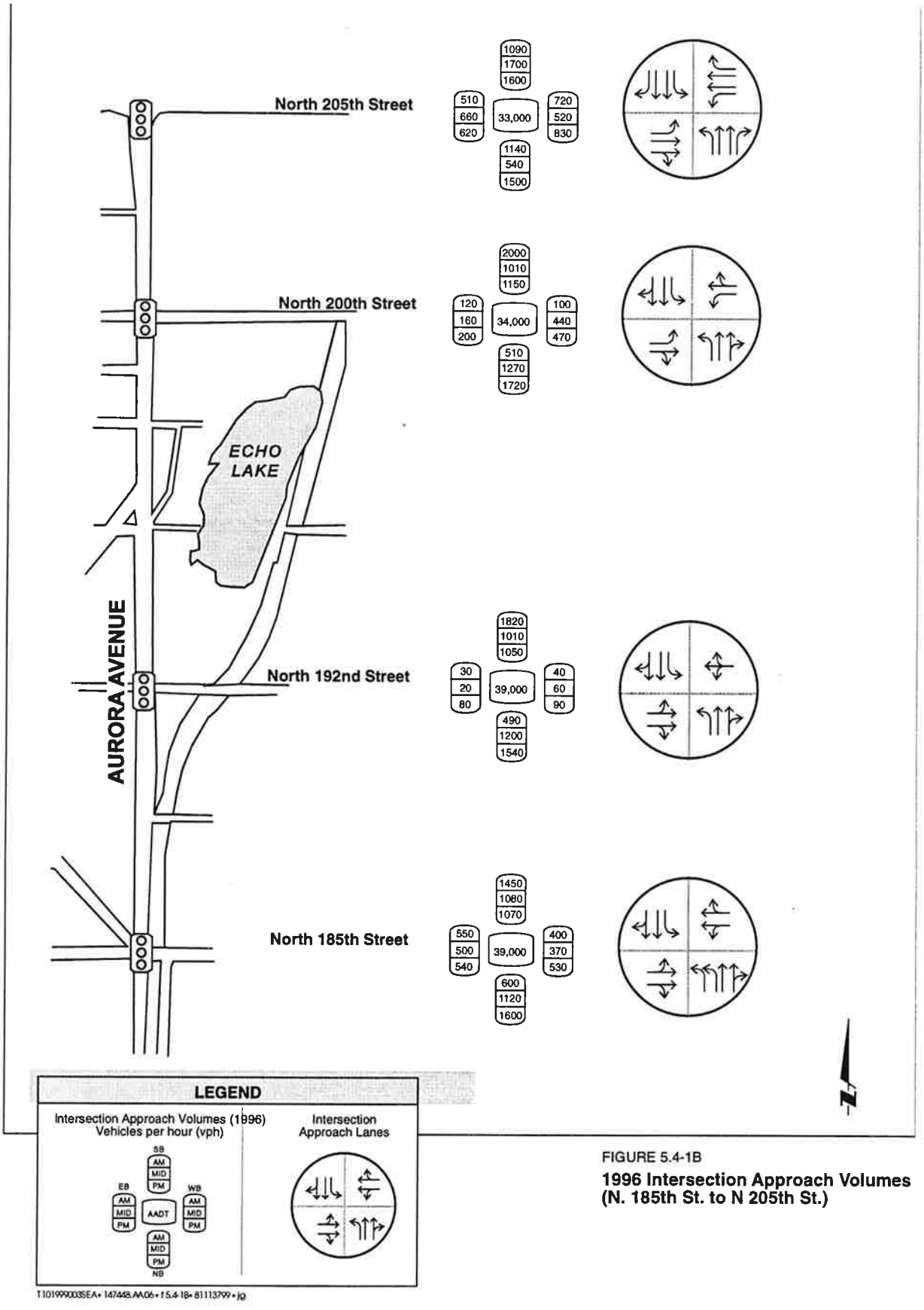


FIGURE 5.4-1B

1996 Intersection Approach Volumes (N. 185th St. to N 205th St.)

5.5 Unsignalized Intersections

In addition to the signalized intersections, there are 18 minor street intersections in the three-mile Shoreline segment of Aurora Avenue. South of N 195th Street these intersections are generally evenly spaced at 1/8th-mile intervals. However, 5 of the 18 minor intersections occur in the ½ mile north of N 195th Street. Table 5.5-1., lists the 18 unsignalized minor street intersections and describes the type of intersection that is made with Aurora Avenue.

TABLE 5.5-1. Unsignalized Intersections

Cross-road	Intersection Type
North 149th Street (west side of highway only)	T
North 152nd Street (east side of highway only)	T
Westminster Way (west side of highway only)	Y
North 163rd Street (west side of highway only)	T
North 165th Street	4-way
North 167th Street (east side of highway only)	T
North 170th Street (west side of highway only)	T
Ronald Place (east side of highway only)	T (45° Skew)
Ronald Place (east side of highway only)	T (15° Skew)
North 180th Street (east side of highway only)	T
North 183rd Street (east side of highway only)	T
188th Way North (west side of highway only)	T (45° Skew)
North 182nd Street (west side of highway only)	T
North 195th Street	4-way
Firlands Way North (west side of highway only)	T (40° Skew)
Echo Lake Place North (east side of highway only)	T (35° Skew)
North 198th Street	4-way
North 199th Street	4-way

Source: CH2M HILL, 1998

5.6 Other Traffic Control Devices

N. 145th Street

Approximately 300 feet of curbing separates the southbound left-turn lane from the northbound traffic lanes.

N. 155th Street

Approximately 300 feet of curbing separates the northbound and southbound left-turn lanes from the opposing traffic lanes. In addition, traffic control islands separate eastbound, northbound, and westbound right-turning movements from the through-lanes.

Westminster Way

A raised, 75-foot traffic control island approximately 300 feet from the intersection of N 160th Street serves to separate the two-way left-turn lane from the northbound left-turn lane. Curbing extends from the traffic control island for the 300 until the intersection of N 160th Street.

N 160th Street

A combination of traffic control islands and curbing are used at this intersection to separate the southbound left-turn lane from the through-traffic lanes.

Ronald Place N

A traffic control island is in place that separates northbound diverging traffic from vehicles making a right-turn onto Aurora Avenue northbound.

N 175th Street

A raised traffic control island extends from the T intersection at Ronald Place N, to the intersection of N 175th Street. This island serves to prohibit left-turning movements from Ronald Place N and to separate northbound, left-turning vehicles from oncoming traffic.

Curbing extends 300 feet north from the intersection to separate the southbound left-turning traffic from southbound through traffic. Approximately 300 feet north of the intersection, a traffic control island serves to define the northern extent of the left turning pocket and separate it from the two-way left-turn lane.

N 185th Street

A combination of traffic control islands and curbing are used similar to what occurs at N 175th Street. The southbound left-turning pocket is 150 feet long and is defined by a 150 tapered traffic control island. Two small traffic control islands control turning movements to and from Firlands Way.

N 192nd Street

Curbing is used in 150-foot segments to separate the northbound and southbound left-turning movements from opposing traffic.

N 200th Street

A 300-foot section of curbing separates the northbound left-turn lane from oncoming traffic lanes. A 600-foot section of curbing, attached to a traffic island associated with N 205th Street, defines the 600-foot southbound left-turn lane.

N 205th Street

A 250-foot traffic island and 900 feet of curbing are used to prohibit left turns for the entire distance between N 200th Street and N 205th Street. The traffic island and 300 feet of the curbing define the northbound left-turn lane.

A small traffic control island separates the northbound right-turn lane with northbound through-traffic lanes at the intersection.

5.7 Illumination

Luminaries exist along the segment and are placed in most cases on their own poles.

5.8 Driveway Access

Land use along Aurora Avenue North is predominantly commercial/retail. Most of the businesses are free standing with individual driveways or continuous shoulder access. This type of development has resulted in a very high number of individual access points. Table 5.8-1 presents the number of driveways, sub-totaled between signalized intersections and by direction. In total there are 197 access points in this three-mile section, an average of over 60 driveways per mile (total of both directions).

TABLE 5.8-1. Driveways

		Driveway Count					
		Northbound		*Southbound*		**Segment Totals**	
Segment Beginning	Driveways Per mile (both directions)	Full Access	Right-in / Right Out Only	Full Access	Right-in / Right Out Only	Full Access	Right-in / Right Out Only
N 145th St.	72	14	2	18	5	32	7
N 155th St.	32	4	2	2	0	6	2
N 160th St.	79	22	6	26	5	48	11
N 175th St.	80	9	8	18	5	27	13
N 185th St.	43	4	4	4	1	8	5
N 192nd St.	60	10	5	8	4	18	9
N 200th St.	44	0	1	0	10	0	11
						139	58
Average	**60**				Total	**197**	

Source: CH2M HILL, 1998

5.9 On-Street Parking

Existing parking along the corridor occurs parallel along the roadway shoulders and angled or perpendicular within the Aurora Avenue right-of-way. This occurs mainly near retail and commercial activities along the segment.

There are approximately 22 businesses along Aurora Avenue that utilize the shoulder for parking where no curb exists. These businesses have parking perpendicular to their frontage that would not be possible with a curb in place.

5.10 Sidewalks & Crosswalks

Sidewalks have been constructed along only approximately 20 percent of the length of Aurora Avenue. The existing sidewalk is discontinuous, having been constructed as part of individual property improvements or along with intersection widening. A shoulder 6 to 8 feet wide is available. Where sidewalks are not available, the shoulder is for the most part paved along the corridor and is in poor condition north of N 152nd Street. Numerous driveways, lack of curb and gutter, and erratic parking all contribute to a general lack of safe passage for pedestrians and pedalcyclists.

Crosswalks are striped and actuated at all of the signalized intersections along the segment. At the intersection of N 175th Street wheelchair detectors have been provided to supplement the button actuation.

5.11 Transit Service

Transit service has recently been improved to and from Downtown Seattle along Aurora Avenue North. Route 358 was initiated in February of 1999 to consolidate service previously provided by the routes 359, 360 and 6.

TABLE 5.11-1. Transit Service

ROUTE	SERVICE	PEAK HEADWAY	OFF-PEAK HEADWAY
370	Aurora Village Transit Center / University of Washington	30 (minutes)	60 (minutes)
358	Aurora Village Transit Center / Downtown Seattle	10	20
340	Shoreline Park & Ride / Bellevue / SeaTac / Burien	15	60
317	Edmonds / Aurora Village Transit Center / Downtown Seattle	30	60
301	Richmond Beach / Shoreline Park & Ride / Downtown Seattle	30	-
943	Shoreline Park & Ride / Providence Medical Center	30	-
948	Ballard / Shoreline Park & Ride / Boeing Everett	60	-

Source: CH2M HILL, 1999

Sound Transit is now determining the phasing of its Regional Express bus network. When the SR-522 and I-405 services are implemented, it is probable that King County Metro will restructure Route 340 North, which terminates at the Shoreline park-and-ride lot. The timing and content of the Sound Transit Regional Express network is still uncertain.

Transit Zones

Transit zones occur approximately every ¼ mile on both sides of the roadway along Aurora Avenue North. Four zones have shelters and are all located on the west side of the roadway. They are located at N. 192nd Street (2 shelters), N 165th Street, and N 160th Street.

Park and Rides

There are two park and rides located along the Aurora Corridor. The Shoreline Park and Ride is located at the intersection of N 192nd Street and is accessible from Aurora Avenue and N 192nd Street. The Aurora Village Transit Center and Park and Ride is located one block east of Aurora Avenue on N 200th Street. It is accessible from N 200th Street and the Aurora Village Parking area.

5.12 Land Use

Existing land use is primarily commercial/retail with a high driveway density and a significant amount of space dedicated to auto parking and circulation. Most of the buildings are small and freestanding with auto-orientated space between them. Aggressive development of larger scale

businesses is hindered by topography constraints that limit parcel depth. There are a number of vacant properties and other attributes generally associated with aging "strip" development. Land uses along Aurora Avenue N between N 175th Street and N 185th Street may attract pedestrian trips from nearby schools and medium to high density housing.

6.0 Existing Roadway Operations

Aurora Avenue North is classified as a principal urban arterial by the Washington State Department of Transportation and by the City of Shoreline. As such, it is expected to carry 20,000 or more vehicle trips per day. In addition, Aurora Avenue is identified as a truck freight route. It carries over 10,000 tons of freight annually and is classified as a T-2 tonnage class roadway.

6.1 Origin and Destination

An Origin and Destination study was conducted in 1996 in support of the City's Comprehensive Plan. Trips for the p.m. peak hour were analyzed. The results of the study indicated that 67 percent of all trips in the p.m. peak hour on Aurora Avenue have on trip end (either an origin or destination) within the City of Shoreline, with the other 33 percent being attributed to through traffic.

6.2 Annual Average Daily Traffic

The Annual Average Daily Traffic (AADT) volumes along Aurora Avenue range between 33,000 and 45,000 vehicles per day (vpd) according to the 1995 – 1997 Annual Traffic Reports published by WSDOT. Figures 5.4-2A and 4.5-2B indicate the 1998 AADT values for the corridor at signalized intersections.

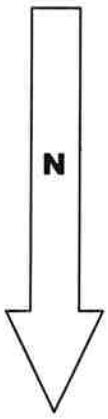
6.3 Traffic Growth

Annual WSDOT traffic counts indicate that daily traffic volumes on Aurora Avenue in the City of Shoreline grew between 10 and 20 percent between 1990 and 1995. This calculates to an annual growth rate of 2 to 4 percent per year.

6.4 Future Daily Traffic Volumes

Traffic conditions for the year 2015 were forecast to support the Comprehensive Plan traffic impact analysis. The following table lists the estimated average daily traffic that is expected in the year 2015 assuming the Comprehensive Plan's preferred land use. The volumes contained in the table below were factored from 2015 p.m. peak forecasts using the existing p.m. peak-hour percentage (7.4%) of total daily traffic.

TABLE 6.4-1. Estimated Future Daily Traffic Volumes



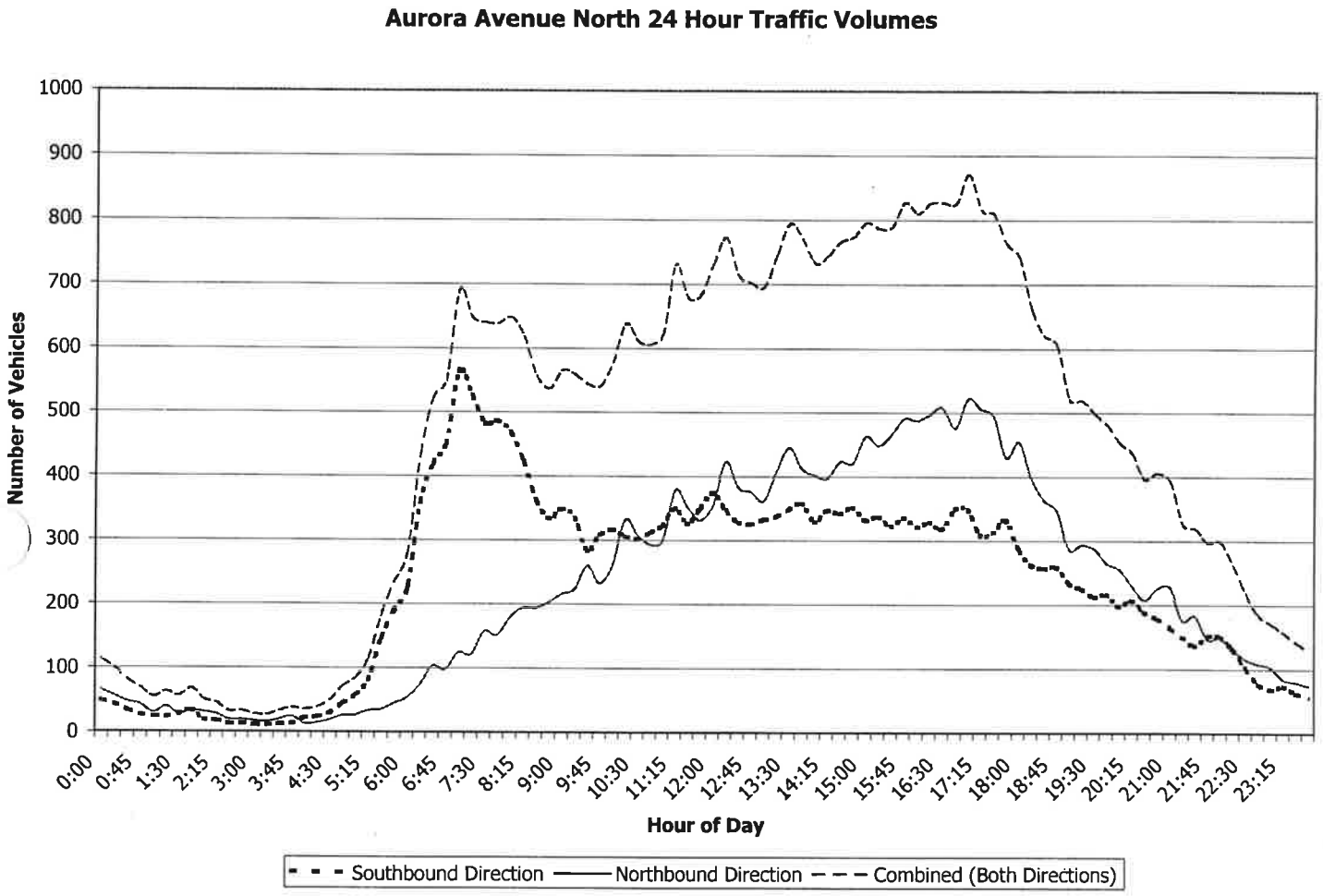
Intersection	Estimated ADT
North 145th Street	54,000
North 155th Street	50,000
North 160th Street	56,000
North 175th Street	48,000
North 185th Street	47,000
North 192nd Street	47,000
North 200th Street	48,000
North 205th Street	53,000

Source: CH2MHILL, 1999

6.5 Hourly Traffic Patterns

Twenty-four hour counts were obtained from WSDOT for use in the Aurora Avenue Study. The counts were taken May 2, 3, and 4, 1995 and averaged over the three days. The counts are presented as 1995 traffic volumes and are used to illustrate the distribution of traffic volumes over a 24-hour period.

FIGURE 6.5-1. Traffic Volumes by Time of Day



Source: WSDOT

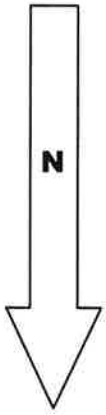
6.6 Intersection Level of Service

Level of Service is a rating assigned to intersections to indicate the overall degree of delay and congestion associated with a roadway or intersection. The general public readily considers levels of service A, B and C acceptable operation. Most people will tolerate Level of Service D operations given expectations of urban conditions. Levels of service E and F are undesirable and warrant improvement.

A 1996 analysis of afternoon peak hour traffic operation published in the Aurora Corridor Subarea Technical Report indicated that only the intersection at N 192nd Street (LOS B) operates at acceptable level of service in the p.m. peak hour. The evaluated 1996 p.m. peak level of

service for the 8 signalized intersections are summarized in the following table. This evaluation indicates a general condition of failure throughout the length of Aurora Avenue North.

TABLE 6.6-1. Intersection Level of Service 1996 p.m. peak



Intersection	Level-of-Service (LOS)
North 145th Street	F
North 155th Street	F
North 160th Street	E
North 175th Street	E
North 185th Street	F
North 192nd Street	B
North 200th Street	E
North 205th Street	E

Source: City of Shoreline Comprehensive Plan, 1998

6.7 Future Intersection Level of Service

Without intersection and roadway improvements, all but one of the signalized intersections listed in the table above will operate at LOS F. The intersection at N 192nd Street will operate at LOS C due to its low cross-street volumes.

6.8 Speed and Delay

A traffic speed and delay study was performed on the corridor in September of 1998. Data was collected for both a.m. and p.m. peak periods in both the northbound and southbound directions.

The data collected and calculated in this study included the following:

- Overall travel time between intersections, which includes travel time between intersections and delay experienced at the intersections.
- Total overall travel-time along the segment which includes delay and travel time along the segment. It is a cumulative total of overall travel time between intersections.
- Congestion and signal delay at intersections which was defined as the period from the moment when the car was required to stop until the moment where it crossed the centerline of the cross-street at the intersection.
- Cumulative delay for travel on the segment, which is a summation of delay, experienced at all intersections.
- Overall travel speed between intersections and for the entire segment.
- Running speed between intersections and for the entire segment.

The following table presents the results of this study.

TABLE 6.8-1. Corridor Speed and Delay

Time of Day	Direction	Overall Travel Speed (MPH) (2)	Running Speed (MPH) (3)	Delay Ratio (Sec./Sec.) (4)	Total Stop Time (Min.)	Average Time/Stop (Min.)	Frequency of Stopping (5)	Overall Travel Time (Min.)
AM PEAK	SB	16	32	0.36	0:03:49	0:01:13	5	0:10:09
AM PEAK	NB	24	33	0.27	0:02:08	0:00:29	3	0:08:33
PM PEAK	SB	26	32	0.29	0:02:43	0:00:43	4	0:09:10
PM PEAK	NB	24	33	0.35	0:03:31	0:01:00	4	0:09:49

Surveys conducted by CH2MHILL September 21, 22, 23, 24, 29, 1998.

(1) Statistics are averages for all runs by time of day and direction.

(2) Includes driving time and stop time.

(3) Includes driving time only.

(4) Indicates the ratio of stop time to overall travel time.

(5) Indicates the average number of signals encountered with delay (red time) out of a possible 8.

6.9 Spot Speeds

In February 1996, WSDOT performed a spot speed inventory at several locations on Aurora Avenue in the City of Shoreline. Speeds were calculated for the 85th percentile by direction and for a.m. peak, p.m. peak and off-peak conditions. Table 6.9-1, below, summarizes the results of the study. The posted speed at all of the study locations is 45 miles per hour.

TABLE 6.9-1. Spot Speeds

Location	SRMP	Direction	Weekday/ Weekend	A.M. Peak	P.M. Peak	off-peak	Daily Avg.
1/8th mile north of N 145th St.	40.65	NB	Weekend	45	39	40	41
			Weekday	45	37	40	40
		SB	Weekend	41	39	39	39
			Weekday	40	39	39	39
1/10th mile south of N 155th	40.90	NB	Weekend	43	37	39	40
			Weekday	43	34	39	40
		SB	Weekend	40	35	36	37
			Weekday	39	36	36	37
1/3 mile south of N 175th	41.65	NB	Weekend	53	49	49	49
			Weekday	53	45	49	51
		SB	Weekend	41	36	37	37
			Weekday	39	36	37	37
1/8th mile south of N 175th	41.85	NB	Weekend	43	37	39	40
			Weekday	43	33	39	40
		SB	Weekend	39	34	35	36
			Weekday	36	50	35	36

Source: WSDOT Northwest Region Traffic Operations

6.10 Vehicle /Modal Classification

Vehicle Classification counts were performed during the a.m. and p.m. peak periods at a location between N 175th Street and N 185th Street. The number of passengers was recorded for each passenger car (including light trucks) that passed the count location in the following categories:

- single occupant
- two-person
- three-person plus

In addition to passenger cars, counts were recorded for trucks, transit vehicles, bicyclists, motorcyclists, and pedestrians. Mode classification count results are presented in Table 6.10-1.

TABLE 6.10-1. Vehicle Classification Counts

Time Period	Direction	---	Bus	Pedestrian	Pedal-cyclists	Single Occupant Vehicles	2 Person	3 + Person	Trucks
AM PEAK	Northbound	*Count*	10	4	2	410	74	9	20
		Percent	**1.9%**	**0.7%**	**0.4%**	**77.5%**	**14%**	**1.7%**	**3.8%**
AM PEAK	Southbound	*Count*	15	2	2	1537	130	24	22
		Percent	**0.9%**	**0.1%**	**0.1%**	**88.7%**	**7.5%**	**1.4%**	**1.3%**
PM PEAK	Northbound	*Count*	11	3	2	1432	331	47	18
		Percent	**0.6%**	**0.2%**	**0.1%**	**77.6%**	**17.9%**	**2.6%**	**1%**
PM PEAK	Southbound	*Count*	10	2	4	881	272	78	9
		Percent	**0.7%**	**0.2%**	**0.3%**	**70.1%**	**21.6%**	**6.2%**	**0.8%**

Surveys conducted by CH2MHILL on September 24 and September 30, 1998.

