TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. FHWA/TX-84/17+250-1	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle SIMULATION OF VEHICLE EMISSIONS AT INTERSECTIONS		5. Report Date August 1983 6. Performing Organization Code
7. Author(s) Fong-Ping Lee, Clyde E. Lee, Randy B. Machemehl, and Charlie R. Copeland, Jr.		8. Performing Organization Report No. Research Report 250-1
9. Performing Organization Name and Address Center for Transportation Research The University of Texas at Austin Austin, Texas 78712-1075		10. Work Unit No. 11. Contract or Grant No. Research Study 2/3-8-79-250
12. Sponsoring Agency Name and Address Texas State Department of Highways and Public Transportation; Transportation Planning Division P. O. Box 5051 Austin, Texas 78763		13. Type of Report and Period Covered Interim 14. Sponsoring Agency Code

15. Supplementary Notes

Study conducted in cooperation with the U. S. Department of Transportation, Federal Highway Administration

Research Study Title: "Vehicle Emissions at Intersections"

16. Abstract

High concentrations of vehicular emissions at road intersections are a health-related issue of concern, and the associated fuel consumption is a matter of continuing economic interest. For this study, a computer simulation model called TEXAS-II was developed at the Center for Transportation Research to estimate with respect to time and location the source of carbon monoxide, hydrocarbon, and oxides of nitrogen emissions and the amount of fuel consumed by vehicles as they pass through an intersection. The model was run approximately 300 times in a series of experiments designed to obtain quantitative estimates of the effects of various traffic and intersection factors on emissions, fuel consumption, traffic delays, and queue lengths. The resulting data were utilized to build predictive models for emissions and fuel consumption at intersections. The factors which were used for simulating the intersection environment were (1) intersection size, (2) presence or absence of a special left-turn lane, (3) pretimed signal control, (4) fully-actuated signal control, (5) all-way stop-sign control, (6) traffic volume, (7) number of left turns, and (8) number of heavy-duty vehicles.

Traffic engineers and transportation planners can utilize the results of this study in three ways: the predictive models can be applied to calculate the expected source of emissions, fuel consumption, and traffic performance parameters for any intersection situation that was included in the range of simulated conditions; these values can be looked up in a series of tables; and the TEXAS-II computer simulation program can be run to obtain detailed data concerning any specific intersection environment of practical interest.

17. Key Words vehicle emissions, intersections, simulation, model, TEXAS-II, fuel consumption, geometry, traffic, signal timing	18. Distribution Statement No restrictions. This document is available to the public through the National Technical Information Service, Springfield, Virginia 22161.		
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages	22. Price

Form DOT F 1700.7 (8-69)

SIMULATION OF VEHICLE EMISSIONS AT INTERSECTIONS

by

Fong-Ping Lee
Clyde E. Lee
Randy B. Machemehl
Charlie R. Copeland, Jr.

Research Report Number 250-1

Vehicle Emissions at Intersections

Research Project 2/3-8-79-250

conducted for

Texas
State Depratment of Highways and Public Transportation

in cooperation with the
U. S. Department of Transportation
Federal Highway Administration

by the

Center for Transportation Research
Bureau of Engineering Research
The University of Texas at Austin

August 1983

The contents of this report reflect the view of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

PREFACE

This report describes the development and application of a vehicle emissions and fuel consumption model for mixed traffic at intersections called TEXAS-II. Momentary speed, acceleration, and position information from a modified version of the TEXAS Model for Intersection Traffic is used in TEXAS-II as input to the embedded EPA Modal Analysis Model to estimate emissions and fuel consumption for light-duty vehicles. A new model, which was developed around diesel and gasoline engine data provided by Southwest Research Institute, estimates these factors for heavy-duty vehicles. Initial work on the new model was performed by Hsin-Hsing Wu and Pramod Athalye in 1980 and further development was done by Charlambos Simeonidis and Steve Beckel in 1981.

This study, dealing primarily with improved techniques for estimating vehicle emissions sources at intersections, was part of a coordinated research project to identify air pollution problems at intersections. The field monitoring and dispersion modeling portion of the work was performed by the Chemical Engineering Department and the Texas Transportation Institute at Texas A&M University under the supervision of Dr. J. A. Bullin and is described in Research Report 250-2F. Rod Moe coordinated the overall research study and represented the Texas State Department of Highways and Public Transportation with technical expertise and administrative support. Mrs. Candace Gloyd handled the word processing for the report manuscript.

SUMMARY

High concentrations of vehicular emissions at road intersections are a health-related issue of concern, and the associated fuel consumption is a matter of continuing economic interest. For use in this study, a computer simulation model called TEXAS-II was developed at the Center for Transportation Research, The University of Texas at Austin, to estimate with respect to time and location the source of carbon monoxide, hydrocarbon, and oxides of nitrogen emissions as well as the amount of fuel consumed by individually-characterized vehicles as they pass through an intersection environment which can be described accurately in terms of its geometric features, traffic control, and traffic stream characteristics.

The TEXAS-II simulation model was run approximately 300 times in a series of experiments designed to obtain quantitative estimates of the effects of various traffic and intersection factors on emissions, fuel consumption, traffic delays, and queue lengths. The resulting data were utilized to build predictive models for emissions and fuel consumption at intersections. The factors which were used for simulating the intersection environment were (1) intersection size, (2) presence or absence of a special left-turn lane, (3) pretimed signal control, (4) full-actuated signal control, (5) all-way stop-sign control, (6) traffic volume, (7) left turns, and (8) heavy-duty vehicles.

Traffic engineers and transportation planners can utilize the results of this study in one of three ways. First, the predictive models can be applied to calculate the expected source of emissions, fuel consumption, and traffic performance parameters for any intersection situation that was included in

the range of simulated conditions. Second, a series of tables can be used for convenient look-up of these values, or finally, the TEXAS-II computer simulation program can be run to obtain detailed data concerning any specific intersection environment of practical interest. The values thus obtained can serve as a basis for further emission dispersion studies or for direct comparison of the effects of various intersection features on emission sources, fuel consumption, vehicular delay, and queue lengths.

IMPLEMENTATION STATEMENT

A set of tables, based on an extensive series of simulation experiments, is presented for direct look-up of quantitative values for carbon monoxide, hydrocarbons, and oxides of nitrogen vehicle emission sources as well as fuel consumption per fifteen minutes at signalized intersections carrying mixed traffic. Various geometric, traffic, and signal timing conditions are included, and the tabular values may be used conveniently for evaluating and comparing the effects of these factors for the overall intersection area or for each intersection approach over a wide range of practical conditions. Multi-term predictive models are provided for computing intermediate values for conditions within the range of signalized intersection environments simulated in the experiments. TEXAS-II, a new computer simulation model which incorporates EPA's Modal Analysis Model for light-duty vehicle emissions and fuel consumption estimates along with a heavy-duty vehicle model developed in the study, can be run to evaluate quantitatively emissions and fuel consumption for any practical geometric, traffic control (signals, signs, or uncontrolled), and traffic mix environment of specific interest. Output from the models is presented for buckets or segments along each lane, for each approach, for the intersection proper, and for the overall intersection system during a specified time interval in a tabular format suitable for direct interpretation or for subsequent use with a dispersion model. This quantitative information is especially useful for identifying existing problem intersections and for evaluating practicable alternative solutions.

TABLE OF CONTENTS

CHAPTER 1. INTRODUCTION

PROBLEM STATEMENT

Vehicle emissions and fuel consumption at or near street intersections are usually higher than on other street segments because the intersection frequently causes vehicles to slow, stand, and accelerate. Pollutants emitted from vehicles in the vicinity of intersections can sometimes accumulate at certain points, and concentrations in the air can make occupancy of these areas potentially dangerous to human health. Excessive fuel consumption at intersections is also a major concern in traffic engineering and in transportation economics as it relates to the conservation of energy.

A practical means of estimating both the vehicle pollutants and fuel consumption near intersections in quantitative terms is needed. Existing and potential locations with excessive emissions and fuel consumption need to be identified so that appropriate remedial and preventative measures can be programmed.

Among the various emitted pollutants, carbon monoxide (CO), hydrocarbons (HC), and oxides of nitrogen (NOx) are of most concern. Carbon monoxide is so toxic that it can cause death within minutes in high concentrations. Hydrocarbons, in the gaseous form, combine with oxides of nitrogen in the presence of sunlight to form photochemical smog. Smog frequently causes watering and burning of the eyes and adversely affects the human respiratory system, especially of those persons in marginal physical condition. Oxides of nitrogen tend to combine with the hemoglobin in the blood and react with moisture in the lungs to form dilute nitric acid. Even when the amounts of

NOx are minute, the effect on the human body is cumulative and therefore undesirable after a long period of time [Ref 1]. HC and NOx, which sometimes react in the atmosphere, can form oxidants and thus are difficult, if not impossible, to monitor accurately with existing equipment and sampling methods. Only CO concentrations can be measured practically by field techniques at this time.

In order to predict the vehicle generated pollutant concentrations which might exist at any selected location on or adjacent to a roadway, the source of emissions must first be estimated. Vehicle source emissions can be characterized by a time-dependent instantaneous rate with respect to location along the roadway. The type and the amount of pollutants emitted from any vehicle traveling along the roadway actually depend on the vehicle type, its condition, and the performance of traffic at the location. Inherently, vehicle emissions are displaced almost immediately from the instantaneous point of deposit due to movement of the air around the vehicles traveling on the roadway, wind, and thermal convection. For certain modeling purposes, however, the emissions deposited along a highway lane or on a set of intersection approach lanes in a short time period, before being dispersed into the air or modified by reaction with other constituents in the air, might be viewed collectively as a line source of pollutants in relation to the overall intersection space [Ref 2]. The pollutants in this line source may be further dispersed into the air, quickly or slowly, depending on the localized meteorological conditions. Locations where the dispersed pollutant concentrations exceed the primary or secondary ambient air quality standards issued by the Environmental Protection Agency in 1971 [Ref 3] can possibly be called pollution hot spots.

In this study, estimating the source of vehicle emissions in quantitative terms is the major concern. Mixing and dispersion of pollutants is the subject of related ongoing research which is utilizing field measurements of pollutants as the basis for developing improved models of pollutant concentrations in or near road intersections. Fuel consumption, which likewise varies with respect to time and location along the roadway, is also addressed in this study since the estimation techniques are somewhat similar and the subject is one of concern. Techniques for identifying the intersection areas and conditions which result in various rates of fuel consumption are presented in subsequent chapters.

The primary objectives of this portion of the overall research project are to:

(1) develop a computer simulation model (TEXAS-II) which can predict the time-dependent vehicle emissions and fuel consumption at intersections on a more detailed basis than any of the currently available techniques, and

(2) develop a series of predictive equations and look-up tables which will describe vehicle emissions sources and fuel consumption at various locations in the intersection vicinity during a specified time interval for various types of geometry, traffic control systems, and traffic flow conditions.

This study concentrates on applying the TEXAS-II computer simulation model in a series of designed experiments to obtain quantitative estimates of vehicle emissions sources and fuel consumption on intersection legs and in the intersection proper. The data resulting from some 300 runs of the model have been used to build predictive models for emissions and fuel consumption at intersections. These models can be used to calculate estimates of emissions, fuel consumption, vehicle delay, and queue length for the situations which are included within the range of experimental values utilized. A series of tables has also been prepared to allow convenient look-up of the experimental values without calculation. The TEXAS-II model can, of course, be executed to obtain detailed data concerning specified intersection environments of practical interest. Efforts to coordinate the predicted emissions with field measurements of pollutant concentrations are described in Appendix I.

BACKGROUND AND SIGNIFICANCE OF STUDY

The Environmental Protection Agency (EPA) initiated an extensive series of studies related to air quality in urban areas following the 1970 Amendments to the Federal Clean Air Act. These studies have addressed the estimation of vehicle emissions and the associated traffic performance on roadways, as well as the estimation of the pollutant concentrations by modelling or by field measurement. In a 1972 report entitled Compilation of Air Pollutant Emission Factors (referred to as AP-42 and revised in 1975) [Ref 4], the dominant emission factors for various sources including various highway vehicles were identified. The 1974 Automobile Exhaust Emissions Modal Analysis Model (referred as the Modal Analysis Model and revised in 1977) [Ref 5] moved a step further by building mathematical models for the instantaneous rate of emissions and fuel flow as functions of instantaneous vehicle speed and acceleration. Only light-duty vehicles were modelled, however. In 1981, a model called MOBILE-2 [Ref 6], revised from the 1978 MOBILE-1 [Ref 7], was presented to extend the methods and the emission factors listed in AP-42 to predict the emissions of both light-duty vehicles and heavy-duty vehicles driving at steady speed or idling. No provision was made in this model for transient state driving. The 1980 HIWAY-2 model [Ref 8], revised from the 1974 HIWAY model [Ref 9], was developed to predict the concentration of pollutants emitted from vehicles. This model combined the Gaussian Plume Equation, meteorological situations, and road geometries to predict pollutant concentrations at receptors downwind from the roadway. The 1978 Carbon Monoxide Hot Spot Guidelines [Ref 10] combined the results of previous studies to present a hand-calculation method for traffic engineers to evaluate CO hot spots along the roadway or at an intersection. The Intersection Midblock Model (IMM) [Ref 11] in 1978 was a computer program for calculation of the procedures listed in the Carbon Monoxide Hot Spot Guidelines. IMM integrated traffic engineering principles, the Model Analysis Model, MOBILE-1, and HIWAY to predict vehicle emissions and CO concentrations.

The revised federal Clean Air Act, in August 1977, accelerated the studies on vehicle emissions by requiring the transportation agency in each major urban area to implement continuous surveillance of pollution hot spots. In responding, some agencies adopted or revised the EPA models. For example, the New York State Department of Transportation modified IMM [Ref 12], and the California State Department of Transportation developed a series of dispersion models: California Line Source Model in 1972 [Ref 13], CALINE-2 in 1978 [Ref 14], and CALINE-3 in 1979 [Ref 15]. CALINE-3 was designed in an attempt to represent the geometric roadway configurations better than HIWAY-2. The TEXIN model [Ref 12], developed by the Texas Transportation Institute in cooperation with the Texas State Department of Highways and Public Transportation and the Federal Highway Administration in 1981, incorporated the MOBILE-2 and CALINE-3 computer models with a set of short-cut traffic and excess emission prediction techniques. Field measurements of CO and test gas concentrations [Ref 16] were used to compare the prediction of TEXIN with the predictions of IMM and others. TEXIN was found better in comparisons with other models but the predictability was still not precise.

Other studies have dealt mainly with street intersections where higher vehicle emissions may be deposited and where more vehicle fuel may be consumed. Patterson [Ref 17] utilized a queuing model and analyzed field measured data to conclude that the emission profile peaked at the stop line and fell off rapidly toward midblock because the time spent near the stop line was much greater than the time spent near midblock. Ismart in 1982 [Ref 18] assumed that free-flowing vehicles generate cruise emissions and consume certain amounts of fuel along the roadway; and that the vehicles which experience stops, slowing, or idling produce excessive emissions and consume excessive amounts of fuel only while in a queue. He also assumed that delay is correlated with, queue length, emissions, and fuel consumption. With these assumptions, he developed a series of equations to estimate emission sources in relation to the average stop time per vehicle. This simplified estimating technique for vehicle emission and fuel consumption applied only to an isolated intersection. Evans in 1978 [Ref 19] summarized results from a series of studies based on driving test vehicles in traffic and reported that fuel consumption and HC emissions were generally linearly dependent on the average trip time per unit distance. He stressed that the single variable average trip time per unit distance could be used to quantify the traffic conditions, including the influence of intersections, and could be used to estimate fuel consumption and HC emissions.

Some effort has been devoted to applying the Modal Analysis Model in evaluating the effect which traffic performance on road networks has on emissions and fuel consumption. The Modal Analysis Model was derived from analysis of second-by-second dynamometer test data within a speed range of 0 to 60 mph for 170 automobiles in six American cities at varying altitudes. The second-by-second speed profile of each light-duty vehicle passing a selected source location along the roadway is needed for input to this model; therefore, it can be conveniently linked to an appropriate traffic simulation model to predict traffic-generated emissions and fuel consumption. Evaluation of the model indicates that it predicts CO and HC much better than NOx. Haefner, et al., [Ref 2] indicated that the Modal Analysis Model estimated actual CO and HC emissions within 13 percent but predicted NOx only within 80 percent. They also pointed out that the model has been used without basic revision since 1977. This is probably due to the fact that the cost of obtaining adequate experimental data is high. Lieberman and Cohan [Ref 20] indicated that acceleration could have a strong effect in increasing vehicle emissions and fuel consumption. Deceleration generally increases CO and HC but decreases NOx. In steady state driving, the emission rates of CO and HC decrease with speed while the emission rate of NOx increases with speed. Graffin in 1979 [Ref 21] reviewed the data that were used for building the Modal Analysis Model and indicated that during acceleration CO and HC were quadratic functions of relative engine power (the product of vehicle acceleration and speed). He also pointed out that the emission rates of CO and HC were constant for idle and deceleration and that NOx emissions were a minimum during idling. These emissions increased linearly in proportion to the relative horsepower. Cohen in 1977 [Ref 22] combined the Modal Analysis Model and a revised HIWAY model with a microscopic simulation model, UTCS-I (later referred to as NETSIM), to estimate the emission source profiles of three classes of vehicles and the dispersion of CO in the vicinity of intersections. The emission source profile and the pollution concentration level were shown to be higher at the stop line and lower at midblock. He indicated that vehicle emissions and fuel consumption were probably higher at the stop line than at midblock due not only to the fact that more time is spent near the stop line than at midblock locations but also because higher rates of emissions and fuel consumption occur at the stop line due to the nature of the vehicles being slowed, stopped, and accelerated. Cohen and Euler in 1978 [Ref 23] indicated that fuel consumption and HC and CO emissions were minimum at approximately the same cycle length as delay in their NETSIM-based simulation study, and that fuel consumption as well as HC and CO emissions were quadratic functions of average speed.

Better estimation models for mixed traffic emissions and fuel consumption at intersections were needed to improve the limitations in the existing methodologies. These limitations included:

(1) Details of intersection geometry are not taken into account adequately; therefore, their impact on traffic behavior cannot be evaluated. For example, the curb return radius in NETSIM is a fixed value in the program, its impact on right-turning vehicles cannot be studied. The angle of intersection for all intersection legs is also a fixed value at 90 degrees.

(2) Only a limited number of individually-characterized vehicle types are represented in the models. Three types of vehicles are generally used in NETSIM.

(3) The models which relate emissions and fuel consumption to vehicle behavior do not account directly for heavy-duty vehicles.

(4) The microscopic behavior of vehicles in the intersection area, and their interactions, are not modeled in realistic detail. For example, NETSIM, which was designed primarily for evaluating street networks, simulates lane changes and left turns in accordance with a predetermined probability distribution rather than on a deterministic basis in relation to the surroundings at a given time.

These improved models needed to be applied in a systematic study of the complex interaction among traffic performance, geometry, traffic control systems, emissions, and fuel consumption in a representative range of practical intersection environments. To address these needs, a research study for developing and applying an improved traffic simulation model was proposed.

This research project was initiated in 1978 as part of a cooperative research program between the Texas State Department of Highways and Public Transportation and The University of Texas at Austin. The TEXAS-II Model was developed under the study as an extension of the TEXAS Model for Intersection Traffic [Refs 24-27]. The TEXAS Model for Intersection Traffic can include 15 types of vehicles, each with different characteristics, and simulate the traffic behavior of each vehicle deterministically so that a detailed description of its instantaneous performance is produced.

In developing TEXAS-II, a post processor which combines the Modal Analysis Model for light-duty vehicles and an emissions and fuel consumption model which was developed on this project [Refs 28-38] for heavy-duty vehicles were added to the TEXAS Model for Intersection Traffic to estimate the vehicle source emissions and fuel consumption for mixed-traffic along the roadway and in the intersection area. The TEXAS-II simulation model is a powerful new tool for investigating the effects of traffic and the specific intersection environment on pollution sources and fuel consumption.

STUDY TECHNIQUES FOR EXPERIMENT DESIGN

Since the practical range of the geometry, traffic control, and traffic stream characteristics (which are normally expected at intersections) is very large, statistical techniques were used to design a series of experiments using small samples to generalize a wide range of cases. Generalized prediction models for vehicle emissions and fuel consumption were developed using efficiently selected samples and statistical methods.

The statistical techniques that were used for experiment design include analysis of variance, fractional replication design, and variance reduction.

Analysis of variance was used to analyze the variability in the observed responses which could be explained by input factors or which could not be explained at all. Therefore, each active and interactive effect of the input factors could be assessed by its relative significance. Then, a prediction model for each response could be built by combining only the significant factors. Generally the prediction models are valid within the experimental range or a little beyond. The technique of fractional replication design was used to select the smallest number of experimental conditions which could provide the information necessary for building models by the analysis of variance technique. This technique is appropriate for use when a large number of variable factors are being analyzed because only a small fraction of all the possible combinations need to be used in the experiment. The variance reduction technique could be used to reduce the variance of simulation results and thereby to increase the precision of the estimates. One such technique is the common random number technique which was used to induce positive correlation between various experimental conditions and thus make the resulting variance smaller than it would be with independent sampling. With these techniques, a series of simulation experiments could be designed and analyzed.

ORGANIZATION OF THE STUDY

In order to predict the traffic-generated emissions and fuel consumption in the vicinity of an intersection, this research study applies the TEXAS-II simulation model in a series of designed experiments to obtain quantitative estimates of vehicle source emissions and fuel consumption on intersection legs and in the intersection proper. The pertinent factors which generally control the intersection environments and which are expected to have strong influences on vehicle emissions and fuel consumption are identified in

Chapter 2. The statistical techniques used for experiment design are discussed in Chapter 3. The TEXAS-II simulation model as well as the emissions and fuel consumption models for heavy-duty vehicles are discussed in Chapter 4. The experiment design for two-phase pretimed signal-controlled intersections and the results of simulation are discussed in Chapter 5. The experiment design for full-actuated signal-controlled intersections and an all-way stop sign controlled intersection and the results are discussed in Chapter 6. Chapter 7 contains the summary, conclusions and recommendations.

CHAPTER 2. FACTORS INCLUDED IN THE SIMULATION EXPERIMENT

SELECTING FACTORS FOR THE EXPERIMENT

Many factors act and interact to produce the intersection environment which receives traffic-generated emissions and fuel consumption, and there are numerous combinations of these causative influences which might result in excessive accumulation of pollutants, fuel consumption, queues of traffic, and delay. In order to determine the factors and combinations of factors, which contribute significantly to the development of these undesirable situations at intersections, several experiments can be conducted with computer simulation. The TEXAS Model for Intersection Traffic [Refs 24-27] has been chosen for execution of these experiments because of the fact that this model, with recent improvements described in Chapter 4, produces information about the instantaneous position, speed, acceleration, emissions, and fuel consumption of each vehicle that traverses the intersection area. The simulation process can be repeated as many times as necessary to yield the relevant information about emissions and fuel consumption that will be caused by traffic interacting with the intersection environment.

The scope of the experiment is concentrated primarily on the factors which are related to isolated intersections in urban areas. Three classes of causative influences are considered; these include geometric configuration, traffic control, and traffic stream characteristics. The geometric configuration determines the vehicle path as well as the vehicle speed and acceleration, and thus defines the location of the source of emissions and fuel consumption with respect to time. Traffic control influences the rate of movement of traffic along each vehicle path. Traffic stream characteristics constitute the integral features of traffic composition and movement with which pollutants and fuel consumption are associated. These three aspects determine to a large extent the amount and location of the vehicle emissions and full consumption that can be associated with the intersection proper and with the approaches.

The specific factors in each class of causative influence that are deemed pertinent will be discussed and selected for inclusion in the experiment in succeeding sections of this chapter. The selected factors should be independent of other factors, or else any observed difference between estimated effects of vehicle pollution, fuel consumption, delay, or queue length will be hard to explain. The independent variables will be assigned different levels, and other related causative factors with fixed values will be held constant for input to the simulation experiments.

Three equi-spaced levels of each selected factor will be described as low, medium, and high in order to represent the factor variability. The possible effects attributable to each factor will be explored in detail, and whether the effect is linear or curvilinear will be detected. Traffic stream characteristics can be defined for each intersection approach; therefore, the number of possible combinations can be very large. In order to reduce this number and still provide a reasonable range of traffic conditions for analysis, the opposing approaches to each intersection will be assumed to have the same traffic stream characteristics. Therefore, there are two replications of approach statistics for each street. Because three levels of each selected factor require more measurements than two levels, three levels will be used only for the major experiment, which represents the most likely occurring situations. Two additional experiments, which are auxiliary to the major experiment, adopt only two levels for each of the selected factors.

INTERSECTION GEOMETRICS

The geometric configuration of an intersection determines the paths which can be used for vehicle and pedestrian movements within its boundaries. Therefore, the geometric configuration defines to a large extent the capacity of the intersection for handling traffic and the amount and spatial distribution of vehicle emissions and fuel consumption. Thus, the statistics related to these responses on an approach basis are also of concern. Eight factors which may be used to characterize the important geometric and operational features of an intersection and its approaches are:

(1) Shape - The number of legs and the angles between the legs generally define the shape of an intersection. For example, a 3-leg intersection can have the shape of a T, a Y, or any skewed shape. Shape influences the distribution of turning traffic, e.g., the truncated street at a T intersection has higher turning percentages than a continuing street. Most 4-leg intersections have legs which cross at or near right angles.

(2) Size - The number of lanes on each intersection leg and the associated lane widths basically determine intersection size.

(3) Directional Operation and Parking - One-way or two-way operation may be provided on the legs which constitute an intersection, and parking may be either prohibited or permitted along one or both sides of the roadway near the intersection. Usually, a one-way street has higher capacity than a two-way street with the same approach width.

(4) Special Lanes - Separate lanes for left or right turns may, or may not, be provided.

(5) Curb-Return or Pavement-Edge Radii - Adjacent curb lines or pavement edges along the legs at an intersection are usually connected by an appropriate radius. These radii define the area within the intersection which may be used by turning traffic.

(6) Sight Distance - The clear visibility distance which a driver has available in the intersection area is determined by intersection and approach geometrics within the traveled way as well as by the location of sight obstructions near the traveled way.

(7) Alignment - Horizontal and vertical alignment of the lanes approaching and leaving an intersection determine the geometry of the vehicle paths which can be used within the intersection.

(8) Channelization - Channelization is the separation or regulation of conflicting traffic movements into definite paths of travel by means of traffic islands or pavement markings. These treatments are used at some intersections to facilitate the safe and orderly movement of both vehicles and pedestrians.

In defining experiments for identifying potential pollution hot spots at intersections, representative geometric features must be selected. Intersections with five or more legs are not commonly used because of the complex vehicle paths within the intersection and the associated traffic control problems. Intersections with only three legs are not as likely to cause pollution problems; therefore, only four-leg intersections will be considered. The simulation technique described herein can, of course, be used to analyze emissions and fuel consumption from traffic using any practicable intersection configuration.

As to intersection size, the total number of lanes on each leg, including both inbound and outbound lanes, might vary from two to ten or more, but the usual range is from two-lane inbound to three-lane inbound and from two-lane outbound to three-lane outbound with or without a special turning lane on the inbound approach. Lane width might vary from nine feet to fourteen feet. Twelve feet is recognized as the standard lane width; therefore, all lanes in the experiment will be twelve feet wide.

One-way streets are generally popular only in built-up areas of cities such as the central business district where parallel and closely-spaced street patterns exist. Most streets are designed for two-way use. Parking, usually, is restricted for some distance away from the intersections. Therefore, the geometrics selected for the experiment will be two-way streets without parking.

The installation of separate turning lanes depends on the traffic volumes and the type of control. Left-turning traffic possibly has more effect on pollution than right-turning traffic as more potential conflicts are encountered in making a left turn. Separate left-turn lanes will be included in the experiment at signalized intersections only. Special right-turn lanes will not be analyzed, but right-turn-on-red maneuvers will be permitted.

Curb radii in urban areas are usually smaller than the pavement edge radii used in rural areas. The street development standards of most cities provide curb return radii of 5 to 30 feet. With a 15-feet radius, most passenger cars can make a right turn with little encroachment on adjacent lanes, but higher speed of these vehicles, or larger vehicles at low speed, will result in substantial encroachment. A curb return radius of 20 feet is used in the experimental design for all geometric configurations.

Approaches to all intersections are considered straight, level, and provided with safe stopping sight distance. No channelization is included in the analysis.

Nine intersection types have been selected to cover the major factors discussed above. They are identified in Table 2-1 and are shown as graphical figures in Appendix A. Two factors from among the eight discussed above have been chosen as the primary basis for selecting the nine representative intersection types for inclusion in the simulation experiment. They are size, and special lanes. These two factors reflect the geometric differences of the nine intersection types by three associated levels for each factor. Size is systematically increased by two lanes of width on the minor street and on the major street. Special left-turn lanes are added to both the major street and to the minor street from the basic 4 x 4, 6 x 4, and 6 x 6 intersection configurations.

TABLE 2-1. GEOMETRIC FEATURES OF INTERSECTION TYPES SELECTED FOR ANALYSIS

INTERSECTION TYPE*	INTERSECTION SIZE (NUMBER OF LANES)		SEPARATE LEFT-TURN LANE	
	MAJOR STREET	MINOR STREET	MAJOR STREET	MINOR STREET
1	4	4	No	No
2	5	4	Yes	No
3	5	5	Yes	Yes
4	6	4	No	No
5	7	4	Yes	No
6	7	5	Yes	Yes
7	6	6	No	No
8	7	6	Yes	No
9	7	7	Yes	Yes

* All intersections are unchannelized, cross shaped, with 20-foot curb return radii, no sight restrictions, two-way traffic, 12-foot-wide lanes and no parking.

TRAFFIC CONTROL AT ISOLATED INTERSECTIONS

Traffic control determines the discharge rate and the volume of traffic that each intersection approach can handle by assigning the right-of-way to vehicles on each street or to those on selected approaches. Traffic control at an isolated intersection may be one of the following six types:

(1) pretimed signals

(2) full-actuated signals,

(3) semi-actuated signals,

(4) all-way stop signs,

(5) stop signs only on minor streets, or

(6) yield signs only on minor streets.

Pretimed signal control exhibits a fixed sequence of green, yellow, and red indications to approaching traffic during a pre-determined cycle time.The duration and sequence of the signal indications do not respond to the actual demand which desires to pass through the intersection at any given time. Both cycle length and the duration of the green intervals for each phase are adjusted to accommodate the heaviest anticipated traffic without excessive delay. Usually, the adopted cycle time is within the range from 50 seconds to 90 seconds for two green phases. If there are four phases, the usual cycle time is from 90 seconds to 120 seconds. The number of phases depends primarily upon total traffic demand and whether or not the volume of left turns is heavy enough to require a separate left-turn phase for traffic on the street. The yellow interval is set to allow drivers either to stop safely before entering the intersection or to clear the intersection before the signal turns red. The yellow time computed by the conventional technique

[Ref 43] for each intersection is rounded to 4 seconds in each intersection for consistency.

Because two-phase pretimed signals are widely used, this is selected as the basic control type for the emission and fuel consumption experiments and for comparison with the other types of control. The design of an experiment for four-phase operation is more complicated than the design for two-phase operation. Four-phase signal control operation will not be considered in this study. For two-phase pretimed signals, cycle time and green split are determined by the design hourly volume on each street. The duration of cycle time depends on the total traffic volume which will traverse the intersection; the higher the total traffic volume, the longer the cycle time should be. Frequent stops resulting from shorter cycle time will cause slow speeds and excessive queue lengths for heavy traffic volumes. Short cycles cannot handle heavy demand effectively. Green split is the division of the cycle time into green time (including yellow time) for each movement so that vehicles can be serviced equitably. The optimal value of green split for a given traffic demand provides for handling all stopped vehicles and makes the green times proportional to the traffic volumes on the two streets. Because cycle time and green split of two-phase pretimed signals cannot always accommodate moment-by-moment demands, variations about the optimal values must be examined to see the impact of non-optimal settings in practice. Each factor of cycle time and green split will be set at three levels for the major experiment. The middle value of cycle time is set at the estimated optimal level for the expected volume; ten seconds shorter or longer are set as low level or high level of cycle time, respectively. The medium level of green split is set as the optimal value, and five percent shorter or longer are set as low or high level of green split, respectively. If the lane volumes on the two intersecting streets are equal or nearly equal, the optimal green share for each street is 50 percent. If the lane volumes on the two streets are significantly different, consideration must be given to the discharge rate of small queues of vehicles on approaches with lesser volumes. The green time consumed by the first few vehicles entering the intersection is longer than that needed by an equal number of following vehicles. The ratio of the required green times should therefore reflect the fact that the average headway needed by each vehicle on the street with the lesser volume is higher than the corresponding headway on the other street. The optimal green split for the unequal traffic demand situation can be determined by recognizing both the effects of starting time delays, cycle time, and the lane volumes on each street.

If traffic demand fluctuates significantly at an intersection traffic- actuated control can be used to provide the duration of each green phase and the sequence of green phases according to actual demand. Detectors are deployed on the intersection approaches to measure instantaneous traffic demand. The green phase of a basic actuated controller is composed of an initial time interval and a series of extensions. The maximum green time for each phase is preset. The initial interval should be set long enough to permit all vehicles stored between the stop line and the detector to enter the intersection. If no additional vehicles cross the detector, the phase will be terminated at the end of a minimum assured green time. The minimum assured green time is usually the sum of an initial interval and one extension that is called a vehicle interval. If a vehicle crosses the detector during the vehicle interval, the remaining time in the interval is cancelled and a new interval is added. Each such extension should allow an approaching vehicle to travel from the detector to the intersection. By this means, the green phase is extended until either no more vehicles are detected (gap-out), or the maximum green time is exceeded (max-out).

Actuated signal control includes two types, full-actuated and semi-actuated. The full-actuated signal controller receives actuation information from detectors deployed on all approaches. It assigns green indications to approaches where there is demand and extends the phase up to the maximum green extension so long as gaps of excessive magnitude do not occur in the approaching traffic stream. The semi-actuated signal controller receives information from detectors deployed only on the minor street approaches. The green rests on the major street if there is no demand on the minor street. When the detectors indicate a demand, the green phase shifts to the minor street after a minimum green time on the major street has elapsed. Extension of the green on the minor street is accomplished as described above for a full-actuated controller.

Since the full-actuated controller can respond to actual traffic demands on both the major and minor streets, it will be used in the experiment to study the effects of actuated control on emissions. At peak traffic demand on both streets, this type controller behaves as a pretimed controller with each green phase equal to the maximum extension. At lesser volumes, there is no definite cycle time. Maximum green can be selected as the controlling factor for the full-actuated signal to see its impact on emissions and fuel consumption and to compare its effects with those for a pretimed signal. The other operating characteristics of the full-actuated signal will be fixed constants at their optimal values and discussed as follows.

The type and location of detectors determines the source of information for an actuated controller and therefore affects the performance of the control system. Inductance loop detectors are used extensively with actuated controllers. There are two types of loop detector configurations: The small-area detector, which is about 6 ft x 6 ft in size, senses vehicle presence or passage over a short length of the traffic lane. It is usually set back from the stop line to generate an early indication of an approaching vehicle. A large area detector, about 6 ft x 15-40 ft in size, is often used on special turning lanes to measure the presence of vehicles. It may provide information which can be used to prevent false calls such as right turn on red and left turn during a permissive conflicting period which otherwise would be generated by a motion detector.

The location of a small-area motion detector should be far enough back from the intersection to give early indications and prevent the approaching vehicle from stopping. But it cannot be too far back so that it causes excessive numbers of vehicles between the detector and the intersection to store for discharge during the minimum assured green time. The setback is suggested as 120 feet when approach speed is not higher than 30 mph [Ref 45]. Six vehicles can be stored from stop line to detector. The initial interval is suggested as 10 seconds and the extension is 3.5 seconds. Therefore, the minimum green time is long enough to discharge six vehicles.

All intersections in a street system are not signalized. Unsignalized intersections may be controlled by all-way stop signs, two-way stop signs, or yield signs. Others might operate without any control except the general rules-of-the-road.

All-way stop control is provided at each leg of an intersection on which the importance of the intersecting streets is equal; therefore, each vehicle must stop before entering the intersection. This type of control is suitable only at small intersections, such as 4 x 2, 4 x 4, and 4 x 2 (T). All-way stop control is selected for this study because of its popular use at small intersections and its flexibility of serving traffic from low level to high level.

Two-way stop control and yield sign control are used only at a minor street to establish the legal superiority of the major street over the minor street. Two-way stop control requires an absolute stop, but the yield sign allows the driver to stop or proceed by his decision. Both types of control work only for light traffic; therefore, the possibility of pollution hot spots occurring is small and neither is considered in this study.

In summary, two-phase pretimed signals, two-phase fully-actuated signals, and all-way stop sign control have been selected for use in the experiments. Each is a factor which characterizes a certain type of traffic control for comparison. Pretimed signals can serve all selected geometry patterns. Full-actuated signals, without a separate left-turn phase, can serve the intersections without special turning lanes, such as 4 x 4, 6 x 6. All-way stop controls can serve small intersections with lesser volumes, such as 4 x 4. The operating characteristics of traffic controls selected for the experiments are summarized in Table 2-2.

TRAFFIC STREAM CHARACTERISTICS

Traffic stream characteristics constitute the integral features of traffic flow on an approach, which includes the following eight factors:

(1) traffic volume,

(2) lane occupancy,

(3) speed distribution,

(4) headway distribution,

(5) turning distribution,

(6) traffic composition,

TABLE 2-2. OPERATING CHARACTERISTICS OF TRAFFIC CONTROLS SELECTED FOR ANALYSIS

CONTROL TYPE	OPERATING VARIABLES	CHARACTERISTICS	GEOMETRY SUTABLE FOR THIS CONTROL TYPE
Pretimed Signal	Cycle Time Split Yellow Time	Dependent on Volumes Dependent on Volumes Set as 4 Seconds	All Geometries in Table 2-1
Full-Actuated Signal	Maximum Green Yellow Time Initial Interval Vehicle Extension Detector Location	Dependent on Volumes Set as 4 Seconds Set as 10 Seconds Set as 3.5 Seconds Set as 120 Feet	4 x 4, 6 x 4, 6 x 6
All-way Stop Signs		First Come, First Served Rule	4 x 4

(7) vehicle characteristics, and

(8) driver characteristics.

Traffic volume is the number of all types of vehicles entered on each approach during a one hour period. Because traffic volume is directly related to the amount of vehicle emissions and fuel consumption, traffic volume must be used for the experiments. To cover the variation of traffic volume on each day, the values at different levels are derived from the upper limit, capacity. Capacity is defined as the maximum number of vehicles which can be accommodated under prevailing conditions. Capacity is a function of the type of traffic control. Stop sign control cannot process as many vehicles as signal control. At two-phase signalized intersections, the lane capacity is about 600 to 700 vehicles per lane, depending on other factors. As an upper limit for experimentation, 600 vph is adopted as the lane capacity of signalized intersections. All-way stop sign control generally cannot process more than about 2500 vph with no trucks and no left turns at a 4 x 4 intersection. Therefore, the approach capacity of a 4 x 4 intersection controlled by all-way stop signs with trucks and left turns is set as 500 vph. The values of low, medium, and high levels of traffic volume are assumed at 0.5, 0.75, 1.0 of capacity, respectively.

Lane occupancy is the spatial distribution of traffic flow within the lanes of each approach. Upon entry to the inbound lanes on an approach, lane occupancy may be nearly uniformly distributed. After entry, lane occupancy is distributed according to the turning movements and the through movements. Therefore, the values of lane distribution upon entry can be input as constants and simulated by the model afterwards. The values of lane distribution depend on the lane configuration. For two-lane approaches, they are assumed at 0.48, 0.52 from left to right. For three-lane approaches, they are assumed as 0.32, 0.35, 0.33 from left or right.

Speed is a general indicator of the quality of service provided by a transportation facility. Because traffic volume has an inverse relationship with speed, speed cannot be chosen as an independent variable. The instantaneous speed of each individual vehicle is simulated by the TEXAS Model in response to its surroundings. The speed upon entry to each inbound approach is assumed to be the speed which the driver would desire to achieve in uninterrupted flow situations. The respective desired speeds for 300, 450, and 600 vph traffic volumes are assumed as 30, 28 and 25 mph.

Headway is the time interval between successive arrivals of vehicles observed from a point along an approach. Generally, headways can be represented by some form of probability distribution. Because traffic volume also influences the type of probability distribution, headways are not represented by a single distribution for the experiments. Arrival headways on the inbound approach are described as a negative exponential distribution when traffic volume is at the low or medium level. For the high level of traffic volume, the shifted negative exponential distribution is used to account for the practical impossibility of having less than a one-second minimum headway.

Turning distribution is the percentage of turning movements and through movements. Because U-turns are generally prohibited at intersections, only left turns, through traffic, and right turns are considered. Because left turns conflict directly with the opposing through traffic and have a stronger effect on traffic delay and vehicle emissions, the amount of left turn traffic is selected as a factor for the experiments. At signalized intersections, the number of left turns which can be accommodated from the cross street is restricted by the opposing traffic volume and the number of opposing lanes. The left-turn capacity at signalized intersections without a special left-turn lane according to Lin [Ref 49] is presented in Table 2-3. The three levels of left turns for experimentation are taken as 0 percent, 40 percent, and 80 percent of the capacity, respectively. These are also listed in Table 2-3. The reason that 100 percent of left-turn capacity was not used in simulation is basically to avoid the critical condition of a continually building queue on an approach. At intersections controlled by all-way stop signs, the amount of left turns can be expressed as a percentage of approach volume because right of way to enter the intersection is not restricted by the opposing traffic nor lanes. Right-turning traffic is not recognized differently from through traffic with respect to causing delay if the curb radius is not small. Therefore, for the experiments right turns are fixed at a level of 100 vehicles per hour on each approach. Through traffic constitutes the remaining approach volume less left turns.

Traffic composition is the percentages of all types of classified vehicles. For the simulation experiments twelve types of vehicles are classified; these include four types of passenger cars and eight types of trucks. Passenger cars consist of sport, compact, medium, and large cars. Large cars include pick-ups, vans, and recreational vehicles because of similar characteristics. The eight truck classes are the eight possible combinations of vehicle type (single unit or tractor-trailer), fuel type (gasoline or diesel), and pay load condition (partial-load or full-load). Buses are included as single unit trucks. The representative gross weights of the eight types of trucks are listed in Table 2-4. Compared with cars, trucks have a stronger effect on traffic delay and vehicle emissions because of larger size and mass. Besides, the truck percentage generally varies more

TABLE 2-3. LEFT-TURN CAPACITY AND LEFT-TURN VOLUMES SELECTED FOR ANALYSIS

No. of Lanes on Opposing Approach		2 Lanes			3 Lanes*		
Volumes of Opposing Approach (VPH)		600	900	1200	900	1350	1800
Left-Turn Capacity (VPH)		120	50	20	90	40	10
Left-Turn Demand Volume, VPH	HIGH LEVEL	96	40	16	72	32	8
	MEDIUM LEVEL	48	20	8	36	16	4
	LOW LEVEL	0	0	0	0	0	0

TABLE 2-4. REPRESENTATIVE WEIGHTS OF TRUCKS SELECTED FOR ANALYSIS

Truck Type	Single Unit				Tractor-Trailer			
Fuel Type	Gasoline		Diesel		Gasoline		Diesel	
Loading Condition	Partial	Full	Partial	Full	Partial	Full	Partial	Full
Weight, lb	15,000	20,000	15,000	20,000	30,000	72,000	30,000	72,000

with respect to time. The truck percentages selected for use in the experiments, for low, medium, and high levels are 0 percent, 5 percent, and 10 percent of the approach volume.

The proportions of the various passenger car types is based on a traffic survey made for this study at Austin, Texas in 1979. The proportions of trucks in various classes is based on a general consideration of truck registration and usage data. According to registration and usage, the ratio of single unit to tractor-trailer is about 3:1. Most single units are gasoline powered, but most tractor-trailers are diesel powered. The possibility of having partially-loaded or fully-loaded heavy vehicles is assumed to be equal. This information is presented in Table 2-5. The traffic compositions at different levels of truck percentages are listed in Table 2-6.

Vehicle characteristics are the physical capabilities and limitations on movement for each type of vehicle. Their values are relatively consistent and are listed in Table 2-7. The operating characteristics indicate the relative ease of maneuverability.

Driver characteristics classify the desires and reaction time of drivers in which ambitious drivers requires less reaction time than slow drivers. Different types of vehicles have different distributions of driver types, e.g., sport cars have more ambitious drivers than the other types of cars. Driver characteristics are held constant throughout each simulation run. The proportions of drivers in each type of vehicle are listed in Table 2-7.

Three factors are chosen from the eight traffic stream characteristics to use in the simulation experiments. They are: traffic volume, left turns, and truck percentage. The traffic stream characteristics are summarized in Table 2-8.

TABLE 2-5. PROPORTIONS OF PASSENGER CARS AND TRUCKS USED FOR ANALYSIS

PASSENGER CARS				TOTAL
Sports	Compact	Medium	Large	
1.7%	24.5%	25.3%	48.5%	100%

TRUCKS

Single Unit				Tractor-Trailer				TOTAL
Gasoline		Diesel		Gasoline		Diesel		
PL[1]	FL[2]	PL	FL	PL	FL	PL	FL	
32.5%	32.5%	2.5%	2.5%	2.5%	2.5%	12.5%	12.5%	100%

[1] PL = partial load

[2] FL = full load

TABLE 2-6. TRAFFIC COMPOSITION AT DIFFERENT LEVELS OF TRUCK PERCENTAGE

LEVEL OF TRUCK	PASSENGER CAR				TRUCK							
					Single Unit				Tractor-Trailer			
					Gasoline		Diesel		Gasoline		Diesel	
Percentage	Sports	Compact	Medium	Large	PL[1]	FL[2]	PL	FL	PL	FL	PL	FL
Low (0%)	1.7	24.5	25.3	48.5	0.	0.	0.	0.	0.	0.	0.	0.
Medium (5%)	1.6	23.3	24.0	46.1	1.6	1.7	0.1	0.1	0.1	0.1	0.6	0.7
High (10%)	1.5	22.0	22.8	43.7	3.2	3.3	0.2	0.3	0.2	0.3	1.2	1.3

[1] PL = partial load

[2] FL = full load

TABLE 2-7. VEHICLE CHARACTERISTICS AND DRIVER CHARACTERISTICS

VEHICLE TYPE / VEHICLE CHARACTERISTIC	PASSENGER CAR				TRUCK							
					Single Unit				Tractor-Trailer			
					Gasoline		Diesel		Gasoline		Diesel	
	Sports	Compact	Medium	Large	PL[1]	FL[2]	PL	FL	PL	FL	PL	FL
Length (feet)	14	15	16	18	32	32	32	32	60	60	60	60
Operating Characteristics Factor	115	90	100	110	85	80	80	75	70	65	75	70
Maximum Uniform Deceleration (ft/sec^2)	14	13	13	8	7	5	7	5	6	4	6	4
Maximum Uniform Acceleration (ft/sec^2)	14	8	9	11	7	6	6	5	4	3	5	4
Maximum Velocity (ft/sec)	205	120	135	150	100	85	100	85	95	75	100	80
Minimum Turning Radius (feet)	20	20	22	24	42	42	42	42	45	45	45	45
DRIVER TYPE	Proportions of Driver Classes (%)											
Aggressive	50	30	35	25	40	40	40	40	40	40	40	40
Average	40	40	35	45	40	40	40	40	40	40	40	40
Slow	10	30	30	30	20	20	20	20	20	20	20	20

[1] PL = partial load [2] FL = full load

TABLE 2-8. SUMMARY OF TRAFFIC STREAM CHARACTERISTICS USED FOR ANALYSIS

TRAFFIC STREAM CHARACTERISTICS	STATUS IN EXPERIMENT	GENERAL FEATURES
1. Traffic Volume	Variable Factor	At two-phase signalized intersections, 300, 450, 600 vph of lane volume have been chosen as low, medium, and high levels, respectively. At all-way stop signs-controlled intersections, 250 and 500 vph have been chosen as low and high levels of approach volume, respectively.
2. Lane Occupancy	Constant	From left lane to right lane excluding the special left-turn lane, 0.48, 0.52 for two-lane approaches and 0.32, 0.35, 0.33 for three-lane approaches have been chosen.
3. Desired Speed	Constant	At signalized intersections, desired speeds are 30, 28, 25 mph at 300, 450, 600 vph lane volumes, respectively. At all-way stop-signs-controlled intersections, desired speed is 30 mph at approach volumes of both 250 and 500 vph.
4. Headway Distribution	Constant	Negative exponential distribution is used for headways at 300 and 450 vph lane volume, and shifted negative exponential distribution is used at 600 vph lane volume.
5. Turning Distribution	Variable Factor	Left turns, see Table 2-3. Right turns are fixed at 100 vph on each approach.
6. Traffic Composition	Variable Factor	See Table 2-6.
7. Vehicle Characteristics	Constant	See Table 2-7.
8. Driver Characteristics	Constant	See Table 2-7.

SUMMARY

The factors of intersection geometry, traffic control, and traffic stream characteristics which can best characterize the various intersection environments of the isolated intersection and which may most influence the amounts and locations of vehicle emissions and fuel consumption have been selected for the simulation experiments. Intersection size which is the number of lanes on each intersection leg and the presence or absence of a special left-turn lane are used to represent the major features of intersection geometry which might influence the driver's maneuvering along the vehicle path. Pretimed signals, full-actuated signals, and all-way stop signs are selected to represent the more commonly-used types of traffic control which affect traffic behavior. Cycle time and green split for the pretimed signal and maximum green for the full-actuated signal are selected to define the effects of signal operation on vehicle emissions and fuel consumption. As to traffic stream characteristics, volume, left turns, and truck percentage are incorporated to represent these effects in the simulation experiments.

Three separate experiments will be designed to evaluate the relative effects of these various factors in different traffic control environments. The largest experiment involves pretimed signals, another utilizes full-actuated signal control, and finally all-way stop control is examined.

CHAPTER 3. EXPERIMENTAL DESIGN FOR DEVELOPMENT OF PREDICTION MODELS

STATISTICAL TECHNIQUES USED FOR DESIGN OF EXPERIMENTS

A series of experiments has been used to quantify the effects of several traffic and intersection factors on selected responses and to identify the significance of these effects so that the pertinent factors can be combined to build prediction models for estimating queue lengths, delays, emissions, and fuel consumption at intersections. The responses include total emissions, total fuel consumption, average delays, and queue lengths for the total intersection system, for each leg, or for more detailed geometric (bucket on approach) configurations during a 15-minute time period.

Statistical techniques which can either increase the precision of the predictive models or reduce the experimental cost have been considered in the design of the experiments. The techniques which have been utilized include: (1) fractional replication design, which can reduce experimental cost by defining the minimum required sample size, (2) variance reduction, which can possibly increase the precision of the experiments, and (3) analysis of variance, which can help identify the significant effects which are needed for building the prediction models.

In designing an experiment, the expected effects of selected factors must be evaluated. These include the main effects and the interactive effects. A main effect is thought of as making a direct contribution to the response of each factor. The change in magnitude of a response due to one unit of change in the factor is computed by the difference between levels of the factor averaged across all levels of the other factors. An interactive effect is classified as first order, second order, third order, etc.;

respectively referred as a two-factor interaction, three-factor interaction, four-factor interaction, etc. In this study, only the first-order interactive effect, i.e., the two-factor interaction, has been considered. Therefore, the term interactive effect hereafter indicates only the first-order interactive effect. An interactive effect indicates that the main effect of one factor is not constant in magnitude across the levels of the other factor. If a factor is found to interact significantly with another factor, the net effect of the factor is the sum of the main effect and the interactive effect.

The significance of each effect is weighed according to its contribution toward explaining the variation in the response. Sum of squares (SS) is used to quantify the explained variability for each effect. Mean square is the quotient of the sum of squares divided by the associated degrees of freedom. The F-test statistic is obtained as a quotient by dividing the mean square of the effect by the mean square of the error term. The significance of the effect is evaluated by determining the probability of occurrence of an F statistic of this size due to chance alone. If not significant, this effect will not be incorporated into the predictive model. The confidence level used in the following experiments has been raised intentionally high, 0.95 or higher, to guarantee the incorporation of effects with higher confidence and to incorporate fewer, but necessary, variables into the predictive model for simplicity.

ANALYSIS OF VARIANCE

Analysis of variance (ANOVA) can be used to identify the significance of main effects and interactive effects, and thereby aid in building a predictive model. ANOVA allows a direct evaluation of the selected factors as to their influence on the observed variations in response. The ANOVA model is a linear combination of effects which deviate from the grand mean. The grand mean of each response, μ, is the average of all measured values. If effects caused by some factors deviate significantly from μ, these effects are added in order to predict the response at that condition. The simplest example of the ANOVA model for a factorial experiment which contains all desired effects is:

$$Y_{ijk} = \mu + s_i + t_j + u_{ij} + \varepsilon_{ijk} \tag{3-1}$$

where Y_{ijk} = response Y due to effects of factors S_i and t_j at its kth replicate

s_i, t_j = main effects of the ith level of factor s, and the jth level of factor t, respectively

u_{ij} = interactive effect of factors s and t at their ith and jth levels, respectively

ε_{ijk} = kth error term within treatment combinations, $NID(o, \sigma^2)$

With this model, three hypotheses are tested:

(1) The means at all levels of factor s are equal

(2) The means at all levels of factor t are equal

(3) The difference between levels of factor s is the same at all levels of factor t

The F-test can be used to identify which effects can be dropped from the prediction model without affecting it significantly.

The above ANOVA model can be generalized into a matrix form and solved by multiple regression techniques. Especially when many factors are incorporated, the matrix form is preferred for analysis.

The matrix form is illustrated below.

$$\underset{n \times 1}{Y} = \underset{n \times m}{X} \; \underset{m \times 1}{T} \qquad (3\text{-}2)$$

where
- Y = measured response
- n = number of measurements
- X = position coefficients (dummy variables)
- m = number of effects
- T = effects

After transformation,

$$X'Y = X'T \leftarrow X'XT$$

the desired effect vector T is solved as

$$T = (X'X)^{-1} X'Y$$

and the sum of squares of T is

$$SS \text{ of } [T] = T'X'Y$$

The X matrix must be designed as purely orthogonal so that the sum of squares for each effect, or source of variability in the experiment, is independent of every other effect. Thus, the sum of squares for each effect can be computed individually and an F-test can be made for each effect independently.

The first column of the X matrix is one, but the construction of the other columns depends on whether the experiment is a two-level factorial or a three-level factorial. Because a two-level factor has only one degree of freedom to estimate one effect, this effect must be assumed to be linear.

The dummy variable in each column used to represent the position of each effect is +1 for the high level and -1 for the low level. Mathematically, the linear effect is defined as one half of the difference in response between the high level and the low level. If the linear effect is significant, the response will be predicted by adding the linear effect when the factor is at the high level. When the factor is at the low level, the linear effect will be subtracted.

A three-level factor has two effects - linear and quadratic. The linear effect is the linear trend of response between high and low levels; therefore, the position coefficients at low, medium, and high levels are -1, 0, +1, respectively. The quadratic effect shows whether the response at the medium level deviates from the linear trend. The position coefficients of the quadratic effect at low, medium, and high levels are +1, -2, +1, respectively. The notations for linear effects and quadratic effect are L and Q.

The interactive effect of a two-level factorial has only one degree of freedom to estimate one effect, symbolized as LL. But, the interaction of a three-level factorial has four degrees of freedom and four effects, symbolized as LL, LQ, QL and QQ. These four effects describe the interactions between any combination of linear effects and quadratic effects. The position coefficient of each interactive effect is the product of the position coefficients of the two interacted factors. For example, the position coefficient of LQ when the first factor is at the high level and the second factor is at the medium level is $(+1) \times (-2) = -2$.

The predictive models after analysis of variance for a two-level factorial and a three-level factorial are shown as follows:

Two-level factorial

$$Y = \mu + \sum_{i=1}^{n} C_{L_i} L_i + \sum_{i=1}^{n-1} \sum_{j=i+1}^{n} C_{L_i} C_{L_j} \times LL_{ij} \tag{3-3}$$

Three-level factorial

$$Y = \mu + \sum_{i=1}^{n} (C_{L_i} L_i + C_{Q_i} Q_i)$$

$$+ \sum_{i=1}^{n-1} \sum_{j=i+1}^{n} (C_{L_i} \times C_{L_j} \times LL_{ij} + C_{L_i} \times C_{Q_j} \times LQ_{ij}$$

$$+ C_{Q_i} \times C_{L_j} \times QL_{ij} + C_{Q_i} \times C_{Q_j} \times QQ_{ij}) \tag{3-4}$$

where Y = predicted response

μ = grand mean

n = number of factors

i, j = notation for i-th, j-th factor

C = position coefficients (dummy variables)

L, Q = linear and quadratic effects

LL, LQ, QL, QQ = interaction effects

These ANOVA models can be transformed from discrete levels to a continuous basis for more convenient use in prediction. In this study, any value within the specified ranges of volume, left turns, truck percentages, cycle length, or cycle split can be interpolated directly or extrapolated slightly. The interpolation or extrapolation is actually an interpolation or extrapolation of the position coefficient which is related to each factor.

The form of interpolation and extrapolation for the linear effects and for the quadratic effects are a straight line and a parabolic curve, respectively. The formula for interpolation and extrapolation are listed as follows:

$$\omega = \frac{A - A_m}{(A_h - A_l)/2} \tag{3-5}$$

where ω = transformation of any value for factor A

A_l, A_m, A_h = values of low, medium, and high levels, respectively

$$Z_L = \omega \tag{3-6}$$

$$Z_Q = 3\;^{2} - 2 \tag{3-7}$$

where Z = position coefficient for interpolated or extrapolated factor

L, Q = linear and quadratic effects, respectively

For each interactive effect, its interpolated or extrapolated position coefficient is the product of the related position coefficient for each of the two interacted factors.

The application of ANOVA technique generally assume that the response values are normally distributed and have constant variances over the experimental ranges. The estimated responses of TEXAS-II model are verified to satisfy these two assumptions. The tests are listed in Appendix G.

FRACTIONAL REPLICATION DESIGN

Fractional replication design can be used to identify the minimum number of experimental conditions needed for estimating adequately the effects of a large number of variable factors and their interactions. The cost of implementing a full-factorial design in such situations might be prohibitive, even though the results might be somewhat more precise than those from a partial factorial design. Since many factors contribute to emissions and fuel consumption at intersections, several thousand runs of the TEXAS Model would be required for a full factorial experiment. A fractional replication design was therefore utilized for the model-building process.

In this type of design, each experimental condition is referred to as a cell. Each cell is identified by a series of level indicators for each factor, e.g. the first factor might be at high level, the second at low level, the third at low level, etc., until the n-th factor is specified by a level indicator. For example, if the notation of each cell is (10001 . . .), there are n digits corresponding to n factors. Each digit represents a level. For a two-level factor, 1 and 0 represent the high and low levels, respectively. For a three-level factorial, 2, 1 and 0 represent high, medium and low levels, respectively.

For a factorial experiment with 1 purely two-level factor or with 1 purely three-level factor, the number of possible experimental conditions is 2^1 or 3^1, respectively. If one lets 1 = 10, it becomes apparent that the possible number of cells quickly becomes impractical to handle as $2^{10} = 1,024$ and $3^{10} = 59,049$.

Fractionation is accomplished by dividing all the possible cells into several blocks through a designated screening process and selecting only one block for actual experimentation [Refs 50-54]. Each block contains an equal number of cells and is expected to provide the same results as any other block. Because a fractional part cannot possibly include all features of the whole, the effects estimated from the fractional replication design contain only a portion of all the possible effects which might be identified from a full-factorial experiment. The critical aspect of fractional replication design is, therefore, to select the cells for experimentation in such a way that all the effects needed for building an adequate model will be included.

Defining contrast is a technical expression that indicates which effects are confounded with blocks in a confounded factorial design [Ref 50]. Several different defining contrasts may be chosen as bases for fractional replication design. For any selected defining contrast, the level indicator of each cell in a full-factorial design is multiplied by the corresponding level indicator of each factor in the defining contrast. Second, all the products are summed. Third, the sum of products is divided by the factor level (2 or 3), and finally the remainder is taken as the identifying value. For example, if the factorial is 2^5 with factors A, B, C, D and E, and the defining contrast is ABC, the identifying value for cell (10110) is 0. For a two-level factorial two different blocks may be defined by two identifying values, 0 and 1. For a three-level factorial, there are three identifying values, 0, 1 and 2.

When several defining contrasts are selected, the number of blocks, N, into which the factorial design can be divided is calculated as the number of the factor level (2 or 3) raised to the power of the number of defining contrasts, b. For example, $N = 2^b$ or 3^b. Two defining contrasts can divide a two-level factorial into four blocks. But for a three-level factorial, two defining contrasts can make nine blocks.

If defining contrasts are not selected properly, the desired main and first-order interactive effects will be confounded or aliased with each other.

Each selected defining contrast and the product of the defining contracts must be maintained as fourth or higher order interactive effects. Otherwise, the desired effects cannot be estimated because some effects will be either confounded or aliased with each other. In fractional replication design, confounding makes it impossible to estimate the effects which are confounded by blocking. If, for example, Effect A is selected as a defining contrast in a 2^5 factorial, each selected cell has many level combinations with the other four factors, but there is only one level of A. Therefore, it is impossible to estimate the effect of Factor A since there is not another level with which to compare it. If both Effect A and Effect B are selected as defining contrasts, neither Effect A, nor Effect B, nor their product Effect AB, can be estimated.

The alias of any effect, in fractional replication design, is actually another effect which is being explained by the same amount of numerical variability in the selected experimental cells. The aliased effects cannot be identified in fractional replication design due to the fact that the cells which can indicate the difference in effects will not be selected for evaluation. For example, Effect A is aliased with Effect BC if the defining contrast is ABC. This aliasing results from the fact that the position coefficients for the selected cells that are used to compute the effects are the same. Since high-order interactive effects are not of concern, no problem is presented by the fact that the desired effects are aliased with the high-order interactive effects. As long as the defining contrasts and their products can be maintained as fourth-order interactive effects or higher, the desired effects will not be aliased with each other. For example, when the defining contrast in a 2^5 factorial is ABCDE, the alias of A is BCDE and the alias of AB is CDE. No main effects or first-order interactive effects are aliased with each other in this situation as the defining contrasts have been properly selected.

However, the loss of information which is due to defining contrasts and their products is increased when the number of defining contrasts is increased. Therefore, a limit for fractionation exists. Beyond that limit, the desired effects must either be confounded or aliased with each other. The limit is reached when no more defining contrasts can be added without their product equalling or exceeding a fourth-order, or higher-order interactive effect. The number of defining contrasts which constitutes the limit is always the same, but which defining contrasts are used is a matter of choice. The actual defining contrasts used in the experiment described herein are listed in Chapters 5 and 6.

The limit of fractionation for commonly-used factorials is listed in Table 3-1. From the measurements required and the degrees of freedom for the error term, some implications which were considered in the design of the experiments described herein are

(1) Two-level factorials require fewer measurements and cost less than three-level factorials. If a medium level has been proved unnecessary, a two-level factorial instead of a three-level should be used.

(2) If a three-level factorial is definitely needed, or if it is desirable to investigate whether the medium level is needed, a larger-size, three-level factorial can be used with the same numbers of observations to estimate more effects and waste less degrees of freedom on the error term than if a smaller size factorial is used. Therefore, if the number of factors is flexible in the formation of the experiment, a 3^{10} factorial is the most economical design of the three-level factorials.

TABLE 3-1. CHARACTERISTICS AND LIMITATIONS ASSOCIATED WITH FRACTIONATION OF FULL-FACTORIAL EXPERIMENT DESIGNS

Type of Full Factorial	2^5	2^6	2^7	2^8	2^9	2^{10}	3^5	3^6	3^7	3^8	3^9	3^{10}
Smallest Usable Portion of Full Factorial	1/2	1/2	1/2	1/4	1/4	1/8	1/3	1/3	1/9	1/27	1/81	1/243
Number of Observations Required	16	32	64	64	128	128	81	243	243	243	243	243
Number of Effects*	16	22	29	37	46	56	51	73	99	129	163	201
Replications of Each Observation	Number of Degrees of Freedom in Error Term											
1	0	10	35	27	82	72	30	170	144	114	80	42
2	16	42	99	91	210	200	111	413	387	357	323	285
4	48	106	227	219	466	456	273	899	873	843	809	771

* The number of effects, including the grand mean, main effects, and interactive effects which can be analyzed are, for a

Two-level factorial = 1 + (1)(No. of factors) + (1)(No. of 1st-order interactions), and for a

Three-level factorial = 1 + (2)(No. of factors) + (4)(No. of 1st-order interactions).

(3) The number of degrees of freedom in the error term of each factorial experiment is determined by the replications of each observation. If the degrees of freedom for the error term goes to zero in the fractional replication design, this design cannot be used. (e.g., The 2^5 factorial has only one replication of each observation and zero degrees of freedom in the error term.) Statistics related to the whole intersection system provide only one replication and also belong to this case. For this situation, a 2^6 factorial is the most economical design. As to the approach statistics, there are two replications for both the major street and the minor street, and there are four replications if both streets have the same traffic input. Then the factorial 2^5 can be considered to replace the 2^6 design.

For factorial experiments with less than five factors, a full factorial should be designed since a fractional replication design will not produce the desired results.

VARIANCE REDUCTION BY BLOCKING WITH COMMON STREAMS

A simulation experiment has the advantage of being able to control fully the experimental environment so as to reduce the experimental error and increase the precision of results. If the mean square of error is reduced by some technique, more effects appear to be significant in the analysis of variance for a given level of significance, or higher confidence levels can be used for the significance test. Both increase the precision of prediction.

Random variations in the factors being considered is a major source of experimental error. One method to reduce the experimental error is to conduct all the experimentation in the same environment. A common random stream which defines the randomness of factors in a simulation model provides the same experimental environment; therefore, the variance of the estimated difference can be smaller than that resulting from the use of different random streams [Ref 59].

Additional variance reduction can sometimes be achieved by grouping the selected cells into several homogeneous blocks. In this technique, all the cells in each block are processed by using common random streams so that the uniformity within the block is enhanced. If the averages of blocks are different from each other, the variability between blocks is explained by the differences between the block averages. Therefore, experimental error is reduced by the blocking effect.

Because the error term in the analysis of variance is assumed to be normally distributed, independence between experimental conditions should be maintained in order to justify this assumption. In simulation experiments, use of a non-overlapping random stream can represent independence. Therefore, the experiments described herein which relate to traffic performance at intersections have been designed to reduce variation and maintain independence simultaneously. This is possible because each intersection has several individual approaches.

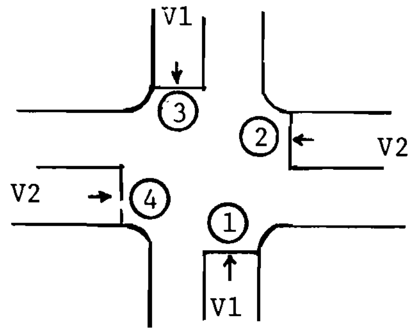
In the TEXAS Model, each inbound approach to the intersection is a source of traffic. Each driver-vehicle unit on each approach is characterized by several random variables such as headway, direction of travel, vehicle type, etc. The headways between units on each approach are generated successively; then all remainaing attributes are assigned in a defined order to each unit according to time of entry into the system.

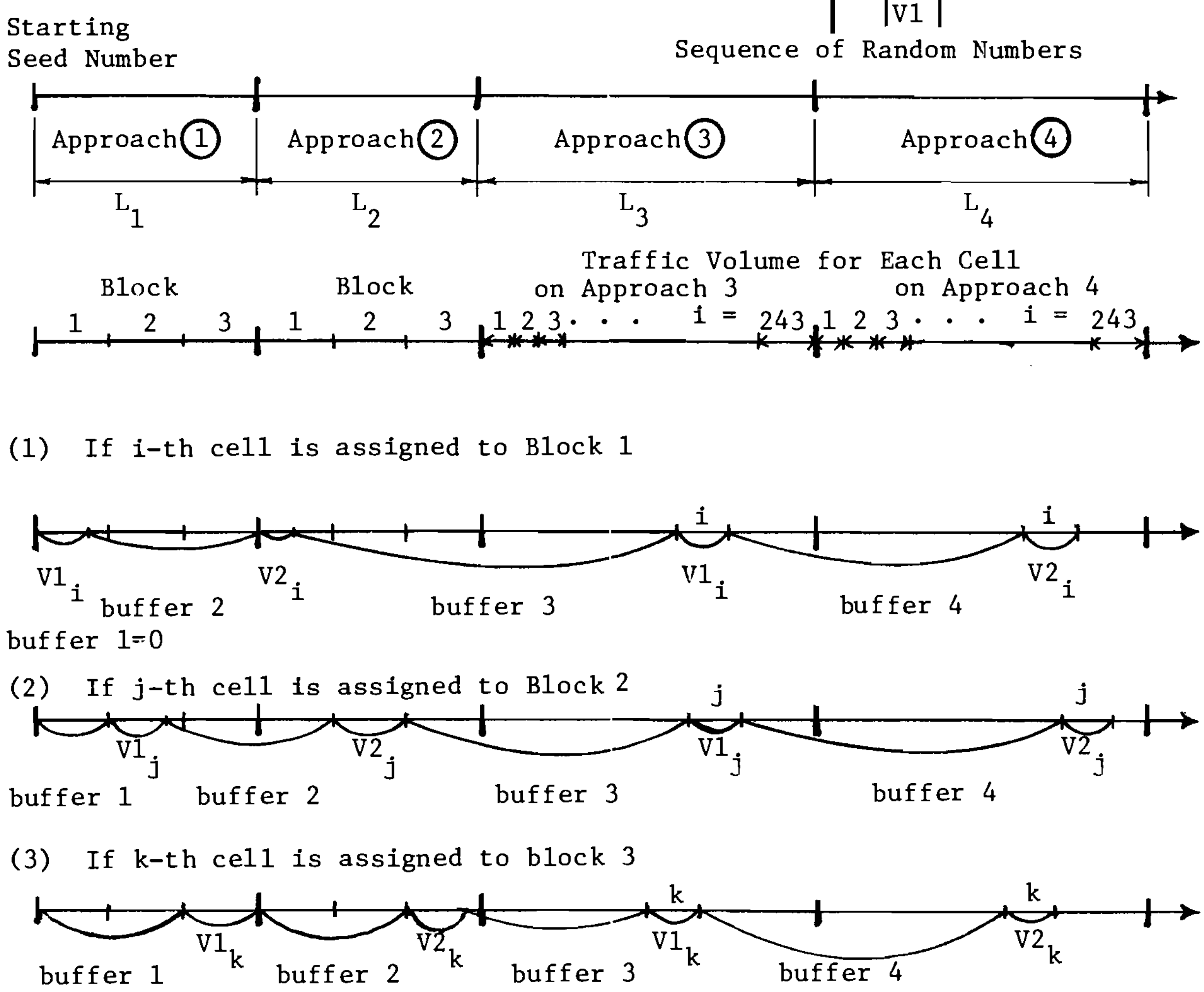
The random stream of approach headways which was generated for use in the experiments with the TEXAS Model utilized a unique sequence of random numbers which was produced from the same seed number. To insure independence and reduce variance, this continuous sequence of numbers was divided into four sections: two sections of equal length followed by two longer sections. The equal-length sections were used for blocking headway-descriptor data into common streams in order to reduce variance. The final two long sequences of random numbers were used to maintain independence in replicates of the approach traffic. The number of sections needed for variance reduction was the number of approaches which were blocked for common streams times the number of blocks. The length of each generated section of ramdom numbers needed to be long enough to characterize the largest traffic volume which might be included in any cell of the experiment. Because the required cell-by-cell traffic volume was different, several buffer zones were used between sections to guarantee that the traffic on each approach which had been blocked into a common stream in each section, utilized the assigned sequence of numbers as expected. These buffer zones were input into the TEXAS Model as traffic on dummy approaches with the volumes designed to make up the difference in actual volume used in each cell and the length of random numbers in each section. Each of the replicate approaches, for independence, utilized successively a non-overlapping sequence in the final long section of random numbers. Buffer zones were used to guarantee that the sequence utilized for each of the approaches in each cell did not overlap with any other. This idea is depicted in Fig 3-1.

SUMMARY

In designing the experiments needed to develop the predictive models for estimating queue lengths, delays, emissions, and fuel consumption, statistical techniques analysis of variance, fractional replication design and variance reduction have been utilized. Analysis of variance was used to

Approach No.	Volume Simulated During 15 Minutes
1 3	V1
2 4	V2





Required Length of the Random Number String

$$L_1 = L_2 = \text{Block } 1 + \text{Block } 2 + \text{Block } 3 = 3 \times \text{Block } 1$$
$$= 3 \times \text{Max}[(V1_i, V2_i), i = 1, 243]$$

$$L_3 = \sum_{i=1}^{243} V1_i, \quad L_4 = \sum_{i=1}^{243} V2_i$$

Fig 3-1. Variance reduction design with common traffic streams for any three-level factorial experiment with three blocks.

identify the significant effects which can be attributed to various experimental factors and indicate which factors should be included in the predictive model for each response. Fractional replication design was used to select the minimum number of experimental conditions which would produce acceptable results for each response. Variance reduction by blocking common random numbers within the fractional replication design was used to enhance the precision of results with a minimum number of simulation runs.

An affordable series of experiments which would yield acceptable results was designed with these techniques. Details of the designs and the resulting predictive models are presented in Chapters 5 and 6.

CHAPTER 4. TEXAS-II - A SIMULATION MODEL FOR PREDICTING VEHICLE EMISSIONS AND FUEL CONSUMPTION AT AN INTERSECTION

STRUCTURE OF THE SIMULATION MODEL

To quantify the effects of intersection geometry, traffic control, and traffic flow on air pollution and fuel consumption, the TEXAS-II simulation model has been developed to compute estimate of vehicle emissions and fuel consumption on a microscopic basis. TEXAS-II is a modified and extended version of the TEXAS Model for Intersection Traffic [Refs 24-27]. It includes a post processor which utilizes data concerning the individual vehicle characteristics and the time rate of movement of each vehicle through the intersection, which are produced by the TEXAS Model, as the basis for estimating emissions and fuel consumption.

The TEXAS Model for Intersection Traffic can simulate the instantaneous behavior of each individually-characterized driver-vehicle unit as it approaches, passes through, and departs from an intersection. At any time, a unit may either maintain or change speed or maintain or change lanes depending on the relative positions and movements of neighboring units and the effects of applicable traffic control devices. The premise is that each simulated driver will attempt to maintain safety and comfort while sustaining desired speed and obeying traffic laws. This model is suitable for a single multi-leg, multi-lane, mixed-traffic intersection operating under any conventional type of control.

The post processor which is now incorporated into TEXAS-II [Ref 64] includes a group of regression models which can predict the instantaneous vehicle emissions and the fuel consumption for various types of vehicles operating under different conditions. The Environmental Protection Agency (EPA) models for 1975 light-duty vehicles operating at low altitude are utilized [Ref 5], but the models which estimate the behavior of heavy-duty vehicles were developed as part of this study [Refs 36-38] with experimental data supplied by Southwest Research Institute [Refs 28-35] Development of the models for heavy-duty vehicles is described in Appendix H for the convenience of the reader.

THE TEXAS MODEL FOR INTERSECTION TRAFFIC

The TEXAS Model for Intersection Traffic includes three data processors: GEOPRO (Geometry), DVPRO (Driver-Vehicle) and SIMPRO (Simulation) for describing, respectively, the geometric configurations, the stochastically arriving traffic, and the behavior of traffic in response to the applicable traffic controls. SIMPRO integrates all the defined elements and computes deterministically the response of each driver-vehicle unit.

GEOPRO defines the geometry of the intersection in the computer. It calculates vehicle paths along the approaches and within the intersection. The number of intersection legs, together with their associated number of lanes and lane widths, define the intersection size and the location of any special lanes. The azimuth for each leg and the associated coordinates define the shape of the intersection. The allowed directional movements of traffic on the inbound approaches and the allowed movements on outbound lanes define the directional use of the intersection.

DVPRO utilizes certain assigned characteristics for each class of driver and vehicle and generates attributes for each individual driver-vehicle unit; thus, each unit is characterized by inputs concerning driver class, vehicle class, desired speed, desired outbound intersection leg, and lateral lane position on the inbound leg. All these attributes are generated by a uniform probability distribution, except for the desired speed which is defined by a normal distribution. Each unit is sequentially ordered by queue-in time as defined by the input of a selected headway distribution. The total number of driver-vehicle units which must be generated by DVPRO is determined by the product of the input traffic volume, in vehicles per hour, and the minutes of time to be simulated.

SIMPRO simulates the traffic behavior of each unit according to the momentary surrounding conditions including any traffic control device indications which might be applicable. Upon entering the inbound approach lane, the entry velocity of each unit is set so that the vehicle will neither exceed a selected desired speed nor collide with the unit immediately ahead of it. If the unit ahead is accelerating, or is traveling at its desired speed, the entering unit will enter the approach at its own desired speed. If the unit ahead is decelerating, the speed of the entering unit is set to a value which is less than its own desired speed. If there is no leading unit on the inbound lane, the unit enters with its desired speed.

After entry, the unit is checked moment by moment as to whether or not it is in a car-following situation. If it is not, the magnitude of required acceleration or deceleration which is appliable at any given instant is calculated by linear interpolation between extreme values which are set for each vehicle class with respect to the desired speed and to zero speed. Maximum required acceleration and deceleration occur at or near zero speed, and zero acceleration occurs at the maximum speed that each type of vehicle can attain. If the unit is in a car-following situation, the speed and acceleration of the unit interact with the speed and position of the unit ahead. Current and relative speeds and positions of all adjacent vehicles are thus utilized in determining the behavior of each driver-vehicle unit in the simulation model.

When car following or traffic control makes it necessary for a unit to accelerate or decelerate, the logic in SIMPRO provides for accelerating to the desired speed, accelerating to the speed of the unit ahead, decelerating to follow the unit ahead, or decelerating to the desired speed within the available distance.

As the unit proceeds along the inbound approach lane, the location and the status of traffic control devices are checked moment by moment. The indication of the traffic control devices will apply to the unit as soon as the unit comes into the influence area of the device.

If stop signs control the intersection, SIMPRO lists the units stopped before the sign according to their arrival times and then releases them in a first-arrived-first-served sequence. If there are simultaneous arrivals on adjacent intersection legs, the unit to the right gets priority for earliest release.

If pre-timed signals control, each unit responds to the signal indications which appear in a defined sequence and are of a specified duration for each phase. Each unit will attempt to go on a green indication after checking for intersection conflicts. If the unit is in the leading position and has cleared intersection conflicts, the unit will enter the intersection. If a leading unit has stopped before the unit being examined, or if the leading unit is decelerating, the unit being examined will begin to stop. When the signal indication is red, each arriving unit will stop; however, a right-turn-on-red option is provided.

If control is by an actuated signal controller, the sequence and duration of each indication is selected in response to the information received by the controller from the detectors. The logic for driver response to signal indications is, of course, the same as that described for the pretimed signal. A detector actuation is defined by the time interval when the front bumper of a unit has crossed the start of the detector but the rear bumper has not crossed the end of the detector. Actuations may continue the phase or allow the phase to change when a maximum time interval for that phase has elapsed or a sufficiently large gap occurs.

A unit is allowed to change into an adjacent lane if less delay can be expected. The geometric path of the lane-changing unit is a cosine curve. Each unit is processed incrementally in time from its entry onto the inbound lane to the end of the outbound lane. The length of each approach is specified. The instantaneous traffic behavior of each unit including speed, location, and time are written onto a tape by the TEXAS Model for subsequent use in the emission processor (EMPRO). Statistics about delays and queue lengths are also gathered by the TEXAS Model for evaluating the performance of traffic at the intersection.

Delay statistics include the average of total delay and the average of stop delay incurred by each vehicle processed. Each delay is summarized by left-turn, right-turn, and straight movement and by the total of these three permitted directional movements on each inbound approach. Total delay is the difference between travel time for a vehicle through the system and the time it would have taken the vehicle at its desired speed. Stop delay is the time spent by a vehicle which has a velocity less than 3 feet/second. Delay statistics show the overall influence of the intersection environment on traffic passing through the intersection. Comparison of the delays experienced by traffic making various directional movements indicates the interaction among traffic flows on the intersecting streets. Queue-length statistics include average queue length and maximum queue length. Both are measured in units of vehicles, not feet. Average queue length and maximum queue length are the averages taken for each inbound lane over any selected time interval.

EMISSION PROCESSOR FOR TEXAS-II

The emissions processor, referred to as EMPRO, incorporates models to predict the instantaneous vehicle emissions of Carbon Monoxide (CO), Hydrocarbons (HC), Oxides of Nitrogen (NOx), and fuel flow (FF) for both light-duty vehicles and heavy-duty vehicles. EMPRO utilizes information from SIMPRO about the instantaneous speed and acceleration of each vehicle to compute instantaneous vehicle emissions and fuel consumption at points along the vehicle path. For evaluation purposes, each lane on each approach is partitioned into a series of buckets, and the emissions and fuel flow are accumulated on a bucket basis to show the spatial variation of emissions and fuel consumption with respect to time. The intersection proper is treated as one bucket, but it collects the emissions and fuel consumption values generated by vehicles crossing it from all approaches. The length of buckets on each inbound or outbound lane can be specified by the user as input data to EMPRO. In this study, the bucket is set as a 100-foot section of a lane, therefore, each inbound or outbound lane is partitioned into eight buckets as all approaches are 800 feet long. The EPA emission and fuel consumption models for light-duty vehicles are expressed directly as functions of vehicle performance (speed and acceleration), but the emission and fuel consumption models for heavy-duty vehicles referenced herein are expressed as functions of engine performance (engine torque and engine speed). EMPRO incorporates a subprogram to convert engine performance into vehicle performance for heavy-duty vehicles in order to estimate emissions and fuel consumption.

Emissions and Fuel Consumption Models for Light-Duty Vehicles

The emission models for CO, HC, NO_x and CO_2 developed by EPA for light-duty vehicles [Ref 5] are presented in quadratic form of speeds for steady state, and in quadratic form of speeds and accelerations for transient states. The fuel consumption model is expressed as a linear function of the amounts of HC, CO and CO_2 emitted. The emission models are formulated as follows:

Steady State

$$L(V) = S_1 + S_2 V + S_3 V^2$$

L = instantaneous emission rate (grams/second)

V = speed (MPH)

S = coefficients (listed in Table 4-1)

Transient State

$$L(V,A) = b_1 + b_2 V + b_3 A + b_4 AV + b_5 V^2 + b_6 A^2 + b_7 V^2 A + b_8 A^2 V + b_9 A^2 V^2$$

A = acceleration or deceleration (MPH/second)

b = coefficients (listed in Table 4-1)

In the Modal Analysis Model, vehicles are classified into 18 groups by model year from 1957 to 1975 and by operating altitude as low or high. The 1975 low altitude group, which provides the most current information available for this study and matches the terrain situations of many American cities, was selected for use in the TEXAS-II model. The models and coefficients for estimating the emissions of CO, HC, NO_x and CO_2 for the 1975 low altitude group of automobiles are listed in Table 4-1. An evaluation of the models

TABLE 4-1. INSTANTANEOUS EMISSION AND FUEL CONSUMPTION MODELS FOR PASSENGER CARS (AFTER REF 5)

INSTANTANEOUS EMISSION MODELS

Steady State Model: $L(V) = S_1 + S_2V + S_3V^2$

L = Instantaneous Emissions Rate (gram/second)

V = Speed (mph)

Transient State Model: $L(V,A) = B_1 + B_2V + B_3A + B_4VA + B_5V^2 + B_6A^2 + B_7V^2A + B_8VA^2 + B_9V^2A^2$

A = Acceleration or Deceleration (M/H^2)

COEFFICIENTS FOR EMISSION MODELS

State		CO	HC	NO_x	CO_2
Steady	S1	1.16557780E - 01	5.38159910E - 03	1.46895690E + 00	2.65079990E - 03
	S2	-4.62989880E - 03	-1.45500000E - 04	7.06690180E - 03	-3.53700020E - 04
	S3	6.98999940E - 05	1.99999980E - 06	1.61370010E - 03	2.34000040E - 05
Transient	B1	2.15785210E - 01	8.06840140E - 03	2.28404900E + 00	1.08160000E - 02
	B2	-1.25777980E - 02	-4.00200020E - 04	-2.62799000E - 02	-1.22500000E - 03
	B3	5.14772980E - 02	9.00400100E - 04	6.55900840E - 02	-7.35400010E - 04
	B4	-2.34259990E - 03	6.50000000E - 05	5.39221990E - 02	5.39399920E - 04
	B5	1.67800000E - 04	6.60000020E - 06	2.12890000E - 03	4.44000030E - 05
	B6	-1.57559990E - 03	-7.35699900E - 04	-1.65571990E - 01	-3.29720000E - 03
	B7	2.82299940E - 04	8.98000000E - 05	3.02321020E - 02	5.26600050E - 04
	B8	1.25299990E - 04	-3.00000010E - 07	-9.01000020E - 05	3.11999970E - 06
	B9	4.85000060E - 05	-6.00000020E - 07	-4.12700000E - 04	-8.40000030E - 06

INSTANTANEOUS FUEL CONSUMPTION MODEL

$$FF = 0.866 * HC + 0.429 * CO + 0.273 * CO_2$$

indicates that in steady-state driving the emissions of CO and HC decrease with speed while the emissions of NO_x and CO_2 increase with speed. The fuel consumption rate in steady-state driving stays almost constant in the speed range up to ten mph and then increases with speed. In transient state driving, acceleration has strong effects to increase the emissions and fuel consumption. The effect of acceleration is higher when speed is higher. Use of the coefficients for the 1975 low altitude group of vehicles can produce negative values for emissions and fuel flow. In the TEXAS-II Model, all such negative values are automatically set to zero.

Emission/Fuel Consumption Models for Heavy-Duty Vehicles

A series of models (see Table 4-2) for estimating instantaneous values of emissions and fuel consumption for heavy-duty vehicles powered by gasoline or diesel engines were developed for incorporation into a data post processor called EMPRO in the TEXAS-II Model. This process is described in detail in Ref 38 and summarized in Appendix H for convenience. Rational approximations of vehicle dimensions and operating characteristics are combined with empirical data on engine performance to produce the models.

A conversion subprogram in EMPRO computes the instantaneous engine brake horsepower needed to produce the speed and acceleration specified in the output from the TEXAS Model and then converts this to the required torque, engine speed, and gear ratio of the truck being simulated. The required engine brake horsepower is the product of vehicle speed and the total propulsive force. The total propulsive force is the sum of the resistance force plus the net force needed to accelerate the mass of the vehicle. The resistance force includes frictional resistance in the vehicle as well as air resistance. The total resistance force can be estimated as a function of vehicle mass, speed, and maximum frontal cross section. The net accelerating

TABLE 4-2. INSTANTANEOUS EMISSION AND FUEL CONSUMPTION MODELS FOR GASOLINE AND DIESEL TRUCKS

EMISSION AND FUEL CONSUMPTION MODELS FOR GASOLINE TRUCKS[1]		
HC	=	6.526E - 03 + 1.088E - 08 * ABS(TRQ) * RPM + 4.153E - 11 * TRQ * TRQ * TRQ * TRQ - 5.46E - 09 * ABS(TRQ) * TRQ * TRQ
CO	=	10.0**(-2.636 + 3.190E - 05 * TRQ * TRQ + 4.257E - 02 * SQRT(RPM) - 2.205E - 06 * ABS(TRQ) * RPM + 1.659E - 10 * TRQ * TRQ * TRQ * TRQ)
NO	=	10.0**(-1.702 + 2.505E - 02 * SQRT(ABS(TRQ)) - 8.991E + 02/RPM - 3.815E - 10 * TRQ * TRQ * TRQ * TRQ + 8.504E - 03 * ABS(TRQ))
FF	=	-1.301 + 7.409E - 06 * ABS(TRQ) * RPM + 7.105E - 02 * SQRT(RPM) + 3.555E - 10 * TRQ * TRQ * TRQ * TRQ
EMISSION AND FUEL CONSUMPTION MODELS FOR DIESEL TRUCKS[1]		
HC	=	-1.183E - 02 + 3.459E - 05 * RPM - 7.560E - 06 * ABS(TRQ) - 4.833E - 09 * RPM * RPM
CO	=	3.069E - 02 - 1.107E - 03 * ABS(TRQ) + 2.212E - 07 * ABS(TRQ) * RPM + 1.103E - 05 * TRQ * TRQ
NO	=	2.602E - 02 - 2.035E - 04 * ABS(TRQ) + 4.024E - 07 * ABS(TRQ) * RPM + 6.591E - 04 * SQRT(ABS(TRQ))
FF	=	-2.898E - 02 + 3.726E - 03 * ABS(TRQ) + 8.097E - 06 * ABS(TRQ) * RPM + 8.467E - 04 * (ABS(TRQ) + RPM) - 1.180E - 01 * SQRT(ABS TRQ))

[1] Units = grams/second

Where TRQ = Engine torque in foot-pounds

RPM = Engine speed in revolutions per minute force is the product of vehicle mass and acceleration. The required instantaneous propulsive force can be approximated by assuming representative values for the weight of the truck, its maximum frontal cross section, and its instantaneous acceleration. Engine speed can be related to vehicular speed by appropriate gear ratios. Then, torque is calculated by dividing the required engine horsepower by the engine speed. These calculated engine speed and torque values are used for the estimation of emissions for heavy-duty vehicles through correlation with data on representative truck engines obtained by Southwestern Research Institute [Refs 28-35].

Diesel trucks and gasoline trucks generally have different vehicle weight and capacity of pay load. The respective weights of full-load and partial-load for each type of truck that have been assumed for this study are listed in Table 2-4. The breakdown of trucks by class, weight, and fuel type is listed in Table 2-5. The maximum frontal cross-sectional area of single-unit and tractor-trailer trucks are assumed to be 60 and 95 square feet, respectively. These values are set in EMPRO as representative default values for this investigation.

EMPRO computes quantitative estimates of CO, HC, NO_x, and fuel consumption and accumulates them in the form of summary statistics. The statistics are tabulated according to bucket, lane, leg, total intersection system and vehicle class for any user-selected time interval. Small buckets and short time intervals can be chosen to help minimize the effects of displacement, dispersion, or reaction of pollutant sources when modeling concentrations at selected locations in or near the intersection system. Bucket statistics show the longitudinal variation of emissions and fuel consumption along each inbound and outbound lane. Lane statistics are the sum of all buckets along a lane and show the transverse variation in emissions and fuel consumption on each intersection leg. Approach statistics are the sum of all lane statistics, regardless of direction, on each leg. Total intersection system statistics are summed about all approaches and the intersection proper area. Both approach statistics and intersection statistics are used to analyze the significant effects of the selected input factors on emissions and fuel consumption. The number of buckets in a total intersection system is quite large; therefore, it is difficult to generalize effects. Only one bucket statistic will be used to demonstrate that the source of emissions and fuel consumption can be predicted in detail by the model. Specific cases can be analyzed readily by running the TEXAS-II Model.

Five examples listed in Table 4-3 are presented to indicate the influence that signal timing, traffic lane volume, percent trucks, and left turns can have on the vehicle emissions and fuel consumption estimates produced by EMPRO. The values for emissions and fuel consumption are larger near the intersection than elsewhere on the indicated inbound and outbound lanes. The maximum values generally occur in bucket No. 1 on the inbound lane. Emissions and fuel consumption in the intersection proper, indicated as bucket No. 0 in Table 4-3, are attributed to through traffic and right turning in the indicated inbound lane only. Emissions and fuel consumption on the outbound lane are contributed by the through traffic on the indicated inbound lane as well as the traffic turning right into this outbound lane from the cross street. Right turns in all five cases are fixed at 100 vph on each approach. Graphs of emissions and fuel consumption along the buckets are presented in Fig 4-1 to Fig 4-4.

TABLE 4-3. EMPRO EMISSIONS AND FUEL CONSUMPTION EXAMPLE PROFILES ALONG RIGHT LANE OF A 4 x 4 INTERSECTION (GRAMS/15 MINUTES)

QUANTITY	BUCKET	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5
	8	6.21	5.79	14.23	7.66	6.70
	7	7.74	9.21	15.96	8.53	5.38
	6	10.08	8.50	18.84	8.57	5.33
	5	10.40	9.45	22.79	7.96	5.70
	4	8.86	6.82	31.89	9.50	5.47
	3	11.59	7.23	66.08	11.85	18.36
	2	23.83	21.37	127.04	22.67	65.11
	1	113.34	172.82	300.87	394.56	253.97
CO	0	64.70	45.65	81.23	120.10	78.00
	-1	33.91	11.42	61.79	25.94	28.92
	-2	9.89	11.96	33.05	20.44	7.04
	-3	6.93	11.77	22.85	17.49	5.31
	-4	7.18	11.79	22.41	20.08	5.56
	-5	7.28	11.83	21.70	17.63	5.57
	-6	7.28	11.73	21.58	17.41	5.57
	-7	7.28	11.73	21.20	17.10	5.54
	-8	7.11	11.26	20.33	16.54	5.95
	8	.48	.47	1.21	.63	.50
	7	.53	.57	1.23	.63	.41
	6	.62	.56	1.35	.63	.40
	5	.63	.59	1.50	.61	.41
	4	.57	.51	1.80	.65	.42
	3	.61	.53	2.98	.70	.85
	2	1.01	.98	4.96	1.16	2.53
	1	4.00	6.25	11.69	7.49	9.55
HC	0	2.52	2.01	3.54	2.34	3.04
	-1	1.38	.72	2.94	1.44	1.16
	-2	.59	.74	1.84	1.30	.43
	-3	.49	.73	1.50	1.29	.37
	-4	.50	.73	1.48	1.29	.38
	-5	.50	.74	1.46	1.29	.38
	-6	.50	.73	1.45	1.28	.38
	-7	.50	.73	1.43	1.27	.38
	-8	.49	.70	1.38	1.23	.38

QUANTITY	BUCKET	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5
	8	2.11	2.00	2.95	2.76	2.26
	7	2.20	2.46	2.91	2.95	1.82
	6	2.69	2.30	2.99	2.79	1.65
	5	2.83	2.44	3.22	2.57	1.48
	4	2.44	1.92	3.58	2.53	1.17
	3	2.29	1.49	6.08	2.46	2.11
	2	3.14	1.87	9.66	2.96	3.29
	1	10.26	10.22	20.00	11.20	12.27
NOX	0	11.73	6.83	14.75	6.48	13.45
	-1	7.11	1.04	11.56	3.62	5.89
	-2	3.02	1.11	6.57	2.56	2.15
	-3	2.31	1.09	4.76	2.34	1.68
	-4	2.33	1.07	4.71	2.48	1.71
	-5	2.35	1.10	4.58	2.28	1.72
	-6	2.35	1.07	4.54	2.23	1.73
	-7	2.35	1.07	4.43	2.18	1.72
	-8	2.29	1.03	4.25	2.16	1.77
	8	154.52	154.52	327.59	186.58	162.26
	7	155.69	161.18	314.72	180.94	130.16
	6	171.85	159.37	326.61	177.87	123.78
	5	176.48	165.52	344.13	171.81	119.52
	4	162.86	155.40	379.72	173.13	113.64
	3	158.57	142.58	515.89	175.66	157.41
	2	183.47	165.62	733.26	204.75	311.56
	1	517.08	714.65	1415.28	803.72	1029.53
FF	0	405.03	335.09	623.78	334.53	466.44
	-1	289.96	142.00	585.06	270.53	234.05
	-2	175.72	143.40	433.09	242.94	129.18
	-3	156.12	142.39	380.67	233.91	115.78
	-4	156.80	142.90	379.35	238.24	116.42
	-5	157.14	143.88	375.09	232.68	116.46
	-6	157.14	142.71	374.27	229.57	116.64
	-7	157.14	142.71	370.71	223.32	116.34
	-8	153.48	136.98	355.77	215.77	115.34

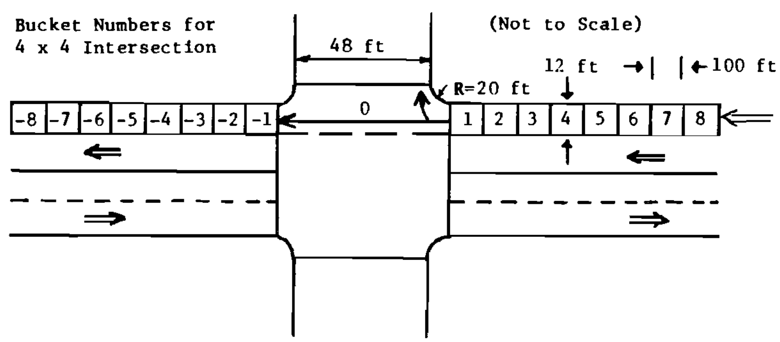
CASE 1 : V = 300 VPH/LANE, NO LEFT TURNS, NO TRUCKS,
G = 27 SEC, R = 23 SEC
(MAXIMUM OBSERVED QUEUE = 3 VEH)

CASE 2 : V = 300 VPH/LANE, NO LEFT TURNS, NO TRUCKS,
G = 23 SEC, R = 27 SEC
(MAXIMUM OBSERVED QUEUE = 4 VEH)

CASE 3 : V = 600 VPH/LANE, NO LEFT TURNS, NO TRUCKS,
G = 32 SEC, R = 38 SEC
(MAXIMUM OBSERVED QUEUE = 6 VEH)

CASE 4 : V = 300 VPH/LANE, NO LEFT TURNS, 5 0/0 TRUCKS,
G = 25 SEC, R = 25 SEC
(MAXIMUM OBSERVED QUEUE = 4 VEH)

CASE 5 : V = 300 VPH/LANE, 48 LEFT TURNS/LEG, NO TRUCKS,
G = 24 SEC, R = 36 SEC
(MAXIMUM OBSERVED QUEUE = 7 VEH)



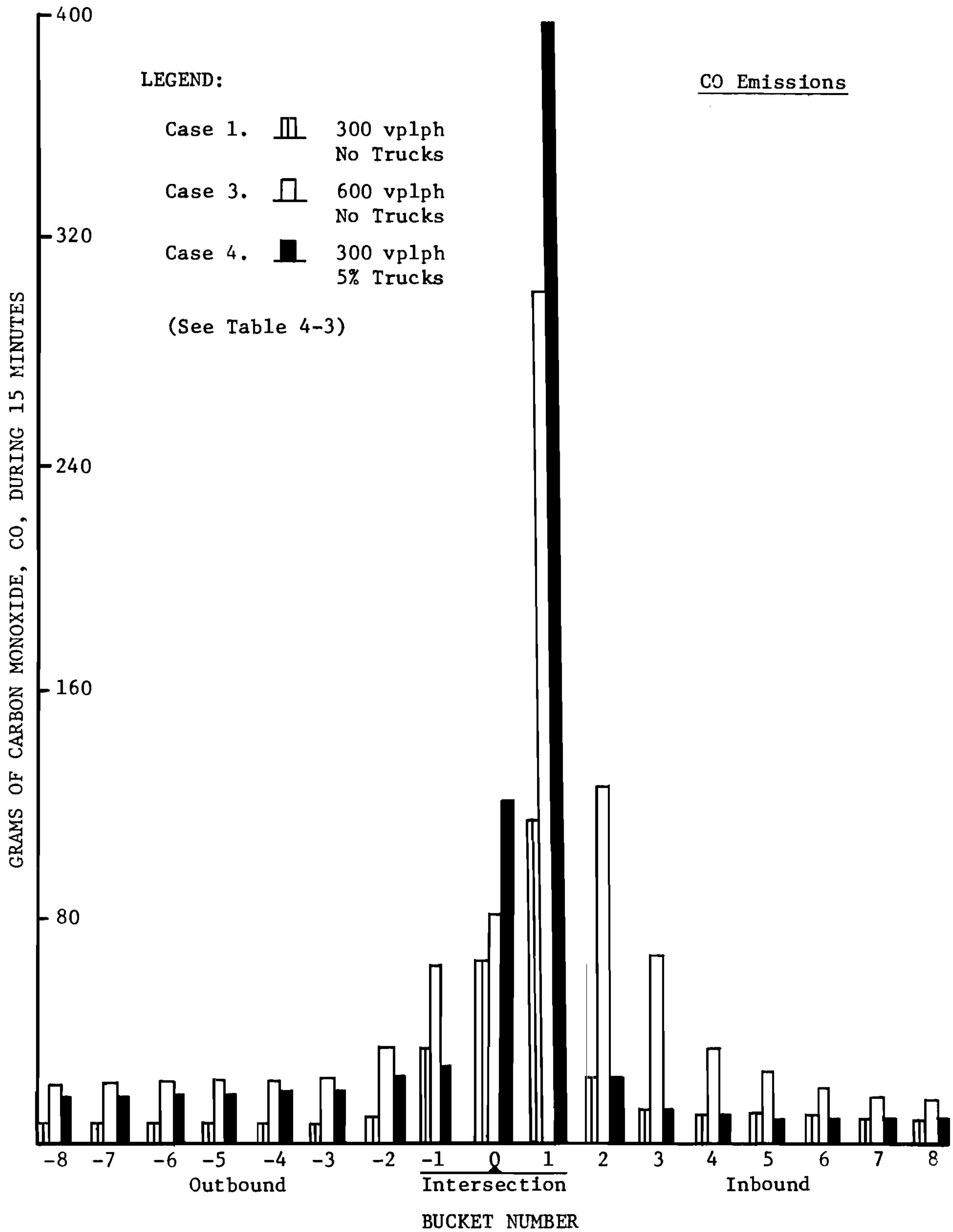


Fig 4-1. Carbon monoxide emissions in 15 minutes into 100-ft long buckets in right-hand lane through 4 x 4 intersection.

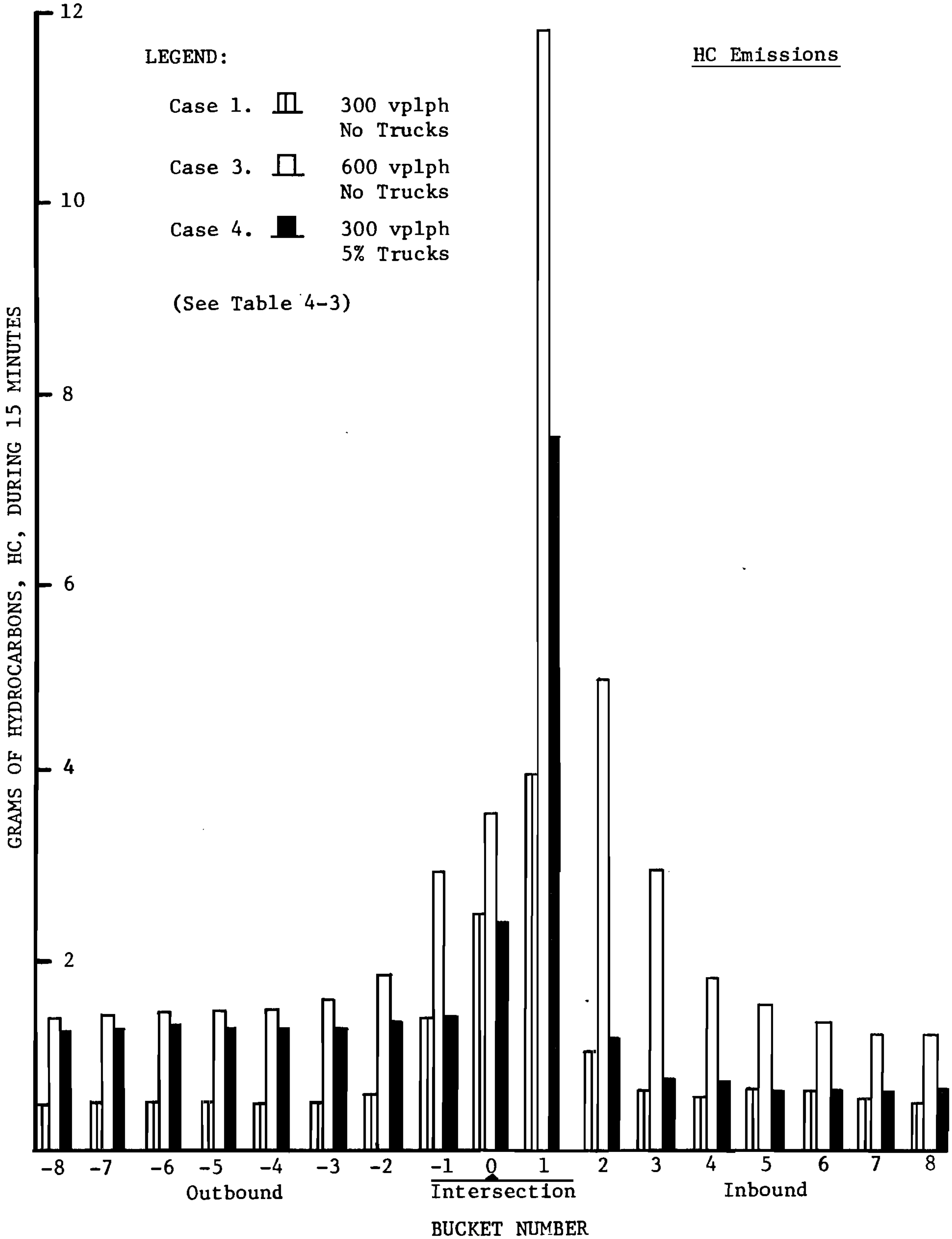


Fig 4-2. Hydrocarbon emissions in 15 minutes into 100-ft long buckets in right-hand lane through 4 x 4 intersection.

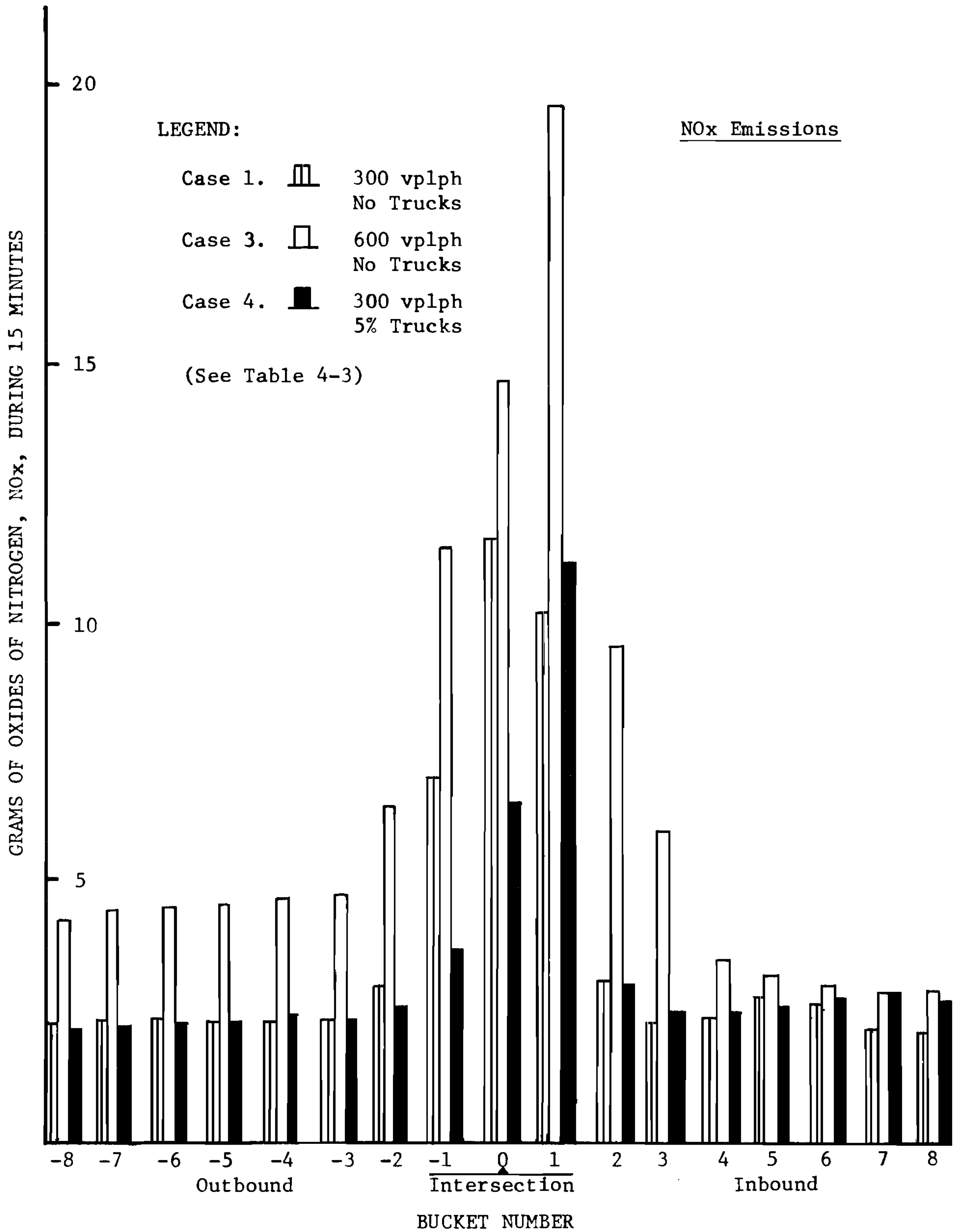


Fig 4-3. Oxides of nitrogen emissions in 15 minutes into 100-ft long buckets in right-hand lane through 4 x 4 intersection.

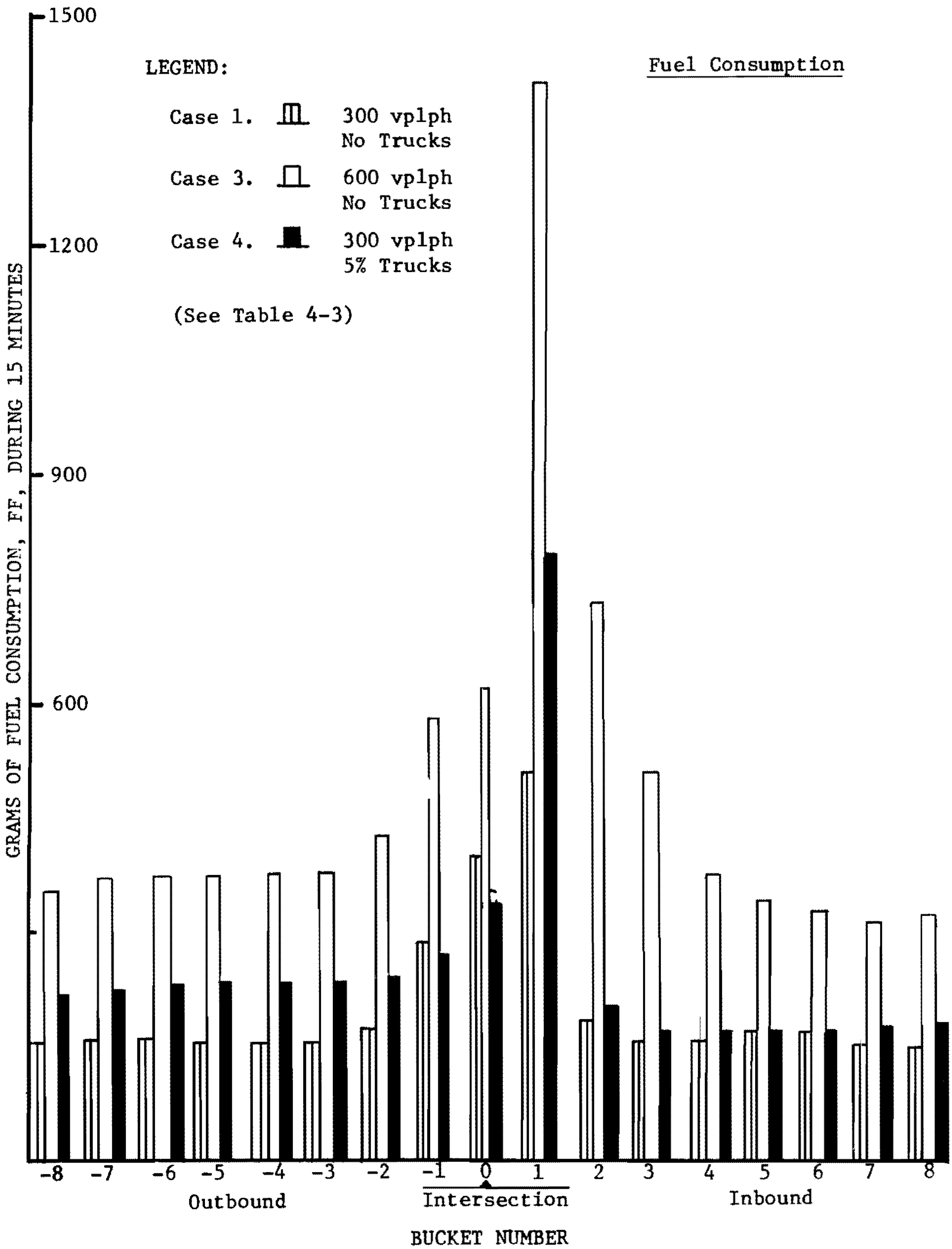


Fig 4-4. Fuel consumption in 15 minutes into 100-ft long buckets in right-hand lane through 4 x 4 intersection.

EFFECT OF START-UP AND SIMULATION TIME ON MODEL RESULTS

The results from a time-dependent simulation process are generally used to describe the behavior of a system that is operating in a stable condition; such is the case in this study. In running the TEXAS-II simulation model, the intersection system starts void of traffic and accepts vehicles which arrive on the inbound lanes according to a statistical frequency distribution. Each vehicle then progresses through the system in response to its momentary surroundings. Until the system loads with vehicles, the pattern of traffic flow is not stable, and the summary statistics produced by the model are not representative of the desired condition. The time needed for start-up, or for filling the empty system, is a function of the intersection geometry, the type of traffic control, and the pattern of traffic passing through the system. Analysis of the summary statistics from the TEXAS Model for intersection environments like the ones used in this study indicated that after about five minutes of simulated real time, stable traffic flow conditions existed in the system. Therefore, for all simulation experiments in the study, five minutes of start-up time were run before any summary statistics were gathered by the TEXAS-II Model.

Variability in intersection traffic flow occurs with respect to time. In order to include this variability in a simulation process, intersection operations must be simulated for a sufficient amount of time to allow a full range of traffic events to occur. Several tests of a 4 x 4 intersection operating under various traffic conditions indicated that the summary statistics for the TEXAS-II Model after fifteen minutes of simulated real time were virtually the same as those after sixty minutes. A fifteen minute simulation time, following a five-minute start-up time, was therefore used for all the simulation experiments in this study.

SUMMARY

The instantaneous emissions of CO, HC and NO_x as well as fuel consumption can be estimated on a microscopic basis by using an extended version of the TEXAS Model For Intersection Traffic called TEXAS-II. The TEXAS-II Model combines the emission models and fuel consumption models developed by EPA for light-duty vehicles and other models developed in this study for heavy-duty vehicles based on engine performance data reported by Southwest Research Institute. The TEXAS Model For Intersection Traffic defines the vehicle paths along the legs and within the intersection, and includes the various characteristics and attributes of stochastically arriving mixed traffic. The instantaneous speed and acceleration of each vehicle is predicted by the simulation of its interaction with adjacent vehicles along the specified path and the influence of any traffic control devices which might be present. The instantaneous speed and acceleration of each vehicle are passed to the appropriate emission and fuel consumption models to predict the instantaneous emissions and fuel consumption of the vehicle at its present location. Passenger cars, diesel trucks, and gasoline trucks each have different emission models and fuel consumption models. For passenger cars, the models utilize instantaneous speed and acceleration of the vehicle, but for trucks, the models use instantaneous engine speed and torque as the basis for estimation. Therefore, a conversion subprogram to transform the predicted instantaneous speed and acceleration of the truck into corresponding engine speed and engine torque for use in the respective emission and fuel consumption models have been incorporated into the new TEXAS-II Model.

Statistics of delays, queue lengths, CO emissions, HC emissions, NO_x emissions, and fuel consumption are gathered to evaluate the effects of the selected factors of intersection geometry, traffic control system, and traffic stream characteristics. Delays include average total delay and average stop delay. Queue lengths include average queue length and maximum queue length. Delays and queue lengths serve as a basis for judging the validity of simulation results since considerable experience and observation of these parameters has already been accumulated. Delays on the inbound approaches are classified by directional movements to indicate the influence of the traffic on the intersecting street. All responses of delays and queue lengths are presented as averages over the inbound lanes. Emissions and fuel consumption are summarized as accumulated totals into defined buckets on each lane, on inbound and outbound lanes, in the intersection area proper, and in the whole intersection system. Only emissions and fuel consumption are presented on a bucket basis. Because the two inbound approaches of one street have been designed with identical traffic input in this study, there are two replications of observations for approach statistics and bucket statistics on each approach for both inbound and outbound traffic. For total intersection statistics, there is only one replication.

In order to simulate representative intersection operations under stable conditions, the first five minutes of each simulation period was eliminated from the summary performance statistics. Only the statistics from the later fifteen minutes were analyzed.

CHAPTER 5. EXPERIMENT DESIGN AND RESULTS FOR TWO-PHASE, PRETIMED SIGNALIZED INTERSECTIONS

DESIGN OF EXPERIMENT

Because two-phase, pretimed signals are frequently used for traffic control at urban intersections, an extensive study was conducted to investigate the main and interactive effects on delay, queue length, emissions, and fuel flow caused by descriptive ranges in relevant factors such as intersection geometry, traffic signal control, and traffic stream characteristics. The discussion in Chapter 2 has suggested that the following ten factors can suitably characterize the usual range of variations in these factors encountered in the two-phase, pretimed signalized intersection environment. The ten factors are:

(1) intersection size,

(2) presence or absence of a left-turn lane,

(3) cycle time,

(4) ratio of green time to each street,

(5) traffic volume on the major street,

(6) left turns from the major street,

(7) truck percentage on the major street,

(8) traffic volume on the minor street,

(9) left turns from the minor street, and

(10) truck percentage on the minor street.

Each factor is given three levels in order to look into the extensive and detailed information which is related to the intersection environment. The numerical values of each factor used in this experiment are listed in Table 5-1.

Intersection size plus whether or not a separate left-turn lane is present, taken at three levels each, define nine general intersection geometric configurations which include two lanes or three lanes inbound and outbound and with or without a separate left-turn lane. Cycle length and green ratio to the major street, taken at three levels each, define nine different combinations of green time and red time for both streets if each level of cycle time and green ratio to the major street have only one value for each level. But, cycle time and green ratio to the major street normally depend on the volumes of traffic on each of the two intersecting streets. If the values of cycle time and green ratio to a street are shorter than what the traffic demands, the vehicles arriving within each cycle cannot be dispatched completely and will accumulate into a long queue. If the values are longer than needed, then each stopped vehicle will incur unnecessary delay. Appropriate ranges and levels of cycle time and green ratio to the major street for each combination of volumes are listed in Table 5-1. The ranges of cycle time at low, medium, and high levels of traffic demand are 50-70, 60-80, and 70-90 seconds, respectively. The low levels of traffic demand are defined by the lane volume combinations on the major street and minor street with values of (300, 300), (450, 300), or (300, 450). The medium levels are defined by (450, 450), (600, 300), or (300, 600). The high levels are defined by (600, 450), (450, 600), or (600, 600). The green ratio assigned to the major street and to the minor street is determined by computing the ratio of the green time required to dispatch the queued

TABLE 5-1. TEN FACTORS USED TO DESCRIBE INTERSECTION ENVIRONMENT AT TWO-PHASE PRETIMED SIGNALIZED INTERSECTIONS

<table>
<tr><th>Influence</th><th>Factor</th><th>Symbol</th><th colspan="11">Numerical Levels</th></tr>
<tr><td rowspan="5">Geometry</td><td rowspan="3">1. Size (Number of Lanes)</td><td rowspan="3">A</td><td colspan="2" rowspan="2">(Number of Lanes per Leg)</td><td colspan="9">B. Left-Turn Lane</td></tr>
<tr><td colspan="3">None</td><td colspan="3">Major Street Only</td><td colspan="3">Both Streets</td></tr>
<tr><td rowspan="3">A. Level of Size</td><td>Low</td><td colspan="3">4 x 4</td><td colspan="3">5 x 4</td><td colspan="3">5 x 5</td></tr>
<tr><td rowspan="2">2. Left-Turn Lane</td><td rowspan="2">B</td><td>Medium</td><td colspan="3">6 x 4</td><td colspan="3">7 x 4</td><td colspan="3">7 x 5</td></tr>
<tr><td>High</td><td colspan="3">6 x 6</td><td colspan="3">7 x 6</td><td colspan="3">7 x 7</td></tr>
<tr><td rowspan="12">Signal Control</td><td rowspan="6">3. Cycle Length</td><td rowspan="6">C</td><td colspan="2" rowspan="2">C. Cycle Length (sec)</td><td colspan="9">E. Volume 1 (Major Street)</td></tr>
<tr><td colspan="3">300</td><td colspan="3">450</td><td colspan="3">600</td></tr>
<tr><td colspan="2">Levels of C</td><td>L</td><td>M</td><td>H</td><td>L</td><td>M</td><td>H</td><td>L</td><td>M</td><td>H</td></tr>
<tr><td rowspan="3">H. Volume 2 (Minor Street)</td><td>300</td><td>50</td><td>60</td><td>70</td><td>50</td><td>60</td><td>70</td><td>60</td><td>70</td><td>80</td></tr>
<tr><td>450</td><td>50</td><td>60</td><td>70</td><td>60</td><td>70</td><td>80</td><td>70</td><td>80</td><td>90</td></tr>
<tr><td>600</td><td>60</td><td>70</td><td>80</td><td>70</td><td>80</td><td>90</td><td>70</td><td>80</td><td>90</td></tr>
<tr><td rowspan="6">4. Green Split (Green Ratio to Major Street</td><td rowspan="6">D</td><td colspan="2" rowspan="2">D. Green Split (percent)</td><td colspan="9">E. Volume 1 (Major Street)</td></tr>
<tr><td colspan="3">300</td><td colspan="3">450</td><td colspan="3">600</td></tr>
<tr><td colspan="2">Levels of D</td><td>L</td><td>M</td><td>H</td><td>L</td><td>M</td><td>H</td><td>L</td><td>M</td><td>H</td></tr>
<tr><td rowspan="3">H. Volume 2 (Minor Street)</td><td>300</td><td>45</td><td>50</td><td>55</td><td>50</td><td>55</td><td>60</td><td>55</td><td>60</td><td>65</td></tr>
<tr><td>450</td><td>40</td><td>45</td><td>50</td><td>45</td><td>50</td><td>55</td><td>50</td><td>55</td><td>60</td></tr>
<tr><td>600</td><td>35</td><td>40</td><td>45</td><td>40</td><td>45</td><td>50</td><td>45</td><td>50</td><td>55</td></tr>
</table>

TABLE 5-1. (CONTINUED)

Influence	Factor	Symbol	Numerical Levels				
Traffic Stream Characteristics on the Major Street	5. Volume (Veh/Hr/Lane)	E	Levels of E		Low	Medium	High
			Veh/Hr/Lane		300	450	600
	6. Left-Turn Volume on Major Street Appoach (Veh/Hr)	F	Levels of Opposing Volume		Low	Medium	High
			Veh/Hr/Lane		300	450	600
			F. Veh/Hr		2 Lanes on Opposing Approach		
			Levels of Left Turns	Low (No Left Turns)	0	0	0
				Medium (40% of Left-Turn Capacity	48	20	8
				High (80% of Left-Turn Capacity	96	40	16

TABLE 5-1. (CONTINUED)

Influence	Factor	Symbol	Numerical Levels				
Traffic Stream Characteristics on the Major Street	6. Left-Turn Volume on Major Street Approach (Veh/Hr)	F	F. Veh/Hr		3 Lanes on Opposing Approach		
			Level of Left Turns	Low (No Left Turns	0	0	0
				Medium (40% of Left-Turn Capacity	36	16	4
				High (80% of Left-Turn Capacity	72	32	8
	7. Truck Percentage	G	Level		Low	Medium	High
			Percent of Approach Volume		0	5	10
Traffic Stream Characteristics on the Minor Street	8. Volume (Veh/Hr/Lane)	H	Same as on the Major Street				
	9. Left-Turn Volume on Minor Street Approach	I					
	10. Truck Percentage	J					

vehicles which arrive at an average headway for the volume being considered on each street during the red time and the early portion of green time before the stopped queue dissipates. For each volume combination there are nine different settings of green time and red time; therefore, there are eighty-one signal settings.

For characterizing the traffic stream, volume has been set on a lane basis with values of 300, 450, and 600 vehicles per hour per lane as low, medium, and high levels, respectively. Left turns are set as 0 percent, 40 percent, and 80 percent of left-turn capacity to represent low, medium, and high levels, respectively. The value of capacity is determined by the volume and the number of lanes of traffic on the opposing approach [Ref 49]. The reason for not using the full capacity value for the high level of left turns is to avoid the critical condition whereby suitable gaps will not occur in opposing traffic and long queues of left-turning vehicles will build up. Truck percentages 0, 5, and 10 percent of approach volume were selected for low, medium, and high levels, respectively.

These ten factors, each with three levels, have been arranged to constitute a 3^{10} factorial, and then a fractional replication design has been used as the basis for selecting 243 combinations of factors, or cells in the experiment, to represent all possible cells in the full 3^{10} factorial. The main effects and the first-order interactive effects which are attributed to the ten factors can be analyzed from this design. These 243 cells can be grouped into three blocks with common traffic streams for possible variance reduction. The 81 cells in each block will be subjected to the same random stream of traffic to increase the homogeneity within the block and to reveal any differences between the block averages. Then, the variability explained by the differences between the block averages can be removed from the error term so that the mean square of error becomes smaller. The defining contrasts for fractionation and blocking, as discussed in Chapter 3, for this 3^{10} factorial are listed in Table 5-2. All the selected cells and their associated blocks are listed in Table 5-3.

This design of the experiment gives each response ten main effects and forty-five interactive effects. Each main effect has one degree of freedom for its linear trend (L) and another degree of freedom for the quadratic trend (Q). Each interactive effect has four degrees of freedom to describe the influence which interaction between two factors has on their linear trends and on their quadratic trends LL, LQ, QL and QQ. All the effects will be arrayed in a fixed sequence to form the vector T as described in Chapter 3. The sequence is arrayed by grand mean first, then by linear effect and quadratic effect of the first factor, then by second factor, and so on until all main effects are arrayed. Then follow the interactive effects of LL, LQ, QL and QQ resulting from the interaction between the first factor and the second factor. Then follow the four interactive effects between the second factor and third factor, and so on until all interactions are arrayed. The block effects of L and Q fill the last two cells of T. In this experiment, 203 effects will be estimated by simulation. For estimation of any response on both the major and the minor streets, the sequence in the T vector is the same. The sequence of T for this experiment is listed in Table 5-4.

The TEXAS-II Model yields quantitative descriptions of fifty-eight simulated responses which are observed as six responses for the intersection system, forty responses for the inbound or outbound legs, four responses in the intersection proper, and eight responses in buckets. The fifty-eight responses are listed in Table 5-5. The six observed responses related to the overall intersection system include averages for total delay and stop delay

TABLE 5-2. DEFINING CONTRASTS FOR FRACTIONAL REPLICATION DESIGN AND BLOCKING FOR COMMON STREAMS

Fractional Replication Design	$B\ C\ D\ E\ F\ G$ $A\ C\ D\ E^2F^2H$ $A\ B\ D^2E^2F\ I$ $A\ B\ C^2E\ F^2$ $A\ B^2C^2D\ F\ J$
Blocking For Common Streams	$F\ H^2I$

Source: Ref 16, p 37.

TABLE 5-3. SELECTED CELLS AND ASSOCIATED BLOCKS USED IN THE MAJOR EXPERIMENT FOR ANALYSIS

CELL NO.	FACTORS* ABCDEFGHIJ	BLK NO.	CELL NO.	FACTORS ABCDEFGHIJ	BLK NO.	CELL NO.	FACTORS ABCDEFGHIJ	BLK NO.	CELL NO.	FACTORS ABCDEFGHIJ	BLK NO.	CELL NO.	FACTORS ABCDEFGHIJ	BLK NO.
1	0000000000	1	51	1212100000	1	101	0201021102	2	151	2120201121	2	201	1102210010	3
2	0001221010	1	52	1220200220	1	102	0202212112	2	152	2121122101	2	202	1110010200	3
3	0002112020	1	53	1221121200	1	103	0210012002	2	153	2122010111	2	203	1111201210	3
4	0010212210	1	54	1222012210	1	104	0211200012	2	154	2200202010	2	204	1112122220	3
5	0011100220	1	55	2000102221	1	105	0212121022	2	155	2201120020	2	205	1120222110	3
6	0012021200	1	56	2001020201	1	106	0220221212	2	156	2202011000	2	206	1121110120	3
7	0020121120	1	57	2002211211	1	107	0221112222	2	157	2210111220	2	207	1122001100	3
8	0021012100	1	58	2010011101	1	108	0222000202	2	158	2211002200	2	208	1200220002	3
9	0022200110	1	59	2011202111	1	109	1000120210	2	159	2212220210	2	209	1201111012	3
10	0100122012	1	60	2012120121	1	110	1001011220	2	160	2220020100	2	210	1202002022	3
11	0101010022	1	61	2020220011	1	111	1002202200	2	161	2221211110	2	211	1210102212	3
12	0102201002	1	62	2021111021	1	112	1010002120	2	162	2222102120	2	212	1211020222	3
13	0110001222	1	63	2022002001	1	113	1011220100	2	163	0000111202	3	213	1212211202	3
14	0111222202	1	64	2100221200	1	114	1012111110	2	164	0001002212	3	214	1220011122	3
15	0112110212	1	65	2101112210	1	115	1020211000	2	165	0002220222	3	215	1221202102	3
16	0120210102	1	66	2102000220	1	116	1021102010	2	166	0010020112	3	216	1222120112	3
17	0121101112	1	67	2110100110	1	117	1022020020	2	167	0011211122	3	217	2000210120	3
18	0122022122	1	68	2111021120	1	118	1100212222	2	168	0012102102	3	218	2001101100	3
19	0200211021	1	69	2112212100	1	119	1101100202	2	169	0020202022	3	219	2002022110	3
20	0201102001	1	70	2120012020	1	120	1102021212	2	170	0021120002	3	220	2010122000	3
21	0202020011	1	71	2121200000	1	121	1110121102	2	171	0022011012	3	221	2011010010	3
22	0210120201	1	72	2122121010	1	122	1111012112	2	172	0100200211	3	222	2012201020	3
23	0211011211	1	73	2200010212	1	123	1112200122	2	173	0101121221	3	223	2020001210	3
24	0212202221	1	74	2201201222	1	124	1120000012	2	174	0102012201	3	224	2021222220	3
25	0220002111	1	75	2202122202	1	125	1121221022	2	175	0110112121	3	225	2022110200	3
26	0221220121	1	76	2210222122	1	126	1122112002	2	176	0111000101	3	226	2100002102	3
27	0222111101	1	77	2211110102	1	127	1200001201	2	177	0112221111	3	227	2101220112	3
28	1000201112	1	78	2212001112	1	128	1201222211	2	178	0120021001	3	228	2102111122	3
29	1001122122	1	79	2220101002	1	129	1202110221	2	179	0121212011	3	229	2110211012	3
30	1002010102	1	80	2221022012	1	130	1210210111	2	180	0122100021	3	230	2111102022	3
31	1010110022	1	81	2222210022	1	131	1211101121	2	181	0200022220	3	231	2112020002	3
32	1011001002	1	82	0000222101	2	132	1212022101	2	182	0201210200	3	232	2120120222	3
33	1012222012	1	83	0001110111	2	133	1220122021	2	183	0202101210	3	233	2121011202	3
34	1020022202	1	84	0002001121	2	134	1221010001	2	184	0210201100	3	234	2122202212	3
35	1021210212	1	85	0010101011	2	135	1222201011	2	185	0211122110	3	235	2200121111	3
36	1022101222	1	86	0011022021	2	136	2000021022	2	186	0212010120	3	236	2201012121	3
37	1100020121	1	87	0012210001	2	137	2001212002	2	187	0220110010	3	237	2202200101	3
38	1101211101	1	88	0020010221	2	138	2002100012	2	188	0221001020	3	238	2210000021	3
39	1102102111	1	89	0021201201	2	139	2010200202	2	189	0222222000	3	239	2211221001	3
40	1110202001	1	90	0022122211	2	140	2011121212	2	190	1000012011	3	240	2212112011	3
41	1111120011	1	91	0100011110	2	141	2012012222	2	191	1001200021	3	241	2220212201	3
42	1112011021	1	92	0101202120	2	142	2020112112	2	192	1002121001	3	242	2221100211	3
43	1120111211	1	93	0102120100	2	143	2021000122	2	193	1010221221	3	243	2222021221	3
44	1121002221	1	94	0110220020	2	144	2022221102	2	194	1011112201	3			
45	1122220201	1	95	0111111000	2	145	2100110001	2	195	1012000211	3			
46	1200112100	1	96	0112002010	2	146	2101001011	2	196	1020100101	3			
47	1201000110	1	97	0120102200	2	147	2102222021	2	197	1021021111	3			
48	1202221120	1	98	0121020210	2	148	2110022211	2	198	1022212121	3			
49	1210021010	1	99	0122211220	2	149	2111210221	2	199	1100101020	3			
50	1211212020	1	100	0200100122	2	150	2112101201	2	200	1101022000	3			

* WHERE 0, 1, OR 2 IN EACH CELL INDICATES LOW, MEDIUM, OR HIGH LEVEL; RESPECTIVELY.

TABLE 5-4. LIST OF ALL MAIN EFFECTS AND 2-FACTOR INTERACTIVE EFFECTS WHICH CAN BE ANALYZED IN THE MAJOR EXPERIMENT

NO.	EFFECT	NO.	EFFECT	NO.	EFFECT	NO.	EFFECT
1	GRAND MEAN	52	SIZE * LT-2 QL	103	CYCLE *TRUCK-1 LQ	154	VOL-1 * LT-2 LL
2	SIZE L	53	SIZE * LT-2 QQ	104	CYCLE *TRUCK-1 QL	155	VOL-1 * LT-2 LQ
3	SIZE Q	54	SIZE *TRUCK-2 LL	105	CYCLE *TRUCK-1 QQ	156	VOL-1 * LT-2 QL
4	LT-LANE L	55	SIZE *TRUCK-2 LQ	106	CYCLE * VOL-2 LL	157	VOL-1 * LT-2 QQ
5	LT-LANE Q	56	SIZE *TRUCK-2 QL	107	CYCLE * VOL-2 LQ	158	VOL-1 *TRUCK-2 LL
6	CYCLE L	57	SIZE *TRUCK-2 QQ	108	CYCLE * VOL-2 QL	159	VOL-1 *TRUCK-2 LQ
7	CYCLE Q	58	LT-LANE* CYCLE LL	109	CYCLE * VOL-2 QQ	160	VOL-1 *TRUCK-2 QL
8	SPLIT L	59	LT-LANE* CYCLE LQ	110	CYCLE * LT-2 LL	161	VOL-1 *TRUCK-2 QQ
9	SPLIT Q	60	LT-LANE* CYCLE QL	111	CYCLE * LT-2 LQ	162	LT-1 *TRUCK-1 LL
10	VOL-1 L	61	LT-LANE* CYCLE QQ	112	CYCLE * LT-2 QL	163	LT-1 *TRUCK-1 LQ
11	VOL-1 Q	62	LT-LANE* SPLIT LL	113	CYCLE * LT-2 QQ	164	LT-1 *TRUCK-1 QL
12	LT-1 L	63	LT-LANE* SPLIT LQ	114	CYCLE *TRUCK-2 LL	165	LT-1 *TRUCK-1 QQ
13	LT-1 Q	64	LT-LANE* SPLIT QL	115	CYCLE *TRUCK-2 LQ	166	LT-1 * VOL-2 LL
14	TRUCK-1 L	65	LT-LANE* SPLIT QQ	116	CYCLE *TRUCK-2 QL	167	LT-1 * VOL-2 LQ
15	TRUCK-1 Q	66	LT-LANE* VOL-1 LL	117	CYCLE *TRUCK-2 QQ	168	LT-1 * VOL-2 QL
16	VOL-2 L	67	LT-LANE* VOL-1 LQ	118	SPLIT * VOL-1 LL	169	LT-1 * VOL-2 QQ
17	VOL-2 Q	68	LT-LANE* VOL-1 QL	119	SPLIT * VOL-1 LQ	170	LT-1 * LT-2 LL
18	LT-2 L	69	LT-LANE* VOL-1 QQ	120	SPLIT * VOL-1 QL	171	LT-1 * LT-2 LQ
19	LT-2 Q	70	LT-LANE* LT-1 LL	121	SPLIT * VOL-1 QQ	172	LT-1 * LT-2 QL
20	TRUCK-2 L	71	LT-LANE* LT-1 LQ	122	SPLIT * LT-1 LL	173	LT-1 * LT-2 QQ
21	TRUCK-2 Q	72	LT-LANE* LT-1 QL	123	SPLIT * LT-1 LQ	174	LT-1 *TRUCK-2 LL
22	SIZE *LT-LANE LL	73	LT-LANE* LT-1 QQ	124	SPLIT * LT-1 QL	175	LT-1 *TRUCK-2 LQ
23	SIZE *LT-LANE LQ	74	LT-LANE*TRUCK-1 LL	125	SPLIT * LT-1 QQ	176	LT-1 *TRUCK-2 QL
24	SIZE *LT-LANE QL	75	LT-LANE*TRUCK-1 LQ	126	SPLIT *TRUCK-1 LL	177	LT-1 *TRUCK-2 QQ
25	SIZE *LT-LANE QQ	76	LT-LANE*TRUCK-1 QL	127	SPLIT *TRUCK-1 LQ	178	TRUCK-1* VOL-2 LL
26	SIZE * CYCLE LL	77	LT-LANE*TRUCK-1 QQ	128	SPLIT *TRUCK-1 QL	179	TRUCK-1* VOL-2 LQ
27	SIZE * CYCLE LQ	78	LT-LANE* VOL-2 LL	129	SPLIT *TRUCK-1 QQ	180	TRUCK-1* VOL-2 QL
28	SIZE * CYCLE QL	79	LT-LANE* VOL-2 LQ	130	SPLIT * VOL-2 LL	181	TRUCK-1* VOL-2 QQ
29	SIZE * CYCLE QQ	80	LT-LANE* VOL-2 QL	131	SPLIT * VOL-2 LQ	182	TRUCK-1* LT-2 LL
30	SIZE * SPLIT LL	81	LT-LANE* VOL-2 QQ	132	SPLIT * VOL-2 QL	183	TRUCK-1* LT-2 LQ
31	SIZE * SPLIT LQ	82	LT-LANE* LT-2 LL	133	SPLIT * VOL-2 QQ	184	TRUCK-1* LT-2 QL
32	SIZE * SPLIT QL	83	LT-LANE* LT-2 LQ	134	SPLIT * LT-2 LL	185	TRUCK-1* LT-2 QQ
33	SIZE * SPLIT QQ	84	LT-LANE* LT-2 QL	135	SPLIT * LT-2 LQ	186	TRUCK-1*TRUCK-2 LL
34	SIZE * VOL-1 LL	85	LT-LANE* LT-2 QQ	136	SPLIT * LT-2 QL	187	TRUCK-1*TRUCK-2 LQ
35	SIZE * VOL-1 LQ	86	LT-LANE*TRUCK-2 LL	137	SPLIT * LT-2 QQ	188	TRUCK-1*TRUCK-2 QL
36	SIZE * VOL-1 QL	87	LT-LANE*TRUCK-2 LQ	138	SPLIT *TRUCK-2 LL	189	TRUCK-1*TRUCK-2 QQ
37	SIZE * VOL-1 QQ	88	LT-LANE*TRUCK-2 QL	139	SPLIT *TRUCK-2 LQ	190	VOL-2 * LT-2 LL
38	SIZE * LT-1 LL	89	LT-LANE*TRUCK-2 QQ	140	SPLIT *TRUCK-2 QL	191	VOL-2 * LT-2 LQ
39	SIZE * LT-1 LQ	90	CYCLE * SPLIT LL	141	SPLIT *TRUCK-2 QQ	192	VOL-2 * LT-2 QL
40	SIZE * LT-1 QL	91	CYCLE * SPLIT LQ	142	VOL-1 * LT-1 LL	193	VOL-2 * LT-2 QQ
41	SIZE * LT-1 QQ	92	CYCLE * SPLIT QL	143	VOL-1 * LT-1 LQ	194	VOL-2 *TRUCK-2 LL
42	SIZE *TRUCK-1 LL	93	CYCLE * SPLIT QQ	144	VOL-1 * LT-1 QL	195	VOL-2 *TRUCK-2 LQ
43	SIZE *TRUCK-1 LQ	94	CYCLE * VOL-1 LL	145	VOL-1 * LT-1 QQ	196	VOL-2 *TRUCK-2 QL
44	SIZE *TRUCK-1 QL	95	CYCLE * VOL-1 LQ	146	VOL-1 *TRUCK-1 LL	197	VOL-2 *TRUCK-2 QQ
45	SIZE *TRUCK-1 QQ	96	CYCLE * VOL-1 QL	147	VOL-1 *TRUCK-1 LQ	198	LT-2 *TRUCK-2 LL
46	SIZE * VOL-2 LL	97	CYCLE * VOL-1 QQ	148	VOL-1 *TRUCK-1 QL	199	LT-2 *TRUCK-2 LQ
47	SIZE * VOL-2 LQ	98	CYCLE * LT-1 LL	149	VOL-1 *TRUCK-1 QQ	200	LT-2 *TRUCK-2 QL
48	SIZE * VOL-2 QL	99	CYCLE * LT-1 LQ	150	VOL-1 * VOL-2 LL	201	LT-2 *TRUCK-2 QQ
49	SIZE * VOL-2 QQ	100	CYCLE * LT-1 QL	151	VOL-1 * VOL-2 LQ	202	BLOCK EFFECT L
50	SIZE * LT-2 LL	101	CYCLE * LT-1 QQ	152	VOL-1 * VOL-2 QL	203	BLOCK EFFECT Q
51	SIZE * LT-2 LQ	102	CYCLE *TRUCK-1 LL	153	VOL-1 * VOL-2 QQ		

TABLE 5-5. LIST OF THE FIFTY-EIGHT RESPONSES WHICH WERE OBSERVED IN THE MAJOR EXPERIMENT

NO.	GEOMETRIC CONFIGURATION OBSERVED	RESPONSE	UNITS
1	TOTAL	AVERAGE TOTAL DELAY ON THE INTERSECTION SYSTEM	SECONDS/VEHICLE
2	INTERSECTION	AVERAGE STOP DELAY ON THE INTERSECTION SYSTEM	SECONDS/VEHICLE
3	SYSTEM	TOTAL CO EMISSION ON THE INTERSECTION SYSTEM	KILOGRAMS/15 MINUTES
4		TOTAL HC EMISSION ON THE INTERSECTION SYSTEM	GRAMS/15 MINUTES
5		TOTAL NOX EMISSION ON THE INTERSECTION SYSTEM	GRAMS/15 MINUTES
6		TOTAL FUEL FLOW ON THE INTERSECTION SYSTEM	KILOGRAMS/15 MINUTES
7	INBOUND OR	AVERAGE TOTAL DELAY OF ALL DIRECTIONAL MOVEMENTS	SECONDS/VEHICLE
8	OUTBOUND	AVERAGE TOTAL DELAY OF LEFT TURNS	SECONDS/VEHICLE
9	APPROACH ON	AVERAGE TOTAL DELAY OF RIGHT TURNS	SECONDS/VEHICLE
10	MINOR STREET	AVERAGE TOTAL DELAY OF STRAIGHT MOVEMENTS	SECONDS/VEHICLE
11		AVERAGE STOP DELAY OF ALL DIRECTIONAL MOVEMENTS	SECONDS/VEHICLE
12		AVERAGE STOP DELAY OF LEFT TURNS	SECONDS/VEHICLE
13		AVERAGE STOP DELAY OF RIGHT TURNS	SECONDS/VEHICLE
14		AVERAGE STOP DELAY OF STRAIGHT MOVEMENTS	SECONDS/VEHICLE
15		AVERAGE QUEUE LENGTH ON APPROACH EXCLUDING THE L-T LANE	NUMBER OF VEHICLES
16		AVERAGE QUEUE LENGTH ON THE LEFT-TURN LANE	NUMBER OF VEHICLES
17		MAXIMUM QUEUE LENGTH ON APPROACH EXCLUDING THE L-T LANE	NUMBER OF VEHICLES
18		MAXIMUM QUEUE LENGTH ON THE LEFT-TURN LANE	NUMBER OF VEHICLES
19		TOTAL CO EMISSION ON INBOUND APPROACH	KILOGRAMS/15 MINUTES
20		TOTAL HC EMISSION ON INBOUND APPROACH	GRAMS/15 MINUTES
21		TOTAL NOX EMISSION ON INBOUND APPROACH	GRAMS/15 MINUTES
22		TOTAL FUEL FLOW ON INBOUND APPROACH	KILOGRAMS/15 MINUTES
23		TOTAL CO EMISSION ON OUTBOUND APPROACH	KILOGRAMS/15 MINUTES
24		TOTAL HC EMISSION ON OUTBOUND APPROACH	GRAMS/15 MINUTES
25		TOTAL NOX EMISSION ON OUTBOUND APPROACH	GRAMS/15 MINUTES
26		TOTAL FUEL FLOW ON OUTBOUND APPROACH	KILOGRAMS/15 MINUTES
27-46	MAJOR STREET	REPEAT 7-26 FOR THE INBOUND OR OUTBOUND APPROACH	
47	INTERSECTION	TOTAL CO EMISSION ON THE INTERSECTION PROPER AREA	KILOGRAMS/15 MINUTES
48	PROPER	TOTAL HC EMISSION ON THE INTERSECTION PROPER AREA	GRAMS/15 MINUTES
49		TOTAL NOX EMISSION ON THE INTERSECTION PROPER AREA	GRAMS/15 MINUTES
50		TOTAL FUEL FLOW ON THE INTERSECTION PROPER AREA	KILOGRAMS/15 MINUTES
51	FIRST BUCKET	TOTAL CO EMISSION ON THE BUCKET NEAREST THE INTERSECTION	KILOGRAMS/15 MINUTES
52	OF INBOUND	TOTAL HC EMISSION ON THE BUCKET NEAREST THE INTERSECTION	GRAMS/15 MINUTES
53	APPROACH ON	TOTAL NOX EMISSION ON THE BUCKET NEAREST THE INTERSECTION	GRAMS/15 MINUTES
54	MINOR STREET	TOTAL FUEL FLOW ON THE BUCKET NEAREST THE INTERSECTION	KILOGRAMS/15 MINUTES
55-58	MAJOR STREET	REPEAT 51-54 FOR THE FIRST BUCKET OF INBOUND APPROACH	

incurred by each vehicle, and the accumulated amounts of Carbon Monoxide (CO), Hydrocarbons (HC), Oxides of Nitrogen (NOx), and Fuel Flow (FF) produced by all vehicles simulated in a fifteen-minute period.

The forty approach statistics include twenty different responses each for the major street and for the minor street. The twenty responses include eight average delays, four average queue lengths, and eight accumulated emissions or fuel flows. Delays include total delay and stop delay for left turn, right turn, and straight movements, and the average for all vehicles processed on the approach. Queue lengths include queue length in the separate left-turn lane only and queue length on the other inbound lanes expressed as the average queue length for all these lanes. For analysis delays to left turners when there are no left turns are automatically set to zero. Similarly queue lengths in left-turn lanes are set to zero when no such lane exists. These computational techniques produce results which allow the effects of left turns and a separate left-turn lane to be evaluated. The accumulated emissions and fuel flows include CO, HC, NOx, and FF on inbound and outbound legs.

The bucket statistics reported herein include only the accumulated emissions and fuel consumption in the intersection proper and in the bucket nearest the intersection. The intersection proper has the highest potential for being a pollution hot spot because all the vehicles from both streets contribute emissions and fuel consumption in this area. The bucket nearest the intersection has been selected because it has a greater potential for accumulating more pollution than other upstream buckets. This tendency can be seen from the emission profiles produced from the example run shown in Table 5-6. This table shows that emissions and fuel consumption drop very significantly between Buckets 1 and 2 and then level off. The general

TABLE 5-6. EXAMPLE SHOWING EMISSIONS AND FUEL FLOW AND THEIR SPATIAL DISTRIBUTION INTO 100-FT BUCKETS [RUN OF THE FIRST CELL (0000000000) OF INTERSECTION 4*4]

EMISSION AND FUEL FLOW PROFILES ALONG BUCKETS
ON ONE INBOUND APPROACH (GRAMS/15 MINUTES)

	BUCKET 1	BUCKET 2	BUCKET 3	BUCKET 4	BUCKET 5	BUCKET 6	BUCKET 7	BUCKET 8
CO LEFT LANE	113.346	23.831	11.598	8.861	10.406	10.081	7.742	6.218
CO RIGHT LANE	124.949	17.093	10.935	6.720	6.674	6.902	6.277	7.764
CO AVERAGE	119.148	20.462	11.266	7.791	8.540	8.491	7.010	6.991
HC LEFT LANE	4.005	1.017	.616	.573	.636	.620	.535	.482
HC RIGHT LANE	4.329	.839	.627	.460	.451	.462	.433	.569
HC AVERAGE	4.167	.928	.621	.516	.544	.541	.484	.526
NOX LEFT LANE	10.261	3.142	2.290	2.442	2.839	2.696	2.206	2.112
NOX RIGHT LANE	9.568	2.336	2.354	1.845	1.991	2.086	1.955	2.536
NOX AVERAGE	9.914	2.739	2.322	2.144	2.415	2.391	2.080	2.324
FF LEFT LANE	517.083	183.478	158.573	162.868	176.487	171.856	155.698	154.527
FF RIGHT LANE	541.615	159.094	151.487	132.395	134.324	138.000	132.709	178.959
FF AVERAGE	529.349	171.286	155.030	147.632	155.406	154.928	144.204	166.743

TOTAL EMISSIONS AND FUEL FLOW ON APPROACHES, INTERSECTION
PROPER, AND INTERSECTION SYSTEM (GRAMS/15 MINUTES)

	CO	HC	NOX	FF
TWO OBSERVATIONS ON INBOUND APPROACH OF MINOR STREET	499.912 541.369	21.470 23.507	73.938 76.756	4040.572 4355.782
TWO OBSERVATIONS ON INBOUND APPROACH OF MAJOR STREET	518.332 567.777	22.756 24.768	57.630 61.297	4004.188 4251.151
TWO OBSERVATIONS ON OUTBOUND LANES OF MINOR STREET	228.405 217.294	12.003 11.360	57.313 54.087	3082.210 2896.542
TWO OBSERVATIONS ON OUTBOUND LANES OF MAJOR STREET	234.936 228.604	14.289 13.920	22.998 22.352	2738.117 2667.452
INTERSECTION PROPER	411.599	16.969	66.232	2724.292
INTERSECTION SYSTEM	3036.629	144.073	426.373	28036.014

pattern of emissions and fuel consumption on approaches, in the intersection proper, and for the total intersection system can be seen in this table, also. Emissions or fuel flow at any specific intersection location can be analyzed by running the TEXAS-II Model with the bucket statistics feature activated. The units of the responses listed in Table 5-5 are kilograms per fifteen minutes for CO emissions and fuel consumption statistics, and grams per fifteen minutes for emissions of HC and NOx.

APPLICATION OF ANALYSIS OF VARIANCE

Implementation of the fractional factorial experiment involved running the TEXAS-II Model for each of the 243 selected cells in order to obtain the 58 desired responses at each selected intersection environment. The technique of analysis of variance was used to evaluate the 243 observations of each response and to identify the factors and their first-order interactions which effected these responses. The mean value at each level of each factor, or each two-factor combination, was used to estimate the contribution of each main effect or interaction to each response. The factors and their interactions which contributed significantly toward explaining the response were formulated into a predictive model for each of the 58 responses. Each model should estimate the expected response value for any situation which was included within the experimental range, no matter whether the particular numerical value was used in the experiment or not.

In order to establish a conceptual basis for evaluating the possible contributions which can be made by each of the ten factors and their interactions, certain practical relationships among the factors must be understood. Some of these are listed below.

(1) For the same volume of traffic in each lane, traffic on a three-lane intersection approach should experience less average delay per vehicle than traffic on a two-lane approach as more flexibility in lane selection is available to the drivers. More total emissions and fuel consumption are expected on the larger number of lanes, however.

(2) The presence of a special left-turn lane is expected to reduce the average delay incurred by left-turning vehicles and to reduce the interference to through and right-turning traffic on the intersection approach.

(3) Optimal cycle times and green splits which minimize delay to the vehicles traversing the intersection can be determined by existing techniques.

(4) At intersections controlled by two-phase pretimed signals, little if any interaction is expected among traffic volume, percent trucks, and left-turning traffic on the two streets as a definite right-of-way is alternatively assigned to traffic on each street. Possible sources of interaction include (a) all vehicles not clearing the interaction on the assigned green indication, and (b) traffic turning right on the red signal indication.

The results of ANOVA for the fifty-eight responses indicated that the effect values of six factors are consistent with the generally accepted ideas while the other four factors display counterintuitive effect estimates. The six consistent factors are intersection size, special left-turn lane, left turns and truck percentage on the major street, and left turns and truck percentage on the minor street. The four counterintuitive effects are volume on the major street, volume on the minor street, cycle time, and green split. The paradoxical results might be caused by the relationship between signal timing and volumes on the two streets. An example is presented hereafter to examine this phenomenon.

The response of average total delay on the minor street was selected for demonstration because delay is better understood than the emissions and fuel flow responses. Especially, the influence of signal timing on vehicle delay is well known. Also an inbound approach statistic can probably demonstrate better the influence of signal performance than an overall intersection statistic. The twenty main effects of the ten factors of this response are listed as follows.

	Linear Trend	Quadratic Trend
Intersection Size	-2.00	-0.43
Special Left-Turn Lane	-2.44	-0.79
Cycle Time	1.68	0.38
Green Split (Percent of cycle to Major Street)	7.88	1.02
Volume 1	8.70	1.02
Left Turn 1	-0.20	-0.01
Truck Percentage 1	-0.02	-0.02
Volume 2	2.65	-0.05
Left Turn 2	4.11	0.35
Truck Percentage 2	1.34	0.00

The factors of intersection size and the presence of a special left-turn lane display acceptable values by reducing the delay reasonably. The factors related to left turns and truck percentage on the major street indicate nearly no effects on the vehicle performance on the minor street, while the corresponding factors on the minor street have strong effects on the delay observed on the minor street. These effect estimates are consistent with generally accepted ideas.

The effect values of Volume 1, Volume 2, cycle time, and green split seem to be paradoxical because the computed values do not match the generally accepted ideas. The linear effect value 8.7 seconds/level of Volume 1 seems to be too high. Traffic volume on the cross street, such as left turns and truck percentage on the cross street, should have no effect, or only a little effect. The reason for the high effect value of Volume 1 may be due to the fact that signal timing is connected to the volume combinations of the two streets. The higher traffic volume on the cross street requires a higher green time for itself and therefore gives a higher red time for the street being studied; this in turn increases the delay incurred on the latter street. For this example response, the increase of traffic volume on the major street requires more red time on the minor street and causes the delay to be increased on the minor street. By the same token the effect of Volume 2 appears to be underestimated. The higher traffic volume on the street concerned, i.e., Volume 2 in this example, requires the higher green time for itself; and the increased actual green time corresponding to a fixed nominal level for the cycle time factor and green split factor may substantially alter the Volume 2 effect estimate. Therefore, red time connected to the traffic volume on the cross street and green time connected to the traffic volume on the street concerned are the major reasons for the unappealing values for Volume 1 and Volume 2. The actual values of green time and red time determined by the selected levels of cycle time and green split at various volume combinations in this experiment are listed in Table 5-7. The interval of red time is increased by the level of traffic volume on the cross street and the interval of green time is increased by the level of traffic volume on the street where vehicle delay is concerned.

Green split is another factor displaying effect estimates which seem to be counterintuitive. The linear trend, 7.88 seconds/level, indicates that the favorable split of green time to the minor street achieved by giving an extra five percent of cycle time more than it should be assigned for the optimal split will reduce the delay of each vehicle on the minor street by 7.88 seconds. But five percent of the average 70 seconds cycle time in this experiment is only 3.5 seconds; this is much shorter than the presented effect value of green split. So the linear effect of green split must have been exaggerated due to some reason. On the contrary, the quadratic effect

TABLE 5-7. SECONDS OF GREEN TIME (PLUS YELLOW) AND RED TIME ON MAJOR STREET AND ON MINOR STREET USED FOR EXPERIMENT DESIGN

Green Time on the Major Street (sec)
(Red Time on the Minor Street) (sec)

Minor Street Volume	Major Street Volume		300			450				600			
	G/C Major Street		0.45	0.5	0.55		0.5	0.55	0.6		0.55	0.6	0.65
300	Cycle Length (sec)	50	22.5	25	27.5	50	25	27.5	30	60	33	36	39
		60	27	30	33	60	30	33	36	70	38.5	42	45.5
		70	31.5	35	38.5	70	35	38.5	42	80	44	48	52
450	G/C Major Street		0.4	0.45	0.5		0.45	0.5	0.55		0.5	0.55	0.6
	Cycle Length (sec)	50	20	22.5	25	60	27	30	33	70	35	38.5	42
		60	24	27	30	70	31.5	35	38.5	80	40	44	48
		70	28	31.5	35	80	36	40	44	90	45	49.5	54
600	G/C Major Street		0.35	0.4	0.45		0.4	0.45	0.5		0.45	0.5	0.55
	Cycle Length (sec)	60	21	24	27	70	28	31.5	35	70	31.5	35	38.5
		70	24.5	28	31.5	80	32	36	40	80	36	40	44
		80	28	32	36	90	36	40.5	45	90	40.5	45	49.5

TABLE 5-7. (CONTINUED)

Red Time on the Major Street (sec)
(Green Time on the Minor Street) (sec)

Major Street Volume			300			450				600			
Minor Street Volume	G/C Major Street		0.45	0.5	0.55		0.5	0.55	0.6		0.55	0.6	0.65
300	Cycle Length (sec)	50	27.5	25	22.5	50	25	22.5	20	60	27	24	21
		60	33	30	27	60	30	27	24	70	31.5	28	24.5
		70	38.5	35	31.5	70	35	31.5	28	80	36	32	28
450	G/C Major Street		0.4	0.45	0.5		0.45	0.5	0.55		0.5	0.55	0.6
	Cycle Length (sec)	50	30	27.5	25	60	33	30	27	70	35	31.5	28
		60	36	33	30	70	38.5	35	31.5	80	40	36	32
		70	42	38.5	25	80	44	40	36	90	45	40.5	36
600	G/C Major Street		0.35	0.4	0.45		0.4	0.45	0.5		0.45	0.5	0.55
	Cycle Length (sec)	60	39	36	33	70	42	38.5	35	70	38.5	35	31.5
		70	45.5	42	38.5	80	48	44	40	80	44	40	36
		80	52	48	44	90	54	49.5	45	90	49.5	45	40.5

value indicates the optimal split, i.e., the selected median level, can reduce the average delay for all the vehicles traversing the intersection. The strong and positive quadratic effect means the unfavorable split causes much more delay than the favorable split can save. The effect of cycle time, presented in this experiment, is not a powerful factor to control the delay as expected. Its possible underestimation may be due to the fact that the influence of the cycle time constituents, red time and green time, have been presented and taken by Volume 1 and Volume 2. The quadratic effect is a negative value and may indicate the selected medium level is not the optimal value.

All the fifty-eight responses indicate the four factors of Volume 1, Volume 2, cycle time, and green split are presented with the unappealing values. The responses observed on an approach basis indicate that the effects of the traffic volume on the cross street and green split are magnified while the effects of the traffic volume on the street concerned and cycle time are contracted. The intersection responses indicate that the effect values of both volumes are all magnified because the effect of red time is greater than the effect of green time. The effect values of cycle time and green split of the intersection responses are reduced. Therefore, if the effects of green time and red time can be separated out from the effects of the two volumes, the unappealing effect values may be changed to be acceptable. Because green time and red time are the product of cycle time and green split, green time and red time have a linear-dependent relationship with cycle time and green split in the mathematical sense. Once the independent variables are found linearly dependent, there are infinitely many solutions for the independent variable to explain the dependent variable. The linear-dependent relationship implies that if the new variables of green time and red time are added into the original 200 possible effects to be regressed with the observations of dependent variables in the 243 cells, the (X'X) matrix cannot be inverted. This means that using the one-stage regression technique to solve the effect values and to change the unappealing values into acceptable ones is impossible.

Then a two-stage regression technique was tried. In the first stage, the linear term and quadratic term of green time and red time were regressed with the dependent variable Y, e.g., delay response, to examine the effects of green time and red time on Y. In order to maintain the grand mean μ, or say the intercept of the regression line the same as in the original ANOVA, the actual values of green time and red time used for regression were adjusted by the average green time and red time in this experiment, 35 seconds each. The first-stage regression produced an equation to predict the response S, which is part of Y, caused by the green time and red time deviated from the signal timing. For the same example of average delay on the minor street,

$$S = 22.65 - 0.18GT + 1.09RT - 0.009GT2 + 0.025RT2$$

$$R^2 = 0.39$$

where

$$GT = \text{green time} - 35,$$
$$RT = \text{red time} - 35,$$
$$GT2 = GT^2 - 58.39, \text{ and}$$
$$RT2 = RT^2 - 58.39.$$

The linear trend is found to be more pronounced than the quadratic trend, and this phenomenon is probably related to the fact previously discussed that most of the unappealing effect values are shown for the linear trend. The coefficients of this equation indicate green time can reduce delay and red time can increase delay, but the effect of red time is much stronger than the effect of green time.

The second-stage regression was processed by regressing the adjusted response z ($z = Y - s + \mu$) on the 200 possible effects. The adjusted response z is the response Y observed with the designated cycle time and green split at each cell transformed to the situation with 70 seconds of cycle time and equal green split. The transformation only counts the main effects of green time and red time and does not count the interactive effects of green time and red time with the other factors. Even so, the effect values solved with the adjusted response z appeared to be appealing for those four factors with connected relationships.

In the example of average total delay on the minor street, the linear trend was shifted from 8.70 to 1.01 and the quadratic trend was reduced from 1.02 to 0.34. Because the effect of red time was separated, the effect of Volume 1 was dropped to the level generally accepted. Similarly, the effect of green time which could reduce delay was removed in the first stage of regression and helped the linear trend of Volume 2 which was increased from 2.65 to 4.17 and the quadratic trend was increased from -0.05 to 0.50. The influence of traffic volume on delay is increasing and should be positive for the quadratic trend to indicate that the difference between high and medium levels is higher than the difference between medium and low levels on the influence of delay. The linear trend of cycle time was changed from the positive value of 1.68 to the negative value of -3.00. Because the effects of green time and red time had been removed in the first stage of regression, the remaining effect of cycle time merely indicates that the longer cycle time could cause drivers to stop less frequently and therefore save time. The quadratic trend was changed from -0.38 to -0.52 and indicates again the selected medium level was probably not the optimal level. The linear trend of green split was reduced from 7.88 to 3.22 seconds. Compared with the expected value of delay, the modified linear trend of green split is an acceptable value. The quadratic trend was changed a little bit but still could indicate the selected medium level is not the optimal value. The interactive terms of the four connected factors were also modified following the changes in the main effects. The main effects and the interactive effects of the four connected factors before and after the modification were listed in Table 5-8.

The other six factors which had been presented with the acceptable values were not changed in the second-stage regression. The interactive terms between the six factors and the previous four factors were changed very little or not at all. The total sum of squares of the error term was not changed. Therefore, the precision of the experiment and the predictability of the model built from this experiment were not changed. In a mathematical sense, this linear-dependent two-stage regression is neither better nor worse for the prediction purpose. But the factors with unappealing effect values due to the previously explained factor relationships were modified to be acceptable.

The 200 possible effects of the factors of geometry, control, and traffic, excluding the grand mean and the two block effects for the example of total delay on the minor street, as solved by the two-stage regression are listed in Table 5-9. This table presents the overall format of effect solutions. The amount of variance reduction influence by the block effects are negligibly low.

