

GUIDELINES FOR PREPARATION OF A TRAFFIC IMPACT ASSESSMENT

November 14, 2013

**Subject: Revision to Regulations Drafted by the City Traffic Engineer dated
April 10, 1998, October 14, 1992 and November 14, 2013.**

The enclosed is an amended version of the guidelines relating to the scope of traffic studies prepared for the city, and the required standards of experience for firms conducting such studies. The revisions appear on page B-1 of appendix B.

The complete document is enclosed, being 8 pages of guidelines, 2 pages of appendix A and 2 pages of appendix B.

The effective date of this revision is November 14, 2013.

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CITY OF WALTHAM TRAFFIC COMMISSION

GUIDELINES FOR PREPARATION OF A TRAFFIC IMPACT ASSESSMENT

The following guidelines are intended to indicate the basic information to be included in traffic analysis reports submitted to the City of Waltham as part of a developer's prospectus or for other purposes. Specific projects may warrant that additional information also be included. Much of the following is taken from MEPA guidelines with their permission. Please see Appendix A for a checklist of deliverable materials and Appendix B for the standards of experience required to be met by firms and individuals preparing traffic impact assessments for the City of Waltham. The legal authority for this document is found in the Acts of 1976 of the Great and General Court of the Commonwealth of Massachusetts, Chapter 143, Section 2; and the City of Waltham General Ordinances Chapter 21, Section 3.5 as amended by Council Order 27225 by Council Order 27225 on September 25, 1991.

A. Project Introduction

1. Proposal Description – A brief description of the proposed development and study area. The boundaries of this study area should be well defined and must include the area mandated by the Zoning Ordinance. If not so mandated, the study area must be negotiated with the City's Traffic Engineer. His/Her written approval of the proposed study area must be obtained before the study begins.
2. Locus Map – To set the context regionally and within the City, provide a map showing proposed site in relation to existing highway and mass transit routes and facilities and private alternative transportation routes.
3. Site Plan – indicating proposed "footprint" of the project relative to other buildings on the site and showing all land owned by the proponent, all access to/from the site and all on-site parking and circulation. A standard engineering scale should be used.
4. Zoning Map – indicating current zoning of the site and adjacent parcels. Proposed changes in zoning should be discussed relative to the potential "full" development of the site. A brief summary of the applicable zoning regulations and requirements should be included.

B. Existing Conditions

1. Roadway Network - indicating jurisdictional responsibilities of each roadway link within the study area if other than the City. Right-of-way lines and "no access" lines should be shown where relevant. Private ways should be indicated as such.
2. Traffic volumes – a traffic flow map should be developed covering the entire study area. Average Annual Weekday volumes should be shown for 24 hours and the AM and PM peak hours in all cases. Saturday peak conditions should also be included for retail developments. Any adjustment factors or growth rates used should be cited and defended and calculations provided.
3. Pedestrian counts may be required for specific developments. Transit usage should be quantified.
4. Accident History – a minimum of three (3) most recent years available to identify problem locations. A written request for accident reports should be made to the Waltham Police Department (and to the local MassDOT District Highway Engineer for accident reports on state owned highways). Accident diagrams summarizing police reports will usually be required.
5. Capacity and LOS Analysis – an existing conditions capacity and level of service analysis should be computed for the roadway network. The performance indicators, delay, v/c ratio and 95% queue length, should be documented in this section. A weave, merge, diverge and ramp road segment analysis should be included where applicable. Also, departure lane merge capacity should be addressed as required and saturation flow rates adjusted accordingly. These analyses should be performed using the **1994 Highway Capacity Manual**, Special Report 209, published by the Transportation Research Board. If microcomputer software is used for intersection analysis, the FHWA supported **HCM** software should be used for capacity analysis. The Massachusetts Highway Department **Queue Length Analysis SIDRA Model, latest version**, should be used for queue analysis.

