

Transportation Concurrency

A Report On:

The Snohomish County Concurrency Management System As Of March 31, 2003

This report updates and replaces the report on the
Level of Service on Snohomish County's Arterial Units dated 08/31/02.

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Summary

Transportation Concurrency, requiring the provision of adequate transportation facilities to serve new land use developments, is one of the major issues affecting the quality of life, natural environment, and economic vitality of Snohomish County. This concurrency management system (CMS) report documents the County's arterial circulation network performance with respect to level of service conditions, and identifies what alternative strategies are being undertaken to alleviate level of service deficiencies.

The measurement of arterial system performance covers the period between August 31st 2002 (the date of publication of the previous report on level of service on Snohomish County's Arterial units) and March 31st 2003.

The following is a summary of the current level of service status on the arterial circulation network:

- The County currently has one arterial unit at ultimate capacity, Snohomish-Woodinville Road, from King County line to SR 522.
- There are six arterial units that are designated as "arterial units in arrears." All six units are located in the SR 9 corridor and form an intersection with it.
 1. 20th Street SE (South Lake Stevens Road to SR 9)
 2. Bunk Foss Road (South Machias Road to SR 9)
 3. Airport Way (99th Ave SE to SR 9)
 4. 180th Street SE (SW County UGB to SR 9)
 5. 180th Street SE (Broadway Ave to SR 9)
 6. 228th Street SE (SW UGB/ 45th Ave SE to SR 9)
- Three arterial units are at risk of falling into arrears.
 1. 20th Street SE (SR 9 to SR 204)
 2. Marsh Rd (Lowell Larimer Rd to SR 9)
 3. 4th Ave W (112th St SW to Everett C/L)

This CMS report also describes arterial network planning and implementation to highlight and describe concurrency projects and studies that lead to and include action strategies of the CMS. These action strategies are projects and studies with the common goal of addressing level of service deficiencies and improving the mobility of people and goods in and across the County.

I. Introduction

A. Purpose

The Snohomish County concurrency management system (CMS) provides the basis for monitoring the traffic impacts of land development, and helps determine if transportation improvements are keeping pace with the prevailing rate of land development.

This report provides a baseline look at how the concurrency management system is performing up to March 31, 2003. Investigation of the arterial circulation network performance through the concurrency management system, provides an overview of the current level of service conditions on the county arterials, a synopsis of arterials considered to be potential concurrency problems, and a summary of the actions and programs to remedy level of service deficiencies.

B. Background and Overview

The CMS is one of the nine categories of measures that constitute the strategy for implementing the transportation element of the County's adopted comprehensive plan. Concurrency management ensures that needed transportation facilities and services are provided concurrent with land development. It deals with the monitoring of roadway level of service and the programming of improvement funds necessary to maintain adopted level of service standards.

In the State of Washington, requirements for concurrency between development approval and public infrastructure were established in the 1990 Growth Management Act (GMA) and subsequent amendments. These requirements necessitate a three-way balancing of land development, transportation level of service and capital financing. The framework for the development of the county's concurrency management system is guided by various provisions of the GMA (RCW 36.70A.020(12); RCW 36.70A.070 (6)(b); RCW 36.70A.070 (6) (a) (iii) (B)), which requires:

- Level of service standards for all arterials and transit routes to serve as a gauge to judge system performance.
- An analysis of funding capability to judge needs against probable funding resources.
- The adoption and enforcement of ordinances, which prohibit development approval if the development causes the level of service on a locally owned transportation facility to decline below the standards adopted, unless improvements or strategies to accommodate the impact of development are made concurrent with the development.
- Specific actions and requirements for bringing into compliance any facilities or services that are below an establish level of service standards.

“Concurrent with the development” shall mean that improvement or strategies are in place at the time of development, or that a financial commitment is in place to complete the improvement or strategies within six years.

Figure 1 shows the role of concurrency management in the comprehensive planning process (land use and transportation planning).

The challenge for the GMA planning process was, and continues to be, determining how to best accommodate a long-range (20 year) forecast for population and employment growth, by adopting a viable land use plan, establishing appropriate level of service standards, accurately identifying the transportation needs that result from the land use plan, and demonstrating that the improvements can be paid for in the transportation portion of the County's Capital Improvement Plan (CIP).

The Transportation Needs Report (TNR) provides a flexible basis for regularly updating transportation needs and improvement descriptions initially identified within the transportation element. The TNR established six "Transportation Service Areas" (TSA) for the purpose of calculating, imposing and administering impact fees for land use developments. TSAs are also used in making concurrency determinations. Each development is assigned to the TSA to which it sends most of its trips, and the County makes concurrency determination by evaluating whether or not these trips will impact any arterial route within the TSA.

The concurrency management and program planning (programming of funds for multimodal project construction, operations and maintenance) processes lead to the annual preparation of a transportation improvement program (TIP). The TIP is a schedule of transportation projects, operations and maintenance improvements matched to expected revenue that the county anticipates pursuing over the ensuing six years.

Concurrency refers to the relationship between the supply of public facilities and the demands placed upon them by population and employment growth. To "maintain concurrency" means ensuring that adequate public facilities are in place to serve new development as it occurs. Though concurrency tests are applied to individual development applications, the GMA planning process in Snohomish County has established the broad, long-term adequacy of its existing and planned transportation facilities to accommodate forecast growth.

C. Snohomish County Code Chapter 30.66B

The GMA and the Washington Administrative Code (WAC 365-195-835) provides detailed guidance for developing a CMS. The County's CMS is implemented in accordance with the County's Unified Development Code SCC Chapter 30.66B (Concurrency and Road Impact Mitigation), and related administrative procedures. SCC Chapter 30.66B addresses the impact of land development on the county road system. It details the obligations and procedures that must be met in order to approve land development and to ensure safe and efficient operation on county roads.

The provisions of SCC Chapter 30.66B are implemented through the overall land use development review process administered by the county's Planning and Development Services (PDS). The Department of Public Works (DPW) conducts the transportation-related part of the development review and provides technical analyses, concurrency determinations and mitigation recommendations. A summary of the requirements of SCC Chapter 30.66B is shown in Figure 2.





SCC Chapter 30.66B addresses several procedural issues relating to imposition of impact fees, frontage improvements, access and circulation, right-of way, inadequate roads, compliance with applicable environmental protection regulation, and integrating SEPA compliance with the project-level process for concurrency management.

The requirements of SCC Chapter 30.66B affect land development review by making the issuance of building and other permits contingent on a positive concurrency determination. Where concurrency problems arise, permits for development would be issued after approval of commitments to actions and funding in compliance with adopted levels of service standards. Level of service and impact mitigation for developments impacting cities and state facilities are processed by interlocal agreements.

D. Level of Service Standards

The GMA requires jurisdictions to adopt level of service standards (LOS) for transportation facilities (RCW 36.070. (6) (a) (iii) (B).) The County’s adopted standards are shown in Table 1. The LOS standards provide the basic measure by which judgments on concurrency and transportation improvement programming for the county arterials are made.

Table 1: Adopted Level of Service Standards

Tolerable Roadway Level-of-Service		
Categories	Not Transit Compatible	Transit Compatible
Rural Area (Outside the UGA)	LOS C for Peak Hour	LOS D for Peak Hour
Urban Area (Inside the UGA)	LOS E for Peak Hour	Below LOS E for Peak Hour

The LOS standards are qualified by rural and urban geography, and whether a development and its immediate vicinity are transit compatible. The County tolerates lower LOS in the urban area than in the rural area. The County also tolerates a lower standard if transit compatibility can be established. Transit compatibility means that a development and the arterials it impacts both meet certain criteria, which demonstrate that transit is a viable alternative for the occupants or users of the development. The transportation element details the criteria for using a lower level of service for transit compatibility.

The letter grades for the LOS represents a qualitative measure which describes operational conditions within a traffic stream and takes into consideration such factors as volume, speed, travel time, and delay. LOS A through C implies free flowing traffic with minimal delay, while LOS D and E imply unstable traffic flow with significant delays. LOS F implies forced, unstable flow with the potential for substantial delays.

