Abridged Version

DETERMINING TRAFFIC SAFETY IMPROVEMENTS UNDER THE TRAFFIC IMPACT FEE ORDINANCE

PROCESS DOCUMENTATION

WASHINGTON COUNTY
DEPARTMENT OF LAND USE
AND TRANSPORTATION

ENGINEERING/SURVEYING DIVISION

AS ADOPTED BY
RESOLUTION AND ORDER NO. 86-95
JULY 22, 1986

DETERMINING TRAFFIC SAFETY IMPROVEMENTS UNDER THE TRAFFIC IMPACT FEE ORDINANCE

CONTENTS

RECOMMENDATION

The Department recommends that the Board establish Alternative B as the level of traffic safety to be utilized in determining necessary traffic safety improvements that will be required as a condition of development, Alternative B is recommended for the following reasons:

1. Alternative A by itself does not include many locations that are considered to be operating at an unacceptable level of safety.

2. Alternative D was developed to be used as a starting point for determining hazard locations and is the benchmark for comparing the effects of the other alternatives, and includes many intersections that are considered to be operating at an acceptable level of safety.

3. The cutoff point for locations to be included in Alternative B (as opposed to Alternative C) appears to be the point of diminishing returns within the range of alternatives considered; i.e., implementation of Alternative C would reduce the number of expected injuries by less than 10% but would increase the number of locations by over 32%. Implementation of Alternative B will require improvements at locations that are considered to be operating at an unacceptable level of safety; where cost effective solutions are expected to improve the locations to an acceptable level of safety.

INTRODUCTION

This report is a compilation of the various procedures that have been developed to process development applications under the Traffic Impact Fee Ordinance, the core of which is the criteria for traffic safety improvements. In the following narrative, the development and application of the criteria are put into context with the overall process of determining traffic related impacts associated with development and implementation of appropriate improvements.

For an overview of the process and to quickly find in this paper the information that is of interest to the reader, refer to Figure 1, Process Outline, page 4.

The objectives of this report are:

1. Document the procedures process developed by the Department to process development applications, determining safety and capacity deficiencies and identifying necessary improvements.

2. Document the process used to determine the criteria for traffic safety improvements, particularly the Safety Priority Index System (SPIS) analysis.

This report will serve as a source reference for staff involved with processing development applications, and will facilitate future updates of the SPIS analysis. It is also intended for external use, for those interested with the development review process or the technical analysis associated with the developed criteria. A listing of existing hazard locations is included in Appendix E.

BACKGROUND

On October 22, 1985 the County adopted the Traffic Fee Ordinance No. 310. The TIF ordinance significantly changed the method in which developments assure for adequate levels of arterial and major collector road service, and shifted the responsibility of determining needed capacity deficiencies from the applicant through the submission of a Traffic Analysis to staff, and requires staff to make a determination of when and where traffic safety improvements (as defined in the ordinance) are required as a condition of development.

Exhibit "C" of the "Washington County Growth Management Policy" (Task Force, July 24, 1984), (Department of Land Use and Transportation, January 15, 1985) states: "The task force recognized that at times distinctions between safety and convenience issues would be difficult to resolve. The task force was advised, however, that engineering standards exist that may be used as objective indicators of what constitute(s) safety concerns. It is the opinion of the task force that further investigation should be made by staff and County Counsel as to the workability of the safety/convenience distinction and the details of a reimbursement system based in part upon it."

It is the need for a distinction between safety and convenience issues that initiated the development of the criteria documented herein.

The basic approach assumed in determining necessary traffic safety improvements is that 1) there currently exist hazardous locations that present an unacceptable risk to the traveling public's safety, and that increasing accident exposure by significant increases in traffic resulting from development is unacceptable without mitigation measures, and 2) significant increases in traffic resulting from development can create hazard locations that currently do not exist and mitigating measures are necessary to protect the traveling public.

For the former (1), a comprehensive analysis of accident data for county road intersections was conducted. The determination of what constitutes an unacceptable risk to the traveling public will require a policy decision. This decision will require the selection of one of the four developed SPIS alternatives (Appendix A).