C. Trip Generation

1. The **unadjusted** Institute of Traffic Engineers (ITE) rates must be used for the particular land use code. These rates should be presented in this section of the report. **Trip Generation, latest edition** published by ITE, should be used for all land use codes. If employment levels are known, trip rates per employee should also be cited. If ITE rates are not available or the sample size is prohibitively small, other transferable empirical research may be cited, fully justified and the sources shown.
2. Alternative trip generation rates may be used and will be considered for comparative purposes where appropriate. Alternate capacity analyses

of baseline and future conditions will also be required for those alternative rates presented.

D. Trip Distribution

1. Distribution – all generated vehicle trips to/from the site through all access points are to be documented. Several categories of trips should be considered for applicable land uses as outlined in the **ITE Trip Generation manual, latest edition**. Analytic bases for reducing the main street volumes due to pass-by trips, impulse trips, etc., are to be documented in detail. The following trips should be considered for all retail developments:
 - Primary/Site – one which the purpose of the trip is shopping and the trip pattern is generally home-to-shopping-to-home.
 - Pass-By/Site – directly from the traffic stream passing the facility on the adjacent street system and does not require a diversion from another roadway.
 - Basis for Trip Distribution percentages and assignment should be well documented.
2. All developments should also consider other study area sites – trips generated from nearby approved or committed projects including state and/or local approvals. Such nearby projects may be across the city line.

E. Future Conditions

1. Traffic Volumes for the “no-build” and “build” scenarios should be graphically shown. Future conditions should cover a five year time horizon normally, with a two year horizon as a minimum for low impact developments.
 - Trip tables for all development within the study area should be generated from available data or reasonable assumptions. Assumptions should be stated explicitly. These tables should be combined with future year background volumes to develop the “no-build” traffic volumes.
 - The trip table for the proposed development should then be added to generate “build” volumes.
 - Transit tables should also be included in this section when applicable.
2. Current Projects – table of all projects within the study radius covering as a minimum a **five year** time horizon from the petition date. Proponents should contact state agencies and other cities and towns regarding the

impact of other known projects in the affected study area to determine how to incorporate those impacts.

3. Capacity Analysis – future conditions capacity (V/C, LOS, delay and 95% queue) should be computed for no-build and build, without and with mitigation measures in place. The performance indicators as documented above in the Existing Conditions section of the report should again be depicted in tabular form, arranged for easy side-by-side comparison.
4. Signal Warrant Analysis – using the **Manual on Uniform Traffic Control Devices, latest edition.**
5. Summary – tabular summary comparing base-case to five year “no-build” and “build” scenarios.

F. Mitigative Measures – All assessments should include but not be limited to the following:

1. Mitigative Actions – Future year performance degradation must be fully mitigated to equivalent “no-build” delay and v/c ratios. The effects of mitigative measures should be quantified in this section.
2. Additional Analysis – capacity analyses of all mitigative measures should be computed as outlined above.

Where use of existing transit systems is proposed as mitigation, analysis of the impacts on capacity and performance of those services should be quantified and documented in this section.

3. Commitment – the report should clearly identify the individual costs of the proposed improvements. The responsible party for the implementation of the proposed improvements should also be clearly identified. A mechanism by which these commitments will be executed and their intended duration should be indicated. A schedule of when, in relation to any project phasing, particular improvements need to be implemented should be outlined.
4. Construction Schedule – with proposed mitigative measures for the following:
 - Noise and dust pollution from construction equipment.
 - Any capacity restraints on the existing network.
 - Area parking supply during construction including construction workers.
 - Loading and unloading of trucks and heavy vehicles.

5. Development Options – alternative densities and land uses along with smaller size developments in some instances should be analyzed as a means of traffic mitigation.

G. Required data: Report Appendix

The following list identifies data which should be included in each report. This list is to be consistently followed when displaying data and analyses:

1. Recorded traffic counts – tabular summaries
 - Turning movement counts.
 - Directional volume counts.
 - Existing AM/PM peak period and 24 hour traffic volumes.
 - Calculated Peak Hour Factors by individual approach.
 - Future year peak hour traffic volumes.
 - Adjustment factors and sources.
2. Permit sketches and layout plans
3. Capacity and LOS analysis data
 - Lane geometry
 - Assumed signal phasing
 - Critical volumes
 - Assumed saturation flow rates
 - All work sheets or computer outputs
4. Queue Analysis on a approach basis for future no-build, full-build and future build with mitigation scenarios in a tabular format.
5. ITE land use code sheets
6. Plotted stopping sight distance analyses
7. Signal warrant analysis sheets
8. Weaving analyses, where applicable

H. Design Standards - The latest edition of the following publications are required to be used. In case of conflicts between these documents, the Zoning Ordinance shall govern, then these guidelines, then the other standards listed.