Table 2 provides a general description of LOS as used by the County to measure roadway conditions on urban/suburban arterials. Average travel speed measurement on the arterial

network is the primary determinant of LOS for use in concurrency determinations.

Table 2: Arterial Roadway Level of Service Descriptions (Urban/Suburban)

Level of Service	Traffic condition	Average Travel Speed (mph)	
		Urban	Suburban
A	Free flow	≥ 30	≥ 35
B	Stable flow	24 - 29	28 - 34
C	Stable flow	18 - 23	22 - 27
D	Unstable flow	14 - 17	17 - 21
E	Unstable flow	10 - 13	13 - 16
F	Forced Flow	< 10	< 13

The County’s use of travel speed measurement for concurrency determinations is consistent with the methods in the most current edition of the Highway Capacity Manual (HCM) as published by the Transportation Research Board of the National Research Council.

Only three of the County’s arterial units are classified as urban arterials:

- 164th St SW (I-5 NB Ramps to Mill Creek C/L)
- Airport Rd / 128th St SW (SR 99 to I-5 SB Ramps)
- 4th Avenue West (128th St SW to 112 St SW.)

The minimum average travel speed for these units is 10 mph. For the remainder of the suburban arterials, maintaining LOS E requires an average peak-hour travel speed of at least 13 miles per hour. This minimum criterion provides the basic measure by which judgments on the LOS on these arterial routes within the County’s designated urban growth areas are made.

Based on the HCM, the County has also adopted procedures for establishing minimum peak-hour travel speed for rural arterials. These are calculated for each arterial unit based on the free flow speed, length of the arterial unit, and the number of traffic signals and stop signs within the unit.

II. Level Of Service Conditions on Arterial Units

The SCC Chapter 30.66B provides authorization for the adoption and implementation of

policies and technical procedures for the administration of the title, to ensure consistency with countywide planning policies and policies adopted within the comprehensive plan.

Table 3 lists the adopted policies and procedures relating to concurrency management. Most of these policies and procedures are applicable per SCC 30.82.010 and are now available on the County’s PDS web page (www.co.snohomish.wa.us/pds) in the “what’s new” section.

Table 3: Adopted Policies and Procedures Relating to Concurrency Management

DPW Rule Number	Title	Type	Adoption Date	Available on the County’s Web
DPW POL-4210	Making Level of Service Determinations for use in Concurrency Determinations	Policy	8/19/02	YES
DPW PRO-4210	Making Level of Service Determinations for use in Concurrency Determinations	Attachments	4/30/99 and 5/1/02	YES
DPW POL-4213	Presubmittal Conferences, Traffic Studies, and Mitigation Offers	Policy	1/1/03	YES
DPW PRO-4213	Presubmittal Conferences, Traffic Studies, and Mitigation Offers	Procedure	7/17/00	NO
DPW POL-4217	Transit Compatibility	Policy	12/21/98	YES
DPW PRO-4217	Transit Compatibility	Procedure	12/21/98	YES
DPW POL-4218	Making Concurrency Determinations	Policy	1/1/03	YES
DPW POL-4219	Transportation Demand Management (TDM) for Developers	Policy	9/27/01	YES

POL-4210 and PRO-4210 sets out the policies and procedures for making LOS determinations on arterial routes.

A. Screening, Monitoring, Operational Analysis, and Future LOS Determinations

The County uses a four-tiered approach to determine the LOS on the County arterial

circulation network. A summary of the process is shown in Figure 3. Snohomish County measures LOS on arterial units as opposed to individual intersections. The County arterial network is disaggregated into smaller units referred to as “arterial units”. Arterial unit means a road, segment of a road, or portion of a road or a system of roads, for the purpose of making LOS and concurrency determinations.

The first tier is screening. Current traffic counts are compared with estimated capacities for each arterial unit. This process screens out units that are operating at very high LOS and are not at risk for concurrency. Most arterial units fall into this tier, and the County only updates traffic counts for these arterial units every three years.

Those arterial units whose traffic counts are approaching the estimated capacity fall into the second tier, monitoring. Monitoring consists of more frequent traffic counts and analysis of the traffic conditions. If monitoring indicates that there may be a current LOS problem, then operational analysis is performed.

The third tier, operational analysis, consists of travel-time studies and/or results from traffic models to determine whether or not LOS on an arterial unit is currently operating below the adopted standard. Detailed descriptions of monitoring and operational analysis approaches are available in Appendix A.

The fourth tier, future LOS determinations, is used to make concurrency determinations for large development through traffic studies, to determine whether or not the LOS on an arterial unit is currently operating, or within six years is forecast to be operating below the adopted standard. Descriptive information on future LOS determinations and how they are developed is contained in Appendix B.

Designation of the level of service status on the county arterial network is made on the basis of the results of the above studies, and available financial resources to complete arterial improvements or implement strategies within six years. Each arterial unit with a LOS below the screening level is designated with one of the following LOS status:

- Ultimate Capacity
- Arterial Unit in Arrears
- Operational Analysis
- Monitoring

A summary of the LOS status on the arterial circulation network as of March 2003 is shown in Table 4. The status for the past few years are also included in the table.



An additional designation “ Arterial Unit at Risk of Falling into Arrears” is used to identify those units undergoing operational analysis that consistently operates at or approaches the LOS standard for a particular arterial category. The Snohomish County Arterial Unit Status Map (attached to this report) shows the status of the arterial unit designations (including the arterial unit number) for each TSA. The status summary for the arterial units that are designated as ultimate capacity, arterial unit in arrears, and at risk of falling into arrears, are listed in Table5.

Table 4: Summary of LOS Status on the Arterial Circulation Network

Arterial Unit Status	Number of Arterial Units @					Percentage of Total Number of Units as of 03/31/03
	12/31/00	07/31/01	12/31/01	08/31/02	03/31/03	
LOS above screening level	174	175	185	225	261	88%
LOS below screening level	68	67	60	42	34	12%
Monitoring level	31	31	18	20	10	4%
Operational Analysis	29	27	33	15	17	6%
Arterial unit in Arrears	7	8	8	6	6	2%
Designated Ultimate Capacity	1	1	1	1	1	
Total Number of units	242	242	245	267	295	100%

B. Arterial Unit at Ultimate Capacity

Any arterial unit which is currently operating, or forecast within six years to be operating below the County’s adopted level-of-service standard, and for which there are no reasonable improvements the County can make to remedy the deficiency, may be designated as an “arterial unit at ultimate capacity.” The County currently has one arterial unit at ultimate capacity, Snohomish-Woodinville Road in TSA E.

Snohomish-Woodinville Rd (King Co. Line to SR 522 EB Ramps)

Snohomish County Council Motion No. 97- 202 designated Snohomish-Woodinville Road as being at “ultimate capacity” effective June 23, 1997. The motion laid out in detail why this action was taken and what it means for developers and the County. Developments impacting Snohomish-Woodinville Road with three (3) or more peak-hour trips will need to do Transportation Demand Management (TDM) at the levels set out in SCC Chapter 30.66B. This can be done through site design, programmatic measures, TDM payments, TDM construction, or a combination of the measures.

Table 5: Arterial Unit Status Summary as of March 2003

Status	TSA	Unit #	Road Name	From/To
Arterial Unit at Ultimate Capacity	E	211	Snohomish-Woodinville Road	King County Line to SR 522
Arterial Unit in Arrears (AUIA)	B	316	20 th Street SE	South Lake Stevens Road to SR 9
		256	Bunk Foss Road	South Machias Road to SR 9
	C	353	Airport Way	99 th Ave SE to SR 9
	E	350	180 th Street SE	SW County UGB to SR 9
		262	180 th Street SE	Broadway Ave to SR-9
		272	228 th Street SE	SW UGB/ 45th Ave SE to SR 9
Arterial Unit at Risk of falling into Arrears	B	238	20 th Street SE	SR 9 to SR 204
	C	198	Marsh Rd	Lowell Larimer Rd to SR 9
	D	352	4 th Ave W	112 th St SW to Everett C/L

C Arterial Unit in Arrears

Any arterial unit currently operating or forecast within six years to be operating below the County’s adopted LOS standard, and for which there is no financial commitment in place to

complete improvements or implement strategies that are forecast to remedy the LOS deficiency within six years, is designated as an “arterial unit in arrears.” There are six arterial units with this designation shown in Table 5. All six units are located in the SR 9 corridor and form an intersection with it.