6.11 Accident Experience

Accident Data for the study corridor was obtained from the Washington State Department of Transportation for a three-year period from January 1994 through October 1996. During this period a total of 1,230 accidents were recorded including 2 fatalities. WSDOT estimates that this equates to over $61 Million in social costs for this period. Refer to Figure 6.11-1 for a breakdown of accidents by type.

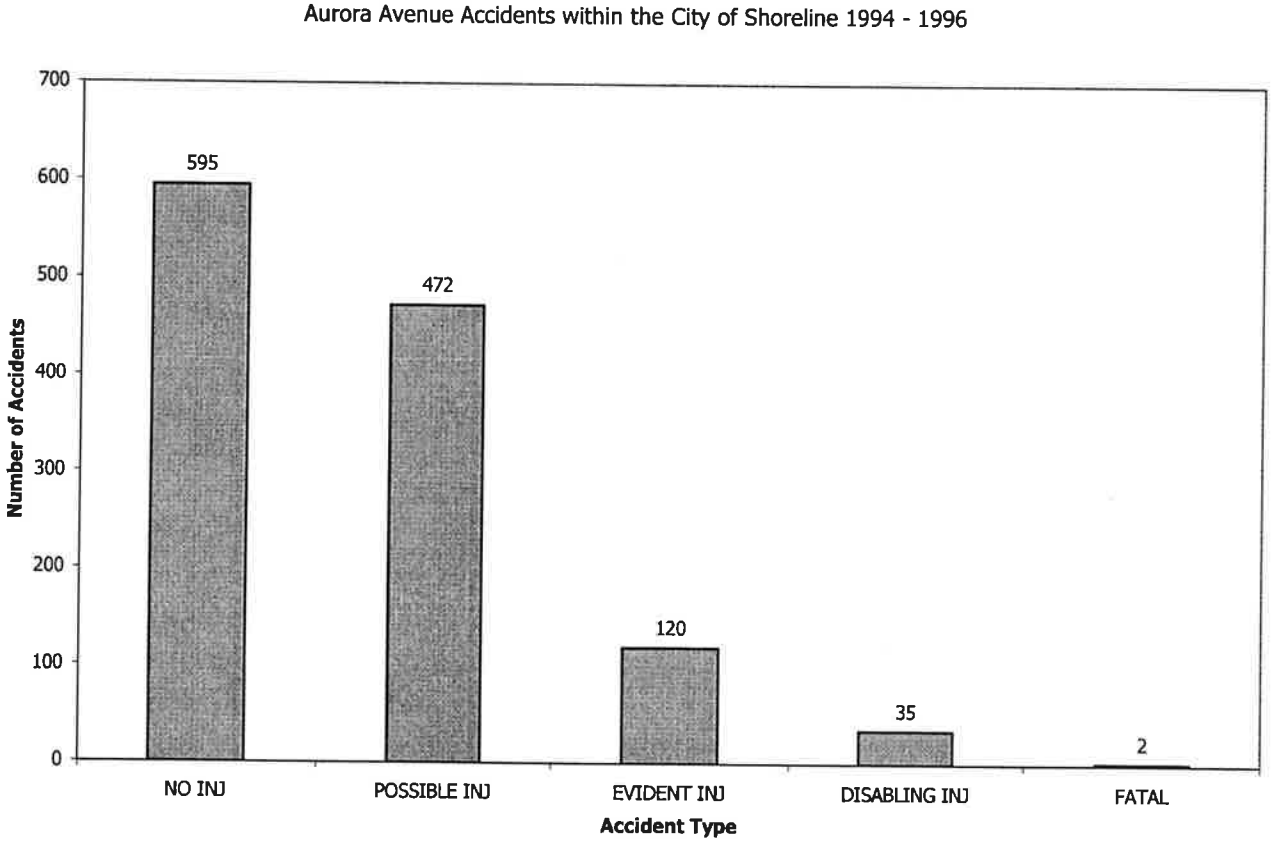


FIGURE 6.11-1. Summary of Accidents 1994 – 1996 by Type

Injuries resulted from 155 accidents (13 percent) and two accidents resulted in fatalities.

Both fatal accidents occurred at night. One involved a pedestrian being struck by a motor vehicle. The other was the result of a vehicle-vehicle collision.

6.12 Accident Rates

Accident data is further broken down to rate by intersection and segment. Aurora Avenue within the City of Shoreline experiences some of the highest accident rates in the State for a facility of its type. Table 6.12-1 contains accident rate calculations by intersection and segment.

TABLE 6.12-1. Accident Rates for Signalized Intersections and Segments 11/93 – 10/96

Segment	Length mi.	Hwy 99 ADT	Cross Road Volume	Accidents		Accident Rate per Million Vehicles	
				Intersection	Mid-Block	Entries	Miles
N 145th/SR 523 Intersection	--		22,000	78		1.27	
N 145th to N 152nd	0.32	34,000			52		4.36
N 152nd Intersection	--			27		--	
N 152nd to N 155th	0.17	35,000			61		9.36
N 155th Intersection	--		13,000	64		1.27	
N 155th to N 160th	0.26	33,000			32		3.41
N 160th Intersection	--		10,000	40		0.75	
N 160th to N 165th	0.25	39,000			36		3.37
N 165th Intersection	--			21		--	
N 165th to N 170th	0.26	39,000			46		4.14
N 170th Intersection	--			12		--	
N 170th to N 175th	0.24	39,000			48		4.68
N 175th Intersection	--		14,000	58		1.00	
N 175th to N 180th	0.26	39,000			26		2.34
N 180th Intersection	--			9		--	
N 180th to N 185th	0.25	39,000			61		5.71
N 185th Intersection	--		11,000	53		0.97	
N 185th to N 192nd	0.31	39,000			27		2.04
N 192nd Intersection	--		2,000	10		0.22	
N 192nd to N 195th	0.19	39,000			14		1.73
N 195th Intersection	--			5		--	
N 195th to N 200th	0.25	34,000			38		4.08
N 200th Intersection	--		8,000	41		0.91	
N 200th to N 205th	0.26	33,000			39		4.15
N 205th Intersection	--		16,000	44		0.82	

Source: WSDOT Transportation Data Office. Data reflects period from 11/93 to 10/96

6.13 High Accident Locations

Every two years WSDOT identifies High Accident Locations (HALS) and high accident Corridors (HACS) based on the number and severity of accidents on similar sections of roadway throughout the state. Four high accident locations are located within the study limits – one of which is part of a high accident corridor. Table 6.13-1 indicates the location of these segments.

TABLE 6.13-1. High Accident Locations (1/95 to 12/96)

Segment	Length Mi.	Accident Type			Total	ADT	Rate Per Million Vehicle Mi.
		Property	Injury	Fatal			
N 135th to N 155th	1.18	180	179		359	34,000	12.26
N 160th to N 163rd	0.32	30	27	1	58	39,000	6.37
N 165th to N 175th	0.62	70	67	1	138	39,000	7.82
N 195th to N 205th	0.69	65	74		139	33,500	8.24

Source: WSDOT Northwest Region

6.14 Accident Experience by Time of Day

The following figure indicates accident experience by time of day for reported accidents occurring along SR 99 between 1994 and 1996.

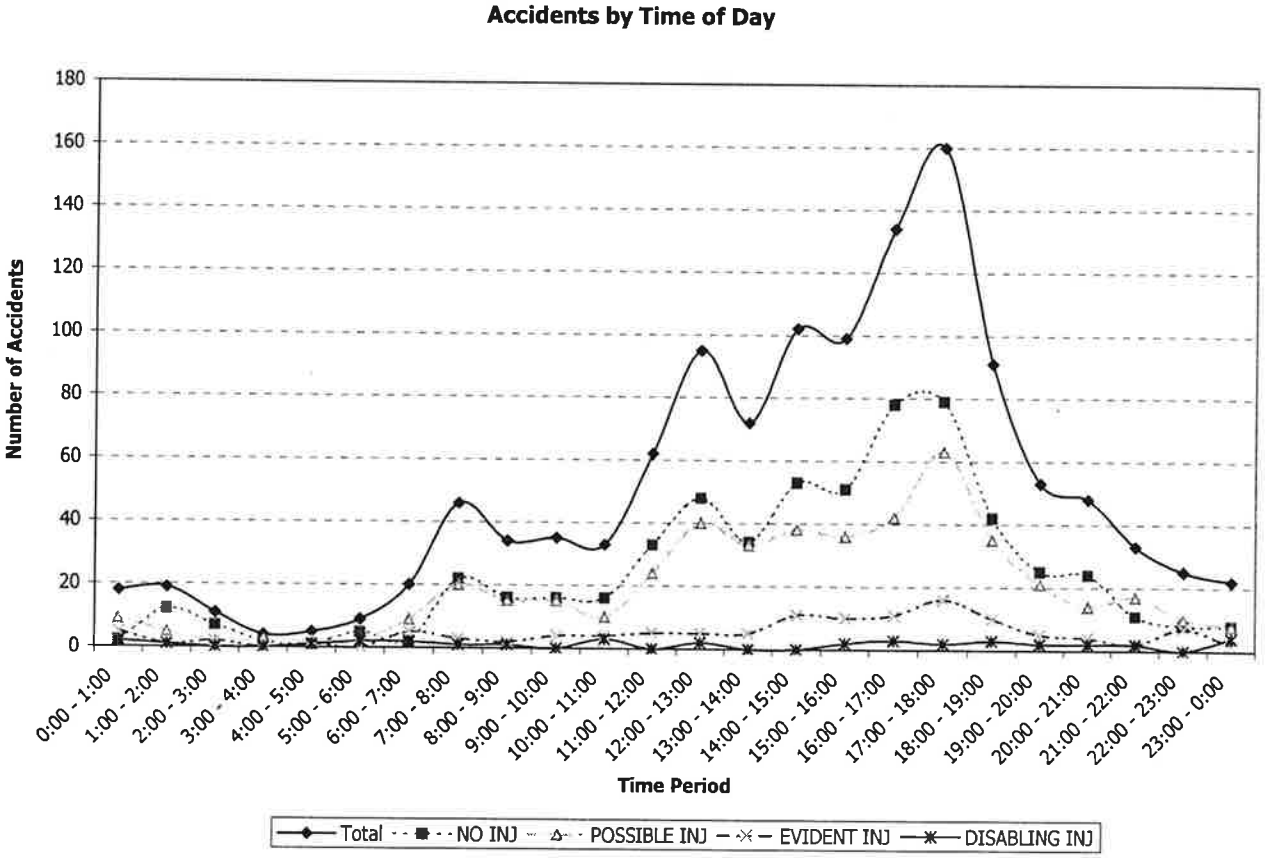


FIGURE 6.14-1. Summary of Accidents by Severity and Time of Day 1994 - 1996

As shown in Figure 6.14-1 vehicle accidents along Aurora Avenue North are concentrated in the p.m. peak when traffic volumes are highest.

6.15 Accident Frequency by State Route Milepost

The following figure is a histogram developed from the 1994 to 1996 accident history for SR 99 obtained from the WSDOT Transportation Data Office, Accident Data Section. This chart represents only reported accident locations and does not indicate actual accident location or accident rate.

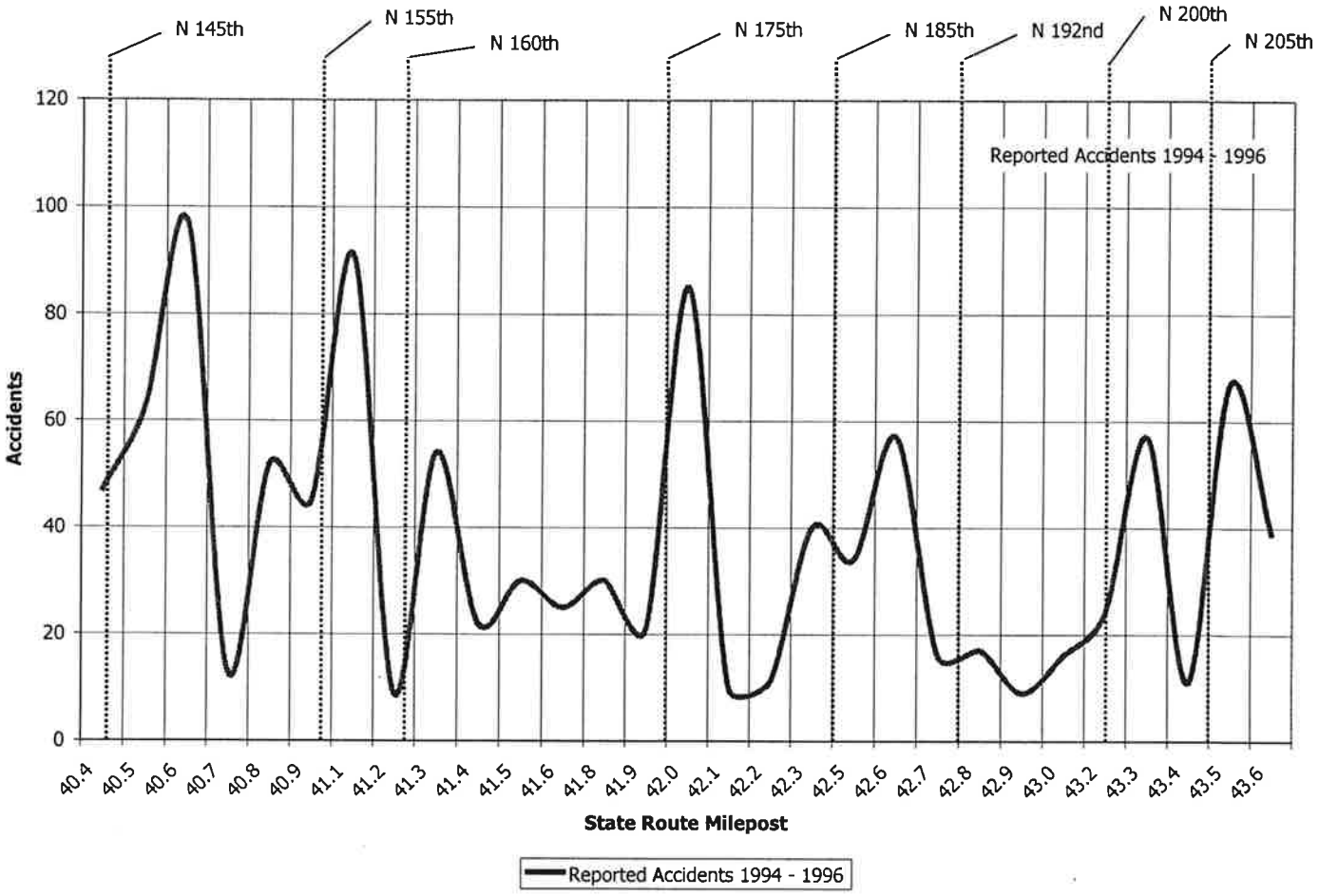


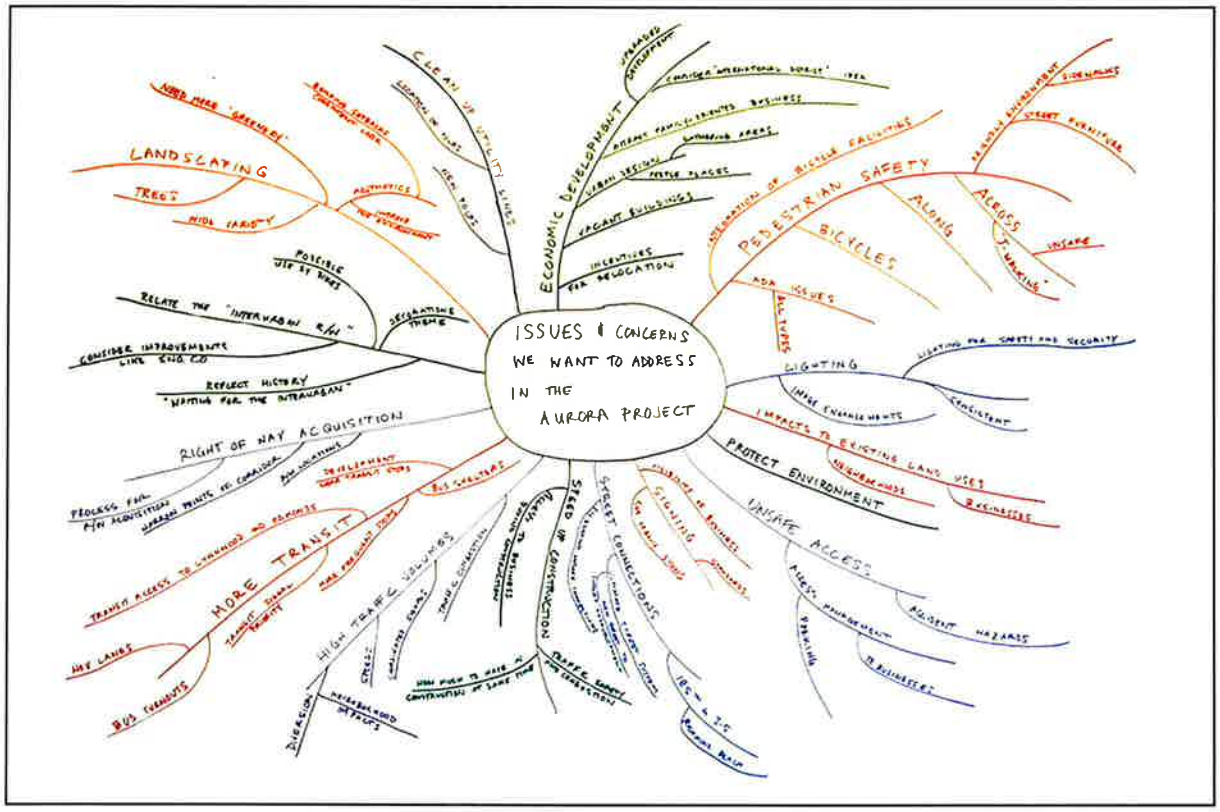
FIGURE 6.15-1. Frequency of Reported Accidents by State Route Milepost 1994 - 1996

7.0 Alternatives Development

The first stop in the development of alternatives was to work with the CATF and ITAC to identify Design issues to be addressed. This was achieved using an interactive process referred to as "affinity diagramming" or "mind mapping". Each committee was asked to respond to the question: "What (issues) do I want to see addressed in the Aurora Corridor Project?" In the process, the advisory committee members were encouraged to offer their thoughts on design issues and to respond to those offered by others. Each of the issues was recorded graphically with each member identifying where each issue fit in relation to other issues. Figure 6-1, below illustrates the diagram produced during the exercise to identify issues.

This exercise provided guidance for the consultant team to prepare design option memoranda that supported the groups' decision-making.

FIGURE 7-1. Mind-map for issues and concerns to address in the Aurora Project



7.1 Design Issues & Options

The corridor study issues considered were identified based upon input received from the Citizen's Advisory Task Force for this study through the mind mapping exercise as well as other discussion. Also, public concerns that were expressed in past public meetings, hearings and workshops, and past corridor study documents were included. In addition, input expressed by the City Council, City staff, and outside agency staff was included. At the first project open house, the public was invited to add to the issues represented on the mind map chart and design issues/options matrix. These issues are grouped into topics and described below. Lettering of issues and numbering of options correspond to rows and columns on the matrix that follows the text.

A. Pedestrian and Bicycle Access/Safety. Unsafe conditions for pedestrians; physical obstacles; poor environment for pedestrians; pedestrian access to and between businesses and neighborhoods; lack of street crossings; American Disability Act requirements; "J-Walking;" integration of bicycles; use of Interurban R/W.

B. Congestion/Capacity. Accommodating future traffic forecasts; concurrency for Comprehensive/Land Use Plan; poor level of service/traffic conditions; excessive traffic delays.

C. Aesthetics/Image. Visual clutter; lack of community identity; too many signs; too much pavement; uninviting environment/atmosphere; litter and debris; overhead utilities; make area more comfortable and attractive for people.

D. Traffic Safety. High accident rates; high speeds; accommodation of U-turns; no control of access and turn movements; traffic conflicts with other modes – buses, pedestrians, trucks; poor visibility after dark.

E. Urban Design/Development. Streetscape to support Comprehensive Plan; uniformity of street edges; improve property interfaces/transitions; lack of city/community theme; consider International District theme or Interurban history; promote economic redevelopment; attract family-oriented businesses.

F. Construction Traffic. Disruption to businesses; access to businesses; visibility of businesses; congestion; pedestrian and transit access during construction.

G. Landscaping. Lack of trees, plants and "greenery;" concern about type of trees; trees versus visibility of businesses; maintenance and litter; visibility relating to traffic safety and personal security; want variety of plant and tree types.

H. Environmental Quality. Stormwater quality; Endangered Species Act; noise; air quality.

I. Traffic Access/Circulation. More east-west street access like 185th Street to I-5; shorter blocks; access to and between businesses and properties.

J. Neighborhood Traffic. Congestion causes traffic diversion to neighborhood streets; lack of north/south arterial capacity; lack of east/west streets.

K. HOV/Transit. Inadequate transit service, frequency, speeds and reliability; transit access to Lynnwood and Edmonds; difficult access to bus stops; frequency/number of bus stops; poor conditions at stops, no benches, no shelters, no lighting.

L. Security. Poor visibility when dark/at night; poor visibility around walls, objects, bushes; visibility to parking lots and businesses from street.

M. Right-of-Way. Acquisition process; identifying existing right-of-way lines; limiting right-of-way needs; impacts on existing businesses.

The issues listed above were addressed by investigating potential design options and through research and providing information. The diagram below lists these design options and how they correspond with study issues. The scope of investigation for each design option is also provided. A complete collection of design investigation technical memoranda is provided in Appendix B of the Technical Appendices that accompany this document.

1. Intersection/Signal Improvements. Evaluate potential solutions such as adding left turn, right turn and through lanes; consider signal equipment and timing.
2. Overhead Utility Relocation/Undergrounding. Consider range of options including relocation of poles and replacing with fewer poles; relocate underground; franchise conditions; decoration of poles.
3. Street Network Development. Establish ultimate network needs; evaluate closures to existing unsafe connections or connections that impact traffic capacity; consider redevelopment needs; consider frontage connections to reduce access points.
4. Illumination Improvements. Identify illumination levels; pole placement options; special lighting for pedestrians or at locations such as intersections and bus stops.
5. Right-of-Way Information. Provide information on right-of-way lines; how they relate to street improvements; process and timing for acquisition.
6. Construction Traffic Control. Identify options to phase construction; ways to expedite construction; special needs for pedestrians, transit, access to businesses; ways to inform business customers; ways to keep businesses appraised.
7. Access Management Measures. Establish range of options such as driveway design standards and spacing; joint access; medians; median breaks; accommodations for U-turns.
8. HOV/Transit Amenities. Consider signal priority treatments; bypass lanes; continuous lanes; bus zone amenities; promote transit service improvements.
9. Environmental Review. Establish surface water management concepts; identify environmental concerns that may need mitigation.
10. Urban Design/Streetscape. Develop streetscape ideas; types of furniture; types of decorations; themes.
11. Landscape Enhancements. Evaluate types of trees; types of plantings; means of irrigation.
12. Pedestrian and Bicycle Facilities. Identify crossing locations; sidewalk requirements; access from neighborhoods and businesses; concepts for integrating bicycles.