1. City of Waltham Zoning Ordinance, with the latest legally applicable amendments.
2. ITE Traffic Access and Impact Studies for Site Development, a proposed recommended practice.

3. Highway Capacity Manual.
4. ITE Trip Generation.
5. Manual on Uniform Traffic Control Devices Handbook and Massachusetts Amendments.
6. Massachusetts Department of Public Works Highway Design Manual.
7. American Association of State Highway and Transportation Officials (AASHTO) Handbook.
8. Access Management for Streets and Highways, FHWA Implementation Package FHWA-IP-82-3, June 1982.

I. Standards for Presentation of Report.

1. Paper copies of the report shall be letter size 8 ½" x 11". Report pages shall be numbered. Every page of each appendix shall be numbered. A table of contents shall be provided which includes major headings and contents of each appendix. Labeled separators shall be used for each appendix.
2. Submit one copy of an Executive Summary, the full Traffic Impact Report and all data files on disk directly to the Traffic Engineer and obtain a receipt. The Executive Summary and Traffic Impact Report shall be a **Microsoft Word** file or an ASCII text file importable into Microsoft Word. Provide a directory of filenames with an explanation of the purposes of each file. Data files shall be as created by the application programs. Hand calculations of capacity are **not permitted**. If these requirements cause a hardship, the proponent may ask for relief.

J. Modeling Standards.

1. Include an explanation of all modeling assumptions used. Identify whether each impute value is default, measured or projected. Saturation flow must be measured for a given movements or use the default value of 1800 Vph. Waltham is part of a metro area over 250,000 population. For signal timing in the case of an isolated intersection, use optimum timing to minimize intersection delay. In the case of an intersection within an existing or proposed interconnected system, use existing cycle length and split or use **PASSER, latest edition** or **TRANSYT-7F, latest edition**, or any other optimization software as requested by the Traffic Engineer, to optimize the entire interconnected system for cycle length and split to produce minimum system delay. Provide time/space diagrams in the latter case. Exclusive pedestrian phases, whether concurrent or exclusive, shall be modeled as if occurring 100% of the cycles. Do not model pedestrian phases as concurrent without the advance permission of the City Traffic Engineer.

K. Traffic Counting Standards.

1. ATR counts must be 48 hours minimum, not including Saturdays, Sundays, holidays, any day within a holiday week, or any day with any snow fall in the Boston basin geographical area. Provide a plot of average directional count by hours for a 24 hours average weekday, for each location counted.
2. Turning movement counts must be sufficient to show that they include the 2 highest peak hours among these possibilities at least: AM highway peak, mid day highway peak, mid afternoon highway peak, PM highway peak. If the 2 highest generator peak hours do not overlap any part of the highway peak, show substantiating data.

L. Site Plan Standards.

1. The proposed site layout in relation to the existing right-of-way shall be clearly shown. The following shall be included:
 - Scaled plan showing existing and proposed layout lines, building and parking lot areas, driveways (with direction of travel) and land usage.
 - Proposed geometric changes and widenings. (Driveways, storage lanes, acceleration/deceleration lanes)
 - Location of traffic channelizing items such as islands, curbing and pavement markings.
 - Relevant radii.
 - The location of physical barriers to traffic such as guard stations, garage doors, and vehicle control devices such as signals, detectors, card readers, payment booth, etc. as applicable.
2. Submit two sets of site plans directly to the Traffic Engineer and obtain a receipt.

M. Delivery of Report Materials.

1. Submit two (2) full copies of the report and ten (10) copies of the Executive Summary to Traffic Engineering. And one (1) copy of the full report on PDF emailed to the Traffic Engineer.
2. Submit one (1) set of plans to the Clerk of the Traffic Commission for Police Department review.
3. Submit one (1) set of plans to the Fire Chief for review.