20th Street SE (South Lake Stevens Road to SR 9)

The westbound traffic volumes on 20th Street SE in the morning peak commute exceed the capacity at the signalized intersection of 20th Street SE and SR 9. Further investigations have confirmed that this is a recurring condition at this location. The results are long backups and significant delays.

The adopted LOS standard for this arterial unit, located inside the urban growth area is LOS E. A travel time study conducted in May 2000 concluded that the average travel speed for westbound traffic in the a.m. peak hour was less than 13 miles per hour. The arterial unit was clearly operating below the County’s standard and remained so for more than one hour during the a.m. peak period. The arterial unit was therefore declared “in arrears” on May 25, 2000.

Bunk Foss Road / Ritchey Road (South Machias Road to SR 9)

Bunk Foss Road is located outside the urban growth area, with an adopted LOS C. Two separate travel time studies conducted in April and June 2000 shows that this unit is operating at LOS F for the westbound movement onto SR 9 in the p.m. peak hour. The arterial unit was declared “in arrears” on August 17, 2000.

Airport Way (99th Ave SE to SR 9)

The adopted LOS standard for Airport Way, which is located inside the urban growth area, is LOS E. This arterial unit connects the City of Snohomish to SR 9. Both Marsh Road and Airport Way are impacted by delay at the signal with SR 9. Based on travel time studies conducted in April, August and November 2000, the worst delay is for westbound p.m. peak-hour traffic.

Traffic congestion is further compounded by southbound traffic at the stop-controlled intersection of Springhetti Road and Airport Way and its close proximity to SR 9. Average travel speeds between 5:00 p.m. and 6:00 p.m. showed LOS F conditions. This unit was declared “in arrears” on December 8, 2000.

180th St SE (Broadway Ave to SR 9)

The adopted LOS standard for this arterial unit, located outside the urban growth area, is LOS C. A travel time study conducted in February 2001 shows that this unit was operating at LOS F for the westbound movement onto SR 9, during the morning and evening peak periods. It was declared “in arrears” on March 21, 2001.

180th St SE (SW County UGB to SR 9)

The adopted LOS standard for this arterial unit, located outside the urban growth area, is LOS C. A travel time study conducted in February 2001 shows that during the p.m. peak period, this unit was operating at LOS F for the eastbound movement onto SR 9. It was declared “in arrears” on March 21, 2001.

228th St SE (SW UGB/ 45th Ave SE to SR-9)

The adopted LOS standard for this arterial unit, located outside the urban growth area, is LOS C. Using the most recent criteria for calculating LOS for rural arterial, LOS C at this

arterial is defined as 25 mph or greater. The most recent travel time study indicated that average speeds have fallen below the adopted LOS standard, due to delay at the intersection with SR 9

Travel times performed June 26, 2001, indicated average speeds of 20 mph for both morning and evening peak periods in the eastbound direction. This unit was declared “in arrears” on July 17, 2001.

D. Arterial Units at Risk of falling into Arrears

Any arterial unit that consistently operates at or approaches the LOS standard for a particular arterial category is designated as “arterial unit at risk of falling into arrears.” The LOS standard for a rural arterial is C, and E for urban. This means that arterial units with LOS C in rural areas, and LOS E in urban areas will be designated with this category.

4th Ave W (112th St SW to Everett C/L)

Increasing traffic volumes and delays on this arterial unit have triggered close scrutiny. The problem appears to be caused by the high volume of traffic coming from Everett Mall Way, overfilling this three-lane section of 4th Ave W. The operations of the intersections at 4th Av W and 112th St SW, worsens this condition, where westbound evening traffic backup at the signal occurs as drivers attempt to make left-hand turns along this existing two-lane facility. The signal timing cycle necessary for westbound traffic affects the green phase interval available for 4th Ave W.

The results from the most recent travel-time studies conducted in June 2002, shows that for the southbound movement, the arterial unit is operating at LOS D during the morning peak, and LOS E in the evening peak. This unit would remain on the “At-Risk” list pending further studies.

20th St SE (SR 9 to SR 204)

This unit is located in a corridor in which the arterial unit to the east (20th St SE from SR 9 to South Lake Stevens Road) is in arrears, and to the west is US Highway 2, which is experiencing severe traffic congestion during the a.m. and p.m. peak periods. Travel-time studies conducted in March 2001, indicated that the unit is operating at LOS D (above the standard) during the p.m. peak period. The unit would, however remain on the “ At risk “ list to continue with further monitoring of travel times.

Marsh Road (Lowell Larimer Road to SR 9)

Travelers on Marsh Road experience significant delay at the eastbound approach to the signal at SR-9. The most recent travel time study performed in May 2002 shows LOS F for the eastbound direction in the evening peak period. The final portion of the extension of 132nd St SE to SR-9 is under construction and is projected to alleviate some of the demand on Marsh Road. With this project’s estimated completion this summer, it is expected that this arterial unit will not be “in arrears.”

E. Critical Arterial Units

The arterial units that are designated as arterial unit in arrears, arterial unit at risk of falling into arrears, monitoring and operational analysis, are collectively referred to as “critical

arterial units.” The county maintains a list of these units, which is updated in conjunction with this report, and reports on future LOS determination prepared by Developers. The list also shows the critical movements (i.e. AM NB/WB, PM NB/WB, AM SB/EB, and PM SB/WB) for which LOS deficiencies have been identified.

This list is provided to developers at the traffic scoping meetings.

III. Concurrency Determinations and Impact Fees

A. Establishing Concurrency for Individual Development Applications

SCC Chapter 30.66B requires that land development (any land use activity that requires a permit or approval by the County, except building permits for single-family dwellings, attached or detached accessory apartments, or duplex conversions, on existing tax lots) proposal submitted to the County, must be reviewed for concurrency with respect to traffic impacts on the LOS of County arterials.

The 2001 revisions to SCC Chapter 30.66B makes provision for an optional process referred to as pre-application concurrency evaluation. The pre-application concurrency evaluation is limited to a review for concurrency with respect to traffic impacts on the LOS of the arterial units within the County. The LOS impacts in other jurisdictions (Cities and Counties) arterial networks, and State highways are not considered as part of this optional process. They are reviewed as part of the land development application.

This process provides developers the opportunity to request an evaluation of the impact of their development, and a pre-application concurrency decision could be made, prior to the submission of their land development applications.

The concurrency management system includes three tiers of developments:

- Small (residential developments generating less than 7 peak-hour trips (PHT), and commercial developments generating less than 5 PHT.)
- Large (developments generating more than 50 PHT.)
- Medium-sized (in between small and large.)

The County has a system for making concurrency determinations based on the evaluation of the impacts of developments on arterial units in arrears. A more detailed explanation of the methodology can be found in Appendix C, and a summary of the process is shown in Figure 4. The County's 1995 GMA Comprehensive Plan did establish the long-term adequacy of the transportation system to accommodate growth. However, concurrency problems could arise with respect to individual development applications at certain points in time, because land may be developed more quickly than expected in some areas, thus getting ahead of the programming of road improvements.

Upon the initial application submittal, a concurrency determination is made. If the development passes the concurrency test, a certificate of concurrency is issued for the development. Certificates of concurrency typically expire six years from date of issuance. A development without a certificate of concurrency cannot be approved.

Table 6 shows a summary of the concurrency determinations that have been made between September 1 2002 and March 1 2003. A total of 86 development applications (including 1 application for pre-application concurrency) were determined to be concurrent during this period. Nineteen development applications were also reviewed for concurrency determinations without a determination being made, due to DPW requests for additional information.



Concurrency, in Snohomish County is really an issue of timing with respect to individual development applications. Over the long term, developments that are consistent with the land use plan should be able to pass concurrency tests. In the short run, in certain areas, at certain times, developments may have to be phased or deferred until transportation facilities are improved to provide the adopted LOS standard.

