Design Consultants, Inc.

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MEMORANDUM

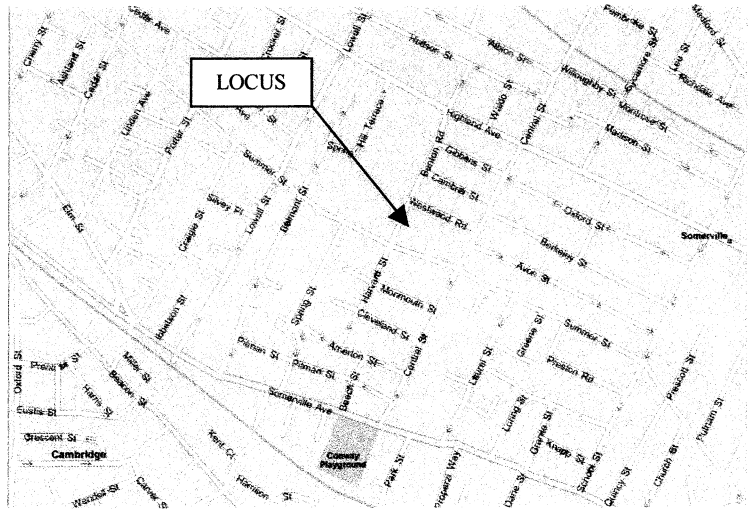
DCI JOB NO. 2009-021.10

TO: City of Somerville
Planning Board

FROM: David Ivany PE, PTOE
Chief Traffic Engineer

SUBJECT: **Traffic Impact Assessment**
3 Benton Road

DATE: May 3, 2010



This memorandum evaluates the traffic impacts associated with the proposed development of 3 residential condominium units (two bedroom units) at 3 Benton Road in Somerville. The proposed new building will be located on a proposed subdivided lot at the northeast corner of Summer Street and Benton Road. Proposed access will utilize the existing curb cut (reduced from 36 to 14 feet) off Benton Road. The undivided site is currently occupied by a large detached residential dwelling (1 Benton Road) that was recently converted to a 3-unit condominium with a new driveway access onto Summer Street. The current proposed site plan for 3 Benton Road will provide 6 parking spaces (3 tandem) at the rear of the building.

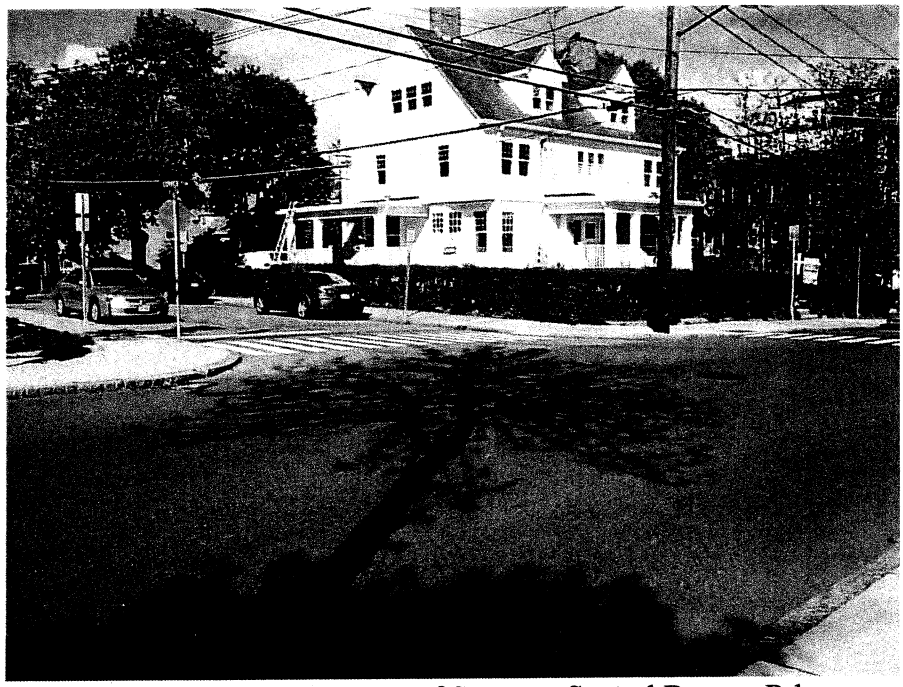
Summary Conclusion

Based on an assessment of the existing and proposed traffic condition that is presented in the following pages herein; it can be concluded that the low traffic volumes generated by the residential development will have little measurable impact on the safe and efficient flow of traffic in the vicinity.