TABLE 5-8. ADJUSTMENTS TO EFFECTS BY TWO-STAGE REGRESSION WITH LINEAR-DEPENDENT VARIABLES FOR THE EXAMPLE STUDY

RESPONSE: AVERAGE TOTAL DELAY ON THE MINOR STREET

EFFECT		VALUE		SUM OF SQUARES		F STATISTIC	
		BEFORE	AFTER	BEFORE	AFTER	BEFORE	AFTER
CYCLE	L	1.68	-3.00	920.4	2920.1	33.6	106.7
CYCLE	Q	-.38	-.52	144.5	261.5	5.3	9.6
SPLIT	L	7.88	3.22	20238.7	3358.6	739.7	122.7
SPLIT	Q	1.02	.95	1016.7	883.7	37.2	32.3
VOL-1	L	8.70	1.01	24675.4	328.0	901.9	12.0
VOL-1	Q	1.02	.34	1009.3	113.8	36.9	4.2
VOL-2	L	2.65	4.17	2293.0	5623.8	83.8	205.5
VOL-2	Q	-.05	.50	2.2	239.6	.1	8.8
CYCLE * SPLIT	LL	1.01	-.82	222.4	143.7	8.1	5.3
CYCLE * SPLIT	LQ	.56	.54	201.9	187.7	7.4	6.9
CYCLE * SPLIT	QL	-.41	-.46	108.3	139.9	4.0	5.1
CYCLE * SPLIT	QQ	-.05	-.05	5.7	5.9	.2	.2
CYCLE * VOL-1	LL	.59	-1.77	74.4	680.0	2.7	24.9
CYCLE * VOL-1	LQ	.07	-.06	3.0	2.5	.1	.1
CYCLE * VOL-1	QL	-.54	-.60	189.3	230.0	6.9	8.4
CYCLE * VOL-1	QQ	-.11	-.11	22.2	22.3	.8	.8
CYCLE * VOL-2	LL	-.20	1.09	8.8	259.0	.3	9.5
CYCLE * VOL-2	LQ	-.40	-.30	102.3	58.7	3.7	2.1
CYCLE * VOL-2	QL	-.04	.02	.8	.2	.0	0
CYCLE * VOL-2	QQ	.24	.24	114.6	113.7	4.2	4.2
SPLIT * VOL-1	LL	5.07	3.46	5586.4	2583.2	204.2	94.4
SPLIT * VOL-1	LQ	.83	.79	448.4	407.2	16.4	14.9
SPLIT * VOL-1	QL	.96	.95	600.3	582.0	21.9	21.3
SPLIT * VOL-1	QQ	.30	.30	172.6	171.8	6.3	6.3
SPLIT * VOL-2	LL	2.83	2.01	1745.0	872.7	63.8	31.9
SPLIT * VOL-2	LQ	.03	.07	.8	3.3	.0	.1
SPLIT * VOL-2	QL	.84	.83	461.8	445.7	16.9	16.3
SPLIT * VOL-2	QQ	.05	.05	5.2	5.3	.2	.2
VOL-1 * VOL-2	LL	2.34	2.53	1190.4	1387.3	43.5	50.7
VOL-1 * VOL-2	LQ	-.37	.47	88.6	146.0	3.2	5.3
VOL-1 * VOL-2	QL	.13	.86	11.8	483.3	.4	17.7
VOL-1 * VOL-2	QQ	-.19	-.12	69.2	28.6	2.5	1.0

TABLE 5-9. EFFECTS ON THE RESPONSE OF AVERAGE TOTAL DELAY ON THE MINOR STREET SOLVED BY TWO-STAGE REGRESSION WITH LINEAR-DEPENDENT VARIABLES

NO.	EFFECT	VALUE	SUM SQUARES	F
2	SIZE L	-2.001	1297.52045	47.4
3	SIZE Q	-.433	182.53733	6.7
4	LT-LANE L	-2.444	1934.62107	70.7
5	LT-LANE Q	-.789	604.53821	22.1
6	CYCLE L	-3.002	2920.12627	106.7
7	CYCLE Q	-.519	261.47004	9.6
8	SPLIT L	3.220	3358.64530	122.7
9	SPLIT Q	.954	883.73353	32.3
10	VOL-1 L	1.006	327.96465	12.0
11	VOL-1 Q	.342	113.82573	4.2
12	LT-1 L	-.202	13.21726	.5
13	LT-1 Q	-.006	.03955	0
14	TRUCK-1 L	-.021	.14951	0
15	TRUCK-1 Q	-.016	.25294	0
16	VOL-2 L	4.166	5623.82203	205.5
17	VOL-2 Q	.497	239.63854	8.8
18	LT-2 L	4.112	5478.63143	200.2
19	LT-2 Q	.349	118.67832	4.3
20	TRUCK-2 L	1.339	580.48871	21.2
21	TRUCK-2 Q	.003	.00951	0
22	SIZE *LT-LANE LL	1.183	302.36534	11.1
23	SIZE *LT-LANE LQ	.194	24.37571	.9
24	SIZE *LT-LANE QL	.294	55.96820	2.0
25	SIZE *LT-LANE QQ	.026	1.35269	0
26	SIZE * CYCLE LL	-.452	44.10074	1.6
27	SIZE * CYCLE LQ	.067	2.94975	.1
28	SIZE * CYCLE QL	-.363	85.19476	3.1
29	SIZE * CYCLE QQ	.379	278.92287	10.2
30	SIZE * SPLIT LL	-1.537	510.48076	18.7
31	SIZE * SPLIT LQ	-.063	2.58655	.1
32	SIZE * SPLIT QL	-.580	217.87122	8.0
33	SIZE * SPLIT QQ	-.194	73.46112	2.7
34	SIZE * VOL-1 LL	-1.476	470.40712	17.2
35	SIZE * VOL-1 LQ	-.252	41.20302	1.5
36	SIZE * VOL-1 QL	-.443	126.93556	4.6
37	SIZE * VOL-1 QQ	-.080	12.45440	.5
38	SIZE * LT-1 LL	.018	.06756	0
39	SIZE * LT-1 LQ	.115	8.53763	.3
40	SIZE * LT-1 QL	.198	25.30766	.9
41	SIZE * LT-1 QQ	.074	10.73492	.4
42	SIZE *TRUCK-1 LL	.130	3.65669	.1
43	SIZE *TRUCK-1 LQ	.224	32.65888	1.2
44	SIZE *TRUCK-1 QL	-.187	22.76065	.8
45	SIZE. *TRUCK-1 QQ	-.270	141.21719	5.2
46	SIZE * VOL-2 LL	-1.328	381.12540	13.9
47	SIZE * VOL-2 LQ	.016	.16949	0
48	SIZE * VOL-2 QL	-.006	.02519	0
49	SIZE * VOL-2 QQ	.241	112.62815	4.1
50	SIZE * LT-2 LL	-2.025	885.66111	32.4
51	SIZE * LT-2 LQ	-.633	259.65776	9.5
52	SIZE * LT-2 QL	.221	31.74846	1.2
53	SIZE * LT-2 QQ	-.322	201.70164	7.4
54	SIZE *TRUCK-2 LL	-.233	11.73292	.4
55	SIZE *TRUCK-2 LQ	-.356	82.28665	3.0
56	SIZE *TRUCK-2 QL	-.615	244.84998	8.9
57	SIZE *TRUCK-2 QQ	-.008	.12177	0
58	LT-LANE* CYCLE LL	.088	1.67352	.1
59	LT-LANE* CYCLE LQ	-.807	422.26668	15.4
60	LT-LANE* CYCLE QL	-.753	367.53572	13.4
61	LT-LANE* CYCLE QQ	.030	1.79587	.1
62	LT-LANE* SPLIT LL	-1.921	796.93463	29.1
63	LT-LANE* SPLIT LQ	-.098	6.26962	.2
64	LT-LANE* SPLIT QL	-.812	427.59394	15.6
65	LT-LANE* SPLIT QQ	-.180	63.13306	2.3
66	LT-LANE* VOL-1 LL	-1.751	662.48059	24.2
67	LT-LANE* VOL-1 LQ	-.305	60.23781	2.2
68	LT-LANE* VOL-1 QL	-.246	39.28402	1.4
69	LT-LANE* VOL-1 QQ	.097	18.35941	.7
70	LT-LANE* LT-1 LL	.040	.35042	0
71	LT-LANE* LT-1 LQ	.025	.40201	0
72	LT-LANE* LT-1 QL	-.008	.04270	0
73	LT-LANE* LT-1 QQ	-.241	112.61852	4.1
74	LT-LANE*TRUCK-1 LL	.055	.65340	0
75	LT-LANE*TRUCK-1 LQ	-.100	6.45602	.2
76	LT-LANE*TRUCK-1 QL	.165	17.60222	.6
77	LT-LANE*TRUCK-1 QQ	.062	7.36795	.3
78	LT-LANE* VOL-2 LL	.222	10.67143	.4
79	LT-LANE* VOL-2 LQ	.534	184.45024	6.7
80	LT-LANE* VOL-2 QL	-.311	62.54719	2.3
81	LT-LANE* VOL-2 QQ	.183	65.05875	2.4
82	LT-LANE* LT-2 LL	-2.965	1898.90460	69.4
83	LT-LANE* LT-2 LQ	-.148	14.25780	.5
84	LT-LANE* LT-2 QL	-.964	602.35348	22.0
85	LT-LANE* LT-2 QQ	-.072	9.96168	.4
86	LT-LANE*TRUCK-2 LL	-.546	64.48482	2.4
87	LT-LANE*TRUCK-2 LQ	-.046	1.38334	.1
88	LT-LANE*TRUCK-2 QL	.035	.78125	0
89	LT-LANE*TRUCK-2 QQ	-.008	.13533	0
90	CYCLE * SPLIT LL	-.816	143.66990	5.3
91	CYCLE * SPLIT LQ	.538	187.66847	6.9
92	CYCLE * SPLIT QL	-.465	139.90940	5.1
93	CYCLE * SPLIT QQ	-.055	5.92385	.2
94	CYCLE * VOL-1 LL	-1.774	680.01386	24.9
95	CYCLE * VOL-1 LQ	-.063	2.54567	.1
96	CYCLE * VOL-1 QL	-.596	229.97991	8.4
97	CYCLE * VOL-1 QQ	-.107	22.31778	.8
98	CYCLE * LT-1 LL	-.960	198.91203	7.3
99	CYCLE * LT-1 LQ	-.618	247.30880	9.0
100	CYCLE * LT-1 QL	.141	12.82430	.5
101	CYCLE * LT-1 QQ	-.087	14.80336	.5
102	CYCLE *TRUCK-1 LL	.491	51.97927	1.9
103	CYCLE *TRUCK-1 LQ	-.147	14.08036	.5
104	CYCLE *TRUCK-1 QL	.273	48.15076	1.8
105	CYCLE *TRUCK-1 QQ	.181	63.69318	2.3
106	CYCLE * VOL-2 LL	1.095	259.00874	9.5
107	CYCLE * VOL-2 LQ	-.301	58.67735	2.1
108	CYCLE * VOL-2 QL	.019	.23500	0
109	CYCLE * VOL-2 QQ	.242	113.69335	4.2
110	CYCLE * LT-2 LL	.322	22.41378	.8
111	CYCLE * LT-2 LQ	-.089	5.08805	.2
112	CYCLE * LT-2 QL	.017	.18877	0
113	CYCLE * LT-2 QQ	-.004	.03243	0
114	CYCLE *TRUCK-2 LL	-.673	97.92960	3.6
115	CYCLE *TRUCK-2 LQ	.019	.22669	0
116	CYCLE *TRUCK-2 QL	-.663	284.64980	10.4
117	CYCLE *TRUCK-2 QQ	-.346	232.51758	8.5
118	SPLIT * VOL-1 LL	3.458	2583.21211	94.4
119	SPLIT * VOL-1 LQ	.793	407.15502	14.9
120	SPLIT * VOL-1 QL	.948	582.01778	21.3
121	SPLIT * VOL-1 QQ	.297	171.75878	6.3
122	SPLIT * LT-1 LL	-.039	.32822	0
123	SPLIT * LT-1 LQ	-.059	2.29218	.1
124	SPLIT * LT-1 QL	-.064	2.62714	.1
125	SPLIT * LT-1 QQ	-.012	.28505	0
126	SPLIT *TRUCK-1 LL	-.271	15.87627	.6
127	SPLIT *TRUCK-1 LQ	.239	37.11390	1.4
128	SPLIT *TRUCK-1 QL	-.016	.17209	0
129	SPLIT *TRUCK-1 QQ	.218	92.32040	3.4
130	SPLIT * VOL-2 LL	2.010	872.72410	31.9
131	SPLIT * VOL-2 LQ	.071	3.28959	.1
132	SPLIT * VOL-2 QL	.829	445.71587	16.3
133	SPLIT * VOL-2 QQ	.052	5.28699	.2
134	SPLIT * LT-2 LL	3.221	2240.73375	81.9
135	SPLIT * LT-2 LQ	.335	72.70840	2.7
136	SPLIT * LT-2 QL	.489	154.66496	5.7
137	SPLIT * LT-2 QQ	-.015	.42371	0
138	SPLIT *TRUCK-2 LL	.981	207.91707	7.6
139	SPLIT *TRUCK-2 LQ	.075	3.63301	.1
140	SPLIT *TRUCK-2 QL	.073	3.46722	.1
141	SPLIT *TRUCK-2 QQ	-.066	8.55488	.3
142	VOL-1 * LT-1 LL	-.412	36.72076	1.3
143	VOL-1 * LT-1 LQ	-.266	45.85627	1.7
144	VOL-1 * LT-1 QL	-.191	23.61372	.9
145	VOL-1 * LT-1 QQ	-.122	28.89840	1.1
146	VOL-1 *TRUCK-1 LL	-.318	21.87587	.8
147	VOL-1 *TRUCK-1 LQ	.239	37.00867	1.4
148	VOL-1 *TRUCK-1 QL	-.094	5.74605	.2
149	VOL-1 *TRUCK-1 QQ	.021	.87063	0
150	VOL-1 * VOL-2 LL	2.534	1387.31576	50.7
151	VOL-1 * VOL-2 LQ	.475	146.00329	5.3
152	VOL-1 * VOL-2 QL	.864	483.30673	17.7
153	VOL-1 * VOL-2 QQ	-.121	28.56485	1.0
154	VOL-1 * LT-2 LL	2.853	1758.22402	64.3
155	VOL-1 * LT-2 LQ	.328	69.73805	2.5
156	VOL-1 * LT-2 QL	.438	124.20631	4.5
157	VOL-1 * LT-2 QQ	.065	8.27331	.3
158	VOL-1 *TRUCK-2 LL	1.088	255.54076	9.3
159	VOL-1 *TRUCK-2 LQ	.193	24.15125	.9
160	VOL-1 *TRUCK-2 QL	.424	116.38294	4.3
161	VOL-1 *TRUCK-2 QQ	.068	8.99286	.3
162	LT-1 *TRUCK-1 LL	.465	46.68987	1.7
163	LT-1 *TRUCK-1 LQ	-.314	63.97533	2.3
164	LT-1 *TRUCK-1 QL	-.642	267.32822	9.8
165	LT-1 *TRUCK-1 QQ	.799	1241.80512	45.4
166	LT-1 * VOL-2 LL	.318	21.79956	.8
167	LT-1 * VOL-2 LQ	.722	337.85557	12.3
168	LT-1 * VOL-2 QL	-.238	36.81773	1.3
169	LT-1 * VOL-2 QQ	.106	21.78262	.8
170	LT-1 * LT-2 LL	-.460	45.63572	1.7
171	LT-1 * LT-2 LQ	-.250	40.54106	1.5
172	LT-1 * LT-2 QL	.077	3.82754	.1
173	LT-1 * LT-2 QQ	-.132	33.97901	1.2
174	LT-1 *TRUCK-2 LL	.125	3.39397	.1
175	LT-1 *TRUCK-2 LQ	-.113	8.20958	.3
176	LT-1 *TRUCK-2 QL	.299	57.92289	2.1
177	LT-1 *TRUCK-2 QQ	.021	.85744	0
178	TRUCK-1* VOL-2 LL	-.334	24.09342	.9
179	TRUCK-1* VOL-2 LQ	.199	25.60894	.9
180	TRUCK-1* VOL-2 QL	-.433	121.48941	4.4
181	TRUCK-1* VOL-2 QQ	-.093	16.84864	.6
182	TRUCK-1* LT-2 LL	.043	.39518	0
183	TRUCK-1* LT-2 LQ	.068	2.98668	.1
184	TRUCK-1* LT-2 QL	-.003	.00419	0
185	TRUCK-1* LT-2 QQ	-.128	31.94397	1.2
186	TRUCK-1*TRUCK-2 LL	-.765	126.41668	4.6
187	TRUCK-1*TRUCK-2 LQ	-.650	273.49402	10.0
188	TRUCK-1*TRUCK-2 QL	.199	25.72040	.9
189	TRUCK-1*TRUCK-2 QQ	-.144	40.33618	1.5
190	VOL-2 * LT-2 LL	.230	11.40801	.4
191	VOL-2 * LT-2 LQ	.164	17.41811	.6
192	VOL-2 * LT-2 QL	-.586	222.65189	8.1
193	VOL-2 * LT-2 QQ	-.052	5.19767	.2
194	VOL-2 *TRUCK-2 LL	.514	57.12392	2.1
195	VOL-2 *TRUCK-2 LQ	.379	93.23710	3.4
196	VOL-2 *TRUCK-2 QL	-.320	66.20169	2.4
197	VOL-2 *TRUCK-2 QQ	.115	25.77384	.9
198	LT-2 *TRUCK-2 LL	.794	136.15927	5.0
199	LT-2 *TRUCK-2 LQ	-.100	6.48126	.2
200	LT-2 *TRUCK-2 QL	.212	29.17049	1.1
201	LT-2 *TRUCK-2 QQ	.018	.61312	0

The process of a two-stage regression for this experiment and the results of each step are listed in Table 5-10. The total sum of squares of the 486 observations from two replications of 243 selected cells and the sum of squares after the correction of the grand mean indicate the amount of variation. The fact that the remaining sum of squares after the regression is the same as the sum of squares computed directly from the adjusted response indicate that the sum of squares of the error term is not changed. The capacity for explaining the variations in the example responses is indicated by the regression equation and the 200 possible effects classified by six significance intervals [(0.999, ∞), (0.99, 0.999), (0.95, 0.99), (0.90, 0.95), (0.75, 0.90), and (0, 0.75)] in the percentages of total variation. For the case of average total delay on the minor street, there are 34 effects out of the 200 which are significant at least at the 0.999 level and which explain 44 percent of the total variation. When the R^2 explained by regression is included, the total explained variability reaches 82 percent. Under these conditions, most of the predictability will come from these significant effects when a predictive model is built.

SIGNIFICANT EFFECTS AND THE PREDICTIVE MODELS

After the analysis of variance with the linear-dependent adjustments on the responses was used to solve all the possible effects of the selected ten factors on the observed fifty-eight responses, the components to formulate the predictive model for each response and the measures of predictability of each model were available for further analysis and evaluation. The components of each model include the grand mean, regression slopes for the variables of green time and red time, and the solved possible effects which have passed the significance test. The physical meaning of these components will be discussed one by one within each response and compared with each

TABLE 5-10. LIST OF ANCOVA RESULTS OF TWO-STAGE REGRESSION WITH LINEAR-DEPENDENT VARIABLES AND MEASURES OF PREDICTABILITY FOR THE EXAMPLE STUDY

RESPONSE: AVERAGE TOTAL DELAY ON THE MINOR STREET

MEAN AND VARIATIONS			
GRAND MEAN,U	22.65		
SS(U)	249328.9		
SS TOTAL	349611.5		
SSCBM(*1)	100282.6	(1.0000)	
FIRST-STAGE REGRESSION			
BO	22.6485		
B1(GT)	-.1762		
B2(RT)	1.0906		
B3(RT2)	.0250		
B4(GT2)	-.0092		
R2		(.3867)	
SSCBM*(1-R2)	61503.3		
SECOND-STAGE REGRESSION (ANOVA OF ADJUSTED DATA)			
SSADJ(*2)	61526.6		
SS[0.999,∞) & D.F.		(.4363)	34
SS[0.99,0.999) & D.F.		(.0492)	21
SS[0.95,0.99) & D.F.		(.0221)	17
SS[0.90,0.95) & D.F.		(.0060)	7
SS[0.75,0.90) & D.F.		(.0154)	29
SS[0.,0.75) & D.F.		(.0092)	92
VARIANCE REDUCED & D.F.		(.0006)	2
SUM OF SQUARES OF ERROR	7633.9	(.0760)	
DEGREES OF FREEDOM	279		
MEAN SQUARE OF ERROR	27.36		
MEASURES OF PREDICTABILITY			
R2+SS[0.999,∞)		[.8230]	
STANDARD ERROR/MEAN		.2309	

*1 : SUM OF SQUARES CORRECTED BY MEAN
*2 : TOTAL SUM OF SQUARES OF ALL ADJUSTED OBSERVATIONS

other between responses to explore the more fundamental mechanisms that these responses represent. The measures which might be used to evaluate the adequacy of the models include two items, (1) the variation ratio which is the ratio of the standard error over the grand mean, and (2) the percentage of the explained variation by the regression together with those effects which are significant at least at the 0.999 level.

The components of the grand mean and the regression slopes as well as the measures of the predictability from the model of each response are listed in Appendix B. Appendix B contains the results of the regression analysis and the analysis of variance of the adjusted data; its format is the same as that in Table 5-9 for the example response, in which the observed variation, the part explained by regression with green time and red time, that part explained by block effects, and that explained by the possible effects for the adjusted response at different significance levels are listed separately. Also, the values of the grand mean, regression slopes, and the mean square of error for each response are included. The F-test statistics of the solved possible effects for the fifty-eight responses which are used to indicate which effects are significant enough to be incorporated in the predictive models are listed in Appendix C. The various predictive models for the fifty-eight responses are listed in Appendix D. The significant effects for each response are also listed. The main effects of the selected ten factors on each response are listed in Table 5-11 for evaluation. The results listed in Appendices B, C, and D are summarized and discussed as follows.

Use of the Grand Mean

The grand mean in the analysis of variance is the average value of all experimental observations. Familiarity with its magnitude helps to understand the average situation. In this study, the values for selected

TABLE 5-11. LIST OF THE MAIN EFFECTS ON THE FIFTY-EIGHT RESPONSES (PER 15 MINUTES) SOLVED BY TWO-STAGE REGRESSION WITH LINEAR-DEPENDENT VARIABLES

MAIN EFFECT	RESPONSE OF MAJOR STREET	AVERAGE TOTAL DELAY				AVERAGE STOP DELAY				AVERAGE AND MAXIMUM QUEUE				INT. AVG.
		7 AVERAGE ATDS2	8 LEFT TURN ATDS2L	9 RIGHT TURN ATDS2R	10 STRAI -GHT ATDS2S	11 AVERAGE ASDS2	12 LEFT TURN ASDS2L	13 RIGHT TURN ASDS2R	14 STRAI -GHT ASDS2S	15 APPR -OACH AGQS2	16 L-T LANE AGQS2B	17 APPR -OACH MXQS2	18 L-T LANE MAQS2B	1 TOTAL DELAY ADTINT
SIZE	L	-2.00	.17	-1.76	-1.90	-.78	1.10	-.40	-.82	-.12	-.00	-.67	-.05	-2.57
SIZE	Q	-.43	1.51	-.24	-.52	-.16	1.32	-.13	-.24	-.04	.00	-.18	-.00	.47
LT-LANE	L	-2.44	-3.60	-2.30	-2.34	-1.20	.23	-.75	-1.22	-.24	.12	-.71	.68	-3.15
LT-LANE	Q	-.79	-1.67	-.61	-.81	-.34	-.56	-.17	-.37	-.06	.04	-.30	.23	.25
CYCLE	L	-3.00	-3.42	-4.00	-3.11	-.88	-2.53	-1.36	-.93	-.45	.01	-1.03	.06	-2.73
CYCLE	Q	-.52	-.02	-.40	-.51	-.35	-.27	-.18	-.33	-.06	-.00	-.11	.00	.12
SPLIT	L	3.22	3.88	3.51	3.33	.93	2.59	.80	1.00	.46	-.02	1.04	-.07	.38
SPLIT	Q	.95	1.49	1.02	.92	.44	1.10	.43	.40	.08	0	.18	-.00	.73
VOL-1	L	1.01	.80	1.79	1.02	.26	.63	.82	.25	.15	.00	.37	-.01	2.20
VOL-1	Q	.34	1.16	.44	.28	.18	1.05	.25	.13	.02	.00	.05	.01	.32
LT-1	L	-.20	-.86	-.14	-.17	-.14	-.69	0	-.11	-.03	.01	-.05	.03	.80
LT-1	Q	-.01	.20	-.10	-.02	.01	.22	-.10	-.01	.03	-.00	-.00	-.00	.01
TRUCK-1	L	-.02	.62	-.23	.01	-.03	.82	-.13	-.01	.03	-.00	.03	.03	.55
TRUCK-1	Q	-.02	-.65	.03	-.01	.06	-.61	.10	.07	.01	.00	-.02	-.00	-.13
VOL-2	L	4.17	4.62	5.24	4.28	1.17	3.20	1.61	1.23	.60	-.01	1.40	-.08	2.55
VOL-2	Q	.50	-.37	.74	.39	.05	-.42	.20	-.02	.05	.00	.06	.02	.36
LT-2	L	4.11	27.49	2.25	3.36	2.43	20.74	.58	1.77	.27	.08	.95	.40	1.56
LT-2	Q	.35	-5.01	.17	.27	.20	-3.58	.04	.13	-.00	0	-.03	-.05	.18
TRUCK-2	L	1.34	1.61	1.23	1.35	.57	1.22	.41	.56	.15	.01	.32	.00	.75
TRUCK-2	Q	.00	-.28	.20	.04	-.04	-.39	.13	-.00	-.02	.01	-.00	.01	-.07

MAIN EFFECT	RESPONSE OF MAJOR STREET	AVERAGE TOTAL DELAY				AVERAGE STOP DELAY				AVERAGE AND MAXIMUM QUEUE				INT. AVG.
		27 AVERAGE ATDS1	28 LEFT TURN ATDS1L	29 RIGHT TURN ATDS1R	30 STRAI -GHT ATDS1S	31 AVERAGE ASDS1	32 LEFT TURN ASDS1L	33 RIGHT TURN ASDS1R	34 STRAI -GHT ASDS1S	35 APPR -OACH AGQS1	36 L-T LANE AGQS1B	37 APPR -OACH MXQS1	38 L-T LANE MAQS1B	2 STOP DELAY ASDINT
SIZE	L	-3.27	.85	-2.16	-3.38	-.89	1.72	-.58	-.95	-.20	.01	-.56	-.02	-.80
SIZE	Q	.99	-.33	.59	1.04	.24	-.58	.13	.28	.05	-0	.17	.01	.12
LT-LANE	L	-4.33	-2.69	-3.12	-4.42	-1.55	.56	-.98	-1.58	-.36	.10	-.86	.65	-1.21
LT-LANE	Q	1.24	1.10	.74	1.29	.46	-.02	.17	.49	.10	-.04	.26	-.20	.07
CYCLE	L	-2.78	-1.53	-3.59	-2.68	-.64	-1.16	-1.30	-.68	-.37	.02	-.74	.10	-.71
CYCLE	Q	.35	-.36	.37	.36	.12	-.58	.14	.15	.07	-.01	.09	-.04	.01
SPLIT	L	-2.24	-1.92	-2.52	-2.22	-.42	-1.92	-.51	-.52	-.30	.02	-.66	.08	.22
SPLIT	Q	.57	.92	.61	.55	.27	.63	.25	.26	.03	.00	.13	.02	.35
VOL-1	L	3.33	2.98	4.37	3.70	.76	1.89	1.41	.82	.46	-.03	.97	-.13	.50
VOL-1	Q	.50	-.80	.75	.43	.07	-.58	.18	.03	.01	-.00	.03	-.01	.01
LT-1	L	1.76	25.40	.66	1.20	1.23	20.92	.23	.68	.10	.14	.29	.77	.54
LT-1	Q	-.04	-4.70	-.16	-.11	.01	-3.94	-.15	-.03	.01	.01	-.02	-.08	.02
TRUCK-1	L	1.16	.38	.97	1.14	.42	.16	.26	.40	.05	-.00	.18	-.03	.17
TRUCK-1	Q	-.13	-.09	-.22	-.14	-.02	-.03	-.10	-.03	-.05	.00	-.04	.02	-.02
VOL-2	L	1.27	-.02	1.89	1.20	.33	-.05	.89	.30	.16	-.01	.30	-.05	.71
VOL-2	Q	.32	.50	.29	.30	.17	.19	.16	.17	.04	.00	.07	-.00	.03
LT-2	L	-.55	-2.13	-.48	-.50	-.33	-2.00	-.19	-.29	-.05	.01	-.12	.01	.86
LT-2	Q	.09	.47	.20	.08	-.01	.31	.02	-.02	.04	.00	-.01	.01	.07
TRUCK-2	L	.40	1.26	.46	.32	.18	.99	.18	.10	.10	-.00	.06	.01	.29
TRUCK-2	Q	-.18	-.20	-.17	-.16	-.07	-.22	-.01	-.05	-.03	-.00	-.06	-.00	-.04

TABLE 5-11. (CONTINUED)

RESPONSE TOTAL EMISSIONS OF CO

MAIN EFFECT		47 I. PROPER COINTP	19 IB/MINOR COIS2	39 IB/MAJOR COIS1	23 OB/MINOR COOS2	43 OB/MAJOR COOS1	51 BKT/MINOR COIBS2	55 BKT/MAJOR COIBS1	3 I. SYSTEM COINTT
SIZE	L	930.1	531.7	608.3	51.7	154.0	-2.9	16.9	2691.5
SIZE	Q	-6.0	148.2	-142.1	44.7	-93.0	-1.6	-2.8	-84.4
LT-LANE	L	172.9	-109.9	-81.4	-3.6	12.3	-22.0	-7.9	-365.2
LT-LANE	Q	-37.5	-68.0	31.4	-2.7	-21.3	-5.5	2.5	-121.2
CYCLE	L	-173.9	-491.1	-472.3	12.4	22.4	-56.8	-53.1	-1857.1
CYCLE	Q	31.2	-2.1	39.1	-.1	-3.6	3.8	2.0	66.6
SPLIT	L	-1.3	480.2	-449.7	52.6	-50.8	53.6	-48.0	64.6
SPLIT	Q	2.2	56.4	32.3	5.8	-7.3	1.4	1.0	174.1
VOL-1	L	141.3	180.2	635.7	-39.1	11.4	18.6	68.2	1576.3
VOL-1	Q	-48.0	16.7	14.8	-3.2	-33.3	2.2	-9.0	-10.1
LT-1	L	-16.7	-26.9	73.4	34.7	-6.7	-1.3	-2.2	149.2
LT-1	Q	22.0	-2.0	15.6	6.2	14.7	1.2	4.1	69.2
TRUCK-1	L	985.8	14.1	1415.8	203.0	412.9	.6	159.1	4091.6
TRUCK-1	Q	-37.4	-10.9	-44.5	-16.0	-14.7	-.4	-3.2	-172.3
VOL-2	L	140.6	656.3	186.0	12.8	-39.2	72.0	20.2	1631.9
VOL-2	Q	-75.7	1.4	25.1	-25.7	1.0	-12.0	-.3	3.6
LT-2	L	-2.4	150.6	-13.0	-9.7	51.7	9.2	1.5	359.1
LT-2	Q	-6.7	1.3	3.1	3.0	-.6	-.8	-1.2	13.7
TRUCK-2	L	935.8	1371.9	12.8	364.5	146.1	173.6	1.4	3790.6
TRUCK-2	Q	-22.7	-46.6	-4.7	-23.7	-3.4	-7.6	-.0	-156.8

RESPONSE TOTAL EMISSIONS OF HC

MAIN EFFECT		48 I. PROPER HCINTP	20 IB/MINOR HCIS2	40 IB/MAJOR HCIS1	24 OB/MINOR HCOS2	44 OB/MAJOR HCOS1	52 BKT/MINOR HCIBS2	56 BKT/MAJOR HCIBS1	4 I. SYSTEM HCINTT
SIZE	L	13.915	12.899	12.368	4.031	3.421	-.081	.094	65.438
SIZE	Q	.175	4.027	-3.508	1.633	-1.579	-.009	-.005	1.146
LT-LANE	L	2.402	-3.204	-4.544	-.084	-1.401	-.621	-.537	-18.468
LT-LANE	Q	-.281	-1.671	1.387	.008	.242	-.196	.148	-.067
CYCLE	L	-2.817	-13.167	-13.063	-2.192	-2.615	-1.364	-1.277	-62.076
CYCLE	Q	.257	-.407	.888	.055	-.080	.012	.095	.911
SPLIT	L	-.106	13.405	-12.587	2.873	-3.400	1.297	-1.204	.583
SPLIT	Q	.010	1.701	1.086	-.018	-.055	.071	.055	5.429
VOL-1	L	2.385	4.693	17.526	.367	3.901	.459	1.652	52.973
VOL-1	Q	-.658	.534	1.445	.047	.151	.035	-.173	4.353
LT-1	L	-.043	-.478	2.787	.724	-.412	-.074	.120	5.242
LT-1	Q	.116	-.018	.087	.057	.094	.049	.043	.441
TRUCK-1	L	5.518	.130	15.109	1.498	6.136	.021	1.079	45.748
TRUCK-1	Q	-.191	-.146	-.729	-.087	-.251	.017	-.028	-2.428
VOL-2	L	2.287	17.968	4.955	3.224	.512	1.749	.451	53.313
VOL-2	Q	-.791	1.317	.753	.087	.160	-.185	.008	4.635
LT-2	L	-.023	5.639	-.693	-.568	.968	.485	-.031	10.692
LT-2	Q	-.036	.196	.267	-.027	.008	.022	.005	.887
TRUCK-2	L	5.169	14.504	.753	5.333	1.108	1.212	.072	43.397
TRUCK-2	Q	-.135	-.497	-.285	-.220	-.025	-.077	-.001	-2.054

TABLE 5-11. (CONTINUED)

RESPONSE — TOTAL EMISSIONS OF NOX

MAIN EFFECT		49 I. PROPER NOINTP	21 IB/MINOR NOIS2	41 IB/MAJOR NOIS1	25 OB/MINOR NOOS2	45 OB/MAJOR NOOS1	53 BKT/MINOR NOIBS2	57 BKT/MAJOR NOIBS1	5 I. SYSTEM NOINTT
SIZE	L	53.817	36.847	42.457	15.541	23.766	.050	1.022	237.224
SIZE	Q	.331	10.457	-11.324	6.394	-9.542	-.015	-.277	-8.029
LT-LANE	L	10.437	-1.961	2.507	-.986	5.410	-.539	.260	9.943
LT-LANE	Q	-1.620	-1.791	-.352	.241	-2.815	-.182	-.145	-9.432
CYCLE	L	-7.561	-18.839	-18.857	-3.708	-3.954	-1.874	-1.753	-90.714
CYCLE	Q	.428	-.060	.622	.026	-.278	.077	.081	.620
SPLIT	L	-.178	18.593	-19.599	7.319	-7.757	1.748	-1.739	-2.889
SPLIT	Q	-.241	1.118	.970	.005	-.287	-.004	.041	3.613
VOL-1	L	6.305	6.705	25.928	-.626	7.202	.647	2.315	78.417
VOL-1	Q	-3.699	-.078	-1.120	-.019	-1.678	-.045	-.371	-5.790
LT-1	L	-.300	-.504	2.092	3.001	-1.839	-.116	-.130	5.500
LT-1	Q	-.082	-.286	-.118	.167	.021	-.005	.032	-.431
TRUCK-1	L	8.429	.721	40.974	3.773	22.531	.052	2.501	135.998
TRUCK-1	Q	-.207	-.019	-1.849	-.239	-.814	.057	-.123	-5.841
VOL-2	L	6.149	25.194	6.380	6.659	-.485	2.389	.587	75.496
VOL-2	Q	-3.588	-1.405	.520	-1.935	.430	-.376	-.009	-4.780
LT-2	L	-.597	4.122	-1.236	-2.601	3.434	.152	-.063	7.437
LT-2	Q	.113	.312	.337	.004	-.014	.036	-.005	1.280
TRUCK-2	L	8.457	38.401	1.317	20.924	3.046	2.697	.150	127.377
TRUCK-2	Q	-.114	-.898	-.327	-.470	-.166	-.068	.016	-3.722

RESPONSE — TOTAL FUEL FLOW

MAIN EFFECT		50 I. PROPER FFINTP	22 IB/MINOR FFIS2	42 IB/MAJOR FFIS1	26 OB/MINOR FFOS2	46 OB/MAJOR FFOS1	54 BKT/MINOR FFIBS2	58 BKT/MAJOR FFIBS1	6 I. SYSTEM FFINTT
SIZE	L	2136.7	2142.9	2132.3	1047.5	1118.1	-5.8	17.7	12881.5
SIZE	Q	46.9	659.5	-607.7	392.5	-429.3	-.8	-2.8	30.1
LT-LANE	L	365.0	-299.8	-394.6	-19.8	-41.4	-60.0	-46.0	-1511.2
LT-LANE	Q	-34.8	-179.0	128.1	6.2	-18.0	-19.1	11.6	-125.4
CYCLE	L	-490.9	-1738.5	-1782.5	-489.8	-562.5	-153.3	-146.5	-9146.7
CYCLE	Q	22.7	-29.0	93.9	9.4	-8.5	2.2	9.3	131.6
SPLIT	L	-14.3	1764.9	-1752.6	608.1	-698.2	147.4	-141.7	-155.7
SPLIT	Q	-5.5	170.5	111.9	-2.4	-9.9	5.9	5.5	540.4
VOL-1	L	412.8	609.4	2397.2	100.6	818.8	51.1	191.5	7851.9
VOL-1	Q	-94.8	44.5	150.0	5.0	-11.8	1.8	-18.5	375.5
LT-1	L	-4.9	-42.6	256.9	141.0	-109.7	-6.7	7.0	491.1
LT-1	Q	4.3	-5.3	-.8	11.1	4.2	3.7	3.2	18.3
TRUCK-1	L	503.6	22.7	1822.8	172.1	871.2	2.7	105.6	5777.6
TRUCK-1	Q	-17.9	-17.5	-85.2	-16.2	-28.0	2.3	-3.9	-294.0
VOL-2	L	399.5	2359.7	648.6	705.7	124.0	197.8	50.2	7675.8
VOL-2	Q	-97.1	137.4	79.0	-27.2	29.1	-19.9	1.6	436.6
LT-2	L	-6.7	539.1	-77.5	-143.0	172.8	41.6	-4.5	982.7
LT-2	Q	.2	21.5	36.0	3.2	-3.1	2.7	.8	115.2
TRUCK-2	L	487.7	1732.7	87.8	783.1	136.6	118.5	7.5	5480.4
TRUCK-2	Q	-9.6	-39.8	-33.6	-21.1	-6.5	-4.6	.7	-201.8

factors have been chosen to represent realistic circumstances which might occur at street intersections.

The Grand Mean of Average Total Delay and Average Stop Delay. The grand mean of average total delay and average stop delay is 20 seconds and 10 seconds, respectively. This means that on average the speed changes involved in going through the intersection system account for 10 seconds of the total delay, and stop time accounts for the other 10 seconds. All the intersection system averages and approach averages on both the major street and on the minor street indicate similar values. Among the directional movements, left turns generally incur the most delay. Values for average total delay of 30 seconds and average stop delay of 24 seconds to left-turning vehicles indicate that waiting for an acceptable gap is the major source of delay. On the contrary, right turners average only 8 seconds of stop delay but another 12 seconds of delay while accelerating and decelerating. Comparison between delays to each turning movement is not direct as the left turns generally have a larger turning radius than right turns in the selected geometrics. Left-turn speeds may be higher, but the path is also longer. The average total delay and average stop delay to straight through movements are numerically close to the averages for all movements combined.

The Grand Mean of Average Queue Length and Maximum Queue Length. The grand mean of average queue length and maximum queue length during fifteen minutes on approaches excluding the left-turn lane are 2 vehicles (about 40 feet back from the stop line) and 7 vehicles (about 140 feet back), respectively. Because most of the time the queued vehicles are located only in the first 100 feet bucket, the emissions and fuel consumption values shown in Table 5-6 are high in the first bucket and drop significantly in the second bucket. As to queue length in the special left-turn lane, the grand means of average queue length and maximum queue length are one vehicle and two vehicles, respectively. The maximum queue length observed in a special left-turn lane in any of the 243 situations simulated was 6 vehicles. The grand means of queue lengths listed in Appendix B were computed with the conditions that there was no such lane.

The Grand Means of Total Emissions and Fuel Consumption. The grand means of total emissions and fuel consumption during the fifteen minutes show the spatial distribution of emissions along the vehicle path in the intersection systems on the basis of the total intersection system, the intersection proper area, inbound and outbound legs of the major and the minor streets, and buckets. For CO, the grand mean of the total amount produced in the overall intersection system was 15 kilograms. On overall average, the inbound lanes on each of the four legs and the intersection proper each produced about 2.8 kilograms of CO, and each outbound leg produced about 0.9 kilograms. The first bucket on one inbound leg produced 0.4 kilograms; therefore, it is apparent that the emission of CO is concentrated in the intersection proper area and in the nearby area on the inbound lanes. On outbound lanes, the emission of CO is lower.

For HC, the average total emission in the overall intersection system was 410 grams. The average emissions in the intersection proper area, on the inbound lanes of each leg, on the outbound lanes of each leg, and in the first inbound bucket are 45, 75, 30, and 10 grams, respectively. The emission of HC was more evenly distributed among these areas than CO, but it was concentrated mainly on the inbound lanes. For NOx, the average total emission in the overall intersection system was 1100 grams. The emissions in the intersection proper area, on the inbound lanes of each leg, on the outbound lanes of each leg, and in the first inbound bucket were 160, 170, 100, and 18 grams, respectively. This type of emission profile of NOx is more evenly distributed than that of HC. For FF, the total fuel consumption in the overall intersection system was 70 kilograms. The fuel consumption in the intersection proper area, on the inbound lanes of each leg, on the outbound lanes of each leg, and in the first inbound bucket were 7, 11, 6, and 1.1 kilograms, respectively. The comparable profile of FF is similar to that of HC and concentrates on the inbound lanes.

From these profiles of emissions and fuel consumption, it can be seen that generally excessive emissions and fuel flow are of less concern on the outbound lanes than on the inbound lanes and in the intersection proper area. This is probably attributed to less interference to traffic in these areas. Because a large amount of CO emission (2.8 kilograms) was concentrated mainly in the intersection proper area this area appears to have a high potential as a CO pollution hot spot.

Regression Line Slopes of Green Time and Red Time vs. Measured Responses

The contribution of green time and red time toward effecting each measured response is indicated by the magnitude and the sign of the regression line slope. The magnitude indicates the relative significance of the effect caused by green time or red time, and the sign indicates whether the response is increased or decreased by green time or red time.

Regression of Sixteen Average Delays on the Inbound Lanes. The regressions of sixteen average delays on inbound approaches of the major street or minor street vs. green time and red time, generally indicate that red time increases the formation of these responses with positive slopes but that green time decreases the formation with negative slopes. The magnitude of the coefficient of red time is much greater than that of green time. For evaluating the responses on an intersection basis, green time and red time were selected as the green time and red time of the minor street. Because the green time of the minor street is equivalent to the red time of the major street, their combined effects on the response is dominated by the effect of red time and thus appear with positive regression slopes. The slopes of the red time and green time regression lines for the average total delay and average stop delay in the overall intersection system are all positive.

The power of regression analysis to explain the variation of a response is indicated by R^2. The higher R^2 is, the more variations are explained by the regression. The values of R^2 are high in all observed delay statistics except for delay to left turns. The R^2 values for average total delay and average stop delay were 30 percent and 50 percent, respectively, but the R^2 for delay to left turns was only 10 percent. This indicates that the timing of a two-phase pretimed signal explains more of the variability in delay to right turns and straight movements than of the variation in delay to left turns.

<u>Regression of Queue Length</u>. The regression of queue length vs. red and green time showed that both green time and red time on the average increased the queue length on an approach basis, but that green time reduced queue length in the left-turn lane. The R^2 for queue length on an approach basis reached 30 percent, but for the left-turn lane, R^2 was only 10 percent.

<u>Regression of Total Emissions and Fuel Consumption</u>. The regression of total emissions and fuel consumption on the intersection proper explains very little about the variations of responses because the R^2 value was nearly zero. For CO, regression explained about 11 percent of the variability in all cases of total emissions on inbound lanes, on inbound buckets, and in the overall intersection system with positive coefficients of green time and red time. It explained almost nothing about total emissions of CO on the

outbound lanes with a nearly zero coefficient. For HC, R^2 ranged from 20 percent to 30 percent for inbound lanes, outbound lanes, and the overall intersection system. The R^2 was 40 percent for the first inbound bucket. The coefficients of green time and red time are positive for inbound lanes, buckets, and the overall intersection system. But, the coefficients of red time for outbound lane HC responses are negative. For NOx and FF, the signs of the coefficients were the same as those which appeared in the HC regression. The R^2 of FF is comparable with the R^2 of HC, but the R^2 of NOx is generally about 10 percent lower.

Significant Effects and F-Test Statistics

Six classes of significance have been used to demonstrate the relative capability of the 200 possible effects listed in Table 5-4 to explain the total variation of each measured response. The classifications were also used to select the threshold of significance for that level to be incorporated into the predictive models. The six classes are

(1) significant at least at 0.999 level (0.999, ∞),

(2) significant between 0.99 and 0.999 levels (0.99, 0.999),

(3) significant between 0.95 and 0.99 levels (0.95, 0.99),

(4) between 0.90 and 0.95 levels (0.90, 0.95),

(5) significant between 0.75 and 0.90 levels (0.75, 0.90), and

(6) significant lower than 0.75 level (0, 0.75).

For statistics of delay and queue length, the number of effects incorporated into each class is listed. Among the six classes the first class (0.999, ∞) explains most of the variations with very few factors. The sixth class (0, 0.75) explains almost nothing but contains the most factors. Therefore, those items significant at less than the 0.75 level are considered to have no effect. Generally, the percentage of the variations that was explained by the first class and by regression taken together $[R^2 + SS\ (0.999, \infty)]$, reached 80 percent for delays and queue lengths and 90 percent for emissions and fuel consumption. Therefore, the models to predict delays and queue lengths were considered to incorporate effects at least at the 0.95 significance level to assure the precision of the prediction, and the models to predict emissions and fuel consumption used the 0.99 significance level.

F-Test Statistics. F-test statistics are used to indicate the relative significance of the 200 effects and the block effect of each response. In Appendix C, the linear trend and the quadratic trend of each main effect are averaged and the four components LL, LQ, QL and QQ of each interactive effect are averaged to simplify the comparison of the relative significance between the ten main effects and the forty-five interactive effects. Delays and queue lengths generally indicate more involvement of the interactions between the selected factors of intersection geometry, signal control and traffic stream characteristics than emissions and fuel consumption. On the contrary, the main effects of the selected factors on emissions and fuel consumption explain most of the variability in each response and only a few interactive effects are significant. For all responses on inbound lanes, the two factors of left turns and trucks on the other street had almost no effect on the responses on the concerned street. Therefore, the responses on the inbound lanes, including the selected buckets, were treated as being affected only by the other eight factors. For the responses based on the intersection system and on the intersection proper, the factor of green split has little effect. For the emissions and fuel consumption on outbound lanes, the effect of the left-turn lane was not as significant as it was on the inbound lanes. The left-turn lane has nearly no effects on CO emissions and fuel consumption on the outbound lanes.

Significant Effects. As to delays and queue lengths, the two geometric factors of intersection size (number of lanes) and left-turn lane significantly reduced the average values of the delay incurred by each vehicle and the queue length developed on the inbound lanes. This was probably due to the fact that drivers were provided more space for maneuvering through the intersection. These two factors strongly interact with each other and also interact with the factors of green split, volume, and left turns on the street concerned. Therefore, these factors, which have very complicated interactions, appeared in the predictive models. All the interactions indicated that the effect of each factor was not constant, as for the main effect, but depended upon the situations which were defined together with the interacting factors. The main effect of cycle time indicated a negative impact on the responses, but it produced almost no interactive effect.

The factor of green ratio to the major street indicated a positive effect toward increasing the delays and queue lengths on the minor street when the green ratio was split favorably to the major street. By the same token, this factor reduced the delays and queue lengths on the major street when it was set favorably to the major street. When the factor of green ratio was set at its optimum value, the average delay in the total intersection system was less than the setting which favored either the major street or the minor street. Only the factor of green ratio among the selected factors indicated that its quadratic effect is more significant than its linear effect. That means the response values are concave in shape and the response value at the medium level is the least compared with the response values at the high and low levels. The factor of volume and left turns were all positive in their effects and had strong interactions with all the previously mentioned factors except cycle time. Trucks had little effect on delays and queue lengths, and the magnitude was much less than for those factors mentioned before. The traffic volume on the intersecting street also had some positive effect. The effects on delays shown by each of the directional movements on inbound lanes indicated several points which tend to characterize the intersection environment.

(1) The factor of intersection size increased the delay to left turns because there were more opposing lanes. This effect mainly appeared with the stop delay. This factor reduced the delay to other directional movements.

(2) Both left turns and straight movements experienced less delay after a special left-turn lane was added.

(3) The change of cycle time or green ratio to the major street mainly influenced the speed-change delay.

(4) Stopped delay was the major portion of delay for left turns. For other directional movements, delay came mainly from the speed change due to traffic interference related to traffic volume.

Intersection size had a very strong effect on total emissions and fuel consumption on the total intersection system, on the intersection proper, and on the inbound and outbound legs, but not on the selected bucket with a fixed area. The presence of left-turn lane reduced the total emissions of CO and HC and fuel consumption on inbound lanes, including the selected bucket on the inbound lane, and on the total intersection system. On the contrary, the presence of left-turn lane increased the total emissions of NOx on the inbound lanes, including the selected bucket on the inbound lane, and on the total intersection system. The presence of left-turn lane increased the area of the intersection proper and thus increased the total emissions and fuel consumption on the intersection proper. The effect of left-turn lane can be judged as being limited within just several buckets away from the stop line, by perceiving the effect of left-turn lane on the selected bucket nearest the intersection sharing a very large portion of the effect of left-turn lane on the inbound approach. The effect of cycle time listed in Table 5-11 was only one portion of the cycle time effect. The effect of cycle time listed in Table 5-11 indicated only that the increase of cycle time reduced the number of vehicle stoppings and thus reduced emissions and fuel consumption.

The effect of green split listed in Table 5-11 had strong effects on emissions and fuel consumption on inbound lanes. Whichever the street was favorably assigned with the green time, the emissions and fuel consumption were reduced. While emissions and fuel consumption the other street was increased. The quadratic trend of green split had strong effects on total emissions and fuel consumption on the total intersection system. The complete effects of cycle time and green split should contain the effects listed in Table 5-11 and the effects of green time and red time which had been separated out in the first-stage regression. The complete effect values of cycle time and green split can be examined by the predictive values listed in Appendices E and F. Traffic volume and truck percentage both have very strong positive effect on the formation of emissions and fuel consumptions on inbound or outbound approaches, or in the whole intersection system or in the intersection proper. Comparatively, the positive effect of left turns is weaker than the effects of traffic volume and truck percentage. The volume on the other street also has some positive effect.

In Table 5-11, the linear trend of each main effects of most factors were found much more significant than the quadratic trend. Therefore, the linear trend dominates the effect of each factor, except for the green split factor. This suggests that two levels instead of three levels can be used in subsequent experiments if the same ranges of factor values are used. The additional information provided by the medium level does not justify the increase in cost.

<u>Measures of Model Performance and Application of Results</u>

The ratio of the standard error to the grand mean is an index to the precision of the predictive model. The smaller the ratio, the more precise is the model. This ratio, together with the explained percentage of total variation indicated that delays of left turns and queue lengths on the special left-turn lane were not predicted well by this experiment design. The possible reasons for this might include (1) all dominant factors were not incorporated into the experiment design, and (2) assigning zero response values to the low levels of left turns or to left-turn lane failed to reflect the true response variation. All other responses were predicted very well.

A series of fifty-eight predictive models was built from the fifty-eight responses that came from the simulation experiments. These models, which are listed in Appendix D, were assembled from the grand means, the slopes of regression lines for green time and red time, and the significant effects of selected factors among the fifty-eight observed responses. Among the fifty-eight models, seventeen of them were selected to tabulate the predictive values over the experimental ranges. The seventeen responses are

(1) average total delay on the intersection system,

(2) total CO produced on the intersection system,

(3) total HC produced on the intersection system,

(4) total NOx produced on the intersection system,

(5) total FF produced on the intersection system,

(6) average total delay on the minor street,

(7) maximum queue length on the minor street,

(8) total CO produced on the minor street,

(9) total HC produced on the minor street,

(10) total NOx produced on the minor street,

(11) total FF produced on the minor street,

(12) average total delay on the major street,

(13) maximum queue length on the major street,

(14) total CO produced on the major street,

(15) total HC produced on the major street,

(16) total NOx produced on the major street, and

(17) total FF produced on the major street.

The seventeen models provide one practical means for traffic engineers and transportation planners to evaluate the impact of the intersection environment, and change therein, on air quality, fuel consumption, and traffic behavior. These models were based on the interactive relationship among ten factors each taken at three quantitative levels; therefore, there are 3^{10} = 59,049 possible combinations of factors and levels. Even though only 243 selected combinations were actually utilized in model building, the fractional factorial experiment design that was used to choose the proper combinations make the models applicable over the full range of factors and levels. Numerical values resulting from applying the predictive models are listed in two appendices. An extensive set of tables which is presented in Appendix E shows the various observed responses for the full range of experimental conditions accumulated for the overall intersection system during fifteen minutes of observation time. These tables can be used to estimate quantitatively the pollutants, fuel consumption, and delay that might be present in an existing intersection system that is similar to one of those included in the tables. Or, different systems can be compared in terms of one or more of the many cause-and-effect combinations that might be of interest from an overall intersection system performance standpoint. Another set of tables, in Appendix F, can be used in a similar way to evaluate or compare pollutants, fuel consumption, delay, and queue lengths on the legs of an intersection for the various defined situations that are included in the experiment.

These models and tables cover a rather wide range of signalized intersection conditions which are likely to be of interest to the user, but all situations are not included. Data for an analysis of almost any geometry, traffic control, and traffic stream combination that would be of practical concern can be obtained by making a few runs of the TEXAS II Model. This procedure is recommended for detailed evaluation of specific intersection conditions as it yields more precise results than using the models or the tables.

SUMMARY

Ten factors of intersection geometry, traffic control, and traffic stream characteristics have been used in a designed simulation experiment to investigate their main effects and first-order interactive effects on the formation of vehicle delays, queue lengths, emissions, and fuel consumption. The technique of fractional replication design was used to choose only 243 cells from all the 59,049 possible conditions of the 3^{10} full factorial experiment with ten three-level factors. A variance reduction technique of blocking common random numbers within the selected cells was investigated for possibly increasing the precision of the experiment, but it produced only negligible effects.

Because the values of cycle time and green split, which were used as independent factors in the experiment design, actually depend on the volumes of traffic on the two intersecting streets, the technique of analysis of variance did not correctly attribute the explained variability to each effect as these factors are not completely independent. After this fact was recognized, the linear-dependent two-stage regression analysis was used to remove or reduce the variations caused by green time and red time effects from the observations. In the first stage of analysis a regression equation was developed to identify the variations in each response which were affected by green time and red time. All effects that were so affected were then removed from the observations. Then, the adjusted observations were solved by the analysis of variance second stage analysis. Following this analysis, the significant effects from the second-stage regression, grand mean, and the regression slopes from the first stage regression were combined to build a predictive model for each response.

WORKING EXAMPLES

The application of these predictive models is demonstrated by the following examples. These examples illustrate the effects of traffic stream characteristics, signal performance, and geometric configurations on the various responses which are tabulated in Appendix E and Appendix F.

Suppose that the baseline situation is this: the intersection geometry is 4 x 4, the lane volume on the major street (V-1) and the lane volume on the minor street (V-2) is 450 vehicles per hour per lane on both streets, no left turns, and no trucks. Examination of the responses listed in Table 5-12A indicates that a cycle time of 60 seconds and a green time of 30 seconds to each street will give the least average total delay (18.5 seconds) to each vehicle in the intersection system. Increasing the cycle time or

TABLE 5-12A. EXAMPLES OF PREDICTIVE RESPONSES WHICH OCCURRED ON THE TOTAL INTERSECTION SYSTEM IN 15 MINUTES (TAKEN FROM APPENDIX E)

INTERSECTION ENVIRONMENT				1. AVG DELAY (SEC/VEH)				2. TOTAL CO (KG)				3. TOTAL HC (GRAM)				4. TOTAL NOX (GRAM)				5. TOTAL FF (KG)			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLLL	HLLL	LHLL	HHLL	LLLL	HLLL	LHLL	HHLL	LLLL	HLLL	LHLL	HHLL	LLLL	HLLL	LHLL	HHLL
GEOMETRY 4*4																							
450	450	60	33	22.1	28.2	25.0	32.7	4.1	5.3	9.8	11.0	245	290	320	377	567	583	733	771	44.2	48.2	53.3	58.6
●450	450	60	30	(18.5)	<22.6>	19.2	25.0	(4.2)	<5.4>	9.0	10.2	(226)	<271>	273	330	(552)	<567>	703	740	(42.0)	<46.0>	48.4	53.7
○450	450	60	27	19.4	25.4	[18.0]	25.7	4.2	5.3	[8.1]	9.3	226	271	[268]	325	547	562	[683]	720	42.5	46.6	[48.5]	53.7
450	450	70	38	23.7	27.5	26.5	32.0	4.6	5.0	9.5	10.0	253	281	323	364	555	588	736	789	46.0	48.4	54.8	58.5
450	450	70	35	20.3	22.2	21.1	24.6	5.1	5.6	9.2	9.7	243	271	284	325	555	587	720	773	44.7	47.1	50.8	54.5
450	450	70	31	21.5	25.4	20.2	25.7	5.5	6.0	8.8	9.3	251	280	289	330	564	596	714	767	46.2	48.7	51.8	55.5
450	450	80	44	27.7	29.3	30.5	33.8	5.3	5.1	10.9	10.8	272	283	359	384	537	553	732	769	46.4	47.2	56.9	59.0
450	450	80	40	25.0	24.6	25.7	27.0	5.5	5.3	10.3	10.1	260	272	319	344	533	549	712	749	44.8	45.7	52.7	54.8
450	450	80	36	26.6	28.2	25.2	28.5	5.6	5.4	9.5	9.4	265	277	320	345	536	552	700	737	45.9	46.7	53.2	55.3
450	600	70	35	34.4	40.5	38.1	45.8	6.5	6.9	14.2	14.6	361	393	469	513	615	631	900	937	58.6	61.3	72.1	76.1
450	600	70	31	29.3	33.4	30.9	36.6	5.9	6.3	12.8	13.2	322	354	401	446	586	602	856	893	54.3	57.1	65.1	69.0
450	600	70	28	31.7	37.8	31.2	39.0	6.7	7.1	12.8	13.2	349	380	424	468	594	610	848	885	57.4	60.1	67.6	71.6
450	600	80	40	35.6	39.5	39.3	44.8	7.0	6.7	14.0	13.8	371	386	474	502	596	628	895	948	59.8	60.9	72.9	75.3
450	600	80	36	30.9	32.8	32.5	36.1	6.8	6.6	13.0	12.8	341	356	416	444	582	615	866	919	56.5	57.6	66.9	69.3
450	600	80	32	33.7	37.5	33.2	38.7	8.1	7.9	13.5	13.2	376	391	447	475	602	635	870	924	60.4	61.5	70.3	72.7
450	600	90	45	39.6	41.2	43.3	46.6	7.9	6.9	15.6	14.7	384	382	504	516	574	589	886	923	59.9	59.4	74.8	75.6
450	600	90	40	35.5	35.1	37.1	38.4	7.4	6.5	14.2	13.3	352	351	444	456	553	569	850	887	56.2	55.7	68.4	69.2
450	600	90	36	38.6	40.2	38.1	41.4	8.3	7.4	14.3	13.4	383	382	471	482	565	581	847	884	59.5	59.0	71.1	71.9
GEOMETRY 5*4																							
450	450	60	33	12.0	14.6	14.0	18.3	5.4	6.0	11.4	12.1	201	223	276	311	712	714	878	902	42.2	45.1	51.4	55.4
450	450	60	30	10.7	11.2	10.6	12.8	5.2	5.9	10.5	11.1	194	216	241	275	688	691	840	863	41.3	44.1	47.7	51.8
450	450	60	27	12.0	14.5	9.8	14.0	5.0	5.7	9.4	10.0	194	216	236	271	677	679	813	836	41.7	44.5	47.6	51.6
450	450	70	38	14.7	15.0	16.7	18.7	5.6	5.6	11.0	11.0	218	223	288	306	695	714	876	916	43.9	45.2	52.7	55.2
450	450	70	35	13.7	12.0	13.6	13.6	5.9	5.9	10.5	10.5	219	225	261	279	686	705	852	892	43.9	45.1	50.0	52.5
450	450	70	31	15.3	15.6	13.1	15.1	6.2	6.1	9.8	9.8	228	233	265	284	689	707	839	878	45.3	46.5	50.8	53.3
450	450	80	44	17.6	15.7	19.6	19.4	6.5	5.8	12.6	11.9	228	217	315	318	682	685	877	900	44.4	44.1	55.0	55.9
450	450	80	40	17.1	13.3	17.1	14.9	6.5	5.9	11.7	11.1	227	217	287	289	670	672	849	873	44.2	43.8	52.0	52.9
450	450	80	36	19.2	17.3	17.0	16.8	6.4	5.7	10.8	10.1	233	222	288	290	666	668	830	854	45.0	44.6	52.3	53.2
450	600	70	35	21.4	23.9	24.2	28.4	7.5	7.4	15.6	15.5	298	307	406	427	752	754	1036	060	54.8	56.3	68.2	71.0
450	600	70	31	18.5	19.1	19.3	21.5	6.7	6.6	14.0	13.9	271	280	350	372	715	717	985	008	51.8	53.3	62.5	65.2
450	600	70	28	21.4	23.9	20.0	24.3	7.4	7.3	13.8	13.7	297	306	372	394	716	718	970	993	54.6	56.1	64.8	67.6
450	600	80	40	23.7	24.0	26.6	28.6	7.8	7.1	15.3	14.5	316	309	420	425	728	747	1027	067	55.8	55.7	69.0	70.1
450	600	80	36	21.3	19.7	22.1	22.1	7.5	6.7	14.1	13.3	298	291	373	378	706	725	990	029	53.8	53.7	64.2	65.4
450	600	80	32	24.5	24.8	23.2	25.2	8.6	7.8	14.3	13.6	333	326	404	409	719	738	987	027	57.5	57.4	67.4	68.6
450	600	90	45	26.5	24.6	29.4	29.2	8.9	7.5	17.0	15.6	320	297	441	430	710	713	1023	047	56.0	54.4	70.9	70.5
450	600	90	40	24.7	20.9	25.5	23.3	8.2	6.8	15.5	14.1	300	277	393	382	682	684	979	002	53.6	51.9	65.8	65.4

changing the green ratio to the major street will increase the average total delay. In this situation the total emissions of CO, HC, and NOx and fuel consumption are 4.2 kgs, 226 grams, 552 grams, and 42.0 kgs, respectively. This signal timing does not give the least emissions of CO and NOx, but the second least.

If left turns from the major street are increased from zero to 96 vehicles per hour (the high level) and the other traffic stream characteristics are not changed (see HLLL), the effects of left-turn capacity can be seen. The same signal timing still gives the least average total delay, but this delay has increased from 18.5 to 22.6 seconds per vehicle. The emissions of CO, HC, NOx, and fuel consumption are all increased to 5.4 kgs, 271 grams, 567 grams, and 46.0 kgs. Only one of these, 271 grams of HC, is the least emission or fuel consumption value produced by the nine different signal timing plans listed.

Again, if truck percentage on the major street is changed to the high level (110 percent of the approach volume) and the other traffic stream characteristics remain as in the baseline situation, the optimal signal performance for delay is 60 seconds of cycle time with green time to the major street and the minor street of 33 and 27 seconds, respectively. This produces 18.0 seconds per vehicle for average total delay. Emissions and fuel consumption are dramatically increased to 8.1 kgs, 268 grams, 683 grams, and 48.5 kgs for CO, HC, NOx, and FF, respectively (see column heading LHLL).

These two examples show the separate effect of left turns and trucks on delay, emissions, and fuel consumption for this specific situation and also indicate how signal performance can be varied to reduce the undesirable responses. If left turns and trucks are both at high levels, the effects on emissions and fuel consumption are more significant. This can be seen in the values listed under the column heading of HHLL.

If traffic volume on the major street is increased to 600 vehicles per hour and the other traffic stream characteristics of the baseline situation are unchanged, the least average delay, the least emissions and fuel consumption produced by each of the optimal signal performance are all increased. The increase of volume not only increases the total emissions and fuel consumption but also increases the average emissions and fuel consumption. For example, the total CO emission and fuel consumption at the condition of (450, 450, 60, 30; see LLLL) are 4.2 kgs and 42.0 kgs. Their averages over all vehicles are 2.33 and 23.3 grams, respectively. But the total CO and fuel consumption at (450, 600, 70, 31; see LLLL) are 5.9 and 54.3 kgs, respectively. Their averages are 2.81 and 25.8 grams respectively. Actually, the average emissions and fuel consumption are increased by the volumes over all the ranges of this experiment. Therefore, the worst situation of air pollution or energy consumption, as expected, happens at the situations of high volume, high percent trucks, high left turns, and with non-optimum signal timing. This can be seen in the lower right-hand corner of the tables in Appendix E and Appendix F.

The effect of a left-turn lane on the reduction of delay, emissions and fuel consumption can be seen at the corresponding cells in the 5 x 4 geometry. Under the leading HHLL, see that the average total delay, total HC emission, and total fuel consumption are all less in the 5 x 4 geometry than in the comparable 4 x 4 geometry. The total emissions of NOx in the 5 x 4 geometry is significantly greater than in the 4 x 4 geometry. This indicates the positive effect of a left-turn lane on the formation of NOx.

Responses on the inbound lanes due to the previously mentioned changes can be found in Table 5-12B in which the volume of left turns and trucks on the minor street are fixed at low levels. For example at the baseline situation, the average total delays are 21.2 and 24.0 seconds per vehicle, the maximum queue lengths are 5.8 and 6.8 vehicles, and the total CO emissions are 0.85 and 0.93 kilograms for the minor street and the major street, respectively. If volume, or left turns, or trucks is changed on the major street only, the corresponding responses on the major street can also be found.

These examples illustrate only a few of the many possible comparisons of data that can be made. A reasonable estimate of any of the responses can be made for a chosen combination of parameters which falls within the range of the variables used in the simulation experiments.

COMPARISONS WITH RELATED STUDIES

Comparisons with related studies verify results of this simulation experiment. Evans [Ref 19] indicated that hydrocarbon emission and fuel consumption are linearly dependent on the average trip time per unit distance. Ismart [Ref 18] developed a series of equations to predict vehicle emissions and fuel consumption based on the assumption that vehicle delay is highly correlated with emissions and fuel consumption. This approach was adopted in the TEXIN Model [Ref 12] by Texas Transportation Institute. The data collected in this experiment agrees with previous findings that hydrocarbons and fuel consumption are correlated with vehicle delay and average trip time per unit distance. But the predictability of the single factor model, in terms of R^2, is lower than that of the model built in this experiment containing generally twenty to forty items. Carbon monoxide and

TABLE 5-12B. EXAMPLES OF PREDICTIVE RESPONSES WHICH OCCURRED ON THE INBOUND APPROACHES IN 15 MINUTES (TAKEN FROM APPENDIX F)

INTERSECTION ENVIRONMENT				AVERAGE TOTAL DELAY (SECONDS/VEHICLE)					MAXIMUM QUEUE LENGTH (VEHICLES)					TOTAL CO EMISSION (KILOGRAMS)				
STREET				MINOR	MAJOR				MINOR	MAJOR				MINOR	MAJOR			
LEFT TURNS				LOW	LOW		HIGH		LOW	LOW		HIGH		LOW	LOW		HIGH	
TRUCKS				LOW	LOW	HIGH	LOW	HIGH	LOW	LOW	HIGH	LOW	HIGH	LOW	LOW	HIGH	LOW	HIGH
V-2	V-1	CY	GT	LL	LL	LH	HL	HH	LL	LL	LH	HL	HH	LL	LL	LH	HL	HH
GEOMETRY 4*4																		
450	450	60	33	14.5	33.5	45.0	50.6	65.6	4.5	8.1	9.9	11.0	13.6	.68	.92	3.33	1.30	3.89
450	450	60	30	21.2	24.0	28.8	35.0	43.3	5.8	6.8	7.3	8.8	10.2	.85	.93	2.95	1.20	3.40
450	450	60	27	19.4	21.4	26.1	36.0	44.2	5.9	6.2	6.8	9.1	10.4	.90	.83	2.46	1.21	3.02
450	450	70	38	14.0	32.2	43.6	45.2	60.2	5.6	8.4	10.4	11.1	13.9	.76	1.15	3.42	1.38	3.84
450	450	70	35	20.8	25.3	30.1	32.3	40.5	7.0	7.4	8.2	9.3	10.8	.98	1.28	3.17	1.41	3.48
450	450	70	31	23.6	21.5	26.3	32.1	40.3	7.8	6.7	7.5	9.4	11.0	1.19	1.12	2.62	1.36	3.03
450	450	80	44	20.4	38.7	50.1	51.5	66.4	5.6	9.4	11.7	11.9	14.9	.75	1.48	3.88	1.56	4.15
450	450	80	40	25.9	33.6	38.4	40.4	48.6	6.8	8.6	9.7	10.3	12.1	.84	1.56	3.58	1.54	3.74
450	450	80	36	29.5	29.5	34.2	39.8	48.0	8.0	7.9	9.0	10.3	12.2	1.06	1.51	3.14	1.60	3.41
450	600	70	35	18.3	49.2	64.5	64.8	83.6	5.7	11.7	13.9	14.6	17.5	.96	1.53	5.11	1.91	5.67
450	600	70	31	28.1	35.7	44.4	45.3	57.4	7.9	9.3	10.3	11.3	13.0	1.16	1.34	4.52	1.61	4.97
450	600	70	28	39.0	29.4	38.0	42.5	54.5	9.6	8.0	9.0	10.8	12.6	1.91	1.00	3.79	1.37	4.35
450	600	80	40	19.7	49.3	64.6	60.8	79.6	7.1	12.2	14.7	14.9	18.1	1.22	1.59	5.03	1.82	5.45
450	600	80	36	29.8	38.4	47.0	43.9	56.0	9.5	10.1	11.3	11.9	13.9	1.50	1.50	4.55	1.63	4.86
450	600	80	32	45.8	30.6	39.3	39.7	51.8	12.0	8.6	9.9	11.2	13.2	2.42	1.07	3.73	1.30	4.14
450	600	90	45	25.9	51.8	67.1	63.1	81.9	6.7	12.8	15.5	15.2	18.7	1.05	1.94	5.51	2.03	5.78
450	600	90	40	35.6	42.4	51.0	47.6	59.8	9.1	10.8	12.3	12.4	14.6	1.25	1.73	4.92	1.71	5.08
450	600	90	36	52.6	34.2	42.8	43.0	55.1	11.9	9.3	10.8	11.7	13.9	2.18	1.40	4.19	1.49	4.46
GEOMETRY 5*4																		
450	450	60	33	10.3	16.8	23.5	26.2	36.4	3.7	6.3	7.1	7.2	8.7	.55	.97	3.26	1.00	3.48
450	450	60	30	15.9	12.1	12.1	15.5	19.0	5.1	5.5	5.1	5.5	5.9	.72	.95	2.86	.88	2.97
450	450	60	27	16.2	11.2	11.2	18.2	21.6	5.2	5.0	4.6	5.9	6.3	.79	.88	2.39	.91	2.61
450	450	70	38	14.5	14.3	20.9	19.6	29.8	6.2	6.0	7.0	6.7	8.5	.71	1.02	3.18	.91	3.26
450	450	70	35	20.2	12.3	12.3	11.5	15.0	7.6	5.5	5.3	5.3	5.9	.94	1.13	2.91	.92	2.87
450	450	70	31	25.1	10.2	10.2	13.1	16.5	8.4	4.9	4.7	5.6	6.2	1.16	1.00	2.38	.89	2.45
450	450	80	44	20.8	19.5	26.2	24.7	34.9	5.9	6.8	8.1	7.2	9.3	.95	1.18	3.48	.92	3.40
450	450	80	40	25.1	19.3	19.4	18.4	21.9	7.1	6.5	6.6	6.1	7.0	1.05	1.24	3.15	.88	2.97
450	450	80	36	30.8	17.0	17.0	19.6	23.1	8.3	5.9	6.0	6.3	7.2	1.28	1.21	2.73	.96	2.66
450	600	70	35	12.2	27.9	38.5	35.8	49.9	4.8	9.0	10.2	9.8	11.8	.79	1.64	5.11	1.68	5.32
450	600	70	31	20.9	19.3	23.2	21.1	28.5	7.1	7.1	7.1	7.0	7.8	.99	1.42	4.49	1.35	4.60
450	600	70	28	34.0	14.7	18.5	20.1	27.4	8.8	5.9	5.9	6.7	7.5	1.75	1.11	3.79	1.14	4.00
450	600	80	40	18.3	26.8	37.3	30.7	44.7	7.7	8.9	10.3	9.5	11.7	1.12	1.53	4.86	1.42	4.93
450	600	80	36	27.3	20.8	24.7	18.6	25.9	10.1	7.2	7.5	7.0	8.0	1.41	1.41	4.35	1.19	4.32
450	600	80	32	45.4	14.8	18.6	16.1	23.5	12.6	5.9	6.2	6.5	7.5	2.35	1.01	3.56	.90	3.63
450	600	90	45	24.3	28.1	38.7	31.8	45.8	6.9	9.3	11.0	9.7	12.1	1.20	1.71	5.17	1.45	5.09
450	600	90	40	32.9	23.6	27.4	21.1	28.5	9.3	7.8	8.3	7.3	8.6	1.41	1.47	4.55	1.11	4.37
450	600	90	36	52.0	17.1	21.0	18.3	25.6	12.1	6.4	6.9	6.8	8.0	2.35	1.16	3.85	.91	3.77

TABLE 5-12B. (CONTINUED)

INTERSECTION ENVIRONMENT				TOTAL HC EMISSION (GRAMS)					TOTAL NOX EMISSION (GRAMS)					TOTAL FUEL FLOW (KILOGRAMS)				
STREET				MINOR	MAJOR				MINOR	MAJOR				MINOR	MAJOR			
LEFT TURNS				LOW	LOW		HIGH		LOW	LOW		HIGH		LOW	LOW		HIGH	
TRUCKS				LOW	LOW	HIGH	LOW	HIGH	LOW	LOW	HIGH	LOW	HIGH	LOW	LOW	HIGH	LOW	HIGH
V-2	V-1	CY	GT	LL	LL	LH	HL	HH	LL	LL	LH	HL	HH	LL	LL	LH	HL	HH
GEOMETRY 4*4																		
450	450	60	33	38	51	82	72	111	103	90	157	104	180	6.6	7.9	11.6	9.8	14.3
450	450	60	30	49	46	66	58	85	112	76	135	83	151	7.6	7.0	9.6	8.1	11.4
450	450	60	27	43	43	60	60	84	113	76	127	85	144	7.2	7.0	9.3	8.5	11.5
450	450	70	38	38	54	87	72	112	98	86	154	100	177	6.3	8.3	12.1	9.9	14.4
450	450	70	35	49	53	74	61	90	109	77	138	84	154	7.4	7.7	10.3	8.4	11.7
450	450	70	31	49	49	68	62	88	113	76	129	85	147	7.4	7.8	10.1	8.9	11.9
450	450	80	44	42	58	92	72	113	95	83	154	97	176	6.9	8.6	12.4	9.8	14.3
450	450	80	40	51	60	83	65	95	100	78	141	85	156	7.7	8.5	11.1	8.9	12.1
450	450	80	36	52	55	75	65	91	105	77	132	86	149	7.9	8.4	10.7	9.2	12.2
450	600	70	35	42	88	138	109	167	103	111	227	129	253	7.1	12.4	18.5	14.5	21.3
450	600	70	31	55	71	110	83	129	113	86	193	95	211	8.3	10.4	15.3	11.6	17.2
450	600	70	28	73	60	95	76	119	131	76	176	88	196	10.2	9.5	14.1	11.1	16.4
450	600	80	40	45	90	141	107	166	102	103	221	120	246	7.3	12.5	18.6	14.2	21.0
450	600	80	36	60	75	116	84	131	114	82	192	92	209	8.6	10.7	15.6	11.5	17.1
450	600	80	32	84	63	100	76	120	138	70	172	82	192	11.0	9.7	14.3	11.0	16.3
450	600	90	45	47	92	145	106	165	95	99	218	116	243	7.5	12.7	18.9	14.1	20.9
450	600	90	40	61	79	121	84	133	104	78	189	87	207	8.8	11.2	16.1	11.7	17.3
450	600	90	36	86	65	103	74	119	127	66	169	77	189	11.4	10.0	14.6	10.9	16.3
GEOMETRY 5*4																		
450	450	60	33	32	39	66	49	82	99	110	173	119	191	6.1	6.9	10.1	7.7	11.6
450	450	60	30	41	37	52	38	60	109	95	151	98	162	6.9	6.5	8.5	6.4	9.2
450	450	60	27	38	35	47	40	59	109	96	143	99	156	6.7	6.3	8.1	6.7	9.2
450	450	70	38	38	38	66	44	79	99	102	168	112	186	6.4	6.8	10.1	7.3	11.2
450	450	70	35	47	39	55	36	59	110	93	151	95	161	7.3	6.7	8.8	6.3	9.1
450	450	70	31	49	37	50	38	58	115	93	142	97	155	7.6	6.7	8.4	6.7	9.1
450	450	80	44	44	41	70	43	79	101	96	163	106	181	7.2	7.1	10.3	7.2	11.1
450	450	80	40	51	46	63	39	63	106	91	150	93	161	7.8	7.5	9.5	6.7	9.4
450	450	80	36	55	42	56	40	61	111	90	142	94	154	8.3	7.2	8.9	6.9	9.3
450	600	70	35	36	72	117	82	134	98	130	243	142	263	6.4	11.0	16.6	11.9	18.2
450	600	70	31	47	58	92	59	99	108	104	209	109	221	7.3	9.4	13.8	9.5	14.6
450	600	70	28	67	48	78	53	90	127	95	192	102	206	9.5	8.4	12.4	8.8	13.6
450	600	80	40	45	69	115	75	128	102	119	233	131	253	7.2	10.6	16.2	11.1	17.4
450	600	80	36	57	58	92	55	96	114	97	203	102	216	8.3	9.3	13.6	8.9	14.0
450	600	80	32	84	46	77	47	86	138	86	184	92	199	11.0	8.1	12.2	8.3	13.1
450	600	90	45	49	70	118	73	127	99	111	226	123	247	7.7	10.8	16.4	11.0	17.3
450	600	90	40	61	61	97	54	97	107	89	197	94	210	8.7	9.7	14.1	9.1	14.2
450	600	90	36	89	47	80	45	85	131	78	178	84	192	11.6	8.4	12.5	8.2	13.0

oxides of nitrogen are found to be almost uncorrelated with vehicle delay and trip time.

The regressions of vehicle emissions and fuel consumption per vehicle-mile on the average trip time per mile of each vehicle passing through the intersection are listed in Table 5-13. The coefficients indicate that trip time increases the formation of CO, HC and FF but decreases NOx. The R^2 for CO and NOx are very low while the R^2 for HC and FF are somewhat higher. The regression of total delay on stop delay and the regression of emissions, fuel consumption and queue length on the total delay per vehicle are also listed in Table 5-13. Stop delay is found to be highly correlated with total delay. Therefore, the stop delay which is easily observed in the field can be used to estimate the total delay incurred in the intersection system. This study also agrees with the previous finding that total delay per vehicle is a good predictor for queue length, hydrocarbons, and fuel consumption as raised by Ismart. But delay did not closely predict CO and NOx emissions.

One possible reason that delay or trip time was not correlated with CO and NOx but highly correlated with HC is that vehicle delay may cause heterogeneous temperature and mixture conditions in the engine. More HC is produced in the varying engine operating situation that occurs when the vehicle is delayed while more CO and NOx are produced at high engine operating temperatures. The correlations between fuel consumption and delay or trip time can be reasoned as follows: increased delay causes longer trip times, and longer trip time means increased fuel consumption. Another reason that delay and trip time alone was not correlated with CO and NOx is that delay does not reliably indicate the effect of trucks in the traffic flow, but an increase in trucks had a decisive impact on these emissions.

TABLE 5-13. CORRELATIONS BETWEEN EMISSIONS, FUEL FLOW, QUEUE LENGTHS, AND DELAY

DEPENDENT VARIABLE Y	INDEPENDENT VARIABLE X	REGRESSION EQUATION	R2
CO (GRAMS/VEH-MILE)	TRIP TIME (SEC/MILE)	Y=19.9698 + 0.1090X	0.0734
HC (GRAMS/VEH-MILE)	TRIP TIME (SEC/MILE)	Y= 0.0888 + 0.005242X	0.6104
NOX (GRAMS/VEH-MILE)	TRIP TIME (SEC/MILE)	Y= 3.4838 - 0.002093X	0.0208
FF (GRAMS/VEH-MILE)	TRIP TIME (SEC/MILE)	Y=96.0277 + 0.4888X	0.4444
TOTAL DELAY (SEC/VEH)	STOP DELAY (SEC/VEH)	Y= 0.8421 + 1.8190X	0.8591
CO (GRAMS/VEH)	TOTAL DELAY (SEC/VEH)	Y= 5.4360 + 0.2130X	0.3250
HC (GRAMS/VEH)	TOTAL DELAY (SEC/VEH)	Y= 0.1271 + 0.006527X	0.8137
NOX (GRAMS/VEH)	TOTAL DELAY (SEC/VEH)	Y= 0.5314 + 0.00003233X	0.1999
FF (GRAMS/VEH)	TOTAL DELAY (SEC/VEH)	Y=26.5106 + 0.6612X	0.7477
AVERAGE QUEUE (VEHICLES)	TOTAL DELAY (SEC/VEH)	Y=-0.0574 + 0.08635X	0.7178
MAXIMUM QUEUE (VEHICLES)	TOTAL DELAY (SEC/VEH)	Y= 1.8033 + 0.2163X	0.8149

Therefore, the improvements on intersection geometry or signal operation which can reduce traffic delay may reduce the HC emission and fuel consumption but have little to do with the emissions of CO and NOx.

Cohen and Euler [Ref 22] indicated that the cycle length which minimizes delay also minimizes fuel consumption and hydrocarbon and carbon monoxide emissions. The predictive values listed in Appendices E and F generally agree with this finding. The lowest level of cycle time selected in this experiment generally gives lower delay, hydrocarbon emissions, and fuel consumption than the medium and high levels do. But the reduction in delay, HC emissions, and fuel consumption that can be achieved by optimization of cycle time varies with the other factors which together define the intersection environment. Roughly speaking, the overall reduction of hydrocarbon emissions and fuel consumption that was produced by the optimization of cycle time was not more than about five percent. In this experiment, the optimization of green split was also found to reduce emissions and fuel consumption.

CHAPTER 6. EXPERIMENT DESIGNS AND RESULTS FOR THE TWO-PHASE FULL-ACTUATED SIGNALIZED INTERSECTIONS AND THE ALL-WAY STOP-SIGN-CONTROLLED INTERSECTION

DESIGN OF EXPERIMENTS

The major experiment, described in Chapter 5, provided data for exploring the effects of intersection geometry, signal timing, and traffic stream characteristics on the emissions, fuel consumption, delay and queue length responses at two-phase pretimed signalized intersections. Two other experiments were designed to allow comparison of the effects of different types of traffic control on the production of these responses. The intersection environment as defined by geometry and traffic stream characteristics, was kept the same or made similar.

The two types of controls selected for comparison include full-actuated signals and all-way stop signs. Under full-actuated control the duration of the green indication on each signal phase varies between a minimum assured green interval and a maximum extension interval in response to the momentary traffic demand as indicated by detectors in the intersection approach lanes. All-way stop-sign control simply requires drivers to obey the basic right-of-way rules and respond to the static and dynamic intersection situation at the time of arrival on an approach.

These two experiments were designed with only two levels for each factor and with the same traffic stream characteristics on all four inbound approaches. Each simulation run thus produces four replications of each observed response on an approach basis. The intersection geometries which were selected for study of full-actuated signal control are 4 x 4 and 6 x 6. These configurations occur frequently in practice and provide four replications of each observed response for the simulation experiment. They may also indicate the effects of the difference in maneuvering space for traffic on 2-lane and 3-lane approaches. As in the major experiment, right turns on red were allowed and the yellow interval was set at 4 seconds.

The operating factors for full-actuated signal control include the setting of the initial interval, the vehicle interval, the maximum extension, and the location of the vehicle detectors. For an approach speed limit of 30 mph, appropriate signal controller settings have been suggested as 10 seconds for the initial interval, 3.5 second for the vehicle interval and a 120 feet setback of a 6' x 6' detector from the stop line [Ref 45]. This detector placement provides to the signal controller an early indication of a vehicle arrival and thus may allow vehicles which are at the head of an approaching queue to enter the intersection without stopping. It also requires a minimum assured green time of 13.5 seconds (initial interval plus vehicle interval) to dispatch up to about six vehicles which may be stored within the 120 feet between the stop line and the detector. Under light traffic demand, some of this green time might be wasted. While it is recognized that this detector placement and configuration might not be optimum for all situations, it was used in this study for comparison purposes.

Maximum extension is a selected time value that is set on a full-actuated signal controller to insure that the green indication will be transferred after this amount of time has elapsed following the detection of a vehicle on an opposing phase. When traffic flow on the green indication is high, continuous vehicle arrivals over the detectors extend the green one vehicle interval at a time up to the maximum extension (max out) and make the full-actuated controller perform like a pretimed controller with all green phases equal in duration to the maximum extension time.

In the full-actuated signal experiment, the high volume level of 600 vehicles per hour per lane was used to check whether pretimed and full-actuated signals both perform the same at this level of traffic volume. It is expected that when traffic volume is low, less frequent vehicle arrivals will make the full-actuated controller have more gap-outs (no arrival within the vehicle interval) than max-outs. A traffic volume of 300 vehicles per hour per lane was used in the experiment to represent the low traffic volume level. Since these volume levels are the same as those used in the major experiment with the pretimed signal, a comparison can be made to indicate whether the cycle time set on the pretimed controller fits or over-supplies the traffic demand. The low and high levels of maximum extension for 300 vphpl volume were set at 21 and 31 seconds to compare with the 50 and 70 seconds of cycle time in the pretimed signal at a 50 percent green split. The low and high levels of maximum extension for 600 vphpl volume were 31 and 41 seconds to compare with the 70 and 90 seconds of cycle time in the pretimed signal.

The low and high levels of left turns used in the second experiment were, as before, no left turns and 80 percent of left-turn capacity, respectively. Left-turn capacity is listed in Table 2-3 for the various intersection situations. Truck percentages for low and high levels were no trucks and 10 percent of approach volume, respectively.

For all-way stop-sign control, intersection type 4 x 4 was the only geometry considered. This configuration was included in both of the other experiments and thus can be compared with the other types of traffic control. There are only three variable factors which need to be included in the experiment for all-way stop-sign controlled intersections. These all relate to traffic stream characteristics and are traffic volume, left turns, and truck percentages. No variable geometric factors or traffic control factors were included. All-way stop-sign controlled 4 x 4 intersections generally cannot process more than about 2500 vehicles per hour without left turns and trucks. The low and high levels of traffic volume, on an approach basis, for the stop-sign control experiment were set at 250 vph and 500 vph, respectively. The low and high levels of left turns were no left turns and 96 left turns per hour, respectively. Trucks percentages for low and high levels were no trucks and 10 percent of the approach volume, respectively.

The two experiments for the full-actuated signalized intersections and for the all-way stop-sign controlled intersection were designed as a 2^5 factorial and a 2^3 factorial, respectively. As discussed in Chapter 3, a 2^5 factorial can have a one half-fractional replication design, but the 2^3 factorial should be designed as a full factorial. The defining contrast for the 2^5 factorial experiment and the selected experimental conditions for both experiments are listed in Table 6-1. Since variance reduction by blocking headways with common streams proved to have a negligible effect in the major experiment, this technique was not incorporated into the designs of these two experiments.

The effects which can be estimated by these designs of experiments are listed in Table 6-2. Only main effects and first-order interactive effects can be estimated in the experiment for full-actuated signals with the fractional replication design. These effects plus the second-order interactive effects can be estimated in the full-factorial experiment for the all-way stop-sign controlled intersection.

TABLE 6-1. SELECTED EXPERIMENTAL CONDITIONS FOR THE TWO MINOR EXPERIMENTS

SECOND EXPERIMENT
FOR FULL-ACTUATED SIGNALIZED INTERSECTIONS 4*4 AND 6*6

NO.	FACTOR ABCDE	NO.	FACTOR ABCDE	NO.	FACTOR ABCDE	NO.	FACTOR ABCDE
1	00000	5	01001	9	10001	13	11000
2	00011	6	01010	10	10010	14	11011
3	00101	7	01100	11	10100	15	11101
4	00110	8	01111	12	10111	16	11110

DEFINING CONTRAST FOR FRACTIONAL REPLICATION DESIGN : ABCDE

THIRD EXPERIMENT
FOR ALL-WAY STOP SIGNS CONTROLLED INTERSECTION 4*4

NO.	FACTOR CDE	NO.	FACTOR CDE	NO.	FACTOR CDE	NO.	FACTOR CDE
1	000	3	010	5	100	7	110
2	001	4	011	6	101	8	111

NO FRACTIONAL REPLICTION DESIGN IS ALLOWED.

WHERE, FACTOR A : SIZE (NUMBER OF LANES)
FACTOR B : MAXIUM EXTENSION OF FULL-ACTUATED SIGNAL
FACTOR C : LANE VOLUME
FACTOR D : LEFT TURNS
FACTOR E : TRUCK PERCENTAGES

TABLE 6-2. EFFECTS CAN BE ESTIMATED IN THE TWO MINOR EXPERIMENTS

SECOND EXPERIMENT
FOR FULL-ACTUATED SIGNALIZED INTERSECTIONS 4*4 AND 6*6

NO.	EFFECT	NO.	EFFECT
1	GRAND MEAN	9	SIZE * LT
2	SIZE	10	SIZE *TRUCK
3	MAX GT	11	MAX GT *VOLUME
4	VOLUME	12	MAX GT * LT
5	LT	13	MAX GT *TRUCK
6	TRUCK	14	VOLUME * LT
7	SIZE *MAX GT	15	VOLUME *TRUCK
8	SIZE *VOLUME	16	LT *TRUCK

THIRD EXPERIMENT
FOR ALL-WAY STOP SIGNS CONTROLLED INTERSECTION 4*4

NO.	EFFECT	NO.	EFFECT
1	GRAND MEAN	5	VOLUME * LT
2	VOLUME	6	VOLUME *TRUCK
3	LT	7	LT *TRUCK
4	TRUCK	8	VOLUME * LT * TRUCK

Each of the selected experimental conditions was simulated by the TEXAS-II Model only once as in the major experiment. One replication of each observation in the 2^5 factorial experiment with a fractional replication design has zero degrees of freedom for the error term to conduct the ANOVA analysis. The responses which have only one replication of each observation include all delays and the emissions and fuel consumption responses that are based on the intersection system and the intersection proper. Only the responses that were observed in inbound and outbound lanes and in the buckets can be analyzed because there are four replications each. The 22 responses which can be analyzed are listed in Table 6-3, including eight delays, two queue lengths, and twelve responses about emissions and fuel consumption.

ANALYSIS OF VARIANCE AND PREDICTIVE MODELS

Data developed through the two experiments were analyzed using analysis of variance (ANOVA) and significant effects for each response were incorporated into a series of predictive models. The possible effects determined by the design of each experiment and analyzed by ANOVA include the main effects of the selected factors and their interactive effects. In the actual signal experiment, because fractional replication design is applied, only the first order interactive effects can be analyzed. The full factorial design of the stop sign experiment permitted analyses of first and second order interactive effects. As defined in Chapter 3, the main effect of a two-level factor A is one half the difference between the observed response value at high and low levels of the factor. The first order interactive effect AB is to determine whether the main effect A is consistent over the two levels of factor B. The first interactive effect AB is expressed as one half the difference between the main effect A at the high level of B and the main effect A at the low level of B. The second order interactive effect ABC

TABLE 6-3. LIST OF THE TWENTY-TWO APPROACH RESPONSES WHICH WERE OBSERVED FOR THE TWO MINOR EXPERIMENTS

NO.	SYMBOL	APPROACH RESPONSES	UNITS
1	ATDA	AVERAGE TOTAL DELAY OF ALL VEHICLES ON INBOUND APPROACH	SECONDS/VEHICLE
2	ATDL	AVERAGE TOTAL DELAY OF LEFT TURNS ON INBOUND APPROACH	SECONDS/VEHICLE
3	ATDR	AVERAGE TOTAL DELAY OF RIGHT TURNS ON INBOUND APPROACH	SECONDS/VEHICLE
4	ATDS	AVERAGE TOTAL DELAY OF STRAIGHTS ON INBOUND APPROACH	SECONDS/VEHICLE
5	ASDA	AVERAGE STOP DELAY OF ALL VEHICLES ON INBOUND APPROACH	SECONDS/VEHICLE
6	ASDL	AVERAGE STOP DELAY OF LEFT TURNS ON INBOUND APPROACH	SECONDS/VEHICLE
7	ASDR	AVERAGE STOP DELAY OF RIGHT TURNS ON INBOUND APPROACH	SECONDS/VEHICLE
8	ASDS	AVERAGE STOP DELAY OF STRAIGHTS ON INBOUND APPROACH	SECONDS/VEHICLE
9	QAVG	AVERAGE QUEUE LENGTH ON APPROACH	NUMBER OF VEHICLES
10	QMAX	MAXIMUM QUEUE LENGTH ON APPROACH	NUMBER OF VEHICLES
11	COIP	TOTAL CO EMISSION ON INBOUND APPROACH	KILOGRAMS/15 MINUTES
12	HCIP	TOTAL HC EMISSION ON INBOUND APPROACH	GRAMS/15 MINUTES
13	NOIP	TOTAL NOX EMISSION ON INBOUND APPROACH	GRAMS/15 MINUTES
14	FFIP	TOTAL FUEL FLOW ON INBOUND APPROACH	KILOGRAMS/15 MINUTES
15	COOP	TOTAL CO EMISSION ON OUTBOUND APPROACH	KILOGRAMS/15 MINUTES
16	HCOP	TOTAL HC EMISSION ON OUTBOUND APPROACH	GRAMS/15 MINUTES
17	NOOP	TOTAL NOX EMISSION ON OUTBOUND APPROACH	GRAMS/15 MINUTES
18	FFOP	TOTAL FUEL FLOW ON OUTBOUND APPROACH	KILOGRAMS/15 MINUTE
19	COBK	TOTAL CO EMISSION ON INBOUND BUCKET NEAREST INTERSECTION	KILOGRAMS/15 MINUTES
20	HCBK	TOTAL HC EMISSION ON INBOUND BUCKET NEAREST INTERSECTION	GRAMS/15 MINUTES
21	NOBK	TOTAL NOX EMISSION ON INBOUND BUCKET NEAREST INTERSECTION	GRAMS/15 MINUTES
22	FFBK	TOTAL FUEL FLOW ON INBOUND BUCKET NEAREST INTERSECTION	KILOGRAMS/15 MINUTES

is to indicate whether the first order interactive effect BC is consistent over the two levels of A. The second interactive effect ABC is expressed as one half the difference between the first order interactive effect BC at the high level A and the first order interactive effect BC at the low level of A. The significance of each effect is determined by the amount of observed variations it explains. The unexplained variability is lumped as the error term and used to indicate the measures of predictive capability for each model. The values of all the effects for the 22 responses in each of the two minor experiments and the significance of these effects are listed in Table 6-4.

EFFECTS OF FACTORS IN THE FULL-ACTUATED SIGNAL EXPERIMENT

Within the experiment for full-actuated signalized intersections, an increase in intersection size reduced the average delay per vehicle and queue length but increased the total emissions and fuel consumption. Intersection size increased the emissions of NOx but decreased the emissions of HC into the bucket nearest the stop line.

The duration of maximum green, as set in this experiment, caused no appreciable effects for most responses except to increase by a slight amount stop delay, maximum queue length, and the emissions of HC into the stop-line bucket. No matter whether the full-actuated signal performed like a pretimed signal with fixed cycle time when traffic volumes were at high levels, or provided flexible service to traffic when traffic volume was low, the effect of maximum green appeared to be negligibly small.

More traffic volume per lane increased delay, queue lengths, fuel consumption, and emissions for all directional movements except for total CO on the outbound approach which was not affected. Left turns had a strong impact on vehicle responses on the inbound lanes but no effects on vehicle

TABLE 6-4. SIGNIFICANT EFFECTS IDENTIFIED FOR EACH RESPONSE IN THE TWO MINOR EXPERIMENTS

SECOND EXPERIMENT FOR FULL-ACTUATED SIGNALIZED INTERSECTIONS 4*4 AND 6*6

RESPONSE	AVERAGE TOTAL DELAY ON INBOUND APPROACH				AVERAGE STOP DELAY ON INBOUND APPROACH				QUEUE LENGTH		TOTAL
EFFECT	AVERAGE 1 ATDA	LEFT 2 ATDL	RIGHT 3 ATDR	STRAIGHT 4 ATDS	AVERAGE 5 ASDA	LEFT 6 ASDL	RIGHT 7 ASDR	STRAIGHT 8 ASDS	AVERAGE 9 QAVG	MAXIMUM 10 QMAX	CO 11 COIP
GRAND MEAN	29.45	29.03	28.63	28.77	13.44	19.40	10.55	13.10	2.61	8.56	3.18
SIZE	-9.47***	-3.27.	-7.37***	-9.52***	-2.95***	-.73	-1.89**	-3.00***	-.74**	-2.16***	.44***
MAX GT	.58	2.46	.02	.44	1.18+	1.93	.94.	1.04+	.22	.57.	-.04
VOLUME	14.39***	9.53***	15.98***	14.96***	4.93***	5.34*	5.76***	5.33***	1.77***	4.29***	1.63***
LT	4.50*	29.03***	2.98*	3.79+	2.57***	19.40***	.92.	2.03**	.14	1.49***	.26**
TRUCK	.76	2.05	.38	.72	.37	1.40	.26	.30	.17	.16	1.41***
SIZE *MAX GT	.51	.09	.29	.50	-.11	.46	-.40	-.13	-.06	-.09	-.11.
SIZE *VOLUME	-8.18***	-4.84+	-6.26***	-8.38***	-2.77***	-2.97.	-1.46*	-2.86***	-.71**	-1.93***	.05
SIZE * LT	-2.32.	-3.27.	-1.48	-2.25.	-1.35*	-.73	-.52	-1.34*	.08	-.89*	-.05
SIZE *TRUCK	.05	.73	.37	-.10	.02	.95	.39	-.11	-.09	.03	.49***
MAX GT *VOLUME	-.29	-.73	-.30	-.17	.30	-.95	.33	.41	.13	.13	-.03
MAX GT * LT	.23	2.46	-.75	.16	.32	1.93	-.52	.26	.12	0	-.29***
MAX GT *TRUCK	1.58	4.84+	.65	1.76	1.01.	2.97.	.20	1.10+	-.13	.63+	.02
VOLUME * LT	1.97	9.53***	1.51	2.74.	.94.	5.34*	.32	1.54*	-.03	1.06**	.26***
VOLUME *TRUCK	.51	-.09	.15	.59	.33	-.46	.09	.41	.17	.19	.64***
LT *TRUCK	-.37	2.05	-.52	-.44	.26	1.40	.24	.19	.07	.03	.04

RESPONSE	AMOUNT ON INBOUND APPROACH			TOTAL AMOUNT ON OUTBOUND APPROACH				AVERAGE AMOUNT ON BUCKET			
EFFECT	HC 12 HCIP	NOX 13 NOIP	FF 14 FFIP	CO 15 COOP	HC 16 HCOP	NOX 17 NOOP	FF 18 FFOP	CO 19 COBK	HC 20 HCBK	NOX 21 NOBK	FF 22 FFBK
GRAND MEAN	88.53	177.88	12.75	.84	28.70	88.65	5.99	.41	11.08	17.23	1.24
SIZE	4.93*	39.06***	1.42***	.17***	3.29***	26.50***	1.15***	.01.	-.17*	1.22***	0
MAX GT	.55	-1.60	.01	-.01	-.26	-.55	-.01	-0	.14+	-.28	0
VOLUME	47.62***	59.15***	6.07***	.04	8.67***	12.75***	1.70***	.15***	4.10***	4.53***	.45***
LT	7.41**	5.89***	.71**	-.03	-.14	.45	-.01	.02*	.68***	.33	.06***
TRUCK	15.60***	46.00***	1.95***	.47***	6.76***	23.86***	.96***	.16***	1.10***	2.68***	.11***
SIZE *MAX GT	-.07	-1.87.	-.02	-.07+	-.24	.13	-.01	-.01	-.04	.05	-0
SIZE *VOLUME	-3.97.	6.95***	-.08	-0	1.11**	6.34*	.39***	.02+	-.05	.77*	.01
SIZE * LT	-2.11	-1.83.	-.22	-.01	.09	.49	.02	-.01	-.13+	-.10	-.01.
SIZE *TRUCK	3.66.	6.76***	.39+	.15***	1.71***	6.81**	.24***	.02+	.16*	.05	.02*
MAX GT *VOLUME	-.22	-.43	-.03	.01	.04	-.28	-0	-0	-.20*	-.31	-.03**
MAX GT * LT	-1.98	-3.79**	-.21	-0	-.75+	-3.88.	-.13**	-.02*	-.09.	-.22	-.01.
MAX GT *TRUCK	1.83	1.17	.17	-.01	-.43	-.40	-.04	-0	-.07	-.01	-.01.
VOLUME * LT	5.00*	4.20**	.49*	.07.	-.12	-1.10	-.04	.01	-.14+	-.17	-.01+
VOLUME *TRUCK	7.94**	23.94***	.98***	-.07+	1.12**	5.60*	.19***	.06***	.36***	.86**	.03***
LT *TRUCK	.06	1.59	-.01	-.04	-.33	-.73	-.04	.01	.09.	.02	.01

THIRD EXPERIMENT FOR ALL-WAY STOP SIGN CONTROLLED INTERSECTION 4*4

RESPONSE	AVERAGE TOTAL DELAY ON INBOUND APPROACH				AVERAGE STOP DELAY ON INBOUND APPROACH				QUEUE LENGTH		TOTAL
EFFECT	AVERAGE 1 ATDA	LEFT 2 ATDL	RIGHT 3 ATDR	STRAIGHT 4 ATDS	AVERAGE 5 ASDA	LEFT 6 ASDL	RIGHT 7 ASDR	STRAIGHT 8 ASDS	AVERAGE 9 QAVG	MAXIMUM 10 QMAX	CO 11 COIP
GRAND MEAN	16.67	9.14	17.29	16.44	8.05	4.58	7.82	8.14	1.14	2.91	415.24
VOLUME L	4.33***	2.78***	4.96***	4.11***	1.65***	1.33***	1.73***	1.50***	.57***	.81***	149.92***
LT L	1.37***	9.14***	1.51**	1.29***	.80***	4.58***	.75***	.81***	.15***	.34**	-7.71
TRUCK L	-.29.	-.57+	-.63.	-.07	-.20+	-.32**	-.41**	-.09	-.02	-.03	97.32***
VOLUME * LT	1.15***	2.78***	1.55**	.94***	.68***	1.33***	.69***	.59***	.14***	.19+	-11.25
VOLUME *TRUCK	-.46+	-.73*	-.90+	-.20	-.19+	-.31*	-.44**	-.07	-.01	-0	21.39
LT *TRUCK	-.23	-.57+	-.81+	.06	-.16.	-.32**	-.43**	-.03	.03	.09	-24.08.
V * L * T	-.36.	-.73*	-.84+	-.10	-.15.	-.31*	-.37*	-.03	.02	.06	-37.61+

RESPONSE	AMOUNT ON INBOUND APPROACH			TOTAL AMOUNT ON OUTBOUND APPROACH				AVERAGE AMOUNT ON BUCKET			
EFFECT	HC 12 HCIP	NOX 13 NOIP	FF 14 FFIP	CO 15 COOP	HC 16 HCOP	NOX 17 NOOP	FF 18 FFOP	CO 19 COBK	HC 20 HCBK	NOX 21 NOBK	FF 22 FFBK
GRAND MEAN	17.45	41.43	2955.2	258.62	10.03	30.59	2041.5	102.47	4.15	4.67	455.57
VOLUME L	6.06***	9.85***	906.2***	39.27.	2.12***	6.82**	465.4***	42.17***	1.70***	1.31***	178.43***
LT L	.59*	-.23	52.2.	-22.88	-.06	.36	17.7	6.04**	.32***	.18+	28.86***
TRUCK L	2.72***	12.29***	413.4***	135.75***	2.56***	9.61***	344.0***	-.50	.16*	1.31***	33.64***
VOLUME * LT	.56+	-.82	29.3	-45.99+	-.39.	-1.02	-46.8.	5.88**	.27***	.06	22.35**
VOLUME *TRUCK	.29	2.66**	63.5.	11.01	.35.	1.76	50.0.	-2.28.	-.06	.29**	-.65
LT *TRUCK	-.06	.60	27.7	-24.29	-.11	.22	15.0	-2.79.	-.05	.04	-3.20
V * L * T	-.53+	-1.17.	-73.6+	-47.88+	-.51+	-1.37	-72.6*	-3.70*	-.13+	-.12.	-14.29*

*** : SIGNIFICANT AT 0.999 LEVEL
** : SIGNIFICANT AT 0.99 LEVEL
* : SIGNIFICANT AT 0.95 LEVEL
+ : SIGNIFICANT AT 0.90 LEVEL
. : SIGNIFICANT AT 0.75 LEVEL

responses on the outbound lanes. Left turns caused an increase in delay, maximum queue length, total emissions and fuel consumption on inbound lanes, as well as emissions of CO and HC and fuel consumption into the stop-line bucket. The presence of trucks, in the numbers utilized in the experiment, caused no appreciable effects to delay and queue length but did show extremely strong effects upon emissions and fuel consumption.

The interactive effect between intersection size and volume is very significant for delay and queue length. The negative interaction indicated that a high volume on a 2-lane inbound approach caused more delay and higher queue length than a high volume on a 3-lane inbound approach. The interaction between volume and left turns and the interaction between size and left turns have slightly significant effects. The interactive effects for emissions and fuel consumption generally are more complicated than those for delay and queue lengths. Both the interaction between volume and trucks and the interaction between intersection size and trucks are significantly positive, and together indicate that a 3-lane inbound approach can contain more trucks and produce more emissions and fuel consumption than a 2-lane inbound approach.

EFFECTS OF FACTORS IN THE STOP-SIGN EXPERIMENT

In the stop-sign experiment, traffic volume and left turns had strong positive effects to increase delays of all directional movements and queue lengths. Their significantly positive interactions indicated that more volume and more left turns caused more delay and longer queue lengths. Approach volume had a very strong effect on emissions and fuel consumption, except for CO emissions on the outbound lanes. Left turns had positive effects on emissions and fuel consumption, mainly into the stop-line bucket. Truck percentage increased emissions and fuel consumption significantly.

MEASURES OF PREDICTABILITY AND PREDICTIVE MODELS

The results of analysis of variance for each response in the full-actuated signal and stop-sign experiments are listed in Table 6-5,in which total variation of observed responses and the percentages of the explained variations by the six designated significance levels are incorporated. Generally, the flexible service provided by the full-actuated signal causes more variability and thus higher error terms for delay or queue length than those in the experiments for pretimed signal or all-way stop signs. For example, the percentage of unexplained variation for average total delay on the inbound approach in the second experiment is about 30 percent but they are 20 percent and 5 percent in the pretimed and stop-sign experiments, respectively. As to emissions and fuel consumption, the error term for the full-actuated signal experiment is small, but the error term for the all-way stop-sign experiment is large for CO both inbound and outbound, and NOx outbound.

Therefore, the measures of predictability indicate that the predictive models for delay and queue length at intersections controlled by full-actuated signals will not provide good results. Their percentages of explained variation by the most significant effects are very low and the ratio of standard error over the grand mean indicates that the predictions are scattered. The measures of predictability indicate, however, that the predictive models for emissions and fuel consumption at the full-actuated signal controlled intersection and the predictive models for delay and queue length at the all-way stop-sign controlled intersection will provide satisfactory results. As to the predictive models for emissions and fuel

TABLE 6-5. LIST OF ANOVA RESULTS AND MEASURES OF PREDICTABILITY FOR EACH RESPONSE IN THE TWO MINOR EXPERIMENTS

SECOND EXPERIMENT FOR FULL-ACTUATED SIGNALIZED INTERSECTIONS 4*4 AND 6*6

RESPONSE		AVERAGE TOTAL DELAY ON INBOUND APPROACH				AVERAGE STOP DELAY ON INBOUND APPROACH			QUEUE	LENGTH	TOTAL
	AVERAGE	LEFT	RIGHT	STRAIGHT	AVERAGE	LEFT	RIGHT	STRAIGHT	AVERAGE	MAXIMUM	CO
	1	2	3	4	5	6	7	8	9	10	11
	ATDA	ATDL	ATDR	ATDS	ASDA	ASDL	ASDR	ASDS	QAVG	QMAX	COIP
MEAN AND VARIATION											
SS TOTAL	36083.74	91968.49	29575.40	37684.13	4541.43	42069.43	3650.49	4759.29	413.82	2396.70	384.05
GRAND MEAN	29.45	29.03	28.63	28.77	13.44	19.40	10.55	13.10	2.61	8.56	3.18
ANOVA RESULTS											
SS[0.999,∞)	.6451	.7129	.7549	.6529	.6662	.5726	.5817	.6124	.4862	.7742	.9309
SS[0.99,0.999)	0	0	0	0	0	0	.0623	.0554	.1624	.0302	.0225
SS[0.95,0.99)	.0359	0	.0193	0	.0257	.0867	.0372	.0563	0	.0210	0
SS[0.90,0.95)	0	.0326	0	.0245	.0196	0	0	.0310	0	.0104	0
SS[0.75,0.90)	.0095	.0149	0	.0213	.0269	.0269	.0305	0	0	.0086	.0022
SS[0.,0.75)	.0144	.0151	.0134	.0079	.0073	.0223	.0218	.0076	.0306	.0024	.0017
SS ERR(0/0)	.2951	.2245	.2124	.2934	.2543	.2915	.2665	.2373	.3208	.1532	.0427
SS ERR TOTAL	10647.92	20649.09	6281.35	11055.50	1155.04	12262.24	972.92	1129.49	132.77	367.29	16.41
D.F. OF ERROR	48	48	48	48	48	48	48	48	48	48	48
M.S. ERROR	14.89	20.74	11.44	15.18	4.91	15.98	4.50	4.85	1.66	2.77	.58
MEASURES OF PREDICTABILITY											
SS[0.999,∞)	.6451	.7129	.7549	.6529	.6662	.5726	.5817	.6124	.4862	.7742	.9309
S.E./MEAN	.5057	.7145	.3996	.5275	.3650	.8239	.4267	.3703	.6372	.3232	.1840

RESPONSE	AMOUNT ON INBOUND APPROACH			TOTAL AMOUNT ON OUTBOUND APPROACH				AVERAGE AMOUNT ON BUCKET			
	HC	NOX	FF	CO	HC	NOX	FF	CO	HC	NOX	FF
	12	13	14	15	16	17	18	19	20	21	22
	HCIP	NOIP	FFIP	COOP	HCOP	NOOP	FFOP	COBK	HCBK	NOBK	FFBK
MEAN AND VARIATION											
SS TOTAL	191060.88	510755.79	3002.54	23.55	9278.24	117780.00	350.73	3.62	1220.87	2271.13	14.02
GRAND MEAN	88.53	177.88	12.75	.84	28.70	88.65	5.99	.41	11.08	17.23	1.24
ANOVA RESULTS											
SS[0.999,∞)	.8411	.9826	.9291	.7472	.9281	.7794	.9827	.8848	.9755	.8242	.9812
SS[0.99,0.999)	.0395	.0040	.0107	0	.0173	.0252	.0032	0	0	.0210	.0030
SS[0.95,0.99)	.0165	0	.0052	0	0	.0389	0	.0169	.0049	.0167	.0013
SS[0.90,0.95)	.0052	0	.0032	.0397	.0039	0	0	.0118	.0030	0	.0009
SS[0.75,0.90)	.0045	.0008	0	0	0	.0082	0	.0025	.0009	0	.0014
SS[0.,0.75)	.0041	.0009	.0028	.0121	.0032	.0015	.0009	.0052	.0004	.0106	.0005
SS ERR(0/0)	.0891	.0117	.0490	.2010	.0475	.1468	.0132	.0788	.0153	.1275	.0117
SS ERR TOTAL	17030.79	5994.70	147.18	4.73	440.27	17295.76	4.62	.28	18.62	289.65	.16
D.F. OF ERROR	48	48	48	48	48	48	48	48	48	48	48
M.S. ERROR	18.84	11.18	1.75	.31	3.03	18.98	.31	.08	.62	2.46	.06
MEASURES OF PREDICTABILITY											
SS[0.999,∞)	.8411	.9826	.9291	.7472	.9281	.7794	.9827	.8848	.9755	.8242	.9812
S.E./MEAN	.2128	.0628	.1374	.3753	.1055	.2141	.0518	.1864	.0562	.1426	.0471

TABLE 6-5. (CONTINUED)

THIRD EXPERIMENT FOR ALL-WAY STOP SIGN CONTROLLED INTERSECTION 4*4

RESPONSE	AVERAGE TOTAL DELAY ON INBOUND APPROACH				AVERAGE STOP DELAY ON INBOUND APPROACH				QUEUE LENGTH		TOTAL
	AVERAGE	LEFT	RIGHT	STRAIGHT	AVERAGE	LEFT	RIGHT	STRAIGHT	AVERAGE	MAXIMUM	CO
	1	2	3	4	5	6	7	8	9	10	11
	ATDA	ATDL	ATDR	ATDS	ASDA	ASDL	ASDR	ASDS	QAVG	QMAX	COIP
MEAN AND VARIATION											
SS TOTAL	761.63	3306.22	1176.32	671.01	135.81	808.42	166.58	117.28	12.72	34.72	1387088.0
GRAND MEAN	16.67	9.14	17.29	16.44	8.05	4.58	7.82	8.14	1.14	2.91	415.24
ANOVA RESULTS											
SS[0.999,∞)	.9225	.9586	.6686	.9253	.9009	.9714	.7722	.8853	.9235	.6103	.7370
SS[0.99,0.999)	0	0	.1276	0	0	0	.1044	0	0	.1089	0
SS[0.95,0.99)	0	.0103	0	0	0	.0157	.0268	0	0	0	0
SS[0.90,0.95)	.0090	.0064	.0593	0	.0189	0	0	0	0	.0329	.0327
SS[0.75,0.90)	.0088	0	.0106	0	.0113	0	0	0	0	0	.0133
SS[0.,0.75)	.0021	.0000	.0000	.0027	.0000	.0000	.0000	.0040	.0045	.0127	.0149
SS ERR(0/0)	.0576	.0247	.1339	.0720	.0689	.0129	.0966	.1107	.0720	.2352	.2021
SS ERR TOTAL	43.89	81.79	157.49	48.29	9.35	10.41	16.09	12.98	.92	8.16	280330.29
D.F. OF ERROR	24	24	24	24	24	24	24	24	24	24	24
M.S. ERROR	1.83	3.41	6.56	2.01	.39	.43	.67	.54	.04	.34	11680.43
MEASURES OF PREDICTABILITY											
SS[0.999,∞)	.9225	.9586	.6686	.9253	.9009	.9714	.7722	.8853	.9235	.6103	.7370
S.E./MEAN	.0812	.2020	.1481	.0862	.0776	.1432	.1047	.0903	.1754	.2004	.2603

RESPONSE	AMOUNT ON INBOUND APPROACH			TOTAL AMOUNT ON OUTBOUND APPROACH				AVERAGE AMOUNT ON BUCKET			
	HC	NOX	FF	CO	HC	NOX	FF	CO	HC	NOX	FF
	12	13	14	15	16	17	18	19	20	21	22
	HCIP	NOIP	FFIP	COOP	HCOP	NOOP	FFOP	COBK	HCBK	NOBK	FFBK
MEAN AND VARIATION											
SS TOTAL	1508.03	8831.72	33325822.	1358291.0	429.27	8551.23	11980739.	62476.33	103.17	120.93	1138473.7
GRAND MEAN	17.45	41.43	2955.21	258.62	10.03	30.59	2041.15	102.47	4.15	4.67	455.57
ANOVA RESULTS											
SS[0.999,∞)	.9353	.8990	.9527	.4342	.8220	.3454	.8953	.9107	.9527	.9082	.9500
SS[0.99,0.999)	0	.0256	0	0	0	.1738	0	.0363	0	.0226	.0141
SS[0.95,0.99)	0	0	0	0	0	0	.0140	.0071	.0083	0	.0057
SS[0.90,0.95)	.0200	0	.0052	.1038	.0190	0	0	0	.0051	.0088	0
SS[0.75,0.90)	0	.0049	.0065	.0363	.0205	0	.0126	.0066	0	.0037	0
SS[0.,0.75)	.0018	.0040	.0016	.0291	.0011	.0232	.0015	.0002	.0017	.0013	.0003
SS ERR(0/0)	.0429	.0665	.0340	.3966	.1374	.4576	.0766	.0391	.0322	.0554	.0299
SS ERR TOTAL	64.66	587.33	1133033.0	538668.59	58.98	3913.20	917864.37	2445.92	3.32	6.69	34018.30
D.F. OF ERROR	24	24	24	24	24	24	24	24	24	24	24
M.S. ERROR	2.69	24.47	47209.25	22444.52	2.46	163.05	38244.35	101.91	.14	.28	1417.43
MEASURES OF PREDICTABILITY											
SS[0.999,∞)	.9353	.8990	.9527	.4342	.8220	.3454	.8953	.9107	.9527	.9082	.9500
S.E./MEAN	.0940	.1194	.0735	.5793	.1564	.4174	.0958	.0985	.0902	.1133	.0826

consumption at all-way stop-sign controlled intersections, the measures of predictability are acceptable except for CO on both inbound and outbound lanes and NOx on outbound lanes. The predictive models for each response observed in the two experiments are listed in Table 6-6. These models are formulated using effects significant at least at the 0.95 level.

COMPARISON BETWEEN THE INFLUENCE OF PRETIMED SIGNALS AND FULL-ACTUATED SIGNALS ON VEHICLE EMISSIONS AND FUEL CONSUMPTION

The information obtained in the experiments separately for the pretimed signal and for the full-actuated signal can be combined to examine whether the full-actuated signal is superior to the pretimed signal in causing less vehicle delay, queue length, emissions, and fuel consumption generally or conditionally. The responses which can be selected for comparison are all the responses on the inbound approach, which include average total delay, maximum queue length, total emissions of CO, HC and NOx, as well as the total fuel consumption. The data used to represent the full-actuated signal are the averages of the four replications for the sixteen selected experimental conditions. The data used for comparing the pretimed signal are the averages of the predictive values for the major street and the minor street with corresponding traffic situations as used in the full-actuated signal experiment. These values and their differences are listed in Table 6-7.

Generally, the observed difference between the two signal types for the six responses are small. Some difference was observed in average total delay, in which the average vehicle at the pretimed signalized intersection incurred 2.6 seconds more delay than for the actuated control. Compared with average total delay for the sixteen intersections of 32.0 seconds, the percentage difference is small. As to the total emissions of CO and total

TABLE 6-6. PREDICTIVE MODELS FOR THE TWENTY-TWO RESPONSES IN THE TWO MINOR EXPFRIMENTS

SECOND EXPERIMENT FOR FULL-ACTUATED SIGNALIZED INTERSECTIONS 4*4 AND 6*6

RESPONSE		PREDICTIVE MODEL
1	ATDA	29.45 - 9.47 * SZ + 14.39 * VO + 4.50 * LT - 8.18 * SZ * VO
2	ATDL	29.03 + 9.53 * VO + 29.03 * LT + 9.53 * VO * LT
3	ATDR	28.63 - 7.37 * SZ + 15.98 * VO + 2.98 * LT - 6.26 * SZ * VO
4	ATDS	28.77 - 9.52 * SZ + 14.96 * VO - 8.38 * SZ * VO
5	ASDA	13.44 - 2.95 * SZ + 4.93 * VO + 2.57 * LT - 2.77 * SZ * VO - 1.35 * SZ *LT
6	ASDL	19.40 + 5.34 * VO + 19.40 * LT + 5.34 * VO * LT
7	ASDR	10.55 - 1.89 * SZ + 5.76 * VO - 1.46 * SZ * VO
8	ASDS	13.10 - 3.00 * SZ + 5.33 * VO + 2.03 * LT - 2.86 * SZ * VO - 1.34 * SZ * LT + 1.54 *VO * LT
9	QAVG	2.61 - .74 * SZ + 1.77 * VO - .71 * SZ * VO
10	QMAX	8.56 - 2.16 * SZ + 4.29 * VO + 1.49 * LT - 1.93 * SZ * VO - .89 * SZ * LT + 1.06 *VO * LT
11	COIP	3.18 + .44 * SZ + 1.63 * VO + .26 * LT + 1.41 * TR + .49 * SZ * TR - .29 *MG * LT + .26 * VO * LT + .64 * VO * TR
12	HCIP	88.53 + 4.93 * SZ + 47.62 * VO + 7.41 * LT + 15.60 * TR + 5.00 * VO * LT + 7.94 *VO * TR
13	NOIP	177.88 + 39.06 * SZ + 59.15 * VO + 5.89 * LT + 46.00 * TR + 6.95 * SZ * VO + 6.76 *SZ * TR - 3.79 * MG * LT + 4.20 * VO * LT + 23.94 * VO * TR
14	FFIP	12.75 + 1.42 * SZ + 6.07 * VO + .71 * LT + 1.95 * TR + .49 * VO * LT + .98 *VO * TR
15	COOP	.84 + .17 * SZ + .47 * TR + .15 * SZ * TR
16	HCOP	28.70 + 3.29 * SZ + 8.67 * VO + 6.76 * TR + 1.11 * SZ * VO + 1.71 * SZ * TR + 1.12 *VO * TR
17	NOOP	88.65 + 26.50 * SZ + 12.75 * VO + 23.86 * TR + 6.34 * SZ * VO + 6.81 * SZ * TR + 5.60 *VO * TR
18	FFOP	5.99 + 1.15 * SZ + 1.70 * VO + .96 * TR + .39 * SZ * VO + .24 * SZ * TR - .13 *MG * LT + .19 * VO * TR
19	COBK	.41 + .15 * VO + .02 * LT + .16 * TR - .02 * MG * LT + .06 * VO * TR
20	HCBK	11.08 - .17 * SZ + 4.10 * VO + .68 * LT + 1.10 * TR + .16 * SZ * TR - .20 *MG * VO + .36 * VO * TR
21	NOBK	17.23 + 1.22 * SZ + 4.53 * VO + 2.68 * TR + .77 * SZ * VO + .86 * VO * TR
22	FFBK	1.24 + .45 * VO + .06 * LT + .11 * TR + .02 * SZ * TR - .03 * MG * VO + .03 *VO * TR

TABLE 6-6. (CONTINUED)

THIRD EXPERIMENT FOR ALL-WAY STOP SIGN CONTROLLED INTERSECTION 4*4

RESPONSE		PREDICTIVE MODEL
1	ATDA	16.67 + 4.33 * VO + 1.37 * LT + 1.15 * VO * LT
2	ATDL	9.14 + 2.78 * VO + 9.14 * LT + 2.78 * VO * LT − .73 * VO * TR − .73 * VO * LT * TR
3	ATDR	17.29 + 4.96 * VO + 1.51 * LT + 1.55 * VO * LT
4	ATDS	16.44 + 4.11 * VO + 1.29 * LT + .94 * VO * LT
5	ASDA	8.05 + 1.65 * VO + .80 * LT + .68 * VO * LT
6	ASDL	4.58 + 1.33 * VO + 4.58 * LT − .32 * TR + 1.33 * VO * LT − .31 * VO * TR − .32 * LT * TR − .31 * VO * LT * TR
7	ASDR	7.82 + 1.73 * VO + .75 * LT − .41 * TR + .69 * VO * LT − .44 * VO * TR − .43 * LT * TR − .37 * VO * LT * TR
8	ASDS	8.14 + 1.50 * VO + .81 * LT + .59 * VO * LT
9	QAVG	1.14 + .57 * VO + .15 * LT + .14 * VO * LT
10	QMAX	2.91 + .81 * VO + .34 * LT
11	COIP	415.24 +149.92 * VO + 97.32 * TR
12	HCIP	17.45 + 6.06 * VO + 2.72 * TR
13	NOIP	41.43 + 9.85 * VO + 12.29 * TR + 2.66 * VO * TR
14	FFIP	2955.21 +906.25 * VO + 413.41 * TR
15	COOP	258.62 +135.75 * TR
16	HCOP	10.03 + 2.12 * VO + 2.56 * TR
17	NOOP	30.59 + 6.82 * VO + 9.61 * TR
18	FFOP	2041.15 +465.44 * VO + 344.30 * TR − 72.46 * VO * LT * TR
19	COBK	102.47 + 42.17 * VO + 6.04 * LT + 5.88 * VO * LT − 3.70 * VO * LT * TR
20	HCBK	4.15 + 1.70 * VO + .32 * LT + .16 * TR + .27 * VO * LT
21	NOBK	4.67 + 1.31 * VO + 1.31 * TR + .29 * VO * TR
22	FFBK	455.57 +178.43 * VO + 28.86 * LT + 33.64 * TR + 22.35 * VO * LT − 14.29 * VO * LT * TR

WHERE THE VALUE OF EACH FACTOR IS +1 WHEN AT THE HIGH LEVEL AND -1 AT THE LOW LEVEL

TABLE 6-7. COMPARISONS BETWEEN THE APPROACH RESPONSES PRODUCED AT THE PRETIMED SIGNALIZED INTERSECTION AND THOSE PRODUCED AT THE FULL-ACTUATED SIGNALIZED INTERSECTION

TRAFFIC SITUATION					AVERAGE TOTAL DELAY			MAXIMUM QUEUE LENGTH			TOTAL CO EMISSION			TOTAL HC EMISSION			TOTAL NOX EMISSION			TOTAL FF		
INT	CYC	VOL	LT	TRK	P.S.	A.S.	DIF	P.S.	A.S.	DIF	P.S.	A.S.	DIF	P.S.	A.S.	DIF	P.S.	A.S.	DIF	P.S.	A.S.	DIF
4*4	50	300	LOW	LOW	13.9	12.4	1.5	3.8	3.4	.4	.8	.5	.3	29	22	6.4	75	66	9.4	4.7	4.1	.6
4*4	50	300	HGH	HGH	22.8	18.9	3.9	5.7	4.6	1.0	1.9	1.7	.2	49	39	9.1	109	108	.1	6.8	6.2	.6
4*4	70	600	LOW	HGH	49.2	53.2	-4.0	12.7	12.4	.3	5.6	4.9	.7	115	136	-21.3	240	235	4.1	18.0	18.2	-.3
4*4	70	600	HGH	LOW	56.1	71.0	-15.0	14.9	19.9	-5.0	2.7	3.5	-.9	110	133	-22.7	137	143	-6.3	14.6	16.7	-2.1
4*4	70	300	LOW	HGH	19.9	13.8	6.1	5.0	4.3	.8	1.6	1.8	-.1	42	36	5.9	96	102	-6.5	6.1	5.8	.3
4*4	70	300	HGH	LOW	25.9	20.4	5.5	6.1	5.8	.3	1.1	.7	.4	40	29	11.0	71	69	2.5	5.6	4.7	.8
4*4	90	600	LOW	LOW	48.3	49.1	-.8	12.8	13.4	-.6	2.1	2.5	-.4	98	101	-3.4	120	120	.0	13.5	13.6	-.1
4*4	90	600	HGH	HGH	68.6	72.7	-4.1	18.3	22.1	-3.8	6.2	6.3	-.1	164	169	-5.9	255	264	-9.9	20.7	21.4	-.7
6*6	50	300	LOW	HGH	18.5	11.5	7.0	2.8	3.5	-.7	2.8	3.0	-.2	52	56	-4.3	180	176	4.2	8.6	9.2	-.6
6*6	50	300	HGH	LOW	20.4	14.0	6.4	3.3	3.8	-.5	.9	1.0	-.1	39	41	-2.8	125	128	-2.8	6.7	7.2	-.5
6*6	70	600	LOW	LOW	24.6	21.4	3.2	7.3	6.8	.6	2.5	2.2	.2	104	99	4.7	204	200	3.6	16.4	15.8	.5
6*6	70	600	HGH	HGH	40.8	28.7	12.1	11.7	9.6	2.1	8.0	8.8	-.8	177	174	2.9	360	376	-15.6	24.6	24.5	.1
6*6	70	300	LOW	LOW	18.6	12.4	6.2	4.6	4.3	.3	.9	.9	.0	45	39	6.4	125	123	1.7	7.4	6.9	.5
6*6	70	300	HGH	HGH	16.6	17.1	-.5	4.7	4.6	.1	2.9	2.8	.1	63	62	1.0	178	175	2.6	9.3	9.5	-.2
6*6	90	600	LOW	HGH	32.8	25.9	7.0	9.9	8.7	1.2	7.8	7.5	.3	154	158	6.5	340	351	-11.0	23.3	22.8	.4
6*6	90	600	HGH	LOW	35.7	28.9	6.8	11.2	10.0	1.2	3.5	2.7	.8	126	116	9.4	207	204	3.4	18.4	17.4	.9
AVERAGE					32.0	29.4	2.6	8.4	8.6	-.1	3.2	3.2	.0	88.7	88.5	.2	176	177	-1.3	12.8	12.7	.0

DIFFERENCE AT SPECIFIC SITUATIONS

	VOLUME		VOLUME		VOLUME		VOLUME		VOLUME		VOLUME	
	300	600	300	600	300	600	300	600	300	600	300	600
INT 4*4	4.2	-6.0	.6	-2.3	.2	-.2	8.1	-13.3	1.4	-3.0	.6	-.8
INT 6*6	4.8	7.3	-.2	1.3	-.1	.1	.1	5.9	1.4	-4.9	-.2	.5

WHERE CYCLE ARE 50,70,AND 90 SECONDS OF PRETIMED SIGNAL ARE EQUIVALENT OR COMPARABLE TO 21,31,AND 41 SECONDS OF MAXIMUM GREEN OF FULL-ACTUATED SIGNAL, RESPECTIVELY.

fuel consumption, the observed differences between the two signal types are virtually zero. If the differences at each condition are classified by the intersection geometry and traffic volume, the differences in responses except for delay are a little more significant, but still negligible.

The data obtained in the two experiments do not demonstrate that the two signal types at the selected operation ranges cause different amounts of vehicle emissions and fuel consumption. Analysis of other specific situations might, however, reveal significant differences due to the different types of signal control.

COMPARISON BETWEEN ALL-WAY STOP SIGN, PRETIMED SIGNALS AND FULL-ACTUATED SIGNALS CONTROL ON VEHICLE EMISSIONS AND FUEL CONSUMPTION

The information obtained in the three experiments described above indicated that all-way stop sign control could cause more HC emissions and fuel consumption than the pretimed signal control or full-actuated signal control for comparable conditions. All-way stop-sign control generally caused more traffic delay and therefore, more delay-related HC emissions and fuel consumption. Signal control generally provided higher speed for vehicles traversing the intersection and, therefore, more emissions of NOx. The data do not indicate conclusively which type of traffic control caused the least amount of CO emissions. These data are direct outputs from the TEXAS-II Model for the 4 x 4 intersections listed in Table 6-8. All approach volumes were fixed at 250 vphpl for the stop-sign experiment and 300 vphpl for the two signal experiments. Left turns were fixed at zero and 96 turning vehicles per hour. Truck percentages were zero and 10 percent of the approach volume; therefore, the actual number of trucks used in the stop-sign experiment was less than for the signal control experiments. Even though the

TABLE 6-8. COMPARISONS BETWEEN STOP-SIGN, PRETIMED SIGNAL, AND FULL-ACTUATED SIGNAL CONTROL ON VEHICLE EMISSIONS AND FUEL CONSUMPTION ON ONE INBOUND APPROACH OF A 4 * 4 INTERSECTION

	CO EMISSIONS			HC EMISSIONS			NOX EMISSIONS			FUEL CONSUMPTION		
	P.S.	A.S.	STOP	P.S.	A.S.	STOP	P.S.	A.S.	STOP	P.S.	A.S.	STOP
CASE 1	.8	.5	.9	29	22	37	75	66	49	4.7	4.1	5.2
CASE 2	.6	1.8	1.1	42	36	46	96	102	84	6.1	5.8	6.6
CASE 3	.1	0.7	1.9	40	29	80	71	69	72	5.6	4.7	8.9
CASE 4	.9	1.7	1.6	49	39	68	109	108	94	6.8	6.2	8.6

ALL FOUR CASES ARE 600 VPH PER APPROACH FOR PRETIMED-SIGNAL EXPERIMENT AND FULL-ACTUATED EXPERIMENT.
ALL FOUR CASES ARE 500 VPH PER APPROACH FOR STOP-SIGN EXPERIMMENT.
CASE 1 : NO LEFT TURNS, NO TRUCKS.
CASE 2 : NO LEFT TURNS, 10 PERCENT TRUCKS.
CASE 3 : 96 LEFT TURNS, NO TRUCKS.
CASE 4 : 96 LEFT TURNS, 10 PERCENT TRUCKS.
UNITS : KILOGRAMS/ 15 MINUTES FOR CO AND FF; GRAMS/ 15 MINUTES FOR HC AND NOX.

approach volume and the number of trucks were less, all-way stop-sign control caused more HC emissions and fuel consumption and less NOx emissions.

CHAPTER 7. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY

Concern about the possible adverse impact of vehicle emissions and fuel consumption on human health and energy conservation stimulated this research to develop practical techniques for estimating these factors quantitatively, so that existing intersection situations and proposed changes in individual intersection environments could be evaluated. The TEXAS-II simulation model, which can predict the quantities of emitted carbon monoxide (CO), hydrocarbon (HC), oxides of nitrogen (NOx), and fuel consumption was developed for use in the study and for future application. TEXAS-II is a modified and extended version of the TEXAS Model for Intersection Traffic. The TEXAS Model for Intersection Traffic generates position, speed, and acceleration values for individually-characterized driver-vehicle units as they pass through an intersection in response to their static and dynamic surroundings. In TEXAS-II, these values are then used in a data past processor called EMPRO as input to the emission and fuel consumption model (Modal Analysis Model) which was developed previously for light-duty vehicles by the Environmental Protection Agency [Ref 5] and to a series of newly-developed emissions and fuel flow models for heavy-duty vehicles that are based on engine performance data and emission bag values reported by Southwest Research Institute [Ref 28-35]. The TEXAS-II model thus produces instantaneous estimates of emissions and fuel flow with respect to location and time for each vehicle that traverses the intersection. For data presentation purposes, each lane on each intersection leg is partitioned into several buckets, and the values of estimated emissions and fuel consumption are accumulated into the appropriate bucket with respect to time.

With the TEXAS-II Model as a tool to simulate the responses which result from different intersection situations, vehicle emissions and fuel consumption data were collected in a series of simulation experiments which were designed to show the related effects of intersection geometry, traffic control system, and traffic stream characteristics. Traffic delay and queue length data were also gathered during more than 300 simulation runs of the TEXAS-II Model. These familiar traffic engineering data served as points of reference for judging the validity of the simulation results since considerable experience with observation and evaluation of these parameters has been accumulated over the years.

Three experiments using the TEXAS-II Model were designed to represent the more common intersection environments in which traffic is controlled by pretimed signals, full-actuated signals, or by all-way stop signs. The first experiment for two-phase pretimed signalized intersections, a 3^{10} factorial which represents 59,049 separate cases, was considered to be the major experiment. It incorporated ten factors which were chosen to characterize the important features of the signalized intersection environment. Each of the ten factors was assigned three levels (low, medium, and high) so that their effects could be evaluated in more detail. The ten factors include

(1) intersection size,

(2) left-turn lane (present or absent),

(3) cycle length,

(4) green split of cycle time,

(5) traffic volume on the major street,

(6) left-turn volume on the major street,

(7) truck percentage on the major street,

(8) traffic volume on the minor street,

(9) left-turn volume on the minor street, and

(10) truck percentage on the minor street.

The first two geometric factors, each considered at three levels, define nine representative intersection configurations. The two pretimed signal operating factors represent the variable features of signal timing. The last six factors represent the dominant features of the traffic streams on both the major and the minor street. This 3^{10} factorial experiment permitted exploration of the main effects of the ten factors as well as the possible interactions among them.

Two additional experiments were designed to determine whether different types of traffic control devices affect the selected responses. The scale of these experiments was much smaller than that of the major experiment. Two levels of each factor instead of three levels were used because experience gained from the major experiment indicated that most factors did not deviate significantly from a linear trend between the low and high levels. In these experiments, the factors used to characterize the traffic stream were no longer separated according to major street and minor street. Instead, the same traffic input was used on each inbound intersection approach to replicate the conditions and thus possibly reduce the experimental variations.

The second experiment dealt with a series of full-actuated, signalized-intersection environments in which five factors were incorporated (1) intersection size, (2) maximum green time, (3) traffic volume, (4) left turns, and (5) percent trucks. The third experiment dealt with the all-way, stop-sign controlled intersection environment in which only three factors were involved: (1) traffic volume, (2) left turns, and (3) percent trucks.

The fractional replication design technique was used to determine the smallest number of observations that could be used for experimentation and still obtain all the information needed for analysis. This technique is suitable when the factorial experiment contains at least five factors. A fractional factorial design made it possible to use only 243 experimental conditions for the major 3^{10} factorial experiment and sixteen conditions for the second 2^5 factorial experiment. For the third 2^3 factorial experiment, all of the eight possible conditions in a full-factorial design were used.

A variance reduction technique which involved blocking the headways of vehicle arrivals into common streams was designed into the major experiment in an attempt to increase the precision of the experimental results. The observed variations in each response attributable to this blocking effect were found to be negligible. The technique was therefore not used in the next two experiments.

All significant effects which are attributable to the factors contained in a properly designed experiment can be identified by the technique of analysis of variance. The effects attributable to the factors which passed a significance test were formulated into a series of models for predicting CO, HC, and NOx emissions, fuel consumption, delays, and queue lengths for intersection environments in which traffic is controlled by pretimed signals, full-actuated signals, or all-way stop signs. The predictive capability of each of these models was found to be generally acceptable as indicated by R^2 values greater than about 80 percent.

The predictive models for emissions and fuel consumption at pre-timed signalized intersections are based on the interactive relationship among ten factors each taken at three quantitative levels. Even though only 243 selected combinations from all $3^{10} = 59,049$ possible combinations of factors and levels were actually utilized in model building, the fractional factorial experiment design that was used to choose the proper combinations make the models applicable over the full range of factors and levels. Numerical values resulting from applying the predictive models to calculate average total delay per vehicle, total emissions of CO, HC, and NOx, and fuel consumption in fifteen minutes for the overall intersection system and separately for the inbound approaches on the major and the minor streets are listed in Appendices E and F. These values represent the relations among the ten factors each taken at three selected quantitative levels. Selected descriptors of a practical range of intersection situations are thus included in these tables for convenient use without calculation. A more refined evaluation of any specific intersection environment of practical interest can be made by calculating values with the predictive models or by running the TEXAS-II Model with the defined conditions of interest included directly as input.

CONCLUSIONS

After making about 300 runs of the TEXAS-II Model in a series of simulation experiments that were designed to investigate the effects of several selected intersection environmental factors on emissions and fuel consumption and analyzing the results, the following conclusions are drawn.

TEXAS-II, which was developed especially for use in this project, is a powerful computer model which can simulate intersection traffic behavior and the resulting vehicle emissions and fuel consumption on a very detailed, time-dependent basis. Features of this new model which are particularly useful for intersection evaluation studies include

(1) Virtually any intersection geometry of practical interest can be represented accurately.

(2) Driver-vehicle response to various types of traffic controls, ranging from the basic right-of-way rules and simple signs to complex signal systems, can be simulated.

(3) Up to 15 types of vehicles can be modeled on an individual basis, and selected traffic flow patterns can be repeatedly injected into the model to simulate and compare intersection system performance.

(4) New models for emissions and fuel consumption of heavy-duty vehicles are incorporated into TEXAS-II. Fuel type (gasoline or diesel), truck type (single unit or tractor-trailer), and vehicle mass are considered in these models. Development of these models is described in Appendix H.

An overview of the results of the simulation experiments for various intersection configurations, traffic control schemes, and traffic flow conditions in relation to emissions and fuel consumption warrants the following observations.

(1) Additional emissions and fuel consumption result from interrupted traffic flow on the intersection legs and in the intersection proper, as compared with uninterrupted flow.

(2) Vehicle acceleration tends to produce additional emissions and fuel consumption, especially CO and NOx; therefore, the emissions in the intersection proper can equal or exceed the total emissions on all inbound lanes because the intersection proper is in the acceleration zone for traffic on both intersecting streets.

(3) Improvements in intersection geometry and traffic signal operation generally reduce excess emissions and fuel consumption more on the inbound intersection lanes than in the intersection proper or on the outbound lanes.

(4) Among the ten factors that were used to characterize the influence of the intersection environment on vehicle emissions and fuel consumption, traffic volume and percent heavy-duty vehicles had the largest effect. For example, the change attributable to increasing traffic volume from 300 to 600 vehicles per hour per lane or adding 10 percent trucks to the traffic stream was much larger than the change resulting from providing special left-turn lanes or improving signal operations within practical limits.

(5) Results of the simulation experiments presented in this study generally agree with the findings from field studies reported in [Ref 19] in that (1) HC emissions and fuel consumption are linearly

correlated with the average trip time per unit distance, and (2) no correlation is found with this parameter for CO and NOx. In this study, a single-term model using average trip time per unit distance accounted for 44 percent of the variability in fuel consumption while a 37-term model explained 97 percent of the variability.

Further analysis of the detailed experimental results leads to the following statements.

(1) Truck percentage, traffic volume per lane, and the number of lanes on each approach (intersection size) are major contributors to vehicle emissions and fuel consumption at intersections and on the approaches, regardless of whether the traffic control device is a pretimed signal, a full-actuated signal, or all-way stop signs.

(2) For the same total traffic volume at signalized intersections, left turns increase the amount of emissions and fuel consumption on inbound lanes.

(3) The presence of a special left-turn lane at a two-phase pretimed signalized intersection reduces CO and HC emissions and fuel consumption, but increases the total emissions of NOx, on the inbound lanes. Quantitatively these effects are relatively small, however.

(4) For the practical range of cycle times and traffic volumes used in the experiment, longer cycle times cause more emissions and fuel consumption on the inbound lanes but less in the intersection proper.

(5) When the total available green time in the signal cycle is apportioned properly to accommodate the respective traffic demand on each phase, emissions and fuel consumption for the intersection proper and the approaches are minimized.

(6) The overall average difference between the operational effects of the pretimed signal and the full-actuated signal on vehicle emissions and fuel consumption for the rather wide range of intersection environments that were simulated in the experiments was negligible.

(7) Within the range of factors studied, average delay per vehicle and queue length are reduced significantly when more lanes and special left-turn lanes are provided or when signal operations are improved. These responses are increased significantly when traffic volume per lane and left turns increase, but only slightly when truck percentage increases.

RECOMMENDATIONS

For further study, the following features can be considered.

(1) The Modal Analysis Model for light-duty vehicles should be updated to represent the performance of the present model years of passenger cars.

(2) The emissions and fuel consumption models for heavy-duty vehicles should be validated by comparing predicted values with field collected data.

(3) A suitable dispersion model should be combined with the output from the TEXAS-II Model to predict pollutant concentrations that are dispersed to various locations of interest from the source emissions.

(4) In a refined emission-dispersion model, attention should be given to the height and lateral position of the tail pipe on tractor-trailer and other types of vehicles so that the emissions source is properly represented.

(5) The need for an improved simulation model which accounts for cold starts, vehicle mass, and vehicle maintenance condition should be evaluated.

(6) A more detailed analysis of the large amount of information about delays and queue lengths which was obtained from the simulation experiments should be made.

REFERENCES

1. Springer, George S. and Donald J. Patterson, Engine Emissions: Pollutant Formation and Measurement, Plenum Press, 1973.

2. Haefner, Lonnie E., et al., "Line Source Emissions Modeling," Transportation Research Record 648, 1977.

3. Federal Register, Vol. 36, No. 84, Friday, April 30, 1971.

4. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors, Office of Air Quality Planning and Standards, AP-42, 1972.

5. Kunzelman, P, et al., Automobile Exhaust Emission Modal Analysis Model, Office of Air and Water Programs, EPA-460/3-74-005, January 1974.

6. Environmental Protection Agency, User's Guide to MOBILE-2 (MOBILE SOURCE EMISSIONS MODEL), Office of Mobile Source Air Pollution Control, EPA-460/13-81-006, 1981.

7. Environmental Protection Agency, User's Guide to the MOBILE-1 PROGRAM, Office of Transportation and Land Use Policy, EPA-400/9-78-005, 1978.

8. Environmental Protection Agency, User's Guide for HIWAY-2, A highway Air Pollution Model, EPA-600/8-80-018, 1980.

9. Environmental Protection Agency, User's Guide for HIWAY, A Highway Air Pollution Model, EPA-650/4-74-008, 1974.

10. Environmental Protection Agency, Carbon Monoxide Hot Spot Guidelines, Office of Air Quality Planning and Standards, EPA-450/3-78-033 to 035, 1978.

11. Environmental Protection Agency, Carbon Monoxide Hot Spot Guidelines-Volume V: User's Manual for Intersection Midblock Model, Offices of Air Quality Planning and Standards, EPA-450/3-78-037, 1978.

12. Texas Transportation Institute, Texas A&M University, Air Pollution Near Simple Signalized Intersections, December 1981.

13. Beaton, J.L., et al., Mathematical Approach to Estimating Highway Impact on Air Quality, California Department of Transportation, Air Quality Manual, Vol. 4, April 1972.

14. Jones, K.E. and A. Wylbur, A User's Manual for the CALINE-2 Computer Program, California Department of Transportation, 1976.

15. Benson, P.E., CALINE-3 - A Versatile Dispersion Model for Predicting Air Pollution Levels Near Highway and Arterial Streets, California Department of Transportation, Interim Report, 1979.

16. Bullin, J.A., et al., Vehicle Emissions at Intersections, Texas State Department of Highways and Public Transportation, December 1982.

17. Patterson, Robert M., "Air Quality Modeling At Signalized Intersections," Transportation Research Board Special Report 167, 1976.

18. Ismart, D., "Mobile Source Emissions and Energy Analysis at an Isolated Intersection," paper presented at the Sixty-first Annual Meeting of the Transportation Research Board, January 1982.

19. Evans, Leonard, Urban Traffic, Fuel Economy and Emissions: Consistency of Various Measurements, GMR-2813, August 1978.

20. Lieberman, Edward B. and Stephen Cohen, "New Techniques for Evaluating Urban Traffic Energy Consumption and Emissions," Transportation Research Record 599, pp. 41-45, 1976.

21. Graffin, Richard, Air Quality Impact of Signaling Decisions, Colorado Department of Highways, Interim Report, September 1979.

22. Cohen, S.L., "Use of Traffic Simulation in Analysis of Carbon Monoxide Pollution," Transportation Research Record 648, pp. 74-76, 1977.

23. Cohen, Stephen L. and Gary Euler, "Signal Cycle Length and Fuel Consumption and Emissions," Transportation Research Record 667, pp. 41-48, 1978.

24. Lee, Clyde E., Thomas W. Rioux, and Charlie R. Copeland, Jr., "The TEXAS Model for Intersection Traffic-Development," Research Report No. 184-1, Center for Highway Research, The University of Texas at Austin, December 1977.

25. Lee, Clyde E., Thomas W. Rioux, Vivek S. Savur, and Charlie R. Copeland, Jr., "The TEXAS Model for Intersection Traffic - Programmer's Guide," Research Report No. 184-2, Center for Highway Research, The University of Texas at Austin, December 1977.

26. Lee, Clyde E., Glenn E. Grayson, Charlie R. Copeland, Jr., Jeff W. Miller, Thomas W. Rioux, and Vivek S. Savur, "The TEXAS Model for Intersection Traffic - User's Guide," Research Report No. 184-3, Center for Highway Research, The University of Texas at Austin, July 1977.

27. Lee, Clyde E., Vivek S. Savur, and Glenn E. Grayson, "Application of the TEXAS Model for Analysis of Intersection Capacity and Evaluation of Traffic Control Warrants," Research Report 184-4F, Center for Highway Research, The University of Texas at Austin.

28. Urban, Charles M. and Karl J. Springer, Study of Emissions From Heavy-Duty Vehicles, Southwestern Research Institute, San Antonio, Texas, May 1976.

29. Ingalls, Melvin N. and Karl J. Springer, Summary and Comparison of Mass Emissions - All Gasoline and Diesel Powered Trucks Tested on the San Antonio Road Route 1971-1975, Southwestern Research Institute, San Antonio, Texas, March 1975.

30. Springer, Karl J. and Clifford D. Tyree, Exhaust Emissions From Gasoline-Powered Vehicles Above 6,000 Lb. Gross Vehicle Weight, Southwestern Research Institute, San Antonio, Texas.

31. Ingalls, Melvin N. and Karl J. Springer, In-Use Heavy-Duty Gasoline Truck Emissions, Part I, Mass Emissions From Trucks Operated Over a Road Course, Southwestern Research Institute, San Antonio, Texas, February 1973.

32. Urban, Charles M. and Karl J. Springer, 13-Mode Diesel Emissions Test Results on 12 Trucks, Southwestern Research Institute, San Antonio, Texas, February 1976.

33. Ingalls, Melvin N. and Robert L. Mason, Heavy-Duty Fuel Economy Program - Phase I, Specific Analysis of Certain Existing Data, Southwestern Research Institute, San Antonio, Texas, EPA-460/3-77-001, January 1977.

34. Urban, Charles M. and Karl J. Springer, Heavy-Duty Fuel Economy Program - Phase 2, Evaluation of Emission Control Technology Approaches, Southwestern Research Institute, San Antonio, Texas, EPA-460/3-77-010, July 1977.

35. Urban, Charles M., Heavy-Duty Fuel Economy Program - Phase 3, Transient Cycle Evaluations of the Advanced Emissions Control Technology Engine, Southwestern Research Institute, San Antonio, Texas, EPA-460/3-78-005, May 1978.

36. Wu, Hsin Hsing, "Modeling Heavy-Duty Gasoline Vehicle Emissions and Fuel Consumption," Master's Thesis, College of Engineering, Department of Civil Engineering, The University of Texas at Austin, August 1980.

37. Athalye, Pramod, "Modeling Heavy-Duty Diesel Vehicles Emissions and Fuel Consumption," Master's Thesis, College of Engineering, Department of Civil Engineering, The University of Texas at Austin, August 1980.

38. Simeonidis, Charalambos, "Emissions and Fuel Consumption as Functions of Vehicle Speed and Acceleration," Master's Thesis, College of Engineering, Department of Civil Engineering, The University of Texas at Austin, December 1981.

39. Chang, Man-Feng and Robert Herman, Trip Time - Stop Time and Fuel Consumption Characteristics in Cities, GMR-3089, September 1979.

40. Highway Research Board, Highway Capacity Manual, Special Report 87, 1965.

41. Federal Highway Administration, Traffic Control System Handbook, 1976.

42. Federal Highway Administration, Manual on Uniform Traffic Control Devices, 1971.

43. Institute of Traffic Engineers, Transportation and Traffic Engineering Handbook, 1976.

44. Federal Highway Administration, "Analysis of Capacity at Signalized Intersections," Public Roads, Vol 34, No's 9 and 10, August and October 1976.

45. Parsonson, Peter S., et al., "Small-Area Detection at Intersection Approaches," ITE Southern Section Technical Report by Technical Committee 18, Traffic Engineering, February 1974.

46. Pignataro, Louis J., Traffic Engineering, Theory and Practice, Prentice-Hall, 1973.

47. Webster, F.V. and B.M. Cobbe, "Traffic Signals," Road Research Technical Paper No. 56, Her Majesty's Stationery Office, 1976.

48. Motor Vehicle Manufacturers Association of the United States, MVMA: Motor Vehicle Facts and Figures, 1980.

49. Lin, Han-Jei, "A Simulation Study of Left-Turn Operations at Signalized Intersections," Ph.D. Dissertation, College of Engineering, Department of Civil Engineering, The University of Texas at Austin, December 1982.

50. Hicks, Charles R., Fundamental Concepts in the Design of Experiments, Holt, Rinehart and Winston, 1973.

51. Box, George E., William G. Hunter, and J. Stuart Hunter, Statistics for Experiments, An Introduction to Design, Data Analysis and Model Building, Wiley, N.Y., 1978.

52. Anderson, V.L. and R.A. Mclean, Design of Experiments: A Realistic Approach, Marcel Dekker, N.Y., 1974.

53. Conner, W.S. and Shirley Young, "Fractional Factorial Designs for Experiments With Factors at Two and Three Levels," Applied Mathematical Series, 58, National Bureau of Standards, 1960.

54. Conner, W.S. and Marvin Zelen, "Fractional Factorial Experiment Designs for Factors at Three Levels," Applied Mathematical Series 54, National Bureau of Standards, 1959.

55. Mihram, G.A., "Blocking in Similar Experimental Designs," Journal of Statistical Computation and Simulation, Vol. 3, 1974, pp. 29-32.

56. Conway, R.W., "Some Tactical Problems in Digital Simulation," Management Science, October 1963, pp. 47-61.

57. John, Peter W.M., <u>Statistical Design and Analysis of Experiments</u>, The MacMillan Company, 1971.

58. Margolin, Barry H., "Systematic Methods for Analyzing $2^n 3^m$ Factorial Experiments with Applications," <u>Technometrics</u>, May 1967, pp. 245-259.

59. Wilson, James, "Variance Reduction Techniques for the Simulation of Queueing Networks," Ph.D. Dissertation, Purdue University, December 1979.

60. Jucker, James V., "Policy - Comparison Simulation Experiments: Design and Analysis," <u>Decision Sciences</u>, 1975.

61. Wright, R.D. and T.E. Ramsey, Jr., "On the Effectiveness of Common Random Numbers," <u>Management Science</u>, July 1979.

62. Schruben, Lee, W. and Barry H. Margolin, "Pseudorandom Number Assignment in Statistically Designed Simulation Distribution Sampling Experiments," <u>Journal of the American Statistical Association</u>, September 1978.

63. Gerlough, Daniel L. and J. Huber Matthew, "Traffic Flow Theory: A Monograph," <u>TRB Special Report 165</u>, 1975, pp. 87-108.

64. Copeland, Charlie R., Jr., "Modifications of the TEXAS Model to Include Estimates of Vehicular Emissions," Master's Thesis, College of Engineering, Department of Civil Engineering, The University of Texas at Austin, May 1980.

65. Wilson, James R. and A. Alan B. Pritsker, "A Survey of Research on the Simulation Startup Problem, <u>Simulation</u>, Vol. 31, No. 2, August 1978, pp. 55-58.

66. Wilson, James R. and A. Alan B. Pritsker, "Evaluation of Startup Policies in Simulation Experiments," <u>Simulation</u>, Vol. 31, No. 3, September 1978, pp. 79-89.

67. Winer, B.J., <u>Statistical Principles in Experimental Design</u>, McGraw-Hill, 1962.

68. Huitema, Bradley E., <u>The Analysis of Covariance and Alternatives</u>, John Wiley and Sons, 1980.

69. <u>Federal Register</u>, Volume 42, No. 174, September 8, 1977.

70. Buckley, Frank T., Jr., et. al., "Analysis of Coast-Down Data to Access Aerodynamic Drag Reduction on Full-Scale Tractor-Trailer Trucks in Windy Environments," Mechanical Engineering Department, University of Maryland, Society of Automotive Engineers Transactions, Section 4,c Report No. 760850, 1976.

71. Walston, W.H., Jr., et. al., "Test Procedures for the Evaluation of Aerodynamic Drag on Full-Scale Vehicles in Windy Environments," SAE Paper No. 760106, February 1976.

72. Storment, John O. and Springer, Karl J., "A Surveillance Study of Smoke from Heavy-Duty Diesel-Powered Vehicles Southwestern U.S.A.," Southwest Research Institute, San Antonio, Texas, Contract No. EHS 70-109, EPA, June 1973.

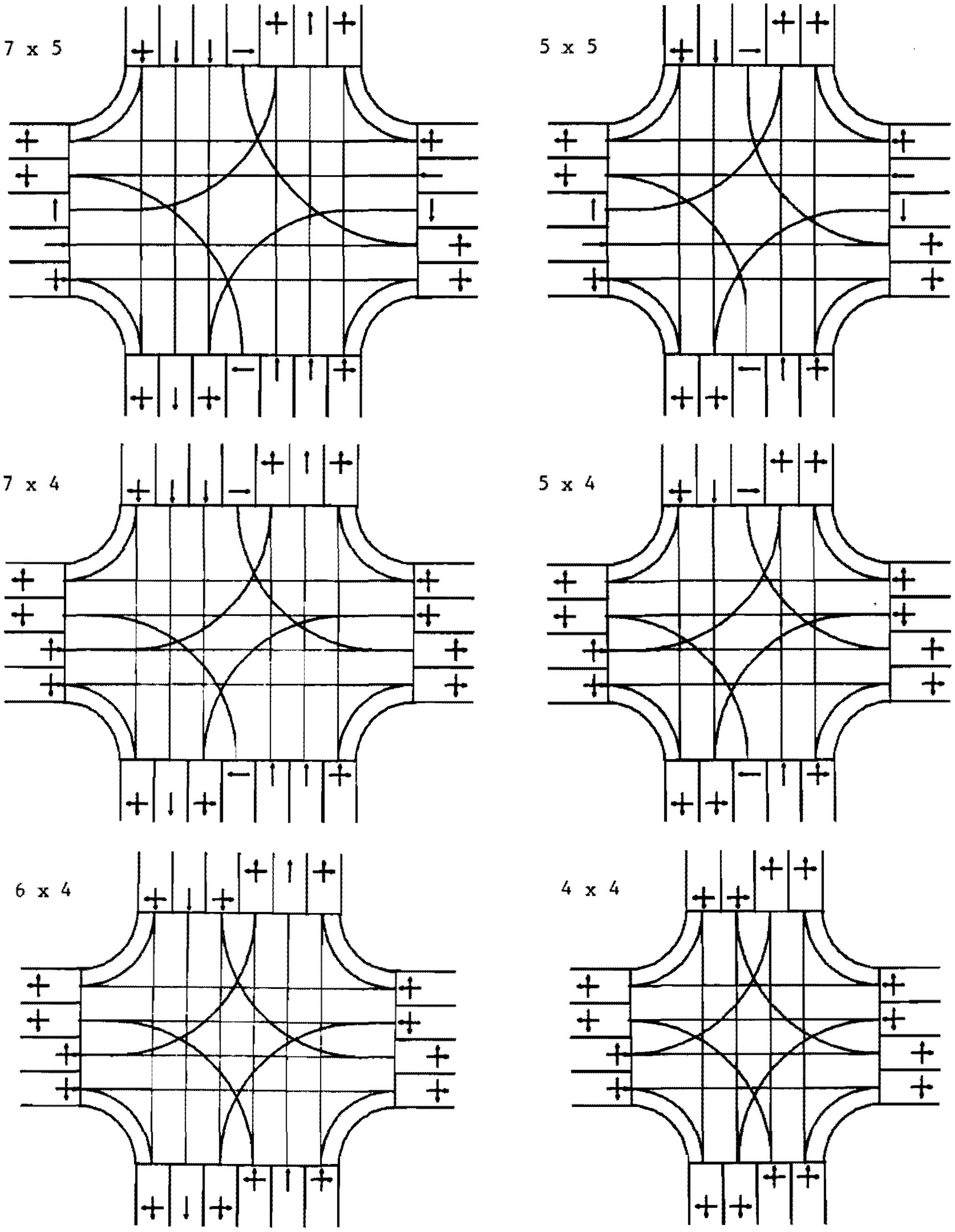
73. MVMA Motor Vehicle Facts and Figures '81, page 13, Motor Vehicle Manufacturers Association of the United States, Inc., 1980.

74. Kim, Jae-On and Kohout, Frank J., "Analysis of Variance and Covariance," Statistical Package for the Social Sciences, pp. 398-433, Second Edition, McGraw-Hill Book Company, 1975.

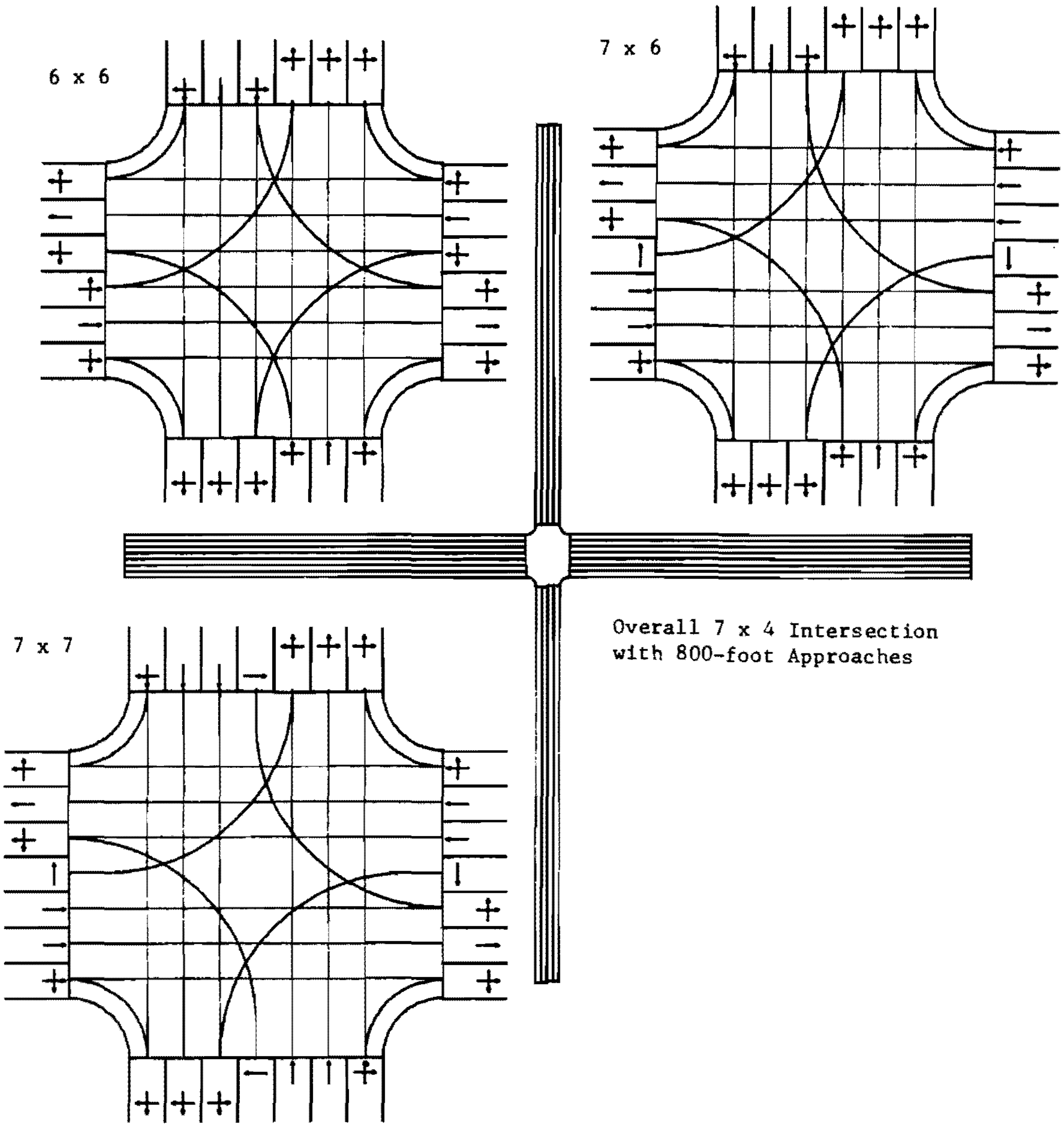
75. Kim, Jae-On and Kohout, Frank J., "Multiple Regression Analysis," Statisticsl Package for the Social Sciences, pp. 320-367, Second Edition, McGraw-Hill Book Company, 1975.

APPENDIX A

CONFIGURATIONS OF THE NINE SELECTED INTERSECTION GEOMETRIES



Vehicular paths within the intersection and allowed directional movements on each lane for various intersection sizes.