TABLE 7.1-1. Design Options Matrix

AURORA AVENUE NORTH CORRIDOR PRE-DESIGN STUDY
PROPOSED DESIGN OPTION INVESTIGATIONS

CORRIDOR STUDY ISSUES & CONCERNS		DESIGN OPTION INVESTIGATIONS											
		1. Intersection/Signal Improvements	2. Overhead Utility Relocation/Undergrounding	3. Street Network Development	4. Illumination Improvements	5. Right-of-Way Information	6. Construction Traffic Control	7. Access Management Measures	8. HOV/Transit Amenities	9. Environmental Considerations	10. Urban Design/Streetscape	11. Landscape Enhancements	12. Pedestrian Facilities
A.	Pedestrian Access/Safety				✓		✓	✓	✓		✓	✓	✓
B.	Congestion/Capacity	✓		✓		✓	✓	✓	✓	✓			
C.	Aesthetics/Image		✓				✓				✓	✓	
D.	Traffic Safety	✓		✓	✓		✓	✓					✓
E.	Urban Design/Development		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F.	Construction Traffic			✓			✓						
G.	Landscaping										✓	✓	✓
H.	Environmental Quality	✓					✓			✓			
I.	Traffic Access/Circulation	✓		✓			✓	✓					
J.	Neighborhood Traffic	✓		✓			✓			✓			
K.	HOV/Transit	✓		✓	✓		✓	✓	✓		✓	✓	✓
L.	Security				✓				✓		✓	✓	✓
M.	Right-of-way	✓	✓	✓		✓		✓			✓		

7.2 Development of Alternatives

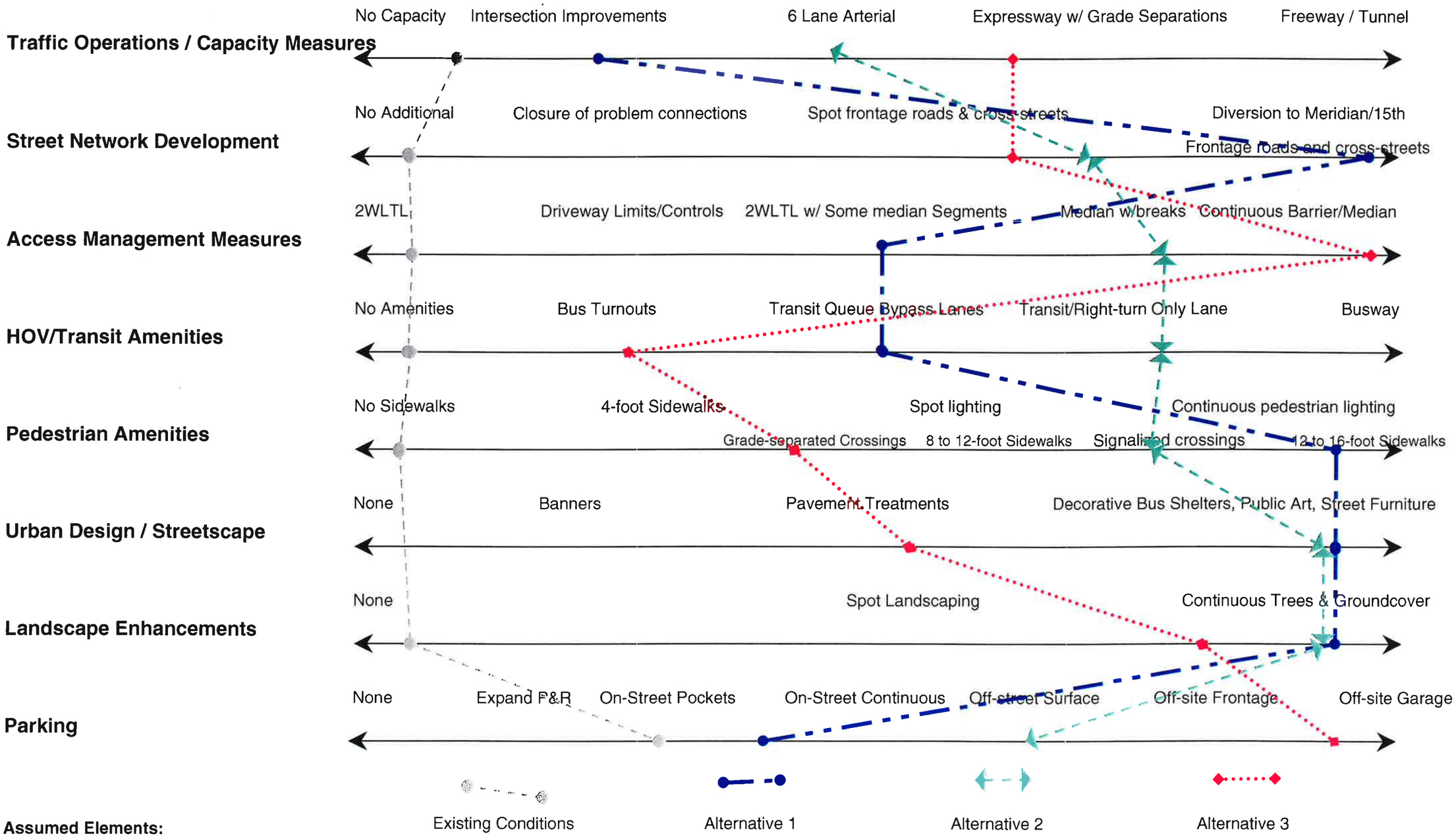
The design option memoranda were provided to each of the members of the CATF and ITAC. In addition, the content of each memorandum was presented to the CATF members. After several sessions of discussion on design options development of ideas, the CATF was prepared to begin assembling design alternatives.

Construction of the design alternatives was an exercise where the CATF began by agreeing on some elements that could be assumed for any alternative. These included illumination improvements, undergrounding of overhead utilities and transit signal priority among others. Assumptions for the design were made either because the design element was consistent with an existing policy of the city, had been clearly identified as a public priority, or was a part of an already planned and funded project.

Four alternatives were developed, one no-action alternative and three that included some measure of improvement over existing conditions. In order to visually identify the differences between alternatives while under development and to understand the relative emphasis on design options between alternatives, a diagramming process was used. This diagramming process, the results of which are shown in Figure 7.2-1, involved creating a horizontal continuum for each major design option. Along each continuum were placed several design decisions or elements which addressed the design element to varying degrees. In order for the group to have a frame of reference, the existing roadway conditions were drawn onto the diagram as well.

This process was effective not only in helping to create three distinct alternatives, but enabling the CATF to understand the breadth of options available to them in composing their design alternatives.

Figure 7.2-1 Development of Design Alternatives



Assumed Elements:

Street Illumination; Undergrounding of Utilities; Environmental mitigation/stormwater improvements; Transit signal priority technology; Construction traffic control

Comprehensive Plan Guidelines: LOS E Traffic Operations, Balance between regional and local movements, Land-use supportive transportation; Minor landscaping; Minimum-width sidewalks; Design reflective of community identities; North/South bicycle access provided via Interurban Trail.

7.3 Alternatives Description

A joint design session was held between the CATF and ITAC to provide an opportunity for each group to discuss and define the three design alternatives. Out of that meeting came three definite design alternatives to be further developed for evaluation. The following are general descriptions and illustrations for each alternative that indicate how each major design element is treated in the alternative. Following the text description of each alternative is a conceptual cross-section drawing that indicates number of lanes, sidewalks and amenity zones. Following the cross-section drawings are a set of two plan drawings that indicate typical sections of roadway that could be expected for the design alternative. This level of alternative development was intended to provide a good sense of the features that comprise each alternatives and the relative scope of each. At this level of development each of the alternatives were presented to the public at an open house. Input received from the public at that open house was considered in finalizing the alternatives prior to evaluation.

Alternative 1

This alternative would be oriented to providing local access.

Traffic Operations/Capacity. Four general traffic lanes would be provided throughout the corridor. Intersection capacity improvements, including a moderate level of additional approach lanes, would be developed. The approximate Aurora Avenue traffic capacity would be 40-to-45 thousand vehicles per day. Some of the projected Year 2015 traffic volume would need to be accommodated in other north/south roadways including I-5, Meridian Avenue, Dayton Avenue, and 15th Avenue. The posted speed limit would be reduced to 35 miles per hour.

Street Network Development. This alternative would require adding traffic capacity measures on other north/south streets and other east-west street connections to allow diversion of traffic from the Aurora Avenue corridor. Also, parallel local collector streets should be developed adjacent to Aurora Avenue to provide for local access to properties. Additional signalized street intersections would be developed. Safety design changes would be made at spot locations.

Access Management Measures. The number and location of driveways for access to properties would be developed according to Washington State and King County Standards. Medians would be installed at intersection approaches. Some segments of center two-way, left-turn lanes would be retained. U-turns would be accommodated at signalized intersections and at mid-block median breaks.

HOV/Transit Amenities. Transit queue-jump lanes would be added at major intersections. Enhanced bus zones with bus shelters would be established. Transit signal priority would be implemented. Buses would load/unload passengers in the queue-jump lanes and at bus turnouts (where queue-jump lanes are not installed).

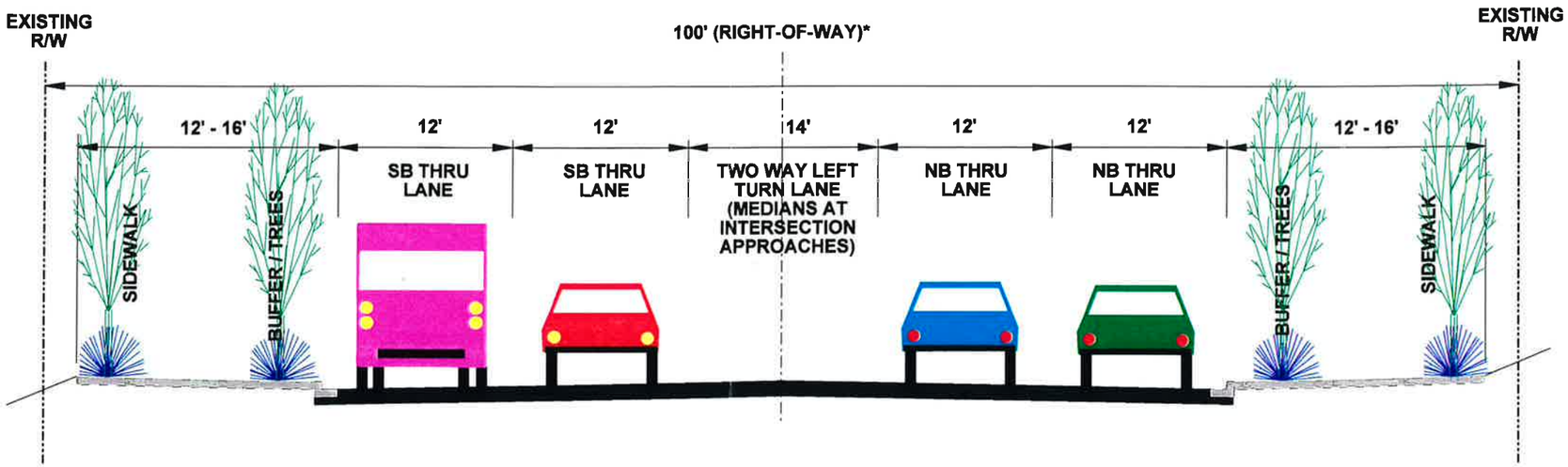
Pedestrian Amenities. Sidewalks would be developed at widths of 12-to-16 feet, depending upon the location. Several signalized at-grade pedestrian crossings of Aurora Avenue would be developed. Median refuge islands would be developed at each crossing. Continuous decorative pedestrian-scaled lighting would be installed along the corridor.

Urban Design/Streetscape. Formal, pedestrian-oriented streetscape would be developed. Street furniture would be provided, including benches, trash receptacles, and lighting. Public

art should be integrated into the project, including decorative bus shelters. Pavement treatments would also be used in special areas and crossings. Extensive gateway treatments would be developed at each end of the corridor

Landscape Enhancements. Extensive landscaping would be installed, including street trees along sidewalks and possibly some trees in median segments. A double row of trees along sidewalks would be used in areas with enough right-of-way width.

Parking. Most parking would be accommodated on private properties off-street. Some pockets of on-street parking could be developed along retail-commercial zones.



ALTERNATIVE 1
TYPICAL SECTION

Figure 7.3.1-1
Design Alternative 1
Conceptual Cross-section

* THIS CROSS SECTION ILLUSTRATES A 100' RIGHT OF WAY WIDTH.
ACTUAL RIGHT OF WAY WIDTH ALONG AURORA AVENUE VARIES FROM 90 - 110 FEET.

AURORA CORRIDOR
TRANSPORTATION SOLUTIONS FOR SHORELINE'S MAIN STREET

CITY OF SHORELINE

Hough Beck Baird Inc.

CH2MHILL

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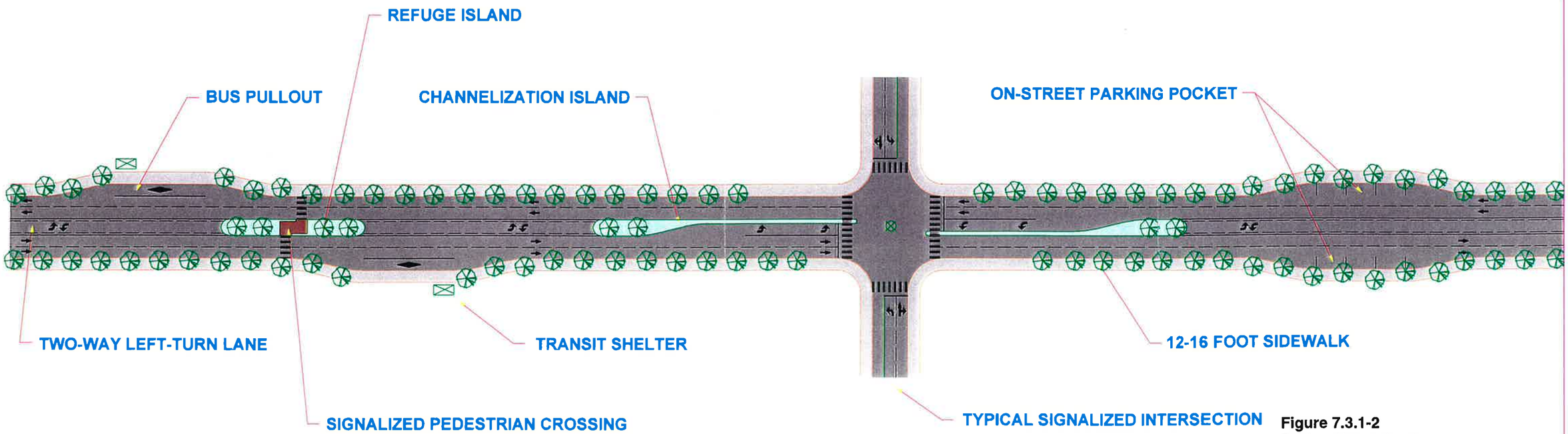

Figure 7.3.1-2
Design Alternative 1
Conceptual Plan Sheet 1

ALTERNATIVE 1
Sheet 1
DRAFT FOR DISCUSSION ONLY

DRAWING NOTES:

Hypothetical plan illustrating typical components of design alternatives

Driveways are not shown (some consolidated access driveways are illustrated)

Notice specific call-out descriptions for each alternative

AURORA CORRIDOR
TRANSPORTATION SOLUTIONS FOR SHORELINE'S MAIN STREET

CITY OF SHORELINE

Hough Beck Baird Inc

CH2MHILL

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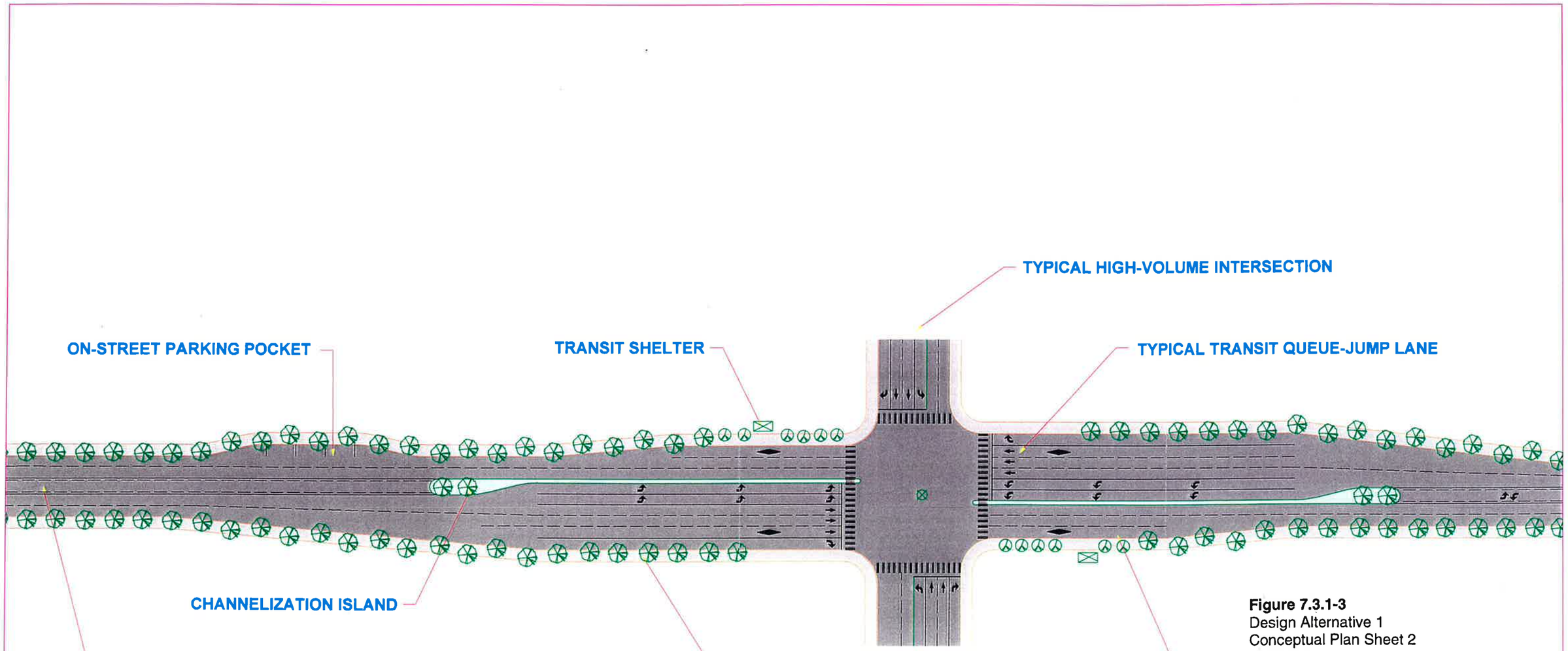

Figure 7.3.1-3
Design Alternative 1
Conceptual Plan Sheet 2

DRAWING NOTES:

Hypothetical plan illustrating typical components of design alternatives

Driveways are not shown (some consolidated access driveways are illustrated)

Notice specific call-out descriptions for each alternative

ALTERNATIVE 1
Sheet 2
DRAFT FOR DISCUSSION ONLY

AURORA CORRIDOR
TRANSPORTATION SOLUTIONS FOR SHORELINE'S MAIN STREET

CITY OF SHORELINE

Hough Beck Baird Inc.

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Alternative 2

This alternative would be oriented to people movement.

Traffic Operations/Capacity. Six lanes would be provided throughout the corridor, including two general traffic lanes and one transit/right-turn-only lane in each direction. Major intersection capacity improvements, including many additional approach lanes, would be developed. The approximate Aurora Avenue traffic capacity would be 45-to-50 thousand vehicles per day. The posted speed limit would be reduced to 40 miles per hour.

Street Network Development. Some parallel local collector streets should be developed adjacent to Aurora Avenue to provide for local access to properties. Some minor street intersections would be modified to limit turns to right-in-right-out. Safety design changes would be made at spot locations.

Access Management Measures. The number and location of driveways for access to properties would be developed according to Washington State and King County Standards. Medians would be installed throughout the corridor. Some median breaks would be developed at locations where consolidated access to properties can be accomplished and for left turns onto minor cross-streets. U-turns would be accommodated at intersections and median breaks.

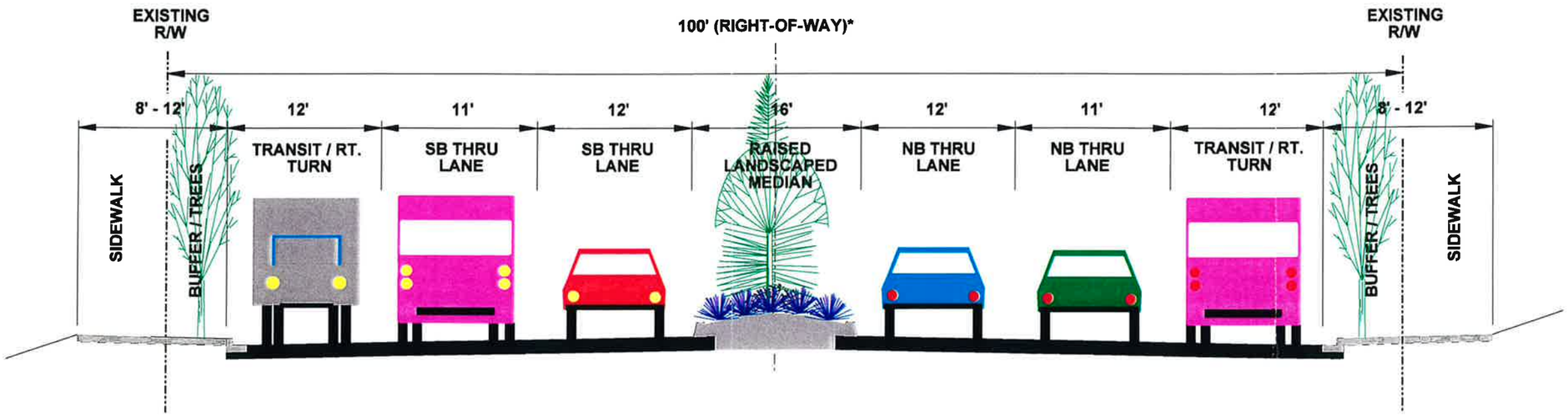
HOV/Transit Amenities. Continuous transit lanes would be developed throughout the corridor. The transit lanes would be shared with traffic that turns right into and from driveways and cross-streets. Enhanced bus zones with bus shelters would be established. Transit signal priority would be established. Buses would load/unload passengers in the transit lanes (i.e. no bus turnouts would be developed).

Pedestrian Amenities. Sidewalks would be developed at widths of 8-to-12 feet, depending upon the location. Some signalized at-grade pedestrian crossings of Aurora Avenue would be developed. Median refuge islands would be developed at each pedestrian crossing. Continuous decorative pedestrian-scaled lighting would be installed along the corridor.

Urban Design/Streetscape. Formal streetscape, including benches, trash receptacles, and lighting would be developed. Some public art would be integrated into the project. , including decorative bus shelters. Pavement treatments would also be used in special areas and crossings. Extensive gateway treatment would be developed at each end of the corridor.

Landscape Enhancements. Landscaping, including street trees, would be installed along each side and in the median throughout the corridor.

Parking. All parking would be accommodated on private properties off-street.



ALTERNATIVE 2
TYPICAL SECTION

Figure 7.3.2-1
Design Alternative 2
Conceptual Cross-section

* THIS CROSS SECTION ILLUSTRATES A 100' RIGHT OF WAY WIDTH.
ACTUAL RIGHT OF WAY WIDTH ALONG AURORA AVENUE VARIES FROM 90 - 110 FEET.

AURORA CORRIDOR
TRANSPORTATION SOLUTIONS FOR SHORELINE'S MAIN STREET

CITY OF SHORELINE

Hough Beck & Baird Inc.

