APPENDICES

FOR

TRAFFIC IMPACT STUDY
CONNECTICUT AVENUE CORRIDOR
for the
CLEVELAND PARK AND
WOODLEY PARK NEIGHBORHOODS

District of Columbia
Zoning Commission Case 86-26

Prepared by

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APPENDIX A

REVIEW OF PRELIMINARY REPORT (September, 1987)

CONNECTICUT AVENUE CORRIDOR STUDY

Prepared by the

Office of Planning

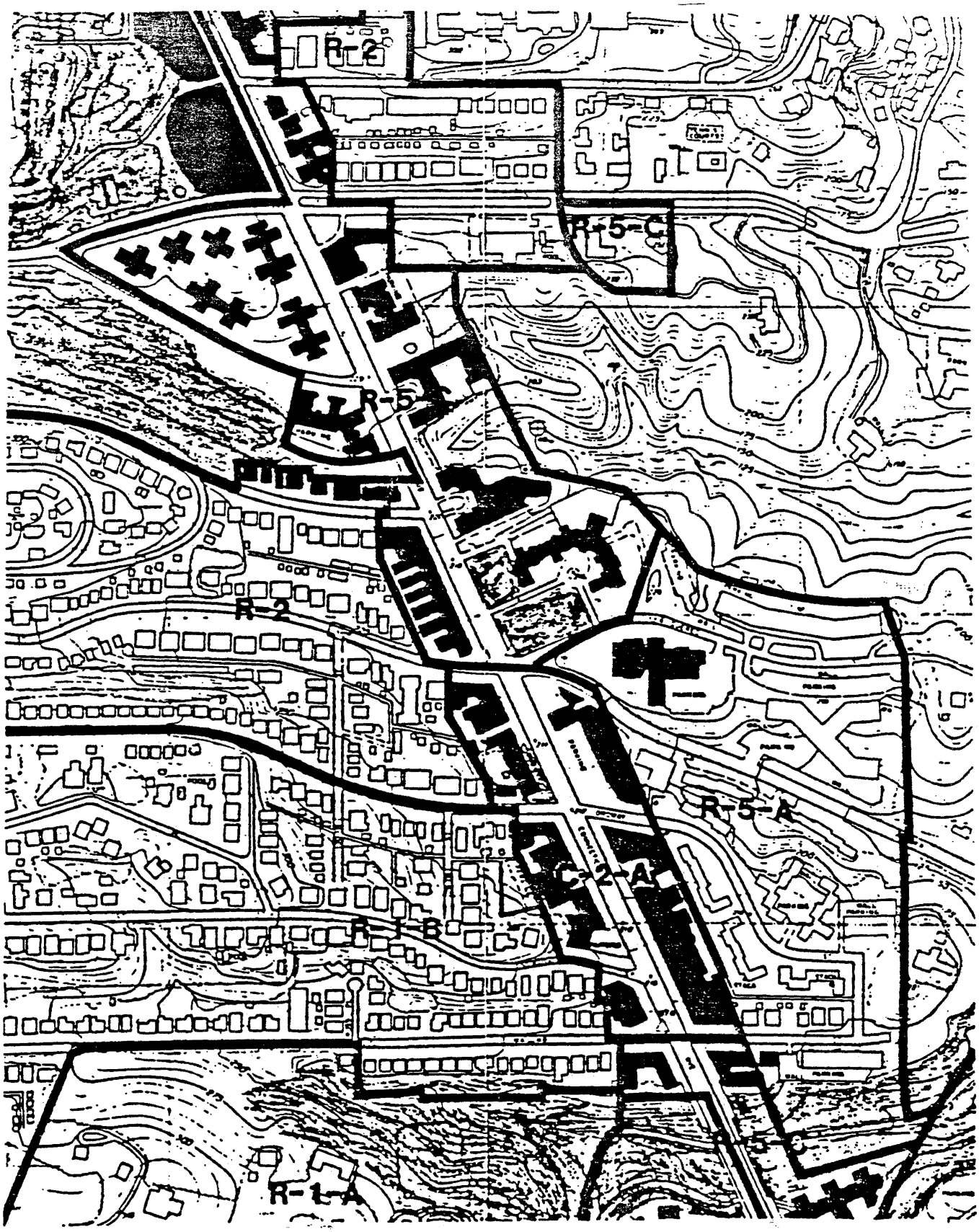
District of Columbia

Overview of The Office of Planning Preliminary Report Connecticut Avenue Corridor Study (Sept. 1987) - From Tilden to Calvert (Figures A-1 and A-2)

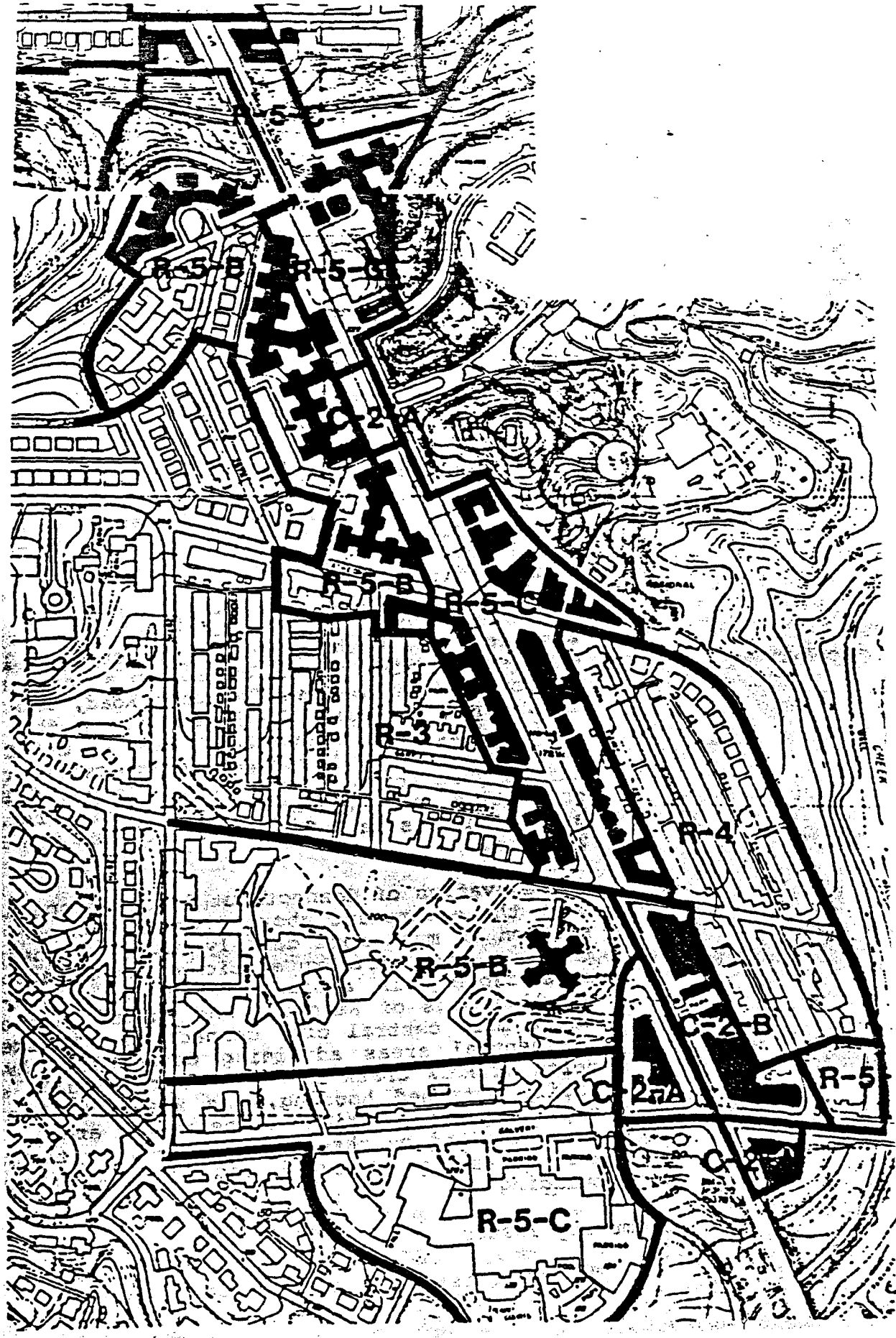
This study was conducted by the Office of Planning (OP) with the assistance of the Department of Public Works (DPW), and includes analysis of the impact of potential future development along Connecticut Avenue between Western Avenue at Chevy Chase Circle to Calvert Street in Woodley Park. This is the second study by OP and DPW concerning redevelopment along Ward 3's commercial corridors. It focuses on the street frontage of connecticut Avenue. Approximately 80 squares were surveyed by Office of Planning staff to determine existing development conditions in five subsections: Chevy Chase Circle to Nebraska Avenue; Nebraska Avenue to Tilden Street; Tilden Street to Klingle Road; Klingle Road to Calvert Street (in Wards 1 and 3); and Calvert Street (Taft Bridge) to Florida Avenue (in Ward 1). This serves as the existing development (or base case) scenario.

As indicated on p.8 of the report, describing the area between Tilden and Macomb Street, the zoning of this portion of Connecticut Avenue is generally higher density residential with a lower density commercial strip for part of the block fronting on Connecticut Avenue. South of Macomb Street are some larger apartment/condominium complexes (on the west side-opposite the National Zoo). Between Woodley Road and Calvert Street, the land use is almost entirely commercial along the Avenue. The Sheraton Washington and Omni-Shoreham hotels are also located in this area. Most zoning is R-5-C residential and C-2-A or C-2-B commercial.

The major issues are identified on p.10 as "development and traffic". The development issue revolves around the potential replacement of existing small scale (2 or 3 story) buildings with much larger buildings for office and other non-neighborhood related uses. The most significant traffic issue is



TILDEN STREET TO MACOMB STREET



MACOMB STREET TO CALVERT STREET

concern that this redevelopment will result in increased traffic volume and congestion as well as safety problems.

The OP/DPW preliminary report dealt with two land use scenarios:

1. Existing Land Uses

2. Expected Year 2000 Redevelopment Land Uses

The future scenario used the following assumptions (as stated on page 22):

(1) The majority of residentially zoned areas along the avenue are basically stable with no major changes anticipated;

(2) Development will occur in accord with the comprehensive plan policies;

(3) In new development 100 percent of the zoning envelope will be used;

(4) Only selected commercially zoned areas along the avenue may be subject to development or redevelopment by the Year 2000; and

The fourth assumption involves the most judgment on which specific parcels/buildings are likely to be redeveloped.

Review of Section: Transportation Assessment

This section of the report identified some limitations of the study (on page 24 by what the study did not do:

1. assess the impact of Metro on traffic conditions on Connecticut Avenue and the opportunity for increased transit use.

2. perform a detaiiled analysis of the impacts of regional growth on the corridor. Growth rates were, however, extrapolated from historical trends.

3. analyze potential changes in side street traffic.

4. utilize the Metropolitan Council of Governments' (COG) long-range forecasting data to predict future traffic volumes on Connecticut Avenue and the arterial streets which cross it.

5. analyze any options other than worst case development and through traffic growth.

The length of the Connecticut Avenue corridor was divided into four zones:

zone 1: Western Avenue to Nebraska Avenue

zone 2: Nebraska Avenue to Tilden Street

zone 3: Tilden street to Macomb Street

zone 4: Macomb Street to Calvert Street

This review of the OP/DPW study is concerned only with zones 3 and 4. The following findings of the OP study, stated on pages 25 and 26, were reviewed in some detail and comments are included in the main body of this report:

1. In Zone 3, the levels of service remain good at all intersections except Porter Street which will require Transportation System Management (TSM) measures to maintain the current level of service.

2. In Zone 4, there are no intersections with current or projected serious level of service problems.

3. The traffic growth on Connecticut Avenue due to development is localized and is not expected to cause serious traffic congestion either on Connecticut Avenue or in the Connecticut Avenue Corridor.

4. The implementation of Transportation System Management (TSM) techniques at intersections with projected low levels of service can improve the quality of flow at most intersections by one level of service.

This section of the OP/DPW report indicates that "the ability of Connecticut Avenue to handle the existing and projected traffic was evaluated by the use of the nationally accepted Highway Capacity Manual (1985) methods, specifically by the use of levels of service calculations." The level of

service descriptions are reproduced from P. 27/28 of the OP report and are shown on the next page. Input data for the analysis included complete turning movement vehicular volumes at all signalized intersections, as well as traffic signal timing and phasing, roadway geometry, truck volumes, bus movements, and parking regulations for the approaches to each intersection. The results of the analysis for the existing (1986) situation (Table 1) is reproduced in this appendix.

Natural traffic growth (through traffic only) was addressed on pages 28 and 29 and was stated as 1% per year for peak hours. However, copies of the OP/DPW computer output tables showed the use of a 2% per year growth rate. Local traffic growth was based on changed land uses due to redevelopment assumptions for each block along Connecticut and aggregated to four zones. Traffic estimates were obtained by applying the trip generation rates indicated below:

Trip Generation Rates

	Peak Hour				Off Peak		Week End	
	AM		PM					
	In	Out	In	Out	In	Out	In	Out
Office (1,000 ft^2)	1.4	0.1	0.21	1.3	0.1	0.1	0.22	0.19
Retail (1,000 ft^2)	0.18	0.13	1	1.6	0.3	0.3	1.6	1.6
Residential (D.U.)	0.12	0.23	0.24	0.11	0.1	0.1	0.2	0.13
Hotel (Room)	0.1	0.15	0.25	0.05	0.2	0.2	0.37	0.3
Theater (Seat)	0	0	0.1	0.1	0.1	0.1	0.5	0.5
School (1,000 ft^2)	0.19	0.07	0.07	0.13			0.11	0.04

Level of Service Definitions: In general, the various levels of service are defined as follows:

- Level of service A describes operations with very low delay, i.e., less than five seconds per vehicle. Most vehicles arrive during the green signal phase and do not stop at all. This generally occurs with extremely favorable signal progression and short cycle lengths.

- Level of service B describes operations with delay in the range of five to 15 seconds per vehicle. More vehicles stop at traffic signals than for levels of service A but traffic movements are generally stable with a minimum of congestion.

- Level of service C describes operations with delays in the range of 15 to 25 seconds per vehicle. Individual cycle failures (all vehicles stopped for red signal not clearing intersection on next green signal) may begin to appear at this level. The number of vehicles stopping is significant although many still pass through the intersection without stopping.

- Level of service D describes operations with delay in the range of 25 to 40 seconds per vehicle. At level D the influence of congestion becomes more noticeable. Many vehicles stop and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

- Level of service E describes operations with delay in the range of 40 to 60 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delays generally indicate high volume to capacity ratios and individual cycle failures are frequent occurrences.

- Level of service F describes operations with delay in excess of 60 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition occurs when arrival flow rates exceed the capacity of the intersection.

*Highway Capacity Manual, Special Report 209, Transportation Research Board, 1985.

TABLE 1

EXISTING LEVELS OF SERVICE
CONNECTICUT AVENUE AT:

	AM PEAK	MID-DAY	PM PEAK
OLIVER STREET	A	A	B
MCKINLEY STREET	D	B	E
LIVINGSTON STREET	B	A	A
MILITARY ROAD	E	A	E
JENIFER STREET	A	A	A
HUNTINGTON STREET	A	A	A
NEBRASKA AVENUE	E	A	E
FESSENDEN STREET	B	A	A
DAVENPORT STREET	B	A	A
BRANDYWINE STREET	C	A	A
ALBEMARLE STREET	C	A	B
YUMA STREET	C	A	B
WINDOM STREET	C	B	C
VEAZEY STREET	C	B	C
VAN NESS STREET	C	B	E
TILDEN STREET	D	B	C
SEDGEWICK STREET	A	A	A
PORTER STREET	C	A	C
ORDWAY STREET	A	A	A
MACOMB STREET	A	A	B
DEVONSHIRE PLACE	A	A	A
ZOO ENTRANCE	A	A	B
CATHEDRAL AVENUE	B	A	C
WOODLEY ROAD	C	A	A
24TH STREET	A	A	A
CALVERT STREET	C	B	B

The natural growth for through traffic was combined with the new development traffic to yield the total traffic increase to the year 2000.

Four assumptions were made regarding side street traffic impacts (p. 32):

1. As development related traffic growth is minimal and Connecticut Avenue is expected to operate at an acceptable level, side street impacts are not anticipated to be a major problem.

2. Generally increasing traffic congestion along the corridor, described in the Analysis section of this chapter, may result in some drivers attempting to take alternate routes through the surrounding neighborhoods.

3. Traffic attracted to new development on the Avenue may also use local streets (the location of the development will largely determine which streets) to get to the corridor from points east and west.

4. Without physical changes to the road network in the area, the streets most likely to see the greatest impact from generally increasing traffic levels are those currently used as collectors and arterials.

The study also states, "Mitigation of many of the impacts that may occur is possible with advance planning and standard TSM measures."

Results of the OP/DPW analysis of the future levels of service along connecticut Avenue (Table 2) is also included in this appendix. The first

TABLE 2

EXISTING AND PROJECTED LEVELS OF SERVICE AT
INTERSECTIONS ALONG CONNECTICUT AVENUE - YEAR 2000

LOCATION	AM PEAK			MID-DAY			PM PEAK			TSM MEASURES
	EXISTING	FUTURE		EXISTING	FUTURE		EXISTING	FUTURE		
		NO TSM	T S M		NO TSM	T S M		NO TSM	T S M	
Zone #1										
Oliver	A	B	A	A	A	*	B	D	B	Reversible
McKinley	D	E	D	B	D	*	E	E	D	Lane
Livingston	B	C	B	A	B	*	A	C	B	No Left Turn
Military	E	E	E	A	D	*	E	E	E	
Jenifer	A	A	*	A	A	*	A	A	*	
Huntington	A	A	*	A	A	*	A	A	*	Parking
Nebraska	E	F	E	A	C	B	E	E	E	Restrictions
Zone #2										
Fessenden	B	C	*	A	A	*	A	B	*	
Davenport	B	C	*	A	A	*	A	B	*	
Brandywine	C	D	*	A	A	*	A	B	*	
Albemarle	C	D	*	A	B	*	B	C	*	
Yuma	C	D	*	A	B	*	B	C	*	
Windom	C	D	*	B	B	*	C	D	*	Improve Bus
Veazey	C	D	*	B	B	*	C	C	*	Operation
Van Ness	C	C	*	B	C	*	E	F	E	Bus Bays
Tilden	D	E	C	B	D	B	C	D	C	NP on Tilden
Zone #3										
Sedgewick	A	B	*	A	A	*	A	B	*	
Porter	C	E	E	A	A	*	C	E	D	Turn
Ordway	A	A	*	A	A	*	A	B	*	Restrictions
Macomb	A	B	*	A	A	*	B	C	*	
Zone #4										
Devonshire	A	B	*	A	A	*	A	B	*	
Zoo	A	B	*	A	A	*	B	C	*	
Cathedral	B	C	B	A	B	*	C	D	D	Remove W/B
Woodley	C	C	*	A	A	*	A	A	*	Parking
24th	A	B	*	A	A	*	A	A	*	
Calvert	C	D	D	B	C	*	B	C	*	

* - No TSM Measures Proposed

future level of service column, "contains the levels anticipated with no traffic capacity improvements implemented throughout the corridor. The second column contains levels of service anticipated with the implementation of transportation system management (TSM) improvements at intersections with future levels of service of E or F. These improvements include the extension of the reversible lane operation on Connecticut Avenue in the peak periods, restricted parking at selected areas along Connecticut Avenue, turning restrictions and/or the addition of turning lanes at selected intersections and traffic signalization improvements."

Specifically for the Tilden Street to Calvert Street area, the conclusions stated are:

1. Minor peak period congestion occurs at present at Porter street and will worsen in the future to service level E. TSM measures are necessary to bring the future levels back to existing conditions.

2. There is very little development induced growth from Macomb to Calvert Steet, and future traffic levels reflect this minimal growth. The normal projected growth in through traffic produces a decline of a maximum of only one level of service at most intersections throughout the day.

The overall conclusions of the Transportation Assessment Section are stated below (p. 36):

"Based on the analyses conducted as part of this study, several conclusions may be drawn.

- Existing levels of service, with few exceptions, are good for all time periods throughout the length of Connecticut Avenue.

- The impact of the development proposed in this study upon future traffic levels is minimal and does not warrant any change in current development plans.

- Any side street impacts will be localized and should not be attributable to unacceptable levels of service on Connecticut Avenue.