Surrounding Roadway Network

Summer Street is a two-way local/collector street that extends from Bow Street in Union Square to Willow Avenue, a distance of about 1¼ miles. To the west of Willow Street, Summer Street is one-way eastbound, providing a connection from Elm Street (leading from Davis Square), a distance of about 1,000 feet. At the intersection with Benton Road, the street width is about 29 feet wide, providing for residential permit parking on the north side, with 7-foot wide concrete sidewalks on both sides. The posted speed limit is 25 mph. Daily traffic volumes along Summer Street are estimated to be about 8,000 vehicles per day.

Benton Road is a local north-south residential street that extends from Summer Street to Hudson Street, a distance of about 1300 feet. The segment from Summer Street to Highland Street is 1000 feet long with a roadway width of about 26 feet. Sidewalks and residential permit parking are provided on both sides. Stop sign control exists at the intersections with Summer Street and Highland Avenue. Daily traffic volumes along this segment of Benton Road are estimated at 1,200 vehicles per day.



Project Site – NE corner of Summer St. and Benton Rd.

Summer Street and Benton Road Intersection

This 4-legged intersection is unsignalized with posted stop control and stop bar for the Benton Road approach. Harvard Street forms the south leg and is one way southbound. Pedestrian crosswalks and ADA ramps are provided at the corners for Benton Road, Harvard Street and Summer Street on the east leg of the intersection.

Field observations note clear sight distances at the intersection except for vehicles stopping on Benton Road before entering the intersection. Views to the east (left) are limited due to parked vehicles along the north side of Summer Street as well as the hedge at the corner. An appropriate warning sign for the intersection is posted for westbound vehicles on Summer Street approaching the intersection. It was also noted that parking on both sides of Benton Road, generally restrict traffic movements entering or departing Summer Street to one movement at a time.

Views to the east along Summer Street

Intersection Traffic

Traffic movements were manually recorded at the intersection of Summer Street and Benton Road from 4-6 PM on Wednesday, April 28, 2010 to confirm the existing traffic condition. The existing peak hour volumes are shown in the following Figure 1.

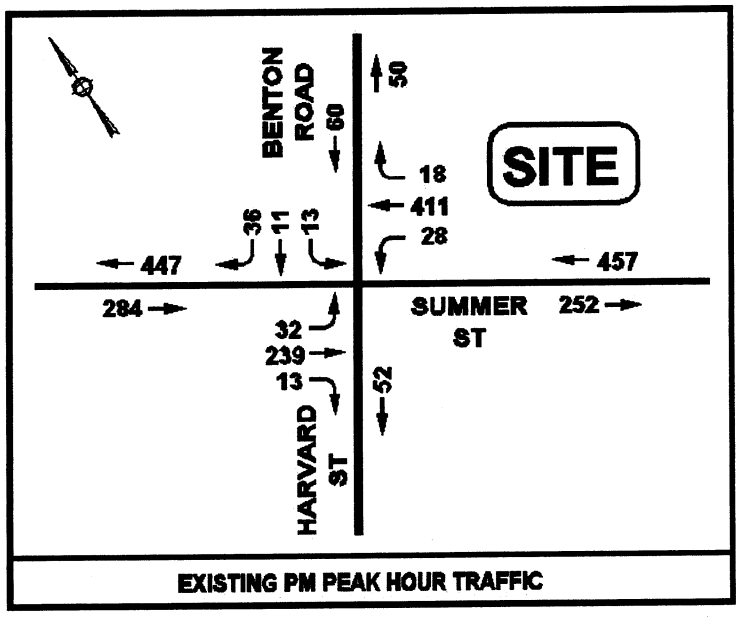


Figure 1

The results reflect the local residential traffic environment with higher volumes along Summer Street that represent drivers utilizing the street to conveniently access destinations in various parts of the city. A peak hour total of 801 vehicles was counted entering the intersection, while 110 vehicles either entered or departed Benton Road. Details of the traffic count data, including pedestrian and bicycle activity is provided in the attached Appendix.