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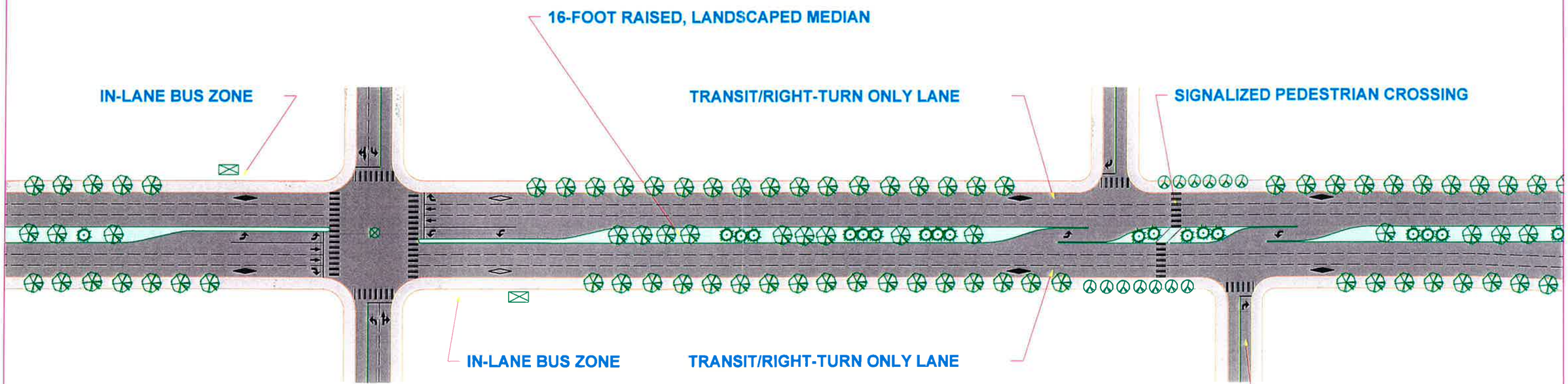

DRAWING NOTES:

Hypothetical plan illustrating typical components of design alternatives

Driveways are not shown (some consolidated access driveways are illustrated)

Notice specific call-out descriptions for each alternative

Figure 7.3.2-2
Design Alternative 2
Conceptual Plan Sheet 1

ALTERNATIVE 2
Sheet 1
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AURORA CORRIDOR
TRANSPORTATION SOLUTIONS FOR SHORELINE'S MAIN STREET

CITY OF SHORELINE

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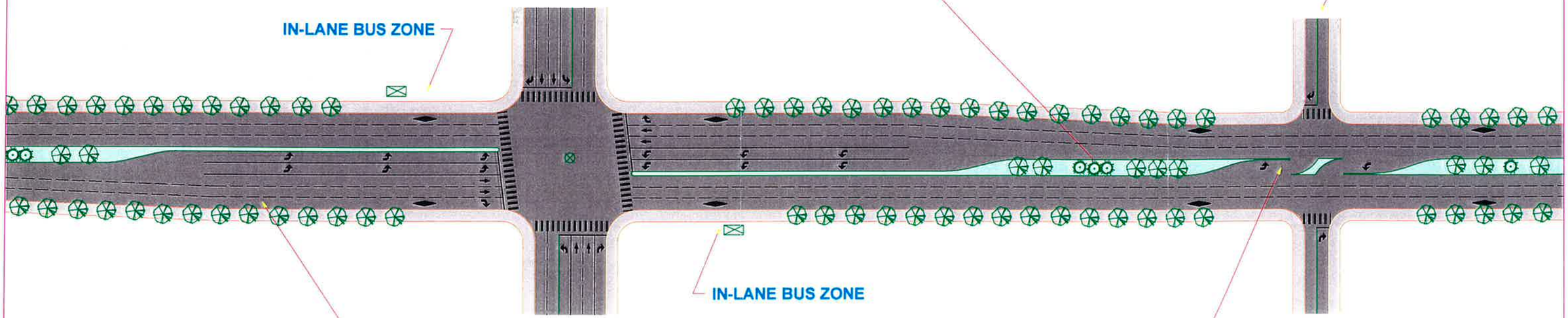

DRAWING NOTES:

Hypothetical plan illustrating typical components of design alternatives

Driveways are not shown (some consolidated access driveways are illustrated)

Notice specific call-out descriptions for each alternative

Figure 7.3.2-3
Design Alternative 2
Conceptual Plan Sheet 2

ALTERNATIVE 2
Sheet 2
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AURORA CORRIDOR
TRANSPORTATION SOLUTIONS FOR SHORELINE'S MAIN STREET

CITY OF SHORELINE

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Alternative 3

This alternative would be oriented to providing more regional access.

Traffic Operations/Capacity. Four general traffic lanes would be provided throughout the corridor. Interchanges with grade separated street crossings would be constructed at major streets such as 145th Street, 155th Street, 175th Street and 200th Street. Approximate Aurora Avenue traffic capacity would be 55-to-60 thousand vehicles per day. All existing, at-grade crossing movements would be moved to interchange ramp intersections and/or local streets. Some ramp connection modifications would be made between Aurora Avenue, 205th Street and SR 104. The posted speed limit could remain at 45 miles per hour or increased to 50 miles per hour.

Street Network Development. Parallel frontage roads and local collector streets would be developed adjacent to Aurora Avenue to provide for local access to properties. Some minor street right-in-right-out access would be provided. Some grade separated cross-street connections would be developed such as at 160th Street and 205th Street.

Access Management Measures. Most access to properties would be from frontage roads and parallel local collector streets. A center median barrier planter would be developed along most of the corridor. Some consolidated access to properties would be developed with right-in-right-out connections. U-turns could be made through interchanges.

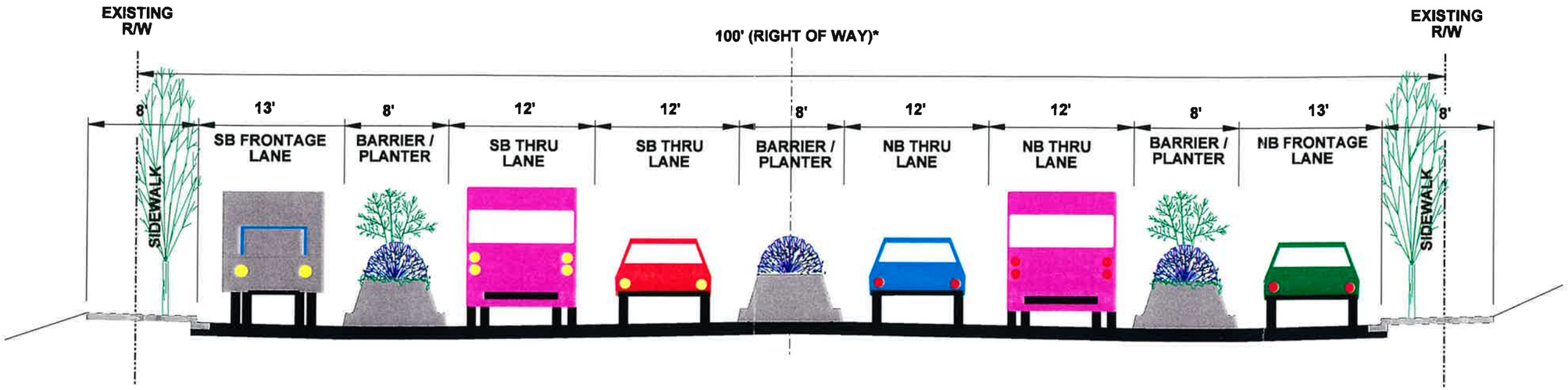
HOV/Transit Amenities. Transit flyer stops could be developed at interchanges. Transit slip ramps could be connected to frontage roads, and bus turn-outs would be created.

Pedestrian Amenities. Eight-foot-wide sidewalks would be included. All pedestrian crossings would be grade-separated either at street interchanges, street grade separations, or on pedestrian-only crossing structures. Continuous decorative pedestrian-scaled lighting would be installed along the corridor.

Urban Design/Streetscape. Streetscape features would be developed on the outside edges of the corridor along frontage roads and sidewalks. , including decorative bus shelters. Pavement treatments would also be used in special areas and crossings. Extensive gateway treatment would be developed at each end of the corridor.

Landscape Enhancements. Landscaping would be installed along each outside planter and in the median planter throughout the corridor. Street trees would be planted along sidewalks on each side of the corridor.

Parking. All parking would be accommodated on private properties off-street.



ALTERNATIVE 3
TYPICAL SECTION

Figure 7.3.3-1
Design Alternative 3
Conceptual Cross-section

* THIS CROSS SECTION ILLUSTRATES A 100' RIGHT OF WAY WIDTH.
ACTUAL RIGHT OF WAY WIDTH ALONG AURORA AVENUE VARIES FROM 90 - 110 FEET.

AURORA CORRIDOR
TRANSPORTATION SOLUTIONS FOR SHORELINE'S MAIN STREET

CITY OF SHORELINE

Hough Beck Baird Inc.

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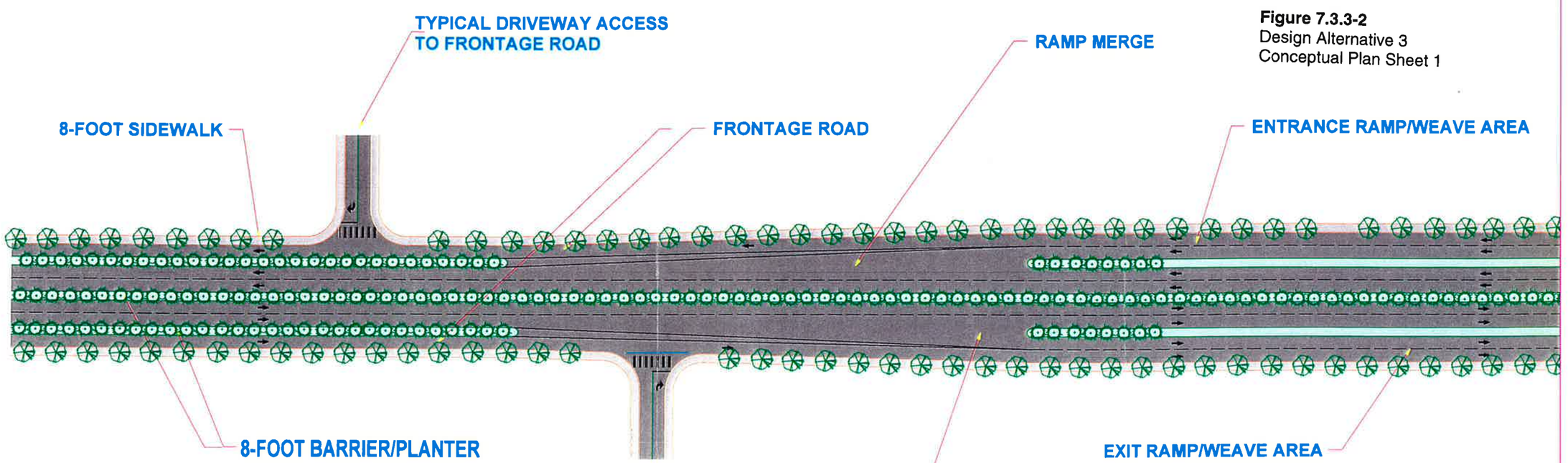

Figure 7.3.3-2
Design Alternative 3
Conceptual Plan Sheet 1

DRAWING NOTES:

Hypothetical plan illustrating typical components of design alternatives

Driveways are not shown (some consolidated access driveways are illustrated)

Notice specific call-out descriptions for each alternative

ALTERNATIVE 3
Sheet 1
DRAFT FOR DISCUSSION ONLY

AURORA CORRIDOR
TRANSPORTATION SOLUTIONS FOR SHORELINE'S MAIN STREET

CITY OF SHORELINE

Hough Beck Baird Inc.

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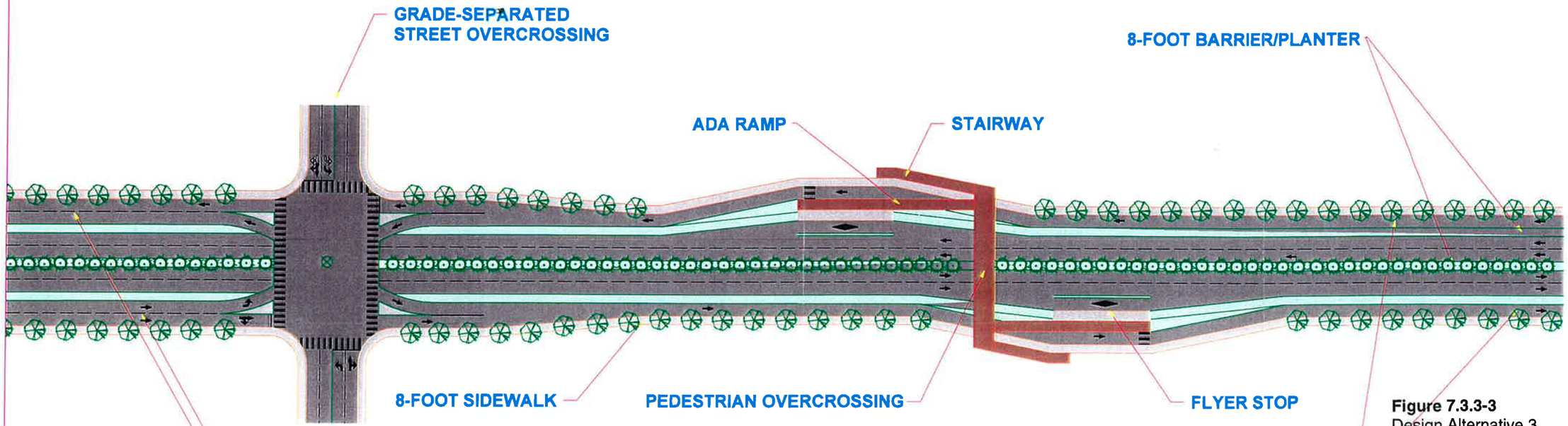

Figure 7.3.3-3
Design Alternative 3
Conceptual Plan Sheet 2

DRAWING NOTES:

Hypothetical plan illustrating typical components of design alternatives

Driveways are not shown (some consolidated access driveways are illustrated)

Notice specific call-out descriptions for each alternative

ALTERNATIVE 3
Sheet 2
DRAFT FOR DISCUSSION ONLY

AURORA CORRIDOR
TRANSPORTATION SOLUTIONS FOR SHORELINE'S MAIN STREET

CITY OF SHORELINE

Hough Beck Baird Inc.

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7.4 Visual Analysis and Conceptual Drawings

Once the three alternatives were final and set for evaluation, additional development was required to measure the precise costs and impacts of each. In order to generate the required detail, each of the three alternatives was designed to a conceptual level for the entire three mile corridor. Plan-view drawings over an aerial photography base were prepared for the three alternatives and used by the CATF and ITAC to further understand and refine the design alternatives. The conceptual channelization plans for the preferred alternative located in Section 9.3 illustrate the type of plan view drawing used. In addition to plan-view drawings, photographic simulations using three dimensional engineering models were used to visually represent each alternative and how it could look when constructed. Each of the following figures (7.4-1 to 7.4-4) represent a view looking North from the vicinity of N 172nd Street.

In order to compare the potential costs to develop each of the alternatives, concept-level cost estimates were prepared. These can be found in Appendix C.

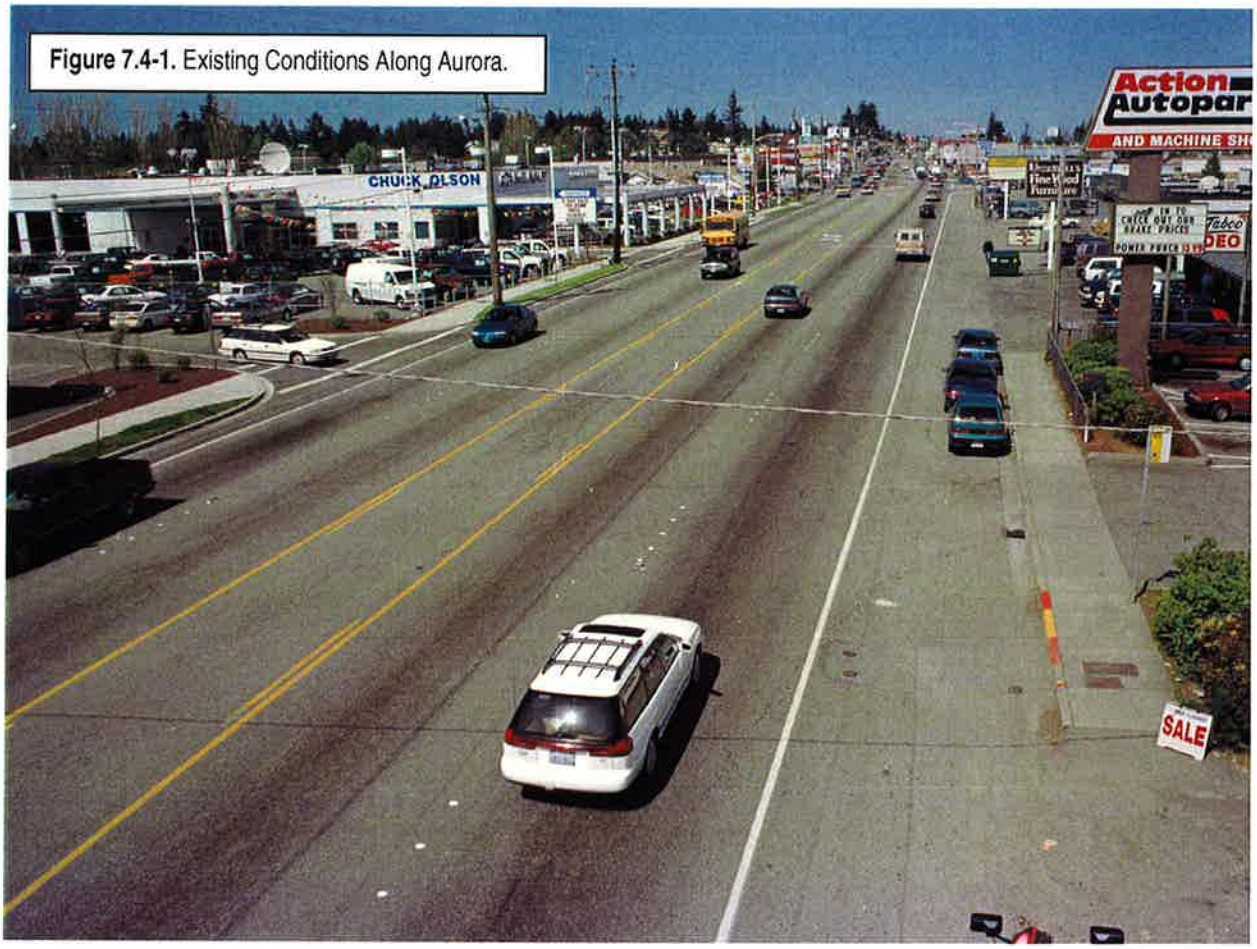


Figure 7.4-1. Existing Conditions Along Aurora.

Figure 7.4-2. Conceptual Design Alternative 1.

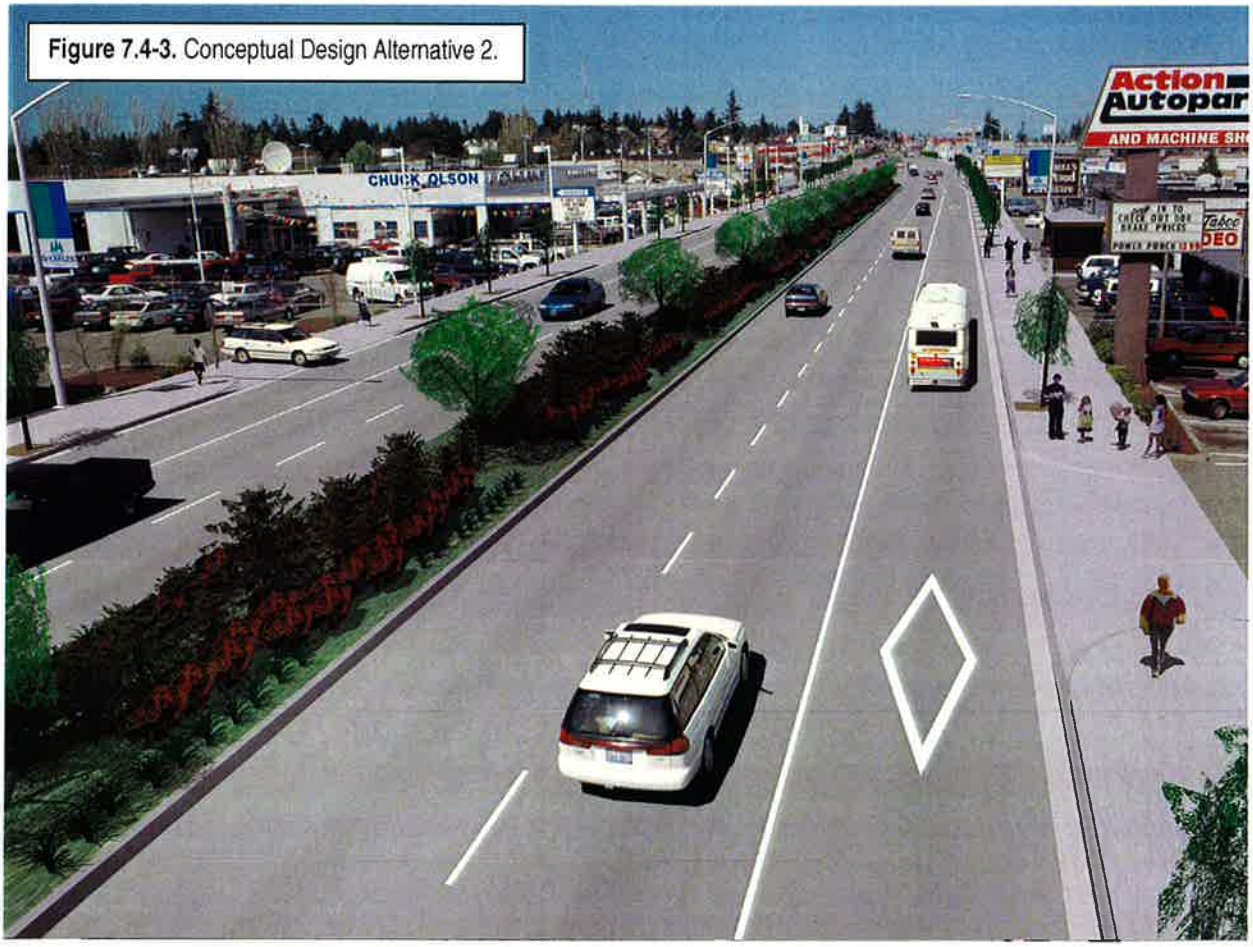


Figure 7.4-3. Conceptual Design Alternative 2.

Figure 7.4-4. Conceptual Design Alternative 3.

8.0 Evaluation of Alternatives

8.1 Methodology

The purpose of the evaluation process for the Aurora Corridor Multi-modal Pre-design Study was to evaluate a range of potential design alternatives and arrive at a preferred alternative for recommendation to the City Council. Included in the process was a review of the original project goals defined by the Council and identification of detailed evaluation criteria to be used in technical analyses.

The evaluation process is designed to ensure that the Citizen's Advisory Task Force's preferred alternative will directly address problems and needs identified in the Aurora Corridor Project Problem Statement, and directly fulfill the project goals.

8.2 Evaluation Criteria and Rating

Evaluation was performed on three candidate alternatives. The criteria described below were used in the analysis of design alternatives to identify a preferred alternative to be recommended to the City Council. The criteria chosen represent factors unique to the Shoreline Community as well as typical environmental factors that would be addressed during environmental assessment.

The criteria fell into four general areas. Economic factors related to funding feasibility, economic development and cost. Environmental factors relate to both the natural and physical environment. Mode-choice factors relate to the relative benefit provided to alternative (non-SOV) transportation modes. Operations factors relate to how well the facility operates based on performance measures such as safety, speed and level of service.

Economic Factors

Economic factors are of keen interest in the City of Shoreline. There is a consensus that the preferred design should be attractive for funding at the state and federal levels. The community would like to minimize any cost that property owners along Aurora and Shoreline Citizens may have to bear in implementing the preferred design.

The City of Shoreline also views the Aurora Avenue North Multi-Modal Corridor Project as a significant opportunity to promote economic development and redevelopment along the corridor. These and other economic factors used in the evaluation are listed in the table below.

TABLE 8.2-1 Economic Evaluation Criteria

Economic Factors	
Evaluation Criterion	**Description**
Funding Feasibility	Qualitative evaluation of ease of funding expressed in a rating of relative difficulty. Based on type of project, preliminary cost estimate, and anticipated funding qualifications. Derived from 1999 TIB Application Instructions for UATA and TIA, PSRC Regional Project Evaluation Application for TEA-21 Funds, and Statewide STP Competitive Program Project Application
Economic Development	Qualitative evaluation of the extent to which alternatives further the City's economic development objectives of pursuing a strong and diverse economy while maintaining and improving the quality of life. In particular, Goal ED 10 of the Economic Development Element of the Comprehensive Plan calls for recognizing the Aurora Corridor as the economic core of the City with potential for revitalization, providing services, jobs, opportunities, and becoming an activity center for Shoreline.
Capital Cost	Quantitative "order-of-magnitude" measure of capital cost in dollars based upon conceptual definitions for alternatives.

Environmental Factors

The criteria in Table 8.2-2 represent the primary environmental areas of interest that the Shoreline Community identified as important to consider in the selection of a design concept. It is acknowledged that several more environmental areas would require investigation in the course of fulfilling environmental documentation requirements as part of either a SEPA or NEPA process.

Factors that were selected to enable comparative-level evaluation include several that have high public sensitivity. Aesthetics and image ranks high on the lists of the general public who desire a street design that improves the look and visual environment of Shoreline. Another factor that has been strongly voiced by the public is the concern over the potential for traffic spillover into neighborhoods. Right of Way Needs/Impacts is a factor that relates directly to business and property owners with frontage directly on Aurora Avenue. Other critical environmental factors used in analysis include Air Quality implications which has a great bearing on funding and approvals as well as stormwater and water quality which is of increased interest since the recent listing of several salmon species under the Endangered Species Act (ESA).