Overall 7 x 4 Intersection
with 800-foot Approaches

APPENDIX B

RESULTS OF TWO-STAGE REGRESSION WITH LINEAR-DEPENDENT VARIABLES FOR THE FIFTY-EIGHT RESPONSES IN THE MAJOR EXPERIMENT

TABLE B-1. RESULTS OF TWO-STAGE REGRESSION WITH LINEAR-DEPENDENT VARIABLES FOR THE FIFTY-EIGHT RESPONSES IN THE MAJOR EXPERIMENT

	AVERAGE TOTAL DELAY ON MINOR STREET				AVERAGE STOP DELAY ON MINOR STREET				AVERAGE QUEUE / MINOR	
RESPONSE	7	8	9	10	11	12	13	14	15	16
	AVERAGE	LEFT TURN	R. TURN	STRAIGHT	AVERAGE	LEFT TURN	R. TURN	STRAIGHT	APPROACH	L-T LANE
	ATDS2	ATDS2L	ATDS2R	ATDS2S	ASDS2	ASDS2L	ASDS2R	ASDS2S	AGQS2	AGQS2B
FIRST-STAGE REGRESSION										
SS TOTAL	100282.6	553862.4	88570.1	98650.2	30136.9	368645.6	16834.7	28328.6	1072.7	22.0
GRAND MEAN	22.6485	32.4995	22.6638	21.8424	12.0764	24.3152	8.7864	11.7298	1.9456	.0766
B1(GT)	-.1762	-.5367	.1035	-.1054	-.2524	-.5315	-.0497	-.1947	.0264	-.0061
B2(RT)	1.0906	1.2923	.9444	1.0595	.6905	1.0867	.5272	.6640	.1001	.0036
B3(RT2)	.0250	.0185	.0193	.0270	.0157	.0122	.1000	.0174	.0016	.0001
B4(GT2)	-.0092	.0255	-.0160	-.0131	.0009	.0296	-.0035	-.0027	-.0019	.0002
R2	.3867	.0947	.3448	.3829	.5278	.1029	.5212	.5261	.3334	.0560
SS TOTAL*(1-R2)	61503.3	501411.6	58031.1	60877.0	14230.7	330712.0	8060.5	13424.9	715.1	20.8
SECOND-STAGE REGRESSION (ANOVA OF ADJUSTED DATA)										
SS OF ADJ DATA	61526.6	501150.1	57975.8	60842.9	14196.6	330604.1	8035.3	13429.2	720.6	21.0
SS[0.999,∞) +D.F.	.4363 34	.6485 14	.5109 39	.4425 39	.2802 26	.5336 8	.2636 22	.2753 31	.4243 22	.7413 26
SS[0.99,0.999)+D.F.	.0492 21	.0479 13	.0200 9	.0358 14	.0414 18	.0739 15	.0295 10	.0456 18	.0517 16	.0302 11
SS[0.95,0.99) +D.F.	.0221 17	.0256 11	.0205 17	.0292 21	.0357 24	.0398 12	.0339 19	.0335 23	.0317 17	.0336 20
SS[0.90,0.95) +D.F.	.0060 7	.0164 12	.0120 15	.0093 10	.0136 15	.0204 11	.0148 14	.0144 15	.0193 16	.0205 19
SS[0.75,0.90) +D.F.	.0154 29	.0302 34	.0110 24	.0137 26	.0157 29	.0472 42	.0292 44	.0151 26	.0231 35	.0250 38
SS[0.,0.75) +D.F.	.0077 92	.0105 116	.0097 96	.0064 90	.0064 88	.0146 112	.0102 91	.0045 87	.0089 94	.0125 86
VAR REDUCED +D.F.	.0006 2	.0004 2	.0010 2	.0009 2	.0006 2	.0004 2	.0015 2	.0012 2	.0042 2	.0070 2
SS ERR(0/0) +D.F.	.0760 279	.1258 279	.0701 279	.0793 279	.0786 279	.1672 279	.0961 279	.0843 279	.1034 279	.0908 279
SS ERR TOTAL	7633.9	69647.6	6203.6	7818.9	2364.7	61624.1	1613.1	2388.2	111.7	2.0
M.S. ERROR	27.4	249.6	22.2	28.0	8.5	220.9	5.8	8.6	.4	.0
MEASURES OF PREDICTABILITY										
R2+SS[0.999,∞)	.8230	.7432	.8557	.8254	.8080	.6365	.7848	.8014	.7577	.7973
S.E./MEAN	.2310	.4862	.2081	.2424	.2411	.6112	.2737	.2494	.3252	1.0607

	MAXIMUM QUEUE/MINOR		AVERAGE TOTAL DELAY ON MAJOR STREET				AVERAGE STOP DELAY ON MAJOR STREET			
RESPONSE	17	18	27	28	29	30	31	32	33	34
	APPROACH	L-T LANE	AVERAGE	LEFT TURN	R. TURN	STRAIGHT	AVERAGE	LEFT TURN	R. TURN	STRAIGHT
	MXQS2	MXQS2B	ATDS1	ATDS1L	ATDS1R	ATDS1S	ASDS1	ASDS1L	ASDS1R	ASDS1S
FIRST-STAGE REGRESSION										
SS TOTAL	6539.0	491.6	82155.9	447057.2	69574.3	83156.1	17201.6	336415.8	12727.1	16122.4
GRAND MEAN	6.9222	.4527	20.6040	30.1000	20.6633	20.0599	10.7752	24.8623	8.1241	10.4941
B1(GT)	.0906	-.0176	-.0155	.0796	.1755	.0252	-.1620	.1333	-.0223	-.1292
B2(RT)	.2306	.0067	.8543	.9663	.7490	.8325	.5604	.8659	.4488	.5389
B3(RT2)	.0037	-.0001	-.0025	.0225	-.0045	-.0035	.0029	.0254	.0004	.0019
B4(GT2)	-.0050	.0005	-.0100	.0243	-.0166	-.0120	-.0011	.0293	-.0044	-.0030
R2	.3210	.0174	.2552	.0701	.2635	.2431	.5363	.0826	.4572	.5233
SS TOTAL*(1-R2)	4440.0	483.0	61189.7	415718.5	51241.5	62940.8	7976.4	308627.8	6908.3	7685.6
SECOND-STAGE REGRESSION (ANOVA OF ADJUSTED DATA)										
SS OF ADJ DATA	4430.0	481.9	61128.6	415584.1	51196.3	62938.2	7950.8	308583.5	6890.4	7666.4
SS[0.999,∞) +D.F.	.5184 33	.8175 14	.6102 53	.5756 7	.5852 47	.6160 50	.3394 52	.5462 9	.3094 26	.3426 49
SS[0.99,0.999)+D.F.	.0281 12	.0234 10	.0298 17	.0526 10	.0329 18	.0291 16	.0257 17	.0210 4	.0372 12	.0376 24
SS[0.95,0.99) +D.F.	.0252 20	.0145 10	.0189 18	.0363 13	.0272 22	.0227 21	.0240 26	.0561 17	.0541 32	.0211 23
SS[0.90,0.95) +D.F.	.0154 17	.0167 19	.0098 15	.0333 17	.0147 19	.0121 18	.0086 15	.0328 15	.0123 10	.0071 12
SS[0.75,0.90) +D.F.	.0138 26	.0209 38	.0136 32	.0411 34	.0103 22	.0117 29	.0100 27	.0409 33	.0214 29	.0096 26
SS[0.,0.75) +D.F.	.0018 92	.0094 109	.0041 65	.0204 119	.0006 72	.0060 66	.0037 63	.0283 122	.0078 91	.0061 66
VAR REDUCED +D.F.	.0002 2	.0025 2	.0003 2	.0042 2	.0002 2	.0005 2	.0007 2	.0055 2	0 2	.0008 2
SS ERR(0/0) +D.F.	.0761 279	.0777 279	.0581 279	.1664 279	.0654 279	.0588 279	.0516 279	.1866 279	.1006 279	.0518 279
SS ERR TOTAL	496.5	38.1	4769.3	74385.0	4543.5	4893.3	885.2	62751.9	1276.8	832.4
M.S. ERROR	1.8	.1	17.1	266.6	16.3	17.5	3.2	224.9	4.6	3.0
MEASURES OF PREDICTABILITY										
R2+SS[0.999,∞)	.8394	.8349	.8654	.6457	.8487	.8591	.8757	.6288	.7666	.8659
S.E./MEAN	.1927	.8163	.2007	.5425	.1953	.2088	.1653	.6032	.2633	.1646

	AVERAGE AND MAXIMUM QUEUE ON MAJOR STREET			
RESPONSE	35	36	37	38
	APPROACH	L-T LANE	APPROACH	L-T LANE
	AGQS1	AGQS1B	MXQS1	MXQS1B
FIRST-STAGE REGRESSION				
SS TOTAL	814.0	29.9	3817.4	659.9
GRAND MEAN	1.6746	.1370	6.0401	.8498
B1(GT)	.0333	-.0091	.0963	-.0324
B2(RT)	.0792	.0064	.1736	.0191
B3(RT2)	.0003	-0	-.0003	-.0001
B4(GT2)	-.0012	.0003	-.0032	.0004
R2	.2924	.0946	.3298	.0504
SS TOTAL*(1-R2)	576.0	27.1	2558.4	626.6
SECOND-STAGE REGRESSION (ANOVA OF ADJUSTED DATA)				
SS OF ADJ DATA	570.6	27.5	2558.0	626.7
SS[0.999,∞) +D.F.	.5571 61	.6485 13	.5392 44	.8136 18
SS[0.99,0.999)+D.F.	.0377 21	.0448 11	.0177 10	.0126 6
SS[0.95,0.99) +D.F.	.0188 18	.0320 15	.0273 26	.0129 10
SS[0.90,0.95) +D.F.	.0116 17	.0211 15	.0085 13	.0077 10
SS[0.75,0.90) +D.F.	.0123 31	.0326 39	.0152 38	.0206 42
SS[0.,0.75) +D.F.	.0104 52	.0041 107	.0049 69	.0123 114
VAR REDUCED +D.F.	.0012 2	.0001 2	.0003 2	.0001 2
SS ERR(0/0) +D.F.	.0585 279	.1222 279	.0571 279	.0698 279
SS ERR TOTAL	47.2	3.7	218.2	46.0
M.S. ERROR	.2	.0	.8	.2
MEASURES OF PREDICTABILITY				
R2+SS[0.999,∞)	.8495	.7431	.8690	.8640
S.E./MEAN	.2456	.8406	.1464	.4778

	AVERAGE DELAY IN INTERSECTION	
RESPONSE	1	2
	TOTAL DELAY	STOP DELAY
	ATDINT	ASDINT
FIRST-STAGE REGRESSION		
SS TOTAL	20278.5	3324.1
GRAND MEAN	20.8200	10.7300
B1(GT)	.3900	.1900
B2(RT)	.4600	.2100
B3(RT2)	-0	0
B4(GT2)	-.0100	-0
R2	.2900	.4000
SS TOTAL*(1-R2)	14397.7	1994.5
SECOND-STAGE REGRESSION (ANOVA OF ADJUSTED DATA)		
SS OF ADJ DATA	14495.6	1994.5
SS[0.999,°)	.4719	.3853
SS[0.99,0.999)	.0825	.0533
SS[0.95,0.99)	.0548	.0384
SS[0.90,0.95)	.0162	.0278
SS[0.75,0.90)	.0264	.0363
SS[0.,0.75)	.0327	.0343
VAR REDUCED	0	.0001
SS ERR(0/0)	.0255	.0245
SS ERR TOTAL	516.9	81.4
M.S. ERROR	14.4	2.3
MEASURES OF PREDICTABILITY		
R2+SS[0.999,°)	.7619	.7853
S.E./MEAN	.1820	.1402

TABLE B-1. (CONTINUED)

RESPONSE	TOTAL EMISSIONS OF CO							
	47	19	39	23	43	51	55	3
	I. PROPER	IB/MINOR	IB/MAJOR	OB/MINOP	OB/MAJOR	BKT/MINOR	BKT/MAJOR	INT. SYSTEM
	COINTP	COIS2	COIS1	COOS2	COOS1	COIBS2	COIBS1	COINTT
FIRST-STAGE REGRESSION								
SS TOTAL	520.1	1486.0	1505.1	92.4	127.9	18.7	16.7	9970.3
GRAND MEAN	2.8386	2.7720	2.8533	.8911	.9854	.4374	.4028	15.0035
B1(GT)	.0034	.0553	.0646	-.0008	.0004	.0053	.0061	.1568
B2(RT)	.0037	.0432	.0362	-.0030	-.0072	.0060	.0055	.2102
B3(RT2)	-.0006	.0012	.0000	-.0001	.0002	-.0000	.0000	-.0017
B4(GT2)	-.0003	-.0019	-.0018	.0001	-.0002	-.0002	-.0003	-.0031
R2	0	.1100	.1100	0	.0100	.1100	.1300	.1100
SS TOTAL*(1-R2)	520.1	1322.5	1339.5	92.4	126.6	16.7	14.6	8873.5
SECOND-STAGE REGRESSION (ANOVA OF ADJUSTED DATA)								
SS OF ADJ DATA	519.2	1318.8	1333.7	92.0	126.4	16.7	14.5	8825.6
SS[0.999,∞)	.9346	.8194	.8267	.6713	.7241	.7898	.7678	.8258
SS[0.99,0.999)	.0095	.0080	.0074	.0333	.0341	.0135	.0142	.0096
SS[0.95,0.99)	.0094	.0116	.0069	.0231	.0308	.0140	.0132	.0113
SS[0.90,0.95)	.0116	.0046	.0066	.0107	.0216	.0072	.0066	.0071
SS[0.75,0.90)	.0121	.0059	.0059	.0368	.0305	.0073	.0096	.0123
SS[0.,0.75)	.0138	.0071	.0079	.0390	.0224	.0085	.0112	.0154
VAR REDUCED	.0002	.0002	.0001	.0014	.0001	.0001	.0003	.0001
SS ERR(0/0)	.0088	.0332	.0285	.1844	.1264	.0496	.0471	.0074
SS ERR TOTAL	4.5764	49.3584	42.9139	17.0304	16.1637	.9300	.7891	73.9527
M.S. ERROR	.1271	1.3711	1.1921	.4731	.4490	.0258	.0219	2.0542
MEASURES OF PREDICTABILITY								
R2+SS[0.999,∞)	.9346	.9294	.9367	.6713	.7341	.8998	.8978	.9358
S.E./MEAN	.1256	.4224	.3827	.7719	.6800	.3675	.3675	.0955

RESPONSE	TOTAL EMISSIONS OF HC							
	48	20	40	24	44	52	56	4
	I. PROPER	IB/MINOR	IB/MAJOR	OB/MINOR	OB/MAJOR	BKT/MINOR	BKT/MAJOR	INT. SYSTEM
	HCINTP	HCIS2	HCIS1	HCOS2	HCOS1	HCIBS2	HCIBS1	HCINTT
FIRST-STAGE REGRESSION								
SS TOTAL	47891.3	667903.3	620728.3	39025.5	50848.0	5655.6	4997.9	5084732.1
GRAND MEAN	45.7200	73.1500	76.8700	25.2600	30.0500	11.1800	10.3800	410.6700
B1(GT)	.0800	1.5700	1.8300	.6000	.7400	.1100	.1400	6.2400
B2(RT)	.0800	1.4100	1.1500	-.1800	-.2000	.2300	.2100	7.5800
B3(RT2)	-.0100	.0400	0	0	.0100	-0	-0	-.0200
B4(GT2)	-0	-.0500	-.0500	-0	-.0100	-0	-.0100	-.0900
R2	0	.2300	.2400	.2600	.2900	.3700	.4100	.3000
SS TOTAL*(1-R2)	47891.3	514285.5	471753.5	28878.9	36102.1	3563.0	2948.8	3559312.5
SECOND-STAGE REGRESSION (ANOVA OF ADJUSTED DATA)								
SS OF ADJ DATA	47658.6	515441.8	473091.4	28983.3	36341.4	3574.9	2937.9	3540644.2
SS[0.999,∞)	.9716	.7150	.7108	.6994	.6677	.5717	.5525	.6504
SS[0.99,0.999)	.0068	.0090	.0101	.0022	.0053	.0102	.0081	.0120
SS[0.95,0.99)	.0028	.0068	.0086	.0025	.0048	.0099	.0059	.0088
SS[0.90,0.95)	.0026	.0020	.0043	.0024	.0046	.0040	.0018	.0060
SS[0.75,0.90)	.0041	.0063	.0040	.0049	.0038	.0048	.0039	.0090
SS[0.,0.75)	.0091	.0015	.0003	.0010	.0004	.0011	.0009	.0085
VAR REDUCED	.0001	.0003	.0001	.0001	.0003	.0005	.0008	.0001
SS ERR(0/0)	.0029	.0291	.0218	.0275	.0231	.0278	.0161	.0052
SS ERR TOTAL	137.2	19413.8	13505.2	1073.4	1175.7	157.1	80.6	26550.4
M.S. ERROR	3.8	539.3	375.1	29.8	32.7	4.4	2.2	737.5
MEASURES OF PREDICTABILITY								
R2+SS[0.999,∞)	.9716	.9450	.9508	.9594	.9577	.9417	.9625	.9504
S.E./MEAN	.0427	.3175	.2520	.2162	.1902	.1868	.1442	.0661

RESPONSE	TOTAL EMISSIONS OF NOX							
	49	21	41	25	45	53	57	5
	I. PROPER	IB/MINOR	IB/MAJOR	OB/MINOR	OB/MAJOR	BKT/MINOR	BKT/MAJOR	INT. SYSTEM
	NOINTP	NOIS2	NOIS1	NOOS2	NOOS1	NOIBS2	NOIBS1	NOINTT
FIRST-STAGE REGRESSION								
SS TOTAL	573156.6	1955358.1	2246101.9	404623.0	653041.2	9911.0	10205.5	22079444.7
GRAND MEAN	163.7900	148.9700	193.0000	91.2100	101.8500	19.6000	17.5300	1097.3960
B1(GT)	-.0300	2.7500	3.0200	1.3500	1.4400	.2100	.2000	8.2800
B2(RT)	-.1500	.7900	.6500	-.6800	-.6100	.1500	.1600	9.1500
B3(RT2)	-.0200	.0400	.0100	.0200	.0300	0	0	-.1100
B4(GT2)	-.0200	-.0700	-.0900	-.0300	-.0300	-.0100	-.0100	-.1200
R2	0	.1300	.1200	.1300	.0900	.2200	.2200	.1100
SS TOTAL*(1-R2)	573156.6	1701161.6	1976569.7	352022.0	594267.5	7730.6	7960.3	19649915.8
SECOND-STAGE REGRESSION (ANOVA OF ADJUSTED DATA)								
SS OF ADJ DATA	571313.4	1707880.3	1968157.0	351291.2	594537.7	7735.2	7979.3	19663474.9
SS[0.999,∞)	.9862	.8301	.8434	.8019	.8695	.7055	.7220	.8695
SS[0.99,0.999)	.0007	.0074	.0052	.0054	.0027	.0032	.0075	.0066
SS[0.95,0.99)	.0026	.0071	.0040	.0040	.0055	.0108	.0121	.0042
SS[0.90,0.95)	.0021	.0021	.0022	.0024	.0017	.0061	.0029	.0021
SS[0.75,0.90)	.0023	.0042	.0024	.0067	.0047	.0083	.0051	.0033
SS[0.,0.75)	.0046	.0000	.0069	.0100	.0025	.0060	.0017	.0021
VAR REDUCED	0	.0001	0	.0001	.0004	0	.0002	.0001
SS ERR(0/0)	.0015	.0195	.0159	.0395	.0230	.0401	.0285	.0021
SS ERR TOTAL	870.8	38191.8	35806.4	16000.3	15023.0	397.5	290.7	47456.2
M.S. ERROR	24.2	1060.9	994.6	444.5	417.3	11.0	8.1	1318.2
MEASURES OF PREDICTABILITY								
R2+SS[0.999,∞)	.9862	.9601	.9634	.9319	.9595	.9255	.9420	.9795
S.E./MEAN	.0301	.1928	.1723	.2261	.1967	.1786	.1621	.0331

RESPONSE	TOTAL FUEL CONSUMPTION							
	50	22	42	26	46	54	58	6
	I. PROPER	IB/MINOR	IB/MAJOR	OB/MINOR	OB/MAJOR	BKT/MINOR	BKT/MAJOR	INT. SYSTEM
	FFINTP	FFIS2	FFIS1	FFOS2	FFOS1	FFIBS2	FFIBS1	FFINTT
FIRST-STAGE REGRESSION								
SS TOTAL	994.6	11030.1	11210.0	1679.5	2099.5	61.0	56.9	108889.0
GRAND MEAN	6.8527	10.9969	11.8726	5.5985	6.5067	1.2651	1.1910	69.9496
B1(GT)	.0238	.2590	.2971	.1350	.1579	.0163	.0185	.9845
B2(RT)	.0225	.1139	.0884	-.0406	-.0402	.0192	.0179	1.0568
B3(RT2)	-.0009	.0045	.0007	.0011	.0014	0	.0000	-.0052
B4(GT2)	-.0006	-.0060	-.0062	-.0015	-.0020	-.0004	-.0006	-.0107
R2	.0200	.2300	.2500	.2900	.3200	.3400	.3800	.2800
SS TOTAL*(1-R2)	974.7	8493.2	8407.5	1192.5	1427.6	40.3	35.3	78400.1
SECOND-STAGE REGRESSION (ANOVA OF ADJUSTED DATA)								
SS OF ADJ DATA	977.2	8500.8	8361.3	1186.3	1434.2	40.5	35.3	78573.4
SS[0.999,∞)	.9742	.7336	.7145	.6842	.6650	.6148	.5931	.6979
SS[0.99,0.999)	.0012	.0069	.0080	.0017	.0019	.0060	.0043	.0071
SS[0.95,0.99)	.0018	.0036	.0037	.0014	.0018	.0095	.0048	.0063
SS[0.90,0.95)	.0013	.0017	.0022	.0014	.0014	.0045	.0023	.0009
SS[0.75,0.90)	.0018	.0037	.0027	.0025	.0020	.0032	.0026	.0033
SS[0.,0.75)	.0000	.0016	.0056	.0058	.0000	.0000	.0000	.0019
VAR REDUCED	0	.0002	.0001	.0001	.0003	.0004	.0005	.0001
SS ERR(0/0)	.0010	.0187	.0132	.0129	.0093	.0224	.0124	.0025
SS ERR TOTAL	.9810	205.8524	147.8064	21.6700	19.5541	1.3694	.7059	273.0613
M.S. ERROR	.0272	5.7181	4.1057	.6019	.5432	.0380	.0196	7.5850
MEASURES OF PREDICTABILITY								
R2+SS[0.999,∞)	.9942	.9636	.9645	.9742	.9850	.9548	.9731	.9779
S.E./MEAN	.0241	.2174	.1707	.1386	.1133	.1542	.1176	.0394

WHERE IN THE HEADINGS OF EMISSIONS AND FUEL CONSUMPTION
I. PROPER : INTERSECTION PROPER AREA , IB : INBOUND APPROACH , OB : OUTBOUND APPROACH , BKT : 1ST BUCKET

APPENDIX C

F-TEST STATISTICS OF SIGNIFICANCE FOR THE FIFTY-EIGHT RESPONSES IN THE MAJOR EXPERIMENT

TABLE C-1. F-TEST STATISTICS FOR EVALUATING SIGNIFICANCE OF THE FIFTY-EIGHT MAJOR EXPERIMENT RESPONSES

RESPONSE	MINOR STREET AVERAGE TOTAL DELAY				MINOR STREET AVERAGE STOP DELAY				MINOR STREET AVERAGE AND MAXIMUM QUEUE				INTERSECTION AVERAGE	
EFFECT	7 AVERAGE ATDS2	8 LEFT TURN ATDS2L	9 RIGHT TURN ATDS2R	10 STRAI -GHT ATDS2S	11 AVERAGE ASDS2	12 LEFT TURN ASDS2L	13 RIGHT TURN ASDS2R	14 STRAI -GHT ASDS2S	15 APPR -OACH AGQS2	16 L-T LANE AGQS2B	17 APPR -OACH MXQS2	18 L-T LANE MAQS2B	1 TOTAL DELAY ATDINT	2 STOP DELAY ASDINT
SIZE	27.1	4.4	23.9	25.6	13.3	4.7	5.8	16.0	7.4	1.5	49.1	2.9	41.0	24.4
LT-LANE	46.4	13.8	46.7	43.1	34.3	.8	18.4	36.1	28.5	393.6	70.2	729.2	57.1	53.3
CYCLE	58.1	7.6	120.4	60.3	21.8	4.8	54.8	22.6	84.6	2.5	100.4	4.5	42.3	18.1
SPLIT	77.5	14.1	112.5	78.6	27.4	7.6	33.5	28.1	92.7	5.4	107.6	6.2	9.9	14.8
VOL-1	8.1	3.1	27.5	7.4	3.2	2.8	24.0	2.1	9.4	.2	13.3	.3	29.0	8.9
LT-1	.3	.6	.4	.2	.4	.4	.9	.2	1.1	3.1	.2	.7	3.6	10.7
TRUCK-1	0	1.1	.4	0	.2	1.4	1.2	.3	.4	.3	.2	.7	2.0	1.1
VOL-2	107.2	14.1	212.1	108.8	26.1	7.9	75.8	28.5	148.4	4.9	179.5	8.8	38.8	18.0
LT-2	102.2	539.3	37.4	66.7	115.4	343.6	9.5	60.5	30.3	132.2	81.9	198.7	14.3	27.0
TRUCK-2	10.6	1.9	11.8	10.6	6.3	1.5	6.2	6.0	9.5	4.0	9.4	.2	3.3	3.3
SIZE *LT-LANE	3.5	.6	4.4	3.5	2.8	.4	1.3	3.3	1.4	1.5	5.4	2.9	21.2	11.3
SIZE * CYCLE	3.8	1.7	2.7	4.1	3.3	1.1	1.0	4.0	2.7	4.5	2.7	1.9	.4	.7
SIZE * SPLIT	7.4	1.5	6.7	8.4	5.0	1.3	2.9	7.1	3.0	.8	6.0	.6	.2	.5
SIZE * VOL-1	6.0	.4	6.3	7.8	4.4	.9	2.1	7.2	1.1	.9	7.6	1.2	10.9	7.9
SIZE * LT-1	.4	.5	1.1	.4	.6	.7	1.6	.5	.8	1.8	1.1	1.5	.3	.5
SIZE *TRUCK-1	1.8	.4	1.0	2.2	2.7	.3	2.5	3.3	.5	12.6	1.0	8.9	.9	1.6
SIZE * VOL-2	4.5	7.9	3.9	4.4	3.8	7.4	2.2	3.3	3.5	1.7	6.9	.3	4.5	5.1
SIZE * LT-2	12.6	2.0	14.2	12.1	6.1	2.6	5.4	6.5	6.7	.7	9.0	1.2	2.1	2.3
SIZE *TRUCK-2	3.1	.9	2.1	3.6	2.6	.9	.5	3.6	1.4	5.4	2.3	1.5	.4	.6
LT-LANE* CYCLE	7.3	.8	9.3	7.0	3.3	1.1	6.2	3.3	3.5	.4	5.6	.3	1.1	.9
LT-LANE* SPLIT	11.8	7.0	8.7	10.7	12.4	3.9	6.9	11.0	3.1	6.8	8.6	.1	1.8	3.7
LT-LANE* VOL-1	7.1	2.3	4.9	7.1	9.6	1.2	2.5	10.0	4.3	17.6	3.9	2.0	8.1	6.4
LT-LANE* LT-1	1.0	3.4	.4	.9	1.8	3.5	1.0	1.6	4.0	3.0	1.1	.7	2.1	3.1
LT-LANE*TRUCK-1	.3	.9	.4	.5	.4	.8	.8	.6	1.5	.3	.2	.7	.6	1.1
LT-LANE* VOL-2	3.0	.8	2.0	3.3	3.0	2.3	1.2	3.7	1.7	65.4	5.5	48.2	3.1	3.6
LT-LANE* LT-2	23.1	6.1	15.4	21.5	17.7	2.4	3.9	17.5	13.2	132.2	32.1	198.6	3.3	3.9
LT-LANE*TRUCK-2	.6	1.9	1.2	1.2	.7	2.2	1.9	1.2	1.2	4.0	1.8	.2	.6	.6
CYCLE * SPLIT	4.4	.7	4.4	4.6	3.5	.3	3.3	3.7	3.1	1.1	2.0	1.4	.4	.8
CYCLE * VOL-1	8.5	3.7	7.3	7.8	9.8	3.2	4.7	8.8	6.2	1.4	6.2	1.4	.7	1.8
CYCLE * LT-1	4.3	5.7	2.5	3.6	4.4	5.0	2.1	3.0	2.0	2.8	2.4	1.1	3.7	1.6
CYCLE *TRUCK-1	1.6	2.1	.9	1.9	2.3	2.8	.8	2.4	2.3	3.1	2.8	.3	.4	.7
CYCLE * VOL-2	4.0	2.2	7.3	4.5	2.3	2.3	4.4	2.7	6.2	2.2	7.9	1.7	.9	.8
CYCLE * LT-2	.3	.5	.2	.4	.4	.5	.2	.5	.9	.6	.2	1.6	.8	.9
CYCLE *TRUCK-2	5.6	3.3	4.7	5.4	6.8	3.5	3.8	6.3	1.7	4.7	3.1	3.0	1.6	2.0
SPLIT * VOL-1	34.2	2.5	37.9	33.1	22.6	1.8	24.8	21.3	18.3	.3	19.5	1.4	1.7	2.3
SPLIT * LT-1	.1	.5	1.2	.1	.0	.3	1.3	.0	1.0	1.8	.2	.7	.9	1.3
SPLIT *TRUCK-1	1.4	1.4	2.1	1.4	2.5	1.4	2.6	3.1	2.8	3.7	1.2	3.3	4.7	3.8
SPLIT * VOL-2	12.1	1.0	26.4	13.9	2.0	2.2	11.3	4.2	13.7	1.5	11.8	1.4	2.8	2.6
SPLIT * LT-2	22.6	27.4	15.3	16.7	24.3	21.4	9.0	14.8	4.2	7.4	11.1	2.0	6.2	10.3
SPLIT *TRUCK-2	2.0	1.2	3.2	2.3	1.5	1.4	1.5	1.7	3.2	9.8	3.6	5.5	.6	1.1
VOL-1 * LT-1	1.3	.6	1.4	1.3	.8	1.2	.5	.9	.5	9.6	1.6	6.3	.7	2.0
VOL-1 *TRUCK-1	.6	.3	1.1	.5	.9	.7	1.4	.7	.6	2.0	.4	.8	.5	.3
VOL-1 * VOL-2	18.7	1.4	42.0	19.9	2.8	2.1	20.4	4.3	23.8	4.2	31.8	2.0	19.5	15.9
VOL-1 * LT-2	17.9	21.7	7.4	15.6	21.9	17.4	3.9	17.0	2.4	7.3	8.8	1.2	2.1	4.2
VOL-1 *TRUCK-2	3.7	.2	2.6	3.9	3.0	.2	2.0	3.4	3.1	1.9	1.8	.8	.4	.3
LT-1 *TRUCK-1	14.8	4.2	13.1	13.5	12.6	3.4	7.7	10.6	4.1	3.9	7.8	1.4	3.1	4.5
LT-1 * VOL-2	3.8	.9	3.6	4.0	3.8	1.0	1.3	4.5	1.6	2.9	1.7	.1	.9	1.8
LT-1 * LT-2	1.1	.4	.7	1.3	1.4	.3	.5	1.8	1.7	8.9	.9	5.0	.1	.3
LT-1 *TRUCK-2	.6	.9	.5	.9	.7	1.1	1.1	1.3	2.1	1.0	.2	1.7	1.3	.8
TRUCK-1* VOL-2	1.7	.8	1.9	1.8	1.6	.8	.7	1.8	.5	2.6	1.6	.5	.4	.6
TRUCK-1* LT-2	.3	1.0	.5	.7	.5	1.3	.4	.3	1.9	.7	.8	.6	1.2	1.7
TRUCK-1*TRUCK-2	4.3	4.8	3.9	4.1	3.7	4.3	3.3	3.4	2.7	2.4	2.9	1.5	1.0	1.2
VOL-2 * LT-2	2.3	.8	3.8	6.5	4.0	1.3	.9	7.2	2.1	20.8	9.8	13.8	.8	2.2
VOL-2 *TRUCK-2	2.2	1.6	2.8	1.9	1.7	1.3	1.9	1.4	2.4	5.6	2.1	1.2	.7	.8
LT-2 *TRUCK-2	1.6	.8	1.5	1.8	2.4	1.1	.7	2.4	2.5	3.2	1.6	1.5	3.4	1.5

RESPONSE	MAJOR STREET AVERAGE TOTAL DELAY				MAJOR STREET AVERAGE STOP DELAY				MAJOR STREET AVERAGE AND MAXIMUM QUEUE			
EFFECT	27 AVERAGE ATDS1	28 LEFT TURN ATDS1L	29 RIGHT TURN ATDS1R	30 STRAI -GHT ATDS1S	31 AVERAGE ASDS1	32 LEFT TURN ASDS1L	33 RIGHT TURN ASDS1R	34 STRAI -GHT ASDS1S	35 APPR -OACH AGQS1	36 L-T LANE AGQS1B	37 APPR -OACH MXQS1	38 L-T LANE MAQS1B
SIZE	128.8	.6	57.0	135.4	49.1	2.8	13.9	61.4	45.0	.5	83.9	.5
LT-LANE	221.0	6.6	113.0	225.8	155.1	.2	37.3	175.1	149.1	172.9	196.5	532.8
CYCLE	76.7	1.6	132.3	69.8	23.4	1.6	62.1	28.9	143.4	9.7	117.7	14.2
SPLIT	56.6	3.8	74.1	53.5	20.1	3.5	15.9	25.6	91.8	5.5	101.8	7.2
VOL-1	112.3	6.6	205.8	131.8	30.4	3.3	73.8	37.0	207.7	9.8	194.4	16.1
LT-1	29.4	431.2	5.0	13.7	78.0	348.9	4.2	25.5	9.3	259.7	17.5	596.0
TRUCK-1	13.2	.1	10.9	12.5	9.2	0	3.6	8.8	9.0	.2	8.2	1.9
VOL-2	18.0	.4	38.0	15.6	10.0	.1	30.5	9.3	29.1	.9	21.8	2.2
LT-2	3.2	3.2	3.5	2.5	5.6	3.0	1.3	4.7	6.8	.6	2.8	.8
TRUCK-2	2.4	1.0	3.1	1.6	2.3	.8	1.1	1.0	11.7	.5	3.1	.1
SIZE *LT-LANE	120.2	2.2	65.2	128.4	52.8	1.0	22.6	61.6	53.6	2.0	58.1	1.8
SIZE * CYCLE	1.0	1.1	1.6	1.0	1.6	1.5	.8	2.2	6.3	4.3	.6	5.4
SIZE * SPLIT	9.1	.1	9.0	9.3	6.7	.3	3.8	8.0	1.7	2.4	4.2	1.6
SIZE * VOL-1	34.1	4.4	22.4	-31.2	18.0	3.0	7.0	14.5	18.2	2.0	24.2	1.1
SIZE * LT-1	2.6	2.0	1.6	2.7	4.2	2.7	.4	4.5	.2	1.6	1.7	1.7
SIZE *TRUCK-1	5.1	.4	2.8	5.5	4.3	.7	.9	5.7	7.9	1.4	3.5	.5
SIZE * VOL-2	16.6	.7	10.9	17.0	12.7	.3	3.8	14.3	10.3	1.4	10.1	1.8
SIZE * LT-2	4.7	1.3	7.4	5.3	3.8	1.3	5.4	5.6	5.1	.6	5.6	.6
SIZE *YRUCK-2	2.5	.9	2.1	2.4	2.8	1.0	1.4	2.3	9.5	1.4	3.3	1.5
LT-LANE* CYCLE	2.0	2.4	4.0	1.9	3.2	3.4	3.0	2.4	6.5	1.6	4.2	1.3
LT-LANE* SPLIT	17.6	2.3	12.4	16.6	23.7	1.1	9.7	22.6	3.4	3.5	8.3	2.8
LT-LANE* VOL-1	24.4	1.0	20.2	25.8	10.1	3.2	6.4	14.1	11.0	24.5	22.1	30.1
LT-LANE* LT-1	14.8	3.9	5.7	14.6	18.4	1.7	1.3	21.1	14.8	66.1	23.6	149.4
LT-LANE*TRUCK-1	7.4	1.5	5.0	7.2	7.8	1.5	2.4	8.5	9.8	.6	7.2	.9
LT-LANE* VOL-2	30.6	1.1	19.3	29.7	34.7	.4	7.4	36.7	24.8	5.3	20.1	2.8
LY-LANE* LT-2	3.1	4.2	3.0	2.1	5.1	4.3	2.0	3.3	6.0	.2	1.7	.3
LT-LANE*TRUCK-2	1.3	4.3	1.0	1.3	1.0	4.4	.6	.9	7.8	2.0	1.7	.5
CYCLE * SPLIT	9.4	1.6	9.9	10.4	6.4	1.8	4.5	8.9	10.6	1.1	5.1	1.3
CYCLE * VOL-1	2.0	1.3	2.4	2.1	3.2	.9	2.8	3.2	5.8	2.2	3.9	.8
CYCLE * LT-1	13.7	2.5	9.9	14.1	6.2	3.7	3.4	7.7	7.2	3.5	7.6	5.0
CYCLE *TRUCK-1	.9	.6	1.0	.8	1.4	.9	.7	.9	3.8	2.1	2.6	2.2
CYCLE * VOL-2	1.9	.2	1.3	1.9	2.7	.9	.4	2.2	11.0	1.0	1.4	.9
CYCLE * LT-2	7.8	2.4	8.1	7.2	5.5	2.8	5.4	4.9	4.3	2.3	3.2	1.3
CYCLE *TRUCK-2	8.1	1.0	6.8	8.6	5.2	1.3	4.3	6.4	6.9	.8	3.8	1.0
SPLIT * VOL-1	11.3	1.0	22.0	11.9	4.5	1.0	10.6	5.9	14.1	2.1	16.5	1.0
SPLIT * LT-1	10.3	5.4	8.9	9.6	10.0	4.5	6.5	8.5	7.7	7.0	5.8	5.8
SPLIT *TRUCK-1	20.0	1.1	13.1	17.2	10.9	.6	3.8	8.1	10.6	.4	13.0	.6
SPLIT * VOL-2	16.3	2.9	18.5	13.7	17.6	1.6	12.8	15.7	9.6	1.3	11.9	2.1
SPLIT * LT-2	4.9	2.6	4.2	4.6	5.2	2.4	.9	5.2	5.8	.7	3.3	.8
SPLIT *TRUCK-2	2.0	.8	.8	2.2	3.9	.9	.5	4.9	3.0	4.9	1.7	5.8
VOL-1 * LT-1	1.5	1.7	2.1	1.7	7.0	1.9	1.5	3.8	3.9	38.0	2.7	35.9
VOL-1 *TRUCK-1	5.9	.7	7.8	6.1	3.4	.9	4.7	4.1	3.7	.7	3.5	1.3
VOL-1 * VOL-2	20.7	3.3	35.8	22.4	4.6	3.5	16.1	8.7	48.6	4.5	41.1	4.4
VOL-1 * LT-2	1.4	.4	.4	1.6	1.7	.5	1.0	2.1	7.5	1.5	1.6	.6
VOL-1 *TRUCK-2	1.4	.9	1.3	1.7	1.2	1.1	1.5	1.9	5.2	1.4	1.0	2.7
LT-1 *TRUCK-1	5.3	1.9	4.2	5.0	6.0	1.8	2.3	4.9	4.1	.3	3.8	1.4
LT-1 * VOL-2	6.3	10.9	5.6	5.7	9.5	10.2	2.5	7.1	2.5	6.9	3.8	5.0
LT-1 * LT-2	.6	1.5	.7	.5	.9	1.7	.3	.5	2.9	.8	.7	.3
LT-1 *TRUCK-2	7.8	1.5	6.0	8.1	4.9	1.8	2.2	6.3	9.2	.5	7.7	.7
TRUCK-1* VOL-2	3.0	.4	3.1	2.6	4.5	.4	2.1	3.4	3.4	.8	2.0	.7
TRUCK-1* LT-2	8.4	2.7	7.4	8.6	7.3	1.6	5.0	8.4	7.4	1.7	5.7	.8
TRUCK-1*TRUCK-2	2.4	2.2	1.1	2.6	2.4	1.9	1.2	3.0	2.0	2.1	2.2	1.2
VOL-2 * LT-2	5.2	.8	1.8	5.6	7.8	1.1	2.4	9.2	6.4	5.5	4.6	3.2
VOL-2 *TRUCK-2	1.3	1.6	.7	1.0	2.3	1.6	.6	1.4	8.9	.8	2.5	.4
LT-2 *TRUCK-2	16.1	3.2	14.9	16.0	7.4	3.7	6.2	7.3	7.4	1.0	11.1	2.2

TABLE C-1. (CONTINUED)

RESPONSE — TOTAL EMISSIONS OF CO

EFFECT	47 I. PROPER COINTP	19 IB/MINOR COIS2	39 IB/MAJOR COIS1	23 OB/MINOR COOS2	43 OB/MAJOR COOS1	51 BKT/MINOR COIBS2	55 BKT/MAJOR COIBS1	3 INT. SYSTEM COINTT
SIZE	551.3	319.2	453.6	23.0	138.8	.8	17.6	286.5
LT-LANE	21.8	23.8	10.0	.1	4.2	27.8	4.6	7.0
CYCLE	21.1	220.9	239.7	.4	1.5	158.6	162.1	136.5
SPLIT	0	219.8	216.3	7.6	7.6	139.7	132.1	3.8
VOL-1	17.1	30.5	426.4	4.2	9.7	17.6	280.6	98.0
LT-1	1.1	.6	6.4	3.5	1.9	.3	3.2	1.5
TRUCK-1	622.0	.6	2117.4	111.4	478.6	0	1451.2	663.6
VOL-2	23.6	394.4	38.5	5.7	4.3	272.6	23.5	105.0
LT-2	.1	20.8	.3	.3	7.4	4.3	.4	5.1
TRUCK-2	559.0	1729.5	.2	357.1	59.8	1473.0	.1	569.5
SIZE *LT-LANE	5.3	.6	.6	.1	15.3	1.3	5.3	.8
SIZE * CYCLE	1.5	1.2	.5	.9	.7	2.0	.2	.4
SIZE * SPLIT	.7	2.6	2.9	.6	4.1	3.2	4.6	.5
SIZE * VOL-1	.9	.1	9.0	.2	4.5	.3	1.0	.9
SIZE * LT-1	.4	.6	.9	1.0	1.4	.8	1.2	.4
SIZE *TRUCK-1	29.6	1.0	52.9	1.9	24.4	.9	6.7	16.5
SIZE * VOL-2	2.5	8.5	.7	1.1	1.3	.4	2.3	2.7
SIZE * LT-2	.2	12.1	2.5	.9	1.0	1.1	3.2	1.3
SIZE *TRUCK-2	16.1	29.9	2.5	2.2	2.4	2.0	2.2	5.7
LT-LANE* CYCLE	.3	4.7	3.9	.3	1.5	2.0	1.6	.8
LT-LANE* SPLIT	1.5	1.9	1.3	2.3	.7	1.0	1.3	.8
LT-LANE* VOL-1	1.1	1.2	1.1	.6	1.0	1.3	7.5	.8
LT-LANE* LT-1	.7	.4	4.7	.4	.6	.3	7.3	1.0
LT-LANE*TRUCK-1	2.6	.9	1.4	.7	4.5	.5	1.0	.8
LT-LANE* VOL-2	.7	2.1	4.7	.0	1.5	2.5	0	1.1
LT-LANE* LT-2	.6	10.4	.4	.6	1.3	10.1	.4	1.6
LT-LANE*TRUCK-2	1.4	2.5	1.2	.3	1.5	1.1	.7	.7
CYCLE * SPLIT	.4	3.5	2.9	1.0	.4	2.1	1.4	1.0
CYCLE * VOL-1	.5	4.6	2.3	.9	.8	3.5	1.4	.8
CYCLE * LT-1	1.2	2.2	2.9	1.1	2.2	.4	.5	2.1
CYCLE *TRUCK-1	.7	.6	1.5	.2	3.1	1.4	1.0	1.3
CYCLE * VOL-2	1.4	5.6	5.3	.9	1.0	.6	4.0	1.2
CYCLE * LT-2	1.0	1.6	1.8	.8	.9	1.4	.3	.7
CYCLE *TRUCK-2	.6	2.6	2.0	.0	1.4	1.5	.5	1.6
SPLIT * VOL-1	1.2	16.0	7.2	1.3	2.3	2.0	2.5	1.6
SPLIT * LT-1	1.9	2.1	.6	1.5	1.3	2.0	.7	.7
SPLIT *TRUCK-1	1.1	1.0	14.3	.5	2.7	.7	4.6	3.4
SPLIT * VOL-2	1.8	14.9	12.1	.7	.0	1.7	1.7	2.0
SPLIT * LT-2	.7	2.9	1.1	.9	1.9	1.5	2.3	.6
SPLIT *TRUCK-2	.8	8.4	1.1	2.2	.3	4.3	1.4	2.2
VOL-1 * LT-1	1.1	4.8	.7	2.5	2.5	1.8	1.5	1.1
VOL-1 *TRUCK-1	6.4	.5	119.6	3.4	5.6	.2	67.0	14.1
VOL-1 * VOL-2	1.0	41.8	46.3	.4	1.5	3.5	11.4	30.1
VOL-1 * LT-2	.6	4.9	1.8	.9	1.7	2.0	.4	.8
VOL-1 *TRUCK-2	.3	8.0	1.3	.5	.5	3.8	.6	1.7
LT-1 *TRUCK-1	.4	8.8	1.2	1.1	1.4	3.0	2.2	1.2
LT-1 * VOL-2	.6	2.5	.9	.7	.4	1.0	.3	.8
LT-1 * LT-2	1.3	2.8	2.2	.5	1.6	2.0	2.7	1.3
LT-1 *TRUCK-2	1.1	.3	2.3	.2	4.6	.6	1.7	.8
TRUCK-1* VOL-2	.7	1.4	9.2	1.6	2.4	1.1	7.6	1.6
TRUCK-1* LT-2	2.0	1.7	2.7	2.0	.3	3.3	1.0	1.1
TRUCK-1*TRUCK-2	.9	.5	.9	1.1	3.6	.1	2.8	.8
VOL-2 * LT-2	.9	3.0	1.4	1.6	1.0	1.1	1.1	2.0
VOL-2 *TRUCK-2	6.1	84.8	2.4	7.1	3.4	54.7	2.2	12.4
LT-2 *TRUCK-2	.8	.8	4.2	.4	2.6	1.6	3.6	1.0

RESPONSE — TOTAL EMISSIONS OF HC

EFFECT	48 I. PROPER HCINTP	20 IB/MINOR HCIS2	40 IB/MAJOR HCIS1	24 OB/MINOR HCOS2	44 OB/MAJOR HCOS1	52 BKT/MINOR HCIBS2	56 BKT/MAJOR HCIBS1	4 INT. SYSTEM HCINTT
SIZE	4117.4	500.6	635.5	1021.1	737.5	1.9	5.1	470.8
LT-LANE	127.7	43.4	88.4	.3	82.3	144.4	198.8	37.5
CYCLE	172.9	404.8	579.1	202.8	263.6	535.4	929.8	423.5
SPLIT	.3	438.6	542.0	347.5	444.7	488.3	817.4	9.8
VOL-1	148.4	53.3	1048.9	6.0	587.8	61.8	1580.9	314.5
LT-1	.9	.6	26.1	22.5	7.6	3.7	11.1	3.0
TRUCK-1	649.5	.2	769.3	95.4	1454.9	.4	654.6	231.8
VOL-2	151.0	763.8	87.9	438.6	13.0	910.0	114.1	319.4
LT-2	.1	74.3	2.3	13.7	36.0	68.2	.6	12.8
TRUCK-2	569.2	491.5	2.7	1203.6	47.3	427.5	2.9	208.3
SIZE *LT-LANE	16.6	1.2	30.9	.6	58.6	4.5	4.2	8.9
SIZE * CYCLE	5.8	2.0	.9	.8	.5	1.1	2.7	.4
SIZE * SPLIT	1.7	.8	1.3	.9	3.0	.1	1.2	.4
SIZE * VOL-1	3.5	.2	3.3	1.5	2.4	.4	9.6	.9
SIZE * LT-1	.5	.5	.1	1.9	3.8	2.7	.7	.1
SIZE *TRUCK-1	23.6	.9	4.8	1.6	38.3	3.4	6.3	2.8
SIZE * VOL-2	7.5	11.4	1.2	52.0	1.6	2.0	2.3	3.8
SIZE * LT-2	.1	17.9	7.3	1.3	.4	1.6	7.0	2.3
SIZE *TRUCK-2	15.3	6.0	3.9	17.1	1.3	2.5	3.5	1.0
LT-LANE* CYCLE	.6	9.1	5.5	2.1	2.1	1.5	5.8	1.3
LT-LANE* SPLIT	3.9	7.6	6.3	2.2	.8	5.7	6.6	1.2
LT-LANE* VOL-1	1.7	3.8	18.0	.8	18.6	5.7	11.5	7.1
LT-LANE* LT-1	.5	1.0	13.5	.7	1.1	1.0	63.8	1.7
LT-LANE*TRUCK-1	2.1	.6	4.3	.8	1.6	.8	.9	.7
LT-LANE* VOL-2	.5	3.9	21.0	.1	.7	10.9	8.4	3.5
LT-LANE* LT-2	.8	20.0	1.9	.6	1.1	49.0	.6	3.5
LT-LANE*TRUCK-2	1.4	1.5	1.6	.4	1.5	2.6	1.3	.8
CYCLE * SPLIT	.4	4.9	10.3	.9	1.3	5.8	10.7	.7
CYCLE * VOL-1	.4	6.0	4.2	.3	1.2	4.9	3.6	.4
CYCLE * LT-1	.7	3.4	8.8	1.4	9.4	.7	.9	3.1
CYCLE *TRUCK-1	.7	1.9	1.1	.1	2.7	3.0	1.8	1.1
CYCLE * VOL-2	2.4	11.6	3.0	.5	1.8	1.0	10.9	2.4
CYCLE * LT-2	.8	.8	5.1	.4	.7	1.3	.5	.7
CYCLE *TRUCK-2	.6	4.0	4.9	.4	1.9	1.9	.6	2.2
SPLIT * VOL-1	1.9	46.5	32.8	1.6	.4	6.8	5.0	3.0
SPLIT * LT-1	2.3	.6	6.4	2.2	1.0	.8	1.0	.5
SPLIT *TRUCK-1	1.3	.6	22.1	.7	9.5	1.3	2.3	4.9
SPLIT * VOL-2	3.7	35.9	28.7	.7	.2	1.3	7.5	3.7
SPLIT * LT-2	1.7	13.4	2.3	.7	1.7	4.9	4.3	3.6
SPLIT *TRUCK-2	1.0	4.9	1.2	.5	.6	2.5	3.1	1.3
VOL-1 * LT-1	1.6	4.1	1.0	8.1	3.0	1.3	3.8	1.2
VOL-1 *TRUCK-1	11.0	.1	63.6	2.5	24.1	2.1	22.5	10.1
VOL-1 * VOL-2	11.6	87.4	109.5	8.5	19.8	15.5	55.0	70.3
VOL-1 * LT-2	.3	11.7	3.9	.4	1.6	3.8	3.3	2.4
VOL-1 *TRUCK-2	.2	5.6	1.0	.8	.4	.4	.5	1.5
LT-1 *TRUCK-1	.7	16.2	5.7	1.4	1.0	9.4	5.5	3.0
LT-1 * VOL-2	.3	3.4	4.6	.9	.1	2.0	1.3	1.1
LT-1 * LT-2	1.6	1.0	.7	1.4	1.8	3.1	6.1	.3
LT-1 *TRUCK-2	.7	.5	5.5	.4	2.2	.8	1.4	.3
TRUCK-1* VOL-2	.6	1.9	6.2	.8	1.7	2.1	2.3	1.1
TRUCK-1* LT-2	1.7	.9	3.9	.5	.4	2.2	.8	.8
TRUCK-1*TRUCK-2	.9	2.3	1.4	2.6	3.9	.2	5.7	1.0
VOL-2 * LT-2	1.3	5.0	2.0	4.0	6.2	3.8	3.3	1.5
VOL-2 *TRUCK-2	11.4	32.0	2.2	9.6	1.9	13.5	5.5	9.7
LT-2 *TRUCK-2	.9	.9	14.3	.5	10.6	4.2	5.4	3.0

TABLE C-1. (CONTINUED)

RESPONSE — TOTAL EMISSIONS OF NOX

EFFECT	49 I. PROPER NOINTP	21 IB/MINOR NOIS2	41 IB/MAJOR NOIS1	25 OB/MINOR NOOS2	45 OB/MAJOR NOOS1	53 BKT/MINOR NOIBS2	57 BKT/MAJOR NOIBS1	5 INT. SYSTEM NOINTT
SIZE	9699.4	1995.1	2761.0	1028.8	2521.1	.4	198.5	3469.8
LT-LANE	391.1	15.9	8.4	3.3	159.6	44.3	20.4	22.5
CYCLE	193.2	420.0	450.3	38.8	47.8	401.4	481.0	505.7
SPLIT	.7	413.6	488.4	151.3	181.8	347.4	470.7	2.9
VOL-1	270.6	53.2	853.3	1.1	181.4	48.3	897.6	384.1
LT-1	.4	.6	5.6	25.7	10.2	1.5	3.1	1.9
TRUCK-1	238.3	.6	2132.2	40.7	1533.3	1.4	980.0	1142.8
VOL-2	256.0	758.2	52.5	157.0	2.3	696.8	53.6	354.4
LT-2	1.4	20.5	2.4	19.1	35.5	3.0	.6	3.7
TRUCK-2	239.6	1748.0	2.6	1238.6	28.1	829.0	3.6	999.5
SIZE *LT-LANE	118.6	.4	12.3	1.1	172.0	2.0	111.9	30.5
SIZE * CYCLE	14.4	1.8	.1	.9	.8	.9	2.4	.6
SIZE * SPLIT	1.2	1.5	1.1	1.2	1.9	1.3	.3	1.1
SIZE * VOL-1	8.7	.9	27.8	2.7	10.3	1.7	.3	16.4
SIZE * LT-1	1.7	1.5	.6	1.9	4.3	1.5	2.0	1.7
SIZE *TRUCK-1	4.7	0	20.3	.3	51.0	1.5	.5	16.3
SIZE * VOL-2	5.3	22.8	.6	12.5	.5	3.4	.2	9.6
SIZE * LT-2	.5	8.1	2.3	.7	.4	1.5	1.2	1.4
SIZE *TRUCK-2	6.9	20.3	3.8	24.5	.4	.7	2.8	8.6
LT-LANE* CYCLE	.6	4.6	2.1	1.1	1.0	.2	2.4	1.0
LT-LANE* SPLIT	6.0	2.0	2.9	.9	.6	.1	5.2	1.9
LT-LANE* VOL-1	2.1	.8	1.8	.6	.1	2.3	14.1	.8
LT-LANE* LT-1	.6	1.3	3.0	.5	1.0	1.3	9.7	1.2
LT-LANE*TRUCK-1	1.7	2.1	3.7	.8	1.7	.9	1.5	1.9
LT-LANE* VOL-2	.3	3.6	5.8	.4	1.6	2.1	1.4	2.9
LT-LANE* LT-2	.2	7.5	1.2	.3	.6	10.9	1.3	1.6
LT-LANE*TRUCK-2	.6	1.6	1.7	.7	.5	.9	.7	.8
CYCLE * SPLIT	.3	5.5	9.2	1.1	1.8	4.8	8.5	1.2
CYCLE * VOL-1	1.5	2.6	4.1	.6	1.5	.5	4.2	.5
CYCLE * LT-1	3.0	2.3	.2	.6	2.7	1.6	6.3	.6
CYCLE *TRUCK-1	.5	2.8	.5	.2	1.6	.7	1.2	1.7
CYCLE * VOL-2	1.3	7.1	2.2	.9	1.2	1.7	2.6	2.9
CYCLE * LT-2	.9	1.0	.9	.5	.1	1.2	2.1	.3
CYCLE *TRUCK-2	.9	2.5	1.5	.4	1.6	1.5	.5	2.0
SPLIT * VOL-1	4.3	15.1	9.2	.5	1.9	.6	1.4	1.8
SPLIT * LT-1	1.3	.8	1.8	.9	.6	.3	1.9	.1
SPLIT *TRUCK-1	2.6	.9	8.7	.6	1.2	.2	3.5	3.1
SPLIT * VOL-2	3.8	8.4	4.7	1.6	.4	2.3	.5	1.1
SPLIT * LT-2	2.5	3.5	1.8	.8	1.3	1.7	1.0	1.9
SPLIT *TRUCK-2	1.1	4.3	.7	.2	.4	2.8	.7	1.8
VOL-1 * LT-1	.7	4.0	1.0	9.9	4.0	.7	2.9	1.3
VOL-1 *TRUCK-1	8.8	.4	159.2	1.2	37.3	.3	31.9	49.8
VOL-1 * VOL-2	18.4	48.5	60.4	2.9	5.6	11.8	34.2	52.2
VOL-1 * LT-2	.8	2.9	2.1	.8	1.5	2.7	1.0	.5
VOL-1 *TRUCK-2	1.1	9.3	.4	1.6	1.6	.8	1.4	3.6
LT-1 *TRUCK-1	.5	5.1	2.8	.9	.3	2.2	3.5	1.1
LT-1 * VOL-2	.1	1.5	2.5	1.0	.4	.4	1.6	.6
LT-1 * LT-2	.6	.8	1.2	1.6	.6	1.9	2.3	.6
LT-1 *TRUCK-2	.3	.6	2.8	.4	1.8	.6	.5	.2
TRUCK-1* VOL-2	1.2	1.5	7.7	.4	2.1	1.0	3.1	4.0
TRUCK-1* LT-2	.9	.5	.6	.3	.4	1.1	.3	.6
TRUCK-1*TRUCK-2	1.7	.9	1.8	3.1	4.0	1.5	2.4	1.6
VOL-2 * LT-2	2.5	5.2	.8	6.8	11.1	1.0	1.6	.5
VOL-2 *TRUCK-2	10.6	115.8	.9	17.8	1.3	20.3	2.0	39.5
LT-2 *TRUCK-2	3.7	1.9	5.4	.4	2.9	2.0	8.9	2.5

RESPONSE — TOTAL FUEL CONSUMPTION

EFFECT	50 I. PROPER FPINTP	22 IB/MINOR FFIS2	42 IB/MAJOR FFIS1	26 OB/MINOR FFOS2	46 OB/MAJOR FFOS1	54 BKT/MINOR FFIBS2	58 BKT/MAJOR FFIBS1	6 INT. SYSTEM FFINTT
SIZE	13590.3	1294.8	1729.1	3252.4	4167.7	1.1	21.5	1772.1
LT-LANE	406.8	40.9	62.6	1.0	6.2	155.3	161.1	24.9
CYCLE	720.9	664.2	979.7	501.0	731.8	776.5	1390.6	894.0
SPLIT	.9	703.1	950.8	771.2	1127.6	720.4	1291.4	9.6
VOL-1	586.8	82.9	1778.0	21.3	1550.5	86.6	2413.4	662.8
LT-1	.2	.4	20.2	42.2	28.0	2.9	5.1	2.6
TRUCK-1	756.8	.3	1022.7	63.5	1759.9	.8	717.4	359.2
VOL-2	558.6	1235.0	134.3	1043.2	41.5	1330.2	162.1	635.3
LT-2	.2	64.1	3.1	42.7	69.1	57.9	1.4	10.7
TRUCK-2	707.9	660.3	3.4	1281.8	43.5	465.6	3.6	322.0
SIZE *LT-LANE	48.4	1.2	24.4	1.0	.8	4.8	1.3	4.1
SIZE * CYCLE	13.3	1.8	.7	1.3	1.1	1.1	3.3	.4
SIZE * SPLIT	1.3	.9	1.2	1.3	1.8	.2	.7	.5
SIZE * VOL-1	22.5	.2	21.1	2.7	56.3	.5	8.9	9.3
SIZE * LT-1	1.7	.7	.1	2.2	5.7	2.2	.8	.3
SIZE *TRUCK-1	23.2	.8	5.9	.4	50.4	4.0	5.5	4.5
SIZE * VOL-2	28.0	35.5	1.0	108.9	2.7	2.3	1.4	15.9
SIZE * LT-2	.3	17.4	6.2	1.2	1.1	1.2	6.4	2.7
SIZE *TRUCK-2	20.1	7.5	4.1	25.1	.7	2.0	3.6	2.0
LT-LANE* CYCLE	.6	9.6	5.0	1.9	1.7	.9	5.2	1.6
LT-LANE* SPLIT	7.2	7.1	6.1	1.1	.7	5.1	6.6	1.4
LT-LANE* VOL-1	4.6	2.7	17.2	.9	6.2	4.5	14.7	6.0
LT-LANE* LT-1	.4	.8	12.0	.5	1.5	1.4	64.4	1.6
LT-LANE*TRUCK-1	2.8	.9	4.4	.6	1.3	.9	.7	.9
LT-LANE* VOL-2	.8	4.2	20.0	.2	.5	11.4	8.7	3.9
LT-LANE* LT-2	.6	18.9	1.7	.5	1.3	48.9	.5	3.3
LT-LANE*TRUCK-2	.9	1.7	2.0	.2	1.2	2.4	2.1	1.0
CYCLE * SPLIT	.5	5.1	12.3	1.4	1.4	6.7	14.9	1.1
CYCLE * VOL-1	1.1	4.9	4.9	.2	2.1	3.3	4.4	.4
CYCLE * LT-1	1.7	3.6	7.8	.7	1.9	.8	.5	2.7
CYCLE *TRUCK-1	.9	2.0	1.0	.2	2.4	2.2	1.7	1.0
CYCLE * VOL-2	2.5	11.8	2.5	1.5	2.2	1.2	9.9	3.0
CYCLE * LT-2	.7	.8	4.4	.3	.2	1.5	.7	.5
CYCLE *TRUCK-2	.5	3.9	4.2	.8	1.2	1.9	.2	2.0
SPLIT * VOL-1	2.9	44.7	32.4	1.2	1.3	5.0	5.1	3.0
SPLIT * LT-1	2.0	.8	5.9	1.6	.9	.8	1.1	.4
SPLIT *TRUCK-1	2.2	.6	21.7	.9	2.5	.8	1.0	4.6
SPLIT * VOL-2	4.7	34.0	25.9	1.2	.3	2.1	5.0	3.3
SPLIT * LT-2	2.3	11.5	2.5	1.0	1.1	4.4	3.9	3.5
SPLIT *TRUCK-2	.6	4.9	1.1	.1	.3	2.8	3.1	1.4
VOL-1 * LT-1	1.4	4.6	.9	15.9	9.0	2.1	3.7	1.3
VOL-1 *TRUCK-1	16.5	.1	85.6	1.1	35.9	1.6	21.2	17.0
VOL-1 * VOL-2	43.5	104.2	136.7	23.7	48.8	23.7	77.5	99.9
VOL-1 * LT-2	.7	9.3	4.0	.9	1.0	2.9	3.0	1.6
VOL-1 *TRUCK-2	.9	6.0	.7	.8	.8	.3	1.0	1.7
LT-1 *TRUCK-1	.5	14.7	5.3	1.4	1.0	8.5	6.1	2.7
LT-1 * VOL-2	.5	2.7	4.6	.6	.4	1.2	2.0	.9
LT-1 * LT-2	1.5	.7	.9	1.5	.6	3.1	5.3	.4
LT-1 *TRUCK-2	.7	.4	5.6	.2	1.5	.6	1.4	.3
TRUCK-1* VOL-2	1.5	1.9	6.1	.8	2.2	1.8	1.6	1.4
TRUCK-1* LT-2	1.7	.5	3.8	.2	.8	1.1	1.1	.8
TRUCK-1*TRUCK-2	2.0	1.8	1.6	3.6	4.3	.6	6.2	1.0
VOL-2 * LT-2	2.0	5.2	1.7	9.6	14.7	2.8	3.6	1.1
VOL-2 *TRUCK-2	16.3	43.5	1.7	16.8	2.0	12.6	5.4	14.1
LT-2 *TRUCK-2	2.6	1.1	14.9	.3	5.5	3.7	6.2	3.4

WHERE IN THE HEADINGS OF EMISSIONS AND FUEL CONSUMPTION
I. PROPER : INTERSECTION PROPER AREA , IB : INBOUND APPROACH , OB : OUTBOUND APPROACH , BKT : 1ST BUCKET

F DISTRIBUTION SIGNIFICANCE LEVEL		0.999	0.99	0.95	0.90	0.75
RESPONSES 1- 6, WITH 1 REPLICA	F(1,36)	12.31	7.40	4.11	2.85	1.37
RESPONSES 7-58, WITH 2 REPLICA	F(1,279)	10.79	6.68	3.86	2.72	1.32

APPENDIX D

PREDICTIVE MODELS OF THE FIFTY-EIGHT RESPONSES OBSERVED IN THE MAJOR EXPERIMENT

Predicted Parameters

- Delays
- Queue Lengths
- Emissions of

  Carbon Monoxide (CO)
  Hydrocarbons (HC)
  Oxides of Nitrogen (NOx)

- Fuel Consumption

TABLE D-1. LEGEND

Symbol in Model	Factor	Level for use in Model for the Factor Shown		
		-1	0	+1
SIZE	Intersection size	4 x 4	6 x 4	6 x 6
LBAY	Presence of left-turn lane	None	yes, major	yes, both
CYCL	Cycle time	- 10 seconds	optimal cycle	+ 10 seconds
GRS1	Green ratio to the major street	-5%	optimal split	+5%
VOL1	Lane volume on the major street	300	450	600
LTN1	Left turns from the major street	0%	40% of LT capacity	80%
TRK1	Truck percentage on the major street	0%	5%	10%
VOL2	Lane volume on the minor street	300	450	600
LTN2	Left turns from the minor street	0%	40% of LT capacity	80%
TRK2	Truck percentage on the minor street	0%	5%	10%

NOTES: For the total intersection system and for the intersection proper, GT and RT define the green time and the red time on the minor street.

For all other locations within the intersection system, GT and RT indicate the green time and the red time on each street.

GT2 = (GT-35)**2

RT2 = (RT-35)**2

Quadratic effects = QUADR(SIZE) = (3*SIZE**2-2),QUADR(<BAY) = (3**<BAY**2-2) . . . QUADRATIC

TABLE D-1. PREDICTIVE MODELS OF THE FIFTY-EIGHT RESPONSES OBSERVED IN THE MAJOR EXPERIMENT

```
1  * AVERAGE TOTAL DELAY ON THE INTERSECTION SYSTEM   (SECONDS/VEHICLE)
    RES =  20.8200 + .390*(GT - 35) +  .4600*(RT - 35)        -.0100*(GT2 - 58.39)
-  2.570 * SIZE                   +   .468 * QUADR(SIZE)          -  3.152 * LBAY                  -  2.730 * CYCL
+   .730 * QUADR(GRS1)            +  2.196 * VOL1                 +   .800 * LTN1                  +  2.545 * VOL2
+   .361 * QUADR(VOL2)            +  1.559 * LTN2                 +   .754 * TRK2                  +  2.890 * SIZE*LBAY
-   .633 * SIZE*QUADR(LBAY)       -   .653 * QUADR(SIZE)*LBAY     -  2.127 * SIZE*VOL1             +   .596 * QUADR(SIZE)*VOL1
-  1.541 * SIZE*VOL2              -   .881 * SIZE*LTN2            -   .451 * QUADR(LBAY)*GRS1      -  1.974 * LBAY*VOL1
-   .924 * LBAY*LTN1              -  1.240 * LBAY*VOL2            -   .922 * LBAY*LTN2             -   .532 * QUADR(LBAY)*LTN2
-  1.110 * CYCL*LTN1              +.259 * QUADR(CYCL)*QUADR(LTN1) +   .520 * QUADR(GRS1)*VOL1      -  1.048 * GRS1*TRK1
+.365 * QUADR(GRS1)*QUADR(TRK1)   +   .626 * QUADR(GRS1)*VOL2     +  1.757 * GRS1*LTN2             +  2.757 * VOL1*VOL2
+   .599 * VOL1*QUADR(VOL2)      +   .693 * QUADR(VOL1)*VOL2     +   .903 * VOL1*LTN2             +.366 * QUADR(LTN1)*QUADR(TRK1)
-.265 * QUADR(LTN1)*QUADR(TRK2)   -.247 * QUADR(TRK1)*QUADR(LTN2) +   .433 * LTN2*QUADR(TRK2)      +   .583 * QUAOR(LTN2)*TRK2

2  * AVERAGE STOP  DELAY ON THE INTERSECTION SYSTEM   (SECONDS/VEHICLE)
    RES =  10.7300 + .190*(GT - 35) +  .2100*(RT - 35)
-   .797 * SIZE                   -  1.214 * LBAY                 -   .711 * CYCL                  +   .347 * QUADR(GRS1)
+   .498 * VOL1                   +   .543 * LTN1                 +   .707 * VOL2                  +   .859 * LTN2
+   .295 * TRK2                   +   .876 * SIZE*LBAY            -   .185 * SIZE*QUADR(LBAY)      -   .674 * SIZE*VOL1
+   .254 * QUADR(SIZE)*VOL1       -   .629 * SIZE*VOL2            -   .396 * SIZE*LTN2             -   .276 * QUADR(LBAY)*GRS1
-   .720 * LBAY*VOL1              -   .405 * LBAY*LTN1            -   .519 * LBAY*VOL2             -   .395 * LBAY*LTN2
-   .233 * QUADR(LBAY)*LTN2       -   .294 * CYCL*LTN1            -.112 * QUADR(CYCL)*QUADR(TRK2)  +   .200 * QUADR(GRS1)*VOL1
-   .330 * GRS1*TRK1              +.135 * QUADR(GRS1)*QUADR(TRK1) +   .246 * QUADR(GRS1)*VOL2      +   .906 * GRS1*LTN2
+  1.073 * VOL1*VOL2              +   .535 * VOL1*LTN2            +   .310 * LTN1*TRK1             +.159 * QUADR(LTN1)*QUADR(TRK1)
+   .329 * LTN1*VOL2              -.116 * QUADR(TRK1)*QUADR(LTN2) -   .169 * QUADR(VOL2)*LTN2      +   .186 * QUADR(LTN2)*TRK2

3  * TOTAL CO  EMISSION ON THE INTERSECTION SYSTEM      (KILOGRAMS/15 MINUTES)
    RES =  15.0035 +  .167*(GT - 35) +  .2102*(RT - 35)  -.0017*(RT2 - 58.39)  -.0031*(GT2 - 58.39)
+   2.69 * SIZE                   -    .37 * LBAY                 -   1.86 * CYCL                  +   1.58 * VOL1
+   4.09 * TRK1                   +   1.63 * VOL2                 +    .36 * LTN2                  +   3.79 * TRK2
+    .92 * SIZE*TRK1              -    .37 * QUADR(SIZE)*TRK1     +    .40 * BIZE*VOL2             +    .64 * SIZE*TRK2
-    .42 * GRS1*TRK1              +    .39 * GRS1*TRK2            +   1.02 * VOL1*TRK1             +   1.07 * VOL1*VOL2
+    .42 * VOL1*QUADR(VOL2)       +    .43 * QUADR(VOL1)*VOL2     +    .94 * VOL2*TRK2

4  * TOTAL HC  EMISSION ON THE INTERSECTION SYSTEM      (GRAMS/15 MINUTES)
    RES = 410.6700 + 6.240*(GT - 35) + 7.5800*(RT - 35)  -.0200*(RT2 - 58.39)  -.0900*(GT2 - 58.39)
+  65.44 * SIZE                   -  18.47 * LBAY                 -  62.08 * CYCL                  +   5.43 * QUADR(GRS1)
+  52.97 * VOL1                   +   4.35 * QUADR(VOL1)          +  45.75 * TRK1                  +  53.32 * VOL2
+   4.63 * QUADR(VOL2)            +  10.69 * LTN2                 +  43.40 * TRK2                  +  13.85 * SIZE*LBAY
+   8.10 * SIZE*VOL2              -  13.30 * LBAY*VOL1            -   9.63 * LBAY*VOL2             -   7.30 * LBAY*LTN2
-   8.09 * CYCL*LTN1              +   4.50 * QUADR(GRS1)*VOL1     -   8.16 * GRS1*TRK1             +2.48 * QUADR(GRS1)*QUADR(TRK1)
+   5.41 * QUADR(GRS1)*VOL2       +   9.74 * GRS1*LTN2            +  16.51 * VOL1*TRK1             +  29.19 * VOL1*VOL2
+  12.85 * VOL1*QUADR(VOL2)       +  13.51 * QUADR(VOL1)*VOL2     +   7.18 * VOL1*LTN2             +2.58 * QUADR(LTN1)*QUADR(TRK1)
+  16.04 * VOL2*TRK2

5  * TOTAL NOX EMISSION ON THE INTERSECTION SYSTEM      (GRAMS/15 MINUTES)
    RES = 1098.0   + 8.280*(GT - 35) + 9.1500*(RT - 35)  -.1100*(RT2 - 58.39)  -.1200*(GT2 - 58.39)
+ 237.22 * SIZE                   -   8.03 * QUADR(SIZE)          +   9.94 * LBAY                  -   9.43 * QUADR(LBAY)
-  90.71 * CYCL                   +  78.42 * VOL1                 -   5.79 * QUADR(VOL1)           + 136.00 * TRK1
-   5.84 * QUADR(TRK1)            +  75.50 * VOL2                 -   4.78 * QUADR(VOL2)           + 127.38 * TRK2
-  26.58 * SIZE*LBAY              +   9.82 * SIZE*QUADR(LBAY)     +  10.96 * QUADR(SIZE)*LBAY      -3.87 * QUADR(SIZE)*QUADR(LBAY)
+  24.03 * SIZE*VOL1              -   8.19 * QUADR(SIZE)*VOL1     +  24.59 * SIZE*TRK1             -   7.94 * QUADR(SIZE)*TRK1
+  17.65 * SIZE*VOL2              -   6.43 * QUADR(SIZE)*VOL2     +  19.14 * SIZE*TRK2             -  11.63 * LBAY*VOL2
+  48.88 * VOL1*TRK1              +  22.04 * VOL1*VOL2            +  18.13 * VOL1*QUAOR(VOL2)      +  17.56 * QUADR(VOL1)*VOL2
-4.11 * QUADR(VOL1)*QUADR(VOL2)   +  11.84 * VOL1*TRK2            +  12.96 * TRK1*VOL2             +  43.70 * VOL2*TRK2
+   9.98 * LTN2*TRK2

6  * TOTAL FUEL CONSUMPTION ON THE INTERSECTION SYSTEM  (KILOGRAMS/15 MINUTES)
    RES =  69.9496 +  .884*(GT - 35) + 1.0568*(RT - 35)  -.0052*(RT2 - 58.39)  -.0107*(GT2 - 58.39)
+  12.88 * SIZE                   -   1.51 * LBAY                 -   9.15 * CYCL                  +    .54 * QUADR(GRS1)
+   7.85 * VOL1                   +    .38 * QUADR(VOL1)          +   5.78 * TRK1                  +   7.68 * VOL2
+    .44 * QUAOR(VOL2)            +    .98 * LTN2                 +   5.48 * TRK2                  +   1.01 * SIZE*LBAY
+   1.41 * SIZE*VOL1              -    .44 * QUADR(SIZE)*VOL1     +    .83 * SIZE*TRK1             +   1.79 * SIZE*VOL2
+    .64 * QUADR(SIZE)*VOL2       -   1.22 * LBAY*VOL1            -   1.03 * LBAY*VOL2             -    .74 * LBAY*LTN2
-    .80 * CYCL*LTN1              +    .78 * CYCL*VOL2            +    .45 * QUADR(GRS1)*VOL1      -    .81 * GRS1*TRK1
+    .52 * QUADR(GRS1)*VOL2       +    .94 * GRS1*LTN2            +   2.16 * VOL1*TRK1             +   2.84 * VOL1*VOL2
+   1.81 * VOL1*QUADR(VOL2)       +   1.81 * QUADR(VOL1)*VOL2     + .24 * QUADR(LTN1)*QUADR(TRK1)  +   1.97 * VOL2*TRK2

7  * AVERAGE TOTAL DELAY / MINOR STREET *AVERAGE   (SECONDS / VEHICLE)
    RES = [illegible] -.1762*(GT - 35) + 1.0906*(RT - 35) + .0250*(RT2 - 58.39) - .0092*(GT2 - 58.39)
-   2.00 * SIZE                   -    .43 * QUADR(SIZE)          -   2.44 * LBAY                  -    .79 * QUADR(LBAY)
-   3.00 * CYCL                   -    .52 * QUADR(CYCL)          +   3.22 * GRS1                  +    .95 * QUADR(GRS1)
+   1.01 * VOL1                   +    .34 * QUADR(VOL1)          +   4.17 * VOL2                  +    .50 * QUADR(VOL2)
+   4.11 * LTN2                   +    .35 * QUADR(LTN2)          +   1.34 * TRK2                  +   1.18 * SIZE*LBAY
+.38 * QUADR(SIZE)*QUADR(CYCL)    -   1.54 * SIZE*GRS1            -    .58 * QUADR(SIZE)*GRB1      -   1.48 * SIZE*VOL1
-    .44 * QUADR(SIZE)*VOL1       -.27 * QUADR(SIZE)*QUADR(TRK1)  -   1.33 * SIZE*VOL2             +.24 * QUADR(SIZE)*QUADR(VOL2)
-   2.03 * SIZE*LTN2              -    .63 * SIZE*QUADR(LTN2)     -.32 * QUADR(SIZE)*QUADR(LTN2)   -    .61 * QUADR(SIZE)*TRK2
-    .81 * LBAY*QUADR(CYCL)       -    .75 * QUADR(LBAY)*CYCL     -   1.92 * LBAY*GRS1             -    .81 * QUADR(LBAY)*GRS1
-   1.[illegible] * LBAY*VOL1     -.24 * QUADR(LBAY)*QUADR(LTN1)  +    .53 * LBAY*QUADR(VOL2)      -   2.97 * LBAY*LTN2
-    .96 * QUADR(LBAY)*LTN2       -    .82 * CYCL*GRS1            +    .54 * CYCL*QUADR(GRS1)      -    .46 * QUADR(CYCL)*GRS1
-   1.77 * CYCL*VOL1              -    .60 * QUADR(CYCL)*VOL1     -    .96 * CYCL*LTN1             -    .62 * CYCL*QUADR(LTN1)
+   1.09 * CYCL*VOL2              +.24 * QUADR(CYCL)*QUADR(VOL2)  -    .66 * QUADR(CYCL)*TRK2      -.35 * QUADR(CYCL)*QUADR(TRK2)
+   3.46 * GRS1*VOL1              +    .79 * GRS1*QUADR(VOL1)     +    .95 * QUADR(GRS1)*VOL1      +.30 * QUADR(GRS1)*QUADR(VOL1)
+   2.01 * GRS1*VOL2              +    .83 * QUADR(GRS1)*VOL2     +   3.22 * GRS1*LTN2             +    .49 * QUADR(GRS1)*LTN2
+    .98 * GRS1*TRK2              +   2.53 * VOL1*VOL2            +    .47 * VOL1*QUADR(VOL2)      +    .86 * QUADR(VOL1)*VOL2
+   2.85 * VOL1*LTN2              +    .44 * QUADR(VOL1)*LTN2     +   1.09 * VOL1*TRK2             +    .42 * QUADR(VOL1)*TRK2
-    .64 * QUADR(LTN1)*TRK1       +.80 * QUADR(LTN1)*QUADR(TRK1)  +    .72 * LTN1*QUADR(VOL2)      -    .43 * QUADR(TRK1)*VOL2
-    .77 * TRK1*TRK2              -    .65 * TRK1*QUADR(TRK2)     -    .59 * QUADR(VOL2)*LTN2      +    .79 * LTN2*TRK2

8  * AVERAGE TOTAL DELAY / MINOR STREET *LEFT  (SECONDR / VEHICLE)
    RES = 32.4995 -.5367*(GT - 35) + 1.2923*(ST - 35) + .0185*(RT2 - 58.39) + .0255*(GT2 - 58.39)
+   1.51 * QUADR(SIZE)            -   3.60 * LBAY                 -   1.67 * QUADR(LBAY)           -   3.42 * CYCL
+   3.88 * GRS1                   +   1.49 * QUADR(GRS1)          +   1.16 * QUADR(VOL1)           +   4.62 * VOL2
+  27.49 * LTN2                   -   5.01 * QUADR(LTN2)          -   2.28 * SIZE*CYCL             -   5.50 * SIZE*VOL2
-   1.35 * QUADR(SIZE)*VOL2       +   1.53 * QUADR(SIZE)*LTN2     -   4.69 * LBAY*GRS1             -   1.69 * QUADR(LBAY)*GRS1
-   2.58 * LBAY*VOL1              +   2.43 * LBAY*LTN1            -.87 * QUADR(LBAY)*QUADR(LTN1)   -   4.44 * LBAY*LTN2
-   1.27 * QUADR(LBAY)*LTN2       +.94 * QUADR(LBAY)*QUADR(TRK2)  -   4.01 * CYCL*VOL1             -   3.08 * CYCL*LTN1
-   1.91 * CYCL*QUADR(LTN1)       +   1.39 * QUADR(CYCL)*LTN1     +.98 * QUADR(CYCL)*QUADR(TRK1)   -   1.62 * CYCL*QUADR(VOL2)
-.21 * QUADR(CYCL)*QUADR(TRK2)    +   3.26 * GRS1*VOL1            +  10.79 * GRS1*LTN2             +   1.76 * QUADR(GRS1)*LTN2
+   9.73 * VOL1*LTN2              +   3.55 * LTN1*TRK1            +   1.59 * QUADR(TRK1)*TRK2      -1.00 * QUADR(TRK1)*QUADR(TRK2)

9  * AVERAGE TOTAL DELAY / MINOR STREET *RIGHT  (SECONDS / VEHICLE)
    RES = 22.6638 + .1035*(GT - 35) + .9444*(RT - 35) + .0193*(RT2 - 58.39) - .0160*(GT2 - 58.39)
-   1.76 * SIZE                   -   2.30 * LBAY                 -    .61 * QUADR(LBAY)           -   4.00 * CYCL
-    .40 * QUADR(CYCL)            +   3.51 * GRS1                 +   1.02 * QUADR(GRS1)           +   1.79 * VOL1
+    .44 * QUADR(VOL1)            +   5.24 * VOL2                 +    .74 * QUADR(VOL2)           +   2.25 * LTN2
+   1.23 * TRK2                   +   1.31 * SIZE*LBAY            -    .37 * QUADR(SIZE)*CYCL      +.24 * QUADR(SIZE)*QUADR(CYCL)
-   1.38 * SIZE*GRS1              -    .36 * QUADR(SIZE)*GRB1     -.22 * QUADR(SIZE)*QUADR(GRS1)   -   1.51 * SIZE*VOL1
-   1.20 * SIZE*VOL2              -   1.85 * SIZE*LTN2            -    .61 * SIZE*QUADR(LTN2)      -.32 * QUADR(SIZE)*QUADR(LTN2)
-    .45 * QUADR(SIZE)*TRK2       -    .72 * LBAY*QUADR(CYCL)     -    .87 * QUADR(LBAY)*CYCL      -   1.16 * LBAY*GRS1
-    .84 * QUADR(LBAY)*GRS1       -   1.23 * LBAY*VOL1            -   2.16 * LBAY*LTN2             -    .73 * QUADR(LBAY)*LTN2
-    .99 * CYCL*GRS1              +    .44 * CYCL*QUADR(GRS1)     -   1.27 * CYCL*VOL1             -    .67 * QUADR(CYCL)*VOL1
-    .76 * CYCL*LTN1              +   1.48 * CYCL*VOL2            +.29 * QUADR(CYCL)*QUADR(VOL2)   -    .76 * CYCL*TRK2
-    .58 * QUADR(CYCL)*TRK2       +   3.35 * GRS1*VOL1            +    .69 * GRS1*QUADR(VOL1)      +    .93 * QUADR(GRS1)*VOL1
+.21 * QUADR(GRS1)*QUADR(TRK1)    +   2.73 * GRS1*VOL2            +   1.04 * QUADR(GRS1)*VOL2      +   2.40 * GRS1*LTN2
+    .37 * QUADR(GRS1)*LTN2       +   1.05 * GRS1*TRK2            +   3.29 * VOL1*VOL2             +    .87 * VOL1*QUADR(VOL2)
+   1.17 * QUADR(VOL1)*VOL2       +   1.68 * VOL1*LTN2            +    .77 * VOL1*TRK2             -    .44 * QUADR(LTN1)*TRK1
+.70 * QUADR(LTN1)*QUADR(TRK1)    +    .67 * LTN1*QUADR(VOL2)     -    .37 * QUADR(TRK1)*VOL2      -    .75 * TRK1*TRK2
-    .48 * TRK1*QUADR(TRK2)       +   1.06 * VOL2*LTN2            +    .70 * VOL2*TRK2             +    .66 * LTN2*TRK2
```

TABLE D-1. (CONTINUED)

```
10  * AVERAGE TOTAL DELAY / MINOR STREET *STRAIGHT  (SECONDS / VEHICLE)
     RES = 21.8424 -.1054*(GT - 35) + 1.0595*(RT - 35) + .0270*(RT2 - 58.39) - .0131*(GT2 - 58.39)
-    1.90 * SIZE                    -    .52 * QUADR(SIZE)             -   2.34 * LBAY                   -    .81 * QUADR(LBAY)
-    3.11 * CYCL                    -    .51 * QUADR(CYCL)             +   3.33 * GRS1                   +    .92 * QUADR(GRS1)
+    1.02 * VOL1                    +   4.28 * VOL2                    +    .39 * QUADR(VOL2)            +   3.36 * LTN2
+    1.35 * TRK2                    +   1.15 * SIZE*LBAY               -    .43 * QUADR(SIZE)*CYCL       +.40 * QUADR(SIZE)*QUADR(CYCL)
-    1.57 * SIZE*GRS1               -    .67 * QUADR(SIZE)*GRS1        -.25 * QUADR(SIZE)*QUADR(GRS1)    -   1.71 * SIZE*VOL1
-     .48 * QUADR(SIZE)*VOL1        -.29 * QUADR(SIZE)*QUADR(TRK1)     -   1.36 * SIZE*VOL2              -   1.96 * SIZE*LTN2
-     .69 * SIZE*QUADR(LTN2)        -.32 * QUADR(SIZE)*QUADR(LTN2)     -    .69 * QUADR(SIZE)*TRK2       -    .82 * LBAY*QUADR(CYCL)
-     .73 * QUADR(LBAY)*CYCL        -   1.93 * LBAY*GRS1               -    .73 * QUADR(LBAY)*GRS1       -   1.77 * LBAY*VOL1
+     .59 * LBAY*QUADR(VOL2)        -   2.88 * LBAY*LTN2               -    .97 * QUADR(LBAY)*LTN2       -    .92 * CYCL*GRS1
+     .52 * CYCL*QUADR(GRS1)        -    .48 * QUADR(CYCL)*GRS1        -   1.70 * CYCL*VOL1              -    .61 * QUADR(CYCL)*VOL1
-     .79 * CYCL*LTN1               -    .61 * CYCL*QUADR(LTN1)        +   1.25 * CYCL*VOL2              +.24 * QUADR(CYCL)*QUADR(VOL2)
-     .80 * CYCL*TRK2               -    .67 * QUADR(CYCL)*TRK2        -.30 * QUADR(CYCL)*QUADR(TRK2)    +   3.36 * GRS1*VOL1
+     .85 * GRS1*QUADR(VOL1)        +    .95 * QUADR(GRS1)*VOL1        +.32 * QUADR(GRS1)*QUADR(VOL1)    +.24 * QUADR(GRS1)*QUADR(TRK1)
+    2.21 * GRS1*VOL2               +    .88 * QUADR(GRS1)*VOL2        +   2.82 * GRS1*LTN2              +    .44 * QUADR(GRS1)*LTN2
+    1.04 * GRS1*TRK2               +   2.73 * VOL1*VOL2               +    .43 * VOL1*QUADR(VOL2)       +    .86 * QUADR(VOL1)*VOL2
+    2.68 * VOL1*LTN2               +    .46 * QUADR(VOL1)*LTN2        +   1.14 * VOL1*TRK2              +    .45 * QUADR(VOL1)*TRK2
-     .63 * QUADR(LTN1)*TRK1        +.78 * QUADR(LTN1)*QUADR(TRK1)     +    .78 * LTN1*QUADR(VOL2)       -    .43 * QUADR(TRK1)*VOL2
-     .70 * TRK1*QUADR(TRK2)        +   1.10 * VOL2*LTN2               -    .79 * QUADR(VOL2)*LTN2       +    .84 * LTN2*TRK2

11  *  AVERAGE STOP DELAY / MINOR STREET *AVERAGE   (SECONDS / VEHICLE)
     RES = 12.0764 -.2524*(GT - 35) + .6905*(RT - 35) + .0157*(RT2 - 58.39) + .0009*(GT2 - 58.39)
-     .78 * SIZE                    -   1.20 * LBAY                    -    .34 * QUADR(LBAY)            -    .88 * CYCL
-     .35 * QUADR(CYCL)             +    .93 * GRS1                    +    .44 * QUADR(GRS1)            +   1.17 * VOL2
+    2.43 * LTN2                    +    .20 * QUADR(LTN2)             +    .57 * TRK2                   +    .50 * SIZE*LBAY
+     .25 * QUADR(SIZE)*LBAY        +.18 * QUADR(SIZE)*QUADR(CYCL)     -    .61 * SIZE*GRS1              -    .33 * QUADR(SIZE)*GRS1
-     .59 * SIZE*VOL1               -    .29 * QUADR(SIZE)*VOL1        -.19 * QUADR(SIZE)*QUADR(TRK1)    -    .57 * SIZE*VOL2
+.17 * QUADR(SIZE)*QUADR(VOL2)      -    .84 * SIZE*LTN2               -    .29 * QUADR(SIZE)*TRK2       -    .26 * LBAY*QUADR(CYCL)
-     .31 * QUADR(LBAY)*CYCL        -   1.07 * LBAY*GRS1               -    .48 * QUADR(LBAY)*GRS1       -   1.12 * LBAY*VOL1
-     .25 * LBAY*QUADR(VOL1)        -.17 * QUADR(LBAY)*QUADR(LTN1)     +    .32 * LBAY*QUADR(VOL2)       -   1.48 * LBAY*LTN2
-     .40 * QUADR(LBAY)*LTN2        +    .27 * CYCL*QUADR(GRS1)        -    .27 * QUADR(CYCL)*GRS1       -   1.09 * CYCL*VOL1
-     .32 * QUADR(CYCL)*VOL1        -    .50 * CYCL*LTN1               -    .35 * CYCL*QUADR(LTN1)       +.15 * QUADR(CYCL)*QUADR(TRK1)
+.14 * QUADR(CYCL)*QUADR(VOL2)      -    .38 * QUADR(CYCL)*TRK2        -.25 * QUADR(CYCL)*QUADR(TRK2)    +   1.59 * GRS1*VOL1
+     .37 * GRS1*QUADR(VOL1)        +    .39 * QUADR(GRS1)*VOL1        +    .26 * GRS1*QUADR(TRK1)       +.15 * QUADR(GRS1)*QUADR(TRK1)
+     .27 * QUADR(GRS1)*VOL2        +   1.86 * GRS1*LTN2               +    .29 * QUADR(GRS1)*LTN2       +    .42 * GRS1*TRK2
+     .47 * VOL1*VOL2               +    .24 * QUADR(VOL1)*VOL2        +   1.75 * VOL1*LTN2              +    .31 * QUADR(VOL1)*LTN2
+     .57 * VOL1*TRK2               +    .52 * LTN1*TRK1               -    .63 * QUADR(LTN1)*TRK1       +.34 * QUADR(LTN1)*QUADR(TRK1)
+     .37 * LTN1*QUADR(VOL2)        -    .31 * TRK1*QUADR(TRK2)        -    .41 * VOL2*LTN2              -    .38 * QUADR(VOL2)*LTN2
+     .52 * LTN2*TRK2               +   1.32 * QUADR(SIZE)

12  *  AVERAGE STOP DELAY / MINOR STREET *LEFT  (SECONDS / VEHICLE)
     RES = 24.3152 -.5315*(GT - 35) + 1.0867*(RT - 35) + .0122*(RT2 -58.39) + .0296(GT2 - 58.39)
-    2.53 * CYCL                    +   2.59 * GRS1                    +   1.10 * QUADR(GRS1)            +   1.05 * QUADR(VOL1)
+    3.20 * VOL2                    +  20.74 * LTN2                    -   3.58 * QUADR(LTN2)            -   4.78 * SIZE*VOL2
-    1.55 * QUADR(SIZE)*VOL2        +   1.31 * QUADR(SIZE)*LTN2        -   3.06 * LBAY*GRS1              -   1.39 * QUADR(LBAY)*GRS1
+    2.21 * LBAY*LTN1               -.82 * QUADR(LBAY)*QUADR(LTN1)     +   2.95 * LBAY*VOL2              -   1.54 * LBAY*QUADR(LTN2)
+.97 * QUADR(LBAY)*QUADR(TRK2)      -   3.34 * CYCL*VOL1               -   2.76 * CYCL*LTN1              -   1.73 * CYCL*QUADR(LTN1)
+.03 * QUADR(CYCL)*QUADR(TRK1)      -   1.49 * CYCL*QUADR(VOL2)        -.20 * QUADR(CYCL)*QUADR(TRK2)    +   2.64 * GRS1*VOL1
-    2.56 * GRS1*VOL2               +   8.87 * GRS1*LTN2               +   1.50 * QUADR(GRS1)*LTN2       -   2.31 * VOL1*VOL2
+    8.19 * VOL1*LTN2               +   3.01 * LTN1*TRK1               +   1.25 * LTN1*QUADR(TRK1)       +   1.37 * QUADR(TRK1)*TRK2
-.99 * QUADR(TRK1)*QUADR(TRK2)

13  *  AVERAGE STOP DELAY / MINOR STREET *RIGHT  (SECONDS / VEHICLE)
     RES =  8.7864 -.0497*(GT - 35) + .5272*(RT - 35) + .1000*(RT2 - 58.39) - .0035*(GT2 - 58.39)
-     .40 * SIZE                    -    .75 * LBAY                    -    .17 * QUADR(LBAY)            -   1.36 * CYCL
-     .18 * QUADR(CYCL)             +    .80 * GRS1                    +    .43 * QUADR(GRS1)            +    .82 * VOL1
+     .25 * QUADR(VOL1)             +   1.61 * VOL2                    +    .20 * QUADR(VOL2)            +    .58 * LTN2
+     .41 * TRK2                    -    .40 * SIZE*GRS1               -    .37 * SIZE*VOL1              +    .19 * SIZE*QUADR(TRK1)
-     .39 * SIZE*VOL2               -    .54 * SIZE*LTN2               -    .22 * SIZE*QUADR(LTN2)       -.12 * QUADR(SIZE)*QUADR(LTN2)
-     .23 * LBAY*QUADR(CYCL)        -    .40 * QUADR(LBAY)*CYCL        -    .45 * QUADR(LBAY)*GRS1       -    .48 * LBAY*VOL1
-     .57 * LBAY*LTN2               -    .21 * QUADR(LBAY)*TRK2        -    .44 * CYCL*GRS1              -    .53 * CYCL*VOL1
-     .27 * QUADR(CYCL)*VOL1        +    .56 * CYCL*VOL2               +.13 * QUADR(CYCL)*QUADR(VOL2)    -    .43 * CYCL*TRK2
-     .24 * QUADR(CYCL)*TRK2        +   1.34 * GRS1*VOL1               +    .35 * GRS1*QUADR(VOL1)       +    .39 * QUADR(GRS1)*VOL1
-     .19 * QUADR(GRS1)*LTN1        +    .25 * GRS1*QUADR(TRK1)        +    .85 * GRS1*VOL2              +    .40 * QUADR(GRS1)*VOL2
+     .93 * GRS1*LTN2               +    .37 * GRS1*TRK2               +   1.11 * VOL1*VOL2              +    .29 * VOL1*QUADR(VOL2)
+     .48 * QUADR(VOL1)*VOL2        +    .63 * VOL1*LTN2               +    .36 * VOL1*TRK2              -    .19 * QUADR(LTN1)*TRK1
+.27 * QUADR(LTN1)*QUADR(TRK1)      -.13 * QUADR(TRK1)*QUADR(TRK2)     +.13 * QUADR(VOL2)*QUADR(TRK2)

14  *  AVERAGE STOP DELAY / MINOR STREET *STRAIGHT  (SECONDS / VEHICLE)
     RES = 11.7298 -.1947*(GT - 35) + .6640*(RT - 35) + .0174*(RT2 - 58.39) - .0027*(GT2 -58.39)
-     .82 * SIZE                    -    .24 * QUADR(SIZE)             -   1.22 * LBAY                   -    .37 * QUADR(LBAY)
-     .93 * CYCL                    -    .33 * QUADR(CYCL)             +   1.00 * GRS1                   +    .40 * QUADR(GRS1)
+    1.23 * VOL2                    +   1.77 * LTN2                    +    .56 * TRK2                   +    .57 * SIZE*LBAY
+     .25 * QUADR(SIZE)*LBAY        -    .28 * QUADR(SIZE)*CYCL        +.20 * QUADR(SIZE)*QUADR(CYCL)    -    .68 * SIZE*GRS1
-     .40 * QUADR(SIZE)*GRS1        -.14 * QUADR(SIZE)*QUADR(GRS1)     -    .84 * SIZE*VOL1              -    .32 * QUADR(SIZE)*VOL1
-.21 * QUADR(SIZE)*QUADR(TRK1)      -    .52 * SIZE*VOL2               +.15 * QUADR(SIZE)*QUADR(VOL2)    -    .83 * SIZE*LTN2
-     .76 * SIZE*QUADR(LTN2)        -    .37 * QUADR(SIZE)*TRK2        -    .78 * LBAY*QUADR(CYCL)       -    .29 * QUADR(LBAY)*CYCL
-    1.10 * LBAY*GRS1               -    .40 * QUADR(LBAY)*GRS1        -   1.16 * LBAY*VOL1              -    .24 * LBAY*QUADR(VOL1)
-.15 * QUADR(LBAY)*QUADR(LTN1)      +    .37 * LBAY*QUADR(VOL2)        -   1.49 * LBAY*LTN2              -    .41 * QUADR(LBAY)*LTN2
-     .42 * LBAY*TRK2               -    .43 * CYCL*GRS1               -    .25 * CYCL*QUADR(GRS1)       -    .27 * QUADR(CYCL)*GRS1
-    1.02 * CYCL*VOL1               -    .33 * QUADR(CYCL)*VOL1        -    .32 * CYCL*QUADR(LTN1)       +    .24 * QUADR(CYCL)*TRK1
+.15 * QUADR(CYCL)*QUADR(VOL2)      -    .40 * QUADR(CYCL)*TRK2        -.20 * QUADR(CYCL)*QUADR(TRK2)    +   1.50 * GRS1*VOL1
+     .40 * GRS1*QUADR(VOL1)        +    .39 * QUADR(GRS1)*VOL1        +.14 * QUADR(GRS1)*QUADR(VOL1)    +    .25 * GRS1*QUADR(TRK1)
+.18 * QUADR(GRS1)*QUADR(TRK1)      +    .44 * GRS1*VOL2               +    .33 * QUADR(GRS1)*VOL2       +   1.47 * GRS1*LTN2
+     .24 * QUADR(GRS1)*LTN2        +    .46 * GRS1*TRK2               +    .66 * VOL1*VOL2              +    .25 * QUADR(VOL1)*VOL2
+    1.54 * VOL1*LTN2               +    .31 * QUADR(VOL1)*LTN2        +    .59 * VOL1*TRK2              +    .24 * QUADR(VOL1)*TRK2
-     .43 * QUADR(LTN1)*TRK1        +.32 * QUADR(LTN1)*QUADR(TRK1)     +    .45 * LTN1*QUADR(VOL2)       -    .35 * TRK1*QUADR(TRK2)
-     .55 * QUADR(VOL2)*LTN2        +    .56 * LTN2*TRK2

15  *     AVERAGE QUEUE LENGTH / MINOR     *LANE AVG Q (NO. OF VEHICLES)
     RES =  1.9456 +  .0264*(GT - 35) + .1001*(RT - 35) + .0016*(RT2 - 58.39) - .0019*(GT2 - 58.39)
- .119 * SIZE                       - .242 * LBAY                      - .062 * QUADR(LBAY)              - .446 * CYCL
- .059 * QUADR(CYCL)                +.456 * GRS1                       + .084 * QUADR(GRS1)              + .149 * VOL1
+ .600 * VOL2                       + .047 * QUADR(VOL2)               + .274 * LTN2                     + .148 * TRK2
+ .086 * SIZE*LBAY                  + .056 * SIZE*QUADR(CYCL)          - .058 * QUADR(SIZE)*CYCL         - .061 * QUADR(SIZE)*GRS1
- .053 * QUADR(SIZE)*VOL2           - .131 * SIZE*LTN2                 -.048 * QUADR(SIZE)*QUADR(LTN2)   - .089 * LBAY*QUADR(CYCL)
- .149 * LBAY*GRS1                  - .141 * LBAY*VOL1                 +.033 * QUADR(LBAY)*QUADR(VOL1)   -.049 * QUADR(LBAY)*QUADR(LTN1)
-.031 * QUADR(LBAY)*QUADR(TRK1)     + .058 * LBAY*QUADR(VOL2)          - .296 * LBAY*LTN2                - .063 * QUADR(CYCL)*GRS1
- .134 * CYCL*VOL1                  - .090 * QUADR(CYCL)*VOL1          +.038 * QUADR(CYCL)*QUADR(TRK1)   + .183 * CYCL*VOL2
- .055 * QUADR(CYCL)*VOL2           -.034 * QUADR(CYCL)*QUADR(TRK2)    + .341 * GRS1*VOL1                + .067 * QUADR(GRS1)*VOL1
+ .050 * GRS1*QUADR(TRK1)           +.035 * QUADR(GRS1)*QUADR(TRK1)    + .280 * GRS1*VOL2                + .077 * QUADR(GRS1)*VOL2
+ .159 * GRS1*LTN2                  + .125 * GRS1*TRK2                 + .366 * VOL1*VOL2                + .079 * VOL1*QUADR(VOL2)
+ .083 * QUADR(VOL1)*VOL2           + .116 * VOL1*LTN2                 + .128 * VOL1*TRK2                +.057 * QUADR(LTN1)*QUADR(TRK1)
+ .053 * QUADR(LTN1)*LTN2           - .068 * QUADR(LTN1)*TRK2          - .070 * QUADR(TRK1)*TRK2         - .067 * QUADR(VOL2)*LTN2
+ .133 * VOL2*TRK2                  + .088 * LTN2*TRK2                 - .051 * LTN2*QUADR(TRK2)         + .115 * LBAY

16  *     AVERAGE QUEUE LENGTH / MINOR     *BAY AVG Q (NO. OF VEHICLES)
     RES =   .0766 -  .0061*(GT - 35) + .0036*(RT - 35) + .0001*(RT2 - 58.39) + .0002*(GT2 - 58.39)
+ .038 * QUADR(LBAY)                - .016 * GRS1                      - .013 * VOL2                     + .077 * LTN2
+ .006 * QUADR(TRK2)                + .012 * SIZE*QUADR(CYCL)          + .007 * QUADR(SIZE)*CYCL         - .009 * SIZE*QUADR(LTN1)
+ .016 * SIZE*QUADR(TRK1)           - .013 * QUADR(SIZE)*TRK1          +.006 * QUADR(SIZE)*QUADR(TRK1)   + .013 * QUADR(SIZE)*TRK2
+ .027 * LBAY*GRS1                  + .007 * QUADR(LBAY)*GRS1          + .041 * LBAY*VOL1                + .014 * QUADR(LBAY)*VOL1
+ .014 * LBAY*LTN1                  - .080 * LBAY*VOL2                 + .008 * LBAY*QUADR(VOL2)         - .027 * QUADR(LBAY)*VOL2
+ .115 * LBAY*LTN2                  + .038 * QUADR(LBAY)*LTN2          + .010 * LBAY*QUADR(TRK2)         - .008 * CYCL*QUADR(LTN1)
+ .008 * CYCL*QUADR(TRK1)           - .013 * CYCL*VOL2                 + .021 * CYCL*TRK2                - .007 * QUADR(CYCL)*TRK2
- .017 * GRS1*TRK1                  -.004 * QUADR(GRS1)*QUADR(TRK1)    + .026 * GRS1*LTN2                + .009 * GRS1*QUADR(LTN2)
+ .022 * GRS1*TRK2                  + .012 * GRS1*QUADR(TRK2)          + .010 * QUADR(GRS1)*TRK2         - .013 * VOL1*QUADR(LTN1)
- .014 * QUADR(VOL1)*LTN1           -.004 * QUADR(VOL1)*QUADR(LTN1)    +.005 * QUADR(VOL1)*QUADR(TRK1)   - .022 * VOL1*VOL2
+ .031 * VOL1*LTN2                  + .007 * VOL1*QUADR(TRK2)          - .009 * LTN1*QUADR(TRK1)         -.005 * QUADR(LTN1)*QUADR(TRK1)
+ .008 * QUADR(LTN1)*VOL2           + .023 * LTN1*LTN2                 + .013 * LTN1*QUADR(LTN2)         + .015 * TRK1*VOL2
- .016 * TRK1*TRK2                  - .052 * VOL2*LTN2                 - .013 * VOL2*TRK2                - .011 * VOL2*QUADR(TRK2)
+ .008 * QUADR(VOL2)*TRK2           + .010 * LTN2*QUADR(TRK2)
```

TABLE D-1. (CONTINUED)

```
17  *     MAXIMUM QUEUE LENGTH / MINOR     *LANE MAX Q (NO. OF VEHICLES)
      RES =   6.9222 +   .0906*(GT - 35) +   .2306*(RT - 35) + .0037*(RT2 - 58.39) - .0050*(GT2 - 58.39)
- .668 * SIZE                      - .176 * QUADR(SIZE)              - .712 * LBAY                      - .296 * QUADR(LBAY)
-1.013 * CYCL                      - .110 * QUADR(CYCL)              +1.042 * GRS1                      + .179 * QUADR(GRS1)
+ .316 * VOL1                      +1.400 * VOL2                     + .948 * LTN2                      + .322 * TRK2
+ .341 * SIZE*LBAY                 + .104 * QUADR(SIZE)*LBAY         - .114 * QUADR(SIZE)*CYCL          - .313 * SIZE*GRS1
- .172 * QUADR(SIZE)*GRS1          - .377 * SIZE*VOL1                - .166 * QUADR(SIZE)*VOL1          - .429 * SIZE*VOL2
- .474 * SIZE*LTN2                 - .103 * SIZE*QUADR(LTN2)         -.063 * QUADR(SIZE)*QUADR(LTN2)    - .124 * SIZE*QUADR(TRK2)
- .158 * LBAY*QUADR(CTCL)          - .172 * QUADR(LBAY)*CYCL         - .453 * LBAY*GRS1                 - .159 * QUADR(LBAY)*GRS1
- .321 * LBAY*VOL1                 - .211 * QUADR(LBAY)*VOL2         - .917 * LBAY*LTN2                 - .243 * QUADR(LBAY)*LTN2
+.064 * QUADR(LBAY)*QUADR(LTN2)    - .204 * LBAY*TRK2                - .350 * CYCL*VOL1                 - .162 * QUADR(CYCL)*VOL1
- .129 * CYCL*QUADR(LTN1)          + .125 * QUADR(CYCL)*TRK1         +.067 * QUADR(CYCL)*QUADR(TRK1)    + .487 * CYCL*VOL2
-.084 * QUADR(CYCL)*QUADR(TRK2)    + .756 * GRS1*VOL1                + .136 * QUADR(GRS1)*VOL1          + .574 * GRS1*VOL2
+ .137 * QUADR(GRS1)*VOL2          + .598 * GRS1*LTN2                + .273 * GRS1*TRK2                 + .860 * VOL1*VOL2
+ .193 * VOL1*QUADR(VOL2)          + .255 * QUADR(VOL1)*VOL2         + .532 * VOL1*LTN2                 + .187 * VOL1*TRK2
+.165 * QUADR(LTN1)*QUADR(TRK1)    + .120 * LTN1*QUADR(VOL2)         - .138 * TRK1*QUADR(TRK2)          + .404 * VOL2*LTN2
- .204 * QUADR(VOL2)*LTN2          + .192 * VOL2*TRK2                + .190 * LTN2*TRK2

18  *     MAXIMUM QUEUE LENGTH / MINOR     *BAY MAX Q (NO. OF VEHICLES)
      RES =    .4527 -   .0176*(GT - 35) +   .0067*(RT - 35) - .0001*(RT2 - 58.39) + .0005*(GT2 - 58.39)
- .049 * SIZE                      + .679 * LBAY                     + .227 * QUADR(LBAY)               + .061 * CYCL
- .072 * GRS1                      - .080 * VOL2                     + .398 * LTN2                      - .055 * QUADR(LTN2)
- .074 * SIZE*LBAY                 - .051 * SIZE*CYCL                + .041 * SIZE*QUADR(TRK1)          - .061 * QUADR(SIZE)*TRK1
+.024 * QUADR(SIZE)*QUADR(TRK1)    + .059 * LBAY*VOL1                - .297 * LBAY*VOL2                 + .034 * LBAY*QUADR(VOL2)
- .099 * QUADR(LBAY)*VOL2          + .597 * LBAY*LTN2                - .082 * LBAY*QUADR(LTN2)          + .199 * QUADR(LBAY)*LTN2
-.027 * QUADR(LBAY)*QUADR(LTN2)    - .057 * CYCL*VOL1                -.023 * QUADR(CYCL)*QUADR(TRK2)    - .069 * GRS1*TRK1
-.018 * QUADR(GRS1)*QUADR(VOL2)    + .060 * GRS1*TRK2                + .042 * GRS1*QUADR(TRK2)          -.021 * QUADR(GRS1)*QUADR(TRK2)
- .066 * QUADR(VOL1)*LTN1          - .056 * VOL1*VOL2                + .069 * LTN1*LTN2                 + .045 * LTN1*QUADR(LTN2)
-.019 * QUADR(LTN1)*QUADR(TRK2)    - .181 * VOL2*LTN2

19  * TOTAL CO  EMISSION ON INBOUND APPROACH OF MINOR STREET       (KILOGRAMS/15 MINUTES)
      RES =  2.7720 +.0553*(GT - 35) +  .0432*(RT - 35) + .0012*(RT2 - 58.39) - .0019*(GT2 - 58.39)
+    .532 * SIZE                   +    .148 * QUADR(SIZE)           -    .110 * LBAY                   -    .068 * QUADR(LBAT)
-    .491 * CYCL                   +    .480 * GRS1                  +    .056 * QUADR(GRS1)            +    .180 * VOL1
+    .656 * VOL2                   +    .151 * LTN2                  +   1.372 * TRK2                   -    .047 * QUADR(TRK2)
-    .034 * SIZE*QUADR(GRS1)       -.023 * QUADR(SIZE)*QUADR(GRS1)   +    .128 * SIZE*VOL2              +    .057 * QUADR(SIZE)*VOLZ
-    .077 * SIZE*LTN2              -    .084 * SIZE*QUADR(LTN2)      +    .036 * QUADR(SIZE)*LTN2       -.031 * QUADR(SIZE)*QUADR(LTN2)
+    .295 * SIZE*TRK2              -    .037 * QUADR(SIZE)*TRK2      -.021 * QUADR(SIZE)*QUADR(TRK2)    -    .055 * QUADR(LBAY)*CYCL
-.019 * QUADR(LBAY)*QUADR(CYCL)    -    .063 * LBAY*GRS1             -    .039 * QUADR(LBAY)*VOL2       -    .166 * LBAY*LTN2
-    .045 * QUADR(LBAY)*LTN2       -    .035 * QUADR(LBAY)*TRK2      -    .080 * CYCL*GRS1              -    .033 * QUADR(CYCL)*GRS1
-    .064 * CYCL*VOL1              -    .058 * QUADR(CYCL)*VOL1      -    .081 * CYCL*LTN1              -    .134 * CYCL*VOL2
-    .072 * CYCL*TRK2              +    .202 * GRS1*VOL1             +    .039 * QUADR(GRS1)*VOL1       +.023 * QUADR(GRS1)*QUADR(VOL1)
-.023 * QUADR(GRS1)*QUADR(LTN1)    +    .179 * GRS1*VOL2             +    .066 * QUADR(GRS1)*VOL2       +    .095 * GRS1*LTN2
+    .162 * GRS1*TRK2              -    .039 * QUADR(VOL1)*LTN1      -.030 * QUADR(VOL1)*QUADR(LTN1)    +    .273 * VOL1*VOL2
+    .100 * VOL1*QUADR(VOL2)       +    .099 * QUADR(VOL1)*VOL2      +    .125 * VOL1*LTN2              +    .160 * VOL1*TRK2
+.054 * QUADR(LTN1)*QUADR(TRK1)    +    .049 * LTN1*QUADR(VOL2)      -.027 * QUADR(LTN1)*QUADR(LTN2)    -    .041 * QUADR(VOL2)*LTN2
-.019 * QUADR(VOL2)*QUADR(LTN2)    +    .520 * VOL2*TRK2             -    .040 * QUADR(VOL2)*TRK2

20  * TOTAL HC  EMISSION ON INBOUND APPROACH OF MINOR STREET       (GRAMS/15 MINUTES)
      RES = 73.1500 -1.570*(GY - 35) + 1.4100*(RT - 35) + .0400*(RT2 - 58.19) - .2300*(GT2 - 58.39)
+ 12.899 * SIZE                    +  4.027 * QUADR(SIZE)            -  3.204 * LBAY                    -  1.671 * QUADR(LBAY)
- 13.167 * CYCL                    + 13.405 * GRS1                   +  1.701 * QUADR(GRS1)             +  4.693 * VOL1
+   .534 * QUADR(VOL1)             + 17.968 * VOL2                   +  1.317 * QUADR(VOL2)             +  5.639 * LTN2
+ 14.504 * TRK2                    -   .652 * QUADR(SIZE)*CYCL       +  2.769 * SIZE*VOL2               +  1.446 * QUADR(SIZE)*VOL2
-  2.627 * SIZE*LTN2               -  1.703 * SIZE*QUADR(LTN2)       +   .896 * QUADR(SIZE)*LTN2        -.746 * QUADR(SIZE)*QUADR(LTN2)
+  2.396 * SIZE*TRK2               -   .721 * SIZE*QUADR(TRK2)       -  1.323 * LBAY*QUADR(CYCL)        -  1.405 * QUADR(LBAY)*CYCL
-  2.530 * LBAY*GRS1               -   .941 * QUADR(LBAY)*GRS1       -  2.041 * LBAY*VOL1               +   .809 * LBAY*QUADR(VOL2)
-   .890 * QUADR(LBAY)*VOL2        -  4.418 * LBAY*LTN2              -  1.441 * QUAOR(LBAY)*LTN2        -  1.174 * LBAY*TRK2
-  1.794 * CYCL*GRS1               +   .717 * CYCL*QUADR(GRS1)       -   .723 * QUADR(CYCL)*GRS1        -  1.988 * CYCL*VOL1
-  1.109 * QUADR(CYCL)*VOL1        -  1.862 * CYCL*LTN1              +   .644 * QUADR(CYCL)*TRK1        +  3.781 * CYCL*VOL2
-  1.252 * CYCL*TRK2               -.540 * QUADR(CYCL)*QUADR(TRK2)   +  6.623 * GRS1*VOL1               +  1.260 * GRS1*QUADR(VOL1)
+  1.668 * QUADR(GRS1)*VOL1        +.569 * QUADR(GRS1)*QUADR(VOL1)   +  5.921 * GRS1*VOL2               +   .644 * GRS1*QUADR(VOL2)
+  1.752 * QUADR(GRS1)*VOL2        +  4.060 * GRS1*LTN2              +  2.398 * GRS1*TRK2               -   .749 * QUADR(VOL1)*LTN1
-.475 * QUADR(VOL1)*QUADR(LTN1)    +  7.821 * VOL1*VOL2              +  2.841 * VOL1*QUADR(VOL2)        +  2.980 * QUADR(VOL1)*VOL2
+  3.804 * VOL1*LTN2               +  2.529 * VOL1*TRK2              -   .659 * QUADR(LTN1)*TRK1        +.452 * QUADR(LTN1)*QUADR(TRK1)
+  1.085 * LTN1*QUADR(VOL2)        -   .687 * QUADR(TRK1)*VOL2       -   .929 * TRK1*QUADR(TRK2)        +  1.638 * VOL2*LTN2
-   .965 * QUADR(VOL2)*LTN2        +  6.333 * VOL2*TRK2

21  * TOTAL NOX EMISSION ON INBOUND APPROACH OF MINOR STREET       (GRAMS/15 MINUTES)
      RES = 168.9200 +2.750*(GT - 35) + .7900*(RT - 35) + .0400*(RT2 - 58.39) - .0700*(GT2 - 58.39)
+ 36.847 * SIZE                    + 10.457 * QUADR(SIZE)            -  1.961 * LBAY                    -  1.791 * QUADR(LBAY)
- 18.839 * CYCL                    + 18.593 * GRS1                   +  1.118 * QUADR(GRS1)             +  6.705 * VOL1
+ 25.194 * VOL2                    -  1.405 * QUADR(VOL2)            +  4.122 * LTN2                    + 38.401 * TRK2
-   .898 * QUADR(TRK2)             -  1.049 * QUADR(SIZE)*CYCL       +   .924 * QUADR(SIZE)*LTN1        +  5.935 * SIZE*VOL2
-  1.654 * SIZE*QUADR(VOL2)        +  2.174 * QUADR(SIZE)*VOL2       -  2.619 * SIZE*LTN2               -  1.711 * SIZE*QUADR(LTN2)
+   .903 * QUADR(SIZE)*LTN2        -.606 * QUADR(SIZE)*QUADR(LTN2)   +  6.712 * SIZE*TRK2               +  1.422 * QUADR(SIZE)*TRK2
-  1.166 * LBAY*QUADR(CYCL)        -  1.679 * QUADR(LBAY)*CYCL       -  1.623 * LBAY*GRS1               -.538 * QUADR(LBAY)*QUADR(LTN1)
+  1.734 * LBAY*TRK1               -  1.650 * LBAY*VOL2              -  1.029 * QUADR(LBAY)*VOL2        -  3.917 * LBAY*LTN2
-   .976 * QUADR(LBAY)*LTN2        -  1.768 * LBAY*TRK2              -  2.861 * CYCL*GRS1               -  1.095 * QUADR(CYCL)*GRS1
-  1.164 * QUADR(CYCL)*VOL1        -  2.208 * CYCL*LTN1              +  1.053 * QUADR(CYCL)*TRK1        +  4.091 * CYCL*VOL2
-.610 * QUADR(CYCL)*QUADR(TRK2)    +  5.444 * GRS1*VOL1              +  1.253 * QUADR(GRS1)*VOL1        +  4.007 * GRS1*VOL2
+  1.275 * QUADR(GRS1)*VOL2        +  2.702 * GRS1*LTN2              +  3.040 * GRS1*TRK2               -   .998 * QUADR(VOL1)*LTN1
-.772 * QUADR(VOL1)*QUADR(LTN1)    +  6.305 * VOL1*VOL2              +  4.131 * VOL1*QUADR(VOL2)        +  3.151 * QUADR(VOL1)*VOL2
+  2.310 * VOL1*LTN2               +  4.639 * VOL1*TRK2              +.102 * QUADR(LTN1)*QUADR(TRK1)    +  2.513 * VOL2*LTN2
-  1.435 * QUADR(VOL2)*LTN2        + 17.032 * VOL2*TRK2              +  1.066 * QUADR(VOL2)*TRK2        +  1.652 * LTN2*TRK2

22  * TOTAL FUEL CONSUMPTION ON INBOUND APPROACH OF MINOR STREET  (KILOGRAMS/15 MINUTES)
      RES =  10.9969 + .259*(GT - 35) + .1139*(RT - 35) + .0045*(RT2 - 58.39) - .0060*(GT2 - 58.39)
+  2.143 * SIZE                    +   .660 * QUADR(SIZE)            -   .300 * LBAY                    -   .179 * QUADR(LBAY)
-  1.739 * CYCL                    +  1.765 * GRS1                   +   .171 * QUADR(GRS1)             +   .609 * VOL1
+  2.360 * VOL2                    +   .137 * QUADR(VOL2)            +   .539 * LTN2                    +  1.733 * TRK2
+   .561 * SIZE*VOL2               +   .232 * QUADR(SIZE)*VOL2       -   .268 * SIZE*LTN2               -   .172 * SIZE*QUADR(LTN2)
+   .094 * QUADR(SIZE)*LTN2        -.075 * QUADR(SIZE)*QUADR(LTN2)   +   .294 * SIZE*TRK2               -   .139 * LBAY*QUADR(CYCL)
-   .148 * QUADR(LBAY)*CYCL        -   .251 * LBAY*GRS1              -   .094 * QUADR(LBAY)*GRS1        -   .181 * LBAY*VOL1
+   .080 * LBAY*QUADR(VOL2)        -   .093 * QUADR(LBAY)*VOL2       -   .444 * LBAY*LTN2               -   .142 * QUADR(LBAY)*LTN2
-   .132 * LBAY*TRK2               -   .192 * CYCL*GRS1              +   .073 * CYCL*QUADR(GRS1)        -   .074 * QUADR(CYCL)*GRS1
-   .169 * CYCL*VOL1               -   .112 * QUADR(CYCL)*VOL1       -   .203 * CYCL*LTN1               +   .071 * QUADR(CYCL)*TRK1
+   .394 * CYCL*VOL2               -   .125 * CYCL*TRK2              -.054 * QUADR(CYCL)*QUADR(TRK2)    +   .673 * GRS1*VOL1
+   .120 * GRS1*QUADR(VOL1)        +   .169 * QUADR(GRS1)*VOL1       +.056 * QUADR(GRS1)*QUADR(VOL1)    +   .597 * GRS1*VOL2
+   .068 * GRS1*QUADR(VOL2)        +   .171 * QUADR(GRS1)*VOL2       +   .385 * GRS1*LTN2               +   .246 * GRS1*TRK2
-   .115 * VOL1*LTN1               -   .079 * QUADR(VOL1)*LTN1       -.054 * QUADR(VOL1)*QUADR(LTN1)    +   .796 * VOL1*VOL2
+   .369 * VOL1*QUADR(VOL2)        +   .353 * QUADR(VOL1)*VOL2       +   .348 * VOL1*LTN2               +   .271 * VOL1*TRK2
+.142 * QUADR(LTN1)*QUADR(TRK1)    +   .097 * LTN1*QUADR(VOL2)       -   .072 * QUADR(TRK1)*VOL2        -   .085 * TRK1*QUADR(TRK2)
+   .192 * VOL2*LTN2               -   .096 * QUADR(VOL2)*LTN2       +   .766 * VOL2*TRK2

23  * TOTAL CO  EMISSION ON OUTBOUND APPROACH OF MINOR STREET      (KILOGRAMS/15 MINUTES)
      RES =    .8911  -.001*(GT - 35)  -.0030*(RT - 35)  -.0001*(RT2 - 58.39) + .0001*(GT2 - 58.39)
+    .051 * SIZE                   +    .044 * QUADR(SIZE)           +    .052 * GRS1                   -    .039 * VOL1
+    .034 * LTN1                   +    .202 * TRK1                  -    .016 * QUADR(TRK1)            -    .025 * QUADR(VOL2)
+    .364 * TRK2                   -    .023 * QUADR(TRK2)           -    .033 * SIZE*LTN1              -    .037 * SIZE*TRK1
+    .021 * QUADR(SIZE)*TRK2       -    .038 * LBAY*GRS1             -.013 * QUADR(GRS1)*QUADR(LTN1)    +    .047 * GRS1*TRK2
-    .047 * VOL1*LTN1              -    .058 * VOL1*TRK1             -    .073 * VOL2*TRK2              -    .025 * QUADR(VOL2)*TRK2

24  * TOTAL HC  EMISSION ON OUTBOUND APPROACH OF MINOR STREET      (GRAMS/15 MINUTES)
      RES =  25.2600 + .600*(GT - 35)  -.1800*(RT - 35)
+    .004 * SIZE                   +    .001 * QUADR(SIZE)           -    .002 * CYCL                   +    .002 * GRS1
+    .001 * TRK1                   +    .003 * VOL2                  +    .005 * TRK2                   +    .001 * SIZE*VOL2
```

TABLE D-1. (CONTINUED)

```
25  * TOTAL NOX EMISSION ON OUTBOUND APPROACH OF MINOR STREET     (GRAMS/15 MINUTES)
     RES =  93.2300 +1.350*(GT - 35)   -.6800*(RT - 35)  +.0200*(RT2 - 58.39)  -.0300*(GT2 - 58.39)
+    .015 * SIZE                   +   .006 * QUADR(SIZE)             -   .003 * CYCL                 +    .007 * GRS1
+    .003 * LTN1                   +   .003 * TRK1                    +   .006 * VOL2                 -    .001 * QUAOR(VOL2)
-    .002 * LTN2                   +   .020 * TRK2                    +   .001 * SIZE*GRS1            +    .001 * SIZE*VOL1
-    .001 * SIZE*LTN1              +   .003 * SIZE*VOL2               +   .004 * SIZE*TRK2            +    .001 * QUADR(SIZE)*TRK2
-    .001 * GRS1*VOL2              -   .003 * VOL1*LTN1               +   .001 * VOL1*TRK2            -    .001 * LTN1*LTN2
+    .001 * TRK1*TRK2              +   .002 * VOL2*LTN2               +   .004 * VOL2*TRK2

26  * TOTAL FUEL CONSUMPTION ON OUTBOUND APPROACH OF MINOR STREET (KILOGRAMS/15 MINUTES)
     RES =    5.5985 + .135*(GT - 35)   -.0406*(RT - 35)  +.0011*(RT2 - 58.39)  -.0015*(GT2 - 58.39)
+  1.047 * SIZE                    +   .392 * QUADR(SIZE)             -   .489 * CYCL                 +    .608 * GRS1
+   .100 * VOL1                    +   .140 * LTN1                    +   .172 * TRK1                 +    .705 * VOL2
-   .027 * QUADR(VOL2)             -   .142 * LTN2                    +   .783 * TRK2                 -    .021 * QUADR(TRK2)
+   .037 * SIZE*GRS1               +   .056 * SIZE*VOL1               -   .054 * SIZE*LTN1            +    .349 * SIZE*VOL2
+   .106 * QUADR(SIZE)*VOL2        +   .168 * SIZE*TRK2               +   .050 * QUADR(SIZE)*TRK2     -.014 * QUADR(GRS1)*QUADR(LTN1)
-   .039 * GRS1*VOL2               -   .143 * VOL1*LTN1               +   .085 * VOL1*QUADR(VOL2)     +    .057 * QUADR(VOL1)*VOL2
-.014 * QUADR(VOL1)*QUADR(VOL2)    +   .059 * TRK1*TRK2               +   .115 * VOL2*LTN2            +    .147 * VOL2*TRK2
-   .027 * QUADR(VOL2)*TRK2

RESPONSE 27  * AVERAGE TOTAL DELAY / MAJOR STREET *AVERAGE  (SECONDS / VEHICLE)
     RES = 20.6040 - .0155*(GT - 35) +  .8543*(RT - 35) - .0025*(RT2 -58.39) - .0100*(GT2 - 58.39)
-  3.269 * SIZE                    +   .986 * QUADR(SIZE)             -  4.328 * LBAY                 +  1.239 * QUADR(LBAT)
-  2.782 * CYCL                    +   .346 * QUADR(CYCL)             -  2.240 * GRS1                 +   .565 * QUADR(GRS1)
+  3.332 * VOL1                    +   .500 * QUADR(VOL1)             +  1.760 * LTN1                 +  1.159 * TRK1
+  1.267 * VOL2                    +   .316 * QUADR(VOL2)             -   .555 * LTN2                 +  4.749 * SIZE*LBAY
-  1.553 * SIZE*QUADR(LBAY)        -  1.421 * QUADR(SIZE)*LBAY        +.497 * QUADR(SIZE)*QUADR(LBAY) +  1.527 * SIZE*GRS1
-   .332 * SIZE*QUADR(GRS1)        -  2.832 * SIZE*VOL1               +   .937 * QUADR(SIZE)*VOL1     -   .644 * SIZE*LTN1
-  1.095 * SIZE*TRK1               -  2.155 * SIZE*VOL2               +   .428 * QUADR(SIZE)*VOL2     -   .640 * QUADR(SIZE)*LTN2
+   .361 * SIZE*QUADR(TRK2)        +   .397 * QUADR(LBAY)*CTCL        +  2.050 * LBAY*GRS1            -   .514 * LBAY*QUADR(GRS1)
-   .418 * QUADR(LBAY)*GRS1        -  2.511 * LBAY*VOL1               +   .677 * QUADR(LBAY)*VOL1     -  1.792 * LBAY*LTN1
+   .680 * QUADR(LBAY)*LTN1        -  1.241 * LBAY*TRK1               +   .377 * QUADR(LBAY)*TRK1     -  2.871 * LBAY*VOL2
+   .664 * QUADR(LBAY)*VOL2        +   .812 * LBAY*LTN2               +  1.438 * CYCL*GRS1            -   .486 * CYCL*QUADR(GRS1)
-.250 * QUADR(CYCL)*QUADR(VOL1)    -  1.064 * CYCL*LTN1               +   .431 * CYCL*QUADR(LTN1)     +   .322 * QUADR(CYCL)*LTN1
+.509 * QUADR(CYCL)*QUADR(LTN1)    -   .545 * QUADR(CYCL)*LTN2        +.381 * QUADR(CYCL)*QUADR(LTN2) -   .673 * CYCL*TRK2
-   .331 * CYCL*QUADR(TRK2)        +   .491 * QUADR(CYCL)*TRK2        -.345 * QUADR(CYCL)*QUADR(TRK2) -  1.648 * GRS1*VOL1
-   .410 * GRS1*QUADR(VOL1)        -   .628 * GRS1*LTN1               +   .543 * GRS1*QUADR(LTN1)     +   .806 * QUADR(GRS1)*LTN1
-  1.675 * GRS1*TRK1               +   .553 * QUADR(GRS1)*TRK1        +.534 * QUADR(GRS1)*QUADR(TRK1) -  1.977 * GRS1*VOL2
+   .585 * QUADR(GRS1)*VOL2        +  1.052 * GRS1*LTN2               -.199 * QUADR(GRS1)*QUADR(LTN2) +  1.189 * VOL1*TRK1
+  2.071 * VOL1*VOL2               +   .608 * VOL1*QUADR(VOL2)        +   .576 * QUADR(VOL1)*VOL2     +.192 * QUADR(VOL1)*QUADR(LTN2)
+   .869 * LTN1*TRK1               +   .514 * LTN1*QUADR(TRK1)        +   .887 * LTN1*VOL2            -   .355 * LTN1*QUADR(VOL2)
-   .439 * QUADR(LTN1)*VOL2        -.516 * QUADR(LTN1)*QUADR(TRK2)    +   .895 * TRK1*VOL2            -   .804 * TRK1*LTN2
-.432 * QUADR(TRK1)*QUADR(LTN2)    -   .352 * QUADR(TRK1)*TRK2        -   .736 * VOL2*LTN2            -.302 * QUADR(VOL2)*QUADR(LTN2)
+   .775 * LTN2*QUADR(TRK2)        +  1.029 * QUADR(LTN2)*TRK2        -  2.685 * LBAY                 +  1.096 * QUADR(LBAY)
$HD!  Taurus off 00:55 - reconnect at 01:05 [ 22 Jul 1983 ]
-  1.916 * GRS1

RESPONSE 28  * AVERAGE TOTAL DELAY / MAJOR STREET *LEFT     (SECONDS / VEHICLE)
     RES = 30.1000 +  .0796*(GT - 35) +  .9663*(RT - 35) + .0225*(RT2 - 58.39) +  .0243*(GT2 - 58.39)
+  2.981 * VOL1                    + 25.401 * LTN1                    -  4.703 * QUADR(LTN1)          -  2.128 * LTN2
+  2.492 * SIZE*LBAY               -  3.188 * SIZE*VOL1               +  1.816 * QUADR(SIZE)*VOL1     -  1.420 * SIZE*QUADR(LTN2)
-  1.483 * LBAY*QUADR(CYCL)        +  3.022 * LBAY*GRS1               -  3.684 * LBAY*LTN1            +  3.592 * LBAY*LTN2
-  1.287 * QUADR(LBAY)*LTN2        -  4.347 * LBAY*TRK2               +  3.309 * CYCL*LTN1            -  1.285 * QUADR(CYCL)*LTN2
-  4.853 * GRS1*LTN1               +  1.911 * QUADR(GRS1)*VOL2        +  2.550 * GRS1*LTN2            -  3.950 * VOL1*VOL2
+  7.235 * LTN1*VOL2               -  2.230 * LTN1*LTN2               -  2.367 * TRK1*LTN2            -  1.511 * QUADR(TRK1)*LTN2
-.046 * QUADR(TRK1)*QUADR(TRK2) +.100 * QUADR(LTN2)*QUADR(TRK2)

RESPONSE 29  * AVERAGE TOTAL DELAY / MAJOR STREET *RIGHT    (SECONDS / VEHICLE)
     RES = 20.6633 +  .1755*(GT - 35) +  .7490*(RT - 35) - .0045*(RT2 - 58.39) -  .0166*(GT2 - 58.39)
-  2.164 * SIZE                    +   .595 * QUADR(SIZE)             -  3.122 * LBAY                 +   .736 * QUADR(LBAY)
-  3.594 * CYCL                    +   .372 * QUADR(CYCL)             -  2.521 * GRS1                 +   .609 * QUADR(GRS1)
+  4.366 * VOL1                    +   .745 * QUADR(VOL1)             +   .659 * LTN1                 +   .974 * TRK1
+  1.892 * VOL2                    +   .287 * QUADR(VOL2)             -   .477 * LTN2                 +   .464 * TRK2
+  3.644 * SIZE*LBAY               -  1.013 * SIZE*QUADR(LBAY)        -   .954 * QUADR(SIZE)*LBAY     +.262 * QUADR(SIZE)*QUADR(LBAY)
+   .602 * SIZE*CYCL               +  1.589 * SIZE*GRS1               -  2.306 * SIZE*VOL1            +   .648 * QUADR(SIZE)*VOL1
-   .704 * SIZE*TRK1               -  1.728 * SIZE*VOL2               +   .384 * SIZE*QUADR(LTN2)     -   .751 * QUADR(SIZE)*LTN2
+   .332 * SIZE*QUAOR(TRK2)        +   .767 * LBAY*CYCL               +   .358 * QUADR(LBAY)*CYCL     +  1.698 * LBAY*GRS1
-   .573 * LBAY*QUADR(GRS1)        -  2.503 * LBAY*VOL1               +   .632 * QUADR(LBAY)*VOL1     -  1.066 * LBAY*LTN1
+   .366 * QUADR(LBAY)*LTN1        -   .932 * LBAY*TRK1               +   .324 * LBAY*QUADR(TRK1)     -  2.261 * LBAY*VOL2
+   .483 * QUADR(LBAY)*VOL2        -   .414 * QUADR(LBAY)*LTN2        +  1.539 * CYCL*GRS1            -   .437 * CYCL*QUADR(GRS1)
-.228 * QUADR(CYCL)*QUAOR(VOL1)    -  1.227 * CYCL*LTN1               +   .409 * CYCL*QUADR(LTN1)     +.310 * QUADR(CYCL)*QUADR(LTN1)
-   .603 * CYCL*VOL2               -   .348 * CYCL*QUADR(LTN2)        -   .531 * QUADR(CYCL)*LTN2     +.357 * QUADR(CYCL)*QUADR(LTN2)
+   .501 * QUADR(CYCL)*TRK2        -.295 * QUADR(CYCL)*QUADR(TRK2)    -  2.381 * GRS1*VOL1            -   .394 * GRS1*QUADR(VOL1)
+   .409 * QUAOR(GRS1)*VOL1        +   .609 * GRS1*QUADR(LTN1)        +   .673 * QUADR(GRS1)*LTN1     -  1.448 * GRS1*TRK1
+   .424 * QUADR(GRS1)*TRK1        +.379 * QUADR(GRS1)*QUADR(TRK1)    -  2.141 * GRS1*VOL2            +   .531 * QUADR(GRS1)*VOL2
+  1.007 * GRS1*LTN2               +   .594 * VOL1*LTN1               +  1.100 * VOL1*TRK1            +.200 * QUADR(VOL1)*QUADR(TRK1)
+  2.506 * VOL1*VOL2               +   .843 * VOL1*QUADR(VOL2)        +   .893 * QUADR(VOL1)*VOL2     +   .713 * LTN1*TRK1
-   .407 * QUADR(LTN1)*YRK1        -   .406 * LTN1*QUADR(VOL2)        -   .542 * QUADR(LTN1)*VOL2     -.441 * QUADR(LTN1)*QUADR(TRK2)
+   .641 * TRK1*VOL2               -   .772 * TRK1*LTN2               -.392 * QUADR(TRK1)*QUADR(LTN2) -   .661 * VOL2*LTN2
+   .685 * LTN2*QUADR(TRK2)        +   .969 * QUADR(LTN2)*TRK2

RESPONSE 30  * AVERAGE TOTAL DELAY / MAJOR STREET *STRAIGHT (SECONDS / VEHICLE)
     RES = 20.0599 +  .0252*(GT - 35) +  .8325*(RT - 35) - .0035*(RT2 - 58.39) - .0120*(GT2 - 58.39)
-  3.379 * SIZE                    +  1.042 * QUADR(SIZE)             -  4.416 * LBAY                 +  1.283 * QUADR(LBAY)
-  2.680 * CYCL                    +   .361 * QUADR(CYCL)             -  2.216 * GRS1                 +   .545 * QUADR(GRS1)
+  3.705 * VOL1                    +   .431 * QUADR(VOL1)             +  1.202 * LTN1                 +  1.138 * TRK1
+  1.195 * VOL2                    +   .297 * QUADR(VOL2)             -   .501 * LTN2                 +  4.973 * SIZE*LBAY
-  1.574 * SIZE*QUADR(LBAY)        -  1.510 * QUADR(SIZE)*LBAY        +.551 * QUADR(SIZE)*QUADR(LBAY) +  1.527 * SIZE*GRS1
-   .372 * SIZE*QUADR(GRS1)        -  2.765 * SIZE*VOL1               +   .885 * QUADR(SIZE)*VOL1     -   .698 * SIZE*LTN1
-  1.155 * SIZE*TRK1               -  2.178 * SIZE*VOL2               +   .487 * QUADR(SIZE)*VOL2     -   .688 * QUADR(SIZE)*LTN2
+   .385 * SIZE*QUADR(TRK2)        +   .374 * QUADR(LBAY)*CYCL        +  1.998 * LBAY*GRS1            -   .512 * LBAY*QUADR(GRS1)
-   .420 * QUADR(LBAY)*GRS1        -  2.614 * LBAY*VOL1               +   .699 * QUADR(LBAY)*VOL1     -  1.779 * LBAY*LTN1
+   .696 * QUADR(LBAY)*LTN1        -  1.214 * LBAY*TRK1               +   .334 * LBAY*QUADR(TRK1)     +   .364 * QUADR(LBAY)*TRK1
-  2.858 * LBAY*VOL2               +   .677 * QUADR(LBAY)*VOL2        +   .696 * LBAY*LTN2            +  1.526 * CYCL*GRS1
-   .518 * CYCL*QUADR(GRS1)        -.257 * QUADR(CYCL)*QUADR(VOL1)    -  1.074 * CYCL*LTN1            +   .435 * CYCL*QUADR(LTN1)
+   .332 * QUADR(CYCL)*LTN1        +.530 * QUADR(CYCL)*QUADR(LTN1)    -   .540 * QUADR(CYCL)*LTN2     +.346 * QUADR(CYCL)*QUADR(LTN2)
-   .789 * CYCL*TRK2               -   .337 * CYCL*QUADR(TRK2)        +   .458 * QUADR(CYCL)*TRK2     -.366 * QUADR(CYCL)*QUADR(TRK2)
-  1.731 * GRS1*VOL1               -   .367 * GRS1*QUADR(VOL1)        +   .593 * GRS1*QUADR(LTN1)     +   .777 * QUADR(GRS1)*LTN1
-  1.604 * GRS1*TRK1               +   .492 * QUADR(GRS1)*TRK1        +.494 * QUADR(GRS1)*QUADR(TRK1) -  1.834 * GRS1*VOL2
+   .559 * QUADR(GRS1)*VOL2        +  1.042 * GRS1*LTN2               -.198 * QUADR(GRS1)*QUADR(LTN2) -   .360 * QUADR(VOL1)*LTN1
+  1.259 * VOL1*TRK1               +  2.296 * VOL1*VOL2               +   .597 * VOL1*QUADR(VOL2)     +   .485 * QUADR(VOL1)*VOL2
+.199 * QUADR(VOL1)*QUADR(LTN2)    +   .799 * LTN1*TRK1               +   .513 * LTN1*QUADR(TRK1)     +   .677 * LTN1*VOL2
-   .382 * LTN1*QUADR(VOL2)        -   .472 * QUADR(LTN1)*VOL2        -.531 * QUADR(LTN1)*QUADR(TRK2) +   .804 * TRK1*VOL2
-   .727 * TRK1*LTN2               -.458 * QUADR(TRK1)*QUADR(LTN2)    -   .354 * QUADR(TRK1)*TRK2     -   .689 * VOL2*LTN2
-.336 * QUADR(VOL2)*QUADR(LTN2)    +   .793 * LTN2*QUADR(TRK2)        +  1.011 * QUADR(LTN2)*TRK2

RESPONSE 31  *  AVERAGE STOP DELAY / MAJOR STREET *AVERAGE  (SECONDS / VEHICLE)
     RES = 10.7752 - .1620*(GT - 35) +  .5604*(RT - 35) +  .0029*(RT2 - 58.39) -  .0011*(GT2 - 58.39)
-   .888 * SIZE                    +   .239 * QUADR(SIZE)             -  1.551 * LBAY                 +   .459 * QUADR(LBAY)
-   .644 * CYCL                    +   .119 * QUADR(CYCL)             -   .416 * GRS1                 +   .271 * QUADR(GRS1)
+   .762 * VOL1                    +  1.235 * LTN1                    +   .423 * TRK1                 +   .333 * VOL2
+   .169 * QUADR(VOL2)             -   .332 * LTN2                    +  1.365 * SIZE*LBAY            -   .481 * SIZE*QUADR(LBAY)
-   .372 * QUADR(SIZE)*LBAY        +.121 * QUADR(SIZE)*QUADR(LBAY)    -   .173 * SIZE*QUADR(CYCL)     +   .561 * SIZE*GRS1
-   .155 * SIZE*QUADR(GRS1)        -   .824 * SIZE*VOL1               +   .331 * QUADR(SIZE)*VOL1     -   .320 * SIZE*LTN1
+   .175 * SIZE*QUADR(LTN1)        -   .426 * SIZE*TRK1               -.081 * QUADR(SIZE)*QUADR(TRK1) -   .830 * SIZE*VOL2
-   .234 * QUADR(SIZE)*LTN2        +   .138 * SIZE*QUADR(TRK2)        -.101 * QUADR(SIZE)*QUADR(TRK2) +   .216 * QUADR(LBAY)*CYCL
+   .961 * LBAY*GRS1               -   .269 * LBAY*QUADR(GRS1)        -   .254 * QUADR(LBAY)*GRS1     +.082 * QUADR(LBAY)*QUADR(GRS1)
-   .590 * LBAY*VOL1               +   .165 * LBAY*QUADR(VOL1)        +   .163 * QUADR(LBAY)*VOL1     -.094 * QUADR(LBAY)*QUADR(VOL1)
-   .859 * LBAY*LTN1               +   .333 * QUADR(LBAY)*LTN1        -   .550 * LBAY*TRK1            +   .192 * QUADR(LBAY)*TRK1
-  1.302 * LBAY*VOL2               +   .319 * QUADR(LBAY)*VOL2        +   .468 * LBAY*LTN2            -   .159 * QUADR(LBAY)*LTN2
+   .559 * CYCL*GRS1               -.120 * QUADR(CYCL)*QUADR(VOL1)    +   .206 * CYCL*QUADR(LTN1)     +   .144 * QUADR(CYCL)*LTN1
+.140 * QUADR(CYCL)*QUADR(LTN1)    +   .253 * CYCL*TRK1               -   .293 * CYCL*VOL2            -   .186 * QUADR(CYCL)*LTN2
+.139 * QUADR(CYCL)*QUADR(LTN2)    +   .187 * QUADR(CYCL)*TRK2        -.103 * QUADR(CYCL)*QUADR(TRK2) -   .331 * GRS1*VOL1
-   .143 * GRS1*QUADR(VOL1)        -.089 * QUADR(GRS1)*QUADR(VOL1)    -   .407 * GRS1*LTN1            +   .188 * GRS1*QUADR(LTN1)
+   .323 * QUADR(GRS1)*LTN1        -   .462 * GRS1*TRK1               +   .243 * QUADR(GRS1)*TRK1     +.166 * QUADR(GRS1)*QUADR(TRK1)
-   .844 * GRS1*VOL2               -   .290 * QUADR(GRS1)*VOL2        +   .437 * GRS1*LTN2            -.081 * QUADR(GRS1)*QUADR(LTN2)
-   .238 * GRS1*QUADR(TRK2)        -   .512 * VOL1*LTN1               +   .150 * VOL1*QUADR(LTN1)     -   .158 * QUADR(VOL1)*LTN1
+   .373 * VOL1*TRK1               -   .370 * VOL1*VOL2               -   .183 * VOL1*QUADR(VOL2)     +.100 * QUADR(VOL1)*QUADR(LTN2)
+   .434 * LTN1*TRK1               +   .229 * LTN1*QUADR(TRK1)        +   .651 * LTN1*VOL2            -   .158 * QUADR(LTN1)*VOL2
-.172 * QUADR(LTN1)*QUADR(TRK2)    +   .489 * TRK1*VOL2               -   .342 * TRK1*LTN2            -.178 * QUADR(TRK1)*QUADR(LTN2)
-   .140 * QUADR(TRK1)*TRK2        -   .412 * VOL2*LTN2               -   .165 * VOL2*QUADR(LTN2)     -.138 * QUADR(VOL2)*QUADR(LTN2)
+   .239 * VOL2*TRK2               +   .340 * QUADR(LTN2)*TRK2
```

TABLE D-1. (CONTINUED)

```
RESPONSE 32  *  AVERAGE STOP DELAY / MAJOR STREET *LEFT     (SECONDS / VEHICLE)
     RES = 24.8623 +  .1333*(GT - 35) +  .8659*(RT - 35) +  .0254*(RT2 - 58.39) +  .0293*(GT2 -58.39)
 +  1.715 * SIZE                   -  1.925 * GRS1                  +  1.886 * VOL1                   + 20.924 * LTN1
 -  3.939 * QUADR(LTN1)            -  1.996 * LTN2                  -  2.060 * SIZE*VOL1              +  1.478 * QUADR(SIZE)*VOL1
 +  2.727 * SIZE*LTN1              -  1.230 * SIZE*QUADR(LTN2)      -  2.640 * LBAY*CYCL              -  1.483 * LBAY*QUADR(CYCL)
 +  2.017 * LBAY*GRS1              +  3.514 * LBAY*VOL1             -  1.413 * LBAY*QUADR(LTN1)       +  3.382 * LBAY*LTN2
 -  1.231 * QUADR(LBAY)*LTN2       -  3.939 * LBAY*TRK2             +  1.156 * CYCL*QUADR(GRS1)       +  3.882 * CYCL*LTN1
 -  2.263 * CYCL*LTN2              -  4.092 * GRS1*LTN1             +  1.433 * QUADR(GRS1)*VOL2       +  2.223 * GRS1*LTN2
 -  1.245 * VOL1*QUADR(LTN1)       -  3.612 * VOL1*VOL2             +  6.324 * LTN1*VOL2              -  2.174 * LTN1*LTN2
 -.889 * QUADR(TRK1)*QUADR(TRK2)+1.115 * QUADR(LTN2)*QUADR(TRK2)

RESPONSE 33  *  AVERAGE STOP DELAY / MAJOR STREET *RIGHT    (SECONDS / VEHICLE)
     RES =  8.1241 - .0223*(GT - 35) +  .4488*(RT - 35) +  .0004*(RT2 - 58.39) -  .0044*(GT2 - 58.39)
 -   .584 * SIZE                   -   .985 * LBAY                  +   .166 * QUADR(LBAY)            -  1.302 * CYCL
 +   .140 * QUADR(CYCL)            -   .510 * GRS1                  +   .251 * QUADR(GRS1)            +  1.410 * VOL1
 +   .181 * QUADR(VOL1)            -   .148 * QUADR(LTN1)           +   .264 * TRK1                   +   .885 * VOL2
 +   .162 * QUADR(VOL2)            +  1.223 * SIZE*LBAY             -   .265 * SIZE*QUADR(LBAY)       -   .235 * QUADR(SIZE)*LBAY
 +   .561 * SIZE*GRS1              -   .730 * SIZE*VOL1             -   .552 * SIZE*VOL2              +   .226 * SIZE*QUADR(LTN2)
 -   .315 * QUADR(SIZE)*LTN2       +   .311 * LBAY*CYCL             +   .173 * QUADR(LBAY)*CYCL       +   .739 * LBAY*GRS1
 -   .270 * LBAY*QUADR(GRS1)       -   .527 * LBAY*VOL1             +   .282 * QUADR(LBAY)*VOL1       +   .179 * LBAY*QUADR(LTN1)
 -   .298 * LBAY*TRK1              +   .166 * LBAY*QUADR(TRK1)      -   .703 * LBAY*VOL2              +   .202 * QUADR(LBAY)*VOL2
 -   .167 * QUADR(LBAY)*LTN2       +   .529 * CYCL*GRS1             +   .214 * CYCL*QUADR(VOL1)       -   .370 * CYCL*LTN1
 +   .198 * CYCL*QUADR(LTN1)       -   .168 * CYCL*QUADR(LTN2)      +.165 * QUADR(CYCL)*QUADR(LTN2)   +   .221 * QUADR(CYCL)*TRK2
 -.137 * QUADR(CYCL)*QUADR(TRK2)   -   .830 * GRS1*VOL1             -   .174 * GRS1*QUADR(VOL1)       +   .177 * QUADR(GRS1)*VOL1
 +   .280 * GRS1*QUADR(LTN1)       +   .272 * QUADR(GRS1)*LTN1      -.100 * QUADR(GRS1)*QUADR(LTN1)   -   .432 * GRS1*TRK1
 +   .169 * QUADR(GRS1)*TRK1       -   .929 * GRS1*VOL2             +   .206 * QUADR(GRS1)*VOL2       +.107 * QUADR(VOL1)*QUADR(LTN1)
 +   .453 * VOL1*TRK1              +   .181 * QUADR(VOL1)*TRK1      +.102 * QUADR(VOL1)*QUADR(TRK1)   +   .809 * VOL1*VOL2
 +   .313 * VOL1*QUADR(VOL2)       +   .371 * QUADR(VOL1)*VOL2      -   .183 * QUADR(LTN1)*TRK1       -   .236 * QUADR(LTN1)*VOL2
 -.112 * QUADR(LTN1)*QUADR(TRK2)   -.101 * QUADR(TRK1)*QUADR(VOL2)  -   .317 * TRK1*LTN2              -.176 * QUADR(TRK1)*QUADR(LTN2)
 -   .446 * VOL2*LTN2              +   .168 * LTN2*QUADR(TRK2)      +   .380 * QUADR(LTN2)*TRK2

RESPONSE 34  *  AVERAGE STOP DELAY / MAJOR STREET *STRAIGHT (SECONDS / VEHICLE)
     RES = 10.4941 - .1292*(GT - 35) +  .5389*(RT - 35) +  .0019*(RT2 - 58.39) -  .0030*(GT2 - 58.39)
 -   .951 * SIZE                   +   .275 * QUADR(SIZE)           -  1.581 * LBAY                   +   .492 * QUADR(LBAY)
 -   .680 * CYCL                   +   .152 * QUADR(CYCL)           -   .517 * GRS1                   +   .261 * QUADR(GRS1)
 +   .824 * VOL1                   +   .682 * LTN1                  +   .398 * TRK1                   +   .297 * VOL2
 +   .167 * QUADR(VOL2)            -   .291 * LTN2                  +  1.433 * SIZE*LBAY              -   .457 * SIZE*QUADR(LBAY)
 -   .413 * QUADR(SIZE)*LBAY       +.153 * QUADR(SIZE)*QUADR(LBAY)  -   .164 * SIZE*QUADR(CYCL)       +   .569 * SIZE*GRS1
 -   .179 * SIZE*QUADR(GRS1)       -   .733 * SIZE*VOL1             +   .280 * QUADR(SIZE)*VOL1       -   .355 * SIZE*LTN1
 +   .152 * SIZE*QUADR(LTN1)       -   .474 * SIZE*TRK1             -.085 * QUADR(SIZE)*QUADR(TRK1)   -   .829 * SIZE*VOL2
 +   .160 * QUADR(SIZE)*VOL2       -   .283 * QUADR(SIZE)*LTN2      +   .155 * SIZE*QUADR(TRK2)       +   .185 * QUADR(LBAY)*CYCL
 +   .891 * LBAY*GRS1              -   .269 * LBAY*QUADR(GRS1)      -   .236 * QUADR(LBAY)*GRS1       +.090 * QUADR(LBAY)*QUADR(GRS1)
 -   .673 * LBAY*VOL1              +   .210 * LBAY*QUADR(VOL1)      +   .169 * QUADR(LBAY)*VOL1       -.108 * QUADR(LBAY)*QUADR(VOL1)
 -   .863 * LBAY*LTN1              +   .366 * QUADR(LBAY)*LTN1      -   .521 * LBAY*TRK1              +   .163 * LBAY*QUADR(TRK1)
 +   .185 * QUADR(LBAY)*TRK1       -  1.294 * LBAY*VOL2             +   .324 * QUADR(LBAY)*VOL2       +   .370 * LBAY*LTN2
 +   .621 * CYCL*GRS1              -.123 * QUADR(CYCL)*QUADR(VOL1)  +   .206 * CYCL*QUADR(LTN1)       +   .157 * QUADR(CYCL)*LTN1
 +.155 * QUADR(CYCL)*QUADR(LTN1)   -   .239 * CYCL*VOL2             -   .139 * CYCL*QUADR(LTN2)       -   .187 * QUADR(CYCL)*LTN2
 +.098 * QUADR(CYCL)*QUADR(LTN2)   -   .326 * CYCL*TRK2             -   .140 * CYCL*QUADR(TRK2)       +   .154 * QUADR(CYCL)*TRK2
 -.113 * QUADR(CYCL)*QUADR(TRK2)   -   .405 * GRS1*VOL1             -.099 * QUADR(GRS1)*QUADR(VOL1)   -   .232 * GRS1*LTN1
 +   .232 * GRS1*QUADR(LTN1)       +   .286 * QUADR(GRS1)*LTN1      -   .405 * GRS1*TRK1              +   .188 * QUADR(GRS1)*TRK1
 +.130 * QUADR(GRS1)*QUADR(TRK1)   -   .788 * GRS1*VOL2             +   .264 * QUADR(GRS1)*VOL2       +   .436 * GRS1*LTN2
 -.081 * QUADR(GRS1)*QUADR(LTN2)   -   .253 * GRS1*QUADR(TRK2)      -   .141 * QUADR(GRS1)*TRK2       -   .249 * QUADR(VOL1)*LTN1
 +   .431 * VOL1*TRK1              +   .567 * VOL1*VOL2             +   .196 * VOL1*QUADR(VOL2)       +.105 * QUADR(VOL1)*QUADR(LTN2)
 +   .359 * LTN1*TRK1              +   .213 * LTN1*QUADR(TRK1)      +   .443 * LTN1*VOL2              -   .188 * QUADR(LTN1)*VOL2
 -.081 * QUADR(LTN1)*QUADR(VOL2)   -.189 * QUADR(LTN1)*QUADR(TRK2)  +   .406 * TRK1*VOL2              -   .267 * TRK1*LTN2
 -.197 * QUADR(TRK1)*QUADR(LTN2)   -   .143 * QUADR(TRK1)*TRK2      -.084 * QUADR(TRK1)*QUADR(TRK2)   -   .359 * VOL2*LTN2
 -   .190 * VOL2*QUADR(LTN2)       -.165 * QUADR(VOL2)*QUADR(LTN2)  +   .135 * LTN2*QUADR(TRK2)       +   .329 * QUADR(LTN2)*TRK2

RESPONSE 35  *   AVERAGE QUEUE LENGTH / MAJOR STREET   *LANE AVG Q (NUMBER OF VEHICLES)
     RES =  1.6746 +  .0333*(GT - 35) +  .0792*(RT - 35) + .0003*(RT2 - 58.39) - .0012*(GT2 - 58.39)
 -   .197 * SIZE                   +   .052 * QUADR(SIZE)           -   .355 * LBAY                   +   .099 * QUADR(LBAY)
 -   .366 * CYCL                   +   .072 * QUADR(CYCL)           -   .304 * GRS1                   +   .035 * QUADR(GRS1)
 +   .465 * VOL1                   +   .095 * LTN1                  +   .047 * TRK1                   -   .049 * QUADR(TRK1)
 +   .161 * VOL2                   +   .039 * QUADR(VOL2)           -   .052 * LTN2                   +   .038 * QUADR(LTN2)
 +   .098 * TRK2                   -   .029 * QUADR(TRK2)           +   .323 * SIZE*LBAY              -   .098 * SIZE*QUADR(LBAY)
 -   .089 * QUADR(SIZE)*LBAY       +.035 * QUADR(SIZE)*QUADR(LBAY)  -   .071 * SIZE*QUADR(CYCL)       -   .205 * SIZE*VOL1
 +   .066 * QUADR(SIZE)*VOL1       +   .069 * SIZE*QUADR(TRK1)      -.033 * QUADR(SIZE)*QUADR(TRK1)   -   .171 * SIZE*VOL2
 -   .067 * QUADR(SIZE)*LTN2       -   .127 * SIZE*TRK2             +   .053 * SIZE*QUADR(TRK2)       -.020 * QUADR(SIZE)*QUADR(TRK2)
 -   .044 * LBAY*QUADR(CYCL)       +   .069 * QUADR(LBAY)*CYCL      +   .096 * LBAY*GRS1              -   .159 * LBAY*VOL1
 -.020 * QUADR(LBAY)*QUADR(VOL1)   -   .169 * LBAY*LTN1             +   .069 * QUADR(LBAY)*LTN1       +   .084 * LBAY*QUADR(TRK1)
 -.031 * QUADR(LBAY)*QUADR(TRK1)   -   .257 * LBAY*VOL2             +   .056 * QUADR(LBAY)*VOL2       +   .061 * LBAY*LTN2
 -   .060 * LBAY*QUADR(LTN2)       -   .113 * LBAY*TRK2             +   .043 * LBAY*QUADR(TRK2)       +   .035 * QUADR(LBAY)*TRK2
 +   .114 * CYCL*GRS1              -   .050 * CYCL*QUADR(GRS1)      -   .039 * QUADR(CYCL)*GRS1       +.030 * QUADR(CYCL)*QUADR(GRS1)
 +   .111 * CYCL*VOL1              +   .038 * QUADR(CYCL)*VOL1      -   .075 * CYCL*LTN1              +   .067 * CYCL*QUADR(LTN1)
 +   .087 * CYCL*TRK1              +   .086 * QUADR(CYCL)*VOL2      +.036 * QUADR(CYCL)*QUADR(VOL2)   -   .061 * QUADR(CYCL)*LTN2
 -   .071 * CYCL*TRK2              -   .068 * CYCL*QUADR(TRK2)      -   .190 * GRS1*VOL1              -.028 * QUADR(GRS1)*QUADR(VOL1)
 +   .086 * QUADR(GRS1)*LTN1       -   .063 * GRS1*TRK1             +   .033 * GRS1*QUADR(TRK1)       +.046 * QUADR(GRS1)*QUADR(TRK1)
 -   .126 * GRS1*VOL2              -   .087 * GRS1*LTN2             -   .021 * GRS1*QUADR(LTN2)       -   .033 * GRS1*QUADR(TRK2)
 +.022 * QUADR(GRS1)*QUADR(TRK2)   -   .050 * QUADR(VOL1)*LTN1      +.020 * QUADR(VOL1)*QUADR(LTN1)   -   .061 * VOL1*QUADR(TRK1)
 +   .333 * VOL1*VOL2              +   .097 * VOL1*QUADR(VOL2)      +   .057 * QUADR(VOL1)*VOL2       -.020 * QUADR(VOL1)*QUADR(VOL2)
 +   .055 * VOL1*QUADR(LTN2)       +.038 * QUADR(VOL1)*QUADR(LTN2)  +   .080 * VOL1*TRK2              -   .046 * VOL1*QUADR(TRK2)
 +   .076 * LTN1*TRK1              +   .044 * LTN1*QUADR(TRK1)      +   .070 * LTN1*VOL2              -.023 * QUADR(LTN1)*QUADR(LTN2)
 -   .064 * QUADR(LTN1)*TRK2       -.040 * QUADR(LTN1)*QUADR(TRK2)  -   .058 * QUADR(TRK1)*VOL2       +   .043 * QUADR(TRK1)*LTN2
 -.040 * QUADR(TRK1)*QUADR(LTN2)   -   .110 * VOL2*LTN2             -   .044 * QUADR(VOL2)*LTN2       +   .119 * VOL2*TRK2
 -   .057 * VOL2*QUADR(TRK2)       +   .065 * LTN2*QUADR(TRK2)      +   .053 * QUADR(LTN2)*TRK2

RESPONSE 36  *   AVERAGE QUEUE LENGTH / MAJOR STREET   *BAY AVG Q (NUMBER OF VEHICLES)
     RES =    .1370 - .0091*(GT - 35) +  .0064*(RT - 35) + .0003*(GT2 - 58.39)
 +   .101 * LBAY                   -   .037 * QUADR(LBAY)           +   .022 * CYCL                   -   .010 * QUADR(CYCL)
 +   .021 * GRS1                   -   .028 * VOL1                  +   .145 * LTN1                   +   .008 * QUADR(LTN1)
 +   .024 * SIZE*CYCL              +.007 * QUADR(SIZE)*QUADR(CYCL)  +   .010 * SIZE*QUADR(GRS1)       -   .018 * SIZE*VOL1
 +   .010 * QUADR(SIZE)*TRK1       -   .016 * LBAY*GRS1             +   .013 * QUADR(LBAY)*GRS1       -   .066 * LBAY*VOL1
 +   .024 * QUADR(LBAY)*VOL1       +   .103 * LBAY*LTN1             -   .042 * QUADR(LBAY)*LTN1       -.006 * QUADR(LBAY)*QUADR(LTN1)
 +   .023 * LBAY*VOL2              -   .014 * QUADR(LBAY)*VOL2      -.005 * QUADR(CYCL)*QUADR(VOL1)   -   .013 * QUADR(CYCL)*LTN1
 -.005 * QUADR(CYCL)*QUADR(LTN1)   -   .016 * CYCL*LTN2             +   .018 * GRS1*VOL1              -   .039 * GRS1*LTN1
 -   .016 * GRS1*VOL2              +   .023 * GRS1*TRK2             -.008 * QUADR(GRS1)*QUADR(TRK2)   -   .096 * VOL1*LTN1
 -   .025 * VOL1*VOL2              +.006 * QUADR(VOL1)*QUADR(VOL2)  +   .040 * LTN1*VOL2              -   .009 * TRK1*QUADR(LTN2)
 -   .010 * TRK1*QUADR(TRK2)       +   .027 * VOL2*LTN2             -.008 * QUADR(VOL2)*QUADR(LTN2)

RESPONSE 37  *   MAXIMUM QUEUE LENGTH / MAJOR STREET   *LANE MAX Q (NUMBER OF VEHICLES)
     RES =  6.0401 +  .0963*(GT - 35) +  .1736*(RT - 35) - .0003*(RT2 - 58.39) -  .0032*(GT2 - 58.39)
 -   .560 * SIZE                   +   .174 * QUADR(SIZE)           -   .862 * LBAY                   +   .261 * QUADR(LBAY)
 -   .739 * CYCL                   +   .086 * QUADR(CYCL)           -   .663 * GRS1                   +   .131 * QUADR(GRS1)
 +   .967 * VOL1                   +   .288 * LTN1                  +   .184 * TRK1                   +   .301 * VOL2
 +   .069 * QUADR(VOL2)            -   .116 * LTN2                  -   .062 * QUADR(TRK2)            +   .731 * SIZE*LBAY
 -   .197 * SIZE*QUADR(LBAY)       -   .200 * QUADR(SIZE)*LBAY      +.088 * QUADR(SIZE)*QUADR(LBAY)   +   .230 * SIZE*GRS1
 -   .528 * SIZE*VOL1              +   .150 * QUADR(SIZE)*VOL1      -   .178 * SIZE*TRK1              -   .355 * SIZE*VOL2
 +   .080 * SIZE*QUADR(LTN2)       -   .137 * QUADR(SIZE)*LTN2      +   .113 * SIZE*QUADR(TRK2)       +   .134 * QUADR(LBAY)*CYCL
 +   .314 * LBAY*GRS1              -   .078 * LBAY*QUADR(GRS1)      -   .515 * LBAY*VOL1              +   .133 * QUADR(LBAY)*VOL1
 -   .500 * LBAY*LTN1              +   .168 * QUADR(LBAY)*LTN1      -   .237 * LBAY*TRK1              +   .074 * LBAY*QUADR(TRK1)
 +   .085 * QUADR(LBAY)*TRK1       -   .512 * LBAY*VOL2             +   .078 * QUADR(LBAY)*VOL2       +   .074 * LBAY*QUADR(TRK2)
 +   .235 * CYCL*GRS1              +   .215 * CYCL*VOL1             +.096 * QUADR(CYCL)*QUADR(LTN1)   +   .121 * CYCL*TRK1
 -   .087 * CYCL*QUADR(TRK1)       -   .097 * QUADR(CYCL)*LTN2      +   .076 * QUADR(CYCL)*TRK2       -.051 * QUADR(CYCL)*QUADR(TRK2)
 -   .459 * GRS1*VOL1              -   .078 * GRS1*QUADR(VOL1)      +   .082 * GRS1*QUADR(LTN1)       +   .142 * QUADR(GRS1)*LTN1
 -   .299 * GRS1*TRK1              +   .103 * QUADR(GRS1)*TRK1      +.084 * QUADR(GRS1)*QUADR(TRK1)   -   .367 * GRS1*VOL2
 +   .091 * QUADR(GRS1)*VOL2       +   .165 * GRS1*LTN2             -.048 * QUADR(GRS1)*QUADR(LTN2)   +   .137 * VOL1*LTN1
 +   .203 * VOL1*TRK1              +   .650 * VOL1*VOL2             +   .181 * VOL1*QUADR(VOL2)       +   .138 * QUADR(VOL1)*VOL2
 -.044 * QUADR(VOL1)*QUADR(VOL2)   +.042 * QUADR(VOL1)*QUADR(LTN2)  +   .186 * LTN1*TRK1              +   .158 * LTN1*VOL2
 -   .079 * QUADR(LTN1)*VOL2       -.108 * QUADR(LTN1)*QUADR(TRK2)  +   .154 * TRK1*VOL2              -.092 * QUADR(TRK1)*QUADR(LTN2)
 -   .074 * VOL2*QUADR(LTN2)       -.064 * QUADR(VOL2)*QUADR(LTN2)  +   .137 * VOL2*TRK2              -   .070 * VOL2*QUADR(TRK2)
 +   .137 * LTN2*TRK2              +   .156 * LTN2*QUADR(TRK2)      +   .152 * QUADR(LTN2)*TRK2
```