Table 6: Summary of Concurrency Determinations

Development Type and / or Size	Number of Concurrency Determinations						
	TSA A	TSA B	TSA C	TSA D	TSA E	TSA F	Total
Small residential development (less than 7 PHT)	11	0	1	14	1	2	29
Small non-residential development (less than 5 PHT)	2	2	1	0	1	0	6
Medium residential development (7 – 50 PHT)	5	1	2	22	1	3	34
Medium non-residential development (5 – 50 PHT)	1	1	0	1	2	0	5
Large development (greater than 50 PHT)	3	0	1	5	1	1	11
Pre- application Concurrency	0	0	0	1	0	0	1
Total	22	4	5	43	6	6	86

B. Pipeline Database and Key Intersections

The concurrency management system uses an inventory of developments in the pipeline, referred to as the pipeline database, to forecast future traffic volumes on arterial units. The term “developments in the pipeline” means developments previously deemed concurrent, but not yet built and occupied. If a development is deemed concurrent, the number of trips from its assignment is added to the inventory of trips from developments in the pipeline.

For each arterial unit, DPW has identified the key intersections, which contribute to the delay. Typically, each arterial unit will have a key intersection at one or both ends. Sometimes there will be one or more other key intersections.

For each key intersection the possible traffic movements consist of all the possible directions in which a vehicle can go at that intersection (e.g., eastbound through, eastbound left turn, eastbound right turn, westbound through, etc.)

The traffic studies submitted by developers include trip assignments, which show the number of individual vehicle trips likely to be added to each traffic movement at each key intersection.

For each key intersection, the inventory of trips from developments in the pipeline consists of all the trips assigned from developments previously deemed concurrent. However, when a development is constructed and occupied, it is assumed that the trips from that development will show up in the actual traffic counts, and they are removed from the pipeline inventory.

DPW maintains a database that contains all of the trip assignments at the key intersections for all developments deemed concurrent. Reports from this database provide the summations of trips for each possible traffic movement at each of the key intersections, and are made available to developers for the purpose of preparing new traffic studies.

C. Traffic Impact Fees

The requirements for road system impact fees are established in the GMA (RCW 82.02.050-100.) Various provisions in SCC Chapter 30.66B ensure that developments mitigate their impact upon the future road system by paying a traffic impact fee reasonably related to the impacts of the development on arterial roads located in the same TSA as the development.

The estimated cost of capacity improvements that are reasonably related to the impacts of new development, and that will reasonably benefit new development, are identified in the transportation needs report (TNR) for each TSA. Appendix D of this report identifies the improvement projects that are part of the cost basis for the traffic impact fees. These improvement projects were identified through the long-range transportation planning process for the County's transportation element, as the major capacity projects that are necessary to maintain the adopted LOS standards, and supports future land use development included in the 20-year growth forecast requirements of the GMA.

The total cost for all the improvement projects in a TSA are then divided by the estimated number of new trips anticipated within the TSA as the area develops over the life of the comprehensive plan. This determines the maximum fee amount that could be charged for each new trip in a given TSA.

County Council sets traffic impact fees for the type and location of proposed development. Fees are set at a point below the maximum rate identified in the TNR and reflect the policy direction of the council. Fees were last reviewed and increased by 30% in April 2002. The current impact fee schedule is shown in Table 7. Each development is required to pay an amount equal to the new average daily trips (ADT) generated by the development times the per trip for the specific land use type, location and TSA.

The impact fees are placed in interest-bearing accounts (Traffic Mitigation Accounts) and held until they are transferred to the County Road Fund to offset expenditures on eligible transportation improvement projects. Impact fees must be used within six years of collection, or they must be returned with interest to the property owner of record at the time

of the refund.

The traffic impact fees are spent on capacity improvements on eligible arterials as identified on the Annual Construction Program for Transportation (ACP.) The Six Year Transportation Improvement Program (TIP) gives a longer-range plan for expenditure of the mitigation fees on the various projects. DPW produces an annual report on the traffic mitigation accounts, showing the source and amount of all moneys collected on each impact fee account, and the capital improvements that were financed in whole or in part by the impact fees. The most recent annual report was published in March 2002.

Table 7: Impact Fee Schedule

LOCATION	TYPE	NEW TRIP AMOUNT	
		URBAN Development Inside the Urban Growth Area (UGA)	RURAL Development Outside the Urban Growth Area (UGA)
Transportation Service Area (TSA)	Residential (R) Commercial (C)		
A	R	\$205	\$224
A	C	\$174	\$192
B	R	\$337	\$368
B	C	\$286	\$317
C	R	\$203	\$221
C	C	\$172	\$190
D	R	\$226	\$247
D	C	\$192	\$213
E	R	\$195	\$213
E	C	\$166	\$183
F	R	\$195	\$213
F	C	\$166	\$183

Table 8 shows a summary of the traffic impact fees. The dollar amounts shown in Table 8 are the balance of fees as of December 31 2002, which have not yet been transferred to the County Road Fund to offset expenditures on transportation improvement projects reasonably

related to the impacts of new developments. The balance for each TSA is made up of the items identified as TIF and TDM in Appendix B of the most recent Traffic Mitigation Accounts annual report.

The TIF for TSA A and D are inclusive of fees from developments, which impact the arterial networks within the cities of Arlington, Marysville and Mill Creek. The fees are collected through interlocal agreements.

The total balance of TIF in Table 8 is \$10,906,962. This is less than the projected cost (\$16,072,000) for transportation improvements in the Six-Year Network (See Chapter IV.B) that are coming from traffic impact fees. The TIP is the main source for identifying the county's projects in the six-year network. Since the projects in the Six-Year Network are fully funded, and are expected to be constructed and open to the public within six year, full funding for these projects will be made available from the existing balance in Table 8, and TIF from new developments in the ensuing six years.

Table 8: Traffic Impact Fees Summary (Fund Balance through 2002)

Transportation Service Area (TSA)	Traffic Impact Fees (TIF)
A	\$2,203,122
B	\$2,335,259
C	\$23,371
D	\$5,219,854
E	\$743,867
F	\$381,489



IV. Arterial Network Planning and Implementation

The CMS deals with the monitoring of roadway LOS and the programming of improvement funds necessary to maintain adopted LOS standards. The concurrency management and program planning (programming of funds for multimodal project construction, operations and maintenance) processes lead to the annual preparation of a transportation improvement program (TIP.)

A. Transportation Improvement Program

The Transportation Improvement Program (TIP) is a schedule of transportation projects, operations and maintenance improvements matched to expected revenue that the county anticipates pursuing over the ensuing six years. The concurrency management and program planning processes lead to the annual preparation of the TIP.

The Snohomish County Council adopted the TIP for the period 2003–2008, on November 11 2002 (Motion No:02-437.) Two sections of the TIP relating to traffic safety/intersection (Section D) and capacity (Section E) sets out the projects that are expected to ensure safe and efficient operation on County roads and sustain the adopted LOS on the County’s arterial network. Table 9 lists the concurrency projects in 2003-2008 TIP.

Table 9: Concurrency Projects in the 2003-2008 Transportation Improvement Program

TSA	TIP #	C* (Not Fully Funded)	C (Fully Funded)
B	E.27	20 th St SE: SR 2 to S. Lake Stevens Road	
C	E.38	Airport Way and Marsh Road: Snohomish C/L to Seattle Hill Road	
D	E.10		132 nd St SE / Cathcart Way: Seattle Hill Rd to Sno-Cascade Dr.
	E.11		132 nd St SE Extension/ Cathcart Way: Sno-Cascade Drive to SR 9
	E.12		164 th St SW: Spruce Way to Ash Way
E	E.23	Snohomish Woodinville Road: SR 522 to King County Line	
	E.30	180 th St SE: 35 th Avenue SE to Broadway Avenue	
E/F	D.20		39th Av SE / SR 524 Realignment

Concurrency projects in the TIP are highlighted by the use of two designations, C and C*. C indicates a fully funded project that will eliminate a concurrency problem, or prevent a

concurrency problem from occurring elsewhere in the arterial network, and C* indicates a project on an “arterial unit in arrears” that is not fully funded. 4th Ave West (TIP # E.39) is designated with a C, even though it is not fully funded. The correction will be made in the annual updating of the TIP.