TABLE 8.2-2 Environmental Evaluation Criteria

Environmental Factors	
Evaluation Criterion	**Description**
Aesthetics and Image	Assessment of the quality of facilities and design included within the alternative in terms of measures of image and aesthetics compatible with the City of Shoreline's Urban Design Vision and image of the corridor identified in the Comprehensive Plan.
Right-of-way Needs/Impacts	Quantitative measure of right of way needs expressed in square footage based on preliminary conceptual design, number of parcels affected and number of businesses taken/relocated.
Air Quality and Energy Implications	Assessment of the relative air quality impact expressed in terms of measures derived from anticipated traffic conditions in the year 2015 for each of the design alternatives. The quality of traffic operations improvements are evaluated as a combination of carbon monoxide (CO) by vehicle type (cars, trucks and buses) and Nitrous Oxides (NOx) by vehicle type.
Neighborhood Spillover Traffic	Assessment of the quantity and location of traffic diverted due to design and capacity features of each design alternative. The magnitude of Neighborhood Spillover Traffic Impacts is evaluated as a combination of total volume diverted and the number of streets affected by diverted traffic.
Stormwater and Water-quality implications	Assessment of the relative stormwater facility needs and water quality impact expressed in terms of total impervious area and forecast average daily traffic related to the project design alternative. Stormwater and water quality implications are evaluated as a combination of the total area of impervious surface that is a combination of sidewalk area, roadway surface, and any structures associated with the design alternative.

Mode-Choice Factors

The City of Shoreline Comprehensive Plan directs that considerations for alternate travel modes such as walking and transit are included in a roadway design for the Aurora Corridor. A multi-modal facility, in contrast to one that is predominantly automobile-oriented, also creates favor with funding authorities.

In order to ensure that preferred alternative design concept is selected that addresses this central need transit operation and pedestrian safety factors were included in the evaluation. Table 8.2-3 below lists the criteria and describes how they were used in analysis.

TABLE 8.2-3 Mode-Choice Evaluation Criteria

Mode Choice Factors	
Evaluation Criterion	**Description**
Transit Operations Improvement	Assessment of the quality of transit facilities included with the alternative in terms of measures of transit speed and reliability, rider comfort, and accessibility to transit service. The quality of transit improvements are evaluated as a combination of service reliability, travel time, waiting environment, and the quality of pedestrian connectors to provide access to transit stops.
Pedestrian Safety Improvement	Assessment of the quality of pedestrian facilities included within the alternative in terms of measures of pedestrian safety, comfort, and accessibility. The quality of pedestrian system improvements are evaluated as a combination of safety, comfort, and accessibility features that best match the characteristics for the alternative.

Operations Factors

Roadway reconstruction projects are often initiated as roadways begin to fail operationally. Safety problems and traffic congestion have demonstrated the need for improvement to Aurora Avenue North.

The criteria listed in the following table provide the necessary comparisons to ensure that the preferred design concept will provide acceptable operations for the design year of 2015.

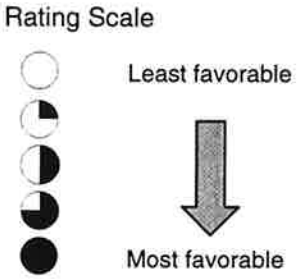
TABLE 8.2-4 Operations Evaluation Criteria

Operations Factors	
Evaluation Criterion	**Description**
Traffic Safety Improvement	Assessment of the relative improvement of traffic safety based upon geometric design, operational and environmental characteristics of the alternatives.
Traffic Operations (LOS) Improvement	Assessment of the quality of traffic design included with the alternative in terms of measures of anticipated traffic conditions in the year 2015 for each of the design alternatives. The quality of traffic operations improvements are evaluated as a combination of travel time, average speed, average intersection delay, and level of service.
Consistency with Comprehensive Plan goals	Qualitative measure of effectiveness based on general interpretation of the Comprehensive Plan. Primary focus of the analysis is on the four policy areas in the plan that specifically address Aurora: Transportation Element, Land Use Element, Economic Development Element, and Urban Design Element. The analysis is to compare each alternative to the varying elements in the Plan. The Comprehensive Plan has several elements that address Aurora. The ratings are based on a review of the features of the alternatives as compared with the policies in the plan.

8.3 Comparison of Alternatives

Each criterion was divided into a five-rating scale. Each rating is made up of several reproducible quantitative and qualitative measures relating to the criterion. Someone appropriately knowledgeable on the subject applied each criterion to the alternatives. For example: an economic development specialist, Property Counselors, performed analysis for the economic development criterion, a water resources engineer evaluated stormwater and water-quality implications, etc.

In order to facilitate visual comparison of alternatives, a graphical scale was used to differentiate the rating values. For each criterion, an open circle represents the least favorable rating and a completely filled circle represents most favorable. Filling of the circle by quarters represents the three intervening rating values. This is similar to the "Consumer Reports" style of ranking.



The following table (8.3-1) contains the evaluation results for comparison between the three design alternatives. Each alternative is rated for each criterion. In addition, bulleted items of note related to each respective criterion are provided in the table.

Table 8.3-1 Evaluation Results

	Evaluation Criterion	Alternative 1	Alternative 2	Alternative 3
Economic Factors	***Funding feasibility*** ● BEST ○ WORST	- Lowest cost alternative - Does not provide significant mobility improvements - Provides some facility for alternative modes - Provides some safety improvement for pedestrians - Requires the most amount of City / property owner funding	- Cost is slightly higher than Alternative 1. - Improves both local and regional mobility - Increases roadway width by providing a transit lane in each direction - Significantly improves safety for all users of the roadway - Provides most opportunity for funding partnerships	- Highest cost by far of all alternatives - Provides regional mobility at the expense of local access - Improves safety for all users of the roadway - Uncertain affect on economic development - Favors vehicular travel relative to pedestrian and transit
	Economic Development ● MOST ○ LEAST	- Provides only limited increase in capacity. - Provides maximum access and visibility for individual business properties. - Minimizes property take and maximizes property depth. - Additional capacity provided on east-west streets can enhance expansion opportunities. - Gateway, landscape, and pedestrian improvements enhance overall attractiveness for redevelopment.	- Provides increase in traffic capacity. - Access to individual properties reduced as result of center median. - Increased roadway take renders many properties unsuitable. - Consolidated access points improve appearance of business district. - Gateway, landscape, and pedestrian improvements enhance overall attractiveness for redevelopment.	- Provides greatest increase in traffic capacity. - Access to individual properties significantly reduced as additional turning movements and distance necessitated by frontage roads. - Visibility of properties at key development nodes (intersections) reduced by interchange ramps. - Property take is greatest at key development nodes to accommodate interchanges. - Gateway, landscape, and pedestrian improvements enhance overall attractiveness for redevelopment.
	Capital Cost ● LOWEST ○ HIGHEST	$44 - 48 Million - Cost range affected by stormwater / Endangered Species Act mitigation costs. - High cost items include intersection widenings and wide sidewalks.	$49 - 54 Million - Cost range affected by stormwater / Endangered Species Act mitigation costs. - High cost items include intersection widenings and the continuous road widening.	$130 - 142 Million - Cost range affected by stormwater / Endangered Species Act mitigation costs. - High cost items include interchanges, overcrossing structures and right-of-way.
	Aesthetics and Image ● MOST IMPROVEMENT ○ LEAST IMPROVEMENT	- Wide sidewalks offer good pedestrian area-to-auto area ratio. - Street trees help to create a positive image for corridor. - Two-way left turn lane not pedestrian-friendly, does not provide positive image. - Overall: Reduced clutter and improved uniformity by consistent road edge improvement and removal of overhead utility lines, moderate aesthetic improvement, moderate visual, business and investment climate.	- Planting strips with trees and center-planted median provide positive image. - Center-planted median helps break up visual impact of roadway pavement. - Roadway width at some intersections not pedestrian-friendly. - Overall: Reduced clutter and improved uniformity by consistent road edg and removal of overhead utility lines, moderate aesthetic improvement, moderate visual, business and investment climate.	- Several barriers to pedestrian travel exist, including concrete barriers/planters and absence of street-level pedestrian crossings. - Sidewalks only 8' in width. - Poor pedestrian area-to-automobile area ratio. - Overall: Reduced clutter and improved uniformity by consistent road edg and removal of overhead utility lines, minor to moderate aesthetic improvement, minor to moderate visual, business and investment climate.
Environmental Factors	***Right-of-way Needs/Impacts*** ● LOWEST ○ HIGHEST	- 6 building relocations - 4,200 SF partial building take - 29,100 SF full building take. - 216,000 SF of right-of-way needed -164 affected parcels	- 8 building relocation/demolition - 16,700 SF partial building take - 34,400 SF full building take. - 315,000 SF of right-of-way needed - 176 affected parcels	- 31 building relocation/demolition - 30,200 SF partial building take - 202,500 SF full building lake. - 512,000 SF of right-of-way needed - 185 affected parcels
	Air Quality and Energy Implications ● LEAST IMPACT ○ MOST IMPACT	- Intersection delay causes highest CO (kg/hr) of alternatives - NOx emissions lowest between alternatives. - Idling at intersections causes increased energy use.	- Lowest intersection delay between alternatives contributes to low CO (kg/hr) production. - NOx emissions similar to Alternative 1. - Lowest corridor average delay translates to lowest energy use.	- High free-flow speed provides lowest CO (kg/hr) of alternatives - NOx highest between alternatives. - High delay at intersections and high speeds translate to high energy consumption.
	Neighborhood Spillover Traffic ● LEAST IMPACT ○ MOST IMPACT	- Diverts most traffic from Aurora - Signiticantly impacts Meridian Avenue - Significantly impacts Dayton Avenue - Improved cross-street connections encourage neighborhood traffic	- Traffic distribution similar to existing condition - No significant diversions to parallel routes - Right-turn lane reduces attraction of traffic diversion	- Diverts traffic onto Aurora From I-5 - Limited frontage road capacity diverts traffic to neighborhood streets - Heavy impact to east/west routes
	Stormwater and Water-quality implications ● MOST FAVORABLE ○ LEAST FAVORABLE	- Smallest increase in impervious surface - Requires least amount of off-site mitigation - Stormwater runoff most like existing condition - Lowest total area of surfacing	- Increases impervious surface by 25 percent over existing condition - Would require off-site detention facilities - Slighlly greater total surface area than Alternative 1	- Increases impervious surfaces by 100 percent over existing condition - Would require major conveyance and detention facilities. - Highest total surface area

Table 8.3-1 Evaluation Results

Evaluation Criterion	Alternative 1	Alternative 2	Alternative 3
Mode-Choice Factors			
Transit Operations Improvement ● GREATEST ○ LEAST	- Transit vehicles get trapped behind excessive queues and cannot access bypass lane - Wide sidewalks and landscaping provide a comfortable environment for transit riders - Worst transit travel time reliability due to turnouts and transitions into traffic (northbound standard deviation = 4.8 minutes) - Northbound transit travel time twice that of alternative 2 (23.4 minutes)	- Transit benefits are provided regardless of general purpose lane congestion - Wide sidewalks, landscaping and shelters provide a comfortable environment for transit riders. - Frequent crossing opportunties are located near bus zones - Continuous transit/right-turn lane provides for reliable service through the corridor (northbound standard deviation = 0.7 minutes) - Average transit travel time throughout corridor is best of arterial alternatives (northbound time = 12.3 minutes)	- Limited stops limits access to local destinations. - Long distance between flyer stops and crossing opportunities may discourage riders. - Rider comfort may be low due to flyer stop location on the expressway. - Landscaping and sidewalks provide a comfortable environment for transi riders traveling between stops. - Travel time reliability is impacted by turnouts (northbound standard deviation = 6.7 minutes) - Average northbound transit travel time = 16.6 minutes
Pedestrian Safety Improvement ● GREATEST ○ LEAST	- Less pedestrian safety due to 2-way-left-turn lane - Lack of continuous median increase traffic conflicts - Fewer signal controlled crossings may cause "j-walking" - Wider sidewalks/landscaping/art/furniture and positive features - Lower traffic volume/speeds plus fewer lanes are positive features	- Access management with median create safest pedestrian environment - Transit lanes with transit amenities generates more pedestrians - Median landscaping and street tree buffers create best pedestrian environment - Median/turn breaks provide more pedestrian crossing locations - Median and edge landscaping calms traffic and improves pedestrian comfort	- Expressway cross-section creates divided pedestrian environment - Raised barriers provide safest conditions for pedestrians - High traffic volumes and speeds create noise and reduce comfort for pedestrians - The wide cross-section for pavement allows less landscaping/art/furniture - Grade separated crossings require ramps and longer walking/crossing distances
Operations Factors			
Traffic Safety Improvement ● GREATEST ○ LEAST	- Very high number of uncontrolled traffic conflicts - High number of crossing conflicts increases accident severity - Heavy congestion causes rear-end collisions - Two-way-left-turn lane and on-street parking are accident hazards - Lower speed is a positive feature	- Moderate level of uncontrolled traffic conflicts - Few uncontrolled crossing conflicts reduces accident severity - Median and edge treatments help reduce traffic speeds and accident rates - Transit/right-turn-only lane provides safest access to businesses - Lower congestion levels reduces potential for rear-end collisions	- Lowest uncontrolled traffic conflicts of all alternatives - No uncontrolled crossing conflicts so accident severity is much lower - Opposing/through/business access traffic is divided with safety barriers - Uniform operating speeds on mainline roadways reduces accident potential - Lowest congestion levels reduces accident potential
Consistency with Comprehensive Plan goals ● HIGHEST ○ LOWEST	- Best pedestrian environment: wide sidewalks, crossings. - Transit queue jumps help transit move people at intersections. - Negative impact on neighborhood streets and parallel arterials. - Accomodates gateways and other image enhancers. - Unlimited left turn access supports existing businesses.	- Pedestrian environment is good, most pedestrian crossings. - Best alternative for transit and people movement. - Capacity is improved (over Alt. 1); safer than Alt. 1. - Access is focused, and opportunities for shared driveways. - Business access is improved with transit right turn lane.	- Pedestrian environment is the worst. - Helps transit move through Shoreline but with fewer stops. - Capacity greatly improved via grade separated intersections. - Access to businesses is more complicated, but safer. - Aurora image changes to through traffic orientation.
Traffic Operations Improvement ● GREATEST ○ LEAST	- Two-way left turn lane causes mid-block delay. - Low average speed along corridor. - Large speed differential approaching intersections. - More intersections causes more total delay in the corridor. - Mid-block parking causes interference with through traffic. - Several intersections will operate at worse than level of service E. - Average system delay is 79.9 seconds per vehicle.	- Level of service E or better achieved at each intersection (improvement of existing condition) - Average speed along corridor near posted speed - Right-turn lane and median reduce traffic turbulence - Average intersection delay less than one minute per vehicle - Average system delay is 62.9 seconds per vehicle	- No intersection delay along aurora - Single-point diamond interchanges pose operational challenges - Average travel speed above posted speed - Significant delays experienced along frontage roads - Average system delay is 91.5 seconds per vehicle

8.4 Summary of Results

Alternative 2 was found to have the highest funding feasibility score. Although the estimated cost of Alternative 2 is slightly higher than Alternative 1, Alternative 2 had a more favorable set of design features, a better regional/local balance and provided more benefits in terms of traffic operations (level of service), safety and mode-choice.

Alternative 1 was found by a small margin to provide slightly more economic development potential than Alternative 2. The difference between them lies mainly in property access. Based on the ratings unlimited property access would score the highest. Since Alternative 1 retains the existing two-way left-turn lane, it evaluated slightly higher in terms of property access.

Alternative 1 was found to have the lowest right-of-way needs and impacts. This is due mostly to the fact that the only capacity improvement associated with this alternative occurs at intersections, where impacts are very similar to those in Alternative 2.

Alternative 2 was found to have the least impact on neighborhood spillover traffic. According to travel demand model results, Alternative 2 maintains a traffic balance among north/south roadways similar to what exists currently. Alternative 1 could be expected to shift significant traffic volumes to parallel routes including Meridian Avenue, Fremont Avenue and Dayton Avenue as well as onto roadways east of Interstate 5.

Alternative 2 provides the greatest improvement to transit operations. Transit travel times for the length of the corridor were modeled to be over 10 minutes faster for Alternative 2 compared to Alternative 1. Due to the extremely congested conditions that would be expected in Alternative 1, buses get trapped in pull-outs and stuck outside of the traffic lanes.

Pedestrian safety is improved the greatest with Alternative 2. Traffic safety is improved most in Alternative 3 due to is barrier separation and one-way frontage road operation. Features of Alternative 2 such as the access management treatments, transit facilities and pedestrian crossings associated with median breaks provide the best combination of pedestrian amenity and safety. Alternative 1 due to the high number of traffic conflicts, on-street parking, heavy congestion and two-way left-turn lane provides the least improvement to traffic safety.

9.0 Preferred Alternative

The CATF, upon review of evaluation results and public input, selected Alternative 2 for further development as a preliminary preferred design concept for recommendation to the City Council. The preferred alternative is described below. Following the general description is a listing of the CATF's recommendations that amended the design of Alternative 2 and supplied accompanying statements for the Council to consider when implementing the project. Following the CATF recommendation statements are plan view drawings of the recommended alternative and a summary of the landscape and urban design preferences identified by the CATF for the recommended alternative.

9.1 General Description

The main features of this design concept include the addition of business access transit lanes on the outside of the roadway; curbs, gutters, landscaping/street furnishing strip, and sidewalks on both sides; and the creation of a landscaped center median/safety lane with left and u-turn pockets. The recommendation also includes four new signalized intersections and four new pedestrian activated signalized crossings.

Traffic Services

Two general-purpose traffic lanes will be provided in each direction. An additional lane in each direction will provide business access for right-turning vehicles and for continuous transit vehicle movement along the corridor. Additional left- and right-turn lanes will be provided where warranted at high-volume intersections.

9.2 CATF Recommended Improvements to Alternative 2

The CATF developed a recommendation made up of 32 specific points addressing the range of issues in the Aurora Corridor.

The CATF's goal in the Aurora Corridor Pre-Design project was to develop a design concept that improves safety for pedestrians and drivers, improves the aesthetics and image of the street, adds people moving capacity, and supports existing and future business investments along the street. Landscaping is a key feature in strengthening the image and in supporting the walkability of the corridor.

The following statements outline the recommendation of the CATF on the development and implementation of the project:

1) The maximum number of lanes on an intersection leg shall not exceed eight lanes including turning lanes. Seven lanes is the desired width.
2) Provide ability at intersections for all pedestrians to safely cross (and include median refuge at intersections with pedestrian pushbuttons). New mid-block pedestrian crossings should include pedestrian activated signals. Bus stops and pedestrian crossings will complement each other.
3) Twelve foot sidewalks will be provided on both sides of Aurora the entire length. Consider reducing the initial sidewalk width to mitigate land impacts/acquisitions on existing businesses. Note: a minimum of four feet of a landscaping/street furnishing zone is included in the twelve foot width total above.

4) Utilize more landscaping or colored pavement in sidewalk areas to soften the look. The four foot landscaping/street furnishing strip behind the curb should utilize trees in tree grates/pits (consider a combination tree protector/bike rack), low growing ground cover/shrubs, and could utilize some special paving (or brick) between curb and sidewalk to strengthen the identity of an area.
5) Strive to design the project so that new sidewalks can link to existing recently constructed sidewalks (such as Seattle Restaurant Supply, Drift-on-Inn, Schucks, Hollywood Video, and Easley Cadillac).
6) Re-align the street where possible to avoid property takes.
7) As the final design is developed, work with WSDOT to obtain design approvals for lane width reductions, and look for opportunities to reduce (but not eliminate) the median width both to enable reduction of pavement widths, construction costs, and land impacts/acquisition on existing businesses.
8) Develop median breaks or intersections for business access and U-turns at least every 800-to-1000 feet (these details will be worked out during future design phases and will be based in part on the amount of traffic entering and exiting businesses).
9) Use low growing drought resistant ground-cover and space trees in the median to allow visibility across it.
10) Unify the corridor by adding art, special light fixtures, pavement patterns (and coloring at crosswalks), street furniture, banners, unique bus shelters, etc. to dramatically enhance image and uniqueness of the streetscape and develop it differently than the standard design that has been constructed for most streets.
11) Unify the entire corridor by the use of street trees, lighting, special paving, bus zone design, and other elements to visually connect the corridor along its length.
12) Provide elements in the Interurban/Aurora Junction area, between 175th and 185th that create a safe, pedestrian oriented streetscape. Elements can include special treatments of crossings, linkages to the Interurban Trail, etc.
13) Develop signature gateway designs at 145th and 205th with special interest landscaping, lighting, paving and public art to provide a visual cue to drivers that they have entered a special place.
14) Develop themes that reflect the character and uses of different sections of the street (such as the 150th to 160th area which has a concentration of international businesses, recall the historic significance of the Interurban or other historic elements, and Echo Lake).
15) Utilize the Arts Council and neighborhoods to solicit and select art along the corridor.
16) Strengthen connections to the Interurban Trail through signing and other urban design techniques.
17) Develop a design for closure of Westminster Road between 158th and 155th by developing a southbound right turn lane at 155th Street and converting the existing road section to a driveway entrance to Aurora Square. Also, develop an elevated Interurban trail crossing through "the Triangle" that is integrated with future development of the Triangle (reserve the option to build above Westminister should we not be successful in closing the roadway).

18) Pursue modifying the access to Firlands at 185th, closing Firlands north of 195th, and developing a new signal at 195th.

19) The preferred design shall include:

- Stormwater management improvements to accompany the project that follow the city's policies;
- Traffic signal control and coordination technology (including coordination with Seattle and Edmonds SR 99 signal systems);
- Traffic signal technology to enable transit priority operations;
- Continuous illumination for traffic safety and pedestrian scale lighting;
- Undergrounding of overhead utility distribution lines.

20) Traffic signals will include audible elements for the sight-impaired, and wheelchair detection loops for wheelchair users.

21) The City should establish a right-of-way policy to retain or relocate existing businesses along the corridor, including those that do not own the land on which they are located. Consideration should be given to providing financial incentives to those businesses.

22) Work with property and business owners during the preliminary engineering phase to consolidate driveways, share driveways, and potentially to share parking and inter business access across parcel lines. Be creative and sensitive to the parking needs of businesses, including consideration for some potential clustered/shared parking lots (especially if remnant parcels are available).

23) Provide improvements that will not generate an increase in neighborhood spillover traffic.

24) Work with transit agencies to provide increased service and seek capital investments from them to support this project.

25) Develop partnerships with WSDOT and King County/Metro to jointly fund the project.

26) Provide curb bulbs where practical on side streets to reduce pedestrian crossing width and to discourage cut-through traffic.

27) Strengthen and preserve the heritage of the red brick road. If the design impacts the red brick road in its current configuration/location north of 175th, preserve its heritage by relocating it elsewhere.

28) Consider new signalized intersections at 152nd, 165th, 182nd, and 195th.