- Future peak period levels of service at a few intersections will deteriorate to a point that TSM measures will be necessary to maintain existing service levels. These measures may include:
  - Parking restrictions near intersections and around access routes to Rock Creek Parkway
  - Turning restrictions
  - Bus bays
  - Extension of the current reversible lane operation"

APPENDIX B

TRIP DISTRIBUTION

BY: LAND USE CATEGORY
SQUARE
AM AND PM PEAKS

TRIP DISTRIBUTION: ADDITIONAL (NEW DEVELOPMENT) TRIPS- BY OFFICE

DWP

OFFICE

SQUARE	AM, IN N	S	E	W	TOTAL	AM, OUT N	S	E	W	TOTAL	PM, IN N	S	E	W	TOTAL	PM, OUT N	S	E	W	TOTAL
2202 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	7	3	3	2	14	1	0	0	0	1	1	0	0	0	2	7	2	3	2	13
2203 (1)	16	6	7	4	33	1	0	0	0	2	3	1	0	0	5	15	6	6	4	31
(2)	16	6	7	4	33	1	0	0	0	2	3	1	0	0	5	15	6	6	4	31
2204 (1)	96	35	39	23	193	8	3	1	1	14	17	6	3	3	29	89	32	36	21	179
(2)	96	35	39	23	193	8	3	1	1	14	17	6	3	3	29	89	32	36	21	179
2068 (1)	38	11	3	3	55	1	3	0	0	4	2	5	0	0	8	36	10	3	3	51
(2)	48	14	3	3	69	1	3	0	0	5	3	7	1	1	10	45	13	3	3	64
2069 (1)	57	16	4	4	82	1	4	0	0	6	3	8	1	1	12	53	15	4	4	76
(2)	41	12	3	3	59	1	3	0	0	4	2	6	0	0	9	38	11	3	3	55
2083 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	40	11	3	3	57	1	3	0	0	4	2	6	0	0	9	37	11	3	3	53
2082 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	24	7	2	2	35	1	2	0	0	2	1	3	0	0	5	23	6	2	2	32
2222 (1)	45	13	3	3	65	1	3	0	0	5	2	6	0	0	10	42	12	3	3	60
(2)	77	22	5	5	109	2	5	0	0	8	4	11	1	1	16	71	20	5	5	102
2218 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	117	33	8	8	167	3	8	1	1	12	6	16	1	1	25	109	31	8	8	155

(1) DPW Estimated
(2) Neighborhood Data

TRIP DISTRIBUTION: ADDITIONAL (NEW DEVELOPMENT) TRIPS - BY RETAIL

DWP

RETAIL

SQUARE	AM, IN					AM, OUT					PM, IN					PM, OUT				
	N	S	E	W	TOTAL	N	S	E	W	TOTAL	N	S	E	W	TOTAL	N	S	E	W	TOTAL
2202 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	0	0	0	0	1	0	0	0	0	1	1	2	1	1	4	2	2	1	1	7
2203 (1)	3	1	0	0	4	1	2	0	0	3	7	9	4	4	24	13	13	6	6	38
(2)	3	1	0	0	4	1	2	0	0	3	7	9	4	4	24	13	13	6	6	38
2204 (1)	5	2	1	1	8	1	4	1	1	6	14	18	7	7	46	26	26	11	11	73
(2)	5	2	1	1	8	1	4	1	1	6	14	18	7	7	46	26	26	11	11	73
2068 (1)	5	1	0	0	7	2	3	0	0	5	12	23	2	2	39	25	25	6	6	63
(2)	6	2	0	0	9	2	4	0	0	6	15	30	2	2	49	32	32	8	8	79
2069 (1)	7	2	1	1	11	2	5	0	0	8	18	35	3	3	59	37	37	9	9	94
(2)	5	2	0	0	8	2	3	0	0	5	13	25	2	2	42	27	27	7	7	67
2083 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	5	1	0	0	7	2	3	0	0	5	12	25	2	2	41	26	26	7	7	65
2082 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	3	1	0	0	4	1	2	0	0	3	7	15	1	1	25	16	16	4	4	40
2222 (1)	6	2	0	0	8	2	4	0	0	6	14	28	2	2	46	30	30	7	7	74
(2)	10	3	1	1	14	3	6	1	1	10	23	47	4	4	78	50	50	13	13	125
2218 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	15	4	1	1	21	5	9	1	1	16	36	72	6	6	119	76	76	19	19	191

(1) DPW Estimated
(2) Neighborhood Data

TRIP DISTRIBUTION: ADDITIONAL (NEW DEVELOPMENT) TRIPS - BY RESIDENTIAL

DWF

RESIDENTIAL

SQUARE	AM, IN N	S	E	W	TOTAL	AM, OUT N	S	E	W	TOTAL	PM, IN N	S	E	W	TOTAL	PM, OUT N	S	E	W	TOTAL
2202 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	1	0	0	0	2	1	2	0	0	4	1	2	0	0	4	1	1	0	0	2
2203 (1)	3	1	0	0	5	3	6	0	0	9	2	6	1	1	10	1	2	0	0	4
(2)	3	1	0	0	5	3	6	0	0	9	2	6	1	1	10	1	2	0	0	4
2204 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2068 (1)	5	3	0	0	8	5	10	1	1	16	5	10	1	1	17	5	2	0	0	8
(2)	5	3	0	0	9	5	10	1	1	17	5	11	1	1	18	5	2	0	0	8
2069 (1)	6	3	1	1	10	6	12	1	1	20	6	12	1	1	20	6	3	0	0	9
(2)	10	5	1	1	16	9	18	2	2	30	10	19	2	2	32	9	4	1	1	15
2083 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	3	1	0	0	4	3	5	0	0	9	3	5	0	0	9	2	1	0	0	4
2082 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	2	1	0	0	3	2	3	0	0	5	2	3	0	0	5	1	1	0	0	2
2222 (1)	6	3	0	0	10	6	11	1	1	18	6	12	1	1	19	5	3	0	0	9
(2)	5	3	0	0	8	5	10	1	1	16	5	10	1	1	17	5	2	0	0	8
2218 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	11	6	1	1	18	11	21	2	2	35	11	22	2	2	37	10	5	1	1	17

(1) DPW Estimated
(2) Neighborhood Data

TRIP DISTRIBUTION: ADDITIONAL (NEW DEVELOPMENT) TRIPS - BY HOTEL

DWP

HOTEL

SQUARE	AM, IN					AM, OUT					PM, IN					PM, OUT				
	N	S	E	W	TOTAL	N	S	E	W	TOTAL	N	S	E	W	TOTAL	N	S	E	W	TOTAL
2202 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2203 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2204 (1)	1	2	0	0	3	1	3	0	0	4	1	5	0	0	7	0	1	0	0	1
(2)	1	2	0	0	3	1	3	0	0	4	1	5	0	0	7	0	1	0	0	1
2068 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2069 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2083 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2082 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2222 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2218 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(1) DPW Eatimated
(2) Neighborhood Data

APPENDIX C

CRITICAL LANE VOLUME (CLV) ANALYSIS PROCEDURE

1. Explanation of the CLV Procedure

   (from "Guidelines for the Analysis of the Traffic Impact of Development Proposals MD National Capital Park and Planning Commission, 1984)

2. Work Short Calculations
   a. Existing AM and PM
   b. Scenario 1
   c. Scenario 2

ized intersections, the operating condition which defines the level of service is critical lane volume (Table 2). For uninterrupted flow the operating condition is service volume (Table 3).

(b) Critical Lane Analysis

A technical description of the critical lane volume technique is given in the January 1971 issue of Traffic Engineering magazine. The following is a brief description of the technique.

The critical lane analysis gives the number of vehicles that can be handled by a certain intersection configuration at a given level of service. The technique determines the level of service at which a certain configuration and volume will operate. The advantage of the technique is that it is simple and easy to use. It is, however, a general technique not suitable for design.

Procedure

1. Determine the total volume on each approach.

2. Subtract from the total approach volume any right or left turn volume that operates on an exclusive turn lane.

3. Determine the maximum volume per lane for each approach by applying the appropriate lane use factor to the volume from Step 2.

Number of Approach Lanes	Lane Use Factor
1	1.0
2	0.55
3	0.40
4	0.30

4. For each approach add the opposing left turns to the lane volume from Step 3.

5. Add the higher of the north-south volumes to the higher of the east-west volumes to obtain the critical lane volume.

6. Compare the critical lane volume to a level of service using Table 2.

(c) Standards

A Level of Service "D" is acceptable for peak hour traffic up to a volume of 1,450 vph for the critical lane volume.

TABLE 2

Level of Service
Interrupted Flow

Service Level	Description	Critical Lane Volume (Per Hour Green)
A	Free flow, turns easily made, excess green time on all phases	Less than 1,000
B	Stable flow, more platooning of vehicles, less than 10% of the cycles loaded	1,000 - 1,150
C	Stable flow, less than 30% of the cycles loaded	1,150 - 1,300
D	Approaching unstable flow, less than 70% of the cycles loaded, some drivers must wait through one	1,300 - 1,450
E	Theoretical capacity, less than 100% of the cycles loaded, motorists frequently wait through	Greater than 1,450

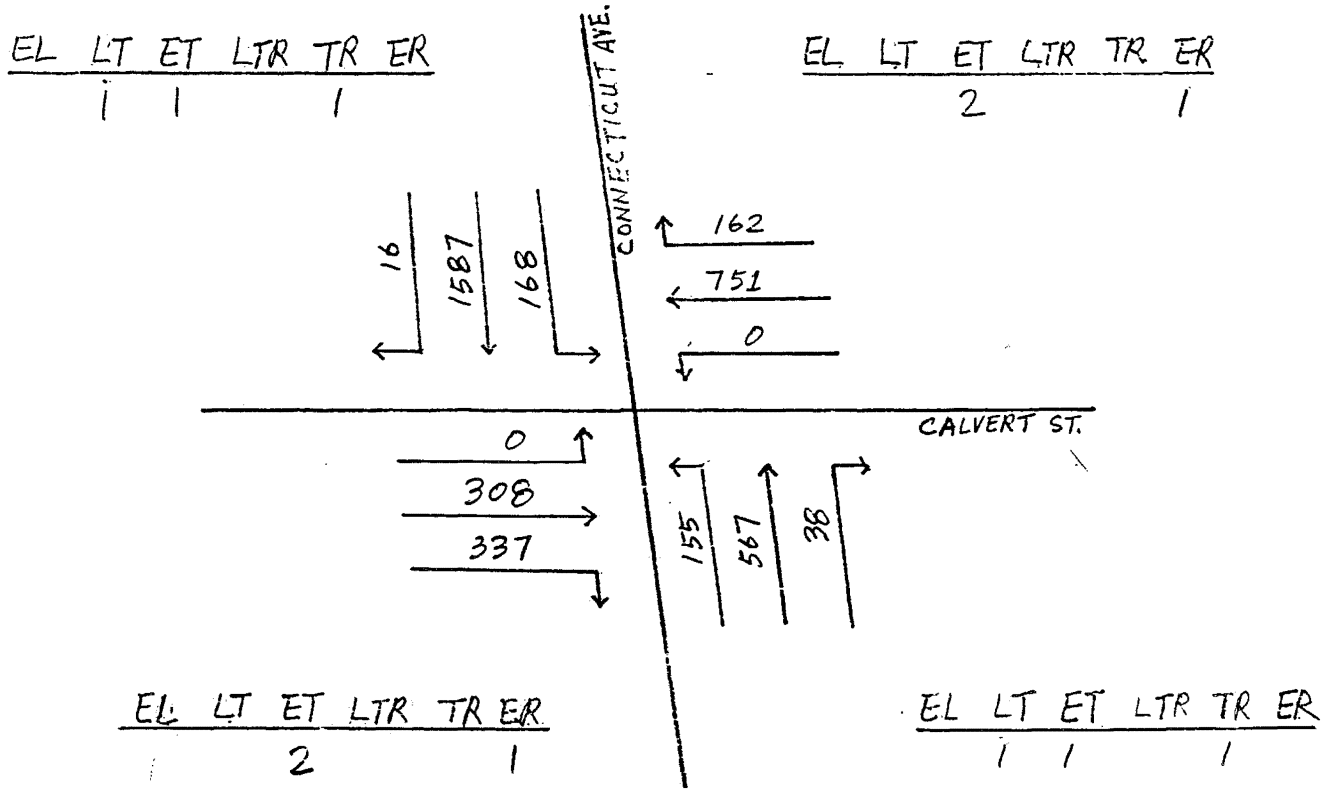
TABLE 3

Level of Service
Uninterrupted Flow

Service Level	Description	Service Volume
A	Free flow, operating speed at speed limit	600 vehicles per lane per hour
B	Stable flow, operating speed at speed limit (55 mph or higher)	1,000 vehicles per lane per hour
C	Stable flow, operating speed at speed limit (45 mph or greater)	1,500 vehicles per lane per hour
D	Approaching unstable flow, fluctuating flow, little freedom to maneuver, operating speed at 35 mph or greater	1,800 vehicles per lane per hour
E	Unstable flow, 30 mph operating speed	2,000 vehicles per lane per hour