Transportation Projects must be included in the TIP in order to be eligible for consideration for funding from various sources, including Federal, State, and other agencies. While the CIP requires that projects have adequate funding currently available, the TIP shows projects with probable funding as well.

B Six-Year Network

The TIP is also the main source for identifying the county’s project in the six-year network. The six-year network is made up of a list of those projects in the TIP that are fully funded, and are expected to be constructed and open to public use within six years.

Joint projects with other jurisdictions may be added to the list if they are shown to be fully funded in each jurisdiction’s TIP and are expected to be constructed and open to public use within six years. Projects from TIPs in other jurisdictions may also be added to the list if they are fully funded. WSDOT does not produce a TIP. State projects are added to the list of future network assumptions when they have been budgeted for construction.

Table 10 lists the projects in the current Six-Year Network. It includes projects from the current TIP, City of Bothell and WSDOT. The projects from the TIP show the projected cost and the contribution of traffic impact fees. The projected cost is the remaining cost, as prior expenditures on some of the on-going projects are excluded.

Table 10: Six-Year Network

TSA	TIP#	Road Name	Project Description	Projected Cost (2003-2008)	Traffic Impact Fees	
					Contribution to projected Cost	% of Projected Cost
A	D.02.04	Shoultes Road (108th ST NE) at 51st AV NE	Intersection Signalization	\$2,447,000	\$1,065,000	44%
	D.02.16	Marine Dr at Waterworks Road	Intersection Signalization	\$1,921,000	\$750,000	39%
	D.15	Marine Dr 19 AV NE to 7 DR NW	Three lane urban design + bike lanes	\$6,118,000	\$1,510,000	25%
B	E.20	Lundeen Park Way Ext SR 9 to SR 204	Three lane urban section + bike lanes	\$10,270,000	\$2,585,000	25%
D	D.02.12	35 AV W at 156th ST SW	Intersection Signalization	\$384,000	\$160,000	42%
	D.02.13	180th ST SE at Brook Blvd	Intersection Signalization	\$337,000	\$40,000	12%
	D.02.14	35 AV SE at 168th ST SE	Intersection Signalization	\$333,000	\$20,000	6%

	D.08A	148 ST SW 52 AV W to SR 99	Three lane urban design + bike lanes	\$2,727,000	\$382,000	14%
TSA	TIP#	Road Name	Project Description	Projected Cost (2003- 2008)	Traffic Impact Fees	
					Contribution to projected Cost	% of Projected Cost
	D.08A	148 ST SW SR 99 to 35 AV W	Four lane urban design + bike lanes	-	-	-
D	D.08B	148 ST SW at 35th AV W	Intersection Signalization and Improvements	\$371,000	\$0	0%
	E.03	132 ST SE SR 96 to 120 PL SE	Three lane urban design + bike lanes	\$3,347,000	\$605,000	18%
	E.04	35 AV SE Seattle Hill Rd to 132 ST SE	Three lane urban design + bike lanes	\$5,384,000	\$1,150,000	21%
	E.07	112 ST SW 4 AV W to Everett C/L	Five lane urban design + bike lanes	\$2,937,000	\$150,000	5%
	E.07	112 ST SW Everett C/L to 4 AV W	Five lane urban design + bike lanes	-	-	-
	E.08B	Beverly Park Road at SR 525	Intersection Improvements	\$551,000	\$0	0%
	E.10	132 ST SE Seattle Hill Rd to Snohomish Cascade Dr	Five lane urban design + bike lanes	\$3,059,000	\$1,860,000	61%
	E.11	132 ST Ext Snohomish Cascade Dr to SR 9	Four lane urban section + bike lanes	Included in E.10	-	-
	E.12	164 ST SW Spruce Way to Ash Way	Five lane urban design + bike lanes	\$11,498,000	\$5,320,000	46%
	E.18	Beverly Park Road Airport Road to 112 ST SW	Four lane urban section + bike lanes	\$889,000	\$25,000	3%
E	D.20	39 AV SE 207 ST SE to 204 ST SE	Realignment	\$2,325,000	\$450,000	19%
	Included in D.20	39 AV SE at SR 524	Intersection Signalization	-	-	-
	D.02.15	45 AV SE at 228 ST SE	Intersection Signalization	\$356,000	\$5,000	1%
F	D.02.24	39 AV SE at 228 ST SE	Intersection Signalization	\$479,000	\$25,000	5%
City of Bothell		228th ST SE at 35th AV SE	Intersection Signalization			

WSDOT	SR 99 168th ST SW to 148th ST SW	Seven lane urban design
	SR 522 Paradise Lake Road to Snohomish River	Four-lane divided highway + 2 new Interchanges
	SR 525 I-5 to SR 526	Five lane urban design

The total contribution of TIF to projected cost is \$16,072,000. The overall percentage of projected cost for transportation improvements in the six-year network that are coming from traffic impact fees is twenty-nine percent. For major capacity improvement projects such as 164th St SW and 132nd St SE, the percentage of TIF contributions are forty-six and sixty-one percent respectively.

DPW maintains an updated list of the six-year network. The list is provided to developers, who are required to do traffic studies to support their applications for new developments. Analyses of future trip distributions, assignments, and forecasts of future LOS, are based on assumptions about the County's future road network, as it will be in six years. Six years corresponds to the span of the County's TIP.

C. Transportation Improvement Studies.

The County's system for making concurrency determination based on the evaluation of the impacts of developments on arterial units in arrears, ensures that needed transportation facilities and services are provided concurrent with land development. DPW POL-4210 and DPW PRO- 4210 (See Table 6), sets out DPW policies and procedures for responding to arterial units in arrears.

Once a notice is issued indicating that an arterial unit is in arrears, DPW prepares options to address the deficiency in LOS. These options may include such things as:

- A strategic plan with multi-faceted approach to remedy the arterial unit in arrears.
- An amendment to the six-year TIP to "fix" the problem, and/ or
- A proposal to Council to declare the arterial unit as being at "ultimate capacity."

The purpose of the strategic plan is to determine projects, programs, or other actions to remedy level-of-service deficiencies. The strategies may include, but are not limited to:

- Road Improvements: major widenings, spot improvements, work on alternate routes.
- Demand Management: Park and Ride lots, buses, vans, incentives, information, and promotions.

The strategic plans do not remove concurrency requirements for developments, but they do provide a plan for dealing with a concurrency problem within a reasonable time period. Information for the strategic plan is developed through feasibility studies to define the transportation problem(s) and points the way to initial design work and environmental studies, corridor investigations including traffic studies, design studies, and funding applications. The status summaries for the following projects are set out below:

- Snohomish-Woodinville Road (SR 522 TO King County Line)
- Beverly Park Road (from Airport Road to SR-525)
- 20th Street SE (from SR 9 to SR 2)
- 20th Street SE (from South Lake Stevens Road to SR-9)
- 180th St SE (from Broadway Ave to SR-9)
- 180th St SE from (SW County UGB to SR-9)
- 228th St SE (from SW UGB/ 45th Ave SE to SR-9)
- Airport Way (from 99th Ave SE to SR-9)
- Bunk Foss Road / Ritchey Road (from South Machias Road to SR-9)
- 4th Ave W (from 112th St SW to Everett C/L)

Snohomish-Woodinville Road (King County Line to SR 522)

In the motion designating Snohomish-Woodinville Road as being at ultimate capacity, the Council directed Public Works to improve Snohomish-Woodinville Road's operating efficiency (e.g., shoulders and/or center turn lane).

In 1999 the County submitted an application to the Transportation Improvement Board's (TIB) Transportation Partnership Program (TPP). Unfortunately, the project did not score high enough to be considered for funding. In March 2000 a pre-design study to evaluate design alternatives was completed. The study confirmed that the lack of width between the railroad tracks and SR 522 at the County Line precludes the possibility of constructing additional general-purpose lanes.

The design of the final recommended improvements is on going. It will include two travel lanes, a center turn lane, bicycle lanes in both directions, a sidewalk on the east side of the roadway, a planter strip, curb, and sidewalk on the west side, water detention ponds, and a traffic signal at the intersection with 240th St SE. As the road approaches the SR 522 off-ramp, it will be widened to five lanes. This configuration will match the WSDOT proposed improvement on SR 522.