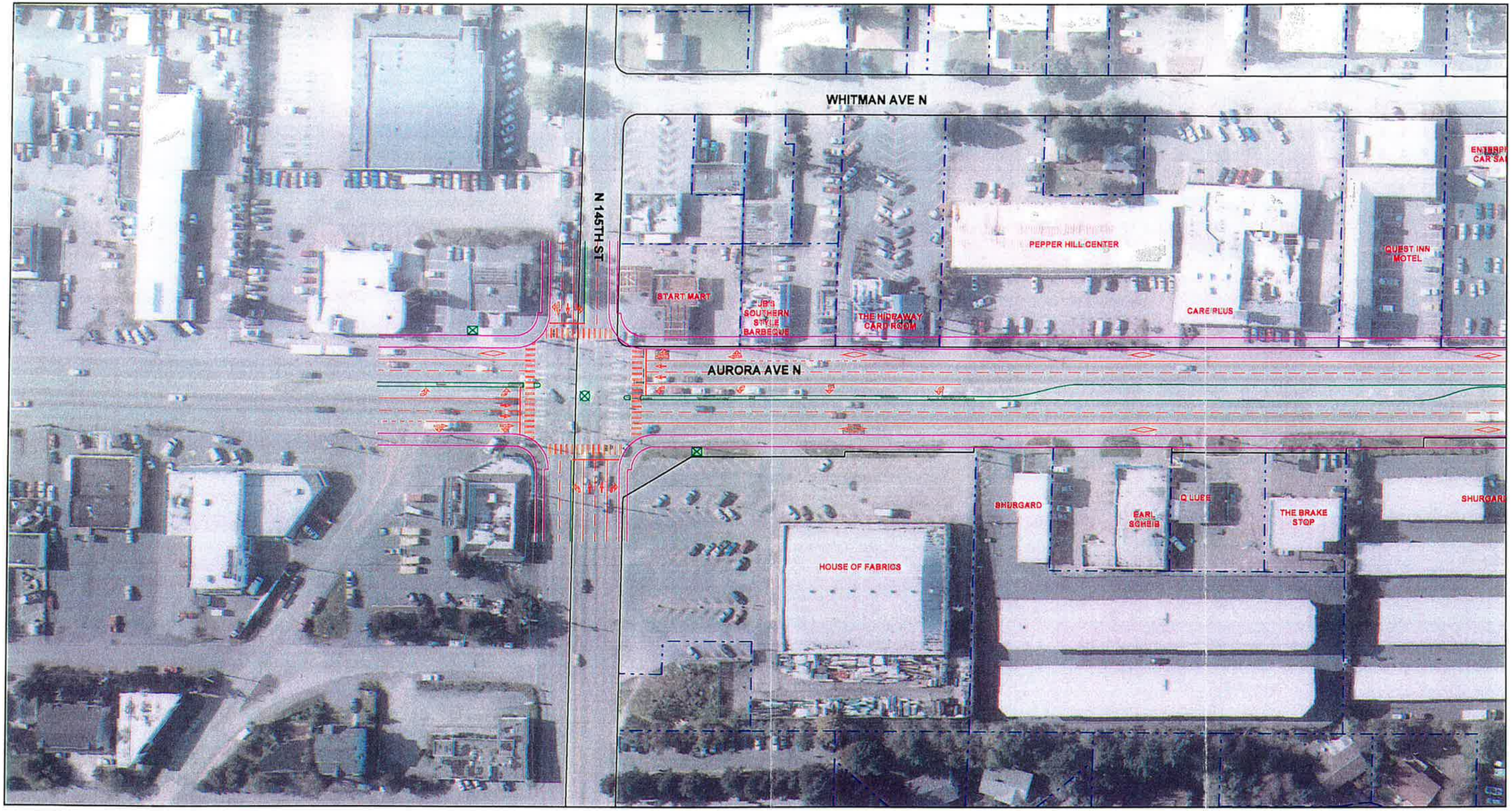
29) Consider new pedestrian only signalized crossings in the vicinity of 149th, 170th, 180th and 202nd.

30) Sign Ronald Place south of 175th as the route to I-5.

31) Pursue reducing the speed limit to 35 mph where appropriate recognizing the potential impacts of spillover traffic with a lower posted speed.

32) Seek funding to develop a program to assist and encourage businesses to improve their facades.

9.3 Conceptual Channelization Plans



LEGEND:

- R/W LINES
- PARCEL LINES
- SIGNALIZED INTERSECTION
- BUS STOP
- TRANSIT & RIGHT TURN LANE

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DR M ROHILA							
CHK M STEPHAN							
APVD T BEVAN	NO.	DATE	REVISION	BY	APVD		

AURORA CORRIDOR MULTI-MODAL
PRE-DESIGN STUDY
PRELIMINARY PREFERRED ALTERNATIVE
CONCEPTUAL LAYOUT

SHEET 1 OF 13
DWG NO. A2-1
DATE JUN 1999
PROJ NO. 147448

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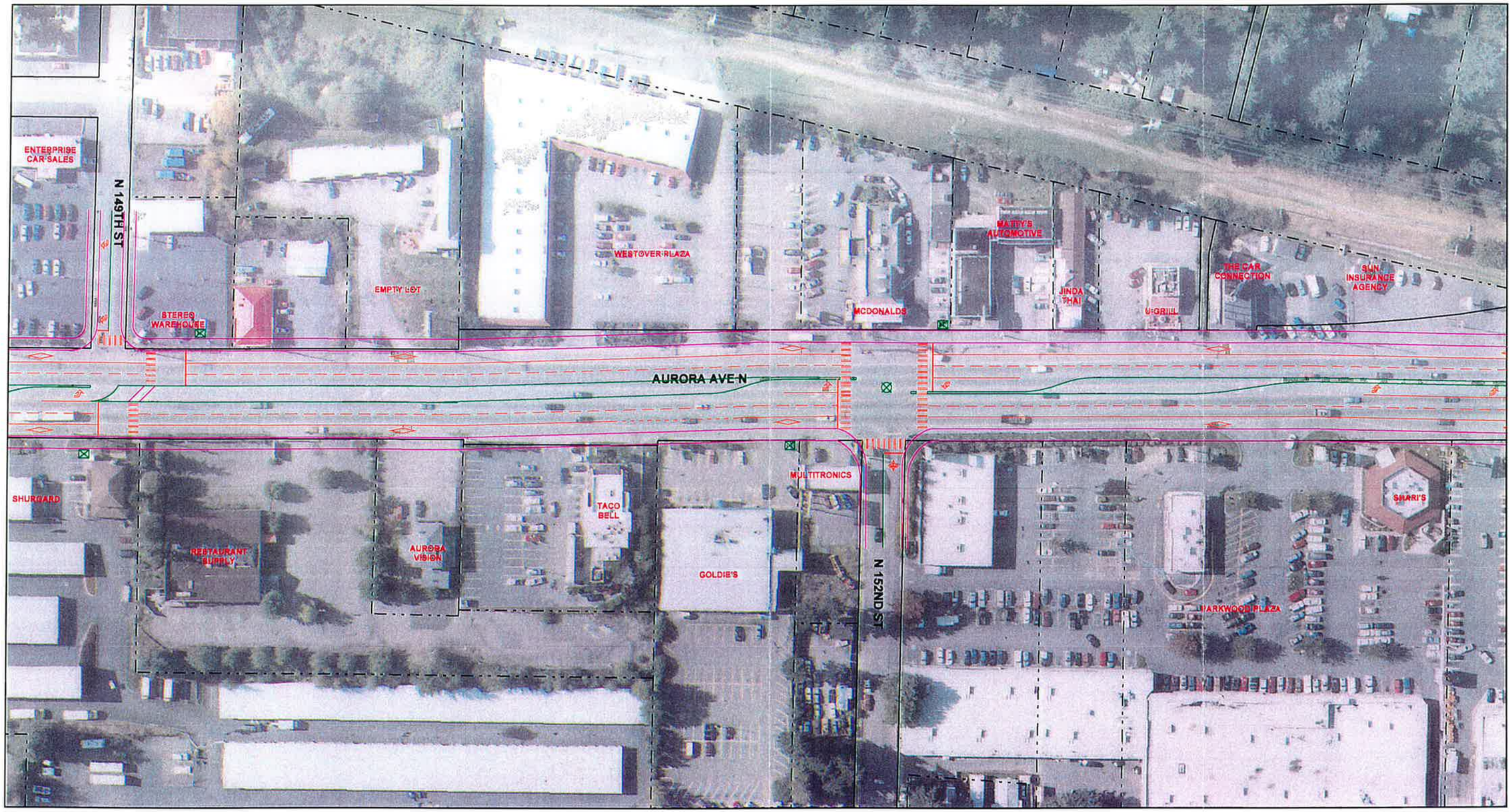

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- PARCEL LINES
- SIGNALIZED INTERSECTION
- BUS STOP
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CHK M STEPHAN						CITY OF SHORELINE	SHEET 2 OF 13
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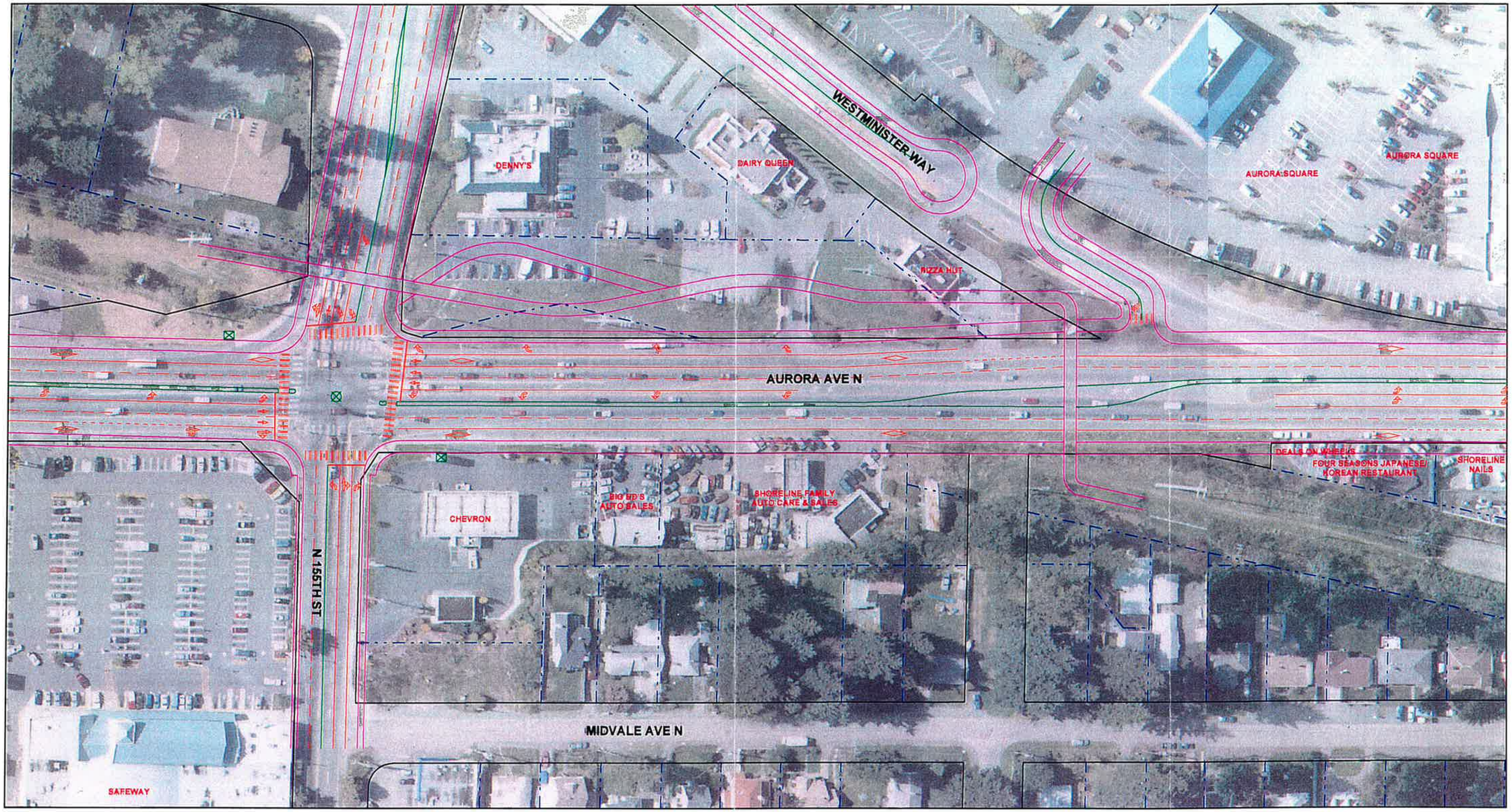

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- R/W LINES
- PARCEL LINES
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- BUS STOP
- TRANSIT & RIGHT TURN LANE

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SCALE IN FEET

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PRE-DESIGN STUDY

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CONCEPTUAL LAYOUT

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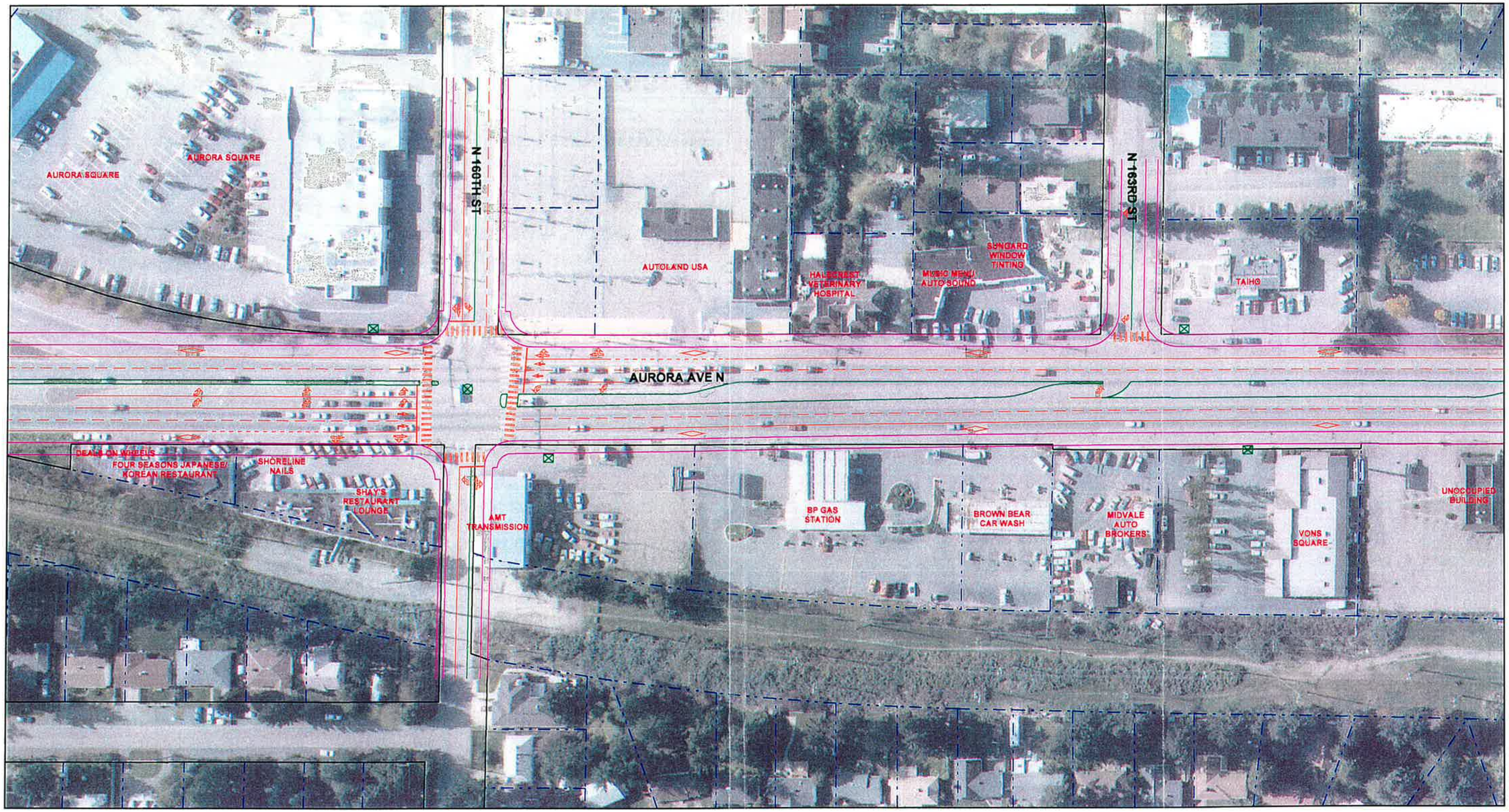

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- BUS STOP
- TRANSIT & RIGHT TURN LANE

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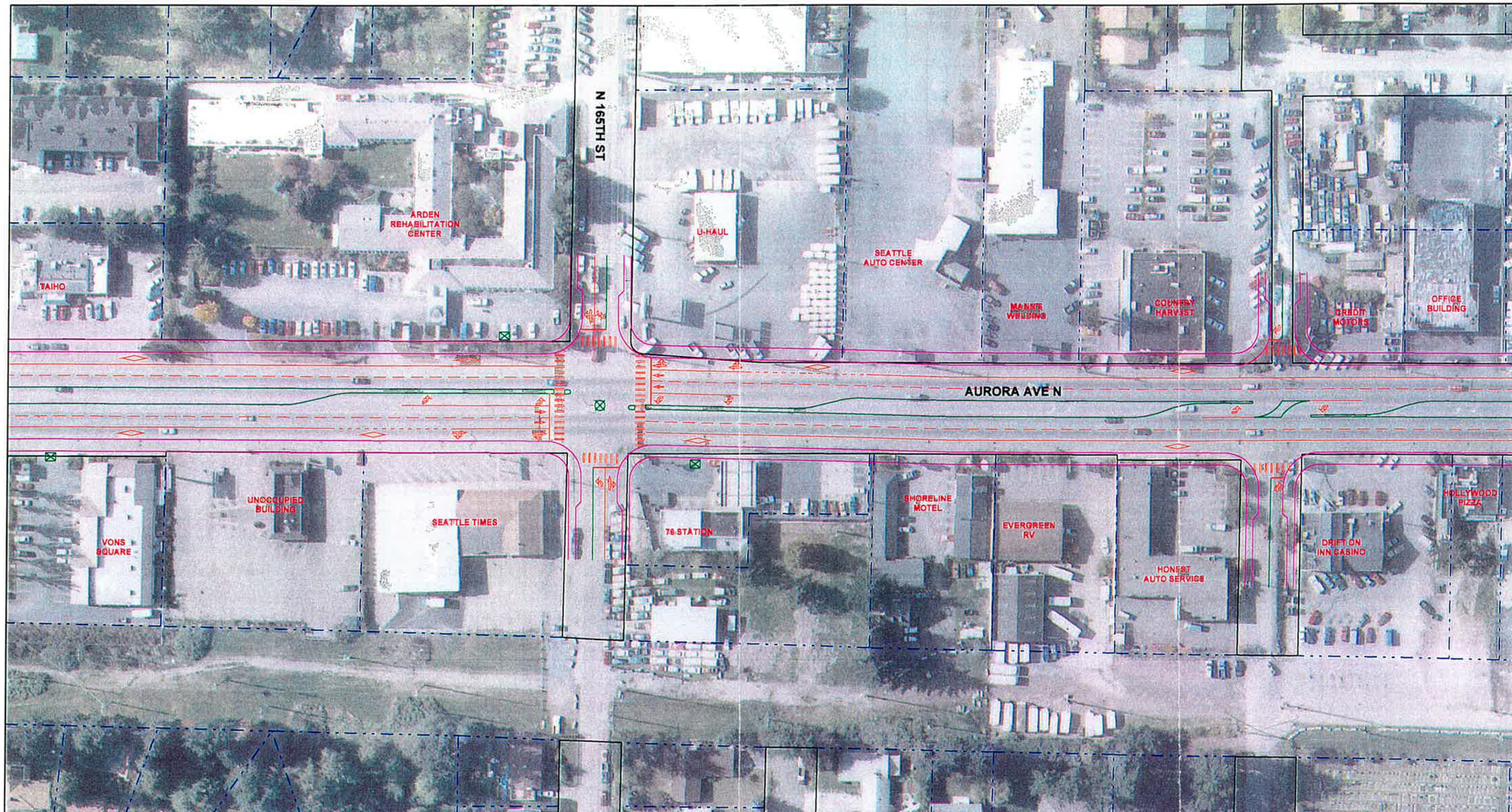

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- BUS STOP
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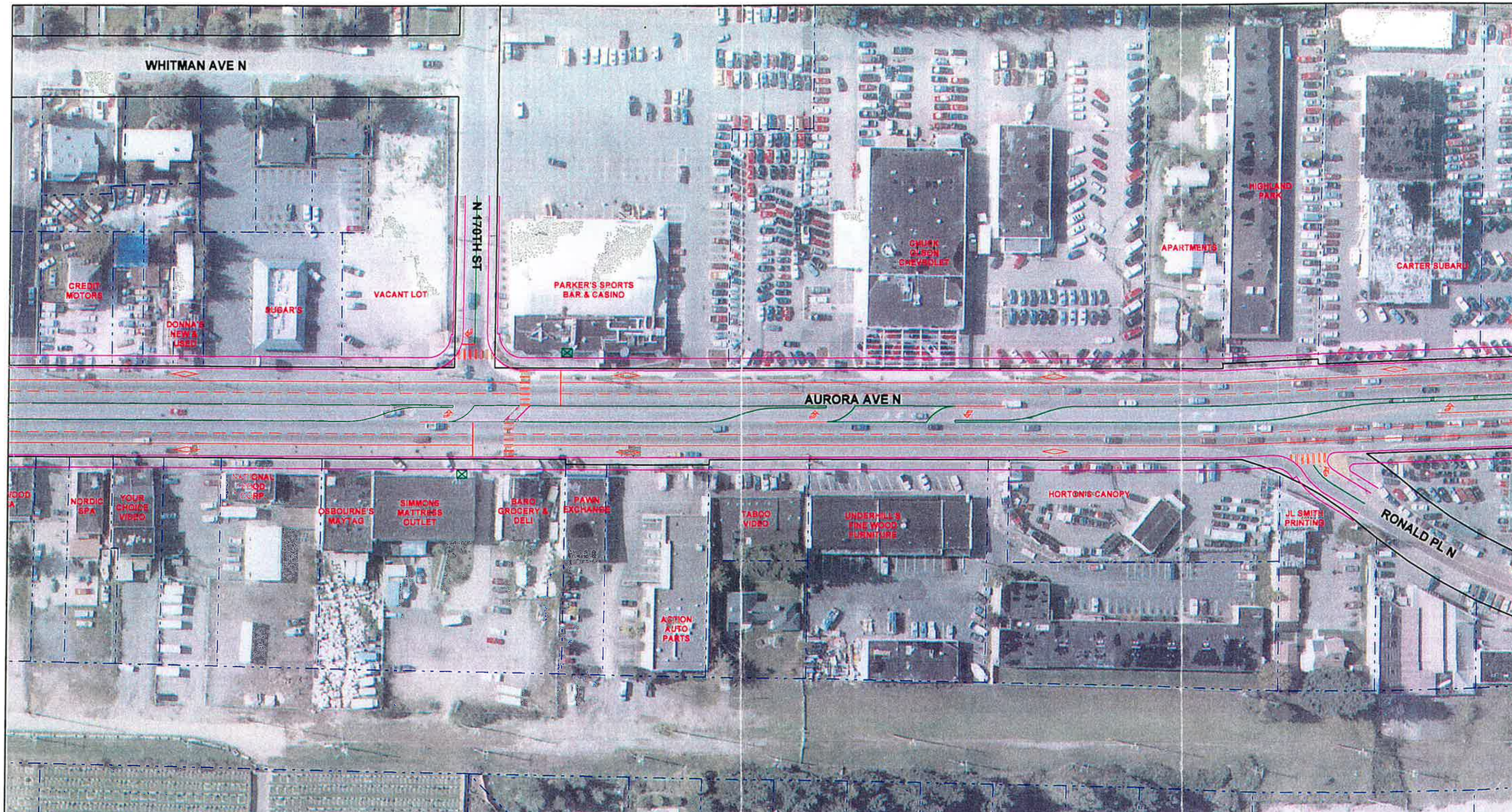

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- BUS STOP
- TRANSIT & RIGHT TURN LANE

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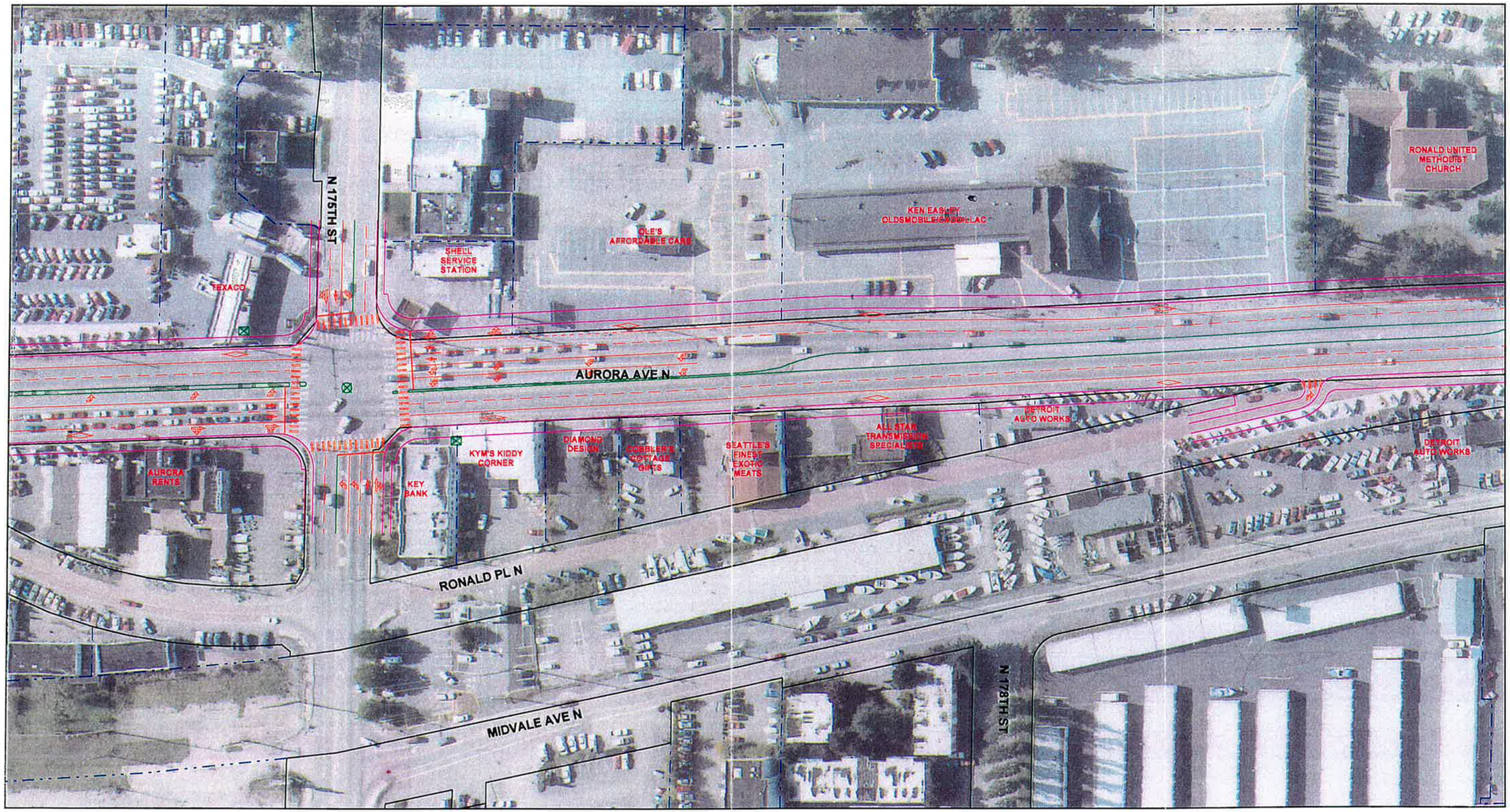