Note: Service volumes lower for undivided facility

AM EXISTING



CAPACITY ANALYSIS

NS

(16 + 1587 + 168) · .4 + 155 = 863*

VC

(155 + 567 + 38) · .4 + 168 = 472

EW

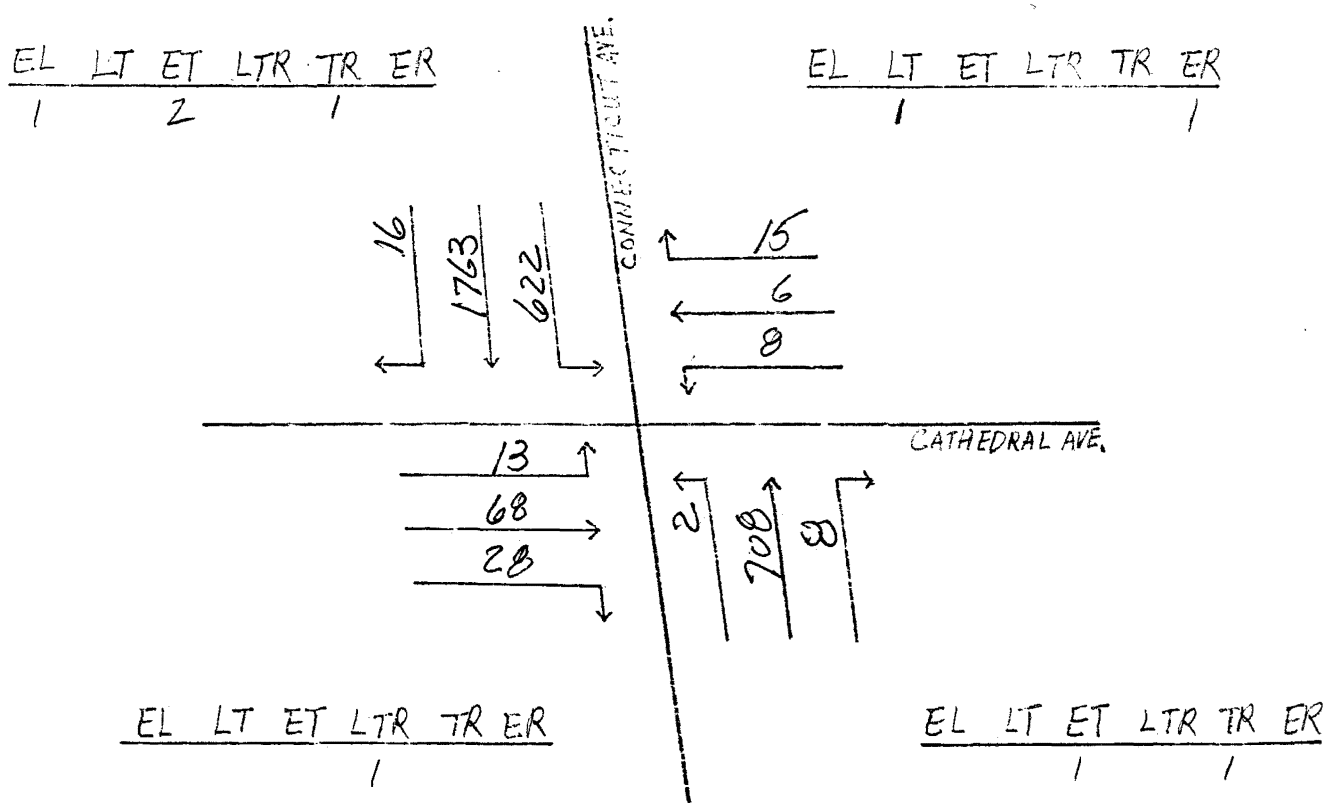
EB - 308 (.55) = 169

WB 751 (.55) = 413*

CLV Σ = 1276 LOS = C

EXHIBIT CAPACITY/LOS
CONNECTICUT & CALVERT
EXISTING TRAFFIC AM PEAK

AM EXISTING



CAPACITY ANALYSIS

NS

(1763 + 16) · 4 + (2) = 714

(708 + 8)(.55) + 622 = 1016 *

EW

(13 + 68 + 28) + 8 = 117 *

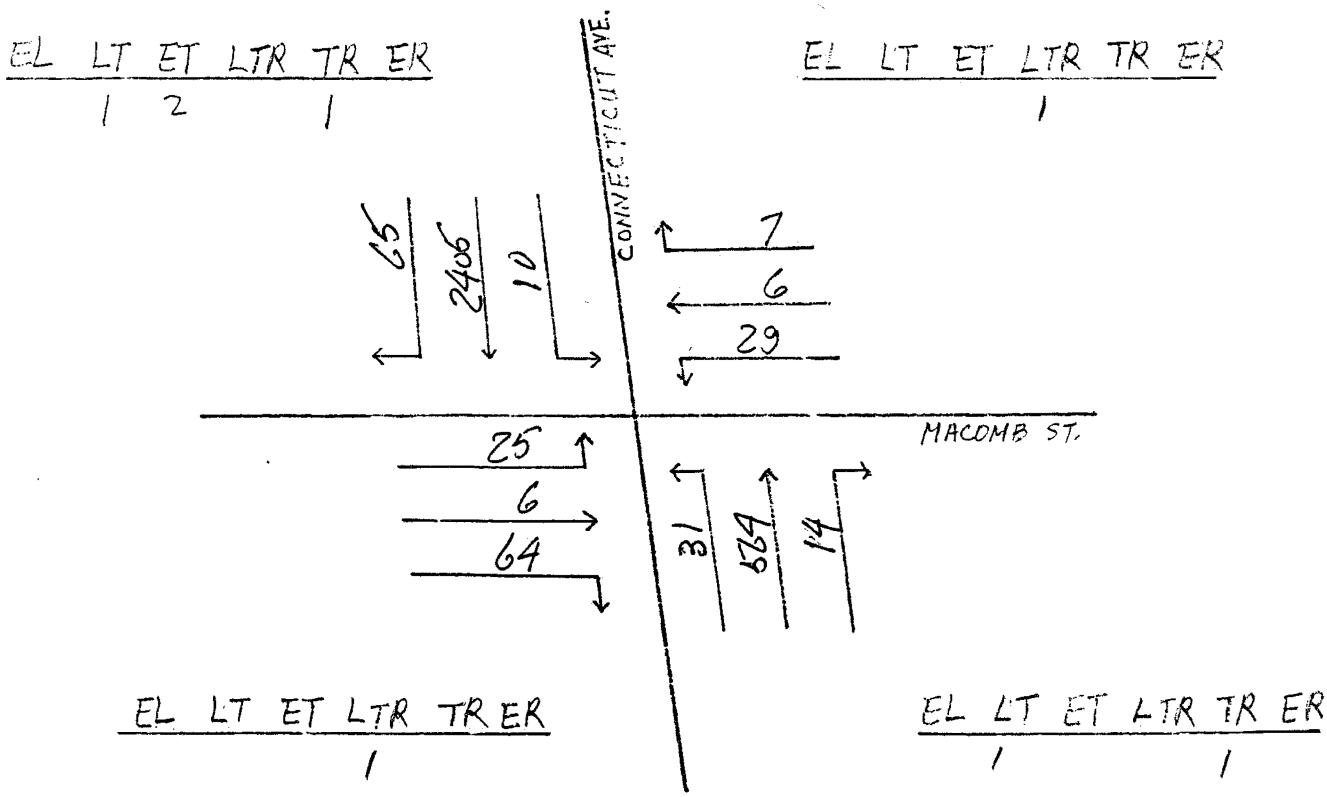
VS

(15 + 6 + 8) + 13 = 42

CLV Σ = N33 LOS = B

EXHIBIT CAPACITY/LOS: EXISTING TRAFFIC
CONNECTICUT & CATHEDRAL

AM EXISTING



CAPACITY ANALYSS

NS

(564+31+14).55+ 10 = 345

(65+2405+10).3 +31 774*

EW

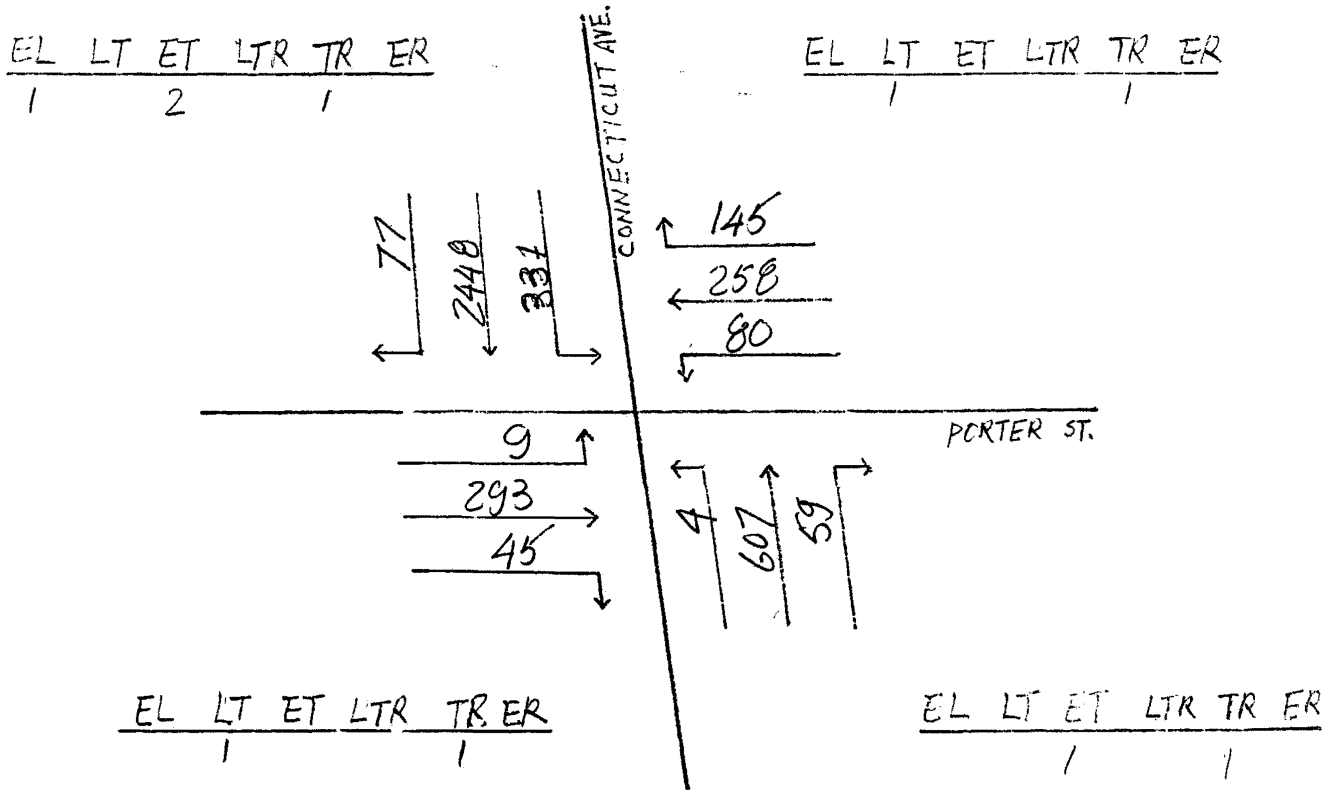
(25+6+64) + 29 = 124*

(29+6+7) +25 = 67

CLV E = 898 LOS = A

EXHIBIT CAPACITY/LOS: EXISTING TRAFFIC CONNECTICUT & MACOMB (AM PEAK)

AM EXISTING



NS

$(607+59)\cdot\frac{.55}{1} 331 = 691$

$(77+2448)\cdot.4 + (4) = 1014^*$

EW

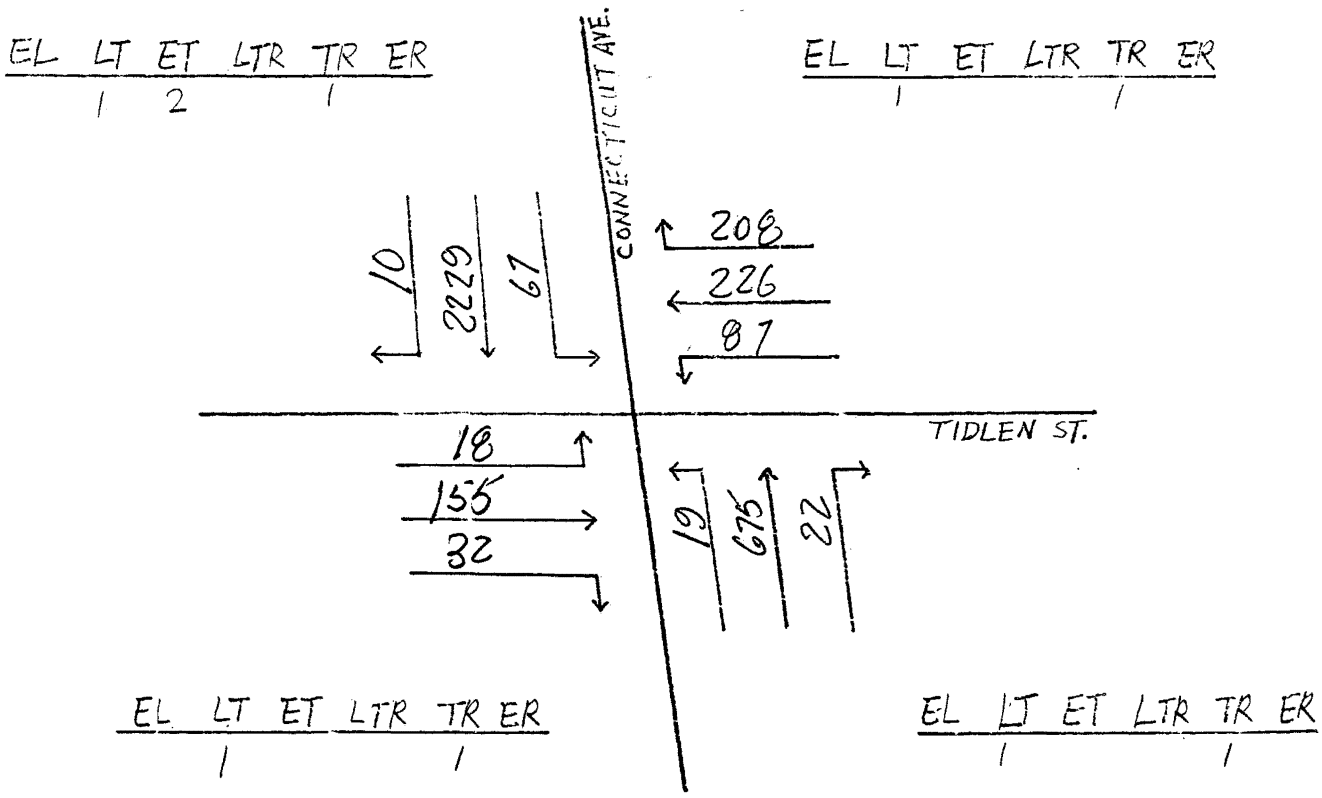
$(9+293+45)\cdot.55 + 80 = 271$

$(145+258+80)\cdot.55 + 9 = 275^*$

CLV $\Sigma = 1289$ LOS = C

EXHIBIT CAPACITY/LOS: EXISTING TRAFFIC
CONNECTICUT & PORTER (AM Peak)

AM, EXISTING



CAPACITY ANALYSIS

NS

$(2229+10+67).3+19 = 711^*$

$(19+675+22).55+67 = 461$

EW

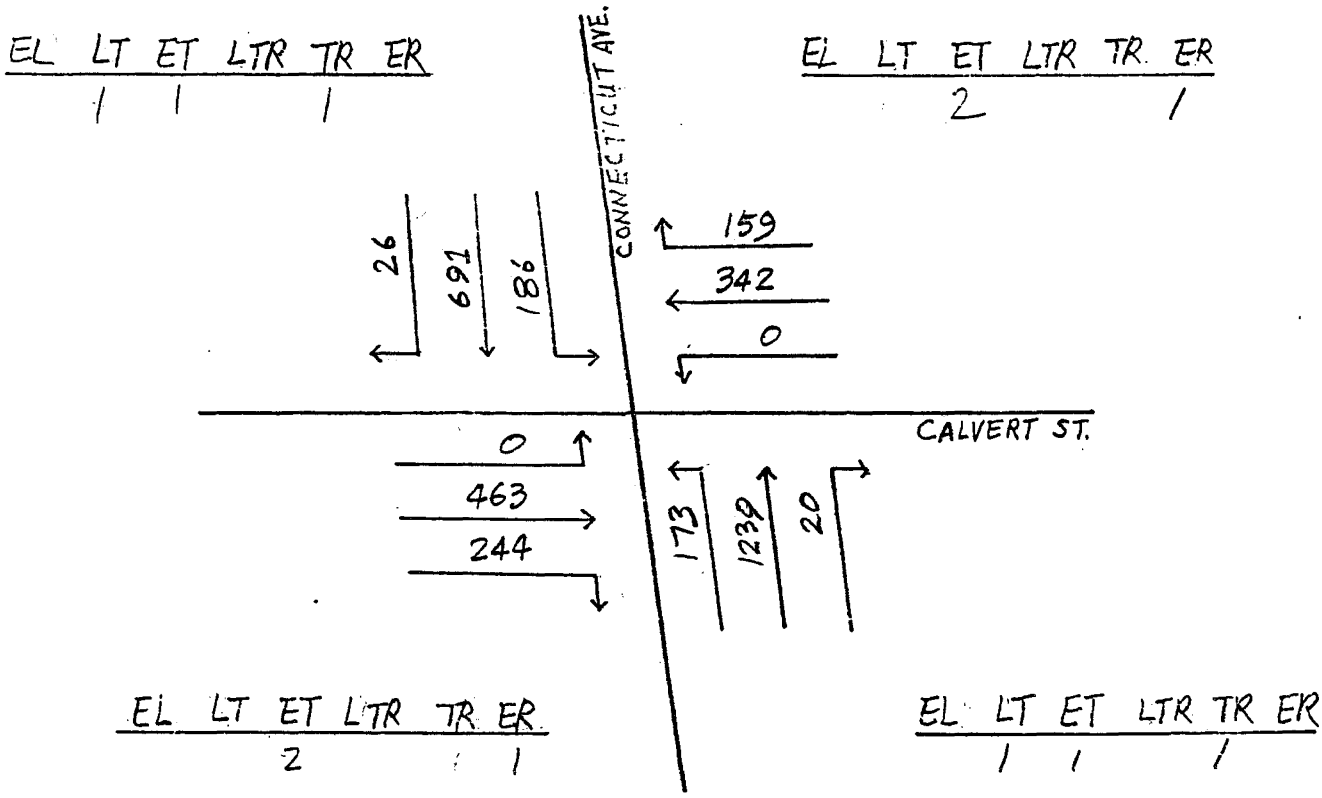
$(18+155+32).55+87 = 200$

$(208+226+87).56+18 = 305^*$

CLV E = 1016 LOS = B

EXHIBIT CAPACITY/LOS ANALYSIS: EXISTING TRAFFIC CONNECTICUT & TILDEN (AM Peak)

PM EXISTING



CAPACITY ANALYSIS

NS

(173 + 1239 + 20) · .4 + 186 = 759*

VS

(26 + 691 + 186) · .4 + 173 = 534

EW

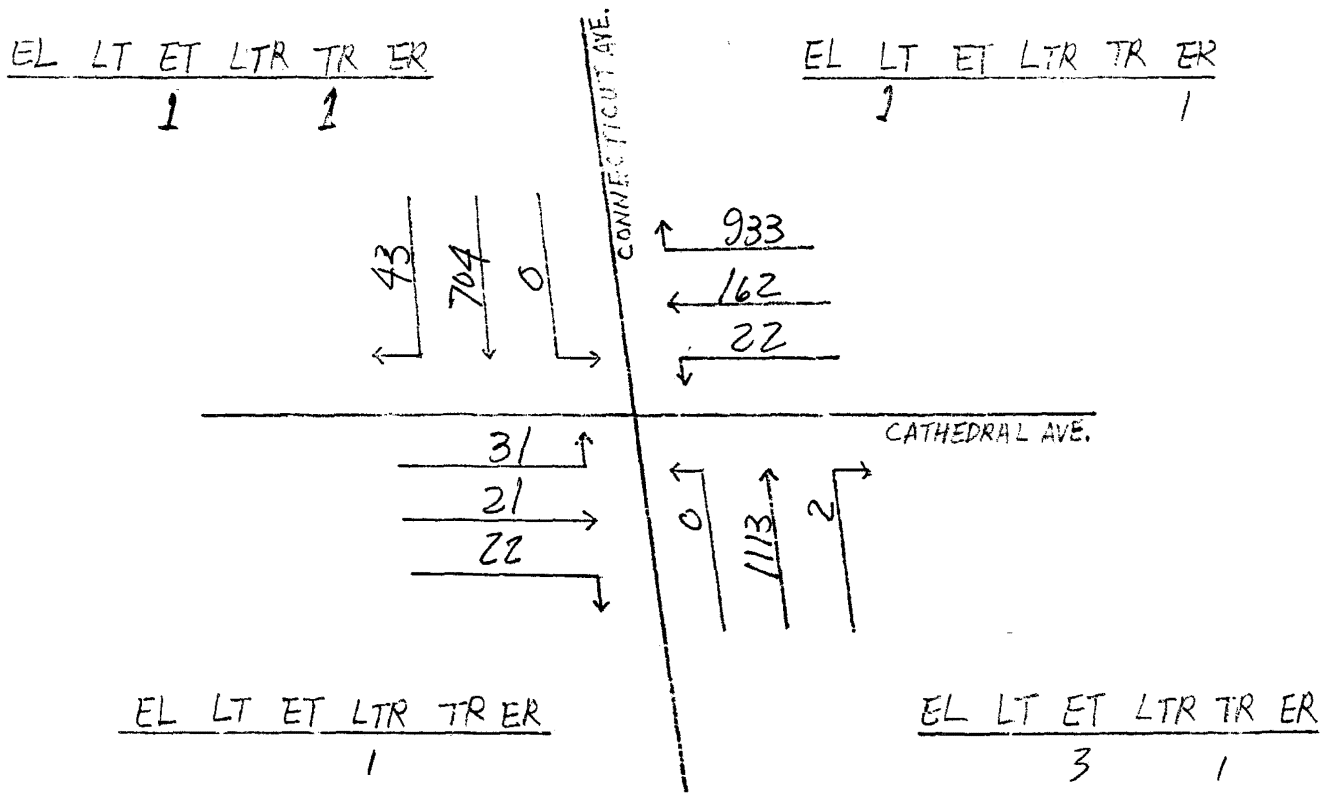
463 (.55) = 255*

342 (.55) = 188

CLV Σ = 1019 LOS = B

EXHIBIT CAPACITY/LOS – EXISTING TRAFFIC
CONNECTICUT & CALVERT PM PEAK

PM EXISTING



CAP

NS

$(704+43) \cdot .55 = 411$ *

$(113+2) \cdot .3 = 334.5$

EW

$(31+21+22) + 22 = 96$

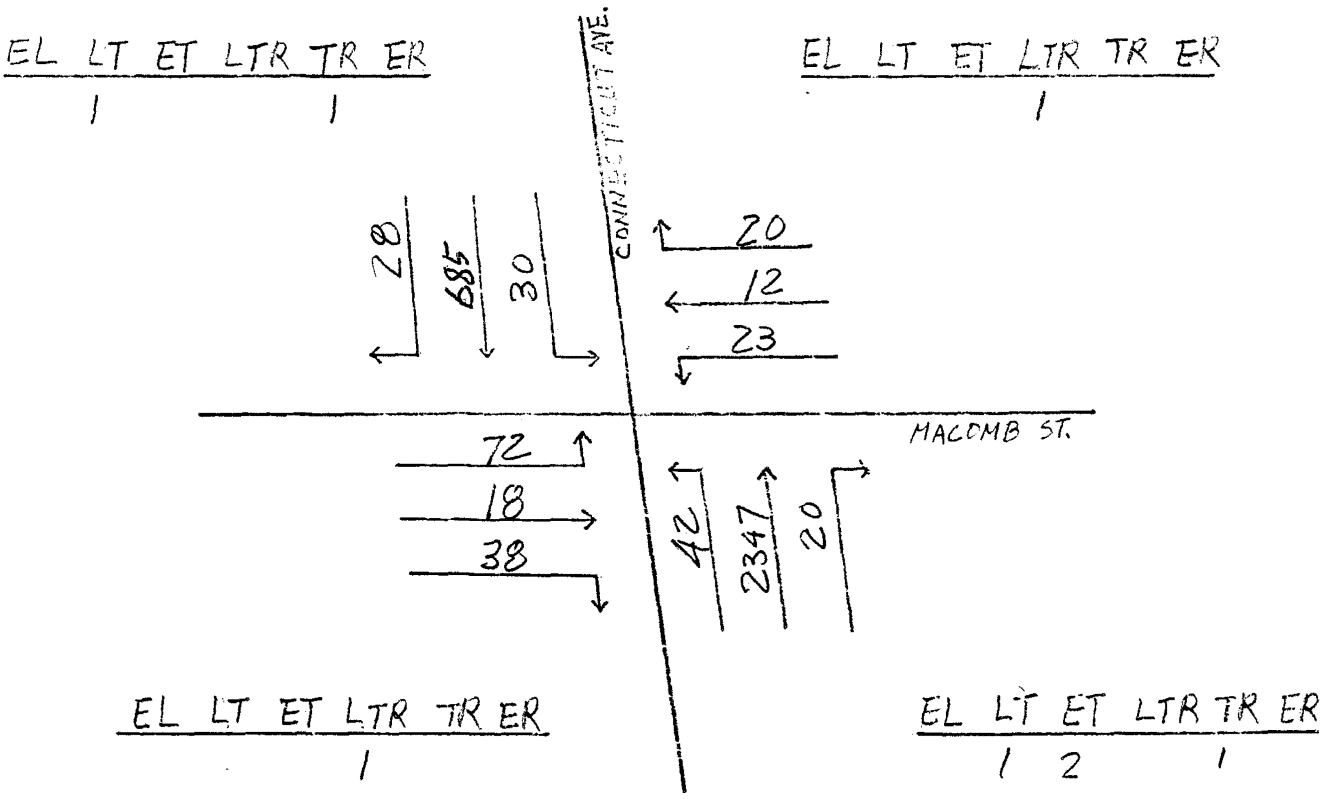
$162+22 \neq 31 = 215$

$933 + 31 = 964$*

CLV $E = 1375$

LOS = D

PM EXISTING



CAPACITY ANALYSIS

NS

$(28+685+30) .55 + 42 = 451$

$(42+2347+20) .3 + 30 = 753^*$

EW

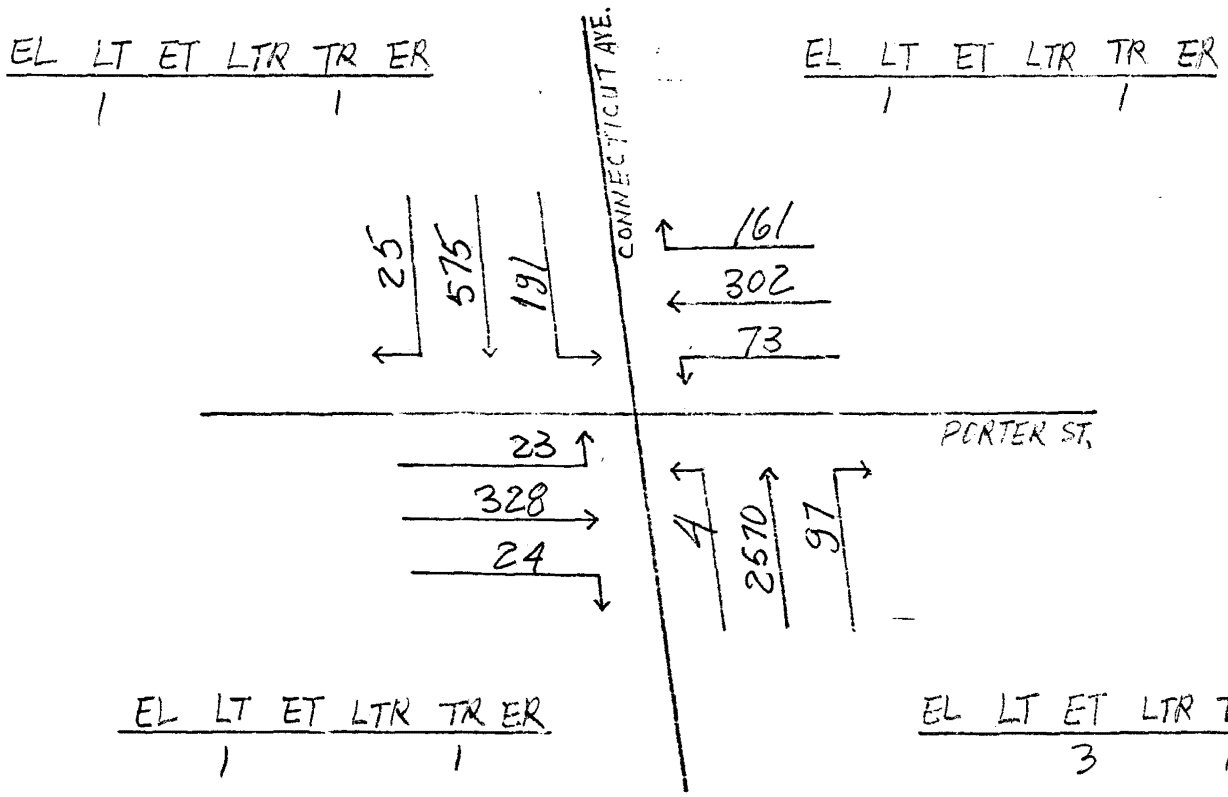
$(72+18+38) + 23 = 151^*$

$(20+12+23) + 72 = 127$

$CLV \Sigma = 904$ LOS = A

EXHIBIT CAPACITY/LOS: EXISTING TRAFFIC CONNECTICUT & MACOMB (PM PEAK)