The estimated cost in 2002 dollars is \$2.9 million. It is anticipated that another TIB application will be submitted for this project.

Beverly Park Road (Airport Road to SR-525)

DPW is currently working on a design project that will widen Beverly Park Road to five lanes with curb, gutter, sidewalks and bicycle lanes. This improvement would alleviate the LOS deficiency on this arterial unit. Scheduled construction is not expected to begin until 2006.

20th Street SE (SR 9 to SR 2)

Previous feasibility studies on the 20th St SE corridor (SR 2 to South Lake Stevens Road) considered alternatives for three or four lanes along this section, or if it should be five lanes. An application for state funding was submitted in late 1999, but was not successful.

A draft traffic analysis report for the section of 20th St SE between 91st Av SE and 99th Av SE was completed in 2002. This report shows that significant LOS improvements could be achieved along this corridor, if the intersection of 20th St SE and SR 9 is grade separated.

A draft design report for this section of 20th Street SE, including analysis of at-grade and grade-separated options for the SR 9 / 20th Street SE intersection is presently being reviewed by DPW. The goal of the design report is to provide information that would lead to the selection of a preferred alternative for the proposed improvements.

The operational impact of the SR 2 / SR204/ interchange on the proposals for 20th St SE and SR 9 interchange, was not included in the design report. A supplemental traffic analysis report will be completed in late summer of this year. This report would provide an analysis of the impact of the SR2/SR 204 interchange on the LOS conditions on this unit, with improvements to the 20th Street SE/SR 9 intersection.

20th Street SE (South Lake Stevens Road to SR-9)

The draft traffic analysis report for this section of 20th St SE between SR 9 and 99th Av SE recommended a widening of 20 St SE to five lanes, and intersection improvements at SR 9 and 99th Av SE. The draft design report mentioned above also includes this section of 20th Street SE.

A traffic report for the 20th St SE and South Lake Stevens Road intersection has also been completed, with recommendation for the signalization of the intersection. DPW is currently working on the design report for the signalization of South Lake Stevens Road and 20th St SE. The project will be designed and implemented concurrently with the improvements along 20th Street SE (99th Av SE to S. Lake Stevens Road,), which will be widen to three lanes with bicycle lanes and sidewalks.

The 20th St SE and South Lake Stevens Road intersection improvements project is scheduled for construction in 2005, and is included in the 2003- 2008 TIP as phase 3 of the 20 St SE corridor project.

180th St SE (Broadway Ave to SR-9)

A preliminary traffic assessment of this arterial shows that a possible solution would most likely be to improve the capacity on SR 9. This would mean additional lanes north and south on SR 9 and not just at the intersection (180th St SE/ SR 9,) where most of the traffic delay is occurring. This widening, with optimum signal timing, would permit a high volume of traffic with shorter green time on the State Highway, thereby improving the traffic condition on 180th St SE.

Corridor study for this arterial unit is planned to start this year. This study is included in the 2003-2008 TIP.

180th St SE (SW County UGB to SR-9)

This arterial unit is experiencing the same problem as the unit described above. As previously stated, increased capacity and optimum signal timing is needed at SR 9 to improve the LOS at this intersection.

The corridor study on 180th Street starting later this year, will investigate options to reduce the LOS deficiencies for both units.

228th St SE (SW UGB/ 45th Ave SE to SR-9)

DPW recently reanalyzed this unit in conjunction with a developer proposed improvements at the intersection of 228th St SE and SR 9. Numerous traffic analyses with Synchro (simulation software to analyze corridors with traffic signals) were performed using all feasible improvements. None of the analysis showed much success in alleviating the LOS deficiency in the eastbound direction for the evening peak.

WSDOT is planning for an improvement of the intersection of SR 9 and 228th Street SE as part of SR 9 corridor improvement. However, funding has not yet been identified.

Airport Way (99th Ave SE to SR-9)

A project to widen this portion of Airport Way has been identified in the Transportation Element, but has not been programmed. A preliminary traffic assessment of this arterial shows that a possible solution would most likely be to improve the capacity at the intersection of Airport Way and SR 9.

Further analysis of this unit will be carried out after the opening of the extension of 132nd St SE to SR 9.

Bunk Foss Road / Ritchey Road (South Machias Road to SR-9)

Signalization of the intersection of Bunk Foss Road and SR 9 will likely remedy the LOS deficiency. WSDOT is planning for such improvement. However, funding has not yet been identified.

4th Ave W (112th St SW to Everett C/L)

A capacity improvement project to increase 112th St SW to five lanes including a two-way left-turn lane at the intersection with 4th Avenue West is presently being implemented. In addition to the widening on 112th St SW, a northbound through lane will be constructed south of the intersection. The first stage will improve the traffic signal and the second stage to complete the widening process will occur later this year. The widening will alleviate much of the westbound left-turn problem.

To evaluate the signal operation and the operation of the 4th Ave W corridor, a Synchro analysis was conducted using calibration to match the most recent travel time study. Synchro was then used to evaluate conditions using the 2008 pipeline traffic volumes and improvements at 4th Ave W and 112th St SW. Southbound LOS was E (14.9 mph travel speed). Further Synchro analysis will be conducted on an on going basis until the completion of the 112th St SW Improvements.

V. Conclusions

The concurrency management system (CMS), through its substantial performance monitoring function, helps to identify transportation system deficiencies and potential solutions through:

- The establishment of a set of performance measures based on adopted LOS standards,
- The monitoring and reporting on system performance, and
- Evaluation of the effectiveness of proposed and implemented strategies.

The CMS represent a significant step towards inter-departmental cooperation and coordination between DPW and PDS in the implementation of the County's comprehensive plan land use and transportation elements.

The CMS supports the County's long-term land use and transportation goals and objectives defined in the comprehensive plan and assists in the six-year transportation improvement program (TIP) project evaluation and selection process. Output from the CMS could influence new land development decisions, changes to land use and transportation policies, and identify potential concurrency management strategies for implementation or highlight a corridor for more detailed analysis to determine the best mix of strategies.

While the CMS is a State requirement under the Growth Management Act (GMA), traffic from State highways of statewide significance (like I-5, SR 522, and SR 2) is legally exempt from concurrency requirements. However, traffic from state highways impacts the county transportation systems operations and capacity, and consequently land development decisions.

The county Arterial Unit Status Map shows that traffic to/from state highways (SR 9 and USHWY 2) are having a severe impact on the county's local transportation system operations. All of the County arterials that are designated as "arterial unit in areas" are adjacent to these routes.

APPENDIX A: Arterial Units Undergoing Monitoring and Operational Analyses

- The LOS determination for arterial units (AU) that are being monitored is shown in Table A1. The determinations are consistent with the process described in Figure 3, and are based on traffic count data, and/or field review of traffic conditions.

Table A1: List of Units Monitored in 2002

TSA	R/U	Unit ID#	ARTERIAL UNIT	Traffic Count in 2002?	ACTION	REASON FOR ACTION
A	R	102	Pioneer Highway (300 th St NW to Sno/Skagit County Line)	N	Remove	Field Review Est LOS = "A"
	R	138	140 th St NE/NW (46 th Ave NW to 23 rd Ave NE)	Y	Remove	Field Review Est LOS = "A"
	R	147	67 th Ave NE (108 th St NE to 2020' S/O SR 531)	Y	Remove	Field Review Est LOS = "A"
B	U	175	Lakeview Dr (Lundeen Park Way to Lake Stevens C/L)	Y	Remove	2002 Travel Time LOS = "C"
	R	180	Machias Cut-Off/S Machias Rd (Lake Stevens UGB to OK Mill Rd)	Y	Remove	Field Review Est LOS = "A"
	R	181	OK Mill/Creswell Rd (S Machias Rd to Dubuque Rd)	Y	Remove	Field Review Est LOS = "A"
	R	187	S Machias Rd (SR 2 to Machias Cutoff)	Y	Remove	Field Review Est LOS = "A"
	U	317	91 st Ave SE (20 th St SE to SR 204)	Y	Move to operational analysis	Last Travel Time 2000 LOS = "D"
C	R	261	Broadway Ave (164 th St SE to SR 9)	Y	Remain in monitoring	Field Review Est LOS = "B"
D	U	202	Seattle Hill Rd (35 th Ave SE to SR 96)	N	Remove	End of Year AU Report recommends No "Mon"
	U	203	35 Ave SE (Seattle Hill Rd to SR 96)	Y	Move to operational analysis	Last Travel Time – 1998. Verify Signal Oper
	U	204	35 Ave SE (168 th St SE to Seattle Hill Rd)	Y	Move to operational analysis	Last Travel Time – 2001. Verify Signal Oper
	U	228	Airport Rd/128 th St SW (SR 99 to I-5 Ramps)	Y	Move to operational analysis	"Before" Study for Corridor Signal Improvements
	U	230	112 th St SW (Everett C/L to Everett C/L)	Y	Move to operational analysis	Analyze After Construction of 112St SW.
	U	259	132 nd St SE/134 th Pl SE (Snohomish Cascade Drive to Seattle Hill Rd)	Y	Move to operational analysis	Analyze After Opening of 132 St SE Ext.
	U	287	36/35 Ave W (Lynnwood C/L s/o 164 th St SW to SR 99)	N	Remove	2002 Travel Time LOS = "C"