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- BUS STOP
- TRANSIT & RIGHT TURN LANE

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SCALE IN FEET

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PRE-DESIGN STUDY
PRELIMINARY PREFERRED ALTERNATIVE
CONCEPTUAL LAYOUT

SHEET 7 OF 13
DWG NO. A2-7
DATE JUN 1999
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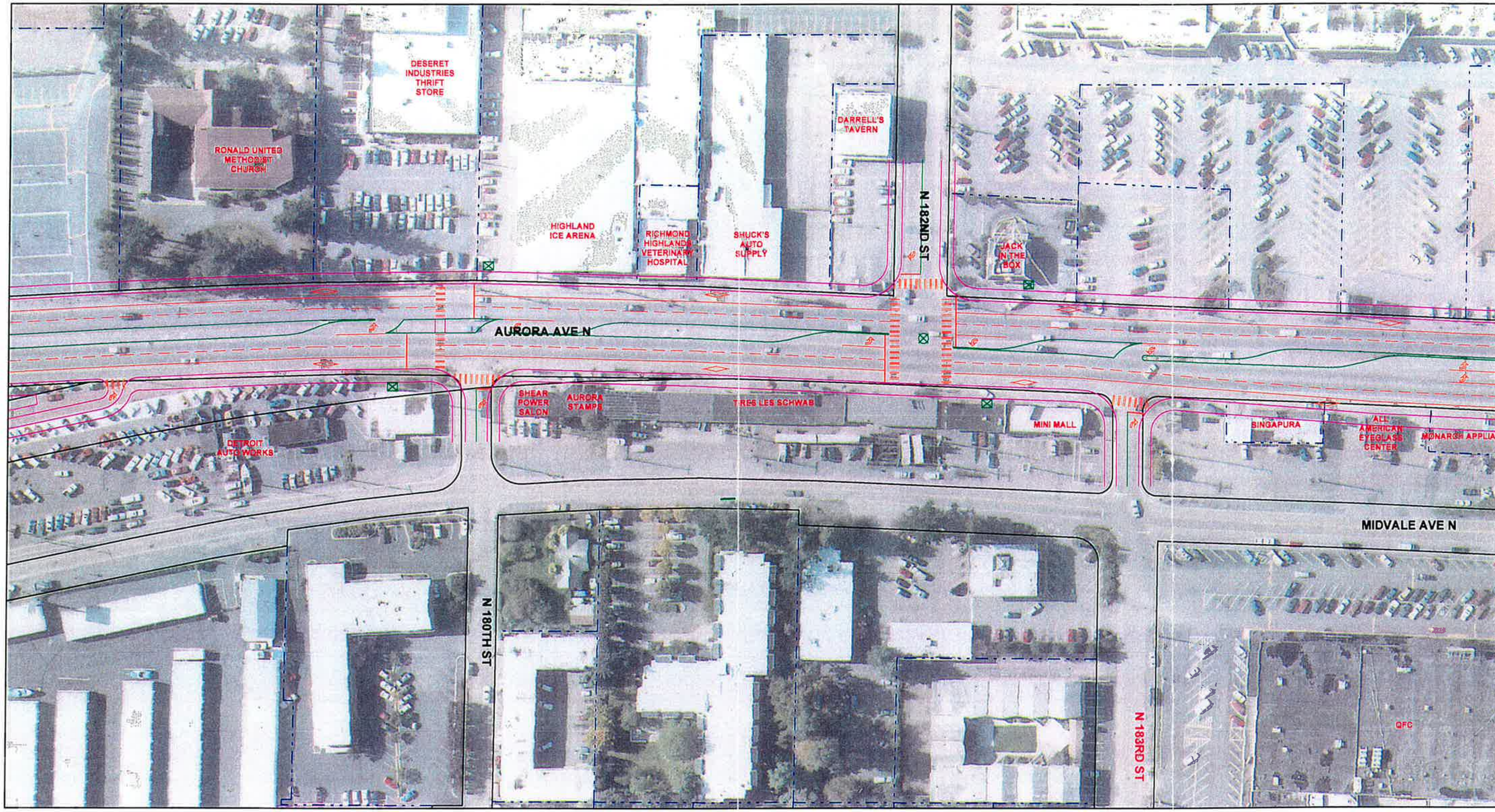

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- SIGNALIZED INTERSECTION
- BUS STOP
- TRANSIT & RIGHT TURN LANE

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APVD	T BEVAN

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PRELIMINARY PREFERRED ALTERNATIVE CONCEPTUAL LAYOUT

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DWG NO.	A2-8
DATE	JUN 1999
PROJ NO.	147448

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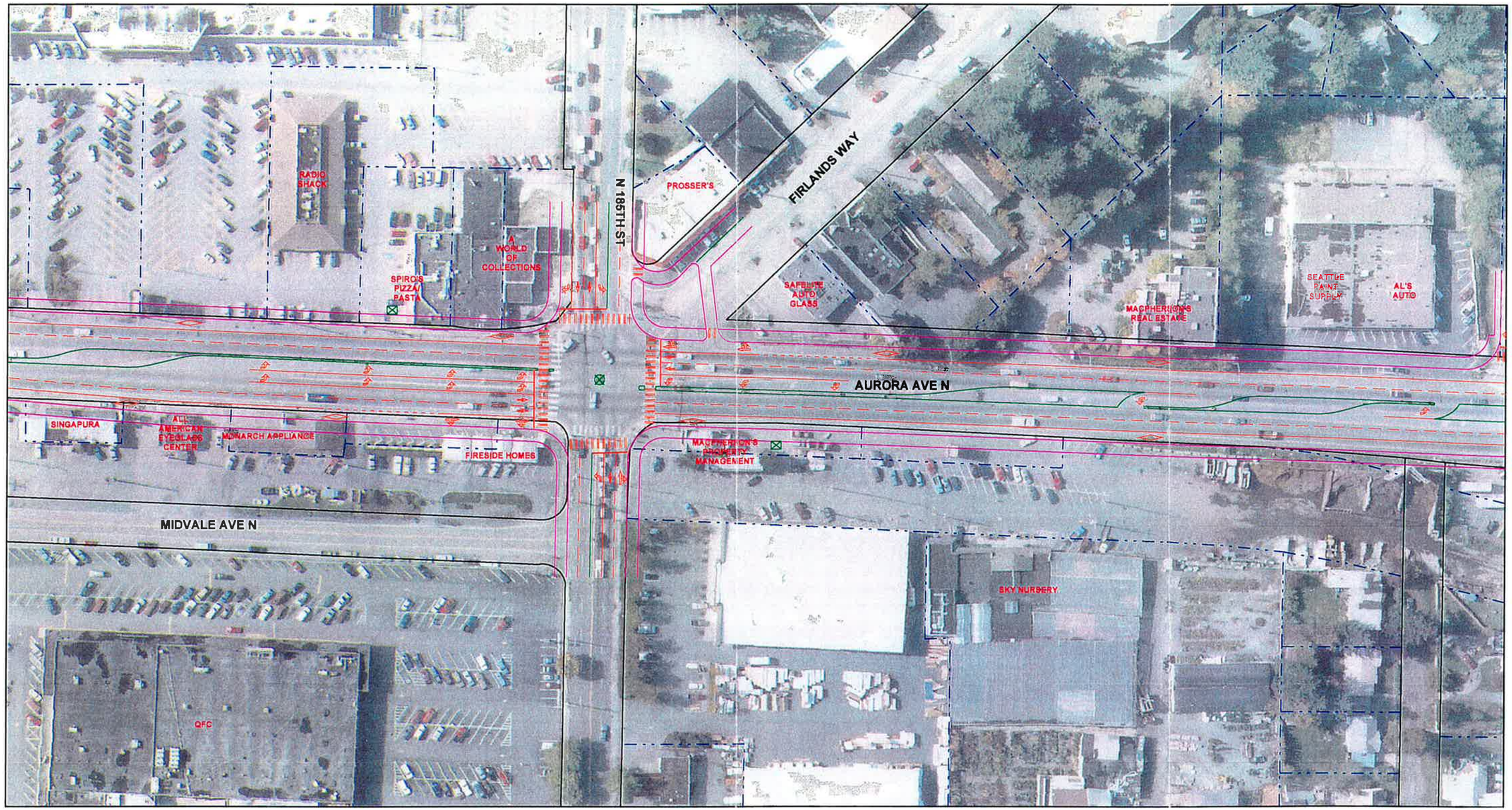

LEGEND:

- R/W LINES
- PARCEL LINES
- SIGNALIZED INTERSECTION
- BUS STOP
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DR	M ROHILA					BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	AURORA CORRIDOR MULTI-MODAL PRE-DESIGN STUDY
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APVD	T BEVAN	NO.	DATE	REVISION	BY	APVD	SHEET 9 OF 13
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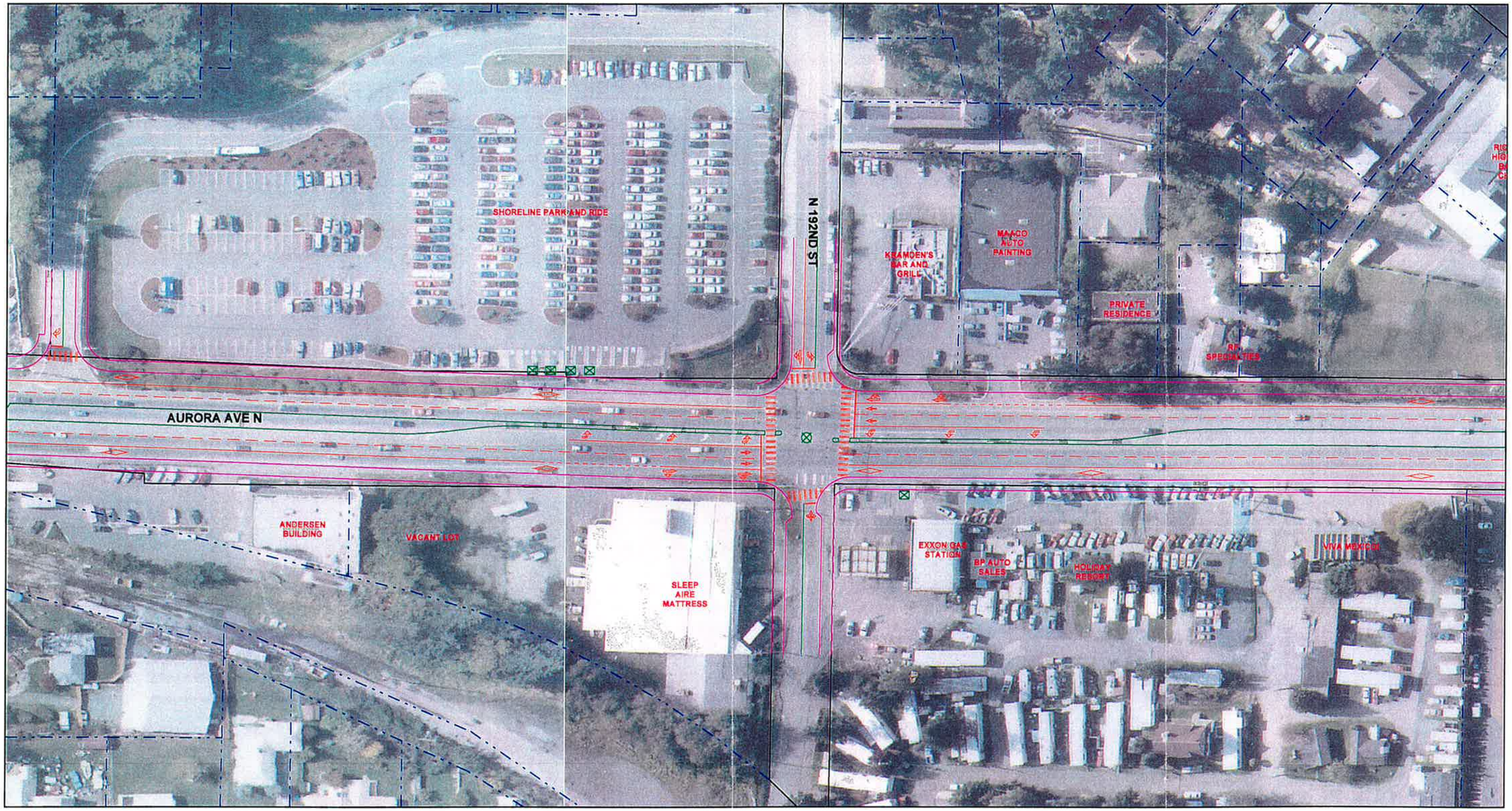

LEGEND:

- R/W LINES
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PRE-DESIGN STUDY
PRELIMINARY PREFERRED ALTERNATIVE
CONCEPTUAL LAYOUT

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DATE JUN 1999
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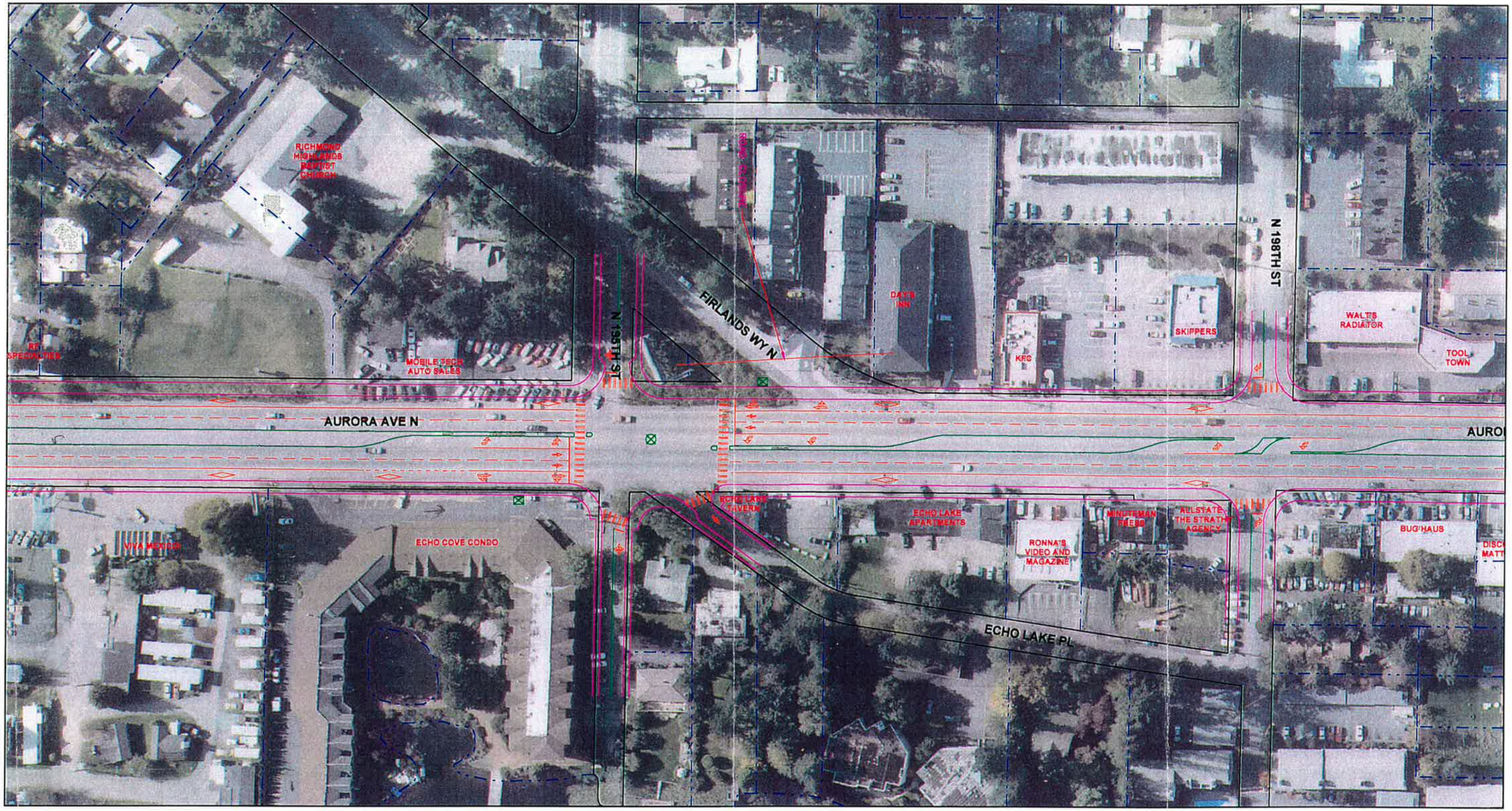

LEGEND:

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- PARCEL LINES
- SIGNALIZED INTERSECTION
- BUS STOP
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SHEET 11 OF 13
DWG NO. A2-11
DATE JUN 1999
PROJ NO. 147448

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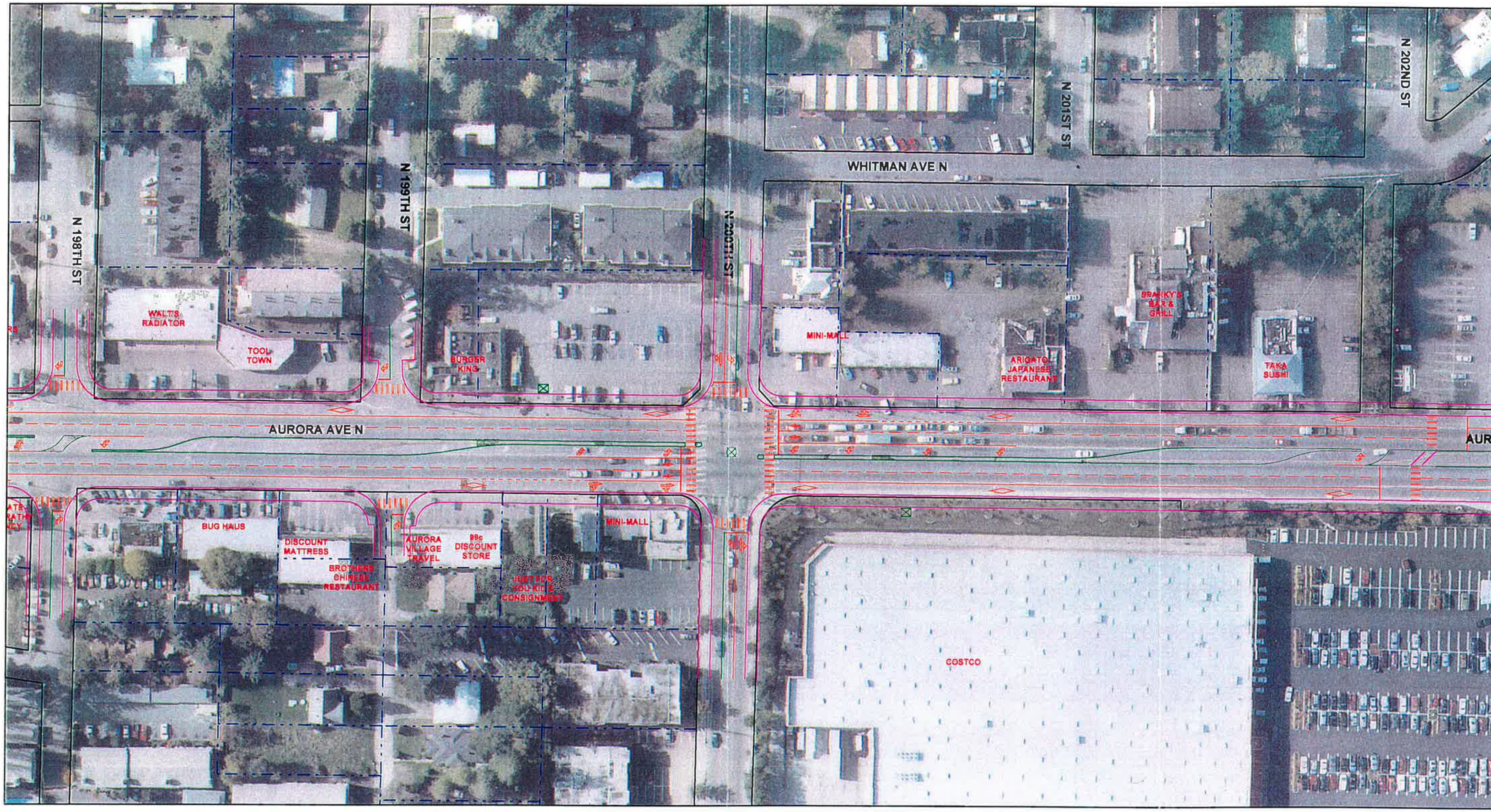

LEGEND:

- R/W LINES
- PARCEL LINES
- SIGNALIZED INTERSECTION
- BUS STOP
- TRANSIT & RIGHT TURN LANE

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MAPPING FOR PLANNING PURPOSES ONLY:
AERIAL PHOTOGRAPHY OBTAINED FROM WALKER AND ASSOCIATES 9/97. ORIGINAL NEGATIVES AT 1" = 2000 5/32 SCALE. THIS PHOTOGRAPHY WAS SCALED TO THE EXISTING PARCEL LINES OBTAINED FROM THE CITY OF SEATTLE PUBLIC UTILITIES CENTRAL GEOGRAPHIC DATABASE CURRENT 12/97. THIS MAPPING IS INTENDED FOR PLANNING AND CONCEPTUAL PRE-DESIGN PURPOSES ONLY AND IS NOT APPROPRIATE FOR THE DEVELOPMENT OF CONSTRUCTION OR RIGHT-OF-WAY PLANS.