PM EXISTING



NS

$(25 + 575 + 191) \cdot .55 + (4) = 439$

$(2570 + 97) \cdot .3 + 191 = 991^*$

EW

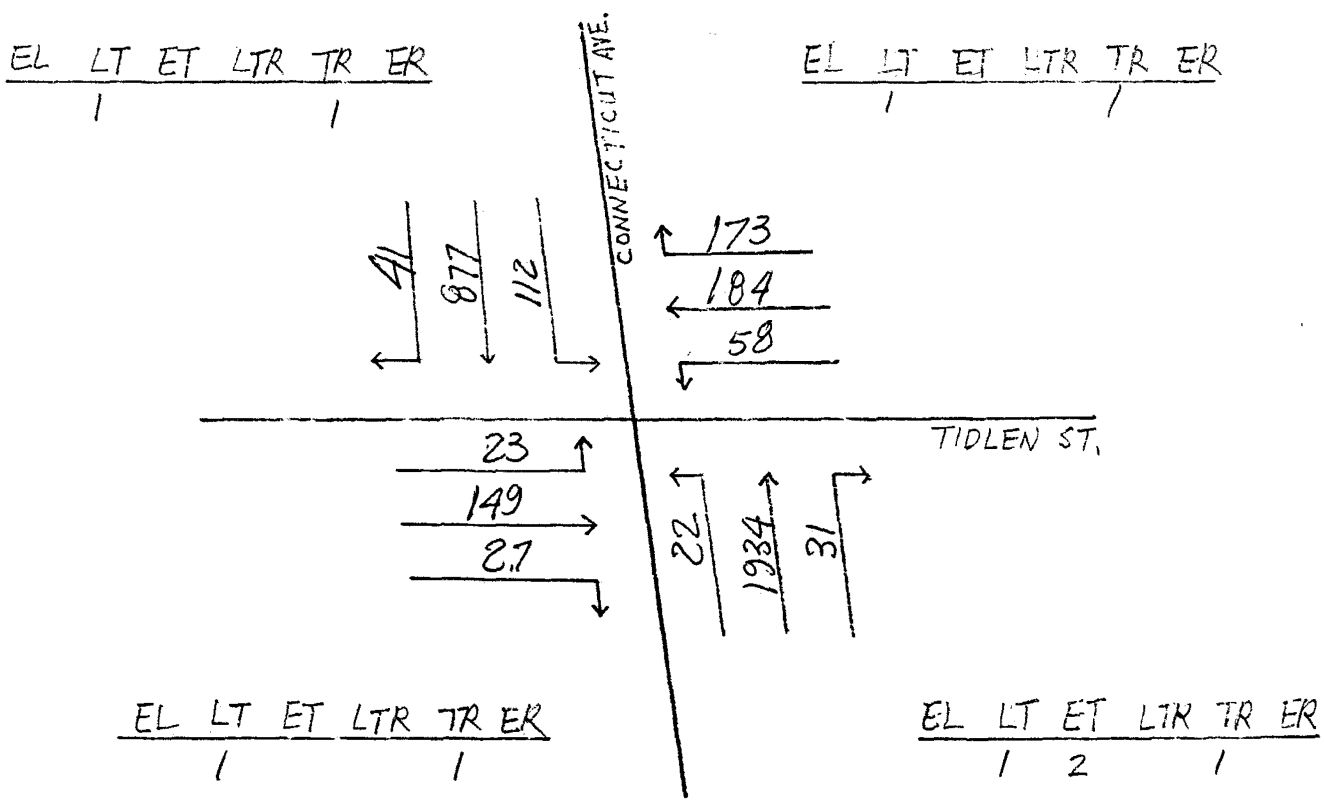
$(23 + 328 + 24) \cdot .55 + 73 = 279$

$(161 + 302 + 73) \cdot .55 + 23 = 318^*$

CLV Σ = 1309 LOS = D

EXHIBIT CAPACITY/LOS ANALYSIS: EXISTING TRAFFIC
CONNECTICUT & PORTER (PM Peak)

PM EXISTING



CAPACITY ANALYSIS

NS

$(41+877+112).55+22 = 589$

$(22+1934+31).3+112 = 708^*$

EW

$(23+149+27).55+58 = 167$

$(173+184+58).55+23 = 251^*$

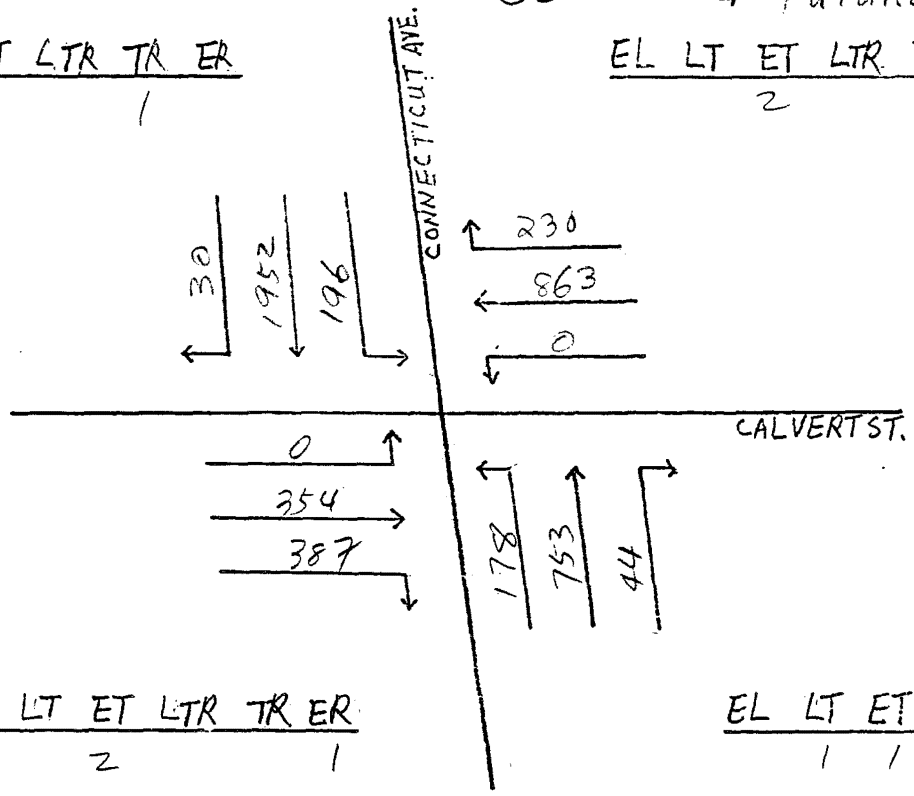
$CLV \Sigma = 959$ LOS = A

EXHIBIT CAPACITY/LOS ANALYSIS: EXISTING TRAFFIC
CONNECTICUT & TILDEN (PM Peak)