Accident History

Available accident data was obtained from the City of Somerville police records for the intersection of Summer Street and Benton Road and immediate vicinity. The results are shown as follows:

Year	*2005*	*2006*	*2007*	*2008*	*2009*	*2010**
Reported Accidents	1	1	2**	2**	0	0

* - From Jan 1 to April 27, 2010

** - Includes one Hit and Run accident with a parked vehicle near the intersection

As shown above, the intersection has averaged about one accident per year since 2005. The two hit and run accidents that occurred in 2007 and 2008 may not have been intersection related but have been included as noted. This level of accident history is considered to be a typical for a local residential intersection, with accidents generally occurring due to driver error or inattention.

In addition, the MassDOT crash rate formula was used to calculate the crash rate for the intersection (see attached Appendix). This crash rate is expressed in Million Entering

Vehicles (MEV), which is standard to the Traffic Engineering profession. The District 4 average crash rate (covering the greater Boston area) for unsignalized intersections is 0.59. The crash rate for the intersection is calculated at 0.31; lower than the state average and therefore does not indicate a safety concern.

The lack of accidents can be attributed somewhat to the low operating speeds, posted signs and striping, as well as users familiar with the intersection. Along Summer Street, a 20 MPH school zone crossing is located a short distance to the west while a traffic signal is located 500 feet to the east at Central Street.

Trip Generation

DCI has estimated vehicle trips that will be generated by the proposed residential development by utilizing trip rates presented in the Institute of Transportation Engineers (ITE) Trip Generator Manual – 8th Edition. (see attached Appendix for ITE source data)

3 Units
Residential Condominium
(Land use 230)

Daily	PM Peak Hour
In – 9	In – 1
Out – 9	Out – 1
Total – 18	Total – 2

Proposed site circulation will allow for cars to turn around on site, thus avoiding backing movements onto Benton Road, allowing for safe and efficient access/egress.

As can be seen above, the low volumes generated by the proposed development during the peak hours will have little, if any, measurable impacts on traffic flows along Benton Road, Summer Street and the surrounding roadways. Peak hour site traffic (2 vehicles per hour) will amount to approximately one vehicle every 30 minutes either entering or exiting the driveway. This is negligible when compared to the 800 vehicles per hour using the Summer Street/Benton Road intersection.

It should also be noted that the daily and peak hour site trips may be reduced somewhat due to the nearby MBTA bus stops and feeder service on Highland Avenue to the Davis Square Red Line that will encourage residents at the site to utilize transit. Residents may also choose to conveniently walk or bicycle to nearby destinations in Somerville and Cambridge.

Trip generation studies published by ITE show that peak hour rates for residential development coincides with the peak commute periods of adjacent traffic from 7:00 to 9:00 AM and 4:00 to 6:00 PM. Site traffic during off-peak periods will therefore be somewhat lower throughout the day and also reflect the lower traffic volumes on the adjacent roadways (typically about one half of peak hour activity).

APPENDIX

Design Consultants, Inc.
Consulting Engineers and Surveyors

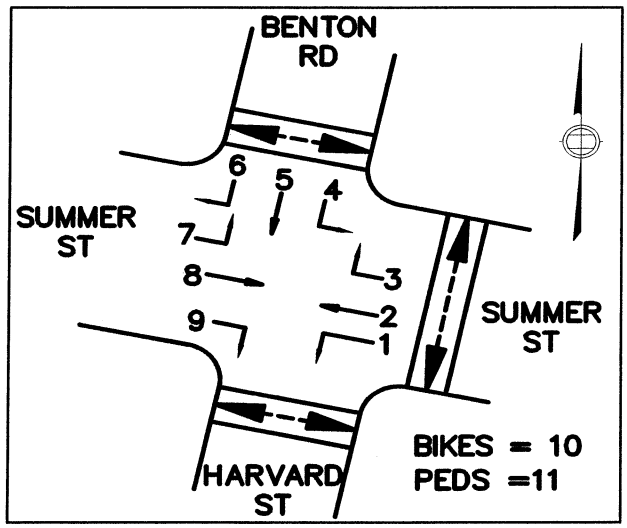
265 MEDFORD ST · SOMERVILLE, ME 02147 · (617) 776-3350