For the latter (2), necessary improvements are determined through the application of accepted traffic engineering procedures, standards, and practices, combined with the determination of unacceptable risk described above (Appendix B).

ASSUMPTIONS FOR THE CREATION OF CRITERIA FOR TRAFFIC SAFETY IMPROVEMENTS

This report is a continuation of previous effects pertaining to the establishment and implementation of the TIF ordinance, "Washington County Growth Management Policy" (Task Force, July 24, 1984), "A Fee-Based Traffic Impact System" (Task Force, July 31, 1985), and "Analysis and Methodology for the Creation of a Fee-Based Traffic Impact System", (DLUT, January 15, 1985). The following assumptions guided the procedures and criteria described herein:

1. Applicants are not required to identify, analyze, or evaluate capacity deficiencies which occur as a result of their development.

2. The Department of Land Use and Transportation ,Engineering Section, will identify, analyze, and monitor needed capacity improvements which occur due to increased traffic resulting from development, necessary for a systematic monitoring and evaluation of the performance of the County transportation system and to aid in prioritization of TIF and other capital improvement projects.

3. A consistent, defendable method for determining necessary traffic safety improvements is needed for: 1) determining improvements necessary for the traveling public's safety, 2) consistency in conditioning developments, and 3) establishing jurisdictional immunity in potential lawsuits concerning the operational safety of the County transportation system.

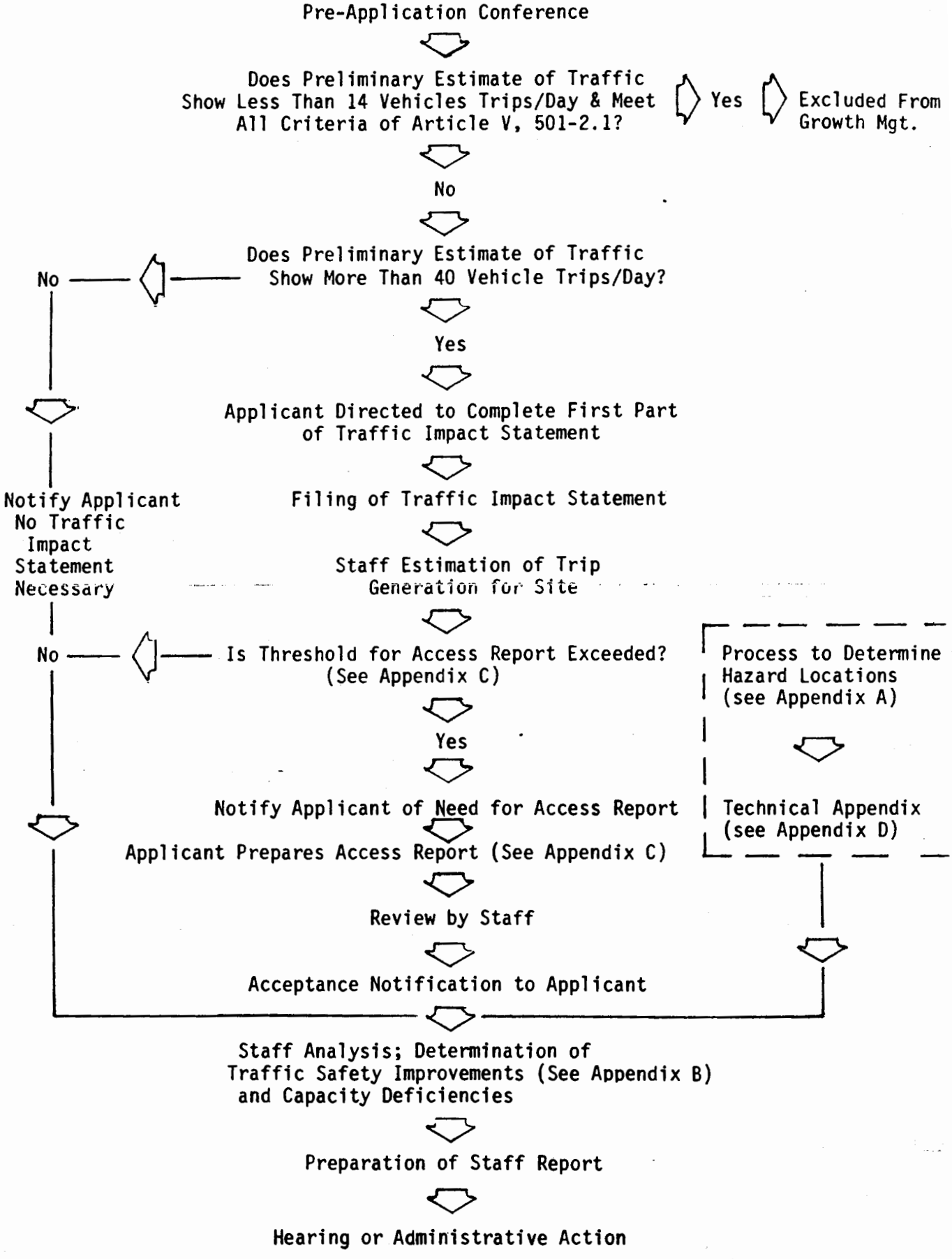
Board approval of the assumptions as stated above will provide staff with a clear directive in applying the procedures that are described in this report.