SCENARIO 3 FUTURE, AM

EL	LT	ET	LTR	TR	ER
1	1			1	

EL	LT	ET	LTR	TR	ER
		2		1	



EL	LT	ET	LTR	TR	ER
		2		1	

EL	LT	ET	LTR	TR	ER
1	1			1	

CAPACITY ANALYSIS

N-S

$(30+1952+196)\cdot 0.4+178 = 1049$ *

$(178+753+44)\cdot 0.4+196 = 556$

E-W

$354 \times 0.55 = 195$

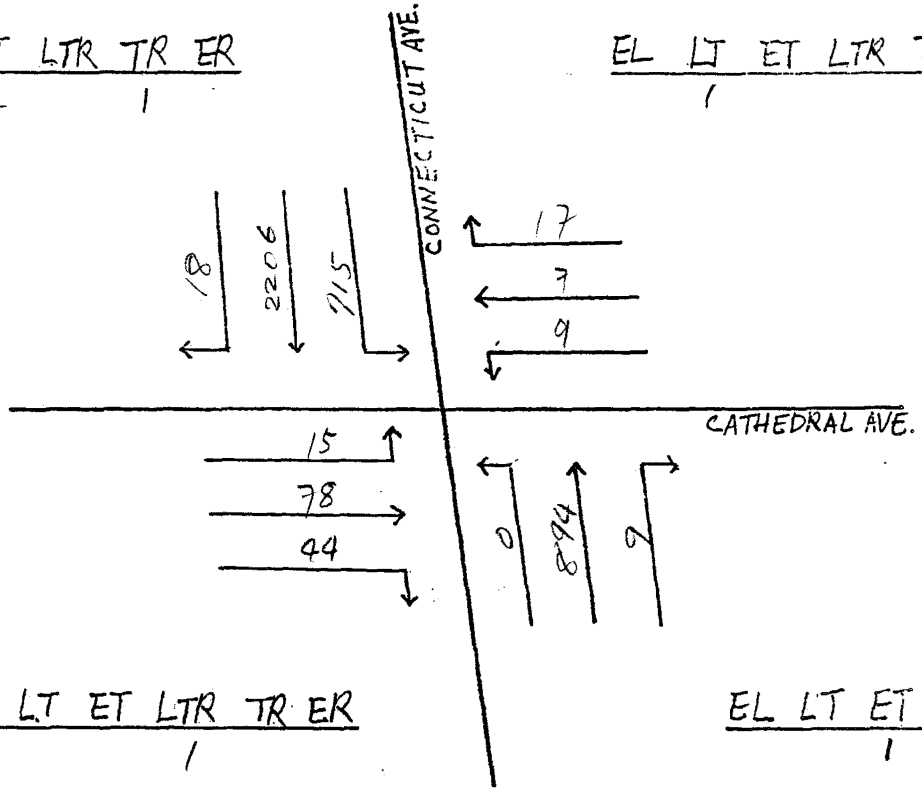
$863 \times 0.55 = 475$ *

CLVE = 1524 LOS = E

SCENARIO 1 FUTURE, AM

EL	LT	ET	LTR	TR	ER
1		2		1	

EL	LT	ET	LTR	TR	ER
1					1



EL	LT	ET	LTR	TR	ER
1					

EL	LT	ET	LTR	TR	ER
1					1

CAPACITY ANALYSIS

N-S

(=206+18)·0.4 = 890

(894+9)·0.55+715 = 1261 *

E-W

(15+78+44)+9 = 146 *

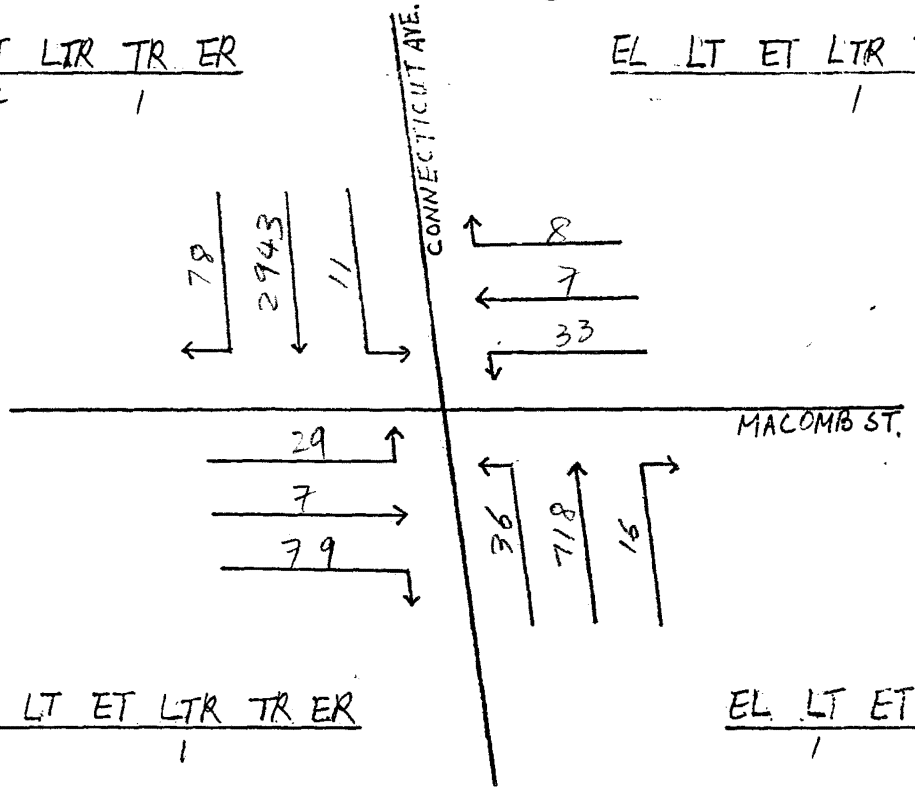
(7+9)+15 = 31

CLV = 1407 LOS = D

SCENARIO 2 FUTURE, AM

EL LT ET LTR TR ER
1 2 1

EL LT ET LTR TR ER
1



EL LT ET LTR TR ER
1

EL LT ET LTR TR ER
1 1

CAPACITY ANALYSIS

N-S

$(78+2943+11)\times 0.3+36 = 946$ *

$(36+718+16)\times 0.55+11 = 435$

E-W

$(29+7+79)+33 = 148$ *

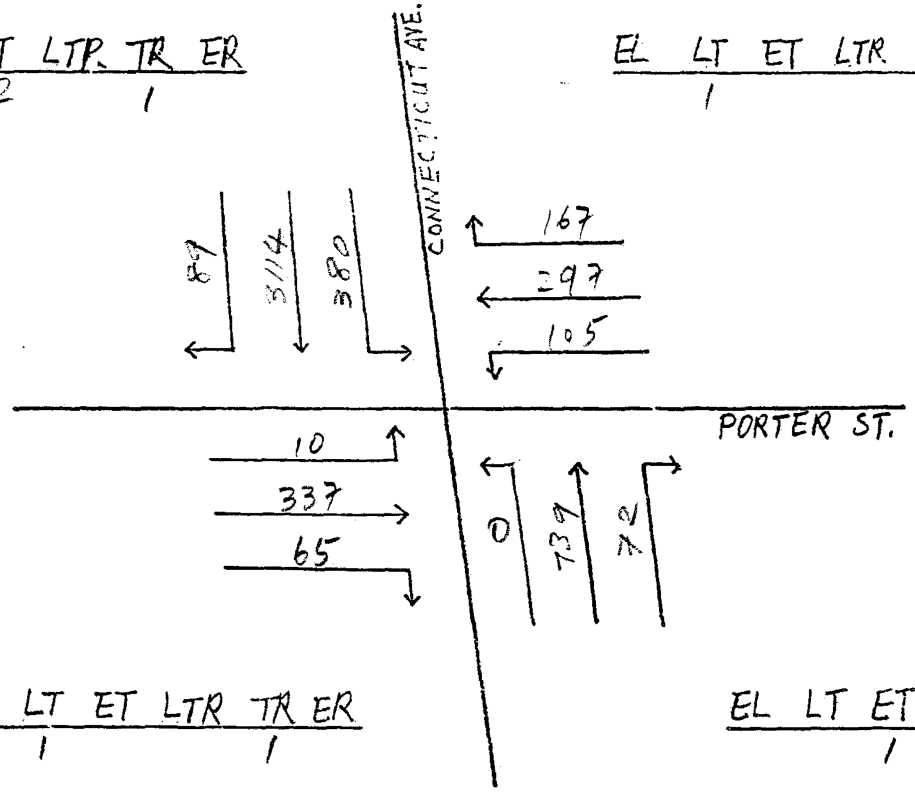
$(8+7+33)+29 = 77$

CLV = 1094 LOS = B

SCENARIO 1 FUTURE. AM

EL	LT	ET	LTR	TR	ER
1		2		1	

EL	LT	ET	LTR	TR	ER
1				1	



EL	LT	ET	LTR	TR	ER
1				1	

EL	LT	ET	LTR	TR	ER
1				1	

NS

$(89+3114)\times 0.4 = 1281^{*}$

$(739+72)\times 0.55+380 = 826$

E-W

$(10+337+65)\times 0.55+105 = 332^{*}$

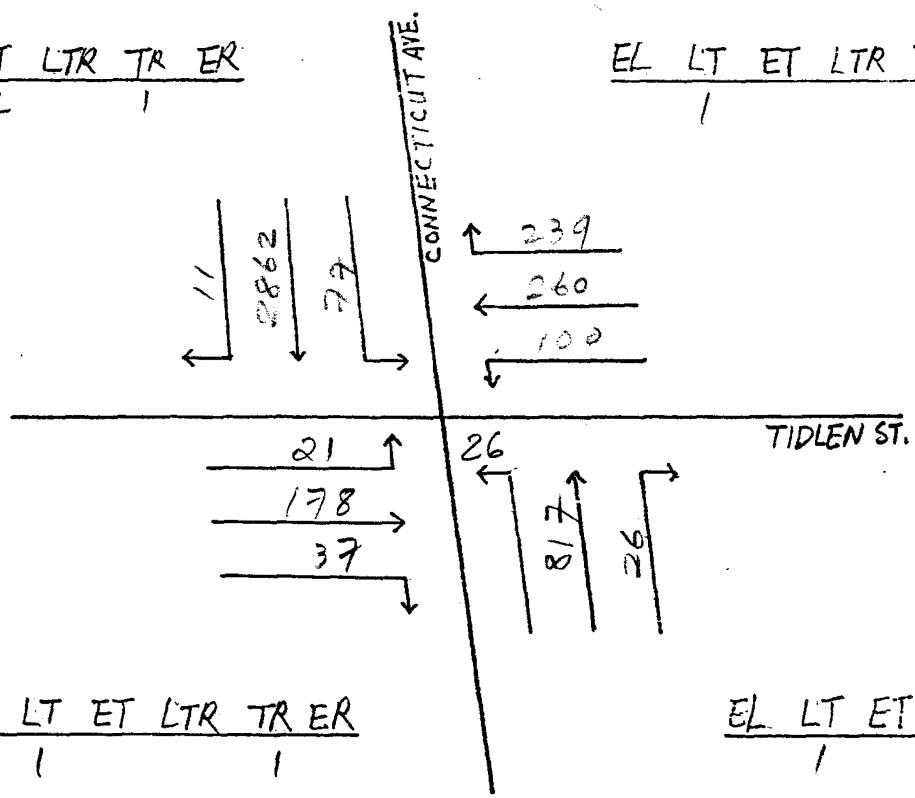
$(167+297+105)\times 0.55+10 = 323$

CLV = 1,613 LOS = F

SCENARIO 1 FUTURE AM

EL	LT	ET	LTR	TR	ER
	1	2		1	

EL	LT	ET	LTR	TR	ER
	1			1	



EL	LT	ET	LTR	TR	ER
	1			1	

EL	LT	ET	LTR	TR	ER
	1			1	

N-S

$(11+2862+77)\times 0.3+26 = 911^{*}$

$(22+817+26)\times 0.55+77 = 553$

E-W

$(21+178+37)\times 0.55+100 = 230$

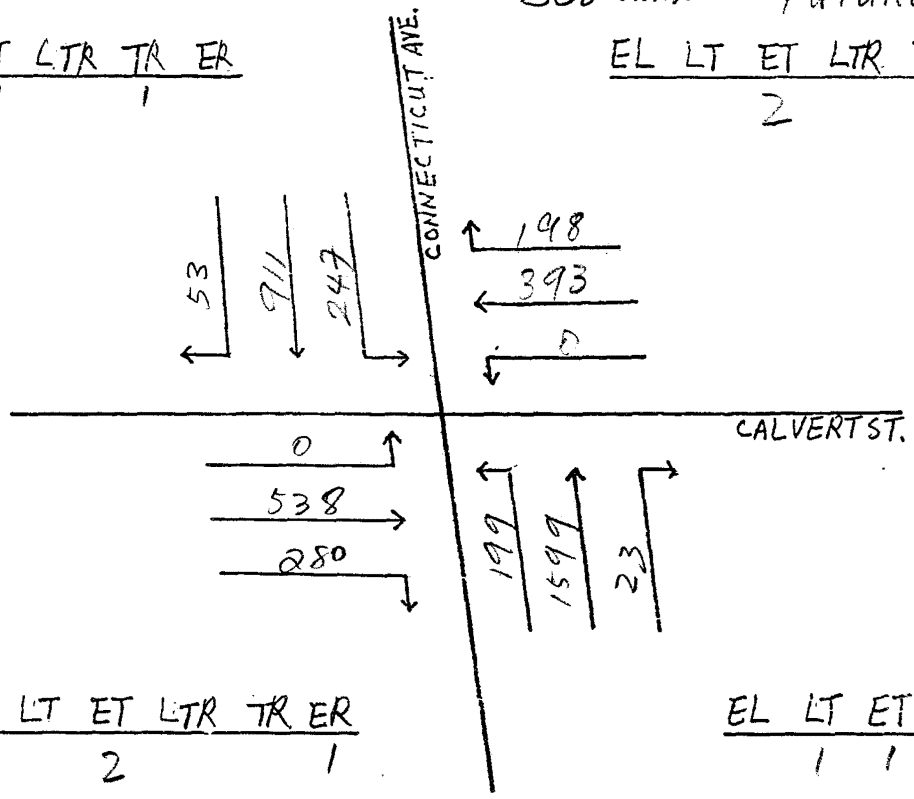
$(239+260+100)\times 0.55+21 = 350^{*}$

CLV = 1261 LOS = C

SCENARIO 1 FUTURE PM

EL	LT	ET	LTR	TR	ER
1	1			1	

EL	LT	ET	LTR	TR	ER
		2			1



EL	LT	ET	LTR	TR	ER
		2			1

EL	LT	ET	LTR	TR	ER
1	1			1	

N-S

$(53+911+247)\times 0.4+199 = 683$

$(199+1599+23)\times 0.4+247 = 975$ *

E-W

$538 \times 0.55 = 296$ *

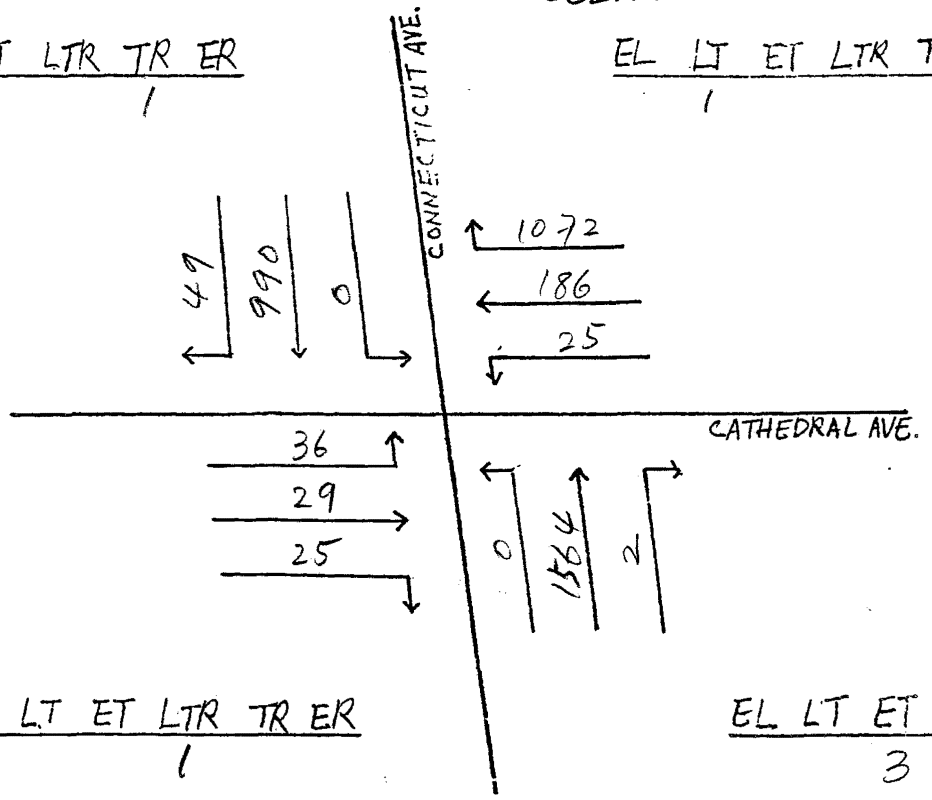
$393 \times 0.55 = 216$

CLV = 1,271 LOS = C

SCENARIO 1 FUTURE PM

EL LT ET LTR TR ER
1 1

EL LT ET LTR TR ER
1 1



EL LT ET LTR TR ER
1

EL LT ET LTR TR ER
3 1

N-S

(49 + 990) x 0.55 = 594 *

(1564 + 2) x 0.3 = 470

E-W

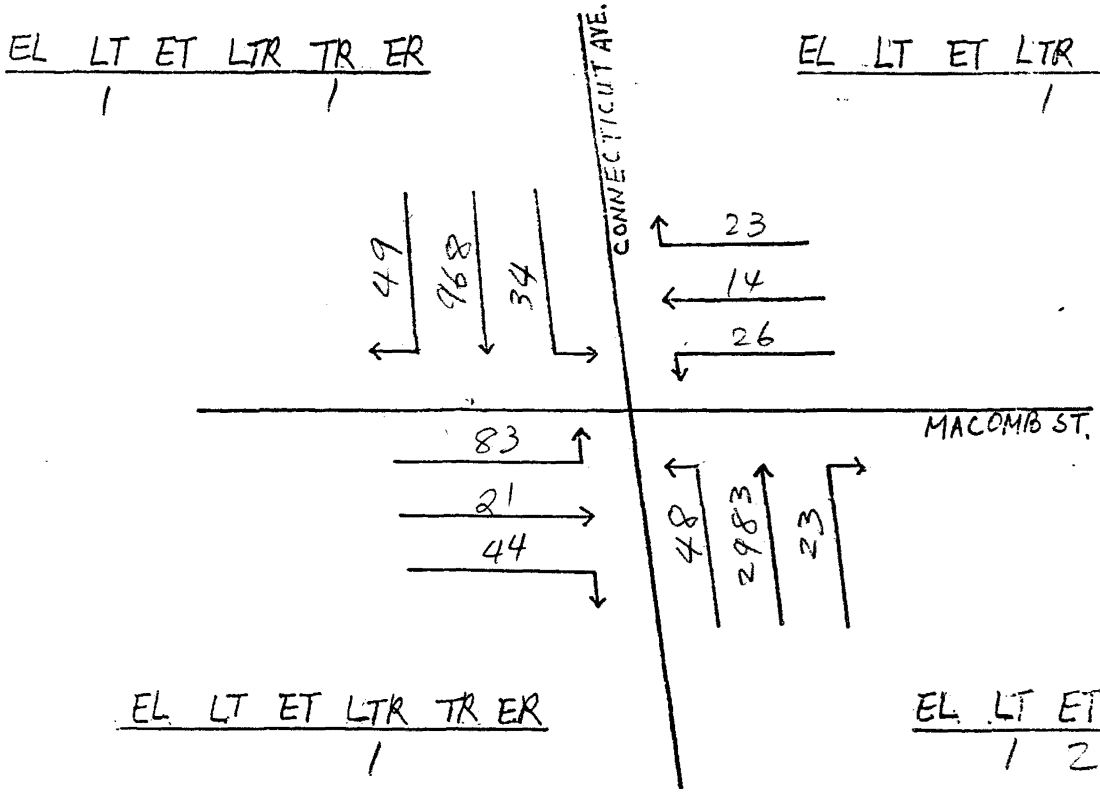
(36 + 29 + 25) + 25 = 115

(186 + 25) + 36 = 247

1072 + 36 = 1108 *

CLV = 1,702 - LOS = F

SCENARIO 1 FUTURE PM



N-S

(49+968+34) x 0.55 + 48 = 626

(48+2983+23) x 0.3 + 54 = 950 *

E-W

(83+21+44) + 26 = 174 *

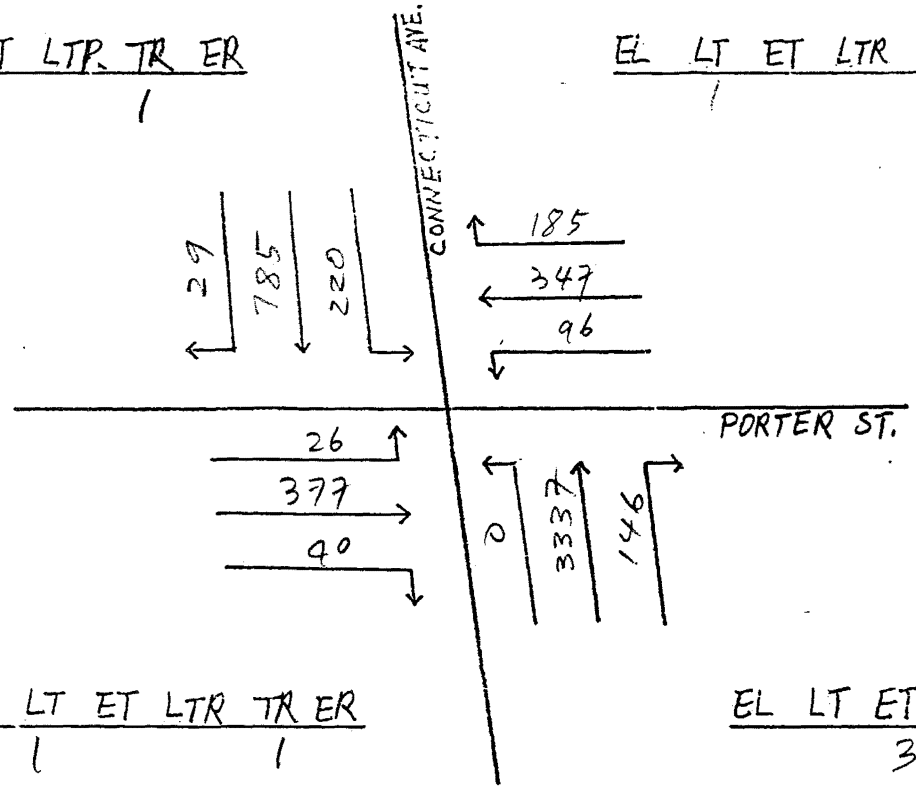
(23+14+26) + 83 = 146

CCV = 1124 LOS = B

SCENARIO 1 FUTURE PM

EL	LT	ET	LTR	TR	ER
	1			1	

EL	LT	ET	LTR	TR	ER
	1			1	



EL	LT	ET	LTR	TR	ER
	1			1	

EL	LT	ET	LTR	TR	ER
	3			1	

N-S

$(29+785+220)\times 0.55 = 569$

$(3337+146)\times 0.3+220 = 1265^{*}$

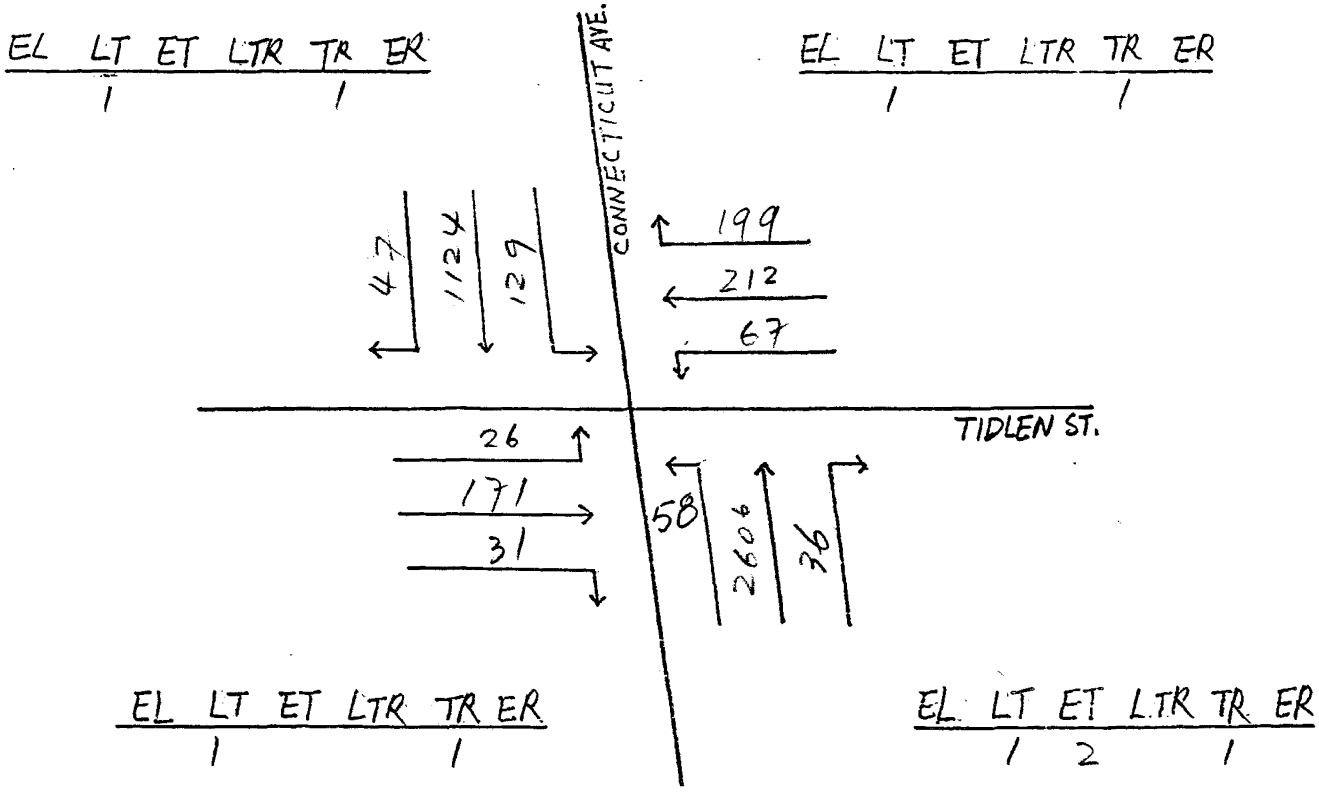
E-W

$(26+377+40)\times 0.55+96 = 340$

$(185+347+96)\times 0.55+26 = 371^{*}$

CLV = 1636 LOS = F

SCENARIO 1 FUTURE PM



N-S

$(47+1124+129)\times 0.55+58 = 713$

$(25+2606+36)\times 0.3+129 = 929$ *

E-W

$(26+171+31)\times 0.55+67 = 192$

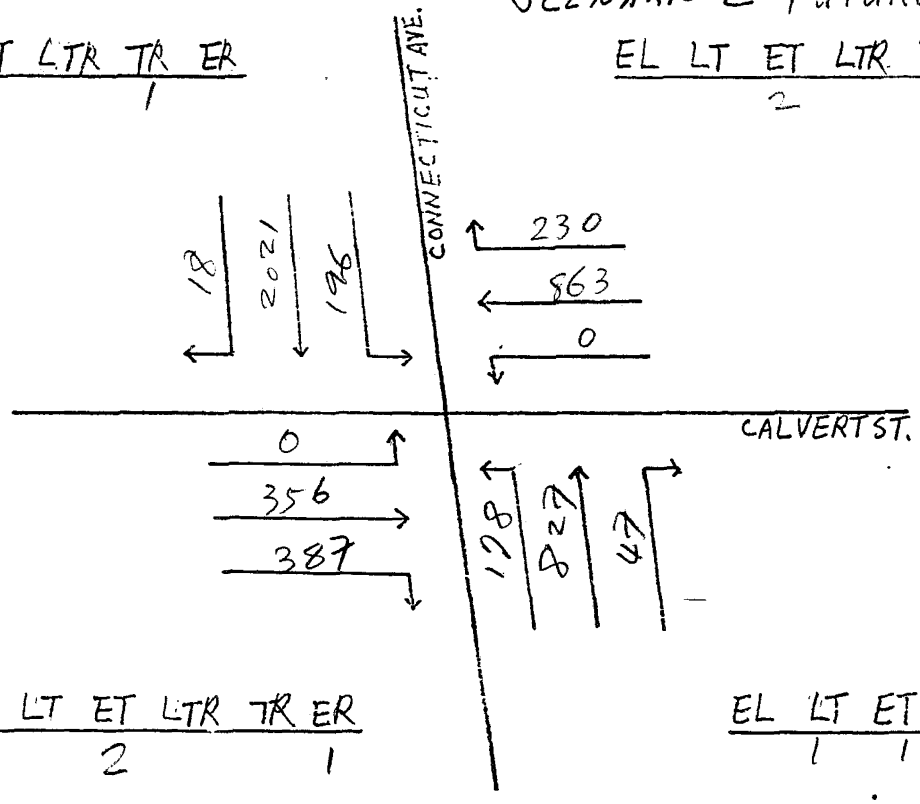
$(199+212+67)\times 0.55+26 = 289$ *

CCV = 1218 LOS = C

SCENARIO 2 FUTURE AM

EL LT ET LTR TR ER
1 1 1

EL LT ET LTR TR ER
2 1



EL LT ET LTR TR ER
2 1

EL LT ET LTR TR ER
1 1 1

N-S

$(18+2021+196)\times 0.4 + 178 = 1072^{*}$

$(178+827+47)\times 0.4 + 196 = 617$

E-W

$356 \times 0.55 = 196$

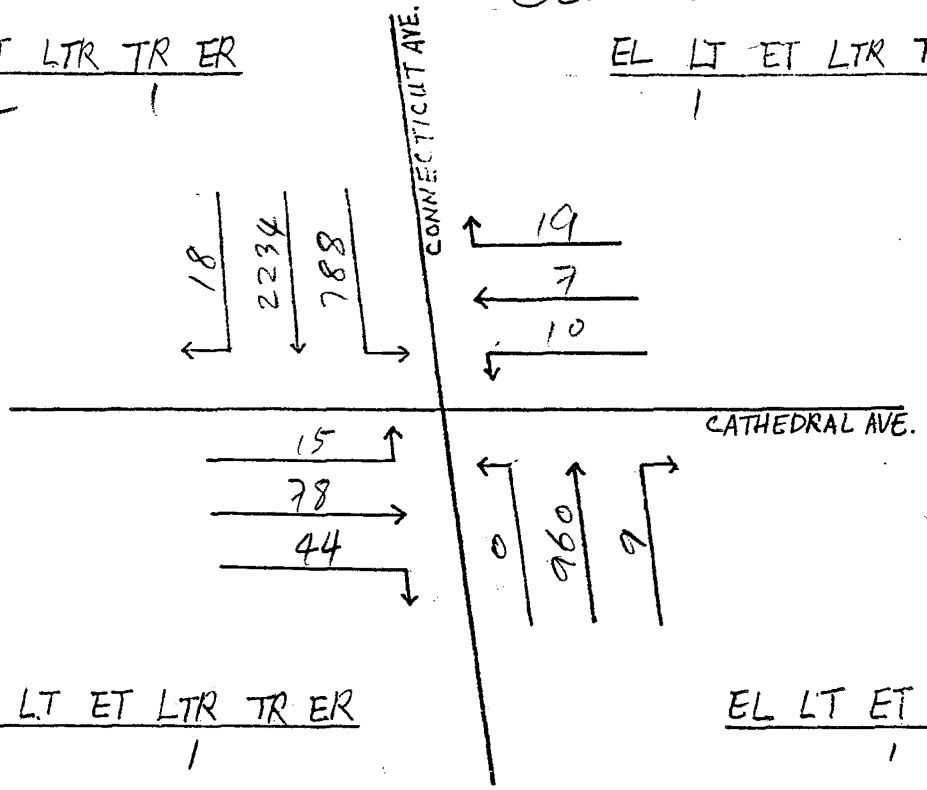
$863 \times 0.55 = 475^{*}$

CLV = 1547 LOS = E

SCENARIO 2 FUTURE AM

EL	LT	ET	LTR	TR	ER
1		2		1	

EL	LT	ET	LTR	TR	ER
1					1



EL	LT	ET	LTR	TR	ER
1					

EL	LT	ET	LTR	TR	ER
1				1	

N-S

$(18+2234)\times 0.4 = 901$

$(960+9)\times 0.55+788 = 1320$ *

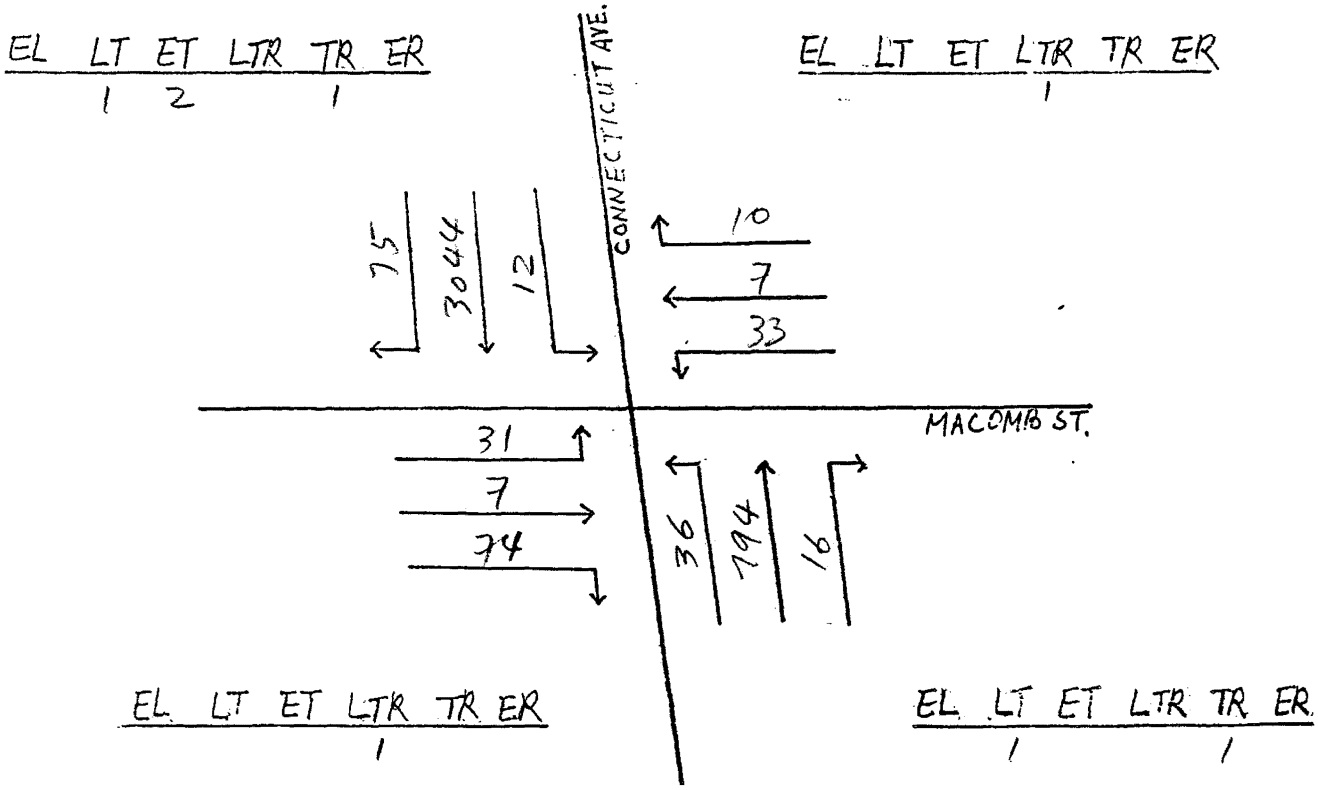
E-W

$(15+78+44)+10 = 147$ *

$(10+7)+15 = 32$

CLV = 1467 LOS = E

SCENARIO 2 FUTURE AM



N-S

$(75+3044+12)\times 0.3+36 = 975^{*}$

$(36+794+16)\times 0.55+12 = 472$

E-W

$(31+7+74)+33 = 145^{*}$

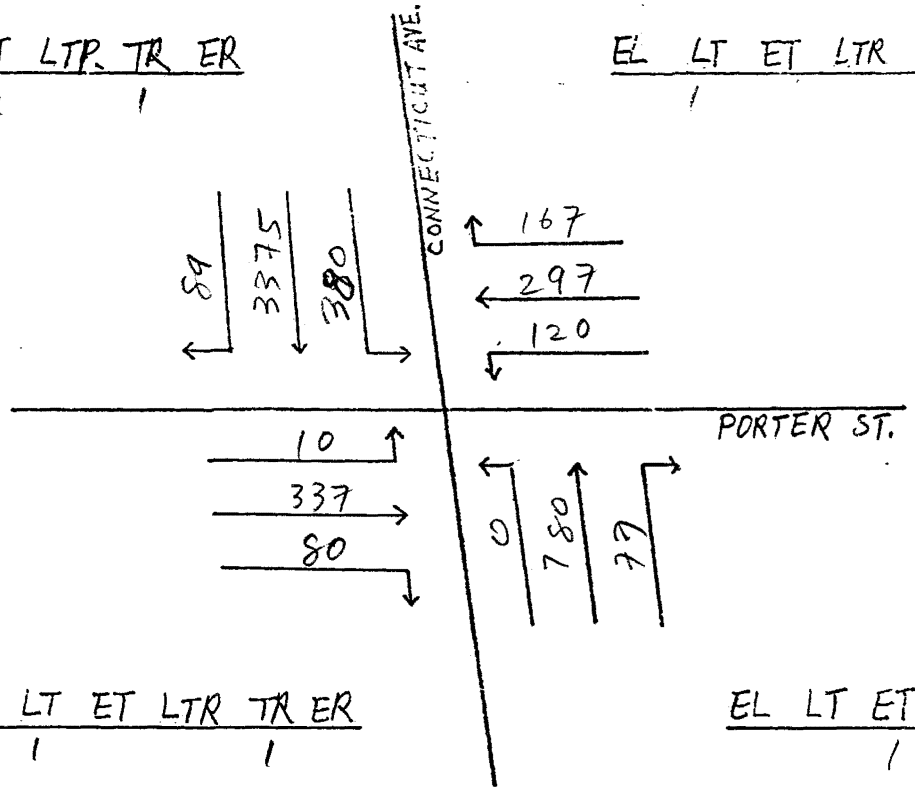
$(10+7+33)+31 = 50$

CLV = 1120 LOS = B

SCENARIO 2 FUTURE AM

EL LT ET LTR TR ER
1 2 1

EL LT ET LTR TR ER
1 1



EL LT ET LTR TR ER
1 1

EL LT ET LTR TR ER
1 1

N-S

(89+3375)×0.4 = 1356 *

(780+77)×0.55+380 = 851

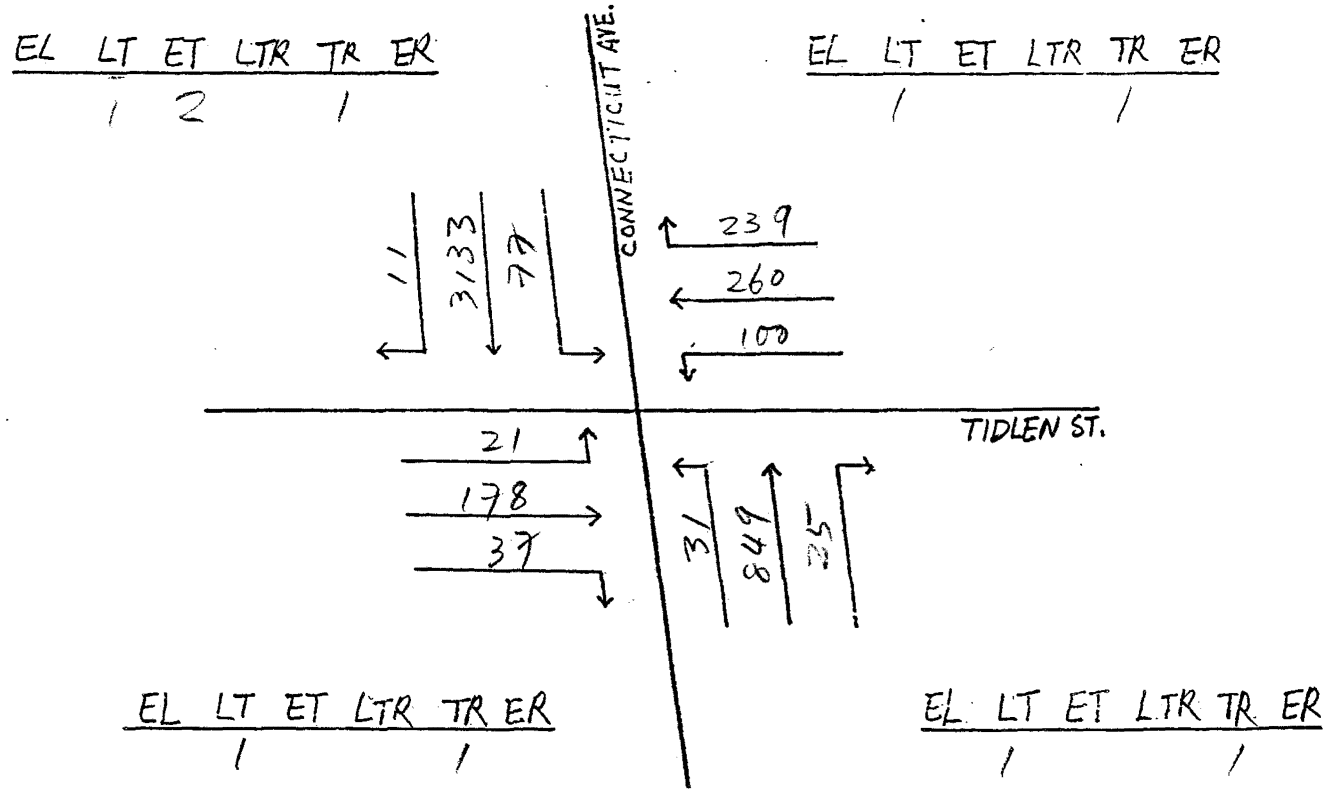
E-W

(10+337+80)×0.55+120 = 355 *

(167+297+120)×0.15+10 = 331

CLV = 1707 LOS = F

SCENARIO 2 FUTURE AM



NS

$(11+3133+77)\times 0.3 + 31 = 997$ *

$(31+849+25)\times 0.55 + 77 = 575$

$(21+178+37)\times 0.55 + 100 = 230$

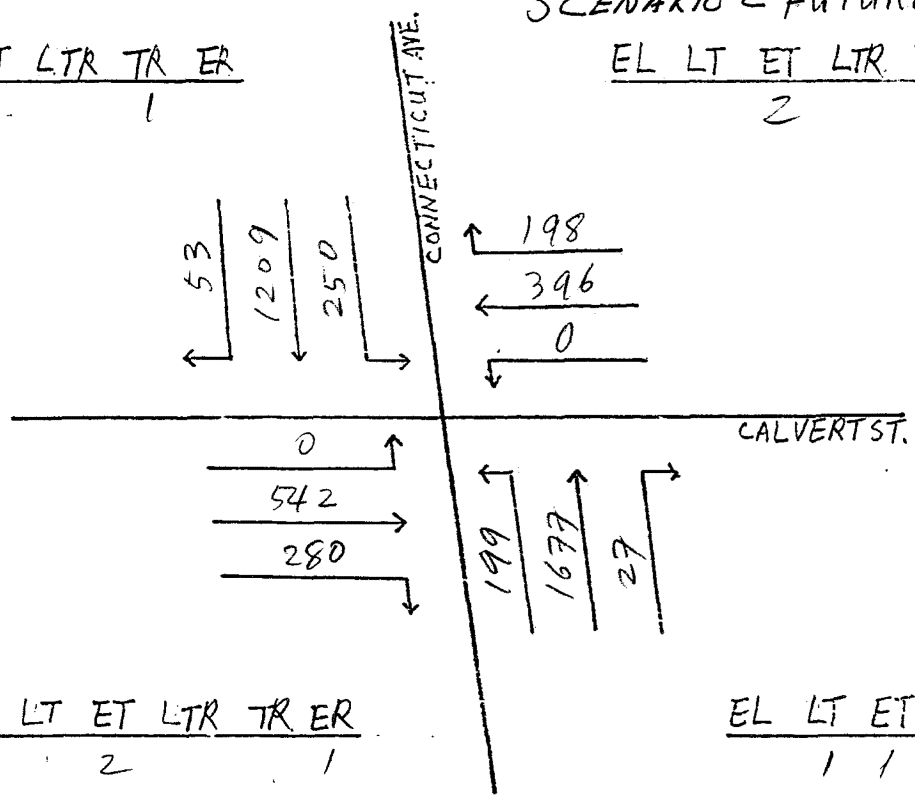
$(239+260+100)\times 0.55 + 21 = 350$ *

CLV = 1347 LOS = D

SCENARIO 2 FUTURE PM

EL	LT	ET	LTR	TR	ER
1	1			1	

EL	LT	ET	LTR	TR	ER
		2		1	



EL	LT	ET	LTR	TR	ER
		2		1	

EL	LT	ET	LTR	TR	ER
1	1			1	

NS

$(53 + 1209 + 250) \times 0.4 + 199 = 804$

$(199 + 1677 + 27) \times 0.4 + 250 = 1011$ *

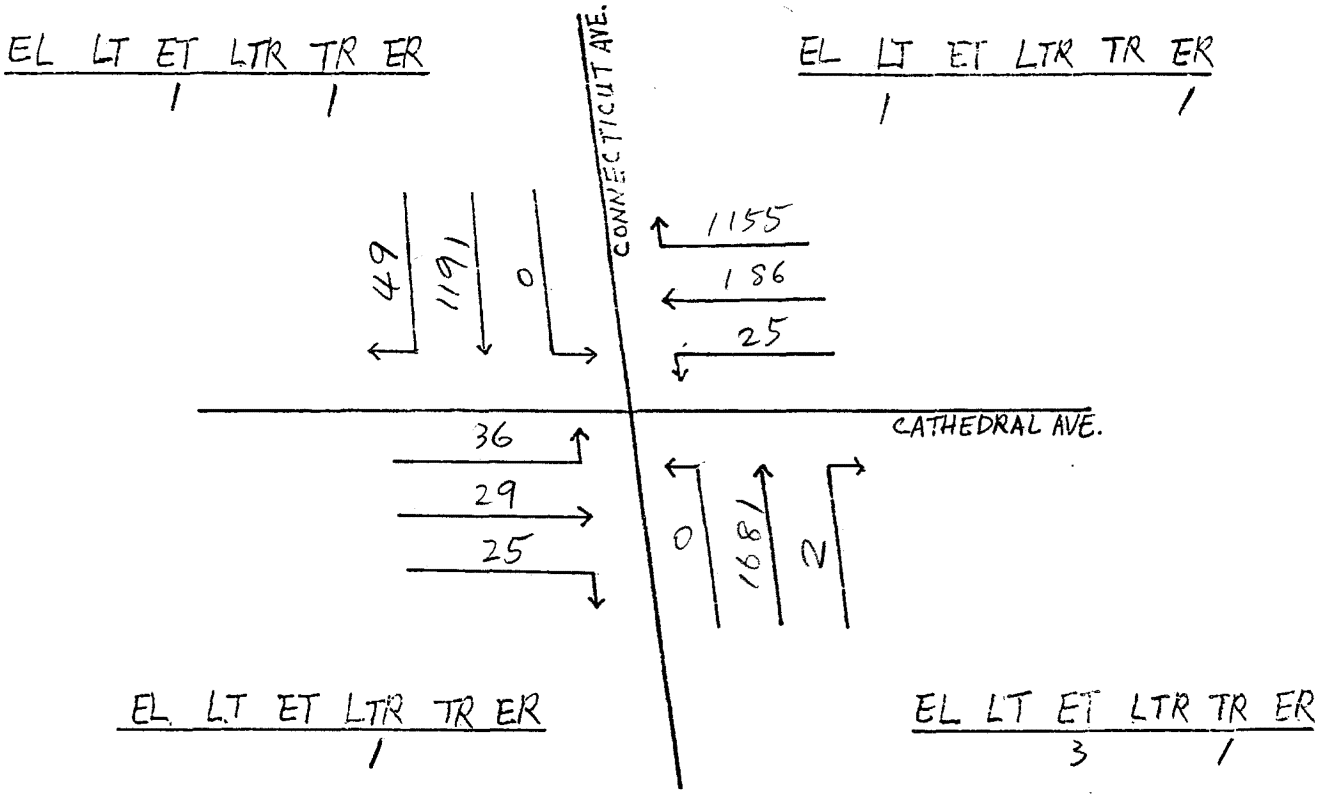
E-W

$542 \times 0.55 = 298$ *

$396 \times 0.55 = 218$

CLV = 1309 LOS = D

SCENARIO 2 FUTURE PM



N-S

(49+1191) x 0.55 = 682 *

(1681+2) x 0.3 = 505

E-W