TABLE D-1. (CONTINUED)

```
RESPONSE 38  *     MAXIMUM QUEUE LENGTH / MAJOR STREET     *BAT MAX Q (NUMBER OF VEHICLES)
      RES =    .8498 - .0324*(GT - 35) +   .0191*(RT - 35) - .0001*(RT2 - 58.39) +   .0004*(GT2 - 58.39)
 +    .648 * LBAY                   -    .202 * QUADR(LBAY)            +    .102 * CYCL                  -    .037 * QUADR(CYCL)
 +    .081 * GRS1                   -    .128 * VOL1                   +    .765 * LTN1                  -    .084 * QUADR(LTN1)
 -    .047 * VOL2                   -.019 * QUADR(SIZE)*QUADR(LBAY) +    .097 * SIZE*CYCL             +.027 * QUADR(SIZE)*QUADR(CYCL)
 -    .068 * LBAY*GRS1              -    .263 * LBAY*VOL1              +    .085 * QUADR(LBAY)*VOL1      +    .574 * LBAY*LTN1
 -    .074 * LBAY*QUADR(LTN1)       -    .191 * QUADR(LBAY)*LTN1       +    .062 * LBAY*VOL2             -    .057 * QUAOR(CYCL)*LTN1
 -.022 * QUADR(CYCL)*QUADR(LTN1) -.021 * QUADR(CYCL)*QUADR(TRK1) -    .120 * GRS1*LTN1             -    .068 * GRS1*VOL2
 +    .079 * GRS1*TRK2              -.034 * QUADR(GRS1)*QUADR(TRK2) -    .329 * VOL1*LTN1             -    .061 * VOL1*VOL2
 +.027 * QUADR(VOL1)*QUADR(VOL2) +.027 * QUADR(VOL1)*QUADR(TRK2) +    .106 * LTN1*VOL2             +    .079 * VOL2*LTN2
 -.019 * QUADR(VOL2)*QUADR(LTN2) +    .039 * LTN2*QUADR(TRK2)

RESPONSE 39  * TOTAL CO  EMISSION ON INBOUND APPROACH OF MAJOR STREET      (KILOGRAMS/15 MAJUTES)
      RES =    2.8533 +   .065*(GT - 35) +    .0362*(RT - 35)  - .0018*(GT2 - 58.39)
 +    .608 * SIZE                   -    .142 * QUADR(SIZE)            -    .081 * LBAY                  -    .472 * CTCL
 +    .039 * QUADR(CYCL)            -    .450 * GRS1                   +    .636 * VOL1                  +    .073 * LTN1
 +  1.416 * TRK1                    -    .045 * QUADR(TRR1)            +    .186 * VOL2                  +    .113 * SIZE*VOL1
 -    .055 * QUADR(SIZE)*VOL1       +    .361 * SIZE*TRK1              -    .082 * QUADR(SIZE)*TRK1      +    .057 * QUADR(LBAY)*CYCL
 -    .109 * LBAY*LTN1              -    .111 * LBAY*VOL2              +    .080 * CYCL*GRS1             -    .072 * CYCL*LTN1
 -    .040 * CYCL*QUADR(VOL2)       +    .048 * QUADR(CYCL)*VOL2       -    .140 * GRS1*VOL1             -    .195 * GRS1*TRK1
 -    .164 * GRS1*VOL2              -    .041 * GRS1*QUADR(VOL2)       +    .583 * VOL1*TRK1             +    .229 * VOL1*VOL2
 +    .110 * VOL1*QUADR(VOL2)       +    .117 * QUADR(VOL1)*VOL2       +    .159 * TRK1*VOL2             +    .046 * QUADR(TRK1)*LTN2
 +    .075 * VOL2*TRK2              +    .040 * QUADR(LTN2)*TRK2

RESPONSE 40  * TOTAL HC  EMISSION ON INBOUND APPROACH OF MAJOR STREET      (GRAMS/15 MAJUTES)
      RES =   76.8700 + 1.830*(GT - 35) +  1.1500*(RT - 35)  - .0500*(GT2 - 58.39)
 + 12.368 * SIZE                    -  3.508 * QUADR(SIZE)             -  4.544 * LBAY                  +  1.387 * QUADR(LBAY)
 - 13.063 * CYCL                    +    .888 * QUADR(CYCL)            - 12.587 * GRS1                  +  1.086 * QUADR(GRS1)
 + 17.526 * VOL1                    +  1.445 * QUADR(VOL1)             +  2.787 * LTN1                  + 15.109 * TRK1
 -    .729 * QUADR(TRK1)            +  4.955 * VOL2                    +    .753 * QUADR(VOL2)           +  4.308 * SIZE*LBAY
 -  1.171 * SIZE*QUADR(LBAY)        -  1.009 * QUADR(SIZE)*LBAY        +.474 * QUADR(SIZE)*QUADR(LBAY) +  1.540 * SIZE*TRK1
 -  1.328 * QUADR(SIZE)*LTN2        +    .774 * SIZE*QUADR(TRK2)       +  1.161 * QUADR(LBAY)*CYCL      +  1.787 * LBAY*GRS1
 -    .849 * LBAY*QUADR(GRS1)       -  3.697 * LBAY*VOL1               +    .828 * QUADR(LBAY)*VOL1      -  3.081 * LBAY*LTN1
 +    .909 * QUADR(LBAY)*LTN1       +    .719 * LBAY*QUADR(TRK1)       -  4.100 * LBAY*VOL2             +  2.633 * CYCL*GRS1
 +  1.840 * CYCL*VOL1               -  1.799 * CYCL*LTN1               +.573 * QUADR(CYCL)*QUADR(LTN1) +    .823 * QUADR(CYCL)*VOL2
 -    .836 * QUADR(CYCL)*LTN2       +.425 * QUADR(CYCL)*QUADR(LTN2) -.415 * QUADR(CYCL)*QUADR(TRK2) -  5.036 * GRS1*VOL1
 -    .941 * GRS1*QUADR(VOL1)       +  1.122 * QUADR(GRS1)*LTN1        -  3.654 * GRS1*TRK1             +.745 * QUADR(GRS1)*QUADR(TRK1)
 -  4.629 * GRS1*VOL2               +    .964 * QUADR(GRS1)*VOL2       +  1.274 * GRS1*LTN2             +  7.452 * VOL1*TRK1
 +  6.829 * VOL1*VOL2               +  2.780 * VOL1*QUADR(VOL2)        +  2.992 * QUADR(VOL1)*VOL2      +.543 * QUADR(VOL1)*QUADR(LTN2)
 +  1.774 * LTN1*TRK1               +  1.589 * LTN1*VOL2               -.684 * QUADR(LTN1)*QUADR(TRK2) +  2.298 * TRK1*VOL2
 -.503 * QUADR(TRK1)*QUADR(LTN2) +  1.384 * LTN2*TRK2               +  1.068 * LTN2*QUADR(TRK2)      +  1.469 * QUADR(LTN2)*TRK2

RESPONSE 41  * TOTAL NOX EMISSION ON INBOUND APPROACH OF MAJOR STREET      (GRAMS/15 MAJUTES)
      RES = 183.0000 + 3.020*(GT - 35) +    .6500*(RT - 35)  + .0100*(RT2 - 58.39)  -.0900*(GT2 - 58.39)
 + 42.457 * SIZE                    - 11.324 * QUADR(SIZE)             +  2.507 * LBAY                  - 18.857 * CYCL
 - 19.599 * GRS1                    +    .970 * QUADR(GRS1)            + 25.928 * VOL1                  -  1.120 * QUADR(VOL1)
 +  2.092 * LTN1                    + 40.974 * TRK1                    -  1.849 * QUADR(TRK1)           +  6.380 * VOL2
 -  3.057 * SIZE*LBAY               +  1.755 * SIZE*QUADR(LBAY)        +  1.803 * QUADR(SIZE)*LBAY      +  6.962 * SIZE*VOL1
 -  1.166 * SIZE*QUADR(VOL1)        -  2.100 * QUADR(SIZE)*VOL1        +  6.050 * SIZE*TRK1             -  1.950 * QUADR(SIZE)*TRK1
 +  1.234 * SIZE*QUADR(TRK2)        -  1.195 * LBAY*QUADR(GRS1)        -  2.515 * LBAY*LTN1             +  1.212 * LBAY*QUADR(TRK1)
 -  3.516 * LBAY*VOL2               +  4.457 * CYCL*GRS1               +  2.997 * CYCL*VOL1             -  4.138 * GRS1*VOL1
 -  3.963 * GRS1*TRK1               -  3.012 * GRS1*VOL2               + 19.228 * VOL1*TRK1             +  1.697 * QUADR(VOL1)*TRK1
 +  6.071 * VOL1*VOL2               +  3.548 * VOL1*QUADR(VOL2)        +  4.498 * QUADR(VOL1)*VOL2      -.955 * QUADR(VOL1)*QUADR(VOL2)
 +  2.088 * LTN1*TRK1               -.712 * QUADR(LTN1)*QUADR(TRK2) +  4.165 * TRK1*VOL2             +  2.149 * LTN2*TRK2
 -.824 * QUADR(LTN2)*QUADR(TRK2)

RESPONSE 42  * TOTAL FUEL CONSUMPTION ON INBOUND APPROACH OF MAJOR STREET  (KILOGRAMS/15 MAJUTES)
      RES =   11.8726 +   .297*(GT - 35) +    .0884*(RT - 35)  + .0007*(RT2 - 58.39)  -.0062*(GT2 - 58.39)
 +  2.132 * SIZE                    -    .608 * QUADR(SIZE)            -    .395 * LBAY                  +    .128 * QUADR(LBAY)
 -  1.782 * CYCL                    +    .094 * QUADR(CYCL)            -  1.753 * GRS1                  +    .112 * QUADR(GRS1)
 +  2.397 * VOL1                    +    .150 * QUADR(VOL1)            +    .257 * LTN1                  +  1.823 * TRK1
 -    .085 * QUADR(TRK1)            +    .649 * VOL2                   +    .079 * QUADR(VOL2)           +    .411 * SIZE*LBAY
 -    .096 * SIZE*QUADR(LBAY)       -    .091 * QUADR(SIZE)*LBAY       +.044 * QUADR(SIZE)*QUADR(LBAY) +    .388 * SIZE*VOL1
 -    .124 * QUADR(SIZE)*VOL1       +    .176 * SIZE*TRK1              -    .081 * QUADR(SIZE)*TRK1      -    .128 * QUADR(SIZE)*LTN2
 +    .083 * SIZE*QUADR(TRK2)       +    .113 * QUADR(LBAY)*CYCL       +    .160 * LBAY*GRS1             -    .101 * LBAY*QUADR(GRS1)
 -    .375 * LBAY*VOL1              +    .084 * QUADR(LBAY)*VOL1       -    .306 * LBAY*LTN1             +    .089 * QUADR(LBAY)*LTN1
 -    .131 * LBAY*TRK1              +    .076 * LBAY*QUADR(TRK1)       -    .421 * LBAY*VOL2             +    .307 * CYCL*GRS1
 +    .109 * CYCL*VOL1              -    .125 * CYCL*LTN1              +.057 * QUADR(CYCL)*QUADR(LTN1) +    .081 * QUADR(CYCL)*VOL2
 -    .083 * QUADR(CYCL)*LTN2       +.044 * QUADR(CYCL)*QUADR(LTN2) -.044 * QUADR(CYCL)*QUADR(TRK2) -    .526 * GRS1*VOL1
 -    .093 * GRS1*QUADR(VOL1)       +    .111 * QUADR(GRS1)*LTN1       -    .377 * GRS1*TRK1             +    .074 * QUADR(GRS1)*TRK1
 +.077 * QUADR(GRS1)*QUADR(TRK1) -    .462 * GRS1*VOL2              +    .097 * QUADR(GRS1)*VOL2      +    .137 * GRS1*LTN2
 +    .901 * VOL1*TRK1              +    .090 * QUADR(VOL1)*TRK1       +    .697 * VOL1*VOL2             +    .153 * VOL1*QUADR(VOL2)
 +    .391 * QUADR(VOL1)*VOL2       -.051 * QUADR(VOL1)*QUADR(VOL2) +.056 * QUADR(VOL1)*QUADR(LTN2) +    .179 * LTN1*TRK1
 +    .141 * LTN1*VOL2              -.072 * QUADR(LTN1)*QUADR(TRK2) +    .237 * TRK1*VOL2             -.051 * QUADR(TRK1)*QUADR(LTN2)
 +    .175 * LTN2*TRK2              +    .107 * LTN2*QUADR(TRK2)       +    .148 * QUADR(LTN2)*TRK2

RESPONSE 43  * TOTAL CO  EMISSION ON OUTBOUND APPROACH OF MAJOR STREET     (KILOGRAMS/15 MAJUTES)
      RES =      .9854 +   .0004*(GT - 35)    -.0072*(RT - 35) + .0002*(RT2 - 58.39)  -.0002*(GT2 - 58.39)
 +    .154 * SIZE                   -    .093 * QUADR(SIZE)            -    .021 * QUADR(LBAY)           -    .051 * GRS1
 -    .033 * QUADR(VOL1)            +    .413 * TRK1                   -    .039 * VOL2                  +    .052 * LTN2
 +    .146 * TRK2                   -    .073 * SIZE*LBAY              +    .039 * SIZE*QUADR(LBAY)      +    .033 * QUADR(SIZE)*LBAY
 -.019 * QUADR(SIZE)*QUADR(LBAY) +    .028 * SIZE*QUADR(GRS1)       -    .057 * SIZE*VOL1             +    .122 * SIZE*TRK1
 -    .061 * QUADR(SIZE)*TRK1       +    .044 * LBAY*TRK1              -    .028 * QUADR(LBAY)*TRK1      +    .027 * QUADR(CYCL)*TRK1
 -    .043 * GRS1*LTN2              -    .035 * QUADR(VOL1)*TRK1       +    .063 * LTN1*TRK2             -.016 * QUADR(TRK1)*QUADR(TRK2)
 -    .053 * VOL2*TRK2

RESPONSE 44  * TOTAL HC  EMISSION ON OUTBOUND APPROACH OF MAJOR STREET     (GRAMS/15 MAJUTES)
      RES =   30.0500 +   .740*(GT - 35)    -.2000*(RT - 35) + .0100*(RT2 - 58.39)  -.0100*(GT2 - 58.39)
 +  3.421 * SIZE                    -  1.579 * QUADR(SIZE)             -  1.401 * LBAY                  +    .242 * QUADR(LBAY)
 -  2.615 * CYCL                    -  3.400 * GRS1                    +  3.901 * VOL1                  -    .412 * LTN1
 +  6.136 * TRK1                    -    .251 * QUADR(TRK1)            +    .512 * VOL2                  +    .968 * LTN2
 +  1.108 * TRK2                    +  1.775 * SIZE*LBAY               -    .414 * SIZE*QUADR(LBAY)      -    .499 * QUADR(SIZE)*LBAY
 +.135 * QUADR(SIZE)*QUADR(LBAY) +    .224 * SIZE*QUADR(GRS1)       +    .362 * SIZE*VOL1             -    .241 * SIZE*QUADR(LTN1)
 +  1.481 * SIZE*TRK1               -    .508 * QUADR(SIZE)*TRK1       -    .938 * LBAY*VOL1             +    .432 * QUADR(LBAY)*VOL1
 -    .494 * CYCL*LTN1              +.199 * QUADR(CYCL)*QUADR(LTN1) -    .630 * GRS1*TRK1             +.156 * QUADR(GRS1)*QUADR(TRK1)
 +    .429 * VOL1*LTN1              +  1.294 * VOL1*TRK1               -    .234 * QUADR(VOL1)*TRK1      +    .461 * VOL1*QUADR(VOL2)
 +    .520 * QUADR(VOL1)*VOL2       +    .365 * LTN1*TRK2              -.156 * QUADR(TRK1)*QUADR(TRK2) -    .653 * VOL2*LTN2
 +    .376 * LTN2*TRK2              +    .296 * LTN2*QUADR(TRK2)       +    .369 * QUADR(LTN2)*TRK2

RESPONSE 45  * TOTAL NOX EMISSION ON OUTBOUND APPROACH OF MAJOR STREET     (GRAMS/15 MAJUTES)
      RES = 103.8500 + 1.440*(GT - 35)    -.6100*(RT - 35) + .0300*(RT2 - 58.39)  -.0300*(GT2 - 58.39)
 + 23.766 * SIZE                    -  9.542 * QUADR(SIZE)             +  5.410 * LBAY                  -  2.815 * QUADR(LBAY)
 -  3.954 * CYCL                    -  7.757 * GRS1                    +  7.202 * VOL1                  -  1.678 * QUADR(VOL1)
 -  1.839 * LTN1                    + 22.531 * TRK1                    -    .814 * QUADR(TRK1)           +  3.434 * LTN2
 +  3.046 * TRK2                    -  9.267 * SIZE*LBAY               +  3.432 * SIZE*QUAOR(LBAY)      +  3.501 * QUADR(SIZE)*LBAY
 -.226 * QUADR(SIZE)*QUADR(LBAY) +  2.820 * SIZE*VOL1               -    .844 * QUADR(SIZE)*VOL1      -    .864 * SIZE*QUADR(LTN1)
 +  6.344 * SIZE*TRK1               -  1.858 * QUADR(SIZE)*TRK1        +  1.991 * VOL1*LTN1             +  5.956 * VOL1*TRK1
 +    .970 * QUADR(VOL1)*VOL2       +  1.420 * TRK1*VOL2               -.551 * QUADR(TRK1)*QUADR(TRK2) -  3.169 * VOL2*LTN2
 +  1.299 * LTN2*TRK2

RESPONSE 46  * TOTAL FUEL CONSUMPTION ON OUTBOUND APPROACH OF MAJOK STREET (KILOGRAMS/15 MAJUTES)
      RES =    6.5067 +   .158*(GT - 35)    -.0402*(RT - 35) + .0014*(RT2 - 58.39)  -.0020*(GT2 - 58.39)
 +  1.118 * SIZE                    -    .429 * QUADR(SIZE)            -    .041 * LBAY                  -    .562 * CYCL
 -    .698 * GRS1                   +    .819 * VOL1                   -    .110 * LTN1                  +    .871 * TRK1
 -    .028 * QUADR(TRK1)            +    .124 * VOL2                   +    .029 * QUADR(VOL2)           +    .173 * LTN2
 +    .137 * TRK2                   +    .228 * SIZE*VOL1              -    .084 * QUADR(SIZE)*VOL1      +    .056 * SIZE*LTN1
 -    .037 * SIZE*QUADR(LTN1)       +    .223 * SIZE*TRK1              -    .072 * QUADR(SIZE)*TRK1      +    .055 * SIZE*VOL2
 -    .073 * LBAY*VOL1              +    .029 * QUADR(LBAY)*VOL1       -    .047 * GRS1*TRK1             +    .104 * VOL1*LTN1
 +    .209 * VOL1*TRK1              -    .056 * VOL1*VOL2              +    .094 * VOL1*QUADR(VOL2)      +    .104 * QUADR(VOL1)*VOL2
 -.022 * QUADR(TRK1)*QUADR(TRK2) -    .134 * VOL2*LTN2              +    .059 * LTN2*TRK2             +    .029 * QUADR(LTN2)*TRK2
```

TABLE D-1. (CONTINUED)

```
RESPONSE 47  * TOTAL CO  EMISSION ON THE INTERSECTION PROPER AREA     (KILOGRAMS/15 MINUTES)
     RES =   2.8386 +  .003*(GT - 35) +  .0037*(RT - 35)  -.0006*(RT2 - 58.39)  -.0003*(GT2 - 58.39)
 +    .930 * SIZE                   +    .173 * LBAY                  -    .174 * CYCL                  +    .141 * VOL1
 -    .048 * QUADR(VOL1)            +    .986 * TRK1                  +    .141 * VOL2                  -    .076 * QUADR(VOL2)
 +    .936 * TRK2                   -    .095 * SIZE*LBAY             +    .349 * SIZE*TRK1             -    .073 * QUADR(SIZE)*TRK1
 +    .274 * SIZE*TRK2              +    .095 * LBAY*TRK1             +    .148 * VOL1*TRK1             +    .094 * TRK1*LTN2
 +    .144 * VOL2*TRK2

RESPONSE 48  * TOTAL HC  EMISSION ON THE INTERSECTION PROPER AREA     (GRAMS/15 MINUTES)
     RES =  45.7200 +  .080*(GT - 35) +  .0800*(RT - 35)  -.0100*(RT2 - 58.39)
 + 13.915 * SIZE                    +  2.402 * LBAY                   -    .281 * QUADR(LBAY)           -  2.817 * CYCL
 +    .257 * QUADR(CYCL)            +  2.385 * VOL1                   -    .658 * QUADR(VOL1)           +  5.518 * TRK1
 +  2.287 * VOL2                    -    .791 * QUADR(VOL2)           +  5.169 * TRK2                   -    .878 * SIZE*LBAY
 +    .445 * SIZE*QUADR(LBAY)       +    .459 * QUADR(SIZE)*LBAY      -.196 * QUADR(SIZE)*QUADR(LBAY)   -    .892 * SIZE*CYCL
 -    .310 * SIZE*QUADR(VOL1)       +  1.734 * SIZE*TRK1              -    .321 * QUADR(SIZE)*TRK1      +    .938 * SIZE*VOL2
 +  1.467 * SIZE*TRK2               -    .645 * LBAY*GRS1             +    .299 * QUADR(CYCL)*VOL2      -    .554 * GRS1*VOL2
 +  1.200 * VOL1*TRK1               -    .626 * VOL1*VOL2             +    .443 * VOL1*QUADR(VOL2)      +    .451 * QUADR(VOL1)*VOL2
 +  1.225 * VOL2*TRK2

RESPONSE 49  * TOTAL NOX EMISSION ON THE INTERSECTION PROPER AREA     (GRAMS/15 MINUTES)
     RES = 163.2900 -  .030*(GT - 35) -  .1500*(RT - 35)  -.0200*(RT2 - 58.39)  -.0200*(GT2 - 58.39)
 + 53.817 * SIZE                    + 10.437 * LBAY                   -  1.620 * QUADR(LBAY)            -  7.561 * CYCL
 +  6.305 * VOL1                    -  3.699 * QUADR(VOL1)            +  8.429 * TRK1                   +  6.149 * VOL2
 -  3.588 * QUADR(VOL2)             +  8.457 * TRK2                   -  7.106 * SIZE*LBAY              +  2.697 * SIZE*QUADR(LBAY)
 +  2.595 * QUADR(SIZE)*LBAY        -.234 * QUADR(SIZE)*QUADR(LBAY)   -  3.530 * SIZE*CYCL              -  1.451 * SIZE*QUADR(VOL1)
 +  1.984 * SIZE*TRK1               -  1.161 * SIZE*QUADR(VOL2)       +  2.277 * SIZE*TRK2              -  1.929 * LBAY*GRS1
 +  1.784 * GRS1*VOL1               -.448 * QUADR(GRS1)*QUADR(LTN2)   +  2.663 * VOL1*TRK1              -  2.772 * VOL1*VOL2
 +  1.203 * VOL1*QUADR(VOL2)        +  1.024 * QUADR(VOL1)*VOL2       +  1.143 * VOL2*LTN2              +  2.873 * VOL2*TRK2

RESPONSE 50  * TOTAL FUEL CONSUMPTION ON THE INTERSECTION PROPER AREA (KILOGRAMS/15 MINUTES)
     RES =   6.8527 +  .024*(GT - 35) +  .0225*(RT - 35)  -.0009*(RT2 - 58.39)  -.0006*(GT2 - 58.39)
 +  2.137 * SIZE                    +    .047 * QUADR(SIZE)           +    .365 * LBAY                  -    .035 * QUADR(LBAY)
 -    .491 * CYCL                   +    .023 * QUADR(CYCL)           +    .413 * VOL1                  -    .095 * QUADR(VOL1)
 +    .504 * TRK1                   +    .400 * VOL2                  -    .097 * QUADR(VOL2)           +    .488 * TRK2
 -    .129 * SIZE*LBAY              +    .062 * SIZE*QUADR(LBAY)      +    .060 * QUADR(SIZE)*LBAY      -.033 * QUADR(SIZE)*QUADR(LBAY)
 -    .115 * SIZE*CYCL              +    .131 * SIZE*VOL1             -    .040 * SIZE*QUADR(VOL1)      +    .149 * SIZE*TRK1
 +    .155 * SIZE*VOL2              -    .034 * SIZE*QUADR(VOL2)      +    .139 * SIZE*TRK2             -    .074 * LBAY*GRS1
 +    .045 * LBAY*VOL1              +    .026 * QUADR(CYCL)*VOL2      +    .044 * GRS1*VOL1             -    .049 * GRS1*VOL2
 +    .125 * VOL1*TRK1              -    .086 * VOL1*VOL2             +    .080 * VOL1*QUADR(VOL2)      +    .072 * QUADR(VOL1)*VOL2
 +    .124 * VOL2*TRK2

RESPONSE 51  * TOTAL CO  EMISSION ON THE INBOUND BUCKET OF MINOR STREET NEAREST THE INTERSECTION     (KILOGRAMS/15 MINUTES)
     RES =    .4374 +  .005*(GT - 35) +  .0060*(RT - 35)       -.0002*(GT2 - 58.39)
 -    .022 * LBAY                   -    .005 * QUADR(LBAY)           -    .057 * CYCL                  +    .054 * GRS1
 +    .019 * VOL1                   -    .072 * VOL2                  -    .012 * QUADR(VOL2)           +    .009 * LTN2
 +    .174 * TRK2                   -    .008 * QUADR(TRK2)           -    .007 * SIZE*QUADR(GRS1)      +    .011 * LBAY*VOL2
 -    .022 * LBAY*LTN2              -    .006 * QUADR(LBAY)*LTN2      -    .011 * CYCL*GRS1             -    .007 * QUADR(CYCL)*VOL1
 +    .015 * GRS1*TRK2              -.003 * QUADR(VOL1)*QUADR(LTN1)   +    .015 * VOL1*TRK2             +    .012 * TRK1*LTN2
 +    .056 * VOL2*TRK2              -    .009 * QUADR(VOL2)*TRK2

RESPONSE 52  * TOTAL HC  EMISSION ON THE INBOUND BUCKET OF MINOR STREET NEAREST THE INTERSECTION     (GRAMS/15 MINUTES)
     RES =  11.1500 +  .110*(GT - 35) +  .2300*(RT - 35)
 -    .621 * LBAY                   -    .196 * QUADR(LBAY)           -  1.364 * CYCL                   +  1.297 * GRS1
 +    .071 * QUADR(GRS1)            +    .459 * VOL1                  +  1.749 * VOL2                   -    .185 * QUADR(VOL2)
 +    .485 * LTN2                   +  1.212 * TRK2                   -    .077 * QUADR(TRK2)           +    .133 * SIZE*LBAY
 +    .097 * QUADR(SIZE)*LBAY       -    .148 * SIZE*TRK1             -    .076 * QUADR(SIZE)*TRK2      -    .218 * LBAY*GRS1
 -    .180 * LBAY*VOL1              -    .328 * LBAY*VOL2             -    .614 * LBAY*LTN2             -    .206 * QUADR(LBAY)*LTN2
 +.047 * QUADR(LBAY)*QUADR(TRK2)    -    .229 * CYCL*GRS1             -    .158 * CYCL*VOL1             -    .084 * QUADR(CYCL)*VOL1
 +.051 * QUADR(CYCL)*QUADR(TRK1)    +    .254 * GRS1*VOL1             +    .206 * GRS1*LTN2             +    .080 * VOL1*QUADR(TRK1)
 +    .142 * VOL1*QUADR(VOL2)       +    .183 * QUADR(VOL1)*VOL2      +    .185 * VOL1*LTN2             +    .147 * LTN1*TRK1
 -    .102 * QUADR(LTN1)*TRK1       +.057 * QUADR(LTN1)*QUADR(TRK1)   +    .355 * VOL2*TRK2             -    .116 * LTN2*QUADR(TRK2)

RESPONSE 53  * TOTAL NOX EMISSION ON THE INBOUND BUCKET OF MINOR STREET NEAREST THE INTERSECTION     (GRAMS/15 MINUTES)
     RES =  18.6000 +  .210*(GT - 35) +  .1500*(RT - 35)       -.0100*(GT2 - 58.39)
 -    .539 * LBAY                   -    .182 * QUADR(LBAY)           -  1.874 * CYCL                   +  1.748 * GRS1
 +    .647 * VOL1                   +  2.389 * VOL2                   -    .376 * QUADR(VOL2)           +  2.697 * TRK2
 +    .130 * QUADR(LBAY)*VOL1       +    .212 * LBAY*VOL2             -    .439 * LBAY*LTN2             -    .173 * QUADR(LBAY)*LTN2
 -    .273 * CYCL*GRS1              -    .130 * GRS1*QUADR(TRK2)      +    .250 * VOL1*QUADR(VOL2)      +    .199 * QUADR(VOL1)*VOL2
 +    .717 * VOL2*TRK2

RESPONSE 54  * TOTAL FUEL CONSUMPTION ON THE INBOUND BUCKET OF MINOR STREET NEAREST THE INTERSECTION (KILOGRAMS/15 MINUTES)
     RES =   1.2651 +  .016*(GT - 35) +  .0192*(RT - 35)       -.0004*(GT2 - 58.39)
 -    .060 * LBAY                   -    .019 * QUADR(LBAY)           -    .153 * CYCL                  +    .147 * GRS1
 +    .006 * QUADR(GRS1)            +    .051 * VOL1                  +    .198 * VOL2                  -    .020 * QUADR(VOL2)
 +    .042 * LTN2                   +    .119 * TRK2                  +    .012 * SIZE*LBAY             -    .009 * QUADR(SIZE)*LBAY
 -    .015 * SIZE*TRK1              -    .019 * LBAY*GRS1             -    .013 * LBAY*VOL1             +    .031 * LBAY*VOL2
 -    .057 * LBAY*LTN2              -    .019 * QUADR(LBAY)*LTN2      -    .023 * CYCL*GRS1             +    .020 * GRS1*VOL1
 +    .017 * GRS1*LTN2              +    .018 * VOL1*QUADR(VOL2)      +    .020 * QUADR(VOL1)*VOL2      +    .013 * VOL1*LTN2
 +    .015 * LTN1*TRK1              -    .009 * QUADR(LTN1)*TRK1      +.005 * QUADR(LTN1)*QUADR(TRK1)   -    .007 * LTN1*QUADR(LTN2)
 +    .032 * VOL2*TRK2              -    .010 * LTN2*QUADR(TRK2)

RESPONSE 55  * TOTAL CO  EMISSION ON THE INBOUND BUCKET OF MAJOR STREET NEAREST THE INTERSECTION     (KILOGRAMS/15 MINUTES)
     RES =    .4028 +  .006*(GT - 35) +  .0055*(RT - 35)       -.0003*(GT2 - 58.39)
 +    .017 * SIZE                   -    .008 * LBAY                  -    .053 * CYCL                  -    .048 * GRS1
 +    .048 * VOL1                   -    .009 * QUADR(VOL1)           +    .159 * TRK1                  +    .020 * VOL2
 -    .010 * SIZE*LBAY              +    .006 * SIZE*QUADR(LBAY)      +    .007 * SIZE*QUADR(GRS1)      +    .015 * SIZE*TRK1
 -    .006 * QUADR(SIZE)*TRK1       +    .006 * SIZE*QUADR(LTN2)      +    .014 * LBAY*VOL1             -    .007 * QUADR(LBAY)*VOL1
 -    .019 * LBAY*LTN1              +    .006 * QUADR(CYCL)*VOL2      +    .006 * GRS1*QUADR(VOL1)      -    .015 * GRS1*TRK1
 +    .058 * VOL1*TRK1              -    .007 * QUADR(VOL1)*TRK1      +    .010 * VOL1*QUADR(VOL2)      +    .008 * QUADR(VOL1)*VOL2
 +    .019 * TRK1*VOL2              -.003 * QUADR(TRK1)*QUADR(TRK2)   +    .011 * VOL2*TRK2             -    .005 * LTN2*QUADR(TRK2)

RESPONSE 56  * TOTAL HC  EMISSION ON THE INBOUND BUCKET OF MAJOR STREET NEAREST THE INTERSECTION     (GRAMS/15 MINUTES)
     RES =  10.1800 +  .140*(GT - 35) +  .2100*(RT - 35)       -.0100*(GT2 - 58.39)
 +    .094 * SIZE                   -    .537 * LBAY                  +    .148 * QUADR(LBAY)           -  1.277 * CYCL
 +    .095 * QUADR(CYCL)            -  1.204 * GRS1                   +    .055 * QUADR(GRS1)           +  1.652 * VOL1
 -    .173 * QUADR(VOL1)            +    .120 * LTN1                  +  1.079 * TRK1                   +    .451 * VOL2
 +    .135 * SIZE*LBAY              -    .170 * SIZE*VOL1             +    .071 * QUADR(SIZE)*VOL1      -    .088 * QUADR(SIZE)*TRK1
 -    .136 * SIZE*LTN2              +    .068 * SIZE*QUADR(LTN2)      +    .056 * SIZE*QUADR(TRK2)      +    .078 * QUADR(LBAY)*CYCL
 +    .095 * LBAY*GRS1              -    .089 * LBAY*QUADR(GRS1)      +    .155 * LBAY*VOL1             -    .082 * QUADR(LBAY)*VOL1
 -.040 * QUADR(LBAY)*QUADR(VOL1)    -    .489 * LBAY*LTN1             +    .180 * QUADR(LBAY)*LTN1      -    .208 * LBAY*VOL2
 -    .190 * CYCL*GRS1              +    .055 * CYCL*QUADR(GRS1)      -    .055 * QUADR(CYCL)*GRS1      +    .119 * CYCL*VOL1
 -    .110 * CYCL*VOL2              +    .092 * QUADR(CYCL)*VOL2      +.042 * QUADR(CYCL)*QUADR(VOL2)   +    .075 * GRS1*QUADR(VOL1)
 -    .164 * GRS1*VOL2              +    .126 * GRS1*LTN2             -    .076 * QUADR(VOL1)*LTN1      +    .343 * VOL1*TRK1
 +    .236 * VOL1*VOL2              +    .222 * VOL1*QUADR(VOL2)      +    .152 * QUADR(VOL1)*VOL2      -.048 * QUADR(VOL1)*QUADR(VOL2)
 +.040 * QUADR(VOL1)*QUADR(LTN2)    +    .084 * QUADR(LTN1)*TRK1      -    .103 * LTN1*LTN2             -.047 * QUADR(LTN1)*QUADR(LTN2)
 +    .099 * TRK1*TRK2              -.045 * QUADR(TRK1)*QUADR(TRK2)   -    .099 * VOL2*LTN2             +    .152 * VOL2*TRK2
 +    .095 * LTN2*TRK2              -    .056 * LTN2*QUADR(TRK2)      +    .058 * QUADR(LTN2)*TRK2

RESPONSE 57  * TOTAL NOX EMISSION ON THE INBOUND BUCKET OF MAJOR STREET NEAREST THE INTERSECTION     (GRAMS/15 MINUTES)
     RES =  17.5300 +  .200*(GT - 35) +  .1600*(RT - 35)       -.0100*(GT2 - 58.39)
 +  1.022 * SIZE                    -    .277 * QUADR(SIZE)           +    .260 * LBAY                  -    .145 * QUADR(LBAY)
 -  1.753 * CYCL                    -  1.739 * GRS1                   +  2.315 * VOL1                   -    .371 * QUADR(VOL1)
 +  2.501 * TRK1                    -    .123 * QUADR(TRK1)           +    .587 * VOL2                  +    .150 * TRK2
 -  1.053 * SIZE*LBAY               +    .375 * SIZE*QUADR(LBAY)      +    .390 * QUADR(SIZE)*LBAY      -.138 * QUADR(SIZE)*QUADR(LBAY)
 -    .123 * LBAY*QUADR(GRS1)       +    .437 * LBAY*VOL1             -    .155 * QUADR(LBAY)*VOL1      -    .390 * LBAY*LTN1
 +    .374 * CYCL*GRS1              +    .281 * CYCL*VOL1             +    .189 * CYCL*LTN1             -.074 * QUADR(CYCL)*QUADR(LTN1)
 +.065 * QUADR(CYCL)*QUADR(VOL2)    -    .109 * QUADR(GRS1)*TRK1      +    .217 * VOL1*LTN1             +    .762 * VOL1*TRK1
 +    .316 * VOL1*VOL2              +    .319 * VOL1*QUADR(VOL2)      +    .225 * QUADR(VOL1)*VOL2      -.107 * QUADR(VOL1)*QUADR(VOL2)
 +    .108 * QUADR(LTN1)*TRK1       +    .229 * TRK1*VOL2             +    .189 * LTN2*TRK2             -    .179 * LTN2*QUADR(TRK2)

RESPONSE 58  * TOTAL FUEL CONSUMPTION ON THE INBOUND BUCKET OF MAJOR STREET NEAREST THE INTERSECTION (KILOGRAMS/15 MINUTES)
     RES =   1.1910 +  .018*(GT - 35) +  .0179*(RT - 35)       -.0006*(GT2 - 58.39)
 +    .018 * SIZE                   -    .046 * LBAY                  +    .012 * QUADR(LBAY)           -    .146 * CYCL
 +    .009 * QUADR(CYCL)            -    .142 * GRS1                  +    .006 * QUADR(GRS1)           +    .191 * VOL1
 -    .019 * QUADR(VOL1)            +    .106 * TRK1                  +    .050 * VOL2                  +    .007 * TRK2
 -    .015 * SIZE*VOL1              +    .007 * QUADR(SIZE)*VOL1      -    .008 * QUADR(SIZE)*TRK1      -    .013 * SIZE*LTN2
 +    .005 * SIZE*QUADR(TRK2)       +    .007 * QUADR(LBAY)*CYCL      -    .009 * LBAY*QUADR(GRS1)      +    .019 * LBAY*VOL1
 -    .008 * QUADR(LBAY)*VOL1       -.004 * QUADR(LBAY)*QUADR(VOL1)   -    .046 * LBAY*LTN1             +    .017 * QUADR(LBAY)*LTN1
 -    .020 * LBAY*VOL2              +    .022 * CYCL*GRS1             -    .006 * CYCL*QUADR(GRS1)      -    .005 * QUADR(CYCL)*GRS1
 +    .013 * CYCL*VOL1              -    .009 * CYCL*VOL2             +    .008 * QUADR(CYCL)*VOL2      +.004 * QUADR(CYCL)*QUADR(VOL2)
 +    .008 * GRS1*QUADR(VOL1)       -    .012 * GRS1*VOL2             +    .011 * GRS1*LTN2             -    .006 * QUADR(VOL1)*LTN1
 +    .031 * VOL1*TRK1              -    .020 * VOL1*VOL2             +    .026 * VOL1*QUADR(VOL2)      +    .018 * QUADR(VOL1)*VOL2
 -.005 * QUADR(VOL1)*QUADR(VOL2)    +.004 * QUADR(VOL1)*QUADR(LTN2)   +    .008 * QUADR(LTN1)*TRK1      -    .010 * LTN1*LTN2
 -.004 * QUADR(LTN1)*QUADR(LTN2)    +    .010 * TRK1*TRK2             -.004 * QUADR(TRK1)*QUADR(TRK2)   -    .011 * VOL2*LTN2
 +    .013 * VOL2*TRK2              +    .009 * LTN2*TRK2             -    .007 * LTN2*QUADR(TRK2)
```

APPENDIX E

PREDICTED VALUES OF DELAY, EMISSIONS, AND FUEL FLOW IN FIFTEEN MINUTES FOR THE OVERALL INTERSECTION SYSTEM CONTROLLED BY PRETIMED SIGNALS

Legend:

V-2	Lane volume on the minor street
V-1	Lane volume on the major street
CY	Cycle time
GT	Green time on the minor street

TABLE E-1A. AVERAGE TOTAL DELAY PER VEHICLE (SECONDS/VEHICLE) FOR GEOMETRY 4*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET LOW LEVEL								TRUCKS ON THE MINOR STREET HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	11.8	16.8	13.9	20.5	12.1	17.1	14.1	20.8	13.9	18.8	15.9	22.5	16.0	21.0	18.0	24.7
300	300	50	25	10.1	13.1	10.0	14.7	13.9	16.9	13.8	18.5	13.2	16.1	13.1	17.7	18.8	21.8	18.7	23.4
300	300	50	22	8.5	13.5	6.3	13.0	15.8	20.8	13.6	20.3	12.6	17.5	10.4	17.0	21.7	26.7	19.5	26.2
300	300	60	33	13.5	16.2	15.5	19.9	13.8	16.5	15.8	20.2	14.3	17.1	16.4	20.8	16.5	19.2	18.5	22.9
300	300	60	30	12.0	12.8	12.0	14.4	15.8	16.6	15.8	18.2	13.9	14.6	13.8	16.2	19.5	20.3	19.4	21.9
300	300	60	27	10.8	13.5	8.6	13.0	18.1	20.8	15.9	20.3	13.6	16.3	11.4	15.8	22.7	25.5	20.6	25.0
300	300	70	38	17.9	18.4	19.9	22.1	18.2	18.7	20.2	22.4	17.5	18.0	19.5	21.6	19.6	20.1	21.6	23.8
300	300	70	35	16.7	15.3	16.6	16.9	20.5	19.1	20.4	20.7	17.3	15.8	17.2	17.4	22.9	21.5	22.9	23.1
300	300	70	31	15.8	16.3	13.6	15.8	23.1	23.6	20.9	23.1	17.3	17.8	15.1	17.3	26.5	27.0	24.3	26.5
300	450	50	25	16.5	21.4	19.3	25.9	18.5	23.5	21.4	28.0	18.5	23.5	21.4	28.0	22.4	27.4	25.3	31.9
300	450	50	22	12.9	15.8	13.6	18.3	18.5	21.4	19.2	23.9	15.9	18.9	16.7	21.3	23.4	26.3	24.1	28.8
300	450	50	20	12.9	17.8	11.5	18.1	22.0	26.9	20.6	27.3	16.9	21.9	15.6	22.2	27.9	32.8	26.5	33.2
300	450	60	30	18.4	21.1	21.2	25.6	20.5	23.2	23.3	27.7	19.2	21.9	22.0	26.4	23.1	25.9	26.0	30.4
300	450	60	27	15.1	15.9	15.9	18.3	20.7	21.5	21.5	23.9	16.9	17.7	17.7	20.1	24.4	25.1	25.1	27.6
300	450	60	24	15.2	17.9	13.8	18.2	24.3	27.0	22.9	27.3	18.0	20.7	16.6	21.0	28.9	31.7	27.6	32.0
300	450	70	35	23.1	23.6	25.9	28.1	25.1	25.7	28.0	30.2	22.6	23.1	25.5	27.7	26.6	27.1	29.4	31.6
300	450	70	31	20.1	18.6	20.8	21.1	25.7	24.2	26.5	26.7	20.7	19.2	21.4	21.6	28.1	26.6	28.9	29.1
300	450	70	28	20.4	20.9	19.0	21.2	29.5	30.0	28.2	30.3	22.0	22.5	20.6	22.8	32.9	33.4	31.6	33.8
300	600	60	27	24.6	29.6	28.3	34.9	28.5	33.5	32.2	38.8	26.7	31.6	30.3	37.0	32.4	37.4	36.1	42.7
300	600	60	24	19.6	22.5	21.1	25.8	27.0	29.9	28.5	33.2	22.6	25.6	24.2	28.8	31.9	34.8	33.4	38.1
300	600	60	21	20.9	25.9	20.4	27.0	31.9	36.8	31.3	38.0	25.0	29.9	24.5	31.1	37.8	42.7	37.2	43.9
300	600	70	31	26.2	28.9	29.9	34.3	30.1	32.8	33.8	38.2	27.0	29.8	30.7	35.1	32.8	35.5	36.4	40.8
300	600	70	28	21.4	22.2	23.0	25.4	28.8	29.6	30.4	32.8	23.2	24.0	24.8	27.2	32.5	33.2	34.0	36.5
300	600	70	24	22.8	25.6	22.3	26.7	33.8	36.5	33.2	37.6	25.6	28.4	25.1	29.5	38.4	41.1	37.9	42.3
300	600	80	36	30.7	31.2	34.4	36.5	34.6	35.1	38.3	40.4	30.3	30.8	33.9	36.1	36.0	36.5	39.7	41.9
300	600	80	32	26.2	24.7	27.8	28.0	33.6	32.1	35.2	35.4	26.8	25.3	28.3	28.5	36.0	34.5	37.6	37.8
300	600	80	28	27.9	28.5	27.4	29.6	38.9	39.4	38.4	40.5	29.5	30.0	29.0	31.2	42.3	42.8	41.8	44.0
450	300	50	30	15.1	21.1	17.1	24.8	15.4	21.4	17.4	25.1	18.1	24.1	20.1	27.8	20.2	26.2	22.2	29.9
450	300	50	27	12.9	16.9	12.8	18.5	16.7	20.7	16.6	22.3	16.8	20.9	16.7	22.5	22.5	26.5	22.4	28.1
450	300	50	25	12.2	18.2	10.0	17.7	19.5	25.5	17.3	25.0	17.1	23.2	15.0	22.7	26.3	32.3	24.1	31.8
450	300	60	36	17.0	20.8	19.0	24.5	17.2	21.1	19.3	24.8	18.7	22.5	20.7	26.2	20.8	24.6	22.8	28.3
450	300	60	33	15.1	17.0	15.0	18.6	18.9	20.8	18.8	22.4	17.8	19.7	17.8	21.3	23.5	25.3	23.4	26.9
450	300	60	30	14.7	18.5	12.5	18.0	22.0	25.8	19.8	25.3	18.4	22.2	16.2	21.7	27.5	31.4	25.4	30.9
450	300	70	42	21.3	22.9	23.3	26.6	21.6	23.2	23.6	26.9	21.8	23.4	23.8	27.1	23.9	25.5	25.9	29.2
450	300	70	38	20.0	19.7	20.0	21.3	23.8	23.5	23.7	25.1	21.5	21.1	21.4	22.7	27.2	26.8	27.1	28.4
450	300	70	35	19.9	21.5	17.7	21.0	27.2	28.8	25.0	28.3	22.4	24.0	20.2	23.5	31.5	33.1	29.4	32.7
450	450	60	33	22.1	28.2	25.0	32.7	24.2	30.3	27.1	34.8	25.1	31.1	27.9	35.7	29.0	35.1	31.9	39.6
450	450	60	30	18.5	22.6	19.2	25.0	24.1	28.2	24.8	30.6	22.5	26.5	23.2	29.0	29.9	34.0	30.7	36.4
450	450	60	27	19.4	25.4	18.0	25.7	28.5	34.5	27.1	34.9	24.3	30.4	23.0	30.7	35.3	41.3	33.9	41.7
450	450	70	38	23.7	27.5	26.5	32.0	25.7	29.6	28.6	34.1	25.4	29.2	28.2	33.7	29.3	33.1	32.2	37.7
450	450	70	35	20.3	22.2	21.1	24.6	25.9	27.8	26.7	30.2	23.1	24.9	23.8	27.3	30.5	32.4	31.3	34.8
450	450	70	31	21.5	25.4	20.2	25.7	30.6	34.5	29.3	34.8	25.3	29.1	23.9	29.4	36.2	40.0	34.9	40.4
450	450	80	44	27.7	29.3	30.5	33.8	29.8	31.4	32.6	35.9	28.2	29.8	31.0	34.3	32.1	33.7	34.9	38.2
450	450	80	40	25.0	24.6	25.7	27.0	30.6	30.2	31.3	32.6	26.4	26.1	27.2	28.5	33.9	33.5	34.6	35.9
450	450	80	36	26.6	28.2	25.2	28.5	35.7	37.3	34.3	37.6	29.1	30.7	27.7	31.0	40.0	41.6	38.7	42.0
450	600	70	35	34.4	40.5	38.1	45.8	38.3	44.3	42.0	49.7	37.4	43.4	41.1	48.8	43.1	49.2	46.8	54.5
450	600	70	31	29.3	33.4	30.9	36.6	36.7	40.8	38.3	44.0	33.3	37.3	34.8	40.6	42.5	46.6	44.1	49.8
450	600	70	28	31.7	37.8	31.2	39.0	42.7	48.7	42.2	49.9	36.7	42.8	36.2	43.9	49.5	55.5	49.0	56.7
450	600	80	40	35.6	39.5	39.3	44.8	39.5	43.3	43.2	48.7	37.4	41.2	41.0	46.5	43.1	46.9	46.8	52.3
450	600	80	36	30.9	32.8	32.5	36.1	38.4	40.2	39.9	43.5	33.7	35.5	35.2	38.8	42.9	44.8	44.5	48.0
450	600	80	32	33.7	37.5	33.2	38.7	44.6	48.5	44.1	49.6	37.4	41.3	36.9	42.4	50.2	54.0	49.7	55.2
450	600	90	45	39.6	41.2	43.3	46.6	43.5	45.1	47.2	50.5	40.1	41.7	43.8	47.0	45.8	47.4	49.5	52.8
450	600	90	40	35.5	35.1	37.1	38.4	42.9	42.6	44.5	45.8	37.0	36.6	38.6	39.9	46.3	45.9	47.8	49.1
450	600	90	36	38.6	40.2	38.1	41.4	49.5	51.1	49.0	52.3	41.1	42.7	40.6	43.9	53.9	55.5	53.3	56.6
600	300	60	39	19.7	26.9	21.8	30.6	20.0	27.2	22.0	30.9	23.6	30.8	25.6	34.5	25.8	32.9	27.8	36.6
600	300	60	36	15.0	20.1	14.9	21.7	18.8	23.9	18.7	25.5	19.9	25.0	19.8	26.6	25.5	30.7	25.4	32.3
600	300	60	33	17.9	25.0	15.7	24.5	25.2	32.4	23.0	31.9	23.8	30.9	21.6	30.4	32.9	40.1	30.8	39.6
600	300	70	45	20.9	25.8	22.9	29.5	21.2	26.1	23.2	29.8	23.5	28.4	25.5	32.1	25.6	30.6	27.7	34.3
600	300	70	42	16.5	19.5	16.4	21.1	20.3	23.2	20.2	24.8	20.1	23.1	20.1	24.7	25.8	28.7	25.7	30.3
600	300	70	38	20.0	24.9	17.8	24.4	27.3	32.2	25.1	31.7	24.6	29.6	22.5	29.1	33.8	38.7	31.6	38.2
600	300	80	52	24.0	26.7	26.1	30.4	24.3	27.0	26.3	30.7	25.4	28.1	27.5	31.8	27.6	30.3	29.6	34.0
600	300	80	48	20.6	21.3	20.5	22.9	24.4	25.1	24.3	26.7	22.9	23.7	22.9	25.3	28.6	29.3	28.5	30.9
600	300	80	44	24.6	27.3	22.4	26.8	31.9	34.6	29.7	34.1	28.0	30.7	25.8	30.2	37.1	39.8	35.0	39.3
600	450	70	42	30.1	37.2	32.9	41.7	32.2	39.3	35.0	43.8	34.0	41.1	36.8	45.6	37.9	45.0	40.7	49.6
600	450	70	38	24.1	29.2	24.8	31.7	29.7	34.8	30.4	37.3	29.0	34.1	29.7	36.6	36.4	41.6	37.2	44.0
600	450	70	35	28.7	35.8	27.3	36.1	37.8	44.9	36.4	45.3	34.5	41.7	33.2	42.0	45.5	52.6	44.2	53.0
600	450	80	48	30.7	35.7	33.6	40.2	32.8	37.7	35.7	42.3	33.4	38.3	36.2	42.8	37.3	42.2	40.1	46.7
600	450	80	44	25.3	28.2	26.0	30.6	30.9	33.8	31.6	36.2	28.9	31.9	29.7	34.3	36.4	39.3	37.1	41.7
600	450	80	40	30.5	35.4	29.1	35.7	39.6	44.5	38.2	44.8	35.1	40.0	33.7	40.3	46.1	51.0	44.7	51.3
600	450	90	54	33.9	36.6	36.7	41.1	36.0	38.7	38.8	43.2	35.3	38.0	38.1	42.5	39.2	41.9	42.1	46.5
600	450	90	49	29.4	30.1	30.1	32.5	35.0	35.7	35.7	38.1	31.8	32.5	32.5	34.9	39.2	39.9	40.0	42.4
600	450	90	45	35.0	37.7	33.6	38.0	44.1	46.8	42.8	47.1	38.4	41.1	37.0	41.4	49.3	52.0	48.0	52.4
600	600	70	38	43.7	50.9	47.4	56.2	47.6	54.8	51.3	60.1	47.6	54.8	51.3	60.1	53.4	60.5	57.0	65.9
600	600	70	35	35.7	40.9	37.3	44.1	43.1	48.3	44.7	51.6	40.6	45.8	42.2	49.0	49.9	55.0	51.4	58.3
600	600	70	31	41.6	48.8	41.1	49.9	52.5	59.7	52.0	60.8	47.5	54.6	47.0	55.8	60.3	67.4	59.8	68.6
600	600	80	44	44.9	49.9	48.6	55.2	48.8	53.8	52.5	59.1	47.6	52.5	51.2	57.9	53.3	58.2	57.0	63.6
600	600	80	40	37.5	40.4	39.1	43.7	44.9	47.9	46.5	51.1	41.1	44.1	42.7	47.3	50.4	53.3	52.0	56.6
600	600	80	36	43.8	48.8	43.3	49.9	54.8	59.7	54.2	60.8	48.5	53.4	48.0	54.6	61.2	66.2	60.7	67.3
600	600	90	49	49.0	51.7	52.7	57.1	52.9	55.6	56.6	61.0	50.4	53.1	54.1	58.5	56.2	58.9	59.9	64.2
600	600	90	45	42.0	42.8	43.6	46.0	49.5	50.2	51.0	53.4	44.4	45.2	46.0	48.4	53.7	54.4	55.3	57.7
600	600	90	40	49.0	51.7	48.5	52.8	59.9	62.6	59.4	63.8	52.4	55.1	51.9	56.2	65.1	67.8	64.6	69.0

TABLE E-1B. AVERAGE TOTAL DELAY PER VEHICLE (SECONDS/VEHICLE) FOR GEOMETRY 5*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	6.0	7.4	7.2	10.3	7.6	9.0	8.8	11.9	7.1	8.5	8.2	11.3	10.5	12.0	11.7	14.8
300	300	50	25	6.5	6.0	5.6	6.7	11.7	11.1	10.8	11.9	8.6	8.1	7.7	8.8	15.6	15.1	14.7	15.8
300	300	50	22	5.3	6.8	2.3	5.4	14.0	15.4	11.0	14.1	8.4	9.9	5.4	8.5	18.9	20.4	15.9	19.0
300	300	60	33	8.8	8.0	10.0	10.9	10.4	9.7	11.6	12.5	8.7	7.9	9.8	10.7	12.1	11.3	13.3	14.2
300	300	60	30	9.6	6.9	8.7	7.6	14.8	12.0	13.8	12.8	10.5	7.7	9.5	8.5	17.4	14.7	16.5	15.4
300	300	60	27	8.8	8.0	5.8	6.6	17.4	16.6	14.4	15.3	10.6	9.8	7.6	8.5	21.1	20.3	18.1	19.0
300	300	70	38	12.0	9.0	13.2	11.9	13.6	10.6	14.8	13.5	10.6	7.6	11.8	10.5	14.1	11.1	15.3	13.9
300	300	70	35	13.1	8.1	12.2	8.9	18.3	13.3	17.4	14.1	12.7	7.7	11.8	8.5	19.7	14.7	18.8	15.5
300	300	70	31	12.6	9.6	9.6	8.2	21.2	18.2	18.2	16.9	13.2	10.2	10.2	8.8	23.7	20.7	20.7	19.3
300	450	50	25	7.6	9.0	9.6	12.7	11.0	12.5	13.1	16.2	8.7	10.1	10.7	13.8	14.0	15.4	16.0	19.1
300	450	50	22	6.3	5.7	6.2	7.3	13.2	12.7	13.2	14.3	8.4	7.8	8.3	9.4	17.2	16.6	17.1	18.2
300	450	50	20	6.7	8.2	4.5	7.7	17.2	18.6	15.0	18.1	9.8	11.2	7.6	10.7	22.1	23.5	19.9	23.1
300	450	60	30	10.7	9.9	12.7	13.6	14.1	13.3	16.1	17.0	10.5	9.7	12.5	13.4	15.8	15.0	17.8	18.7
300	450	60	27	9.7	6.9	9.6	8.5	16.7	13.9	16.6	15.5	10.5	7.8	10.5	9.4	19.3	16.6	19.3	18.2
300	450	60	24	10.2	9.4	8.0	8.9	20.6	19.9	18.5	19.4	12.0	11.2	9.8	10.7	24.3	23.5	22.2	23.0
300	450	70	35	14.2	11.2	16.2	14.9	17.7	14.6	19.7	18.3	12.8	9.8	14.8	13.5	18.1	15.1	20.1	18.8
300	450	70	31	13.5	8.5	13.5	10.1	20.5	15.5	20.4	17.1	13.1	8.1	13.0	9.7	21.9	16.9	21.8	18.5
300	450	70	28	14.3	11.2	12.1	10.7	24.7	21.7	22.5	21.2	14.9	11.8	12.7	11.3	27.2	24.1	25.0	23.7
300	600	60	27	12.8	14.2	15.6	18.7	18.0	19.5	20.9	24.0	13.9	15.3	16.7	19.8	21.0	22.4	23.8	26.9
300	600	60	24	10.0	9.5	10.8	11.9	18.8	18.2	19.5	20.7	12.1	11.6	12.8	14.0	22.7	22.2	23.5	24.6
300	600	60	21	11.8	13.3	10.5	13.6	24.1	25.5	22.7	25.9	14.9	16.3	13.6	16.7	29.0	30.5	27.7	30.8
300	600	70	31	15.6	14.8	18.4	19.3	20.8	20.0	23.6	24.5	15.4	14.6	18.2	19.1	22.5	21.7	25.3	26.2
300	600	70	28	13.0	10.3	13.8	12.7	21.8	19.0	22.5	21.4	13.9	11.1	14.6	13.5	24.5	21.7	25.2	24.1
300	600	70	24	14.9	14.1	13.5	14.4	27.2	26.4	25.8	26.7	16.7	15.9	15.4	16.3	30.8	30.0	29.5	30.4
300	600	80	36	18.9	15.9	21.7	20.4	24.1	21.1	27.0	25.6	17.5	14.5	20.3	19.0	24.6	21.5	27.4	26.1
300	600	80	32	16.7	11.7	17.4	14.1	25.4	20.4	26.2	22.9	16.2	11.3	17.0	13.7	26.9	21.9	27.6	24.3
300	600	80	28	18.8	15.8	17.5	16.2	31.1	28.1	29.8	28.4	19.4	16.4	18.1	16.8	33.5	30.5	32.2	30.9
450	300	50	30	8.0	10.5	9.2	13.4	9.6	12.2	10.8	15.0	10.0	12.5	11.2	15.4	13.5	16.0	14.6	18.9
450	300	50	27	8.0	8.6	7.1	9.3	13.2	13.7	12.3	14.5	11.0	11.6	10.1	12.3	18.0	18.6	17.1	19.3
450	300	50	25	7.8	10.3	4.7	9.0	16.4	18.9	13.4	17.6	11.8	14.3	8.7	12.9	22.3	24.8	19.2	23.5
450	300	60	36	11.0	11.3	12.2	14.2	12.6	12.9	13.8	15.8	11.8	12.1	12.9	14.9	15.2	15.5	16.4	18.4
450	300	60	33	11.4	9.8	10.5	10.5	16.6	14.9	15.7	15.7	13.2	11.5	12.3	12.3	20.2	18.5	19.3	19.3
450	300	60	30	11.4	11.7	8.4	10.4	20.1	20.4	17.1	19.1	14.2	14.5	11.2	13.1	24.7	25.0	21.7	23.6
450	300	70	42	14.2	12.3	15.4	15.2	15.8	13.9	17.0	16.8	13.7	11.8	14.9	14.7	17.2	15.3	18.4	18.1
450	300	70	38	15.2	11.3	14.3	12.1	20.4	16.5	19.4	17.2	15.7	11.8	14.8	12.6	22.7	18.8	21.8	19.6
450	300	70	35	15.5	13.6	12.5	12.3	24.2	22.2	21.2	20.9	17.0	15.1	14.0	13.8	27.5	25.6	24.5	24.3
450	450	60	33	12.0	14.6	14.0	18.3	15.5	18.0	17.5	21.7	14.0	16.6	16.0	20.3	19.3	21.8	21.3	25.5
450	450	60	30	10.7	11.2	10.6	12.8	17.6	18.2	17.5	19.8	13.7	14.2	13.6	15.8	22.5	23.0	22.4	24.6
450	450	60	27	12.0	14.5	9.8	14.0	22.5	25.0	20.3	24.5	16.0	18.5	13.8	18.0	28.3	30.8	26.1	30.3
450	450	70	38	14.7	15.0	16.7	18.7	18.2	18.5	20.2	22.2	15.5	15.8	17.5	19.5	20.8	21.1	22.8	24.8
450	450	70	35	13.7	12.0	13.6	13.6	20.7	19.0	20.6	20.6	15.5	13.8	15.4	15.4	24.2	22.6	24.2	24.2
450	450	70	31	15.3	15.6	13.1	15.1	25.8	26.1	23.6	25.6	18.1	18.4	15.9	17.9	30.4	30.7	28.2	30.2
450	450	80	44	17.6	15.7	19.6	19.4	21.0	19.1	23.0	22.8	17.1	15.2	19.1	18.9	22.4	20.5	24.4	24.2
450	450	80	40	17.1	13.3	17.1	14.9	24.1	20.2	24.0	21.8	17.7	13.8	17.6	15.4	26.5	22.6	26.4	24.2
450	450	80	36	19.2	17.3	17.0	16.8	29.7	27.7	27.5	27.2	20.7	18.8	18.5	18.3	33.0	31.1	30.8	30.6
450	600	70	35	21.4	23.9	24.2	28.4	26.6	29.1	29.4	33.6	23.4	25.9	26.2	30.4	30.4	33.0	33.3	37.5
450	600	70	31	18.5	19.1	19.3	21.5	27.3	27.8	28.0	30.3	21.5	22.1	22.3	24.5	32.1	32.7	32.9	35.1
450	600	70	28	21.4	23.9	20.0	24.3	33.7	36.2	32.3	36.5	25.4	27.9	24.0	28.2	39.5	42.0	38.2	42.4
450	600	80	40	23.7	24.0	26.6	28.6	29.0	29.3	31.8	33.8	24.5	24.8	27.3	29.3	31.6	31.9	34.4	36.4
450	600	80	36	21.3	19.7	22.1	22.1	30.1	28.4	30.8	30.8	23.1	21.4	23.8	23.8	33.7	32.0	34.4	34.4
450	600	80	32	24.5	24.8	23.2	25.2	36.8	37.1	35.4	37.4	27.3	27.6	25.9	27.9	41.4	41.7	40.0	42.0
450	600	90	45	26.5	24.6	29.4	29.2	31.8	29.9	34.6	34.4	26.1	24.1	28.9	28.7	33.1	31.2	36.0	35.7
450	600	90	40	24.7	20.9	25.5	23.3	33.5	29.6	34.2	32.0	25.3	21.4	26.0	23.8	35.9	32.0	36.6	34.4
450	600	90	36	28.3	26.4	26.9	26.7	40.5	38.6	39.2	39.0	29.8	27.9	28.4	28.2	43.9	42.0	42.5	42.3
600	300	60	39	11.4	15.0	12.6	17.9	13.0	16.6	14.2	19.5	14.3	17.9	15.5	20.8	17.8	21.4	19.0	24.3
600	300	60	36	8.9	10.5	8.0	11.3	14.0	15.7	13.1	16.5	12.8	14.5	11.9	15.2	19.8	21.4	18.9	22.2
600	300	60	33	12.3	15.9	9.2	14.6	20.9	24.5	17.9	23.2	17.2	20.8	14.2	19.5	27.7	31.3	24.7	30.0
600	300	70	45	13.7	15.1	14.9	18.0	15.3	16.7	16.5	19.6	15.4	16.8	16.5	19.6	18.8	20.2	20.0	23.1
600	300	70	42	11.6	11.0	10.7	11.8	16.7	16.2	15.8	16.9	14.3	13.7	13.3	14.5	21.3	20.7	20.3	21.4
600	300	70	38	15.5	16.9	12.5	15.6	24.2	25.6	21.2	24.3	19.2	20.6	16.2	19.3	29.7	31.1	26.7	29.8
600	300	80	52	15.7	14.9	16.9	17.7	17.3	16.5	18.5	19.4	16.1	15.3	17.3	18.2	19.6	18.8	20.8	21.6
600	300	80	48	14.5	11.7	13.6	12.5	19.6	16.8	18.7	17.6	15.9	13.1	15.0	13.9	22.9	20.1	22.0	20.9
600	300	80	44	18.9	18.1	15.9	16.8	27.6	26.8	24.6	25.5	21.4	20.5	18.4	19.2	31.9	31.0	28.9	29.7
600	450	70	42	18.8	22.4	20.8	26.1	22.2	25.8	24.2	29.5	21.7	25.3	23.7	29.0	26.9	30.6	29.0	34.3
600	450	70	38	15.0	16.7	14.9	18.3	22.0	23.6	21.9	25.2	18.9	20.6	18.9	22.2	27.7	29.4	27.7	31.0
600	450	70	35	20.0	23.7	17.9	23.2	30.5	34.1	28.3	33.6	25.0	28.6	22.8	28.1	37.3	40.9	35.1	40.4
600	450	80	48	20.6	22.0	22.6	25.7	24.0	25.4	26.0	29.1	22.2	23.6	24.2	27.3	27.5	28.9	29.5	32.6
600	450	80	44	17.4	16.8	17.3	18.4	24.3	23.8	24.3	25.4	20.0	19.5	20.0	21.1	28.8	28.3	28.8	29.9
600	450	80	40	23.0	24.4	20.8	23.9	33.5	34.9	31.3	34.4	26.7	28.1	24.5	27.6	39.0	40.4	36.8	39.9
600	450	90	54	22.6	21.8	24.6	25.5	26.0	25.2	28.0	28.9	23.0	22.2	25.0	25.9	28.3	27.5	30.3	31.2
600	450	90	49	20.3	17.5	20.2	19.1	27.3	24.5	27.2	26.1	21.8	19.0	21.7	20.6	30.5	27.8	30.5	29.4
600	450	90	45	26.4	25.6	24.2	25.1	36.8	36.0	34.7	35.5	28.8	28.0	26.6	27.5	41.1	40.3	38.9	39.8
600	600	70	38	29.4	33.1	32.3	37.6	34.7	38.3	37.5	42.8	32.4	36.0	35.2	40.5	39.4	43.1	42.3	47.6
600	600	70	35	23.7	25.3	24.4	27.8	32.5	34.1	33.2	36.5	27.6	29.3	28.4	31.7	38.2	39.9	39.0	42.3
600	600	70	31	30.0	33.7	28.7	34.0	42.3	45.9	40.9	46.3	34.9	38.6	33.6	38.9	49.1	52.7	47.7	53.0
600	600	80	44	31.8	33.2	34.6	37.7	37.0	38.4	39.9	43.0	33.5	34.9	36.3	39.4	40.6	42.0	43.4	46.5
600	600	80	40	26.6	26.1	27.4	28.5	35.4	34.8	36.2	37.3	29.3	28.7	30.1	31.2	39.9	39.3	40.7	41.8
600	600	80	36	33.4	34.8	32.1	35.1	45.7	47.1	44.3	47.4	37.1	38.5	35.7	38.8	51.2	52.6	49.8	52.9
600	600	90	49	34.7	33.9	37.6	38.5	40.0	39.2	42.8	43.7	35.2	34.3	38.0	38.9	42.3	41.4	45.1	46.0
600	600	90	45	30.0	27.2	30.8	29.7	38.8	36.0	39.5	38.4	31.4	28.7	32.2	31.1	42.0	39.3	42.8	41.7
600	600	90	40	37.4	36.6	36.0	36.9	49.7	48.8	48.3	49.2	39.8	39.0	38.5	39.3	53.9	53.1	52.6	53.4

TABLE E-1C. AVERAGE TOTAL DELAY PER VEHICLE (SECONDS/VEHICLE) FOR GEOMETRY 5*5

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	9.0	10.2	9.3	12.3	5.6	6.8	5.9	8.9	9.1	10.3	9.4	12.4	7.5	8.8	7.9	10.8
300	300	50	25	9.1	8.4	7.4	8.3	9.2	8.5	7.5	8.4	10.2	9.5	8.5	9.4	12.2	11.5	10.4	11.4
300	300	50	22	5.7	6.9	1.8	4.7	9.3	10.5	5.4	8.4	7.8	9.0	3.9	6.9	13.2	14.5	9.4	12.3
300	300	60	33	13.0	12.0	13.3	14.0	9.6	8.6	9.9	10.6	11.9	10.9	12.2	12.9	10.3	9.3	10.6	11.4
300	300	60	30	13.4	10.4	11.6	10.4	13.5	10.5	11.7	10.5	13.2	10.3	11.5	10.2	15.2	12.2	13.4	12.2
300	300	60	27	10.2	9.3	6.4	7.1	13.9	12.9	10.0	10.7	11.1	10.1	7.3	8.0	16.6	15.6	12.7	13.4
300	300	70	38	15.0	11.8	15.4	13.9	11.6	8.4	12.0	10.5	12.6	9.5	13.0	11.5	11.1	7.9	11.4	9.9
300	300	70	35	15.7	10.6	14.0	10.5	15.8	10.7	14.1	10.6	14.3	9.2	12.6	9.1	16.3	11.1	14.6	11.1
300	300	70	31	12.9	9.7	9.1	7.5	16.5	13.3	12.7	11.2	12.5	9.3	8.7	7.2	18.0	14.8	14.1	12.6
300	450	50	25	9.6	10.9	10.8	13.8	8.0	9.3	9.2	12.2	9.8	11.0	10.9	13.9	10.0	11.2	11.2	14.1
300	450	50	22	7.9	7.2	7.0	7.9	9.8	9.1	8.9	9.9	9.0	8.3	8.1	9.1	12.8	12.1	11.9	12.8
300	450	50	20	6.1	7.3	3.0	6.0	11.5	12.7	8.5	11.4	8.2	9.4	5.2	8.1	15.4	16.7	12.4	15.4
300	450	60	30	13.9	12.9	15.1	15.8	12.3	11.3	13.5	14.2	12.8	11.8	13.9	14.7	13.0	12.0	14.2	14.9
300	450	60	27	12.5	9.5	11.6	10.3	14.4	11.5	13.5	12.2	12.4	9.4	11.4	10.2	16.1	13.2	15.2	13.9
300	450	60	24	10.7	9.7	7.7	8.4	16.1	15.1	13.1	13.8	11.5	10.6	8.5	9.2	18.8	17.8	15.8	16.5
300	450	70	35	16.3	13.1	17.4	15.9	14.7	11.5	15.8	14.3	13.9	10.7	15.1	13.5	14.1	10.9	15.3	13.8
300	450	70	31	15.2	10.0	14.2	10.7	17.1	11.9	16.1	12.7	13.8	8.6	12.9	9.4	17.5	12.4	16.6	13.1
300	450	70	28	13.6	10.4	10.6	9.1	19.0	15.8	16.0	14.5	13.2	10.0	10.2	8.7	20.5	17.3	17.5	16.0
300	600	60	27	13.9	15.1	15.9	18.8	14.1	15.3	16.1	19.0	14.0	15.2	16.0	18.9	16.0	17.3	18.0	21.0
300	600	60	24	10.7	9.9	10.6	11.5	14.4	13.7	14.3	15.3	11.8	11.0	11.7	12.6	17.3	16.6	17.2	18.2
300	600	60	21	10.2	11.4	8.0	10.9	17.4	18.7	15.2	18.2	12.3	13.5	10.1	13.0	21.4	22.6	19.2	22.1
300	600	70	31	17.8	16.8	19.8	20.5	18.0	17.0	20.0	20.7	16.7	15.7	18.7	19.4	18.7	17.7	20.7	21.4
300	600	70	28	14.8	11.9	14.7	13.5	18.5	15.6	18.5	17.2	14.7	11.7	14.6	13.3	20.3	17.3	20.2	18.9
300	600	70	24	14.4	13.4	12.2	12.9	21.6	20.7	19.5	20.2	15.3	14.3	13.1	13.8	24.3	23.4	22.2	22.9
300	600	80	36	19.9	16.7	21.9	20.4	20.1	16.9	22.2	20.6	17.6	14.4	19.6	18.1	19.6	16.4	21.6	20.1
300	600	80	32	17.3	12.1	17.2	13.7	21.0	15.8	20.9	17.4	15.9	10.7	15.8	12.3	21.5	16.3	21.4	17.9
300	600	80	28	17.2	14.0	15.0	13.5	24.4	21.2	22.2	20.7	16.8	13.6	14.6	13.1	25.9	22.7	23.7	22.2
450	300	50	30	9.8	12.1	10.1	14.1	6.4	8.7	6.7	10.7	10.8	13.1	11.1	15.2	9.2	11.6	9.6	13.6
450	300	50	27	9.4	9.7	7.6	9.7	9.5	9.9	7.7	9.8	11.4	11.8	9.7	11.7	13.4	13.7	11.6	13.7
450	300	50	25	6.8	9.2	3.0	7.0	10.4	12.8	6.6	10.6	9.8	12.2	6.0	10.0	15.3	17.7	11.5	15.5
450	300	60	36	13.9	14.1	14.3	16.1	10.5	10.7	10.9	12.7	13.7	13.8	14.1	15.9	12.2	12.3	12.5	14.3
450	300	60	33	14.0	12.1	12.2	12.0	14.1	12.2	12.3	12.1	14.7	12.9	13.0	12.8	16.7	14.8	14.9	14.8
450	300	60	30	11.6	11.8	7.8	9.6	15.3	15.4	11.4	13.2	13.4	13.5	9.6	11.4	18.9	19.0	15.0	16.9
450	300	70	42	16.0	13.9	16.3	15.9	12.6	10.5	12.9	12.5	14.5	12.4	14.9	14.5	13.0	10.9	13.3	12.9
450	300	70	38	16.6	12.5	14.8	12.4	16.7	12.6	14.9	12.5	16.1	12.0	14.3	12.0	18.0	14.0	16.3	13.9
450	300	70	35	14.6	12.5	10.7	10.3	18.2	16.1	14.4	13.9	15.1	13.0	11.3	10.9	20.6	18.5	16.7	16.3
450	450	60	33	12.8	15.2	14.0	18.0	11.2	13.6	12.4	16.4	13.9	16.2	15.0	19.1	14.1	16.5	15.3	19.3
450	450	60	30	11.1	11.4	10.1	12.2	13.0	13.3	12.1	14.1	13.1	13.4	12.2	14.2	16.8	17.2	15.9	18.0
450	450	60	27	10.1	12.4	7.1	11.1	15.5	17.9	12.5	16.5	13.1	15.4	10.1	14.1	20.4	22.7	17.4	21.4
450	450	70	38	16.7	16.8	17.9	19.7	15.1	15.2	16.3	18.1	16.5	16.6	17.7	19.5	16.7	16.8	17.9	19.7
450	450	70	35	15.2	13.4	14.3	14.2	17.2	15.3	16.2	16.1	16.0	14.2	15.1	14.9	19.8	17.9	18.9	18.7
450	450	70	31	14.6	14.7	11.6	13.4	20.0	20.1	17.0	18.8	16.3	16.5	13.3	15.1	23.6	23.7	20.6	22.4
450	450	80	44	18.4	16.3	19.6	19.2	16.8	14.7	18.0	17.6	16.9	14.8	18.1	17.7	17.2	15.1	18.3	17.9
450	450	80	40	17.5	13.5	16.6	14.2	19.4	15.4	18.5	16.1	17.1	13.0	16.1	13.8	20.8	16.7	19.9	17.5
450	450	80	36	17.3	15.2	14.3	13.9	22.7	20.6	19.7	19.3	17.8	15.7	14.8	14.4	25.1	23.0	22.1	21.7
450	600	70	35	21.2	23.5	23.2	27.2	21.4	23.7	23.4	27.4	22.2	24.5	24.2	28.2	24.3	26.6	26.3	30.3
450	600	70	31	17.9	18.3	17.8	19.9	21.6	22.0	21.5	23.6	19.9	20.3	19.8	21.9	25.5	25.9	25.4	27.5
450	600	70	28	18.5	20.9	16.3	20.4	25.8	28.1	23.6	27.6	21.5	23.9	19.4	23.4	30.6	33.0	28.4	32.5
450	600	80	40	24.7	24.8	26.7	28.5	24.9	25.1	26.9	28.7	24.5	24.6	26.5	28.3	26.6	26.7	28.6	30.4
450	600	80	36	21.9	20.0	21.8	21.6	25.6	23.8	25.5	25.4	22.7	20.8	22.6	22.4	28.2	26.4	28.1	28.0
450	600	80	32	22.8	22.9	20.6	22.4	30.0	30.2	27.9	29.7	24.6	24.7	22.4	24.2	33.7	33.8	31.5	33.3
450	600	90	45	26.4	24.3	28.4	28.0	26.6	24.5	28.6	28.2	24.9	22.8	26.9	26.5	27.0	24.9	29.0	28.5
450	600	90	40	24.1	20.1	24.1	21.7	27.9	23.8	27.8	25.4	23.7	19.6	23.6	21.2	29.2	25.2	29.2	26.8
450	600	90	36	25.4	23.3	23.2	22.8	32.6	30.5	30.4	30.0	25.9	23.8	23.7	23.3	35.0	32.9	32.8	32.4
600	300	60	39	11.9	15.4	12.3	17.4	8.5	12.0	8.9	14.0	13.9	17.3	14.2	19.3	12.3	15.7	12.6	17.8
600	300	60	36	9.0	10.5	7.3	10.4	9.1	10.6	7.4	10.5	11.9	13.4	10.2	13.3	13.9	15.4	12.1	15.3
600	300	60	33	10.1	13.5	6.2	11.4	13.7	17.2	9.9	15.0	14.0	17.5	10.2	15.3	19.5	22.9	15.6	20.8
600	300	70	45	15.4	16.6	15.7	18.6	12.0	13.2	12.3	15.2	16.1	17.3	16.4	19.3	14.5	15.7	14.9	17.8
600	300	70	42	12.9	12.1	11.1	12.1	13.0	12.2	11.2	12.2	14.6	13.8	12.8	13.7	16.5	15.8	14.8	15.7
600	300	70	38	14.5	15.7	10.7	13.6	18.1	19.4	14.3	17.2	17.2	18.4	13.4	16.3	22.7	23.9	18.8	21.7
600	300	80	52	16.2	15.2	16.6	17.3	12.8	11.8	13.2	13.9	15.7	14.7	16.0	16.7	14.1	13.1	14.5	15.2
600	300	80	48	14.6	11.6	12.8	11.6	14.7	11.7	13.0	11.7	15.0	12.1	13.3	12.0	17.0	14.0	15.2	14.0
600	300	80	44	16.8	15.8	12.9	13.6	20.4	19.4	16.6	17.2	18.2	17.2	14.4	15.1	23.7	22.7	19.8	20.5
600	450	70	42	18.3	21.8	19.5	24.6	16.7	20.2	17.9	23.0	20.2	23.7	21.4	26.5	20.5	23.9	21.7	26.8
600	450	70	38	14.2	15.6	13.2	16.4	16.1	17.6	15.2	18.3	17.1	18.6	16.2	19.3	20.9	22.3	19.9	23.1
600	450	70	35	16.9	20.3	13.9	19.0	22.3	25.8	19.3	24.4	20.8	24.3	17.8	22.9	28.1	31.6	25.1	30.2
600	450	80	48	21.3	22.5	22.5	25.4	19.7	20.9	20.9	23.8	22.0	23.2	23.2	26.1	22.2	23.4	23.4	26.3
600	450	80	44	17.7	16.9	16.8	17.7	19.6	18.8	18.7	19.6	19.4	18.6	18.5	19.4	23.1	22.4	22.2	23.1
600	450	80	40	21.0	22.2	18.0	20.9	26.4	27.7	23.4	26.3	23.7	24.9	20.7	23.6	31.0	32.2	28.0	30.9
600	450	90	54	22.1	21.1	23.3	24.0	20.5	19.5	21.7	22.4	21.6	20.6	22.8	23.4	21.8	20.8	23.0	23.7
600	450	90	49	19.5	16.5	18.5	17.3	21.4	18.4	20.5	19.2	19.9	16.9	19.0	17.7	23.7	20.7	22.8	21.5
600	450	90	45	23.2	22.2	20.2	20.9	28.7	27.7	25.6	26.3	24.7	23.7	21.7	22.3	31.9	30.9	28.9	29.6
600	600	70	38	28.0	31.5	30.0	35.2	28.2	31.7	30.3	35.4	30.0	33.4	32.0	37.1	32.0	35.5	34.0	39.2
600	600	70	35	21.9	23.3	21.8	24.9	25.6	27.0	25.5	28.6	24.8	26.3	24.7	27.9	30.4	31.8	30.3	33.4
600	600	70	31	25.9	29.4	23.7	28.9	33.1	36.6	31.0	36.1	29.8	33.3	27.7	32.8	38.9	42.4	36.7	41.9
600	600	80	44	31.5	32.8	33.6	36.5	31.8	33.0	33.8	36.7	32.2	33.5	34.2	37.2	34.3	35.5	36.3	39.2
600	600	80	40	26.0	25.2	25.9	26.8	29.7	28.9	29.6	30.5	27.7	26.9	27.6	28.5	33.2	32.5	33.1	34.1
600	600	80	36	30.5	31.7	28.3	31.2	37.7	38.9	35.5	38.4	33.1	34.4	31.0	33.9	42.2	43.4	40.0	42.9
600	600	90	49	33.3	32.3	35.3	36.0	33.5	32.5	35.5	36.2	32.8	31.8	34.8	35.5	34.8	33.8	36.8	37.5
600	600	90	45	28.2	25.2	28.1	26.8	31.9	28.9	31.8	30.5	28.6	25.7	28.5	27.3	34.2	31.2	34.1	32.8
600	600	90	40	33.3	32.3	31.1	31.8	40.5	39.5	38.3	39.0	34.7	33.7	32.5	33.2	43.8	42.8	41.6	42.3

TABLE E-1D. AVERAGE TOTAL DELAY PER VEHICLE (SECONDS/VEHICLE) FOR GEOMETRY 6*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	8.7	13.7	9.8	16.4	7.3	12.2	8.3	14.9	10.8	15.7	11.8	18.5	11.2	16.1	12.2	18.8
300	300	50	25	7.0	10.0	6.0	10.6	9.0	12.0	8.0	12.7	10.1	13.0	9.0	13.7	13.9	16.9	12.9	17.6
300	300	50	22	5.4	10.3	2.3	8.9	11.0	15.9	7.8	14.4	9.5	14.4	6.3	12.9	16.9	21.8	13.7	20.3
300	300	60	33	10.4	13.1	11.5	15.9	8.9	11.7	10.0	14.4	11.2	14.0	12.3	16.7	11.6	14.3	12.6	17.1
300	300	60	30	8.9	9.7	7.9	10.3	11.0	11.7	9.9	12.4	10.8	11.5	9.7	12.1	14.6	15.4	13.6	16.0
300	300	60	27	7.7	10.4	4.5	8.9	13.2	15.9	10.1	14.5	10.5	13.2	7.3	11.7	17.9	20.6	14.7	19.1
300	300	70	38	14.8	15.3	15.8	18.0	13.3	13.8	14.3	16.5	14.3	14.8	15.4	17.6	14.7	15.2	15.8	17.9
300	300	70	35	13.6	12.1	12.6	12.8	15.7	14.2	14.6	14.8	14.2	12.7	13.1	13.4	18.1	16.6	17.0	17.2
300	300	70	31	12.6	13.1	9.5	11.7	18.2	18.7	15.1	17.2	14.2	14.7	11.1	13.3	21.6	22.1	18.5	20.7
300	450	50	25	10.2	15.2	12.1	18.7	10.5	15.5	12.4	19.1	12.3	17.2	14.2	20.8	14.4	19.4	16.3	23.0
300	450	50	22	6.6	9.6	6.4	11.1	10.5	13.4	10.3	14.9	9.7	12.7	9.5	14.1	15.4	18.3	15.2	19.8
300	450	50	20	6.6	11.6	4.3	11.0	14.0	18.9	11.7	18.3	10.7	15.6	8.4	15.0	19.9	24.8	17.6	24.2
300	450	60	30	12.1	14.9	14.0	18.4	12.5	15.2	14.4	18.8	13.0	15.7	14.8	19.3	15.1	17.9	17.0	21.4
300	450	60	27	8.9	9.6	8.7	11.1	12.7	13.5	12.5	14.9	10.7	11.4	10.5	12.9	16.4	17.1	16.2	18.6
300	450	60	24	8.9	11.7	6.6	11.0	16.3	19.0	14.0	18.4	11.7	14.5	9.4	13.8	20.9	23.7	18.6	23.0
300	450	70	35	16.8	17.3	18.7	20.9	17.2	17.7	19.0	21.2	16.4	16.9	18.3	20.5	18.6	19.1	20.5	22.6
300	450	70	31	13.9	12.4	13.7	13.9	17.7	16.2	17.5	17.7	14.4	13.0	14.2	14.4	20.1	18.7	19.9	20.1
300	450	70	28	14.2	14.7	11.9	14.0	21.5	22.0	19.2	21.4	15.7	16.2	13.4	15.6	24.9	25.4	22.6	24.8
300	600	60	27	13.7	18.6	16.4	23.0	15.8	20.8	18.5	25.2	15.7	20.7	18.4	25.1	19.7	24.7	22.4	29.1
300	600	60	24	8.6	11.6	9.2	13.9	14.3	17.2	14.9	19.5	11.7	14.6	12.3	16.9	19.2	22.1	19.8	24.4
300	600	60	21	10.0	14.9	8.5	15.1	19.2	24.1	17.7	24.3	14.1	19.0	12.6	19.2	25.1	30.0	23.6	30.2
300	600	70	31	15.3	18.0	18.0	22.4	17.4	20.1	20.1	24.5	16.1	18.8	18.8	23.2	20.1	22.8	22.8	27.2
300	600	70	28	10.5	11.2	11.1	13.5	16.1	16.9	16.7	19.2	12.3	13.0	12.9	15.3	19.8	20.5	20.4	22.8
300	600	70	24	11.9	14.6	10.4	14.8	21.1	23.8	19.6	24.0	14.7	17.4	13.2	17.6	25.7	28.4	24.2	28.6
300	600	80	36	19.7	20.3	22.5	24.6	21.9	22.4	24.6	26.8	19.3	19.8	22.0	24.2	23.3	23.8	26.0	28.2
300	600	80	32	15.3	13.8	15.9	16.1	20.9	19.4	21.5	21.7	15.8	14.3	16.4	16.6	23.3	21.8	23.9	24.1
300	600	80	28	17.0	17.5	15.5	17.7	26.2	26.7	24.7	26.9	18.6	19.1	17.1	19.3	29.6	30.1	28.1	30.3
450	300	50	30	10.5	16.5	11.5	19.2	9.0	15.0	10.0	17.8	13.4	19.5	14.5	22.2	13.8	19.8	14.8	22.6
450	300	50	27	8.2	12.3	7.2	12.9	10.2	14.3	9.2	15.0	12.2	16.2	11.1	16.9	16.1	20.1	15.0	20.8
450	300	50	25	7.5	13.6	4.4	12.1	13.1	19.1	9.9	17.6	12.5	18.5	9.3	17.1	19.9	25.9	16.7	24.5
450	300	60	36	12.3	16.1	13.4	18.9	10.8	14.7	11.9	17.4	14.0	17.9	15.1	20.6	14.4	18.2	15.5	21.0
450	300	60	33	10.5	12.3	9.4	12.9	12.5	14.3	11.5	15.0	13.2	15.0	12.1	15.7	17.1	18.9	16.0	19.6
450	300	60	30	10.0	13.8	6.9	12.4	15.6	19.4	12.4	17.9	13.7	17.6	10.6	16.1	21.1	25.0	18.0	23.5
450	300	70	42	16.7	18.3	17.7	21.0	15.2	16.8	16.2	19.5	17.2	18.8	18.2	21.5	17.5	19.1	18.6	21.9
450	300	70	38	15.4	15.0	14.3	15.7	17.4	17.0	16.4	17.7	16.9	16.5	15.8	17.1	20.7	20.4	19.7	21.0
450	300	70	35	15.3	16.9	12.1	15.4	20.8	22.4	17.7	21.0	17.7	19.3	14.6	17.9	25.1	26.7	22.0	25.3
450	450	60	33	14.4	20.4	16.2	24.0	14.7	20.7	16.6	24.3	17.3	23.4	19.2	26.9	19.5	25.5	21.4	29.1
450	450	60	30	10.7	14.8	10.5	16.3	14.6	18.6	14.3	20.1	14.7	18.8	14.5	20.2	20.4	24.4	20.2	25.9
450	450	60	27	11.6	17.6	9.3	17.0	18.9	25.0	16.6	24.4	16.6	22.6	14.3	22.0	25.8	31.8	23.5	31.2
450	450	70	38	15.9	19.7	17.8	23.3	16.2	20.0	18.1	23.6	17.6	21.4	19.5	25.0	19.8	23.6	21.7	27.2
450	450	70	35	12.6	14.4	12.4	15.9	16.4	18.3	16.2	19.7	15.3	17.1	15.1	18.6	21.0	22.8	20.8	24.3
450	450	70	31	13.8	17.6	11.4	17.0	21.1	24.9	18.8	24.3	17.5	21.3	15.2	20.7	26.7	30.5	24.4	29.9
450	450	80	44	19.9	21.5	21.8	25.1	20.2	21.8	22.1	25.4	20.4	22.0	22.3	25.5	22.6	24.2	24.4	27.7
450	450	80	40	17.2	16.8	17.0	18.3	21.0	20.6	20.8	22.1	18.7	18.3	18.4	19.8	24.3	24.0	24.1	25.4
450	450	80	36	18.8	20.4	16.5	19.8	26.2	27.8	23.8	27.1	21.3	22.9	19.0	22.3	30.5	32.1	28.2	31.5
450	600	70	35	21.9	28.0	24.6	32.4	24.1	30.1	26.8	34.5	24.9	30.9	27.6	35.3	28.9	34.9	31.6	39.3
450	600	70	31	16.8	20.9	17.4	23.2	22.5	26.5	23.1	28.8	20.8	24.9	21.4	27.2	28.3	32.3	28.9	34.6
450	600	70	28	19.3	25.3	17.8	25.5	28.4	34.5	27.0	34.7	24.2	30.3	22.8	30.5	35.2	41.3	33.8	41.5
450	600	80	40	23.2	27.0	25.9	31.4	25.3	29.1	28.0	33.5	24.9	28.7	27.6	33.1	28.9	32.7	31.6	37.1
450	600	80	36	18.5	20.3	19.1	22.6	24.1	26.0	24.7	28.3	21.2	23.0	21.8	25.3	28.7	30.5	29.3	32.8
450	600	80	32	21.2	25.1	19.8	25.3	30.4	34.2	28.9	34.4	25.0	28.8	23.5	29.0	36.0	39.8	34.5	40.0
450	600	90	45	27.1	28.7	29.8	33.1	29.3	30.9	32.0	35.3	27.6	29.2	30.3	33.6	31.6	33.2	34.3	37.6
450	600	90	40	23.0	22.7	23.7	25.0	28.7	28.3	29.3	30.6	24.5	24.1	25.1	26.4	32.0	31.6	32.6	33.9
450	600	90	36	26.1	27.7	24.7	27.9	35.3	36.9	33.8	37.1	28.6	30.2	27.1	30.4	39.6	41.2	38.1	41.4
600	300	60	39	13.6	20.7	14.6	23.4	12.1	19.2	13.1	21.9	17.4	24.6	18.5	27.3	17.8	24.9	18.9	27.7
600	300	60	36	8.8	13.9	7.7	14.6	10.8	16.0	9.8	16.6	13.7	18.8	12.6	19.5	17.5	22.7	16.5	23.3
600	300	60	33	11.7	18.9	8.6	17.4	17.3	24.4	14.1	22.9	17.6	24.7	14.5	23.3	25.0	32.1	21.8	30.7
600	300	70	45	14.7	19.6	15.7	22.3	13.2	18.1	14.3	20.9	17.3	22.2	18.4	25.0	17.7	22.6	18.7	25.3
600	300	70	42	10.3	13.3	9.3	13.9	12.4	15.3	11.3	15.9	14.0	16.9	12.9	17.5	17.8	20.8	16.8	21.4
600	300	70	38	13.8	18.7	10.7	17.3	19.4	24.3	16.2	22.8	18.5	23.4	15.3	21.9	25.8	30.8	22.7	29.3
600	300	80	52	17.9	20.6	18.9	23.3	16.4	19.1	17.4	21.8	19.3	22.0	20.3	24.7	19.6	22.3	20.7	25.1
600	300	80	48	14.4	15.1	13.3	15.7	16.4	17.1	15.4	17.8	16.8	17.5	15.7	18.1	20.6	21.4	19.6	22.0
600	300	80	44	18.4	21.1	15.3	19.6	23.9	26.6	20.8	25.2	21.8	24.5	18.7	23.0	29.2	31.9	26.0	30.4
600	450	70	42	20.8	27.9	22.6	31.5	21.1	28.2	23.0	31.8	24.6	31.8	26.5	35.3	26.8	34.0	28.7	37.5
600	450	70	38	14.8	19.9	14.5	21.4	18.6	23.8	18.4	25.2	19.6	24.8	19.4	26.3	25.3	30.5	25.1	32.0
600	450	70	35	19.4	26.5	17.0	25.9	26.7	33.8	24.4	33.2	25.2	32.4	22.9	31.7	34.4	41.6	32.1	40.9
600	450	80	48	21.4	26.3	23.3	29.9	21.7	26.7	23.6	30.2	24.1	29.0	25.9	32.5	26.2	31.1	28.1	34.7
600	450	80	44	16.0	18.9	15.7	20.4	19.8	22.7	19.6	24.2	19.6	22.5	19.4	24.0	25.3	28.2	25.1	29.7
600	450	80	40	21.1	26.1	18.8	25.4	28.5	33.4	26.2	32.8	25.8	30.7	23.5	30.1	35.0	39.9	32.7	39.3
600	450	90	54	24.6	27.3	26.5	30.8	24.9	27.6	26.8	31.2	26.0	28.7	27.9	32.2	28.2	30.8	30.0	34.4
600	450	90	49	20.1	20.8	19.8	22.3	23.9	24.6	23.7	26.1	22.5	23.2	22.2	24.6	28.1	28.9	27.9	30.3
600	450	90	45	25.7	28.4	23.4	27.7	33.0	35.7	30.7	35.1	29.1	31.8	26.8	31.1	38.3	41.0	36.0	40.3
600	600	70	38	29.7	36.9	32.4	41.3	31.9	39.0	34.6	43.4	33.6	40.7	36.3	45.1	37.6	44.7	40.3	49.1
600	600	70	35	21.7	26.9	22.3	29.2	27.3	32.5	28.0	34.8	26.6	31.7	27.2	34.0	34.1	39.2	34.7	41.5
600	600	70	31	27.6	34.7	26.1	34.9	36.8	43.9	35.3	44.1	33.5	40.6	32.0	40.8	44.5	51.6	43.0	51.8
600	600	80	44	30.9	35.8	33.6	40.2	33.1	38.0	35.8	42.4	33.6	38.5	36.3	42.9	37.5	42.5	40.2	46.8
600	600	80	40	23.5	26.4	24.1	28.7	29.1	32.1	29.7	34.4	27.1	30.1	27.7	32.4	34.6	37.6	35.2	39.9
600	600	80	36	29.8	34.7	28.3	34.9	39.0	43.9	37.5	44.1	34.5	39.4	33.0	39.6	45.5	50.4	44.0	50.6
600	600	90	49	35.0	37.7	37.7	42.1	37.2	39.9	39.9	44.3	36.4	39.1	39.1	43.5	40.4	43.1	43.1	47.5
600	600	90	45	28.0	28.7	28.6	31.0	33.7	34.4	34.3	36.7	30.4	31.1	31.0	33.4	37.9	38.6	38.5	40.9
600	600	90	40	35.0	37.7	33.5	37.9	44.1	46.8	42.6	47.0	38.4	41.1	36.9	41.3	49.4	52.1	47.9	52.3

TABLE E-1E. AVERAGE TOTAL DELAY PER VEHICLE (SECONDS/VEHICLE) FOR GEOMETRY 7*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	11.6	13.1	11.8	15.0	11.5	12.9	11.7	14.8	12.7	14.1	12.9	16.0	14.4	15.9	14.6	17.8
300	300	50	25	12.2	11.6	10.3	11.4	15.6	15.0	13.7	14.8	14.3	13.7	12.4	13.5	19.5	18.9	17.6	18.8
300	300	50	22	11.0	12.4	7.0	10.1	17.9	19.3	13.9	17.0	14.1	15.5	10.1	13.2	22.8	24.3	18.9	22.0
300	300	60	33	14.5	13.7	14.7	15.6	14.3	13.5	14.6	15.5	14.3	13.5	14.5	15.4	16.0	15.2	16.2	17.1
300	300	60	30	15.3	12.5	13.4	12.3	18.7	15.9	16.8	15.7	16.1	13.3	14.2	13.2	21.3	18.6	19.5	18.4
300	300	60	27	14.4	13.6	10.4	11.3	21.3	20.5	17.3	18.2	16.3	15.5	12.3	13.2	25.0	24.2	21.0	21.9
300	300	70	38	17.7	14.7	17.9	16.6	17.5	14.5	17.8	16.4	16.3	13.2	16.5	15.2	18.0	15.0	18.2	16.9
300	300	70	35	18.8	13.8	16.9	13.6	22.2	17.2	20.3	17.0	18.4	13.4	16.5	13.2	23.6	18.6	21.7	18.4
300	300	70	31	18.2	15.2	14.3	12.9	25.1	22.1	21.2	19.8	18.8	15.8	14.9	13.5	27.6	24.6	23.6	22.3
300	450	50	25	10.1	11.6	11.2	14.3	11.8	13.2	12.9	16.0	11.2	12.6	12.3	15.4	14.7	16.2	15.8	18.9
300	450	50	22	8.8	8.3	7.8	8.9	14.0	13.5	13.0	14.1	10.9	10.4	9.9	11.0	17.9	17.4	16.9	18.0
300	450	50	20	9.3	10.7	6.1	9.2	18.0	19.4	14.8	17.9	12.3	13.8	9.2	12.3	22.9	24.3	19.8	22.9
300	450	60	30	13.2	12.4	14.3	15.2	14.9	14.1	16.0	16.8	13.1	12.3	14.1	15.0	16.6	15.8	17.6	18.5
300	450	60	27	12.2	9.5	11.2	10.1	17.4	14.7	16.4	15.3	13.1	10.3	12.0	11.0	20.1	17.3	19.1	18.0
300	450	60	24	12.7	11.9	9.6	10.5	21.4	20.6	18.3	19.2	14.6	13.8	11.4	12.3	25.1	24.3	22.0	22.9
300	450	70	35	16.7	13.7	17.8	16.5	18.4	15.4	19.5	18.1	15.3	12.3	16.4	15.1	18.9	15.9	19.9	18.6
300	450	70	31	16.1	11.1	15.0	11.7	21.3	16.3	20.2	16.9	15.7	10.7	14.6	11.3	22.7	17.7	21.7	18.3
300	450	70	28	16.8	13.8	13.6	12.3	25.5	22.5	22.4	21.0	17.4	14.4	14.2	12.9	27.9	24.9	24.8	23.5
300	600	60	27	10.6	12.1	12.5	15.6	14.1	15.5	16.0	19.1	11.7	13.1	13.6	16.7	17.0	18.5	18.9	22.0
300	600	60	24	7.8	7.3	7.6	8.8	14.8	14.3	14.6	15.8	9.9	9.4	9.7	10.9	18.8	18.2	18.6	19.7
300	600	60	21	9.7	11.1	7.3	10.4	20.2	21.6	17.8	21.0	12.7	14.2	10.4	13.5	25.1	26.5	22.8	25.9
300	600	70	31	13.4	12.6	15.3	16.2	16.9	16.1	18.7	19.6	13.2	12.4	15.1	16.0	18.6	17.8	20.4	21.3
300	600	70	28	10.9	8.1	10.6	9.6	17.8	15.1	17.6	16.5	11.7	8.9	11.5	10.4	20.5	17.8	20.3	19.2
300	600	70	24	12.7	11.9	10.4	11.3	23.2	22.4	20.9	21.8	14.5	13.8	12.2	13.1	26.9	26.1	24.6	25.5
300	600	80	36	16.7	13.7	18.6	17.2	20.2	17.2	22.1	20.7	15.3	12.3	17.2	15.8	20.6	17.6	22.5	21.2
300	600	80	32	14.5	9.5	14.3	11.0	21.5	16.5	21.3	18.0	14.1	9.1	13.9	10.6	22.9	17.9	22.7	19.4
300	600	80	28	16.7	13.6	14.4	13.0	27.2	24.2	24.9	23.5	17.3	14.2	14.9	13.6	29.6	26.6	27.3	26.0
450	300	50	30	12.1	14.6	12.3	16.5	12.0	14.5	12.2	16.4	14.1	16.6	14.3	18.5	15.8	18.3	16.0	20.2
450	300	50	27	12.1	12.7	10.3	12.5	15.5	16.1	13.7	15.9	15.1	15.7	13.3	15.5	20.4	20.9	18.5	20.7
450	300	50	25	11.9	14.4	7.9	12.1	18.8	21.3	14.8	19.0	15.9	18.4	11.9	16.1	24.6	27.1	20.6	24.8
450	300	60	36	15.1	15.4	15.3	17.3	15.0	15.3	15.2	17.2	15.9	16.2	16.1	18.1	17.6	17.9	17.8	19.8
450	300	60	33	15.6	13.9	13.7	13.7	18.9	17.3	17.1	17.1	17.3	15.6	15.4	15.4	22.5	20.9	20.7	20.7
450	300	60	30	15.5	15.8	11.6	13.5	22.4	22.7	18.5	20.4	18.3	18.6	14.3	16.3	27.0	27.3	23.1	25.0
450	300	70	42	18.3	16.4	18.5	18.3	18.2	16.3	18.4	18.2	17.8	15.9	18.1	17.8	19.5	17.6	19.8	19.5
450	300	70	38	19.3	15.4	17.4	15.2	22.7	18.8	20.8	18.6	19.8	15.9	18.0	15.7	25.1	21.2	23.2	21.0
450	300	70	35	19.6	17.7	15.6	15.4	26.5	24.6	22.5	22.3	21.1	19.2	17.2	16.9	29.9	28.0	25.9	25.7
450	450	60	33	13.0	15.6	14.1	18.3	14.7	17.2	15.8	20.0	15.0	17.6	16.1	20.3	18.5	21.1	19.6	23.8
450	450	60	30	11.7	12.2	10.6	12.9	16.9	17.4	15.8	18.1	14.7	15.2	13.6	15.9	21.7	22.3	20.7	22.9
450	450	60	27	13.0	15.5	9.8	14.0	21.7	24.2	18.5	22.7	17.0	19.5	13.8	18.0	27.5	30.0	24.4	28.6
450	450	70	38	15.7	16.0	16.8	18.8	17.4	17.7	18.5	20.4	16.5	16.8	17.5	19.5	20.0	20.3	21.0	23.0
450	450	70	35	14.7	13.0	13.6	13.7	19.9	18.2	18.8	18.9	16.4	14.8	15.4	15.4	23.5	21.8	22.4	22.4
450	450	70	31	16.3	16.6	13.2	15.2	25.0	25.3	21.9	23.9	19.1	19.4	15.9	17.9	29.6	29.9	26.5	28.5
450	450	80	44	18.6	16.7	19.6	19.4	20.3	18.3	21.3	21.1	18.1	16.2	19.1	18.9	21.6	19.7	22.7	22.4
450	450	80	40	18.1	14.3	17.1	14.9	23.3	19.4	22.3	20.1	18.6	14.8	17.6	15.4	25.7	21.8	24.6	22.4
450	450	80	36	20.2	18.3	17.0	16.8	28.9	27.0	25.7	25.5	21.7	19.8	19.6	18.3	32.2	30.3	29.1	28.9
450	600	70	35	17.6	20.2	19.5	23.7	21.1	23.6	23.0	27.2	19.6	22.2	21.5	25.7	25.0	27.5	26.8	31.1
450	600	70	31	14.8	15.4	14.6	16.8	21.8	22.3	21.6	23.8	17.8	18.3	17.6	19.8	26.6	27.2	26.4	28.7
450	600	70	28	17.7	20.2	15.4	19.6	28.2	30.7	25.9	30.1	21.7	24.2	19.4	23.6	34.0	36.6	31.7	35.9
450	600	80	40	20.0	20.3	21.9	23.9	23.5	23.8	25.4	27.4	20.8	21.1	22.7	24.6	26.1	26.4	28.0	30.0
450	600	80	36	17.6	15.9	17.4	17.4	24.6	22.9	24.4	24.4	19.4	17.7	19.1	19.2	28.2	26.5	28.0	28.0
450	600	80	32	20.8	21.1	18.5	20.5	31.3	31.6	29.0	31.0	23.6	23.9	21.2	23.2	35.9	36.2	33.6	35.6
450	600	90	45	22.8	20.9	24.7	24.5	26.3	24.4	28.2	28.0	22.3	20.4	24.2	24.0	27.7	25.7	29.5	29.3
450	600	90	40	21.0	17.1	20.8	18.6	28.0	24.1	27.8	25.6	21.5	17.6	21.3	19.1	30.4	26.5	30.2	28.0
450	600	90	36	24.6	22.6	22.2	22.0	35.1	33.1	32.8	32.5	26.1	24.1	23.7	23.5	38.4	36.5	36.1	35.9
600	300	60	39	14.0	17.6	14.2	19.5	13.8	17.5	14.1	19.4	16.9	20.5	17.1	22.4	18.6	22.2	18.8	24.1
600	300	60	36	11.5	13.1	9.6	12.9	14.9	16.5	13.0	16.3	15.4	17.0	13.5	16.8	20.6	22.3	18.7	22.1
600	300	60	33	14.8	18.5	10.9	16.2	21.7	25.4	17.8	23.1	19.7	23.4	15.8	21.1	28.5	32.1	24.5	29.8
600	300	70	45	16.3	17.7	16.5	19.6	16.1	17.5	16.4	19.4	17.9	19.3	18.1	21.2	19.6	21.0	19.9	22.9
600	300	70	42	14.2	13.6	12.3	13.4	17.6	17.0	15.7	16.8	16.8	16.3	15.0	16.1	22.1	21.5	20.2	21.3
600	300	70	38	18.1	19.5	14.1	17.2	25.0	26.4	21.0	24.1	21.8	23.2	17.8	20.9	30.5	31.9	26.5	29.6
600	300	80	52	18.3	17.5	18.5	19.4	18.1	17.3	18.4	19.2	18.7	17.9	18.9	19.8	20.4	19.6	20.6	21.5
600	300	80	48	17.1	14.3	15.2	14.1	20.4	17.6	18.6	17.5	18.5	15.7	16.6	15.5	23.7	20.9	21.8	20.7
600	300	80	44	21.5	20.7	17.5	18.4	28.4	27.6	24.4	25.3	23.9	23.1	20.0	20.8	32.7	31.9	28.7	29.6
600	450	70	42	18.2	21.8	19.3	24.6	19.9	23.5	20.9	26.2	21.1	24.7	22.2	27.5	24.6	28.3	25.7	31.0
600	450	70	38	14.5	16.1	13.4	16.8	19.7	21.3	18.6	22.0	18.4	20.0	17.3	20.7	25.4	27.1	24.4	27.7
600	450	70	35	19.5	23.1	16.4	21.7	28.2	31.8	25.1	30.4	24.4	28.0	21.3	26.6	35.0	38.6	31.8	37.1
600	450	80	48	20.0	21.4	21.1	24.2	21.7	23.1	22.7	25.8	21.7	23.1	22.7	25.8	25.2	26.6	26.3	29.3
600	450	80	44	16.8	16.3	15.8	16.9	22.0	21.5	21.0	22.1	19.5	18.9	18.5	19.6	26.5	26.0	25.5	26.6
600	450	80	40	22.4	23.8	19.3	22.4	31.2	32.6	28.0	31.1	26.1	27.5	23.0	26.1	36.7	38.1	33.5	36.6
600	450	90	54	22.0	21.2	23.1	23.9	23.7	22.9	24.8	25.6	22.4	21.6	23.5	24.4	26.0	25.1	27.0	27.9
600	450	90	49	19.8	17.0	18.7	17.6	25.0	22.2	23.9	22.8	21.2	18.4	20.2	19.0	28.2	25.4	27.2	26.1
600	450	90	45	25.8	25.0	22.7	23.5	34.5	33.7	31.4	32.3	28.2	27.4	25.1	26.0	38.8	38.0	35.6	36.5
600	600	70	38	24.2	27.8	26.1	31.4	27.7	31.3	29.6	34.9	27.1	30.7	29.0	34.3	32.4	36.0	34.3	39.6
600	600	70	35	18.4	20.1	18.2	21.6	25.4	27.1	25.2	28.6	22.4	24.0	22.1	25.5	31.2	32.8	31.0	34.3
600	600	70	31	24.8	28.4	22.5	27.8	35.3	38.9	33.0	38.3	29.7	33.3	27.4	32.7	42.0	45.7	39.7	45.0
600	600	80	44	26.5	27.9	28.4	31.5	30.0	31.4	31.9	35.0	28.2	29.6	30.1	33.2	33.5	34.9	35.4	38.5
600	600	80	40	21.4	20.8	21.2	22.3	28.4	27.8	28.2	29.3	24.1	23.5	23.8	25.0	32.9	32.3	32.7	33.8
600	600	80	36	28.2	29.6	25.8	28.9	38.7	40.1	36.4	39.4	31.8	33.2	29.5	32.6	44.2	45.6	41.9	44.9
600	600	90	49	29.5	28.7	31.4	32.2	33.0	32.2	34.9	35.7	29.9	29.1	31.8	32.7	35.2	34.4	37.1	38.0
600	600	90	45	24.8	22.0	24.6	23.4	31.8	29.0	31.5	30.4	26.2	23.4	26.0	24.9	35.0	32.2	34.8	33.7
600	600	90	40	32.1	31.3	29.8	30.7	42.6	41.8	40.3	41.2	34.6	33.7	32.2	33.1	46.9	46.1	44.6	45.5

TABLE E-1F. AVERAGE TOTAL DELAY PER VEHICLE (SECONDS/VEHICLE) FOR GEOMETRY 7*5

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		HIGH		TRUCKS ON MAJOR STREET LOW		HIGH		TRUCKS ON MAJOR STREET LOW		HIGH		TRUCKS ON MAJOR STREET LOW		HIGH	
				L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	15.6	16.8	15.0	17.9	10.4	11.7	9.8	12.7	15.7	16.9	15.1	18.0	12.4	13.6	11.8	14.7
300	300	50	25	15.7	15.0	13.0	14.0	14.1	13.3	11.3	12.3	16.8	16.1	14.1	15.1	17.0	16.3	14.3	15.3
300	300	50	22	12.2	13.5	7.4	10.4	14.1	15.4	9.3	12.2	14.4	15.6	9.6	12.5	18.1	19.3	13.3	16.2
300	300	60	33	19.6	18.6	19.0	19.7	14.4	13.4	13.8	14.5	18.4	17.5	17.8	18.5	15.1	14.2	14.5	15.2
300	300	60	30	20.0	17.0	17.3	16.0	18.3	15.4	15.6	14.3	19.8	16.9	17.1	15.9	20.0	17.1	17.3	16.0
300	300	60	27	16.8	15.8	12.0	12.7	18.7	17.7	13.9	14.6	17.7	16.7	12.9	13.6	21.4	20.4	16.6	17.3
300	300	70	38	21.6	18.4	21.0	19.5	16.4	13.3	15.8	14.3	19.2	16.0	18.6	17.1	15.9	12.7	15.3	13.8
300	300	70	35	22.3	17.1	19.6	16.1	20.7	15.5	18.0	14.5	20.9	15.8	18.2	14.7	21.1	16.0	18.4	14.9
300	300	70	31	19.5	16.3	14.7	13.2	21.4	18.2	16.5	15.0	19.1	15.9	14.3	12.8	22.8	19.6	18.0	16.5
300	450	50	25	13.1	14.4	13.3	16.3	9.8	11.0	10.0	12.9	13.2	14.5	13.4	16.4	11.7	13.0	11.9	14.9
300	450	50	22	11.4	10.6	9.5	10.5	11.5	10.8	9.7	10.6	12.5	11.8	10.6	11.6	14.5	13.8	12.6	13.6
300	450	50	20	9.5	10.8	5.6	8.5	13.2	14.4	9.2	12.2	11.6	12.9	7.7	10.6	17.2	18.4	13.2	16.1
300	450	60	30	17.4	16.4	17.6	18.3	14.0	13.0	14.2	14.9	16.2	15.3	16.4	17.2	14.7	13.7	14.9	15.6
300	450	60	27	16.0	13.0	14.1	12.8	16.1	13.2	14.2	13.0	15.8	12.9	13.9	12.7	17.8	14.9	15.9	14.7
300	450	60	24	14.1	13.2	10.2	10.9	17.8	16.8	13.8	14.5	15.0	14.0	11.0	11.7	20.5	19.5	16.5	17.3
300	450	70	35	19.7	16.5	19.9	18.4	16.4	13.2	16.6	15.1	17.3	14.2	17.6	16.1	15.8	12.6	16.0	14.5
300	450	70	31	18.6	13.4	16.7	13.3	18.8	13.6	16.9	13.4	17.2	12.1	15.4	11.9	19.2	14.1	17.4	13.9
300	450	70	28	17.1	13.9	13.1	11.6	20.7	17.5	16.8	15.2	16.7	13.5	12.7	11.2	22.2	19.0	18.2	16.7
300	600	60	27	12.6	13.9	13.7	16.6	11.1	12.3	12.1	15.0	12.7	14.0	13.8	16.7	13.0	14.3	14.1	17.0
300	600	60	24	9.4	8.7	8.4	9.3	11.4	10.7	10.3	11.3	10.5	9.8	9.5	10.4	14.3	13.6	13.3	14.2
300	600	60	21	8.9	10.2	5.8	8.7	14.4	15.7	11.3	14.2	11.1	12.3	7.9	10.8	18.4	19.6	15.2	18.2
300	600	70	31	16.5	15.6	17.6	18.3	15.0	14.0	16.0	16.7	15.4	14.4	16.5	17.2	15.7	14.7	16.7	17.5
300	600	70	28	13.6	10.6	12.5	11.3	15.5	12.6	14.5	13.2	13.5	10.5	12.4	11.1	17.3	14.3	16.2	14.9
300	600	70	24	13.2	12.2	10.0	10.7	18.6	17.7	15.5	16.2	14.0	13.1	10.9	11.6	21.3	20.4	18.2	18.9
300	600	80	36	18.7	15.5	19.7	18.2	17.1	13.9	18.2	16.7	16.3	13.1	17.4	15.9	16.6	13.4	17.7	16.1
300	600	80	32	16.1	10.9	15.0	11.5	18.0	12.8	17.0	13.5	14.7	9.5	13.6	10.1	18.5	13.3	17.4	13.9
300	600	80	28	16.0	12.8	12.8	11.3	21.4	18.2	18.3	16.8	15.6	12.4	12.4	10.9	22.9	19.7	19.8	18.2
450	300	50	30	14.8	17.2	14.2	18.2	9.7	12.0	9.0	13.1	15.8	18.2	15.2	19.3	12.5	14.9	11.9	15.9
450	300	50	27	14.4	14.8	11.7	13.8	12.8	13.1	10.1	12.1	16.4	16.8	13.7	15.8	16.6	17.0	13.9	16.0
450	300	50	25	11.9	14.2	7.1	11.1	13.7	16.1	8.9	13.0	14.9	17.2	10.1	14.1	18.6	20.9	13.8	17.8
450	300	60	36	19.0	19.1	18.4	20.2	13.8	14.0	13.2	15.0	18.8	18.9	18.2	20.0	15.4	15.6	14.8	16.6
450	300	60	33	19.0	17.2	16.3	16.1	17.3	15.5	14.6	14.5	19.8	17.9	17.1	16.9	20.0	18.1	17.3	17.1
450	300	60	30	16.7	16.8	11.9	13.7	18.6	18.7	13.8	15.6	18.5	18.6	13.7	15.5	22.2	22.3	17.4	19.2
450	300	70	42	21.0	18.9	20.4	20.0	15.9	13.8	15.3	14.8	19.6	17.5	19.0	18.5	16.2	14.1	15.6	15.2
450	300	70	38	21.6	17.5	18.9	16.5	20.0	15.9	17.2	14.9	21.1	17.1	18.4	16.0	21.3	17.3	18.6	16.2
450	300	70	35	19.6	17.5	14.8	14.4	21.5	19.4	16.7	16.3	20.2	18.1	15.4	14.9	23.9	21.8	19.1	18.6
450	450	60	33	14.8	17.1	15.0	19.0	11.4	13.7	11.6	15.7	15.8	18.1	16.0	20.0	14.3	16.6	14.5	18.5
450	450	60	30	13.0	13.4	11.1	13.2	13.1	13.5	11.3	13.3	15.0	15.4	13.1	15.2	17.0	17.4	15.1	17.2
450	450	60	27	12.0	14.4	8.0	12.1	15.7	18.0	11.7	15.7	15.0	17.4	11.1	15.1	20.5	22.9	16.6	20.6
450	450	70	38	18.6	18.7	18.8	20.6	15.3	15.4	15.5	17.3	18.4	18.5	18.6	20.4	16.9	17.0	17.1	18.9
450	450	70	35	17.2	15.3	15.3	15.1	17.3	15.5	15.4	15.3	17.9	16.1	16.1	15.9	19.9	18.1	18.1	17.9
450	450	70	31	16.5	16.6	12.5	14.3	20.2	20.3	16.2	18.0	18.3	18.4	14.3	16.1	23.8	23.9	19.8	21.6
450	450	80	44	20.3	18.2	20.5	20.1	17.0	14.9	17.2	16.8	18.8	16.8	19.1	18.7	17.3	15.2	17.5	17.1
450	450	80	40	19.4	15.4	17.6	15.2	19.6	15.5	17.7	15.3	19.0	14.9	17.1	14.7	21.0	16.9	19.1	16.7
450	450	80	36	19.2	17.1	15.2	14.8	22.9	20.8	18.9	18.5	19.7	17.7	15.8	15.4	25.3	23.2	21.3	20.9
450	600	70	35	18.4	20.7	19.4	23.5	16.8	19.2	17.9	21.9	19.4	21.8	20.5	24.5	19.7	22.1	20.8	24.8
450	600	70	31	15.1	15.5	14.1	16.1	17.1	17.5	16.0	18.1	17.2	17.5	16.1	18.2	21.0	21.3	19.9	22.0
450	600	70	28	15.7	18.1	12.6	16.6	21.2	23.6	18.1	22.1	18.8	21.1	15.6	19.6	26.1	28.4	22.9	27.0
450	600	80	40	21.9	22.1	23.0	24.8	20.4	20.5	21.4	23.2	21.7	21.8	22.8	24.6	22.0	22.1	23.1	24.9
450	600	80	36	19.1	17.3	18.1	17.9	21.1	19.2	20.0	19.9	19.9	18.0	18.8	18.7	23.7	21.8	22.6	22.5
450	600	80	32	20.0	20.1	16.9	18.7	25.5	25.6	22.4	24.2	21.8	21.9	18.7	20.5	29.1	29.2	26.0	27.8
450	600	90	45	23.6	21.5	24.6	24.2	22.0	19.9	23.1	22.7	22.1	20.0	23.2	22.8	22.4	20.3	23.5	23.0
450	600	90	40	21.4	17.3	20.3	17.9	23.3	19.3	22.3	19.9	20.9	16.8	19.8	17.5	24.7	20.6	23.7	21.3
450	600	90	36	22.6	20.5	19.5	19.0	28.1	26.0	24.9	24.5	23.1	21.0	20.0	19.6	30.5	28.4	27.3	26.9
600	300	60	39	15.4	18.9	14.8	19.9	10.3	13.7	9.7	14.8	17.4	20.8	16.8	21.9	14.0	17.5	13.4	18.6
600	300	60	36	12.5	14.0	9.8	13.0	10.9	12.3	8.2	11.3	15.4	16.9	12.7	15.9	15.6	17.1	12.9	16.1
600	300	60	33	13.6	17.0	8.8	13.9	15.5	18.9	10.7	15.8	17.5	21.0	12.7	17.9	21.2	24.7	16.4	21.6
600	300	70	45	18.9	20.1	18.3	21.2	13.7	14.9	13.1	16.0	19.6	20.8	19.0	21.9	16.3	17.5	15.6	18.6
600	300	70	42	16.4	15.6	13.7	14.6	14.7	14.0	12.0	12.9	18.1	17.3	15.4	16.3	18.3	17.5	15.5	16.5
600	300	70	38	18.0	19.2	13.2	16.1	19.9	21.1	15.1	18.0	20.7	21.9	15.9	18.8	24.4	25.6	19.6	22.5
600	300	80	52	19.7	18.7	19.1	19.8	14.6	13.6	14.0	14.6	19.2	18.2	18.6	19.3	15.9	14.9	15.3	15.9
600	300	80	48	18.1	15.1	15.4	14.1	16.4	13.5	13.7	12.5	18.5	15.6	15.8	14.6	18.7	15.8	16.0	14.7
600	300	80	44	20.3	19.3	15.5	16.2	22.1	21.1	17.3	18.0	21.7	20.7	16.9	17.6	25.4	24.4	20.6	21.3
600	450	70	42	18.7	22.1	18.9	24.0	15.3	18.8	15.6	20.7	20.6	24.1	20.8	26.0	19.1	22.6	19.3	24.5
600	450	70	38	14.6	16.0	12.7	15.8	14.7	16.2	12.8	16.0	17.5	19.0	15.6	18.8	19.5	21.0	17.6	20.8
600	450	70	35	17.3	20.7	13.3	18.4	21.0	24.4	17.0	22.1	21.2	24.7	17.2	22.4	26.7	30.2	22.8	27.9
600	450	80	48	21.7	22.9	21.9	24.8	18.3	19.5	18.5	21.4	22.4	23.6	22.6	25.5	20.8	22.1	21.1	24.0
600	450	80	44	18.1	17.3	16.2	17.1	18.2	17.5	16.3	17.3	19.8	19.0	17.9	18.8	21.8	21.0	19.9	20.8
600	450	80	40	21.4	22.6	17.4	20.3	25.1	26.3	21.1	24.0	24.1	25.3	20.1	23.0	29.6	30.8	25.6	28.5
600	450	90	54	22.5	21.5	22.7	23.4	19.2	18.2	19.4	20.1	22.0	21.0	22.2	22.9	20.4	19.5	20.7	21.4
600	450	90	49	19.8	16.9	18.0	16.7	20.0	17.0	18.1	16.8	20.3	17.3	18.4	17.1	22.3	19.3	20.4	19.1
600	450	90	45	23.6	22.6	19.6	20.3	27.3	26.3	23.3	24.0	25.1	24.1	21.1	21.8	30.6	29.6	26.6	27.3
600	600	70	38	23.7	27.2	24.8	29.9	22.2	25.6	23.2	28.3	25.6	29.1	26.7	31.8	25.9	29.4	27.0	32.1
600	600	70	35	17.5	19.0	16.5	19.6	19.5	21.0	18.4	21.6	20.5	21.9	19.4	22.6	24.3	25.7	23.2	26.4
600	600	70	31	21.6	25.0	18.4	23.6	27.1	30.5	23.9	29.0	25.5	29.0	22.4	27.5	32.8	36.3	29.7	34.8
600	600	80	44	27.2	28.4	28.3	31.2	25.7	26.9	26.7	29.6	27.9	29.1	29.0	31.9	28.2	29.4	29.3	32.2
600	600	80	40	21.6	20.9	20.6	21.5	23.6	22.9	22.6	23.5	23.3	22.6	22.3	23.2	27.1	26.4	26.1	27.0
600	600	80	36	26.1	27.4	23.0	25.9	31.6	32.8	28.5	31.4	28.8	30.0	25.7	28.6	36.1	37.4	33.0	35.9
600	600	90	49	29.0	28.0	30.1	30.7	27.5	26.5	28.5	29.2	28.5	27.5	29.5	30.2	28.7	27.7	29.8	30.5
600	600	90	45	23.9	20.9	22.8	21.5	25.8	22.9	24.8	23.5	24.3	21.3	23.3	22.0	28.1	25.1	27.1	25.8
600	600	90	40	29.0	28.0	25.8	26.5	34.4	33.4	31.3	32.0	30.4	29.4	27.3	27.9	37.7	36.7	34.6	35.3

TABLE E-1G. AVERAGE TOTAL DELAY PER VEHICLE (SECONDS/VEHICLE) FOR GEOMETRY 6*6

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		HIGH		TRUCKS ON MAJOR STREET LOW		HIGH		TRUCKS ON MAJOR STREET LOW		HIGH		TRUCKS ON MAJOR STREET LOW		HIGH	
				L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	8.6	13.6	8.7	15.3	5.4	10.3	5.5	12.1	10.7	15.6	10.8	17.4	9.3	14.2	9.4	16.0
300	300	50	25	6.9	9.9	4.9	9.6	7.2	10.2	5.2	9.8	10.0	12.9	8.0	12.6	12.1	15.1	10.1	14.7
300	300	50	22	5.3	10.2	1.2	7.8	9.1	14.0	5.0	11.6	9.4	14.3	5.3	11.9	15.0	19.9	10.9	17.5
300	300	60	33	10.3	13.0	10.4	14.8	7.1	9.8	7.2	11.6	11.1	13.9	11.2	15.6	9.7	12.5	9.8	14.2
300	300	60	30	8.8	9.6	6.8	9.3	9.1	9.9	7.1	9.5	10.7	11.4	8.6	11.1	12.8	13.5	10.8	13.2
300	300	60	27	7.6	10.3	3.5	7.9	11.3	14.1	7.2	11.7	10.4	13.1	6.3	10.7	16.0	18.7	11.9	16.3
300	300	70	38	14.7	15.2	14.8	16.9	11.4	11.9	11.5	13.7	14.2	14.7	14.3	16.5	12.8	13.3	12.9	15.1
300	300	70	35	13.5	12.0	11.5	11.7	13.8	12.3	11.8	12.0	14.1	12.6	12.1	12.3	16.2	14.7	14.2	14.4
300	300	70	31	12.5	13.0	8.4	10.6	16.3	16.8	12.2	14.4	14.1	14.6	10.0	12.2	19.7	20.2	15.6	17.8
300	450	50	25	10.6	15.5	11.5	18.1	9.1	14.1	10.1	16.7	12.6	17.6	13.6	20.2	13.0	18.0	14.0	20.6
300	450	50	22	7.0	9.9	5.8	10.5	9.1	12.0	7.9	12.5	10.0	13.0	8.9	13.5	14.0	16.9	12.8	17.4
300	450	50	20	7.0	11.9	3.7	10.3	12.6	17.5	9.3	15.9	11.0	16.0	7.8	14.4	18.5	23.4	15.2	21.8
300	450	60	30	12.5	15.2	13.4	17.8	11.1	13.8	12.0	16.4	13.3	16.0	14.2	18.6	13.7	16.4	14.6	19.1
300	450	60	27	9.2	10.0	8.1	10.5	11.3	12.1	10.1	12.6	11.0	11.8	9.9	12.3	15.0	15.7	13.8	16.2
300	450	60	24	9.3	12.0	6.0	10.4	14.9	17.6	11.6	16.0	12.1	14.8	8.8	13.2	19.5	22.3	16.3	20.7
300	450	70	35	17.2	17.7	18.1	20.3	15.7	16.2	16.7	18.9	16.7	17.3	17.7	19.9	17.2	17.7	18.1	20.3
300	450	70	31	14.2	12.7	13.0	13.3	16.3	14.8	15.1	15.3	14.8	13.3	13.6	13.8	18.7	17.2	17.5	17.8
300	450	70	28	14.5	15.0	11.2	13.4	20.1	20.6	16.8	19.0	16.1	16.6	12.8	15.0	23.5	24.0	20.3	22.4
300	600	60	27	12.9	17.8	14.7	21.3	13.3	18.2	15.0	21.6	15.0	19.9	16.7	23.3	17.2	22.1	18.9	25.6
300	600	60	24	7.8	10.8	7.5	12.1	11.7	14.7	11.4	16.0	10.9	13.9	10.6	15.2	16.6	19.6	16.3	20.9
300	600	60	21	9.2	14.2	6.8	13.4	16.6	21.6	14.2	20.8	13.3	18.2	10.8	17.5	22.5	27.5	20.1	26.7
300	600	70	31	14.5	17.2	16.2	20.7	14.9	17.6	16.6	21.0	15.3	18.0	17.1	21.5	17.5	20.2	19.3	23.7
300	600	70	28	9.7	10.4	9.3	11.8	13.6	14.3	13.2	15.7	11.5	12.2	11.2	13.6	17.2	18.0	16.9	19.3
300	600	70	24	11.1	13.8	8.7	13.1	18.5	21.2	16.1	20.5	13.9	16.7	11.5	15.9	23.2	25.9	20.7	25.1
300	600	80	36	19.0	19.5	20.7	22.9	19.3	19.8	21.1	23.3	18.5	19.0	20.3	22.5	20.8	21.3	22.5	24.7
300	600	80	32	14.5	13.0	14.1	14.3	18.4	16.9	18.0	18.2	15.0	13.6	14.7	14.9	20.8	19.3	20.4	20.6
300	600	80	28	16.2	16.7	13.8	16.0	23.6	24.1	21.2	23.4	17.8	18.3	15.4	17.5	27.0	27.5	24.6	26.8
450	300	50	30	8.8	14.9	8.9	16.6	5.6	11.6	5.7	13.4	11.8	17.8	11.9	19.6	10.4	16.4	10.5	18.2
450	300	50	27	6.6	10.6	4.6	10.3	6.8	10.9	4.8	10.6	10.5	14.6	8.5	14.3	12.7	16.7	10.7	16.4
450	300	50	25	5.9	11.9	1.8	9.5	9.7	15.7	5.6	13.3	10.8	16.9	6.7	14.5	16.5	22.5	12.4	20.1
450	300	60	36	10.7	14.5	10.8	16.3	7.4	11.2	7.5	13.0	12.4	16.2	12.5	18.0	11.0	14.8	11.1	16.6
450	300	60	33	8.8	10.7	6.8	10.3	9.1	10.9	7.1	10.6	11.5	13.4	9.5	13.1	13.7	15.5	11.7	15.2
450	300	60	30	8.4	12.2	4.3	9.8	12.2	16.0	8.1	13.6	12.1	15.9	8.0	13.5	17.7	21.5	13.6	19.1
450	300	70	42	15.0	16.6	15.1	18.4	11.8	13.4	11.9	15.2	15.5	17.1	15.6	18.9	14.1	15.7	14.2	17.5
450	300	70	38	13.7	13.4	11.7	13.0	14.0	13.6	12.0	13.3	15.2	14.9	13.2	14.5	17.3	17.0	15.3	16.6
450	300	70	35	13.6	15.2	9.5	12.8	17.4	19.0	13.3	16.6	16.1	17.7	12.0	15.3	21.7	23.3	17.6	20.9
450	450	60	33	13.2	19.2	14.1	21.8	11.7	17.8	12.6	20.4	16.1	22.2	17.1	24.8	16.5	22.6	17.5	25.2
450	450	60	30	9.5	13.6	8.4	14.1	11.6	15.7	10.4	16.2	13.5	17.6	12.3	18.1	17.4	21.5	16.2	22.0
450	450	60	27	10.4	16.4	7.1	14.9	16.0	22.0	12.7	20.5	15.4	21.4	12.1	19.8	22.8	28.9	19.5	27.3
450	450	70	38	14.7	18.5	15.6	21.1	13.3	17.1	14.2	19.7	16.4	20.2	17.3	22.8	16.8	20.7	17.8	23.3
450	450	70	35	11.4	13.2	10.2	13.7	13.5	15.3	12.3	15.8	14.1	16.0	12.9	16.5	18.0	19.9	16.9	20.4
450	450	70	31	12.6	16.4	9.3	14.8	18.2	22.0	14.9	20.4	16.3	20.1	13.0	18.5	23.7	27.6	20.5	26.0
450	450	80	44	18.7	20.3	19.6	22.9	17.3	18.9	18.2	21.5	19.2	20.8	20.1	23.4	19.6	21.2	20.5	23.8
450	450	80	40	16.0	15.6	14.8	16.1	18.1	17.7	16.9	18.2	17.5	17.1	16.3	17.6	21.4	21.0	20.2	21.5
450	450	80	36	17.6	19.2	14.3	17.6	23.2	24.8	19.9	23.2	20.1	21.7	16.8	20.1	27.5	29.1	24.3	27.5
450	600	70	35	19.6	25.7	21.4	29.1	20.0	26.0	21.7	29.5	22.6	28.6	24.3	32.1	24.8	30.8	26.6	34.3
450	600	70	31	14.5	18.6	14.1	19.9	18.4	22.4	18.0	23.8	18.5	22.5	18.1	23.9	24.2	28.3	23.8	29.6
450	600	70	28	16.9	23.0	14.5	22.2	24.3	30.4	21.9	29.6	21.9	28.0	19.5	27.2	31.2	37.2	28.7	36.4
450	600	80	40	20.8	24.7	22.6	28.1	21.2	25.0	23.0	28.5	22.6	26.4	24.3	29.8	24.8	29.6	26.5	32.0
450	600	80	36	16.1	18.0	15.8	19.3	20.0	21.9	19.7	23.2	18.9	20.7	18.5	22.1	24.6	26.4	24.3	27.8
450	600	80	32	18.9	22.7	16.5	22.0	26.3	30.1	23.9	29.4	22.6	26.5	20.2	25.7	31.9	35.7	29.4	34.9
450	600	90	45	24.8	26.4	26.6	29.8	25.2	26.8	26.9	30.2	25.3	26.9	27.0	30.3	27.5	29.1	29.2	32.5
450	600	90	40	20.7	20.3	20.4	21.7	24.6	24.2	24.3	25.6	22.2	21.8	21.9	23.2	27.9	27.6	27.6	28.9
450	600	90	36	23.8	25.4	21.4	24.7	31.2	32.8	28.8	32.1	26.3	27.9	23.9	27.1	35.5	37.1	33.1	36.4
600	300	60	39	10.4	17.5	10.5	19.3	7.1	14.3	7.2	16.0	14.2	21.4	14.3	23.2	12.9	20.0	12.9	21.8
600	300	60	36	5.6	10.8	3.6	10.4	5.9	11.0	3.9	10.7	10.5	15.6	8.5	15.3	12.6	17.8	10.6	17.4
600	300	60	33	8.5	15.7	4.4	13.3	12.3	19.5	8.2	17.0	14.4	21.5	10.3	19.1	20.0	27.2	15.9	24.8
600	300	70	45	11.5	16.4	11.6	18.2	8.3	13.2	8.4	15.0	14.1	19.1	14.2	20.8	12.7	17.7	12.8	19.4
600	300	70	42	7.1	10.1	5.1	9.8	7.4	10.4	5.4	10.0	10.8	13.7	8.8	13.4	12.9	15.8	10.9	15.5
600	300	70	38	10.6	15.6	6.5	13.1	14.4	19.3	10.3	16.9	15.3	20.2	11.2	17.8	20.9	25.8	16.8	23.4
600	300	80	52	14.7	17.4	14.8	19.1	11.4	14.1	11.5	15.9	16.1	18.8	16.2	20.5	14.7	17.4	14.8	19.1
600	300	80	48	11.2	11.9	9.2	11.6	11.5	12.2	9.5	11.9	13.6	14.3	11.6	14.0	15.7	16.4	13.7	16.1
600	300	80	44	15.2	17.9	11.1	15.5	19.0	21.7	14.9	19.3	18.6	21.3	14.5	18.9	24.2	26.9	20.1	24.5
600	450	70	42	18.0	25.2	19.0	27.8	16.6	23.7	17.5	26.3	21.9	29.1	22.8	31.7	22.3	29.5	23.2	32.1
600	450	70	38	12.0	17.2	10.9	17.7	14.1	19.3	12.9	19.8	16.9	22.1	15.7	22.6	20.8	26.0	19.7	26.5
600	450	70	35	16.6	23.8	13.4	22.2	22.2	29.4	18.9	27.8	22.5	29.6	19.2	28.1	29.9	37.1	26.7	35.5
600	450	80	48	18.7	23.6	19.6	26.2	17.3	22.2	18.2	24.8	21.3	26.2	22.2	28.9	21.7	26.7	22.7	29.3
600	450	80	44	13.2	16.2	12.1	16.7	15.3	18.2	14.1	18.8	16.9	19.8	15.7	20.3	20.8	23.7	19.6	24.2
600	450	80	40	18.4	23.3	15.1	21.7	24.0	28.9	20.7	27.3	23.0	28.0	19.8	26.4	30.5	35.4	27.2	33.8
600	450	90	54	21.9	24.6	22.8	27.2	20.4	23.1	21.3	25.7	23.2	25.9	24.2	28.6	23.7	26.4	24.6	29.0
600	450	90	49	17.3	18.1	16.2	18.6	19.4	20.1	18.2	20.6	19.7	20.4	18.6	21.0	23.6	24.4	22.5	24.9
600	450	90	45	22.9	25.6	19.7	24.1	28.5	31.2	25.3	29.7	26.3	29.0	23.1	27.5	33.8	36.5	30.5	34.9
600	600	70	38	25.9	33.0	27.6	36.4	26.2	33.4	28.0	36.8	29.7	36.9	31.5	40.3	32.0	39.1	33.7	42.5
600	600	70	35	17.8	23.0	17.5	24.3	21.7	26.9	21.4	28.2	22.7	27.9	22.4	29.2	28.4	33.6	28.1	35.0
600	600	70	31	23.7	30.9	21.3	30.1	31.1	38.3	28.7	37.5	29.6	36.8	27.2	36.0	38.9	46.0	36.4	45.2
600	600	80	44	27.1	32.0	28.8	35.4	27.4	32.3	29.2	35.8	29.7	34.6	31.4	38.0	31.9	36.8	33.7	40.3
600	600	80	40	19.6	22.6	19.3	23.9	23.5	26.5	23.2	27.8	23.3	26.2	22.9	27.5	29.0	31.9	28.6	33.3
600	600	80	36	26.0	30.9	23.5	30.1	33.4	38.3	30.9	37.5	30.6	35.5	28.2	34.8	39.8	44.8	37.4	44.0
600	600	90	49	31.2	33.9	32.9	37.3	31.5	34.2	33.3	37.7	32.6	35.3	34.3	38.7	34.8	37.5	36.5	40.9
600	600	90	45	24.2	24.9	23.8	26.2	28.0	28.8	27.7	30.1	26.6	27.3	26.2	28.6	32.3	33.0	31.9	34.3
600	600	90	40	31.1	33.8	28.7	33.0	38.5	41.2	36.1	40.4	34.5	37.2	32.1	36.4	43.7	46.4	41.3	45.7

TABLE E-1H. AVERAGE TOTAL DELAY PER VEHICLE (SECONDS/VEHICLE) FOR GEOMETRY 7*6

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET								LEFT TURNS ON MINOR STREET							
				LOW LEVEL				HIGH LEVEL				LOW LEVEL				HIGH LEVEL			
				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET			
				LOW		HIGH		LOW		HIGH		LOW		HIGH		LOW		HIGH	
				L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR	
				LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	12.3	13.8	11.6	14.7	10.4	11.9	9.7	12.8	13.4	14.8	12.7	15.8	13.4	14.8	12.6	15.7
300	300	50	25	12.9	12.3	10.1	11.2	14.5	14.0	11.7	12.8	15.0	14.4	12.1	13.3	18.4	17.9	15.6	16.7
300	300	50	22	11.7	13.1	6.8	9.9	16.9	18.3	11.9	15.0	14.8	16.2	9.9	13.0	21.8	23.2	16.8	20.0
300	300	60	33	15.2	14.4	14.4	15.3	13.3	12.5	12.6	13.4	15.0	14.2	14.3	15.2	15.0	14.2	14.2	15.1
300	300	60	30	16.0	13.2	13.2	12.1	17.6	14.8	14.8	13.7	16.8	14.1	14.0	12.9	20.3	17.5	17.5	16.4
300	300	60	27	15.1	14.3	10.2	11.1	20.3	19.5	15.3	16.2	17.0	16.2	12.0	12.9	24.0	23.2	19.0	19.9
300	300	70	38	18.4	15.4	17.6	16.3	16.5	13.5	15.7	14.4	17.0	14.0	16.2	14.9	16.9	13.9	16.2	14.9
300	300	70	35	19.5	14.5	16.7	13.4	21.1	16.1	18.3	15.0	19.1	14.1	16.3	13.0	22.6	17.6	19.7	16.4
300	300	70	31	19.0	15.9	14.0	12.7	24.1	21.1	19.2	17.8	19.6	16.5	14.6	13.3	26.5	23.5	21.6	20.3
300	450	50	25	11.3	12.7	11.4	14.5	11.2	12.6	11.3	14.4	12.4	13.8	12.5	15.6	14.1	15.6	14.2	17.3
300	450	50	22	10.0	9.4	8.0	9.1	13.4	12.9	11.4	12.6	12.1	11.5	10.1	11.2	17.3	16.8	15.3	16.5
300	450	50	20	10.4	11.9	6.3	9.4	17.4	18.8	13.3	16.4	13.5	14.9	9.4	12.5	22.3	23.7	18.2	21.3
300	450	60	30	14.4	13.6	14.5	15.4	14.3	13.5	14.4	15.3	14.2	13.4	14.3	15.2	16.0	15.2	16.1	17.0
300	450	60	27	13.4	10.6	11.4	10.3	16.8	14.1	14.8	13.7	14.2	11.5	12.2	11.2	19.5	16.8	17.5	16.4
300	450	60	24	13.9	13.1	9.8	10.7	20.8	20.0	16.7	17.6	15.7	14.9	11.6	12.5	24.5	23.7	20.4	21.3
300	450	70	35	17.9	14.9	18.0	16.7	17.8	14.8	17.9	16.6	16.5	13.5	16.6	15.3	18.3	15.3	18.4	17.0
300	450	70	31	17.2	12.2	15.2	11.9	20.7	15.7	18.7	15.4	16.8	11.8	14.8	11.5	22.1	17.1	20.1	16.8
300	450	70	28	18.0	14.9	13.9	12.5	24.9	21.9	20.8	19.5	18.6	15.5	14.4	13.1	27.3	24.3	23.2	21.9
300	600	60	27	10.7	12.1	11.6	14.7	12.4	13.8	13.3	16.4	11.7	13.2	12.7	15.8	15.3	16.7	16.2	19.3
300	600	60	24	7.9	7.3	6.7	7.8	13.1	12.6	11.9	13.1	10.0	9.4	8.8	9.9	17.0	16.5	15.9	17.0
300	600	60	21	9.7	11.1	6.4	9.5	18.4	19.9	15.2	18.3	12.8	14.2	9.5	12.6	23.4	24.8	20.1	23.2
300	600	70	31	13.4	12.6	14.3	15.2	15.1	14.3	16.1	16.9	13.3	12.5	14.2	15.1	16.8	16.0	17.7	18.6
300	600	70	28	10.9	8.1	9.7	8.6	16.1	13.4	14.9	13.9	11.7	9.0	10.6	9.5	18.8	16.0	17.6	16.5
300	600	70	24	12.7	11.9	9.5	10.4	21.5	20.7	18.2	19.1	14.6	13.8	11.3	12.2	25.2	24.4	21.9	22.8
300	600	80	36	16.7	13.7	17.6	16.3	18.4	15.4	19.4	18.0	15.3	12.3	16.2	14.9	18.9	15.9	19.8	18.5
300	600	80	32	14.5	9.5	13.3	10.0	19.7	14.8	18.6	15.3	14.1	9.1	12.9	9.6	21.2	16.2	20.0	16.7
300	600	80	28	16.7	13.7	13.4	12.1	25.4	22.4	22.2	20.8	17.3	14.3	14.0	12.7	27.9	24.9	24.6	23.3
450	300	50	30	11.3	13.8	10.5	14.7	9.4	11.9	8.6	12.9	13.3	15.8	12.5	16.7	13.2	15.8	12.5	16.7
450	300	50	27	11.3	11.9	8.5	10.7	12.9	13.5	10.1	12.3	14.3	14.9	11.5	13.7	17.8	18.3	14.9	17.2
450	300	50	25	11.0	13.6	6.1	10.3	16.2	18.7	11.2	15.5	15.0	17.6	10.1	14.3	22.0	24.5	17.1	21.3
450	300	60	36	14.3	14.6	13.6	15.5	12.4	12.7	11.7	13.7	15.0	15.4	14.3	16.3	15.0	15.3	14.3	16.2
450	300	60	33	14.7	13.1	11.9	11.9	16.3	14.7	13.5	13.5	16.5	14.8	13.6	13.7	19.9	18.3	17.1	17.1
450	300	60	30	14.7	15.0	9.8	11.8	19.8	20.1	14.9	16.9	17.5	17.8	12.5	14.5	24.4	24.7	19.5	21.5
450	300	70	42	17.5	15.6	16.8	16.5	15.6	13.7	14.9	14.6	17.0	15.1	16.3	16.0	17.0	15.0	16.2	16.0
450	300	70	38	18.5	14.6	15.7	13.4	20.1	16.2	17.3	15.1	19.0	15.1	16.2	14.0	22.5	18.6	19.6	17.4
450	300	70	35	18.8	16.9	13.9	13.6	23.9	22.0	19.0	18.8	20.3	18.4	15.4	15.1	27.3	25.4	22.3	22.1
450	450	60	33	12.7	15.2	12.7	17.0	12.6	15.1	12.7	16.9	14.7	17.2	14.7	18.9	16.4	18.9	16.5	20.7
450	450	60	30	11.3	11.8	9.3	11.5	14.7	15.3	12.7	15.0	14.3	14.8	12.3	14.5	19.6	20.1	17.6	19.8
450	450	60	27	12.6	15.1	8.5	12.7	19.5	22.1	15.4	19.7	16.6	19.1	12.5	16.7	25.4	27.9	21.3	25.5
450	450	70	38	15.4	15.7	15.4	17.4	15.3	15.6	15.4	17.3	16.1	16.4	16.2	18.2	17.9	18.2	18.0	19.9
450	450	70	35	14.3	12.6	12.3	12.3	17.7	16.1	15.7	15.8	16.1	14.4	14.1	14.1	21.3	19.7	19.3	19.3
450	450	70	31	15.9	16.2	11.8	13.8	22.9	23.2	18.8	20.8	18.7	19.0	14.6	16.6	27.5	27.8	23.4	25.4
450	450	80	44	18.2	16.3	18.3	18.1	18.1	16.2	18.2	18.0	17.7	15.8	17.8	17.6	19.5	17.6	19.6	19.3
450	450	80	40	17.8	13.9	15.8	13.6	21.2	17.3	19.2	17.0	18.3	14.4	16.3	14.1	23.5	19.7	21.5	19.3
450	450	80	36	19.8	17.9	15.7	15.5	26.8	24.8	22.7	22.4	21.3	19.4	17.2	17.0	30.1	28.2	26.0	25.8
450	600	70	35	16.1	18.7	17.1	21.3	17.9	20.4	18.8	23.0	18.1	20.7	19.0	23.3	21.7	24.2	22.6	26.8
450	600	70	31	13.3	13.8	12.1	14.4	18.5	19.1	17.4	19.6	16.3	16.8	15.1	17.3	23.4	23.9	22.2	24.4
450	600	70	28	16.2	18.7	12.9	17.1	24.9	27.4	21.7	25.9	20.2	22.7	16.9	21.1	30.8	33.3	27.5	31.7
450	600	80	40	18.5	18.8	19.4	21.4	20.2	20.5	21.2	23.1	19.3	19.6	20.2	22.2	22.8	23.1	23.7	25.7
450	600	80	36	16.1	14.4	14.9	14.9	21.3	19.7	20.2	20.2	17.9	16.2	16.7	16.7	24.9	23.3	23.8	23.8
450	600	80	32	19.3	19.6	16.0	18.0	28.0	28.4	24.8	26.8	22.1	22.4	18.8	20.8	32.6	32.9	29.4	31.4
450	600	90	45	21.3	19.4	22.2	22.0	23.0	21.1	24.0	23.7	20.8	18.9	21.7	21.5	24.4	22.5	25.3	25.1
450	600	90	40	19.5	15.6	18.3	16.1	24.8	20.9	23.6	21.4	20.0	16.1	18.9	16.6	27.1	23.2	25.9	23.7
450	600	90	36	23.0	21.1	19.8	19.5	31.8	29.9	28.5	28.3	24.6	22.6	21.3	21.0	35.1	33.2	31.9	31.6
600	300	60	39	11.6	15.2	10.9	16.2	9.7	13.3	9.0	14.3	14.5	18.1	13.8	19.1	14.5	18.1	13.7	19.0
600	300	60	36	9.1	10.7	6.3	9.6	10.7	12.4	7.9	11.2	13.0	14.7	10.2	13.5	16.5	18.1	13.6	17.0
600	300	60	33	12.5	16.1	7.5	12.8	17.6	21.2	12.7	18.0	17.4	21.0	12.4	17.7	24.4	28.0	19.4	24.7
600	300	70	45	13.9	15.3	13.2	16.2	12.0	13.4	11.3	14.3	15.6	17.0	14.8	17.9	15.5	16.9	14.8	17.9
600	300	70	42	11.8	11.2	9.0	10.1	13.4	12.9	10.6	11.7	14.5	13.9	11.6	12.7	17.9	17.4	15.1	16.2
600	300	70	38	15.7	17.1	10.8	13.9	20.9	22.3	15.9	19.0	19.4	20.8	14.5	17.5	26.4	27.8	21.4	24.5
600	300	80	52	15.9	15.1	15.2	16.0	14.0	13.2	13.3	14.1	16.3	15.5	15.6	16.4	16.3	15.5	15.5	16.4
600	300	80	48	14.7	11.9	11.9	10.7	16.3	13.5	13.5	12.4	16.1	13.3	13.3	12.2	19.6	16.8	16.7	15.6
600	300	80	44	19.1	18.3	14.2	15.1	24.3	23.5	19.4	20.2	21.6	20.7	16.6	17.5	28.5	27.7	23.6	24.5
600	450	70	42	16.3	19.9	16.4	21.7	16.2	19.8	16.3	21.6	19.2	22.8	19.3	24.6	21.0	24.6	21.0	26.3
600	450	70	38	12.6	14.2	10.6	13.9	16.0	17.6	14.0	17.3	16.5	18.1	14.5	17.8	21.7	23.4	19.7	23.1
600	450	70	35	17.6	21.2	13.5	18.8	24.5	28.1	20.4	25.7	22.5	26.1	18.4	23.7	31.3	34.9	27.2	32.5
600	450	80	48	18.1	19.5	18.2	21.3	18.0	19.4	18.1	21.2	19.8	21.2	19.9	22.9	21.5	22.9	21.6	24.7
600	450	80	44	14.9	14.3	12.9	14.0	18.3	17.8	16.3	17.5	17.6	17.0	15.6	16.7	22.9	22.3	20.8	22.0
600	450	80	40	20.5	21.9	16.4	19.5	27.5	28.9	23.4	26.5	24.2	25.6	20.1	23.2	33.0	34.4	28.9	32.0
600	450	90	54	20.1	19.3	20.2	21.1	20.0	19.2	20.1	21.0	20.5	19.7	20.6	21.5	22.3	21.5	22.4	23.2
600	450	90	49	17.9	15.1	15.9	14.8	21.3	18.5	19.3	18.2	19.3	16.5	17.3	16.2	24.6	21.8	22.6	21.4
600	450	90	45	23.9	23.1	19.8	20.7	30.8	30.0	26.7	27.6	26.3	25.5	22.2	23.1	35.1	34.3	31.0	31.9
600	600	70	38	21.1	24.8	22.1	27.4	22.9	26.5	23.8	29.1	24.1	27.7	25.0	30.3	27.6	31.2	28.5	33.8
600	600	70	35	15.4	17.0	14.2	17.6	20.6	22.3	19.5	22.8	19.3	21.0	18.1	21.5	26.4	28.0	25.2	28.5
600	600	70	31	21.7	25.3	18.5	23.8	30.5	34.1	27.2	32.5	26.6	30.3	23.4	28.7	37.2	40.8	34.0	39.3
600	600	80	44	23.5	24.9	24.4	27.5	25.2	26.6	26.1	29.2	25.2	26.6	26.1	29.2	28.7	30.1	29.6	32.7
600	600	80	40	18.3	17.8	17.2	18.3	23.6	23.0	22.4	23.5	21.0	20.4	19.8	20.9	28.1	27.5	26.9	28.0
600	600	80	36	25.1	26.5	21.8	24.9	33.9	35.3	30.6	33.7	28.8	30.2	25.5	28.6	39.4	40.8	36.1	39.2
600	600	90	49	26.4	25.6	27.4	28.2	28.2	27.3	29.1	29.9	26.9	26.0	27.8	28.6	30.4	29.6	31.3	32.2
600	600	90	45	21.7	18.9	20.5	19.4	27.0	24.2	25.8	24.7	23.1	20.3	22.0	20.9	30.2	27.4	29.0	27.9
600	600	90	40	29.1	28.3	25.8	26.7	37.8	37.0	34.6	35.4	31.5	30.7	28.2	29.1	42.1	41.3	38.8	39.7

TABLE E-11. AVERAGE TOTAL DELAY PER VEHICLE (SECONDS/VEHICLE) FOR GEOMETRY 7*7

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	17.3	18.6	15.8	18.7	10.4	11.7	8.8	11.8	17.4	18.7	15.9	18.8	12.4	13.6	10.8	13.7
300	300	50	25	17.5	16.7	13.8	14.8	14.1	13.3	10.4	11.3	18.6	17.8	14.9	15.9	17.0	16.3	13.3	14.3
300	300	50	22	14.0	15.3	8.2	11.2	14.1	15.4	8.3	11.3	16.1	17.4	10.4	13.3	18.1	19.3	12.3	15.2
300	300	60	33	21.3	20.4	19.8	20.5	14.4	13.4	12.8	13.6	20.2	19.2	18.6	19.3	15.1	14.1	13.6	14.3
300	300	60	30	21.7	18.8	18.1	16.8	18.3	15.4	14.6	13.4	21.6	18.6	17.9	16.7	20.0	17.1	16.3	15.1
300	300	60	27	18.6	17.6	12.8	13.5	18.7	17.7	12.9	13.6	19.4	18.5	13.7	14.4	21.4	20.4	15.6	16.3
300	300	70	38	23.4	20.2	21.8	20.3	16.4	13.3	14.9	13.4	21.0	17.8	19.4	17.9	15.9	12.7	14.3	12.8
300	300	70	35	24.1	18.9	20.4	16.9	20.7	15.5	17.0	13.5	22.7	17.5	19.0	15.5	21.1	16.0	17.5	14.0
300	300	70	31	21.2	18.1	15.5	14.0	21.3	18.2	15.6	14.1	20.9	17.7	15.1	13.6	22.8	19.6	17.1	15.5
300	450	50	25	15.3	16.6	14.6	17.5	10.2	11.5	9.5	12.4	15.4	16.7	14.7	17.6	12.2	13.4	11.4	14.3
300	450	50	22	13.6	12.9	10.8	11.7	12.0	11.3	9.1	10.1	14.7	14.0	11.9	12.8	14.9	14.2	12.1	13.1
300	450	50	20	11.7	13.0	6.8	9.7	13.6	14.9	8.7	11.6	13.9	15.1	8.9	11.8	17.6	18.8	12.7	15.6
300	450	60	30	19.6	18.6	18.8	19.5	14.5	13.5	13.7	14.4	18.4	17.5	17.7	18.4	15.2	14.2	14.4	15.1
300	450	60	27	18.2	15.2	15.3	14.1	16.6	13.6	13.7	12.5	18.0	15.1	15.2	13.9	18.3	15.3	15.4	14.2
300	450	60	24	16.4	15.4	11.4	12.1	18.3	17.3	13.3	14.0	17.2	16.3	12.3	13.0	21.0	20.0	16.0	16.8
300	450	70	35	21.9	18.7	21.2	19.7	16.8	13.6	16.1	14.6	19.6	16.4	18.8	17.3	16.3	13.1	15.5	14.0
300	450	70	31	20.8	15.7	18.0	14.5	19.2	14.1	16.4	12.9	19.5	14.3	16.6	13.1	19.7	14.5	16.9	13.4
300	450	70	28	19.3	16.1	14.3	12.8	21.2	18.0	16.2	14.7	18.9	15.7	14.0	12.4	22.6	19.4	17.7	16.2
300	600	60	27	13.7	15.0	13.8	16.7	10.4	11.6	10.5	13.4	13.8	15.1	13.9	16.8	12.3	13.6	12.4	15.4
300	600	60	24	10.5	9.8	8.5	9.5	10.7	10.0	8.7	9.6	11.6	10.9	9.6	10.6	13.7	12.9	11.6	12.6
300	600	60	21	10.0	11.3	5.9	8.9	13.7	15.0	9.6	12.6	12.1	13.4	8.0	11.0	17.7	18.9	13.6	16.5
300	600	70	31	17.6	16.7	17.7	18.4	14.3	13.3	14.4	15.1	16.5	15.5	16.6	17.3	15.0	14.0	15.1	15.8
300	600	70	28	14.7	11.7	12.7	11.4	14.9	11.9	12.9	11.6	14.5	11.6	12.5	11.3	16.6	13.6	14.6	13.3
300	600	70	24	14.2	13.3	10.1	10.9	18.0	17.0	13.9	14.6	15.1	14.1	11.0	11.7	20.7	19.7	16.6	17.3
300	600	80	36	19.8	16.6	19.9	18.4	16.5	13.3	16.5	15.0	17.4	14.2	17.5	16.0	15.9	12.7	16.0	14.5
300	600	80	32	17.1	12.0	15.1	11.6	17.3	12.2	15.3	11.8	15.8	10.6	13.7	10.3	17.8	12.6	15.8	12.3
300	600	80	28	17.0	13.8	12.9	11.4	20.8	17.6	16.6	15.1	16.7	13.5	12.6	11.0	22.2	19.0	18.1	16.6
450	300	50	30	15.0	17.4	13.5	17.5	8.1	10.5	6.5	10.6	16.1	18.4	14.5	18.5	11.0	13.3	9.4	13.4
450	300	50	27	14.6	15.0	11.0	13.0	11.2	11.6	7.6	9.6	16.7	17.0	13.0	15.1	15.1	15.5	11.4	13.5
450	300	50	25	12.1	14.4	6.3	10.4	12.2	14.5	6.4	10.5	15.1	17.5	9.4	13.4	17.1	19.4	11.3	15.3
450	300	60	36	19.2	19.3	17.6	19.4	12.3	12.4	10.7	12.5	19.0	19.1	17.4	19.2	13.9	14.0	12.3	14.1
450	300	60	33	19.2	17.4	15.6	15.4	15.8	14.0	12.1	12.0	20.0	18.1	16.3	16.2	18.4	16.6	14.8	14.6
450	300	60	30	16.9	17.0	11.2	13.0	17.0	17.1	11.3	13.1	18.7	18.8	12.9	14.7	20.6	20.8	14.9	16.7
450	300	70	42	21.3	19.2	19.7	19.3	14.3	12.2	12.8	12.3	19.8	17.7	18.2	17.8	14.7	12.6	13.1	12.7
450	300	70	38	21.8	17.8	18.2	15.8	18.4	14.3	14.7	12.4	21.4	17.3	17.7	15.3	19.8	15.7	16.1	13.7
450	300	70	35	19.8	17.7	14.1	13.7	19.9	17.8	14.2	13.8	20.4	18.3	14.6	14.2	22.3	20.2	16.6	16.1
450	450	60	33	15.4	17.8	14.7	18.7	10.3	12.7	9.6	13.6	16.5	18.8	15.7	19.7	13.2	15.5	12.4	16.5
450	450	60	30	13.7	14.0	10.8	12.9	12.0	12.4	9.2	11.3	15.7	16.0	12.8	14.9	15.9	16.3	13.1	15.1
450	450	60	27	12.7	15.0	7.7	11.8	14.6	16.9	9.7	13.7	15.7	18.0	10.8	14.8	19.5	21.8	14.5	18.5
450	450	70	38	19.3	19.4	18.6	20.4	14.2	14.3	13.4	15.2	19.1	19.2	18.3	20.1	15.8	15.9	15.1	16.9
450	450	70	35	17.8	16.0	15.0	14.8	16.2	14.4	13.4	13.2	18.6	16.8	15.8	15.6	18.8	17.0	16.0	15.8
450	450	70	31	17.2	17.3	12.2	14.0	19.1	19.2	14.1	15.9	18.9	19.1	14.0	15.8	22.7	22.8	17.8	19.6
450	450	80	44	21.0	18.9	20.2	19.8	15.9	13.8	15.1	14.7	19.5	17.4	18.8	18.4	16.2	14.1	15.5	15.1
450	450	80	40	20.1	16.1	17.3	14.9	18.5	14.4	15.7	13.3	19.7	15.6	16.8	14.4	19.9	15.8	17.1	14.7
450	450	80	36	19.9	17.8	15.0	14.5	21.8	19.7	16.9	16.4	20.4	18.3	15.5	15.1	24.2	22.1	19.2	18.8
450	600	70	35	17.9	20.3	18.0	22.1	14.6	17.0	14.7	18.7	19.0	21.3	19.1	23.1	17.5	19.8	17.6	21.6
450	600	70	31	14.7	15.0	12.7	14.7	14.9	15.2	12.9	14.9	16.7	17.1	14.7	16.7	18.7	19.1	16.7	18.8
450	600	70	28	15.3	17.6	11.2	15.2	19.0	21.3	14.9	18.9	18.3	20.6	14.2	18.2	23.9	26.2	19.8	23.8
450	600	80	40	21.5	21.6	21.6	23.4	18.2	18.3	18.3	20.1	21.3	21.4	21.3	23.2	19.8	19.9	19.9	21.7
450	600	80	36	18.6	16.8	16.6	16.5	18.8	17.0	16.8	16.7	19.4	17.6	17.4	17.3	21.5	19.6	19.5	19.3
450	600	80	32	19.6	19.7	15.5	17.3	23.3	23.4	19.2	21.0	21.3	21.5	17.2	19.0	26.9	27.0	22.8	24.6
450	600	90	45	23.1	21.0	23.2	22.8	19.8	17.7	19.9	19.5	21.7	19.6	21.7	21.3	20.2	18.1	20.3	19.9
450	600	90	40	20.9	16.8	18.9	16.5	21.1	17.0	19.1	16.7	20.4	16.4	18.4	16.0	22.5	18.4	20.5	18.1
450	600	90	36	22.1	20.1	18.0	17.6	25.9	23.8	21.8	21.3	22.7	20.6	18.6	18.2	28.2	26.1	24.1	23.7
600	300	60	39	14.1	17.6	12.5	17.7	7.2	10.6	5.6	10.7	16.0	19.5	14.5	19.6	11.0	14.4	9.4	14.5
600	300	60	36	11.2	12.7	7.5	10.7	7.8	9.2	4.1	7.3	14.1	15.6	10.5	13.6	12.6	14.0	8.9	12.0
600	300	60	33	12.3	15.7	6.5	11.6	12.4	15.8	6.6	11.7	16.2	19.6	10.4	15.6	18.2	21.6	12.4	17.5
600	300	70	45	17.6	18.8	16.0	18.9	10.6	11.9	9.1	12.0	18.3	19.5	16.7	19.6	13.2	14.4	11.6	14.5
600	300	70	42	15.1	14.3	11.4	12.3	11.6	10.9	8.0	8.9	16.7	16.0	13.1	14.0	15.2	14.4	11.5	12.4
600	300	70	38	16.7	17.9	10.9	13.8	16.8	18.0	11.0	13.9	19.4	20.6	13.6	16.5	21.3	22.6	15.6	18.5
600	300	80	52	18.4	17.4	16.8	17.5	11.5	10.5	9.9	10.6	17.9	16.9	16.3	17.0	12.8	11.8	11.2	11.9
600	300	80	48	16.8	13.8	13.1	11.8	13.4	10.4	9.7	8.4	17.2	14.3	13.6	12.3	15.7	12.7	12.0	10.7
600	300	80	44	19.0	18.0	13.2	13.9	19.1	18.1	13.3	14.0	20.4	19.4	14.6	15.3	22.3	21.4	16.6	17.3
600	450	70	42	17.8	21.3	17.1	22.2	12.7	16.1	12.0	17.1	19.8	23.2	19.0	24.1	16.5	19.9	15.7	20.9
600	450	70	38	13.7	15.2	10.8	14.0	12.1	13.5	9.2	12.4	16.6	18.1	13.8	16.9	16.9	18.3	14.0	17.2
600	450	70	35	16.4	19.9	11.5	16.6	18.3	21.8	13.4	18.5	20.4	23.8	15.4	20.5	24.1	27.5	19.2	24.3
600	450	80	48	20.8	22.0	20.1	23.0	15.7	16.9	14.9	17.8	21.5	22.7	20.8	23.7	18.2	19.4	17.5	20.4
600	450	80	44	17.2	16.4	14.4	15.3	15.6	14.8	12.8	13.7	18.9	18.1	16.0	17.0	19.1	18.4	16.3	17.2
600	450	80	40	20.5	21.7	15.6	18.5	22.4	23.7	17.5	20.4	23.2	24.4	18.3	21.2	27.0	28.2	22.0	24.9
600	450	90	54	21.7	20.7	20.9	21.6	16.5	15.5	15.8	16.5	21.1	20.1	20.4	21.0	17.8	16.8	17.1	17.8
600	450	90	49	19.0	16.0	16.1	14.9	17.4	14.4	14.5	13.2	19.4	16.5	16.6	15.3	19.7	16.7	16.8	15.5
600	450	90	45	22.7	21.7	17.8	18.5	24.6	23.7	19.7	20.4	24.2	23.2	19.3	19.9	27.9	26.9	23.0	23.7
600	600	70	38	21.7	25.2	21.8	26.9	18.4	21.8	18.5	23.6	23.6	27.1	23.7	28.9	22.2	25.6	22.3	27.4
600	600	70	35	15.5	17.0	13.5	16.7	15.7	17.2	13.7	16.9	18.5	19.9	16.5	19.6	20.5	22.0	18.5	21.7
600	600	70	31	19.6	23.0	15.5	20.6	23.3	26.7	19.2	24.3	23.5	27.0	19.4	24.5	29.1	32.5	25.0	30.1
600	600	80	44	25.2	26.4	25.3	28.2	21.9	23.1	22.0	24.9	25.9	27.1	26.0	28.9	24.4	25.7	24.5	27.4
600	600	80	40	19.6	18.9	17.6	18.6	19.8	19.1	17.8	18.8	21.3	20.6	19.3	20.3	23.4	22.6	21.4	22.3
600	600	80	36	24.1	25.4	20.0	22.9	27.8	29.1	23.7	26.6	26.8	28.0	22.7	25.6	32.4	33.6	28.3	31.2
600	600	90	49	27.0	26.0	27.1	27.8	23.7	22.7	23.8	24.5	26.5	25.5	26.5	27.2	25.0	24.0	25.1	25.8
600	600	90	45	21.9	18.9	19.9	18.6	22.1	19.1	20.1	18.8	22.3	19.3	20.3	19.0	24.4	21.4	22.3	21.1
600	600	90	40	27.0	26.0	22.8	23.5	30.7	29.7	26.6	27.2	28.4	27.4	24.3	25.0	34.0	33.0	29.8	30.5