PROCESS OUTLINE

A general overview of the procedures developed to process development applications is depicted in Figure 1. Procedures developed to process developments under the Traffic Impact Fee Ordinance are noted in the outline and referenced to the appropriate appendix.

FIGURE 1

PROCESS OUTLINE



APPENDIX B

CRITERIA FOR TRAFFIC SAFETY IMPROVEMENTS

This appendix contains the recommended criteria for traffic safety improvements. The SPIS value of the recommended Alternative B is used to determine existing hazard locations.

One of the features of the criteria is in limiting the level of improvement for existing hazard locations, Section C. The cost values used in this section are from ODOT and represent a net monetary loss to society resulting from accidents, and are a standard for estimating the cost effectiveness of safety improvements. The desirable aspects of this feature is that it provides predictability to developers as to the upper limit of their potential improvement costs and limits county discretion in specifying the level of improvements. An undesirable aspect is that it will complicate administration of the criteria.

Figure 1B displays the criteria in a summarized tree structure.

The following criteria will be used to determine when Traffic Safety Improvements, as defined in the Traffic Impact Fee Ordinance #310, will be required as a condition of development. When warranted or specified, all improvements shall conform to County standards. The SPIS value (Section A.2) and the values used in the benefit-cost analysis (Section C.1) will be updated annually.

A. Definitions

1. Added Traffic: Traffic generated by developments, or phases of developments, which have been issued a building permit, or in the case of subdivisions have received final development approval, but are not yet occupied.

2. Existing Hazard Locations: Locations identified by a SPIS value greater than or equal to 32.24, where there is an existing accident history that currently presents an unacceptable risk to the traveling public's safety.

3. Existing Traffic: Traffic volumes measured within the previous 12 months of the development application.

4. Frontage: That portion of a site which abuts a public road.

5. Impact Area: The impact area for developments will be those road links where site generated traffic equals or exceeds 10% of existing average daily traffic but including at a minimum those access roads lying adjacent to and between the development and the nearest major collector or arterial road. Links within the developments impact area are considered to have a significant increase in traffic.

6. Link: A section of roadway which includes the intersection at both ends. The end points of a road link will be at an equally or higher classed roadway.

7. Predicted Hazard Locations: Locations identified in the County Transportation Plan as a Geometric or Traffic Safety Concern, or locations where safety improvements are warranted due to increased traffic resulting from development.

8. Total Traffic: The sum of existing, added, and site generated traffic.

9. Traffic Safety Improvements: Those street improvements including traffic control devices, necessary to protect the travelling public as determined by the Director (Traffic Impact Fee Ordinance #310).