(36+29+25)+25 = 115

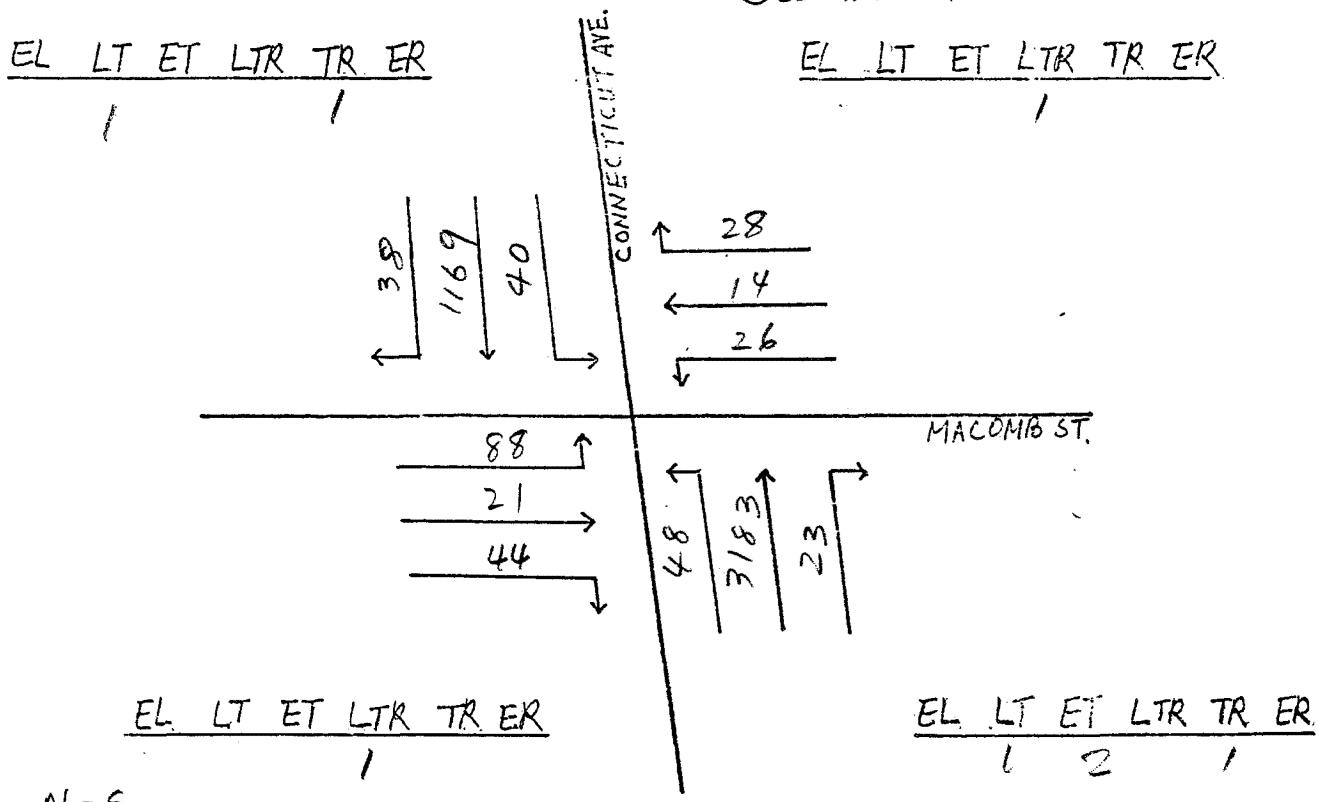
(186+25) + 36 = 247

1155 + 36 = 1191 *

CLV = ~~1873~~

LOS = F

SCENARIO 2 FUTURE PM



N-S

$(38 + 1169 + 40) \times 0.55 + 48 = 734$

$(48 + 3183 + 23) \times 0.3 + 40 = 1016$ *

E-W

$(88 + 21 + 44) + 26 = 179$ *

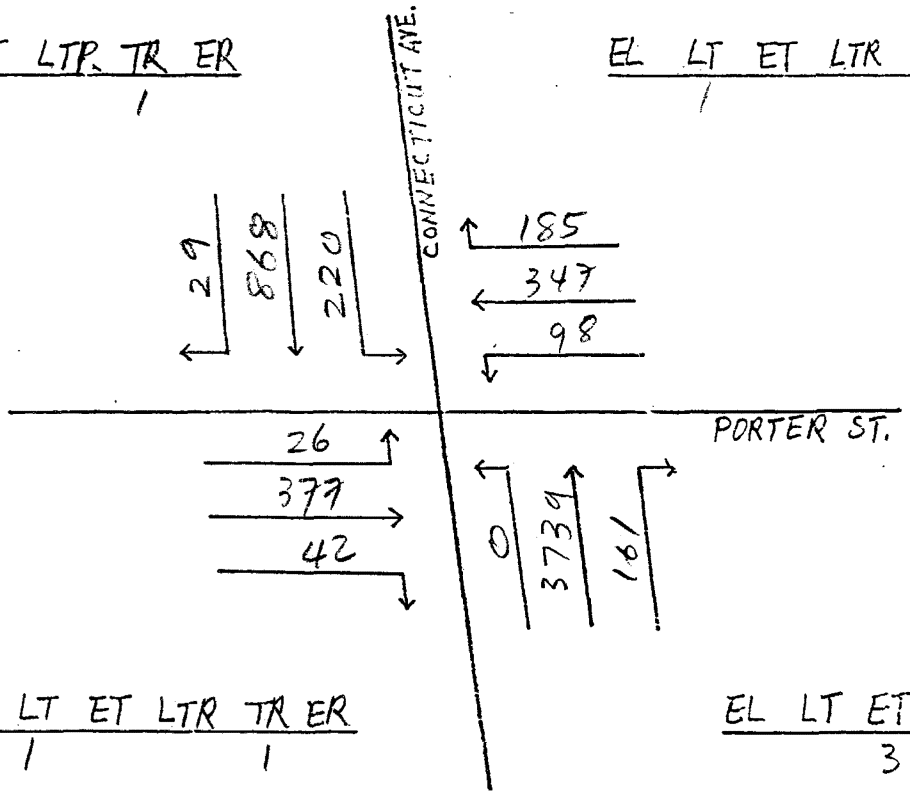
$(28 + 14 + 26) + 88 = 156$

CLV = 1195 LOS = C

SCENARIO 2 FUTURE PM

EL	LT	ET	LTR	TR	ER
1				1	

EL	LT	ET	LTR	TR	ER
1				1	



EL	LT	ET	LTR	TR	ER
1				1	

EL	LT	ET	LTR	TR	ER
3				1	

N-S

$(29+868+220)\times 0.55 = 614$

$(3739+161)\times 0.3 + 220 = 1390$ ↓

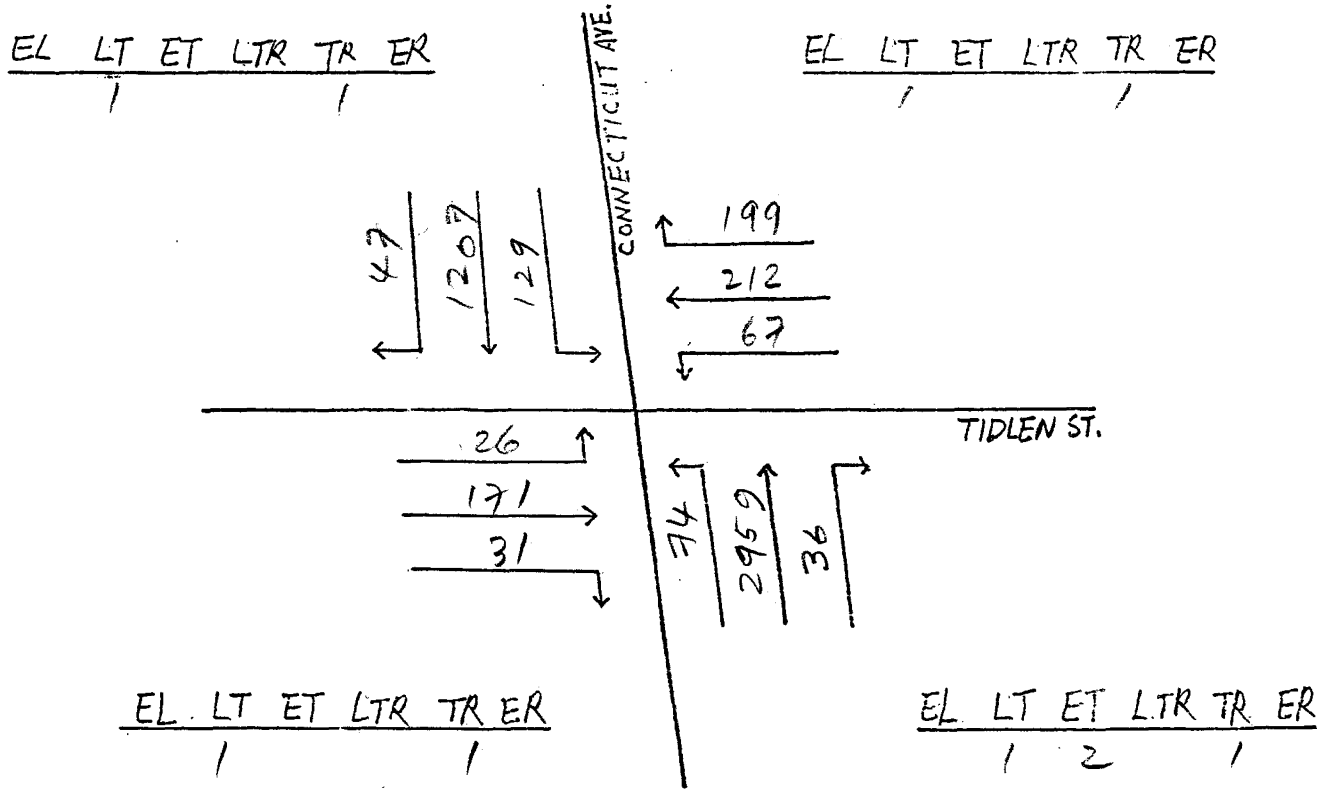
E-W

$(26+377+42)\times 0.55 + 98 = 343$

$(185+347+98)\times 0.55 + 26 = 373$ ↓

CLV = 1763 LOS = F

SCENARIO 2 FUTURE PM



N-S

$(47+1207+129)\times 0.55+74 = 835$

$(74+2959+36)\times 0.3+129 = 1050$ *

E-W

$(26+171+31)+\times 0.55+67 = 192$

$(199+212+67)\times 0.55+26 = 289$ *

CLV = 1339 LOS = D

APPENDIX D

HIGHWAY CAPACITY MANUAL (HCM)
COMPUTER PRINT OUTS FOR 5 INTERSECTIONS

1. Existing
2. Scenario 1
3. Scenario 2

References:

1. Highway Capacity Manual
   Transportation Research Board,
   Special Report 209, 1985
2. Highway Capacity Software:
   User's Manual
   Federal Highway Administration,
   January 1987, (Chapter 9)

CONNECTICUT AVE. & CALVERT ST. EXISTING AM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
T	380	3208	0.119	0.306	980	0.388	
R	337	1313	0.257	0.383	503	0.670	
WB							
T	928	3208	0.289	0.306	980	0.947	*
R	156	1195	0.130	0.439	525	0.297	
NB							
LTR	970	2435	0.399	0.461	1123	0.864	
SB							
LTR	2285	4212	0.543	0.517	2176	1.050	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.027
Lost Time Per Cycle, L = 6.0 sec. X critical = 1.101

CONNECTICUT AVE & CALVERT ST. EXISTING, AM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP.. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
T	0.388	0.306	90.0	18.7	980	0.1	1.00	18.8	C	19.3	C
R	0.670	0.383	90.0	17.5	503	2.4	1.00	19.9	C		
WB											
T	0.947	0.306	90.0	23.2	980	12.7	1.00	35.9	D	32.5	D
R	0.297	0.439	90.0	12.4	525	0.1	1.00	12.5	B		
NB											
LTR	0.864	0.461	90.0	16.5	1123	5.1	1.00	21.6	C	21.6	C
SB											
LTR	1.050	0.517	90.0	17.5	2176	28.9	1.00	46.3	E	46.3	E

Intersection Delay = 34.8 (sec/veh) Intersection LOS = D

CONNECTICUT AVE. & CATHEDRAL AVE. EXISTING, AM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	116	1403	0.083	0.306	429	0.271	*
WB							
LT	16	1383	0.012	0.306	423	0.039	
R	10	1360	0.007	0.606	823	0.012	
NB							
TR	884	3125	0.283	0.294	920	0.961	*
SB							
Lperm.	164						
Lprot.	568	1524	0.373	0.300	508	1.118	*
TR	2302	4687	0.491	0.628	2942	0.782	

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 0.738
Lost Time Per Cycle, L = 6.0 sec. X critical = 0.791

CONNECTICUT AVE. & CATHEDRAL AVE, EXISTING AM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.271	0.306	90.0	18.0	429	0.1	1.00	18.1	C	18.1	C
WB											
LT	0.039	0.306	90.0	16.7	423	0.0	1.00	16.7	C	12.5	B
R	0.012	0.606	90.0	5.4	823	0.0	1.00	5.4	B		
NB											
TR	0.961	0.294	90.0	23.7	920	15.4	1.00	39.1	D	39.1	D
SB											
L	1.118	0.628	90.0	15.9	508	73.2	1.00	89.1	F	29.3	D
TR	0.782	0.628	90.0	9.3	2942	1.0	1.00	10.3	B		

Intersection Delay = 31.0 (sec/veh) Intersection LOS = D

CONNECTICUT AVE & MACOMB ST. EXISTING AM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	77	1317	0.058	0.306	403	0.191	*
WB							
LTR	47	1267	0.037	0.306	387	0.122	
NB							
L	36	114	0.319	0.628	72	0.508	
TR	680	1519	0.448	0.628	954	0.713	
SB							
LTR	3209	6135	0.523	0.628	3851	0.833	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 0.581
Lost Time Per Cycle, L = 6.0 sec. X critical = 0.623

CONNECTICUT AVE. & MACOMB ST EXISTING - AM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.191	0.306	90.0	17.5	403	0.0	1.00	17.5	C	17.5	C
WB											
LTR	0.122	0.306	90.0	17.1	387	0.0	1.00	17.1	C	*	*
NB											
L	0.508	1.256	90.0	7.0	72	4.7	1.00	11.6	B	10.4	B
TR	0.713	0.628	90.0	8.6	954	1.8	1.00	10.3	B		
SB											
LTR	0.833	0.628	90.0	9.9	3851	1.2	1.00	11.1	B	11.1	B

Intersection Delay = 11.2 (sec/veh) Intersection LOS = B

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE, & PORTER ST, EXISTING, AM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	410	2999	0.137	0.306	916	0.447	
WB							
LTR	578	2634	0.219	0.306	805	0.718	*
NB							
TR	816	3083	0.265	0.517	1593	0.513	
SB							
Lperm.	322						
Lprot.	68	1524	0.045	0.078	169	0.401	
TR	3261	4673	0.698	0.628	2933	1.112	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 0.917
Lost Time Per Cycle, L = 6.0 sec. X critical = 0.983

CONNECTICUT AVE. & PORTER ST, EXISTING, AM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.447	0.306	90.0	19.1	916	0.2	1.00	19.3	C	19.3	C
WB											
LTR	0.718	0.306	90.0	21.1	805	2.2	1.00	23.3	C	23.3	C
NB											
TR	0.513	0.517	90.0	10.9	1593	0.2	1.00	11.1	B	11.1	B
SB											
L	0.401	0.628	90.0	6.3	169	0.9	1.00	7.2	B	62.1	F
TR	1.112	0.628	90.0	15.7	2933	53.0	1.00	68.7	F		

Intersection Delay = 47.2 (sec/veh) Intersection LOS = E