TABLE E-2A. TOTAL CO EMITTED IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 4*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		HIGH		TRUCKS ON MAJOR STREET LOW		HIGH		TRUCKS ON MAJOR STREET LOW		HIGH		TRUCKS ON MAJOR STREET LOW		HIGH	
				L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	3.0	4.0	6.1	7.1	2.8	3.8	6.7	7.7	5.4	7.2	8.4	10.3	6.0	7.9	9.9	11.7
300	300	50	25	2.7	3.7	4.9	5.9	2.8	3.8	5.9	6.9	5.9	7.7	8.0	9.8	6.8	8.6	9.9	11.7
300	300	50	22	2.6	3.6	4.0	5.0	3.1	4.1	5.3	6.3	6.6	8.4	7.9	9.7	7.9	9.7	10.1	11.9
300	300	60	33	3.7	4.1	6.1	6.4	3.5	3.9	6.7	7.1	5.6	6.7	7.9	9.1	6.2	7.3	9.4	10.5
300	300	60	30	3.9	4.2	5.4	5.7	4.0	4.3	6.4	6.7	6.5	7.6	8.0	9.1	7.5	8.6	9.8	11.0
300	300	60	27	4.3	4.6	4.9	5.2	4.7	5.1	6.2	6.6	7.7	8.8	8.3	9.5	9.0	10.1	10.5	11.6
300	300	70	38	4.3	3.9	7.3	7.0	4.1	3.7	7.9	7.6	5.6	6.1	8.6	9.1	6.2	6.7	10.1	10.6
300	300	70	35	4.0	3.7	6.2	5.9	4.2	3.8	7.2	6.9	6.1	6.6	8.3	8.8	7.1	7.6	10.1	10.6
300	300	70	31	4.1	3.7	5.4	5.1	4.5	4.2	6.7	6.4	6.9	7.4	8.3	8.8	8.3	8.7	10.4	10.9
300	450	50	25	3.7	5.5	8.8	10.5	3.5	5.3	9.5	11.2	6.8	9.4	11.9	14.4	7.5	10.0	13.4	15.9
300	450	50	22	4.3	6.0	8.5	10.3	4.4	6.2	9.5	11.3	8.2	10.7	12.4	14.9	9.1	11.7	14.2	16.8
300	450	50	20	3.5	5.3	6.9	8.7	4.0	5.8	8.3	10.0	8.2	10.8	11.6	14.1	9.5	12.1	13.7	16.3
300	450	60	30	4.2	5.3	8.6	9.7	4.0	5.1	9.3	10.4	6.8	8.7	11.2	13.1	7.4	9.3	12.7	14.5
300	450	60	27	5.2	6.3	8.8	9.9	5.4	6.5	9.8	10.9	8.6	10.5	12.1	14.0	9.6	11.4	13.9	15.8
300	450	60	24	4.9	6.0	7.6	8.7	5.4	6.5	8.9	10.0	9.0	10.9	11.7	13.6	10.3	12.2	13.9	15.8
300	450	70	35	4.5	5.0	9.6	10.0	4.3	4.8	10.3	10.7	6.6	7.8	11.6	12.9	7.2	8.4	13.1	14.3
300	450	70	31	5.2	5.6	9.4	9.8	5.3	5.8	10.4	10.8	8.0	9.2	12.2	13.5	9.0	10.2	14.0	15.3
300	450	70	28	4.5	4.9	7.8	8.3	4.9	5.4	9.2	9.6	8.0	9.3	11.4	12.7	9.4	10.6	13.6	14.8
300	600	60	27	4.4	5.4	11.5	12.5	4.2	5.2	12.1	13.1	8.2	10.0	15.3	17.1	8.8	10.6	16.8	18.6
300	600	60	24	4.2	5.2	10.5	11.5	4.4	5.4	11.5	12.5	8.8	10.6	15.1	16.9	9.8	11.6	16.9	18.7
300	600	60	21	4.4	5.4	9.8	10.8	4.8	5.8	11.1	12.1	9.7	11.5	15.1	16.9	11.0	12.8	17.3	19.1
300	600	70	31	4.9	5.3	11.4	11.7	4.7	5.1	12.0	12.4	8.2	9.4	14.6	15.8	8.8	10.0	16.1	17.3
300	600	70	28	5.2	5.6	10.8	11.2	5.4	5.7	11.8	12.1	9.3	10.4	14.9	16.0	10.2	11.4	16.7	17.8
300	600	70	24	5.7	6.1	10.5	10.8	6.2	6.5	11.8	12.1	10.6	11.7	15.3	16.4	11.9	13.0	17.4	18.6
300	600	80	36	5.3	5.0	12.4	12.1	5.1	4.8	13.1	12.8	8.1	8.6	15.2	15.7	8.7	9.2	16.7	17.1
300	600	80	32	5.3	4.9	11.5	11.2	5.4	5.1	12.5	12.2	8.8	9.3	15.0	15.5	9.7	10.2	16.8	17.3
300	600	80	28	5.4	5.0	10.8	10.4	5.8	5.5	12.1	11.8	9.6	10.1	15.1	15.5	10.9	11.4	17.2	17.7
450	300	50	30	3.4	3.8	7.1	7.5	4.4	4.8	8.9	9.3	8.5	9.7	12.1	13.3	10.2	11.5	14.7	16.0
450	300	50	27	2.6	3.0	5.3	5.8	3.8	4.2	7.5	7.9	8.4	9.6	11.2	12.4	10.5	11.7	14.1	15.4
450	300	50	25	3.2	3.6	5.1	5.5	4.8	5.2	7.6	8.0	9.8	11.0	11.7	12.9	12.2	13.4	15.0	16.2
450	300	60	36	4.2	4.0	7.2	6.9	5.2	4.9	9.0	8.7	8.8	9.3	11.7	12.3	10.5	11.1	14.3	14.9
450	300	60	33	3.9	3.6	5.9	5.7	5.1	4.9	8.1	7.8	9.1	9.7	11.2	11.8	11.2	11.8	14.2	14.8
450	300	60	30	5.0	4.7	6.2	6.0	6.6	6.3	8.7	8.4	11.0	11.6	12.3	12.8	13.5	14.0	15.6	16.1
450	300	70	42	5.4	4.5	9.0	8.1	6.3	5.4	10.8	9.9	9.4	9.3	13.0	12.9	11.1	11.0	15.6	15.5
450	300	70	38	4.7	3.8	7.5	6.6	6.0	5.1	9.7	8.8	9.5	9.4	12.3	12.2	11.6	11.5	15.2	15.1
450	300	70	35	5.5	4.6	7.4	6.5	7.1	6.2	9.9	9.0	11.0	10.9	13.0	12.9	13.5	13.4	16.3	16.2
450	450	60	33	4.1	5.3	9.8	11.0	5.1	6.2	11.6	12.8	9.9	11.9	15.6	17.5	11.6	13.6	18.2	20.1
450	450	60	30	4.2	5.4	9.0	10.2	5.5	6.6	11.2	12.3	10.7	12.7	15.6	17.5	12.8	14.8	18.5	20.5
450	450	60	27	4.2	5.3	8.1	9.3	5.8	6.9	10.6	11.8	11.5	13.4	15.5	17.4	13.9	15.9	18.8	20.7
450	450	70	38	4.6	5.0	9.5	10.0	5.5	6.0	11.3	11.8	9.8	11.1	14.7	16.0	11.5	12.8	17.4	18.7
450	450	70	35	5.1	5.6	9.2	9.7	6.3	6.8	11.3	11.8	11.1	12.4	15.2	16.5	13.2	14.5	18.2	19.5
450	450	70	31	5.5	6.0	8.8	9.3	7.1	7.6	11.3	11.7	12.3	13.6	15.6	16.9	14.7	16.0	18.9	20.2
450	450	80	44	5.3	5.1	10.9	10.8	6.2	6.0	12.7	12.5	9.9	10.6	15.6	16.2	11.7	12.3	18.2	18.9
450	450	80	40	5.5	5.3	10.3	10.1	6.8	6.6	12.5	12.3	11.0	11.6	15.8	16.4	13.1	13.7	18.7	19.4
450	450	80	36	5.6	5.4	9.5	9.4	7.2	7.0	12.0	11.8	11.8	12.4	15.8	16.4	14.2	14.9	19.1	19.7
450	600	70	35	6.5	6.9	14.2	14.6	7.4	7.8	16.0	16.4	13.0	14.2	20.7	21.9	14.7	15.9	23.3	24.5
450	600	70	31	5.9	6.3	12.8	13.2	7.2	7.6	14.9	15.3	13.1	14.3	20.0	21.2	15.2	16.4	23.0	24.2
450	600	70	28	6.7	7.1	12.8	13.2	8.4	8.8	15.2	15.6	14.8	16.0	20.8	22.0	17.2	18.4	24.1	25.3
450	600	80	40	7.0	6.7	14.0	13.8	7.9	7.7	15.8	15.6	12.9	13.5	19.9	20.5	14.7	15.2	22.6	23.1
450	600	80	36	6.8	6.6	13.0	12.8	8.1	7.9	15.2	14.9	13.5	14.1	19.7	20.3	15.6	16.2	22.7	23.2
450	600	80	32	8.1	7.9	13.5	13.2	9.7	9.5	15.9	15.7	15.6	16.2	20.9	21.5	18.1	18.6	24.2	24.8
450	600	90	45	7.9	6.9	15.6	14.7	8.8	7.9	17.4	16.4	13.2	13.1	20.9	20.8	15.0	14.9	23.6	23.5
450	600	90	40	7.4	6.5	14.2	13.3	8.7	7.7	16.4	15.5	13.5	13.4	20.4	20.3	15.6	15.5	23.4	23.3
450	600	90	36	8.3	7.4	14.3	13.4	9.9	9.0	16.8	15.9	15.2	15.1	21.2	21.1	17.7	17.6	24.5	24.4
600	300	60	39	4.4	5.4	8.6	9.6	4.2	5.2	9.3	10.3	10.5	12.3	14.8	16.6	11.2	13.0	16.3	18.1
600	300	60	36	3.0	4.0	6.4	7.4	3.2	4.2	7.4	8.4	10.0	11.8	13.4	15.2	10.9	12.7	15.2	17.0
600	300	60	33	4.5	5.5	7.0	8.0	4.9	5.9	8.3	9.3	12.2	14.0	14.7	16.5	13.5	15.3	16.9	18.7
600	300	70	45	4.4	4.7	8.0	8.3	4.2	4.5	8.6	9.0	10.0	11.2	13.6	14.7	10.6	11.8	15.0	16.2
600	300	70	42	3.5	3.9	6.2	6.6	3.7	4.0	7.2	7.6	9.9	11.1	12.6	13.8	10.9	12.0	14.5	15.6
600	300	70	38	5.5	5.8	7.4	7.7	6.0	6.3	8.7	9.0	12.7	13.8	14.5	15.7	14.0	15.1	16.7	17.8
600	300	80	52	5.2	4.8	9.4	9.1	5.0	4.6	10.1	9.7	10.2	10.7	14.5	15.0	10.9	11.3	16.0	16.4
600	300	80	48	4.1	3.8	7.5	7.2	4.3	4.0	8.5	8.2	10.0	10.5	13.4	13.9	10.9	11.4	15.2	15.7
600	300	80	44	5.8	5.5	8.3	8.0	6.3	5.9	9.7	9.3	12.4	12.9	15.0	15.4	13.7	14.2	17.1	17.6
600	450	70	42	6.7	8.5	13.0	14.8	6.5	8.3	13.7	15.4	13.6	16.1	19.9	22.4	14.2	16.8	21.3	23.9
600	450	70	38	6.4	8.2	11.9	13.6	6.6	8.3	12.8	14.6	14.0	16.6	19.5	22.0	15.0	17.6	21.3	23.9
600	450	70	35	7.1	8.9	11.7	13.5	7.6	9.4	13.1	14.8	15.5	18.1	20.1	22.7	16.8	19.4	22.3	24.8
600	450	80	48	6.3	7.4	11.9	13.0	6.1	7.2	12.5	13.6	12.6	14.5	18.2	20.1	13.2	15.1	19.7	21.6
600	450	80	44	6.5	7.6	11.2	12.3	6.6	7.7	12.2	13.3	13.6	15.4	18.3	20.2	14.5	16.4	20.1	22.0
600	450	80	40	7.7	8.8	11.6	12.7	8.2	9.3	13.0	14.0	15.6	17.5	19.5	21.4	16.9	18.8	21.7	23.5
600	450	90	54	6.7	7.2	13.0	13.4	6.5	7.0	13.7	14.1	12.5	13.7	18.8	20.0	13.1	14.4	20.3	21.5
600	450	90	49	6.7	7.1	12.1	12.6	6.9	7.3	13.1	13.6	13.3	14.5	18.7	19.9	14.2	15.5	20.5	21.8
600	450	90	45	7.6	8.0	12.2	12.6	8.1	8.5	13.5	14.0	15.0	16.2	19.5	20.8	16.3	17.5	21.7	22.9
600	600	70	38	10.2	11.2	18.5	19.5	9.9	10.9	19.1	20.1	17.7	19.5	26.0	27.8	18.3	20.1	27.5	29.3
600	600	70	35	9.0	10.0	16.5	17.5	9.1	10.1	17.5	18.5	17.3	19.1	24.8	26.6	18.3	20.1	26.6	28.4
600	600	70	31	10.6	11.6	17.2	18.2	11.1	12.1	18.5	19.5	19.7	21.5	26.3	28.1	21.0	22.8	28.5	30.3
600	600	80	44	10.1	10.4	17.7	18.0	9.9	10.2	18.3	18.7	17.1	18.2	24.7	25.8	17.7	18.8	26.2	27.3
600	600	80	40	9.4	9.8	16.2	16.6	9.6	9.9	17.2	17.6	17.2	18.4	24.0	25.2	18.2	19.3	25.8	27.0
600	600	80	36	11.5	11.8	17.4	17.8	12.0	12.3	18.8	19.1	20.1	21.2	26.0	27.2	21.4	22.5	28.2	29.3
600	600	90	49	11.0	10.7	19.3	19.0	10.8	10.5	20.0	19.6	17.5	17.9	25.8	26.3	18.1	18.6	27.3	27.7
600	600	90	45	10.0	9.7	17.5	17.2	10.1	9.8	18.5	18.2	17.3	17.8	24.7	25.2	18.2	18.7	26.6	27.1
600	600	90	40	11.7	11.4	18.4	18.1	12.2	11.9	19.7	19.4	19.8	20.3	26.4	26.9	21.1	21.6	28.6	29.1

TABLE E-2B. TOTAL CO EMITTED IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 5*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET								LEFT TURNS ON MINOR STREET							
				LOW LEVEL				HIGH LEVEL				LOW LEVEL				HIGH LEVEL			
				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET			
				LOW		HIGH		LOW		HIGH		LOW		HIGH		LOW		HIGH	
				L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR	
				LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	4.7	5.2	8.1	8.7	3.9	4.4	8.2	8.7	7.1	8.4	10.5	11.8	7.1	8.4	11.4	12.7
300	300	50	25	4.2	4.7	6.7	7.3	3.7	4.2	7.1	7.6	7.3	8.7	9.9	11.2	7.7	9.0	11.1	12.4
300	300	50	22	3.9	4.4	5.6	6.1	3.8	4.3	6.3	6.8	7.9	9.2	9.6	10.9	8.5	9.8	11.1	12.4
300	300	60	33	5.2	5.1	8.0	7.8	4.4	4.2	8.0	7.8	7.1	7.7	9.8	10.5	7.1	7.7	10.7	11.3
300	300	60	30	5.2	5.0	7.1	6.9	4.7	4.5	7.4	7.3	7.8	8.5	9.7	10.4	8.1	8.8	10.9	11.5
300	300	60	27	5.4	5.2	6.4	6.3	5.2	5.1	7.1	7.0	8.8	9.5	9.8	10.5	9.5	10.1	11.4	12.0
300	300	70	38	6.0	5.1	9.4	8.6	5.1	4.3	9.4	8.6	7.3	7.3	10.7	10.7	7.2	7.2	11.5	11.5
300	300	70	35	5.5	4.7	8.1	7.3	5.0	4.2	8.5	7.6	7.6	7.6	10.2	10.2	7.9	7.9	11.4	11.4
300	300	70	31	5.4	4.5	7.1	6.3	5.2	4.4	7.8	7.0	8.2	8.2	10.0	10.0	8.9	8.9	11.5	11.5
300	450	50	25	5.2	6.5	10.7	11.9	4.4	5.6	10.7	11.9	8.3	10.4	13.8	15.8	8.3	10.4	14.6	16.7
300	450	50	22	5.6	6.8	10.2	11.4	5.1	6.3	10.6	11.8	9.5	11.5	14.1	16.1	9.8	11.8	15.3	17.3
300	450	50	20	4.6	5.9	8.4	9.6	4.5	5.7	9.1	10.3	9.3	11.3	13.1	15.1	10.0	12.0	14.6	16.6
300	450	60	30	5.6	6.1	10.3	10.9	4.7	5.3	10.3	10.9	8.1	9.5	12.9	14.3	8.1	9.5	13.7	15.1
300	450	60	27	6.4	7.0	10.3	10.9	5.9	6.4	10.6	11.2	9.7	11.1	13.6	15.0	10.0	11.4	14.8	16.2
300	450	60	24	5.8	6.4	8.9	9.5	5.7	6.2	9.6	10.2	9.9	11.3	13.0	14.4	10.6	12.0	14.5	15.9
300	450	70	35	6.0	6.0	11.5	11.4	5.2	5.1	11.5	11.4	8.1	8.8	13.5	14.2	8.0	8.8	14.4	15.1
300	450	70	31	6.5	6.4	11.1	11.0	6.0	5.9	11.5	11.4	9.3	10.0	13.9	14.6	9.6	10.3	15.1	15.8
300	450	70	28	5.6	5.5	9.3	9.2	5.4	5.3	10.0	9.9	9.1	9.9	12.9	13.6	9.8	10.5	14.4	15.2
300	600	60	27	5.6	6.2	13.1	13.6	4.8	5.3	13.2	13.7	9.4	10.8	16.9	18.3	9.4	10.7	17.8	19.1
300	600	60	24	5.3	5.8	12.0	12.5	4.8	5.3	12.3	12.8	9.9	11.2	16.6	17.9	10.2	11.5	17.7	19.0
300	600	60	21	5.2	5.7	11.0	11.5	5.1	5.6	11.7	12.2	10.6	11.9	16.4	17.7	11.3	12.6	17.9	19.2
300	600	70	31	6.1	5.9	12.9	12.7	5.2	5.1	12.9	12.7	9.3	10.0	16.1	16.8	9.3	10.0	17.0	17.6
300	600	70	28	6.2	6.0	12.1	12.0	5.6	5.5	12.5	12.3	10.2	10.8	16.2	16.8	10.5	11.2	17.3	18.0
300	600	70	24	6.4	6.3	11.6	11.4	6.3	6.1	12.3	12.1	11.3	11.9	16.4	17.0	11.9	12.6	17.9	18.6
300	600	80	36	6.6	5.8	14.1	13.3	5.8	5.0	14.1	13.3	9.3	9.3	16.8	16.8	9.3	9.3	17.7	17.7
300	600	80	32	6.3	5.5	13.0	12.2	5.8	5.0	13.3	12.5	9.8	9.8	16.5	16.5	10.2	10.2	17.7	17.7
300	600	80	28	6.2	5.4	12.0	11.2	6.1	5.2	12.7	11.9	10.5	10.5	16.3	16.3	11.2	11.2	17.8	17.8
450	300	50	30	4.9	4.8	8.9	8.8	5.2	5.1	10.1	10.0	9.9	10.6	13.9	14.7	11.0	11.8	15.9	16.7
450	300	50	27	3.8	3.7	7.0	6.9	4.4	4.3	8.5	8.4	9.6	10.3	12.8	13.5	11.1	11.8	15.1	15.8
450	300	50	25	4.2	4.1	6.5	6.5	5.2	5.1	8.4	8.3	10.8	11.5	13.2	13.9	12.6	13.3	15.8	16.5
450	300	60	36	5.5	4.8	8.9	8.1	5.8	5.1	10.0	9.3	10.0	10.1	13.4	13.4	11.1	11.2	15.3	15.4
450	300	60	33	4.9	4.2	7.4	6.7	5.6	4.8	8.9	8.2	10.2	10.3	12.7	12.8	11.7	11.7	15.0	15.1
450	300	60	30	5.8	5.1	7.5	6.7	6.8	6.0	9.3	8.6	11.9	12.0	13.5	13.6	13.7	13.8	16.2	16.3
450	300	70	42	6.8	5.4	10.9	9.5	7.1	5.7	12.0	10.6	10.8	10.2	14.8	14.2	11.9	11.3	16.8	16.2
450	300	70	38	6.0	4.6	9.2	7.8	6.6	5.2	10.7	9.2	10.7	10.1	13.9	13.3	12.2	11.6	16.2	15.6
450	300	70	35	6.5	5.1	8.9	7.4	7.5	6.1	10.7	9.3	12.1	11.5	14.4	13.8	13.9	13.3	17.1	16.5
450	450	60	33	5.4	6.0	11.4	12.1	5.7	6.3	12.6	13.2	11.1	12.6	17.2	18.7	12.2	13.7	19.2	20.6
450	450	60	30	5.2	5.9	10.5	11.1	5.9	6.5	12.0	12.6	11.8	13.2	17.0	18.5	13.2	14.7	19.3	20.8
450	450	60	27	5.0	5.7	9.4	10.0	6.0	6.6	11.2	11.9	12.3	13.8	16.7	18.2	14.1	15.6	19.4	20.8
450	450	70	38	5.6	5.6	11.0	11.0	5.9	5.9	12.1	12.1	10.8	11.6	16.2	17.0	11.9	12.7	18.2	19.0
450	450	70	35	5.9	5.9	10.5	10.5	6.6	6.6	12.0	12.0	11.9	12.7	16.5	17.3	13.4	14.2	18.8	19.6
450	450	70	31	6.2	6.1	9.8	9.8	7.1	7.1	11.7	11.7	12.9	13.7	16.6	17.4	14.7	15.5	19.3	20.1
450	450	80	44	6.5	5.8	12.6	11.9	6.8	6.1	13.7	13.0	11.2	11.3	17.2	17.4	12.3	12.4	19.2	19.3
450	450	80	40	6.5	5.9	11.7	11.1	7.2	6.5	13.2	12.6	12.0	12.1	17.2	17.3	13.4	13.6	19.5	19.7
450	450	80	36	6.4	5.7	10.8	10.1	7.4	6.7	12.6	11.9	12.6	12.8	17.0	17.2	14.4	14.6	19.7	19.8
450	600	70	35	7.5	7.4	15.6	15.5	7.8	7.7	16.8	16.7	14.0	14.7	22.1	22.8	15.1	15.8	24.1	24.8
450	600	70	31	6.7	6.6	14.0	13.9	7.4	7.3	15.5	15.4	14.0	14.7	21.2	21.9	15.4	16.1	23.5	24.3
450	600	70	28	7.4	7.3	13.8	13.7	8.3	8.2	15.6	15.5	15.4	16.1	21.8	22.5	17.2	17.9	24.5	25.2
450	600	80	40	7.8	7.1	15.3	14.5	8.1	7.4	16.4	15.7	13.8	13.8	21.2	21.2	14.9	14.9	23.2	23.2
450	600	80	36	7.5	6.7	14.1	13.3	8.1	7.4	15.6	14.8	14.2	14.3	20.8	20.8	15.7	15.7	23.1	23.1
450	600	80	32	8.6	7.8	14.3	13.6	9.6	8.8	16.1	15.4	16.1	16.1	21.8	21.8	17.9	17.9	24.4	24.5
450	600	90	45	8.9	7.5	17.0	15.6	9.2	7.8	18.1	16.7	14.3	13.7	22.4	21.8	15.4	14.8	24.3	23.7
450	600	90	40	8.2	6.8	15.5	14.1	8.8	7.4	17.0	15.5	14.4	13.8	21.6	21.0	15.8	15.2	23.9	23.3
450	600	90	36	8.9	7.5	15.3	13.9	9.9	8.5	17.1	15.7	15.8	15.2	22.3	21.7	17.6	17.0	24.9	24.3
600	300	60	39	5.6	6.1	10.2	10.7	4.7	5.2	10.2	10.7	11.7	13.0	16.3	17.7	11.7	13.0	17.2	18.5
600	300	60	36	4.0	4.5	7.8	8.3	3.5	4.0	8.2	8.7	11.0	12.3	14.7	16.1	11.3	12.6	15.9	17.2
600	300	60	33	5.2	5.7	8.2	8.7	5.1	5.6	8.9	9.4	12.9	14.3	15.9	17.2	13.6	14.9	17.4	18.7
600	300	70	45	5.4	5.3	9.4	9.2	4.6	4.4	9.4	9.2	11.0	11.7	15.0	15.6	11.0	11.7	15.8	16.5
600	300	70	42	4.4	4.2	7.5	7.3	3.9	3.7	7.8	7.7	10.7	11.4	13.8	14.5	11.1	11.7	15.0	15.7
600	300	70	38	6.1	6.0	8.4	8.2	6.0	5.8	9.1	8.9	13.3	13.9	15.5	16.2	13.9	14.6	17.1	17.7
600	300	80	52	6.4	5.5	11.0	10.2	5.5	4.7	11.0	10.2	11.4	11.4	16.0	16.0	11.4	11.4	16.9	16.9
600	300	80	48	5.1	4.3	8.9	8.1	4.6	3.8	9.3	8.4	11.0	11.0	14.8	14.7	11.3	11.3	15.9	15.9
600	300	80	44	6.6	5.8	9.5	8.7	6.4	5.6	10.2	9.4	13.2	13.2	16.1	16.1	13.9	13.8	17.7	17.7
600	450	70	42	7.7	9.0	14.4	15.6	6.9	8.1	14.4	15.7	14.6	16.6	21.2	23.3	14.5	16.6	22.1	24.1
600	450	70	38	7.2	8.4	13.0	14.3	6.7	7.9	13.4	14.6	14.8	16.9	20.7	22.7	15.1	17.2	21.8	23.9
600	450	70	35	7.7	9.0	12.7	13.9	7.5	8.8	13.4	14.6	16.1	18.2	21.1	23.2	16.8	18.8	22.6	24.7
600	450	80	48	7.1	7.7	13.1	13.7	6.2	6.8	13.1	13.7	13.4	14.8	19.4	20.8	13.4	14.8	20.2	21.6
600	450	80	44	7.1	7.7	12.2	12.8	6.6	7.2	12.6	13.2	14.2	15.6	19.3	20.7	14.5	15.9	20.5	21.9
600	450	80	40	8.1	8.7	12.4	13.0	8.0	8.5	13.1	13.7	16.0	17.4	20.3	21.7	16.7	18.1	21.8	23.2
600	450	90	54	7.7	7.6	14.4	14.3	6.9	6.8	14.4	14.3	13.5	14.2	20.2	20.9	13.5	14.2	21.0	21.7
600	450	90	49	7.5	7.4	13.3	13.2	7.0	6.9	13.7	13.6	14.0	14.8	19.9	20.6	14.4	15.1	21.1	21.8
600	450	90	45	8.2	8.1	13.2	13.1	8.0	8.0	13.9	13.8	15.5	16.3	20.5	21.2	16.2	16.9	22.0	22.8
600	600	70	38	10.9	11.4	19.6	20.1	10.1	10.6	19.7	20.2	18.5	19.8	27.2	28.5	18.5	19.8	28.0	29.3
600	600	70	35	9.6	10.1	17.4	17.9	9.1	9.6	17.8	18.3	17.9	19.2	25.8	27.1	18.2	19.5	26.9	28.3
600	600	70	31	11.0	11.5	18.0	18.5	10.8	11.3	18.7	19.2	20.1	21.4	27.1	28.4	20.7	22.0	28.6	29.9
600	600	80	44	10.7	10.5	18.7	18.5	9.8	9.7	18.7	18.5	17.7	18.3	25.7	26.3	17.6	18.3	26.5	27.2
600	600	80	40	9.8	9.7	17.0	16.9	9.3	9.2	17.4	17.2	17.6	18.3	24.8	25.5	18.0	18.6	26.0	26.6
600	600	80	36	11.7	11.5	18.0	17.9	11.5	11.4	18.7	18.6	20.3	20.9	26.6	27.3	20.9	21.6	28.1	28.8
600	600	90	49	11.8	10.9	20.5	19.7	10.9	10.1	20.5	19.7	18.2	18.2	26.9	26.9	18.2	18.2	27.8	27.8
600	600	90	45	10.6	9.8	18.4	17.6	10.1	9.3	18.8	18.0	17.8	17.8	25.7	25.7	18.2	18.2	26.9	26.9
600	600	90	40	12.1	11.3	19.1	18.3	12.0	11.1	19.8	19.0	20.2	20.2	27.2	27.2	20.8	20.8	28.7	28.7

TABLE E-2C. TOTAL CO EMITTED IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 5*5

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		HIGH		TRUCKS ON MAJOR STREET LOW		HIGH		TRUCKS ON MAJOR STREET LOW		HIGH		TRUCKS ON MAJOR STREET LOW		HIGH	
				L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	4.3	4.3	8.1	8.2	2.8	2.9	7.5	7.5	6.7	7.5	10.5	11.4	6.1	6.9	10.7	11.6
300	300	50	25	3.6	3.6	6.5	6.6	2.4	2.4	6.3	6.3	6.8	7.6	9.7	10.5	6.4	7.3	10.3	11.1
300	300	50	22	3.1	3.1	5.2	5.3	2.3	2.3	5.3	5.3	7.1	7.9	9.2	10.0	7.1	7.9	10.1	10.9
300	300	60	33	5.7	5.0	8.8	8.1	4.2	3.5	8.2	7.5	7.5	7.7	10.6	10.8	6.9	7.0	10.8	11.0
300	300	60	30	5.4	4.7	7.7	7.0	4.3	3.6	7.4	6.7	8.0	8.2	10.3	10.5	7.7	7.9	10.9	11.0
300	300	60	27	5.4	4.7	6.8	6.2	4.6	3.9	6.9	6.2	8.8	9.0	10.2	10.4	8.8	9.0	11.1	11.3
300	300	70	38	5.6	4.2	9.4	8.1	4.1	2.8	8.8	7.4	6.9	6.4	10.7	10.2	6.2	5.7	10.9	10.4
300	300	70	35	4.9	3.6	7.9	6.6	3.8	2.5	7.6	6.3	7.0	6.5	10.0	9.5	6.7	6.2	10.5	10.0
300	300	70	31	4.6	3.3	6.7	5.4	3.8	2.4	6.7	5.4	7.4	6.9	9.6	9.1	7.5	7.0	10.5	9.9
300	450	50	25	4.6	5.4	10.5	11.2	3.1	3.9	9.9	10.6	7.7	9.3	13.6	15.1	7.1	8.6	13.8	15.3
300	450	50	22	4.8	5.5	9.8	10.5	3.6	4.4	9.5	10.3	8.7	10.2	13.7	15.2	8.3	9.9	14.2	15.8
300	450	50	20	3.6	4.4	7.8	8.5	2.8	3.6	7.8	8.6	8.3	9.8	12.5	14.0	8.3	9.9	13.3	14.9
300	450	60	30	5.8	5.9	10.9	11.0	4.3	4.4	10.3	10.4	8.3	9.2	13.5	14.4	7.7	8.6	13.7	14.6
300	450	60	27	6.4	6.5	10.7	10.8	5.2	5.3	10.4	10.5	9.7	10.6	14.0	14.9	9.4	10.3	14.6	15.5
300	450	60	24	5.6	5.7	9.1	9.2	4.8	4.9	9.2	9.3	9.8	10.7	13.2	14.1	9.8	10.7	14.1	15.0
300	450	70	35	5.4	4.9	11.3	10.7	3.9	3.4	10.7	10.1	7.5	7.7	13.3	13.5	6.8	7.0	13.5	13.7
300	450	70	31	5.7	5.1	10.7	10.1	4.5	4.0	10.4	9.8	8.5	8.7	13.5	13.7	8.2	8.4	14.0	14.3
300	450	70	28	4.5	4.0	8.7	8.1	3.7	3.2	8.8	8.2	8.1	8.4	12.3	12.5	8.2	8.4	13.2	13.4
300	600	60	27	4.8	4.8	12.7	12.7	3.4	3.4	12.1	12.1	8.6	9.5	16.5	17.3	8.0	8.8	16.7	17.6
300	600	60	24	4.3	4.3	11.4	11.4	3.2	3.2	11.1	11.1	8.9	9.7	15.9	16.8	8.6	9.4	16.5	17.3
300	600	60	21	4.0	4.0	10.2	10.2	3.2	3.2	10.3	10.3	9.4	10.2	15.6	16.4	9.4	10.2	16.5	17.3
300	600	70	31	6.1	5.4	13.3	12.6	4.6	3.9	12.6	12.0	9.3	9.5	16.5	16.7	8.7	8.8	16.7	16.9
300	600	70	28	6.0	5.3	12.3	11.7	4.8	4.2	12.0	11.4	10.0	10.2	16.4	16.5	9.7	9.8	16.9	17.1
300	600	70	24	6.0	5.4	11.6	10.9	5.2	4.6	11.6	11.0	10.9	11.0	16.4	16.5	10.9	11.0	17.3	17.4
300	600	80	36	5.8	4.5	13.7	12.4	4.3	3.0	13.1	11.8	8.5	8.0	16.4	15.9	7.9	7.4	16.6	16.1
300	600	80	32	5.3	4.0	12.4	11.1	4.2	2.9	12.1	10.8	8.8	8.3	15.9	15.4	8.5	8.0	16.4	15.9
300	600	80	28	5.0	3.7	11.2	9.9	4.2	2.9	11.3	10.0	9.3	8.8	15.5	15.0	9.3	8.8	16.4	15.9
450	300	50	30	4.2	3.6	8.7	8.1	3.9	3.3	9.2	8.6	9.3	9.5	13.7	13.9	9.8	10.0	15.0	15.3
450	300	50	27	3.0	2.4	6.5	5.9	2.9	2.4	7.4	6.8	8.8	9.0	12.4	12.6	9.6	9.8	14.0	14.3
450	300	50	25	3.2	2.6	5.9	5.3	3.5	2.9	7.1	6.5	9.8	10.0	12.5	12.7	10.9	11.2	14.5	14.7
450	300	60	36	5.7	4.4	9.4	8.2	5.3	4.1	9.9	8.7	10.2	9.8	13.9	13.5	10.7	10.2	15.3	14.8
450	300	60	33	4.9	3.6	7.8	6.5	4.9	3.6	8.6	7.4	10.2	9.7	13.1	12.6	11.0	10.6	14.7	14.3
450	300	60	30	5.6	4.3	7.6	6.4	5.9	4.7	8.8	7.6	11.7	11.2	13.7	13.3	12.8	12.4	15.7	15.3
450	300	70	42	6.2	4.3	10.6	8.7	5.8	3.9	11.1	9.2	10.2	9.1	14.6	13.5	10.6	9.5	15.9	14.8
450	300	70	38	5.1	3.2	8.7	6.8	5.1	3.2	9.6	7.7	9.9	8.8	13.5	12.4	10.7	9.6	15.1	14.0
450	300	70	35	5.5	3.6	8.2	6.3	5.8	3.9	9.4	7.5	11.0	9.9	13.7	12.6	12.2	11.1	15.8	14.7
450	450	60	33	4.5	4.7	11.0	11.1	4.2	4.3	11.5	11.6	10.3	11.2	16.7	17.7	10.7	11.7	18.1	19.0
450	450	60	30	4.2	4.3	9.8	10.0	4.2	4.3	10.7	10.8	10.7	11.7	16.3	17.3	11.5	12.5	18.0	19.0
450	450	60	27	3.7	3.9	8.5	8.7	4.1	4.2	9.7	9.9	11.1	12.0	15.8	16.8	12.2	13.2	17.8	18.8
450	450	70	38	5.6	5.1	11.3	10.8	5.2	4.7	11.9	11.4	10.8	11.1	16.6	16.9	11.3	11.6	17.9	18.2
450	450	70	35	5.7	5.2	10.6	10.1	5.7	5.2	11.5	11.0	11.7	12.0	16.6	16.9	12.5	12.8	18.3	18.6
450	450	70	31	5.7	5.2	9.8	9.3	6.0	5.5	11.0	10.5	12.5	12.8	16.6	16.9	13.6	14.0	18.6	18.9
450	450	80	44	5.6	4.5	12.1	10.9	5.3	4.1	12.6	11.4	10.3	10.0	16.8	16.4	10.8	10.4	18.1	17.8
450	450	90	40	5.5	4.3	11.1	9.9	5.5	4.3	11.9	10.8	10.9	10.6	16.5	16.2	11.7	11.4	18.2	17.9
450	450	80	36	5.1	4.0	9.9	8.7	5.5	4.3	11.1	9.9	11.4	11.0	16.1	15.8	12.5	12.2	18.2	17.8
450	600	70	35	6.5	5.9	15.0	14.4	6.1	5.5	15.5	14.9	12.9	13.2	21.4	21.7	13.4	13.6	22.8	23.0
450	600	70	31	5.5	4.9	13.1	12.5	5.4	4.9	14.0	13.4	12.7	12.9	20.3	20.6	13.5	13.7	22.0	22.2
450	600	70	28	5.9	5.3	12.7	12.1	6.2	5.6	13.9	13.3	13.9	14.1	20.7	21.0	15.1	15.3	22.8	23.0
450	600	80	40	7.6	6.4	15.4	14.2	7.3	6.0	15.9	14.7	13.5	13.1	21.3	20.9	14.0	13.6	22.7	22.2
450	600	80	36	7.0	5.8	14.0	12.8	7.0	5.8	14.9	13.6	13.7	13.3	20.7	20.3	14.6	14.1	22.4	22.0
450	600	80	32	7.9	6.7	14.0	12.8	8.3	7.0	15.2	14.0	15.4	15.0	21.5	21.1	16.6	16.1	23.6	23.1
450	600	90	45	7.8	5.9	16.3	14.4	7.5	5.6	16.8	14.9	13.2	12.1	21.7	20.6	13.7	12.6	23.0	21.9
450	600	90	40	6.9	5.0	14.6	12.7	6.9	5.0	15.5	13.5	13.1	12.0	20.8	19.7	13.9	12.8	22.4	21.3
450	600	90	36	7.4	5.5	14.2	12.3	7.8	5.9	15.4	13.5	14.4	13.3	21.2	20.1	15.5	14.4	23.2	22.1
600	300	60	39	4.7	4.7	9.7	9.7	3.2	3.2	9.1	9.1	10.8	11.6	15.8	16.7	10.2	11.0	16.0	16.9
600	300	60	36	2.9	2.9	7.1	7.1	1.8	1.8	6.8	6.8	9.9	10.7	14.0	14.8	9.5	10.3	14.6	15.4
600	300	60	33	3.9	3.9	7.3	7.3	3.1	3.1	7.3	7.3	11.6	12.5	15.0	15.8	11.7	12.5	15.9	16.7
600	300	70	45	5.3	4.7	9.7	9.0	3.8	3.2	9.0	8.4	10.9	11.1	15.3	15.4	10.3	10.4	15.5	15.6
600	300	70	42	4.1	3.4	7.6	6.9	2.9	2.3	7.3	6.6	10.5	10.6	13.9	14.1	10.1	10.3	14.5	14.6
600	300	70	38	5.6	5.0	8.3	7.6	4.8	4.2	8.3	7.7	12.8	13.0	15.4	15.6	12.8	13.0	16.3	16.5
600	300	80	52	5.5	4.1	10.5	9.2	4.0	2.7	9.9	8.5	10.5	10.0	15.5	15.0	9.9	9.4	15.7	15.2
600	300	80	48	4.0	2.7	8.2	6.9	2.9	1.6	7.9	6.6	9.9	9.4	14.0	13.5	9.5	9.0	14.6	14.1
600	300	80	44	5.3	4.0	8.6	7.3	4.5	3.1	8.7	7.3	11.9	11.4	15.2	14.7	11.9	11.4	16.1	15.6
600	450	70	42	6.6	7.4	13.7	14.4	5.1	5.9	13.1	13.8	13.5	15.0	20.5	22.1	12.8	14.4	20.7	22.3
600	450	70	38	5.9	6.6	12.1	12.9	4.7	5.5	11.8	12.6	13.5	15.1	19.7	21.3	13.2	14.8	20.3	21.8
600	450	70	35	6.2	7.0	11.6	12.3	5.4	6.1	11.6	12.4	14.6	16.2	20.0	21.5	14.6	16.2	20.9	22.4
600	450	80	48	6.8	6.9	13.2	13.3	5.3	5.4	12.6	12.6	13.1	14.0	19.5	20.4	12.4	13.3	19.7	20.6
600	450	80	44	6.6	6.7	12.1	12.2	5.4	5.5	11.8	11.9	13.7	14.6	19.2	20.1	13.3	14.2	19.7	20.6
600	450	80	40	7.4	7.5	12.1	12.2	6.6	6.7	12.2	12.3	15.3	16.2	20.0	20.9	15.3	16.2	20.9	21.8
600	450	90	54	6.6	6.0	13.7	13.1	5.1	4.6	13.1	12.5	12.4	12.6	19.4	19.7	11.7	12.0	19.6	19.9
600	450	90	49	6.2	5.6	12.4	11.8	5.0	4.5	12.1	11.6	12.7	13.0	19.0	19.2	12.4	12.7	19.5	19.7
600	450	90	45	6.7	6.1	12.1	11.5	5.9	5.3	12.1	11.5	14.0	14.3	19.4	19.6	14.0	14.3	20.3	20.5
600	600	70	38	9.6	9.6	18.7	18.7	8.1	8.1	18.1	18.1	17.2	18.0	26.3	27.1	16.5	17.3	26.5	27.3
600	600	70	35	8.0	8.1	16.3	16.3	6.9	6.9	16.0	16.0	16.4	17.2	24.6	25.4	16.1	16.9	25.2	26.0
600	600	70	31	9.2	9.2	16.7	16.7	8.4	8.4	16.7	16.7	18.4	19.2	25.8	26.6	18.4	19.2	26.6	27.5
600	600	80	44	10.2	9.5	18.6	17.9	8.7	8.0	17.9	17.3	17.2	17.3	25.6	25.7	16.5	16.7	25.8	25.9
600	600	80	40	9.1	8.5	16.7	16.0	8.0	7.3	16.4	15.8	16.9	17.1	24.5	24.7	16.6	16.8	25.0	25.2
600	600	80	36	10.8	10.1	17.5	16.9	10.0	9.3	17.6	16.9	19.4	19.5	26.1	26.2	19.4	19.5	27.0	27.1
600	600	90	49	10.4	9.1	19.6	18.2	9.0	7.6	18.9	17.6	16.9	16.4	26.0	25.5	16.3	15.8	26.2	25.7
600	600	90	45	9.1	7.8	17.3	16.0	7.9	6.6	17.0	15.7	16.3	15.8	24.6	24.1	16.0	15.5	25.1	24.6
600	600	90	40	10.4	9.1	17.8	16.5	9.6	8.3	17.9	16.6	18.4	17.9	25.9	25.3	18.5	18.0	26.7	26.2

TABLE E-2D. TOTAL CO EMITTED IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 6*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	3.1	4.1	10.2	11.2	2.9	3.9	10.9	11.9	6.8	8.6	13.9	15.7	7.4	9.2	15.4	17.2
300	300	50	25	2.8	3.8	9.0	10.0	2.9	3.9	10.0	11.0	7.2	9.1	13.5	15.3	8.2	10.0	15.3	17.1
300	300	50	22	2.7	3.7	8.1	9.1	3.2	4.2	9.4	10.4	8.0	9.8	13.4	15.2	9.3	11.1	15.5	17.3
300	300	60	33	3.8	4.2	10.2	10.5	3.6	4.0	10.9	11.2	7.0	8.1	13.3	14.5	7.6	8.7	14.8	16.0
300	300	60	30	4.0	4.3	9.5	9.8	4.1	4.4	10.5	10.8	7.9	9.0	13.4	14.6	8.8	10.0	15.2	16.4
300	300	60	27	4.4	4.7	9.1	9.4	4.8	5.2	10.4	10.7	9.1	10.2	13.8	14.9	10.4	11.5	15.9	17.1
300	300	70	38	4.4	4.0	11.4	11.1	4.2	3.8	12.1	11.8	7.0	7.4	14.0	14.5	7.6	8.1	15.5	16.0
300	300	70	35	4.1	3.8	10.4	10.0	4.3	3.9	11.4	11.0	7.5	8.0	13.7	14.2	8.5	9.0	15.6	16.1
300	300	70	31	4.2	3.8	9.5	9.2	4.6	4.3	10.9	10.6	8.3	8.8	13.7	14.2	9.6	10.1	15.9	16.4
300	450	50	25	4.2	5.9	13.3	15.0	3.9	5.7	13.9	15.7	8.5	11.1	17.6	20.2	9.2	11.7	19.1	21.7
300	450	50	22	4.7	6.5	13.0	14.7	4.8	6.6	14.0	15.7	9.9	12.4	18.1	20.7	10.8	13.4	20.0	22.5
300	450	50	20	4.0	5.7	11.4	13.1	4.4	6.2	12.7	14.5	9.9	12.5	17.3	19.9	11.2	13.8	19.5	22.1
300	450	60	30	4.7	5.7	13.1	14.2	4.4	5.5	13.7	14.8	8.5	10.4	16.9	18.8	9.1	11.0	18.4	20.3
300	450	60	27	5.7	6.8	13.2	14.3	5.8	6.9	14.2	15.3	10.3	12.2	17.9	19.8	11.3	13.2	19.7	21.6
300	450	60	24	5.3	6.4	12.1	13.1	5.8	6.9	13.4	14.5	10.7	12.6	17.5	19.4	12.0	13.9	19.6	21.5
300	450	70	35	5.0	5.4	14.1	14.5	4.8	5.2	14.7	15.2	8.3	9.5	17.4	18.6	8.9	10.1	18.9	20.1
300	450	70	31	5.6	6.0	13.9	14.3	5.8	6.2	14.9	15.3	9.7	10.9	18.0	19.2	10.7	11.9	19.8	21.0
300	450	70	28	4.9	5.3	12.3	12.7	5.4	5.8	13.6	14.1	9.8	11.0	17.2	18.4	11.1	12.3	19.3	20.6
300	600	60	27	5.1	6.1	16.3	17.3	4.9	5.9	16.9	17.9	10.2	12.0	21.3	23.2	10.8	12.6	22.8	24.6
300	600	60	24	5.0	6.0	15.3	16.3	5.1	6.1	16.3	17.3	10.8	12.7	21.2	23.0	11.8	13.6	23.0	24.8
300	600	60	21	5.1	6.1	14.6	15.6	5.6	6.6	15.9	16.9	11.8	13.6	21.2	23.0	13.1	14.9	23.4	25.2
300	600	70	31	5.7	6.0	16.2	16.5	5.5	5.8	16.8	17.2	10.2	11.4	20.7	21.9	10.9	12.0	22.2	23.3
300	600	70	28	6.0	6.3	15.6	15.9	6.1	6.5	16.6	16.9	11.3	12.5	20.9	22.1	12.3	13.4	22.8	23.9
300	600	70	24	6.5	6.8	15.2	15.6	6.9	7.3	16.6	16.9	12.6	13.7	21.4	22.5	13.9	15.0	23.5	24.7
300	600	80	36	6.1	5.8	17.2	16.9	5.9	5.6	17.9	17.6	10.1	10.6	21.2	21.7	10.7	11.2	22.7	23.2
300	600	80	32	6.0	5.7	16.3	16.0	6.1	5.8	17.3	17.0	10.8	11.3	21.1	21.6	11.7	12.2	22.9	23.4
300	600	80	28	6.1	5.8	15.5	15.2	6.6	6.2	16.9	16.6	11.7	12.2	21.1	21.6	13.0	13.5	23.3	23.8
450	300	50	30	3.6	4.0	11.3	11.7	4.5	4.9	13.1	13.5	9.9	11.2	17.6	18.8	11.7	12.9	20.2	21.5
450	300	50	27	2.7	3.1	9.6	10.0	4.0	4.4	11.7	12.1	9.8	11.1	16.7	17.9	11.9	13.2	19.6	20.9
450	300	50	25	3.3	3.7	9.3	9.7	4.9	5.4	11.8	12.2	11.2	12.5	17.2	18.4	13.7	14.9	20.5	21.7
450	300	60	36	4.4	4.2	11.4	11.2	5.3	5.1	13.2	12.9	10.2	10.8	17.2	17.8	12.0	12.5	19.8	20.4
450	300	60	33	4.0	3.8	10.2	9.9	5.3	5.0	12.3	12.0	10.6	11.2	16.7	17.3	12.7	13.3	19.7	20.3
450	300	60	30	5.1	4.9	10.4	10.2	6.7	6.5	12.9	12.6	12.5	13.0	17.8	18.3	14.9	15.5	21.1	21.6
450	300	70	42	5.6	4.7	13.2	12.3	6.5	5.6	15.0	14.1	10.8	10.7	18.5	18.4	12.6	12.5	21.1	21.0
450	300	70	38	4.9	4.0	11.7	10.8	6.2	5.3	13.9	13.0	11.0	10.8	17.8	17.7	13.0	12.9	20.7	20.6
450	300	70	35	5.6	4.7	11.6	10.7	7.3	6.3	14.1	13.2	12.5	12.4	18.5	18.4	14.9	14.8	21.8	21.7
450	450	60	33	4.6	5.8	14.3	15.5	5.6	6.7	16.1	17.3	11.7	13.6	21.4	23.3	13.4	15.4	24.0	26.0
450	450	60	30	4.7	5.8	13.6	14.7	6.0	7.1	15.7	16.9	12.5	14.5	21.4	23.3	14.6	16.6	24.3	26.3
450	450	60	27	4.7	5.8	12.7	13.8	6.3	7.4	15.2	16.3	13.3	15.2	21.3	23.2	15.7	17.7	24.6	26.5
450	450	70	38	5.0	5.5	14.1	14.6	6.0	6.5	15.9	16.4	11.5	12.8	20.6	21.9	13.3	14.6	23.2	24.5
450	450	70	35	5.6	6.0	13.7	14.2	6.8	7.3	15.9	16.4	12.8	14.1	21.0	22.3	14.9	16.2	24.0	25.3
450	450	70	31	6.0	6.5	13.3	13.8	7.6	8.1	15.8	16.3	14.0	15.3	21.4	22.7	16.5	17.8	24.7	26.0
450	450	80	44	5.7	5.6	15.5	15.3	6.7	6.5	17.3	17.1	11.7	12.3	21.4	22.1	13.5	14.1	24.0	24.7
450	450	80	40	6.0	5.8	14.9	14.7	7.3	7.1	17.0	16.8	12.7	13.4	21.6	22.2	14.8	15.5	24.6	25.2
450	450	80	36	6.0	5.9	14.1	13.9	7.7	7.5	16.5	16.4	13.6	14.2	21.6	22.2	16.0	16.7	24.9	25.5
450	600	70	35	7.3	7.7	19.1	19.5	8.2	8.7	20.9	21.3	15.1	16.3	26.8	28.0	16.8	18.0	29.4	30.7
450	600	70	31	6.7	7.1	17.6	18.0	8.0	8.4	19.7	20.2	15.2	16.4	26.1	27.4	17.3	18.5	29.1	30.3
450	600	70	28	7.5	8.0	17.6	18.0	9.2	9.6	20.1	20.5	16.9	18.1	26.9	28.1	19.3	20.5	30.2	31.4
450	600	80	40	7.8	7.5	18.9	19.6	8.7	8.5	20.7	20.4	15.0	15.6	26.1	26.6	16.8	17.3	28.7	29.3
450	600	80	36	7.6	7.4	17.9	17.6	8.9	8.7	20.0	19.8	15.6	16.2	25.9	26.4	17.7	18.3	28.8	29.4
450	600	80	32	8.9	8.7	18.3	18.1	10.5	10.3	20.8	20.5	17.7	18.3	27.1	27.6	20.1	20.7	30.4	30.9
450	600	90	45	8.7	7.7	20.4	19.5	9.6	8.7	22.2	21.3	15.3	15.2	27.1	27.0	17.1	17.0	29.7	29.6
450	600	90	40	8.2	7.3	19.1	18.2	9.5	8.5	21.2	20.3	15.6	15.5	26.5	26.4	17.7	17.6	29.5	29.4
450	600	90	36	9.1	8.2	19.1	18.2	10.7	9.8	21.6	20.7	17.3	17.2	27.4	27.3	19.7	19.6	30.7	30.6
600	300	60	39	4.6	5.6	12.9	13.9	4.4	5.4	13.6	14.6	12.0	13.9	20.3	22.1	12.7	14.5	21.8	23.6
600	300	60	36	3.3	4.3	10.7	11.7	3.4	4.4	11.7	12.7	11.5	13.3	18.9	20.7	12.4	14.3	20.8	22.6
600	300	60	33	4.7	5.7	11.3	12.3	5.2	6.2	12.6	13.6	13.7	15.5	20.3	22.1	15.0	16.8	22.4	24.2
600	300	70	45	4.6	5.0	12.2	12.6	4.4	4.8	12.9	13.2	11.5	12.7	19.1	20.3	12.1	13.3	20.6	21.8
600	300	70	42	3.8	4.1	10.5	10.9	3.9	4.3	11.5	11.9	11.4	12.6	18.2	19.4	12.4	13.6	20.0	21.2
600	300	70	38	5.7	6.1	11.6	12.0	6.2	6.6	13.0	13.3	14.2	15.3	20.1	21.3	15.5	16.6	22.3	23.4
600	300	80	52	5.4	5.1	13.7	13.4	5.2	4.9	14.3	14.0	11.7	12.2	20.0	20.5	12.4	12.9	21.5	22.0
600	300	80	48	4.4	4.0	11.8	11.5	4.5	4.2	12.8	12.5	11.5	12.0	18.9	19.4	12.5	13.0	20.8	21.3
600	300	80	44	6.0	5.7	12.6	12.3	6.5	6.2	13.9	13.6	13.9	14.4	20.5	21.0	15.2	15.7	22.7	23.2
600	450	70	42	7.3	9.0	17.6	19.4	7.1	8.8	18.3	20.0	15.4	18.0	25.7	28.3	16.0	18.6	27.2	29.8
600	450	70	38	7.0	8.7	16.5	18.2	7.1	8.9	17.4	19.2	15.9	18.4	25.4	27.9	16.8	19.4	27.2	29.7
600	450	70	35	7.7	9.4	16.3	18.1	8.2	9.9	17.7	19.4	17.4	19.9	26.0	28.6	18.7	21.2	28.2	30.7
600	450	80	48	6.8	7.9	16.5	17.6	6.6	7.7	17.1	18.2	14.4	16.3	24.1	26.0	15.0	16.9	25.5	27.4
600	450	80	44	7.0	8.1	15.8	16.9	7.2	8.2	16.8	17.9	15.4	17.3	24.2	26.1	16.4	18.2	26.0	27.9
600	450	80	40	8.3	9.4	16.2	17.3	8.7	9.8	17.6	18.6	17.4	19.3	25.4	27.3	18.7	20.6	27.5	29.4
600	450	90	54	7.3	7.7	17.6	18.0	7.1	7.5	18.3	18.7	14.3	15.6	24.7	25.9	15.0	16.2	26.2	27.4
600	450	90	49	7.3	7.7	16.7	17.2	7.4	7.8	17.7	18.2	15.1	16.3	24.6	25.8	16.1	17.3	26.4	27.6
600	450	90	45	8.2	8.6	16.8	17.2	8.6	9.1	18.1	18.6	16.8	18.0	25.4	26.7	18.1	19.3	27.6	28.8
600	600	70	38	11.0	12.0	23.4	24.4	10.8	11.8	24.0	25.0	19.9	21.7	32.2	34.0	20.5	22.3	33.7	35.5
600	600	70	35	9.9	10.9	21.4	22.4	10.0	11.0	22.4	23.4	19.5	21.3	31.0	32.8	20.4	22.3	32.8	34.6
600	600	70	31	11.5	12.5	22.1	23.1	11.9	12.9	23.5	24.5	21.9	23.7	32.5	34.3	23.2	25.0	34.7	36.5
600	600	80	44	10.9	11.3	22.6	22.9	10.7	11.1	23.3	23.6	19.2	20.4	30.9	32.0	19.8	21.0	32.4	33.5
600	600	80	40	10.3	10.6	21.1	21.5	10.4	10.8	22.1	22.5	19.4	20.5	30.2	31.4	20.3	21.5	32.0	33.2
600	600	80	36	12.4	12.7	22.4	22.7	12.8	13.2	23.7	24.0	22.2	23.4	32.2	33.4	23.5	24.7	34.4	35.5
600	600	90	49	11.9	11.5	24.2	23.9	11.7	11.3	24.9	24.6	19.6	20.1	32.0	32.5	20.2	20.7	33.5	34.0
600	600	90	45	10.9	10.6	22.4	22.1	11.0	10.7	23.4	23.1	19.4	19.9	30.9	31.4	20.4	20.9	32.8	33.3
600	600	90	40	12.6	12.3	23.3	23.0	13.1	12.8	24.6	24.3	21.9	22.4	32.6	33.1	23.2	23.7	34.8	35.3

TABLE E-2E. TOTAL CO EMITTED IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	4.6	5.1	12.0	12.5	3.7	4.2	12.0	12.5	8.2	9.5	15.7	17.0	8.2	9.5	16.5	17.9
300	300	50	25	4.0	4.5	10.6	11.1	3.5	4.0	11.0	11.5	8.5	9.8	15.1	16.4	8.8	10.1	16.3	17.6
300	300	50	22	3.7	4.3	9.5	10.0	3.6	4.1	10.2	10.7	9.0	10.3	14.8	16.1	9.7	11.0	16.3	17.6
300	300	60	33	5.1	4.9	11.9	11.7	4.2	4.1	11.9	11.7	8.2	8.9	15.0	15.6	8.2	8.8	15.8	16.5
300	300	60	30	5.0	4.9	10.9	10.8	4.5	4.3	11.3	11.1	8.9	9.6	14.9	15.5	9.3	9.9	16.1	16.7
300	300	60	27	5.2	5.1	10.3	10.1	5.0	4.9	11.0	10.8	9.9	10.6	15.0	15.7	10.6	11.2	16.5	17.2
300	300	70	38	5.8	5.0	13.3	12.4	4.9	4.1	13.3	12.5	8.4	8.4	15.9	15.8	8.4	8.4	16.7	16.7
300	300	70	35	5.4	4.5	12.0	11.2	4.8	4.0	12.3	11.5	8.7	8.7	15.4	15.4	9.1	9.1	16.5	16.5
300	300	70	31	5.2	4.4	11.0	10.2	5.0	4.2	11.7	10.8	9.4	9.4	15.1	15.1	10.0	10.0	16.7	16.7
300	450	50	25	5.4	6.6	14.9	16.1	4.5	5.8	14.9	16.1	9.8	11.8	19.3	21.3	9.7	11.8	20.1	22.2
300	450	50	22	5.7	7.0	14.4	15.6	5.2	6.5	14.8	16.0	10.9	13.0	19.6	21.6	11.2	13.3	20.7	22.8
300	450	50	20	4.8	6.0	12.6	13.8	4.6	5.9	13.3	14.5	10.7	12.8	18.5	20.6	11.4	13.4	20.1	22.1
300	450	60	30	5.7	6.3	14.5	15.1	4.9	5.4	14.5	15.1	9.5	10.9	18.4	19.8	9.5	10.9	19.2	20.6
300	450	60	27	6.5	7.1	14.5	15.1	6.0	6.6	14.8	15.4	11.1	12.5	19.1	20.5	11.5	12.9	20.3	21.7
300	450	60	24	6.0	6.6	13.1	13.7	5.8	6.4	13.8	14.4	11.4	12.8	18.5	19.9	12.0	13.4	20.0	21.4
300	450	70	35	6.2	6.1	15.7	15.6	5.3	5.3	15.7	15.6	9.5	10.2	19.0	19.7	9.5	10.2	19.8	20.6
300	450	70	31	6.6	6.6	15.3	15.2	6.1	6.1	15.7	15.6	10.7	11.5	19.4	20.1	11.0	11.8	20.6	21.3
300	450	70	28	5.7	5.6	13.5	13.4	5.5	5.5	14.2	14.1	10.6	11.3	18.4	19.1	11.2	12.0	19.9	20.6
300	600	60	27	6.1	6.6	17.7	18.2	5.3	5.8	17.7	18.2	11.2	12.5	22.8	24.1	11.2	12.5	23.6	24.9
300	600	60	24	5.8	6.3	16.5	17.0	5.3	5.8	16.8	17.3	11.7	13.0	22.4	23.7	12.0	13.3	23.5	24.9
300	600	60	21	5.7	6.2	15.6	16.1	5.5	6.0	16.3	16.8	12.4	13.7	22.2	23.5	13.0	14.3	23.7	25.1
300	600	70	31	6.5	6.4	17.4	17.2	5.7	5.5	17.4	17.2	11.1	11.7	21.9	22.6	11.1	11.7	22.8	23.4
300	600	70	28	6.6	6.5	16.6	16.5	6.1	6.0	17.0	16.8	12.0	12.6	22.0	22.6	12.3	12.9	23.1	23.8
300	600	70	24	6.9	6.8	16.1	15.9	6.7	6.6	16.8	16.6	13.0	13.7	22.2	22.8	13.7	14.3	23.7	24.4
300	600	80	36	7.1	6.3	18.6	17.8	6.2	5.4	18.7	17.8	11.1	11.1	22.7	22.6	11.1	11.1	23.5	23.5
300	600	80	32	6.8	6.0	17.5	16.7	6.3	5.5	17.9	17.0	11.6	11.6	22.3	22.3	11.9	11.9	23.5	23.5
300	600	80	28	6.7	5.9	16.6	15.7	6.5	5.7	17.3	16.4	12.3	12.3	22.1	22.1	12.9	12.9	23.7	23.6
450	300	50	30	4.8	4.7	12.8	12.8	5.1	5.0	14.0	13.9	11.1	11.8	19.2	19.9	12.2	12.9	21.2	21.9
450	300	50	27	3.7	3.6	10.9	10.8	4.3	4.2	12.4	12.3	10.8	11.5	18.0	18.8	12.3	13.0	20.4	21.1
450	300	50	25	4.1	4.0	10.5	10.4	5.1	5.0	12.3	12.2	12.0	12.7	18.4	19.1	13.8	14.5	21.1	21.8
450	300	60	36	5.4	4.7	12.8	12.0	5.7	5.0	14.0	13.2	11.2	11.3	18.6	18.7	12.3	12.4	20.6	20.6
450	300	60	33	4.8	4.1	11.4	10.6	5.4	4.7	12.9	12.1	11.4	11.5	17.9	18.0	12.9	12.9	20.3	20.3
450	300	60	30	5.7	5.0	11.4	10.7	6.7	5.9	13.2	12.5	13.1	13.1	18.8	18.8	14.9	14.9	21.4	21.5
450	300	70	42	6.7	5.3	14.8	13.4	7.0	5.6	15.0	14.6	12.0	11.4	20.1	19.5	13.1	12.5	22.1	21.5
450	300	70	38	5.9	4.5	13.1	11.7	6.5	5.1	14.6	13.2	11.9	11.3	19.2	18.5	13.4	12.8	21.5	20.9
450	300	70	35	6.4	5.0	12.8	11.4	7.4	6.0	14.6	13.2	13.2	12.6	19.6	19.0	15.0	14.4	22.3	21.7
450	450	60	33	5.6	6.2	15.7	16.4	5.9	6.5	16.9	17.5	12.6	14.1	22.7	24.2	13.7	15.2	24.7	26.2
450	450	60	30	5.5	6.1	14.7	15.4	6.1	6.7	16.2	16.9	13.3	14.7	22.5	24.0	14.7	16.2	24.9	26.3
450	450	60	27	5.2	5.9	13.6	14.3	6.2	6.8	15.5	16.1	13.8	15.3	22.2	23.7	15.6	17.1	24.9	26.4
450	450	70	38	5.8	5.8	15.3	15.2	6.1	6.1	16.4	16.4	12.3	13.1	21.8	22.6	13.4	14.3	23.7	24.5
450	450	70	35	6.1	6.1	14.7	14.7	6.8	6.8	16.2	16.2	13.4	14.2	22.0	22.8	14.9	15.7	24.3	25.1
450	450	70	31	6.4	6.4	14.1	14.1	7.3	7.3	15.9	15.9	14.4	15.2	22.2	23.0	16.2	17.0	24.8	25.6
450	450	80	44	6.7	6.0	16.8	16.1	7.0	6.3	18.0	17.3	12.7	12.8	22.8	22.9	13.8	13.9	24.8	24.9
450	450	80	40	6.7	6.1	16.0	15.3	7.4	6.7	17.5	16.8	13.5	13.6	22.8	22.9	14.9	15.1	25.1	25.2
450	450	80	36	6.6	5.9	15.0	14.4	7.6	6.9	16.9	16.2	14.1	14.3	22.6	22.7	15.9	16.1	25.2	25.4
450	600	70	35	8.1	8.0	20.2	20.1	8.4	8.3	21.4	21.3	15.8	16.5	28.0	28.7	16.9	17.7	29.9	30.7
450	600	70	31	7.3	7.2	18.6	18.5	7.9	7.8	20.1	20.0	15.8	16.5	27.1	27.8	17.2	18.0	29.4	30.1
450	600	70	28	7.9	7.8	18.4	18.3	8.9	8.8	20.2	20.1	17.2	17.9	27.7	28.4	19.0	19.7	30.3	31.0
450	600	80	40	8.4	7.6	19.8	19.1	8.7	7.9	21.0	20.3	15.6	15.6	27.1	27.1	16.7	16.8	29.0	29.1
450	600	80	36	8.0	7.3	18.6	17.9	8.7	7.9	20.1	19.4	16.0	16.1	26.6	26.7	17.5	17.5	29.0	29.0
450	600	80	32	9.1	8.4	18.9	18.1	10.1	9.3	20.7	20.0	17.9	17.9	27.7	27.7	19.7	19.7	30.3	30.4
450	600	90	45	9.4	8.0	21.6	20.2	9.7	8.3	22.7	21.3	16.1	15.5	28.2	27.6	17.2	16.6	30.2	29.6
450	600	90	40	8.7	7.3	20.0	18.6	9.4	8.0	21.5	20.1	16.2	15.6	27.5	26.9	17.6	17.0	29.8	29.2
450	600	90	36	9.4	8.0	19.9	18.5	10.4	9.0	21.7	20.3	17.7	17.1	28.1	27.5	19.5	18.9	30.8	30.2
600	300	60	39	5.5	6.0	14.2	14.7	4.7	5.2	14.2	14.7	13.0	14.3	21.6	23.0	12.9	14.3	22.5	23.8
600	300	60	36	4.0	4.5	11.8	12.3	3.5	4.0	12.2	12.7	12.2	13.5	20.0	21.4	12.5	13.8	21.2	22.5
600	300	60	33	5.2	5.7	12.2	12.7	5.0	5.5	12.9	13.4	14.2	15.5	21.2	22.5	14.9	16.2	22.7	24.0
600	300	70	45	5.4	5.2	13.4	13.2	4.5	4.4	13.4	13.2	12.3	12.9	20.3	20.9	12.3	12.9	21.1	21.8
600	300	70	42	4.3	4.2	11.5	11.3	3.8	3.7	11.8	11.7	12.0	12.6	19.1	19.8	12.3	13.0	20.3	21.0
600	300	70	38	6.1	5.9	12.4	12.2	5.9	5.8	13.1	12.9	14.5	15.2	20.8	21.5	15.2	15.9	22.4	23.0
600	300	80	52	6.3	5.5	15.0	14.2	5.5	4.7	15.0	14.2	12.7	12.7	21.3	21.3	12.6	12.6	22.2	22.2
600	300	80	48	5.1	4.3	12.9	12.1	4.6	3.8	13.3	12.5	12.2	12.2	20.1	20.0	12.5	12.5	21.2	21.2
600	300	80	44	6.5	5.7	13.5	12.7	6.4	5.5	14.2	13.4	14.4	14.4	21.4	21.4	15.1	15.1	23.0	23.0
600	450	70	42	8.0	9.3	18.7	20.0	7.2	8.4	18.7	20.0	16.1	18.2	26.9	28.9	16.1	18.2	27.7	29.8
600	450	70	38	7.5	8.7	17.4	18.6	7.0	8.2	17.7	19.0	16.4	18.5	26.3	28.3	16.7	18.8	27.5	29.5
600	450	70	35	8.0	9.2	17.0	18.3	7.8	9.1	17.7	19.0	17.7	19.7	26.7	28.8	18.4	20.4	28.2	30.3
600	450	80	48	7.4	8.0	17.4	18.0	6.5	7.1	17.4	18.0	15.0	16.4	25.0	26.4	14.9	16.3	25.8	27.2
600	450	80	44	7.4	7.9	16.5	17.1	6.8	7.4	16.9	17.5	15.7	17.1	24.9	26.3	16.1	17.4	26.1	27.5
600	450	80	40	8.4	9.0	16.7	17.3	8.2	8.8	17.4	18.0	17.6	19.0	25.9	27.3	18.2	19.6	27.4	28.8
600	450	90	54	8.0	7.9	18.7	18.6	7.2	7.1	18.7	18.7	15.1	15.8	25.8	26.5	15.0	15.8	26.6	27.4
600	450	90	49	7.8	7.7	17.7	17.6	7.3	7.2	18.0	17.9	15.6	16.4	25.5	26.2	15.9	16.7	26.7	27.4
600	450	90	45	8.5	8.4	17.5	17.4	8.3	8.2	18.2	18.1	17.1	17.8	26.1	26.9	17.8	18.5	27.6	28.4
600	600	70	38	11.5	12.0	24.3	24.8	10.7	11.2	24.3	24.8	20.4	21.7	33.1	34.4	20.3	21.7	34.0	35.3
600	600	70	35	10.2	10.7	22.1	22.6	9.7	10.2	22.4	22.9	19.8	21.1	31.7	33.0	20.1	21.4	32.9	34.2
600	600	70	31	11.6	12.1	22.6	23.1	11.4	11.9	23.3	23.8	22.0	23.3	33.0	34.3	22.6	23.9	34.5	35.9
600	600	80	44	11.3	11.1	23.3	23.2	10.4	10.3	23.3	23.2	19.6	20.2	31.6	32.3	19.5	20.2	32.5	33.1
600	600	80	40	10.4	10.3	21.7	21.5	9.9	9.8	22.0	21.9	19.5	20.2	30.7	31.4	19.8	20.5	31.9	32.6
600	600	80	36	12.3	12.1	22.7	22.5	12.1	12.0	23.4	23.2	22.2	22.8	32.5	33.2	22.8	23.5	34.1	34.7
600	600	90	49	12.4	11.5	25.1	24.3	11.5	10.7	25.1	24.3	20.1	20.1	32.9	32.9	20.1	20.1	33.7	33.7
600	600	90	45	11.2	10.4	23.1	22.3	10.7	9.9	23.5	22.6	19.7	19.7	31.6	31.6	20.0	20.0	32.8	32.8
600	600	90	40	12.7	11.9	23.8	23.0	12.6	11.7	24.5	23.7	22.0	22.0	33.1	33.1	22.7	22.7	34.6	34.6

TABLE E-2F. TOTAL CO EMITTED IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*5

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	4.4	4.4	12.3	12.3	2.9	3.0	11.7	11.7	8.1	8.9	16.0	16.8	7.5	8.3	16.2	17.0
300	300	50	25	3.7	3.7	10.7	10.7	2.5	2.5	10.4	10.4	8.1	9.0	15.2	16.0	7.8	8.6	15.7	16.5
300	300	50	22	3.2	3.2	9.4	9.4	2.4	2.4	9.5	9.5	8.5	9.3	14.6	15.5	8.5	9.3	15.5	16.3
300	300	60	33	5.8	5.1	12.9	12.3	4.3	3.6	12.3	11.7	8.9	9.1	16.1	16.2	8.2	8.4	16.3	16.4
300	300	60	30	5.5	4.8	11.8	11.2	4.4	3.7	11.5	10.9	9.4	9.6	15.8	15.9	9.1	9.3	16.3	16.5
300	300	60	27	5.5	4.8	11.0	10.3	4.7	4.0	11.0	10.4	10.2	10.4	15.7	15.8	10.2	10.4	16.6	16.7
300	300	70	38	5.7	4.3	13.5	12.2	4.2	2.9	12.9	11.6	8.3	7.8	16.1	15.6	7.6	7.1	16.3	15.8
300	300	70	35	5.0	3.7	12.0	10.7	3.9	2.6	11.8	10.5	8.4	7.9	15.4	14.9	8.1	7.6	16.0	15.5
300	300	70	31	4.7	3.4	10.8	9.5	3.9	2.5	10.9	9.6	8.8	8.3	15.0	14.5	8.9	8.4	15.9	15.4
300	450	50	25	5.0	5.8	14.9	15.7	3.6	4.3	14.3	15.1	9.4	11.0	19.3	20.9	8.8	10.3	19.5	21.1
300	450	50	22	5.2	6.0	14.3	15.0	4.1	4.8	14.0	14.7	10.4	11.9	19.4	21.0	10.0	11.6	20.0	21.5
300	450	50	20	4.0	4.8	12.3	13.0	3.2	4.0	12.3	13.1	10.0	11.6	18.2	19.8	10.0	11.6	19.1	20.6
300	450	60	30	6.2	6.3	15.4	15.5	4.7	4.8	14.8	14.9	10.0	10.9	19.2	20.1	9.4	10.3	19.4	20.3
300	450	60	27	6.8	6.9	15.2	15.3	5.6	5.7	14.9	15.0	11.4	12.3	19.8	20.7	11.1	12.0	20.3	21.2
300	450	60	24	6.1	6.1	13.6	13.7	5.2	5.3	13.6	13.7	11.5	12.4	19.0	19.9	11.5	12.4	19.9	20.8
300	450	70	35	5.9	5.3	15.8	15.2	4.4	3.8	15.1	14.6	9.2	9.4	19.1	19.3	8.5	8.7	19.3	19.5
300	450	70	31	6.1	5.5	15.2	14.6	5.0	4.4	14.9	14.3	10.2	10.4	19.3	19.5	9.9	10.1	19.8	20.0
300	450	70	28	5.0	4.4	13.2	12.6	4.2	3.6	13.2	12.7	9.8	10.1	18.1	18.3	9.9	10.1	18.9	19.2
300	600	60	27	5.6	5.6	17.5	17.5	4.1	4.1	16.9	16.9	10.7	11.5	22.6	23.4	10.0	10.8	22.8	23.6
300	600	60	24	5.0	5.1	16.1	16.1	3.9	3.9	15.9	15.9	10.9	11.7	22.0	22.8	10.6	11.4	22.6	23.4
300	600	60	21	4.8	4.8	15.0	15.0	4.0	4.0	15.1	15.1	11.4	12.2	21.7	22.5	11.4	12.3	22.6	23.4
300	600	70	31	6.8	6.1	18.1	17.4	5.3	4.7	17.4	16.8	11.4	11.5	22.6	22.8	10.7	10.8	22.8	23.0
300	600	70	28	6.7	6.0	17.1	16.4	5.5	4.9	16.8	16.2	12.0	12.2	22.4	22.6	11.7	11.9	23.0	23.1
300	600	70	24	6.8	6.1	16.3	15.7	6.0	5.3	16.4	15.7	12.9	13.1	22.5	22.6	12.9	13.1	23.3	23.5
300	600	80	36	6.6	5.2	18.5	17.2	5.1	3.8	17.9	16.6	10.6	10.1	22.5	22.0	9.9	9.4	22.7	22.2
300	600	80	32	6.1	4.8	17.2	15.8	4.9	3.6	16.9	15.6	10.9	10.4	22.0	21.4	10.5	10.0	22.5	22.0
300	600	80	28	5.8	4.4	16.0	14.7	5.0	3.6	16.1	14.8	11.3	10.8	21.6	21.1	11.4	10.9	22.5	22.0
450	300	50	30	4.4	3.8	12.9	12.3	4.0	3.5	13.4	12.8	10.7	11.0	19.2	19.4	11.2	11.4	20.5	20.8
450	300	50	27	3.1	2.5	10.7	10.2	3.1	2.5	11.6	11.0	10.2	10.5	17.9	18.1	11.1	11.3	19.5	19.8
450	300	50	25	3.3	2.7	10.1	9.5	3.7	3.1	11.3	10.7	11.2	11.5	18.0	18.2	12.4	12.6	20.0	20.3
450	300	60	36	5.8	4.6	13.6	12.4	5.5	4.3	14.1	12.9	11.6	11.2	19.4	19.0	12.1	11.7	20.8	20.3
450	300	60	33	5.0	3.8	12.0	10.7	5.0	3.8	12.8	11.6	11.6	11.2	18.6	18.1	12.4	12.0	20.2	19.8
450	300	60	30	5.8	4.5	11.8	10.6	6.1	4.8	13.0	11.8	13.1	12.7	19.2	18.8	14.3	13.8	21.2	20.8
450	300	70	42	6.4	4.5	14.8	12.9	6.0	4.1	15.3	13.4	11.6	10.5	20.1	19.0	12.1	11.0	21.4	20.3
450	300	70	38	5.3	3.4	12.9	11.0	5.3	3.4	13.8	11.9	11.3	10.2	19.0	17.9	12.2	11.1	20.6	19.5
450	300	70	35	5.6	3.7	12.4	10.5	6.0	4.1	13.6	11.7	12.5	11.4	19.2	18.1	13.6	12.5	21.3	20.2
450	450	60	33	5.0	5.2	15.5	15.7	4.7	4.8	16.0	16.2	12.0	13.0	22.6	23.5	12.5	13.5	23.9	24.9
450	450	60	30	4.7	4.8	14.3	14.5	4.7	4.8	15.2	15.3	12.5	13.5	22.2	23.1	13.3	14.3	23.8	24.8
450	450	60	27	4.2	4.4	13.0	13.2	4.6	4.7	14.2	14.4	12.8	13.8	21.7	22.6	14.0	15.0	23.7	24.6
450	450	70	38	6.1	5.6	15.9	15.4	5.7	5.2	16.4	15.9	12.6	12.9	22.4	22.7	13.0	13.3	23.7	24.0
450	450	70	35	6.2	5.7	15.1	14.6	6.2	5.7	16.0	15.5	13.5	13.8	22.4	22.7	14.3	14.6	24.1	24.4
450	450	70	31	6.2	5.7	14.3	13.8	6.5	6.0	15.5	15.0	14.3	14.6	22.4	22.7	15.4	15.7	24.4	24.7
450	450	80	44	6.1	5.0	16.6	15.5	5.8	4.6	17.1	16.0	12.1	11.7	22.6	22.2	12.6	12.2	23.9	23.6
450	450	80	40	6.0	4.8	15.6	14.5	5.9	4.8	16.5	15.3	12.7	12.3	22.4	22.0	13.5	13.2	24.0	23.7
450	450	80	36	5.6	4.5	14.4	13.3	6.0	4.8	15.6	14.5	13.2	12.8	22.0	21.6	14.3	14.0	24.0	23.6
450	600	70	35	7.3	6.7	19.8	19.2	6.9	6.3	20.3	19.8	15.0	15.2	27.6	27.8	15.5	15.7	28.9	29.1
450	600	70	31	6.3	5.7	18.0	17.4	6.3	5.7	18.8	18.2	14.8	15.0	26.5	26.7	15.6	15.8	28.2	28.4
450	600	70	28	6.7	6.1	17.6	17.0	7.0	6.4	18.8	18.2	16.0	16.2	26.9	27.1	17.2	17.4	28.9	29.1
450	600	80	40	8.4	7.2	20.3	19.0	8.1	6.8	20.8	19.5	15.6	15.2	27.5	27.0	16.1	15.6	28.8	28.4
450	600	80	36	7.9	6.6	18.9	17.6	7.8	6.6	19.7	18.5	15.8	15.4	26.9	26.4	16.7	16.2	28.5	28.1
450	600	80	32	8.7	7.5	18.9	17.7	9.1	7.8	20.1	18.8	17.5	17.1	27.7	27.2	18.7	18.2	29.7	29.3
450	600	90	45	8.6	6.7	21.2	19.3	8.3	6.4	21.7	19.8	15.3	14.2	27.8	26.7	15.8	14.7	29.2	28.1
450	600	90	40	7.7	5.8	19.4	17.5	7.7	5.8	20.3	18.4	15.2	14.1	26.9	25.8	16.0	14.9	28.6	27.5
450	600	90	36	8.2	6.3	19.1	17.2	8.6	6.7	20.3	18.4	16.5	15.4	27.3	26.2	17.6	16.5	29.3	28.2
600	300	60	39	4.9	4.9	14.0	14.0	3.4	3.4	13.4	13.4	12.3	13.2	21.4	22.2	11.7	12.5	21.6	22.4
600	300	60	36	3.2	3.2	11.4	11.4	2.0	2.0	11.1	11.1	11.4	12.2	19.6	20.4	11.1	11.9	20.1	21.0
600	300	60	33	4.2	4.2	11.5	11.6	3.4	3.4	11.6	11.6	13.2	14.0	20.5	21.4	13.2	14.0	21.4	22.2
600	300	70	45	5.6	4.9	14.0	13.3	4.1	3.4	13.3	12.7	12.5	12.6	20.8	21.0	11.8	11.9	21.0	21.2
600	300	70	42	4.3	3.6	11.8	11.2	3.2	2.5	11.6	10.9	12.0	12.1	19.5	19.7	11.7	11.8	20.1	20.2
600	300	70	38	5.9	5.2	12.6	11.9	5.1	4.4	12.6	12.0	14.3	14.5	21.0	21.2	14.3	14.5	21.9	22.1
600	300	80	52	5.7	4.4	14.8	13.4	4.2	2.9	14.1	12.8	12.0	11.5	21.1	20.6	11.4	10.9	21.3	20.8
600	300	80	48	4.3	2.9	12.5	11.2	3.1	1.8	12.2	10.9	11.4	10.9	19.6	19.1	11.1	10.6	20.2	19.7
600	300	80	44	5.5	4.2	12.9	11.6	4.7	3.4	12.9	11.6	13.4	12.9	20.8	20.3	13.4	12.9	21.7	21.2
600	450	70	42	7.2	7.9	18.3	19.0	5.7	6.4	17.7	18.4	15.3	16.9	26.4	28.0	14.6	16.2	26.6	28.2
600	450	70	38	6.4	7.2	16.7	17.5	5.3	6.0	16.4	17.2	15.4	16.9	25.6	27.2	15.0	16.6	26.2	27.7
600	450	70	35	6.8	7.5	16.2	16.9	5.9	6.7	16.2	17.0	16.5	18.0	25.9	27.4	16.5	18.0	26.8	28.3
600	450	80	48	7.3	7.4	17.8	17.9	5.9	6.0	17.2	17.2	14.9	15.8	25.4	26.3	14.3	15.2	25.6	26.5
600	450	80	44	7.1	7.2	16.7	16.8	6.0	6.1	16.4	16.5	15.5	16.4	25.1	26.0	15.2	16.1	25.6	26.5
600	450	80	40	8.0	8.1	16.7	16.8	7.2	7.3	16.8	16.9	17.1	18.0	25.9	26.8	17.2	18.1	26.8	27.7
600	450	90	54	7.2	6.6	18.3	17.7	5.7	5.1	17.7	17.1	14.2	14.5	25.3	25.6	13.6	13.8	25.5	25.8
600	450	90	49	6.7	6.2	17.0	16.4	5.6	5.0	16.7	16.2	14.6	14.8	24.8	25.1	14.3	14.5	25.4	25.6
600	450	90	45	7.2	6.7	16.7	16.1	6.4	5.9	16.7	16.1	15.9	16.1	25.3	25.5	15.9	16.1	26.2	26.4
600	600	70	38	10.5	10.5	23.6	23.6	9.0	9.0	23.0	23.0	19.3	20.1	32.5	33.3	18.7	19.5	32.7	33.5
600	600	70	35	8.9	8.9	21.2	21.2	7.8	7.8	20.9	20.9	18.5	19.4	30.8	31.7	18.2	19.0	31.4	32.2
600	600	70	31	10.1	10.1	21.6	21.6	9.3	9.3	21.6	21.6	20.5	21.3	32.0	32.8	20.5	21.3	32.9	33.7
600	600	80	44	11.0	10.4	23.5	22.8	9.5	8.9	22.9	22.2	19.3	19.5	31.8	31.9	18.7	18.8	32.0	32.1
600	600	80	40	10.0	9.3	21.6	21.0	8.9	8.2	21.3	20.7	19.1	19.2	30.7	30.9	18.8	18.9	31.2	31.4
600	600	80	36	11.7	11.0	22.4	21.8	10.9	10.2	22.5	21.8	21.5	21.7	32.3	32.5	21.5	21.7	33.2	33.3
600	600	90	49	11.3	10.0	24.5	23.2	9.8	8.5	23.8	22.5	19.1	18.6	32.2	31.7	18.4	17.9	32.4	31.9
600	600	90	45	9.9	8.6	22.2	20.9	8.8	7.5	22.0	20.7	18.5	18.0	30.8	30.3	18.2	17.7	31.3	30.8
600	600	90	40	11.3	10.0	22.7	21.4	10.5	9.2	22.8	21.5	20.6	20.1	32.1	31.6	20.6	20.1	32.9	32.4

TABLE E-2G. TOTAL CO EMITTED IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 6*6

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	4.5	5.5	11.2	12.2	4.3	5.3	11.8	12.8	9.4	11.2	16.2	18.0	10.1	11.9	17.6	19.5
300	300	50	25	4.1	5.1	10.0	11.0	4.2	5.2	11.0	12.0	9.9	11.7	15.7	17.6	10.8	12.6	17.6	19.4
300	300	50	22	4.1	5.1	9.1	10.1	4.5	5.5	10.4	11.4	10.6	12.4	15.6	17.4	11.9	13.7	17.8	19.6
300	300	60	33	5.2	5.5	11.2	11.5	4.9	5.3	11.8	12.2	9.6	10.7	15.6	16.8	10.2	11.4	17.1	18.3
300	300	60	30	5.3	5.6	10.5	10.8	5.4	5.8	11.5	11.8	10.5	11.7	15.7	16.8	11.5	12.6	17.5	18.7
300	300	60	27	5.7	6.0	10.0	10.4	6.2	6.5	11.4	11.7	11.7	12.8	16.0	17.2	13.0	14.1	18.2	19.3
300	300	70	38	5.7	5.4	12.4	12.1	5.5	5.2	13.1	12.8	9.6	10.1	16.3	16.8	10.2	10.7	17.8	18.3
300	300	70	35	5.5	5.1	11.3	11.0	5.6	5.3	12.3	12.0	10.1	10.6	16.0	16.5	11.1	11.6	17.8	18.3
300	300	70	31	5.5	5.2	10.5	10.2	6.0	5.7	11.9	11.6	11.0	11.5	16.0	16.5	12.3	12.8	18.2	18.6
300	450	50	25	5.2	6.9	13.9	15.7	5.0	6.7	14.6	16.3	10.8	13.4	19.6	22.2	11.5	14.0	21.1	23.6
300	450	50	22	5.7	7.5	13.6	15.4	5.9	7.6	14.6	16.4	12.2	14.7	20.1	22.7	13.1	15.7	21.9	24.5
300	450	50	20	5.0	6.7	12.0	13.8	5.5	7.2	13.4	15.1	12.2	14.8	19.3	21.8	13.5	16.1	21.4	24.0
300	450	60	30	5.7	6.8	13.7	14.8	5.5	6.5	14.4	15.5	10.8	12.7	18.9	20.8	11.4	13.3	20.4	22.3
300	450	60	27	6.7	7.8	13.9	15.0	6.8	7.9	14.9	16.0	12.6	14.5	19.8	21.7	13.6	15.5	21.7	23.5
300	450	60	24	6.3	7.4	12.7	13.8	6.8	7.9	14.1	15.1	13.0	14.9	19.4	21.3	14.3	16.2	21.6	23.5
300	450	70	35	6.0	6.4	14.7	15.2	5.8	6.2	15.4	15.8	10.6	11.8	19.3	20.6	11.2	12.4	20.8	22.1
300	450	70	31	6.6	7.1	14.6	15.0	6.8	7.2	15.5	16.0	12.0	13.2	19.9	21.2	13.0	14.2	21.8	23.0
300	450	70	28	5.9	6.3	13.0	13.4	6.4	6.8	14.3	14.7	12.1	13.3	19.1	20.4	13.4	14.6	21.3	22.5
300	600	60	27	5.8	6.8	16.6	17.6	5.6	6.6	17.3	18.3	12.2	14.0	23.0	24.8	12.8	14.6	24.5	26.3
300	600	60	24	5.7	6.7	15.6	16.6	5.8	6.8	16.6	17.6	12.8	14.6	22.8	24.6	13.8	15.6	24.6	26.4
300	600	60	21	5.8	6.8	14.9	15.9	6.3	7.3	16.2	17.2	13.7	15.5	22.8	24.7	15.0	16.8	25.0	26.8
300	600	70	31	6.4	6.7	16.5	16.8	6.2	6.5	17.2	17.5	12.2	13.4	22.3	23.5	12.8	14.0	23.8	25.0
300	600	70	28	6.7	7.0	15.9	16.3	6.8	7.2	16.9	17.3	13.3	14.4	22.6	23.7	14.3	15.4	24.4	25.5
300	600	70	24	7.2	7.5	15.6	15.9	7.6	8.0	16.9	17.3	14.6	15.7	23.0	24.1	15.9	17.0	25.2	26.3
300	600	80	36	6.8	6.5	17.6	17.3	6.6	6.3	18.2	17.9	12.1	12.6	22.9	23.4	12.7	13.2	24.4	24.9
300	600	80	32	6.7	6.4	16.6	16.3	6.8	6.5	17.6	17.3	12.8	13.3	22.7	23.2	13.7	14.2	24.6	25.0
300	600	80	28	6.8	6.5	15.9	15.6	7.3	6.9	17.2	16.9	13.7	14.1	22.8	23.3	15.0	15.4	24.9	25.4
450	300	50	30	5.7	6.1	13.0	13.4	6.6	7.0	14.8	15.2	13.3	14.5	20.6	21.8	15.0	16.3	23.2	24.5
450	300	50	27	4.8	5.2	11.3	11.7	6.1	6.5	13.4	13.8	13.2	14.4	19.7	20.9	15.3	16.5	22.6	23.9
450	300	50	25	5.4	5.8	11.0	11.5	7.0	7.4	13.5	13.9	14.6	15.8	20.2	21.5	17.0	18.3	23.5	24.8
450	300	60	36	6.5	6.2	13.1	12.9	7.4	7.2	14.9	14.7	13.6	14.1	20.2	20.8	15.3	15.9	22.8	23.4
450	300	60	33	6.1	5.8	11.9	11.6	7.4	7.1	14.0	13.8	14.0	14.5	19.7	20.3	16.1	16.6	22.7	23.3
450	300	60	30	7.2	6.9	12.1	11.9	8.8	8.5	14.6	14.4	15.8	16.4	20.8	21.3	18.3	18.8	24.1	24.7
450	300	70	42	7.6	6.7	15.0	14.1	8.6	7.7	16.8	15.8	14.2	14.1	21.5	21.4	15.9	15.8	24.1	24.0
450	300	70	38	7.0	6.1	13.5	12.5	8.2	7.3	15.6	14.7	14.3	14.2	20.8	20.7	16.4	16.3	23.8	23.6
450	300	70	35	7.7	6.8	13.4	12.4	9.3	8.4	15.8	14.9	15.8	15.7	21.5	21.4	18.3	18.2	24.8	24.7
450	450	60	33	6.4	7.5	15.7	16.9	7.3	8.5	17.5	18.7	14.7	16.7	24.1	26.0	16.5	18.4	26.7	28.7
450	450	60	30	6.4	7.6	15.0	16.1	7.7	8.9	17.1	18.2	15.5	17.5	24.1	26.0	17.6	19.6	27.0	29.0
450	450	60	27	6.4	7.5	14.1	15.2	8.0	9.2	16.5	17.7	16.3	18.3	24.0	25.9	18.7	20.7	27.3	29.2
450	450	70	38	6.8	7.3	15.5	16.0	7.7	8.2	17.3	17.8	14.6	15.9	23.3	24.6	16.3	17.6	25.9	27.2
450	450	70	35	7.3	7.8	15.1	15.6	8.6	9.1	17.3	17.8	15.9	17.2	23.7	25.0	18.0	19.3	26.7	28.0
450	450	70	31	7.7	8.2	14.7	15.2	9.3	9.8	17.2	17.7	17.1	18.4	24.1	25.4	19.5	20.8	27.4	28.7
450	450	80	44	7.5	7.3	16.9	16.7	8.4	8.2	18.6	18.5	14.7	15.4	24.1	24.7	16.5	17.1	26.7	27.4
450	450	80	40	7.7	7.6	16.2	16.1	9.0	8.8	18.4	18.2	15.8	16.4	24.3	24.9	17.9	18.5	27.2	27.9
450	450	80	36	7.8	7.6	15.5	15.3	9.4	9.2	17.9	17.8	16.6	17.3	24.3	24.9	19.1	19.7	27.6	28.2
450	600	70	35	8.7	9.1	20.1	20.6	9.7	10.1	21.9	22.4	17.8	19.0	29.2	30.4	19.5	20.7	31.8	33.0
450	600	70	31	8.1	8.5	18.7	19.1	9.4	9.8	20.8	21.2	17.9	19.2	28.5	29.7	20.0	21.3	31.5	32.7
450	600	70	28	9.0	9.4	18.7	19.1	10.6	11.0	21.2	21.6	19.6	20.8	29.3	30.5	22.0	23.2	32.6	33.8
450	600	80	40	9.2	9.0	19.9	19.7	10.2	9.9	21.7	21.5	17.7	18.3	28.4	29.0	19.5	20.0	31.1	31.6
450	600	80	36	9.1	8.8	18.9	18.7	10.3	10.1	21.1	20.8	18.4	18.9	28.2	28.8	20.5	21.0	31.2	31.7
450	600	80	32	10.4	10.1	19.4	19.1	12.0	11.7	21.9	21.6	20.4	21.0	29.4	30.0	22.9	23.4	32.7	33.3
450	600	90	45	10.1	9.2	21.5	20.6	11.0	10.1	23.3	22.4	18.0	17.9	29.5	29.3	19.8	19.7	32.1	32.0
450	600	90	40	9.6	8.7	20.2	19.3	10.9	10.0	22.3	21.4	18.4	18.2	28.9	28.8	20.4	20.3	31.9	31.8
450	600	90	36	10.5	9.6	20.2	19.3	12.1	11.2	22.7	21.8	20.0	19.9	29.7	29.6	22.5	22.4	33.0	32.9
600	300	60	39	7.4	8.4	15.4	16.4	7.2	8.2	16.0	17.0	16.1	17.9	24.1	25.9	16.8	18.6	25.6	27.4
600	300	60	36	6.1	7.1	13.2	14.2	6.2	7.2	14.2	15.2	15.6	17.4	22.7	24.5	16.5	18.3	24.5	26.3
600	300	60	33	7.5	8.5	13.7	14.7	8.0	9.0	15.1	16.1	17.8	19.6	24.0	25.8	19.1	20.9	26.2	28.0
600	300	70	45	7.4	7.8	14.7	15.0	7.2	7.6	15.3	15.7	15.6	16.8	22.9	24.0	16.2	17.4	24.3	25.5
600	300	70	42	6.6	6.9	13.0	13.3	6.7	7.1	14.0	14.3	15.5	16.7	21.9	23.1	16.5	17.6	23.8	24.9
600	300	70	38	8.5	8.9	14.1	14.4	9.0	9.4	15.4	15.8	18.3	19.4	23.8	25.0	19.6	20.7	26.0	27.2
600	300	80	52	8.2	7.9	16.1	15.8	8.0	7.7	16.8	16.5	15.8	16.3	23.8	24.3	16.5	16.9	25.3	25.7
600	300	80	48	7.2	6.8	14.3	13.9	7.3	7.0	15.3	14.9	15.6	16.1	22.7	23.2	16.5	17.0	24.5	25.0
600	300	80	44	8.8	8.5	15.1	14.7	9.3	9.0	16.4	16.1	18.0	18.5	24.3	24.8	19.3	19.8	26.4	26.9
600	450	70	42	9.8	11.5	19.7	21.5	9.6	11.3	20.4	22.2	19.2	21.7	29.2	31.7	19.8	22.4	30.7	33.2
600	450	70	38	9.5	11.2	18.6	20.3	9.6	11.3	19.6	21.3	19.7	22.2	28.8	31.3	20.6	23.2	30.6	33.2
600	450	70	35	10.2	11.9	18.4	20.2	10.6	12.4	19.8	21.5	21.2	23.7	29.4	32.0	22.5	25.0	31.6	34.2
600	450	80	48	9.3	10.4	18.6	19.7	9.1	10.2	19.3	20.3	18.2	20.1	27.5	29.4	18.8	20.7	29.0	30.9
600	450	80	44	9.5	10.6	17.9	19.0	9.6	10.7	18.9	20.0	19.2	21.1	27.6	29.5	20.1	22.0	29.4	31.3
600	450	80	40	10.8	11.8	18.3	19.4	11.2	12.3	19.7	20.8	21.2	23.1	28.8	30.7	22.5	24.4	31.0	32.9
600	450	90	54	9.8	10.2	19.7	20.2	9.6	10.0	20.4	20.8	18.1	19.3	28.1	29.3	18.7	20.0	29.6	30.8
600	450	90	49	9.7	10.2	18.9	19.3	9.9	10.3	19.9	20.3	18.9	20.1	28.0	29.2	19.8	21.1	29.8	31.1
600	450	90	45	10.6	11.1	18.9	19.4	11.1	11.5	20.3	20.7	20.6	21.8	28.8	30.1	21.9	23.1	31.0	32.2
600	600	70	38	13.2	14.2	25.2	26.2	13.0	14.0	25.9	26.9	23.3	25.1	35.3	37.1	23.9	25.7	36.8	38.6
600	600	70	35	12.0	13.0	23.2	24.2	12.2	13.2	24.2	25.2	22.9	24.7	34.1	35.9	23.9	25.7	35.9	37.7
600	600	70	31	13.6	14.6	23.9	24.9	14.1	15.1	25.3	26.3	25.3	27.1	35.6	37.4	26.6	28.4	37.8	39.6
600	600	80	44	13.1	13.4	24.4	24.8	12.9	13.2	25.1	25.4	22.7	23.8	34.0	35.1	23.3	24.4	35.5	36.6
600	600	80	40	12.5	12.8	22.9	23.3	12.6	12.9	23.9	24.3	22.8	24.0	33.3	34.5	23.8	24.9	35.1	36.3
600	600	80	36	14.5	14.9	24.2	24.5	15.0	15.3	25.5	25.8	25.7	26.8	35.3	36.5	27.0	28.1	37.5	38.6
600	600	90	49	14.0	13.7	26.0	25.7	13.8	13.5	26.7	26.4	23.1	23.6	35.1	35.6	23.7	24.2	36.6	37.1
600	600	90	45	13.0	12.7	24.2	23.9	13.2	12.9	25.2	24.9	22.9	23.4	34.0	34.5	23.8	24.3	35.9	36.4
600	600	90	40	14.8	14.5	25.1	24.8	15.3	14.9	26.4	26.1	25.4	25.9	35.7	36.2	26.7	27.2	37.9	38.4

TABLE E-2H. TOTAL CO EMITTED IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*6

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET LOW LEVEL								TRUCKS ON THE MINOR STREET HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	5.6	6.1	12.7	13.2	4.8	5.3	12.8	13.3	10.6	11.9	17.7	19.0	10.6	11.9	18.6	19.9
300	300	50	25	5.1	5.6	11.3	11.8	4.6	5.1	11.7	12.2	10.8	12.1	17.1	18.4	11.1	12.5	18.3	19.6
300	300	50	22	4.8	5.3	10.2	10.7	4.6	5.1	10.9	11.4	11.3	12.7	16.8	18.1	12.0	13.3	18.3	19.6
300	300	60	33	6.1	6.0	12.6	12.4	5.3	5.1	12.6	12.4	10.6	11.2	17.0	17.6	10.5	11.2	17.8	18.5
300	300	60	30	6.1	5.9	11.7	11.5	5.6	5.4	12.0	11.9	11.3	11.9	16.9	17.5	11.6	12.3	18.1	18.7
300	300	60	27	6.3	6.1	11.0	10.9	6.1	5.9	11.7	11.6	12.3	12.9	17.0	17.7	12.9	13.6	18.5	19.2
300	300	70	38	6.8	6.0	14.0	13.1	6.0	5.2	14.0	13.2	10.7	10.7	17.9	17.8	10.7	10.7	18.7	18.7
300	300	70	35	6.4	5.6	12.7	11.9	5.9	5.1	13.0	12.2	11.1	11.1	17.4	17.4	11.4	11.4	18.5	18.5
300	300	70	31	6.3	5.4	11.7	10.9	6.1	5.3	12.4	11.6	11.7	11.7	17.1	17.1	12.4	12.4	18.7	18.7
300	450	50	25	6.1	7.4	15.3	16.5	5.3	6.5	15.3	16.5	11.8	13.8	20.9	23.0	11.8	13.8	21.8	23.8
300	450	50	22	6.5	7.7	14.8	16.0	6.0	7.2	15.1	16.4	12.9	15.0	21.2	23.3	13.3	15.3	22.4	24.5
300	450	50	20	5.5	6.8	13.0	14.2	5.4	6.6	13.7	14.9	12.8	14.8	20.2	22.3	13.4	15.5	21.7	23.8
300	450	60	30	6.4	7.0	14.9	15.5	5.6	6.2	14.9	15.5	11.6	13.0	20.0	21.4	11.6	13.0	20.9	22.3
300	450	60	27	7.3	7.8	14.9	15.5	6.8	7.3	15.2	15.8	13.2	14.6	20.8	22.2	13.5	14.9	22.0	23.4
300	450	60	24	6.7	7.3	13.5	14.1	6.6	7.1	14.2	14.8	13.4	14.8	20.2	21.6	14.1	15.5	21.7	23.1
300	450	70	35	6.9	6.9	16.1	16.0	6.1	6.0	16.1	16.0	11.5	12.3	20.7	21.4	11.5	12.2	21.5	22.3
300	450	70	31	7.4	7.3	15.7	15.6	6.9	6.8	16.0	16.0	12.8	13.5	21.1	21.8	13.1	13.8	22.3	23.0
300	450	70	28	6.4	6.4	13.9	13.8	6.3	6.2	14.6	14.5	12.6	13.3	20.1	20.8	13.3	14.0	21.6	22.3
300	600	60	27	6.5	7.0	17.7	18.2	5.7	6.2	17.8	18.3	12.9	14.2	24.1	25.4	12.9	14.2	25.0	26.3
300	600	60	24	6.2	6.7	16.6	17.1	5.7	6.2	16.9	17.4	13.4	14.7	23.7	25.0	13.7	15.0	24.9	26.2
300	600	60	21	6.1	6.6	15.6	16.1	6.0	6.5	16.3	16.8	14.1	15.4	23.6	24.9	14.7	16.0	25.1	26.4
300	600	70	31	7.0	6.8	17.5	17.3	6.1	6.0	17.5	17.3	12.8	13.4	23.3	24.0	12.8	13.4	24.1	24.8
300	600	70	28	7.0	6.9	16.7	16.5	6.5	6.4	17.1	16.9	13.7	14.3	23.3	24.0	14.0	14.6	24.5	25.2
300	600	70	24	7.3	7.2	16.1	16.0	7.2	7.0	16.8	16.7	14.7	15.4	23.6	24.2	15.4	16.1	25.1	25.7
300	600	80	36	7.5	6.7	18.7	17.9	6.7	5.9	18.7	17.9	12.8	12.8	24.0	24.0	12.8	12.8	24.9	24.9
300	600	80	32	7.2	6.4	17.6	16.8	6.7	5.9	17.9	17.1	13.3	13.3	23.7	23.7	13.6	13.6	24.8	24.8
300	600	80	28	7.1	6.3	16.6	15.8	7.0	6.1	17.3	16.5	14.0	14.0	23.5	23.5	14.7	14.6	25.0	25.0
450	300	50	30	6.6	6.5	14.3	14.2	6.9	6.8	15.4	15.4	14.2	14.9	21.9	22.6	15.3	16.0	23.9	24.6
450	300	50	27	5.5	5.4	12.4	12.3	6.1	6.0	13.9	13.8	13.9	14.6	20.8	21.5	15.4	16.1	23.1	23.8
450	300	50	25	5.9	5.8	11.9	11.8	6.9	6.8	13.8	13.7	15.1	15.8	21.1	21.8	16.9	17.6	23.8	24.5
450	300	60	36	7.2	6.5	14.2	13.5	7.5	6.7	15.4	14.7	14.3	14.4	21.3	21.4	15.4	15.5	23.3	23.4
450	300	60	33	6.6	5.9	12.8	12.1	7.2	6.5	14.3	13.5	14.5	14.5	20.7	20.7	15.9	16.0	23.0	23.1
450	300	60	30	7.5	6.8	12.9	12.1	8.5	7.7	14.7	13.9	16.2	16.2	21.5	21.6	18.0	18.0	24.2	24.2
450	300	70	42	8.5	7.1	16.3	14.8	8.8	7.4	17.4	16.0	15.1	14.5	22.8	22.2	16.2	15.6	24.8	24.2
450	300	70	38	7.7	6.3	14.6	13.1	8.3	6.9	16.0	14.6	15.0	14.4	21.9	21.3	16.5	15.9	24.2	23.6
450	300	70	35	8.2	6.8	14.2	12.8	9.2	7.8	16.1	14.7	16.3	15.7	22.4	21.8	18.1	17.5	25.0	24.4
450	450	60	33	7.1	7.7	16.8	17.5	7.4	8.0	18.0	18.6	15.4	16.9	25.2	26.6	16.5	18.0	27.1	28.6
450	450	60	30	6.9	7.6	15.8	16.5	7.6	8.2	17.3	18.0	16.0	17.5	25.0	26.4	17.5	19.0	27.3	28.7
450	450	60	27	6.7	7.3	14.8	15.4	7.7	8.3	16.6	17.2	16.6	18.0	24.7	26.1	18.4	19.8	27.3	28.8
450	450	70	38	7.3	7.3	16.4	16.4	7.6	7.6	17.5	17.5	15.1	15.9	24.2	25.0	16.2	17.0	26.2	27.0
450	450	70	35	7.6	7.6	15.9	15.8	8.3	8.2	17.3	17.3	16.2	17.0	24.4	25.2	17.7	18.5	26.7	27.6
450	450	70	31	7.8	7.8	15.2	15.2	8.8	8.8	17.1	17.1	17.2	18.0	24.6	25.4	19.0	19.8	27.2	28.0
450	450	80	44	8.2	7.5	17.9	17.3	8.5	7.8	19.1	18.4	15.4	15.6	25.2	25.3	16.5	16.7	27.2	27.3
450	450	80	40	8.2	7.6	17.1	16.5	8.8	8.2	18.6	18.0	16.3	16.4	25.2	25.3	17.7	17.9	27.5	27.6
450	450	80	36	8.1	7.4	16.2	15.5	9.1	8.4	18.0	17.3	16.9	17.0	25.0	25.1	18.7	18.8	27.6	27.8
450	600	70	35	9.2	9.1	21.0	20.9	9.5	9.4	22.2	22.1	18.3	19.0	30.1	30.8	19.4	20.1	32.0	32.8
450	600	70	31	8.4	8.3	19.4	19.3	9.0	9.0	20.9	20.8	18.2	18.9	29.2	29.9	19.7	20.4	31.5	32.2
450	600	70	28	9.1	9.0	19.2	19.1	10.0	9.9	21.0	20.9	19.7	20.4	29.8	30.5	21.5	22.2	32.4	33.1
450	600	80	40	9.5	8.8	20.7	19.9	9.8	9.1	21.8	21.1	18.0	18.1	29.1	29.2	19.2	19.2	31.1	31.2
450	600	80	36	9.2	8.4	19.5	18.7	9.8	9.1	21.0	20.2	18.5	18.5	28.7	28.8	19.9	20.0	31.1	31.1
450	600	80	32	10.3	9.5	19.7	18.9	11.2	10.5	21.5	20.8	20.3	20.4	29.8	29.8	22.1	22.2	32.4	32.5
450	600	90	45	10.6	9.2	22.4	21.0	10.9	9.5	23.5	22.1	18.5	17.9	30.3	29.7	19.6	19.0	32.3	31.7
450	600	90	40	9.9	8.5	20.9	19.4	10.5	9.1	22.3	20.9	18.6	18.0	29.6	29.0	20.1	19.5	31.9	31.3
450	600	90	36	10.6	9.2	20.7	19.3	11.6	10.1	22.5	21.1	20.1	19.5	30.2	29.6	21.9	21.3	32.9	32.3
600	300	60	39	8.1	8.6	16.4	16.9	7.2	7.7	16.4	16.9	16.8	18.1	25.1	26.4	16.8	18.1	26.0	27.3
600	300	60	36	6.5	7.0	14.0	14.5	6.0	6.5	14.4	14.9	16.0	17.3	23.5	24.8	16.3	17.7	24.7	26.0
600	300	60	33	7.7	8.2	14.4	14.9	7.6	8.1	15.1	15.6	18.0	19.3	24.6	26.0	18.7	20.0	26.2	27.5
600	300	70	45	7.9	7.8	15.6	15.4	7.1	6.9	15.6	15.4	16.1	16.7	23.7	24.4	16.1	16.7	24.6	25.2
600	300	70	42	6.8	6.7	13.6	13.5	6.3	6.2	14.0	13.8	15.8	16.5	22.6	23.3	16.1	16.8	23.8	24.4
600	300	70	38	8.6	8.5	14.6	14.4	8.4	8.3	15.3	15.1	18.4	19.0	24.3	25.0	19.0	19.7	25.8	26.5
600	300	80	52	8.8	8.0	17.2	16.4	8.0	7.2	17.2	16.4	16.5	16.5	24.8	24.8	16.5	16.5	25.7	25.7
600	300	80	48	7.6	6.8	15.1	14.3	7.1	6.3	15.5	14.6	16.0	16.0	23.5	23.5	16.4	16.3	24.7	24.7
600	300	80	44	9.1	8.2	15.7	14.9	8.9	8.1	16.4	15.6	18.3	18.3	24.9	24.9	18.9	18.9	26.4	26.4
600	450	70	42	10.2	11.5	20.6	21.8	9.4	10.6	20.6	21.8	19.6	21.7	30.0	32.1	19.6	21.7	30.8	32.9
600	450	70	38	9.7	10.9	19.2	20.5	9.2	10.4	19.6	20.8	19.9	22.0	29.4	31.5	20.2	22.3	30.6	32.7
600	450	70	35	10.2	11.4	18.9	20.1	10.0	11.3	19.6	20.8	21.2	23.2	29.9	31.9	21.8	23.9	31.4	33.4
600	450	80	48	9.6	10.2	19.3	19.9	8.7	9.3	19.3	19.9	18.5	19.9	28.1	29.5	18.4	19.8	29.0	30.4
600	450	80	44	9.6	10.1	18.4	19.0	9.1	9.6	18.8	19.3	19.2	20.6	28.1	29.5	19.5	20.9	29.2	30.6
600	450	80	40	10.6	11.2	18.6	19.2	10.5	11.0	19.3	19.9	21.1	22.5	29.1	30.5	21.7	23.1	30.6	32.0
600	450	90	54	10.2	10.1	20.6	20.5	9.4	9.3	20.6	20.5	18.5	19.3	28.9	29.7	18.5	19.3	29.8	30.5
600	450	90	49	10.0	9.9	19.5	19.4	9.5	9.4	19.9	19.8	19.1	19.8	28.6	29.4	19.4	20.2	29.8	30.6
600	450	90	45	10.7	10.6	19.4	19.3	10.5	10.4	20.1	20.0	20.6	21.3	29.3	30.0	21.3	22.0	30.8	31.5
600	600	70	38	13.4	13.9	25.8	26.3	12.6	13.1	25.8	26.3	23.5	24.9	35.9	37.3	23.5	24.8	36.8	38.1
600	600	70	35	12.1	12.6	23.6	24.1	11.5	12.0	24.0	24.5	23.0	24.3	34.5	35.8	23.3	24.6	35.7	37.0
600	600	70	31	13.4	13.9	24.2	24.7	13.3	13.8	24.9	25.4	25.1	26.5	35.9	37.2	25.8	27.1	37.4	38.7
600	600	80	44	13.1	13.0	24.9	24.7	12.3	12.1	24.9	24.7	22.7	23.4	34.5	35.1	22.7	23.4	35.3	36.0
600	600	80	40	12.3	12.2	23.2	23.0	11.8	11.7	23.6	23.4	22.7	23.3	33.6	34.2	23.0	23.7	34.8	35.4
600	600	80	36	14.2	14.0	24.2	24.1	14.0	13.9	24.9	24.8	25.3	26.0	35.4	36.0	26.0	26.7	36.9	37.5
600	600	90	49	14.3	13.4	26.7	25.8	13.4	12.6	26.7	25.9	23.3	23.3	35.7	35.7	23.3	23.3	36.6	36.5
600	600	90	45	13.1	12.3	24.6	23.8	12.6	11.8	25.0	24.2	22.9	22.9	34.5	34.5	23.2	23.2	35.7	35.6
600	600	90	40	14.6	13.8	25.3	24.5	14.4	13.6	26.0	25.2	25.2	25.2	35.9	35.9	25.9	25.9	37.5	37.5

TABLE E-21. TOTAL CO EMITTED IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*7

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET								LEFT TURNS ON MINOR STREET							
				LOW LEVEL				HIGH LEVEL				LOW LEVEL				HIGH LEVEL			
				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET			
				LOW		HIGH		LOW		HIGH		LOW		HIGH		LOW		HIGH	
				L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR	
				LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	5.8	5.8	13.3	13.3	4.3	4.3	12.7	12.7	10.7	11.6	18.2	19.1	10.1	10.9	18.5	19.3
300	300	50	25	5.0	5.0	11.7	11.7	3.9	3.9	11.4	11.4	10.8	11.6	17.4	18.2	10.4	11.3	18.0	18.8
300	300	50	22	4.6	4.6	10.4	10.4	3.7	3.8	10.4	10.4	11.1	11.9	16.9	17.7	11.1	11.9	17.8	18.6
300	300	60	33	7.1	6.4	13.9	13.3	5.6	5.0	13.3	12.6	11.5	11.7	18.4	18.5	10.9	11.0	18.6	18.7
300	300	60	30	6.8	6.2	12.8	12.2	5.7	5.0	12.5	11.9	12.0	12.2	18.0	18.2	11.7	11.9	19.6	18.7
300	300	60	27	6.8	6.2	12.0	11.3	6.0	5.4	12.0	11.4	12.8	13.0	18.0	18.1	12.8	13.0	18.8	19.0
300	300	70	38	7.0	5.7	14.5	13.2	5.5	4.2	13.9	12.6	10.9	10.4	18.4	17.9	10.2	9.7	18.6	18.1
300	300	70	35	6.4	5.1	13.0	11.7	5.2	3.9	12.7	11.4	11.0	10.5	17.7	17.2	10.7	10.2	18.3	17.7
300	300	70	31	6.0	4.7	11.8	10.5	5.2	3.9	11.9	10.6	11.5	11.0	17.3	16.8	11.5	11.0	18.2	17.7
300	450	50	25	6.1	6.8	15.6	16.4	4.6	5.3	15.0	15.7	11.7	13.3	21.3	22.8	11.1	12.6	21.5	23.0
300	450	50	22	6.2	7.0	14.9	15.7	5.1	5.8	14.6	15.4	12.7	14.2	21.4	22.9	12.4	13.9	21.9	23.5
300	450	50	20	5.1	5.8	12.9	13.7	4.3	5.0	13.0	13.7	12.3	13.9	20.2	21.7	12.3	13.9	21.0	22.6
300	450	60	30	7.2	7.3	16.1	16.2	5.7	5.8	15.4	15.5	12.3	13.2	21.2	22.1	11.7	12.6	21.4	22.3
300	450	60	27	7.8	7.9	15.8	15.9	6.7	6.8	15.5	15.6	13.7	14.6	21.7	22.6	13.4	14.3	22.3	23.2
300	450	60	24	7.1	7.2	14.2	14.3	6.3	6.4	14.3	14.4	13.8	14.7	20.9	21.8	13.8	14.7	21.8	22.7
300	450	70	35	6.9	6.3	16.4	15.8	5.4	4.8	15.8	15.2	11.5	11.7	21.0	21.3	10.8	11.0	21.2	21.5
300	450	70	31	7.1	6.6	15.8	15.3	6.0	5.4	15.5	15.0	12.5	12.7	21.2	21.4	12.2	12.4	21.7	22.0
300	450	70	28	6.0	5.4	13.8	13.3	5.2	4.6	13.9	13.3	12.1	12.4	20.0	20.2	12.2	12.4	20.9	21.1
300	600	60	27	6.3	6.3	17.9	17.9	4.8	4.8	17.2	17.3	12.7	13.5	24.2	25.1	12.0	12.8	24.4	25.3
300	600	60	24	5.7	5.7	16.5	16.5	4.6	4.6	16.2	16.2	12.9	13.7	23.6	24.5	12.6	13.4	24.2	25.0
300	600	60	21	5.5	5.5	15.4	15.4	4.7	4.7	15.4	15.4	13.4	14.2	23.3	24.1	13.4	14.2	24.2	25.0
300	600	70	31	7.5	6.8	18.4	17.7	6.0	5.4	17.8	17.1	13.3	13.5	24.2	24.4	12.7	12.8	24.4	24.6
300	600	70	28	7.4	6.7	17.4	16.8	6.2	5.6	17.2	16.5	14.0	14.2	24.1	24.2	13.7	13.8	24.6	24.8
300	600	70	24	7.5	6.8	16.7	16.0	6.7	6.0	16.7	16.1	14.9	15.0	24.1	24.2	14.9	15.1	25.0	25.1
300	600	80	36	7.3	5.9	18.8	17.5	5.8	4.5	18.2	16.9	12.6	12.0	24.1	23.6	11.9	11.4	24.3	23.8
300	600	80	32	6.8	5.4	17.5	16.2	5.6	4.3	17.2	15.9	12.8	12.3	23.6	23.1	12.5	12.0	24.1	23.6
300	600	80	28	6.5	5.1	16.4	15.0	5.6	4.3	16.4	15.1	13.3	12.8	23.2	22.7	13.3	12.8	24.1	23.6
450	300	50	30	6.5	5.9	14.6	14.0	6.1	5.5	15.1	14.5	14.1	14.3	22.2	22.4	14.6	14.8	23.5	23.8
450	300	50	27	5.2	4.6	12.5	11.9	5.2	4.6	13.3	12.7	13.6	13.8	20.9	21.1	14.4	14.6	22.5	22.8
450	300	50	25	5.4	4.8	11.8	11.2	5.7	5.1	13.0	12.4	14.6	14.8	21.0	21.2	15.7	16.0	23.0	23.3
450	300	60	36	7.9	6.7	15.3	14.1	7.6	6.3	15.9	14.6	15.0	14.6	22.4	22.0	15.5	15.0	23.8	23.3
450	300	60	33	7.1	5.9	13.7	12.5	7.1	5.9	14.6	13.3	15.0	14.5	21.6	21.1	15.8	15.4	23.3	22.8
450	300	60	30	7.8	6.6	13.6	12.3	8.1	6.9	14.8	13.5	16.5	16.0	22.2	21.8	17.6	17.2	24.2	23.8
450	300	70	42	8.4	6.5	16.5	14.6	8.1	6.2	17.1	15.2	15.0	13.9	23.1	22.0	15.5	14.4	24.4	23.3
450	300	70	38	7.4	5.5	14.6	12.7	7.4	5.5	15.5	13.6	14.7	13.6	22.0	20.9	15.5	14.4	23.7	22.6
450	300	70	35	7.7	5.8	14.1	12.2	8.0	6.1	15.3	13.4	15.8	14.7	22.2	21.1	17.0	15.9	24.3	23.2
450	450	60	33	6.8	6.9	16.9	17.1	6.4	6.6	17.4	17.6	15.1	16.0	25.2	26.2	15.6	16.5	26.6	27.5
450	450	60	30	6.4	6.6	15.7	15.9	6.4	6.6	16.6	16.7	15.5	16.5	24.9	25.8	16.3	17.3	26.5	27.5
450	450	60	27	6.0	6.1	14.4	14.6	6.3	6.5	15.6	15.8	15.9	16.8	24.3	25.3	17.0	18.0	26.4	27.3
450	450	70	38	7.8	7.3	17.3	16.8	7.5	7.0	17.8	17.3	15.6	15.9	25.1	25.4	16.1	16.4	26.4	26.7
450	450	70	35	7.9	7.4	16.5	16.0	7.9	7.4	17.4	16.9	16.5	16.8	25.1	25.4	17.3	17.6	26.8	27.1
450	450	70	31	7.9	7.4	15.7	15.2	8.3	7.8	16.9	16.4	17.3	17.6	25.1	25.4	18.5	18.8	27.1	27.4
450	450	80	44	7.9	6.7	18.0	16.9	7.5	6.4	18.5	17.4	15.1	14.8	25.3	24.9	15.6	15.2	26.6	26.3
450	450	80	40	7.7	6.5	17.0	15.9	7.7	6.5	17.9	16.7	15.7	15.4	25.1	24.7	16.6	16.2	26.7	26.4
450	450	80	36	7.4	6.2	15.8	14.7	7.7	6.5	17.0	15.9	16.2	15.8	24.7	24.3	17.3	17.0	26.7	26.3
450	600	70	35	8.7	8.1	20.9	20.3	8.4	7.8	21.4	20.8	17.7	18.0	29.9	30.2	18.2	18.4	31.3	31.5
450	600	70	31	7.7	7.1	19.0	18.5	7.7	7.1	19.9	19.3	17.5	17.7	28.9	29.1	18.3	18.5	30.5	30.8
450	600	70	28	8.1	7.5	18.6	19.1	8.5	7.9	19.8	19.2	18.7	19.0	29.2	29.5	19.9	20.1	31.3	31.5
450	600	80	40	9.8	8.6	21.3	20.1	9.5	8.2	21.9	20.6	18.3	17.9	29.8	29.4	18.8	18.4	31.2	30.7
450	600	80	36	9.3	8.0	19.9	18.7	9.3	8.0	20.8	19.5	18.6	18.1	29.2	28.8	19.4	18.9	30.9	30.5
450	600	80	32	10.2	8.9	20.0	18.7	10.5	9.2	21.2	19.9	20.2	19.8	30.0	29.6	21.4	20.9	32.1	31.6
450	600	90	45	10.1	8.1	22.3	20.3	9.7	7.8	22.8	20.9	18.0	16.9	30.2	29.1	18.5	17.4	31.5	30.5
450	600	90	40	9.2	7.3	20.5	18.6	9.2	7.3	21.4	19.5	17.9	16.8	29.3	28.2	18.7	17.6	30.9	29.8
450	600	90	36	9.7	7.8	20.2	18.3	10.0	8.1	21.4	19.5	19.2	18.1	29.7	28.6	20.3	19.2	31.7	30.6
600	300	60	39	7.7	7.7	16.4	16.4	6.2	6.2	15.8	15.8	16.4	17.2	25.1	26.0	15.8	16.6	25.4	26.2
600	300	60	36	6.0	6.0	13.8	13.8	4.8	4.8	13.6	13.6	15.5	16.3	23.3	24.2	15.1	16.0	23.9	24.7
600	300	60	33	7.0	7.0	14.0	14.0	6.2	6.2	14.1	14.1	17.2	18.1	24.3	25.1	17.3	18.1	25.2	26.0
600	300	70	45	8.4	7.7	16.4	15.7	6.9	6.2	15.8	15.1	16.5	16.7	24.6	24.7	15.9	16.0	24.8	24.9
600	300	70	42	7.1	6.4	14.3	13.6	6.0	5.3	14.0	13.4	16.1	16.2	23.3	23.4	15.7	15.9	23.8	24.0
600	300	70	38	8.7	8.0	15.0	14.4	7.9	7.2	15.1	14.4	18.4	18.6	24.8	24.9	18.4	18.6	25.6	25.8
600	300	80	52	8.5	7.2	17.2	15.9	7.0	5.7	16.6	15.3	16.1	15.6	24.8	24.3	15.5	15.0	25.1	24.5
600	300	80	48	7.0	5.7	14.9	13.6	5.9	4.6	14.6	13.3	15.5	15.0	23.4	22.8	15.2	14.6	23.9	23.4
600	300	80	44	8.3	7.0	15.3	14.0	7.5	6.2	15.4	14.1	17.5	17.0	24.5	24.0	17.5	17.0	25.4	24.9
600	450	70	42	9.6	10.4	20.4	21.2	8.2	8.9	19.8	20.5	19.1	20.6	29.8	31.4	18.4	20.0	30.0	31.6
600	450	70	38	8.9	9.7	18.8	19.6	7.8	8.5	18.6	19.3	19.1	20.7	29.0	30.6	18.8	20.4	29.6	31.1
600	450	70	35	9.2	10.0	18.3	19.1	8.4	9.2	18.4	19.1	20.2	21.8	29.3	30.9	20.2	21.8	30.2	31.7
600	450	80	48	9.8	9.9	19.9	20.0	8.3	8.4	19.3	19.4	18.7	19.6	28.8	29.7	18.0	18.9	29.0	29.9
600	450	80	44	9.6	9.7	18.8	18.9	8.5	8.5	18.6	18.6	19.3	20.2	28.5	29.4	19.0	19.8	29.0	29.9
600	450	80	40	10.5	10.5	18.8	18.9	9.7	9.7	18.9	19.0	20.9	21.8	29.3	30.2	20.9	21.8	30.2	31.1
600	450	90	54	9.6	9.1	20.4	19.8	8.2	7.6	19.8	19.2	18.0	18.2	28.7	29.0	17.3	17.6	28.9	29.2
600	450	90	49	9.2	8.6	19.1	18.6	8.1	7.5	18.9	18.3	18.3	18.6	28.3	28.5	18.0	18.3	28.8	29.0
600	450	90	45	9.7	9.1	18.8	18.2	8.9	8.3	18.8	18.3	19.6	19.9	28.7	28.9	19.6	19.9	29.6	29.8
600	600	70	38	12.6	12.6	25.4	25.4	11.2	11.2	24.8	24.8	22.8	23.6	35.6	36.4	22.1	22.9	35.8	36.6
600	600	70	35	11.1	11.1	23.0	23.0	9.9	9.9	22.7	22.8	22.0	22.8	33.9	34.8	21.7	22.5	34.5	35.3
600	600	70	31	12.3	12.3	23.4	23.4	11.5	11.5	23.4	23.4	24.0	24.8	35.1	35.9	24.0	24.8	36.0	36.8
600	600	80	44	13.2	12.5	25.3	24.6	11.7	11.0	24.7	24.0	22.8	22.9	34.9	35.0	22.1	22.3	35.1	35.2
600	600	80	40	12.2	11.5	23.4	22.8	11.0	10.4	23.1	22.5	22.5	22.7	33.8	34.0	22.2	22.4	34.3	34.5
600	600	80	36	13.8	13.2	24.2	23.6	13.0	12.4	24.3	23.6	25.0	25.1	35.4	35.6	25.0	25.1	36.3	36.4
600	600	90	49	13.5	12.2	26.3	25.0	12.0	10.7	25.7	24.3	22.5	22.0	35.3	34.8	21.9	21.4	35.5	35.0
600	600	90	45	12.1	10.8	24.1	22.7	11.0	9.6	23.8	22.5	21.9	21.4	33.9	33.4	21.6	21.1	34.4	33.9
600	600	90	40	13.4	12.1	24.5	23.2	12.6	11.3	24.6	23.3	24.0	23.5	35.2	34.7	24.1	23.6	36.0	35.5

TABLE E-3A. TOTAL HC EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 4*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET								LEFT TURNS ON MINOR STREET							
				LOW LEVEL				HIGH LEVEL				LOW LEVEL				HIGH LEVEL			
				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET			
				LOW		HIGH		LOW		HIGH		LOW		HIGH		LOW		HIGH	
				L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR	
				LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	161	185	194	230	150	174	183	220	196	220	229	265	206	230	238	275
300	300	50	25	146	170	151	188	155	179	160	197	193	217	197	234	222	246	227	263
300	300	50	22	131	155	131	168	160	184	160	197	189	213	189	226	238	262	238	275
300	300	60	33	157	165	186	206	158	166	187	207	183	191	211	232	204	212	232	253
300	300	60	30	152	160	152	173	172	180	172	193	189	197	189	210	229	237	230	250
300	300	60	27	145	153	141	161	185	193	181	201	193	201	189	210	254	261	249	270
300	300	70	38	187	179	233	237	177	168	222	227	203	195	249	253	213	204	259	263
300	300	70	35	177	169	195	199	186	178	204	208	205	196	222	227	234	226	252	256
300	300	70	31	167	158	180	184	195	187	209	213	206	197	219	223	255	246	268	272
300	450	50	25	201	238	267	317	205	242	271	320	248	285	314	364	272	309	338	388
300	450	50	22	185	222	223	272	208	245	246	296	244	281	281	331	287	324	325	375
300	450	50	20	175	212	208	258	218	255	251	301	245	282	278	328	308	345	342	391
300	450	60	30	205	226	267	300	221	242	282	316	243	264	305	338	279	299	340	374
300	450	60	27	198	219	231	265	233	254	266	299	247	268	280	314	302	323	335	369
300	450	60	24	195	216	224	257	249	270	278	312	256	277	285	318	330	351	359	393
300	450	70	35	232	237	311	328	236	240	315	332	260	265	339	356	284	289	363	380
300	450	70	31	221	225	271	289	244	249	295	312	260	265	311	328	304	309	355	372
300	450	70	28	213	218	259	277	256	261	302	320	264	269	310	328	327	332	374	391
300	600	60	27	274	298	373	410	293	317	392	428	334	358	433	469	372	396	471	508
300	600	60	24	238	262	308	345	275	299	346	383	309	333	379	416	367	391	437	474
300	600	60	21	254	278	320	357	311	335	377	414	336	360	402	439	413	437	480	516
300	600	70	31	281	289	376	396	311	319	406	426	331	339	426	446	381	389	475	496
300	600	70	28	252	260	319	339	301	309	368	388	314	321	380	400	383	391	449	470
300	600	70	24	275	283	337	357	344	351	405	426	348	356	410	430	437	444	499	519
300	600	80	36	300	291	412	416	318	310	430	434	340	332	452	456	379	370	490	495
300	600	80	32	267	259	351	355	305	296	388	393	319	310	402	407	377	368	460	465
300	600	80	28	285	277	365	369	343	334	422	426	349	340	428	432	426	418	505	510
450	300	50	30	193	225	235	279	199	230	240	284	260	292	302	346	286	317	328	372
450	300	50	27	174	205	187	231	199	230	212	256	252	284	266	310	298	329	311	355
450	300	50	25	167	198	176	220	211	243	220	264	257	288	266	310	322	353	331	375
450	300	60	36	198	213	235	263	215	230	252	280	256	271	293	321	293	308	330	358
450	300	60	33	187	202	196	224	224	239	233	261	256	272	265	293	313	328	322	350
450	300	60	30	189	205	194	222	245	261	250	278	270	285	275	303	346	361	351	379
450	300	70	42	225	224	280	292	231	230	285	297	273	272	328	340	299	298	354	365
450	300	70	38	213	212	240	251	238	237	265	276	273	272	299	311	318	317	344	356
450	300	70	35	211	210	233	245	256	255	278	289	282	281	304	316	347	346	369	381
450	450	60	33	245	290	320	377	265	310	340	397	325	369	399	456	365	409	439	496
450	450	60	30	226	271	273	330	266	310	312	369	317	362	363	421	377	421	423	480
450	450	60	27	226	271	268	325	285	330	327	384	329	373	371	428	408	452	450	507
450	450	70	38	253	281	323	364	284	312	355	395	323	351	393	434	374	402	445	485
450	450	70	35	243	271	284	325	293	322	335	376	324	352	366	407	395	423	437	478
450	450	70	31	251	280	289	330	322	350	359	400	344	372	382	423	435	463	472	513
450	450	80	44	272	283	359	384	291	303	379	404	332	344	419	444	372	384	459	484
450	450	80	40	260	272	319	344	299	311	358	383	331	343	391	415	391	403	450	475
450	450	80	36	265	277	320	345	324	336	379	404	348	360	403	428	427	439	482	507
450	600	70	35	361	393	469	513	396	427	503	547	453	484	560	604	507	538	615	659
450	600	70	31	322	354	401	446	376	407	455	499	425	456	504	548	499	530	578	622
450	600	70	28	349	380	424	468	422	453	497	541	463	494	538	582	556	588	631	675
450	600	80	40	371	386	474	502	417	432	520	548	453	468	556	584	519	534	622	650
450	600	80	36	341	356	416	444	406	421	481	509	434	449	509	537	520	535	595	622
450	600	80	32	376	391	447	475	461	476	531	559	481	496	551	579	586	601	656	684
450	600	90	45	384	382	504	516	418	417	539	550	456	455	576	588	510	509	631	643
450	600	90	40	352	351	444	456	406	404	498	510	436	434	528	540	510	509	602	614
450	600	90	36	383	382	471	482	456	455	544	556	478	477	566	578	571	570	659	671
600	300	60	39	254	293	304	356	244	282	294	345	353	392	404	455	363	402	413	465
600	300	60	36	214	252	236	287	223	261	245	296	325	363	346	398	354	392	376	427
600	300	60	33	237	276	255	306	266	304	283	335	359	398	377	428	408	447	426	477
600	300	70	45	241	263	287	322	242	264	288	323	330	353	376	411	352	374	397	433
600	300	70	42	209	232	227	262	230	252	247	283	311	333	328	363	351	374	369	404
600	300	70	38	244	266	257	292	284	306	297	332	356	379	370	405	417	439	430	465
600	300	80	52	275	281	338	357	265	271	328	347	355	361	419	437	365	371	428	447
600	300	80	48	245	251	280	299	254	260	289	308	336	343	371	390	366	372	401	420
600	300	80	44	277	283	307	326	305	311	336	355	380	386	410	429	428	435	459	478
600	450	70	42	343	395	426	491	347	399	430	495	454	506	538	602	479	530	562	626
600	450	70	38	306	357	361	425	329	381	384	448	429	480	484	548	472	524	527	592
600	450	70	35	335	387	386	450	378	430	429	493	469	521	520	584	533	584	583	648
600	450	80	48	331	366	410	458	346	381	425	473	432	468	511	560	468	503	547	595
600	450	80	44	303	339	354	402	338	373	389	437	416	452	467	515	471	507	522	570
600	450	80	40	344	379	390	438	398	433	444	493	469	504	515	563	543	578	589	638
600	450	90	54	360	379	456	488	364	383	460	492	452	471	548	580	476	495	573	605
600	450	90	49	333	353	402	434	357	376	425	457	437	456	505	537	481	500	549	581
600	450	90	45	371	390	434	466	414	433	477	509	486	505	550	582	549	568	613	645
600	600	70	38	488	526	604	655	506	544	622	673	611	650	727	779	649	688	766	817
600	600	70	35	424	463	512	564	462	501	550	601	559	598	647	699	617	656	705	757
600	600	70	31	479	518	563	614	537	575	620	672	626	664	710	761	703	742	787	838
600	600	80	44	484	506	596	631	514	536	626	661	598	620	710	745	648	670	760	795
600	600	80	40	432	454	516	551	481	504	565	600	557	580	641	676	627	649	710	746
600	600	80	36	496	519	575	611	565	587	644	679	633	655	712	748	722	744	801	836
600	600	90	49	515	522	645	664	534	540	663	682	620	626	749	768	658	664	788	807
600	600	90	45	460	466	561	580	498	504	599	618	576	582	677	696	634	640	735	754
600	600	90	40	522	528	619	638	580	586	676	695	650	656	746	765	727	733	824	843

TABLE E-3B. TOTAL HC EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 5*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	146	147	179	193	142	144	175	189	174	176	207	221	191	193	224	238
300	300	50	25	143	144	147	162	159	160	163	178	183	185	188	202	219	221	224	238
300	300	50	22	128	129	128	142	163	165	163	178	179	181	180	194	235	237	235	250
300	300	60	33	151	136	179	177	159	144	187	185	170	155	198	196	198	183	227	225
300	300	60	30	157	142	157	155	184	170	185	183	188	173	188	186	235	221	235	233
300	300	60	27	150	136	146	144	197	182	193	191	192	178	188	186	259	245	255	253
300	300	70	38	172	141	218	200	169	138	214	196	181	151	227	209	198	167	244	226
300	300	70	35	174	143	191	173	190	159	208	189	195	164	212	194	231	200	249	231
300	300	70	31	164	133	177	159	199	168	212	194	196	165	209	191	252	221	265	247
300	450	50	25	167	181	233	260	178	192	243	271	207	222	273	300	239	253	304	332
300	450	50	22	162	177	200	227	193	207	230	258	215	229	252	279	265	280	303	330
300	450	50	20	153	167	186	213	203	217	236	263	216	231	250	277	286	301	320	347
300	450	60	30	180	178	241	252	202	200	264	275	211	209	272	283	253	252	315	326
300	450	60	27	184	182	217	228	226	224	259	270	227	225	260	271	289	287	322	333
300	450	60	24	181	179	210	221	242	241	271	282	235	234	264	275	317	315	346	357
300	450	70	35	198	180	277	271	209	191	287	282	219	201	298	293	250	233	329	324
300	450	70	31	198	180	249	244	229	211	279	274	231	213	282	277	282	264	333	327
300	450	70	28	191	173	237	232	240	223	287	282	235	217	282	276	305	287	352	347
300	600	60	27	221	223	320	334	246	248	345	359	274	275	373	387	319	321	418	432
300	600	60	24	196	197	266	281	241	242	311	325	260	262	331	345	325	327	396	410
300	600	60	21	212	213	278	292	276	278	342	357	288	289	354	368	372	374	438	453
300	600	70	31	237	222	331	329	273	258	368	366	280	265	374	372	337	322	431	429
300	600	70	28	219	204	285	283	275	261	341	340	274	259	340	338	350	336	416	415
300	600	70	24	242	227	304	302	318	303	379	377	308	293	370	368	404	389	466	464
300	600	80	36	246	216	358	340	272	241	384	366	280	249	392	374	326	295	438	419
300	600	80	32	225	194	309	291	270	239	354	336	270	240	354	336	335	305	419	401
300	600	80	28	244	213	323	305	308	277	387	369	300	270	380	362	385	354	464	446
450	300	50	30	169	177	210	232	181	190	223	244	229	238	271	292	262	271	304	325
450	300	50	27	161	169	174	195	193	201	206	227	233	242	246	268	285	294	298	320
450	300	50	25	154	163	163	184	206	214	214	236	238	246	247	268	309	318	318	340
450	300	60	36	182	175	219	224	206	198	243	248	233	226	270	276	277	270	314	320
450	300	60	33	183	176	192	197	226	219	235	241	246	238	254	260	309	302	313	323
450	300	60	30	185	178	190	195	248	241	253	258	259	252	264	269	342	335	347	352
450	300	70	42	201	177	255	244	213	190	268	257	242	218	297	286	275	251	330	319
450	300	70	38	200	177	227	216	232	209	259	248	253	230	280	269	306	282	332	321
450	300	70	35	198	175	220	209	250	226	272	261	263	239	285	274	335	311	357	346
450	450	60	33	201	223	276	311	228	250	303	338	274	296	349	383	321	343	396	431
450	450	60	30	194	216	241	275	241	262	287	321	279	300	325	359	345	367	391	426
450	450	60	27	194	216	236	271	260	282	302	337	290	312	332	367	376	398	418	453
450	450	70	38	218	223	288	306	256	262	326	345	281	287	351	370	340	345	410	428
450	450	70	35	219	225	261	279	277	282	319	337	294	299	336	354	372	377	414	432
450	450	70	31	228	233	265	284	305	311	343	361	314	320	352	370	412	417	449	468
450	450	80	44	228	217	315	318	255	244	342	344	281	271	369	371	329	318	416	418
450	450	80	40	227	217	287	289	274	263	333	335	293	282	352	354	359	349	419	421
450	450	80	36	233	222	288	290	299	288	354	356	310	299	365	367	396	385	451	453
450	600	70	35	298	307	406	427	340	348	447	469	383	392	491	512	445	453	552	574
450	600	70	31	271	280	350	372	332	340	411	432	367	376	446	468	448	457	527	549
450	600	70	28	297	306	372	394	378	386	452	474	405	414	480	502	506	514	581	602
450	600	80	40	316	309	420	425	369	362	472	478	392	384	495	500	465	457	568	573
450	600	80	36	298	291	373	378	370	363	445	451	385	377	460	465	477	470	552	558
450	600	80	32	333	326	404	409	425	418	496	501	432	424	502	508	544	536	614	619
450	600	90	45	320	297	441	430	362	338	482	472	386	363	507	496	448	424	568	558
450	600	90	40	300	277	393	382	361	338	454	443	378	354	470	459	459	435	551	540
450	600	90	36	331	308	419	408	412	388	500	489	420	396	508	497	521	497	609	598
600	300	60	39	220	236	270	299	216	233	267	296	313	329	363	392	329	345	380	409
600	300	60	36	191	207	213	242	207	223	229	258	295	311	317	346	332	348	354	382
600	300	60	33	215	231	232	261	250	266	268	297	330	346	348	377	386	402	404	433
600	300	70	45	215	215	261	274	223	223	269	282	298	298	344	357	326	326	372	385
600	300	70	42	195	195	213	226	223	223	240	253	290	290	308	320	338	338	355	368
600	300	70	38	230	230	243	256	277	277	290	303	336	336	349	362	403	403	417	429
600	300	80	52	241	224	304	301	237	221	301	297	314	298	378	374	331	315	395	391
600	300	80	48	222	206	257	254	238	222	273	270	307	291	342	339	344	327	379	375
600	300	80	44	254	238	285	281	290	273	320	317	351	334	381	378	406	390	437	434
600	450	70	42	290	319	373	415	301	330	384	426	394	424	478	520	426	455	509	551
600	450	70	38	264	293	319	361	294	323	349	391	380	409	435	477	431	460	486	528
600	450	70	35	293	322	344	386	343	372	394	436	421	450	472	514	491	520	542	584
600	450	80	48	286	299	365	390	308	321	387	413	381	394	460	486	424	436	503	528
600	450	80	44	270	283	321	346	312	325	362	388	377	390	427	453	439	452	489	515
600	450	80	40	311	323	357	383	372	385	418	444	429	442	475	501	510	523	557	582
600	450	90	54	306	303	403	412	317	314	414	423	392	389	489	498	423	420	520	529
600	450	90	49	292	288	360	369	322	319	390	400	389	386	457	466	440	436	508	517
600	450	90	45	329	326	393	402	379	375	443	452	438	434	501	511	508	504	572	581
600	600	70	38	415	431	531	560	440	456	556	585	532	548	648	677	577	593	694	722
600	600	70	35	363	379	451	480	408	424	496	525	492	508	580	609	557	573	645	674
600	600	70	31	418	435	502	531	483	499	566	595	558	574	642	671	643	659	727	755
600	600	80	44	420	420	532	544	457	456	569	581	527	527	639	652	584	584	696	709
600	600	80	40	380	379	463	476	436	436	519	532	498	498	582	595	575	575	659	671
600	600	80	36	444	444	523	536	519	519	599	611	574	574	654	666	670	670	749	762
600	600	90	49	443	426	572	569	468	452	597	594	540	524	670	666	586	570	715	712
600	600	90	45	399	383	500	496	444	427	545	541	508	492	609	606	573	557	674	671
600	600	90	40	461	445	558	555	526	509	622	619	582	566	679	675	667	650	763	760

TABLE E-3C. TOTAL HC EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 5*5

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	165	166	198	212	126	126	159	172	188	188	220	234	168	169	201	214
300	300	50	25	163	163	167	180	142	143	147	160	196	197	201	214	196	197	201	214
300	300	50	22	136	136	136	149	135	136	135	148	181	181	181	194	200	201	201	214
300	300	60	33	179	164	208	205	151	135	179	176	192	176	220	217	184	168	212	209
300	300	60	30	185	169	185	182	176	161	177	174	209	194	209	206	221	205	221	218
300	300	60	27	167	151	163	160	177	162	173	170	202	187	198	195	233	218	229	226
300	300	70	38	192	160	238	218	152	120	198	179	195	163	241	221	175	143	221	202
300	300	70	35	194	162	211	192	173	141	191	172	208	176	226	207	208	176	226	207
300	300	70	31	172	140	185	166	171	139	184	165	198	166	211	192	217	185	230	211
300	450	50	25	179	193	245	271	154	167	220	246	213	227	279	305	208	222	274	300
300	450	50	22	175	188	212	238	169	182	206	233	220	234	258	284	235	248	272	299
300	450	50	20	153	167	186	213	167	180	200	226	210	224	244	270	244	258	278	304
300	450	60	30	201	198	262	272	187	184	248	258	225	223	287	297	232	229	293	303
300	450	60	27	205	202	238	248	210	208	243	253	241	238	274	284	267	264	300	310
300	450	60	24	190	188	219	229	215	213	244	254	238	235	267	277	283	281	312	322
300	450	70	35	210	191	289	283	185	166	264	257	225	206	304	298	220	201	299	293
300	450	70	31	210	192	261	255	205	186	255	249	237	218	288	282	251	233	302	296
300	450	70	28	191	172	237	231	205	186	251	245	229	210	276	270	263	244	310	303
300	600	60	27	226	226	325	338	215	215	314	327	272	273	371	384	282	282	380	394
300	600	60	24	201	201	271	285	209	210	280	293	259	259	329	342	287	288	358	371
300	600	60	21	205	206	271	285	233	234	299	313	275	275	341	354	323	323	389	402
300	600	70	31	250	234	345	342	250	235	345	342	287	271	381	378	307	292	402	399
300	600	70	28	233	217	299	296	252	237	319	316	281	265	347	344	321	305	387	384
300	600	70	24	244	228	306	303	283	267	345	342	303	288	365	362	363	347	425	422
300	600	80	36	251	219	363	344	240	209	352	333	279	247	391	371	288	256	400	381
300	600	80	32	230	198	314	295	239	207	322	303	269	237	352	333	298	266	381	362
300	600	80	28	237	205	316	297	265	233	344	325	287	255	366	347	335	304	415	396
450	300	50	30	179	186	220	241	155	163	197	217	233	241	274	295	229	237	271	292
450	300	50	27	171	178	184	204	166	174	180	200	236	244	250	270	252	260	266	286
450	300	50	25	152	160	161	182	168	175	177	197	230	237	238	259	265	273	274	295
450	300	60	36	201	192	238	242	188	180	226	230	245	237	282	287	253	245	290	295
450	300	60	33	202	193	210	215	209	200	218	222	258	249	267	271	285	277	294	298
450	300	60	30	192	184	197	201	219	210	223	228	260	251	264	269	307	298	311	316
450	300	70	42	211	186	265	253	187	162	242	230	246	221	300	289	242	218	297	285
450	300	70	38	210	186	237	225	206	181	232	221	257	232	283	271	273	248	299	287
450	300	70	35	197	172	219	207	212	187	234	222	255	230	277	265	290	266	312	300
450	450	60	33	204	225	279	312	195	216	269	303	270	291	345	379	281	302	356	389
450	450	60	30	197	218	243	277	207	228	253	287	275	295	321	354	305	326	351	385
450	450	60	27	185	206	227	261	215	236	257	290	275	295	316	350	324	345	366	400
450	450	70	38	229	234	299	317	231	236	301	319	286	290	356	373	308	313	378	396
450	450	70	35	230	235	272	289	252	256	294	311	298	303	340	358	340	345	382	399
450	450	70	31	227	232	265	282	268	273	306	323	307	312	345	362	368	373	406	423
450	450	80	44	230	219	318	319	221	209	309	310	278	266	365	366	288	277	376	377
450	450	80	40	230	219	289	291	240	229	300	301	289	277	348	349	319	308	379	380
450	450	80	36	224	212	279	280	254	242	309	310	294	283	349	350	344	332	399	400
450	600	70	35	294	301	401	422	299	306	406	427	372	380	480	500	397	405	505	525
450	600	70	31	266	274	345	366	291	298	370	390	356	364	435	456	401	408	480	500
450	600	70	28	281	289	356	376	325	333	400	420	382	390	457	478	447	454	521	542
450	600	80	40	320	312	424	428	337	328	440	444	389	381	492	497	426	417	529	533
450	600	80	36	302	293	377	381	338	329	413	417	382	374	457	461	438	430	513	518
450	600	80	32	325	317	396	400	381	372	451	456	417	409	488	492	493	485	564	568
450	600	90	45	316	291	436	425	321	296	442	430	375	350	496	484	400	376	521	509
450	600	90	40	296	271	388	376	320	296	412	401	366	342	459	447	411	387	504	492
450	600	90	36	315	290	403	391	359	334	447	435	397	373	485	473	461	437	549	538
600	300	60	39	220	235	271	298	181	196	231	259	307	322	357	385	287	302	337	365
600	300	60	36	192	207	214	241	171	186	193	221	289	304	311	339	289	304	311	339
600	300	60	33	203	218	221	249	203	218	220	248	313	328	330	358	332	347	350	378
600	300	70	45	224	223	270	282	196	195	242	253	301	300	347	358	293	292	339	350
600	300	70	42	204	203	222	234	195	194	213	225	292	291	310	322	304	303	322	333
600	300	70	38	227	226	240	252	238	237	251	263	327	326	340	352	358	357	371	383
600	300	80	52	241	224	305	300	202	184	265	260	308	291	372	367	289	272	352	348
600	300	80	48	222	205	258	253	202	185	237	233	301	284	336	332	301	284	336	332
600	300	80	44	243	225	274	269	242	225	273	268	333	316	364	359	352	335	383	379
600	450	70	42	283	311	366	407	257	285	341	382	381	409	464	505	376	404	459	500
600	450	70	38	257	285	312	353	251	279	306	347	367	395	422	463	381	409	436	477
600	450	70	35	275	303	325	366	288	316	339	380	396	424	447	488	430	458	481	521
600	450	80	48	287	299	366	391	273	285	352	377	376	388	455	480	382	394	461	486
600	450	80	44	271	283	322	347	277	289	328	352	372	384	422	447	398	409	448	473
600	450	80	40	300	312	347	371	326	337	372	397	412	424	459	483	458	469	504	529
600	450	90	54	299	295	396	404	274	270	371	379	379	374	475	484	374	369	470	478
600	450	90	49	285	280	353	361	279	274	347	355	375	371	443	452	390	385	458	466
600	450	90	45	310	306	374	382	324	320	388	396	412	408	476	485	446	442	510	519
600	600	70	38	400	416	517	545	390	405	506	534	511	526	627	655	520	535	637	664
600	600	70	35	349	364	437	465	357	372	445	473	471	486	559	587	500	515	588	615
600	600	70	31	392	407	476	504	420	435	504	532	526	541	610	637	574	589	658	686
600	600	80	44	414	413	526	538	415	413	527	538	515	514	627	639	536	535	648	659
600	600	80	40	374	373	457	469	394	392	477	489	486	485	570	581	526	525	610	622
600	600	80	36	426	425	506	517	466	465	545	557	550	549	630	641	610	609	689	701
600	600	90	49	428	411	558	553	417	400	547	542	520	502	649	645	529	512	658	654
600	600	90	45	384	367	486	481	393	376	494	490	487	470	588	584	516	499	617	613
600	600	90	40	435	418	532	528	463	446	560	556	550	532	646	642	598	581	695	690

TABLE E-3D. TOTAL HC EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 6*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	180	204	244	281	159	183	224	261	224	248	289	325	224	248	289	326
300	300	50	25	165	189	201	238	165	189	201	238	221	245	257	294	241	265	277	314
300	300	50	22	150	174	182	219	169	193	201	237	217	241	249	286	257	281	288	325
300	300	60	33	176	184	236	257	167	175	228	248	211	219	271	292	223	230	283	303
300	300	60	30	171	178	203	223	181	189	213	234	217	225	249	270	248	256	280	301
300	300	60	27	164	172	191	212	194	202	222	242	222	229	249	270	272	280	300	320
300	300	70	38	206	197	283	288	186	177	263	268	231	223	309	313	231	223	309	313
300	300	70	35	196	188	245	250	195	187	245	249	233	225	282	287	253	244	302	306
300	300	70	31	186	177	231	235	204	196	250	254	234	226	279	283	273	265	318	323
300	450	50	25	224	261	322	371	218	255	316	366	281	318	378	428	295	332	393	443
300	450	50	22	208	245	277	327	222	259	291	341	276	313	346	395	310	347	380	429
300	450	50	20	198	235	263	313	231	269	296	346	278	315	343	393	331	368	396	446
300	450	60	30	229	249	322	355	234	255	327	361	276	296	369	402	301	322	395	428
300	450	60	27	221	242	286	320	246	267	311	345	280	300	345	378	325	346	390	424
300	450	60	24	218	239	279	312	263	284	323	357	288	309	349	382	353	374	414	447
300	450	70	35	255	260	366	383	249	254	360	377	293	297	403	421	307	312	418	435
300	450	70	31	244	249	326	344	258	262	340	357	293	298	375	393	327	332	409	427
300	450	70	28	236	241	314	332	269	274	348	365	297	301	375	392	350	355	428	446
300	600	60	27	302	326	432	469	311	335	441	478	371	395	501	538	399	423	530	567
300	600	60	24	265	289	367	404	293	317	396	432	345	369	448	484	394	418	496	533
300	600	60	21	281	305	379	416	329	353	427	463	373	397	471	508	441	465	539	575
300	600	70	31	309	317	435	456	329	337	455	476	368	376	494	515	408	416	535	555
300	600	70	28	280	288	378	398	319	327	417	438	350	358	448	469	410	418	508	529
300	600	70	24	302	310	396	417	361	369	455	476	385	392	478	499	464	472	558	578
300	600	80	36	327	319	471	475	336	328	480	484	377	369	521	525	406	397	549	554
300	600	80	32	295	286	410	414	323	314	438	442	356	347	471	475	404	396	519	524
300	600	80	28	313	304	424	428	360	352	472	476	385	377	497	501	453	445	564	569
450	300	50	30	210	241	283	327	206	237	279	323	286	318	360	404	302	334	376	420
450	300	50	27	190	221	235	279	205	237	250	295	278	309	323	367	314	345	359	403
450	300	50	25	183	215	224	268	218	249	259	303	283	314	324	368	338	369	379	423
450	300	60	36	214	229	283	311	222	237	291	319	281	296	350	378	309	324	378	406
450	300	60	33	204	219	244	272	231	246	271	299	282	297	323	351	329	344	370	398
450	300	60	30	206	221	242	270	252	267	289	316	296	311	332	360	362	378	399	427
450	300	70	42	242	241	328	340	237	236	324	336	299	298	385	397	315	314	402	413
450	300	70	38	230	229	288	299	245	244	303	315	299	297	357	368	334	333	392	404
450	300	70	35	228	226	281	293	262	261	316	328	308	307	362	374	363	362	417	429
450	450	60	33	266	310	372	429	276	321	383	440	355	399	461	518	385	430	492	549
450	450	60	30	247	292	325	382	277	321	355	412	347	392	425	482	397	442	475	533
450	450	60	27	247	291	321	378	296	341	370	427	359	403	433	490	428	473	502	559
450	450	70	38	274	302	376	417	295	324	397	438	353	381	455	496	395	423	497	538
450	450	70	35	263	291	337	378	304	333	378	419	354	382	428	469	415	443	489	530
450	450	70	31	272	300	342	382	333	361	402	443	374	402	444	485	455	483	525	565
450	450	80	44	292	304	412	436	303	314	422	447	362	374	481	506	392	404	512	536
450	450	80	40	280	292	372	396	310	322	401	426	362	373	453	477	412	423	503	527
450	450	80	36	286	298	373	397	335	347	422	447	378	390	465	490	448	460	535	559
450	600	70	35	386	418	526	570	411	442	550	594	487	518	627	671	532	563	671	715
450	600	70	31	347	379	458	502	391	423	502	546	460	491	571	615	524	555	635	679
450	600	70	28	374	405	480	524	437	469	544	588	497	529	604	648	581	613	688	732
450	600	80	40	396	411	531	559	432	447	567	595	487	502	622	650	543	559	679	706
450	600	80	36	366	381	473	501	421	437	528	556	469	484	575	603	544	560	651	679
450	600	80	32	401	416	503	531	476	491	578	606	515	530	618	646	611	626	713	741
450	600	90	45	409	408	561	573	433	432	586	597	490	489	643	654	535	534	688	699
450	600	90	40	377	376	501	513	421	420	545	557	470	469	594	606	534	533	659	670
450	600	90	36	408	407	527	539	471	470	591	603	512	511	632	644	596	595	716	728
600	300	60	39	268	307	350	402	248	287	330	381	377	415	459	510	377	416	459	510
600	300	60	36	228	266	282	333	227	266	281	332	348	387	402	453	368	406	421	473
600	300	60	33	251	290	301	352	270	309	319	371	383	421	432	484	422	460	471	523
600	300	70	45	255	277	332	368	246	268	324	359	354	376	432	467	365	388	443	478
600	300	70	42	223	246	273	308	234	257	284	319	334	356	383	419	365	387	414	450
600	300	70	38	258	280	303	338	288	310	333	368	380	402	425	460	430	453	476	511
600	300	80	52	289	295	384	403	269	275	364	383	379	385	474	493	379	385	474	493
600	300	80	48	259	265	326	345	258	264	325	344	360	366	427	446	379	386	446	465
600	300	80	44	291	297	353	372	309	316	372	391	403	409	466	485	442	448	505	524
600	450	70	42	361	413	477	541	356	407	471	535	482	534	597	662	497	548	612	676
600	450	70	38	324	376	411	475	338	389	425	489	456	508	543	607	490	542	577	641
600	450	70	35	353	405	436	500	387	438	469	533	497	549	580	644	551	602	633	698
600	450	80	48	349	384	460	508	355	390	465	514	460	496	571	619	486	521	597	645
600	450	80	44	321	357	404	452	347	382	429	477	444	480	527	575	490	525	572	620
600	450	80	40	362	397	440	488	407	442	485	533	496	532	574	623	561	597	639	687
600	450	90	54	378	397	506	538	372	392	501	533	480	499	608	640	494	514	623	654
600	450	90	49	352	371	452	484	366	385	465	497	465	484	565	597	499	518	599	631
600	450	90	45	389	408	485	517	422	441	518	550	514	533	609	641	567	586	663	695
600	600	70	38	510	549	658	710	519	557	667	718	643	682	791	842	672	710	820	871
600	600	70	35	447	486	567	618	475	514	595	646	591	630	711	763	640	678	760	811
600	600	70	31	502	541	618	669	550	588	665	716	658	697	773	825	726	764	841	893
600	600	80	44	507	529	650	686	527	549	670	706	630	652	774	809	670	693	814	849
600	600	80	40	455	477	570	605	494	517	610	645	589	612	705	740	649	672	765	800
600	600	80	36	519	541	630	665	578	600	689	724	665	687	776	811	744	767	855	891
600	600	90	49	538	544	699	718	547	553	708	727	652	658	813	832	681	687	842	861
600	600	90	45	483	489	615	634	511	517	644	663	608	614	741	760	656	662	789	808
600	600	90	40	545	551	674	693	593	599	721	740	682	688	810	829	750	756	878	897