10% impact area

B. Objective of Traffic Safety Improvements

B.1 For existing hazard locations:

To mitigate the adverse effects of increased traffic resulting from development on existing hazard locations which currently present a significant risk to the traveling public's safety, and where significant increases in additional traffic is unacceptable without improvements.

B.2 For predicted hazard locations:

To prevent future hazards locations by installing improvements where the increased traffic resulting from developments warrant the improvements, and where the existing, pre-development conditions did not warrant the improvements.

C. Level of Improvement

C.1 For existing hazard locations:

Existing hazard locations are identified through an analysis of the previous three years accident data, and have been determined to present an unacceptable risk to the traveling public's safety. Improvements will be required to correct the existing deficiencies. In no case will improvements be required where the benefit-cost ratio of the improvement is less than one (1) as determined by the following formula:

$$B/C = \frac{(\text{Annual Benefits}) * (\text{Series Present Worth Factor (20 yrs @ 10\%)}}{\text{Estimated Improvement Cost}}$$

$$\text{Where Annual Benefits} = \frac{\text{Total Accident Cost}}{3}$$

And where
Total Accident Costs = (Number of Reported PDO* Accidents) * 2 *$1,190 +

(Total Number of Injuries) * $9,300 +

(Total Number of Fatalities) * $220,000

The total accident costs will be calculated based on the previous three years accident data, on file and available at the Department of Land Use and Transportation.

C.2 For predicted hazard locations:

* Property damage only.

C.2.1 For warranted improvements:

The level and cost of improvement will be that level and cost as specified in Section D, Criteria.

C.2.2 For hazard locations identified in the County Transportation Plan:

The level of improvement will be determined by accepted engineering standards and practices and will be determined based on the impact and benefit of the proposed development.

D. Criteria

Locations will be analyzed to determine if they are existing hazard locations (improvements required under D.1.1 and D.2.1), predicted hazard locations (improvements required under D.1.2 and D.2.2) or other locations that warrant improvements under D.1.2.2 and D.2.2.2. If a location is determined to be an existing and predicted hazard location, both criteria shall apply.

D.1 Frontage Improvements

D.1.1 Existing Hazard Improvements

Existing hazards will be improved as specified in Section C.1 when site generated traffic equals or exceeds 10% of existing traffic.

D.1.2 Predicted Hazard Improvements

D.1.2.1 Hazard locations identified in the County Transportation Plan:

Hazard locations as defined in section A and identified in the County Transportation Plan will be improved as specified in Section C.2.2 when site generated traffic equals or exceeds 10% of existing traffic.

D.1.2.2 Warranted Improvements

Regardless as to whether there is a 10% impact on the frontage road, and regardless of whether situated at a predicted or existing hazard location, the following criteria shall be applied.

1. Frontage road access points that meet any of the signal warrants specified in the "Manual on Uniform Traffic Control Devices" (MUTCD), U.S. Department of Transportation Federal Highway Administration (FHWA), 1978 will be signalized. Level of improvement will provide Level of Service "D" or better at all times with the exception of a twenty (20) minute period in any peak hour when Level of Service "E" will be tolerated as determined using procedures established by the "1985 Highway Capacity Manual", Special Report 209 Transportation Research Board. Total traffic will be considered in establishing Level of Service.

2. Left Turn Refuge Lanes will be installed on frontage roads at the access points when warranted by "A Policy on Geometric Design of Highways and Streets", American Association of State Highway and Transportation Officials (AASHTO), 1984.

3. Sidewalks will be installed along the sites frontage, placed at ultimate location and grade, unless an exception is approved in accordance with the standard of the Community Development Code (CDC) Section 501-5.4.

4. Intersection sight distance at frontage road access point(s) must meet County standards.

5. Intersections that are adjacent to the site and serve as the primary route for traffic to the site will be adequately illuminated with street lighting in accordance with "An Informational Guide for Street Lighting", AASHTO, 1984. Such intersections that are hazardous due to inadequate sight distance will be improved.

6. Frontage road access points will be adequately illuminated with street lighting in accordance with "An Informational Guide for Street Lighting", AASHTO, 1984.