4. Submit two (2) sets of full size plans and eight (8) sets of half size plans to Traffic Engineering.
5. Submit one (1) set of the disk data as described in these guidelines to Traffic Engineering.
6. Obtain signatures on a receipt attesting to the delivery of all the above.
7. **In order to have consideration of the traffic impact report placed on the agenda of the Traffic Commission's regular meeting usually scheduled for the third Thursday of a month, (except July and August) the above materials shall be delivered to all the listed parties on or before 4:00 pm of the last business day of the preceding month. Before requesting a special meeting of the Traffic Commission to consider the traffic impact report, the petitioner shall deliver the above materials at least three weeks before the date of the requested special meeting.**

SEASONAL VARIATIONS OF TRAFFIC VOLUMES WITHIN WALTHAM

LOCATION: RT. 128 / I -95, SOUTH OF RT. 20

COUNT STATION: 32

MONTH	1991	1992	AVERAGE VOLUME	DEVIATION FROM AVERAGE	DEVIATION FROM MAXIMUM
JAN	134,600	138,100	136,350	11.02%	18.57%
FEB	128,800	145,100	136,950	10.63%	18.21%
MAR	147,500	149,200	148,350	3.19%	11.41%
APR	152,200	155,500	153,850	-0.40%	8.12%
MAY	157,100	160,500	158,800	-3.63%	5.17%
JUN	169,100	165,800	167,450	-9.28%	0.00%
JUL	152,900	163,700	158,300	-3.31%	5.46%
AUG	158,000	164,400	161,200	-5.20%	3.73%
SEP	157,800	162,200	160,000	-4.42%	4.45%
OCT	159,600	164,200	161,900	-5.66%	3.31%
NOV	150,400	152,700	151,550	1.10%	9.50%
DEC	142,900	145,300	144,100	5.96%	13.94%
TOTAL	150,908	155,558	153,233		

CITY OF WALTHAM TRAFFIC COMMISSION

APPENDIX A CHECKLIST FOR DELIVERY OF MATERIALS TO BE INCLUDED IN A TRAFFIC IMPACT ASSESSMENT

Note: Section letters and numbers below refer to corresponding sections of the document titled "GUIDELINES FOR PREPARATION OF A TRAFFIC IMPACT ASSESSMENT".

G - DATA REQUIRED TO BE SUBMITTED.

- G 1. Recorded traffic counts – tabular summaries.
 - Turning movement counts.
 - Directional volume counts.
 - Existing AM/PM peak period and 24 hour traffic volumes.
 - Calculated Peak Hour Factors by individual approach.
 - Future year peak hour traffic volumes.
 - Adjustment factors and sources.
- G 2. Permit sketches and layout plans.
- G 3. Capacity and LOS analysis data.
 - Lane geometry
 - Assumed signal phasing
 - Critical volumes
 - Assumed saturation flow rates
 - All work sheets or computer outputs
- G 4. ITE Trip Generation land use code sheets.
- G 5. Plotted stopping sight distance analyses.
- G 6. Signal warrant analysis sheets.
- G 7. Weaving analyses, where applicable.

I - STANDARDS FOR PRESENTATION OF REPORT.

- I 1. Paper copies of the report shall be letter size 8 ½" x 11". Report pages shall be numbered. Every page of each appendix shall be numbered. A table of contents

shall be provided which includes major headings and contents of each appendix. Labeled separators shall be used for each appendix.

- I 2. Submit the report and all data files on disk directly to the Traffic Engineer. See section M.4.

The report shall be a Microsoft Word file or an ASCII text file importable into Microsoft Word running under Microsoft Windows/Windows 95.

Provide a directory of filenames with an explanation of the purposes of each file. Data files shall be as created by the application programs.

K - TRAFFIC COUNTS.

- K 1. ATR counts: Provide a plot of average directional count by hours for a 24-hour average weekday, for each location counted.

- K 2. Turning movement counts: Provide a graphic presentation.

L - SITE PLAN STANDARDS.