	U	336	35 Ave SE (Grannis to 168 th St SE)	Y	Remove	End of Year AU Report recommends No "Mon"
TSA	R/U	Unit ID#	ARTERIAL UNIT	Traffic Count in 2002?	ACTION	REASON FOR ACTION
E	R	330	Broadway Ave (Maltby UGB/. 05 Mi. North of 200 th St SE to 164 th St SE)	Y	Remove	Field Review Est LOS = "A"
F	U	214	Larch Way (Mountlake Terrace C/L to Cypress Way)	Y	Remain in monitoring	Field Review Est LOS = "D"
	U	333	228 th St SE (35th Ave SE/Bothell C/L to 39 th Ave SE)	Y	Remove	2002 Travel Time LOS = "A"

More than half of the units in the Monitoring list are operating with LOS at or above the screening level (LOS=> C for urban arterials, LOS= A for rural arterials). These units will be removed from the list and transferred to the Screening list. The units with operational conditions that indicate that there may be LOS problems, will be moved to the Operational Analysis list.

- The LOS determination for arterial units in the Operational Analysis list is shown in Table A2. The determinations are also consistent with the process described in Figure 3, and are based on travel time studies (TT), simulation of traffic conditions using the Synchro traffic model, and/or field review of traffic conditions. The Operational Analysis process is used to determine whether or not the LOS on an arterial unit is currently operating below the adopted standard. The result for each unit is therefore the worst traffic condition, the peak hour (AM or PM) of occurrence, and travel direction (EB, WB, NB, SB).

Based on the result of the worst LOS on the unit, possible actions include moving the unit from the list and transfer to the screening list when the LOS is above the screening level, moving the unit to the Monitoring list, and continuing with further operational analysis.

Table A2: Operational Analysis Results

TSA	R/U	Unit ID#	ARTERIAL UNIT	TT Ever?	TT 2002?	WORST LOS	WORST MOVEMENT	ACTION	REASON FOR ACTION
A	R	139	140 th /Stimson/136 th St NE (23 rd Ave NE to Marysville C/L)	Y	Y	B	EB WB PM	Move to monitoring	2002 Travel Time LOS = "B"
	U	163	Marine Drive (Marysville UGB to I-5)	Y	N	D	EB PM	Remains in op. analysis	No Travel done in 2002
	U	172	Lundeen Park Way (SR 9 to Callow Rd)	Y	Y	C	WB PM	Remove	2002 Travel Time LOS = "C"

B	U	238	20 th St SE (SR 204 to SR 9)	Y	N	D	EB PM	Remains in op. analysis	No Travel Time done in 2002
	U	342	Vernon Rd (Lundeen Park Way to Lake Stevens C/L)	N	N			Remove	Field Review Estimated LOS = "B"
TSA	R/U	Unit ID#	ARTERIAL UNIT NAME	TT Ever?	TT 2002?	WORST LOS	WORST MOVEMENT	ACTION	REASON FOR ACTION
C	R	198	Marsh Rd (Lowell Larimer Rd to SR 9)	Y	Y	F	EB PM	Remains in op. analysis	2002 Travel Time LOS = "F"
	U	235	Airport Way (99 th Ave SE to Snohomish C/L)	Y	Y	D	NB PM	Remains in op. analysis	2003 Travel Time LOS = "D"
	R	237	88 th St SE/92 nd St SE (SR-2 Overpass to W end Bridge #633)	Y	Y	B	EB WB PM	Remains in op. analysis	Field Review Estimated LOS "C"
	U	307	Lowell-Snohomish River Rd (Snohomish UGB to Airport Way)	N	N			Remove	Field Review Estimated LOS "C"
D	U	219	164 th St SW (Lynnwood C/L to I-5 NB Ramps)	Y	Y	D	EB PM	Move to monitoring	2002 Travel Time LOS = "D"
	U	227	Beverly Park Rd (SR 525 to Airport Rd)	Y	Y	E	WB PM	Move to monitoring	Synchro Forecast Analysis LOS = "D"
	U	229	4 th Ave W (128 th St SW to 112 th St SW)	Y	Y	D	NB PM	Remains in op. analysis	Do Travel Time after completion of 112ST SW
	U	352	4 th Ave W (12 th St SW to EV C/L)	Y	Y	D	SB AM PM	Remains in op. analysis	Do Travel Time after completion of 112 ST SW
F	U	278	Poplar Way (Lynnwood C/L to Brier C/L)	Y	Y	D	NB SB PM	Remains in op. analysis	Field Review Estimated LOS "D"
	U	215	Hazel Rd/204 th Ave SW (44 th Ave W to Cypress Way)	Y	Y	C	EB WB PM	Remove	2002 Travel Time LOS = "C"

3. The new lists of arterial units that are being monitored and needing operational analysis are shown in Tables A3 and A4. The results of the analyses and subsequent action taken will be published in the next issue of the concurrency management system report.

Table A3: List of Arterial Units Being Monitored

TSA	R/U	Unit ID#	ARTERIAL UNIT
A	R	101	Old Pacific Highway (Stanwood C/L to Pioneer Hwy)
		139	140/Stimson/139 St NE (23 Ave NE to Marysville C/L)
		161	Marine Dr NE (Marysville UGB to 64 St NW)
C	R	261	Broadway Ave (164 St SE to SR 9)
		407	S Machias Rd (SR 2 overpass to Old Machias Rd S)
TSA	R/U	Unit ID#	ARTERIAL UNIT
D	U	219	164 St SW (Lynnwood C/L to I-5 NB ramps)
		227	Beverly Park Rd (SR 525 to Airport Rd)
E	R	266	Echo Lake Rd (SR 522 to Lost Lake Rd)
	U	354	Paradise Lake Rd (SR 522 to Maltby UGB)
F	U	214	Larch Way (Mountlake Terrace C/L to Cypress Way)

Table A4: List of Arterial Units Needing Operational Analysis

TSA	R/U	Unit ID#	ARTERIAL UNIT
A	R	248	34 Ave NE (116 St NE to 136 St NE)
	U	163	Marine Dr (Marysville UGB to I-5)
B	U	238	20 St SE (SR 204 to SR 9)
		317	91 Ave SE (20 St SE to SR 204)
C	R	237	88 St SE /92 St SE (SR-2 Overpass to W end Bridge #633)
	U	235	Airport Way (99 Ave SE to Snohomish C/L)
	R	198	Marsh Rd (Lowell Larimer Rd to SR 9)
		352	4 Ave W (112 St SW to Everett C/L)
		229	4 Ave W (128 St SW to 112 St SW)
		204	35 Ave SE (168 St SE to Seattle Hill Rd)

D	U	203	35 Ave SE (Seattle Hill Rd to SR 96)
		228	128 St SW/Airport Rd (SR 99 to I-5 Ramps)
		230	112 St SW (Everett C/L to Everett C/L)
		366	121 St SW (SR 525 to Beverly Park Rd)
		259	132 St SE (Snohomish Cascade Dr to Seattle Hill Rd)
TSA	R/U	Unit ID#	ARTERIAL UNIT
E	U	209	39 Ave SE (228 St SE to SR 524)
F	U	278	Poplar Way (Lynnwood C/L to Brier C/L)

APPENDIX B: Future Level Of Service Determinations

- Future LOS determinations used to make concurrency determinations for large developments shall be made through traffic studies. Future LOS determinations may also be conducted by DPW as part of technical studies. Appropriate methods that are consistent with the framework established in DPW-POL-4210 shall be used to make the future LOS determinations in traffic studies.