D.2. Impact Area Improvements

D.2.1 Existing Hazard Improvements

1. Unsignalized intersections that currently meet signal warrants (existing traffic) and are identified as an existing hazard location will require improvements and signalization. Level of improvement will provide Level of Service "D" or better at all times with the exception of a twenty (20) minute period in any peak hour when Level of Service "E" will be tolerated as determined using procedures established by the 1985 Highway Capacity Manual and as specified in Section C.1. Total traffic will be considered in establishing Level of Service.

2. Signalized intersections that are identified as a hazard location will require improvements as specified in Section C.1.

3. Unsignalized intersections that do not meet signal warrants considering total traffic but are an existing hazard location will require improvements as specified in Section C.1.

D.2.2 Predicted Hazard Improvements

D.2.2.1 Hazard locations identified in the County Transportation Plan

Hazard locations as defined in section A and identified in the County Transportation Plan will be improved as specified in Section C.2.2.

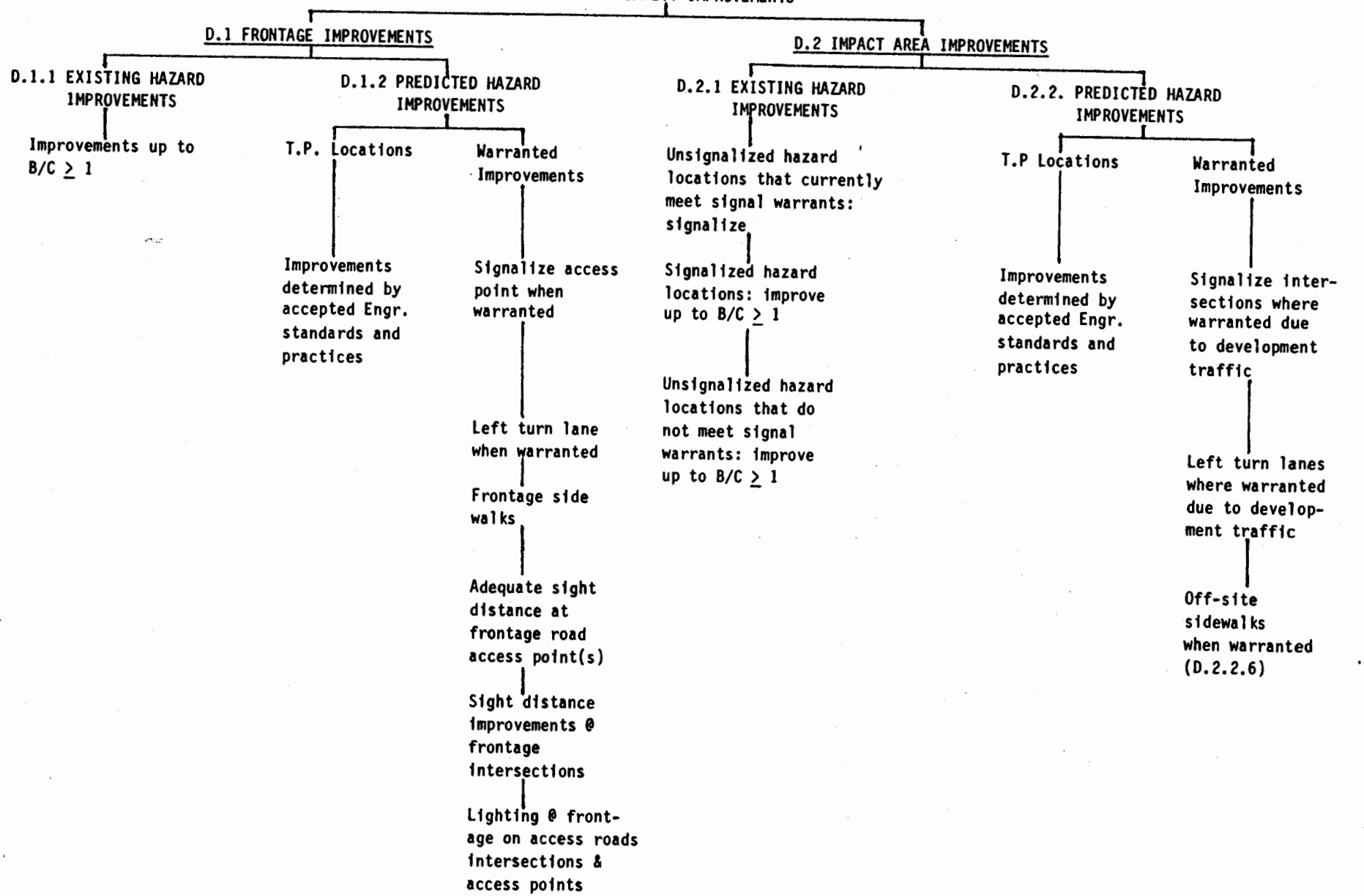
D.2.2.2 Warranted Improvements

1. Unsignalized intersections that currently do not meet signal warrants but will meet signal warrants considering total traffic will require improvements and signalization. Level of improvement will provide Level of Service "D" or better at all times with the exception of a twenty (20) minute period in any peak hour when Level of Service "E" will be tolerated as determined using procedures established by the 1985 Highway Capacity Manual. Total traffic will be considered in establishing Level of Service.

2. Left-turn refuge lanes at intersections within the impact area will be required if existing volumes do not warrant the improvement but the improvement is warranted by AASHTO considering total traffic.

3. Off-site sidewalks which are needed to allow safe pedestrian travel from the development to an existing network of sidewalks or to a area of heavy pedestrian draw, such as a neighborhood commercial development, will be required.

FIGURE 1B
TRAFFIC SAFETY IMPROVEMENTS



APPENDIX C

APPENDIX C

ACCESS REPORT REQUIREMENT

The requirements for access reports, a traffic analysis that is the responsibility of the applicant for some developments, is documented in this appendix. The requirements are included in this paper as they are interrelated with the criteria for traffic safety improvements and associated internal procedures.