LOCATION: SUMMER ST AT BENTON RD
TIME: 4:00PM-6:00PM
DATE: 4/28/2010
WEATHER: 45°, RAIN

PROJ NO.: 2009-021.10
SHEET NO: 1 of 1
CALCULATED BY: SMK
NOTES:

TIME	1	2	3	4	5	6	7	8	9	10	11	TOTAL VEHICLES
4:00 PM 4:15 PM	10	78	12	2	4	11	4	39	3	0	7	170
4:15 PM 4:30 PM	8	70	4	1	4	10	7	41	3	0	2	150
4:30 PM 4:45 PM	13	64	5	5	0	10	2	39	5	1	1	145
4:45 PM 5:00 PM	6	86	3	3	4	8	3	46	5	0	6	170
5:00 PM 5:15 PM	10	110	4	1	2	11	6	55	2	2	4	207
5:15 PM 5:30 PM	3	94	3	7	0	7	9	74	2	3	5	207
5:30 PM 5:45 PM	6	94	4	3	3	11	12	58	3	3	11	208
5:45 PM 6:00 PM	9	113	7	2	6	7	5	52	6	1	8	216
TOTAL	65	709	42	24	23	75	48	404	29	10	44	1,473

Peak Hour (5:00PM-6:00PM)	**28**	**411**	**18**	**13**	**11**	**36**	**32**	**239**	**13**	**9**	**28**	**801**



Note:
Pedestrians and bikes mainly traveled with the flow of Summer Street

massDOT

CRASH RATE WORKSHEET

CITY/TOWN : Somerville COUNT DATE : 4/28/2010

DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

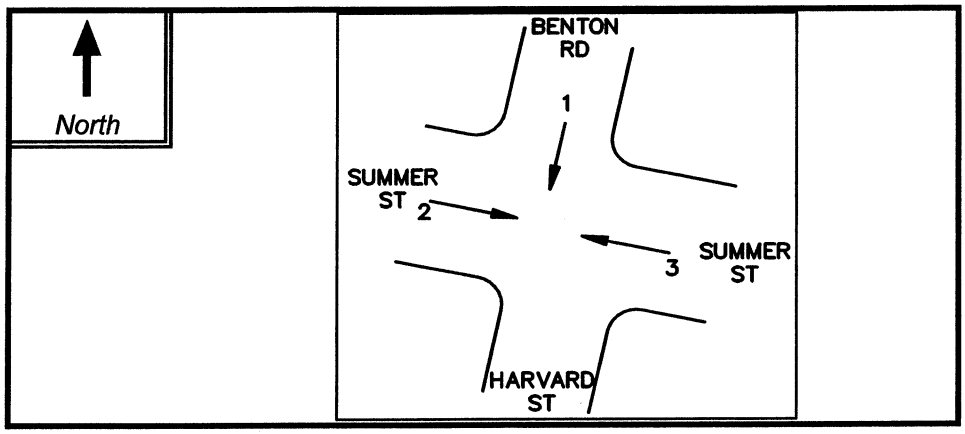
~ INTERSECTION DATA ~

MAJOR STREET : Summer Street

MINOR STREET(S) : Benton Road

Harvard Street

INTERSECTION DIAGRAM



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	SB	EB	WB			
VOLUMES (PM) :	60	284	457			801

" K " FACTOR : 0.090 APPROACH ADT : 8,900 ADT = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 5 # OF YEARS : 5 AVERAGE # OF CRASHES (A) : 1.00

CRASH RATE CALCULATION : 0.31 RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments :

Project Title & Date: 2009-021.10 3 Benton Road 5/3/2010

Residential Condominium/Townhouse
(230)