In accordance with SCC Chapter 30.66B.035, any development that will add three or more P.M. peak hour trips to the road system may be required to provide a traffic study where there is the need for additional information to determine the impacts of the development. Traffic studies include traffic counts, trip generations, trip assignment, trip distribution, and traffic impact analysis. An outline of DPW general traffic study requirements is shown in Table B1.

Table B1: Outline General Traffic Study Requirements

Development Type and/or Size	Trip Generation Required?	Trip Distribution Required?	Trip Assignment Required?	Level of Service Forecasting Required?
Small residential development (less than 7 PHT)	Yes	No	No	No
Small non-residential development (less than 5 PHT)	Yes	No	No	No
Medium residential development (7 - 50 PHT)	Yes	Yes, if the development is located in a TSA with an arterial unit in arrears	Yes, if the development is located in a TSA with an arterial unit in arrears	No
Medium non-residential development (5 - 50 PHT)	Yes	Yes, if the development is located in a TSA with an arterial unit in arrears	Yes, if the development is located in a TSA with an arterial unit in arrears	No
Large development (greater than 50 PHT)	Yes	Yes	Yes	Yes, for those critical arterial units impacted by 3 or more directional PHT

Trip Generation, Distribution and Assignment

2. Trip generation provides an estimate of how many new AM and PM peak-hour trips are likely to be generated by the development. Trip distribution is a type of traffic analysis that estimates the likely destinations of trips generated by the proposed development and the likely traffic routes to reach those destinations. The result of this analysis is a schematic map showing what percentage of trips from the proposed development are added to arterial units in the vicinity of the proposed development.

Trip assignment is based on the trip distribution and estimates the number of individual vehicle trips likely to be added to each traffic movement at each key intersection for both the AM and PM peak hours.

The trip assignments are shown in two different formats. The first is a schematic drawing of the key intersections showing the number of trips assigned to each possible traffic movement (e.g., eastbound left turn, eastbound through, eastbound right turn, westbound left turn, etc.) The second is a table, listing the number of trips assigned to each movement.

Traffic Counts for Key Intersections

3. Traffic counts are conducted at the key intersections on a regular basis. DPW has an ongoing program to conduct such counts. If no recent counts are available for a particular key intersection, developers are required to provide them as part of their traffic study. For each traffic movement at each key intersection, the forecast of future traffic volumes, consists of the current traffic counts plus the trips from the inventory of developments in the pipeline. For a development required to analyze its impacts on the future LOS of the road system, the forecast also includes the trips assigned from the proposed development.

Future LOS Forecasts

4. The critical arterial units are those for which LOS forecasts may be required as part of the traffic studies for proposed developments. Analyses of future trip distributions, assignments, and forecasts of future LOS, are made using:
 - The future road network as it will be in six years (Six-Year Network).
 - Those arterial units whose traffic counts are approaching the estimated capacity (Critical Arterial Units).
 - An estimate of future traffic volumes at each traffic movement for the key intersections on a critical arterial unit.

Methods exist for estimating the future LOS of the arterial unit. These methods consist of mathematical traffic models that have been programmed into various computer software programs. There are at least four possible outcomes from such forecasts for any given critical arterial unit.

Adequate LOS

5. The forecast LOS may be better than the County's adopted standard. In this case, the arterial unit will remain on the list of critical arterial units, but will not be designated as in arrears.

Deficient LOS Without Development

6. The forecast LOS may be worse than the County's adopted standard even without adding in the trips from the proposed development. Assuming that there are no improvements identified and fully funded that will remedy the LOS deficiency within six years, then the arterial unit will be designated as in arrears.

Adequate LOS Without Development, Deficient LOS With the Development

7. The forecast LOS may be adequate without the proposed development, but deficient with the trips from the proposed development. In this case, the development may be allowed to reduce the size of the development to generate just the number of trips corresponding to the threshold between adequate and deficient LOS. The proposed development will be deemed concurrent, but the arterial unit will be designated as in arrears for any subsequent developments.

Deficient LOS but Improvements Will Remedy

8. The forecast LOS may be worse than the County's adopted standard, but if there are improvements identified and fully-funded that will remedy the deficient level-of-service, then the arterial unit will not be declared in arrears, and the proposed development can be deemed concurrent. Essentially, once a project has been added to the list of future road network assumptions, the future LOS analysis assumes that the road network has the expanded capacity associated with the project.

APPENDIX C: Making Concurrency Determinations

1. Snohomish County makes concurrency determinations for individual development proposals by evaluating whether or not they will impact any arterial units in arrears within the development's TSA. Each development is assigned to the transportation service area TSA to which it sends most of its trips. In general, developments are only required to evaluate their impacts on arterial units in arrears within their own TSA.

Whether or not a particular arterial unit is impacted by three or more peak hour trips is determined through the trip distributions and assignments prepared by developers as part of their traffic studies. Basically, if a development does not impact an arterial unit in arrears it can be deemed concurrent.

Arterial units in arrears are defined in terms of the peak hour (AM peak and/or PM peak) and travel direction of LOS deficiency. For example, 20th ST SE is "in arrears" for the westbound, AM peak hour. It is not in arrears for the eastbound, AM peak hour or either direction in the PM peak hour.

What Constitutes an "Impact" to Determine Concurrency?

2. To "impact" an arterial unit in arrears, as defined for the purpose of making concurrency determinations, means to add three or more vehicle trips during the peak hour and in the direction for which the unit is in arrears.

For instance, on 20th St SE, adding three (3) trips westbound during the AM peak does meet the criteria of "impact," and a development with such impact would not be deemed concurrent. Adding two (2) trips westbound and one (1) trip eastbound does not constitute an impact such that the development would not be deemed concurrent, because there would have to be three (3) trips in the same direction during the AM peak hour. Adding three (3) trips westbound during the PM peak hour also would not constitute an impact upon which to deny concurrency.

When the County Council determines that excessive expenditure of public funds is not warranted for the purpose of maintaining adopted LOS standards on an arterial unit, the County Council may designate, by motion, such arterial unit as being at ultimate capacity. Improvements needed to address operational and safety issues may be identified in conjunction with such ultimate capacity designation.

Any proposed development that will place three (3) or more peak-hour trips on any designated ultimate capacity arterial unit, can be deemed concurrent only if the development offers to mitigate its road system impact by providing sufficient transportation demand management (TDM) measures to indicate the potential for removing a minimum of ten (10) percent of the development's peak-hour trips from the road system.

Three Classes of Developments Based on Size

3. For the purpose of evaluating developments for concurrency, Snohomish County divides applicants into three classes, based on the estimated number of new vehicle trips that are expected to be generated by the developments after occupancy.

Residential developments generating less than seven (7) peak-hour trips or commercial developments generating less than five (5) peak-hour trips are considered small. Any developments generating more than fifty (50) peak-hour trips are considered large. Anything in between is considered medium-sized.

Concurrency Determinations for Small Developments

4. Small developments are considered to have minimal impacts on the LOS of the road system and are automatically deemed concurrent.

Concurrency Determinations for Medium-Sized Developments

5. A medium-sized developments, proposed in a TSA with no arterial unit in arrears, is deemed concurrent. A medium-sized development, proposed in a TSA with one (1) or more arterial units in arrears can only be deemed concurrent based on a trip distribution that demonstrates that the development will not impact an arterial unit in arrears.

Concurrency Determinations for Large Developments

6. The same rules apply for large developments as for medium-sized developments except that large developments must also prepare traffic studies to forecast future LOS on critical arterial units. Note that medium-sized developments are not required to prepare these forecasts. However, if a forecast results in the designation of an arterial unit in arrears, then any subsequent medium-sized development will have to evaluate its impact on that arterial unit in arrears.