The requirements replace the "Traffic Impact Evaluation Procedures" Resolution and Order 83-219, in specifying the requirements for traffic analysis that is the responsibility of the applicant, for developments within the unincorporated areas of the county.

The required analysis is much less stringent then specified in Resolution and Order 83-219, limiting the need, scope, and detail of the analysis. An access report is required only when the development has a considerable increase in traffic compared to the existing traffic at the frontage road. When required, the report need only consider safety at the developments access point and trip generation and assignment to the major collector and arterial road system. Evaluation of capacity is intentionally omitted.

The requirements for access reports have been finalized and administered since May 28, 1986. The requirements are distributed to applicants at the pre-application conference or after the traffic Impact Statement has been completed, when it has ben determined that the threshold for a report is met.

REQUIREMENTS FOR ACCESS REPORTS
FOR DEVELOPMENTS WITHIN THE
UNINCORPORATED AREAS OF WASHINGTON COUNTY
May, 1986

A traffic analysis to be titled "Access Report" is required prior to County acceptance of Development Applications when trip generation (Average Weekday Trips) and existing Average Daily Traffic (ADT) of the frontage county road at the point of access of that road fall within the ranges given below (vpd: vehicles per day).

Existing ADT of County Road at Point of Access	Trip Generation of Development
0 - 3000 vpd	2000 vpd or more
3001 - 6000 vpd	1000 vpd or more
Greater than 6001 vpd	500 vpd or more

ACCESS REPORT REQUIREMENTS

Objective

The objective of the Report is to analyze and evaluate access safety, feasibility, operation and performance, considering the movement of site generated traffic in relation to the existing conditions; traffic flow, access points, and intersections within the influence area. Alternate methods of mitigating identified deficiencies will be established and final recommendations made for improvements necessary for safe and efficient traffic flow. The Access Report will be prepared and certified by a Traffic or Civil Engineer registered in the State of Oregon.