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CH2MHILL

CITY OF SHORELINE

AURORA CORRIDOR MULTI-MODAL
PRE-DESIGN STUDY

PRELIMINARY PREFERRED ALTERNATIVE CONCEPTUAL LAYOUT

SHEET	12 OF 13
DWG NO.	A2-12
DATE	JUN 1999
PROJ NO.	147448

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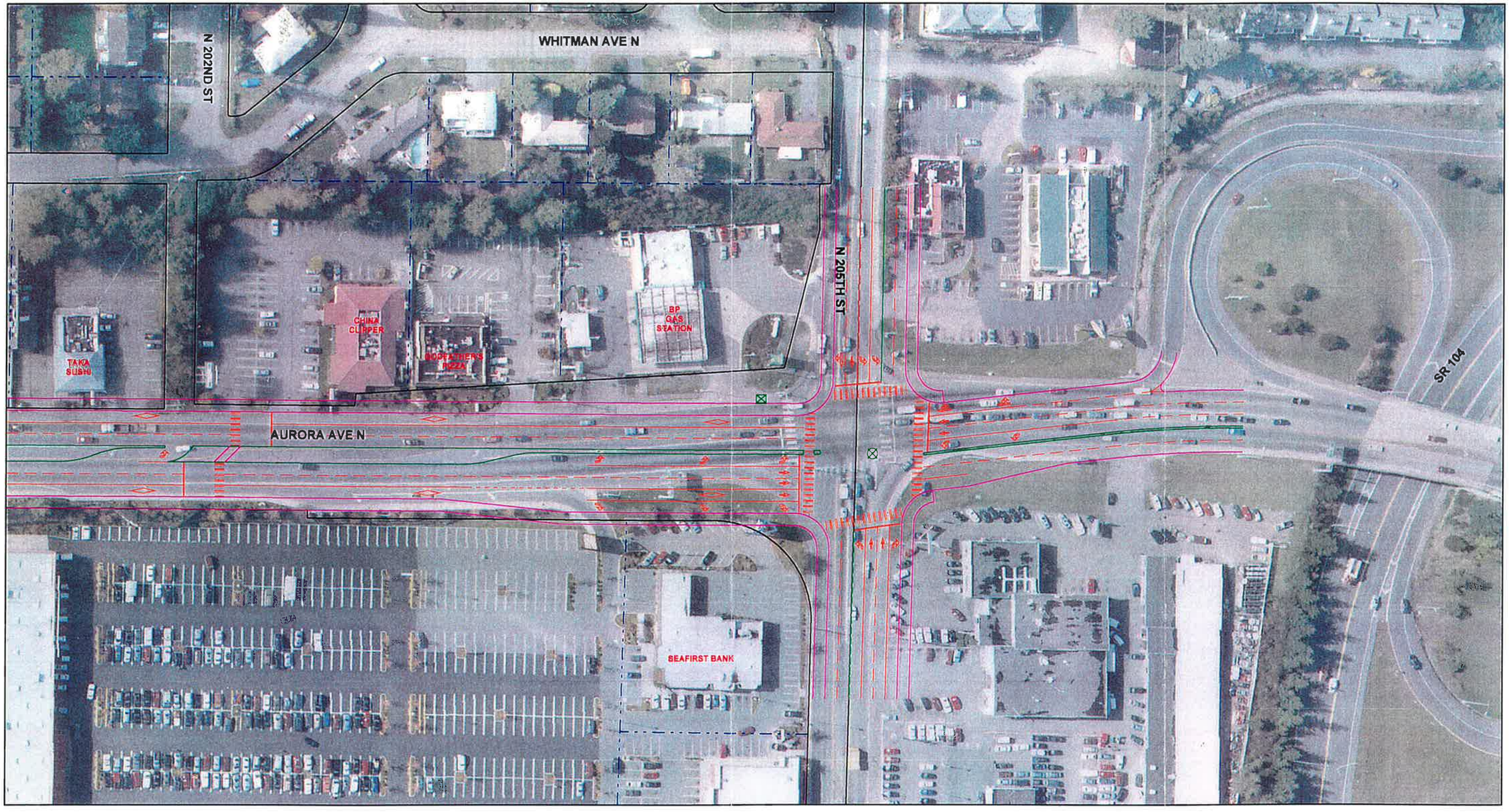

LEGEND:

- R/W LINES
- PARCEL LINES
- SIGNALIZED INTERSECTION
- BUS STOP
- TRANSIT & RIGHT TURN LANE

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MAPPING FOR PLANNING PURPOSES ONLY:
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DSGN	T SLIND
DR	M ROHILA
CHK	M STEPHAN
APVD	T BEVAN

NO.	DATE	REVISION	BY	APVD

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CH2MHILL

CITY OF SHORELINE

AURORA CORRIDOR MULTI-MODAL
PRE-DESIGN STUDY
PRELIMINARY PREFERRED ALTERNATIVE
CONCEPTUAL LAYOUT

SHEET NO.	13 OF 13
DWG NO.	A2-13
DATE	JUN 1999
PROJ NO.	147448

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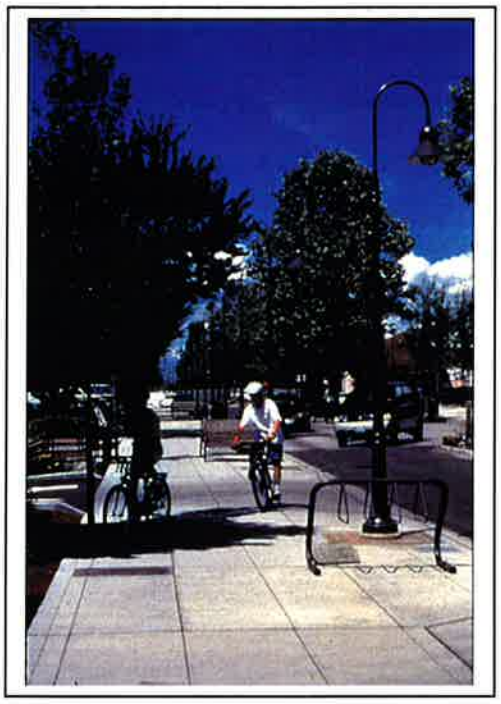
9.4 Landscape and Urban Design Elements

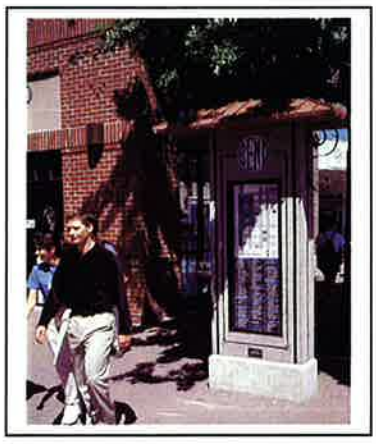
Aesthetic improvement for the Aurora Corridor over existing conditions was one of the most frequently mentioned priorities by both the CATF and the public attending the open houses. Everyone exposed to the project , it seemed, wanted to be involved with any activity that would beautify Aurora Avenue. Specific landscaping and urban design details will be developed in subsequent phases of the project. The following summary of the landscape and urban design concept represents the work that was done over the course of several working meetings with the CATF that included public input received at the public open houses.



Concept Summary

The Design Concept guiding the development of Landscape and Urban Design Elements along the Aurora Avenue North Corridor creates a "Vision" for the streetscape that will unify the entire corridor and create a special character or "identity" to reflect the City of Shoreline community. To accomplish this "Vision", the conceptual design of the corridor has been divided into three main elements:

- Unify the Entire Corridor,
- Create "Signature" Entry Gateways, and
- Highlight the 175th to 185th Area & Interurban/Aurora Junction.



Landscape and Urban Design Elements will be used to create a visually unified, coherent design throughout the length of the entire corridor (see attached figure). Street trees, lighting and special paving, as well as other elements, will provide a strong visual connection to help unify the corridor design. Public safety elements used throughout the corridor (curb bulbs, crosswalks, signalization, signage) will also help enhance pedestrian safety and experience along the corridor. Specific pedestrian areas, such as: bus shelters, intersections, Interurban Trail connections and a pedestrian connection to Echo Lake Park will be highlighted with a special interest landscape, public art, signage, etc. within the streetscape design. Landscape and urban design elements proposed for these areas also include landscape planting areas, medians and street trees; site furnishings; lighting; public art; special paving and public safety elements.

"Signature" Entry Gateways will be created at either end of the Aurora Avenue North Corridor to represent the Shoreline community and welcome residents and visitors to the City. Landscape and Urban Design Elements, such as: lighting, special interest landscape,

paving and public art will be intensified in these areas to identify the gateways and highlight the unique character and "identity" of Shoreline.

Throughout the *175th to 185th Area* and *Interurban/Aurora Junction*, Landscape and Urban Design Elements will be used to create safe, pedestrian-oriented streets that reflect the character of each area. A hierarchy of gateways will create "entrances" to the 175th to 185th Area to reinforce the character of the neighborhoods. Connections to the Interurban Trail through these areas will also be defined with signage, site furnishings, public art, etc. to recall the Interurban rail line. Public safety enhancements will be used throughout these areas to create safe, public streets for both bicycles and pedestrians.

Interim standards, which are currently under consideration by the City of Shoreline, will be needed to implement these improvements.

Design Description

Unify the Entire Corridor

Unifying the corridor by improving the physical environment can have many positive effects. Not only will curbs and sidewalks add to the comfort and safety of pedestrians, but also the addition of street trees—whether in a center median or in a planting strip along the roadway—will improve the appearance and cohesiveness of the corridor. Additionally, pedestrian-scaled lighting and street furniture help to create a sense of place, further encouraging pedestrian and transit use. All of these elements acting in concert can further define and identify an area, possibly encouraging passing motorists to stop and take advantage of commercial opportunities.

The following landscape and urban design elements will be used to create a visually unified, coherent design throughout the length of the entire corridor.

Street trees, lighting and special paving, as well as other elements, will provide a strong visual connection to help unify the corridor design. Trees will be placed in grates adjacent to sidewalks and in landscaped medians, where appropriate. Pedestrian-scaled street lighting along sidewalks will increase safety and help provide visual continuity along Aurora Avenue.

Sidewalks will be twelve feet wide wherever possible, with a four-foot amenity zone for trees in tree grates or a continuous planting area. Specific types of landscaping and lighting, as well as their placement, have not yet been defined.

Public safety elements used throughout the corridor will help enhance pedestrian safety and experience along the corridor. Elements to be used include curb bulbs and curb radius reductions, crosswalks, signalization, signage, and stop bars.

Specific pedestrian areas, such as bus shelters, intersections, Interurban Trail connections and a pedestrian connection to Echo Lake Park will be highlighted with a special interest landscaping, public art, and signage within the streetscape design. These areas are to be

improved with site furnishings, special paving, and pedestrian level lighting. Additionally, public art and/or custom bus shelters will help highlight these areas.

Create "Signature" Entry Gateways

"Signature" Entry Gateways will be created at either end of the Aurora Avenue North Corridor (intersections of Aurora and 145th / 205th) to represent the Shoreline community and welcome residents and visitors to the City.

Landscape and urban design elements, such as lighting, special interest landscaping, paving and public art will be intensified in these areas to identify the gateways and highlight the unique character and "identity" of Shoreline. Specific types of landscaping and lighting, as well as their placement, have not yet been defined.

The combination of pedestrian-level lighting, special interest/character landscape, special paving, public art, and public safety elements, including curb bulbs and special crosswalk paving can help identify the gateway. These treatments will also encourage pedestrian activity, providing important indicators that someone has arrived at a special place.

Highlight the 175th to 185th Area

Throughout the *175th to 185th Area*, landscape and urban design elements will be used to create safe, pedestrian oriented streets that reflect the character of each area.

Elements will include special pedestrian-scale lighting along sidewalks and clustered in special pedestrian areas, such as transit stops and gateways to the area. Lights used in clusters or along the sidewalk in this area could have a slightly different look than those used throughout the corridor to give a further impression of being in a special place.

In this area, a landscape planting area adjacent to sidewalk will provide a buffer by separating the pedestrian from automobile traffic. The landscape planting will provide special interest and to create a unique image for the 175th to 185th Area. Specific types of landscaping and lighting, as well as their placement, have not yet been defined.

Special paving will be used in the 175th to 185th Area to help depict a specific image or create a pattern meandering through the sidewalks and plazas. Special paving will also be extended across roadways at designated crosswalks or major intersections to slow traffic and reinforce the pedestrian as a priority in those areas.

Public art will be used in pocket parks and plazas and at transit stops in this area. Site furnishings, including benches, bollards, signage, trash receptacles, drinking fountains, and bike racks will assist in creating convenience and comfort for pedestrians.

Public safety elements, including curb bulbs and radius reductions will help calm traffic at intersections to create safer conditions for pedestrians. Refuge islands and offset midblock

crosswalks can help slow pedestrians cross Aurora, and pedestrian signalization with a "chirp" sound will allow pedestrians to activate their own crossing signal and be rewarded with an audible notice letting them know it is their turn to use the roadway. Specific designs for these improvements, as well as their placement, have not yet been defined.

The "4 corners" & Interurban Gateways greet people to the 175th to 185th Area. At these gateways, public art, special paving, pedestrian lighting, and special landscaping will define the entrances. Site furnishings, signage, and public art recalling the old interurban will define a connection to the interurban trail.

Highlight Interurban/Aurora Junction

As in the 175th to 185th Area, special pedestrian lighting, landscaping, and paving will be used to create a positive impression for those travelling through the area, while providing pedestrians with a more comfortable environment. Public art will be used in pocket parks and plazas and at transit stops to create an identity for the area.

Site furnishings, including benches, bollards, signage, trash receptacles, drinking fountains, and bike racks will assist in creating convenience and comfort for pedestrians.

Public safety elements will include curb bulbs for side-street crossing and a pedestrian overpass to accommodate Interurban Trail users. A connection to the Interurban trail will be defined with signage, public art, and additional site furnishings.

Design Element Descriptions

This section identifies the specific Landscape and Urban Design Elements used within each of the above main elements to support the overall Design Concept for the Aurora Avenue North Mult-imodal Corridor Study.

Landscaping

Street trees and other landscape plantings have a significant impact on the character and scale of a street environment. These elements help "soften" the impact of roadways, parking lots and building facades by adding color, texture and diversity to the street corridor. For example, the playful way light filters through a tree canopy on a brisk autumn day creates a rhythm all its own that distracts from the hard, gray surrounding environment.

Planting medians with trees, shrubs and/or groundcovers "softens" the impact of the corridor by providing a visual break in the roadway and may increase vehicular safety by separating lanes of traffic in each direction. Different types of trees, such as flowering/accent trees, at major intersections, gateways, etc. should be clustered in the median to help reinforce pedestrian or special interest areas. Medians can also provide the additional area needed for planting evergreen trees to increase variety, create a more park-

like or boulevard effect, and/or provide a dramatic backdrop for other ornamental plant types.

Street trees will be provided along sidewalks, either in tree grates or planting strips, to add interest, provide a pedestrian scale and reduce the overall impact of buildings, parking lots and roadways. Accent plantings should also be provided throughout the streetscape. When located between the sidewalk and roadway, planting strips help protect pedestrians by providing a buffer between sidewalks and vehicles.

Landscaping used throughout the corridor will respond to the issues raised by the community, city and other governmental agencies, such as sight lines to businesses and vehicular/pedestrian safety. The safety and security of pedestrians regarding vegetation heights and densities should also be considered. Tree types selected will reflect impacts from adjacent cars/trucks and overhead utility lines, as well as other general maintenance considerations.

Drought tolerant plants for water conservation

As water becomes scarcer and society's embrace of water conservation practices and goals intensifies, a "water conservation" irrigation system would address both the economical and ecological concerns. Even traditionally "drought-tolerant" and/or native plant types require irrigation in an exposed streetscape environment. In addition, water "auditing" practices and increased viability of plantings reinforces the benefit of using an automatic "water conservation" irrigation system.

Pedestrian & Street Lighting

Lighting of the street system, including adjacent sidewalks, walkways, and bike lanes, increases security and pedestrian safety and comfort. Lighting can help to create an overall impression of the corridor by providing identity and cohesiveness through repeated patterns of lightposts, special light fixtures, etc.

Public Art

Public Art can be incorporated into a number of other elements of urban design, including sidewalks, grating, bus shelters, lighting, and landscaping, or as a standalone element. Public art helps add identity to an area, and can function as another element that advances overall corridor cohesiveness and identity. This could potentially be accomplished through the use of patterns, materials, or images that reflect the history, culture, geography, landmarks, or other meaningful aspects of the community.

Public art should be woven into these urban design/streetscape elements to help create a special "identity" to the corridor. Integrating public art into the streetscape design may also help reduce costs. Public art may also be a standalone element that highlights special areas, such as gateways, bus shelters, or other facilities. Public art used in the Aurora Corridor should be coordinated with the Shoreline Arts Commission.

Site Furnishings

Street furniture (i.e., benches, tree grates, bicycle racks, raised planters, etc.) and sidewalk paving can help create a more pedestrian friendly environment and provide a unifying element throughout the Aurora Avenue North Corridor. Public amenities, such as benches and drinking fountains, can help create a more inviting atmosphere and attract more people to the area; while materials, color, texture and patterns can help tie these amenities together.

Benches, trash receptacles, drinking fountains, tree grates, bicycle racks, raised planters and bollards should be used to establish a certain character reflected in the style, materials, color, texture, etc. of the different street furniture elements. They can also help connect the corridor design to the surrounding community. Different types of benches (or other elements) should be considered, such as "perching" benches versus a bench with a supporting back element. Each type can portray a different connotation to the user. For example, a regular bench with a back support could suggest a place to sit and relax while a "perching" bench suggests a more transient nature. Different materials can reflect the colors, texture, etc. of a "downtown", industrial, commercial or historic area while patterns within different streetscape elements may reflect a particular architectural feature on an adjacent building or a pattern from the paving surface to help unify the entire corridor design.

Special Paving

Paving materials can help define an "identity"; describe the past history, cultural or environmental aspect of a community; or unify an overall design concept. Special inlays, materials or colors could depict a specific image or create a pattern meandering through the sidewalks and plazas. Special textured paving can also be extended across roadways at designated crosswalks or major intersections to slow traffic and reinforce the pedestrian as a priority in those areas. They can also help "jump" large intersections to create a more sinuous, coherent movement throughout the entire Aurora Avenue North Corridor.

Public Safety Elements

Curb bulbs & radius reduction

Curb bulbs extend the sidewalk into the street. The bulbs, which may be landscaped, improve pedestrian crossings by providing better visibility between pedestrians and motorists, shortening the crossing distance, and reducing the time that pedestrians are in the street. Curb bulbs located at the intersection also prevent people from parking in a crosswalk or blocking a curb ramp. Curb bulbs may encourage motorists to drive more slowly by restricting turning speeds and narrowing the roadway.

The reduction of an existing curb radius at an intersection is recommended where appropriate to slow motorists who do not stop completely to execute a turn. A reduced radius shortens the pedestrian crossing distance, improves visibility between pedestrians and motorists, reduces the speed at which motorists can turn, and may add parking spaces to the street.

Driveway consolidation

Consolidating driveways to parking areas and businesses reduces the number of conflict points between pedestrians and motorists. Most pedestrian/motor vehicle collisions on busy streets occur at points of intersecting movements, such as intersections, driveways, and alleys.

Marked crosswalks (intersection, midblock, etc.)

Crosswalks should be marked at intersections and at midblock locations. Marked crosswalks alert motorists that they are approaching a high pedestrian location, and guide pedestrians to a safer crossing. Signs or flashing beacons should accompany midblock crosswalks.

Refuge islands

Pedestrian refuges are raised islands in the center of the street protecting the pedestrian from moving traffic. They allow pedestrians an opportunity to cross one half of the roadway, with a safe place to stop before crossing the second half of the roadway. They are typically constructed at marked crosswalks either at a midblock location or at an intersection. It is important that the size of the island be large enough to be effective in providing pedestrians with comfort and safety.

Signage

These signs inform drivers to be aware of special situations. In general, traffic signs have not been as effective as traffic calming measures. Internally illuminated signs are clearly visible to drivers and pedestrians at night. Signs mounted at eye level help alert drivers to pedestrians crossing.

Stop bars

Stop lines or bars are usually 12- to 24-inch wide solid white lines that extend across all approaching lanes and require drivers to stop in advance of crosswalks. Stop bars are recommended to create additional motorist awareness of pedestrians and are especially used in areas of high traffic volume.

Landscaped Medians

Medians are raised islands built in the center of a street. Medians can slow traffic, decrease accidents, and give pedestrians a safe place to stop as they cross the street. By providing areas for planting trees, shrubs and groundcovers, medians "soften" the impact of the corridor by providing a visual break in the roadway and may increase vehicular safety by separating lanes of traffic in each direction

Transit Stops

Transit stops are another element of urban design that help to give an area a sense of identity, uniformity, and individuality.

There are a number of options for bus shelters at transit stops: the basic METRO standard, a modified METRO bus shelter, or a completely different bus shelter. The basic METRO bus shelter is a brown box with three walls and a bench and is seen throughout King County. A modified shelter may have public art on the walls of the shelter and a different roof form. Such a shelter can be used to reinforce identity for Shoreline and/or the corridor. A completely different or custom bus shelter could be used within the corridor to greatly enhance the identity and individuality of the area.

9.5 Concept-Level Cost Estimate

Developing an accurate cost estimate when the project is at a very preliminary stage of development is difficult. It is, however, very important to have a good opinion of cost for financial planning and the pursuit of funding. In order to develop the most accurate cost opinions with only concept-level design data available a method was used that aggregated cost data from other recent, similar projects.

Actual costs from constructed projects were aggregated into units that could be applied to the project at its conceptual-design level. Appendix D contains a preliminary opinion of cost for the Preliminary Preferred Alternative.

9.6 Shoreline City Council Action

On August 23, 1999 the Shoreline City Council voted unanimously to accept the CATF recommended design alternative.

One of the Shoreline City Council goals for 1999 was to pursue the implementation of the Aurora Corridor project. Several actions have been taken during the course of the study towards achievement of that goal. The CATF has met 14 times, aggressively sought input from the community (including three Open Houses) and developed a recommended alternative that represents a comprehensive solution for Aurora Avenue North. Funding has been secured for the preliminary engineering and environmental review phases of work and for final design, right of way and construction of a first stage. The first stage will be within the N 145th Street to N 165th Street segment.

City Staff performed policy analysis on the recommended alternative in order to ensure that the recommendation of the CATF is consistent and compliant with the Comprehensive Plan. Staff recommended that the most efficient vehicle for ensuring compliance and for moving forward with the environmental and preliminary engineering phases of the project, was to amend the Capital Improvement Program. Since the Capital Improvement Program is a part of the Comprehensive Plan, amending the Aurora project description within the CIP was the recommended approach. In adopting Resolution #156, the City Council endorsed the Staff's findings of compliance and recommendation.

The Council's decision brought to a closure the Aurora Corridor Multi-Modal Pre-Design Study and authorized the next steps of implementation. The Council took the following actions on August 23rd:

- Adopted Council Resolution #156 (Full text is included on the following pages)
- Selected a section of the corridor for first phase construction. Staff recommended the first phase fall within the 145th to 165th area (the exact project limits will depend on funding, cost, and progress with the Seattle section).
- Authorized the City Manager to execute an Interlocal Agreement with the Washington State Department of Transportation (WSDOT) in order to move ahead with aerial mapping and environmental analysis in 1999.

RESOLUTION NO. 156

A RESOLUTION OF THE CITY OF SHORELINE, WASHINGTON, ACCEPTING THE RECOMMENDATION OF THE CITIZENS ADVISORY TASK FORCE, FINDING THE RECOMMENDATION IN CONFORMANCE WITH THE COMPREHENSIVE PLAN, INITIATING AN AMENDMENT TO THE CAPITAL IMPROVEMENT PROGRAM, AND DIRECTING STAFF TO PURSUE ENVIRONMENTAL ANALYSIS FOR THE AURORA CORRIDOR.

WHEREAS, the City of Shoreline undertook a Multi-Modal Pre-Design Study for the Aurora Corridor in Shoreline; and

WHEREAS, the Council appointed a Citizens Advisory Task Force consisting of business and citizen representatives to guide the Pre-Design Study process and undertook and extensive community outreach program; and

WHEREAS, the Citizens Advisory Task Force developed a recommendation for the design of the street corridor which the City Council has accepted; and

WHEREAS, the City of Shoreline Capital Improvement Program project description for the Aurora Corridor transportation improvements must be amended to reflect the Citizens Advisory Task Force recommendation; and

WHEREAS, the City has reviewed the recommendation of the Citizens Advisory Task Force for conformance with the Comprehensive Plan; and

WHEREAS, in order to implement this project an environmental review process must occur; NOW, THEREFORE,

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SHORELINE, WASHINGTON AS FOLLOWS:

Section 1. Acceptance of Recommendation. The recommendation of the Citizens Advisory Task Force transmitted to the City Council on July 19, 1999, is hereby accepted. The recommendation consists of a description of the corridor concept and 32 specific points to guide the design and implementation of the project.

Section 2. Conformance with the Comprehensive Plan. The Council finds the recommendation of the Citizens Advisory Task Force to be in conformance with the Comprehensive Plan.

Section 3. Amendment of the Capital Improvement Program. The Capital Improvement Program shall be amended as indicated in Exhibit A which reflects the project description as recommended by the Citizens Advisory Task Force. The amendment process shall include a public hearing and review by the Planning Commission prior to adoption by the City Council.

Section 4. Environmental Review. Council directs staff to proceed with the environmental review process for the Aurora Corridor project. This review shall include an analysis of surface water, historic properties, recreation, transportation, air quality, noise, social, and economics.

ADOPTED BY THE CITY COUNCIL ON ------AUGUST 23, 1999.