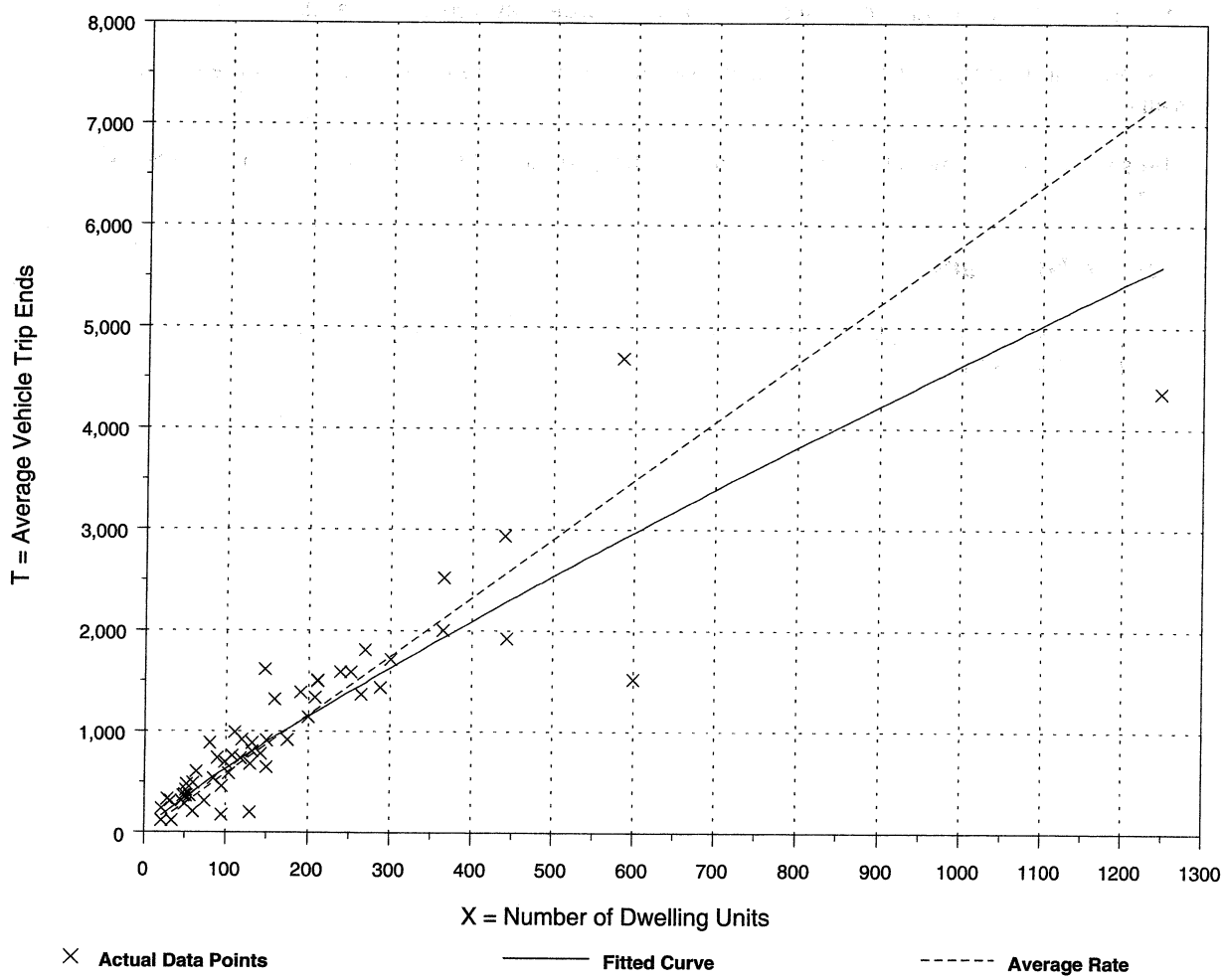
Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Number of Studies: 56
Avg. Number of Dwelling Units: 179
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
5.81	1.53 - 11.79	3.11

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.87 Ln(X) + 2.46

R^2 = 0.80

Residential Condominium/Townhouse
(230)