Trip Generation

Estimates of trip generation must be made for peak hour traffic, for design purposes, as opposed to estimates of Average Weekday Traffic used in the calculation of the Traffic Impact Fee. Selection of the design hour used in the analysis will be justified but will include, as a minimum, AM and PM peak hour. Trip generation estimates will be based on the most recent issue of the ITE Trip Generation, An Informational Report. Where trip generation rates are not available in the ITE report, or justification can be made for the use of different rates, approval of the rate(s) must be obtained from the Director prior to use.

Area to be Considered in the Report

At a minimum, the analysis will consider all road segments, access points, and intersections within the influence area, defined as the sites frontage and the distance "d" extending out from the sites property line with d equaling 1000 feet for major arterials, 600 feet for minor arterials, 100 feet for major collectors, and 50 feet for minor collectors. Verification of compliance to the access spacing standards (CDC 501-5.3) is required. Any variance to the access spacing standards must be identified and justified, including evidence showing that other methods to gain access which does not require a variance are not feasible.

Trip Distribution and Assignment

Traffic generated from the development will be logically distributed and assigned at the frontage road access point(s) and at the point(s) where site generated traffic accesses the county major collector and arterial road system, based on Metro's zoned figures, supplied by staff, or analysis of local traffic patterns based on collected data.

Traffic Volumes to be Used in Analysis

The frontage road access point(s) will be analyzed and evaluated considering "total" traffic, the sum of existing, "added", and site generated traffic. Added traffic is defined as traffic generated by developments, or phases of developments, which have been issued a building permit, or in the case of subdivisions have received final development approval, but are not yet occupied. Added traffic volumes will be supplied by staff. Existing traffic must have been measured within the previous twelve months.

Safety Considerations

The frontage road access point(s) will be evaluated for safety considering existing traffic movements, intersections, and other driveways within the influence area. Potential safety problems resulting from conflicting turning movements with other driveways and intersections within the influence area, and internal traffic circulation, must be addressed.

Any safety or geometric concern, identified in the County Transportation Plan, which is adjacent to the sites frontage will be addressed. Potential solutions will be identified and evaluated, and specific recommendations made to alleviate the safety or geometric concern.

A determination of the need for traffic signals will be made at the frontage road access point(s), based on warrants in the Manual on Uniform Traffic Control Devices. If a traffic signal is warranted, recommendations will be made as to the type of traffic signal control and signal phasing. If storage lanes for right or left turns are required, recommendations will include the amount of storage needed.

Availability of adequate sight distance must be addressed at the proposed frontage road access point(s) for both the existing road configuration and the ultimate road configuration, based on improvements identified in the County Transportation Plan. Entering sight distance will ensure that a driver (eye 3.5 feet above the access road or driveway approach and 10 feet from the extended curb line or edge of pavement of the through street) has a minimum sight distance equal to ten (10) times the speed of the through street, continuously available in either direction, for an object 4.25 feet above the road. The posted speed of the through street (or basic speed rule, if unposted), or the 85th percentile speed (whichever is greater), will be used to establish the distance which must be available.

Acceleration lanes, deceleration lanes, turning lanes, and channelization will be considered, evaluated and recommended when determined necessary by accepted standards and practices.

Access Report Format

In general, the Access Report will devote a section to each of the topics discussed above. Documentation will include: 1) A description of development, intended use, ITE use code and complete documentation of trip generation calculations; 2) Traffic flow diagrams displaying traffic distribution, traffic assignment, existing, added and total traffic; 3) Vicinity map and influence area map displaying the existing road system including road names, functional classification, existing pavement and shoulder width, striping and channelization, and all existing driveways and intersections within the influence area; 4) Turning movements at access point(s) and intersections within the influence area; and 5) Technical appendices and other material necessary to convey a complete understanding to staff of the technical adequacy of the report.

Treatment of State Facilities

Any access onto a State highway facility requires approval from the Oregon State Department of Transportation (ODOT). Traffic analysis must meet ODOT's requirements for a Traffic Impact Analysis and County requirements for a Access Report.