TABLE E-3E. TOTAL HC EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	204	205	268	282	190	192	255	269	242	243	306	320	249	250	313	327
300	300	50	25	201	202	237	251	207	209	243	258	250	252	286	301	277	278	313	327
300	300	50	22	186	187	217	232	211	213	243	258	247	248	279	293	293	294	325	339
300	300	60	33	209	194	269	267	207	192	267	265	237	222	297	295	256	241	316	314
300	300	60	30	215	200	247	245	233	218	264	263	255	240	287	285	293	278	325	323
300	300	60	27	208	193	236	234	245	231	273	271	259	245	287	285	317	302	345	343
300	300	70	38	230	199	307	289	217	186	294	276	249	218	326	308	256	225	333	315
300	300	70	35	232	201	281	263	238	207	287	269	262	231	311	293	289	258	338	320
300	300	70	31	221	190	266	248	247	216	292	274	263	232	308	290	309	278	354	336
300	450	50	25	229	243	326	354	230	245	328	355	279	293	376	404	300	315	398	425
300	450	50	22	225	239	294	321	245	260	315	342	286	301	355	383	327	342	396	424
300	450	5C	20	215	229	280	307	255	269	320	347	288	302	353	380	348	363	413	441
300	450	60	30	242	240	335	346	254	253	348	359	282	281	376	387	315	314	409	420
300	450	60	27	246	244	311	322	278	276	343	354	298	296	363	374	350	349	415	426
300	450	60	24	243	242	304	315	295	293	355	367	307	305	367	378	379	377	439	450
300	450	70	35	260	242	370	365	261	243	372	367	291	273	401	396	312	294	423	418
300	450	70	31	260	242	343	338	281	263	363	358	303	285	385	380	344	326	426	421
300	450	70	28	253	235	331	326	293	275	371	366	307	289	385	380	367	349	445	440
300	600	60	27	287	289	418	432	303	305	434	448	350	351	480	495	386	387	516	530
300	600	60	24	262	264	365	379	297	299	400	414	336	338	438	453	391	393	494	508
300	600	60	21	278	280	376	391	333	334	431	445	364	365	462	476	438	440	536	551
300	600	70	31	303	288	429	427	330	315	456	454	356	341	482	480	403	388	529	527
300	600	70	28	286	271	383	382	332	317	430	428	350	335	448	446	416	402	514	512
300	600	70	24	308	294	402	400	374	360	468	466	384	369	478	476	470	456	564	562
300	600	80	36	313	282	457	438	328	298	472	454	356	325	500	482	392	361	536	517
300	600	80	32	292	261	407	389	327	296	442	424	346	315	462	444	402	371	517	499
300	600	80	28	310	279	421	403	365	334	476	458	376	345	487	469	451	420	562	544
450	300	50	30	224	233	297	319	227	236	300	322	294	303	367	389	317	326	391	412
450	300	50	27	216	225	261	283	238	247	283	305	298	306	343	364	340	349	385	407
450	300	50	25	209	218	250	272	251	260	292	313	302	311	343	365	365	373	405	427
450	300	60	36	237	230	306	312	252	244	321	326	298	290	367	372	332	325	401	407
450	300	60	33	238	231	279	284	272	265	313	318	310	303	351	356	364	357	405	410
450	300	60	30	240	233	277	282	294	286	330	335	324	317	360	366	398	390	434	439
450	300	70	42	256	232	342	331	259	235	345	334	307	283	393	382	330	306	416	406
450	300	70	38	256	232	314	303	278	254	336	325	318	294	376	365	361	337	419	408
450	300	70	35	254	230	307	297	295	272	349	338	328	304	381	371	390	366	443	433
450	450	60	33	261	283	367	402	278	300	385	419	343	365	450	484	381	403	487	522
450	450	60	30	254	276	332	367	291	312	369	403	348	369	426	460	405	426	483	517
450	450	60	27	254	276	328	362	310	332	384	418	359	381	433	467	436	457	509	544
450	450	70	38	277	283	379	398	306	312	408	426	350	356	452	470	399	405	501	519
450	450	70	35	279	284	352	371	327	332	400	419	363	368	436	455	431	437	505	523
450	450	70	31	288	293	357	375	355	361	425	443	383	389	453	471	471	477	540	559
450	450	80	44	287	277	407	409	305	294	424	426	350	340	470	472	388	377	507	510
450	450	80	40	287	277	378	380	324	313	415	417	362	351	453	455	419	408	510	512
450	450	80	36	293	282	379	382	349	338	436	438	379	368	466	468	455	445	542	544
450	600	70	35	362	371	502	523	394	403	533	555	457	465	596	617	508	517	648	669
450	600	70	31	335	344	446	467	386	395	497	518	441	449	552	573	512	521	623	645
450	600	70	28	361	370	468	490	432	441	539	560	479	487	585	607	569	578	676	698
450	600	80	40	380	373	515	521	423	416	558	564	465	458	600	606	528	521	663	669
450	600	80	36	362	355	469	474	425	417	531	537	458	451	565	570	541	534	648	653
450	600	80	32	397	390	500	505	479	472	582	587	505	498	607	613	607	600	710	715
450	600	90	45	384	361	537	526	416	393	569	558	460	436	612	601	512	488	664	653
450	600	90	40	364	341	488	478	415	392	540	529	451	427	575	564	522	499	647	636
450	600	90	36	395	372	515	504	466	442	586	575	493	470	613	602	584	561	704	693
600	300	60	39	273	289	355	384	260	276	342	371	375	391	457	486	382	398	464	493
600	300	60	36	244	260	298	327	251	267	304	333	358	374	412	440	384	400	438	467
600	300	60	33	267	284	317	346	293	309	343	372	393	409	442	471	439	455	488	517
600	300	70	45	268	268	346	358	266	266	344	357	361	360	438	451	379	379	457	469
600	300	70	42	248	248	298	310	266	266	316	328	352	352	402	414	390	390	440	452
600	300	70	38	283	283	328	341	320	320	365	378	398	398	444	456	456	456	501	514
600	300	80	52	294	277	389	385	281	264	376	372	377	360	472	468	384	368	479	476
600	300	80	48	275	259	342	338	281	265	348	345	370	353	437	433	396	380	463	460
600	300	80	44	307	291	370	366	333	317	395	392	413	397	476	472	459	443	522	518
600	450	70	42	347	376	462	504	348	377	463	505	461	490	576	618	483	512	598	640
600	450	70	38	321	350	408	450	342	371	429	470	447	476	534	576	488	517	575	617
600	450	70	35	351	380	433	475	391	420	473	515	488	517	570	612	548	577	631	673
600	450	80	48	343	356	454	479	356	369	466	492	448	461	558	584	481	493	591	617
600	450	80	44	327	340	410	435	359	372	442	467	443	456	526	551	496	509	578	604
600	450	80	40	368	381	446	472	419	432	498	523	496	508	574	599	567	580	646	671
600	450	90	54	364	360	492	501	365	362	493	503	459	455	587	596	480	477	608	618
600	450	90	49	349	346	449	458	370	366	470	479	456	452	555	565	497	493	596	606
600	450	90	45	386	383	482	491	426	423	522	531	504	501	600	609	565	562	660	670
600	600	70	38	476	492	625	653	492	508	640	669	603	619	751	780	639	655	787	816
600	600	70	35	425	441	545	574	460	476	580	609	563	579	683	711	618	634	738	767
600	600	70	31	480	496	596	624	535	551	650	679	629	646	745	774	704	720	820	849
600	600	80	44	481	481	625	638	508	508	652	665	598	598	742	755	646	645	789	802
600	600	80	40	441	441	557	569	488	487	603	616	569	569	685	698	636	636	752	764
600	600	80	36	505	505	616	629	571	571	682	695	645	645	756	769	731	731	843	855
600	600	90	49	504	488	665	662	520	504	681	678	611	595	773	769	647	631	809	805
600	600	90	45	460	444	593	590	496	479	628	625	579	563	712	709	635	618	767	764
600	600	90	40	523	507	651	648	577	561	706	703	653	637	782	778	728	712	857	853

TABLE E-3F. TOTAL HC EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*5

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	226	226	290	303	176	177	241	254	257	258	322	335	228	228	292	306
300	300	50	25	223	223	259	272	193	193	229	242	266	266	302	315	256	257	292	306
300	300	50	22	196	196	228	241	185	186	217	231	250	251	282	296	260	261	292	305
300	300	60	33	239	224	299	297	201	186	262	259	261	246	321	319	244	228	304	301
300	300	60	30	245	230	277	274	227	211	259	256	279	263	311	308	281	265	312	309
300	300	60	27	227	211	254	251	228	212	255	253	272	256	299	296	293	277	321	318
300	300	70	38	252	220	329	310	202	171	280	261	264	232	342	323	235	203	313	294
300	300	70	35	254	222	303	284	224	192	273	254	277	246	327	308	268	236	317	298
300	300	70	31	232	200	277	257	221	189	266	247	267	235	312	293	277	245	322	303
300	450	50	25	243	257	341	367	208	222	306	332	287	301	385	411	272	286	370	396
300	450	50	22	239	253	308	335	224	237	293	319	294	308	363	390	299	312	368	395
300	450	50	20	218	231	283	309	222	235	287	313	284	298	349	375	308	322	373	400
300	450	60	30	265	262	358	368	241	239	335	345	299	296	392	402	296	293	389	399
300	450	60	27	269	266	334	344	265	262	330	340	315	312	380	390	331	328	396	406
300	450	60	24	255	252	315	325	270	267	331	341	312	309	372	382	347	345	408	418
300	450	70	35	274	255	385	379	239	220	350	344	299	280	410	403	284	265	395	389
300	450	70	31	275	256	357	351	259	240	342	336	311	292	393	387	316	297	398	392
300	450	70	28	256	237	334	328	260	241	338	332	303	284	381	375	327	309	405	399
300	600	60	27	295	295	425	438	274	274	405	418	350	351	481	494	350	350	481	494
300	600	60	24	269	270	372	385	268	269	371	384	337	337	439	452	356	356	458	471
300	600	60	21	274	274	372	385	292	293	390	403	353	353	451	464	391	392	489	502
300	600	70	31	319	303	445	442	309	294	436	433	365	349	491	488	376	360	502	499
300	600	70	28	301	285	399	396	311	296	409	406	359	343	457	454	389	374	487	484
300	600	70	24	312	297	406	403	342	326	436	433	382	366	475	472	432	416	525	522
300	600	80	36	320	288	464	445	299	268	443	424	357	325	500	481	356	324	500	481
300	600	80	32	299	267	414	395	298	266	413	394	347	315	462	443	366	334	481	462
300	600	80	28	306	274	417	398	324	292	435	416	365	333	476	457	404	372	515	496
450	300	50	30	236	244	310	330	203	211	276	297	300	308	373	394	287	295	360	381
450	300	50	27	228	236	273	294	214	222	259	280	303	311	348	369	310	318	355	375
450	300	50	25	210	218	251	271	216	223	256	277	297	304	337	358	323	330	363	384
450	300	60	36	258	250	327	332	236	228	305	310	312	304	381	386	311	302	380	384
450	300	60	33	259	251	300	304	257	248	297	302	325	316	365	370	343	334	383	388
450	300	60	30	250	241	286	290	267	258	303	307	327	318	363	367	364	356	400	405
450	300	70	42	268	244	355	343	235	210	321	310	313	288	399	387	300	275	386	374
450	300	70	38	268	243	326	314	254	229	312	300	324	299	382	370	330	306	388	377
450	300	70	35	254	230	308	296	260	235	314	302	322	297	376	364	348	323	401	390
450	450	60	33	266	287	372	406	247	268	353	387	342	363	448	482	343	364	449	483
450	450	60	30	259	280	337	370	259	280	337	371	346	367	424	458	367	388	445	478
450	450	60	27	247	268	321	354	267	288	341	374	346	367	420	453	386	407	460	493
450	450	70	38	291	296	393	410	283	288	385	403	357	362	459	477	370	374	472	489
450	450	70	35	292	297	366	383	304	309	378	395	370	374	443	461	402	407	476	493
450	450	70	31	289	294	359	376	321	325	390	408	379	383	448	465	430	435	500	517
450	450	80	44	292	281	412	413	273	262	393	394	349	337	468	470	350	339	470	471
450	450	80	40	292	280	383	384	293	281	384	385	360	349	451	452	381	369	472	473
450	450	80	36	286	274	373	374	306	294	393	394	365	354	452	454	406	394	493	494
450	600	70	35	360	368	499	520	355	363	495	515	448	455	587	608	463	471	603	623
450	600	70	31	332	340	443	464	347	355	458	479	432	439	543	563	467	475	578	598
450	600	70	28	347	355	454	474	381	389	488	509	458	466	565	585	513	520	619	640
450	600	80	40	387	378	522	526	393	385	528	533	465	456	600	604	492	484	627	631
450	600	80	36	368	360	475	479	394	386	501	505	458	449	565	569	504	496	611	615
450	600	80	32	392	383	494	498	437	429	540	544	493	485	595	600	559	551	661	666
450	600	90	45	382	357	535	523	377	353	530	518	451	426	603	591	466	442	619	607
450	600	90	40	362	337	486	474	377	352	501	489	442	417	566	554	477	453	601	590
450	600	90	36	381	356	501	489	415	391	535	523	473	448	593	581	527	503	647	635
600	300	60	39	276	291	358	385	226	241	308	336	371	386	453	481	342	357	424	452
600	300	60	36	247	262	301	328	217	232	271	299	354	369	408	436	344	359	398	426
600	300	60	33	259	274	308	336	248	263	298	325	377	392	427	454	387	402	437	464
600	300	70	45	279	278	357	369	241	240	319	331	365	364	443	455	348	347	425	437
600	300	70	42	260	258	309	321	241	240	291	302	357	356	407	418	359	358	408	420
600	300	70	38	282	281	328	339	283	282	329	340	392	390	437	448	413	412	458	470
600	300	80	52	296	279	392	387	247	230	342	338	373	356	468	464	344	327	439	435
600	300	80	48	278	260	345	340	248	231	315	310	366	348	433	428	356	339	423	419
600	300	80	44	298	281	361	356	288	270	350	346	398	380	460	456	407	390	470	466
600	450	70	42	342	370	457	498	307	335	422	463	450	478	565	606	435	463	550	591
600	450	70	38	316	344	403	444	301	329	388	429	436	464	522	563	440	468	527	568
600	450	70	35	334	362	417	458	338	366	421	462	465	493	548	588	489	517	572	613
600	450	80	48	347	359	458	482	323	335	434	459	445	457	556	581	442	454	553	577
600	450	80	44	331	343	413	438	327	339	409	434	441	453	523	548	457	469	539	564
600	450	80	40	360	372	438	463	375	387	454	478	481	493	559	584	517	529	595	620
600	450	90	54	359	355	487	496	324	320	452	461	448	443	576	584	433	429	561	570
600	450	90	49	344	340	444	453	329	324	429	437	444	440	544	553	449	445	549	557
600	450	90	45	370	365	465	474	374	369	469	478	481	477	577	586	506	501	601	610
600	600	70	38	464	479	612	640	444	459	592	620	584	599	732	760	584	599	732	760
600	600	70	35	413	428	533	560	412	427	531	559	544	559	664	692	563	578	683	711
600	600	70	31	456	471	572	600	475	490	590	618	599	614	715	742	638	653	753	781
600	600	80	44	478	477	622	633	469	468	613	624	588	587	732	744	599	598	743	755
600	600	80	40	438	436	553	565	448	447	563	575	559	558	675	687	590	589	705	717
600	600	80	36	490	489	601	613	520	519	631	643	623	622	735	746	673	672	785	796
600	600	90	49	492	475	653	649	472	454	633	628	593	576	754	750	593	575	754	749
600	600	90	45	448	431	581	577	447	430	580	576	561	543	694	689	580	562	713	708
600	600	90	40	499	482	628	623	517	500	646	642	623	606	752	747	662	644	790	786

TABLE E-3G. TOTAL HC EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 6*6

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	217	241	274	310	188	212	244	281	271	295	327	364	262	286	318	355
300	300	50	25	203	227	231	268	193	217	221	257	268	292	296	333	278	302	306	343
300	300	50	22	188	212	211	248	197	221	220	257	265	289	288	325	294	318	318	354
300	300	60	33	214	222	266	286	196	203	247	268	258	266	310	331	260	268	312	333
300	300	60	30	208	216	232	253	209	217	233	254	264	272	288	308	286	293	309	330
300	300	60	27	201	209	221	241	222	230	241	262	269	277	288	309	310	317	329	350
300	300	70	38	244	235	313	317	214	205	283	288	278	270	348	352	269	260	338	343
300	300	70	35	234	225	275	279	224	215	265	269	280	272	321	326	290	282	331	336
300	300	70	31	223	215	260	265	233	224	269	274	281	273	318	322	311	302	347	352
300	450	50	25	266	303	355	405	251	288	340	390	332	369	421	471	337	374	426	476
300	450	50	22	250	287	311	361	254	291	315	365	328	365	389	439	352	389	413	463
300	450	50	20	240	277	297	347	264	301	321	370	329	366	386	436	373	410	430	480
300	450	60	30	271	291	356	389	267	287	352	385	327	348	412	446	343	364	428	462
300	450	60	27	263	284	320	353	279	299	335	369	331	352	388	421	367	388	423	457
300	450	60	24	260	281	313	346	295	316	348	381	340	361	392	426	395	416	447	481
300	450	70	35	297	302	399	417	282	286	384	401	344	349	446	464	349	353	451	469
300	450	70	31	286	291	360	377	290	295	364	382	344	349	418	436	369	373	443	460
300	450	70	28	278	283	348	365	302	306	372	389	348	353	418	435	392	397	462	479
300	600	60	27	348	372	471	507	347	371	470	506	426	450	549	585	446	470	568	605
300	600	60	24	312	336	406	442	330	354	424	461	401	425	495	532	440	464	534	571
300	600	60	21	327	351	417	454	365	389	455	492	429	453	518	555	487	511	577	613
300	600	70	31	355	363	473	494	366	373	484	504	424	432	542	562	454	462	572	593
300	600	70	28	326	334	416	436	356	364	446	466	406	414	496	517	456	464	546	567
300	600	70	24	349	357	434	455	398	406	484	504	440	448	526	546	510	518	595	616
300	600	80	36	374	365	509	514	373	364	508	512	433	424	568	573	452	444	587	592
300	600	80	32	341	332	448	452	359	351	466	471	411	403	519	523	450	442	557	562
300	600	80	28	359	351	462	466	397	389	500	504	441	433	544	548	499	491	602	607
450	300	50	30	266	297	331	375	252	284	317	361	352	383	417	461	358	390	424	468
450	300	50	27	246	278	283	327	252	283	289	333	344	375	381	425	370	401	407	451
450	300	50	25	240	271	272	316	265	296	297	341	349	380	381	425	394	425	427	471
450	300	60	36	271	286	331	359	268	283	329	357	347	362	408	436	365	380	426	454
450	300	60	33	260	275	293	320	277	292	310	338	348	363	380	408	385	401	418	446
450	300	60	30	262	277	290	318	299	314	327	355	362	377	390	418	419	434	447	474
450	300	70	42	298	297	376	388	284	283	362	374	365	364	443	455	371	370	449	461
450	300	70	38	286	285	336	347	292	291	342	353	364	363	414	426	390	389	440	452
450	300	70	35	284	283	329	341	309	308	355	366	374	373	419	431	419	418	465	476
450	450	60	33	327	371	425	482	327	372	425	482	425	469	523	580	446	490	544	601
450	450	60	30	308	352	378	435	328	372	398	455	417	462	487	544	458	502	528	585
450	450	60	27	308	352	373	430	347	392	413	470	429	473	494	551	489	533	554	611
450	450	70	38	334	363	428	469	346	375	440	481	423	451	517	558	455	483	549	590
450	450	70	35	324	352	389	430	355	384	421	462	424	452	489	530	476	504	541	582
450	450	70	31	333	361	394	435	384	412	445	486	444	472	505	546	516	544	577	618
450	450	80	44	353	365	464	489	353	365	465	489	432	444	543	568	453	465	564	589
450	450	80	40	341	353	424	449	361	373	444	469	432	444	514	539	472	484	555	580
450	450	80	36	346	358	425	450	386	398	465	489	448	460	527	552	508	520	587	612
450	600	70	35	451	483	582	626	466	498	597	641	562	593	693	737	597	628	728	772
450	600	70	31	412	443	515	559	447	478	549	594	534	565	637	681	589	620	691	735
450	600	70	28	439	470	537	581	493	524	591	635	572	603	670	714	646	677	744	789
450	600	80	40	461	476	588	615	487	502	614	642	562	577	688	716	608	623	735	763
450	600	80	36	431	446	529	557	477	492	575	603	543	558	642	669	609	624	708	736
450	600	80	32	466	481	560	588	531	546	625	653	590	605	684	712	675	690	769	797
450	600	90	45	474	472	618	629	489	487	633	644	565	564	709	721	600	599	744	756
450	600	90	40	442	441	558	569	476	475	592	604	544	543	660	672	599	598	715	727
450	600	90	36	473	471	584	596	527	525	638	650	587	586	698	710	661	660	772	784
600	300	60	39	343	382	417	468	313	352	387	438	461	500	535	586	452	490	525	577
600	300	60	36	303	341	348	400	292	331	338	389	432	471	478	529	442	481	488	539
600	300	60	33	326	365	367	419	335	374	376	428	467	506	508	560	497	535	538	589
600	300	70	45	330	352	399	434	311	334	381	416	438	461	508	543	440	462	510	545
600	300	70	42	298	321	340	375	299	322	341	376	418	441	460	495	440	462	481	516
600	300	70	38	333	355	370	405	353	376	390	425	464	487	501	536	505	528	542	577
600	300	80	52	364	370	451	470	334	340	421	440	463	469	550	569	453	460	540	559
600	300	80	48	334	340	392	411	323	330	382	401	444	450	503	522	454	460	513	532
600	300	80	44	366	372	420	439	375	381	429	448	487	494	542	561	517	523	571	590
600	450	70	42	441	492	548	612	425	477	532	596	571	622	678	742	576	627	683	747
600	450	70	38	403	455	482	546	407	459	486	550	545	597	623	688	569	621	648	712
600	450	70	35	433	484	507	571	456	508	530	595	586	637	660	724	630	681	704	768
600	450	80	48	428	464	531	579	424	460	527	575	549	584	651	699	565	600	668	716
600	450	80	44	401	436	475	523	416	452	490	539	533	568	607	655	569	604	643	691
600	450	80	40	441	477	511	559	476	512	546	594	585	620	655	703	640	676	710	758
600	450	90	54	457	477	577	609	442	461	562	594	568	588	688	720	573	593	693	725
600	450	90	49	431	450	523	555	435	454	527	559	554	573	645	677	578	597	670	702
600	450	90	45	468	487	556	588	492	511	579	611	602	622	690	722	646	665	733	765
600	600	70	38	594	632	734	785	593	631	733	784	736	775	876	927	755	794	895	946
600	600	70	35	531	569	642	693	549	588	661	712	684	723	796	847	723	762	835	886
600	600	70	31	586	624	693	744	624	662	731	782	751	790	858	909	809	848	916	968
600	600	80	44	590	613	726	761	601	623	736	771	723	745	858	894	754	776	889	924
600	600	80	40	538	561	645	681	568	590	675	710	682	705	790	825	733	755	840	875
600	600	80	36	602	625	705	740	652	674	755	790	758	780	861	896	828	850	931	966
600	600	90	49	622	628	774	793	620	627	773	792	745	751	898	917	764	770	917	936
600	600	90	45	566	572	691	710	585	591	709	728	701	707	825	844	739	746	864	883
600	600	90	40	628	635	749	768	666	673	787	806	775	781	895	914	833	839	953	972

TABLE E-3H. TOTAL HC EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*6

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	248	249	304	318	225	226	281	295	295	296	351	366	292	294	349	363
300	300	50	25	245	246	273	287	242	243	270	284	304	305	332	346	321	322	349	363
300	300	50	22	230	231	253	268	246	247	270	284	300	302	324	338	337	338	360	374
300	300	60	33	253	238	305	303	241	227	293	291	291	276	343	341	300	285	351	350
300	300	60	30	259	244	282	281	267	252	291	289	308	294	332	330	337	322	360	358
300	300	60	27	252	237	271	269	280	265	299	297	313	298	332	330	361	346	380	378
300	300	70	38	274	243	343	325	251	220	320	302	302	271	372	353	300	269	369	351
300	300	70	35	276	245	317	299	272	242	314	295	316	285	357	339	333	302	374	356
300	300	70	31	265	234	302	284	282	251	318	300	317	286	353	335	353	322	390	372
300	450	50	25	277	292	366	394	269	283	358	385	337	351	426	453	349	363	438	465
300	450	50	22	273	287	334	361	284	299	345	372	344	358	405	432	375	390	436	464
300	450	50	20	263	278	320	347	294	308	350	378	346	360	402	430	396	411	453	480
300	450	60	30	290	289	375	386	293	292	378	389	340	339	425	436	363	362	448	460
300	450	60	27	294	293	351	362	317	315	374	385	356	354	413	424	399	397	455	466
300	450	60	24	292	290	344	355	334	332	386	397	365	363	417	428	427	425	479	490
300	450	70	35	308	290	411	405	300	282	402	397	349	331	451	446	360	343	463	458
300	450	70	31	309	291	383	378	320	302	394	389	361	343	435	430	392	374	466	461
300	450	70	28	301	283	371	366	332	314	401	396	365	347	434	429	415	397	485	480
300	600	60	27	340	342	462	477	346	348	468	483	412	413	534	548	438	439	560	575
300	600	60	24	315	316	409	423	340	342	434	449	398	400	492	506	444	445	538	552
300	600	60	21	331	333	421	435	376	377	466	480	426	427	515	530	491	492	581	595
300	600	70	31	356	341	474	472	373	358	491	489	418	403	536	534	455	441	573	571
300	600	70	28	338	324	428	426	375	360	465	463	412	397	502	500	469	454	559	557
300	600	70	24	361	346	446	444	417	403	503	501	446	431	531	530	523	508	608	606
300	600	80	36	366	335	501	483	371	341	507	489	418	387	554	535	444	413	580	562
300	600	80	32	344	313	451	433	370	339	477	459	408	378	516	497	454	423	561	543
300	600	80	28	363	332	466	447	408	377	511	492	438	407	541	523	504	473	606	588
450	300	50	30	287	295	352	373	280	289	345	367	366	375	431	453	380	388	445	466
450	300	50	27	279	287	315	337	291	300	328	350	370	378	406	428	403	411	439	461
450	300	50	25	272	281	304	326	304	313	337	358	375	383	407	428	427	436	459	481
450	300	60	36	300	293	361	366	305	297	365	371	370	362	431	436	395	387	456	461
450	300	60	33	301	294	333	339	325	318	358	363	382	375	415	420	427	419	459	465
450	300	60	30	303	296	331	337	347	339	375	380	396	389	424	430	460	453	488	493
450	300	70	42	319	295	397	386	312	288	390	379	379	355	457	446	392	369	471	460
450	300	70	38	318	295	368	357	331	307	381	370	390	367	440	429	423	400	473	462
450	300	70	35	316	293	362	351	348	325	394	383	400	376	445	434	452	429	498	487
450	450	60	33	328	350	426	461	336	358	434	468	420	442	518	552	448	469	546	580
450	450	60	30	321	343	391	425	348	370	418	452	424	446	494	528	471	493	541	576
450	450	60	27	321	343	386	421	368	389	433	468	436	457	501	536	502	524	568	602
450	450	70	38	344	350	438	457	363	369	457	476	426	432	520	539	466	471	560	578
450	450	70	35	346	351	411	429	384	390	450	468	439	445	505	523	498	504	563	582
450	450	70	31	355	360	416	434	413	418	474	492	460	465	521	539	538	543	599	617
450	450	80	44	354	344	466	468	362	351	473	475	427	416	538	540	455	444	566	568
450	450	80	40	354	344	437	439	381	371	464	466	438	428	521	523	486	475	568	571
450	450	80	36	360	349	438	440	406	396	485	487	455	445	534	536	522	511	601	603
450	600	70	35	434	442	565	586	456	464	587	608	537	546	668	690	580	588	711	732
450	600	70	31	406	415	509	530	448	456	550	572	521	530	624	646	583	592	686	707
450	600	70	28	433	441	531	553	494	502	592	614	559	568	658	679	641	649	739	761
450	600	80	40	452	444	578	584	485	478	612	617	546	539	673	678	600	592	726	732
450	600	80	36	433	426	532	537	486	479	585	590	539	532	637	643	612	605	711	716
450	600	80	32	469	461	563	568	541	533	635	640	586	578	680	685	678	671	772	778
450	600	90	45	456	432	600	589	478	454	622	611	540	517	685	674	583	559	727	716
450	600	90	40	436	412	552	541	477	454	593	582	532	508	648	637	594	570	709	699
450	600	90	36	467	443	578	567	527	504	639	628	574	551	686	675	655	632	767	756
600	300	60	39	354	370	428	457	331	347	405	434	466	482	539	568	463	479	537	566
600	300	60	36	325	341	371	400	322	338	368	396	448	465	494	523	465	482	511	540
600	300	60	33	349	365	390	419	365	381	406	435	483	499	525	553	520	536	561	590
600	300	70	45	349	349	419	431	338	338	407	420	451	451	521	533	460	460	530	542
600	300	70	42	330	329	371	383	338	338	379	392	443	443	484	497	471	471	513	525
600	300	70	38	364	364	401	414	392	392	429	441	489	489	526	539	537	537	574	586
600	300	80	52	375	359	462	458	352	336	439	436	467	451	554	551	465	449	552	548
600	300	80	48	356	340	415	411	353	337	412	408	460	444	519	515	477	461	536	532
600	300	80	44	388	372	443	439	404	388	459	455	504	487	558	555	540	524	595	591
600	450	70	42	432	462	539	581	424	453	531	573	556	585	663	705	568	597	675	717
600	450	70	38	407	436	485	527	418	447	496	538	542	571	620	662	573	602	652	694
600	450	70	35	436	465	510	552	467	496	541	583	583	612	657	699	634	663	708	750
600	450	80	48	429	441	531	557	432	444	534	560	543	556	645	671	566	579	668	694
600	450	80	44	413	426	487	513	435	448	509	535	538	551	613	638	581	594	655	681
600	450	80	40	453	466	523	549	495	508	565	591	591	603	660	686	653	666	723	748
600	450	90	54	449	446	569	579	441	438	561	570	554	551	674	683	566	562	686	695
600	450	90	49	435	431	526	536	446	442	537	547	551	547	642	652	582	579	674	683
600	450	90	45	472	468	559	569	502	499	590	599	599	596	687	696	650	647	737	747
600	600	70	38	566	582	706	735	572	588	712	741	702	718	842	871	728	744	868	897
600	600	70	35	515	531	626	655	540	556	652	681	662	678	774	802	708	724	819	848
600	600	70	31	570	586	677	706	615	631	722	751	729	745	836	865	794	810	901	930
600	600	80	44	571	571	707	720	589	589	724	737	698	697	833	846	735	735	871	883
600	600	80	40	531	531	638	651	568	568	675	688	669	669	776	789	726	726	833	846
600	600	80	36	595	595	698	711	652	651	754	767	744	744	847	860	821	821	924	937
600	600	90	49	594	578	747	744	600	584	753	750	711	695	864	860	737	721	890	886
600	600	90	45	550	534	675	671	576	559	700	697	679	662	803	800	724	708	849	845
600	600	90	40	613	596	733	730	658	641	778	775	753	736	873	869	818	801	938	935

TABLE E-31. TOTAL HC EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*7

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET: LOW		HIGH		TRUCKS ON MAJOR STREET: LOW		HIGH		TRUCKS ON MAJOR STREET: LOW		HIGH		TRUCKS ON MAJOR STREET: LOW		HIGH	
				L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	277	278	334	347	218	219	275	288	318	319	375	388	280	280	336	349
300	300	50	25	275	275	303	316	235	235	263	276	327	327	355	368	308	308	336	349
300	300	50	22	248	248	271	285	228	228	251	265	312	312	335	349	312	312	336	349
300	300	60	33	291	275	343	340	244	228	296	293	323	307	375	372	295	279	347	344
300	300	60	30	297	281	321	318	269	253	293	290	340	324	364	361	332	316	356	353
300	300	60	27	279	263	298	295	270	254	289	286	333	317	352	350	345	329	364	361
300	300	70	38	304	272	373	354	245	213	314	295	325	294	395	376	287	255	356	337
300	300	70	35	305	274	347	327	266	234	307	288	339	307	380	361	320	288	361	342
300	300	70	31	283	252	320	301	263	232	300	281	328	296	365	346	329	297	365	346
300	450	50	25	300	313	389	415	255	268	344	371	353	366	442	468	328	342	418	444
300	450	50	22	295	309	356	383	270	284	331	357	360	373	421	447	355	368	416	442
300	450	50	20	274	287	330	357	268	282	325	351	350	363	407	433	364	378	421	447
300	450	60	30	321	319	406	416	288	285	373	383	365	362	450	460	352	349	437	447
300	450	60	27	325	323	382	392	312	309	368	378	380	378	437	447	387	384	443	454
300	450	60	24	311	308	363	373	317	314	369	379	377	375	430	440	403	401	456	466
300	450	70	35	331	312	433	427	286	267	388	382	364	346	467	461	340	321	443	436
300	450	70	31	331	312	405	399	306	287	380	374	376	358	451	444	372	353	446	440
300	450	70	28	312	293	382	375	306	287	376	370	369	350	439	432	383	364	453	447
300	600	60	27	355	356	477	491	325	325	447	460	420	421	543	556	410	411	533	546
300	600	60	24	330	330	424	437	319	320	413	426	407	407	501	514	416	417	510	523
300	600	60	21	334	335	424	437	343	344	433	446	423	423	512	526	452	452	541	554
300	600	70	31	379	363	497	494	360	345	478	475	435	419	553	550	436	421	554	551
300	600	70	28	362	346	451	448	362	347	452	449	429	413	519	516	450	434	539	536
300	600	70	24	373	357	458	455	393	377	478	475	452	436	537	534	492	476	577	574
300	600	80	36	381	349	516	497	350	318	486	467	427	395	562	543	417	385	552	533
300	600	80	32	359	327	466	447	348	317	456	437	417	385	524	505	426	394	533	514
300	600	80	28	366	334	469	450	375	343	478	458	435	403	538	519	464	432	567	548
450	300	50	30	307	315	372	392	264	272	329	349	380	388	445	465	357	365	422	443
450	300	50	27	299	307	335	356	275	283	312	333	383	391	420	441	380	388	417	437
450	300	50	25	280	288	313	333	276	284	309	329	377	384	409	429	393	401	425	446
450	300	60	36	329	320	389	394	297	289	358	362	392	384	453	457	381	372	442	446
450	300	60	33	330	321	362	366	318	309	350	354	405	396	437	441	413	404	445	450
450	300	60	30	320	312	348	353	328	319	356	360	407	398	435	439	434	426	462	467
450	300	70	42	339	314	417	405	296	271	374	362	393	368	471	459	370	345	448	436
450	300	70	38	338	314	388	376	315	290	365	353	404	379	454	442	400	376	450	439
450	300	70	35	325	300	370	358	321	296	366	354	402	377	447	435	418	393	463	452
450	450	60	33	341	362	439	473	312	333	410	444	426	447	524	558	418	438	516	549
450	450	60	30	334	354	403	437	325	345	394	428	430	451	500	534	441	462	511	545
450	450	60	27	322	343	387	421	332	353	398	431	430	451	496	529	461	482	526	560
450	450	70	38	366	370	460	477	349	353	442	460	441	446	535	552	444	449	538	556
450	450	70	35	367	371	432	450	369	374	435	452	454	459	519	537	476	481	542	559
450	450	70	31	364	369	425	443	386	391	447	464	463	467	524	541	505	509	566	583
450	450	80	44	367	356	478	479	339	327	450	451	433	422	544	546	425	413	536	537
450	450	80	40	367	355	450	451	358	346	441	442	444	433	527	528	456	444	538	540
450	450	80	36	361	349	439	440	371	359	450	451	450	438	528	529	480	469	559	560
450	600	70	35	439	447	570	591	425	432	556	576	536	544	667	688	542	550	673	694
450	600	70	31	411	419	514	535	417	424	519	540	520	528	623	643	546	553	648	669
450	600	70	28	426	434	525	545	451	459	549	570	547	554	645	665	591	599	690	710
450	600	80	40	466	457	592	597	463	454	590	594	553	545	680	685	571	562	698	702
450	600	80	36	447	439	546	550	464	455	562	567	546	538	645	649	583	575	682	686
450	600	80	32	471	462	565	569	507	499	601	605	582	573	676	680	638	629	732	736
450	600	90	45	461	437	605	594	447	422	591	579	539	515	684	672	545	521	690	678
450	600	90	40	441	416	557	545	446	422	562	550	531	506	647	635	556	532	672	660
450	600	90	36	460	436	572	560	485	460	597	585	561	537	673	661	606	582	718	706
600	300	60	39	365	380	438	466	306	321	379	407	470	485	544	571	431	446	505	533
600	300	60	36	336	351	381	409	296	311	342	370	452	468	498	526	433	448	479	507
600	300	60	33	348	363	389	417	328	343	369	397	476	491	517	545	476	491	517	545
600	300	70	45	368	367	438	450	321	320	390	402	464	463	533	545	437	435	506	518
600	300	70	42	349	347	390	401	321	319	362	373	456	455	497	508	448	447	489	501
600	300	70	38	371	370	408	420	363	362	400	411	490	489	527	539	502	501	539	550
600	300	80	52	386	368	472	468	327	309	413	409	472	454	558	554	433	415	520	515
600	300	80	48	367	350	425	421	327	310	386	381	464	447	523	518	445	428	504	499
600	300	80	44	387	370	441	437	367	350	421	417	496	479	550	546	496	479	551	546
600	450	70	42	436	464	542	583	391	419	498	539	553	581	660	701	528	557	635	676
600	450	70	38	410	438	488	529	385	413	463	504	538	567	617	658	534	562	612	653
600	450	70	35	428	456	502	543	422	450	496	537	568	596	642	683	582	611	657	698
600	450	80	48	440	452	543	567	407	419	510	534	548	560	650	675	535	547	637	662
600	450	80	44	424	436	499	523	411	423	485	509	544	555	618	642	550	562	624	649
600	450	80	40	453	465	523	548	459	471	529	554	584	596	654	679	610	622	680	705
600	450	90	54	452	448	572	581	408	403	528	536	550	546	670	679	526	522	646	655
600	450	90	49	438	433	529	538	412	408	504	513	547	543	639	647	542	538	634	642
600	450	90	45	463	459	550	559	458	453	545	553	584	580	672	680	599	595	686	695
600	600	70	38	562	577	702	730	532	547	672	699	691	706	831	859	681	696	821	849
600	600	70	35	510	526	622	650	500	515	611	639	651	666	763	791	661	676	772	800
600	600	70	31	554	569	661	689	563	578	670	698	706	721	814	841	735	750	843	870
600	600	80	44	576	575	711	723	557	556	692	704	695	694	831	843	697	696	832	844
600	600	80	40	535	534	642	654	536	535	643	655	667	665	774	785	687	686	795	806
600	600	80	36	588	587	691	702	608	607	711	722	731	730	834	845	771	770	874	886
600	600	90	49	590	573	743	738	560	542	713	708	700	683	853	849	690	673	843	839
600	600	90	45	546	529	671	666	535	518	660	655	668	650	792	788	677	660	802	797
600	600	90	40	597	580	717	713	606	588	726	721	730	713	850	846	759	742	879	875

TABLE E-4A. TOTAL NOX EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 4*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	444	460	521	558	434	450	511	548	525	541	618	656	555	571	649	686
300	300	50	25	447	463	509	546	451	466	512	549	544	560	623	660	588	604	666	703
300	300	50	22	412	428	458	495	429	445	475	512	526	542	589	626	583	599	646	683
300	300	60	33	422	454	513	567	412	445	503	557	495	527	602	656	525	557	633	686
300	300	60	30	442	474	517	571	445	478	521	574	531	563	623	677	575	607	667	720
300	300	60	27	421	454	482	535	438	471	499	552	527	560	604	658	584	617	661	715
300	300	70	38	412	428	517	555	403	418	508	545	477	493	599	636	507	523	629	666
300	300	70	35	426	442	516	553	429	445	519	556	507	523	613	650	550	566	657	694
300	300	70	31	399	415	473	510	416	432	490	527	496	512	587	624	553	569	644	681
300	450	50	25	513	529	667	704	503	519	657	694	617	633	788	825	647	663	819	856
300	450	50	22	505	521	644	681	509	524	648	685	626	642	782	819	670	686	825	862
300	450	50	20	485	501	609	646	502	518	626	663	623	639	764	801	680	696	821	858
300	450	60	30	497	529	666	719	487	520	656	709	593	626	779	832	624	656	809	862
300	450	60	27	504	536	657	711	508	540	661	714	617	649	787	840	661	693	830	884
300	450	60	24	497	530	635	689	514	547	652	706	627	659	781	835	684	716	838	892
300	450	70	35	492	508	674	711	482	498	664	701	580	596	779	816	610	626	809	846
300	450	70	31	492	508	659	696	495	511	663	700	597	612	780	817	640	656	824	861
300	450	70	28	478	493	629	666	495	510	646	683	599	615	767	804	656	672	824	861
300	600	60	27	511	527	783	820	501	517	774	811	639	655	928	965	669	685	958	995
300	600	60	24	491	506	748	785	494	510	752	789	636	651	909	946	679	695	953	990
300	600	60	21	483	499	725	762	500	516	742	779	645	660	903	940	702	717	960	997
300	600	70	31	487	519	774	827	477	510	764	817	607	639	910	964	637	670	941	994
300	600	70	28	480	513	752	805	484	516	755	809	617	649	905	958	661	693	948	1002
300	600	70	24	482	515	738	792	499	532	755	809	636	668	908	962	692	725	965	1018
300	600	80	36	475	491	775	812	465	481	766	803	587	602	904	941	617	632	934	971
300	600	80	32	459	475	745	782	463	479	748	785	588	604	890	927	631	647	933	970
300	600	80	28	453	469	723	760	470	486	740	777	598	614	885	922	655	671	942	979
450	300	50	30	513	529	602	639	518	534	607	644	681	697	787	824	726	742	832	869
450	300	50	27	509	525	583	620	527	543	601	638	694	709	784	821	752	768	843	880
450	300	50	25	488	504	547	584	520	536	578	616	690	705	765	802	761	777	837	874
450	300	60	36	506	538	609	662	511	543	614	667	666	698	786	839	711	743	831	884
450	300	60	33	517	549	605	659	536	568	624	677	694	726	798	852	752	785	857	910
450	300	60	30	513	545	586	639	545	577	617	671	706	739	796	849	778	810	867	921
450	300	70	42	494	509	611	648	499	514	616	653	645	661	779	816	690	706	824	861
450	300	70	38	503	519	605	642	521	537	623	660	671	687	790	827	730	746	848	885
450	300	70	35	493	508	579	616	525	540	611	648	678	694	781	818	750	765	853	890
450	450	60	33	567	583	733	771	572	588	739	776	759	775	942	979	804	820	987	1024
450	450	60	30	552	567	703	740	570	586	721	758	760	776	928	965	818	834	986	1023
450	450	60	27	547	562	683	720	578	594	714	751	772	788	924	961	844	859	996	1033
450	450	70	38	555	588	736	789	560	593	741	795	739	771	936	990	784	816	981	1035
450	450	70	35	555	587	720	773	573	605	738	792	755	787	937	990	813	846	995	1049
450	450	70	31	564	596	714	767	595	628	745	799	781	813	947	1001	852	885	1019	1073
450	450	80	44	537	553	732	769	542	558	737	774	713	729	924	961	758	774	969	1006
450	450	80	40	533	549	712	749	552	567	731	768	725	741	921	958	784	800	980	1017
450	450	80	36	536	552	700	737	568	584	732	769	745	761	926	963	817	833	997	1034
450	600	70	35	615	631	900	937	620	636	905	942	830	846	1132	1169	875	891	1177	1214
450	600	70	31	586	602	856	893	605	621	874	911	819	834	1105	1142	877	893	1163	1200
450	600	70	28	594	610	848	885	626	642	880	917	843	859	1114	1151	915	930	1185	1222
450	600	80	40	596	628	895	948	601	633	900	953	803	836	1119	1172	849	881	1164	1217
450	600	80	36	582	615	866	919	601	633	884	938	806	839	1107	1160	865	897	1165	1218
450	600	80	32	602	635	870	924	634	666	902	956	843	875	1128	1181	915	947	1199	1253
450	600	90	45	574	589	886	923	579	594	891	928	773	789	1102	1139	818	834	1147	1184
450	600	90	40	553	569	850	887	571	587	869	906	769	785	1083	1120	827	843	1141	1178
450	600	90	36	565	581	847	884	597	613	879	916	797	813	1096	1133	869	885	1168	1205
600	300	60	39	544	560	673	710	535	550	663	700	800	816	946	983	830	846	976	1013
600	300	60	36	534	549	647	684	537	553	651	688	806	822	936	973	850	865	980	1017
600	300	60	33	531	547	630	667	548	564	647	684	820	836	935	972	877	893	992	1029
600	300	70	45	507	539	650	703	497	529	640	693	754	787	914	967	784	817	944	997
600	300	70	42	512	544	640	693	516	548	643	697	776	809	920	974	820	852	964	1017
600	300	70	38	528	561	641	694	545	578	658	711	809	841	938	991	866	898	995	1048
600	300	80	52	508	524	665	702	499	515	656	693	748	764	921	958	778	794	951	988
600	300	80	48	515	531	657	694	519	535	661	698	771	787	929	967	815	831	973	1010
600	300	80	44	527	543	654	691	544	560	671	708	800	816	943	980	857	873	1000	1037
600	450	70	42	651	667	857	894	641	657	847	884	930	946	1153	1190	960	976	1183	1220
600	450	70	38	632	647	823	860	635	651	826	863	928	943	1135	1172	971	987	1179	1216
600	450	70	35	643	659	819	856	660	676	836	873	956	972	1148	1185	1013	1029	1205	1242
600	450	80	48	607	639	827	881	597	629	817	871	878	910	1115	1168	908	940	1145	1198
600	450	80	44	604	636	809	863	608	640	813	866	892	924	1114	1167	936	968	1157	1211
600	450	80	40	633	665	823	876	650	682	840	893	938	970	1144	1197	994	1027	1201	1254
600	450	90	54	608	624	843	880	598	614	833	870	871	887	1122	1159	901	917	1152	1189
600	450	90	49	605	620	824	861	608	624	827	864	884	900	1120	1157	928	944	1163	1200
600	450	90	45	628	643	831	868	645	660	848	885	924	940	1144	1181	981	997	1201	1238
600	600	70	38	706	722	1031	1068	696	712	1021	1058	1009	1025	1350	1387	1039	1055	1380	1417
600	600	70	35	671	686	980	1017	674	690	983	1020	990	1006	1316	1353	1034	1050	1359	1397
600	600	70	31	695	711	989	1026	712	728	1006	1043	1031	1047	1342	1379	1088	1104	1399	1436
600	600	80	44	668	701	1007	1060	659	691	997	1051	963	996	1318	1372	993	1026	1348	1402
600	600	80	40	650	682	973	1027	654	686	977	1030	962	994	1301	1355	1005	1037	1345	1398
600	600	80	36	689	722	997	1051	706	739	1014	1068	1017	1050	1342	1395	1074	1107	1399	1452
600	600	90	49	679	695	1032	1069	670	685	1022	1059	966	982	1335	1372	996	1012	1365	1402
600	600	90	45	655	671	992	1029	659	674	996	1033	958	974	1312	1349	1002	1018	1356	1393
600	600	90	40	687	703	1009	1046	704	720	1026	1063	1007	1023	1346	1383	1064	1080	1402	1439

TABLE E-4B. TOTAL NOX EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 5*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET								LEFT TURNS ON MINOR STREET							
				LOW LEVEL				HIGH LEVEL				LOW LEVEL				HIGH LEVEL			
				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET			
				LOW		HIGH		LOW		HIGH		LOW		HIGH		LOW		HIGH	
				L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR	
				LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	609	611	686	709	603	605	680	703	680	682	773	797	714	716	808	831
300	300	50	25	603	606	665	689	611	613	673	696	691	694	770	793	739	741	817	841
300	300	50	22	562	564	608	631	583	585	629	653	666	668	729	753	727	729	790	814
300	300	60	33	582	600	673	713	576	595	667	707	645	663	752	792	679	698	787	827
300	300	60	30	593	612	669	709	601	619	676	716	673	691	765	805	720	739	813	853
300	300	60	27	566	585	626	666	587	606	647	687	662	681	739	779	723	742	800	840
300	300	70	38	577	579	682	706	571	574	676	700	632	634	754	777	666	668	788	811
300	300	70	35	582	584	672	695	590	592	680	703	654	656	760	784	701	704	808	831
300	300	70	31	548	551	623	646	570	572	644	667	637	639	728	751	698	700	789	812
300	450	50	25	669	672	824	847	664	666	818	842	764	766	935	959	799	801	970	993
300	450	50	22	653	656	793	816	661	663	800	824	765	767	921	944	813	815	968	992
300	450	50	20	627	629	751	774	648	650	772	795	755	758	896	919	816	819	957	980
300	450	60	30	649	667	817	857	643	662	811	851	735	754	920	960	770	788	955	995
300	450	60	27	647	666	800	840	655	674	808	848	751	769	920	960	798	817	968	1008
300	450	60	24	634	653	772	812	655	674	793	833	754	773	908	948	815	834	969	1009
300	450	70	35	648	650	831	854	643	645	825	849	727	729	926	949	761	763	960	984
300	450	70	31	640	642	807	831	648	650	815	838	735	738	919	943	783	785	967	990
300	450	70	28	619	621	771	794	640	643	792	816	731	733	900	923	792	794	961	984
300	600	60	27	659	661	932	955	654	656	926	950	778	780	1067	1090	812	814	1101	1125
300	600	60	24	631	633	888	912	639	641	896	919	766	769	1040	1064	814	816	1088	1111
300	600	60	21	617	619	859	882	638	640	880	903	769	771	1027	1051	830	832	1088	1112
300	600	70	31	631	649	917	957	625	644	912	951	741	760	1044	1084	775	794	1078	1118
300	600	70	28	616	634	887	927	623	642	895	935	743	761	1031	1071	790	809	1078	1118
300	600	70	24	611	629	867	907	632	651	888	928	755	773	1027	1067	816	834	1088	1128
300	600	80	36	623	625	924	947	618	620	918	942	725	728	1043	1066	760	762	1077	1100
300	600	80	32	600	602	885	908	607	610	893	916	719	721	1020	1044	766	768	1068	1092
300	600	80	28	587	589	857	880	608	610	878	901	723	725	1009	1032	784	786	1070	1093
450	300	50	30	666	668	755	779	675	678	765	788	825	827	931	954	874	876	980	1003
450	300	50	27	654	656	727	751	676	678	750	773	829	831	919	943	891	894	982	1005
450	300	50	25	626	628	685	708	662	664	721	744	818	820	893	917	894	896	969	993
450	300	60	36	654	672	757	797	663	681	766	806	804	823	924	964	853	872	973	1013
450	300	60	33	657	676	745	785	680	698	767	807	824	843	929	968	887	905	991	1031
450	300	60	30	646	665	719	759	682	701	755	794	830	849	919	959	906	924	995	1035
450	300	70	42	647	649	764	787	656	658	773	796	789	791	923	946	838	840	972	995
450	300	70	38	648	650	750	773	670	672	772	796	807	809	925	949	869	871	988	1011
450	300	70	35	631	633	717	741	667	669	753	777	806	809	910	933	882	884	985	1009
450	450	60	33	712	714	878	902	721	723	888	911	894	896	1077	1101	943	945	1126	1150
450	450	60	30	688	691	840	863	711	713	862	886	887	889	1055	1079	950	952	1118	1141
450	450	60	27	677	679	813	836	713	715	849	872	892	894	1045	1068	968	970	1121	1144
450	450	70	38	695	714	876	916	704	723	885	925	869	888	1067	1106	918	937	1116	1156
450	450	70	35	686	705	852	892	709	728	874	914	877	896	1059	1099	940	958	1121	1161
450	450	70	31	689	707	839	878	725	743	874	914	896	915	1063	1103	972	991	1138	1178
450	450	80	44	682	685	877	900	692	694	886	910	848	850	1060	1083	897	900	1109	1132
450	450	80	40	670	672	849	873	693	695	872	895	853	855	1048	1072	915	917	1111	1134
450	450	80	36	666	668	830	854	702	704	866	890	865	868	1046	1069	941	944	1122	1145
450	600	70	35	752	754	1036	1060	761	763	1046	1069	958	960	1259	1282	1007	1009	1308	1332
450	600	70	31	715	717	985	1008	738	740	1007	1030	938	940	1224	1247	1000	1002	1286	1310
450	600	70	28	716	718	970	993	752	754	1006	1029	955	958	1226	1249	1031	1033	1302	1325
450	600	80	40	728	747	1027	1067	737	756	1036	1076	926	944	1241	1281	975	993	1290	1330
450	600	80	36	706	725	990	1029	729	747	1012	1052	921	939	1221	1260	983	1002	1283	1323
450	600	80	32	719	738	987	1027	755	774	1023	1063	950	969	1235	1275	1026	1045	1311	1351
450	600	90	45	710	713	1023	1047	720	722	1032	1056	900	902	1229	1253	949	951	1279	1302
450	600	90	40	682	684	979	1002	704	706	1002	1025	888	890	1202	1225	950	953	1264	1288
450	600	90	36	687	689	969	992	723	725	1005	1028	910	912	1208	1232	986	988	1284	1308
600	300	60	39	686	688	815	838	680	682	809	832	932	934	1077	1101	966	968	1111	1135
600	300	60	36	667	669	780	804	675	677	788	811	930	932	1060	1083	977	979	1107	1131
600	300	60	33	658	660	756	779	679	681	777	801	937	939	1052	1075	998	1000	1113	1136
600	300	70	45	643	662	786	826	637	656	780	820	881	900	1040	1080	915	934	1075	1115
600	300	70	42	640	659	768	808	648	667	776	815	895	913	1039	1079	942	961	1087	1126
600	300	70	38	650	668	762	802	671	690	783	823	921	940	1050	1090	982	1001	1111	1151
600	300	80	52	650	652	807	830	644	646	801	824	879	882	1053	1076	914	916	1087	1111
600	300	80	48	649	651	790	814	656	658	798	821	895	897	1053	1076	943	945	1101	1124
600	300	80	44	654	656	780	804	675	677	801	825	917	919	1060	1083	978	980	1121	1144
600	450	70	42	784	786	990	1014	778	781	985	1008	1054	1056	1277	1300	1088	1090	1311	1334
600	450	70	38	757	759	948	971	765	767	955	979	1043	1045	1251	1274	1091	1093	1298	1322
600	450	70	35	762	764	937	961	783	785	958	982	1065	1067	1257	1280	1126	1128	1318	1341
600	450	80	48	735	754	955	995	729	748	950	989	997	1015	1233	1273	1031	1049	1268	1308
600	450	80	44	724	743	929	969	732	751	937	977	1002	1021	1224	1264	1050	1069	1272	1312
600	450	80	40	746	765	936	976	768	786	957	997	1041	1060	1247	1287	1102	1121	1308	1348
600	450	90	54	742	744	976	999	736	738	970	994	995	997	1246	1269	1029	1031	1280	1303
600	450	90	49	730	732	949	972	738	740	957	980	1000	1002	1235	1259	1047	1050	1283	1306
600	450	90	45	746	748	950	973	767	769	971	994	1033	1035	1253	1276	1094	1096	1314	1337
600	600	70	38	831	834	1156	1179	826	828	1150	1174	1125	1127	1466	1489	1159	1161	1500	1524
600	600	70	35	788	790	1097	1120	795	798	1104	1128	1098	1100	1423	1447	1145	1148	1471	1494
600	600	70	31	805	808	1099	1123	827	829	1120	1144	1132	1134	1442	1466	1193	1195	1503	1527
600	600	80	44	789	807	1127	1167	783	802	1121	1161	1074	1093	1429	1469	1108	1127	1463	1503
600	600	80	40	762	781	1085	1125	770	789	1093	1133	1064	1083	1404	1444	1112	1130	1451	1491
600	600	80	36	795	813	1102	1142	816	834	1123	1163	1113	1132	1437	1477	1174	1193	1498	1538
600	600	90	49	805	807	1157	1180	799	801	1151	1175	1082	1084	1451	1474	1116	1118	1485	1508
600	600	90	45	772	774	1109	1133	780	782	1117	1140	1066	1068	1420	1443	1113	1116	1467	1491
600	600	90	40	798	800	1119	1143	819	821	1140	1164	1108	1110	1446	1470	1169	1171	1507	1531

TABLE E-4C. TOTAL NOX EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 5*5

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET LOW LEVEL								TRUCKS ON THE MINOR STREET HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	613	601	690	700	575	563	652	662	674	663	768	778	676	665	770	780
300	300	50	25	619	608	681	690	594	583	656	666	697	686	776	785	712	701	791	801
300	300	50	22	551	540	597	607	540	528	586	596	646	635	709	719	675	663	738	747
300	300	60	33	609	614	700	726	571	576	662	688	662	667	770	796	664	669	772	798
300	300	60	30	632	637	707	734	607	612	683	709	702	707	794	820	717	722	809	836
300	300	60	27	578	583	639	665	567	572	627	654	665	670	742	768	694	699	771	797
300	300	70	38	581	570	686	696	543	532	648	658	627	615	748	758	628	617	750	760
300	300	70	35	598	586	688	697	573	562	663	673	660	648	766	776	675	664	781	791
300	300	70	31	538	526	612	622	526	515	601	611	616	605	707	717	645	633	736	746
300	450	50	25	682	670	836	846	644	632	798	808	767	755	938	948	769	757	940	950
300	450	50	22	677	666	816	826	652	641	791	801	779	768	935	945	794	783	950	960
300	450	50	20	625	613	748	758	613	602	737	747	743	732	884	893	772	760	912	922
300	450	60	30	684	689	852	879	646	651	814	841	761	766	946	972	763	768	948	974
300	450	60	27	694	699	847	873	669	674	822	849	788	793	958	984	803	808	973	999
300	450	60	24	654	659	792	818	643	648	781	807	765	770	919	945	793	798	948	974
300	450	70	35	661	649	843	853	622	611	805	815	729	718	929	938	731	720	930	940
300	450	70	31	664	652	831	841	639	628	806	816	749	738	933	943	765	753	948	958
300	450	70	28	617	605	768	778	605	594	757	767	719	707	887	897	747	736	916	926
300	600	60	27	680	668	952	962	642	630	914	924	789	777	1078	1088	790	779	1080	1089
300	600	60	24	663	651	920	930	638	627	895	905	788	777	1062	1072	804	792	1077	1087
300	600	60	21	622	611	864	874	611	600	853	863	765	753	1023	1033	793	782	1052	1061
300	600	70	31	674	679	961	987	636	641	922	949	775	780	1078	1104	777	782	1080	1106
300	600	70	28	670	676	942	968	646	651	917	943	788	793	1076	1102	803	808	1091	1117
300	600	70	24	639	644	895	921	628	633	884	910	773	778	1046	1072	802	807	1074	1101
300	600	80	36	644	632	944	954	605	594	906	916	736	725	1053	1063	738	727	1055	1065
300	600	80	32	631	620	917	926	607	595	892	902	741	729	1043	1052	756	744	1058	1067
300	600	80	28	592	581	862	872	581	570	851	861	718	707	1005	1015	747	735	1033	1043
450	300	50	30	659	647	748	758	636	624	725	735	808	796	914	923	824	813	930	940
450	300	50	27	658	646	731	741	648	636	721	731	823	812	914	923	853	842	944	953
450	300	50	25	604	593	662	672	607	596	666	676	786	775	861	871	830	818	905	915
450	300	60	36	669	674	772	799	646	651	749	775	810	815	930	956	827	832	947	973
450	300	60	33	684	689	772	798	674	679	762	788	841	846	946	972	871	877	976	1002
450	300	60	30	647	652	719	746	650	655	723	749	821	826	910	936	864	869	954	980
450	300	70	42	639	628	756	766	616	604	733	743	772	760	906	915	788	777	922	932
450	300	70	38	652	640	754	763	642	630	744	753	801	790	919	929	831	820	950	959
450	300	70	35	609	597	695	705	612	601	699	708	774	763	878	887	818	806	921	931
450	450	60	33	713	701	879	889	689	678	856	866	885	874	1068	1078	902	890	1085	1095
450	450	60	30	700	689	852	861	690	679	842	851	890	878	1058	1067	920	908	1088	1097
450	450	60	27	662	651	798	808	666	655	802	812	868	857	1021	1031	912	900	1064	1074
450	450	70	38	719	724	900	926	696	701	876	903	883	888	1081	1107	900	905	1097	1124
450	450	70	35	721	726	887	913	712	717	877	903	903	908	1084	1111	933	938	1114	1141
450	450	70	31	697	703	847	874	701	706	851	877	895	900	1062	1088	939	944	1105	1132
450	450	80	44	683	672	878	887	660	648	854	864	839	828	1051	1060	856	844	1067	1077
450	450	80	40	682	671	861	871	672	661	851	861	855	843	1051	1061	885	873	1081	1091
450	450	80	36	652	641	816	826	656	644	819	829	842	830	1022	1032	885	874	1066	1075
450	600	70	35	760	749	1045	1055	737	726	1022	1032	957	945	1258	1268	973	962	1275	1285
450	600	70	31	735	724	1005	1014	725	714	995	1004	948	937	1234	1244	978	967	1264	1274
450	600	70	28	710	698	964	974	713	702	967	977	940	928	1210	1220	983	971	1254	1263
450	600	80	40	760	765	1058	1085	736	741	1035	1061	948	953	1263	1289	965	970	1280	1306
450	600	80	36	749	754	1033	1059	739	744	1023	1049	954	959	1254	1280	984	989	1284	1310
450	600	80	32	736	741	1004	1030	740	745	1008	1034	958	963	1242	1268	1001	1006	1286	1312
450	600	90	45	719	708	1032	1042	696	684	1009	1018	899	888	1228	1238	916	904	1245	1255
450	600	90	40	702	690	999	1009	692	680	989	999	898	887	1212	1222	928	917	1242	1252
450	600	90	36	681	669	963	973	684	673	966	976	894	883	1193	1202	937	926	1236	1246
600	300	60	39	667	655	796	805	629	617	757	767	903	892	1049	1058	905	893	1050	1060
600	300	60	36	659	648	773	782	634	623	748	758	912	901	1042	1052	927	916	1058	1067
600	300	60	33	624	613	722	732	613	601	711	721	894	882	1008	1018	922	911	1037	1047
600	300	70	45	647	652	790	816	609	614	752	778	875	880	1035	1061	877	882	1037	1063
600	300	70	42	656	661	783	809	631	636	758	785	901	906	1045	1071	916	921	1060	1086
600	300	70	38	639	644	751	777	628	633	740	766	900	906	1029	1056	929	934	1058	1084
600	300	80	52	631	619	788	798	593	581	750	759	851	839	1024	1034	853	841	1026	1036
600	300	80	48	641	629	782	792	616	605	758	768	878	866	1036	1046	893	881	1051	1061
600	300	80	44	620	609	746	756	609	597	735	745	873	862	1016	1026	902	891	1045	1055
600	450	70	42	773	762	979	989	735	724	941	951	1033	1022	1256	1266	1035	1024	1258	1268
600	450	70	38	757	746	948	958	732	721	923	933	1034	1022	1241	1251	1049	1038	1257	1266
600	450	70	35	736	724	911	921	724	713	900	910	1029	1018	1221	1231	1058	1046	1250	1260
600	450	80	48	747	752	967	994	709	714	929	956	999	1004	1236	1262	1001	1006	1238	1264
600	450	80	44	748	753	953	979	723	728	928	954	1016	1021	1238	1264	1031	1037	1253	1279
600	450	80	40	744	749	933	959	732	737	922	948	1029	1034	1235	1261	1057	1062	1264	1290
600	450	90	54	731	719	965	975	692	681	927	937	974	963	1225	1235	976	965	1227	1237
600	450	90	49	730	719	949	959	705	694	924	934	991	979	1226	1236	1006	994	1241	1251
600	450	90	45	720	709	924	934	709	697	912	922	997	986	1217	1227	1026	1014	1246	1256
600	600	70	38	829	817	1153	1163	790	779	1115	1125	1112	1101	1453	1463	1114	1103	1455	1465
600	600	70	35	796	785	1105	1115	771	760	1080	1090	1097	1085	1422	1432	1112	1100	1437	1447
600	600	70	31	788	776	1081	1091	776	765	1070	1080	1105	1093	1415	1425	1133	1122	1444	1453
600	600	80	44	809	814	1147	1173	771	776	1109	1135	1084	1089	1439	1466	1086	1091	1441	1467
600	600	80	40	794	799	1117	1143	769	774	1092	1118	1086	1091	1426	1452	1101	1106	1441	1467
600	600	80	36	800	805	1108	1134	789	794	1096	1122	1109	1114	1433	1459	1137	1142	1462	1488
600	600	90	49	802	790	1154	1164	764	752	1116	1126	1069	1058	1438	1448	1071	1059	1440	1450
600	600	90	45	781	769	1118	1127	756	744	1093	1103	1065	1053	1418	1428	1080	1068	1433	1443
600	600	90	40	780	768	1102	1111	768	757	1090	1100	1080	1069	1419	1429	1109	1098	1447	1457

TABLE E-4D. TOTAL NOX EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 6*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET								LEFT TURNS ON MINOR STREET							
				LOW LEVEL				HIGH LEVEL				LOW LEVEL				HIGH LEVEL			
				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET			
				LOW		HIGH		LOW		HIGH		LOW		HIGH		LOW		HIGH	
				L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR	
				LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	685	679	859	874	675	669	849	864	781	775	972	987	811	805	1002	1017
300	300	50	25	670	664	829	844	674	668	833	848	783	777	958	973	826	820	1002	1017
300	300	50	22	653	647	796	812	670	664	813	829	782	776	942	957	839	833	999	1014
300	300	60	33	671	682	859	891	662	672	850	881	759	770	964	995	789	800	994	1026
300	300	60	30	673	684	846	877	677	687	849	881	778	788	967	998	821	832	1010	1042
300	300	60	27	671	681	828	860	688	698	845	877	792	802	966	997	849	859	1022	1054
300	300	70	38	670	664	872	887	660	654	862	877	749	743	968	983	780	774	998	1013
300	300	70	35	665	659	852	867	669	663	856	871	762	756	965	980	805	799	1008	1024
300	300	70	31	656	650	827	843	673	667	844	860	769	763	957	972	826	820	1014	1029
300	450	50	25	811	804	1062	1077	801	795	1052	1067	930	924	1198	1213	960	954	1228	1243
300	450	50	22	785	779	1021	1036	789	783	1025	1040	921	915	1174	1189	965	959	1217	1232
300	450	50	20	783	777	1004	1019	800	794	1021	1036	936	930	1173	1189	993	987	1230	1245
300	450	60	30	803	813	1068	1100	793	804	1058	1090	914	925	1196	1228	945	955	1226	1258
300	450	60	27	792	803	1042	1074	796	806	1046	1077	920	931	1187	1218	964	974	1230	1262
300	450	60	24	803	814	1038	1069	820	831	1055	1086	948	958	1199	1231	1005	1015	1256	1288
300	450	70	35	806	800	1085	1100	796	790	1075	1090	909	903	1205	1220	939	933	1235	1250
300	450	70	31	788	782	1052	1067	792	786	1056	1071	908	902	1188	1204	951	945	1232	1247
300	450	70	28	792	786	1040	1055	809	803	1057	1072	928	922	1193	1209	985	979	1250	1265
300	600	60	27	849	843	1219	1234	839	833	1209	1224	992	986	1378	1394	1023	1017	1409	1424
300	600	60	24	811	805	1165	1180	815	809	1169	1184	971	965	1342	1357	1015	1009	1385	1401
300	600	60	21	822	816	1160	1175	839	833	1177	1192	998	992	1353	1369	1055	1049	1410	1426
300	600	70	31	834	844	1217	1249	824	834	1207	1239	969	979	1369	1400	999	1009	1399	1431
300	600	70	28	809	820	1177	1209	813	823	1181	1212	961	971	1346	1377	1004	1015	1389	1421
300	600	70	24	829	839	1181	1213	846	856	1198	1230	997	1008	1366	1398	1054	1064	1423	1455
300	600	80	36	829	823	1227	1242	820	814	1217	1232	956	950	1370	1385	986	980	1400	1416
300	600	80	32	796	790	1178	1193	800	794	1182	1197	940	934	1338	1354	983	977	1382	1397
300	600	80	28	808	802	1175	1190	825	819	1192	1207	968	962	1352	1367	1025	1019	1408	1424
450	300	50	30	762	756	948	964	768	762	954	969	946	940	1148	1164	991	985	1193	1209
450	300	50	27	740	734	911	926	759	753	929	945	940	934	1128	1143	999	993	1186	1201
450	300	50	25	737	731	893	908	769	763	925	940	954	948	1126	1141	1026	1020	1198	1213
450	300	60	36	763	773	963	995	768	779	968	1000	938	949	1155	1186	983	994	1200	1231
450	300	60	33	757	767	941	973	775	786	960	992	949	959	1150	1182	1007	1017	1208	1240
450	300	60	30	770	781	940	971	802	813	972	1003	979	989	1165	1197	1051	1061	1237	1268
450	300	70	42	759	753	973	988	764	758	978	993	926	920	1157	1172	971	965	1202	1217
450	300	70	38	751	745	949	964	769	763	968	983	934	928	1150	1165	993	987	1208	1223
450	300	70	35	758	752	942	957	790	784	973	989	958	952	1158	1174	1030	1024	1230	1245
450	450	60	33	873	867	1136	1151	878	872	1141	1156	1080	1074	1360	1375	1125	1119	1405	1420
450	450	60	30	840	833	1088	1103	858	852	1106	1121	1063	1057	1328	1343	1122	1116	1386	1401
450	450	60	27	852	846	1085	1100	884	878	1117	1132	1093	1087	1342	1357	1164	1158	1414	1429
450	450	70	38	869	880	1147	1178	874	885	1152	1183	1068	1078	1362	1394	1113	1123	1407	1439
450	450	70	35	851	861	1113	1145	869	880	1131	1163	1066	1077	1345	1377	1125	1135	1403	1435
450	450	70	31	878	888	1124	1156	909	920	1156	1188	1110	1120	1373	1405	1181	1192	1445	1477
450	450	80	44	859	853	1151	1166	865	858	1156	1171	1050	1044	1358	1373	1095	1089	1403	1418
450	450	80	40	837	831	1114	1129	856	850	1132	1147	1045	1039	1337	1353	1103	1097	1396	1411
450	450	80	36	858	852	1119	1134	890	884	1151	1166	1082	1076	1360	1375	1154	1148	1431	1447
450	600	70	35	961	955	1343	1358	966	960	1348	1363	1192	1186	1590	1605	1237	1231	1635	1650
450	600	70	31	915	909	1281	1296	934	927	1300	1315	1162	1156	1545	1560	1221	1215	1604	1619
450	600	70	28	940	934	1291	1306	972	966	1323	1338	1204	1198	1572	1587	1276	1270	1644	1659
450	600	80	40	951	961	1346	1378	956	966	1351	1383	1173	1184	1585	1617	1218	1229	1630	1662
450	600	80	36	919	930	1299	1331	938	948	1318	1350	1158	1169	1555	1587	1217	1227	1614	1645
450	600	80	32	957	967	1322	1353	989	999	1354	1385	1213	1223	1594	1626	1284	1295	1666	1698
450	600	90	45	936	930	1346	1361	941	935	1351	1366	1151	1144	1577	1592	1196	1189	1622	1637
450	600	90	40	898	892	1292	1307	916	910	1310	1326	1129	1123	1540	1555	1187	1181	1598	1613
450	600	90	36	928	921	1306	1322	959	953	1338	1353	1175	1169	1571	1586	1247	1241	1642	1658
600	300	60	39	782	776	1008	1023	773	766	998	1013	1053	1047	1295	1310	1083	1077	1325	1341
600	300	60	36	754	748	964	979	757	751	968	983	1041	1035	1268	1283	1085	1079	1312	1327
600	300	60	33	769	763	964	979	786	780	981	996	1073	1067	1285	1300	1130	1124	1342	1357
600	300	70	45	753	763	993	1024	743	754	983	1014	1015	1026	1272	1303	1046	1056	1302	1334
600	300	70	42	740	751	965	996	744	754	968	1000	1020	1030	1261	1292	1063	1074	1304	1336
600	300	70	38	774	785	983	1015	791	802	1000	1032	1070	1081	1296	1328	1127	1138	1353	1385
600	300	80	52	763	757	1016	1032	753	747	1007	1022	1017	1011	1287	1303	1047	1041	1318	1333
600	300	80	48	752	746	990	1005	755	749	994	1009	1023	1017	1278	1293	1066	1060	1321	1336
600	300	80	44	782	776	1005	1020	799	793	1022	1037	1069	1063	1309	1324	1126	1120	1366	1381
600	450	70	42	945	939	1248	1263	935	929	1239	1254	1240	1234	1559	1575	1270	1264	1590	1605
600	450	70	38	908	902	1196	1211	912	906	1200	1215	1219	1213	1524	1539	1263	1257	1567	1582
600	450	70	35	938	932	1210	1225	955	949	1227	1242	1265	1259	1554	1570	1322	1316	1611	1627
600	450	80	48	909	920	1226	1258	900	910	1217	1248	1196	1206	1529	1561	1226	1236	1559	1591
600	450	80	44	889	899	1191	1222	893	903	1194	1226	1192	1202	1510	1542	1235	1246	1554	1585
600	450	80	40	936	946	1222	1254	953	963	1239	1271	1255	1266	1558	1590	1312	1322	1615	1647
600	450	90	54	919	913	1250	1265	909	903	1240	1255	1197	1191	1545	1560	1227	1221	1575	1590
600	450	90	49	898	892	1213	1229	901	895	1217	1232	1192	1186	1525	1540	1236	1230	1568	1583
600	450	90	45	938	932	1239	1254	955	949	1256	1271	1250	1243	1567	1582	1306	1300	1624	1639
600	600	70	38	1041	1035	1462	1478	1032	1025	1453	1468	1359	1353	1797	1812	1390	1383	1827	1843
600	600	70	35	988	982	1394	1409	992	985	1397	1413	1323	1317	1745	1760	1366	1360	1789	1804
600	600	70	31	1030	1024	1421	1436	1047	1041	1438	1453	1382	1375	1789	1804	1438	1432	1846	1861
600	600	80	44	1012	1022	1447	1479	1002	1012	1437	1469	1322	1332	1773	1805	1352	1362	1804	1835
600	600	80	40	976	986	1395	1427	979	990	1399	1431	1302	1312	1739	1770	1346	1356	1782	1814
600	600	80	36	1033	1043	1437	1469	1050	1060	1454	1486	1376	1386	1797	1829	1433	1443	1854	1885
600	600	90	49	1031	1025	1480	1495	1021	1015	1470	1485	1332	1326	1798	1813	1363	1356	1828	1844
600	600	90	45	989	983	1422	1438	992	986	1426	1441	1307	1301	1757	1773	1350	1344	1801	1816
600	600	90	40	1039	1033	1457	1472	1056	1050	1474	1489	1374	1367	1809	1824	1430	1424	1866	1881

TABLE E-4E. TOTAL NOX EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	726	706	900	901	720	701	894	896	812	793	1003	1004	847	827	1037	1039
300	300	50	25	703	683	862	863	711	691	869	871	806	786	981	983	854	834	1029	1030
300	300	50	22	679	660	822	824	700	681	843	845	799	779	959	960	860	840	1020	1021
300	300	60	33	707	704	895	913	702	698	890	908	785	782	990	1008	820	816	1024	1042
300	300	60	30	701	698	873	891	709	705	881	899	796	792	985	1003	843	840	1032	1050
300	300	60	27	692	688	849	867	713	709	870	888	803	800	977	995	864	861	1038	1056
300	300	70	38	711	691	913	914	705	685	907	909	781	761	999	1001	815	795	1033	1035
300	300	70	35	698	679	885	886	706	686	892	894	785	765	988	990	832	813	1036	1037
300	300	70	31	682	662	853	855	703	684	874	876	785	766	973	975	846	827	1034	1036
300	450	50	25	843	824	1095	1096	838	818	1089	1091	953	934	1221	1223	988	968	1256	1257
300	450	50	22	810	790	1046	1047	817	798	1053	1055	936	917	1189	1190	984	964	1237	1238
300	450	50	20	801	782	1022	1023	822	803	1043	1044	944	925	1182	1183	1005	986	1243	1244
300	450	60	30	831	828	1096	1114	825	822	1090	1108	933	929	1214	1232	967	964	1249	1267
300	450	60	27	812	809	1062	1080	819	816	1069	1087	930	927	1197	1215	978	975	1244	1262
300	450	60	24	816	813	1051	1069	837	834	1072	1090	951	948	1202	1220	1012	1009	1263	1281
300	450	70	35	839	819	1118	1119	833	813	1112	1114	932	912	1228	1230	966	947	1262	1264
300	450	70	31	813	793	1077	1078	820	801	1084	1086	923	903	1204	1205	971	951	1251	1253
300	450	70	28	810	790	1058	1060	831	811	1079	1081	936	917	1202	1203	997	978	1263	1264
300	600	60	27	874	854	1243	1245	868	849	1238	1239	1008	988	1394	1395	1042	1022	1428	1429
300	600	60	24	828	808	1182	1184	836	816	1190	1191	978	959	1349	1350	1026	1006	1397	1398
300	600	60	21	832	812	1170	1172	853	833	1191	1193	998	979	1354	1355	1059	1040	1415	1416
300	600	70	31	853	850	1237	1255	848	845	1231	1249	979	976	1379	1397	1013	1010	1413	1431
300	600	70	28	821	818	1189	1207	828	825	1196	1215	963	960	1348	1366	1010	1007	1395	1413
300	600	70	24	834	830	1186	1204	855	851	1207	1225	992	989	1362	1380	1053	1050	1423	1441
300	600	80	36	854	834	1252	1253	848	829	1246	1247	971	952	1385	1387	1006	986	1420	1421
300	600	80	32	813	793	1195	1196	821	801	1203	1204	947	927	1345	1347	994	975	1393	1395
300	600	80	28	818	798	1185	1186	839	819	1206	1207	968	949	1352	1353	1029	1010	1413	1414
450	300	50	30	792	772	978	979	801	781	987	988	965	946	1168	1170	1015	995	1217	1219
450	300	50	27	761	742	932	934	784	764	955	956	952	932	1139	1141	1014	994	1201	1203
450	300	50	25	752	732	907	909	788	768	943	945	959	939	1131	1132	1035	1015	1207	1208
450	300	60	36	787	784	987	1005	796	793	996	1014	953	949	1169	1187	1002	999	1218	1237
450	300	60	33	773	770	958	976	795	792	980	998	955	952	1156	1174	1017	1014	1219	1237
450	300	60	30	780	777	949	967	816	813	985	1003	979	975	1165	1183	1054	1051	1240	1258
450	300	70	42	788	769	1002	1004	798	778	1012	1013	946	926	1176	1178	995	975	1225	1227
450	300	70	38	772	752	970	972	794	775	993	995	946	926	1161	1163	1008	988	1224	1225
450	300	70	35	773	753	956	958	809	789	992	993	963	944	1163	1165	1039	1019	1239	1241
450	450	60	33	894	874	1157	1159	903	883	1167	1168	1091	1072	1371	1373	1140	1121	1420	1422
450	450	60	30	853	833	1101	1102	875	855	1123	1125	1067	1047	1331	1333	1129	1109	1394	1395
450	450	60	27	859	839	1092	1093	895	875	1127	1129	1089	1070	1339	1340	1165	1146	1415	1416
450	450	70	38	885	882	1163	1181	895	891	1172	1190	1075	1071	1369	1387	1124	1120	1418	1436
450	450	70	35	859	856	1121	1139	881	878	1143	1161	1065	1061	1343	1361	1127	1124	1406	1424
450	450	70	31	879	876	1126	1144	915	912	1162	1180	1101	1098	1365	1383	1177	1174	1441	1459
450	450	80	44	881	861	1172	1174	890	870	1181	1183	1062	1042	1370	1371	1111	1091	1419	1420
450	450	80	40	850	831	1127	1128	873	853	1149	1151	1048	1028	1341	1342	1111	1091	1403	1405
450	450	80	36	865	845	1125	1127	901	881	1161	1163	1079	1059	1356	1358	1155	1135	1432	1434
450	600	70	35	974	955	1356	1358	984	964	1365	1367	1196	1176	1594	1595	1245	1225	1643	1644
450	600	70	31	920	900	1286	1288	943	923	1309	1310	1158	1138	1541	1542	1220	1201	1603	1605
450	600	70	28	939	919	1290	1291	975	955	1326	1327	1193	1173	1561	1562	1269	1249	1636	1638
450	600	80	40	959	956	1354	1372	968	965	1364	1382	1172	1168	1584	1602	1221	1218	1633	1651
450	600	80	36	919	916	1299	1317	942	939	1322	1340	1149	1145	1546	1564	1211	1208	1608	1626
450	600	80	32	950	947	1315	1333	986	983	1351	1369	1196	1193	1578	1596	1272	1269	1654	1672
450	600	90	45	949	930	1359	1361	959	939	1368	1370	1154	1134	1580	1582	1203	1183	1629	1631
450	600	90	40	903	883	1297	1299	925	906	1320	1321	1124	1104	1535	1537	1187	1167	1598	1599
450	600	90	36	926	906	1305	1306	962	942	1341	1342	1164	1144	1559	1561	1240	1220	1635	1637
600	300	60	39	800	780	1026	1027	794	775	1020	1021	1061	1041	1303	1305	1095	1076	1338	1339
600	300	60	36	763	744	974	975	771	751	981	983	1041	1021	1268	1270	1089	1069	1316	1317
600	300	60	33	772	752	967	969	793	773	988	990	1066	1047	1278	1280	1127	1108	1339	1341
600	300	70	45	765	762	1005	1023	760	757	999	1017	1018	1015	1275	1293	1053	1049	1309	1327
600	300	70	42	745	742	969	987	753	749	977	995	1014	1011	1255	1273	1062	1059	1303	1321
600	300	70	38	772	769	981	999	793	790	1002	1020	1058	1055	1284	1302	1119	1116	1345	1363
600	300	80	52	780	761	1034	1036	775	755	1028	1030	1025	1005	1295	1297	1059	1040	1330	1331
600	300	80	48	761	742	1000	1001	769	749	1007	1009	1023	1003	1278	1279	1070	1051	1325	1327
600	300	80	44	784	765	1007	1009	805	786	1028	1030	1062	1043	1302	1304	1123	1104	1363	1365
600	450	70	42	955	935	1258	1259	949	929	1252	1254	1240	1220	1559	1561	1274	1254	1594	1595
600	450	70	38	910	890	1197	1199	917	898	1205	1207	1211	1191	1516	1517	1259	1239	1563	1565
600	450	70	35	932	913	1205	1206	953	934	1226	1227	1250	1231	1540	1541	1311	1292	1601	1602
600	450	80	48	914	911	1231	1249	908	905	1225	1243	1190	1187	1524	1542	1225	1221	1558	1576
600	450	80	44	885	882	1187	1205	893	890	1195	1213	1179	1175	1497	1515	1226	1223	1545	1563
600	450	80	40	925	922	1212	1230	946	943	1233	1251	1235	1232	1538	1556	1296	1293	1599	1617
600	450	90	54	929	909	1260	1261	923	903	1254	1256	1197	1177	1545	1546	1231	1211	1579	1580
600	450	90	49	899	879	1215	1216	907	887	1223	1224	1184	1164	1517	1518	1232	1212	1564	1566
600	450	90	45	933	913	1233	1235	954	934	1254	1256	1235	1215	1552	1553	1296	1276	1613	1614
600	600	70	38	1043	1023	1464	1466	1037	1017	1458	1460	1351	1332	1789	1791	1386	1366	1823	1825
600	600	70	35	981	962	1387	1389	989	969	1395	1396	1306	1287	1729	1730	1354	1334	1777	1778
600	600	70	31	1017	997	1407	1409	1038	1018	1428	1430	1359	1339	1766	1767	1420	1400	1827	1828
600	600	80	44	1008	1005	1443	1461	1002	999	1438	1456	1308	1305	1760	1778	1343	1339	1795	1813
600	600	80	40	964	961	1384	1402	972	968	1391	1410	1281	1278	1717	1735	1328	1325	1765	1783
600	600	80	36	1014	1011	1419	1437	1035	1032	1440	1458	1348	1344	1769	1787	1409	1405	1830	1848
600	600	90	49	1032	1013	1481	1483	1027	1007	1476	1477	1324	1305	1790	1792	1359	1339	1824	1826
600	600	90	45	982	962	1416	1417	990	970	1424	1425	1291	1271	1741	1743	1338	1319	1789	1790
600	600	90	40	1025	1006	1444	1445	1046	1027	1465	1466	1351	1331	1786	1787	1412	1392	1847	1848

TABLE E-4F. TOTAL NOX EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*5

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		HIGH		TRUCKS ON MAJOR STREET LOW		HIGH		TRUCKS ON MAJOR STREET LOW		HIGH		TRUCKS ON MAJOR STREET LOW		HIGH	
				L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	735	702	909	897	697	664	871	859	812	778	1002	990	814	780	1004	992
300	300	50	25	724	690	882	870	699	666	857	845	817	784	992	980	832	799	1007	995
300	300	50	22	673	640	817	804	662	629	805	793	783	750	943	931	812	779	972	960
300	300	60	33	739	723	927	932	701	685	889	894	808	791	1012	1017	810	793	1014	1019
300	300	60	30	744	728	917	921	720	703	892	897	829	813	1019	1023	845	828	1034	1038
300	300	60	27	709	692	866	870	698	681	855	859	811	794	984	989	839	822	1013	1017
300	300	70	38	720	687	922	910	682	648	884	872	780	747	999	987	782	749	1000	988
300	300	70	35	719	685	905	893	694	661	880	868	796	762	999	987	811	777	1014	1002
300	300	70	31	676	643	848	835	665	632	836	824	770	737	958	946	798	765	986	974
300	450	50	25	860	827	1112	1100	822	789	1074	1062	961	928	1229	1217	963	929	1231	1218
300	450	50	22	838	805	1074	1062	813	780	1049	1037	955	922	1208	1196	970	937	1223	1211
300	450	50	20	803	770	1024	1012	792	759	1013	1001	937	904	1174	1162	966	932	1203	1191
300	450	60	30	871	854	1136	1141	833	816	1098	1103	963	946	1245	1249	965	948	1247	1251
300	450	60	27	863	846	1113	1118	839	822	1088	1093	972	955	1239	1243	987	970	1254	1258
300	450	60	24	841	825	1076	1080	830	813	1065	1069	967	950	1218	1222	995	979	1247	1251
300	450	70	35	856	822	1135	1123	818	784	1097	1085	940	906	1236	1223	941	908	1237	1225
300	450	70	31	841	808	1105	1093	816	783	1080	1068	942	908	1222	1210	957	924	1238	1225
300	450	70	28	812	778	1060	1048	800	767	1049	1037	929	896	1194	1182	958	924	1223	1211
300	600	60	27	899	866	1268	1256	861	828	1230	1218	1023	990	1409	1397	1025	992	1411	1399
300	600	60	24	864	831	1218	1206	840	806	1194	1182	1005	972	1376	1364	1020	987	1391	1379
300	600	60	21	842	808	1180	1168	830	797	1169	1157	999	966	1354	1342	1028	994	1383	1371
300	600	70	31	902	885	1285	1289	864	847	1247	1251	1017	1001	1417	1422	1019	1002	1419	1424
300	600	70	28	880	863	1248	1253	856	839	1224	1228	1013	996	1397	1402	1028	1011	1413	1417
300	600	70	24	867	850	1220	1224	856	839	1208	1213	1016	999	1385	1390	1045	1028	1414	1418
300	600	80	36	879	846	1277	1265	841	808	1239	1227	987	954	1401	1389	989	955	1403	1391
300	600	80	32	849	816	1231	1219	825	791	1207	1195	974	940	1372	1360	989	956	1388	1375
300	600	80	28	828	795	1195	1183	817	784	1184	1171	969	936	1352	1340	998	964	1381	1369
450	300	50	30	789	756	975	963	766	733	952	940	953	920	1156	1144	970	937	1173	1160
450	300	50	27	770	737	941	929	760	727	931	919	951	918	1138	1126	981	948	1168	1156
450	300	50	25	734	701	890	878	738	705	893	881	932	898	1104	1092	975	942	1147	1135
450	300	60	36	808	791	1008	1012	784	768	984	989	964	947	1180	1185	980	963	1197	1201
450	300	60	33	805	788	989	994	795	778	979	984	977	960	1179	1183	1007	990	1209	1213
450	300	60	30	785	769	955	959	789	772	958	963	975	958	1161	1165	1018	1001	1204	1208
450	300	70	42	786	752	1000	988	762	729	977	964	933	900	1164	1152	950	917	1181	1169
450	300	70	38	781	747	979	967	771	737	969	957	945	912	1160	1148	975	942	1190	1178
450	300	70	35	755	722	939	926	759	725	942	930	936	903	1136	1124	980	946	1180	1167
450	450	60	33	899	866	1163	1151	876	843	1140	1127	1087	1054	1367	1355	1104	1070	1384	1372
450	450	60	30	869	836	1118	1105	860	826	1108	1096	1074	1041	1339	1326	1104	1071	1369	1357
450	450	60	27	849	816	1082	1070	853	820	1086	1074	1070	1037	1320	1308	1114	1081	1363	1351
450	450	70	38	914	897	1191	1196	891	874	1168	1173	1093	1077	1388	1392	1110	1093	1404	1409
450	450	70	35	899	882	1161	1165	889	872	1151	1155	1095	1078	1374	1378	1125	1108	1404	1408
450	450	70	31	892	876	1139	1144	896	879	1143	1147	1105	1089	1369	1373	1149	1132	1412	1417
450	450	80	44	886	853	1178	1166	863	830	1154	1142	1057	1024	1366	1354	1074	1041	1382	1370
450	450	80	40	867	834	1143	1131	857	824	1134	1121	1055	1022	1348	1336	1085	1052	1378	1366
450	450	80	36	855	822	1116	1104	859	825	1119	1107	1060	1027	1337	1325	1103	1070	1381	1369
450	600	70	35	988	955	1370	1357	965	931	1346	1334	1199	1166	1598	1585	1216	1183	1614	1602
450	600	70	31	945	912	1311	1299	935	902	1301	1289	1173	1140	1556	1544	1203	1170	1586	1574
450	600	70	28	937	904	1288	1276	941	908	1292	1280	1182	1149	1550	1538	1226	1192	1593	1581
450	600	80	40	995	979	1391	1395	972	955	1368	1372	1199	1182	1611	1615	1215	1198	1627	1632
450	600	80	36	967	950	1347	1352	957	940	1337	1342	1187	1170	1584	1588	1217	1200	1614	1618
450	600	80	32	972	955	1337	1341	975	958	1340	1344	1208	1191	1590	1594	1252	1235	1633	1638
450	600	90	45	963	930	1372	1360	940	906	1349	1337	1158	1125	1584	1572	1175	1141	1601	1589
450	600	90	40	928	894	1322	1310	918	885	1312	1300	1139	1106	1550	1538	1169	1136	1580	1568
450	600	90	36	924	891	1303	1291	928	895	1307	1295	1153	1120	1548	1536	1196	1163	1592	1580
600	300	60	39	786	752	1011	999	748	714	973	961	1037	1004	1280	1267	1039	1006	1281	1269
600	300	60	36	760	727	971	959	736	702	946	934	1029	995	1256	1243	1044	1010	1271	1259
600	300	60	33	743	710	938	926	732	698	927	915	1028	994	1239	1227	1056	1023	1268	1256
600	300	70	45	774	757	1014	1018	736	719	976	980	1018	1001	1274	1278	1019	1003	1276	1280
600	300	70	42	765	748	989	994	740	723	965	969	1025	1008	1266	1270	1040	1023	1281	1286
600	300	70	38	766	749	975	980	755	738	964	968	1043	1026	1268	1273	1071	1054	1297	1301
600	300	80	52	766	733	1020	1008	728	695	982	970	1001	968	1272	1259	1003	970	1273	1261
600	300	80	48	758	725	997	985	734	700	972	960	1010	977	1265	1253	1025	992	1280	1268
600	300	80	44	755	722	978	966	744	711	967	955	1024	990	1263	1251	1052	1019	1292	1280
600	450	70	42	949	915	1252	1240	911	877	1214	1202	1224	1190	1544	1531	1226	1192	1545	1533
600	450	70	38	915	882	1203	1191	890	857	1178	1166	1207	1173	1511	1499	1222	1189	1526	1514
600	450	70	35	911	878	1184	1172	900	867	1172	1160	1220	1186	1509	1497	1248	1215	1537	1525
600	450	80	48	931	914	1248	1252	893	876	1210	1214	1198	1181	1531	1536	1199	1183	1533	1538
600	450	80	44	914	897	1215	1220	889	872	1191	1195	1197	1180	1516	1520	1212	1196	1531	1535
600	450	80	40	927	910	1214	1218	916	899	1202	1207	1228	1211	1531	1535	1256	1239	1559	1564
600	450	90	54	922	889	1253	1241	884	851	1215	1203	1181	1148	1529	1517	1183	1150	1531	1519
600	450	90	49	904	871	1220	1208	879	846	1195	1183	1180	1146	1512	1500	1195	1162	1527	1515
600	450	90	45	912	879	1212	1200	901	867	1201	1189	1204	1171	1521	1509	1233	1199	1550	1538
600	600	70	38	1045	1011	1466	1454	1007	973	1428	1416	1344	1310	1781	1769	1345	1312	1783	1771
600	600	70	35	995	961	1400	1388	970	936	1376	1364	1310	1277	1733	1720	1325	1292	1748	1736
600	600	70	31	1004	970	1394	1382	992	959	1383	1371	1336	1303	1743	1731	1365	1331	1772	1760
600	600	80	44	1033	1016	1468	1473	995	978	1430	1435	1324	1307	1776	1780	1326	1309	1777	1782
600	600	80	40	1000	983	1420	1424	975	959	1395	1400	1307	1291	1744	1748	1323	1306	1759	1764
600	600	80	36	1024	1007	1429	1433	1013	996	1417	1422	1348	1331	1769	1774	1377	1360	1798	1802
600	600	90	49	1034	1001	1483	1471	996	963	1445	1433	1317	1283	1782	1770	1318	1285	1784	1772
600	600	90	45	995	962	1429	1417	970	937	1404	1392	1294	1261	1745	1733	1309	1276	1760	1748
600	600	90	40	1012	979	1431	1419	1001	968	1419	1407	1328	1295	1763	1751	1357	1323	1792	1780

TABLE E-4G. TOTAL NOX EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 6*6

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET LOW LEVEL								TRUCKS ON THE MINOR STREET HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	796	811	971	1008	786	802	961	998	953	969	1145	1182	983	999	1175	1212
300	300	50	25	799	814	959	996	802	818	962	999	973	988	1149	1186	1016	1032	1193	1230
300	300	50	22	764	779	908	945	781	796	925	962	954	970	1116	1153	1011	1027	1173	1210
300	300	60	33	774	806	963	1017	764	796	953	1007	923	955	1129	1182	953	985	1159	1213
300	300	60	30	793	825	967	1021	797	829	971	1024	959	991	1150	1203	1003	1035	1193	1247
300	300	60	27	773	805	932	985	790	822	949	1002	955	988	1131	1184	1012	1045	1188	1241
300	300	70	38	764	780	967	1004	754	770	958	995	905	921	1125	1162	935	951	1155	1192
300	300	70	35	777	793	965	1002	781	797	969	1006	935	951	1140	1177	979	994	1183	1220
300	300	70	31	750	766	923	960	767	783	940	977	925	940	1114	1151	982	997	1171	1208
300	450	50	25	928	944	1181	1218	919	934	1171	1208	1109	1125	1379	1416	1140	1155	1409	1446
300	450	50	22	921	936	1158	1195	924	940	1162	1199	1118	1134	1372	1409	1162	1178	1416	1453
300	450	50	20	901	917	1123	1160	918	934	1140	1177	1115	1131	1354	1391	1172	1188	1411	1448
300	450	60	30	913	945	1179	1233	903	935	1170	1223	1086	1118	1369	1422	1116	1148	1399	1453
300	450	60	27	920	952	1171	1224	923	955	1175	1228	1109	1141	1377	1431	1153	1185	1421	1474
300	450	60	24	913	945	1149	1202	930	962	1166	1219	1119	1151	1372	1425	1176	1208	1429	1482
300	450	70	35	907	923	1188	1225	897	913	1178	1215	1072	1088	1369	1406	1102	1118	1400	1437
300	450	70	31	907	923	1173	1210	911	927	1176	1213	1089	1104	1371	1408	1132	1148	1414	1451
300	450	70	28	893	909	1143	1180	910	926	1160	1197	1091	1107	1358	1395	1148	1164	1415	1452
300	600	60	27	958	974	1329	1366	949	964	1320	1357	1163	1179	1551	1588	1193	1209	1581	1618
300	600	60	24	938	954	1294	1331	942	958	1298	1335	1160	1176	1532	1569	1203	1219	1576	1613
300	600	60	21	931	947	1271	1308	948	964	1288	1325	1169	1185	1526	1563	1226	1242	1583	1620
300	600	70	31	935	967	1320	1373	925	957	1310	1364	1131	1164	1533	1586	1162	1194	1563	1617
300	600	70	28	928	960	1298	1351	932	964	1301	1355	1141	1174	1528	1581	1185	1217	1571	1625
300	600	70	24	930	962	1284	1338	947	979	1301	1355	1160	1192	1531	1584	1217	1249	1588	1641
300	600	80	36	922	938	1321	1358	913	928	1312	1349	1111	1127	1526	1563	1141	1157	1556	1594
300	600	80	32	907	923	1291	1328	911	926	1294	1331	1112	1128	1512	1549	1156	1171	1556	1593
300	600	80	28	901	917	1269	1306	918	934	1286	1323	1123	1139	1508	1545	1180	1195	1565	1602
450	300	50	30	919	935	1107	1144	925	940	1112	1149	1164	1180	1368	1406	1209	1225	1413	1451
450	300	50	27	915	931	1087	1124	933	949	1106	1143	1176	1192	1365	1402	1235	1251	1424	1461
450	300	50	25	894	910	1051	1088	926	942	1083	1120	1173	1188	1346	1383	1244	1260	1418	1455
450	300	60	36	912	944	1113	1167	917	949	1119	1172	1149	1181	1367	1420	1194	1226	1412	1465
450	300	60	33	923	956	1110	1163	942	974	1128	1182	1177	1209	1380	1433	1235	1267	1438	1491
450	300	60	30	919	952	1090	1144	951	983	1122	1176	1189	1222	1377	1430	1261	1293	1449	1502
450	300	70	42	900	916	1115	1152	905	921	1120	1158	1128	1144	1360	1397	1173	1189	1405	1443
450	300	70	38	909	925	1109	1146	928	943	1128	1165	1154	1170	1371	1408	1213	1228	1430	1467
450	300	70	35	899	915	1084	1121	931	947	1116	1153	1161	1177	1362	1399	1232	1248	1434	1471
450	450	60	33	1037	1053	1302	1339	1042	1058	1307	1344	1306	1321	1587	1624	1351	1366	1632	1669
450	450	60	30	1022	1038	1271	1308	1040	1056	1290	1327	1307	1323	1573	1610	1365	1381	1632	1669
450	450	60	27	1017	1033	1251	1288	1049	1065	1283	1320	1319	1334	1570	1607	1390	1406	1641	1678
450	450	70	38	1026	1058	1305	1358	1031	1063	1310	1363	1286	1318	1581	1635	1331	1363	1626	1680
450	450	70	35	1025	1057	1288	1342	1043	1076	1307	1360	1302	1334	1582	1636	1360	1392	1640	1694
450	450	70	31	1034	1066	1282	1336	1066	1098	1314	1368	1327	1360	1592	1646	1399	1432	1664	1718
450	450	80	44	1008	1023	1301	1338	1013	1029	1306	1343	1260	1276	1569	1606	1305	1321	1614	1651
450	450	80	40	1003	1019	1281	1318	1022	1038	1299	1337	1272	1288	1566	1603	1331	1346	1625	1662
450	450	80	36	1006	1022	1269	1306	1038	1054	1301	1338	1292	1308	1571	1608	1364	1379	1643	1680
450	600	70	35	1117	1133	1500	1537	1122	1138	1505	1542	1409	1425	1809	1846	1454	1470	1854	1891
450	600	70	31	1089	1105	1457	1494	1107	1123	1475	1512	1398	1413	1782	1819	1456	1472	1840	1877
450	600	70	28	1096	1112	1449	1486	1128	1144	1481	1518	1422	1438	1791	1828	1494	1509	1863	1900
450	600	80	40	1099	1131	1496	1549	1104	1136	1501	1554	1382	1415	1796	1850	1427	1460	1841	1895
450	600	80	36	1085	1117	1467	1520	1103	1136	1485	1539	1385	1418	1784	1837	1444	1476	1842	1896
450	600	80	32	1105	1137	1471	1525	1136	1169	1503	1556	1422	1454	1805	1858	1494	1526	1877	1930
450	600	90	45	1076	1092	1487	1524	1081	1097	1492	1529	1352	1368	1779	1816	1397	1413	1824	1862
450	600	90	40	1055	1071	1451	1488	1074	1090	1470	1507	1348	1364	1760	1797	1406	1422	1819	1856
450	600	90	36	1067	1083	1448	1485	1099	1115	1480	1517	1376	1392	1773	1810	1448	1464	1845	1882
600	300	60	39	967	982	1194	1231	957	973	1184	1221	1299	1315	1543	1580	1329	1345	1573	1610
600	300	60	36	956	972	1168	1205	959	975	1171	1208	1305	1320	1533	1570	1348	1364	1577	1614
600	300	60	33	954	969	1150	1187	971	986	1167	1204	1319	1335	1532	1569	1376	1392	1589	1626
600	300	70	45	929	961	1170	1224	919	951	1160	1214	1253	1285	1511	1564	1283	1315	1541	1595
600	300	70	42	934	967	1160	1214	938	970	1164	1217	1275	1307	1517	1571	1319	1351	1561	1615
600	300	70	38	951	983	1161	1215	968	1000	1178	1232	1308	1340	1535	1589	1365	1397	1592	1645
600	300	80	52	931	946	1186	1223	921	937	1176	1213	1246	1262	1518	1555	1277	1292	1549	1586
600	300	80	48	938	953	1177	1214	941	957	1181	1218	1270	1286	1527	1564	1314	1329	1570	1607
600	300	80	44	950	965	1174	1211	967	982	1191	1228	1299	1315	1540	1577	1356	1371	1597	1634
600	450	70	42	1137	1153	1441	1478	1127	1143	1432	1469	1493	1509	1814	1851	1523	1539	1844	1881
600	450	70	38	1118	1134	1407	1444	1121	1137	1411	1448	1490	1506	1796	1833	1534	1550	1840	1877
600	450	70	35	1129	1145	1403	1440	1146	1162	1420	1457	1519	1534	1809	1846	1575	1591	1866	1903
600	450	80	48	1093	1125	1411	1465	1083	1115	1402	1455	1441	1473	1776	1829	1471	1503	1806	1859
600	450	80	44	1090	1123	1394	1447	1094	1126	1397	1451	1455	1487	1775	1828	1498	1530	1818	1872
600	450	80	40	1119	1151	1407	1461	1136	1168	1424	1478	1500	1532	1805	1858	1557	1589	1962	1915
600	450	90	54	1094	1110	1427	1464	1085	1100	1417	1454	1434	1450	1783	1820	1464	1480	1813	1850
600	450	90	49	1091	1107	1408	1445	1094	1110	1412	1449	1447	1463	1781	1818	1491	1506	1824	1861
600	450	90	45	1114	1129	1416	1453	1131	1146	1433	1470	1486	1502	1805	1842	1543	1559	1862	1899
600	600	70	38	1224	1240	1647	1684	1215	1231	1637	1674	1604	1620	2043	2080	1634	1650	2074	2111
600	600	70	35	1189	1205	1596	1633	1193	1208	1600	1637	1585	1601	2009	2046	1629	1644	2053	2090
600	600	70	31	1213	1229	1605	1642	1230	1246	1622	1659	1626	1642	2035	2072	1683	1699	2092	2129
600	600	80	44	1187	1219	1623	1677	1177	1209	1614	1667	1558	1590	2011	2065	1588	1621	2042	2095
600	600	80	40	1168	1201	1590	1643	1172	1204	1593	1647	1556	1589	1994	2048	1600	1632	2038	2092
600	600	80	36	1208	1240	1614	1667	1225	1257	1631	1684	1612	1645	2035	2088	1669	1701	2092	2145
600	600	90	49	1198	1213	1648	1685	1188	1204	1639	1676	1561	1577	2028	2065	1591	1607	2058	2095
600	600	90	45	1173	1189	1609	1646	1177	1193	1612	1649	1553	1569	2005	2042	1597	1612	2049	2086
600	600	90	40	1206	1221	1626	1663	1223	1238	1643	1680	1602	1618	2039	2076	1659	1675	2096	2133

TABLE E-4H. TOTAL NOX EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*6

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	848	850	1023	1047	842	845	1018	1041	996	998	1188	1211	1030	1032	1222	1246
300	300	50	25	843	845	1003	1026	851	853	1011	1034	1007	1010	1184	1207	1055	1057	1232	1255
300	300	50	22	801	803	946	969	822	825	967	990	982	985	1144	1167	1043	1046	1205	1228
300	300	60	33	821	840	1011	1050	816	834	1005	1045	961	979	1167	1207	995	1014	1201	1241
300	300	60	30	833	851	1007	1046	840	859	1014	1054	989	1007	1179	1219	1036	1055	1227	1267
300	300	60	27	806	824	964	1004	827	845	985	1025	978	997	1154	1194	1039	1058	1215	1255
300	300	70	38	817	819	1020	1043	811	813	1014	1038	948	950	1168	1191	982	984	1202	1226
300	300	70	35	822	824	1010	1033	830	832	1018	1041	970	972	1175	1198	1018	1020	1222	1246
300	300	70	31	788	790	961	984	809	811	982	1005	953	955	1142	1165	1014	1016	1203	1226
300	450	50	25	973	975	1226	1249	967	969	1220	1243	1144	1146	1414	1437	1179	1181	1448	1471
300	450	50	22	957	959	1194	1218	965	967	1202	1225	1145	1147	1399	1423	1193	1195	1447	1470
300	450	50	20	931	933	1153	1176	952	954	1174	1197	1135	1138	1374	1398	1196	1199	1435	1459
300	450	60	30	952	971	1219	1259	946	965	1213	1253	1115	1134	1399	1439	1150	1168	1433	1473
300	450	60	27	951	970	1202	1242	959	977	1210	1250	1131	1149	1399	1439	1178	1197	1446	1486
300	450	60	24	937	956	1173	1213	958	977	1195	1234	1134	1153	1387	1427	1195	1214	1448	1488
300	450	70	35	952	954	1233	1256	946	948	1227	1250	1107	1109	1404	1428	1141	1143	1439	1462
300	450	70	31	944	946	1209	1233	951	954	1217	1240	1115	1118	1398	1421	1163	1165	1445	1469
300	450	70	28	923	925	1173	1196	944	946	1194	1217	1111	1113	1378	1401	1172	1174	1439	1462
300	600	60	27	995	997	1366	1389	989	991	1360	1384	1190	1192	1578	1601	1224	1227	1612	1635
300	600	60	24	967	969	1322	1346	974	977	1330	1353	1179	1181	1551	1574	1226	1228	1598	1622
300	600	60	21	953	955	1293	1316	974	976	1314	1337	1181	1183	1538	1561	1242	1244	1599	1622
300	600	70	31	966	985	1351	1391	961	979	1346	1385	1153	1172	1555	1595	1187	1206	1589	1629
300	600	70	28	951	970	1321	1361	959	978	1329	1369	1155	1174	1541	1581	1203	1221	1589	1629
300	600	70	24	946	965	1301	1341	968	986	1322	1362	1167	1185	1538	1577	1228	1246	1599	1638
300	600	80	36	959	961	1358	1381	953	955	1352	1376	1138	1140	1553	1577	1172	1174	1587	1611
300	600	80	32	935	938	1319	1342	943	945	1327	1350	1131	1133	1531	1554	1178	1181	1579	1602
300	600	80	28	923	925	1291	1314	944	946	1312	1335	1135	1137	1520	1543	1196	1198	1581	1604
450	300	50	30	960	963	1148	1171	970	972	1157	1181	1196	1198	1400	1423	1245	1247	1449	1472
450	300	50	27	948	950	1120	1143	970	973	1143	1166	1200	1202	1388	1412	1262	1264	1451	1474
450	300	50	25	920	923	1077	1101	956	959	1113	1137	1189	1191	1362	1386	1265	1267	1438	1462
450	300	60	36	948	966	1149	1189	957	976	1158	1198	1175	1193	1393	1433	1224	1243	1442	1482
450	300	60	33	951	970	1137	1177	974	992	1160	1200	1195	1214	1398	1438	1257	1276	1460	1500
450	300	60	30	940	959	1111	1151	976	995	1147	1187	1201	1219	1388	1428	1277	1295	1464	1504
450	300	70	42	941	943	1156	1180	950	952	1166	1189	1160	1162	1392	1415	1209	1211	1441	1464
450	300	70	38	942	944	1142	1166	965	967	1165	1188	1177	1180	1394	1418	1240	1242	1457	1480
450	300	70	35	925	927	1110	1133	961	963	1146	1169	1177	1179	1379	1402	1253	1255	1455	1478
450	450	60	33	1070	1072	1335	1358	1079	1081	1344	1368	1329	1331	1610	1634	1378	1380	1660	1683
450	450	60	30	1047	1049	1296	1320	1069	1071	1319	1342	1322	1324	1588	1612	1385	1387	1651	1674
450	450	60	27	1035	1037	1269	1293	1071	1073	1305	1328	1327	1329	1578	1601	1403	1405	1654	1677
450	450	70	38	1053	1072	1332	1372	1063	1081	1342	1381	1304	1323	1600	1640	1353	1372	1649	1689
450	450	70	35	1045	1063	1308	1348	1067	1086	1331	1371	1312	1331	1592	1632	1374	1393	1655	1694
450	450	70	31	1047	1065	1295	1335	1083	1101	1331	1371	1331	1349	1596	1636	1407	1425	1672	1711
450	450	80	44	1041	1043	1333	1357	1050	1052	1343	1366	1283	1285	1593	1616	1332	1334	1642	1665
450	450	80	40	1028	1030	1306	1329	1051	1053	1328	1352	1287	1289	1582	1605	1350	1352	1644	1667
450	450	80	36	1024	1027	1287	1310	1060	1063	1323	1346	1300	1302	1579	1603	1376	1378	1655	1678
450	600	70	35	1142	1144	1525	1549	1151	1153	1534	1558	1425	1427	1824	1848	1474	1476	1873	1897
450	600	70	31	1106	1108	1473	1497	1128	1130	1496	1519	1405	1407	1789	1813	1467	1469	1852	1875
450	600	70	28	1106	1109	1459	1482	1142	1145	1495	1518	1422	1424	1791	1815	1498	1500	1867	1891
450	600	80	40	1118	1137	1515	1555	1127	1146	1525	1564	1393	1411	1806	1846	1442	1460	1855	1895
450	600	80	36	1097	1115	1478	1518	1119	1138	1501	1541	1388	1406	1786	1826	1450	1469	1848	1888
450	600	80	32	1110	1128	1476	1516	1145	1164	1512	1552	1417	1436	1800	1840	1493	1512	1876	1916
450	600	90	45	1101	1103	1512	1535	1110	1112	1521	1544	1367	1369	1795	1818	1416	1418	1844	1867
450	600	90	40	1072	1074	1468	1491	1095	1097	1490	1514	1355	1357	1767	1791	1417	1420	1830	1853
450	600	90	36	1077	1079	1458	1481	1113	1115	1494	1517	1377	1379	1774	1797	1453	1455	1850	1873
600	300	60	39	996	998	1223	1246	990	992	1217	1241	1318	1321	1562	1586	1353	1355	1597	1620
600	300	60	36	977	979	1189	1212	985	987	1197	1220	1316	1318	1545	1568	1364	1366	1592	1616
600	300	60	33	968	970	1164	1188	989	991	1186	1209	1324	1326	1537	1560	1385	1387	1598	1621
600	300	70	45	953	972	1194	1234	948	966	1189	1229	1268	1286	1525	1565	1302	1321	1560	1600
600	300	70	42	950	969	1176	1216	958	977	1184	1224	1281	1300	1524	1564	1329	1348	1572	1611
600	300	70	38	960	979	1170	1210	981	1000	1192	1231	1308	1326	1535	1575	1369	1387	1596	1636
600	300	80	52	960	962	1215	1239	954	956	1210	1233	1266	1268	1538	1561	1300	1303	1572	1596
600	300	80	48	959	961	1199	1222	966	969	1206	1230	1282	1284	1538	1562	1329	1331	1586	1609
600	300	80	44	964	966	1189	1212	985	987	1210	1233	1304	1306	1545	1568	1365	1367	1606	1629
600	450	70	42	1158	1160	1463	1486	1152	1155	1457	1480	1504	1507	1826	1849	1539	1541	1860	1883
600	450	70	38	1131	1133	1420	1444	1139	1141	1428	1451	1494	1496	1800	1823	1541	1544	1847	1871
600	450	70	35	1136	1138	1410	1433	1157	1159	1431	1454	1515	1517	1806	1829	1576	1578	1867	1890
600	450	80	48	1109	1128	1428	1468	1103	1122	1422	1462	1447	1466	1782	1822	1481	1500	1817	1857
600	450	80	44	1098	1117	1402	1442	1106	1125	1409	1449	1453	1472	1773	1813	1501	1519	1821	1861
600	450	80	40	1120	1139	1408	1448	1142	1160	1429	1469	1492	1511	1796	1836	1553	1572	1857	1897
600	450	90	54	1116	1118	1448	1472	1110	1112	1443	1466	1445	1448	1795	1818	1480	1482	1829	1852
600	450	90	49	1104	1106	1421	1445	1112	1114	1429	1452	1450	1453	1784	1808	1498	1500	1832	1855
600	450	90	45	1120	1122	1422	1445	1141	1143	1443	1466	1483	1485	1802	1825	1544	1546	1863	1886
600	600	70	38	1238	1240	1660	1684	1232	1234	1655	1678	1608	1610	2047	2070	1642	1644	2081	2105
600	600	70	35	1194	1196	1601	1625	1202	1204	1609	1632	1581	1583	2005	2028	1628	1630	2052	2076
600	600	70	31	1212	1214	1604	1627	1233	1235	1625	1648	1615	1617	2024	2047	1676	1678	2085	2108
600	600	80	44	1195	1214	1632	1672	1189	1208	1626	1666	1557	1575	2010	2050	1591	1610	2044	2084
600	600	80	40	1168	1187	1590	1630	1176	1195	1598	1637	1547	1565	1985	2025	1594	1613	2032	2072
600	600	80	36	1201	1220	1607	1647	1222	1241	1628	1668	1596	1615	2019	2059	1657	1676	2080	2120
600	600	90	49	1211	1213	1662	1685	1205	1207	1656	1679	1564	1567	2032	2055	1599	1601	2066	2089
600	600	90	45	1178	1181	1614	1637	1186	1188	1622	1645	1549	1551	2001	2024	1596	1598	2048	2072
600	600	90	40	1204	1206	1624	1647	1225	1227	1645	1668	1591	1593	2027	2051	1652	1654	2088	2112

TABLE E-41. TOTAL NOX EMITTED IN THE TOTAL INTERSECTION SYSTEM (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*7

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET								LEFT TURNS ON MINOR STREET							
				LOW LEVEL				HIGH LEVEL				LOW LEVEL				HIGH LEVEL			
				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET			
				LOW		HIGH		LOW		HIGH		LOW		HIGH		LOW		HIGH	
				L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR	
				LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	858	847	1033	1043	820	809	995	1005	996	985	1188	1198	998	987	1190	1200
300	300	50	25	864	853	1024	1034	840	828	1000	1009	1019	1008	1196	1206	1034	1023	1211	1221
300	300	50	22	796	785	941	951	785	774	930	939	968	956	1129	1139	996	985	1158	1168
300	300	60	33	854	859	1044	1070	816	821	1006	1032	984	989	1190	1217	986	991	1192	1218
300	300	60	30	877	882	1051	1077	852	857	1026	1053	1024	1029	1214	1241	1039	1044	1229	1256
300	300	60	27	824	829	982	1009	812	817	971	997	987	992	1162	1189	1016	1021	1191	1217
300	300	70	38	827	815	1030	1040	788	777	992	1002	948	937	1168	1178	950	939	1170	1180
300	300	70	35	843	832	1031	1041	818	807	1006	1016	982	970	1186	1196	997	985	1201	1211
300	300	70	31	783	772	956	966	772	760	944	954	938	927	1127	1137	967	955	1156	1166
300	450	50	25	991	979	1244	1253	953	941	1206	1215	1153	1141	1422	1432	1155	1143	1424	1434
300	450	50	22	986	975	1224	1233	962	950	1199	1209	1165	1153	1419	1429	1180	1169	1434	1444
300	450	50	20	934	922	1156	1166	922	911	1145	1154	1129	1117	1368	1377	1158	1146	1396	1406
300	450	60	30	993	998	1260	1286	955	960	1222	1248	1147	1152	1430	1457	1149	1154	1432	1458
300	450	60	27	1003	1008	1255	1281	979	984	1230	1256	1174	1179	1442	1468	1189	1194	1457	1483
300	450	60	24	964	969	1200	1226	952	957	1188	1215	1151	1156	1403	1430	1179	1184	1432	1458
300	450	70	35	970	958	1251	1260	932	920	1213	1222	1115	1104	1413	1422	1117	1106	1415	1424
300	450	70	31	973	962	1239	1248	948	937	1214	1224	1135	1124	1417	1427	1150	1139	1432	1442
300	450	70	28	926	914	1176	1186	915	903	1165	1174	1105	1093	1371	1381	1133	1122	1400	1410
300	600	60	27	1021	1010	1392	1402	983	971	1354	1364	1207	1195	1594	1604	1208	1197	1596	1606
300	600	60	24	1004	993	1360	1369	979	968	1335	1345	1206	1195	1578	1588	1222	1210	1594	1603
300	600	60	21	964	952	1304	1314	952	941	1293	1302	1183	1171	1539	1549	1211	1200	1568	1578
300	600	70	31	1015	1020	1400	1427	977	982	1362	1388	1193	1198	1594	1621	1195	1200	1596	1622
300	600	70	28	1012	1017	1381	1408	987	992	1357	1383	1206	1211	1592	1618	1221	1226	1607	1633
300	600	70	24	981	986	1335	1361	969	974	1324	1350	1191	1196	1562	1588	1220	1225	1591	1617
300	600	80	36	985	974	1384	1394	947	935	1346	1356	1154	1143	1570	1579	1156	1144	1571	1581
300	600	80	32	973	961	1356	1366	948	937	1332	1341	1159	1147	1559	1569	1174	1162	1574	1584
300	600	80	28	934	922	1302	1312	923	911	1291	1301	1136	1125	1521	1531	1165	1153	1550	1560
450	300	50	30	959	947	1146	1156	936	924	1123	1133	1184	1173	1389	1398	1201	1190	1405	1415
450	300	50	27	958	946	1130	1139	948	936	1120	1130	1200	1188	1389	1398	1230	1218	1419	1428
450	300	50	25	904	893	1061	1071	907	896	1064	1074	1163	1151	1336	1346	1206	1195	1380	1390
450	300	60	36	969	974	1171	1197	946	951	1147	1174	1187	1192	1405	1431	1203	1208	1421	1448
450	300	60	33	984	989	1170	1196	974	979	1160	1187	1218	1223	1421	1447	1248	1253	1451	1477
450	300	60	30	947	952	1118	1144	950	955	1121	1148	1198	1203	1385	1411	1241	1246	1428	1455
450	300	70	42	939	928	1155	1164	916	904	1131	1141	1148	1137	1381	1390	1165	1154	1397	1407
450	300	70	38	952	940	1152	1162	942	930	1142	1152	1178	1166	1394	1404	1208	1196	1424	1434
450	300	70	35	909	897	1093	1103	912	901	1097	1107	1151	1140	1353	1362	1194	1183	1396	1406
450	450	60	33	1076	1065	1341	1351	1053	1042	1318	1328	1326	1314	1607	1617	1342	1331	1624	1634
450	450	60	30	1064	1053	1314	1324	1054	1043	1304	1314	1330	1319	1596	1606	1360	1349	1626	1636
450	450	60	27	1026	1015	1261	1270	1030	1018	1264	1274	1309	1297	1560	1570	1352	1341	1603	1613
450	450	70	38	1083	1088	1362	1388	1060	1065	1339	1365	1324	1329	1620	1646	1341	1346	1636	1662
450	450	70	35	1085	1090	1349	1375	1075	1080	1339	1365	1343	1348	1623	1650	1373	1378	1653	1680
450	450	70	31	1061	1066	1310	1336	1065	1070	1313	1339	1336	1341	1601	1627	1379	1384	1644	1670
450	450	80	44	1047	1035	1340	1350	1024	1012	1317	1326	1280	1268	1589	1599	1296	1285	1606	1616
450	450	80	40	1046	1034	1324	1333	1036	1025	1314	1323	1295	1284	1590	1599	1325	1314	1620	1629
450	450	80	36	1016	1005	1278	1288	1019	1008	1282	1292	1282	1271	1561	1571	1326	1314	1604	1614
450	600	70	35	1157	1145	1540	1549	1133	1122	1516	1526	1429	1418	1829	1839	1446	1435	1846	1856
450	600	70	31	1131	1120	1499	1509	1121	1110	1489	1499	1421	1409	1805	1815	1451	1439	1835	1845
450	600	70	28	1106	1095	1458	1468	1109	1098	1462	1472	1412	1401	1781	1791	1456	1444	1825	1834
450	600	80	40	1156	1161	1553	1579	1133	1138	1530	1556	1421	1426	1834	1860	1437	1442	1851	1877
450	600	80	36	1145	1150	1527	1553	1135	1141	1517	1543	1427	1432	1825	1851	1457	1462	1855	1881
450	600	80	32	1132	1137	1499	1525	1136	1141	1502	1528	1430	1435	1813	1839	1474	1479	1857	1883
450	600	90	45	1115	1104	1526	1536	1092	1081	1503	1513	1372	1360	1800	1809	1388	1377	1816	1826
450	600	90	40	1098	1086	1494	1503	1088	1076	1484	1493	1371	1360	1783	1793	1401	1390	1813	1823
450	600	90	36	1077	1065	1457	1467	1080	1069	1461	1470	1367	1355	1764	1773	1410	1399	1807	1817
600	300	60	39	983	971	1210	1220	944	933	1172	1181	1296	1284	1539	1549	1297	1286	1541	1551
600	300	60	36	975	964	1187	1197	950	939	1162	1172	1305	1293	1533	1543	1320	1308	1548	1558
600	300	60	33	940	928	1136	1146	928	917	1125	1135	1286	1275	1499	1509	1315	1303	1528	1538
600	300	70	45	963	968	1204	1230	925	930	1166	1192	1268	1273	1526	1552	1270	1275	1527	1554
600	300	70	42	972	977	1197	1224	947	952	1173	1199	1293	1298	1535	1562	1308	1313	1551	1577
600	300	70	38	955	960	1165	1192	943	948	1154	1180	1293	1298	1520	1546	1321	1326	1549	1575
600	300	80	52	947	935	1202	1212	909	897	1164	1174	1243	1232	1515	1525	1245	1234	1517	1527
600	300	80	48	957	945	1197	1206	932	921	1172	1182	1270	1259	1527	1536	1285	1274	1542	1552
600	300	80	44	936	924	1160	1170	925	913	1149	1159	1266	1254	1507	1517	1294	1283	1536	1545
600	450	70	42	1153	1141	1457	1467	1115	1103	1419	1429	1490	1478	1811	1821	1491	1480	1813	1822
600	450	70	38	1137	1125	1426	1436	1112	1101	1401	1411	1490	1479	1796	1806	1505	1494	1811	1821
600	450	70	35	1116	1104	1390	1399	1104	1093	1378	1388	1486	1474	1776	1786	1514	1503	1805	1814
600	450	80	48	1127	1132	1446	1472	1089	1094	1407	1434	1455	1460	1791	1817	1457	1462	1792	1819
600	450	80	44	1128	1133	1431	1457	1103	1108	1406	1432	1473	1478	1793	1819	1488	1493	1808	1834
600	450	80	40	1123	1128	1411	1438	1112	1117	1400	1426	1485	1490	1790	1816	1514	1519	1818	1845
600	450	90	54	1110	1099	1443	1453	1072	1061	1405	1415	1431	1419	1780	1790	1432	1421	1782	1792
600	450	90	49	1110	1099	1427	1437	1085	1074	1403	1412	1447	1435	1781	1791	1462	1451	1796	1806
600	450	90	45	1100	1088	1402	1412	1089	1077	1391	1400	1453	1442	1772	1782	1482	1471	1801	1810
600	600	70	38	1241	1229	1663	1673	1202	1191	1625	1635	1601	1589	2040	2050	1603	1591	2042	2052
600	600	70	35	1208	1197	1615	1625	1183	1172	1591	1601	1585	1574	2009	2019	1600	1589	2024	2034
600	600	70	31	1200	1188	1592	1601	1188	1177	1580	1590	1593	1582	2002	2012	1622	1610	2030	2040
600	600	80	44	1221	1226	1658	1684	1183	1188	1619	1646	1573	1578	2026	2053	1575	1580	2028	2054
600	600	80	40	1206	1211	1627	1653	1181	1186	1602	1629	1574	1579	2012	2039	1590	1595	2028	2054
600	600	80	36	1212	1217	1618	1644	1201	1206	1607	1633	1597	1602	2020	2046	1626	1631	2049	2075
600	600	90	49	1214	1202	1664	1674	1176	1164	1626	1636	1558	1546	2025	2035	1559	1548	2027	2037
600	600	90	45	1193	1181	1628	1638	1168	1156	1603	1613	1553	1542	2005	2015	1568	1557	2020	2030
600	600	90	40	1192	1180	1612	1622	1180	1169	1601	1610	1569	1558	2006	2016	1598	1586	2034	2044

TABLE E-5A. TOTAL FUEL CONSUMPTION IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 4*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	28.7	31.4	32.5	36.4	28.0	30.7	31.8	35.7	32.9	35.6	36.6	40.6	34.7	37.4	38.5	42.5
300	300	50	25	27.8	30.5	28.8	32.8	29.0	31.7	30.0	34.0	33.2	35.9	34.2	38.2	36.9	39.6	38.0	41.9
300	300	50	22	25.9	28.6	26.5	30.4	29.0	31.7	29.5	33.5	32.5	35.2	33.1	37.0	38.2	40.9	38.7	42.7
300	300	60	33	30.0	31.1	33.5	35.8	29.3	30.4	32.8	35.1	33.3	34.4	36.8	39.2	35.2	36.3	38.6	41.0
300	300	60	30	30.2	31.3	30.9	33.3	31.4	32.5	32.1	34.5	34.7	35.8	35.4	37.8	38.4	39.6	39.2	41.5
300	300	60	27	29.2	30.3	29.4	31.8	32.3	33.4	32.5	34.9	35.0	36.1	35.2	37.6	40.6	41.7	40.8	43.2
300	300	70	38	31.1	30.6	36.3	37.1	30.4	29.9	35.6	36.4	33.6	33.1	38.8	39.5	35.4	34.9	40.6	41.4
300	300	70	35	30.7	30.2	33.2	33.9	31.9	31.4	34.4	35.1	34.3	33.9	36.8	37.6	38.1	37.6	40.6	41.3
300	300	70	31	29.2	28.7	31.2	32.0	32.3	31.8	34.3	35.1	34.1	33.6	36.1	36.9	39.7	39.2	41.7	42.5
300	450	50	25	36.1	40.1	44.2	49.4	36.5	40.6	44.6	49.9	41.6	45.6	49.7	54.9	44.6	48.6	52.7	58.0
300	450	50	22	35.0	39.0	40.3	45.6	37.3	41.3	42.7	48.0	41.7	45.7	47.0	52.3	46.6	50.6	52.0	57.2
300	450	50	20	33.6	37.6	38.5	43.8	37.9	41.9	42.7	48.0	41.6	45.6	46.4	51.7	48.3	52.4	53.2	58.5
300	450	60	30	37.7	40.1	45.5	49.2	38.2	40.6	45.9	49.6	42.3	44.8	50.1	53.8	45.4	47.8	53.1	56.8
300	450	60	27	37.5	39.9	42.6	46.2	39.9	42.3	44.9	48.6	43.4	45.8	48.4	52.1	48.3	50.7	53.3	57.0
300	450	60	24	37.0	39.4	41.5	45.2	41.2	43.7	45.8	49.5	44.0	46.5	48.6	52.3	50.8	53.3	55.4	59.1
300	450	70	35	39.0	39.8	48.5	50.6	39.4	40.3	49.0	51.1	42.7	43.6	52.3	54.4	45.7	46.6	55.3	57.4
300	450	70	31	38.3	39.1	45.1	47.2	40.6	41.5	47.4	49.5	43.2	44.1	50.0	52.1	48.1	49.0	54.9	57.0
300	450	70	28	37.0	37.9	43.4	45.5	41.3	42.1	47.6	49.7	43.2	44.1	49.6	51.6	50.0	50.9	56.3	58.4
300	600	60	27	46.3	49.0	58.7	62.7	47.9	50.6	60.3	64.3	53.1	55.8	65.5	69.5	57.3	60.0	69.7	73.7
300	600	60	24	43.0	45.7	52.7	56.7	46.6	49.3	56.3	60.2	51.1	53.8	60.8	64.7	57.1	59.9	66.8	70.8
300	600	60	21	44.1	46.8	53.3	57.3	49.5	52.2	58.7	62.7	53.4	56.1	62.6	66.5	61.3	64.0	70.5	74.5
300	600	70	31	47.3	48.4	59.4	61.8	49.0	50.1	61.1	63.4	53.3	54.4	65.4	67.8	57.5	58.6	69.6	72.0
300	600	70	28	44.9	46.0	54.3	56.7	48.4	49.6	57.8	60.2	52.1	53.2	61.5	63.8	58.2	59.3	67.5	69.9
300	600	70	24	46.7	47.8	55.6	57.9	52.1	53.2	61.0	63.3	55.1	56.2	63.9	66.3	63.0	64.1	71.9	74.3
300	600	80	36	48.0	47.5	61.9	62.7	49.7	49.2	63.5	64.3	53.1	52.6	67.0	67.8	57.3	56.8	71.2	71.9
300	600	80	32	45.0	44.5	56.2	56.9	48.5	48.1	59.7	60.5	51.3	50.9	62.5	63.2	57.4	56.9	68.5	69.3
300	600	80	28	46.1	45.6	56.8	57.5	51.5	51.1	62.2	62.9	53.6	53.2	64.3	65.1	61.6	61.1	72.2	73.0
450	300	50	30	35.8	38.5	40.6	44.6	36.5	39.2	41.3	45.3	43.9	46.6	48.7	52.7	47.2	49.9	52.0	56.0
450	300	50	27	33.7	36.4	35.7	39.7	36.3	39.0	38.3	42.3	43.0	45.7	45.1	49.0	48.1	50.9	50.2	54.2
450	300	50	25	33.5	36.2	35.1	39.1	38.0	40.7	39.6	43.5	44.1	46.8	45.6	49.6	51.1	53.8	52.7	56.6
450	300	60	36	38.0	39.1	42.5	44.8	38.7	39.8	43.2	45.5	45.2	46.4	49.7	52.1	48.5	49.6	53.0	55.4
450	300	60	33	36.9	38.0	38.6	41.0	39.5	40.6	41.2	43.6	45.3	46.4	47.1	49.5	50.5	51.6	52.2	54.6
450	300	60	30	37.8	38.9	39.0	41.4	42.2	43.4	43.5	45.9	47.4	48.6	48.7	51.1	54.5	55.6	55.7	58.1
450	300	70	42	39.0	38.5	45.2	46.0	39.7	39.2	45.9	46.7	45.3	44.9	51.6	52.4	48.6	48.1	54.9	55.6
450	300	70	38	37.6	37.2	41.2	41.9	40.2	39.8	43.7	44.5	45.2	44.8	48.8	49.5	50.4	49.9	53.9	54.7
450	300	70	35	38.0	37.5	41.0	41.8	42.4	42.0	45.5	46.2	46.8	46.3	49.8	50.6	53.8	53.3	56.8	57.6
450	450	60	33	44.2	48.2	53.3	58.6	46.1	50.1	55.2	60.5	53.6	57.7	62.8	68.1	58.1	62.1	67.2	72.5
450	450	60	30	42.0	46.0	48.4	53.7	45.7	49.8	52.1	57.4	52.6	56.7	59.0	64.3	59.0	63.0	65.4	70.6
450	450	60	27	42.5	46.6	48.5	53.7	48.2	52.2	54.1	59.4	54.4	58.4	60.3	65.6	62.6	66.6	68.5	73.8
450	450	70	38	46.0	48.4	54.8	58.5	47.9	50.3	56.7	60.4	54.6	57.0	63.4	67.1	59.0	61.4	67.8	71.5
450	450	70	35	44.7	47.1	50.8	54.5	48.4	50.9	54.5	58.2	54.5	56.9	60.6	64.3	60.8	63.2	66.9	70.6
450	450	70	31	46.2	48.7	51.8	55.5	51.9	54.3	57.5	61.2	57.2	59.7	62.8	66.5	65.4	67.9	71.0	74.7
450	450	80	44	46.4	47.2	56.9	59.0	48.3	49.1	58.8	60.9	54.1	54.9	64.7	66.8	58.5	59.4	69.1	71.2
450	450	80	40	44.8	45.7	52.7	54.8	48.6	49.4	56.4	58.5	53.8	54.6	61.6	63.7	60.1	60.9	67.9	70.0
450	450	80	36	45.9	46.7	53.2	55.3	51.5	52.3	58.8	60.9	56.0	56.8	63.3	65.4	64.2	65.0	71.5	73.6
450	600	70	35	58.6	61.3	72.1	76.1	61.7	64.4	75.1	79.1	69.4	72.1	82.9	86.8	75.0	77.7	88.5	92.4
450	600	70	31	54.3	57.1	65.1	69.0	59.3	62.0	70.0	74.0	66.3	69.0	77.1	81.0	73.8	76.5	84.5	88.5
450	600	70	28	57.4	60.1	67.6	71.6	64.2	66.9	74.4	78.4	70.6	73.3	80.8	84.8	79.9	82.6	90.2	94.1
450	600	80	40	59.8	60.9	72.9	75.3	62.8	63.9	76.0	78.3	69.7	70.8	82.8	85.2	75.3	76.4	88.4	90.8
450	600	80	36	56.5	57.6	66.9	69.3	61.4	62.5	71.8	74.2	67.6	68.7	78.0	80.4	75.1	76.2	85.5	87.9
450	600	80	32	60.4	61.5	70.3	72.7	67.2	68.3	77.1	79.5	72.7	73.9	82.6	85.0	82.1	83.2	92.0	94.4
450	600	90	45	59.9	59.4	74.8	75.6	62.9	62.5	77.8	78.6	68.9	68.5	83.8	84.6	74.5	74.0	89.4	90.2
450	600	90	40	56.2	55.7	68.4	69.2	61.1	60.7	73.3	74.1	66.5	66.0	78.6	79.4	73.9	73.5	86.1	86.9
450	600	90	36	59.5	59.0	71.1	71.9	66.3	65.8	78.0	78.7	70.9	70.5	82.6	83.4	80.3	79.8	92.0	92.8
600	300	60	39	44.6	47.3	50.4	54.4	43.9	46.6	49.7	53.7	56.6	59.4	62.5	66.5	58.5	61.2	64.4	68.3
600	300	60	36	41.4	44.1	44.5	48.5	42.6	45.3	45.7	49.7	54.7	57.4	57.8	61.8	58.5	61.2	61.6	65.5
600	300	60	33	43.4	46.1	46.0	50.0	46.5	49.2	49.1	53.1	57.9	60.6	60.5	64.5	63.6	66.3	66.2	70.1
600	300	70	45	44.8	45.9	50.3	52.7	44.1	45.2	49.6	52.0	56.0	57.1	61.5	63.9	57.8	58.9	63.4	65.7
600	300	70	42	42.6	43.8	45.4	47.8	43.8	44.9	46.6	49.0	55.1	56.2	57.8	60.2	58.8	59.9	61.6	64.0
600	300	70	38	45.9	47.0	48.2	50.6	49.0	50.1	51.3	53.7	59.6	60.7	61.9	64.2	65.2	66.3	67.5	69.9
600	300	80	52	46.3	45.8	53.6	54.4	45.6	45.1	52.9	53.7	56.6	56.2	63.9	64.7	58.5	58.0	65.8	66.6
600	300	80	48	44.3	43.8	48.8	49.6	45.5	45.0	50.0	50.8	55.8	55.4	60.4	61.2	59.6	59.1	64.1	64.9
600	300	80	44	47.2	46.7	51.2	52.0	50.2	49.8	54.3	55.1	59.9	59.5	64.0	64.8	65.6	65.1	69.6	70.4
600	450	70	42	57.0	61.1	67.2	72.5	57.5	61.5	67.7	73.0	70.4	74.5	80.6	85.9	73.5	77.5	83.6	88.9
600	450	70	38	54.1	58.1	61.5	66.8	56.5	60.5	63.9	69.2	68.7	72.7	76.2	81.4	73.6	77.6	81.1	86.3
600	450	70	35	56.7	60.7	63.6	68.9	60.9	64.9	67.9	73.1	72.5	76.5	79.5	84.7	79.3	83.3	86.2	91.5
600	450	80	48	56.6	59.0	66.4	70.1	57.0	59.5	66.9	70.6	69.1	71.5	78.9	82.6	72.1	74.5	82.0	85.6
600	450	80	44	54.7	57.2	61.8	65.5	57.1	59.5	64.2	67.9	68.5	70.9	75.6	79.3	73.4	75.8	80.5	84.2
600	450	80	40	58.6	61.0	65.2	68.9	62.8	65.2	69.4	73.1	73.5	75.9	80.1	83.8	80.3	82.7	86.9	90.6
600	450	90	54	58.0	58.8	69.6	71.7	58.5	59.3	70.1	72.2	69.7	70.5	81.3	83.4	72.7	73.5	84.3	86.4
600	450	90	49	56.2	57.0	65.1	67.2	58.6	59.4	67.4	69.5	69.1	69.9	77.9	80.0	74.0	74.8	82.9	85.0
600	450	90	45	59.5	60.3	67.9	70.0	63.7	64.6	72.1	74.2	73.6	74.4	82.0	84.1	80.4	81.2	88.8	90.9
600	600	70	38	74.0	76.7	88.5	92.5	75.6	78.3	90.1	94.1	88.7	91.4	103.2	107.2	92.9	95.6	107.4	111.4
600	600	70	35	68.4	71.1	80.1	84.1	71.9	74.6	83.7	87.6	84.3	87.0	96.1	100.0	90.4	93.1	102.1	106.1
600	600	70	31	73.4	76.1	84.7	88.6	78.8	81.5	90.1	94.0	90.5	93.2	101.8	105.8	98.5	101.2	109.8	113.7
600	600	80	44	73.9	75.0	88.0	90.4	75.5	76.6	89.7	92.0	87.7	88.8	101.9	104.3	91.9	93.0	106.1	108.4
600	600	80	40	69.5	70.6	80.9	83.3	73.0	74.1	84.5	86.8	84.6	85.7	96.0	98.4	90.6	91.8	102.1	104.5
600	600	80	36	75.5	76.6	86.4	88.8	80.9	82.0	91.8	94.2	91.8	92.9	102.7	105.1	99.7	100.8	110.7	113.1
600	600	90	49	76.1	75.6	92.0	92.8	77.7	77.2	93.7	94.4	89.1	88.6	105.0	105.8	93.2	92.8	109.2	110.0
600	600	90	45	71.2	70.7	84.4	85.2	74.7	74.2	87.9	88.7	85.4	84.9	98.6	99.4	91.5	91.0	104.7	105.5
600	600	90	40	76.8	76.3	89.5	90.3	82.2	81.7	94.9	95.7	92.2	91.7	104.9	105.7	100.2	99.7	112.9	113.7

TABLE E-5B. TOTAL FUEL CONSUMPTION IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 5*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET								LEFT TURNS ON MINOR STREET							
				LOW LEVEL				HIGH LEVEL				LOW LEVEL				HIGH LEVEL			
				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET				TRUCKS ON MAJOR STREET			
				LOW		HIGH		LOW		HIGH		LOW		HIGH		LOW		HIGH	
				L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR		L.T./MAJOR	
				LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	29.7	31.2	33.4	36.2	29.5	31.0	33.3	36.1	33.0	34.5	36.8	39.6	35.5	37.0	39.2	42.0
300	300	50	25	30.0	31.5	31.1	33.8	31.8	33.3	32.8	35.6	34.6	36.1	35.7	38.4	38.9	40.4	40.0	42.7
300	300	50	22	28.0	29.5	28.5	31.3	31.6	33.1	32.1	34.9	33.8	35.3	34.3	37.1	39.9	41.5	40.5	43.3
300	300	60	33	30.9	30.8	34.4	35.5	30.8	30.7	34.2	35.4	33.4	33.3	36.9	38.0	35.8	35.7	39.3	40.4
300	300	60	30	32.3	32.2	33.1	34.2	34.1	34.0	34.8	36.0	36.1	36.0	36.8	37.9	40.4	40.3	41.1	42.2
300	300	60	27	31.2	31.1	31.4	32.6	34.8	34.7	35.0	36.2	36.1	36.0	36.3	37.5	42.3	42.2	42.5	43.7
300	300	70	38	32.1	30.4	37.3	36.9	31.9	30.3	37.2	36.7	33.7	32.1	38.9	38.5	36.1	34.5	41.4	40.9
300	300	70	35	32.9	31.3	35.4	35.0	34.7	33.0	37.2	36.7	35.8	34.1	38.3	37.8	40.1	38.4	42.6	42.1
300	300	70	31	31.3	29.6	33.2	32.8	34.9	33.2	36.9	36.4	35.3	33.7	37.3	36.9	41.5	39.8	43.5	43.1
300	450	50	25	35.1	38.0	43.2	47.3	36.2	39.0	44.3	48.3	39.8	42.7	47.9	52.0	43.4	46.2	51.5	55.6
300	450	50	22	35.3	38.1	40.7	44.8	38.2	41.0	43.6	47.7	41.2	44.0	46.6	50.7	46.7	49.5	52.1	56.1
300	450	50	20	33.8	36.6	38.6	42.7	38.6	41.4	43.4	47.5	40.9	43.7	45.8	49.9	48.2	51.1	53.1	57.2
300	450	60	30	36.7	37.9	44.5	46.9	37.7	38.9	45.5	48.0	40.5	41.7	48.3	50.8	44.1	45.3	51.9	54.4
300	450	60	27	37.8	39.0	42.8	45.3	40.7	41.9	45.7	48.2	42.8	44.0	47.9	50.3	48.3	49.5	53.3	55.8
300	450	60	24	37.0	38.3	41.6	44.1	41.8	43.1	46.4	48.9	43.3	44.5	47.8	50.3	50.6	51.9	55.2	57.7
300	450	70	35	38.0	37.7	47.6	48.5	39.1	38.7	48.6	49.5	41.0	40.6	50.5	51.4	44.6	44.2	54.1	55.0
300	450	70	31	38.6	38.2	45.4	46.3	41.5	41.1	48.3	49.2	42.8	42.4	49.6	50.5	48.2	47.9	55.0	55.9
300	450	70	28	37.2	36.8	43.5	44.4	42.0	41.6	48.3	49.2	42.6	42.2	48.9	49.8	49.9	49.6	56.2	57.1
300	600	60	27	43.4	44.9	55.9	58.6	45.6	47.1	58.1	60.8	49.5	51.0	61.9	64.6	54.2	55.7	66.6	69.4
300	600	60	24	41.5	43.0	51.2	53.9	45.5	47.1	55.2	58.0	48.7	50.2	58.4	61.2	55.3	56.8	65.0	67.8
300	600	60	21	42.4	43.9	51.6	54.3	48.3	49.8	57.5	60.3	50.8	52.3	60.0	62.8	59.3	60.8	68.5	71.3
300	600	70	31	44.4	44.3	56.5	57.7	46.6	46.5	58.7	59.9	49.6	49.5	61.7	62.8	54.3	54.2	66.4	67.6
300	600	70	28	43.3	43.2	52.6	53.8	47.3	47.3	56.7	57.9	49.6	49.6	59.0	60.2	56.3	56.2	65.6	66.8
300	600	70	24	44.8	44.7	53.7	54.9	50.8	50.7	59.7	60.8	52.4	52.3	61.3	62.5	60.9	60.8	69.8	71.0
300	600	80	36	45.2	43.5	59.1	58.6	47.4	45.7	61.2	60.8	49.5	47.8	63.3	62.9	54.2	52.5	68.1	67.7
300	600	80	32	43.5	41.8	54.6	54.2	47.5	45.9	58.7	58.2	49.0	47.3	60.1	59.7	55.6	53.9	66.7	66.3
300	600	80	28	44.4	42.7	55.0	54.6	50.3	48.6	61.0	60.5	51.1	49.4	61.7	61.3	59.6	57.9	70.2	69.8
450	300	50	30	35.7	37.2	40.6	43.3	37.0	38.5	41.8	44.6	43.1	44.6	47.9	50.6	46.9	48.4	51.7	54.5
450	300	50	27	34.9	36.4	37.0	39.7	38.0	39.5	40.1	42.9	43.4	44.9	45.5	48.3	49.1	50.6	51.2	54.0
450	300	50	25	34.5	36.0	36.1	38.9	39.5	41.1	41.1	43.9	44.3	45.8	45.9	48.6	51.9	53.4	53.4	56.2
450	300	60	36	37.8	37.7	42.3	43.5	39.1	39.0	43.6	44.8	44.3	44.2	48.8	49.9	48.1	48.0	52.6	53.8
450	300	60	33	38.0	37.9	39.7	40.9	41.1	41.0	42.9	44.1	45.7	45.6	47.4	48.6	51.4	51.3	53.1	54.3
450	300	60	30	38.7	38.6	39.9	41.1	43.7	43.6	45.0	46.1	47.6	47.5	48.8	50.0	55.1	55.1	56.4	57.6
450	300	70	42	38.9	37.2	45.2	44.7	40.2	38.5	46.4	46.0	44.5	42.8	50.7	50.3	48.3	46.6	54.6	54.1
450	300	70	38	38.9	37.2	42.4	42.0	42.0	40.3	45.5	45.1	45.7	44.0	49.2	48.8	51.4	49.7	54.9	54.5
450	300	70	35	39.0	37.3	42.0	41.6	44.0	42.3	47.0	46.6	47.0	45.3	50.0	49.6	54.6	52.9	57.6	57.2
450	450	60	33	42.2	45.1	51.4	55.4	44.7	47.5	53.8	57.9	50.9	53.7	60.0	64.1	55.9	58.7	65.0	69.1
450	450	60	30	41.3	44.1	47.7	51.8	45.6	48.4	52.0	56.1	51.2	54.0	57.6	61.6	58.0	60.8	64.4	68.5
450	450	60	27	41.7	44.5	47.6	51.6	47.8	50.7	53.8	57.8	52.7	55.6	58.6	62.7	61.5	64.3	67.4	71.5
450	450	70	38	43.9	45.2	52.7	55.2	46.4	47.6	55.2	57.7	51.7	52.9	60.5	63.0	56.7	57.9	65.5	68.0
450	450	70	35	43.9	45.1	50.0	52.5	48.2	49.5	54.3	56.8	52.9	54.1	59.0	61.5	59.8	61.0	65.8	68.3
450	450	70	31	45.3	46.5	50.8	53.3	51.4	52.7	57.0	59.5	55.5	56.7	61.0	63.5	64.2	65.4	69.8	72.3
450	450	80	44	44.4	44.1	55.0	55.9	46.8	46.5	57.4	58.3	51.3	51.0	61.9	62.8	56.3	55.9	66.9	67.8
450	450	80	40	44.2	43.8	52.0	52.9	48.5	48.1	56.3	57.2	52.3	51.9	60.1	61.0	59.1	58.8	67.0	67.9
450	450	80	36	45.0	44.6	52.3	53.2	51.2	50.8	58.5	59.4	54.3	53.9	61.7	62.5	63.1	62.7	70.4	71.3
450	600	70	35	54.8	56.3	68.2	71.0	58.4	59.9	71.8	74.6	64.7	66.2	78.2	81.0	70.9	72.4	84.3	87.1
450	600	70	31	51.8	53.3	62.5	65.2	57.2	58.7	68.0	70.7	62.9	64.4	73.7	76.4	71.0	72.5	81.7	84.5
450	600	70	28	54.6	56.1	64.8	67.6	61.9	63.4	72.2	74.9	67.0	68.5	77.2	80.0	76.9	78.4	87.1	89.9
450	600	80	40	55.8	55.7	69.0	70.1	59.4	59.3	72.6	73.7	64.9	64.8	78.1	79.2	71.1	71.0	84.2	85.4
450	600	80	36	53.8	53.7	64.2	65.4	59.3	59.2	69.7	70.9	64.1	64.0	74.5	75.7	72.1	72.1	82.6	83.7
450	600	80	32	57.5	57.4	67.4	68.6	64.9	64.8	74.8	76.0	69.0	69.0	79.0	80.1	79.0	78.9	88.9	90.0
450	600	90	45	56.0	54.4	70.9	70.5	59.6	58.0	74.5	74.1	64.3	62.6	79.2	78.7	70.4	68.7	85.3	84.9
450	600	90	40	53.6	51.9	65.8	65.4	59.1	57.4	71.3	70.8	63.1	61.4	75.2	74.8	71.1	69.4	83.3	82.8
450	600	90	36	56.7	55.0	68.3	67.9	64.0	62.4	75.7	75.3	67.3	65.7	79.0	78.6	77.3	75.6	88.9	88.5
600	300	60	39	43.5	45.0	49.3	52.1	43.3	44.9	49.2	52.0	54.8	56.3	60.6	63.4	57.2	58.7	63.0	65.8
600	300	60	36	41.6	43.1	44.7	47.5	43.4	44.9	46.5	49.2	54.1	55.6	57.2	60.0	58.4	59.9	61.5	64.3
600	300	60	33	43.4	44.9	46.0	48.8	47.0	48.5	49.7	52.4	57.1	58.6	59.7	62.5	63.3	64.8	65.9	68.7
600	300	70	45	43.6	43.5	49.1	50.3	43.5	43.4	49.0	50.1	54.0	53.9	59.5	60.7	56.4	56.3	61.9	63.1
600	300	70	42	42.7	42.7	45.5	46.7	44.5	44.4	47.3	48.4	54.4	54.3	57.1	58.3	58.6	58.6	61.4	62.6
600	300	70	38	45.8	45.7	48.1	49.3	49.4	49.4	51.7	52.9	58.7	58.6	61.0	62.1	64.8	64.7	67.1	68.3
600	300	80	52	45.2	43.5	52.5	52.1	45.1	43.4	52.4	51.9	54.7	53.1	62.0	61.6	57.2	55.5	64.4	64.0
600	300	80	48	44.5	42.8	49.0	48.6	46.2	44.5	50.8	50.3	55.2	53.5	59.8	59.3	59.5	57.8	64.1	63.6
600	300	80	44	47.1	45.5	51.2	50.8	50.8	49.1	54.8	54.4	59.1	57.4	63.2	62.7	65.3	63.6	69.3	68.9
600	450	70	42	54.0	56.9	64.2	68.3	55.1	57.9	65.3	69.3	66.6	69.5	76.8	80.9	70.2	73.0	80.4	84.5
600	450	70	38	52.4	55.2	59.8	63.9	55.3	58.1	62.7	66.8	66.2	69.0	73.6	77.7	71.7	74.5	79.1	83.2
600	450	70	35	54.8	57.6	61.7	65.8	59.5	62.4	66.5	70.6	69.8	72.6	76.7	80.8	77.1	79.9	84.1	88.2
600	450	80	48	53.5	54.7	63.3	65.8	54.5	55.7	64.4	66.8	65.2	66.4	75.1	77.5	68.8	70.0	78.6	81.1
600	450	80	44	52.9	54.1	60.0	62.5	55.8	57.1	62.9	65.4	65.9	67.1	73.0	75.5	71.3	72.5	78.4	80.9
600	450	80	40	56.5	57.8	63.2	65.7	61.3	62.6	68.0	70.4	70.7	71.9	77.3	79.8	78.0	79.3	84.7	87.2
600	450	90	54	55.0	54.7	66.6	67.5	56.0	55.7	67.7	68.5	65.9	65.5	77.5	78.4	69.4	69.1	81.1	82.0
600	450	90	49	54.5	54.1	63.4	64.3	57.4	57.0	66.3	67.2	66.5	66.2	75.4	76.3	72.0	71.6	80.9	81.8
600	450	90	45	57.6	57.2	66.0	66.9	62.4	62.0	70.8	71.7	70.9	70.5	79.3	80.1	78.2	77.9	86.6	87.5
600	600	70	38	69.1	70.6	83.6	86.4	71.3	72.8	85.8	88.6	83.0	84.5	97.5	100.3	87.7	89.3	102.3	105.0
600	600	70	35	64.8	66.3	76.5	79.3	68.8	70.3	80.6	83.4	79.9	81.4	91.7	94.4	86.5	88.0	98.3	101.0
600	600	70	31	69.6	71.1	80.8	83.6	75.5	77.0	86.8	89.6	85.9	87.4	97.2	100.0	94.4	95.9	105.7	108.5
600	600	80	44	68.9	68.8	83.1	84.2	71.1	71.0	85.2	86.4	81.9	81.8	96.1	97.3	86.7	86.6	100.8	102.0
600	600	80	40	65.8	65.7	77.2	78.4	69.9	69.8	81.3	82.5	80.1	80.0	91.5	92.7	86.7	86.6	98.1	99.3
600	600	80	36	71.6	71.5	82.5	83.7	77.5	77.5	88.5	89.7	87.1	87.0	98.0	99.2	95.6	95.5	106.5	107.7
600	600	90	49	71.2	69.5	87.1	86.7	73.4	71.7	89.3	88.9	83.4	81.7	99.3	98.9	88.1	86.4	104.0	103.6
600	600	90	45	67.6	65.9	80.8	80.4	71.7	70.0	84.9	84.4	81.0	79.3	94.2	93.8	87.6	85.9	100.8	100.4
600	600	90	40	73.0	71.3	85.7	85.3	78.9	77.3	91.6	91.2	87.6	85.9	100.3	99.9	96.1	94.4	108.8	108.4

TABLE E-5C. TOTAL FUEL CONSUMPTION IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 5*5

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				HIGH LEVEL			
				TRUCKS ON MAJOR STREET: LOW		HIGH		TRUCKS ON MAJOR STREET: LOW		HIGH		TRUCKS ON MAJOR STREET: LOW		HIGH		TRUCKS ON MAJOR STREET: LOW		HIGH	
				L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH	L.T./MAJOR LOW	HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	31.1	31.4	34.9	36.4	27.4	27.7	31.2	32.8	33.7	34.0	37.4	39.0	32.5	32.8	36.3	37.9
300	300	50	25	31.7	32.0	32.7	34.3	29.9	30.2	30.9	32.5	35.4	35.7	36.5	38.0	36.2	36.5	37.3	38.8
300	300	50	22	28.3	28.6	28.9	30.4	28.4	28.7	29.0	30.5	33.3	33.6	33.9	35.4	36.0	36.3	36.5	38.1
300	300	60	33	34.3	33.0	37.7	37.7	30.6	29.3	34.1	34.0	36.0	34.7	39.4	39.4	34.9	33.6	38.3	38.3
300	300	60	30	35.9	34.6	36.6	36.6	34.1	32.8	34.8	34.8	38.8	37.5	39.5	39.5	39.6	38.3	40.3	40.3
300	300	60	27	33.5	32.2	33.7	33.7	33.6	32.3	33.8	33.8	37.6	36.3	37.8	37.8	40.3	39.0	40.5	40.5
300	300	70	38	33.5	30.6	38.7	37.1	29.8	27.0	35.1	33.4	34.3	31.5	39.6	37.9	33.2	30.4	38.4	36.8
300	300	70	35	34.6	31.7	37.0	35.4	32.8	29.9	35.2	33.6	36.6	33.7	39.1	37.5	37.4	34.5	39.9	38.2
300	300	70	31	31.6	28.7	33.6	32.0	31.7	28.8	33.7	32.1	34.9	32.0	36.9	35.2	37.5	34.7	39.5	37.9
300	450	50	25	36.0	37.6	44.1	47.0	33.5	35.1	41.6	44.5	39.9	41.5	48.0	50.9	40.0	41.6	48.1	50.9
300	450	50	22	36.4	38.0	41.8	44.6	35.8	37.4	41.1	44.0	41.5	43.1	46.9	49.7	43.4	45.0	48.8	51.7
300	450	50	20	33.6	35.2	38.4	41.3	34.8	36.5	39.7	42.6	39.9	41.5	44.8	47.7	43.7	45.3	48.6	51.5
300	450	60	30	39.5	39.5	47.3	48.6	37.0	37.0	44.8	46.1	42.5	42.6	50.3	51.6	42.6	42.6	50.4	51.6
300	450	60	27	40.8	40.8	45.8	47.1	40.2	40.2	45.2	46.5	45.0	45.1	50.1	51.4	47.0	47.0	52.0	53.3
300	450	60	24	38.8	38.8	43.3	44.6	40.1	40.1	44.6	45.9	44.3	44.3	48.8	50.1	48.1	48.1	52.6	53.9
300	450	70	35	38.9	37.3	48.4	48.1	36.4	34.8	45.9	45.6	41.1	39.5	50.6	50.3	41.1	39.6	50.7	50.3
300	450	70	31	39.7	38.1	46.5	46.2	39.1	37.5	45.9	45.6	43.0	41.5	49.9	49.5	45.0	43.4	51.8	51.5
300	450	70	28	37.0	35.4	43.3	43.0	38.3	36.7	44.6	44.3	41.6	40.0	47.9	47.6	45.4	43.8	51.7	51.4
300	600	60	27	43.8	44.1	56.2	57.7	42.4	42.7	54.9	56.4	49.0	49.3	61.4	63.0	50.2	50.5	62.6	64.2
300	600	60	24	42.0	42.3	51.7	53.3	42.6	42.9	52.3	53.8	48.4	48.7	58.1	59.7	51.5	51.8	61.2	62.8
300	600	60	21	41.6	41.9	50.8	52.4	44.1	44.4	53.3	54.8	49.3	49.6	58.5	60.0	54.3	54.6	63.5	65.0
300	600	70	31	46.7	45.4	58.8	58.8	45.4	44.1	57.5	57.4	51.0	49.8	63.1	63.1	52.3	51.0	64.4	64.3
300	600	70	28	45.8	44.5	55.1	55.1	46.3	45.0	55.7	55.6	51.3	50.0	60.7	60.7	54.4	53.1	63.8	63.8
300	600	70	24	46.0	44.8	54.9	54.9	48.5	47.2	57.4	57.3	52.8	51.5	61.7	61.7	57.8	56.5	66.7	66.7
300	600	80	36	45.5	42.6	59.4	57.8	44.2	41.3	58.1	56.4	49.0	46.1	62.9	61.2	50.2	47.3	64.1	62.5
300	600	80	32	44.0	41.1	55.1	53.5	44.5	41.7	55.7	54.1	48.7	45.8	59.8	58.2	51.8	48.9	62.9	61.3
300	600	80	28	43.6	40.7	54.3	52.6	46.1	43.2	56.7	55.1	49.5	46.7	60.2	58.5	54.5	51.6	65.2	63.5
450	300	50	30	36.1	36.4	40.9	42.5	33.9	34.2	38.7	40.2	42.6	42.9	47.5	49.0	42.9	43.2	47.8	49.3
450	300	50	27	35.5	35.8	37.5	39.1	35.1	35.4	37.2	38.7	43.2	43.5	45.3	46.8	45.4	45.7	47.5	49.0
450	300	50	25	33.8	34.1	35.4	37.0	35.3	35.6	36.9	38.5	42.8	43.1	44.4	45.9	46.8	47.1	48.4	50.0
450	300	60	36	40.2	38.9	44.7	44.6	37.9	36.6	42.4	42.4	45.8	44.5	50.3	50.3	46.1	44.8	50.6	50.6
450	300	60	33	40.5	39.2	42.3	42.2	40.1	38.9	41.9	41.9	47.4	46.1	49.1	49.1	49.6	48.3	51.3	51.3
450	300	60	30	39.9	38.7	41.2	41.2	41.5	40.2	42.7	42.7	48.0	46.7	49.3	49.3	52.1	50.8	53.4	53.3
450	300	70	42	39.3	36.4	45.5	43.9	37.0	34.2	43.3	41.7	44.1	41.2	50.3	48.7	44.4	41.5	50.6	49.0
450	300	70	38	39.4	36.6	43.0	41.3	39.1	36.2	42.6	41.0	45.4	42.6	49.0	47.3	47.6	44.7	51.1	49.5
450	300	70	35	38.3	35.4	41.3	39.7	39.8	36.9	42.8	41.2	45.5	42.6	48.5	46.9	49.6	46.7	52.6	51.0
450	450	60	33	42.1	43.7	51.2	54.1	41.0	42.6	50.1	53.0	49.9	51.5	59.1	61.9	51.4	53.0	60.5	63.4
450	450	60	30	41.3	43.0	47.7	50.6	42.1	43.7	48.5	51.4	50.4	52.0	56.8	59.7	53.7	55.4	60.1	63.0
450	450	60	27	40.4	42.0	46.3	49.2	43.1	44.7	49.0	51.9	50.7	52.3	56.6	59.5	55.9	57.5	61.8	64.7
450	450	70	38	45.7	45.8	54.5	55.8	44.6	44.7	53.4	54.7	52.7	52.7	61.5	62.8	54.2	54.2	63.0	64.3
450	450	70	35	45.9	45.9	52.0	53.3	46.7	46.7	52.8	54.1	54.1	54.1	60.2	61.5	57.4	57.5	63.5	64.8
450	450	70	31	46.0	46.0	51.6	52.8	48.7	48.7	54.2	55.5	55.4	55.4	61.0	62.3	60.6	60.6	66.2	67.5
450	450	80	44	44.3	42.7	54.8	54.5	43.2	41.6	53.7	53.4	50.4	48.8	60.9	60.6	51.8	50.3	62.4	62.1
450	450	80	40	44.2	42.6	52.0	51.7	45.0	43.4	52.8	52.5	51.5	50.0	59.4	59.1	54.9	53.3	62.7	62.4
450	450	80	36	43.7	42.2	51.1	50.8	46.4	44.9	53.8	53.5	52.3	50.7	59.6	59.3	57.5	55.9	64.9	64.5
450	600	70	35	54.1	54.4	67.5	69.1	54.1	54.4	67.6	69.2	63.2	63.5	76.7	78.3	65.8	66.1	79.3	80.9
450	600	70	31	51.3	51.6	62.0	63.5	53.2	53.5	63.9	65.5	61.6	61.9	72.4	73.9	66.1	66.4	76.9	78.4
450	600	70	28	52.8	53.1	63.0	64.6	56.6	56.9	66.9	68.4	64.4	64.7	74.6	76.2	70.8	71.1	81.0	82.6
450	600	80	40	57.1	55.8	70.2	70.2	57.2	55.9	70.3	70.3	65.4	64.1	78.5	78.5	68.0	66.7	81.1	81.1
450	600	80	36	55.3	54.0	65.7	65.6	57.2	55.9	67.6	67.6	64.8	63.5	75.2	75.1	69.3	68.0	79.7	79.6
450	600	80	32	57.7	56.4	67.6	67.6	61.5	60.3	71.5	71.4	68.4	67.1	78.3	78.3	74.8	73.5	84.7	84.7
450	600	90	45	55.3	52.5	70.2	68.6	55.4	52.5	70.3	68.7	62.8	59.9	77.7	76.0	65.4	62.5	80.3	78.7
450	600	90	40	53.1	50.2	65.3	63.7	55.1	52.2	67.2	65.6	61.8	58.9	73.9	72.3	66.3	63.4	78.4	76.8
450	600	90	36	54.9	52.0	66.6	65.0	58.7	55.9	70.4	68.8	64.8	61.9	76.4	74.8	71.2	68.3	82.8	81.2
600	300	60	39	42.8	43.1	48.7	50.3	39.2	39.5	45.0	46.6	53.3	53.6	59.2	60.7	52.2	52.5	58.0	59.6
600	300	60	36	41.2	41.5	44.3	45.8	39.4	39.7	42.5	44.1	52.9	53.2	56.0	57.5	53.6	53.9	56.7	58.3
600	300	60	33	41.7	42.0	44.3	45.9	41.8	42.1	44.4	46.0	54.6	54.9	57.2	58.8	57.2	57.5	59.9	61.4
600	300	70	45	44.9	43.6	50.4	50.4	41.2	39.9	46.8	46.7	54.5	53.2	60.0	60.0	53.4	52.1	58.9	58.9
600	300	70	42	44.2	43.0	47.0	47.0	42.5	41.2	45.3	45.2	55.1	53.8	57.8	57.8	55.8	54.5	58.6	58.6
600	300	70	38	46.1	44.8	48.4	48.3	46.2	44.9	48.5	48.4	58.1	56.8	60.4	60.4	60.7	59.5	63.0	63.0
600	300	80	52	44.6	41.7	51.9	50.2	40.9	38.0	48.2	46.6	53.3	50.4	60.6	59.0	52.2	49.3	59.5	57.8
600	300	80	48	44.0	41.1	48.6	46.9	42.2	39.4	46.8	45.2	54.0	51.1	58.5	56.9	54.7	51.9	59.3	57.7
600	300	80	44	45.4	42.6	49.5	47.9	45.5	42.7	49.6	48.0	56.6	53.7	60.6	59.0	59.2	56.4	63.3	61.7
600	450	70	42	52.9	54.5	63.0	65.9	50.4	52.0	60.5	63.4	64.6	66.3	74.8	77.7	64.7	66.3	74.9	77.8
600	450	70	38	51.4	53.0	58.8	61.7	50.8	52.4	58.2	61.1	64.4	66.0	71.8	74.7	66.3	68.0	73.8	76.7
600	450	70	35	52.5	54.1	59.5	62.3	53.8	55.4	60.7	63.6	66.7	68.3	73.7	76.5	70.5	72.2	77.5	80.4
600	450	80	48	54.2	54.3	64.1	65.4	51.7	51.8	61.6	62.9	65.2	65.2	75.0	76.3	65.2	65.2	75.1	76.4
600	450	80	44	53.9	53.9	61.0	62.3	53.3	53.3	60.4	61.7	66.0	66.0	73.1	74.4	68.0	68.0	75.1	76.4
600	450	80	40	56.2	56.3	62.9	64.1	57.5	57.5	64.1	65.4	69.6	69.6	76.2	77.5	73.4	73.4	80.0	81.3
600	450	90	54	53.8	52.3	65.4	65.1	51.3	49.8	62.9	62.6	63.9	62.3	75.5	75.2	63.9	62.4	75.5	75.2
600	450	90	49	53.5	51.9	62.4	62.1	52.9	51.3	61.8	61.4	64.8	63.2	73.6	73.3	66.7	65.1	75.6	75.3
600	450	90	45	55.3	53.8	63.7	63.4	56.6	55.0	65.0	64.7	67.8	66.2	76.2	75.9	71.6	70.1	80.0	79.7
600	600	70	38	67.4	67.7	81.9	83.4	66.0	66.3	80.5	82.1	80.5	80.8	95.0	96.5	81.7	82.0	96.2	97.8
600	600	70	35	63.2	63.5	75.0	76.6	63.8	64.1	75.5	77.1	77.5	77.9	89.3	90.9	80.7	81.0	92.4	94.0
600	600	70	31	66.8	67.1	78.0	79.6	69.2	69.5	80.5	82.0	82.3	82.6	93.6	95.1	87.3	87.6	98.6	100.1
600	600	80	44	69.1	67.8	83.3	83.2	67.8	66.5	81.9	81.9	81.3	80.1	95.5	95.5	82.6	81.3	96.7	96.7
600	600	80	40	66.2	64.9	77.7	77.6	66.8	65.5	78.2	78.2	79.7	78.4	91.1	91.1	82.8	81.5	94.2	94.2
600	600	80	36	70.7	69.4	81.7	81.6	73.2	71.9	84.1	84.1	85.4	84.1	96.4	96.3	90.4	89.1	101.3	101.3
600	600	90	49	69.5	66.6	85.4	83.8	68.1	65.2	84.1	82.4	80.8	78.0	96.8	95.1	82.1	79.2	98.0	96.4
600	600	90	45	66.0	63.2	79.2	77.6	66.6	63.7	79.8	78.2	78.6	75.8	91.8	90.2	81.7	78.9	94.9	93.3
600	600	90	40	70.2	67.3	82.9	81.3	72.6	69.7	85.3	83.7	84.0	81.1	96.7	95.1	89.0	86.1	101.7	100.1