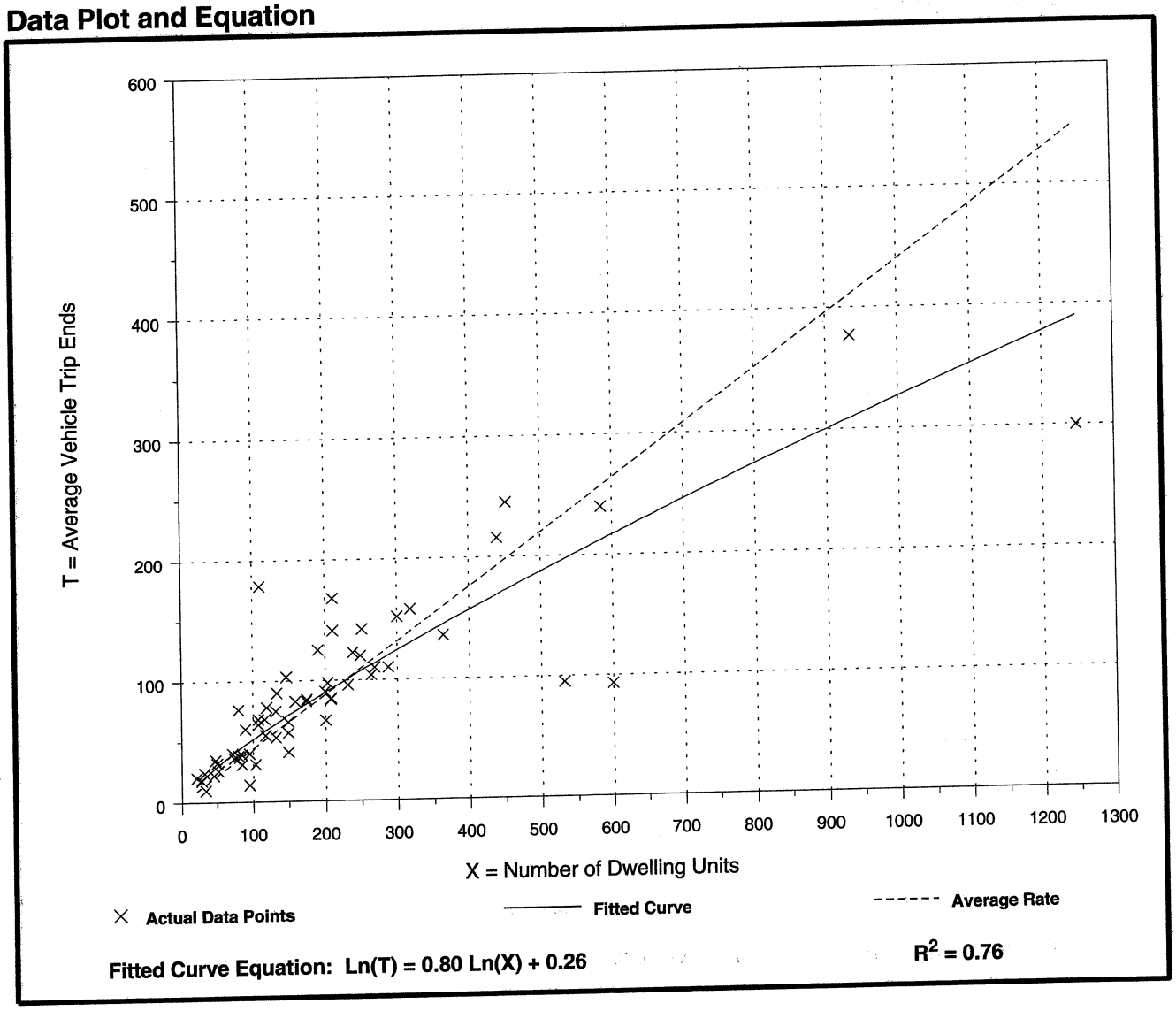
Average Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 59
Avg. Number of Dwelling Units: 213
Directional Distribution: 17% entering, 83% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.61	0.69

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.80 Ln(X) + 0.26

R^2 = 0.76

Residential Condominium/Townhouse
(230)