CONNECTICUT AVE. & TILDEN ST, EXISTING, AM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	241	2545	0.095	0.306	778	0.309	
WB							
LTR	613	2811	0.218	0.306	859	0.714	*
NB							
L	22	114	0.196	0.628	72	0.312	
TR	820	1519	0.540	0.628	954	0.860	
SB							
LTR	2984	5314	0.562	0.628	3336	0.895	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 0.780
Lost Time Per Cycle, L = 6.0 sec. X critical = 0.835

CONNECTICUT AVE. & TILDEN ST, EXISTING, AM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.309	0.306	90.0	18.2	778	0.1	1.00	18.3	C	18.3	C
WB											
LTR	0.714	0.306	90.0	21.1	859	2.0	1.00	23.1	C	23*	C
NB											
L	0.312	1.256	90.0	5.9	72	0.8	1.00	6.7	B	15.7	C
TR	0.860	0.628	90.0	10.3	954	5.7	1.00	16.0	C		
SB											
LTR	0.895	0.628	90.0	10.8	3336	2.6	1.00	13.4	B	13.4	B

Intersection Delay = 15.34* (sec/veh) Intersection LOS = * C

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE. & CALVERT ST . EXISTING PM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
T	572	3208	0.178	0.306	980	0.584	
R	252	1256	0.201	0.383	482	0.523	*
WB							
T	422	3208	0.132	0.306	980	0.431	
R	128	1314	0.097	0.383	504	0.254	
NB							
Lperm.	141						
Lprot.	63	1524	0.041	0.078	169	0.372	
TR	1549	3125	0.496	0.517	1614	0.959	*
SB							
LTR	1159	2435	0.476	0.517	1258	0.921	

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 0.741
Lost Time Per Cycle, L = 6.0 sec. X critical = 0.794

CONNECTICUT AVE. & CALVERT ST. EXISTING PM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
T	0.584	0.306	90.0	20.1	980	0.7	1.00	20.7	C	19.6	C
R	0.523	0.383	90.0	16.3	482	0.8	1.00	17.1	C		
WB											
T	0.431	0.306	90.0	19.0	980	0.2	1.00	19.2	C	18.1	C
R	0.254	0.383	90.0	14.4	504	0.1	1.00	14.5	B		
NB											
L	0.372	0.517	90.0	9.9	169	0.7	1.00	10.5	B	24.4	C
TR	0.959	0.517	90.0	15.8	1614	10.4	1.00	26.2	D		
SB											
LTR	0.921	0.517	90.0	15.2	1258	8.1	1.00	23.3	C	23.3	C

Intersection Delay = 22.4 (sec/veh) Intersection LOS = C

CONNECTICUT AVE. & CATHEDRAL AVE. EXISTING, PM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	75	259	0.290	0.306	79	0.950	
WB							
LT	216	1604	0.135	0.306	490	0.442	
R	498	1363	0.365	0.306	417	1.195	*
NB							
TR	1443	6323	0.228	0.628	3970	0.364	
SB							
LTR	923	3100	0.298	0.628	1946	0.474	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 0.663
Lost Time Per Cycle, L = 6.0 sec. X critical = 0.710

CONNECTICUT AVE. & CATHEDRAL AVE. EXISTING, PM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.950	0.306	90.0	23.2	79	61.1	1.00	84.3	F	84.3	F
WB											
LT	0.442	0.306	90.0	19.1	490	0.4	1.00	19.5	C	107.3	F
R	1.195	0.306	90.0	26.0	417	119.6	1.00	145.5	F		
NB											
TR	0.364	0.628	90.0	6.1	3970	0.0	1.00	6.2	B	6.2	B
SB											
LTR	0.474	0.628	90.0	6.7	1946	0.1	1.00	6.9	B	6.9	B

Intersection Delay = 31.1 (sec/veh) Intersection LOS = D

CONNECTICUT AVE. & MACOMB ST EXISTING PM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	139	1313	0.106	0.306	401	0.345	*
WB							
LTR	51	1291	0.039	0.306	395	0.129	
NB							
LTR	3118	5498	0.567	0.628	3451	0.903	*
SB							
L	35	114	0.309	0.628	72	0.492	
TR	839	1516	0.553	0.628	952	0.881	

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 0.673
Lost Time Per Cycle, L = 6.0 sec. X critical = 0.721

CONNECTICUT AVE. & MACOMB ST. EXISTING PM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.345	0.306	90.0	18.4	401	0.2	1.00	18.7	C	18.7	C
WB											
LTR	0.129	0.306	90.0	17.2	395	0.0	1.00	17.2	C	17.2	C
NB											
LTR	0.903	0.628	90.0	10.9	3451	2.8	1.00	13.7	B	13.7	B
SB											
L	0.492	1.256	90.0	6.9	72	4.1	1.00	11.0	B	17.2	C
TR	0.881	0.628	90.0	10.6	952	6.9	1.00	17.5	C		

Intersection Delay = 14.66 * (sec/veh) Intersection LOS = B *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE. & PORTER ST, EXISTING PM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	455	2671	0.170	0.306	816	0.557	
WB							
LTR	632	2606	0.242	0.306	796	0.793	*
NB							
TR	3425	6292	0.544	0.517	3251	1.054	
SB							
LTR	971	1484	0.654	0.628	932	1.042	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 0.897
Lost Time Per Cycle, L = 6.0 sec. X critical = 0.961

CONNECTICUT AVE. & PORTER ST. EXISTING, PM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.557	0.306	90.0	19.9	816	0.7	1.00	20.5	C	20.5	C
WB											
LTR	0.793	0.306	90.0	21.8	796	3.9	1.00	25.6	D	25.6*	D
NB											
TR	1.054	0.517	90.0	17.5	3251	27.5	1.00	45.1	E	45.1	E
SB											
LTR	1.042	0.628	90.0	13.7	932	34.2	1.00	48.0	E	48.0	E

Intersection Delay = 41.3* (sec/veh) Intersection LOS = E

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE. & TILDEN ST, EXISTING P/M

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	237	2703	0.088	0.312	844	0.281	
WB							
LTR	476	2848	0.167	0.312	889	0.535	*
NB							
LTR	2571	4993	0.515	0.523	2613	0.984	*
SB							
LTR	1272	2127	0.598	0.634	1349	0.943	

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.847
Lost Time Per Cycle, L = 4.8 sec. X critical = 1.951

CONNECTICUT AVE. & TILDEN ST., EXISTING, PM.