- L 1. The proposed site layout in relation to the existing right-of-way shall be clearly shown, including the following details:
- Scaled plan showing existing and proposed layout lines, building and parking lot areas, driveways (with direction of travel) and land usage.
 - Proposed geometric changes and widenings. (Driveways, storage lanes, acceleration/deceleration lanes)
 - Location of traffic channelizing items such as islands curbing and pavement markings.
 - Relevant radii.
 - The location of physical barriers to traffic such as guard stations, garage doors, and vehicles control devices such as signals, detectors, card readers, payment booth, etc. as applicable.

M - DELIVERY OF REPORT MATERIALS.

- M 1. Submit two (2) full copies of the report and ten (10) copies of the Executive Summary to Traffic Engineering. And one (1) copy of the full report on PDF emailed to the Traffic Engineer.
- M 2. Submit one (1) set of full size plans to the Clerk of the Traffic Commission for Police Department review.
- M 3. Submit one (1) set of full size plans to the Fire Chief for review.
- M 4. Submit two (2) sets of full size plans and eight (8) sets of half size plans to Traffic Engineering.
- M 5. Submit one (1) set of the disk data as described in these guidelines to Traffic Engineering.

Summary of quantities of deliverables: Two full copies of report, Ten copies of Executive Summary and one copy of full report on PDF. Four sets of full size plans, Eight sets of half size plans and one set of disk data.

CITY OF WALTHAM TRAFFIC COMMISSION

APPENDIX B. STANDARDS OF EXPERIENCE FOR FIRMS AND INDIVIDUALS PREPARING TRAFFIC IMPACT ASSESSMENTS FOR SUBMITTAL TO THE CITY OF WALTHAM.

The legal authority for these standards is found in the Acts of 1976 of the Great and General Court of the Commonwealth of Massachusetts, Chapter 143, Section 2: and the City of Waltham General Ordinances Chapter 21, Section 3.5 as amended by Council Order 27225 on September 25, 1991.

Any firm or individual proprietorship which prepares a traffic impact assessment or traffic study for the City of Waltham, or presents such an assessment or study to the city of Waltham, or which defends or challenges such an assessment or study before an agency of the City of Waltham, shall cause all such work to be closely supervised by, reviewed by and authorized by or attributed to one or more persons employed by said firm or proprietorship. Each such supervisor, reviewer and author shall meet all of the following three experience qualifications or the respective substitution(s) given below:

- 1) **REGISTRATION.** Each such person shall be a Professional Engineer registered by the Commonwealth of Massachusetts as a Civil Engineer or a Traffic Operations Engineer at the time such report is prepared and for at least three full years out of the previous four years before such preparation; and
- 2) **AUTHORSHIP.** Each such person shall have previously had the primary or sole responsibility for the preparation for a government subdivision or agency of at least ten (10) traffic impact assessments or traffic operations studies, at least one of which shall be of a nature similar to the report to be prepared for, or presented to, or discussed before an agency of the City of Waltham; and
- 3) **EXPERIENCE.** Each such person shall have had the equivalent of full-time paid work experience in the field of traffic engineering on public streets or highways for at least three (3) full years out of the previous six (6) years before undertaking traffic assessment work for the purposes described above for or before an agency of the City of Waltham.

Substitutions for each requirement above, respectively:

- 1) Registration as a Professional Traffic Operations Engineer (PTOE) in another jurisdiction having specialized registration for traffic engineers may be substituted on a "one year for one year" basis for years of registration as a civil or traffic engineer in the Commonwealth (requirement 1)
- 2) Post graduate level continuing education credits (CEU) in the field of traffic engineering or transportation engineering may be substituted for the authorship of

traffic impact assessments on the basis of 3.0 CEU's equal one impact assessment (requirement 2).

- 3) Each twenty-four (24) months of full-time paid work experience in transportation engineering or transportation planning for public streets or highways may be substituted for one (1) year of full-time paid work experience in traffic engineering by those persons who are current members of Associate or higher grade in good standing of the Institute of Transportation Engineers. Also, each twenty-four (24) months of full-time paid work experience in transportation planning for public streets and highways may be substituted for one year of full-time paid work experience in traffic engineering by persons who are current regular members in good standing of the American Planning Association (requirement 3).

Filename: 2013 Traffic Impact Guidelines