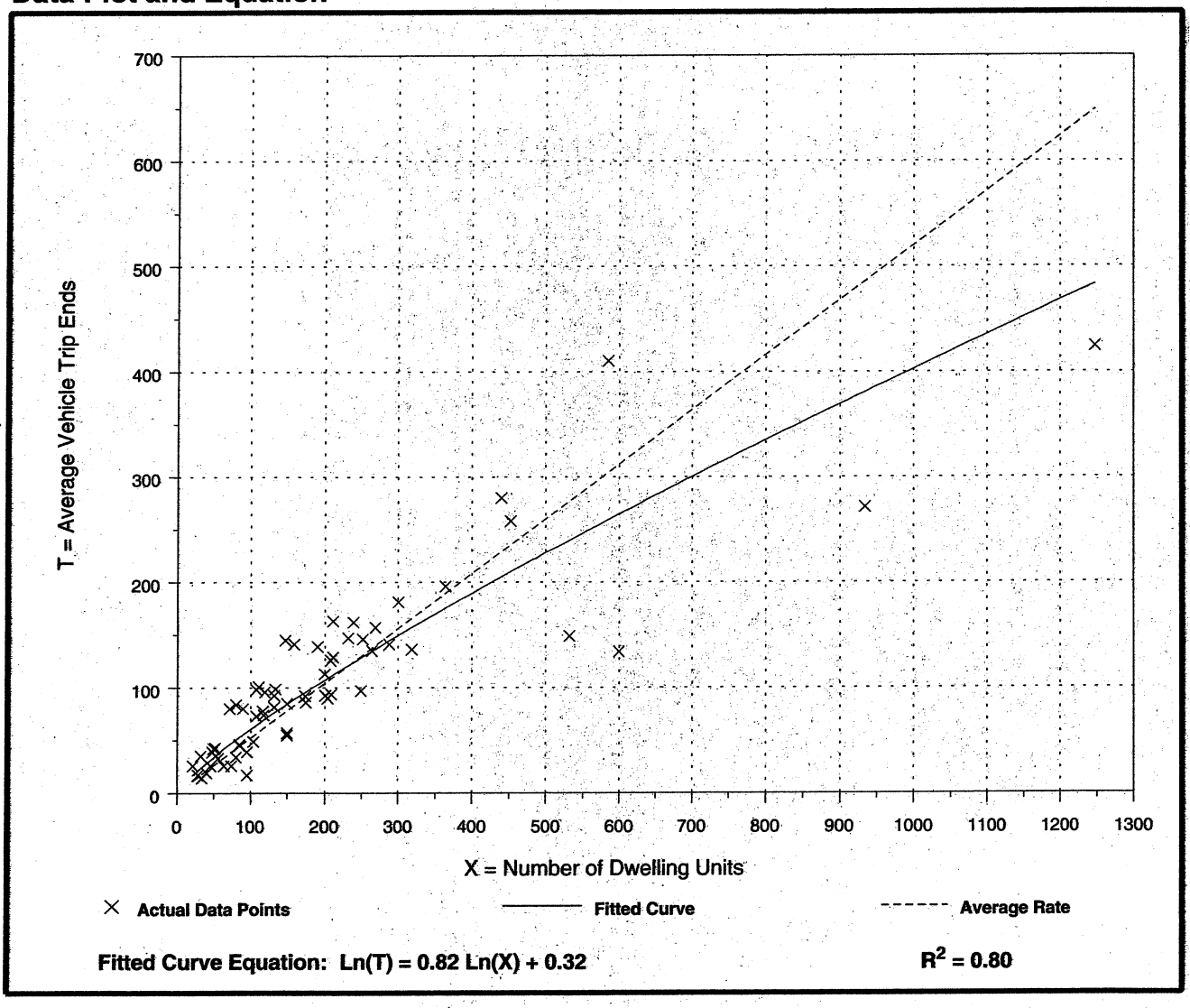
Average Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 62
Avg. Number of Dwelling Units: 205
Directional Distribution: 67% entering, 33% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.52	0.18 - 1.24	0.75

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.82 Ln(X) + 0.32

R^2 = 0.80