TABLE E-5D. TOTAL FUEL CONSUMPTION IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 6*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	35.7	38.4	43.6	47.6	34.0	36.8	41.9	45.9	41.3	44.0	49.2	53.2	42.2	44.9	50.1	54.1
300	300	50	25	33.9	36.6	39.1	43.0	34.1	36.8	39.3	43.2	40.7	43.4	45.9	49.9	43.5	46.2	48.7	52.6
300	300	50	22	32.9	35.7	37.6	41.6	35.0	37.8	39.7	43.7	41.0	43.7	45.7	49.6	45.6	48.4	50.3	54.3
300	300	60	33	37.0	38.2	44.6	47.0	35.4	36.5	42.9	45.3	41.8	42.9	49.4	51.7	42.7	43.8	50.2	52.6
300	300	60	30	36.3	37.4	41.1	43.5	36.5	37.6	41.3	43.7	42.2	43.4	47.1	49.5	45.0	46.1	49.8	52.2
300	300	60	27	36.3	37.4	40.6	43.0	38.4	39.5	42.7	45.1	43.4	44.5	47.8	50.1	48.1	49.2	52.4	54.8
300	300	70	38	38.1	37.7	47.5	48.3	36.5	36.0	45.8	46.6	42.0	41.5	51.3	52.1	42.9	42.4	52.2	53.0
300	300	70	35	36.8	36.3	43.4	44.2	37.0	36.5	43.6	44.4	41.9	41.4	48.5	49.3	44.7	44.2	51.3	52.0
300	300	70	31	36.2	35.8	42.3	43.1	38.3	37.9	44.4	45.2	42.5	42.1	48.7	49.4	47.2	46.7	53.3	54.1
300	450	50	25	45.8	49.8	58.0	63.3	45.3	49.3	57.5	62.8	52.8	56.8	65.0	70.3	54.8	58.8	67.0	72.3
300	450	50	22	43.8	47.8	53.3	58.6	45.2	49.2	54.7	60.0	52.0	56.0	61.4	66.7	55.9	59.9	65.4	70.7
300	450	50	20	43.4	47.4	52.4	57.7	46.7	50.7	55.7	60.9	52.8	56.8	61.8	67.0	58.6	62.6	67.6	72.8
300	450	60	30	47.5	49.9	59.4	63.0	47.0	49.4	58.9	62.5	53.5	56.0	65.4	69.1	55.6	58.0	67.5	71.2
300	450	60	27	46.4	48.8	55.5	59.2	47.7	50.2	56.9	60.6	53.6	56.1	62.8	66.5	57.6	60.0	66.7	70.4
300	450	60	24	46.7	49.2	55.4	59.1	50.0	52.4	58.7	62.4	55.2	57.7	63.9	67.6	61.1	63.5	69.7	73.4
300	450	70	35	48.7	49.6	62.4	64.5	48.2	49.1	61.9	64.0	53.9	54.8	67.6	69.7	56.0	56.8	69.6	71.7
300	450	70	31	47.1	47.9	58.0	60.1	48.5	49.3	59.4	61.5	53.5	54.4	64.4	66.5	57.4	58.3	68.4	70.5
300	450	70	28	46.8	47.7	57.2	59.3	50.1	50.9	60.5	62.6	54.4	55.3	64.9	67.0	60.3	61.1	70.7	72.8
300	600	60	27	58.8	61.5	75.3	79.3	59.4	62.1	76.0	79.9	67.0	69.7	83.6	87.5	70.2	72.9	86.8	90.7
300	600	60	24	54.6	57.3	68.4	72.4	57.2	59.9	71.0	74.9	64.1	66.8	77.9	81.9	69.2	71.9	83.0	87.0
300	600	60	21	56.6	59.3	70.0	73.9	61.1	63.8	74.4	78.3	67.3	70.0	80.6	84.6	74.3	77.0	87.6	91.6
300	600	70	31	59.8	60.9	76.1	78.4	60.5	61.6	76.7	79.1	67.2	68.3	83.4	85.8	70.4	71.6	86.7	89.0
300	600	70	28	56.5	57.6	70.0	72.4	59.1	60.2	72.5	74.9	65.1	66.2	78.6	81.0	70.2	71.3	83.7	86.1
300	600	70	24	59.2	60.3	72.2	74.6	63.6	64.7	76.6	79.0	69.0	70.1	82.0	84.4	76.0	77.1	89.0	91.4
300	600	80	36	60.5	60.0	78.5	79.3	61.2	60.7	79.2	80.0	67.0	66.6	85.0	85.8	70.3	69.8	88.2	89.0
300	600	80	32	56.6	56.1	71.9	72.6	59.1	58.7	74.4	75.2	64.3	63.9	79.6	80.4	69.4	69.0	84.7	85.5
300	600	80	28	58.6	58.2	73.4	74.2	63.1	62.6	77.8	78.6	67.6	67.1	82.3	83.1	74.6	74.1	89.3	90.1
450	300	50	30	42.7	45.4	51.6	55.6	42.4	45.1	51.4	55.3	52.2	54.9	61.2	65.1	54.5	57.2	63.5	67.4
450	300	50	27	39.6	42.3	45.8	49.8	41.3	44.0	47.5	51.4	50.4	53.1	56.6	60.6	54.6	57.3	60.8	64.7
450	300	50	25	40.4	43.1	46.1	50.1	43.9	46.6	49.6	53.6	52.4	55.1	58.1	62.1	58.4	61.1	64.1	68.1
450	300	60	36	44.9	46.0	53.5	55.8	44.6	45.7	53.2	55.6	53.6	54.7	62.2	64.5	55.8	57.0	64.4	66.8
450	300	60	33	42.8	43.9	48.7	51.1	44.4	45.6	50.3	52.7	52.7	53.9	58.6	61.0	56.9	58.0	62.8	65.2
450	300	60	30	44.6	45.8	50.0	52.4	48.1	49.3	53.5	55.9	55.8	56.9	61.1	63.5	61.8	62.9	67.2	69.6
450	300	70	42	45.8	45.4	56.2	57.0	45.6	45.1	56.0	56.7	53.7	53.2	64.0	64.8	56.0	55.5	66.3	67.1
450	300	70	38	43.6	43.1	51.2	52.0	45.2	44.8	52.9	53.6	52.6	52.2	60.3	61.1	56.8	56.3	64.5	65.2
450	300	70	35	44.8	44.4	52.0	52.8	48.3	47.9	55.5	56.3	55.1	54.6	62.2	63.0	61.1	60.7	68.3	69.1
450	450	60	33	53.8	57.8	67.1	72.4	54.7	58.7	68.0	73.3	64.7	68.7	78.0	83.2	68.1	72.2	81.4	86.7
450	450	60	30	50.7	54.7	61.2	66.5	53.5	57.5	64.0	69.3	62.8	66.8	73.3	78.6	68.1	72.1	78.6	83.9
450	450	60	27	52.2	56.2	62.2	67.5	56.8	60.9	66.9	72.2	65.5	69.5	75.5	80.8	72.7	76.7	82.7	88.0
450	450	70	38	55.6	58.0	68.5	72.2	56.5	58.9	69.4	73.1	65.6	68.0	78.5	82.2	69.1	71.5	82.0	85.7
450	450	70	35	53.4	55.8	63.6	67.3	56.2	58.6	66.4	70.1	64.6	67.1	74.8	78.5	70.0	72.4	80.2	83.8
450	450	70	31	55.9	58.3	65.6	69.3	60.5	63.0	70.2	73.9	68.3	70.7	78.0	81.7	75.5	78.0	85.2	88.9
450	450	80	44	56.0	56.8	70.7	72.8	56.9	57.7	71.6	73.7	65.1	66.0	79.8	81.9	68.6	69.4	83.3	85.4
450	450	80	40	53.5	54.4	65.5	67.6	56.3	57.2	68.3	70.4	63.9	64.7	75.9	78.0	69.2	70.1	81.2	83.3
450	450	80	36	55.5	56.3	66.9	69.0	60.2	61.0	71.6	73.7	67.1	67.9	78.5	80.6	74.3	75.1	85.7	87.8
450	600	70	35	71.0	73.7	88.6	92.5	73.0	75.8	90.6	94.6	83.2	85.9	100.8	104.7	87.8	90.5	105.4	109.4
450	600	70	31	65.8	68.5	80.6	84.6	69.7	72.4	84.6	88.6	79.2	81.9	94.1	98.0	85.7	88.4	100.6	104.5
450	600	70	28	69.7	72.4	84.1	88.0	75.6	78.3	89.9	93.9	84.4	87.1	98.7	102.7	92.7	95.4	107.1	111.1
450	600	80	40	72.1	73.3	89.4	91.8	74.2	75.3	91.5	93.8	83.5	84.6	100.7	103.1	88.1	89.2	105.4	107.7
450	600	80	36	67.9	69.0	82.4	84.8	71.9	73.0	86.4	88.8	80.5	81.6	95.0	97.4	87.0	88.1	101.5	103.9
450	600	80	32	72.8	73.9	86.8	89.2	78.6	79.7	92.6	95.0	86.5	87.6	100.6	102.9	94.9	96.0	108.9	111.3
450	600	90	45	72.3	71.8	91.3	92.1	74.3	73.8	93.3	94.1	82.7	82.2	101.7	102.5	87.3	86.9	106.4	107.1
450	600	90	40	67.6	67.2	83.9	84.7	71.6	71.1	87.9	88.7	79.3	78.9	95.6	96.4	85.8	85.4	102.1	102.9
450	600	90	36	71.8	71.4	87.6	88.4	77.7	77.2	93.5	94.2	84.7	84.3	100.5	101.3	93.1	92.6	108.9	109.7
600	300	60	39	51.3	54.0	61.3	65.3	49.7	52.4	59.6	63.6	64.8	67.5	74.8	78.8	65.7	68.4	75.7	79.6
600	300	60	36	47.3	50.0	54.5	58.5	47.5	50.2	54.7	58.7	62.0	64.7	69.2	73.2	64.7	67.5	72.0	75.9
600	300	60	33	50.2	52.9	56.9	60.9	52.3	55.0	59.0	63.0	66.1	68.8	72.9	76.8	70.8	73.5	77.5	81.5
600	300	70	45	51.5	52.6	61.2	63.5	49.8	51.0	59.5	61.9	64.2	65.3	73.8	76.2	65.0	66.2	74.7	77.1
600	300	70	42	48.5	49.6	55.4	57.8	48.7	49.8	55.6	58.0	62.3	63.4	69.2	71.6	65.1	66.2	72.0	74.4
600	300	70	38	52.7	53.8	59.1	61.5	54.8	55.9	61.2	63.6	67.7	68.9	74.2	76.5	72.4	73.5	78.8	81.2
600	300	80	52	53.0	52.6	64.5	65.2	51.4	50.9	62.8	63.6	64.8	64.3	76.2	77.0	65.7	65.2	77.1	77.9
600	300	80	48	50.1	49.6	58.8	59.6	50.3	49.8	59.0	59.8	63.1	62.6	71.8	72.5	65.9	65.4	74.5	75.3
600	300	80	44	53.9	53.4	62.1	62.9	56.0	55.5	64.2	65.0	68.1	67.6	76.3	77.1	72.8	72.3	80.9	81.7
600	450	70	42	66.5	70.5	80.8	86.1	66.0	70.0	80.3	85.6	81.3	85.4	95.6	100.9	83.4	87.4	97.7	103.0
600	450	70	38	62.7	66.7	74.2	79.5	64.0	68.1	75.6	80.9	78.7	82.7	90.3	95.6	82.6	86.7	94.2	99.5
600	450	70	35	66.2	70.2	77.2	82.5	69.4	73.5	80.5	85.8	83.4	87.4	94.5	99.8	89.2	93.3	100.3	105.6
600	450	80	48	66.0	68.5	80.0	83.7	65.5	68.0	79.5	83.2	80.0	82.4	94.0	97.7	82.0	84.5	96.0	99.7
600	450	80	44	63.3	65.7	74.5	78.2	64.7	67.1	75.9	79.6	78.5	80.9	89.7	93.4	82.4	84.8	93.6	97.3
600	450	80	40	68.0	70.5	78.8	82.5	71.3	73.7	82.1	85.7	84.4	86.9	95.2	98.9	90.3	92.7	101.0	104.7
600	450	90	54	67.5	68.3	83.2	85.3	67.0	67.8	82.7	84.8	80.6	81.4	96.3	98.4	82.6	83.5	98.4	100.5
600	450	90	49	64.8	65.6	77.8	79.9	66.1	67.0	79.1	81.2	79.1	79.9	92.1	94.2	83.0	83.8	96.0	98.1
600	450	90	45	69.0	69.8	81.5	83.6	72.3	73.1	84.8	86.9	84.5	85.4	97.0	99.1	90.3	91.2	102.8	104.9
600	600	70	38	86.2	88.9	104.8	108.8	86.9	89.6	105.5	109.5	102.4	105.1	121.0	124.9	105.6	108.3	124.2	128.2
600	600	70	35	79.7	82.4	95.6	99.5	82.2	84.9	98.1	102.1	97.0	99.7	112.9	116.9	102.1	104.8	118.0	122.0
600	600	70	31	85.6	88.3	101.0	105.0	90.0	92.8	105.4	109.4	104.2	106.9	119.6	123.6	111.2	113.9	126.6	130.5
600	600	80	44	86.1	87.2	104.4	106.7	86.7	87.9	105.0	107.4	101.4	102.5	119.7	122.0	104.6	105.7	122.9	125.2
600	600	80	40	80.8	81.9	96.4	98.7	83.3	84.5	98.9	101.3	97.3	98.4	112.9	115.2	102.4	103.5	118.0	120.3
600	600	80	36	87.7	88.8	102.8	105.2	92.1	93.3	107.2	109.6	105.4	106.5	120.5	122.9	112.4	113.5	127.5	129.9
600	600	90	49	88.3	87.8	108.4	109.1	89.0	88.5	109.0	109.8	102.7	102.2	122.8	123.6	105.9	105.5	126.0	126.8
600	600	90	45	82.5	82.0	99.8	100.6	85.0	84.6	102.4	103.2	98.1	97.7	115.4	116.2	103.2	102.8	120.5	121.3
600	600	90	40	89.0	88.5	105.9	106.6	93.5	93.0	110.3	111.1	105.9	105.4	122.7	123.5	112.8	112.4	129.7	130.5

TABLE E-5E. TOTAL FUEL CONSUMPTION IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*4

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET															
				LOW LEVEL								HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	37.7	39.2	45.6	48.4	36.6	38.1	44.5	47.3	42.5	44.0	50.4	53.2	44.0	45.5	51.9	54.6
300	300	50	25	37.2	38.7	42.3	45.1	37.9	39.4	43.1	45.9	43.2	44.7	48.4	51.1	46.5	48.0	51.7	54.4
300	300	50	22	36.0	37.5	40.7	43.4	38.7	40.2	43.3	46.1	43.2	44.8	47.9	50.7	48.4	50.0	53.1	55.9
300	300	60	33	38.9	38.9	46.5	47.7	37.8	37.7	45.4	46.6	42.9	42.8	50.5	51.6	44.3	44.2	51.9	53.1
300	300	60	30	39.5	39.4	44.3	45.5	40.2	40.1	45.1	46.2	44.6	44.5	49.5	50.6	47.9	47.8	52.8	53.9
300	300	60	27	39.2	39.1	43.6	44.7	41.9	41.8	46.2	47.4	45.6	45.5	49.9	51.1	50.8	50.7	55.1	56.3
300	300	70	38	40.1	38.5	49.5	49.0	39.0	37.3	48.3	47.9	43.2	41.5	52.5	52.1	44.6	43.0	54.0	53.6
300	300	70	35	40.1	38.4	46.7	46.2	40.8	39.2	47.4	47.0	44.3	42.7	50.9	50.5	47.7	46.0	54.3	53.8
300	300	70	31	39.3	37.6	45.4	45.0	42.0	40.3	48.1	47.6	44.8	43.1	50.9	50.5	50.0	48.3	56.1	55.7
300	450	50	25	45.9	48.7	58.1	62.2	46.0	48.8	58.2	62.3	52.0	54.9	64.3	68.3	54.6	57.5	66.9	70.9
300	450	50	22	45.2	48.0	54.7	58.7	47.1	49.9	56.6	60.7	52.5	55.3	62.0	66.1	57.0	59.8	66.5	70.6
300	450	50	20	44.5	47.4	53.5	57.6	48.4	51.2	57.4	61.4	53.1	55.9	62.1	66.2	59.5	62.3	68.5	72.6
300	450	60	30	47.5	48.7	59.4	61.8	47.5	48.7	59.4	61.9	52.7	54.0	64.6	67.1	55.3	56.6	67.2	69.7
300	450	60	27	47.6	48.9	56.8	59.3	49.6	50.8	58.7	61.2	54.1	55.3	63.3	65.8	58.6	59.8	67.8	70.2
300	450	60	24	47.8	49.0	56.5	59.0	51.6	52.9	60.3	62.8	55.5	56.7	64.2	66.7	61.9	63.1	70.5	73.0
300	450	70	35	48.8	48.5	62.5	63.4	48.9	48.5	62.5	63.4	53.2	52.8	66.9	67.8	55.8	55.4	69.5	70.4
300	450	70	31	48.5	48.1	59.4	60.3	50.4	50.0	61.3	62.2	54.1	53.7	65.0	65.9	58.6	58.2	69.5	70.4
300	450	70	28	48.0	47.6	58.4	59.3	51.8	51.4	62.2	63.1	54.8	54.4	65.2	66.1	61.2	60.8	71.6	72.5
300	600	60	27	56.9	58.5	73.5	76.3	58.2	59.7	74.7	77.5	64.4	65.9	81.0	83.7	68.2	69.7	84.7	87.5
300	600	60	24	54.1	55.6	67.9	70.6	57.2	58.7	71.0	73.7	62.7	64.2	76.6	79.3	68.4	69.9	82.2	85.0
300	600	60	21	55.9	57.4	69.2	72.0	60.9	62.4	74.2	76.9	65.8	67.3	79.1	81.8	73.3	74.8	86.6	89.4
300	600	70	31	57.9	57.8	74.1	75.3	59.1	59.1	75.4	76.5	64.5	64.4	80.7	81.9	68.3	68.2	84.5	85.7
300	600	70	28	55.9	55.8	69.4	70.5	59.0	58.9	72.5	73.6	63.7	63.6	77.2	78.3	69.3	69.2	82.8	84.0
300	600	70	24	58.3	58.3	71.3	72.5	63.3	63.2	76.3	77.5	67.4	67.3	80.4	81.5	74.9	74.8	87.9	89.1
300	600	80	36	58.7	57.0	76.7	76.3	59.9	58.2	77.9	77.5	64.4	62.7	82.4	82.0	68.2	66.5	86.2	85.8
300	600	80	32	56.1	54.4	71.3	70.9	59.2	57.5	74.4	74.0	63.0	61.3	78.2	77.8	68.6	67.0	83.9	83.5
300	600	80	28	57.9	56.2	72.6	72.2	62.9	61.2	77.6	77.2	66.0	64.3	80.8	80.4	73.6	71.9	88.3	87.9
450	300	50	30	43.6	45.2	52.6	55.3	43.9	45.4	52.9	55.6	52.4	53.9	61.3	64.1	55.2	56.7	64.2	66.9
450	300	50	27	41.9	43.4	48.1	50.8	44.0	45.5	50.2	53.0	51.8	53.3	58.0	60.8	56.6	58.1	62.8	65.5
450	300	50	25	42.4	43.9	48.1	50.9	46.5	48.0	52.2	54.9	53.6	55.1	59.3	62.1	60.2	61.7	65.9	68.7
450	300	60	36	45.7	45.7	54.3	55.5	46.0	45.9	54.6	55.8	53.6	53.5	62.2	63.4	56.5	56.4	65.1	66.2
450	300	60	33	45.0	44.9	50.8	52.0	47.1	47.1	53.0	54.2	54.1	54.0	59.9	61.1	58.8	58.7	64.7	65.8
450	300	60	30	46.6	46.5	52.0	53.1	50.6	50.6	56.0	57.2	56.9	56.8	62.3	63.5	63.5	63.4	68.9	70.1
450	300	70	42	46.8	45.1	57.2	56.8	47.1	45.4	57.5	57.0	53.8	52.2	64.2	63.8	56.7	55.0	67.0	66.6
450	300	70	38	45.8	44.2	53.5	53.1	48.0	46.3	55.6	55.2	54.1	52.4	61.7	61.3	58.8	57.1	66.4	66.0
450	300	70	35	46.9	45.2	54.0	53.6	50.9	49.2	58.1	57.6	56.3	54.6	63.5	63.0	62.9	61.3	70.1	69.6
450	450	60	33	52.9	55.7	66.1	70.2	54.3	57.1	67.6	71.7	62.9	65.8	76.2	80.3	67.0	69.8	80.2	84.3
450	450	60	30	51.0	53.8	61.5	65.6	54.3	57.2	64.9	69.0	62.3	65.1	72.8	76.9	68.2	71.0	78.7	82.8
450	450	60	27	52.3	55.1	62.3	66.4	57.5	60.3	67.5	71.6	64.8	67.6	74.8	78.9	72.6	75.4	82.6	86.7
450	450	70	38	54.6	55.8	67.5	70.0	56.0	57.3	69.0	71.4	63.8	65.0	76.7	79.2	67.8	69.0	80.7	83.2
450	450	70	35	53.6	54.9	63.8	66.3	57.0	58.2	67.2	69.7	64.1	65.3	74.3	76.7	69.9	71.2	80.1	82.6
450	450	70	31	55.9	57.1	65.6	68.1	61.1	62.3	70.8	73.3	67.5	68.8	77.2	79.7	75.3	76.5	85.0	87.5
450	450	80	44	55.1	54.7	69.8	70.6	56.5	56.1	71.2	72.1	63.4	63.0	78.1	79.0	67.4	67.0	82.1	83.0
450	450	80	40	53.9	53.5	65.8	66.7	57.2	56.9	69.2	70.1	63.4	63.1	75.4	76.3	69.3	69.0	81.3	82.2
450	450	80	36	55.6	55.2	67.1	68.0	60.8	60.5	72.3	73.2	66.4	66.0	77.8	78.7	74.2	73.8	85.6	86.5
450	600	70	35	68.1	69.6	85.7	88.5	70.8	72.3	88.3	91.1	79.5	81.0	97.1	99.9	84.7	86.2	102.3	105.1
450	600	70	31	64.2	65.7	79.1	81.8	68.7	70.2	83.6	86.3	76.8	78.3	91.7	94.4	83.9	85.4	98.7	101.5
450	600	70	28	67.9	69.4	82.3	85.1	74.3	75.8	88.7	91.4	81.8	83.3	96.1	98.9	90.7	92.2	105.1	107.8
450	600	80	40	69.2	69.1	86.5	87.6	71.8	71.7	89.1	90.3	79.7	79.7	97.0	98.2	84.9	84.8	102.2	103.3
450	600	80	36	66.3	66.2	80.8	82.0	70.8	70.7	85.3	86.5	78.0	77.9	92.5	93.7	85.1	85.0	99.6	100.8
450	600	80	32	70.9	70.8	84.9	86.1	77.3	77.2	91.3	92.5	83.9	83.8	97.9	99.1	92.8	92.7	106.8	108.0
450	600	90	45	69.4	67.7	88.4	88.0	72.0	70.3	91.0	90.6	79.1	77.4	99.1	97.7	84.2	82.6	103.3	102.8
450	600	90	40	66.1	64.4	82.4	81.9	70.6	68.9	86.9	86.4	76.9	75.3	93.2	92.8	84.0	82.3	100.3	99.9
450	600	90	36	70.1	68.4	85.8	85.4	76.4	74.8	92.2	91.8	82.1	80.5	97.9	97.5	91.1	89.4	106.9	106.5
600	300	60	39	51.3	52.8	61.2	64.0	50.1	51.6	60.1	62.9	64.0	65.5	73.9	76.7	65.4	66.9	75.4	78.1
600	300	60	36	48.5	50.0	55.7	58.5	49.2	50.7	56.5	59.2	62.4	63.9	69.6	72.4	65.7	67.2	72.9	75.7
600	300	60	33	51.2	52.7	57.9	60.7	53.8	55.3	60.6	63.3	66.3	67.8	73.0	75.8	71.5	73.0	78.2	81.0
600	300	70	45	51.4	51.3	61.0	62.2	50.2	50.2	59.9	61.1	63.2	63.1	72.8	74.0	64.6	64.5	74.3	75.4
600	300	70	42	49.6	49.5	56.5	57.7	50.3	50.3	57.3	58.4	62.6	62.5	69.5	70.7	65.9	65.9	72.9	74.0
600	300	70	38	53.6	53.5	60.0	61.2	56.2	56.2	62.7	63.8	67.9	67.8	74.3	75.4	73.1	73.0	79.5	80.6
600	300	80	52	53.0	51.3	64.4	64.0	51.9	50.2	63.3	62.8	63.9	62.3	75.4	74.9	65.4	63.7	76.8	76.4
600	300	80	48	51.3	49.6	60.0	59.6	52.1	50.4	60.7	60.3	63.5	61.8	72.2	71.7	66.8	65.1	75.5	75.1
600	300	80	44	54.9	53.2	63.1	62.7	57.6	55.9	65.7	65.3	68.3	66.6	76.5	76.1	73.5	71.8	81.7	81.3
600	450	70	42	64.5	67.4	78.8	82.9	64.6	67.4	78.9	83.0	78.6	81.4	92.9	96.9	81.2	84.0	95.5	99.5
600	450	70	38	62.0	64.8	73.5	77.6	63.9	66.7	75.5	79.5	77.2	80.0	88.8	92.8	81.7	84.5	93.3	97.3
600	450	70	35	65.3	68.1	76.3	80.4	69.1	71.9	80.1	84.2	81.7	84.5	92.8	96.9	88.1	90.9	99.2	103.2
600	450	80	48	64.0	65.2	77.9	80.4	64.0	65.3	78.0	80.5	77.1	78.4	91.1	93.6	79.7	81.0	93.7	96.2
600	450	80	44	62.5	63.7	73.7	76.2	64.4	65.7	75.7	78.1	76.9	78.1	88.1	90.6	81.4	82.6	92.6	95.1
600	450	80	40	67.0	68.3	77.8	80.3	70.9	72.1	81.6	84.1	82.6	83.9	93.4	95.9	89.0	90.2	99.7	102.2
600	450	90	54	65.5	65.2	81.2	82.1	65.6	65.2	81.3	82.2	77.8	77.4	93.5	94.4	80.4	80.0	96.1	97.0
600	450	90	49	64.1	63.7	77.1	78.0	66.0	65.6	79.0	79.9	77.6	77.2	90.6	91.5	82.0	81.7	95.0	95.9
600	450	90	45	68.1	67.7	80.6	81.5	71.9	71.5	84.4	85.3	82.8	82.4	95.3	96.2	89.2	88.8	101.7	102.6
600	600	70	38	82.3	83.8	101.0	103.7	83.5	85.1	102.2	104.9	97.7	99.2	116.3	119.1	101.4	102.9	120.1	122.8
600	600	70	35	77.1	78.6	93.0	95.7	80.2	81.7	96.1	98.8	93.6	95.1	109.5	112.3	99.3	100.8	115.2	117.9
600	600	70	31	82.8	84.3	98.2	101.0	87.8	89.3	103.2	105.9	100.6	102.1	116.0	118.7	108.1	109.6	123.5	126.3
600	600	80	44	82.1	82.0	100.4	101.6	83.3	83.2	101.6	102.8	96.6	96.5	114.9	116.1	100.4	100.3	118.7	119.8
600	600	80	40	78.1	78.0	93.7	94.8	81.2	81.1	96.8	97.9	93.8	93.7	109.4	110.5	99.5	99.4	115.0	116.2
600	600	80	36	84.8	84.7	99.9	101.1	89.8	89.7	104.9	106.0	101.7	101.6	116.8	118.0	109.3	109.2	124.3	125.5
600	600	90	49	84.4	82.8	104.5	104.1	85.6	84.0	105.7	105.3	98.0	96.4	118.1	117.7	101.8	100.1	121.9	121.4
600	600	90	45	79.9	78.2	97.2	96.8	83.0	81.3	100.3	99.9	94.7	93.0	112.0	111.6	100.4	98.7	117.7	117.3
600	600	90	40	86.2	84.5	103.0	102.6	91.2	89.5	108.0	107.6	102.3	100.6	119.1	118.7	109.8	108.1	126.6	126.2

TABLE E-5F. TOTAL FUEL CONSUMPTION IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*5

ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	40.1	40.4	48.0	49.6	35.5	35.8	43.4	45.0	44.1	44.4	52.0	53.6	42.1	42.4	50.0	51.5
300	300	50	25	39.8	40.1	45.0	46.5	37.0	37.3	42.2	43.8	45.0	45.3	50.2	51.7	44.8	45.1	50.0	51.5
300	300	50	22	37.4	37.7	42.0	43.6	36.5	36.8	41.2	42.7	43.8	44.1	48.5	50.0	45.5	45.8	50.2	51.7
300	300	60	33	43.3	42.0	50.9	50.9	38.7	37.4	46.3	46.2	46.5	45.2	54.0	54.0	44.4	43.1	51.9	51.9
300	300	60	30	44.0	42.8	48.9	48.8	41.3	40.0	46.1	46.1	48.4	47.1	53.2	53.2	48.2	46.9	53.0	53.0
300	300	60	27	42.5	41.2	46.9	46.8	41.7	40.4	46.0	46.0	48.1	46.8	52.4	52.4	49.8	48.5	54.1	54.1
300	300	70	38	42.6	39.7	51.9	50.3	37.9	35.0	47.3	45.6	44.8	42.0	54.2	52.5	42.7	39.9	52.1	50.5
300	300	70	35	42.7	39.8	49.3	47.7	39.9	37.1	46.5	44.9	46.2	43.3	52.8	51.2	46.0	43.1	52.6	50.9
300	300	70	31	40.7	37.8	46.8	45.1	39.8	36.9	45.9	44.3	45.4	42.5	51.5	49.8	47.0	44.2	53.1	51.5
300	450	50	25	47.8	49.4	60.0	62.9	44.3	45.9	56.5	59.4	53.1	54.7	65.4	68.2	52.2	53.8	64.4	67.3
300	450	50	22	47.3	48.9	56.7	59.6	45.7	47.3	55.2	58.0	53.8	55.4	63.3	66.2	54.8	56.4	64.3	67.1
300	450	50	20	45.4	47.0	54.4	57.2	45.7	47.3	54.7	57.5	53.1	54.7	62.1	65.0	56.0	57.6	65.0	67.8
300	450	60	30	51.3	51.3	63.2	64.5	47.8	47.8	59.7	61.0	55.8	55.8	67.7	68.9	54.8	54.9	66.7	68.0
300	450	60	27	51.7	51.7	60.8	62.1	50.1	50.1	59.2	60.5	57.3	57.4	66.5	67.8	58.3	58.3	67.5	68.8
300	450	60	24	50.6	50.6	59.3	60.5	50.9	50.9	59.5	60.8	57.5	57.5	66.1	67.4	60.3	60.4	69.0	70.3
300	450	70	35	50.7	49.1	64.4	64.0	47.2	45.7	60.9	60.6	54.3	52.7	67.9	67.6	53.4	51.8	67.0	66.7
300	450	70	31	50.5	49.0	61.5	61.2	49.0	47.4	59.9	59.6	55.4	53.8	66.3	66.0	56.3	54.8	67.2	66.9
300	450	70	28	48.8	47.2	59.2	58.9	49.1	47.5	59.5	59.2	54.8	53.2	65.2	64.9	57.7	56.1	68.1	67.8
300	600	60	27	58.3	58.6	74.8	76.4	56.0	56.3	72.5	74.1	64.9	65.2	81.5	83.1	65.2	65.5	81.7	83.3
300	600	60	24	55.6	55.9	69.4	71.0	55.2	55.5	69.0	70.6	63.5	63.8	77.3	78.9	65.6	65.9	79.4	81.0
300	600	60	21	56.2	56.5	69.5	71.0	57.6	57.9	70.9	72.5	65.2	65.5	78.6	80.1	69.2	69.6	82.6	84.1
300	600	70	31	61.2	59.9	77.4	77.4	58.9	57.6	75.1	75.1	67.0	65.7	83.2	83.2	67.2	66.0	83.5	83.4
300	600	70	28	59.4	58.1	72.9	72.8	58.9	57.7	72.4	72.4	66.4	65.1	79.9	79.8	68.5	67.2	82.0	82.0
300	600	70	24	60.6	59.3	73.6	73.5	62.0	60.7	75.0	75.0	68.8	67.5	81.8	81.8	72.8	71.5	85.8	85.8
300	600	80	36	60.0	57.2	78.0	76.4	57.7	54.9	75.7	74.1	65.0	62.1	82.9	81.3	65.2	62.3	83.2	81.6
300	600	80	32	57.6	54.7	72.9	71.2	57.2	54.3	72.4	70.8	63.7	60.9	79.0	77.4	65.9	63.0	81.1	79.5
300	600	80	28	58.1	55.3	72.9	71.3	59.6	56.7	74.4	72.7	65.5	62.6	80.3	78.6	69.5	66.6	84.3	82.6
450	300	50	30	45.0	45.3	54.0	55.5	41.8	42.1	50.7	52.3	53.0	53.3	61.9	63.5	52.3	52.6	61.2	62.8
450	300	50	27	43.5	43.8	49.7	51.2	42.1	42.4	48.3	49.9	52.6	52.9	58.8	60.4	53.8	54.1	60.0	61.6
450	300	50	25	42.7	43.1	48.5	50.0	43.3	43.6	49.0	50.5	53.1	53.4	58.8	60.4	56.2	56.5	61.9	63.5
450	300	60	36	49.1	47.8	57.7	57.7	45.8	44.6	54.5	54.4	56.2	54.9	64.8	64.7	55.5	54.2	64.1	64.1
450	300	60	33	48.5	47.2	54.4	54.4	47.2	45.9	53.0	53.0	56.8	55.5	62.7	62.7	58.0	56.7	63.9	63.9
450	300	60	30	48.9	47.6	54.2	54.2	49.4	48.1	54.8	54.7	58.4	57.1	63.8	63.7	61.5	60.2	66.8	66.8
450	300	70	42	48.2	45.3	58.6	57.0	45.0	42.1	55.3	53.7	54.4	51.5	64.8	63.2	53.7	50.9	64.1	62.5
450	300	70	38	47.4	44.6	55.1	53.5	46.1	43.2	53.7	52.1	54.9	52.0	62.5	60.9	56.1	53.2	63.7	62.1
450	300	70	35	47.2	44.3	54.3	52.7	47.7	44.9	54.9	53.2	55.8	53.0	63.0	61.4	58.9	56.1	66.1	64.4
450	450	60	33	53.7	55.3	67.0	69.9	51.7	53.3	64.9	67.8	63.0	64.6	76.3	79.1	63.5	65.1	76.7	79.6
450	450	60	30	52.1	53.7	62.6	65.5	51.9	53.5	62.4	65.3	62.6	64.2	73.1	76.0	64.9	66.5	75.5	78.3
450	450	60	27	52.1	53.7	62.1	65.0	53.8	55.4	63.8	66.7	63.8	65.4	73.8	76.7	68.0	69.7	78.1	80.9
450	450	70	38	57.4	57.4	70.3	71.6	55.3	55.3	68.2	69.5	65.8	65.8	78.7	80.0	66.3	66.3	79.2	80.5
450	450	70	35	56.6	56.7	66.8	68.1	56.5	56.5	66.7	67.9	66.3	66.3	76.5	77.7	68.6	68.7	78.8	80.1
450	450	70	31	57.6	57.7	67.3	68.6	59.3	59.4	69.0	70.3	68.5	68.5	78.2	79.5	72.7	72.7	82.4	83.7
450	450	80	44	55.9	54.3	70.6	70.3	53.8	52.3	68.5	68.2	63.5	61.9	78.1	77.8	63.9	62.4	78.6	78.3
450	450	80	40	54.9	53.4	66.9	66.6	54.7	53.2	66.7	66.4	63.7	62.1	75.6	75.3	66.1	64.5	78.0	77.7
450	450	80	36	55.4	53.8	66.9	66.6	57.1	55.5	68.6	68.3	65.4	63.8	76.8	76.5	69.6	68.1	81.1	80.8
450	600	70	35	68.4	68.7	86.0	87.6	67.5	67.8	85.1	86.7	79.0	79.3	96.6	98.2	80.7	81.0	98.3	99.8
450	600	70	31	64.7	65.0	79.6	81.1	65.7	66.0	80.6	82.1	76.5	76.8	91.4	93.0	80.1	80.4	94.9	96.5
450	600	70	28	67.2	67.5	81.5	83.1	70.0	70.4	84.4	86.0	80.2	80.5	94.6	96.1	85.6	85.9	100.0	101.5
450	600	80	40	71.5	70.2	88.7	88.7	70.6	69.3	87.8	87.8	81.2	79.9	98.5	98.4	82.8	81.6	100.1	100.1
450	600	80	36	68.7	67.4	83.3	83.2	69.7	68.4	84.2	84.2	79.7	78.4	94.2	94.2	83.2	81.9	97.7	97.7
450	600	80	32	72.1	70.8	86.1	86.1	75.0	73.7	89.0	89.0	84.3	83.0	98.3	98.3	89.7	88.4	103.7	103.7
450	600	90	45	69.7	66.8	88.7	87.1	68.8	65.9	87.8	86.2	78.6	75.7	97.6	96.0	80.2	77.3	99.2	97.6
450	600	90	40	66.6	63.7	82.9	81.2	67.6	64.7	83.8	82.2	76.7	73.8	92.9	91.3	80.2	77.3	96.5	94.9
450	600	90	36	69.3	66.4	85.1	83.5	72.2	69.3	88.0	86.3	80.6	77.7	96.4	94.8	86.0	83.1	101.8	100.2
600	300	60	39	51.6	51.9	61.6	63.2	47.0	47.3	57.0	58.5	63.5	63.8	73.5	75.1	61.4	61.7	71.4	73.0
600	300	60	36	49.0	49.3	56.3	57.8	46.3	46.6	53.5	55.1	62.1	62.5	69.4	70.9	61.9	62.2	69.2	70.7
600	300	60	33	50.5	50.8	57.2	58.8	49.6	49.9	56.3	57.9	64.8	65.1	71.5	73.1	66.5	66.8	73.2	74.8
600	300	70	45	53.7	52.4	63.3	63.3	49.0	47.8	58.7	58.7	64.7	63.4	74.4	74.3	62.6	61.3	72.3	72.2
600	300	70	42	52.1	50.8	59.0	59.0	49.3	48.1	56.3	56.2	64.4	63.1	71.3	71.2	64.1	62.9	71.1	71.0
600	300	70	38	54.8	53.6	61.3	61.2	54.0	52.7	60.4	60.4	68.3	67.0	74.7	74.7	70.0	68.7	76.4	76.4
600	300	80	52	53.3	50.5	64.8	63.1	48.7	45.8	60.1	58.5	63.5	60.6	74.9	73.3	61.4	58.5	72.8	71.2
600	300	80	48	51.9	49.0	60.5	58.9	49.1	46.2	57.8	56.2	63.3	60.4	71.9	70.3	63.0	60.2	71.7	70.1
600	300	80	44	54.2	51.3	62.4	60.8	53.3	50.5	61.5	59.9	66.8	63.9	75.0	73.4	68.5	65.6	76.7	75.0
600	450	70	42	64.4	66.0	78.7	81.5	60.9	62.5	75.2	78.1	77.6	79.2	91.9	94.8	76.7	78.3	91.0	93.8
600	450	70	38	62.0	63.6	73.6	76.4	60.4	62.0	72.0	74.8	76.4	78.0	88.0	90.9	77.4	79.0	89.0	91.8
600	450	70	35	64.0	65.6	75.1	78.0	64.3	65.9	75.4	78.3	79.7	81.3	90.7	93.6	82.5	84.1	93.6	96.5
600	450	80	48	65.8	65.8	79.7	81.0	62.3	62.3	76.3	77.5	78.1	78.1	92.1	93.4	77.2	77.2	91.2	92.4
600	450	80	44	64.5	64.5	75.7	77.0	62.9	62.9	74.1	75.4	78.0	78.1	89.3	90.6	79.0	79.0	90.2	91.5
600	450	80	40	67.8	67.8	78.5	79.8	68.1	68.1	78.8	80.1	82.5	82.6	93.3	94.6	85.4	85.4	96.1	97.4
600	450	90	54	65.3	63.8	81.1	80.8	61.9	60.3	77.6	77.3	76.8	75.3	92.6	92.2	75.9	74.3	91.6	91.3
600	450	90	49	64.1	62.5	77.1	76.8	62.5	60.9	75.5	75.2	76.8	75.2	89.8	89.5	77.7	76.2	90.7	90.4
600	450	90	45	66.8	65.3	79.3	79.0	67.1	65.6	79.6	79.3	80.8	79.2	93.3	93.0	83.6	82.0	96.1	95.8
600	600	70	38	81.6	81.9	100.2	101.8	79.3	79.6	97.9	99.5	96.2	96.5	114.8	116.3	96.4	96.7	115.0	116.6
600	600	70	35	76.6	76.9	92.4	94.0	76.1	76.4	92.0	93.6	92.3	92.6	108.2	109.8	94.4	94.7	110.3	111.9
600	600	70	31	81.0	81.3	96.4	98.0	82.5	82.8	97.9	99.4	98.0	98.3	113.4	114.9	102.0	102.3	117.4	119.0
600	600	80	44	83.3	82.1	101.6	101.6	81.0	79.7	99.3	99.3	97.0	95.7	115.3	115.3	97.3	96.0	115.6	115.5
600	600	80	40	79.5	78.3	95.1	95.1	79.1	77.8	94.7	94.7	94.4	93.2	110.0	110.0	96.6	95.3	112.1	112.1
600	600	80	36	85.0	83.7	100.1	100.0	86.4	85.2	101.5	101.5	101.1	99.8	116.2	116.1	105.1	103.8	120.2	120.1
600	600	90	49	83.7	80.8	103.8	102.1	81.4	78.5	101.5	99.8	96.5	93.6	116.6	114.9	96.8	93.9	116.8	115.2
600	600	90	45	79.4	76.5	96.7	95.1	79.0	76.1	96.3	94.7	93.4	90.5	110.7	109.1	95.5	92.7	112.9	111.2
600	600	90	40	84.4	81.6	101.3	99.6	85.9	83.0	102.7	101.1	99.7	96.8	116.5	114.9	103.7	100.8	120.5	118.9

TABLE E-5G. TOTAL FUEL CONSUMPTION IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 6*6

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH		TRUCKS ON MAJOR STREET: LOW		TRUCKS ON MAJOR STREET: HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	43.4	46.1	50.5	54.5	40.7	43.5	47.9	51.8	50.4	53.1	57.5	61.5	50.3	53.1	57.5	61.4
300	300	50	25	42.5	45.2	46.9	50.8	41.7	44.4	46.1	50.1	50.8	53.5	55.1	59.1	52.5	55.3	56.9	60.9
300	300	50	22	40.6	43.3	44.5	48.5	41.7	44.5	45.6	49.6	50.1	52.8	54.0	57.9	53.8	56.5	57.7	61.6
300	300	60	33	44.7	45.8	51.5	53.9	42.1	43.2	48.9	51.2	50.9	52.0	57.7	60.1	50.8	51.9	57.6	60.0
300	300	60	30	44.9	46.0	48.9	51.3	44.1	45.2	48.2	50.5	52.3	53.4	56.3	58.7	54.1	55.2	58.1	60.5
300	300	60	27	43.9	45.1	47.5	49.9	45.1	46.2	48.6	51.0	52.5	53.7	56.1	58.5	56.2	57.3	59.8	62.1
300	300	70	38	45.8	45.3	54.4	55.1	43.2	42.7	51.7	52.5	51.1	50.7	59.7	60.4	51.0	50.6	59.6	60.4
300	300	70	35	45.4	44.9	51.2	52.0	44.6	44.2	50.4	51.2	51.9	51.4	57.7	58.5	53.7	53.2	59.5	60.3
300	300	70	31	43.9	43.4	49.2	50.0	45.0	44.6	50.4	51.1	51.7	51.2	57.0	57.8	55.3	54.9	60.6	61.4
300	450	50	25	53.6	57.6	65.0	70.3	52.1	56.1	63.5	68.8	61.9	66.0	73.4	78.7	63.0	67.0	74.5	79.7
300	450	50	22	52.5	56.5	61.2	66.5	52.9	56.9	61.6	66.9	62.1	66.1	70.8	76.0	65.0	69.0	73.7	79.0
300	450	50	20	51.1	55.2	59.3	64.6	53.4	57.5	61.6	66.9	61.9	66.0	70.1	75.4	66.8	70.8	75.0	80.3
300	450	60	30	55.2	57.6	66.3	70.0	53.7	56.2	64.8	68.5	62.7	65.1	73.8	77.5	63.8	66.2	74.9	78.6
300	450	60	27	55.0	57.5	63.4	67.1	55.4	57.9	63.8	67.5	63.7	66.2	72.1	75.8	66.7	69.1	75.1	78.8
300	450	60	24	54.5	56.9	62.4	66.1	56.8	59.2	64.7	68.4	64.4	66.9	72.3	76.0	69.3	71.7	77.1	80.8
300	450	70	35	56.5	57.3	69.3	71.4	55.0	55.8	67.9	70.0	63.1	63.9	76.0	78.1	64.2	65.0	77.0	79.1
300	450	70	31	55.8	56.6	65.9	68.0	56.2	57.0	66.3	68.4	63.6	64.5	73.8	75.8	66.6	67.4	76.7	78.8
300	450	70	28	54.6	55.4	64.2	66.3	56.8	57.7	66.5	68.6	63.6	64.5	73.3	75.4	68.5	69.3	78.1	80.2
300	600	60	27	66.6	69.3	82.3	86.3	66.3	69.0	82.0	86.0	76.3	79.0	92.0	96.0	78.5	81.2	94.3	98.2
300	600	60	24	63.4	66.1	76.4	80.3	64.9	67.6	78.0	81.9	74.3	77.0	87.3	91.3	78.4	81.1	91.4	95.4
300	600	60	21	64.5	67.2	77.0	81.0	67.9	70.6	80.4	84.4	76.6	79.3	89.1	93.1	82.6	85.3	95.1	99.1
300	600	70	31	67.7	68.8	83.1	85.5	67.3	68.5	82.8	85.2	76.5	77.6	91.9	94.3	78.7	79.8	94.1	96.5
300	600	70	28	65.3	66.4	77.9	80.3	66.8	67.9	79.5	81.9	75.3	76.4	88.0	90.4	79.4	80.5	92.1	94.5
300	600	70	24	67.0	68.1	79.2	81.6	70.5	71.6	82.7	85.0	78.3	79.4	90.5	92.8	84.3	85.4	96.5	98.8
300	600	80	36	68.3	67.9	85.5	86.3	68.0	67.6	85.2	86.0	76.3	75.8	93.5	94.3	78.5	78.1	95.7	96.5
300	600	80	32	65.3	64.9	79.8	80.6	66.9	66.4	81.4	82.2	74.5	74.0	89.0	89.8	78.6	78.2	93.1	93.9
300	600	80	28	66.5	66.0	80.4	81.2	69.9	69.4	83.9	84.7	76.8	76.4	90.8	91.6	82.8	82.4	96.8	97.6
450	300	50	30	54.1	56.8	62.2	66.2	52.8	55.5	61.0	64.9	65.1	67.8	73.2	77.2	66.4	69.1	74.5	78.5
450	300	50	27	51.9	54.7	57.4	61.3	52.6	55.3	58.0	62.0	64.1	66.9	69.6	73.5	67.3	70.1	72.8	76.7
450	300	50	25	51.8	54.5	56.7	60.7	54.3	57.0	59.2	63.2	65.2	67.9	70.1	74.1	70.3	73.0	75.2	79.2
450	300	60	36	56.3	57.4	64.1	66.4	55.0	56.1	62.8	65.2	66.4	67.5	74.2	76.6	67.7	68.8	75.5	77.9
450	300	60	33	55.1	56.3	60.2	62.6	55.8	56.9	60.9	63.2	66.5	67.6	71.6	73.9	69.7	70.8	74.8	77.1
450	300	60	30	56.0	57.2	60.6	63.0	58.6	59.7	63.2	65.5	68.6	69.7	73.2	75.6	73.7	74.8	78.3	80.6
450	300	70	42	57.2	56.8	66.8	67.6	56.0	55.5	65.6	66.4	66.5	66.0	76.1	76.9	67.8	67.3	77.4	78.2
450	300	70	38	55.9	55.4	62.8	63.5	56.6	56.1	63.4	64.2	66.4	65.9	73.2	74.0	69.6	69.1	76.4	77.2
450	300	70	35	56.2	55.8	62.6	63.4	58.8	58.3	65.1	65.9	67.9	67.4	74.3	75.1	73.0	72.5	79.3	80.1
450	450	60	33	65.3	69.3	77.8	83.0	65.2	69.2	77.7	83.0	77.6	81.6	90.1	95.3	80.1	84.1	92.5	97.8
450	450	60	30	63.1	67.1	72.8	78.1	64.9	68.9	74.6	79.9	76.6	80.6	86.3	91.6	81.0	85.0	90.7	96.0
450	450	60	27	63.6	67.7	72.9	78.2	67.3	71.4	76.6	81.9	78.4	82.4	87.6	92.9	84.6	88.6	93.9	99.1
450	450	70	38	67.1	69.5	79.2	82.9	67.0	69.4	79.1	82.8	78.5	80.9	90.7	94.3	81.0	83.4	93.1	96.8
450	450	70	35	65.8	68.2	75.2	78.9	67.6	70.0	77.0	80.7	78.4	80.9	87.9	91.5	82.8	85.2	92.2	95.9
450	450	70	31	67.3	69.8	76.2	79.9	71.0	73.5	79.9	83.6	81.2	83.6	90.1	93.8	87.4	89.9	96.4	100.0
450	450	80	44	67.5	68.3	81.4	83.5	67.4	68.2	81.3	83.4	78.0	78.9	91.9	94.0	80.5	81.4	94.4	96.5
450	450	80	40	65.9	66.8	77.1	79.2	67.7	68.6	78.9	81.0	77.7	78.6	88.9	91.0	82.1	82.9	93.3	95.4
450	450	80	36	67.0	67.8	77.6	79.7	70.6	71.5	81.3	83.4	80.0	80.8	90.6	92.7	86.2	87.0	96.9	99.0
450	600	70	35	82.5	85.2	99.3	103.3	83.6	86.3	100.4	104.4	96.2	98.9	113.0	116.9	99.8	102.5	116.6	120.6
450	600	70	31	78.2	81.0	92.3	96.3	81.2	83.9	95.3	99.2	93.1	95.8	107.2	111.1	98.6	101.3	112.7	116.7
450	600	70	28	81.3	84.0	94.8	98.8	86.1	88.8	99.7	103.7	97.3	100.0	110.9	114.9	104.7	107.4	118.3	122.3
450	600	80	40	83.7	84.8	100.2	102.5	84.8	85.9	101.2	103.6	96.5	97.6	112.9	115.3	100.1	101.2	116.6	118.9
450	600	80	36	80.4	81.5	94.1	96.5	83.4	84.5	97.1	99.5	94.4	95.5	108.1	110.5	99.9	101.0	113.6	116.0
450	600	80	32	84.3	85.4	97.5	99.9	89.2	90.3	102.4	104.8	99.5	100.6	112.7	115.1	106.9	108.0	120.2	122.5
450	600	90	45	83.8	83.3	102.0	102.8	84.9	84.4	103.1	103.9	95.7	95.2	113.9	114.7	99.3	98.9	117.6	118.3
450	600	90	40	80.1	79.6	95.6	96.4	83.1	82.6	98.6	99.4	93.2	92.7	108.7	109.5	98.7	98.3	114.2	115.0
450	600	90	36	83.4	82.9	98.4	99.2	88.2	87.8	103.2	104.0	97.7	97.2	112.7	113.5	105.1	104.6	120.1	120.9
600	300	60	39	66.4	69.1	75.6	79.6	63.8	66.5	73.0	76.9	81.4	84.1	90.5	94.5	81.3	84.0	90.5	94.4
600	300	60	36	63.3	66.0	69.7	73.7	62.5	65.2	69.0	72.9	79.4	82.1	85.9	89.9	81.2	83.9	87.7	91.6
600	300	60	33	65.3	68.0	71.2	75.2	66.4	69.1	72.4	76.3	82.6	85.4	88.6	92.6	86.3	89.0	92.3	96.2
600	300	70	45	66.6	67.7	75.5	77.9	64.0	65.1	72.8	75.2	80.7	81.8	89.5	91.9	80.6	81.7	89.5	91.8
600	300	70	42	64.5	65.6	70.6	73.0	63.7	64.9	69.9	72.2	79.8	80.9	85.9	88.3	81.6	82.7	87.7	90.1
600	300	70	38	67.8	68.9	73.4	75.8	68.9	70.0	74.5	76.9	84.3	85.4	89.9	92.3	88.0	89.1	93.6	96.0
600	300	80	52	68.2	67.7	78.8	79.6	65.5	65.0	76.1	76.9	81.4	80.9	92.0	92.8	81.3	80.8	91.9	92.7
600	300	80	48	66.1	65.7	74.0	74.8	65.4	64.9	73.3	74.0	80.5	80.1	88.4	89.2	82.3	81.9	90.2	91.0
600	300	80	44	69.0	68.5	76.4	77.2	70.1	69.7	77.5	78.3	84.7	84.2	92.0	92.8	88.3	87.9	95.7	96.5
600	450	70	42	81.7	85.7	95.2	100.5	80.2	84.2	93.7	99.0	98.0	102.0	111.5	116.8	99.0	103.1	112.5	117.8
600	450	70	38	78.8	82.8	89.5	94.8	79.2	83.2	89.9	95.2	96.2	100.3	107.0	112.3	99.2	103.2	110.0	115.3
600	450	70	35	81.3	85.4	91.6	96.9	83.6	87.7	93.9	99.2	100.0	104.1	110.3	115.6	104.9	108.9	115.2	120.4
600	450	80	48	81.2	83.7	94.4	98.1	79.7	82.2	92.9	96.6	96.6	99.0	109.8	113.5	97.7	100.1	110.9	114.6
600	450	80	44	79.4	81.8	89.8	93.5	79.8	82.2	90.2	93.9	96.0	98.4	106.4	110.1	99.0	101.4	109.4	113.1
600	450	80	40	83.2	85.7	93.2	96.9	85.5	88.0	95.5	99.2	101.0	103.5	111.0	114.7	105.9	108.3	115.8	119.5
600	450	90	54	82.7	83.5	97.6	99.7	81.2	82.0	96.1	98.2	97.2	98.0	112.1	114.2	98.3	99.1	113.2	115.3
600	450	90	49	80.9	81.7	93.1	95.2	81.3	82.1	93.5	95.6	96.6	97.4	108.8	110.9	99.6	100.4	111.8	113.9
600	450	90	45	84.2	85.0	95.9	98.0	86.5	87.3	98.2	100.3	101.1	102.0	112.8	114.9	106.0	106.8	117.7	119.8
600	600	70	38	101.5	104.2	119.3	123.3	101.1	103.9	119.0	122.9	119.0	121.8	136.9	140.8	121.3	124.0	139.1	143.1
600	600	70	35	95.9	98.6	111.0	114.9	97.4	100.1	112.5	116.5	114.6	117.4	129.7	133.7	118.8	121.5	133.9	137.8
600	600	70	31	100.9	103.6	115.5	119.4	104.3	107.0	118.9	122.9	120.9	123.6	135.5	139.5	126.9	129.6	141.5	145.5
600	600	80	44	101.3	102.5	118.8	121.2	101.0	102.1	118.5	120.9	118.0	119.2	135.6	137.9	120.3	121.4	137.8	140.2
600	600	80	40	97.0	98.1	111.8	114.1	98.6	99.7	113.3	115.7	114.9	116.0	129.7	132.1	119.0	120.2	133.8	136.2
600	600	80	36	103.0	104.1	117.3	119.6	106.4	107.5	120.7	123.1	122.1	123.2	136.4	138.8	128.1	129.2	142.4	144.8
600	600	90	49	103.6	103.1	122.8	123.6	103.2	102.8	122.5	123.3	119.4	118.9	138.7	139.5	121.6	121.2	140.9	141.7
600	600	90	45	98.7	98.2	115.2	116.0	100.2	99.8	116.8	117.6	115.7	115.3	132.3	133.1	119.9	119.4	136.4	137.2
600	600	90	40	104.3	103.8	120.3	121.1	107.7	107.3	123.8	124.6	122.6	122.1	138.6	139.4	128.6	128.1	144.6	145.4

TABLE E-5H. TOTAL FUEL CONSUMPTION IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*6

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET LOW LEVEL								TRUCKS ON THE MINOR STREET HIGH LEVEL							
				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL				LEFT TURNS ON MINOR STREET LOW LEVEL				LEFT TURNS ON MINOR STREET HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	46.4	47.9	53.5	56.3	44.3	45.8	51.4	54.2	52.6	54.1	59.8	62.5	53.1	54.6	60.2	63.0
300	300	50	25	46.8	48.3	51.1	53.9	46.6	48.1	50.9	53.7	54.2	55.7	58.6	61.4	56.6	58.1	60.9	63.7
300	300	50	22	44.7	46.2	48.6	51.3	46.4	47.9	50.3	53.0	53.4	54.9	57.3	60.0	57.6	59.1	61.5	64.2
300	300	60	33	47.6	47.6	54.4	55.6	45.5	45.5	52.3	53.5	53.0	52.9	59.8	61.0	53.5	53.4	60.3	61.4
300	300	60	30	49.1	49.0	53.1	54.3	48.9	48.8	52.9	54.1	55.7	55.6	59.7	60.9	58.0	57.9	62.0	63.2
300	300	60	27	47.9	47.8	51.5	52.6	49.6	49.5	53.1	54.3	55.7	55.6	59.3	60.4	59.9	59.9	63.5	64.7
300	300	70	38	48.8	47.2	57.4	56.9	46.7	45.1	55.3	54.9	53.3	51.7	61.9	61.5	53.8	52.1	62.3	61.9
300	300	70	35	49.7	48.0	55.5	55.1	49.5	47.8	55.3	54.8	55.4	53.7	61.2	60.8	57.7	56.1	63.5	63.1
300	300	70	31	48.0	46.3	53.3	52.9	49.7	48.0	55.0	54.6	54.9	53.3	60.2	59.8	59.2	57.5	64.5	64.0
300	450	50	25	54.7	57.5	66.1	70.2	53.8	56.6	65.2	69.3	62.2	65.1	73.7	77.8	63.9	66.7	75.3	79.4
300	450	50	22	54.9	57.7	63.6	67.6	55.8	58.6	64.5	68.6	63.6	66.5	72.3	76.4	67.1	70.0	75.8	79.9
300	450	50	20	53.3	56.1	61.5	65.6	56.1	59.0	64.4	68.4	63.3	66.1	71.5	75.6	68.7	71.5	76.9	81.0
300	450	60	30	56.2	57.5	67.3	69.8	55.3	56.5	66.4	68.9	62.9	64.2	74.0	76.5	64.5	65.8	75.7	78.1
300	450	60	27	57.3	58.5	65.7	68.2	58.3	59.5	66.6	69.1	65.2	66.5	73.6	76.1	68.7	70.0	77.1	79.6
300	450	60	24	56.6	57.8	64.5	66.9	59.4	60.7	67.3	69.8	65.7	66.9	73.6	76.1	71.1	72.3	79.0	81.5
300	450	70	35	57.6	57.2	70.4	71.3	56.7	56.3	69.5	70.4	63.4	63.0	76.3	77.2	65.0	64.7	77.9	78.8
300	450	70	31	58.1	57.8	68.3	69.2	59.1	58.7	69.2	70.1	65.2	64.8	75.3	76.2	68.7	68.3	78.8	79.7
300	450	70	28	56.7	56.4	66.4	67.3	59.6	59.2	69.2	70.1	65.0	64.6	74.6	75.5	70.4	70.0	80.0	80.9
300	600	60	27	65.8	67.3	81.5	84.3	66.0	67.5	81.8	84.5	74.7	76.2	90.4	93.2	77.5	79.0	93.2	96.0
300	600	60	24	63.8	65.3	76.9	79.6	65.9	67.5	79.0	81.7	73.9	75.4	87.0	89.7	78.6	80.1	91.6	94.4
300	600	60	21	64.7	66.2	77.3	80.0	68.7	70.2	81.3	84.0	76.0	77.5	88.6	91.3	82.6	84.1	95.1	97.9
300	600	70	31	66.8	66.7	82.2	83.4	67.0	66.9	82.4	83.6	74.8	74.7	90.2	91.4	77.6	77.5	93.0	94.2
300	600	70	28	65.6	65.5	78.3	79.5	67.8	67.7	80.4	81.6	74.9	74.8	87.6	88.7	79.5	79.5	92.2	93.4
300	600	70	24	67.2	67.1	79.4	80.6	71.2	71.1	83.4	84.6	77.6	77.5	89.8	91.0	84.2	84.1	96.4	97.6
300	600	80	36	67.5	65.9	84.7	84.3	67.8	66.1	85.0	84.6	74.7	73.0	91.9	91.5	77.5	75.8	94.7	94.3
300	600	80	32	65.8	64.1	80.3	79.9	67.9	66.3	82.4	82.0	74.2	72.5	88.6	88.2	78.9	77.2	93.3	92.9
300	600	80	28	66.7	65.0	80.7	80.3	70.7	69.0	84.7	84.3	76.3	74.6	90.3	89.8	82.9	81.2	96.8	96.4
450	300	50	30	56.1	57.6	64.2	67.0	55.4	56.9	63.5	66.3	66.2	67.7	74.4	77.1	68.1	69.6	76.2	79.0
450	300	50	27	55.2	56.7	60.6	63.4	56.4	57.9	61.8	64.6	66.6	68.1	72.0	74.8	70.3	71.8	75.8	78.5
450	300	50	25	54.8	56.3	59.7	62.5	57.9	59.4	62.8	65.6	67.4	69.0	72.4	75.1	73.1	74.6	78.0	80.8
450	300	60	36	58.1	58.1	66.0	67.1	57.5	57.4	65.3	66.4	67.5	67.4	75.3	76.5	69.3	69.2	77.1	78.3
450	300	60	33	58.3	58.2	63.4	64.6	59.5	59.4	64.6	65.7	68.8	68.7	73.9	75.1	72.6	72.5	77.7	78.8
450	300	60	30	59.0	58.9	63.6	64.8	62.1	62.0	66.7	67.8	70.7	70.7	75.3	76.5	76.4	76.3	81.0	82.1
450	300	70	42	59.2	57.5	68.8	68.4	58.5	56.9	68.1	67.7	67.7	66.0	77.3	76.8	69.5	67.9	79.1	78.7
450	300	70	38	59.2	57.5	66.0	65.6	60.4	58.7	67.2	66.8	68.8	67.2	75.7	75.3	72.6	70.9	79.4	79.0
450	300	70	35	59.3	57.6	65.6	65.2	62.4	60.7	68.7	68.3	70.2	68.5	76.5	76.1	75.8	74.1	82.1	81.7
450	450	60	33	65.4	68.2	77.8	81.9	65.8	68.6	78.3	82.4	76.9	79.7	89.3	93.4	79.9	82.7	92.4	96.4
450	450	60	30	64.4	67.2	74.2	78.2	66.8	69.6	76.5	80.6	77.1	80.0	86.9	91.0	82.1	84.9	91.8	95.9
450	450	60	27	64.8	67.6	74.0	78.1	69.0	71.8	78.3	82.3	78.7	81.5	88.0	92.0	85.5	88.3	94.8	98.8
450	450	70	38	67.1	68.3	79.2	81.7	67.5	68.8	79.7	82.2	77.7	78.9	89.8	92.3	80.7	82.0	92.9	95.4
450	450	70	35	67.0	68.3	76.4	78.9	69.4	70.6	78.8	81.3	78.9	80.1	88.3	90.8	83.8	85.0	93.2	95.7
450	450	70	31	68.4	69.6	77.3	79.8	72.6	73.8	81.5	84.0	81.4	82.7	90.4	92.8	88.2	89.5	97.2	99.6
450	450	80	44	67.5	67.2	81.4	82.3	68.0	67.7	81.9	82.8	77.3	77.0	91.2	92.1	80.3	80.0	94.2	95.1
450	450	80	40	67.3	66.9	78.4	79.3	69.6	69.3	80.8	81.7	78.3	77.9	89.4	90.3	83.2	82.8	94.3	95.2
450	450	80	36	68.1	67.7	78.8	79.7	72.3	72.0	83.0	83.9	80.3	79.9	91.0	91.9	87.1	86.7	97.8	98.7
450	600	70	35	80.7	82.2	97.5	100.3	82.3	83.8	99.1	101.9	93.5	95.0	110.3	113.1	97.7	99.2	114.5	117.3
450	600	70	31	77.7	79.2	91.7	94.5	81.2	82.7	95.3	98.0	91.7	93.2	105.8	108.6	97.8	99.3	111.9	114.6
450	600	70	28	80.5	82.0	94.1	96.8	85.9	87.4	99.5	102.2	95.8	97.3	109.3	112.1	103.7	105.2	117.3	120.1
450	600	80	40	81.8	81.7	98.2	99.4	83.4	83.3	99.9	101.0	93.7	93.6	110.2	111.4	97.9	97.8	114.4	115.6
450	600	80	36	79.7	79.7	93.5	94.6	83.3	83.2	97.0	98.2	92.9	92.8	106.6	107.8	99.0	98.9	112.7	113.9
450	600	80	32	83.5	83.4	96.7	97.9	88.9	88.8	102.1	103.3	97.8	97.8	111.1	112.3	105.8	105.7	119.0	120.2
450	600	90	45	82.0	80.3	100.2	99.8	83.6	81.9	101.8	101.4	93.1	91.4	111.3	110.9	97.3	95.6	115.5	115.1
450	600	90	40	79.5	77.9	95.0	94.6	83.1	81.4	98.6	98.1	91.9	90.2	107.4	106.9	97.9	96.3	113.4	113.0
450	600	90	36	82.6	80.9	97.6	97.2	88.0	86.3	103.0	102.6	96.1	94.5	111.1	110.7	104.1	102.4	119.1	118.7
600	300	60	39	67.4	68.9	76.6	79.3	65.3	66.8	74.5	77.2	81.5	83.0	90.7	93.5	82.0	83.5	91.2	93.9
600	300	60	36	65.5	67.0	72.0	74.7	65.3	66.8	71.7	74.5	80.9	82.4	87.3	90.1	83.2	84.7	89.6	92.4
600	300	60	33	67.3	68.8	73.2	76.0	69.0	70.5	74.9	77.7	83.9	85.4	89.8	92.6	88.1	89.6	94.0	96.8
600	300	70	45	67.5	67.4	76.3	77.5	65.4	65.3	74.2	75.4	80.7	80.7	89.6	90.8	81.2	81.1	90.1	91.2
600	300	70	42	66.6	66.5	72.7	73.9	66.4	66.3	72.5	73.7	81.1	81.0	87.2	88.4	83.4	83.4	89.6	90.7
600	300	70	38	69.7	69.6	75.3	76.5	71.4	71.3	77.0	78.2	85.4	85.3	91.0	92.2	89.6	89.5	95.3	96.4
600	300	80	52	69.1	67.4	79.7	79.3	67.0	65.3	77.6	77.2	81.5	79.8	92.1	91.7	82.0	80.3	92.6	92.2
600	300	80	48	68.3	66.7	76.2	75.8	68.1	66.5	76.0	75.6	82.0	80.3	89.8	89.4	84.3	82.6	92.2	91.8
600	300	80	44	71.0	69.4	78.4	78.0	72.7	71.0	80.1	79.7	85.9	84.2	93.2	92.8	90.1	88.4	97.5	97.1
600	450	70	42	80.7	83.6	94.3	98.3	79.8	82.6	93.3	97.4	96.2	99.0	109.7	113.8	97.8	100.6	111.3	115.4
600	450	70	38	79.1	81.9	89.9	93.9	80.0	82.9	90.8	94.9	95.8	98.6	106.5	110.6	99.3	102.1	110.0	114.1
600	450	70	35	81.5	84.3	91.7	95.8	84.3	87.1	94.6	98.7	99.3	102.2	109.6	113.7	104.7	107.6	115.0	119.1
600	450	80	48	80.2	81.4	93.4	95.8	79.2	80.5	92.4	94.9	94.8	96.0	107.9	110.4	96.4	97.6	109.6	112.1
600	450	80	44	79.6	80.8	90.1	92.5	80.6	81.8	91.0	93.5	95.4	96.6	105.9	108.3	98.9	100.2	109.4	111.9
600	450	80	40	83.2	84.5	93.2	95.7	86.1	87.3	96.0	98.5	100.3	101.5	110.2	112.7	105.7	106.9	115.6	118.1
600	450	90	54	81.7	81.4	96.7	97.6	80.8	80.4	95.7	96.6	95.4	95.1	110.4	111.3	97.1	96.7	112.0	112.9
600	450	90	49	81.2	80.8	93.4	94.3	82.1	81.8	94.3	95.2	96.1	95.8	108.3	109.2	99.6	99.3	111.8	112.7
600	450	90	45	84.3	83.9	96.0	96.9	87.1	86.8	98.8	99.7	100.4	100.1	112.1	113.0	105.8	105.5	117.5	118.4
600	600	70	38	98.6	100.1	116.4	119.2	98.8	100.3	116.7	119.4	115.4	116.9	133.2	136.0	118.2	119.7	136.0	138.8
600	600	70	35	94.3	95.8	109.4	112.1	96.4	97.9	111.5	114.2	112.3	113.8	127.4	130.1	116.9	118.4	132.0	134.8
600	600	70	31	99.1	100.6	113.7	116.4	103.1	104.6	117.7	120.4	118.3	119.8	132.9	135.7	124.8	126.3	139.4	142.2
600	600	80	44	98.4	98.3	115.9	117.1	98.6	98.5	116.1	117.3	114.3	114.2	131.8	133.0	117.1	117.0	134.6	135.8
600	600	80	40	95.3	95.2	110.1	111.2	97.4	97.3	112.2	113.4	112.4	112.3	127.2	128.4	117.1	117.0	131.9	133.0
600	600	80	36	101.1	101.0	115.4	116.5	105.1	105.0	119.4	120.5	119.4	119.3	133.7	134.9	126.0	125.9	140.3	141.4
600	600	90	49	100.7	99.0	120.0	119.5	100.9	99.3	120.2	119.8	115.7	114.1	135.0	134.6	118.5	116.9	137.8	137.4
600	600	90	45	97.1	95.4	113.6	113.2	99.2	97.5	115.7	115.3	113.3	111.7	129.9	129.5	118.0	116.3	134.5	134.1
600	600	90	40	102.5	100.8	118.5	118.1	106.5	104.8	122.5	122.1	120.0	118.3	136.0	135.6	126.5	124.8	142.6	142.1

TABLE E-51. TOTAL FUEL CONSUMPTION IN THE TOTAL INTERSECTION SYSTEM (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*7

INTERSECTION ENVIRONMENT				TRUCKS ON THE MINOR STREET: LOW LEVEL								TRUCKS ON THE MINOR STREET: HIGH LEVEL							
				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL				LEFT TURNS ON MINOR STREET: LOW LEVEL				LEFT TURNS ON MINOR STREET: HIGH LEVEL			
				TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH		TRUCKS ON MAJOR STREET LOW		TRUCKS ON MAJOR STREET HIGH	
				L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH	L.T./MAJOR LOW	L.T./MAJOR HIGH
V-2	V-1	CY	GT	LLLL	HLLL	LHLL	HHLL	LLHL	HLHL	LHHL	HHHL	LLLH	HLLH	LHLH	HHLH	LLHH	HLHH	LHHH	HHHH
300	300	50	27	49.8	50.1	57.0	58.5	44.2	44.5	51.3	52.9	55.3	55.6	62.4	63.9	52.2	52.5	59.3	60.9
300	300	50	25	50.4	50.7	54.8	56.3	46.7	47.0	51.1	52.6	57.1	57.4	61.4	63.0	55.9	56.2	60.3	61.8
300	300	50	22	47.1	47.4	51.0	52.5	45.2	45.5	49.1	50.7	54.9	55.2	58.8	60.4	55.6	55.9	59.5	61.1
300	300	60	33	53.0	51.7	59.8	59.8	47.4	46.1	54.2	54.2	57.6	56.3	64.4	64.4	54.5	53.3	61.3	61.3
300	300	60	30	54.7	53.4	58.7	58.7	50.9	49.6	55.0	54.9	60.5	59.2	64.5	64.5	59.3	58.0	63.3	63.3
300	300	60	27	52.2	51.0	55.8	55.8	50.4	49.1	53.9	53.9	59.2	58.0	62.8	62.8	59.9	58.7	63.5	63.5
300	300	70	38	52.3	49.4	60.8	59.2	46.6	43.8	55.2	53.6	56.0	53.1	64.5	62.9	52.9	50.0	61.4	59.8
300	300	70	35	53.3	50.4	59.1	57.5	49.6	46.7	55.4	53.8	58.2	55.4	64.0	62.4	57.1	54.2	62.9	61.2
300	300	70	31	50.4	47.5	55.7	54.1	48.5	45.6	53.8	52.2	56.5	53.6	61.8	60.2	57.2	54.3	62.5	60.9
300	450	50	25	57.6	59.2	69.0	71.9	53.1	54.7	64.6	67.4	64.3	66.0	75.8	78.6	62.4	64.1	73.9	76.8
300	450	50	22	58.0	59.6	66.7	69.5	55.4	57.0	64.1	67.0	65.9	67.5	74.6	77.5	65.9	67.5	74.6	77.5
300	450	50	20	55.1	56.8	63.4	66.2	54.5	56.1	62.7	65.5	64.3	66.0	72.5	75.4	66.2	67.8	74.4	77.3
300	450	60	30	61.1	61.1	72.2	73.5	56.6	56.7	67.7	69.0	67.0	67.0	78.1	79.4	65.1	65.1	76.2	77.5
300	450	60	27	62.4	62.4	70.7	72.0	59.8	59.8	68.2	69.5	69.5	69.5	77.9	79.1	69.5	69.5	77.8	79.1
300	450	60	24	60.4	60.4	68.2	69.5	59.7	59.7	67.6	68.8	68.7	68.7	76.6	77.9	70.6	70.6	78.4	79.7
300	450	70	35	60.5	58.9	73.3	73.0	56.0	54.5	68.9	68.6	65.5	63.9	78.4	78.1	63.6	62.0	76.5	76.2
300	450	70	31	61.2	59.7	71.4	71.1	58.7	57.1	68.8	68.5	67.5	65.9	77.6	77.3	67.5	65.9	77.6	77.3
300	450	70	28	58.6	57.0	68.2	67.9	57.9	56.3	67.5	67.2	66.0	64.5	75.7	75.4	67.9	66.3	77.5	77.2
300	600	60	27	68.1	68.4	83.9	85.5	64.9	65.2	80.6	82.2	76.2	76.5	92.0	93.5	75.5	75.8	91.3	92.8
300	600	60	24	66.4	66.7	79.4	81.0	65.0	65.3	78.0	79.6	75.7	76.0	88.7	90.3	76.8	77.1	89.9	91.4
300	600	60	21	66.0	66.3	78.5	80.1	66.5	66.8	79.0	80.6	76.5	76.8	89.1	90.6	79.6	79.9	92.1	93.7
300	600	70	31	71.1	69.8	86.5	86.5	67.8	66.5	83.2	83.2	78.3	77.0	93.7	93.7	77.6	76.3	93.0	93.0
300	600	70	28	70.1	68.9	82.8	82.8	68.7	67.5	81.4	81.4	78.6	77.3	91.3	91.2	79.7	78.4	92.4	92.4
300	600	70	24	70.4	69.1	82.6	82.6	70.9	69.6	83.1	83.1	80.1	78.8	92.3	92.2	83.1	81.8	95.3	95.3
300	600	80	36	69.9	67.0	87.1	85.5	66.6	63.7	83.8	82.2	76.3	73.4	93.4	91.8	75.5	72.6	92.7	91.1
300	600	80	32	68.4	65.5	82.8	81.2	67.0	64.1	81.4	79.8	75.9	73.1	90.4	88.8	77.1	74.2	91.6	89.9
300	600	80	28	68.0	65.1	82.0	80.3	68.5	65.6	82.5	80.8	76.8	73.9	90.8	89.1	79.8	76.9	93.8	92.2
450	300	50	30	58.5	58.8	66.6	68.2	54.2	54.6	62.4	64.0	67.8	68.2	76.0	77.6	66.2	66.5	74.3	75.9
450	300	50	27	57.8	58.1	63.2	64.8	55.5	55.8	60.9	62.4	68.4	68.7	73.8	75.4	68.6	68.9	74.0	75.6
450	300	50	25	56.2	56.5	61.1	62.6	55.7	56.0	60.6	62.2	68.0	68.3	72.9	74.5	70.1	70.4	75.0	76.6
450	300	60	36	62.5	61.2	70.3	70.3	58.3	57.0	66.1	66.1	71.0	69.7	78.8	78.8	69.4	68.1	77.2	77.1
450	300	60	33	62.9	61.6	67.9	67.9	60.5	59.2	65.6	65.6	72.6	71.3	77.7	77.6	72.8	71.5	77.9	77.9
450	300	60	30	62.3	61.0	66.9	66.8	61.8	60.6	66.4	66.4	73.2	72.0	77.8	77.8	75.3	74.1	79.9	79.9
450	300	70	42	61.6	58.8	71.2	69.6	57.4	54.5	67.0	65.4	69.3	66.4	78.9	77.2	67.6	64.7	77.2	75.6
450	300	70	38	61.8	58.9	68.6	67.0	59.5	56.6	66.3	64.7	70.6	67.8	77.5	75.9	70.9	68.0	77.7	76.1
450	300	70	35	60.6	57.7	67.0	65.3	60.2	57.3	66.5	64.9	70.7	67.8	77.1	75.4	72.8	69.9	79.2	77.5
450	450	60	33	67.2	68.8	79.7	82.6	64.2	65.8	76.6	79.5	77.9	79.5	90.4	93.3	77.4	79.1	89.9	92.8
450	450	60	30	66.5	68.1	76.2	79.1	65.3	66.9	75.1	77.9	78.4	80.0	88.1	91.0	79.8	81.4	89.5	92.4
450	450	60	27	65.6	67.2	74.8	77.7	66.3	67.9	75.5	78.4	78.7	80.3	88.0	90.8	82.0	83.6	91.2	94.1
450	450	70	38	70.9	70.9	83.0	84.3	67.8	67.9	80.0	81.3	80.7	80.7	92.9	94.1	80.2	80.2	92.4	93.6
450	450	70	35	71.1	71.1	80.5	81.8	69.9	69.9	79.3	80.6	82.1	82.1	91.5	92.8	83.5	83.5	92.9	94.2
450	450	70	31	71.1	71.2	80.0	81.3	71.8	71.9	80.8	82.0	83.4	83.4	92.3	93.6	86.7	86.7	95.6	96.9
450	450	80	44	69.4	67.8	83.3	83.0	66.4	64.8	80.3	80.0	78.4	76.8	92.3	92.0	77.9	76.3	91.8	91.5
450	450	80	40	69.3	67.8	80.5	80.2	68.2	66.6	79.4	79.0	79.5	78.0	90.7	90.4	80.9	79.4	92.1	91.8
450	450	80	36	68.9	67.3	79.6	79.3	69.6	68.0	80.3	80.0	80.3	78.7	91.0	90.7	83.6	82.0	94.2	93.9
450	600	70	35	82.0	82.3	98.8	100.4	80.1	80.4	96.9	98.5	94.0	94.4	110.8	112.4	94.7	95.0	111.5	113.1
450	600	70	31	79.2	79.5	93.3	94.8	79.2	79.5	93.3	94.8	92.5	92.8	106.5	108.1	95.0	95.3	109.1	110.6
450	600	70	28	80.8	81.1	94.3	95.9	82.6	82.9	96.2	97.8	95.2	95.5	108.8	110.3	99.7	100.0	113.2	114.8
450	600	80	40	85.0	83.8	101.5	101.5	83.2	81.9	99.6	99.6	96.2	94.9	112.7	112.6	96.9	95.6	113.3	113.3
450	600	80	36	83.2	81.9	97.0	96.9	83.2	81.9	97.0	96.9	95.6	94.3	109.3	109.3	98.1	96.9	111.9	111.9
450	600	80	32	85.7	84.4	98.9	98.9	87.6	86.3	100.8	100.8	99.3	98.0	112.5	112.5	103.7	102.4	116.9	116.9
450	600	90	45	83.3	80.4	101.5	99.9	81.4	78.5	99.6	98.0	93.6	90.7	111.8	110.2	94.3	91.4	112.5	110.9
450	600	90	40	81.1	78.2	96.6	94.9	81.1	78.2	96.6	95.0	92.6	89.7	108.1	106.5	95.1	92.3	110.6	109.0
450	600	90	36	82.9	80.0	97.9	96.2	84.8	81.9	99.8	98.1	95.6	92.7	110.6	109.0	100.0	97.2	115.0	113.4
600	300	60	39	68.8	69.1	77.9	79.5	63.1	63.4	72.3	73.9	82.1	82.4	91.3	92.8	79.0	79.3	88.2	89.8
600	300	60	36	67.1	67.4	73.5	75.1	63.4	63.7	69.8	71.4	81.6	81.9	88.1	89.6	80.5	80.8	86.9	88.5
600	300	60	33	67.6	67.9	73.6	75.1	65.8	66.1	71.7	73.3	83.4	83.7	89.3	90.9	84.1	84.4	90.0	91.6
600	300	70	45	70.8	69.5	79.7	79.6	65.2	63.9	74.1	74.0	83.3	82.0	92.1	92.1	80.2	78.9	89.1	89.0
600	300	70	42	70.2	68.9	76.3	76.2	66.4	65.1	72.5	72.5	83.8	82.6	90.0	89.9	82.7	81.4	88.8	88.7
600	300	70	38	72.0	70.7	77.6	77.6	70.1	68.8	75.8	75.7	86.9	85.6	92.5	92.5	87.6	86.3	93.2	93.2
600	300	80	52	70.5	67.6	81.1	79.5	64.9	62.0	75.5	73.9	82.1	79.2	92.7	91.1	79.0	76.1	89.6	88.0
600	300	80	48	69.9	67.1	77.8	76.2	66.2	63.3	74.1	72.5	82.7	79.9	90.6	89.0	81.6	78.7	89.4	87.8
600	300	80	44	71.3	68.5	78.7	77.1	69.5	66.6	76.9	75.3	85.4	82.5	92.8	91.1	86.1	83.2	93.5	91.8
600	450	70	42	81.6	83.2	95.1	98.0	77.1	78.8	90.6	93.5	96.2	97.9	109.7	112.6	94.3	96.0	107.8	110.7
600	450	70	38	80.1	81.7	90.9	93.8	77.6	79.2	88.3	91.2	96.0	97.6	106.8	109.6	96.0	97.6	106.8	109.6
600	450	70	35	81.2	82.8	91.5	94.4	80.5	82.2	90.8	93.7	98.3	99.9	108.6	111.5	100.2	101.8	110.5	113.3
600	450	80	48	83.0	83.0	96.1	97.4	78.5	78.5	91.7	93.0	96.8	96.8	109.9	111.2	94.9	94.9	108.0	109.3
600	450	80	44	82.6	82.6	93.1	94.3	80.0	80.1	90.5	91.8	97.6	97.6	108.1	109.3	97.6	97.6	108.0	109.3
600	450	80	40	85.0	85.0	94.9	96.2	84.3	84.3	94.2	95.5	101.2	101.2	111.1	112.4	103.1	103.1	113.0	114.3
600	450	90	54	82.6	81.0	97.5	97.2	78.1	76.5	93.0	92.7	95.5	93.9	110.4	110.1	93.6	92.0	108.5	108.2
600	450	90	49	82.2	80.7	94.4	94.1	79.7	78.1	91.9	91.5	96.4	94.8	108.6	108.2	96.3	94.8	108.5	108.2
600	450	90	45	84.1	82.5	95.8	95.5	83.4	81.8	95.1	94.8	99.4	97.8	111.1	110.8	101.3	99.7	113.0	112.7
600	600	70	38	98.9	99.2	116.7	118.3	95.6	95.9	113.4	115.0	114.9	115.2	132.7	134.3	114.1	114.4	132.0	133.5
600	600	70	35	94.8	95.1	109.9	111.4	93.4	93.7	108.5	110.0	112.0	112.3	127.1	128.6	113.1	113.4	128.2	129.8
600	600	70	31	98.3	98.6	112.9	114.5	98.8	99.1	113.4	115.0	116.7	117.0	131.3	132.9	119.7	120.1	134.4	135.9
600	600	80	44	100.6	99.3	118.1	118.1	97.3	96.1	114.9	114.8	115.7	114.5	133.2	133.2	115.0	113.7	132.5	132.5
600	600	80	40	97.8	96.5	112.5	112.5	96.4	95.1	111.1	111.1	114.1	112.8	128.8	128.8	115.2	113.9	130.0	130.0
600	600	80	36	102.3	101.0	116.5	116.5	102.8	101.5	117.0	117.0	119.8	118.5	134.1	134.1	122.8	121.6	137.1	137.1
600	600	90	49	101.0	98.1	120.3	118.6	97.7	94.8	117.0	115.4	115.2	112.4	134.5	132.9	114.5	111.6	133.8	132.1
600	600	90	45	97.6	94.7	114.1	112.5	96.2	93.3	112.7	111.1	113.0	110.2	129.6	128.0	114.2	111.3	130.7	129.1
600	600	90	40	101.7	98.8	117.8	116.1	102.2	99.3	118.2	116.6	118.4	115.5	134.4	132.8	121.4	118.5	137.5	135.8

APPENDIX F

PREDICTED VALUES OF DELAY, QUEUE LENGTH, EMISSIONS AND FUEL FLOW IN FIFTEEN MINUTES FOR INBOUND INTERSECTION APPROACHES CONTROLLED BY PRETIMED SIGNALS

Legend:

V-2	Lane volume on the minor street
V-1	Lane volume on the major street
CY	Cycle time
GT	Green time on the minor street

TABLE F-1A. AVERAGE TOTAL DELAY ON THE INBOUND APPROACH (SECONDS/VEHICLE) FOR GEOMETRY 4*4

INTERSECTION ENVIRONMENT				MINOR STREET									MAJOR STREET								
				LEFT TURNS LOW LEVEL			LEFT TURNS MEDIUM LEVEL			LEFT TURNS HIGH LEVEL			LEFT TURNS LOW LEVEL			LEFT TURNS MEDIUM LEVEL			LEFT TURNS HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	15.2	13.7	10.0	15.0	14.3	11.4	18.4	18.5	16.4	11.6	13.9	20.4	14.8	17.0	26.6	23.3	24.2	35.5
300	300	50	25	20.0	19.5	16.7	20.6	20.9	18.9	26.7	27.8	26.7	7.7	11.4	9.8	6.2	9.9	11.3	13.3	15.7	18.8
300	300	50	22	11.4	11.9	10.1	15.7	17.0	16.0	27.5	29.6	29.4	5.3	4.3	7.4	4.1	2.9	9.1	14.5	12.1	20.1
300	300	60	33	11.4	8.1	8.9	11.3	8.8	10.3	14.6	12.9	15.3	15.6	18.5	24.4	20.1	22.9	31.8	23.2	24.8	35.5
300	300	60	30	16.7	14.4	16.1	17.3	15.8	18.3	23.5	22.7	26.0	13.7	18.1	15.8	13.5	17.8	18.6	15.2	18.3	20.8
300	300	60	27	11.4	10.0	12.7	15.7	15.1	18.6	27.5	27.7	32.0	11.1	10.7	13.2	11.1	10.6	16.1	16.2	14.5	21.8
300	300	70	38	20.1	17.3	12.2	20.0	17.9	13.7	23.3	22.1	18.6	20.3	23.8	29.0	18.8	22.3	30.5	27.7	29.9	39.9
300	300	70	35	22.6	20.8	16.7	23.2	22.2	18.9	29.4	29.1	26.6	21.0	26.0	23.1	14.9	19.8	19.9	22.4	26.0	27.9
300	300	70	31	19.1	18.2	15.1	23.4	23.3	21.0	35.2	35.9	34.4	17.3	17.5	19.3	11.3	11.4	16.3	22.2	21.0	27.7
300	450	50	25	16.1	14.4	10.5	16.5	15.6	12.5	22.4	22.3	20.0	19.7	23.9	29.4	24.4	28.5	37.0	32.9	35.7	46.0
300	450	50	22	22.6	21.9	19.0	23.8	23.9	21.8	32.4	33.3	32.0	12.6	18.2	15.6	12.6	18.2	13.5	19.7	24.0	26.1
300	450	50	20	14.8	15.1	13.2	19.6	20.7	19.6	34.0	35.9	35.5	12.4	13.2	15.3	12.6	13.3	18.5	23.1	22.6	29.5
300	450	60	30	13.9	10.4	11.0	14.3	11.6	13.0	20.2	18.3	20.5	20.6	25.4	30.2	26.6	31.3	39.2	29.7	33.2	42.9
300	450	60	27	20.4	17.9	19.4	21.6	19.9	22.2	30.2	29.3	32.4	16.1	22.4	19.1	17.4	23.6	23.3	19.2	24.1	25.6
300	450	60	24	16.6	15.1	17.6	21.4	20.7	24.0	35.8	35.8	39.9	14.8	16.3	17.8	16.3	17.7	22.2	21.5	21.6	27.9
300	450	70	35	20.1	17.0	11.8	20.5	18.3	13.8	26.4	24.9	21.3	27.3	32.7	36.9	27.3	32.7	39.9	36.2	40.3	49.4
300	450	70	31	25.1	23.1	18.9	26.3	25.1	21.6	34.9	34.5	31.8	24.5	31.5	27.5	19.8	26.7	25.8	27.4	33.0	33.8
300	450	70	28	21.8	20.8	17.5	26.7	26.4	23.9	41.0	41.5	39.9	22.9	25.0	25.9	18.4	20.4	24.3	29.4	30.1	35.8
300	600	60	27	15.8	16.4	14.9	19.4	20.8	20.1	30.4	32.7	32.7	32.6	37.2	46.1	37.2	41.8	53.7	44.3	47.5	61.2
300	600	60	24	23.9	25.6	25.0	28.2	30.7	31.0	42.0	45.3	46.3	22.4	28.5	29.3	22.4	28.5	32.2	28.0	32.8	38.4
300	600	60	21	29.5	32.2	32.6	37.5	41.0	42.2	57.0	61.3	63.3	17.7	19.0	24.5	17.9	19.1	27.6	26.9	26.8	37.2
300	600	70	31	16.8	15.7	18.6	20.4	20.1	23.8	31.4	31.9	36.4	33.9	39.2	47.4	39.8	45.0	56.3	41.5	45.5	58.5
300	600	70	28	25.0	24.9	28.8	29.3	30.0	34.7	43.1	44.6	50.1	26.3	33.1	33.2	27.6	34.3	37.4	27.9	33.3	38.2
300	600	70	24	35.5	36.4	41.2	43.5	45.2	50.9	63.0	65.5	71.9	20.2	22.1	27.0	21.6	23.4	31.3	25.3	25.9	35.6
300	600	80	36	21.5	20.9	18.0	25.1	25.3	23.2	36.2	37.1	35.8	37.4	43.3	50.9	37.3	43.2	53.8	44.8	49.4	61.8
300	600	80	32	28.8	29.1	27.2	33.1	34.3	33.2	46.9	48.8	48.5	31.4	38.8	38.2	26.7	34.0	36.5	32.7	38.8	43.1
300	600	80	28	40.2	41.5	40.6	48.3	50.4	50.2	67.7	70.6	71.3	24.8	27.4	31.6	20.2	22.8	30.0	29.7	31.0	40.0
450	300	50	30	12.8	11.7	10.6	14.5	14.1	13.8	19.6	20.0	20.5	22.6	25.8	33.2	27.7	30.8	41.2	38.2	40.0	52.3
450	300	50	27	17.5	17.3	17.2	19.8	20.5	21.2	27.7	29.1	30.6	15.8	20.4	19.7	16.2	20.8	23.0	25.3	28.6	32.7
450	300	50	25	12.6	13.4	14.3	18.7	20.3	21.9	32.2	34.6	37.1	12.8	12.6	16.7	13.3	13.1	20.2	25.9	24.4	33.2
450	300	60	36	10.2	7.2	10.6	11.8	9.6	13.8	16.9	15.5	20.5	25.0	28.8	35.5	31.3	35.0	44.8	36.5	39.0	50.5
450	300	60	33	14.7	12.7	17.1	17.1	15.9	21.0	24.9	24.6	30.5	20.9	26.2	24.8	22.5	27.8	29.4	26.4	30.3	33.7
450	300	60	30	13.6	12.6	17.9	19.6	19.4	25.5	33.2	33.8	40.7	17.0	17.5	20.9	18.8	19.2	25.6	26.0	25.1	33.4
450	300	70	42	18.8	16.3	13.8	20.4	18.7	17.0	25.5	24.6	23.8	29.9	34.4	40.5	30.2	34.6	43.8	41.3	44.4	55.3
450	300	70	38	21.6	20.1	18.6	23.9	23.2	22.6	31.8	31.9	32.0	27.8	33.7	31.7	23.5	29.3	30.3	33.1	37.6	40.4
450	300	70	35	20.8	20.3	19.8	26.9	27.2	27.5	40.5	41.5	42.6	23.6	24.7	27.5	19.5	20.5	26.3	32.5	32.2	39.8
450	450	60	33	14.5	13.1	11.9	16.6	16.1	15.6	24.3	24.5	24.8	33.5	38.6	45.0	40.0	45.0	54.4	50.6	54.4	65.6
450	450	60	30	21.2	20.9	20.6	24.1	24.6	25.1	34.5	35.8	37.1	24.0	30.5	28.8	25.8	32.3	33.6	35.0	40.2	43.3
450	450	60	27	19.4	20.0	20.7	26.0	27.4	28.9	42.1	44.3	46.6	21.4	23.1	26.1	23.4	25.0	31.1	36.0	36.3	44.2
450	450	70	38	14.0	10.9	14.0	16.2	13.9	17.8	23.8	22.3	27.0	32.2	37.9	43.6	40.0	45.6	54.4	45.2	49.6	60.2
450	450	70	35	20.8	18.6	22.8	23.7	22.3	27.3	34.1	33.5	39.3	25.3	32.5	30.1	28.4	35.6	36.2	32.3	38.1	40.5
450	450	70	31	23.6	22.4	27.5	30.2	29.8	35.7	46.3	46.7	53.4	21.5	23.9	26.3	24.8	27.1	32.5	32.1	33.1	40.3
450	450	80	44	20.4	17.8	15.2	22.6	20.7	18.9	30.3	29.2	28.1	38.7	45.0	50.1	40.5	46.8	54.9	51.5	56.5	66.4
450	450	80	40	25.9	24.2	22.6	28.8	27.9	27.1	39.2	39.1	39.1	33.6	41.5	38.4	30.8	38.5	38.5	40.4	46.9	48.6
450	450	80	36	29.5	28.7	28.1	36.1	36.1	36.3	52.2	53.0	54.0	29.5	32.5	34.2	26.8	29.7	34.5	39.8	41.5	48.0
450	600	70	35	18.3	19.3	20.4	23.7	25.5	27.4	36.5	39.1	41.8	49.2	54.7	64.5	55.7	61.1	73.9	64.8	69.0	83.6
450	600	70	31	28.1	30.1	32.2	34.2	37.0	39.9	49.8	53.4	57.0	35.7	42.8	44.4	37.5	44.5	49.1	45.3	50.9	57.4
450	600	70	28	39.0	42.0	45.1	48.8	52.6	56.5	70.1	74.7	79.3	29.4	31.6	38.0	31.3	33.4	42.9	42.5	43.3	54.5
450	600	80	40	19.7	18.9	24.5	25.1	25.1	31.4	37.9	38.7	45.8	49.3	55.4	64.6	57.0	63.1	75.3	60.8	65.6	79.6
450	600	80	36	29.8	30.0	36.5	35.9	36.9	44.2	51.5	53.3	61.4	38.4	46.1	47.0	41.5	49.0	53.1	43.9	50.2	56.0
450	600	80	32	45.8	47.0	54.5	55.6	57.6	65.9	76.9	79.7	88.7	30.6	33.5	39.3	33.9	36.6	45.4	39.7	41.2	51.8
450	600	90	45	25.9	25.6	25.3	31.3	31.7	32.3	44.0	45.3	46.6	51.8	58.6	67.1	53.5	60.3	71.8	63.1	68.6	81.9
450	600	90	40	35.6	36.3	37.0	41.7	43.2	44.7	57.3	59.5	61.9	42.4	50.7	51.0	39.5	47.7	51.1	47.6	54.6	59.8
450	600	90	36	52.6	54.2	55.9	62.3	64.8	67.3	83.6	86.8	90.1	34.2	37.7	42.8	31.5	34.9	43.0	43.0	45.2	55.1
600	300	60	39	17.5	14.8	14.4	17.4	15.4	15.8	20.7	19.6	20.8	37.2	41.3	49.6	44.9	48.9	60.2	52.5	55.2	68.3
600	300	60	36	22.3	20.6	21.1	22.9	22.0	23.3	29.0	28.9	31.1	25.4	30.9	31.1	28.4	33.8	37.0	34.6	38.7	43.7
600	300	60	33	23.2	22.4	24.0	27.5	27.5	29.9	39.3	40.1	43.3	22.9	23.6	28.5	26.0	26.6	34.6	35.6	35.0	44.7
600	300	70	45	14.2	9.7	13.7	14.1	10.3	15.2	17.4	14.5	20.1	38.9	43.6	51.2	47.8	52.4	63.1	50.0	53.4	65.8
600	300	70	42	18.9	15.4	20.4	19.5	16.8	22.6	25.7	23.7	30.3	29.8	35.9	35.4	34.0	40.1	42.6	34.9	39.7	44.0
600	300	70	38	24.1	21.5	27.5	28.4	26.6	33.4	40.2	39.2	46.8	26.3	27.6	31.9	30.7	32.0	39.3	35.0	35.0	44.1
600	300	80	52	21.0	16.9	15.2	20.8	17.6	16.6	24.2	21.7	21.6	44.8	50.2	57.2	47.8	53.1	63.1	55.8	59.8	71.6
600	300	80	48	24.0	20.9	20.2	24.7	22.4	22.4	30.8	29.3	30.1	37.8	44.7	43.5	36.1	42.9	44.7	42.7	48.2	51.9
600	300	80	44	29.8	27.7	27.9	34.1	32.8	33.8	45.9	45.4	47.2	34.1	36.1	39.8	32.6	34.5	41.2	42.6	43.3	51.7
600	450	70	42	20.3	17.4	16.8	20.8	18.6	18.8	26.6	25.3	26.3	51.3	57.2	64.5	60.4	66.3	76.6	68.0	72.6	84.7
600	450	70	38	28.4	26.5	26.9	29.6	28.5	29.7	38.2	37.9	39.9	36.0	43.4	42.5	40.4	47.8	49.9	46.6	52.7	56.7
600	450	70	35	31.9	30.9	32.3	36.7	36.6	38.7	51.0	51.7	54.7	34.5	37.1	41.0	39.1	41.6	48.6	48.7	50.0	58.7
600	450	80	48	18.1	13.4	17.3	18.6	14.6	19.3	24.4	21.3	26.8	50.0	56.6	63.2	60.4	66.9	76.6	62.7	67.9	79.4
600	450	80	44	26.4	22.7	27.5	27.6	24.7	30.3	36.3	34.1	40.5	37.4	45.4	43.9	43.1	51.1	52.6	44.0	50.7	54.0
600	450	80	40	34.6	31.8	37.7	39.4	37.5	44.1	53.8	52.6	60.0	34.8	38.0	41.3	40.6	43.8	50.1	45.0	46.9	55.0
600	450	90	54	23.7	19.4	17.5	24.1	20.6	19.5	30.0	27.3	26.9	56.9	64.2	70.2	61.3	68.5	77.5	69.4	75.3	86.1
600	450	90	49	31.2	27.9	27.0	32.4	29.9	29.7	41.0	39.3	39.9	46.1	54.8	52.7	45.8	54.5	55.3	52.5	59.9	62.5
600	450	90	45	40.1	37.8	37.8	45.0	43.4	44.3	59.3	58.6	60.2	43.2	47.1	49.7	43.1	46.9	52.6	53.2	55.7	63.2
600	600	70	38	28.4	27.8	29.6	32.0	32.2	34.8	43.0	44.0	47.4	66.1	72.5	83.2	75.2	81.5	95.2	81.3	86.4	99.8
600	600	70	35	36.0	36.4	39.2	40.4	41.6	45.1	54.2	56.2	60.5	48.7	56.6	59.2	53.1	61.0	66.5	57.9	64.4	71.8
600	600	70	31	52.5	53.9	57.6	60.5	62.7	67.2	80.0	83.0	88.3	42.8	45.9	53.2	47.4	50.4	60.7	55.6	57.3	69.4
600	600	80	44	27.4	25.1	31.3	31.0	29.5	36.5	42.1	41.3	49.1	66.9	73.9	84.0	77.2	84.2	97.2	78.0	83.8	98.6
600	600	80	40	36.6	35.2	42.4	40.9	40.3	48.3	54.7	54.9	63.7	51.3	59.9	61.7	57.0	65.5	70.4	56.4	63.6	70.3
600	600	80	36	56.6	56.2	64.4	64.6	65.0	74.0	84.1	85.3	95.1	45.1	48.8	55.5	50.9	54.6	64.3	53.8	56.1	67.6
600	600	90	49	32.4	30.5	31.0	36.0	34.9	36.2	47.1	46.8	48.8	70.4	78.2	87.5	74.8	82.5	94.8	81.4	87.8	99.9
600	600	90	45	39.1	38.2	39.6	43.5	43.3	45.5	57.3	57.9	60.9	57.5	66.7	67.9	57.2	66.3	70.6	62.4	70.2	76.3
600	600	90	40	62.0	62.0	64.4	70.0	70.9	74.1	89.5	91.2	95.1	49.8	54.2	60.2	49.7	54.0	63.0	58.3	61.3	72.2

TABLE F-1B. AVERAGE TOTAL DELAY ON THE INBOUND APPROACH (SECONDS/VEHICLE) FOR GEOMETRY 5*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	10.1	8.1	3.8	9.9	8.6	5.2	13.2	12.7	10.1	3.6	1.6	7.7	3.0	.9	10.0	7.7	4.3	15.2
300	300	50	25	13.8	12.7	9.5	14.3	14.1	11.6	20.4	20.9	19.2	4.6	4.0	1.9				2.5	.6	3.3
300	300	50	22	7.3	7.3	5.0	11.6	12.3	10.8	23.3	24.8	24.1	4.0		1.3				5.5		6.3
300	300	60	33	11.0	7.2	7.4	10.8	7.8	8.8	14.1	11.9	13.6	6.5	5.1	10.5	7.1	5.7	14.1	6.4	3.7	13.9
300	300	60	30	15.2	12.4	13.5	15.8	13.7	15.7	21.8	20.6	23.3	9.4	9.5	6.7	5.4	5.4	5.7	3.3	2.0	4.1
300	300	60	27	12.0	10.1	12.3	16.2	15.1	18.1	28.0	27.7	31.4	8.6	3.8	5.9	4.7		5.0	6.0		6.8
300	300	70	38	19.6	16.2	10.6	19.4	16.8	12.0	22.6	20.9	16.8	9.9	9.2	13.9	4.6	3.8	11.6	9.7	7.6	17.2
300	300	70	35	21.0	18.6	14.0	21.5	19.9	16.1	27.5	26.7	23.7	15.5	16.2	12.9	5.5	6.2	5.8	9.2	8.6	10.0
300	300	70	31	19.5	18.1	14.5	23.8	23.1	20.3	35.5	35.7	33.6	13.5	9.4	10.8	3.7		4.0	10.8	5.3	11.6
300	450	50	25	10.9	8.7	4.3	11.3	9.8	6.2	17.1	16.4	13.6	7.2	7.1	12.1	8.1	7.9	16.0	12.8	11.3	21.1
300	450	50	22	16.3	15.1	11.6	17.4	17.0	14.3	26.0	26.3	24.5	4.9	6.3	3.2	1.1	2.4	2.3	4.4	4.4	6.1
300	450	50	20	10.7	10.4	7.9	15.4	16.0	14.3	29.7	31.0	30.1	6.5	3.0	4.7	2.9		4.0	9.5	4.7	11.2
300	450	60	30	13.4	9.4	9.4	13.8	10.5	11.3	19.6	17.1	18.7	6.9	7.4	11.8	9.0	9.5	16.9	8.4	7.6	16.8
300	450	60	27	18.8	15.8	16.7	19.9	17.7	19.4	28.5	27.0	29.6	7.3	9.3	5.5	4.7	6.6	5.9	2.7	3.3	4.4
300	450	60	24	17.1	15.1	17.0	21.9	20.6	23.4	36.1	35.7	39.2	7.8	4.9	6.0	5.4	2.5	6.5	6.7	2.5	8.4
300	450	70	35	19.4	15.8	10.1	19.7	17.0	12.0	25.6	23.6	19.4	12.4	13.6	17.3	8.6	9.7	16.4	13.7	13.5	22.1
300	450	70	31	23.4	20.8	16.0	24.5	22.7	18.7	33.0	32.0	28.8	14.5	17.1	12.7	6.0	8.5	7.2	9.7	11.0	11.4
300	450	70	28	22.2	20.6	16.8	27.0	26.2	23.2	41.2	41.2	39.0	14.7	12.5	12.8	6.3	4.0	7.4	13.4	9.9	15.1
300	600	60	27	8.7	8.8	6.7	12.2	13.1	11.8	23.1	24.9	24.4	15.5	15.9	24.3	16.3	16.6	28.1	19.6	18.5	31.8
300	600	60	24	15.7	16.8	15.7	20.0	21.9	21.6	33.7	36.4	36.9	10.2	12.0	12.3	6.4	8.1	11.5	8.2	8.6	13.8
300	600	60	21	23.4	25.5	25.4	31.4	34.3	35.0	50.8	54.5	56.0	7.3	4.3	9.4	3.6	.5	8.6	8.8	4.4	14.3
300	600	70	31	14.3	12.7	15.1	17.9	17.0	20.2	28.8	28.8	32.7	15.6	16.6	24.4	17.7	18.6	29.5	15.6	15.3	27.9
300	600	70	28	21.5	20.8	24.1	25.7	25.9	30.0	39.5	40.4	45.3	13.0	15.4	15.1	10.4	12.8	15.4	6.8	8.0	12.4
300	600	70	24	34.1	34.4	38.8	42.1	43.2	48.3	61.5	63.4	69.3	8.6	6.2	10.6	6.1	3.7	11.2	6.0	2.3	11.6
300	600	80	36	18.9	17.7	14.3	22.5	22.1	19.4	33.4	33.8	32.0	18.0	19.6	26.7	14.1	15.6	25.8	17.7	18.0	30.0
300	600	80	32	25.1	24.9	22.5	29.4	30.0	28.3	43.1	44.5	43.6	16.8	19.9	18.9	8.3	11.3	13.3	10.5	12.3	16.1
300	600	80	28	38.7	39.4	38.0	46.6	48.2	47.5	66.0	68.4	68.5	12.0	10.3	14.1	3.6	1.8	8.6	9.3	6.2	14.8
450	300	50	30	8.7	7.0	5.4	10.3	9.4	8.5	15.3	15.2	15.2	10.4	9.3	16.2	11.6	10.4	20.4	18.4	15.9	27.6
450	300	50	27	12.3	11.6	10.9	14.6	14.7	14.8	22.4	23.3	24.2	8.5	8.8	7.6	5.0	5.3	7.1	10.3	9.3	12.9
450	300	50	25	9.5	9.8	10.1	15.5	16.6	17.7	29.0	30.9	32.8	7.2	2.7	6.3	3.9		6.0	12.6	6.8	15.2
450	300	60	36	10.7	7.3	10.0	12.3	9.6	13.2	17.3	15.4	19.8	11.6	11.1	17.4	14.1	13.5	22.8	15.5	13.6	24.7
450	300	60	33	14.2	11.7	15.4	16.5	14.8	19.3	24.3	23.4	28.7	12.4	13.3	11.5	10.2	11.1	12.3	10.1	9.8	12.8
450	300	60	30	15.2	13.6	18.4	21.1	20.4	26.0	34.6	34.7	41.0	10.2	6.4	9.3	8.2	4.3	10.2	11.6	6.4	14.2
450	300	70	42	19.2	16.1	13.2	20.7	18.5	16.3	25.8	24.3	22.9	15.3	15.5	21.1	11.8	11.9	20.6	19.0	17.8	28.3
450	300	70	38	20.9	18.8	16.8	23.2	21.9	20.7	31.0	30.5	30.1	18.1	19.7	17.2	9.9	11.4	12.0	15.6	15.9	18.3
450	300	70	35	22.3	21.2	20.2	28.3	28.0	27.8	41.8	42.3	42.9	15.7	12.5	14.8	7.6	4.4	9.7	16.8	12.3	19.4
450	450	60	33	10.3	8.4	6.6	12.4	11.3	10.3	19.9	19.6	19.4	16.8	17.5	23.5	19.5	20.2	29.1	26.2	25.6	36.4
450	450	60	30	15.9	15.0	14.2	18.8	18.7	18.6	29.1	29.8	30.5	12.1	14.3	12.1	10.1	12.3	13.1	15.5	16.3	19.0
450	450	60	27	16.2	16.3	16.5	22.8	23.7	24.6	38.8	40.5	42.2	11.2	8.6	11.2	9.4	6.8	12.4	18.2	14.2	21.6
450	450	70	38	14.5	10.8	13.4	16.6	13.7	17.1	24.2	22.1	26.3	14.3	15.7	20.9	13.2	19.5	27.8	19.6	19.7	29.8
450	450	70	35	20.2	17.5	21.1	23.0	21.1	25.5	33.3	32.2	37.4	12.3	15.1	12.3	11.5	14.3	14.5	11.5	13.1	15.0
450	450	70	31	25.1	23.4	27.9	31.6	30.7	36.1	47.6	47.5	53.7	10.2	8.2	10.2	9.6	7.6	12.6	13.1	9.8	16.5
450	450	80	44	20.8	17.5	14.4	22.9	20.4	18.1	30.4	28.8	27.2	19.5	21.6	26.2	17.5	19.5	27.2	24.7	25.4	34.9
450	450	80	40	25.1	22.9	20.7	28.0	26.5	25.1	38.3	37.6	37.1	19.3	22.9	19.4	12.6	16.1	15.6	18.4	20.6	21.9
450	450	80	36	30.8	29.6	28.4	37.4	36.9	36.5	53.4	53.7	54.1	17.0	15.7	17.0	10.4	9.1	13.4	19.6	17.0	23.1
450	600	70	35	12.2	12.7	13.2	17.5	18.8	20.1	30.2	32.3	34.4	27.9	29.1	38.5	30.5	31.7	44.1	35.8	35.7	49.9
450	600	70	31	20.9	22.3	23.9	26.9	29.2	31.5	42.4	45.4	48.5	19.3	22.0	23.2	17.3	19.9	24.1	21.1	22.5	28.5
450	600	70	28	34.0	36.4	38.9	43.7	46.9	50.2	64.8	68.9	73.0	14.7	12.6	18.5	12.8	10.6	19.6	20.1	16.6	27.4
450	600	80	40	18.3	17.0	21.9	23.6	23.0	28.8	36.3	36.6	43.1	26.8	28.7	37.3	30.7	32.5	44.2	30.7	31.2	44.7
450	600	80	36	27.3	26.9	32.9	33.3	33.8	40.5	48.8	50.0	57.6	20.8	24.1	24.7	20.0	23.3	26.8	18.6	20.6	25.9
450	600	80	32	45.4	46.1	53.0	55.1	56.6	64.3	76.3	78.6	87.1	14.8	13.3	18.6	14.2	12.6	21.0	16.1	13.3	23.5
450	600	90	45	24.3	23.4	22.6	29.6	29.5	29.5	42.3	43.0	43.8	28.1	30.6	38.7	26.0	28.5	39.6	31.8	33.0	45.8
450	600	90	40	32.9	33.0	33.2	39.0	39.9	40.8	54.4	56.1	57.9	23.6	27.6	27.4	16.8	20.7	23.7	21.1	23.8	28.5
450	600	90	36	52.0	53.1	54.2	61.7	63.6	65.5	82.9	85.6	88.3	17.1	16.3	21.0	10.6	9.7	17.4	18.3	16.1	25.6
600	300	60	39	14.3	11.0	10.1	14.1	11.6	11.4	17.4	15.7	16.3	19.6	19.3	27.2	23.4	23.1	33.9	27.1	25.5	38.2
600	300	60	36	18.0	15.7	15.7	18.5	17.0	17.9	24.6	23.9	25.5	12.6	13.8	13.5	11.7	12.9	15.6	14.1	13.9	18.5
600	300	60	33	21.0	19.7	20.7	25.2	24.7	26.5	37.0	37.2	39.8	11.8	8.2	12.7	11.1	7.4	15.0	16.9	11.9	21.2
600	300	70	45	15.7	10.6	14.1	15.5	11.2	15.5	18.8	15.3	20.4	20.0	20.4	27.6	25.1	25.4	35.6	23.5	22.5	34.6
600	300	70	42	19.3	15.2	19.7	19.8	16.5	21.8	25.9	23.4	29.4	15.7	17.6	16.7	16.1	17.9	20.0	13.2	13.7	17.6
600	300	70	38	26.6	23.5	28.9	30.8	28.5	34.7	42.5	41.0	48.1	14.0	11.1	14.9	14.6	11.6	18.4	15.0	10.7	19.4
600	300	80	52	22.3	17.7	15.4	22.1	18.3	16.8	25.4	22.3	21.6	24.8	25.8	32.4	23.9	24.9	34.4	28.1	27.8	39.2
600	300	80	48	24.2	20.6	19.3	24.8	21.9	21.4	30.8	28.8	29.1	22.6	25.1	23.6	17.1	19.5	20.9	19.9	21.0	24.3
600	300	80	44	32.2	29.5	29.2	36.4	34.5	35.0	48.1	47.1	48.3	20.7	18.4	21.6	15.3	12.9	19.1	21.5	17.8	25.9
600	450	70	42	17.0	13.6	12.4	17.4	14.7	14.4	23.2	21.3	21.8	29.1	30.7	37.5	34.3	35.9	45.8	38.2	38.4	50.1
600	450	70	38	24.0	21.5	21.4	25.1	23.4	24.1	33.7	32.8	34.2	18.6	21.7	20.4	19.2	22.2	24.0	21.6	23.4	26.9
600	450	70	35	29.6	28.1	28.9	34.4	33.7	35.3	48.6	48.7	51.1	18.9	17.2	20.6	19.6	17.9	24.4	25.4	22.4	30.7
600	450	80	48	19.5	14.3	17.6	19.9	15.4	19.5	25.7	22.0	26.9	26.6	28.9	35.1	33.1	35.4	44.6	31.6	32.6	43.6
600	450	80	44	26.7	22.4	26.7	27.8	24.3	29.4	36.4	33.7	39.6	18.8	22.6	20.6	20.7	24.4	25.4	17.7	20.2	23.0
600	450	80	40	37.0	33.7	39.0	41.8	39.3	45.3	56.0	54.3	61.2	18.0	16.9	19.8	20.0	18.9	24.7	20.5	18.1	25.8
600	450	90	54	24.9	20.1	17.6	25.2	21.2	19.5	31.0	27.8	26.9	32.3	35.3	40.8	32.9	35.8	44.3	37.2	38.8	49.1
600	450	90	49	31.3	27.5	26.0	32.4	29.4	28.7	41.0	38.7	38.8	26.3	30.8	28.2	22.2	26.6	27.0	25.1	28.1	30.4
600	450	90	45	42.3	39.5	39.0	47.1	45.1	45.4	61.4	60.1	61.2	25.2	24.8	27.0	21.2	20.8	26.0	27.5	25.8	32.8
600	600	70	38	23.1	22.0	23.3	26.7	26.4	28.4	37.6	38.1	40.9	39.3	41.5	51.7	44.6	46.6	59.9	46.9	47.7	62.7
600	600	70	35	29.7	29.6	31.8	34.0	34.6	37.6	47.7	49.1	52.9	26.8	30.4	32.5	27.4	30.9	36.0	28.3	30.6	37.5
600	600	70	31	48.3	49.1	52.3	56.2	57.9	61.9	75.6	78.1	82.9	22.7	21.5	28.3	23.4	22.1	32.0	27.8	25.2	36.9
600	600	80	44	26.9	24.0	29.7	30.4	28.3	34.8	41.4	40.1	47.3	38.9	41.7	51.3	45.4	48.1	60.7	42.4	43.9	58.3
600	600	80	40	34.9	33.0	39.6	39.2	38.1	45.5	52.9	52.6	60.8	28.2	32.4	33.9	30.0	34.2	38.7	25.6	28.5	34.8
600	600	80	36	57.1	56.1	63.7	65.0	64.9	73.3	84.4	85.1	94.3	23.8	23.2	29.4	25.7	25.1	34.3	24.8	22.8	33.9
600	600	90	49	31.7	29.3	29.2	35.3	33.6	34.3	46.2	45.4	46.8	41.3	44.7	53.6	41.8	45.2	57.1	44.6	46.7	60.4
600	600	90	45	37.3	35.8	36.7	41.6	40.9	42.6	55.3	55.4	57.9	33.2	38.1	38.9	29.0	33.9	37.7	30.4	34.0	39.6
600	600	90	40	62.3	61.8	63.7	70.3	70.6	73.2	89.7	90.8	94.2	27.3	27.3	32.9	23.3	23.3	31.9	28.1	26.8	37.2

TABLE F-1C. AVERAGE TOTAL DELAY ON THE INBOUND APPROACH (SECONDS/VEHICLE) FOR GEOMETRY 5*5

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	21.7	19.1	14.3	15.6	13.9	9.9	13.1	12.1	8.9	1.4		5.2	1.1		7.8	6.0	2.7	13.2
300	300	50	25	22.7	21.1	17.3	17.4	16.6	13.5	17.5	17.5	15.3	4.7	4.2	1.8				3.1	1.3	3.7
300	300	50	22	10.2	9.6	6.8	8.6	8.8	6.8	14.5	15.5	14.2	3.4		.5				5.4		6.0
300	300	60	33	22.8	18.4	18.1	16.7	13.2	13.6	14.2	11.4	12.6	5.4	4.2	9.2	6.3	5.0	13.1	5.9	3.3	13.2
300	300	60	30	24.3	20.9	21.5	18.9	16.4	17.8	19.1	17.3	19.5	10.7	10.9	7.8	6.9	7.1	7.0	5.1	3.9	5.7
300	300	60	27	15.1	12.7	14.3	13.4	11.8	14.2	19.3	18.5	21.7	9.2	4.5	6.2	5.5	.9	5.6	7.1	1.1	7.7
300	300	70	38	26.7	22.7	16.6	20.6	17.5	12.1	18.0	15.7	11.1	10.1	9.5	13.9	5.0	4.3	11.8	10.4	8.4	17.6
300	300	70	35	25.3	22.4	17.2	20.0	17.9	13.5	20.2	18.8	15.3	18.0	18.9	15.1	8.3	9.1	8.4	12.2	11.7	12.8
300	300	70	31	17.9	16.0	11.8	16.3	15.1	11.7	22.2	21.8	19.2	15.3	11.3	12.4	5.7	1.7	5.8	13.0	7.7	13.6
300	450	50	25	21.0	18.2	13.2	15.5	13.5	9.3	15.4	14.2	10.8	4.5	4.5	9.2	5.6	5.6	13.3	10.6	9.2	18.7
300	450	50	22	23.6	21.8	17.9	18.9	17.9	14.7	21.6	21.4	19.0	4.6	6.0	2.6	1.0	2.4	2.0	4.5	4.6	6.0
300	450	50	20	12.0	11.2	8.2	10.9	10.9	8.7	19.3	20.1	18.7	5.4	2.0	3.4	2.0		2.9	8.9	4.2	10.4
300	450	60	30	23.6	19.1	18.5	18.1	14.3	14.6	18.1	15.1	16.1	5.4	6.0	10.1	7.8	8.4	15.4	7.4	6.7	15.5
300	450	60	27	26.3	22.7	23.1	21.5	18.7	20.0	24.2	22.2	24.3	8.1	10.2	6.1	5.8	7.9	6.8	4.0	4.8	5.5
300	450	60	24	18.6	16.0	17.4	17.5	15.7	17.9	25.9	24.9	27.9	7.8	5.1	5.8	5.7	2.9	6.6	7.3	3.2	8.8
300	450	70	35	24.9	20.8	14.5	19.4	16.1	10.6	19.4	16.9	12.1	12.1	13.4	16.8	8.5	9.7	16.1	13.9	13.8	22.0
300	450	70	31	26.2	23.0	17.7	21.4	19.1	14.5	24.1	22.6	18.8	16.5	19.3	14.5	8.2	10.9	9.2	12.2	13.6	13.7
300	450	70	28	19.0	16.9	12.5	17.9	16.6	13.0	26.3	25.8	23.0	15.9	13.9	13.9	7.8	5.7	8.7	15.2	11.8	16.6
300	600	60	27	15.3	14.9	12.3	13.0	13.4	11.5	18.1	19.3	18.2	12.3	12.8	20.9	13.4	13.8	24.9	16.9	16.0	28.9
300	600	60	24	19.6	20.2	18.5	18.0	19.4	18.5	25.9	28.0	28.0	9.4	11.3	11.3	5.8	7.7	10.6	7.8	8.4	13.2
300	600	60	21	21.4	22.9	22.3	23.5	25.8	26.0	37.0	40.2	41.1	5.7	2.8	7.5	2.3		7.1	7.7	3.5	13.0
300	600	70	31	21.1	19.0	20.8	18.8	17.4	20.0	23.9	23.3	26.7	13.7	14.8	22.2	16.0		27.5	14.1	13.9	26.2
300	600	70	28	25.5	24.3	27.1	23.9	23.5	27.1	31.8	32.2	36.6	13.3	15.9	15.2	11.0	13.5	15.8	7.7	8.9	13.0
300	600	70	24	32.2	32.0	35.8	34.3	34.9	39.4	47.9	49.2	54.6	8.2	5.9	10.0	6.0	3.7	10.8	6.1	2.5	11.4
300	600	80	36	21.1	19.3	15.4	18.7	17.8	14.6	23.8	23.7	21.3	17.2	18.9	25.7	13.5	15.2	25.0	17.4	17.9	29.5
300	600	80	32	24.5	23.7	20.7	22.9	22.9	20.8	30.8	31.6	30.2	18.4	21.6	20.2	10.0	13.2	14.9	12.5	14.4	17.9
300	600	80	28	32.1	32.3	30.3	34.2	35.2	34.0	47.7	49.5	49.1	12.8	11.2	14.6	4.6	3.0	9.4	10.5	7.6	15.9
450	300	50	30	16.2	13.9	11.8	11.9	10.4	9.0	11.0	10.4	9.8	7.9	6.9	13.5	9.4	8.3	17.9	16.4	14.0	25.4
450	300	50	27	17.0	15.7	14.5	13.4	12.9	12.5	15.4	15.7	16.1	8.3	8.8	7.2	5.1	5.5	7.0	10.6	9.7	13.0
450	300	50	25	8.3	8.0	7.8	8.4	8.9	9.5	16.0	17.3	18.7	6.3	1.9	5.2	3.3		5.1	12.2	6.5	14.6
450	300	60	36	18.3	14.3	16.6	14.0	10.8	13.8	13.2	10.8	14.6	10.3	9.9	15.9	13.0	12.6	21.5	14.7	12.9	23.7
450	300	60	33	19.0	16.0	19.2	15.5	13.2	17.2	17.4	16.0	20.8	13.4	14.5	12.3	11.4	12.5	13.3	11.7	11.4	14.1
450	300	60	30	14.0	12.0	16.2	14.2	12.9	17.9	21.8	21.3	27.1	10.5	6.8	9.4	8.7	4.9	10.6	12.4	7.3	14.7
450	300	70	42	22.1	18.5	15.0	17.8	15.0	12.3	17.0	15.0	13.1	15.2	15.5	20.8	12.0	12.2	20.5	19.4	18.3	28.4
450	300	70	38	21.1	18.5	15.9	17.5	15.7	13.9	19.5	18.4	17.5	20.3	22.0	19.2	12.4	14.0	14.2	18.4	18.8	20.8
450	300	70	35	16.5	14.9	13.3	16.6	15.8	15.0	24.3	24.2	24.3	17.1	14.1	16.0	9.4	6.2	11.2	18.8	14.4	21.2
450	450	60	33	16.1	13.7	11.3	12.4	10.7	9.2	14.1	13.2	12.5	13.8	14.7	20.3	16.7	17.6	26.2	23.7	23.3	33.7
450	450	60	30	19.0	17.6	16.2	16.0	15.4	14.8	20.5	20.7	20.9	11.5	13.8	11.3	9.7	12.0	12.5	15.3	16.3	18.6
450	450	60	27	13.4	12.9	12.5	14.1	14.4	14.8	24.2	25.4	26.6	9.9	7.4	9.6	8.3	5.7	11.0	17.3	13.5	20.5
450	450	70	38	20.5	16.3	18.4	16.8	13.3	16.2	18.5	15.9	19.5	12.5	14.0	18.9	16.7	18.1	26.1	18.4	18.5	28.3
450	450	70	35	23.4	20.2	23.3	20.4	18.0	21.8	24.9	23.3	27.9	12.8	15.8	12.6	12.3	15.3	15.1	12.6	14.2	15.9
450	450	70	31	22.4	20.1	24.2	23.1	21.6	26.4	33.2	32.6	38.2	10.0	8.2	9.8	9.7	7.8	12.4	13.4	10.2	16.6
450	450	80	44	22.1	18.3	14.6	18.4	15.4	12.5	20.1	17.9	15.8	18.9	21.1	25.4	17.2	19.3	26.6	24.6	25.5	34.6
450	450	80	40	23.7	20.9	18.2	20.7	18.7	16.8	25.2	24.0	22.9	21.1	24.7	20.9	14.6	18.2	17.4	20.7	23.0	24.0
450	450	80	36	23.4	21.6	19.9	24.1	23.1	22.2	34.3	34.1	33.9	18.0	16.8	17.7	11.7	10.4	14.4	21.1	18.6	24.4
450	600	70	35	14.7	14.6	14.6	14.1	14.8	15.6	20.9	22.5	24.1	24.5	25.8	34.8	27.3	28.6	40.6	32.9	32.9	46.7
450	600	70	31	20.6	21.5	22.5	20.8	22.5	24.3	30.4	32.9	35.5	18.2	21.0	21.9	16.4	19.2	23.0	20.5	22.0	27.7
450	600	70	28	27.7	29.6	31.6	31.6	34.3	37.0	46.9	50.4	53.9	12.8	10.8	16.5	11.2	9.1	17.8	18.7	15.4	25.9
450	600	80	40	20.9	19.0	23.5	20.3	19.3	24.5	27.2	26.9	32.9	24.5	26.5	34.9	28.7	30.6	42.0	28.9	29.6	42.7
450	600	80	36	27.2	26.3	31.7	27.3	27.3	33.5	37.0	37.7	44.7	20.8	24.3	24.5	20.3	23.7	26.9	19.1	21.3	26.3
450	600	80	32	39.3	39.4	45.8	43.2	44.1	51.3	58.5	60.2	68.2	14.1	12.8	17.7	13.7	12.3	20.3	16.0	13.3	23.1
450	600	90	45	22.2	20.8	19.5	21.7	21.0	20.5	28.5	28.7	28.9	27.0	29.7	37.4	25.2	27.8	38.5	31.2	32.5	45.0
450	600	90	40	28.1	27.7	27.3	28.3	28.7	29.1	37.9	39.1	40.3	24.8	29.0	28.5	18.3	22.4	25.0	22.9	25.7	30.1
450	600	90	36	41.2	41.8	42.4	45.1	46.4	47.8	60.4	62.5	64.7	17.7	17.0	21.3	11.3	10.6	17.9	19.3	17.3	26.4
600	300	60	39	24.0	20.2	18.7	18.0	14.9	14.2	15.4	13.2	13.3	15.6	15.5	23.0	19.6	19.5	30.0	23.7	22.2	34.5
600	300	60	36	25.0	22.2	21.7	19.7	17.6	17.9	19.9	18.6	19.7	10.9	12.3	11.6	10.3	11.6	14.0	12.9	12.9	17.1
600	300	60	33	22.0	20.2	20.7	20.4	19.3	20.6	26.3	26.0	28.1	9.4	5.9	10.1	9.0	5.4	12.6	15.0	10.2	19.1
600	300	70	45	25.6	20.0	22.9	19.5	14.7	18.4	17.0	12.9	17.5	17.2	17.7	24.6	22.5	23.0	32.8	21.2	20.4	32.1
600	300	70	42	26.5	21.8	25.8	21.2	17.3	22.0	21.3	18.3	23.8	15.3	17.3	16.0	15.9	17.9	19.6	13.2	13.9	17.4
600	300	70	38	27.8	24.1	29.0	26.1	23.3	29.0	32.0	30.0	36.5	12.8	10.0	13.5	13.6	10.7	17.3	14.3	10.2	18.5
600	300	80	52	27.5	22.4	19.5	21.5	17.1	15.0	18.9	15.3	14.1	23.2	24.4	30.6	22.5	23.6	32.9	27.0	26.8	37.9
600	300	80	48	26.7	22.6	20.7	21.4	18.0	17.0	21.6	19.0	18.8	23.4	26.0	24.1	18.0	20.6	21.7	21.1	22.4	25.3
600	300	80	44	28.7	25.5	24.6	27.1	24.7	24.6	32.9	31.3	32.0	20.7	18.5	21.4	15.5	13.3	19.2	22.0	18.5	26.1
600	450	70	42	25.2	21.2	19.5	19.7	16.5	15.6	19.6	17.2	17.1	24.6	26.4	32.9	30.1	31.8	41.3	34.2	34.6	45.9
600	450	70	38	29.5	26.4	25.7	24.7	22.5	22.6	27.4	26.0	26.9	16.5	19.7	18.1	17.3	20.5	21.9	20.0	21.9	25.0
600	450	70	35	29.0	27.0	27.3	28.0	26.7	27.8	36.4	35.9	37.8	16.0	14.4	17.6	17.0	15.4	21.5	23.1	20.2	28.1
600	450	80	48	27.9	22.1	24.8	22.3	17.3	20.9	22.3	18.1	22.4	23.3	25.7	31.6	30.1	32.5	41.3	28.8	29.9	40.6
600	450	80	44	32.3	27.5	31.2	27.6	23.5	28.1	30.3	27.0	32.4	17.9	21.8	19.5	20.0	23.8	24.5	17.3	19.9	22.4
600	450	80	40	36.6	32.8	37.5	35.5	32.5	38.0	43.9	41.7	48.0	16.3	15.4	17.9	18.6	17.6	23.1	19.3	17.0	24.4
600	450	90	54	28.5	23.2	20.2	23.0	18.5	16.2	23.0	19.2	17.8	30.3	33.3	38.5	31.1	34.1	42.3	35.6	37.3	47.3
600	450	90	49	32.2	27.8	25.8	27.5	23.9	22.6	30.2	27.4	26.9	26.6	31.1	28.2	22.7	27.2	27.3	25.8	29.0	30.9
600	450	90	45	37.3	33.9	32.8	36.2	33.6	33.4	44.6	42.8	43.3	24.7	24.4	26.3	21.0	20.7	25.5	27.5	25.9	32.6
600	600	70	38	27.9	26.3	27.0	25.6	24.7	26.2	30.7	30.6	32.9	34.4	36.7	46.5	39.9	42.1	55.0	42.5	43.4	58.1
600	600	70	35	31.7	31.1	32.7	30.1	30.3	32.7	38.0	38.9	42.2	24.2	27.9	29.7	25.0	28.7	33.4	26.2	28.6	35.1
600	600	70	31	44.3	44.6	47.3	46.4	47.5	51.0	60.0	61.9	66.1	19.3	18.2	24.8	20.3	19.1	28.7	24.9	22.5	33.8
600	600	80	44	31.8	28.4	33.5	29.5	26.8	32.8	34.6	32.7	39.5	35.2	38.1	47.3	41.9	44.7	57.0	39.2	40.7	54.8
600	600	80	40	37.1	34.6	40.7	35.5	33.9	40.8	43.4	42.5	50.2	26.8	31.2	32.3	28.9	33.2	37.3	24.7	27.7	33.7
600	600	80	36	53.3	51.8	58.9	55.4	54.7	62.6	68.9	69.0	77.7	21.6	21.1	27.0	23.8	23.3	32.2	23.1	21.3	32.0
600	600	90	49	32.0	29.0	28.3	29.7	27.5	27.6	34.8	33.4	34.3	38.7	42.3	50.9	39.5	43.0	54.6	42.6	44.8	58.2
600	600	90	45	34.8	32.8	33.1	33.2	32.0	33.1	41.1	40.7	42.6	33.0	38.0	38.4	29.1	34.0	37.5	30.7	34.4	39.6
600	600	90	40	53.8	52.8	54.1	55.9	55.7	57.8	69.5	70.1	73.0	26.3	26.5	31.7	22.6	22.7	31.0	27.6	26.5	36.5

TABLE F-1D. AVERAGE TOTAL DELAY ON THE INBOUND APPROACH (SECONDS/VEHICLE) FOR GEOMETRY 6*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	10.8	12.3	9.3	10.6	12.8	10.7	10.0	13.0	11.7	2.0	1.1	7.3	2.7	1.8	11.0	12.4	10.2	21.2
300	300	50	25	14.1	16.5	14.6	14.6	17.8	16.6	16.8	20.8	20.4	1.3	1.9					5.6	4.9	7.8
300	300	50	22	7.5	10.9	9.9	11.6	15.8	15.7	19.5	24.5	25.1	.3						8.2	2.7	10.3
300	300	60	33	11.1	10.8	12.3	10.9	11.3	13.6	10.3	11.5	14.6	6.9	6.7	12.2	8.9	8.6	17.2	13.2	11.7	22.0
300	300	60	30	14.9	15.5	18.0	15.4	16.8	20.1	17.6	19.8	23.9	8.2	9.5	6.9	5.6	6.8	7.2	8.5	8.4	10.6
300	300	60	27	11.5	13.1	16.6	15.7	18.0	22.3	23.5	26.7	31.8	7.0	3.4	5.6	4.5	.9	6.1	10.8	5.9	12.9
300	300	70	38	17.1	17.1	12.9	16.8	17.7	14.2	16.2	17.9	15.2	10.6	11.1	15.9	6.7	7.1	15.0	16.8	15.9	25.6
300	300	70	35	18.0	19.1	15.8	18.5	20.4	17.9	20.7	23.4	21.7	14.7	16.6	13.3	6.0	7.9	7.6	14.7	15.3	16.8
300	300	70	31	16.4	18.5	16.2	20.6	23.4	21.9	28.5	32.1	31.4	12.2	9.3	10.8	3.7	.8	5.3	15.8	11.6	17.9
300	450	50	25	12.4	13.6	10.5	12.7	14.7	12.4	14.6	17.5	15.9	5.1	6.2	11.3	7.3	8.3	16.5	17.0	16.7	26.7
300	450	50	22	17.3	19.6	17.4	18.4	21.4	20.1	23.1	26.9	26.4	1.2	3.8	.8		1.3	1.3	7.1	8.3	10.1
300	450	50	20	11.5	14.7	13.5	16.2	20.2	19.9	26.6	31.4	31.9	2.4	.1	1.9	.1		2.5	11.8	8.1	14.7
300	450	60	30	14.2	13.7	15.0	14.5	14.8	16.9	16.5	17.5	20.4	6.9	8.6	13.1	10.4	12.0	19.5	14.7	15.1	24.4
300	450	60	27	19.2	19.6	21.9	20.2	21.4	24.5	24.9	27.0	30.8	5.7	8.9	5.2	4.5	7.6	7.0	7.5	9.3	10.5
300	450	60	24	17.3	18.7	22.0	22.0	24.2	28.3	32.4	35.4	40.3	5.7	4.1	5.2	4.7	3.0	7.1	11.1	8.1	14.0
300	450	70	35	17.6	17.5	13.1	17.9	18.6	14.9	19.9	21.4	18.5	12.7	15.0	18.9	10.2	12.5	19.3	20.3	21.3	30.0
300	450	70	31	21.1	22.0	18.6	22.2	23.9	21.2	26.9	29.4	27.5	13.2	17.0	12.7	6.0	9.8	8.5	14.8	17.2	17.8
300	450	70	28	19.8	21.7	19.2	24.5	27.2	25.5	34.9	38.4	37.5	12.9	11.9	12.4	5.9	4.8	8.3	18.0	15.7	21.0
300	600	60	27	11.1	14.7	14.0	14.6	19.0	19.1	21.7	26.9	27.8	11.6	13.2	21.7	13.8	15.3	26.9	22.0	22.2	35.6
300	600	60	24	17.7	22.3	22.5	21.9	27.3	28.4	31.8	38.0	39.8	4.8	7.8	8.2	2.3	5.3	8.7	9.1	10.8	16.0
300	600	60	21	25.3	30.9	32.1	33.2	39.6	41.6	48.8	55.9	58.7	1.4		4.7			5.4	9.3	6.1	16.1
300	600	70	31	16.2	18.0	21.7	19.7	22.3	26.7	26.8	30.2	35.4	13.9	16.0	23.9	17.3	19.4	30.3	20.2	21.1	33.8
300	600	70	28	22.9	25.7	30.3	27.1	30.7	36.1	37.0	41.3	47.6	9.6	13.3	13.0	8.4	12.0	14.7	9.9	12.2	16.8
300	600	70	24	35.4	39.1	44.8	43.3	47.8	54.3	58.8	64.2	71.4	4.7	3.6	8.1	3.7	2.4	10.0	8.6	6.1	15.4
300	600	80	36	18.2	20.4	18.3	21.7	24.7	23.4	28.8	32.6	32.1	16.5	19.3	26.5	13.9	16.7	27.0	22.6	24.1	36.2
300	600	80	32	23.9	27.1	26.0	28.1	32.2	31.8	38.0	42.8	43.3	13.8	18.1	17.2	6.6	10.8	12.9	13.8	16.8	20.7
300	600	80	28	37.3	41.5	41.4	45.2	50.2	50.9	60.7	66.6	68.0	8.5	8.0	11.8	1.4	.8	7.8	12.1	10.2	19.0
450	300	50	30	9.3	11.1	10.8	10.8	13.4	13.9	12.0	15.4	16.7	9.6	9.6	16.7	12.1	12.1	22.2	23.9	22.6	34.5
450	300	50	27	12.4	15.2	15.9	14.7	18.2	19.7	18.6	23.0	25.2	6.0	7.6	6.5	3.9	5.4	7.3	14.3	14.4	18.2
450	300	50	25	9.5	13.3	14.9	15.4	20.0	22.4	25.1	30.4	33.7	4.3	1.0	4.7	2.4		5.7	16.1	11.5	20.0
450	300	60	36	10.7	10.7	14.8	12.2	13.0	17.9	13.4	15.0	20.7	12.8	13.5	19.9	16.6	17.3	26.7	23.1	22.4	33.7
450	300	60	33	13.7	14.7	19.8	16.0	17.7	23.6	19.9	22.5	29.1	12.0	14.2	12.5	11.2	13.3	14.6	16.2	17.0	20.1
450	300	60	30	14.5	16.4	22.5	20.4	23.2	30.0	30.1	33.6	41.3	9.4	6.8	9.8	8.7	6.0	12.1	17.2	13.2	21.0
450	300	70	42	16.6	17.0	15.3	18.0	19.3	18.4	19.2	21.3	21.2	16.8	18.2	23.9	14.7	16.0	24.8	26.9	26.9	37.5
450	300	70	38	17.8	19.2	18.5	20.1	22.3	22.4	24.0	27.0	27.9	18.0	20.8	18.5	11.2	14.0	14.6	22.0	23.5	25.9
450	300	70	35	19.0	21.4	21.7	25.0	28.1	29.2	34.6	38.6	40.5	15.2	13.2	15.6	8.5	6.4	11.9	22.7	19.4	26.6
450	450	60	33	11.6	13.2	12.7	13.6	16.0	16.3	17.3	20.5	21.6	15.5	17.4	23.5	19.5	21.4	30.5	31.3	31.9	42.8
450	450	60	30	16.8	19.4	19.9	19.6	23.0	24.2	26.1	30.2	32.3	9.2	12.7	10.6	8.6	12.0	12.9	19.0	21.1	23.8
450	450	60	27	16.9	20.5	22.0	23.4	27.8	30.0	35.6	40.7	43.8	7.9	6.5	9.2	7.4	6.0	11.7	21.2	18.5	26.0
450	450	70	38	15.2	15.0	18.9	17.2	17.8	22.5	21.0	22.3	27.9	15.1	17.7	23.0	20.3	22.9	31.3	26.8	28.1	38.3
450	450	70	35	20.4	21.2	26.1	23.2	24.8	30.5	29.7	32.0	38.5	11.5	15.6	12.8	12.1	16.1	16.4	17.2	19.9	21.9
450	450	70	31	25.1	26.9	32.8	31.6	34.2	40.9	43.8	47.1	54.6	9.0	8.2	10.2	9.7	8.9	14.0	18.2	16.1	23.0
450	450	80	44	18.8	19.1	17.2	20.9	21.9	20.9	24.6	26.4	26.2	20.6	23.9	28.6	19.9	23.1	30.9	32.2	34.1	43.6
450	450	80	40	22.8	24.0	23.1	25.6	27.6	27.5	32.0	34.8	35.6	18.9	23.6	20.2	13.5	18.2	17.8	24.3	27.7	29.1
450	450	80	36	28.3	30.5	30.6	34.7	37.7	38.7	46.9	50.7	52.4	16.0	15.9	17.3	10.8	10.7	15.1	25.1	23.6	29.8
450	600	70	35	14.5	18.5	20.3	19.8	24.5	27.2	28.6	34.2	37.6	24.8	27.3	36.7	28.8	31.2	43.7	39.2	40.2	54.5
450	600	70	31	22.8	27.7	30.5	28.8	34.5	38.1	40.4	46.9	51.3	14.7	18.6	19.9	14.0	17.8	22.1	22.9	25.5	31.6
450	600	70	28	35.7	41.6	45.4	45.3	52.0	56.7	62.7	70.1	75.6	9.6	8.7	14.8	9.1	8.1	17.2	21.4	19.1	30.0
450	600	80	40	20.0	22.1	28.4	25.2	28.2	35.2	34.1	37.8	45.7	25.8	28.9	37.7	31.1	34.1	45.9	36.1	37.8	51.4
450	600	80	36	28.6	31.7	39.0	34.5	38.5	46.5	46.2	50.9	59.7	18.2	22.8	23.4	18.8	23.3	27.0	22.4	25.6	31.1
450	600	80	32	46.5	50.6	58.9	56.2	61.1	70.1	73.5	79.2	89.0	11.8	11.5	16.9	12.5	12.2	20.6	19.5	17.9	28.2
450	600	90	45	23.4	26.0	26.5	28.6	32.0	33.3	37.5	41.7	43.8	27.4	31.2	39.3	26.7	30.4	41.5	37.5	39.9	52.8
450	600	90	40	31.6	35.2	36.7	37.6	41.9	44.2	49.2	54.4	57.5	21.3	26.5	26.5	15.9	21.1	24.1	25.3	29.1	33.9
450	600	90	36	50.5	55.0	57.5	60.1	65.5	68.7	77.4	83.6	87.7	14.4	14.8	19.6	9.2	9.5	17.3	22.0	21.0	30.6
600	300	60	39	10.5	10.7	11.1	10.2	11.2	12.4	9.7	11.5	13.4	20.7	21.7	29.6	25.9	26.8	37.7	34.7	34.3	47.1
600	300	60	36	13.8	14.9	16.3	14.3	16.2	18.4	16.5	19.2	22.2	12.2	14.6	14.4	12.7	15.0	17.9	20.0	21.1	25.7
600	300	60	33	16.6	18.7	21.1	20.8	23.7	26.8	28.7	32.4	36.3	10.9	8.5	13.1	11.6	9.1	16.8	22.4	18.6	28.1
600	300	70	45	11.3	9.7	14.5	11.0	10.2	15.8	10.5	10.4	16.8	23.2	24.8	32.1	29.7	31.2	41.5	33.1	33.4	45.5
600	300	70	42	14.5	13.8	19.6	14.9	15.1	21.7	17.1	18.1	25.5	17.4	20.5	19.7	19.2	22.2	24.4	21.3	23.0	27.0
600	300	70	38	21.6	21.9	28.7	25.7	26.9	34.4	33.6	35.5	43.9	15.3	13.5	17.5	17.2	15.4	22.3	22.6	19.5	28.3
600	300	80	52	15.3	14.1	13.1	15.0	14.6	14.5	14.4	14.9	15.5	28.3	30.6	37.2	28.8	31.0	40.6	38.0	38.9	50.4
600	300	80	48	16.8	16.6	16.6	17.3	17.9	18.7	19.5	20.9	22.5	24.6	28.3	26.8	20.4	24.1	25.6	28.2	30.6	33.9
600	300	80	44	24.5	25.3	26.3	28.7	30.3	32.1	36.6	39.0	41.6	22.2	21.1	24.4	18.2	17.0	23.3	29.4	27.0	35.1
600	450	70	42	14.0	14.0	14.2	14.3	15.0	16.0	16.2	17.8	19.6	29.8	32.6	39.6	36.4	39.2	49.2	45.3	46.8	58.5
600	450	70	38	20.5	21.5	22.7	21.6	23.3	25.3	26.3	28.8	31.6	17.8	22.1	20.9	19.7	24.0	25.8	27.1	30.1	33.7
600	450	70	35	25.9	27.9	30.0	30.6	33.4	36.3	41.0	44.6	48.3	17.6	17.1	20.6	19.7	19.1	25.7	30.5	28.7	37.1
600	450	80	48	15.8	14.0	18.6	16.1	15.1	20.5	18.1	17.9	24.1	29.4	32.9	39.2	37.3	40.7	50.0	40.8	43.0	54.1
600	450	80	44	22.6	21.8	27.4	23.6	23.6	30.0	28.3	29.1	36.3	20.1	25.0	23.2	23.3	28.2	29.4	25.4	29.0	32.0
600	450	80	40	32.7	32.8	39.4	37.4	38.4	45.7	47.8	49.6	57.7	18.8	18.9	21.9	22.2	22.3	28.2	27.7	26.5	34.2
600	450	90	54	18.6	17.2	16.1	18.8	18.3	17.9	20.8	21.0	21.5	35.4	39.6	45.2	37.4	41.4	50.1	46.6	49.4	59.9
600	450	90	49	24.5	24.2	24.0	25.6	26.0	26.6	30.3	31.5	32.9	27.9	33.5	31.0	25.1	30.7	31.2	33.0	37.3	39.6
600	450	90	45	35.4	36.0	36.8	40.1	41.5	43.1	50.5	52.7	55.1	26.3	27.1	29.4	23.7	24.4	29.7	35.0	34.4	41.5
600	600	70	38	21.1	23.5	26.0	24.6	27.7	31.1	31.7	35.6	39.8	38.3	41.6	52.0	44.9	48.2	61.5	52.3	54.2	69.4
600	600	70	35	27.2	30.5	34.1	31.4	35.6	39.9	41.3	46.2	51.3	24.2	29.0	31.2	26.1	30.9	36.1	32.1	35.5	42.5
600	600	70	31	45.6	49.9	54.4	53.5	58.6	63.9	69.1	75.0	81.1	19.6	19.6	26.6	21.7	21.6	31.6	31.1	29.7	41.5
600	600	80	44	24.2	24.8	31.8	27.7	29.0	36.8	34.8	36.9	45.5	40.0	44.0	53.6	47.8	51.7	64.4	49.9	52.5	67.0
600	600	80	40	31.8	33.3	41.3	36.0	38.4	47.1	45.9	49.0	58.6	27.7	33.2	34.7	30.9	36.3	40.8	31.5	35.6	42.0
600	600	80	36	53.8	56.3	65.2	61.7	65.0	74.7	77.2	81.3	91.9	22.8	23.4	29.7	26.1	26.7	36.0	30.2	29.5	40.6
600	600	90	49	26.4	27.5	28.7	29.9	31.7	33.7	37.0	39.6	42.4	42.6	47.3	56.3	44.5	49.1	61.1	52.3	55.6	69.5
600	600	90	45	31.6	33.6	35.8	35.8	38.6	41.6	45.7	49.2	53.0	33.0	39.1	40.0	30.2	36.2	40.1	36.6	41.3	47.0
600	600	90	40	56.4	59.4	62.5	64.3	68.1	72.0	79.9	84.4	89.2	26.6	27.9	33.6	24.0	25.2	33.9	33.8	33.7	44.2

TABLE F-1E. AVERAGE TOTAL DELAY ON THE INBOUND APPROACH (SECONDS/VEHICLE) FOR GEOMETRY 7*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	6.1	6.9	3.5	5.7	7.4	4.7	5.1	7.6	5.7	12.2	7.0	12.7	9.1	3.9	12.6	14.9	8.4	18.9
300	300	50	25	8.2	10.1	7.6	8.6	11.3	9.6	10.8	14.2	13.3	16.4	12.7	10.3	8.6	4.9	5.5	13.0	8.0	10.4
300	300	50	22	3.7	6.6	5.1	7.8	11.5	10.7	15.6	20.1	20.1	17.1	8.6	11.0	9.5	1.0	6.3	17.3	7.5	14.7
300	300	60	33	11.0	10.1	11.1	10.7	10.6	12.3	10.1	10.7	13.3	15.9	11.4	16.4	14.1	9.5	17.6	14.6	8.7	18.6
300	300	60	30	13.7	13.8	15.7	14.1	15.0	17.7	16.2	17.9	21.4	22.1	19.1	16.0	15.6	12.5	12.5	14.7	10.3	12.1
300	300	60	27	12.4	13.5	16.4	16.5	18.4	22.1	24.3	27.0	31.5	22.6	14.7	16.5	16.3	8.4	13.1	18.8	9.6	16.1
300	300	70	38	16.8	16.3	11.5	16.5	16.8	12.8	15.8	17.0	13.7	18.4	14.6	19.0	10.7	6.7	14.2	16.9	11.7	21.0
300	300	70	35	16.7	17.2	13.4	17.1	18.4	15.4	19.2	21.3	19.1	27.3	24.9	21.2	14.9	12.4	11.7	19.7	16.0	17.1
300	300	70	31	17.2	18.7	15.8	21.3	23.6	21.5	29.1	32.2	30.9	26.6	19.4	20.5	14.3	7.1	11.2	22.6	14.1	19.9
300	450	50	25	7.5	8.2	4.6	7.7	9.2	6.4	9.6	11.9	9.8	10.8	7.5	12.2	9.2	5.8	13.6	15.0	10.4	19.9
300	450	50	22	11.4	13.0	10.4	12.3	14.8	12.9	17.0	20.2	19.2	11.7	10.0	6.5	5.5	3.6	3.2	9.9	6.8	8.2
300	450	50	20	7.6	10.3	8.6	12.3	15.7	14.9	22.6	26.9	26.8	14.6	8.0	9.4	8.5	1.8	6.2	16.4	8.4	14.6
300	450	60	30	14.0	12.9	13.7	14.3	14.0	15.5	16.1	16.6	19.0	11.4	8.8	12.8	11.0	8.3	15.4	11.5	7.6	16.5
300	450	60	27	17.9	17.8	19.5	18.9	19.5	22.1	23.5	25.0	28.3	15.0	13.9	9.8	10.0	8.8	7.7	9.1	6.6	7.4
300	450	60	24	18.1	19.0	21.7	22.8	24.4	28.0	33.1	35.6	39.9	16.8	10.8	11.5	11.9	5.9	9.6	14.5	7.2	12.7
300	450	70	35	17.3	16.6	11.6	17.5	17.6	13.4	19.4	20.3	16.9	15.9	14.0	17.4	9.6	7.6	14.0	15.9	12.6	20.9
300	450	70	31	19.7	20.0	16.0	20.7	21.8	18.6	25.3	27.2	24.8	21.3	20.8	16.1	10.3	9.8	8.1	15.2	13.4	13.5
300	450	70	28	20.5	21.8	18.7	25.1	27.2	25.0	35.5	38.4	36.9	22.8	17.5	17.5	11.9	6.6	9.6	20.2	13.6	18.5
300	600	60	27	4.3	7.4	6.1	7.7	11.6	11.1	14.8	19.4	19.7	12.7	10.0	18.1	11.1	8.3	19.4	15.5	11.4	24.3
300	600	60	24	9.8	13.9	13.6	14.0	18.8	19.3	23.8	29.4	30.7	10.8	9.5	9.4	4.4	3.1	6.1	7.4	4.8	9.5
300	600	60	21	19.5	24.5	25.2	27.4	33.2	34.6	42.8	49.5	51.7	9.1	3.0	7.7	2.9		4.5	9.3	1.9	11.4
300	600	70	31	14.1	15.3	18.5	17.5	19.5	23.5	24.5	27.4	32.1	13.8	11.7	19.1	13.4	11.2	21.7	12.5	9.0	21.3
300	600	70	28	19.6	21.9	26.0	23.8	26.8	31.7	33.6	37.4	43.1	14.4	13.7	13.0	9.3	8.6	10.9	7.0	5.0	9.1
300	600	70	24	34.3	37.5	42.6	42.1	46.1	52.0	57.6	62.4	69.1	11.3	5.8	9.9	6.4	.8	7.9	7.4	.6	9.5
300	600	80	36	15.9	17.6	15.0	19.3	21.8	20.0	26.3	29.6	28.6	15.2	13.7	20.5	8.8	7.3	17.1	13.7	10.9	22.5
300	600	80	32	20.5	23.2	21.6	24.7	28.2	27.3	34.5	38.7	38.7	17.3	17.3	16.0	6.3	6.2	7.9	9.7	8.4	11.9
300	600	80	28	36.0	39.7	39.0	43.9	48.3	48.4	59.3	64.6	65.5	13.8	9.0	12.4	2.9		4.5	9.8	3.6	11.9
450	300	50	30	5.5	6.8	5.9	7.0	9.0	8.9	8.1	10.9	11.6	15.5	11.3	17.9	14.2	9.9	19.6	22.1	16.6	28.0
450	300	50	27	7.5	9.7	9.9	9.7	12.7	13.6	13.6	17.4	19.1	16.8	14.0	12.5	10.9	8.0	9.5	17.4	13.2	16.5
450	300	50	25	6.8	9.9	11.0	12.6	16.6	18.5	22.2	27.0	29.6	16.9	9.3	12.5	11.1	3.4	9.7	21.0	12.1	20.1
450	300	60	36	11.6	11.0	14.6	13.0	13.2	17.6	14.1	15.2	20.3	17.6	14.0	19.9	17.6	13.9	22.9	20.2	15.2	26.0
450	300	60	33	13.5	13.9	18.5	15.7	16.9	22.2	19.5	21.5	27.7	21.6	19.5	17.3	16.9	14.8	15.6	18.1	14.6	17.3
450	300	60	30	16.4	17.8	23.4	22.3	24.5	30.8	31.9	34.8	42.0	20.8	13.8	16.4	16.3	9.2	14.9	20.8	12.5	20.0
450	300	70	42	17.3	17.2	14.9	18.7	19.4	18.0	19.8	21.3	20.7	20.4	17.4	22.7	14.4	11.4	19.7	22.8	18.5	28.6
450	300	70	38	17.4	18.3	17.1	19.6	21.3	20.8	23.5	25.9	26.3	26.4	24.9	22.1	15.8	14.2	14.4	22.7	19.9	21.9
450	300	70	35	20.8	22.6	22.4	26.6	29.3	29.8	36.2	39.6	41.0	25.3	19.0	21.0	14.8	8.5	13.5	25.2	17.5	24.3
450	450	60	33	7.7	8.7	7.7	9.7	11.5	11.2	13.3	15.9	16.5	16.9	14.5	20.1	17.1	14.7	23.3	25.0	21.3	31.7
450	450	60	30	11.8	13.8	13.8	14.5	17.3	18.1	20.9	24.5	26.1	15.5	14.6	12.1	11.0	10.1	10.6	17.5	15.3	17.6
450	450	60	27	14.1	17.1	18.0	20.5	24.3	26.0	32.6	37.2	39.7	15.9	10.2	12.5	11.6	5.8	11.1	21.6	14.5	21.6
450	450	70	38	16.0	15.2	18.6	18.0	18.0	22.2	21.6	22.4	27.4	15.3	13.6	18.5	16.7	15.0	22.9	19.3	16.3	26.1
450	450	70	35	20.1	20.3	24.7	22.8	23.8	29.0	29.2	31.0	37.0	16.5	16.3	13.1	13.3	13.0	12.9	14.5	13.0	14.6
450	450	70	31	27.0	28.2	33.5	33.4	35.4	41.5	45.5	48.3	55.2	15.8	10.7	12.3	12.7	7.6	12.2	17.4	11.0	17.4
450	450	80	44	19.5	19.2	16.8	21.4	21.9	20.3	25.1	26.4	25.6	19.6	18.6	22.9	15.1	14.0	21.3	23.5	21.1	30.2
450	450	80	40	22.3	22.9	21.5	25.0	26.5	25.9	31.4	33.7	33.8	22.7	23.1	19.3	13.5	13.9	13.1	20.5	19.6	20.6
450	450	80	36	29.9	31.6	31.1	36.3	38.8	39.1	48.4	51.7	52.8	21.6	17.2	18.2	12.6	8.2	12.1	23.0	17.3	23.0
450	600	70	35	8.7	12.1	13.4	13.9	18.1	20.2	22.7	27.7	30.6	21.7	19.8	28.8	21.9	19.9	31.9	28.3	25.1	38.9
450	600	70	31	15.8	20.2	22.5	21.8	26.9	30.0	33.3	39.3	43.2	16.4	16.0	16.8	11.9	11.4	15.3	16.9	15.2	20.9
450	600	70	28	30.9	36.2	39.5	40.5	46.6	50.7	57.7	64.7	69.5	13.1	7.8	13.5	8.7	3.4	12.1	17.2	10.6	21.1
450	600	80	40	18.8	20.4	26.2	24.0	26.4	32.9	32.8	36.0	43.3	21.5	20.2	28.6	22.9	21.6	33.0	24.1	21.5	34.7
450	600	80	36	26.3	28.9	35.6	32.2	35.6	43.1	43.8	47.9	56.3	18.7	19.0	19.2	15.5	15.7	18.9	15.2	14.1	19.2
450	600	80	32	46.4	50.0	57.7	56.0	60.4	68.9	73.2	78.4	87.7	14.0	9.5	14.5	11.0	6.3	14.3	14.1	8.2	18.0
450	600	90	45	22.1	24.1	24.1	27.2	30.1	30.9	36.0	39.7	41.2	21.9	21.3	29.0	17.3	16.7	27.4	24.3	22.4	34.9
450	600	90	40	29.2	32.2	33.2	35.1	38.9	40.7	46.6	51.3	53.8	20.6	21.5	21.1	11.4	12.2	14.8	16.9	16.5	20.9
450	600	90	36	50.2	54.2	56.1	59.8	64.6	67.3	77.0	82.6	86.1	15.5	11.6	15.9	6.4	2.5	9.8	15.4	10.1	19.3
600	300	60	39	7.6	7.2	7.1	7.3	7.7	8.3	6.6	7.9	9.3	21.2	17.8	25.3	22.5	19.1	29.6	27.5	22.8	35.1
600	300	60	36	9.8	10.4	11.2	10.2	11.6	13.2	12.3	14.5	16.9	17.5	15.6	15.0	14.2	12.2	14.6	17.7	14.5	18.6
600	300	60	33	14.7	16.3	18.1	18.8	21.2	23.8	26.6	29.8	33.2	18.0	11.3	15.5	14.8	8.1	15.3	21.8	13.7	22.7
600	300	70	45	13.1	10.9	15.2	12.7	11.4	16.4	12.1	11.5	17.4	22.5	19.8	26.7	25.1	22.3	32.2	24.8	20.7	32.4
600	300	70	42	15.1	13.9	19.2	15.5	15.1	21.2	17.7	18.1	24.9	21.6	20.3	19.0	19.5	18.2	19.9	17.7	15.1	18.7
600	300	70	38	24.4	24.2	30.4	28.5	29.0	36.1	36.3	37.7	45.5	21.1	15.1	18.6	19.2	13.1	19.6	20.9	13.5	21.8
600	300	80	52	16.9	15.2	13.7	16.5	15.6	14.9	15.9	15.8	15.9	26.4	24.4	30.6	23.0	20.9	30.1	28.5	25.0	36.1
600	300	80	48	17.3	16.6	16.0	17.7	17.8	18.0	19.8	20.7	21.8	27.6	27.0	25.0	19.5	18.9	19.9	23.5	21.6	24.5
600	300	80	44	27.2	27.4	27.9	31.3	32.3	33.6	39.1	40.9	43.0	26.9	21.5	24.4	19.0	13.5	19.4	26.4	19.7	27.4
600	450	70	42	11.0	10.4	10.1	11.2	11.4	11.9	13.1	14.1	15.3	25.7	24.3	30.7	28.5	27.0	36.5	33.5	30.7	42.0
600	450	70	38	16.4	16.8	17.5	17.4	18.6	20.0	22.0	24.0	26.3	18.5	18.5	16.9	16.7	16.6	18.0	20.2	18.9	22.1
600	450	70	35	23.9	25.3	26.9	28.6	30.8	33.2	38.9	41.9	45.1	20.1	15.3	18.4	18.4	13.5	19.7	25.4	19.2	27.2
600	450	80	48	17.5	15.1	19.2	17.7	16.2	21.0	19.6	18.8	24.5	24.1	23.3	29.2	28.2	27.3	36.2	27.9	25.7	36.4
600	450	80	44	23.1	21.8	26.8	24.1	23.5	29.4	28.8	29.0	35.6	19.7	20.3	18.0	19.0	19.6	20.4	17.3	16.6	19.1
600	450	80	40	35.4	35.0	41.0	40.0	40.4	47.3	50.4	51.6	59.2	20.1	16.0	18.5	19.7	15.5	21.0	21.4	15.8	23.2
600	450	90	54	20.1	18.2	16.5	20.3	19.2	18.3	22.2	21.9	21.8	29.0	28.8	34.0	27.1	26.8	35.1	32.5	31.0	41.0
600	450	90	49	25.0	24.0	23.3	25.9	25.8	25.9	30.6	31.2	32.1	26.3	27.6	24.6	19.7	20.9	21.0	23.7	23.7	25.6
600	450	90	45	38.0	38.0	38.3	42.6	43.5	44.5	52.9	54.6	56.5	26.4	22.9	24.8	20.0	16.4	21.3	27.5	22.6	29.3
600	600	70	38	16.2	18.0	20.0	19.6	22.2	25.0	26.6	30.0	33.6	29.7	28.7	38.6	32.4	31.4	44.3	36.0	33.7	48.4
600	600	70	35	21.2	24.0	26.9	25.3	28.9	32.7	35.1	39.5	44.1	20.5	20.9	22.7	18.5	19.0	23.7	20.7	19.8	26.4
600	600	70	31	41.7	45.5	49.4	49.5	54.1	58.9	65.0	70.4	75.9	17.6	13.3	19.8	15.9	11.5	21.0	21.4	15.7	27.1
600	600	80	44	24.0	24.0	30.4	27.4	28.2	35.4	34.4	36.0	44.0	30.2	29.8	39.1	34.2	33.8	46.0	32.4	30.7	44.8
600	600	80	40	30.4	31.4	38.9	34.6	36.4	44.6	44.4	47.0	56.0	22.7	23.9	25.0	22.1	23.2	27.3	18.9	18.7	24.6
600	600	80	36	54.5	56.5	64.9	62.4	65.1	74.3	77.9	81.4	91.4	19.6	15.9	21.8	19.1	15.4	24.3	19.3	14.3	25.0
600	600	90	49	26.0	26.5	27.2	29.4	30.7	32.1	36.5	38.5	40.8	31.6	32.0	40.5	29.7	29.9	41.6	33.7	32.7	46.1
600	600	90	45	30.1	31.5	33.1	34.2	36.4	38.9	44.0	47.0	50.3	26.8	28.6	29.1	20.2	21.9	25.4	22.8	23.2	28.5
600	600	90	40	57.0	59.4	62.1	64.8	68.1	71.5	80.3	84.3	88.6	22.2	19.2	24.4	15.7	12.6	20.9	21.7	17.4	27.4