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.281	0.312	90.0	17.7	844	0.1	1.00	17.8	C	17.8	C
WB											
LTR	0.535	0.312	90.0	19.4	889	0.5	1.00	19.9	C	*	C
NB											
LTR	0.984	0.523	90.0	16.0	2613	10.6	1.00	26.6	D	26.6	D
SB											
LTR	0.943	0.634	90.0	11.4	1349	9.7	1.00	21.1	C	*	C

Intersection Delay = * (sec/veh) Intersection LOS = * C

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE & CALVERT ST. FUTURE SCENARIO 1, AM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO
EB						
T	437	3208	0.136	0.306	980	0.446
R	384	1313	0.293	0.383	503	0.763
WB						
T	1066	3208	0.332	0.306	980	1.088
R	236	1195	0.197	0.439	525	0.449
NB						
LTR	1249	2569	0.486	0.461	1185	1.054
SB						
Lperm.	93					
Lprot.	138	1524	0.090	0.133	254	0.543
TR	2442	3091	0.790	0.517	1597	1.529

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.122
Lost Time Per Cycle, L = 6.0 sec. X critical = 1.202

CONNECTICUT AVE. & CALVERT ST. FUTURE SCENARIO 1, AM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
T	0.446	0.306	90.0	19.1	980	0.2	1.00	19.3	C	21.1	C
R	0.763	0.383	90.0	18.4	503	4.7	1.00	23.1	C		
WB											
T	1.088	0.306	90.0	24.7	980	50.6	1.00	75.3	F	64.2	F
R	0.449	0.439	90.0	13.4	525	0.4	1.00	13.8	B		
NB											
LTR	1.054	0.461	90.0	19.3	1185	35.5	0.82	45.0	E	45.0	E
SB											
L	0.543	0.517	90.0	11.1	254	1.8	1.00	12.9	B	*	*
TR	1.529	0.517	90.0	*	1597	*	0.82	*	*		

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE. & CATHEDRAL AVE. FUTURE SCENARIO 1, AM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	155	1377	0.113	0.306	421	0.369	*
WB							
LT	19	1304	0.014	0.306	399	0.047	
R	14	1360	0.010	0.606	823	0.017	
NB							
TR	1103	3126	0.353	0.294	920	1.199	*
SB							
Lperm.	103						
Lprot.	738	1524	0.485	0.300	508	1.454	*
TR	2878	4688	0.614	0.628	2943	0.978	

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 0.950
Lost Time Per Cycle, L = 6.0 sec. X critical = 1.018

CONNECTICUT AVE. & CATHEDRAL AVE. FUTURE SCENARIO 1, AM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.369	0.306	90.0	18.6	421	0.3	1.00	18.8	C	18.8	C
WB											
LT	0.047	0.306	90.0	16.7	399	0.0	1.00	16.7	C	11.9	B
R	0.017	0.606	90.0	5.4	823	0.0	1.00	5.4	B		
NB											
TR	1.199	0.294	90.0	26.3	920	110.4	0.82	112.1	F	112.1	F
SB											
L	1.454	0.628	90.0	*	508	*	1.00	*	*	*	*
TR	0.978	0.628	90.0	12.3	2943	9.0	1.00	21.2	C		

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE. & MACOMB ST. FUTURE SCENARIO 1, AM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	123	1295	0.095	0.306	396	0.312	*
WB							
LTR	54	1184	0.046	0.306	362	0.151	
NB							
L	42	114	0.371	0.628	72	0.590	
TR	864	1520	0.568	0.628	954	0.905	
SB							
LTR	3924	5936	0.661	0.628	3726	1.053	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 0.756
Lost Time Per Cycle, L = 6.0 sec. X critical = 0.810

CONNECTICUT AVE. & MACOMB, FUTURE SCENARIO 1, AM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.312	0.306	90.0	18.2	396	0.2	1.00	18.4	C	18.4	C
WB											
LTR	0.151	0.306	90.0	17.3	362	0.0	1.00	17.3	C	17.3	C
NB											
L	0.590	1.256	90.0	7.5	72	8.3	1.00	15.8	C	16.0	C
TR	0.905	0.628	90.0	11.0	954	8.6	0.82	16.0	C		
SB											
LTR	1.053	0.628	90.0	14.0	3726	26.6	1.00	40.6	E	40.6	E

Intersection Delay = 35.3 (sec/veh) Intersection LOS = D

CONNECTICUT AVE & PORTER ST. FUTURE SCENARIO 1, AM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	501	2832	0.177	0.306	865	0.578	
WB							
LTR	684	2445	0.280	0.306	747	0.915	*
NB							
TR	996	3076	0.324	0.517	1589	0.626	*
SB							
Lperm.	233						
Lprot.	214	1524	0.140	0.078	169	1.262	*
TR	515	4511	0.114	0.629	2832	0.182	

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 0.744
Lost Time Per Cycle, L = 6.0 sec. X critical = 0.797

CONNECTICUT AVE. & PORTER ST. FUTURE SCENARIO 1, AM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.578	0.306	90.0	20.0	865	0.7	1.00	20.8	C	20.8	C
WB											
LTR	0.915	0.306	90.0	22.9	747	11.5	1.00	34.4	D	34.4	D
NB											
TR	0.626	0.517	90.0	11.8	1589	0.6	0.67	8.3	B	8.3	B
SB											
L	1.262	0.628	90.0	*	169	*	1.00	*	*	*	*
TR	0.182	0.628	90.0	5.3	2832	0.0	1.00	5.4	B		

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE & TIDLEN ST. FUTURE SCENARIO 1, AM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	285	2346	0.122	0.306	717	0.398	
WB							
LTR	709	2738	0.259	0.306	836	0.848	*
NB							
L	26	114	0.227	0.628	72	0.361	
TR	992	1519	0.653	0.628	954	1.040	
SB							
LTR	3818	4972	0.768	0.628	3121	1.223	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.027
Lost Time Per Cycle, L = 6.0 sec. X critical = 1.100

CONNECTICUT AVE & TILDEN ST FUTURE SCENARIO 1 AM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.398	0.306	90.0	18.8	717	0.2	1.00	19.0	C	19.0	C
WB											
LTR	0.848	0.306	90.0	22.3	836	5.8	1.00	28.0	D	28.0	D
NB											
L	0.361	1.256	90.0	6.1	72	1.4	1.00	7.5	B	37.7	D
TR	1.040	0.628	90.0	13.7	954	33.3	0.82	38.5	D		
SB											
LTR	1.223	0.628	90.0	*	3121	*	1.00	*	*	*	*

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE & CALVERT ST. FUTURE SCENARIO 1, PM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
T	665	3208	0.207	0.306	980	0.678	
R	300	1256	0.239	0.383	482	0.624	*
WB							
T	485	3208	0.151	0.306	980	0.495	
R	198	1314	0.151	0.383	504	0.393	
NB							
LTR	2352	3167	0.743	0.517	1636	1.438	*
SB							
LTR	1561	2442	0.639	0.517	1262	1.237	

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.122
Lost Time Per Cycle, L = 6.0 sec. X critical = 1.202

CONNECTICUT AVE & CALVERT ST, FUTURE SCENARIO 1, PM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
T	0.678	0.306	90.0	20.8	980	1.3	1.00	22.1	C	21.1	C
R	0.624	0.383	90.0	17.1	482	1.8	1.00	18.9	C		
WB											
T	0.495	0.306	90.0	19.4	980	0.3	1.00	19.8	C	18.6	C
R	0.393	0.383	90.0	15.3	504	0.3	1.00	15.6	C		
NB											
LTR	1.438	0.517	90.0	*	1636	*	0.82	*	*	*	*
SB											
LTR	1.237	0.517	90.0	*	1262	*	1.00	*	*	*	*

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE & CATHEDRAL AVE, FUTURE SCENARIO 1 PM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	100	280	0.356	0.306	86	1.166	
WB							
LT	248	1604	0.155	0.306	490	0.507	
R	673	1363	0.494	0.306	417	1.616	*
NB							
TR	2027	6324	0.320	0.628	3970	0.510	
SB							
LTR	1283	3105	0.413	0.628	1949	0.658	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 0.907
Lost Time Per Cycle, L = 6.0 sec. X critical = 0.972

CONNECTICUT AVE & CATHEDRAL AVE FUTURE SCENARIO 1, PM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	1.166	0.306	90.0	25.6	86	155.7	1.00	181.3	F	181.3	F
WB											
LT	0.507	0.306	90.0	19.5	490	0.7	1.00	20.2	C	*	*
R	1.616	0.306	90.0	*	417	*	1.00	*	*		
NB											
TR	0.510	0.628	90.0	7.0	3970	0.1	0.53	3.7	A	3.7	A
SB											
LTR	0.658	0.628	90.0	8.1	1949	0.6	0.67	5.8	B	5.8	B

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE. & MACOMB ST. FUTURE SCENARIO 1, PM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	166	1301	0.128	0.306	398	0.418	*
WB							
LTR	62	1267	0.049	0.306	387	0.160	
NB							
LTR	3952	4863	0.813	0.628	3053	1.295	*
SB							
L	40	114	0.350	0.628	72	0.558	
TR	1196	1514	0.790	0.628	950	1.259	

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 0.940
Lost Time Per Cycle, L = 6.0 sec. X critical = 1.008

CONNECTICUT AVE & MACOMB FUTURE SCENARIO 1, PM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.418	0.306	90.0	18.9	398	0.4	1.00	19.3	C	19.3	C
WB											C
LTR	0.160	0.306	90.0	17.3	387	0.0	1.00	17.4	C	*	*
NB											
LTR	1.295	0.628	90.0	*	3053	*	0.82	*	*	*	*
SB											F
L	0.558	1.256	90.0	7.3	72	6.6	1.00	13.9	B	*	*
TR	1.259	0.628	90.0	*	950	*	1.00	*	*		

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE & PORTER ST, FUTURE SCENARIO 1 PM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	540	2728	0.198	0.306	834	0.648	
WB							
LTR	621	2721	0.228	0.306	831	0.747	*
NB							
TR	4488	6276	0.715	0.517	3243	1.384	*
SB							
LTR	1271	1584	0.803	0.628	994	1.278	

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.293
Lost Time Per Cycle, L = 6.0 sec. X critical = 1.386

CONNECTICUT AVE. & PORTER ST, FUTURE SCENARIO 1, PM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.648	0.306	90.0	20.6	834	1.2	1.00	21.8	C	21.8	C
WB											D
LTR	0.747	0.306	90.0	21.4	831	2.6	1.00	24.0	C	*	*
NB											
TR	1.384	0.517	90.0	*	3243	*	0.82	*	*	*	*
SB											
LTR	1.278	0.628	90.0	*	994	*	1.00	*	*	*	*

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE. & TILDEN ST, FUTURE SCENARIO 1, PM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	275	2550	0.108	0.312	796	0.346	
WB							
LTR	565	2794	0.202	0.312	872	0.648	*
NB							
L	29	136	0.216	0.523	71	0.413	
TR	3419	4781	0.715	0.523	2502	1.366	*
SB							
LTR	1600	2190	0.730	0.634	1389	1.151	

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.268
Lost Time Per Cycle, L = 4.8 sec. X critical = 1.339

CONNECTICUT AVE. & TILDEN ST. FUTURE SCENARIO 1 PM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.346	0.312	90.0	18.1	796	0.1	1.00	18.2	C	18.2	C
WB											C
LTR	0.648	0.312	90.0	20.3	872	1.2	1.00	21.5	C	*	*
NB											
L	0.413	1.047	90.0	9.9	71	2.2	1.00	12.1	B	*	*
TR	1.366	0.523	90.0	*	2502	*	0.82	*	*		
SB											
LTR	1.151	0.634	90.0	17.0	1389	78.3	1.00	95.3	F	95.3	F

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE. & CALVERT ST. FUTURE SCENARIO 2 AM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
T	440	3208	0.137	0.306	980	0.449	
R	384	1313	0.293	0.383	503	0.763	
WB							
T	1066	3208	0.332	0.306	980	1.088	*
R	236	1195	0.197	0.439	525	0.449	
NB							
LTR	1348	2658	0.507	0.461	1226	1.100	
SB							
Lperm.	80						
Lprot.	151	1524	0.099	0.133	254	0.593	
TR	2512	3095	0.812	0.517	1599	1.571	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.360
Lost Time Per Cycle, L = 6.0 sec. X critical = 1.457

CONNECTICUT AVE & CALVERT ST, FUTURE SCENARIO 2 AM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
T	0.449	0.306	90.0	19.1	980	0.2	1.00	19.3	C	21.1	C
R	0.763	0.383	90.0	18.4	503	4.7	1.00	23.1	C		
WB											
T	1.088	0.306	90.0	24.7	980	50.6	1.00	75.3	F	64.2	F
R	0.449	0.439	90.0	13.4	525	0.4	1.00	13.8	B		
NB											
LTR	1.100	0.461	90.0	20.2	1226	53.5	0.82	60.4	F	60.4	F
SB											
L	0.593	0.517	90.0	11.5	254	2.7	1.00	14.2	B	*	*
TR	1.571	0.517	90.0	*	1599	*	0.82	*	*		

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE. & CATHEDRAL AVE. FUTURE SCENARIO 2 AM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	155	1377	0.113	0.306	421	0.369	*
WB							
LT	20	1291	0.015	0.306	395	0.051	
R	16	1360	0.012	0.606	823	0.020	
NB							
TR	1197	3126	0.383	0.294	920	1.300	*
SB							
Lperm.	80						
Lprot.	847	1524	0.556	0.300	508	1.668	*
TR	2914	4688	0.622	0.628	2943	0.990	

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.052
Lost Time Per Cycle, L = 6.0 sec. X critical = 1.127

CONNECTICUT AVE. & CATHEDRAL AVE, FUTURE SCENARIO 2 AM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.369	0.306	90.0	18.6	421	0.3	1.00	18.8	C	18.8	C
WB											
LT	0.051	0.306	90.0	16.8	395	0.0	1.00	16.8	C	11.6	B
R	0.020	0.606	90.0	5.4	823	0.0	1.00	5.4	B		
NB											
TR	1.300	0.294	90.0	*	920	*	0.82	*	*	*	*
SB											
L	1.668	0.628	90.0	*	508	*	1.00	*	*	*	*
TR	0.990	0.628	90.0	12.5	2943	10.9	1.00	23.4	C		

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE. & MACOMB ST, FUTURE SCENARIO 2 AM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	120	1302	0.092	0.306	398	0.301	*
WB							
LTR	57	1198	0.047	0.306	366	0.155	
NB							
L	42	114	0.371	0.628	72	0.590	
TR	953	1521	0.627	0.628	955	0.998	
SB							
LTR	4052	5709	0.710	0.628	3584	1.131	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 0.802
Lost Time Per Cycle, L = 6.0 sec. X critical = 0.859

CONNECTICUT AVE. & MACOMB CT, FUTURE SCENARIO 2 AM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.301	0.306	90.0	18.2	398	0.1	1.00	18.3	C	18.3	C
WB											
LTR	0.155	0.306	90.0	17.3	366	0.0	1.00	17.3	C	17.3	C
NB											
L	0.590	1.256	90.0	7.5	72	8.3	1.00	15.8	C	27.9	D
TR	0.998	0.628	90.0	12.7	955	22.0	0.82	28.4	D		
SB											
LTR	1.131	0.628	90.0	16.3	3584	61.8	1.00	78.1	F	78.1	F

Intersection Delay = 66.5 (sec/veh) Intersection LOS = F

CONNECTICUT AVE. & PORTER ST, FUTURE SCENARIO 2, AM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	519	2778	0.187	0.306	849	0.611	
WB							
LTR	703	2381	0.295	0.306	727	0.966	*
NB							
TR	1052	3075	0.342	0.517	1589	0.662	
SB							
Lperm.	206						
Lprot.	242	1524	0.159	0.078	169	1.427	
TR	4476	4675	0.958	0.628	2935	1.525	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.253
Lost Time Per Cycle, L = 6.0 sec. X critical = 1.342

CONNECTICUT AVE & PORTER ST, FUTURE SCENARIO 2 AM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.611	0.306	90.0	20.3	849	0.9	1.00	21.2	C	21.2	C
WB											
LTR	0.966	0.306	90.0	23.4	727	18.6	1.00	42.0	E	42.0	E
NB											
TR	0.662	0.517	90.0	12.1	1589	0.7	0.67	8.6	B	8.6	B
SB											
L	1.427	0.628	90.0	*	169	*	1.00	*	*	*	*
TR	1.525	0.628	90.0	*	2935	*	1.00	*	*		

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE. & TILDEN ST, FUTURE SCENARIO 2 AM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	285	2154	0.132	0.306	658	0.433	
WB							
LTR	784	2635	0.297	0.306	805	0.973	*
NB							
L	36	114	0.319	0.628	72	0.508	
TR	1028	1520	0.677	0.628	954	1.078	
SB							
LTR	4168	4922	0.847	0.628	3090	1.349	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.144
Lost Time Per Cycle, L = 6.0 sec. X critical = 1.226

CONNECTICUT AVE. & TILDEN ST. FUTURE SCENARIO 2, AM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.433	0.306	90.0	19.0	658	0.3	1.00	19.3	C	19.3	C
WB											
LTR	0.973	0.306	90.0	23.5	805	18.8	1.00	42.3	E	42.3	E
NB											
L	0.508	1.256	90.0	7.0	72	4.7	1.00	11.6	B	49.1	E
TR	1.078	0.628	90.0	14.7	954	46.9	0.82	50.5	E		
SB											
LTR	1.349	0.628	90.0	*	3090	*	1.00	*	*	*	*

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE & CALVERT ST. FUTURE SCENARIO 2 PM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
T	670	3208	0.209	0.306	980	0.683	
R	294	1256	0.234	0.383	482	0.611	*
WB							
T	485	3208	0.151	0.306	980	0.495	
R	174	1314	0.132	0.383	504	0.345	
NB							
LTR	2456	3212	0.765	0.517	1659	1.480	
SB							
LTR	1947	2691	0.723	0.517	1390	1.400	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.277
Lost Time Per Cycle, L = 6.0 sec. X critical = 1.368

CONNECTICUT AVE. & CALVERT ST. FUTURE SCENARIO 2, PM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
T	0.683	0.306	90.0	20.8	980	1.4	1.00	22.2	C	21.1	C
R	0.611	0.383	90.0	17.0	482	1.6	1.00	18.6	C		
WB											
T	0.495	0.306	90.0	19.4	980	0.3	1.00	19.8	C	18.6	C
R	0.345	0.383	90.0	15.0	504	0.2	1.00	15.2	C		
NB											
LTR	1.480	0.517	90.0	*	1659	*	0.82	*	*	*	*
SB											
LTR	1.400	0.517	90.0	*	1390	*	1.00	*	*	*	*

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE & CATHEDRAL AVE, FUTURE SCENARIO 2 PM

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	100	280	0.356	0.306	86	1.166	
WB							
LT	248	1604	0.155	0.306	490	0.507	
R	771	1363	0.565	0.306	417	1.851	*
NB							
TR	2178	6324	0.344	0.628	3970	0.549	
SB							
LTR	1532	3109	0.493	0.628	1952	0.785	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.058
Lost Time Per Cycle, L = 6.0 sec. X critical = 1.134

CONNECTICUT AVE. & CATHEDRAL AVE. ST. FUTURE SCENARIO 2 PM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	1.166	0.306	90.0	25.6	86	155.7	1.00	181.3	F	181.3	F
WB											
LT	0.507	0.306	90.0	19.5	490	0.7	1.00	20.2	C	*	*
R	1.851	0.306	90.0	*	417	*	1.00	*	*		
NB											
TR	0.549	0.628	90.0	7.2	3970	0.1	0.53	3.9	A	3.9	A
SB											B
LTR	0.785	0.628	90.0	9.3	1952	1.5	0.67	7.3	B	*	*

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE. & MACOMB ST. SCENARIO 2, PM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	172	1290	0.133	0.306	394	0.436	*
WB							
LTR	68	1267	0.054	0.306	387	0.176	
NB							
L	56	114	0.497	0.628	71	0.792	
TR	4149	4738	0.876	0.628	2974	1.395	
SB							
L	47	114	0.412	0.628	72	0.656	
TR	1420	1518	0.935	0.628	953	1.490	*

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.068
Lost Time Per Cycle, L = 6.0 sec. X critical = 1.145

CONNECTICUT AVE. & MACOMB ST. SCENARIO 2, PM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.436	0.306	90.0	19.0	394	0.5	1.00	19.5	C	19.5	C
WB											
LTR	0.176	0.306	90.0	17.4	387	0.0	1.00	17.5	C	*	*C
NB											
L	0.792	1.256	90.0	9.4	71	28.5	1.00	37.9	D	*	*F
TR	1.395	0.628	90.0	*	2974	*	0.82	*	*		
SB											
L	0.656	1.256	90.0	8.1	72	12.7	1.00	20.8	C	*	*F
TR	1.490	0.628	90.0	*	953	*	1.00	*	*		

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE. & PORTER ST. FUTURE SCENARIO 2 PM

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	542	2369	0.229	0.306	724	0.749	
WB							
LTR	759	2394	0.317	0.306	731	1.038	*
NB							
TR	5025	6277	0.801	0.517	3243	1.549	*
SB							
LTR	1370	1642	0.834	0.628	1031	1.328	

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.530
Lost Time Per Cycle, L = 6.0 sec. X critical = 1.639

CONNECTICUT AVE. & PORTER ST. FUTURE SCENARIO 2 PM

LEVEL-OF-SERVICE WORKSHEET

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.749	0.306	90.0	21.4	724	3.0	1.00	24.4	C	24.4	C
WB											F
LTR	1.038	0.306	90.0	24.2	731	36.1	1.00	60.2	F	*	*
NB											
TR	1.549	0.517	90.0	*	3243	*	0.82	*	*	*	*
SB											
LTR	1.328	0.628	90.0	*	1031	*	1.00	*	*	*	*

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2

CONNECTICUT AVE. & TILDEN ST. FUTURE SCENARIO 2 PM

CAPACITY ANALYSIS WORKSHEET

	ADJ. FLOW RATE (v)	ADJ. SAT. FLOW RATE (s)	FLOW RATIO (v/s)	GREEN RATIO (g/C)	LANE GROUP CAPACITY (c)	v/c RATIO	
EB							
LTR	275	2550	0.108	0.312	796	0.346	
WB							
LTR	565	2794	0.202	0.312	872	0.648	*
NB							
L	87	136	0.639	0.523	71	1.221	
TR	3876	4783	0.810	0.523	2503	1.549	*
SB							
LTR	1708	2234	0.765	0.634	1417	1.206	

Cycle Length, C = 90.0 sec. Sum (v/s) critical = 1.425
Lost Time Per Cycle, L = 4.8 sec. X critical = 1.505

CONNECTICUT AVE. & TILDEN ST. FUTURE SCENARIO 2 PM

	v/c RATIO	g/C RATIO	CYCLE LEN.	DELAY d 1	LANE GROUP CAP.	DELAY d 2	PROG. FACT.	LANE GRP. DELAY	LANE GRP. LOS	DELAY BY APP.	LOS BY APP.
EB											
LTR	0.346	0.312	90.0	18.1	796	0.1	1.00	18.2	C	18.2	C
WB											
LTR	0.648	0.312	90.0	20.3	872	1.2	1.00	21.5	C	*	*
NB											
L	1.221	1.047	90.0	*	71	*	1.00	*	*	*	*
TR	1.549	0.523	90.0	*	2503	*	0.82	*	*		
SB											
LTR	1.206	0.634	90.0	*	1417	*	1.00	*	*	*	*

Intersection Delay = * (sec/veh) Intersection LOS = *

* Delay and LOS not meaningful when any v/c is greater than 1.2