TABLE F-1F. AVERAGE TOTAL DELAY ON THE INBOUND APPROACH (SECONDS/VEHICLE) FOR GEOMETRY 7*5

INTERSECTION ENVIRONMENT				MINOR STREET									MAJOR STREET								
				LEFT TURNS: LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LEFT TURNS: LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	MED	HIGH	TRUCKS LOW	MED	HIGH	TRUCKS LOW	MED	HIGH	TRUCKS LOW	MED	HIGH	TRUCKS LOW	MED	HIGH	TRUCKS LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	18.0	18.3	14.3	11.8	12.9	9.7	5.3	7.2	4.8	9.8	4.8	10.2	7.0	1.9	10.3	13.1	6.7	16.9
300	300	50	25	17.4	18.7	15.7	12.0	14.1	11.8	8.2	11.1	9.7	16.3	12.8	10.0	8.9	5.2	5.5	13.5	8.6	10.7
300	300	50	22	6.9	9.2	7.2	5.2	8.3	7.0	7.1	11.0	10.5	16.3	8.0	10.0	9.0	.6	5.6	17.1	7.4	14.2
300	300	60	33	23.1	21.7	22.1	16.9	16.3	17.5	10.4	10.6	12.6	14.7	10.4	15.1	13.2	8.7	16.5	13.9	8.2	17.7
300	300	60	30	23.0	22.6	24.0	17.6	17.9	20.1	13.9	15.0	18.0	23.3	20.4	17.0	17.0	14.1	13.7	16.4	12.1	13.5
300	300	60	27	15.8	16.3	18.7	14.0	15.3	18.5	16.0	18.1	22.0	23.0	15.3	16.7	17.0	9.2	13.6	19.7	10.6	16.8
300	300	70	38	24.2	23.2	17.8	18.0	17.8	13.2	11.5	12.1	8.3	18.5	14.8	18.8	10.9	7.2	14.3	17.5	12.4	21.3
300	300	70	35	21.3	21.3	16.9	15.9	16.7	13.1	12.2	13.7	10.9	29.7	27.5	23.4	17.5	15.2	14.1	22.6	19.0	19.8
300	300	70	31	15.9	16.8	13.4	14.1	15.9	13.3	16.1	18.6	16.8	28.3	21.2	21.9	16.2	9.1	12.8	24.7	16.3	21.9
300	450	50	25	17.8	18.0	13.8	12.2	13.2	9.8	8.2	10.0	7.4	7.9	4.8	9.2	6.6	3.4	10.8	12.7	8.2	17.4
300	450	50	22	19.0	20.1	16.9	14.1	16.0	13.6	12.9	15.6	14.0	11.3	9.6	5.8	5.2	3.5	2.8	9.9	6.9	8.0
300	450	50	20	9.3	11.4	9.2	8.1	11.0	9.5	12.5	16.2	15.6	13.4	6.9	7.9	7.5	1.0	5.0	15.6	7.8	13.6
300	450	60	30	24.5	22.9	23.1	18.9	18.1	19.1	14.9	14.9	16.7	9.7	7.3	11.0	9.6	7.1	13.8	10.4	6.6	15.1
300	450	60	27	25.7	25.0	26.2	20.8	20.9	22.9	19.6	20.5	23.3	15.7	14.7	10.3	10.9	9.9	8.5	10.3	8.0	8.3
300	450	60	24	19.9	20.3	22.4	18.7	19.8	22.8	23.2	25.1	28.9	16.7	10.9	11.3	12.1	6.2	9.6	14.9	7.8	12.9
300	450	70	35	23.1	21.9	16.4	17.5	17.1	12.3	13.5	13.9	9.9	15.5	13.7	16.7	9.4	7.6	13.6	16.0	12.8	20.7
300	450	70	31	22.8	22.6	18.0	17.9	18.5	14.7	16.7	18.1	15.1	23.2	22.9	17.8	12.5	12.1	10.0	17.6	15.9	15.6
300	450	70	28	17.6	18.4	14.8	16.4	17.9	15.2	20.9	23.2	21.2	23.9	18.7	18.4	13.3	8.1	10.8	21.9	15.4	19.9
300	600	60	27	11.3	13.8	12.0	8.8	12.1	11.1	10.0	14.1	13.9	9.4	6.8	14.6	8.0	5.3	16.1	12.7	8.7	21.3
300	600	60	24	14.0	17.5	16.7	12.3	16.6	16.5	16.3	21.3	22.1	9.8	8.6	8.2	3.7	2.5	5.1	6.9	4.4	8.9
300	600	60	21	17.7	22.2	22.3	19.7	25.0	25.9	29.4	35.4	37.1	7.4	1.4	5.8	1.5		2.8	8.1	.8	10.0
300	600	70	31	21.2	21.9	24.5	18.7	20.2	23.6	19.9	22.2	26.4	11.7	9.7	16.8	11.5	9.5	19.6	10.8	7.5	19.4
300	600	70	28	24.0	25.7	29.3	22.3	24.8	29.2	26.2	29.5	34.7	14.6	14.1	13.0	9.8	9.2	11.2	7.7	5.8	9.6
300	600	70	24	32.7	35.3	39.9	34.6	38.1	43.4	44.3	48.5	54.7	10.7	5.4	9.2	6.1	.7	7.5	7.4	.7	9.3
300	600	80	36	18.3	19.5	16.3	15.9	17.8	15.4	17.0	19.8	18.2	14.3	12.9	19.4	8.2	6.8	16.2	13.3	10.6	21.8
300	600	80	32	20.2	22.3	20.1	18.5	21.4	20.0	22.4	26.2	25.6	18.8	18.9	17.2	8.0	8.0	9.4	11.6	10.4	13.6
300	600	80	28	29.7	32.9	31.6	31.7	35.6	35.2	41.3	46.1	46.4	14.5	9.8	12.9	3.8		5.2	10.9	4.9	12.8
450	300	50	30	13.3	14.0	12.6	8.9	10.3	9.7	4.1	6.4	6.6	12.9	8.8	15.0	11.9	7.7	17.0	20.0	14.6	25.6
450	300	50	27	12.5	14.2	13.8	8.9	11.3	11.7	6.9	10.1	11.3	16.5	13.9	12.0	10.9	8.1	9.3	17.6	13.6	16.5
450	300	50	25	5.8	8.4	9.0	5.8	9.2	10.6	9.5	13.7	15.9	15.8	8.4	11.3	10.3	2.8	8.7	20.5	11.7	19.4
450	300	60	36	19.5	18.4	21.4	15.1	14.7	18.6	10.3	10.8	15.4	16.1	12.7	18.3	16.4	12.9	21.5	19.2	14.4	24.8
450	300	60	33	18.7	18.5	22.5	15.0	15.6	20.4	13.0	14.4	20.0	22.5	20.5	18.0	18.1	16.1	16.5	19.5	16.2	18.5
450	300	60	30	15.6	16.5	21.4	15.6	17.2	23.0	19.3	21.8	28.3	20.9	14.1	16.4	16.7	9.8	15.1	21.5	13.3	20.4
450	300	70	42	20.5	19.8	17.1	16.1	16.2	14.2	11.3	12.2	11.1	20.2	17.3	22.3	14.4	11.5	19.5	23.0	18.9	28.7
450	300	70	38	17.9	18.2	16.5	14.2	15.3	14.4	12.3	14.1	14.0	28.5	27.2	24.0	18.1	16.7	16.6	25.3	22.6	24.3
450	300	70	35	15.3	16.6	15.8	15.3	17.4	17.4	19.0	21.9	22.7	26.7	20.5	22.1	16.4	10.2	14.8	27.1	19.5	26.0
450	450	60	33	13.8	14.3	12.7	10.0	11.2	10.5	7.8	9.8	9.8	13.8	11.6	16.8	14.2	12.0	20.2	22.4	18.9	28.9
450	450	60	30	15.2	16.7	16.1	12.1	14.4	14.6	12.6	15.7	16.7	14.7	14.0	11.1	10.5	9.7	9.8	17.3	15.2	17.1
450	450	60	27	11.5	14.0	14.4	12.1	15.3	16.5	18.3	22.4	24.3	14.4	8.9	10.7	10.4	4.7	9.6	20.6	13.6	20.4
450	450	70	38	22.3	21.0	23.8	18.4	17.9	21.5	16.2	16.5	20.9	13.3	11.8	16.4	15.1	13.4	21.0	17.9	15.0	24.4
450	450	70	35	23.7	23.4	27.2	20.5	21.0	25.6	21.1	22.4	27.8	17.0	16.9	13.3	14.0	13.8	13.3	15.5	14.0	15.3
450	450	70	31	24.6	25.2	30.0	25.1	26.6	32.2	31.4	33.6	40.0	15.5	10.5	11.8	12.7	7.7	11.9	17.5	11.3	17.3
450	450	80	44	21.1	20.3	17.3	17.2	17.2	15.0	15.0	15.7	14.4	18.9	18.0	21.9	14.7	13.7	20.6	23.3	21.0	29.8
450	450	80	40	21.2	21.3	19.4	18.1	19.0	17.8	18.6	20.3	19.9	24.4	24.9	20.7	15.4	15.9	14.7	22.7	21.9	22.5
450	450	80	36	22.9	24.0	23.0	23.4	25.3	25.1	29.6	32.3	33.0	22.5	18.2	18.8	13.7	9.4	13.0	24.4	18.8	24.2
450	600	70	35	11.5	14.3	15.1	10.8	14.4	16.0	13.7	18.2	20.5	18.1	16.4	25.0	18.5	16.7	28.4	25.3	22.2	35.6
450	600	70	31	15.9	19.7	21.5	15.9	20.5	23.1	21.6	27.0	30.4	15.1	14.9	15.4	10.9	10.5	14.1	16.2	14.6	19.9
450	600	70	28	24.9	29.7	32.5	28.7	34.3	37.8	40.1	46.5	50.8	11.1	6.0	11.3	7.0	1.8	10.1	15.7	9.3	19.4
450	600	80	40	21.8	22.8	28.0	21.1	22.9	28.9	24.0	26.6	33.4	19.1	18.0	26.0	20.8	19.6	30.6	22.2	19.7	32.5
450	600	80	36	26.5	28.5	34.7	26.5	29.4	36.3	32.2	35.9	43.6	18.7	19.1	18.9	15.7	16.0	18.9	15.7	14.7	19.4
450	600	80	32	40.6	43.6	50.8	44.3	48.2	56.1	55.7	60.3	69.1	13.3	8.8	13.5	10.4	5.9	13.6	13.8	8.0	17.5
450	600	90	45	20.3	21.8	21.3	19.6	21.9	22.1	22.6	25.7	26.7	20.7	20.3	27.6	16.4	15.9	26.3	23.6	21.8	34.0
450	600	90	40	24.7	27.2	27.6	24.7	28.0	29.2	30.4	34.5	36.5	21.8	22.8	22.0	12.8	13.8	16.0	18.6	18.3	22.3
450	600	90	36	39.7	43.2	44.6	43.4	47.7	49.9	54.8	59.9	62.9	15.9	12.1	16.1	7.1	3.2	10.3	16.3	11.1	20.0
600	300	60	39	17.7	16.7	16.0	11.5	11.3	11.4	5.0	5.6	6.5	17.1	13.9	21.0	18.7	15.4	25.6	23.9	19.3	31.3
600	300	60	36	17.1	17.2	17.4	11.6	12.5	13.6	7.9	9.6	11.4	15.7	14.0	13.0	12.6	10.8	12.9	16.4	13.3	17.2
600	300	60	33	16.1	17.1	18.4	14.3	16.1	18.2	16.3	18.9	21.7	15.5	8.9	12.7	12.6	5.9	12.8	19.8	11.9	20.5
600	300	70	45	23.3	20.6	24.3	17.1	15.2	19.7	10.6	9.5	14.8	19.6	17.0	23.5	22.5	19.8	29.3	22.3	18.4	29.7
600	300	70	42	22.6	20.9	25.6	17.2	16.2	21.7	13.4	13.3	19.6	21.0	19.9	18.3	19.2	18.0	19.4	17.6	15.2	18.4
600	300	70	38	25.9	25.1	30.8	24.1	24.1	30.6	26.1	26.9	34.2	19.8	13.9	17.1	18.2	12.2	18.3	20.0	12.8	20.7
600	300	80	52	22.4	20.2	18.1	16.2	14.8	13.5	9.7	9.1	8.6	24.7	22.8	28.6	21.6	19.6	28.5	27.2	24.0	34.6
600	300	80	48	20.1	18.8	17.7	14.7	14.2	13.9	10.9	11.2	11.7	28.2	27.7	25.4	20.4	19.9	20.6	24.6	22.8	25.3
600	300	80	44	24.0	23.7	23.6	22.2	22.7	23.4	24.2	25.5	27.0	26.8	21.5	24.0	19.1	13.8	19.3	26.8	20.2	27.5
600	450	70	42	19.4	18.3	17.4	13.8	13.5	13.4	9.8	10.3	11.0	21.1	19.8	25.9	24.2	22.8	32.0	29.4	26.8	37.7
600	450	70	38	22.1	22.0	22.1	17.3	17.9	18.8	16.0	17.5	19.2	16.3	16.4	14.4	14.7	14.7	15.8	18.5	17.3	20.1
600	450	70	35	23.7	24.6	25.6	22.5	24.1	26.0	27.0	29.4	32.1	17.1	12.4	15.2	15.6	10.9	16.7	22.9	16.9	24.5
600	450	80	48	26.1	23.2	26.8	20.5	18.4	22.7	16.5	15.2	20.3	20.8	20.1	25.6	25.1	24.3	32.8	25.0	23.0	33.3
600	450	80	44	29.1	27.1	31.7	24.2	23.0	28.4	23.0	22.6	28.7	18.6	19.4	16.7	18.2	19.0	19.3	16.7	16.2	18.4
600	450	80	40	35.3	34.4	39.9	34.1	34.0	40.3	38.6	39.2	46.3	18.3	14.3	16.4	18.1	14.0	19.2	20.1	14.7	21.6
600	450	90	54	24.0	21.6	19.4	18.4	16.7	15.3	14.4	13.6	12.9	26.8	26.8	31.6	25.1	25.0	32.9	30.8	29.5	39.1
600	450	90	49	26.2	24.7	23.5	21.3	20.6	20.2	20.1	20.2	20.5	26.4	27.9	24.6	20.1	21.5	21.2	24.4	24.5	26.0
600	450	90	45	33.2	32.7	32.4	32.0	32.3	32.8	36.5	37.6	38.9	25.8	22.4	23.9	19.6	16.2	20.7	27.4	22.6	28.9
600	600	70	38	21.2	22.5	24.0	18.8	20.9	23.1	20.0	22.8	25.9	24.6	23.8	33.3	27.6	26.7	39.3	31.4	29.2	43.6
600	600	70	35	23.5	25.7	28.2	21.8	24.8	28.1	25.7	29.6	33.6	17.7	18.4	19.7	16.1	16.6	21.0	18.4	17.7	23.9
600	600	70	31	38.1	41.3	44.7	40.0	44.1	48.3	49.7	54.5	59.5	14.1	10.0	16.1	12.6	8.4	17.6	18.4	12.9	23.9
600	600	80	44	29.2	28.7	34.6	26.7	27.0	33.7	27.9	29.0	36.5	26.3	26.1	35.0	30.6	30.3	42.2	29.0	27.5	41.2
600	600	80	40	32.9	33.4	40.3	31.2	32.5	40.1	35.2	37.2	45.7	21.2	22.5	23.2	20.8	22.0	25.8	17.9	17.8	23.3
600	600	80	36	51.1	52.5	60.3	53.0	55.3	63.9	62.7	65.7	75.1	17.3	13.8	19.3	17.1	13.5	22.0	17.5	12.6	23.0
600	600	90	49	26.6	26.5	26.6	24.1	24.8	25.8	25.3	26.8	28.5	29.0	29.4	37.7	27.3	27.6	38.9	31.5	30.6	43.7
600	600	90	45	27.9	28.8	29.9	26.2	27.9	29.8	30.1	32.6	35.3	26.5	28.4	28.5	20.1	22.0	25.1	22.9	23.5	28.4
600	600	90	40	48.8	50.7	52.8	50.8	53.5	56.4	60.5	63.9	67.6	21.1	18.2	23.1	14.9	11.9	19.9	21.1	16.9	26.6

TABLE F-1G. AVERAGE TOTAL DELAY ON THE INBOUND APPROACH (SECONDS/VEHICLE) FOR GEOMETRY 6*6

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	19.9	20.6	14.8	19.6	21.0	16.0	15.1	17.3	13.1	.3	.4	4.7	.4	.4	7.7	9.5	8.2	17.3
300	300	50	25	21.7	23.3	18.5	22.0	24.5	20.4	20.3	23.5	20.3	1.4	3.0					4.5	4.7	5.7
300	300	50	22	10.0	12.6	8.8	14.1	17.5	14.4	18.0	22.2	19.9	.2						6.8	2.2	8.0
300	300	60	33	15.3	14.2	12.8	14.9	14.6	14.0	10.4	10.9	11.1	6.2	6.9	10.5	7.5	8.1	14.8	11.2	10.6	19.1
300	300	60	30	17.5	17.4	16.9	17.9	18.5	18.9	16.2	17.6	18.8	9.3	11.5	7.0	5.9	8.0	6.6	8.2	9.1	9.4
300	300	60	27	9.1	9.9	10.5	13.1	14.7	16.1	17.1	19.5	21.7	7.8	5.1	5.5	4.6	1.9	5.2	10.3	6.4	11.5
300	300	70	38	23.1	22.4	15.2	22.7	22.8	16.4	18.2	19.1	13.5	9.0	10.4	13.4	4.3	5.6	11.7	13.9	13.9	21.7
300	300	70	35	22.5	22.8	16.6	22.9	24.0	18.6	21.2	23.0	18.4	14.8	17.6	12.5	5.5	8.2	6.1	13.6	15.1	14.8
300	300	70	31	15.9	17.2	11.9	19.9	22.0	17.6	23.9	26.8	23.1	12.1	10.1	9.8	2.9	.9	3.6	14.5	11.1	15.6
300	450	50	25	19.4	19.9	13.9	19.6	20.9	15.6	17.6	19.7	15.3	4.1	6.1	9.4	5.6	7.5	13.9	14.7	15.4	23.5
300	450	50	22	22.9	24.3	19.3	23.8	26.0	21.8	24.6	27.6	24.2	2.0	5.5	.6		2.2	.4	6.6	8.6	8.6
300	450	50	20	12.0	14.4	10.4	16.6	19.8	16.6	23.1	27.1	24.6	2.9	1.5	1.5			1.4	11.0	8.3	13.0
300	450	60	30	16.3	15.0	13.4	16.5	16.0	15.2	14.5	14.8	14.8	6.8	9.4	12.1	9.6	12.1	17.8	13.4	14.6	22.1
300	450	60	27	19.8	19.4	18.8	20.7	21.1	21.3	21.5	22.7	23.7	7.4	11.5	6.0	5.5	9.5	7.0	7.8	10.6	9.9
300	450	60	24	12.9	13.5	13.9	17.5	18.9	20.1	23.9	26.2	28.1	7.2	6.4	5.7	5.4	4.6	6.9	11.2	9.1	13.2
300	450	70	35	21.6	20.7	13.4	21.8	21.7	15.1	19.8	20.5	14.7	11.7	14.9	16.9	8.5	11.7	16.7	18.1	20.0	26.8
300	450	70	31	23.6	23.7	17.3	24.5	25.4	19.8	25.3	27.0	22.2	14.0	18.7	12.6	6.1	10.8	7.6	14.2	17.6	16.3
300	450	70	28	17.2	18.3	12.9	21.8	23.7	19.1	28.3	31.0	27.2	13.4	13.3	12.0	5.7	5.6	7.2	17.3	15.8	19.3
300	600	60	27	14.6	17.5	13.8	18.0	21.6	18.7	21.2	25.6	23.5	10.0	12.4	19.1	11.4	13.8	23.5	19.1	20.2	31.7
300	600	60	24	19.7	23.5	20.8	23.8	28.4	26.5	29.7	35.1	34.0	4.9	8.8	7.4	1.7	5.5	7.1	7.9	10.5	13.9
300	600	60	21	22.2	27.0	25.3	30.0	35.6	34.7	41.7	48.0	47.9	1.2	.3	3.7			3.6	7.8	5.6	13.7
300	600	70	31	14.7	15.8	16.5	18.1	19.9	21.5	21.3	23.9	26.3	13.1	16.2	22.2	15.8	18.9	27.9	18.2	19.9	30.8
300	600	70	28	19.9	21.9	23.7	24.0	26.8	29.3	29.9	33.5	36.9	10.6	15.2	13.1	8.7	13.2	14.1	9.6	12.8	15.5
300	600	70	24	27.3	30.3	33.1	35.1	38.9	42.4	46.8	51.3	55.7	5.5	5.2	7.9	3.7	3.4	9.1	8.0	6.4	14.0
300	600	80	36	18.6	20.1	15.1	21.9	24.2	20.0	25.1	28.2	24.8	14.8	18.5	23.9	11.6	15.2	23.6	19.7	22.1	32.3
300	600	80	32	22.8	25.3	21.2	26.9	30.1	26.9	32.8	36.9	34.4	13.8	19.1	16.3	5.9	11.1	11.4	12.6	16.5	18.6
300	600	80	28	31.1	34.6	31.5	38.9	43.2	40.9	50.6	55.6	54.1	8.3	8.7	10.8	.6	.9	6.0	10.7	9.7	16.6
450	300	50	30	15.0	15.9	12.7	16.3	18.1	15.7	13.6	16.2	14.5	7.1	8.0	13.2	8.9	9.8	18.1	20.1	19.7	29.7
450	300	50	27	16.5	18.5	16.3	18.6	21.4	20.0	18.7	22.2	21.6	5.3	7.7	4.8	2.5	4.9	4.9	12.2	13.3	15.2
450	300	50	25	8.6	11.5	10.3	14.4	18.1	17.7	20.1	24.6	25.0	3.3	1.0	2.8	.7		3.1	13.9	10.1	16.8
450	300	60	36	11.4	10.6	11.8	12.8	12.7	14.7	10.0	10.8	13.6	11.2	12.8	17.4	14.3	15.9	23.5	20.2	20.5	29.8
450	300	60	33	12.9	13.0	15.2	15.0	15.9	18.9	15.0	16.8	20.5	12.2	15.3	11.7	10.6	13.7	13.1	15.1	16.8	18.0
450	300	60	30	8.6	9.8	13.0	14.4	16.4	20.3	20.2	22.9	27.6	9.3	7.6	8.8	8.0	6.2	10.4	15.8	12.7	18.7
450	300	70	42	19.1	18.7	14.2	20.5	20.9	17.1	17.7	19.0	16.0	14.3	16.6	20.5	11.5	13.7	20.6	23.1	24.0	32.7
450	300	70	38	18.8	19.4	15.9	20.9	22.4	19.6	21.0	23.2	21.2	17.3	21.0	16.8	9.7	13.4	12.2	20.0	22.3	22.9
450	300	70	35	15.0	16.6	14.0	20.8	23.2	21.4	26.5	29.7	28.7	14.2	13.1	13.6	6.8	5.7	9.2	20.4	18.0	23.4
450	450	60	33	15.1	15.9	12.5	17.1	18.7	16.1	16.9	19.3	17.4	13.6	16.5	20.7	16.9	19.7	27.0	28.1	29.7	38.7
450	450	60	30	18.8	20.6	18.2	21.5	24.1	22.5	24.1	27.4	26.6	9.1	13.5	9.5	7.8	12.1	11.1	17.6	20.6	21.4
450	450	60	27	14.0	16.7	15.3	20.3	23.9	23.2	28.6	32.9	33.1	7.6	7.1	7.9	6.4	5.8	9.7	19.6	17.8	23.4
450	450	70	38	13.8	12.8	13.8	15.7	15.5	17.3	15.5	16.1	18.7	14.1	17.6	21.1	18.7	22.1	28.7	24.6	26.7	35.1
450	450	70	35	17.5	17.5	19.5	20.2	20.9	23.7	22.7	24.3	27.9	12.3	17.3	12.7	12.2	17.1	15.5	16.7	20.3	20.5
450	450	70	31	17.2	18.2	21.2	23.6	25.3	29.1	31.8	34.4	38.9	9.5	9.7	9.9	9.6	9.7	12.9	17.5	16.3	21.3
450	450	80	44	19.3	18.8	14.0	21.2	21.5	17.5	21.0	22.1	18.9	18.8	22.9	25.8	17.4	21.5	27.4	29.0	31.8	39.6
450	450	80	40	21.7	22.2	18.4	24.4	25.6	22.6	26.9	29.0	26.8	18.8	24.4	19.1	12.7	18.3	16.0	22.9	27.2	26.8
450	450	80	36	22.2	23.6	20.8	28.6	30.8	28.8	36.8	39.8	38.6	15.7	16.5	16.0	9.8	10.5	13.1	23.4	22.9	27.3
450	600	70	35	14.5	17.7	16.7	19.7	23.6	23.4	24.6	29.3	29.9	22.3	25.6	33.2	25.6	28.9	39.5	35.3	37.3	49.7
450	600	70	31	21.2	25.4	25.3	27.1	32.0	32.8	34.8	40.5	42.1	13.9	18.7	18.1	12.5	17.3	19.7	20.8	24.3	28.6
450	600	70	28	29.1	34.3	35.2	38.7	44.6	46.3	52.1	58.8	61.3	8.6	8.6	12.8	7.3	7.3	14.5	19.1	17.7	26.8
450	600	80	40	15.0	16.4	19.8	20.1	22.3	26.5	25.1	28.0	33.0	24.2	28.2	35.1	28.7	32.6	42.6	33.1	35.8	47.5
450	600	80	36	22.1	24.4	28.8	27.9	31.1	36.2	35.6	39.6	45.5	18.4	23.8	22.6	18.2	23.6	25.4	21.2	25.4	29.0
450	600	80	32	35.0	38.3	43.7	44.6	48.7	54.8	58.0	62.9	69.8	11.7	12.3	15.9	11.7	12.3	18.9	18.1	17.4	25.8
450	600	90	45	20.3	22.1	19.7	25.4	28.0	26.4	30.4	33.8	33.0	24.9	29.5	35.8	23.4	28.0	37.3	33.6	36.9	48.0
450	600	90	40	27.0	29.8	28.4	32.8	36.4	35.8	40.5	44.9	45.1	20.5	26.6	24.8	14.4	20.5	21.6	23.2	28.0	30.9
450	600	90	36	40.8	44.6	44.2	50.4	54.9	55.3	63.8	69.1	70.3	13.4	14.7	17.6	7.5	8.7	14.7	19.7	19.6	27.4
600	300	60	39	17.0	16.4	13.8	16.6	16.8	15.0	12.1	13.1	12.1	17.4	19.2	25.3	21.8	23.6	32.7	30.0	30.5	41.5
600	300	60	36	18.7	19.1	17.5	19.1	20.2	19.5	17.3	19.3	19.4	10.6	13.9	11.9	10.3	13.6	14.6	17.1	19.1	21.9
600	300	60	33	16.5	17.9	17.3	20.5	22.7	22.9	24.5	27.5	28.5	9.1	7.6	10.4	9.0	7.5	13.3	19.3	16.4	24.0
600	300	70	45	12.8	10.4	12.3	12.4	10.8	13.5	7.9	7.1	10.6	20.8	23.3	28.7	26.5	28.9	37.4	29.4	30.6	40.8
600	300	70	42	14.4	13.0	15.9	14.8	14.2	17.8	13.1	13.2	17.7	16.7	20.7	18.0	17.8	21.7	22.0	19.3	21.9	24.0
600	300	70	38	16.5	16.1	19.9	20.5	20.9	25.6	24.5	25.7	31.1	14.3	13.5	15.6	15.5	14.6	19.7	20.4	18.2	25.1
600	300	80	52	18.6	16.7	12.8	18.3	17.1	14.0	13.8	13.4	11.1	25.0	28.1	32.9	24.7	27.8	35.6	33.4	35.2	44.8
600	300	80	48	18.6	17.7	14.8	19.0	18.8	16.7	17.3	17.9	16.6	23.0	27.6	24.3	18.1	22.6	22.3	25.3	28.6	30.1
600	300	80	44	21.4	21.4	19.5	25.4	26.2	25.1	29.4	31.0	30.6	20.4	20.2	21.6	15.6	15.3	19.8	26.3	24.7	31.0
600	450	70	42	18.4	17.6	14.9	18.5	18.6	16.6	16.6	17.4	16.3	27.1	30.8	35.9	33.0	36.7	44.8	41.2	43.6	53.5
600	450	70	38	23.4	23.6	21.9	24.3	25.3	24.4	25.1	26.9	26.7	16.8	22.0	19.0	18.0	23.2	23.2	24.9	28.8	30.5
600	450	70	35	23.7	24.9	24.2	28.3	30.3	30.4	34.8	37.6	38.4	16.4	16.8	18.5	17.8	18.1	22.9	28.0	27.1	33.6
600	450	80	48	15.3	12.7	14.4	15.4	13.7	16.2	13.5	12.5	15.8	27.6	32.0	36.4	34.8	39.1	46.6	37.7	40.8	50.0
600	450	80	44	20.5	18.9	21.6	21.4	20.6	24.1	22.2	22.2	26.5	20.0	25.9	22.2	22.5	28.3	27.6	24.0	28.6	29.7
600	450	80	40	25.6	25.0	28.6	30.2	30.4	34.8	36.7	37.6	42.9	18.5	19.5	20.6	21.1	22.1	26.3	26.1	25.8	31.7
600	450	90	54	19.9	17.8	13.7	20.0	18.7	15.5	18.1	17.5	15.1	32.7	37.8	41.5	33.9	38.9	45.7	42.6	46.3	54.9
600	450	90	49	24.3	23.2	20.1	25.3	24.9	22.6	26.0	26.5	25.0	26.9	33.4	29.1	23.5	29.9	28.6	30.7	35.9	36.4
600	450	90	45	30.2	30.0	27.9	34.8	35.4	34.1	41.3	42.7	42.2	25.1	26.8	27.2	21.8	23.4	26.9	32.5	32.8	38.1
600	600	70	38	22.0	23.5	23.2	25.3	27.7	28.1	28.5	31.7	32.9	34.9	39.1	47.6	40.8	44.9	56.4	47.6	50.4	63.7
600	600	70	35	26.5	29.1	29.7	30.6	34.0	35.4	36.6	40.7	42.9	22.6	28.3	28.6	23.8	29.4	32.8	29.1	33.5	38.7
600	600	70	31	39.9	43.4	45.0	47.7	52.0	54.4	59.3	64.4	67.6	17.7	18.6	23.7	19.1	19.9	28.1	27.9	27.4	37.4
600	600	80	44	20.1	19.9	24.0	23.5	24.0	28.9	26.6	28.0	33.7	37.5	42.4	50.2	44.6	49.4	60.3	46.1	49.6	62.3
600	600	80	40	26.2	26.9	32.0	30.3	31.8	37.7	36.2	38.6	45.2	27.0	33.3	33.0	29.4	35.7	38.4	29.5	34.5	39.0
600	600	80	36	43.1	44.8	50.9	50.9	53.4	60.2	62.5	65.8	73.5	21.8	23.3	27.8	24.4	25.9	33.4	27.9	28.1	37.4
600	600	90	49	24.2	24.4	22.7	27.6	28.6	27.7	30.7	32.6	32.5	39.2	44.8	51.9	40.4	45.9	56.1	47.6	51.8	63.8
600	600	90	45	27.8	29.0	28.3	31.9	33.9	34.0	37.8	40.7	41.5	31.3	38.3	37.4	27.8	34.8	36.8	33.6	39.3	43.2
600	600	90	40	47.6	49.8	50.1	55.4	58.4	59.4	67.0	70.8	72.7	24.7	26.9	30.7	21.4	23.5	30.3	30.6	31.5	40.1

TABLE F-1H. AVERAGE TOTAL DELAY ON THE INBOUND APPROACH (SECONDS/VEHICLE) FOR GEOMETRY 7*6

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	17.2	17.3	11.0	16.8	17.7	12.1	12.2	13.9	9.1	11.2	7.0	10.8	7.4	3.1	10.0	12.7	7.1	15.8
300	300	50	25	17.9	19.0	13.6	18.2	20.0	15.4	16.4	19.0	15.2	17.2	14.4	10.1	8.7	5.9	4.6	12.5	8.4	9.0
300	300	50	22	8.3	10.4	6.0	12.3	15.2	11.6	16.2	19.9	17.0	17.7	10.1	10.6	9.4	1.7	5.3	16.6	7.7	13.0
300	300	60	33	17.3	15.6	13.6	16.8	15.9	14.8	12.3	12.1	11.8	15.8	12.2	15.5	13.3	9.7	15.9	13.2	8.3	16.3
300	300	60	30	18.4	17.7	16.7	18.7	18.8	18.6	16.9	17.8	18.4	23.8	21.7	16.8	16.6	14.4	12.5	15.1	11.6	11.5
300	300	60	27	12.1	12.4	12.4	16.1	17.1	17.9	20.0	21.8	23.4	24.1	17.1	17.0	17.0	10.0	12.9	18.9	10.7	15.4
300	300	70	38	24.9	23.7	15.9	24.4	24.0	17.1	19.9	20.2	14.1	17.5	14.5	17.1	9.0	6.0	11.6	14.7	10.4	17.8
300	300	70	35	23.2	23.0	16.2	23.5	24.1	18.1	21.7	23.0	17.9	28.1	26.7	21.1	15.0	13.4	10.9	19.2	16.4	15.7
300	300	70	31	18.7	19.5	13.7	22.7	24.2	19.3	26.6	28.9	24.7	27.2	20.9	20.1	14.2	7.8	10.1	21.9	14.2	18.3
300	450	50	25	16.6	16.6	10.0	16.7	17.4	11.7	14.7	16.2	11.2	10.4	8.1	11.0	8.1	5.7	11.6	13.4	9.7	17.4
300	450	50	22	19.0	19.9	14.3	19.8	21.5	16.7	20.5	23.0	19.0	13.2	12.3	7.0	6.2	5.3	3.0	10.1	7.8	7.4
300	450	50	20	10.2	12.1	7.5	14.7	17.4	13.6	21.2	24.6	21.6	15.8	10.1	9.6	9.0	3.2	5.8	16.3	9.2	13.6
300	450	60	30	18.2	16.3	14.2	18.3	17.2	15.9	16.3	16.0	15.4	11.9	10.3	12.5	10.9	9.1	14.4	10.8	7.8	14.8
300	450	60	27	20.5	19.6	18.5	21.4	21.3	20.9	22.1	22.8	23.2	17.4	17.1	11.2	11.6	11.3	8.4	10.2	8.6	7.5
300	450	60	24	15.8	15.9	15.7	20.3	21.2	21.8	26.7	28.4	29.8	18.9	13.9	12.7	13.3	8.2	10.1	15.3	8.9	12.6
300	450	70	35	23.3	21.9	14.0	23.4	22.8	15.7	21.4	21.5	15.2	15.6	14.6	16.1	8.6	7.5	12.1	14.3	11.9	18.3
300	450	70	31	24.2	23.8	16.8	25.0	25.4	19.3	25.8	26.9	21.6	22.7	23.2	16.6	11.0	11.4	7.9	15.4	14.4	12.7
300	450	70	28	20.0	20.5	14.6	24.5	25.8	20.7	30.9	33.0	28.7	24.0	19.6	17.8	12.4	8.0	9.2	20.2	14.4	17.5
300	600	60	27	9.9	12.2	8.0	13.2	16.3	12.8	16.3	20.2	17.5	11.7	9.9	16.1	9.4	7.5	16.7	13.2	10.0	21.1
300	600	60	24	13.9	17.1	13.9	17.9	21.9	19.5	23.8	28.6	27.0	11.5	11.1	9.2	4.5	4.0	5.2	6.9	5.1	8.1
300	600	60	21	18.5	22.8	20.5	26.2	31.3	29.8	37.8	43.6	43.0	9.6	4.4	7.3	2.7		3.4	8.6	2.0	9.7
300	600	70	31	14.7	15.2	15.4	18.0	19.2	20.3	21.1	23.2	25.0	13.7	12.5	18.1	12.6	11.3	19.9	11.1	8.5	18.9
300	600	70	28	18.7	20.2	21.4	22.8	25.0	27.0	28.6	31.7	34.5	16.0	16.3	13.8	10.3	10.5	11.0	7.4	6.3	8.5
300	600	70	24	28.3	30.8	33.0	36.0	39.3	42.3	47.6	51.6	55.4	12.7	8.1	10.4	7.1	2.5	7.7	7.6	1.7	8.7
300	600	80	36	18.4	19.3	13.8	21.7	23.4	18.6	24.8	27.3	23.3	14.2	13.6	18.6	7.1	6.5	14.5	11.4	9.5	19.3
300	600	80	32	21.5	23.4	18.8	25.5	28.2	24.4	31.4	34.9	31.9	18.1	19.0	15.8	6.3	7.2	7.0	9.2	8.8	10.4
300	600	80	28	32.0	34.9	31.3	39.7	43.4	40.6	51.2	55.7	53.7	14.3	10.4	12.0	2.7		3.4	9.0	3.8	10.2
450	300	50	30	13.2	13.7	9.9	14.5	15.8	12.8	11.7	13.8	11.6	13.7	10.3	15.1	11.7	8.3	16.1	19.0	14.3	23.9
450	300	50	27	13.7	15.1	12.3	15.7	18.0	16.0	15.7	18.7	17.5	16.7	14.9	11.5	10.1	8.2	7.8	16.0	12.8	14.2
450	300	50	25	7.9	10.3	8.5	13.6	16.8	15.8	19.3	23.3	23.0	16.6	9.9	11.3	10.1	3.3	7.8	19.4	11.4	17.6
450	300	60	36	14.3	13.0	13.6	15.6	15.1	16.5	12.8	13.1	15.3	16.6	13.9	18.1	15.9	13.2	20.3	17.9	13.9	22.8
450	300	60	33	14.7	14.3	16.0	16.7	17.2	19.6	16.7	17.9	21.1	22.5	21.2	17.2	17.1	15.8	14.8	17.7	15.1	15.9
450	300	60	30	12.6	13.2	15.8	18.3	19.7	23.2	24.0	26.2	30.4	21.4	15.3	16.1	16.1	10.0	13.8	20.2	12.8	18.4
450	300	70	42	21.9	21.0	15.9	23.2	23.1	18.7	20.4	21.1	17.5	18.6	16.5	20.0	11.9	9.8	16.3	19.7	16.3	24.6
450	300	70	38	20.5	20.6	16.4	22.5	23.4	20.1	22.5	24.2	21.6	26.3	25.8	21.1	15.0	14.4	12.7	21.4	19.4	19.6
450	300	70	35	18.8	19.9	16.7	24.6	26.4	24.1	30.2	32.9	31.3	25.0	19.6	19.7	13.8	8.4	11.5	23.6	16.9	21.8
450	450	60	33	13.3	13.6	9.6	15.2	16.2	13.1	14.9	16.7	14.4	15.7	14.2	18.0	15.2	13.7	20.4	22.5	19.8	28.3
450	450	60	30	15.9	17.1	14.2	18.5	20.5	18.4	21.0	23.8	22.4	16.1	16.1	11.7	10.9	10.8	9.5	16.8	15.5	15.9
450	450	60	27	13.2	15.4	13.4	19.4	22.5	21.3	27.6	31.4	31.0	16.3	11.5	11.9	11.2	6.4	9.8	20.6	14.5	19.7
450	450	70	38	16.7	15.1	15.6	18.5	17.8	19.0	18.2	18.3	20.3	15.0	14.2	17.3	15.7	14.9	21.0	17.8	15.6	23.6
450	450	70	35	19.2	18.7	20.1	21.8	22.1	24.3	24.3	25.3	28.4	18.0	18.7	13.6	14.1	14.7	12.7	14.7	14.1	13.8
450	450	70	31	21.1	21.5	23.9	27.4	28.6	31.8	35.5	37.6	41.6	17.0	12.9	12.6	13.2	9.0	11.8	17.3	11.8	16.4
450	450	80	44	22.0	20.9	15.6	23.9	23.6	19.1	23.6	24.1	20.4	18.4	18.3	20.7	13.2	13.0	18.5	21.1	19.6	26.8
450	450	80	40	23.3	23.2	18.9	25.9	26.6	23.1	28.4	29.9	27.1	23.3	24.6	18.9	13.4	14.7	12.0	19.8	19.8	18.9
450	450	80	36	25.9	26.8	23.5	32.2	33.9	31.3	40.4	42.8	41.1	22.0	18.5	17.6	12.2	8.7	10.8	22.1	17.2	21.2
450	600	70	35	10.8	13.4	11.8	15.8	19.2	18.4	20.7	24.9	24.9	19.8	18.9	26.0	19.3	18.2	28.4	25.2	22.9	34.8
450	600	70	31	16.4	20.0	19.4	22.2	26.6	26.7	29.8	35.0	36.0	16.3	16.8	15.8	11.0	11.5	13.5	15.5	14.7	18.5
450	600	70	28	26.4	31.0	31.3	35.9	41.2	42.4	49.2	55.4	57.3	12.7	8.4	12.2	7.6	3.3	10.1	15.6	9.9	18.5
450	600	80	40	16.0	16.8	19.6	21.0	22.6	26.2	25.9	28.3	32.7	20.5	20.2	26.7	21.2	20.8	30.4	21.8	20.1	31.5
450	600	80	36	21.9	23.7	27.5	27.7	30.3	34.9	35.3	38.7	44.1	19.5	20.7	19.1	15.6	16.7	18.0	14.7	14.6	17.7
450	600	80	32	37.0	39.8	44.6	46.4	50.0	55.6	59.8	64.1	70.5	14.6	10.9	14.1	10.8	7.1	13.2	13.4	8.4	16.4
450	600	90	45	21.1	22.3	19.4	26.1	28.2	26.0	31.0	33.8	32.5	20.0	20.4	26.2	14.8	15.0	23.9	21.1	20.1	30.8
450	600	90	40	26.6	28.9	26.9	32.4	35.5	34.3	40.1	43.9	43.5	20.5	22.3	20.0	10.6	12.3	13.1	15.5	16.0	18.5
450	600	90	36	42.6	45.8	44.9	52.1	56.1	55.9	65.4	70.2	70.8	15.2	12.1	14.6	5.4	2.3	7.8	13.8	9.4	16.7
600	300	60	39	16.1	15.0	11.9	15.7	15.3	13.0	11.1	11.6	10.1	18.5	16.0	21.7	19.1	16.6	25.3	23.5	19.7	30.2
600	300	60	36	16.8	16.6	14.5	17.0	17.7	16.4	15.2	16.7	16.2	16.5	15.6	13.1	12.5	11.5	12.0	15.5	13.1	15.5
600	300	60	33	16.7	17.5	16.4	20.7	22.3	22.0	24.6	27.0	27.4	16.8	11.0	13.4	13.0	7.1	12.4	19.3	12.2	19.3
600	300	70	45	16.6	13.7	15.0	16.2	14.0	16.2	11.6	10.3	13.2	20.7	18.9	23.9	22.6	20.8	28.8	21.7	18.5	28.4
600	300	70	42	17.2	15.2	17.5	17.4	16.3	19.4	15.6	15.3	19.2	21.5	21.2	18.1	18.7	18.4	18.2	16.4	14.7	16.4
600	300	70	38	21.4	20.4	23.7	25.3	25.2	29.3	29.2	29.8	34.7	20.9	15.7	17.4	18.2	13.0	17.7	19.3	12.8	19.3
600	300	80	52	22.3	19.8	15.4	21.9	20.2	16.5	17.3	16.4	13.6	23.7	22.6	26.9	19.6	18.4	25.8	24.5	22.0	31.2
600	300	80	48	21.2	19.7	16.3	21.5	20.8	18.1	19.7	19.8	17.9	26.6	26.9	23.2	17.8	18.1	17.4	21.3	20.2	21.3
600	300	80	44	26.1	25.5	23.1	30.0	30.3	28.6	33.9	35.0	34.1	25.7	21.2	22.2	17.1	12.6	16.6	24.0	18.1	24.0
600	450	70	42	17.4	16.1	12.8	17.5	17.0	14.5	15.5	15.7	14.1	23.7	23.1	27.8	25.7	25.1	32.8	30.2	28.3	37.7
600	450	70	38	21.3	21.0	18.7	22.2	22.6	21.2	22.9	24.2	23.5	18.2	19.1	15.7	15.6	16.5	16.0	18.6	18.2	19.5
600	450	70	35	23.8	24.5	23.2	28.4	29.8	29.3	34.8	37.0	37.3	19.6	15.7	17.0	17.1	13.2	17.5	23.6	18.3	24.4
600	450	80	48	19.0	15.9	17.1	19.1	16.8	18.7	17.1	15.5	18.3	23.0	23.1	27.1	26.3	26.4	33.4	25.4	24.2	33.0
600	450	80	44	23.1	21.0	23.1	24.0	22.6	25.6	24.7	24.1	27.9	20.3	21.8	17.7	18.9	20.4	19.3	16.6	16.8	17.5
600	450	80	40	30.3	29.2	32.3	34.9	34.5	38.4	41.3	41.7	46.4	20.5	17.2	17.9	19.3	16.0	19.7	20.4	15.8	21.3
600	450	90	54	23.5	20.8	16.2	23.6	21.7	17.9	21.5	20.4	17.4	26.9	27.7	31.0	24.3	25.0	31.4	29.2	28.6	36.7
600	450	90	49	26.8	25.1	21.5	27.7	26.8	23.9	28.4	28.3	26.2	26.0	28.2	23.4	18.7	20.8	19.1	22.1	23.0	23.0
600	450	90	45	34.8	34.1	31.4	39.3	39.4	37.5	45.7	46.6	45.5	25.9	23.3	23.3	18.8	16.1	19.1	25.6	21.7	26.5
600	600	70	38	19.1	20.1	19.2	22.4	24.2	24.1	25.5	28.1	28.8	26.9	26.9	34.9	29.0	28.9	39.9	31.9	30.5	43.4
600	600	70	35	22.5	24.6	24.6	26.6	29.4	30.2	32.4	36.0	37.7	19.5	20.9	20.8	16.8	18.2	21.1	18.4	18.4	23.2
600	600	70	31	38.0	41.0	42.1	45.8	49.5	51.4	57.3	61.9	64.6	16.4	13.0	17.7	13.9	10.5	18.2	18.9	14.1	23.6
600	600	80	44	21.9	21.2	24.7	25.2	25.2	29.6	28.3	29.1	34.3	28.3	28.9	36.3	31.6	32.2	42.6	29.3	28.5	40.7
600	600	80	40	26.9	27.1	31.6	30.9	31.9	37.2	36.8	38.6	44.7	22.7	24.7	24.0	21.3	23.3	25.6	17.5	18.2	22.3
600	600	80	36	45.9	47.1	52.6	53.6	55.6	61.9	65.2	68.0	75.1	19.3	16.5	20.5	18.1	15.2	22.3	17.7	13.6	22.5
600	600	90	49	25.9	25.5	23.3	29.1	29.6	28.2	32.2	33.5	32.9	28.9	30.1	36.9	26.2	27.4	37.2	29.6	29.5	41.1
600	600	90	45	28.3	29.0	27.8	32.4	33.8	33.4	38.2	40.5	40.8	25.8	28.5	27.1	18.5	21.1	22.8	20.5	21.8	25.3
600	600	90	40	50.3	51.9	51.6	58.0	60.4	60.9	69.6	72.8	74.1	21.0	18.9	22.3	13.8	11.6	18.0	19.2	15.8	24.0

TABLE F-11. AVERAGE TOTAL DELAY ON THE INBOUND APPROACH (SECONDS/VEHICLE) FOR GEOMETRY 7*7

INTERSECTION				MINOR STREET									MAJOR STREET								
ENVIRONMENT				LEFT TURNS: LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LEFT TURNS: LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	31.2	30.8	23.9	24.9	25.3	19.1	14.5	15.6	10.3	9.2	5.1	8.6	5.6	1.5	8.0	11.1	5.7	14.0
300	300	50	25	29.1	29.7	23.7	23.5	24.9	19.7	15.9	18.0	13.7	17.4	14.8	10.2	9.2	6.5	4.9	13.3	9.3	9.5
300	300	50	22	13.6	15.1	10.2	11.7	14.0	9.9	9.8	12.9	9.5	17.2	9.8	9.9	9.2	1.7	4.8	16.7	7.9	12.8
300	300	60	33	31.4	29.2	26.7	25.1	23.7	22.0	14.7	14.0	13.1	15.0	11.5	14.4	12.7	9.2	15.1	12.9	8.1	15.8
300	300	60	30	29.8	28.6	27.0	24.2	23.8	23.1	16.6	16.9	17.0	25.3	23.3	18.0	18.3	16.3	14.0	17.1	13.8	13.3
300	300	60	27	17.5	17.3	16.7	15.6	16.2	16.4	13.7	15.0	16.0	24.8	18.0	17.5	18.0	11.1	13.7	20.2	12.0	16.4
300	300	70	38	34.4	32.6	24.3	28.1	27.1	19.6	17.6	17.4	10.8	17.8	15.0	17.2	9.6	6.7	12.0	15.5	11.4	18.4
300	300	70	35	30.0	29.2	21.9	24.4	24.4	17.9	16.7	17.5	11.8	30.8	29.5	23.5	17.9	16.5	13.6	22.4	19.7	18.6
300	300	70	31	19.5	19.7	13.4	17.6	18.6	13.1	15.6	17.4	12.7	29.1	23.0	21.8	16.4	10.1	12.0	24.3	16.8	20.5
300	450	50	25	29.0	28.4	21.3	23.3	23.4	17.1	15.4	16.3	10.8	7.9	5.7	8.2	5.9	3.6	9.1	11.4	7.8	15.2
300	450	50	22	28.6	29.0	22.9	23.6	24.8	19.4	18.5	20.4	15.9	13.0	12.3	6.6	6.3	5.5	2.8	10.4	8.3	7.5
300	450	50	20	13.9	15.3	10.1	12.6	14.7	10.4	13.1	16.1	12.5	14.9	9.3	8.5	8.3	2.7	4.9	15.8	8.9	12.9
300	450	60	30	30.8	28.4	25.7	25.0	23.4	21.5	17.1	16.3	15.2	10.6	9.1	10.9	9.8	8.2	13.1	10.0	7.1	13.8
300	450	60	27	30.4	28.9	27.2	25.4	24.7	23.8	20.2	20.4	20.3	18.4	18.3	12.0	12.9	12.7	9.5	11.7	10.2	8.8
300	450	60	24	19.6	19.2	18.4	18.3	18.6	18.7	18.8	20.0	20.8	19.2	14.2	12.7	13.8	8.9	10.4	16.0	9.8	13.1
300	450	70	35	31.2	29.2	20.8	25.4	24.3	16.6	17.5	17.2	10.3	15.5	14.6	15.8	8.7	7.7	12.0	14.7	12.4	18.5
300	450	70	31	29.4	28.4	20.9	24.3	24.1	17.5	19.2	19.8	13.9	24.9	25.5	18.6	13.5	14.0	10.1	18.1	17.3	15.2
300	450	70	28	19.1	19.1	12.6	17.8	18.6	12.9	18.4	19.9	15.0	25.4	21.2	19.0	14.1	9.8	10.7	22.1	16.5	19.2
300	600	60	27	18.9	20.6	15.9	16.3	18.9	14.9	13.6	16.9	13.7	8.7	7.0	12.9	6.6	4.8	13.8	10.7	7.6	18.3
300	600	60	24	20.1	22.8	19.1	18.3	21.8	18.8	18.3	22.6	20.4	10.8	10.6	8.4	4.1	3.7	4.5	6.7	5.1	7.7
300	600	60	21	18.8	22.5	19.7	20.7	25.2	23.2	26.4	31.7	30.5	8.2	3.1	5.7	1.6		2.0	7.6	1.2	8.6
300	600	70	31	23.9	23.8	23.5	21.3	22.0	22.5	18.5	20.1	21.3	11.9	10.8	16.0	11.0	9.9	18.2	9.8	7.3	17.4
300	600	70	28	25.2	26.1	26.7	23.3	25.0	26.5	23.3	25.9	28.1	16.6	17.0	14.1	11.0	11.4	11.5	8.4	7.4	9.4
300	600	70	24	28.8	30.7	32.3	30.6	33.3	35.8	36.3	39.8	43.1	12.5	8.1	9.9	7.1	2.6	7.5	7.9	2.1	8.8
300	600	80	36	22.9	23.3	17.2	20.3	21.5	16.2	17.5	19.5	15.0	13.6	13.1	17.7	6.7	6.3	13.9	11.3	9.5	18.9
300	600	80	32	23.2	24.6	19.5	21.4	23.6	19.2	21.4	24.4	20.8	19.8	20.9	17.3	8.3	9.3	8.8	11.4	11.1	12.4
300	600	80	28	27.7	30.1	26.0	29.6	32.7	29.4	35.3	39.2	36.7	15.3	11.5	12.8	4.0	.1	4.4	10.5	5.4	11.4
450	300	50	30	23.0	22.9	18.6	18.5	19.2	15.6	9.8	11.3	8.6	11.4	8.1	12.6	9.6	6.4	13.8	17.2	12.7	21.9
450	300	50	27	20.8	21.6	18.3	16.9	18.6	16.1	11.0	13.5	11.8	16.8	15.0	11.3	10.4	8.6	7.9	16.5	13.5	14.5
450	300	50	25	9.0	10.8	8.5	8.8	11.5	9.9	8.6	12.1	11.3	15.8	9.3	10.3	9.6	3.0	7.1	19.2	11.3	17.2
450	300	60	36	24.3	22.4	22.5	19.7	18.6	19.5	11.1	10.8	12.5	15.5	13.0	16.7	15.1	12.4	19.2	17.3	13.4	22.0
450	300	60	33	21.9	21.0	22.1	18.1	18.0	19.9	12.2	12.9	15.6	23.7	22.6	18.2	18.5	17.4	16.0	19.4	16.9	17.4
450	300	60	30	13.9	13.9	16.0	13.7	14.6	17.5	13.5	15.2	18.8	21.8	15.9	16.3	16.9	10.9	14.3	21.1	13.9	19.1
450	300	70	42	27.2	25.7	20.1	22.6	21.9	17.1	13.9	14.1	10.0	18.6	16.7	19.8	12.2	10.2	16.4	20.2	17.0	24.9
450	300	70	38	23.0	22.6	17.9	19.2	19.6	15.7	13.3	14.5	11.4	28.8	28.3	23.3	17.6	17.1	15.1	24.3	22.5	22.3
450	300	70	35	15.4	15.9	12.2	15.3	16.6	13.7	15.1	17.2	15.1	26.7	21.4	21.2	15.7	10.4	13.2	25.8	19.2	23.7
450	450	60	33	21.5	21.3	16.8	17.5	18.0	14.3	11.4	12.7	9.8	12.9	11.6	15.0	12.6	11.3	17.7	20.3	17.6	25.8
450	450	60	30	21.4	22.1	18.6	18.1	19.6	16.9	14.8	17.0	15.1	15.6	15.8	11.0	10.7	10.8	9.0	16.9	15.7	15.8
450	450	60	27	12.7	14.3	11.8	13.1	15.6	13.8	15.4	18.7	17.7	15.1	10.4	10.4	10.3	5.6	8.6	19.9	13.9	18.8
450	450	70	38	25.0	23.0	22.9	21.0	19.7	20.5	14.9	14.4	15.9	13.4	12.7	15.5	14.4	13.6	19.4	16.7	14.7	22.2
450	450	70	35	24.9	23.8	24.7	21.6	21.3	23.0	18.3	18.7	21.2	18.7	19.6	14.2	15.1	15.8	13.4	16.0	15.4	14.8
450	450	70	31	20.8	20.6	22.5	21.2	21.9	24.5	23.5	25.0	28.4	17.0	13.0	12.4	13.5	9.4	11.8	17.8	12.4	16.7
450	450	80	44	25.7	24.1	18.2	21.7	20.9	15.8	15.6	15.5	11.3	18.0	18.0	20.1	13.1	13.0	18.1	21.1	19.8	26.7
450	450	80	40	24.3	23.6	18.8	21.0	21.2	17.1	17.6	18.6	15.3	25.2	26.7	20.6	15.6	17.0	14.0	22.2	22.3	21.1
450	450	80	36	20.9	21.2	17.4	21.3	22.5	19.4	23.7	25.6	23.3	23.2	19.8	18.5	13.7	10.2	12.0	23.7	19.0	22.6
450	600	70	35	15.6	17.7	15.5	14.8	17.7	16.3	13.8	17.5	16.9	16.5	15.7	22.5	16.2	15.4	25.2	22.4	20.2	31.8
450	600	70	31	18.5	21.5	20.4	18.4	22.2	21.9	20.2	24.8	25.2	15.3	16.0	14.6	10.3	10.9	12.6	15.1	14.4	17.9
450	600	70	28	22.5	26.5	26.4	26.1	30.9	31.6	33.6	39.2	40.6	11.0	6.8	10.3	6.2	2.0	8.4	14.4	8.8	17.1
450	600	80	40	20.9	21.2	23.5	20.1	21.2	24.3	19.1	21.0	24.9	18.4	18.2	24.4	19.4	19.1	28.3	20.2	18.7	29.7
450	600	80	36	24.1	25.4	28.7	24.1	26.1	30.2	25.8	28.7	33.5	19.8	21.1	19.1	16.1	17.3	18.3	15.5	15.4	18.3
450	600	80	32	33.2	35.5	39.7	36.9	39.9	44.9	44.3	48.1	54.0	14.1	10.6	13.4	10.6	7.0	12.8	13.4	8.5	16.1
450	600	90	45	21.4	22.1	18.6	20.6	22.1	19.4	19.6	21.9	20.0	19.1	19.6	25.1	14.1	14.5	23.0	20.7	19.8	30.2
450	600	90	40	24.2	25.9	23.4	24.1	26.6	24.9	25.9	29.2	28.3	22.0	23.9	21.3	12.3	14.2	14.5	17.5	18.1	20.2
450	600	90	36	34.2	36.9	35.4	37.8	41.3	40.6	45.3	49.6	49.6	15.9	13.0	15.1	6.3	3.4	8.6	15.0	10.7	17.7
600	300	60	39	28.2	26.6	22.9	21.9	21.0	18.2	11.5	11.4	9.4	14.7	12.4	17.7	15.6	13.2	21.5	20.2	16.5	26.7
600	300	60	36	26.1	25.4	22.8	20.6	20.7	18.8	12.9	13.8	12.7	15.1	14.2	11.4	11.3	10.4	10.6	14.5	12.3	14.3
600	300	60	33	20.1	20.4	18.7	18.2	19.3	18.4	16.2	18.1	18.0	14.6	9.0	10.9	11.0	5.3	10.3	17.6	10.6	17.4
600	300	70	45	28.9	25.4	26.2	22.6	19.9	21.5	12.2	10.3	12.7	18.1	16.5	21.1	20.3	18.5	26.2	19.6	16.5	26.0
600	300	70	42	26.7	24.2	26.0	21.1	19.4	22.0	13.5	12.6	15.9	21.3	21.1	17.6	18.7	18.5	18.0	16.6	15.1	16.4
600	300	70	38	24.9	23.4	26.2	23.1	22.3	25.9	21.1	21.2	25.5	19.9	14.8	16.2	17.5	12.4	16.7	18.8	12.4	18.6
600	300	80	52	29.9	26.9	21.9	23.6	21.4	17.2	13.2	11.7	8.4	22.3	21.3	25.3	18.5	17.4	24.4	23.5	21.2	30.0
600	300	80	48	26.1	24.0	20.0	20.5	19.2	16.0	12.8	12.4	10.0	27.5	28.0	23.9	19.0	19.4	18.3	22.7	21.8	22.5
600	300	80	44	24.9	23.9	20.9	23.1	22.8	20.6	21.1	21.6	20.2	25.9	21.5	22.2	17.6	13.1	16.8	24.6	18.9	24.4
600	450	70	42	28.0	26.1	22.3	22.2	21.1	18.1	14.3	14.0	11.8	19.4	19.0	23.3	21.7	21.2	28.6	26.4	24.6	33.7
600	450	70	38	29.2	28.3	25.4	24.1	24.0	22.0	19.0	19.7	18.5	16.3	17.3	13.5	13.9	14.9	14.1	17.2	16.9	17.9
600	450	70	35	25.7	25.8	23.9	24.3	25.2	24.2	24.9	26.6	26.3	16.9	13.1	14.1	14.7	10.9	14.8	21.4	16.3	22.0
600	450	80	48	29.7	26.1	26.7	24.0	21.1	22.5	16.1	14.0	16.2	19.9	20.1	23.8	23.5	23.7	30.3	22.8	21.7	30.2
600	450	80	44	31.1	28.4	30.0	26.1	24.2	26.6	21.0	19.9	23.0	19.5	21.2	16.7	18.4	20.1	18.6	16.4	16.7	17.0
600	450	80	40	32.3	30.6	33.2	31.0	30.1	33.5	31.6	31.4	35.6	19.0	15.9	16.2	18.1	14.9	18.2	19.4	15.0	20.1
600	450	90	54	29.5	26.3	21.1	23.7	21.3	16.9	15.8	14.2	10.6	25.0	25.9	28.9	22.6	23.5	29.5	27.8	27.3	35.1
600	450	90	49	30.1	27.9	23.7	25.1	23.6	20.3	19.9	19.3	16.7	26.4	28.8	23.6	19.4	21.7	19.5	23.1	24.1	23.8
600	450	90	45	32.1	30.8	27.7	30.8	30.3	27.9	31.3	31.7	30.1	25.6	23.1	22.8	18.7	16.2	18.8	25.8	22.0	26.5
600	600	70	38	26.2	26.7	25.3	23.6	24.9	24.3	20.9	23.0	23.1	22.2	22.2	29.9	24.5	24.5	35.2	27.7	26.4	38.9
600	600	70	35	26.9	28.4	27.9	25.1	27.4	27.7	25.1	28.2	29.3	17.0	18.6	18.1	14.7	16.1	18.7	16.5	16.6	21.0
600	600	70	31	36.5	38.9	39.4	38.3	41.6	42.9	44.0	48.1	50.2	13.2	9.9	14.3	11.0	7.7	15.0	16.2	11.6	20.7
600	600	80	44	29.2	27.9	30.9	26.6	26.1	29.9	23.9	24.2	28.7	24.8	25.5	32.5	28.3	29.0	39.0	26.2	25.6	37.4
600	600	80	40	31.4	31.1	35.1	29.6	30.1	34.8	29.6	30.9	36.4	21.4	23.6	22.5	20.3	22.4	24.4	16.8	17.6	21.3
600	600	80	36	44.5	45.2	50.1	46.4	47.8	53.6	52.1	54.3	60.9	17.3	14.7	18.3	16.3	13.6	20.4	16.2	12.2	20.8
600	600	90	49	28.5	27.6	24.8	25.9	25.8	23.8	23.2	23.9	22.7	26.5	27.9	34.3	24.1	25.4	34.8	27.8	27.8	39.0
600	600	90	45	28.2	28.4	26.5	26.4	27.3	26.3	26.4	28.1	27.9	25.8	28.6	26.9	18.7	21.5	22.8	21.0	22.4	25.5
600	600	90	40	44.2	45.3	44.5	46.0	47.9	47.9	51.7	54.4	55.2	20.2	18.2	21.3	13.3	11.2	17.3	18.9	15.6	23.5

TABLE F-2A. MAXIMUM QUEUE LENGTH ON THE INBOUND APPROACH (NO. OF VEHICLES) FOR GEOMETRY 4*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS LOW LEVEL			MINOR STREET LEFT TURNS MEDIUM LEVEL			MINOR STREET LEFT TURNS HIGH LEVEL			MAJOR STREET LEFT TURNS LOW LEVEL			MAJOR STREET LEFT TURNS MEDIUM LEVEL			MAJOR STREET LEFT TURNS HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	3.5	3.7	3.5	3.5	3.7	3.5	3.8	4.4	4.6	3.8	3.9	4.9	4.4	4.5	6.1	5.5	5.5	7.3
300	300	50	25	4.3	4.0	4.3	4.9	4.7	4.9	5.8	6.0	6.6	3.3	3.5	3.2	3.2	3.5	3.7	4.1	4.3	4.7
300	300	50	22	2.2	2.9	3.2	3.4	4.1	4.5	4.9	6.0	6.7	3.3	2.7	3.2	3.3	2.9	3.9	4.9	4.3	5.6
300	300	60	33	3.8	3.2	3.8	3.8	3.2	3.8	4.1	3.9	4.9	4.3	4.8	5.6	4.5	5.1	6.5	5.7	6.2	7.8
300	300	60	30	4.5	3.6	4.6	5.2	4.2	5.2	6.1	5.5	6.9	4.1	4.7	4.2	3.7	4.4	4.4	4.7	5.3	5.6
300	300	60	27	3.0	3.0	4.2	4.2	4.2	5.4	5.7	6.1	7.6	4.0	3.9	4.2	3.8	3.8	4.6	5.5	5.3	6.3
300	300	70	38	4.8	4.6	4.1	4.8	4.6	4.1	5.1	5.3	5.2	5.0	5.8	6.5	4.9	5.8	7.1	6.2	6.9	8.5
300	300	70	35	5.2	4.6	4.5	5.8	5.2	5.2	6.7	6.5	6.8	5.1	6.1	5.5	4.4	5.4	5.4	5.5	6.4	6.6
300	300	70	31	4.0	4.4	4.4	5.2	5.6	5.7	6.7	7.5	7.9	4.9	5.1	5.3	4.3	4.7	5.4	6.1	6.3	7.2
300	450	50	25	3.5	3.6	3.4	4.1	4.2	3.9	4.9	5.4	5.5	6.0	6.3	7.5	7.0	7.4	9.1	8.3	8.5	10.5
300	450	50	22	4.4	4.1	4.3	5.6	5.3	5.5	7.0	7.1	7.7	5.0	5.5	5.3	5.3	5.9	6.3	6.5	6.9	7.5
300	450	50	20	3.3	3.9	4.2	5.1	5.7	6.0	7.1	8.1	8.8	4.9	4.6	5.2	5.4	5.2	6.4	7.2	6.9	8.2
300	450	60	30	4.2	3.5	4.1	4.7	4.1	4.6	5.6	5.3	6.3	6.3	7.1	8.1	7.0	7.9	9.4	8.4	9.1	10.9
300	450	60	27	5.1	4.0	5.0	6.2	5.2	6.2	7.6	7.0	8.4	5.7	6.6	6.2	5.7	6.7	6.9	6.9	7.8	8.2
300	450	60	24	4.5	4.4	5.5	6.2	6.2	7.2	8.3	8.6	10.1	5.5	5.6	6.0	5.7	6.0	6.9	7.6	7.7	8.8
300	450	70	35	4.6	4.4	3.8	5.1	4.9	4.4	6.0	6.1	6.0	7.4	8.5	9.4	7.8	9.0	10.4	9.2	10.3	11.9
300	450	70	31	5.2	4.6	4.5	6.4	5.8	5.6	7.8	7.6	7.8	7.0	8.2	7.7	6.7	8.0	8.1	8.0	9.1	9.5
300	450	70	28	4.9	5.2	5.2	6.6	7.0	7.0	8.7	9.4	9.8	6.7	7.2	7.5	6.6	7.2	8.0	8.6	9.0	10.1
300	600	60	27	3.7	4.2	4.4	4.8	5.3	5.5	6.2	7.1	7.6	8.8	9.6	10.7	9.9	10.8	12.4	11.0	11.7	13.6
300	600	60	24	5.4	5.5	6.1	7.1	7.2	7.8	9.0	9.5	10.6	6.8	7.8	7.5	7.3	8.3	8.6	8.2	9.1	9.6
300	600	60	21	5.8	6.9	7.6	8.1	9.2	9.9	10.7	12.1	13.2	6.0	6.2	6.7	6.6	6.9	7.9	8.2	8.3	9.6
300	600	70	31	4.8	4.6	5.6	5.9	5.7	6.7	7.3	7.5	8.8	9.3	10.5	11.4	10.0	11.4	12.8	11.2	12.4	14.1
300	600	70	28	6.5	5.9	7.3	8.2	7.5	9.0	10.1	9.9	11.7	7.6	9.0	8.5	7.7	9.2	9.3	8.7	10.0	10.4
300	600	70	24	7.6	8.0	9.5	9.9	10.2	11.8	12.4	13.2	15.1	6.6	7.2	7.5	6.8	7.6	8.4	8.5	9.1	10.2
300	600	80	36	4.7	4.9	4.8	5.8	6.0	5.8	7.1	7.7	8.0	10.0	11.5	12.4	10.5	12.1	13.5	11.7	13.2	14.9
300	600	80	32	6.2	6.0	6.3	7.9	7.7	8.0	9.8	10.0	10.7	8.5	10.2	9.7	8.3	10.1	10.1	9.4	11.0	11.3
300	600	80	28	7.6	8.4	8.8	9.9	10.7	11.1	12.5	13.6	14.4	7.3	8.3	8.5	7.3	8.4	9.2	9.1	10.0	11.0
450	300	50	30	3.5	3.9	3.8	4.0	4.4	4.4	5.9	6.6	7.0	4.9	5.1	6.3	6.0	6.3	8.0	7.2	7.4	9.3
450	300	50	27	4.4	4.4	4.8	5.6	5.5	6.0	8.0	8.4	9.2	4.1	4.4	4.3	4.5	5.0	5.3	5.5	5.8	6.4
450	300	50	25	3.4	4.3	4.8	5.1	6.0	6.5	8.1	9.4	10.3	3.7	3.3	3.9	4.3	4.0	5.2	6.0	5.6	6.9
450	300	60	36	4.3	4.0	4.8	4.9	4.5	5.3	6.7	6.7	7.9	5.5	6.1	7.1	6.3	7.0	8.6	7.6	8.2	9.9
450	300	60	33	5.3	4.5	5.7	6.4	5.7	6.9	8.8	8.5	10.1	5.0	5.8	5.4	5.1	6.0	6.2	6.2	7.0	7.4
450	300	60	30	4.7	5.0	6.3	6.5	6.7	8.0	9.5	10.1	11.8	4.6	4.7	5.1	4.9	5.1	6.0	6.7	6.7	7.9
450	300	70	42	5.0	5.1	4.8	5.6	5.7	5.3	7.4	7.9	7.9	6.2	7.2	8.1	6.7	7.8	9.2	8.1	9.0	10.7
450	300	70	38	5.8	5.4	5.5	6.9	6.6	6.7	9.3	9.4	9.9	6.0	7.2	6.7	5.9	7.1	7.2	7.0	8.1	8.4
450	300	70	35	5.5	6.1	6.3	7.2	7.9	8.1	10.3	11.3	11.8	5.6	6.0	6.3	5.6	6.1	6.9	7.5	7.8	8.9
450	450	60	33	4.5	4.8	4.7	5.6	5.9	5.8	7.9	8.6	8.9	8.1	8.5	9.9	9.6	10.2	12.1	11.0	11.4	13.6
450	450	60	30	5.8	5.7	6.1	7.5	7.4	7.8	10.5	10.8	11.5	6.8	7.4	7.3	7.6	8.4	8.9	8.8	9.4	10.2
450	450	60	27	5.9	6.8	7.3	8.2	9.1	9.5	11.7	13.0	13.8	6.2	6.0	6.8	7.2	7.2	8.5	9.1	8.9	10.4
450	450	70	38	5.6	5.2	5.9	6.7	6.3	7.0	9.0	9.1	10.1	8.4	9.3	10.4	9.6	10.7	12.3	11.1	12.0	13.9
450	450	70	35	7.0	6.2	7.3	8.6	7.8	9.0	11.6	11.2	12.7	7.4	8.5	8.2	8.0	9.1	9.5	9.3	10.3	10.8
450	450	70	31	7.8	7.9	9.2	10.0	10.2	11.5	13.6	14.2	15.8	6.7	7.0	7.5	7.4	7.9	8.9	9.4	9.7	11.0
450	450	80	44	5.6	5.6	5.2	6.7	6.7	6.3	9.1	9.5	9.4	9.4	10.6	11.7	10.3	11.7	13.3	11.9	13.1	14.9
450	450	80	40	6.8	6.4	6.5	8.5	8.1	8.1	11.5	11.4	11.9	8.6	10.0	9.7	8.9	10.4	10.6	10.3	11.6	12.1
450	450	80	36	8.0	8.6	8.7	10.2	10.8	10.9	13.8	14.8	15.3	7.9	8.5	9.0	8.3	9.1	10.0	10.3	10.9	12.2
450	600	70	35	5.7	6.4	6.8	7.3	8.0	8.4	10.2	11.3	12.0	11.7	12.6	13.9	13.4	14.4	16.2	14.6	15.5	17.5
450	600	70	31	7.9	8.3	9.1	10.1	10.5	11.3	13.6	14.3	15.5	9.3	10.4	10.3	10.3	11.5	11.9	11.3	12.3	13.0
450	600	70	28	9.6	10.9	11.8	12.4	13.7	14.6	16.5	18.2	19.4	8.0	8.3	9.0	9.1	9.6	10.8	10.8	11.1	12.6
450	600	80	40	7.1	7.2	8.3	8.7	8.8	9.9	11.6	12.1	13.6	12.2	13.6	14.7	13.6	15.1	16.7	14.9	16.2	18.1
450	600	80	36	9.5	9.1	10.7	11.7	11.3	12.9	15.2	15.2	17.1	10.1	11.6	11.3	10.8	12.4	12.7	11.9	13.4	13.9
450	600	80	32	12.0	12.6	14.2	14.8	15.4	17.0	18.8	19.8	21.9	8.6	9.4	9.9	9.5	10.4	11.4	11.2	12.0	13.2
450	600	90	45	6.7	7.2	7.2	8.3	8.8	8.8	11.2	12.1	12.5	12.8	14.5	15.5	13.9	15.7	17.2	15.2	16.9	18.7
450	600	90	40	9.1	9.1	9.6	11.3	11.3	11.8	14.8	15.2	16.0	10.8	12.7	12.3	11.2	13.2	13.3	12.4	14.2	14.6
450	600	90	36	11.9	12.9	13.5	14.7	15.7	16.3	18.8	20.2	21.1	9.3	10.4	10.8	9.8	11.0	12.0	11.7	12.7	13.9
600	300	60	39	4.2	4.2	4.9	5.0	5.1	5.7	6.1	6.6	7.6	7.9	8.3	9.6	9.2	9.7	11.6	10.2	10.5	12.6
600	300	60	36	5.6	5.2	6.3	7.0	6.6	7.8	8.7	8.7	10.3	6.2	6.7	6.7	6.8	7.5	8.0	7.6	8.1	8.8
600	300	60	33	5.7	6.3	7.6	7.8	8.4	9.6	10.1	11.1	12.7	6.0	5.7	6.5	6.8	6.7	8.0	8.3	8.0	9.5
600	300	70	45	4.6	4.0	5.4	5.5	4.8	6.3	6.6	6.3	8.2	8.1	8.9	10.0	9.1	10.0	11.7	10.1	10.9	12.8
600	300	70	42	6.0	4.9	6.9	7.5	6.4	8.3	9.2	8.5	10.8	6.7	7.6	7.4	7.0	8.1	8.4	7.9	8.8	9.4
600	300	70	38	6.9	6.8	8.9	9.0	8.9	10.9	11.3	11.6	14.0	6.4	6.6	7.2	7.0	7.3	8.4	8.5	8.6	10.0
600	300	80	52	5.4	5.2	5.5	6.2	6.0	6.4	7.4	7.5	8.2	9.2	10.3	11.3	9.9	11.1	12.7	11.0	12.1	13.9
600	300	80	48	6.7	6.0	6.9	8.1	7.5	8.3	9.9	9.6	10.8	8.1	9.4	9.1	8.1	9.5	9.7	9.1	10.3	10.8
600	300	80	44	8.0	8.2	9.2	10.0	10.3	11.2	12.3	13.0	14.3	7.8	8.3	8.8	8.0	8.7	9.7	9.6	10.1	11.4
600	450	70	42	5.6	5.6	6.2	7.0	7.0	7.6	8.6	9.0	10.0	12.2	12.9	14.3	14.0	14.8	16.8	15.1	15.7	18.0
600	450	70	38	7.6	7.1	8.2	9.5	9.1	10.2	11.8	11.7	13.2	9.9	10.7	10.8	11.0	11.9	12.6	12.0	12.7	13.6
600	450	70	35	8.9	9.5	10.6	11.5	12.0	13.2	14.3	15.3	16.8	9.5	9.5	10.4	10.8	10.9	12.4	12.4	12.4	14.1
600	450	80	48	6.2	5.5	6.9	7.6	6.9	8.3	9.3	8.9	10.7	12.2	13.2	14.5	13.6	14.8	16.6	14.9	15.9	18.0
600	450	80	44	8.3	7.1	9.0	10.3	9.1	11.0	12.5	11.7	14.0	10.2	11.4	11.3	11.0	12.3	12.8	12.0	13.2	13.9
600	450	80	40	10.5	10.3	12.3	13.0	12.9	14.8	15.9	16.1	18.4	9.7	10.1	10.8	10.6	11.2	12.5	12.4	12.8	14.3
600	450	90	54	6.5	6.2	6.5	7.8	7.5	7.8	9.5	9.5	10.2	13.5	14.9	16.1	14.7	16.2	17.9	16.0	17.3	19.3
600	450	90	49	8.6	7.8	8.6	10.5	9.8	10.5	12.8	12.4	13.6	11.7	13.3	13.1	12.2	13.9	14.2	13.3	14.8	15.5
600	450	90	45	11.1	11.3	12.2	13.7	13.9	14.7	16.5	17.1	18.3	11.2	11.9	12.6	11.8	12.7	13.9	13.6	14.4	15.8
600	600	70	38	7.8	8.2	9.3	9.7	10.1	11.2	11.9	12.7	14.1	15.6	16.7	18.1	17.5	18.7	20.6	18.4	19.5	21.7
600	600	70	35	10.1	10.1	11.6	12.6	12.6	14.1	15.4	15.8	17.7	12.4	13.6	13.7	13.6	14.9	15.5	14.4	15.6	16.4
600	600	70	31	12.9	13.9	15.5	16.0	17.0	18.6	19.4	20.8	22.8	11.3	11.8	12.6	12.7	13.3	14.6	14.1	14.6	16.2
600	600	80	44	8.9	8.6	10.5	10.8	10.5	12.4	13.0	13.1	15.3	15.9	17.4	18.7	17.5	19.1	20.9	18.5	20.0	22.0
600	600	80	40	11.5	10.8	13.1	14.0	13.2	15.6	16.7	16.4	19.1	12.9	14.6	14.5	13.8	15.6	16.0	14.7	16.3	17.0
600	600	80	36	15.0	15.2	17.6	18.1	18.3	20.7	21.4	22.1	24.9	11.8	12.7	13.3	12.9	13.9	15.1	14.4	15.3	16.7
600	600	90	49	9.0	9.1	9.9	10.9	11.0	11.8	13.1	13.6	14.7	17.0	18.8	20.0	18.3	20.2	21.9	19.4	21.2	23.1
600	600	90	45	11.3	11.0	12.2	13.8	13.4	14.6	16.5	16.6	18.2	14.3	16.3	16.1	14.9	17.0	17.4	15.9	17.8	18.4
600	600	90	40	15.4	16.1	17.4	18.5	19.2	20.4	21.9	22.9	24.6	12.9	14.2	14.8	13.7	15.1	16.2	15.3	16.5	17.9

TABLE F-2B. MAXIMUM QUEUE LENGTH ON THE INBOUND APPROACH (NO. OF VEHICLES) FOR GEOMETRY 5*4

INTERSECTION				MINOR			STREET						MAJOR			STREET					
ENVIRONMENT				LEFT TURNS									LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	2.6	2.3	1.7	3.0	2.7	2.2	2.5	2.7	2.5	3.5	2.5	3.6	2.9	2.0	3.6	3.1	2.1	4.0
300	300	50	25	3.4	2.7	2.6	4.4	3.7	3.6	4.5	4.3	4.5	3.5	2.7	2.4	2.2	1.5	1.8	2.3	1.4	1.9
300	300	50	22	1.3	1.6	1.6	2.9	3.2	3.2	3.6	4.3	4.7	3.6	2.0	2.5	2.5	1.0	2.0	3.2	1.6	2.9
300	300	60	33	4.2	3.3	3.5	4.6	3.7	3.9	4.2	3.6	4.2	3.3	2.8	3.7	2.4	2.0	3.4	2.8	2.2	3.9
300	300	60	30	5.0	3.6	4.3	6.0	4.7	5.3	6.2	5.2	6.2	3.7	3.3	2.8	2.1	1.8	1.9	2.2	1.8	2.1
300	300	60	27	3.5	3.1	3.9	5.1	4.7	5.5	5.9	5.8	7.0	3.7	2.6	2.9	2.3	1.3	2.1	3.1	2.0	3.0
300	300	70	38	4.9	4.3	3.4	5.3	4.7	3.8	4.8	4.6	4.1	3.8	3.6	4.4	2.6	2.5	3.9	3.0	2.8	4.4
300	300	70	35	5.3	4.3	3.9	6.3	5.3	4.9	6.4	5.8	5.8	4.5	4.4	3.9	2.6	2.7	2.6	2.8	2.7	3.0
300	300	70	31	4.1	4.1	3.8	5.8	5.8	5.4	6.5	6.9	6.9	4.4	3.6	3.8	2.7	2.0	2.7	3.6	2.8	3.7
300	450	50	25	2.5	2.2	1.6	3.5	3.2	2.5	3.6	3.6	3.4	4.8	4.0	5.3	4.6	4.0	5.8	5.0	4.3	6.3
300	450	50	22	3.5	2.7	2.6	5.0	4.3	4.1	5.7	5.3	5.5	4.3	3.7	3.6	3.5	3.0	3.4	3.7	3.1	3.8
300	450	50	20	2.3	2.6	2.5	4.5	4.7	4.6	5.8	6.4	6.7	4.3	3.0	3.6	3.7	2.5	3.6	4.6	3.2	4.6
300	450	60	30	4.6	3.6	3.7	5.5	4.5	4.7	5.6	5.0	5.5	4.5	4.2	5.2	4.0	3.9	5.4	4.5	4.2	6.0
300	450	60	27	5.5	4.1	4.7	7.0	5.6	6.2	7.7	6.7	7.6	4.3	4.2	3.9	3.2	3.2	3.4	3.5	3.4	3.8
300	450	60	24	4.9	4.5	5.2	7.1	6.6	7.3	8.3	8.3	9.3	4.3	3.4	3.8	3.3	2.6	3.5	4.3	3.4	4.6
300	450	70	35	4.6	4.0	3.1	5.6	5.0	4.0	5.6	5.4	4.8	5.4	5.4	6.3	4.6	4.8	6.2	5.2	5.2	6.9
300	450	70	31	5.3	4.3	3.8	6.8	5.8	5.3	7.5	6.9	6.7	5.4	5.7	5.2	4.0	4.3	4.4	4.4	4.6	4.9
300	450	70	28	5.0	4.9	4.5	7.1	7.1	6.6	8.4	8.7	8.7	5.3	4.8	5.1	4.1	3.6	4.5	5.1	4.6	5.7
300	600	60	27	2.6	2.8	2.6	4.1	4.3	4.1	4.7	5.3	5.4	6.7	6.4	7.6	6.6	6.5	8.2	6.8	6.6	8.5
300	600	60	24	4.4	4.1	4.3	6.4	6.2	6.4	7.6	7.7	8.4	5.2	5.1	4.9	4.5	4.5	4.8	4.5	4.4	5.0
300	600	60	21	4.8	5.5	5.8	7.5	8.2	8.5	9.3	10.3	11.1	4.5	3.6	4.2	3.9	3.2	4.3	4.7	3.8	5.1
300	600	70	31	5.1	4.6	5.2	6.6	6.1	6.6	7.2	7.0	8.0	6.5	6.7	7.6	6.1	6.4	7.9	6.4	6.6	8.4
300	600	70	28	6.8	5.8	6.9	8.9	7.9	9.0	10.1	9.5	10.9	5.3	5.7	5.3	4.3	4.7	4.9	4.4	4.7	5.1
300	600	70	24	8.0	8.0	9.1	10.7	10.6	11.8	12.5	12.8	14.3	4.4	4.0	4.4	3.5	3.3	4.2	4.4	3.9	5.1
300	600	80	36	4.6	4.5	4.0	6.1	6.0	5.4	6.7	6.9	6.8	7.0	7.6	8.4	6.4	7.0	8.4	6.8	7.3	8.9
300	600	80	32	6.2	5.6	5.5	8.3	7.7	7.6	9.5	9.2	9.6	6.0	6.7	6.2	4.7	5.5	5.5	4.9	5.6	5.9
300	600	80	28	7.6	8.0	8.0	10.3	10.7	10.7	12.1	12.9	13.3	5.0	5.0	5.2	3.9	3.9	4.7	4.8	4.7	5.7
450	300	50	30	2.8	2.8	2.3	3.7	3.7	3.2	4.7	5.1	5.1	4.0	3.2	4.4	3.9	3.2	5.0	4.3	3.4	5.4
450	300	50	27	3.7	3.3	3.3	5.3	4.8	4.8	6.9	6.9	7.3	3.7	3.0	2.9	3.0	2.4	2.8	3.1	2.4	3.1
450	300	50	25	2.7	3.2	3.3	4.8	5.3	5.4	7.0	8.0	8.5	3.4	2.0	2.6	2.9	1.6	2.8	3.7	2.3	3.7
450	300	60	36	5.0	4.3	4.6	5.9	5.2	5.5	7.0	6.6	7.4	4.0	3.6	4.6	3.6	3.3	4.9	4.0	3.6	5.4
450	300	60	33	6.0	4.8	5.6	7.5	6.3	7.2	9.1	8.4	9.6	4.0	3.8	3.4	3.0	2.9	3.1	3.2	2.9	3.4
450	300	60	30	5.5	5.3	6.2	7.6	7.4	8.3	9.8	10.1	11.3	3.7	2.7	3.2	2.9	2.0	3.0	3.8	2.8	4.0
450	300	70	42	5.3	5.0	4.3	6.3	5.9	5.2	7.3	7.4	7.0	4.5	4.5	5.4	3.8	3.9	5.4	4.3	4.3	6.0
450	300	70	38	6.1	5.4	5.1	7.6	6.9	6.6	9.3	8.9	9.0	4.8	4.9	4.5	3.5	3.7	3.8	3.8	3.9	4.3
450	300	70	35	5.8	6.1	5.9	8.0	8.2	8.0	10.2	10.8	11.0	4.5	3.9	4.2	3.4	2.9	3.7	4.4	3.7	4.8
450	450	60	33	3.7	3.6	3.1	5.2	5.1	4.6	6.7	7.1	7.0	6.3	5.7	7.1	6.7	6.2	8.1	7.2	6.6	8.7
450	450	60	30	5.1	4.6	4.5	7.1	6.6	6.6	9.3	9.2	9.6	5.5	5.1	5.1	5.2	4.9	5.4	5.5	5.1	5.9
450	450	60	27	5.2	5.7	5.7	7.8	8.3	8.4	10.6	11.5	11.9	5.0	3.8	4.6	4.9	3.9	5.2	5.9	4.7	6.3
450	450	70	38	6.2	5.5	5.8	7.7	6.9	7.2	9.3	8.9	9.6	6.0	5.8	7.0	6.1	6.1	7.8	6.7	6.5	8.5
450	450	70	35	7.6	6.4	7.2	9.7	8.5	9.2	11.8	11.0	12.2	5.5	5.5	5.3	4.9	5.0	5.4	5.3	5.3	5.9
450	450	70	31	8.4	8.2	9.1	11.1	10.9	11.7	13.9	14.0	15.3	4.9	4.2	4.7	4.5	3.9	5.0	5.6	4.8	6.2
450	450	80	44	5.9	5.5	4.7	7.3	6.9	6.1	8.9	8.9	8.5	6.8	7.0	8.1	6.6	6.9	8.5	7.2	7.4	9.3
450	450	80	40	7.1	6.3	5.9	9.2	8.4	8.0	11.3	10.9	11.0	6.5	6.9	6.6	5.6	6.1	6.4	6.1	6.5	7.0
450	450	80	36	8.3	8.4	8.2	10.9	11.1	10.8	13.7	14.3	14.4	5.9	5.5	6.0	5.2	4.9	5.9	6.3	5.9	7.2
450	600	70	35	4.8	5.2	5.1	6.8	7.2	7.1	8.9	9.7	10.0	9.0	8.9	10.2	9.5	9.5	11.4	9.8	9.7	11.8
450	600	70	31	7.1	7.1	7.4	9.7	9.6	10.0	12.4	12.8	13.5	7.1	7.1	7.1	6.9	7.1	7.5	7.0	7.1	7.8
450	600	70	28	8.8	9.7	10.2	12.0	12.9	13.4	15.3	16.6	17.5	5.9	5.2	5.9	5.9	5.3	6.6	6.7	6.0	7.5
450	600	80	40	7.7	7.3	8.1	9.7	9.3	10.1	11.8	11.8	13.0	8.9	9.2	10.3	9.1	9.5	11.2	9.5	9.8	11.7
450	600	80	36	10.1	9.3	10.5	12.6	11.9	13.1	15.4	15.0	16.6	7.2	7.7	7.5	6.8	7.4	7.7	7.0	7.5	8.0
450	600	80	32	12.6	12.8	14.1	15.7	16.0	17.2	19.1	19.7	21.3	5.9	5.6	6.2	5.6	5.5	6.5	6.5	6.2	7.5
450	600	90	45	6.9	7.0	6.6	8.9	9.0	8.6	11.0	11.5	11.5	9.3	10.0	11.0	9.2	10.0	11.6	9.7	10.3	12.1
450	600	90	40	9.3	8.9	9.0	11.9	11.5	11.6	14.6	14.6	15.1	7.8	8.6	8.3	7.0	8.0	8.2	7.3	8.1	8.6
450	600	90	36	12.1	12.7	12.9	15.3	15.9	16.1	18.6	19.6	20.2	6.4	6.4	6.9	5.8	6.0	6.9	6.8	6.8	8.0
600	300	60	39	4.2	3.9	4.2	5.5	5.1	5.4	5.8	5.9	6.5	6.1	5.4	6.8	6.3	5.8	7.7	6.4	5.7	7.8
600	300	60	36	5.7	4.9	5.7	7.5	6.7	7.5	8.5	8.1	9.2	4.9	4.4	4.4	4.4	4.0	4.5	4.3	3.8	4.5
600	300	60	33	5.9	6.1	6.9	8.3	8.5	9.3	9.8	10.4	11.6	4.8	3.5	4.3	4.5	3.4	4.7	5.1	3.8	5.3
600	300	70	45	6.1	5.1	6.1	7.3	6.3	7.4	7.7	7.0	8.5	5.6	5.4	6.6	5.5	5.4	7.1	5.7	5.4	7.4
600	300	70	42	7.5	6.1	7.6	9.4	7.9	9.4	10.3	9.2	11.1	4.8	4.7	4.5	4.0	4.0	4.4	4.0	3.8	4.4
600	300	70	38	8.5	8.0	9.6	10.9	10.4	12.0	12.4	12.3	14.3	4.6	3.8	4.4	4.0	3.3	4.4	4.7	3.8	5.2
600	300	80	52	6.5	5.9	5.8	7.7	7.1	7.1	8.1	7.8	8.2	6.6	6.7	7.8	6.1	6.3	8.0	6.4	6.4	8.3
600	300	80	48	7.8	6.8	7.2	9.7	8.6	9.0	10.6	9.9	10.7	6.0	6.2	6.0	4.9	5.2	5.5	4.9	5.2	5.7
600	300	80	44	9.1	9.0	9.5	11.5	11.4	11.9	13.1	13.4	14.3	5.8	5.3	5.8	4.9	4.5	5.5	5.6	5.1	6.4
600	450	70	42	5.6	5.2	5.5	7.4	7.0	7.2	8.3	8.3	8.9	9.5	9.1	10.6	10.1	9.9	11.9	10.4	10.0	12.3
600	450	70	38	7.6	6.8	7.5	10.0	9.1	9.8	11.5	11.0	12.1	7.7	7.5	7.6	7.7	7.5	8.2	7.8	7.5	8.4
600	450	70	35	9.0	9.2	9.9	12.0	12.1	12.9	14.0	14.6	15.7	7.4	6.4	7.3	7.6	6.7	8.1	8.3	7.3	9.0
600	450	80	48	7.7	6.6	7.6	9.4	8.3	9.3	10.3	9.6	11.0	8.8	8.9	10.2	9.1	9.3	11.2	9.5	9.5	11.6
600	450	80	44	9.7	8.2	9.7	12.1	10.5	12.0	13.6	12.4	14.3	7.3	7.5	7.5	7.0	7.3	7.8	7.2	7.3	8.1
600	450	80	40	11.9	11.4	13.0	14.9	14.3	15.9	17.0	16.8	18.8	6.9	6.4	7.1	6.8	6.3	7.6	7.6	7.0	8.5
600	450	90	54	7.5	6.8	6.7	9.3	8.6	8.5	10.2	9.8	10.1	10.0	10.3	11.6	10.0	10.5	12.3	10.4	10.8	12.8
600	450	90	49	9.6	8.5	8.9	12.0	10.9	11.2	13.5	12.7	13.5	8.7	9.2	9.1	8.1	8.7	9.1	8.3	8.8	9.4
600	450	90	45	12.2	12.0	12.5	15.1	15.0	15.4	17.2	17.4	18.3	8.3	8.0	8.7	7.8	7.7	8.8	8.7	8.4	9.9
600	600	70	38	7.8	7.8	8.5	10.1	10.1	10.8	11.5	11.9	12.9	11.9	12.0	13.5	12.7	12.9	14.9	12.8	12.8	15.0
600	600	70	35	10.1	9.7	10.8	13.0	12.6	13.7	15.0	15.0	16.5	9.2	9.5	9.6	9.3	9.6	10.3	9.2	9.4	10.3
600	600	70	31	13.0	13.5	14.8	16.4	17.0	18.2	19.1	20.0	21.6	8.3	7.7	8.6	8.5	8.1	9.5	9.1	8.5	10.2
600	600	80	44	10.3	9.6	11.1	12.6	11.9	13.4	14.0	13.7	15.5	11.6	12.1	13.4	12.1	12.7	14.5	12.2	12.7	14.7
600	600	80	40	12.9	11.8	13.7	15.7	14.6	16.5	17.8	17.0	19.3	9.2	9.8	9.7	8.9	9.7	10.1	8.9	9.5	10.2
600	600	80	36	16.4	16.3	18.3	19.9	19.7	21.7	22.5	22.7	25.1	8.1	8.0	8.7	8.1	8.1	9.3	8.7	8.6	10.1
600	600	90	49	10.0	9.7	10.1	12.3	12.0	12.4	13.7	13.8	14.5	12.6	13.4	14.6	12.7	13.6	15.3	12.9	13.7	15.7
600	600	90	45	12.3	11.6	12.4	15.2	14.5	15.3	17.2	16.9	18.1	10.4	11.4	11.2	9.8	10.9	11.3	9.9	10.9	11.5
600	600	90	40	16.5	16.7	17.6	19.9	20.2	21.1	22.5	23.2	24.5	9.1	9.4	10.0	8.8	9.1	10.2	9.5	9.7	11.1

TABLE F-2C. MAXIMUM QUEUE LENGTH ON THE INBOUND APPROACH (NO. OF VEHICLES) FOR GEOMETRY 5*5

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	5.5	5.3	4.7	3.7	3.5	2.9	2.2	2.3	2.1	2.8	1.9	2.9	2.1	1.3	2.9	2.5	1.6	3.3
300	300	50	25	5.4	4.8	4.6	4.2	3.5	3.4	3.3	3.0	3.2	3.4	2.7	2.3	2.0	1.4	1.6	2.2	1.5	1.9
300	300	50	22	2.4	2.7	2.6	1.8	2.1	2.0	1.5	2.1	2.5	3.5	2.1	2.5	2.3	.9	1.9	3.2	1.7	2.9
300	300	60	33	6.7	5.8	6.0	4.9	4.0	4.2	3.4	2.8	3.4	3.3	2.9	3.7	2.2	1.9	3.3	2.7	2.2	3.8
300	300	60	30	6.6	5.2	5.9	5.4	4.0	4.7	4.5	3.5	4.5	4.2	3.9	3.4	2.5	2.3	2.3	2.8	2.5	2.7
300	300	60	27	4.2	3.8	4.5	3.6	3.1	3.9	3.2	3.2	4.3	4.3	3.3	3.5	2.8	1.8	2.6	3.7	2.7	3.7
300	300	70	38	6.8	6.2	5.3	5.0	4.4	3.5	3.5	3.3	2.7	4.0	3.9	4.6	2.6	2.6	3.9	3.2	3.0	4.5
300	300	70	35	6.3	5.3	4.8	5.1	4.1	3.6	4.1	3.5	3.5	5.2	5.2	4.6	3.2	3.3	3.2	3.5	3.6	3.7
300	300	70	31	4.2	4.2	3.8	3.6	3.6	3.2	3.3	3.6	3.7	5.2	4.5	4.6	3.3	2.7	3.4	4.4	3.6	4.5
300	450	50	25	4.9	4.6	3.9	3.6	3.3	2.7	2.6	2.7	2.4	3.9	3.3	4.5	3.7	3.2	4.8	4.2	3.6	5.5
300	450	50	22	4.9	4.2	4.0	4.2	3.5	3.3	3.8	3.5	3.7	4.1	3.6	3.4	3.1	2.8	3.1	3.5	3.0	3.6
300	450	50	20	2.9	3.1	3.0	2.8	3.0	2.9	3.0	3.6	3.9	4.1	2.9	3.5	3.3	2.3	3.3	4.4	3.2	4.5
300	450	60	30	6.5	5.5	5.6	5.2	4.2	4.3	4.2	3.6	4.1	4.3	4.1	5.1	3.7	3.6	5.1	4.4	4.1	5.9
300	450	60	27	6.5	5.0	5.6	5.8	4.4	4.9	5.4	4.3	5.3	4.8	4.7	4.3	3.5	3.6	3.7	4.0	3.9	4.3
300	450	60	24	5.0	4.5	5.2	4.9	4.4	5.1	5.1	5.0	6.1	4.7	4.0	4.3	3.6	3.0	3.9	4.8	4.0	5.1
300	450	70	35	6.0	5.3	4.4	4.7	4.1	3.1	3.7	3.5	2.9	5.3	5.5	6.4	4.4	4.7	6.1	5.2	5.3	7.0
300	450	70	31	5.7	4.7	4.2	5.0	4.0	3.5	4.6	4.0	3.8	6.0	6.3	5.9	4.5	4.9	4.9	5.0	5.3	5.6
300	450	70	28	4.5	4.4	4.0	4.4	4.3	3.9	4.6	4.9	4.8	5.9	5.5	5.8	4.5	4.2	5.0	5.8	5.3	6.4
300	600	60	27	4.4	4.6	4.3	3.7	3.8	3.6	3.2	3.7	3.9	5.7	5.6	6.7	5.5	5.5	7.1	5.9	5.8	7.6
300	600	60	24	5.2	4.9	5.2	5.1	4.8	5.0	5.2	5.3	5.9	4.9	4.9	4.6	4.0	4.1	4.4	4.2	4.2	4.7
300	600	60	21	4.7	5.4	5.7	5.2	5.9	6.2	5.9	7.0	7.7	4.2	3.4	3.9	3.5	2.9	3.9	4.4	3.6	4.9
300	600	70	31	6.5	5.9	6.5	5.7	5.2	5.7	5.3	5.1	6.0	6.2	6.5	7.4	5.7	6.1	7.5	6.2	6.4	8.1
300	600	70	28	7.2	6.2	7.3	7.1	6.1	7.1	7.2	6.6	8.0	5.6	6.1	5.6	4.5	5.0	5.1	4.8	5.2	5.5
300	600	70	24	7.5	7.4	8.5	7.9	7.9	9.0	8.6	9.0	10.5	4.7	4.4	4.7	3.7	3.6	4.4	4.7	4.4	5.5
300	600	80	36	5.4	5.2	4.7	4.7	4.5	3.9	4.2	4.4	4.2	6.9	7.5	8.4	6.1	6.8	8.2	6.7	7.3	8.8
300	600	80	32	6.0	5.4	5.3	5.9	5.2	5.2	6.0	5.8	6.1	6.5	7.3	6.7	5.0	5.9	5.9	5.4	6.2	6.4
300	600	80	28	6.5	6.9	6.9	7.0	7.4	7.4	7.7	8.5	8.9	5.5	5.6	5.8	4.2	4.4	5.1	5.3	5.3	6.3
450	300	50	30	4.7	4.6	4.2	3.4	3.3	2.9	3.4	3.7	3.7	3.2	2.5	3.6	3.0	2.4	4.1	3.5	2.7	4.7
450	300	50	27	4.7	4.3	4.3	4.0	3.6	3.6	4.6	4.5	4.9	3.5	2.9	2.7	2.6	2.2	2.5	2.9	2.3	2.9
450	300	50	25	2.7	3.2	3.3	2.6	3.1	3.2	3.8	4.7	5.2	3.3	1.9	2.5	2.6	1.4	2.5	3.5	2.2	3.5
450	300	60	36	6.4	5.7	6.1	5.1	4.4	4.7	5.1	4.8	5.5	3.8	3.5	4.5	3.3	3.1	4.6	3.9	3.5	5.3
450	300	60	33	6.5	5.3	6.1	5.8	4.6	5.4	6.4	5.6	6.8	4.4	4.3	3.9	3.3	3.2	3.4	3.6	3.5	3.9
450	300	60	30	5.0	4.9	5.8	5.0	4.8	5.7	6.1	6.3	7.6	4.2	3.3	3.7	3.2	2.4	3.3	4.2	3.3	4.5
450	300	70	42	6.2	5.9	5.1	4.9	4.6	3.8	4.9	5.0	4.6	4.5	4.6	5.4	3.7	3.9	5.3	4.4	4.4	6.0
450	300	70	38	6.0	5.3	5.0	5.3	4.6	4.3	5.9	5.6	5.6	5.4	5.6	5.2	4.0	4.3	4.3	4.4	4.6	4.9
450	300	70	35	4.9	5.1	4.9	4.8	5.0	4.8	5.9	6.5	6.7	5.2	4.6	4.9	3.9	3.5	4.3	5.0	4.4	5.5
450	450	60	33	5.0	4.9	4.4	4.2	4.2	3.7	4.8	5.1	5.0	5.3	4.9	6.2	5.6	5.3	7.1	6.3	5.8	7.9
450	450	60	30	5.5	5.0	4.9	5.3	4.8	4.7	6.4	6.3	6.6	5.1	4.8	4.8	4.7	4.5	5.0	5.2	4.9	5.6
450	450	60	27	4.6	5.1	5.2	5.1	5.5	5.6	6.8	7.6	8.1	4.7	3.6	4.4	4.5	3.5	4.8	5.6	4.5	6.0
450	450	70	38	7.1	6.3	6.6	6.3	5.5	5.8	6.9	6.5	7.1	5.7	5.6	6.8	5.6	5.7	7.4	6.4	6.3	8.2
450	450	70	35	7.5	6.3	7.1	7.4	6.2	6.9	8.5	7.7	8.8	5.8	5.9	5.7	5.1	5.3	5.6	5.6	5.7	6.2
450	450	70	31	7.4	7.2	8.0	7.9	7.6	8.5	9.6	9.7	11.0	5.2	4.6	5.1	4.7	4.2	5.2	5.9	5.3	6.6
450	450	80	44	6.1	5.8	4.9	5.4	5.0	4.2	5.9	5.9	5.5	6.7	7.0	8.0	6.3	6.7	8.3	7.1	7.4	9.2
450	450	80	40	6.5	5.6	5.3	6.3	5.5	5.1	7.4	7.0	7.0	7.0	7.5	7.1	6.0	6.6	6.7	6.6	7.1	7.5
450	450	80	36	6.7	6.9	6.6	7.1	7.3	7.0	8.8	9.4	9.5	6.4	6.1	6.5	5.5	5.4	6.3	6.9	6.5	7.7
450	600	70	35	5.5	5.9	5.8	5.3	5.7	5.6	6.4	7.1	7.4	7.9	8.0	9.2	8.3	8.4	10.2	8.8	8.8	10.8
450	600	70	31	6.9	6.8	7.2	7.3	7.2	7.6	8.9	9.2	10.0	6.6	6.8	6.7	6.3	6.6	7.0	6.6	6.7	7.4
450	600	70	28	7.7	8.6	9.1	8.6	9.5	10.0	10.9	12.2	13.0	5.5	4.9	5.5	5.4	4.9	6.1	6.3	5.7	7.1
450	600	80	40	8.0	7.6	8.3	7.7	7.4	8.1	8.8	8.8	9.9	8.5	8.9	10.0	8.5	9.1	10.7	9.1	9.5	11.3
450	600	80	36	9.4	8.6	9.8	9.8	9.0	10.2	11.4	11.0	12.6	7.4	8.0	7.7	6.8	7.5	7.8	7.2	7.8	8.2
450	600	80	32	11.0	11.2	12.4	11.9	12.1	13.4	14.2	14.8	16.4	6.1	6.0	6.4	5.7	5.7	6.6	6.7	6.6	7.8
450	600	90	45	6.6	6.7	6.3	6.4	6.4	6.0	7.4	7.9	7.9	9.1	9.9	10.8	8.8	9.7	11.2	9.5	10.2	12.0
450	600	90	40	8.1	7.7	7.8	8.4	8.1	8.1	10.1	10.1	10.5	8.2	9.1	8.7	7.2	8.3	8.4	7.7	8.6	9.0
450	600	90	36	10.0	10.6	10.7	10.9	11.5	11.7	13.2	14.2	14.7	6.8	6.9	7.3	6.0	6.3	7.2	7.2	7.3	8.5
600	300	60	39	5.7	5.3	5.6	4.7	4.3	4.6	4.0	4.0	4.7	4.9	4.3	5.6	4.9	4.5	6.3	5.1	4.6	6.6
600	300	60	36	6.2	5.4	6.2	5.8	5.0	5.7	5.7	5.3	6.4	4.2	3.8	3.8	3.6	3.3	3.8	3.7	3.2	3.9
600	300	60	33	5.4	5.6	6.5	5.6	5.8	6.7	6.1	6.7	7.9	4.2	3.0	3.7	3.7	2.7	3.9	4.5	3.3	4.8
600	300	70	45	7.1	6.0	7.1	6.1	5.0	6.1	5.4	4.7	6.2	5.0	4.9	6.0	4.8	4.8	6.4	5.1	4.9	6.8
600	300	70	42	7.6	6.1	7.6	7.2	5.7	7.2	7.1	6.0	7.9	4.7	4.8	4.5	3.8	3.9	4.2	3.9	3.9	4.5
600	300	70	38	7.6	7.1	8.7	7.8	7.3	8.9	8.3	8.1	10.1	4.6	3.9	4.4	3.9	3.3	4.3	4.7	3.9	5.2
600	300	80	52	6.9	6.3	6.2	5.9	5.3	5.2	5.2	4.9	5.3	6.1	6.3	7.3	5.5	5.9	7.4	5.9	6.1	7.9
600	300	80	48	7.3	6.2	6.7	6.9	5.8	6.3	6.8	6.1	6.9	6.1	6.5	6.1	4.9	5.4	5.6	5.1	5.4	5.9
600	300	80	44	7.7	7.6	8.1	7.9	7.8	8.3	8.4	8.6	9.5	6.0	5.6	6.0	4.9	4.7	5.6	5.8	5.4	6.6
600	450	70	42	6.5	6.1	6.3	6.0	5.6	5.8	5.9	5.8	6.4	8.1	7.9	9.3	8.6	8.5	10.5	9.1	8.7	11.0
600	450	70	38	7.6	6.7	7.4	7.7	6.9	7.5	8.1	7.6	8.7	6.9	6.8	6.9	6.8	6.7	7.4	7.0	6.8	7.7
600	450	70	35	8.0	8.1	8.9	8.7	8.9	9.6	9.8	10.3	11.4	6.7	5.8	6.6	6.7	5.9	7.3	7.6	6.7	8.3
600	450	80	48	8.1	6.9	8.0	7.6	6.5	7.5	7.4	6.7	8.1	8.1	8.2	9.5	8.3	8.5	10.3	8.8	8.9	10.9
600	450	80	44	9.2	7.7	9.1	9.4	7.8	9.3	9.8	8.6	10.4	7.2	7.5	7.4	6.7	7.1	7.6	7.0	7.3	8.0
600	450	80	40	10.5	9.9	11.5	11.2	10.6	12.2	12.2	12.0	14.0	6.8	6.4	7.1	6.5	6.2	7.4	7.5	7.0	8.5
600	450	90	54	7.4	6.6	6.5	6.9	6.2	6.1	6.7	6.4	6.7	9.4	9.9	11.1	9.3	9.9	11.6	9.9	10.3	12.3
600	450	90	49	8.6	7.4	7.8	8.7	7.5	7.9	9.1	8.3	9.1	8.7	9.4	9.2	8.0	8.7	9.0	8.4	8.9	9.5
600	450	90	45	10.2	10.0	10.4	10.9	10.7	11.2	11.9	12.1	12.9	8.3	8.2	8.8	7.7	7.7	8.8	8.8	8.6	10.0
600	600	70	38	8.1	8.1	8.7	8.1	8.1	8.8	8.5	8.9	9.9	10.5	10.6	12.0	11.1	11.3	13.3	11.3	11.4	13.6
600	600	70	35	9.5	9.1	10.2	10.1	9.7	10.8	11.1	11.0	12.5	8.4	8.7	8.7	8.3	8.7	9.3	8.3	8.6	9.4
600	600	70	31	11.4	12.0	13.1	12.6	13.2	14.4	14.2	15.1	16.7	7.4	7.0	7.8	7.5	7.2	8.5	8.2	7.8	9.4
600	600	80	44	10.1	9.4	10.9	10.2	9.5	10.9	10.5	10.2	12.0	10.8	11.4	12.6	11.1	11.8	13.5	11.4	12.0	13.9
600	600	80	40	11.8	10.6	12.5	12.4	11.3	13.2	13.4	12.6	14.9	8.9	9.7	9.5	8.5	9.4	9.8	8.7	9.4	10.0
600	600	80	36	14.4	14.2	16.2	15.6	15.5	17.5	17.2	17.4	19.8	7.9	7.9	8.5	7.7	7.8	9.0	8.5	8.5	9.9
600	600	90	49	9.2	9.0	9.3	9.3	9.0	9.4	9.7	9.7	10.5	11.9	12.8	13.9	11.9	12.9	14.6	12.3	13.2	15.1
600	600	90	45	10.6	9.9	10.7	11.3	10.5	11.3	12.2	11.9	13.0	10.3	11.4	11.2	9.6	10.8	11.1	9.8	10.9	11.4
600	600	90	40	13.8	14.1	15.0	15.1	15.4	16.2	16.6	17.3	18.5	9.1	9.4	9.9	8.6	9.0	10.1	9.5	9.8	11.1

TABLE F-2D. MAXIMUM QUEUE LENGTH ON THE INBOUND APPROACH (NO. OF VEHICLES) FOR GEOMETRY 6*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	2.7	3.5	3.2	2.6	3.4	3.1	2.1	3.3	3.3	2.4	1.7	2.9	2.5	2.0	3.7	3.5	2.9	4.8
300	300	50	25	3.4	3.8	3.9	3.9	4.2	4.4	4.0	4.7	5.3	2.1	1.6	1.4	1.6	1.2	1.5	2.4	1.9	2.4
300	300	50	22	1.8	3.1	3.4	2.9	4.2	4.4	3.6	5.3	5.9	2.3	1.1	1.6	2.0	.8	1.9	3.5	2.2	3.5
300	300	60	33	3.6	3.7	4.2	3.5	3.5	4.0	3.0	3.5	4.3	2.9	2.6	3.6	2.7	2.6	4.1	3.8	3.6	5.3
300	300	60	30	4.3	3.9	4.9	4.7	4.4	5.3	4.8	4.9	6.2	2.9	2.8	2.4	2.1	2.1	2.2	3.0	2.9	3.3
300	300	60	27	3.3	3.9	4.9	4.3	4.9	6.0	5.0	6.0	7.5	3.1	2.3	2.6	2.4	1.7	2.6	4.0	3.2	4.3
300	300	70	38	4.7	5.1	4.5	4.5	5.0	4.4	4.0	4.9	4.7	3.5	3.7	4.5	3.1	3.3	4.7	4.2	4.3	5.9
300	300	70	35	4.9	5.0	4.8	5.4	5.5	5.3	5.5	6.0	6.2	3.9	4.2	3.7	2.8	3.2	3.2	3.8	4.0	4.3
300	300	70	31	4.3	5.3	5.3	5.4	6.4	6.3	6.1	7.5	7.8	3.9	3.5	3.7	3.0	2.6	3.4	4.6	4.1	5.2
300	450	50	25	3.1	3.8	3.5	3.5	4.2	3.8	3.5	4.7	4.7	3.6	3.2	4.5	4.2	3.9	5.7	5.4	4.9	7.0
300	450	50	22	3.9	4.2	4.3	4.9	5.2	5.3	5.5	6.2	6.7	2.8	2.6	2.5	2.8	2.7	3.1	3.8	3.5	4.2
300	450	50	20	3.3	4.5	4.7	4.9	6.1	6.3	6.1	7.8	8.3	3.0	2.0	2.6	3.1	2.2	3.4	4.7	3.7	5.2
300	450	60	30	4.4	4.4	4.8	4.8	4.8	5.2	4.8	5.2	6.0	3.9	4.0	5.1	4.2	4.4	6.0	5.5	5.5	7.4
300	450	60	27	5.1	4.7	5.6	6.1	5.7	6.6	6.8	6.8	8.0	3.5	3.7	3.4	3.2	3.5	3.7	4.2	4.4	4.9
300	450	60	24	5.1	5.6	6.6	6.7	7.2	8.2	7.9	8.9	10.2	3.6	3.0	3.5	3.4	2.9	3.9	5.1	4.5	5.8
300	450	70	35	4.8	5.2	4.6	5.2	5.6	5.0	5.3	6.1	5.8	5.0	5.4	6.3	5.0	5.5	7.0	6.3	6.7	8.4
300	450	70	31	5.4	5.4	5.1	6.4	6.4	6.1	7.0	7.4	7.5	4.8	5.3	4.9	4.1	4.8	4.9	5.3	5.8	6.2
300	450	70	28	5.5	6.5	6.4	7.1	8.1	8.0	8.4	9.7	10.0	4.8	4.6	4.9	4.3	4.2	5.1	6.1	5.9	7.0
300	600	60	27	3.2	4.3	4.4	4.1	5.2	5.3	4.7	6.2	6.7	5.4	5.5	6.7	6.1	6.3	8.1	7.1	7.2	9.2
300	600	60	24	4.7	5.5	6.0	6.3	7.0	7.5	7.4	8.6	9.5	3.7	3.9	3.8	3.7	4.1	4.4	4.5	4.7	5.4
300	600	60	21	5.7	7.4	8.0	7.8	9.5	10.1	9.6	11.7	12.6	3.1	2.5	3.2	3.3	2.9	4.0	4.8	4.2	5.6
300	600	70	31	4.9	5.3	6.2	5.8	6.2	7.1	6.4	7.2	8.5	5.9	6.4	7.4	6.3	6.9	8.4	7.4	7.8	9.6
300	600	70	28	6.4	6.5	7.8	8.0	8.0	9.3	9.1	9.5	11.2	4.4	5.1	4.8	4.2	4.9	5.1	5.1	5.7	6.1
300	600	70	24	8.1	9.1	10.5	10.2	11.2	12.6	12.0	13.4	15.1	3.6	3.5	4.0	3.5	3.6	4.5	5.1	5.0	6.2
300	600	80	36	4.8	5.6	5.4	5.7	6.6	6.3	6.3	7.5	7.7	6.6	7.4	8.4	6.7	7.6	9.1	7.8	8.7	10.4
300	600	80	32	6.2	6.6	6.8	7.7	8.1	8.3	8.9	9.7	10.3	5.3	6.3	5.9	4.7	5.9	6.0	5.7	6.7	7.0
300	600	80	28	8.1	9.5	9.8	10.3	11.7	12.0	12.1	13.8	14.5	4.4	4.7	5.0	4.0	4.4	5.2	5.7	5.9	7.0
450	300	50	30	3.0	4.0	3.8	3.3	4.4	4.2	4.4	5.8	6.0	2.8	2.3	3.6	3.5	3.2	5.0	4.6	4.1	6.2
450	300	50	27	3.8	4.4	4.7	4.8	5.4	5.7	6.4	7.4	8.1	2.3	1.9	1.8	2.3	2.1	2.5	3.2	2.8	3.5
450	300	50	25	3.2	4.8	5.2	4.8	6.4	6.7	7.0	9.0	9.8	2.1	1.0	1.7	2.3	1.4	2.6	3.9	2.8	4.3
450	300	60	36	4.4	4.7	5.4	4.8	5.1	5.7	5.8	6.5	7.5	3.4	3.4	4.5	3.8	3.9	5.5	5.0	4.9	6.8
450	300	60	33	5.2	5.1	6.2	6.2	6.1	7.2	7.9	8.1	9.6	3.2	3.3	3.0	2.9	3.1	3.4	3.9	4.0	4.5
450	300	60	30	5.2	6.1	7.3	6.8	7.7	8.9	9.1	10.3	11.9	3.0	2.4	2.9	2.9	2.4	3.4	4.6	3.9	5.2
450	300	70	42	5.2	5.9	5.4	5.6	6.3	5.8	6.6	7.7	7.6	4.2	4.4	5.4	4.3	4.7	6.2	5.5	5.8	7.5
450	300	70	38	5.8	6.1	6.1	6.8	7.1	7.0	8.4	9.1	9.5	4.2	4.6	4.3	3.6	4.2	4.4	4.7	5.1	5.5
450	300	70	35	6.1	7.3	7.4	7.6	8.9	9.0	9.9	11.5	12.0	4.0	3.7	4.1	3.6	3.4	4.4	5.4	5.0	6.2
450	450	60	33	4.3	5.3	5.1	5.2	6.2	6.0	6.8	8.1	8.3	5.1	4.8	6.2	6.2	6.1	8.1	7.5	7.2	9.4
450	450	60	30	5.6	6.1	6.3	7.1	7.6	7.8	9.2	10.1	10.8	4.0	3.9	3.9	4.5	4.5	5.1	5.5	5.4	6.3
450	450	60	27	6.2	7.7	8.0	8.3	9.8	10.1	11.0	12.9	13.6	3.6	2.8	3.6	4.3	3.6	4.9	6.0	5.2	6.8
450	450	70	38	6.1	6.3	6.9	7.0	7.2	7.8	8.6	9.2	10.1	5.4	5.6	6.8	6.2	6.6	8.3	7.6	7.8	9.8
450	450	70	35	7.3	7.1	8.2	8.8	8.6	9.7	11.0	11.2	12.6	4.6	5.0	4.8	4.8	5.3	5.7	6.0	6.3	6.9
450	450	70	31	8.6	9.4	10.6	10.7	11.5	12.7	13.5	14.7	16.2	4.1	3.7	4.4	4.5	4.2	5.4	6.3	5.9	7.3
450	450	80	44	6.1	6.8	6.3	7.0	7.7	7.2	8.6	9.6	9.5	6.4	6.9	8.0	6.9	7.6	9.2	8.3	8.9	10.8
450	450	80	40	7.2	7.5	7.4	8.7	9.0	8.9	10.9	11.5	11.8	5.8	6.5	6.3	5.7	6.5	6.8	7.0	7.6	8.2
450	450	80	36	8.9	10.1	10.1	11.0	12.2	12.2	13.8	15.3	15.7	5.3	5.2	5.8	5.3	5.4	6.5	7.3	7.2	8.5
450	600	70	35	5.4	6.8	7.0	6.8	8.2	8.4	8.9	10.7	11.3	7.7	7.9	9.3	9.0	9.3	11.2	10.1	10.3	12.4
450	600	70	31	7.5	8.5	9.2	9.6	10.5	11.2	12.3	13.6	14.7	5.5	5.9	5.9	6.1	6.6	7.1	7.0	7.4	8.1
450	600	70	28	9.7	11.7	12.4	12.4	14.3	15.0	15.7	18.0	19.1	4.4	4.1	4.8	5.2	5.0	6.3	6.8	6.4	7.9
450	600	80	40	7.5	8.1	9.2	8.9	9.6	10.6	11.0	12.1	13.5	8.2	8.9	10.1	9.2	10.0	11.7	10.4	11.0	12.9
450	600	80	36	9.7	10.0	11.4	11.7	12.0	13.4	14.4	15.1	16.9	6.3	7.1	7.0	6.6	7.5	7.9	7.6	8.4	9.0
450	600	80	32	12.7	13.9	15.5	15.3	16.6	18.1	18.6	20.2	22.2	5.1	5.1	5.7	5.5	5.7	6.8	7.2	7.2	8.6
450	600	90	45	7.1	8.2	8.1	8.6	9.6	9.5	10.7	12.1	12.4	8.8	9.8	10.9	9.5	10.6	12.2	10.7	11.7	13.6
450	600	90	40	9.4	10.0	10.4	11.4	12.1	12.4	14.1	15.2	15.9	7.1	8.2	7.9	7.0	8.3	8.6	8.1	9.2	9.7
450	600	90	36	12.7	14.3	14.8	15.3	17.0	17.4	18.6	20.6	21.5	5.7	6.1	6.6	5.9	6.4	7.4	7.6	8.0	9.3
600	300	60	39	3.0	3.7	4.3	3.7	4.4	4.9	4.0	5.1	6.0	5.5	5.2	6.6	6.5	6.3	8.2	7.3	7.0	9.2
600	300	60	36	4.3	4.6	5.6	5.6	5.8	6.9	6.5	7.2	8.6	4.0	3.8	3.9	4.3	4.2	4.8	5.0	4.8	5.6
600	300	60	33	5.0	6.2	7.3	6.9	8.1	9.2	8.4	10.0	11.5	4.1	3.1	4.0	4.5	3.7	5.1	5.8	4.9	6.5
600	300	70	45	4.1	4.1	5.4	4.8	4.7	6.1	5.1	5.5	7.2	5.7	5.8	7.0	6.3	6.6	8.3	7.3	7.3	9.4
600	300	70	42	5.4	4.9	6.8	6.7	6.2	8.0	7.6	7.5	9.7	4.5	4.8	4.7	4.5	4.9	5.3	5.3	5.5	6.1
600	300	70	38	6.8	7.3	9.3	8.7	9.2	11.1	10.2	11.1	13.4	4.5	4.0	4.7	4.7	4.3	5.4	6.1	5.5	7.0
600	300	80	52	4.9	5.3	5.6	5.6	6.0	6.2	6.0	6.7	7.3	6.8	7.2	8.4	7.1	7.7	9.3	8.1	8.5	10.4
600	300	80	48	6.1	6.1	6.8	7.4	7.3	8.1	8.3	8.7	9.8	5.9	6.5	6.3	5.6	6.3	6.6	6.4	7.0	7.5
600	300	80	44	7.9	8.8	9.6	9.8	10.7	11.5	11.3	12.6	13.8	5.9	5.7	6.3	5.7	5.7	6.7	7.2	7.0	8.3
600	450	70	42	4.8	5.5	6.0	6.0	6.7	7.2	6.9	7.9	8.8	8.9	8.8	10.4	10.3	10.3	12.4	11.3	11.2	13.5
600	450	70	38	6.7	6.9	7.8	8.5	8.7	9.6	9.9	10.5	11.9	6.8	6.9	7.1	7.5	7.7	8.5	8.4	8.4	9.4
600	450	70	35	8.6	9.7	10.8	11.0	12.1	13.2	13.0	14.6	16.0	6.6	5.9	6.9	7.5	7.0	8.5	9.0	8.3	10.1
600	450	80	48	6.1	6.0	7.3	7.3	7.2	8.5	8.1	8.4	10.1	8.8	9.2	10.6	9.9	10.4	12.3	11.0	11.3	13.5
600	450	80	44	8.0	7.5	9.3	9.8	9.3	11.0	11.3	11.1	13.3	7.1	7.6	7.6	7.5	8.1	8.7	8.4	8.9	9.7
600	450	80	40	10.7	11.2	13.0	13.1	13.6	15.4	15.2	16.0	18.3	6.8	6.5	7.3	7.4	7.2	8.6	9.0	8.7	10.3
600	450	90	54	6.4	6.7	6.9	7.6	7.9	8.1	8.4	9.1	9.7	10.1	10.8	12.1	10.9	11.7	13.6	12.1	12.8	14.8
600	450	90	49	8.4	8.2	8.9	10.2	10.0	10.7	11.6	11.9	12.9	8.6	9.4	9.4	8.7	9.7	10.1	9.7	10.5	11.2
600	450	90	45	11.4	12.3	13.0	13.8	14.6	15.4	15.9	17.1	18.2	8.3	8.4	9.0	8.5	8.8	10.0	10.2	10.3	11.8
600	600	70	38	6.9	8.0	8.9	8.6	9.7	10.6	10.0	11.5	12.8	11.2	11.6	13.1	12.7	13.2	15.3	13.6	13.9	16.2
600	600	70	35	9.1	9.7	11.1	11.4	12.1	13.5	13.4	14.4	16.2	8.3	8.8	9.0	9.1	9.8	10.4	9.8	10.3	11.2
600	600	70	31	12.5	14.1	15.5	15.4	17.0	18.5	18.0	20.0	21.8	7.4	7.2	8.1	8.4	8.3	9.8	9.7	9.5	11.2
600	600	80	44	8.6	9.0	10.7	10.4	10.7	12.5	11.8	12.5	14.6	11.6	12.4	13.7	12.7	13.7	15.5	13.7	14.5	16.6
600	600	80	40	11.1	11.0	13.2	13.4	13.3	15.5	15.4	15.7	18.3	8.8	9.8	9.8	9.4	10.4	10.9	10.1	11.0	11.8
600	600	80	36	15.1	16.0	18.3	18.0	18.9	21.2	20.6	21.9	24.6	7.9	8.1	8.9	8.6	8.9	10.2	10.0	10.2	11.7
600	600	90	49	8.8	9.5	10.2	10.5	11.3	11.9	11.9	13.0	14.0	12.7	13.8	15.1	13.5	14.8	16.6	14.5	15.7	17.7
600	600	90	45	10.9	11.2	12.3	13.3	13.6	14.7	15.3	16.0	17.4	10.2	11.5	11.4	10.4	11.9	12.3	11.3	12.5	13.2
600	600	90	40	15.6	16.9	18.1	18.5	19.8	21.0	21.1	22.8	24.3	9.1	9.6	10.3	9.5	10.1	11.3	11.0	11.5	12.9

TABLE F-2E. MAXIMUM QUEUE LENGTH ON THE INBOUND APPROACH (NO. OF VEHICLES) FOR GEOMETRY 7*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	1.5	1.9	1.2	1.8	2.2	1.5	.5	1.3	1.0	4.8	3.1	4.3	3.8	2.2	3.9	3.9	2.2	4.2
300	300	50	25	2.2	2.2	2.0	3.1	3.1	2.8	2.5	2.8	2.9	5.0	3.5	3.3	3.4	2.0	2.3	3.3	1.8	2.3
300	300	50	22	.7	1.6	1.4	2.1	3.0	2.9	2.1	3.4	3.6	5.3	3.1	3.6	3.8	1.7	2.8	4.5	2.2	3.5
300	300	60	33	3.8	3.5	3.6	4.1	3.8	3.8	2.8	2.9	3.4	4.6	3.4	4.4	3.3	2.2	3.7	3.6	2.3	4.0
300	300	60	30	4.5	3.8	4.3	5.4	4.6	5.1	4.7	4.3	5.3	5.2	4.1	3.7	3.2	2.2	2.4	3.3	2.1	2.5
300	300	60	27	3.5	3.7	4.4	5.0	5.2	5.8	4.9	5.5	6.6	5.5	3.6	4.0	3.7	2.0	2.9	4.4	2.5	3.7
300	300	70	38	4.5	4.6	3.6	4.8	4.8	3.8	3.5	4.0	3.3	5.1	4.2	5.1	3.5	2.7	4.1	3.8	2.9	4.6
300	300	70	35	4.8	4.5	3.9	5.7	5.3	4.8	5.0	5.1	4.9	6.0	5.3	4.8	3.7	3.1	3.1	3.9	3.1	3.4
300	300	70	31	4.2	4.8	4.4	5.6	6.3	5.8	5.6	6.6	6.5	6.2	4.7	4.9	4.1	2.7	3.5	4.9	3.3	4.4
300	450	50	25	1.9	2.2	1.4	2.6	3.0	2.2	1.9	2.6	2.3	5.1	3.7	5.0	4.5	3.2	5.1	4.8	3.4	5.5
300	450	50	22	2.7	2.6	2.3	4.1	4.0	3.6	3.9	4.2	4.3	4.8	3.6	3.5	3.6	2.5	3.0	3.8	2.5	3.2
300	450	50	20	2.1	3.0	2.7	4.1	4.9	4.7	4.5	5.8	6.0	5.1	3.1	3.8	4.0	2.2	3.4	4.9	2.8	4.3
300	450	60	30	4.5	4.1	4.2	5.3	4.9	5.0	4.6	4.6	5.0	4.8	3.8	4.9	3.9	3.1	4.7	4.3	3.3	5.2
300	450	60	27	5.3	4.5	5.0	6.7	5.9	6.4	6.6	6.2	7.0	4.9	4.1	3.8	3.4	2.7	2.9	3.6	2.7	3.3
300	450	60	24	5.3	5.5	6.0	7.3	7.4	8.0	7.8	8.3	9.3	5.0	3.5	4.0	3.7	2.2	3.3	4.6	3.0	4.3
300	450	70	35	4.6	4.6	3.6	5.4	5.4	4.3	4.7	5.1	4.4	5.7	5.0	6.0	4.5	4.0	5.5	5.0	4.3	6.1
300	450	70	31	5.2	4.8	4.2	6.6	6.2	5.5	6.5	6.4	6.2	6.0	5.5	5.2	4.2	3.8	4.0	4.5	3.9	4.4
300	450	70	28	5.4	6.0	5.4	7.4	7.9	7.4	7.9	8.8	8.7	6.1	4.9	5.3	4.4	3.3	4.3	5.4	4.2	5.3
300	600	60	27	1.9	2.6	2.3	3.2	3.9	3.6	3.0	4.1	4.2	6.0	5.0	6.3	5.5	4.7	6.5	5.7	4.7	6.7
300	600	60	24	3.5	3.8	3.9	5.4	5.7	5.8	5.8	6.5	7.0	4.8	4.0	3.9	3.6	3.0	3.4	3.6	2.8	3.4
300	600	60	21	4.4	5.7	5.9	6.9	8.2	8.5	7.9	9.6	10.2	4.3	2.7	3.4	3.3	1.9	3.1	4.0	2.4	3.8
300	600	70	31	5.0	5.0	5.5	6.3	6.4	6.8	6.1	6.6	7.4	5.8	5.3	6.4	5.1	4.7	6.3	5.3	4.7	6.6
300	600	70	28	6.6	6.2	7.1	8.5	8.1	9.0	8.9	8.9	10.2	4.9	4.5	4.2	3.5	3.2	3.4	3.5	3.1	3.6
300	600	70	24	8.2	8.8	9.8	10.7	11.3	12.4	11.8	12.7	14.1	4.2	3.1	3.5	2.9	2.0	2.9	3.7	2.5	3.8
300	600	80	36	4.5	5.0	4.4	5.9	6.3	5.7	5.7	6.5	6.3	6.4	6.2	7.1	5.3	5.2	6.7	5.6	5.4	7.1
300	600	80	32	6.0	6.0	5.8	7.9	7.9	7.7	8.3	8.7	8.9	5.6	5.6	5.2	3.9	4.0	4.1	4.0	3.9	4.3
300	600	80	28	7.9	8.9	8.8	10.4	11.4	11.3	11.5	12.9	13.1	4.8	4.0	4.4	3.3	2.6	3.5	4.1	3.3	4.4
450	300	50	30	2.0	2.6	2.1	2.7	3.4	2.8	3.0	4.0	3.9	4.6	3.1	4.4	4.2	2.8	4.7	4.4	2.9	5.0
450	300	50	27	2.8	3.0	2.9	4.2	4.4	4.3	5.1	5.7	5.9	4.6	3.2	3.2	3.5	2.2	2.7	3.5	2.1	2.9
450	300	50	25	2.3	3.5	3.5	4.3	5.4	5.4	5.7	7.3	7.7	4.6	2.4	3.2	3.6	1.6	2.9	4.4	2.2	3.7
450	300	60	36	4.8	4.7	5.0	5.6	5.5	5.7	5.9	6.2	6.8	4.6	3.5	4.7	3.9	2.9	4.6	4.2	3.1	5.0
450	300	60	33	5.7	5.2	5.9	7.1	6.5	7.2	7.9	7.8	8.9	4.9	4.0	3.7	3.5	2.7	3.0	3.6	2.6	3.2
450	300	60	30	5.7	6.2	7.0	7.7	8.1	8.9	9.2	10.0	11.2	4.8	3.2	3.7	3.6	2.1	3.1	4.4	2.7	4.0
450	300	70	42	5.2	5.6	4.7	6.0	6.3	5.4	6.3	7.0	6.5	5.2	4.4	5.5	4.1	3.5	5.1	4.5	3.7	5.6
450	300	70	38	5.9	5.8	5.4	7.3	7.1	6.7	8.1	8.4	8.4	5.7	5.1	4.8	4.0	3.5	3.7	4.2	3.6	4.1
450	300	70	35	6.2	7.0	6.7	8.1	9.0	8.7	9.6	10.8	10.9	5.7	4.3	4.8	4.1	2.9	3.9	5.0	3.6	4.8
450	450	60	33	3.3	3.8	3.2	4.6	5.1	4.5	5.4	6.3	6.1	6.0	4.7	6.2	6.0	4.9	6.8	6.4	5.1	7.3
450	450	60	30	4.5	4.7	4.5	6.4	6.6	6.4	7.8	8.4	8.6	5.4	4.3	4.4	4.7	3.7	4.4	4.9	3.8	4.7
450	450	60	27	5.2	6.3	6.2	7.7	8.8	8.7	9.7	11.2	11.5	5.1	3.3	4.1	4.7	2.9	4.3	5.6	3.7	5.3
450	450	70	38	6.4	6.3	6.5	7.7	7.6	7.8	8.5	8.8	9.4	5.6	4.8	6.1	5.4	4.7	6.5	5.8	5.0	7.0
450	450	70	35	7.7	7.1	7.8	9.6	9.0	9.7	11.0	10.8	11.8	5.4	4.7	4.6	4.4	3.9	4.3	4.7	4.0	4.7
450	450	70	31	9.1	9.5	10.2	11.5	11.9	12.7	13.6	14.3	15.5	5.0	3.6	4.3	4.2	2.9	4.1	5.2	3.8	5.2
450	450	80	44	6.1	6.4	5.5	7.4	7.7	6.7	8.2	8.9	8.3	6.5	6.0	7.2	5.9	5.5	7.2	6.4	5.9	7.9
450	450	80	40	7.2	7.1	6.6	9.1	9.0	8.5	10.6	10.8	10.7	6.4	6.1	5.9	5.2	5.0	5.3	5.6	5.2	5.8
450	450	80	36	8.9	9.7	9.4	11.4	12.2	11.8	13.4	14.6	14.6	6.0	4.9	5.5	4.9	4.0	5.1	6.0	4.9	6.2
450	600	70	35	4.3	5.3	5.1	6.1	7.1	6.9	7.5	8.8	9.0	7.7	6.9	8.3	7.8	7.1	9.1	8.0	7.2	9.4
450	600	70	31	6.5	7.0	7.3	8.9	9.5	9.7	10.8	11.8	12.4	6.0	5.4	5.4	5.4	4.9	5.5	5.5	4.8	5.6
450	600	70	28	8.7	10.2	10.6	11.7	13.2	13.6	14.2	16.2	16.9	5.1	3.7	4.5	4.7	3.4	4.8	5.4	4.0	5.6
450	600	80	40	7.8	8.1	8.7	9.6	9.9	10.5	11.0	11.6	12.6	7.6	7.2	8.4	7.4	7.2	8.9	7.7	7.3	9.3
450	600	80	36	10.0	9.9	11.0	12.5	12.3	13.4	14.4	14.6	16.1	6.2	6.0	5.8	5.3	5.2	5.6	5.5	5.2	5.8
450	600	80	32	13.1	13.9	15.1	16.1	16.9	18.1	18.6	19.8	21.4	5.1	4.1	4.7	4.4	3.5	4.7	5.2	4.2	5.6
450	600	90	45	7.1	7.8	7.3	8.9	9.6	9.1	10.2	11.3	11.2	8.0	8.0	9.1	7.5	7.6	9.3	7.9	7.9	9.8
450	600	90	40	9.3	9.6	9.6	11.8	12.0	12.0	13.7	14.3	14.7	6.7	6.9	6.6	5.6	5.8	6.1	5.8	5.9	6.4
450	600	90	36	12.7	13.9	14.0	15.7	16.9	17.0	18.2	19.9	20.3	5.5	4.9	5.4	4.6	4.1	5.1	5.4	4.8	6.1
600	300	60	39	2.9	3.1	3.3	3.9	4.2	4.4	3.5	4.2	4.7	6.4	5.1	6.6	6.2	5.0	7.0	6.2	4.8	7.1
600	300	60	36	4.2	4.0	4.7	5.8	5.7	6.3	6.0	6.2	7.3	5.4	4.2	4.3	4.6	3.5	4.1	4.4	3.1	4.0
600	300	60	33	4.9	5.7	6.4	7.1	8.0	8.7	7.9	9.1	10.2	5.6	3.6	4.5	4.9	3.1	4.5	5.4	3.4	5.0
600	300	70	45	5.3	4.9	5.9	6.4	6.0	6.9	6.0	5.9	7.3	6.0	5.1	6.3	5.5	4.7	6.5	5.5	4.6	6.6
600	300	70	42	6.7	5.8	7.2	8.3	7.5	8.9	8.5	8.0	9.8	5.3	4.5	4.5	4.1	3.5	3.9	4.0	3.2	3.9
600	300	70	38	8.1	8.2	9.8	10.4	10.5	12.0	11.1	11.6	13.5	5.4	3.9	4.6	4.4	3.0	4.2	5.0	3.4	4.9
600	300	80	52	5.8	5.8	5.7	6.9	6.8	6.7	6.4	6.8	7.0	6.9	6.3	7.5	6.1	5.6	7.3	6.2	5.6	7.6
600	300	80	48	7.0	6.6	6.9	8.7	8.2	8.5	8.9	8.8	9.5	6.5	6.1	5.9	5.0	4.7	5.1	5.0	4.5	5.1
600	300	80	44	8.8	9.3	9.8	11.1	11.6	12.0	11.8	12.7	13.5	6.6	5.4	6.0	5.3	4.2	5.3	5.9	4.7	6.1
600	450	70	42	4.6	4.8	5.0	6.2	6.4	6.5	6.3	6.9	7.4	8.9	7.8	9.4	9.1	8.2	10.3	9.3	8.2	10.5
600	450	70	38	6.5	6.3	6.9	8.7	8.5	9.0	9.4	9.6	10.5	7.3	6.4	6.6	6.9	6.1	6.8	6.9	5.9	6.9
600	450	70	35	8.4	9.2	9.8	11.2	11.9	12.6	12.5	13.6	14.7	7.2	5.5	6.6	7.0	5.4	7.0	7.6	5.9	7.7
600	450	80	48	7.3	6.8	7.7	8.9	8.4	9.3	9.0	8.9	10.1	8.2	7.5	8.9	8.1	7.6	9.5	8.4	7.7	9.9
600	450	80	44	9.2	8.3	9.7	11.4	10.5	11.9	12.1	11.6	13.3	6.9	6.4	6.5	6.2	5.8	6.4	6.3	5.7	6.5
600	450	80	40	12.0	12.0	13.5	14.7	14.8	16.3	16.0	16.5	18.3	6.8	5.5	6.3	6.2	5.1	6.4	6.9	5.7	7.3
600	450	90	54	7.2	7.1	6.9	8.8	8.7	8.5	8.9	9.2	9.4	9.3	9.0	10.3	9.0	8.8	10.6	9.3	8.9	11.0
600	450	90	49	9.2	8.7	8.9	11.4	10.9	11.1	12.1	11.9	12.6	8.3	8.1	8.1	7.3	7.2	7.7	7.4	7.2	7.9
600	450	90	45	12.3	12.7	13.1	15.0	15.5	15.8	16.3	17.2	17.9	8.1	7.2	7.9	7.2	6.4	7.7	8.0	7.1	8.6
600	600	70	38	6.6	7.3	7.8	8.8	9.4	10.0	9.4	10.4	11.4	10.3	9.7	11.2	10.7	10.2	12.2	10.7	10.0	12.3
600	600	70	35	8.9	9.1	10.1	11.6	11.8	12.8	12.8	13.4	14.8	7.9	7.4	7.6	7.5	7.2	7.9	7.3	6.8	7.8
600	600	70	31	12.2	13.4	14.5	15.5	16.7	17.8	17.4	19.0	20.4	7.1	5.9	6.8	7.0	5.9	7.3	7.4	6.2	7.9
600	600	80	44	9.8	9.7	11.1	11.9	11.8	13.2	12.5	12.9	14.6	10.0	9.8	11.2	10.0	10.0	11.9	10.1	9.9	12.0
600	600	80	40	12.2	11.8	13.6	15.0	14.5	16.3	16.2	16.1	18.3	7.8	7.7	7.7	7.2	7.2	7.8	7.0	7.0	7.7
600	600	80	36	16.3	16.8	18.7	19.6	20.1	22.0	21.4	22.3	24.6	7.0	6.2	7.0	6.5	5.8	7.1	7.1	6.3	7.8
600	600	90	49	9.5	9.9	10.1	11.7	12.0	12.2	12.3	13.0	13.6	10.9	11.1	12.3	10.7	10.9	12.7	10.8	10.9	13.0
600	600	90	45	11.7	11.6	12.3	14.4	14.4	15.0	15.7	16.0	17.0	9.0	9.3	9.2	8.1	8.5	8.9	8.0	8.3	9.0
600	600	90	40	16.4	17.3	18.1	19.7	20.6	21.4	21.5	22.8	24.0	8.0	7.5	8.2	7.2	6.9	8.1	7.9	7.4	8.8

TABLE F-2F. MAXIMUM QUEUE LENGTH ON THE INBOUND APPROACH (NO. OF VEHICLES) FOR GEOMETRY 7*5

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS: LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			MAJOR STREET LEFT TURNS: LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	4.8	5.2	4.5	2.8	3.2	2.5	.5	1.3	.9	4.0	2.5	3.6	2.9	1.5	3.1	3.2	1.6	3.5
300	300	50	25	4.6	4.5	4.3	3.2	3.2	2.9	1.5	1.8	2.0	4.9	3.5	3.2	3.1	1.8	2.0	3.2	1.7	2.2
300	300	50	22	2.1	3.0	2.8	1.3	2.2	2.0	.2	1.5	1.7	5.2	3.0	3.5	3.6	1.5	2.6	4.4	2.2	3.4
300	300	60	33	6.6	6.3	6.4	4.7	4.3	4.4	2.4	2.4	2.9	4.5	3.4	4.3	3.1	2.1	3.5	3.5	2.3	4.0
300	300	60	30	6.4	5.6	6.2	5.0	4.3	4.8	3.3	2.9	3.8	5.7	4.7	4.2	3.6	2.7	2.8	3.8	2.7	3.1
300	300	60	27	4.5	4.7	5.3	3.7	3.9	4.5	2.6	3.2	4.2	6.0	4.3	4.6	4.1	2.4	3.3	4.9	3.2	4.2
300	300	70	38	6.7	6.8	5.8	4.8	4.8	3.8	2.5	2.9	2.3	5.2	4.4	5.2	3.4	2.8	4.1	3.9	3.1	4.7
300	300	70	35	6.1	5.8	5.2	4.8	4.4	3.8	3.0	3.1	2.9	6.7	6.0	5.5	4.2	3.7	3.7	4.5	3.8	4.1
300	300	70	31	4.6	5.2	4.7	3.8	4.4	3.9	2.7	3.7	3.6	6.8	5.5	5.7	4.6	3.3	4.1	5.6	4.1	5.1
300	450	50	25	4.5	4.9	4.1	3.1	3.4	2.6	1.3	2.0	1.6	4.2	2.9	4.1	3.5	2.3	4.1	4.0	2.7	4.7
300	450	50	22	4.4	4.3	4.0	3.6	3.5	3.1	2.4	2.7	2.7	4.6	3.4	3.3	3.2	2.2	2.6	3.5	2.3	3.0
300	450	50	20	2.9	3.8	3.5	2.7	3.5	3.3	2.1	3.3	3.5	4.8	2.9	3.6	3.7	1.9	3.1	4.6	2.7	4.1
300	450	60	30	6.7	6.4	6.4	5.3	4.9	4.9	3.5	3.5	3.9	4.6	3.7	4.7	3.6	2.8	4.4	4.1	3.2	5.0
300	450	60	27	6.6	5.8	6.3	5.8	5.0	5.4	4.6	4.2	5.0	5.3	4.5	4.2	3.6	3.0	3.2	4.0	3.2	3.7
300	450	60	24	5.7	5.8	6.4	5.4	5.6	6.1	4.8	5.4	6.3	5.4	4.0	4.4	4.0	2.6	3.6	5.0	3.5	4.7
300	450	70	35	6.3	6.3	5.2	4.8	4.8	3.7	3.1	3.4	2.7	5.6	5.1	6.0	4.3	3.9	5.4	4.9	4.4	6.1
300	450	70	31	5.9	5.5	4.9	5.1	4.7	4.0	3.9	3.9	3.6	6.5	6.1	5.7	4.6	4.3	4.4	5.0	4.6	5.0
300	450	70	28	5.2	5.7	5.2	4.9	5.5	4.9	4.4	5.3	5.1	6.7	5.5	5.9	4.9	3.9	4.7	6.0	4.8	6.0
300	600	60	27	4.0	4.7	4.4	3.0	3.8	3.5	1.8	2.9	3.0	5.0	4.2	5.4	4.4	3.7	5.4	4.7	3.9	5.8
300	600	60	24	4.6	4.9	5.1	4.3	4.6	4.7	3.7	4.4	4.9	4.4	3.7	3.5	3.1	2.6	2.9	3.2	2.5	3.1
300	600	60	21	4.6	5.9	6.2	4.9	6.2	6.4	4.9	6.6	7.2	3.9	2.5	3.1	2.8	1.5	2.6	3.6	2.2	3.5
300	600	70	31	6.6	6.7	7.1	5.7	5.8	6.2	4.5	4.9	5.7	5.5	5.1	6.1	4.6	4.3	5.8	5.0	4.5	6.3
300	600	70	28	7.3	6.9	7.8	7.0	6.6	7.5	6.3	6.3	7.6	5.1	4.9	4.5	3.6	3.4	3.6	3.8	3.5	3.9
300	600	70	24	8.0	8.6	9.6	8.3	8.9	9.9	8.2	9.2	10.6	4.5	3.5	3.9	3.1	2.2	3.1	4.0	2.9	4.1
300	600	80	36	5.6	6.0	5.4	4.7	5.1	4.5	3.4	4.3	4.0	6.2	6.1	7.0	5.0	5.0	6.5	5.4	5.3	7.0
300	600	80	32	6.1	6.1	5.9	5.8	5.8	5.6	5.1	5.5	5.7	6.0	6.1	5.6	4.2	4.4	4.4	4.4	4.5	4.8
300	600	80	28	7.1	8.1	8.0	7.4	8.4	8.3	7.4	8.7	9.0	5.3	4.6	4.9	3.6	3.0	3.9	4.5	3.8	4.9
450	300	50	30	4.2	4.8	4.2	2.7	3.3	2.8	1.9	2.9	2.7	3.8	2.4	3.6	3.2	1.9	3.7	3.6	2.2	4.2
450	300	50	27	4.1	4.3	4.2	3.3	3.4	3.3	3.1	3.6	3.9	4.3	3.1	2.9	3.1	1.9	2.3	3.3	2.0	2.6
450	300	50	25	2.6	3.8	3.8	2.4	3.5	3.5	2.8	4.3	4.7	4.3	2.3	3.0	3.3	1.4	2.6	4.1	2.1	3.5
450	300	60	36	6.6	6.5	6.7	5.1	5.0	5.2	4.3	4.6	5.2	4.4	3.4	4.5	3.5	2.7	4.2	4.0	3.0	4.8
450	300	60	33	6.5	6.0	6.7	5.7	5.1	5.8	5.5	5.3	6.4	5.3	4.4	4.1	3.7	3.0	3.2	4.0	3.1	3.6
450	300	60	30	5.6	6.1	6.8	5.3	5.8	6.6	5.8	6.6	7.7	5.2	3.7	4.1	3.9	2.4	3.4	4.8	3.2	4.5
450	300	70	42	6.4	6.7	5.8	5.0	5.3	4.4	4.2	4.8	4.3	5.1	4.5	5.4	3.9	3.4	4.9	4.5	3.8	5.5
450	300	70	38	6.1	6.0	5.6	5.3	5.1	4.7	5.1	5.3	5.3	6.3	5.8	5.4	4.4	4.1	4.2	4.8	4.3	4.6
450	300	70	35	5.5	6.3	6.0	5.2	6.1	5.7	5.6	6.8	6.9	6.2	5.0	5.4	4.6	3.4	4.3	5.6	4.3	5.5
450	450	60	33	4.9	5.4	4.8	4.0	4.5	3.9	3.7	4.6	4.4	5.0	3.8	5.2	4.9	3.8	5.8	5.4	4.2	6.4
450	450	60	30	5.2	5.4	5.2	4.9	5.0	4.8	5.2	5.7	6.0	5.0	4.0	4.0	4.2	3.3	3.9	4.6	3.5	4.3
450	450	60	27	4.9	6.0	5.9	5.2	6.3	6.2	6.1	7.6	7.9	4.8	3.0	3.8	4.2	2.6	3.9	5.2	3.5	5.0
450	450	70	38	7.6	7.4	7.6	6.7	6.5	6.7	6.4	6.6	7.2	5.3	4.6	5.8	4.9	4.3	6.0	5.5	4.8	6.7
450	450	70	35	7.9	7.3	8.0	7.6	7.0	7.6	7.9	7.7	8.7	5.6	5.1	4.9	4.5	4.1	4.5	5.0	4.4	5.0
450	450	70	31	3.4	8.7	9.5	8.6	9.0	9.7	9.6	10.3	11.4	5.3	4.0	4.6	4.4	3.2	4.3	5.5	4.2	5.6
450	450	80	44	6.7	7.0	6.0	5.8	6.0	5.1	5.5	6.2	5.6	6.3	5.9	7.0	5.6	5.3	6.9	6.3	5.9	7.7
450	450	80	40	6.9	6.7	6.2	6.6	6.4	5.9	6.9	7.1	7.0	6.9	6.6	6.4	5.5	5.3	5.6	6.0	5.7	6.3
450	450	80	36	7.7	8.5	8.1	7.9	8.7	8.3	8.9	10.0	10.0	6.5	5.5	6.0	5.3	4.4	5.4	6.5	5.5	6.7
450	600	70	35	5.3	6.3	6.1	4.9	5.9	5.7	5.2	6.6	6.8	6.6	5.9	7.2	6.6	6.0	7.9	7.0	6.2	8.3
450	600	70	31	6.6	7.1	7.4	6.8	7.3	7.6	7.6	8.6	9.2	5.5	5.0	4.9	4.8	4.4	4.9	5.0	4.4	5.2
450	600	70	28	7.8	9.4	9.7	8.6	10.2	10.5	10.1	12.0	12.8	4.6	3.3	4.1	4.1	2.9	4.2	5.0	3.6	5.2
450	600	80	40	8.4	8.6	9.2	8.0	8.2	8.8	8.2	8.9	9.9	7.1	6.9	8.0	6.8	6.7	8.3	7.3	7.0	8.9
450	600	80	36	9.7	9.5	10.6	9.9	9.7	10.8	10.8	11.0	12.4	6.3	6.2	6.0	5.3	5.3	5.7	5.6	5.5	6.0
450	600	80	32	11.8	12.6	13.8	12.6	13.4	14.5	14.0	15.3	16.8	5.2	4.4	4.9	4.4	3.7	4.8	5.4	4.5	5.8
450	600	90	45	7.1	7.7	7.2	6.7	7.3	6.8	6.9	8.0	7.9	7.7	7.8	8.9	7.1	7.3	8.9	7.6	7.7	9.5
450	600	90	40	8.4	8.7	8.6	8.6	8.9	8.8	9.5	10.1	10.4	7.1	7.3	7.0	5.7	6.1	6.3	6.1	6.3	6.8
450	600	90	36	10.8	12.0	12.1	11.6	12.8	12.9	13.1	14.7	15.1	5.9	5.4	5.8	4.8	4.4	5.3	5.8	5.2	6.5
600	300	60	39	4.6	4.9	5.1	3.5	3.7	3.9	2.0	2.6	3.1	5.1	3.9	5.3	4.8	3.7	5.6	4.9	3.7	5.8
600	300	60	36	5.0	4.9	5.5	4.4	4.3	4.9	3.5	3.8	4.8	4.7	3.6	3.7	3.7	2.7	3.3	3.7	2.5	3.4
600	300	60	33	4.8	5.6	6.3	4.8	5.6	6.3	4.5	5.7	6.8	4.9	3.1	3.9	4.1	2.4	3.7	4.7	2.8	4.4
600	300	70	45	6.7	6.2	7.2	5.5	5.0	6.0	4.0	3.9	5.3	5.3	4.5	5.7	4.7	4.0	5.7	4.9	4.0	6.0
600	300	70	42	7.0	6.2	7.6	6.5	5.6	7.0	5.6	5.1	6.9	5.2	4.6	4.4	3.9	3.4	3.8	4.0	3.3	3.9
600	300	70	38	7.6	7.7	9.2	7.6	7.7	9.2	7.3	7.8	9.7	5.4	4.0	4.6	4.2	2.9	4.1	4.9	3.5	4.9
600	300	80	52	6.5	6.5	6.4	5.4	5.3	5.2	3.9	4.2	4.4	6.4	5.9	7.0	5.4	5.1	6.7	5.7	5.2	7.1
600	300	80	48	6.8	6.4	6.7	6.3	5.8	6.1	5.4	5.3	6.0	6.6	6.3	6.1	5.0	4.8	5.1	5.1	4.8	5.3
600	300	80	44	7.7	8.2	8.6	7.7	8.2	8.6	7.4	8.3	9.1	6.7	5.7	6.2	5.3	4.3	5.4	6.1	5.0	6.3
600	450	70	42	5.8	6.0	6.1	5.2	5.4	5.5	4.2	4.8	5.3	7.5	6.5	8.0	7.6	6.7	8.8	7.9	6.9	9.2
600	450	70	38	6.7	6.5	7.1	6.7	6.5	7.0	6.3	6.5	7.4	6.5	5.6	5.8	5.9	5.2	5.9	6.0	5.2	6.1
600	450	70	35	7.7	8.5	9.1	8.3	9.0	9.7	8.5	9.6	10.6	6.4	4.9	5.8	6.1	4.6	6.1	6.9	5.3	7.0
600	450	80	48	8.0	7.5	8.4	7.3	6.8	7.7	6.4	6.3	7.5	7.4	6.8	8.2	7.2	6.8	8.6	7.6	7.0	9.1
600	450	80	44	9.0	8.1	9.4	9.0	8.0	9.4	8.6	8.1	9.8	6.7	6.3	6.3	5.9	5.6	6.1	6.1	5.6	6.4
600	450	80	40	10.8	10.9	12.3	11.4	11.4	12.9	11.6	12.0	13.9	6.6	5.4	6.2	5.9	4.9	6.2	6.8	5.6	7.1
600	450	90	54	7.3	7.2	7.0	6.7	6.6	6.4	5.7	6.0	6.2	8.7	8.5	9.8	8.2	8.1	9.9	8.7	8.4	10.5
600	450	90	49	8.4	7.9	8.1	8.4	7.8	8.1	8.0	7.9	8.5	8.3	8.2	8.1	7.1	7.1	7.6	7.4	7.3	8.0
600	450	90	45	10.5	11.0	11.3	11.1	11.5	11.9	11.3	12.2	12.9	8.1	7.3	7.9	7.1	6.4	7.6	8.1	7.2	8.6
600	600	70	38	7.2	7.9	8.4	7.1	7.8	8.3	6.7	7.7	8.6	8.8	8.3	9.7	9.0	8.6	10.6	9.1	8.6	10.8
600	600	70	35	8.5	8.7	9.7	9.0	9.2	10.2	9.2	9.8	11.1	6.9	6.5	6.7	6.5	6.2	6.9	6.4	6.0	6.9
600	600	70	31	10.9	12.1	13.2	12.0	13.2	14.3	12.8	14.4	15.8	6.2	5.1	6.0	5.9	4.9	6.3	6.5	5.4	7.1
600	600	80	44	9.9	9.8	11.2	9.8	9.7	11.1	9.4	9.7	11.4	9.1	9.0	10.3	9.0	9.0	10.9	9.2	9.1	11.2
600	600	80	40	11.4	10.9	12.7	11.9	11.4	13.2	12.1	12.0	14.1	7.5	7.5	7.5	6.7	6.9	7.4	6.8	6.8	7.5
600	600	80	36	14.6	15.0	16.9	15.7	16.1	18.0	16.4	17.3	19.5	6.7	6.0	6.7	6.1	5.5	6.8	6.8	6.1	7.6
600	600	90	49	9.1	9.4	9.6	9.0	9.3	9.5	8.6	9.3	9.9	10.2	10.4	11.7	9.8	10.2	11.9	10.1	10.3	12.3
600	600	90	45	10.3	10.2	10.9	10.8	10.7	11.4	11.0	11.3	12.3	8.9	9.3	9.1	7.8	8.3	8.7	7.9	8.3	8.9
600	600	90	40	14.1	15.0	15.7	15.2	16.1	16.8	15.9	17.2	18.4	7.9	7.5	8.1	7.0	6.7	7.9	7.8	7.4	8.8

TABLE F-2G. MAXIMUM QUEUE LENGTH ON THE INBOUND APPROACH (NO. OF VEHICLES) FOR GEOMETRY 6*6

INTERSECTION ENVIRONMENT				MINOR STREET									MAJOR STREET								
				LEFT TURNS									LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	4.4	5.3	4.4	4.1	5.0	4.0	2.8	4.1	3.6	2.0	1.4	2.4	2.1	1.6	3.1	3.3	2.6	4.4
300	300	50	25	4.6	5.0	4.6	4.9	5.3	4.9	4.2	5.1	5.0	2.0	1.5	1.1	1.4	1.0	1.2	2.4	1.9	2.3
300	300	50	22	1.8	3.3	2.9	2.7	4.2	3.8	2.6	4.5	4.5	2.4	1.2	1.6	2.0	.9	1.8	3.7	2.4	3.6
300	300	60	33	4.2	4.4	4.3	3.9	4.1	4.0	2.7	3.2	3.5	2.5	2.3	3.1	2.3	2.2	3.5	3.6	3.3	4.9
300	300	60	30	4.4	4.1	4.4	4.7	4.4	4.7	4.0	4.1	4.8	2.8	2.7	2.2	1.9	1.9	1.9	3.0	2.9	3.1
300	300	60	27	2.2	2.9	3.4	3.1	3.8	4.2	3.0	4.2	4.9	3.2	2.4	2.6	2.4	1.8	2.5	4.2	3.4	4.4
300	300	70	38	5.6	6.2	5.0	5.3	5.9	4.7	4.1	5.1	4.2	3.2	3.3	4.0	2.6	2.9	4.1	4.0	4.1	5.6
300	300	70	35	5.4	5.6	4.8	5.7	5.9	5.1	5.1	5.6	5.2	3.8	4.1	3.4	2.6	3.0	2.9	3.8	4.0	4.1
300	300	70	31	3.6	4.8	4.1	4.5	5.7	5.0	4.5	6.0	5.7	4.0	3.6	3.7	3.0	2.7	3.3	4.9	4.4	5.3
300	450	50	25	4.1	5.0	4.0	4.4	5.2	4.2	3.6	4.9	4.2	3.1	2.8	3.9	3.7	3.4	5.1	5.0	4.6	6.6
300	450	50	22	4.4	4.8	4.3	5.2	5.7	5.1	5.1	5.9	5.7	2.6	2.4	2.2	2.5	2.4	2.7	3.7	3.5	4.0
300	450	50	20	2.6	4.0	3.6	4.1	5.5	5.0	4.5	6.3	6.2	3.0	2.0	2.6	3.0	2.2	3.3	4.9	3.9	5.2
300	450	60	30	4.3	4.5	4.3	4.6	4.7	4.5	3.8	4.3	4.5	3.5	3.5	4.5	3.7	3.9	5.4	5.2	5.2	6.9
300	450	60	27	4.6	4.3	4.6	5.4	5.1	5.4	5.3	5.4	6.0	3.3	3.5	3.1	2.9	3.2	3.3	4.2	4.3	4.7
300	450	60	24	3.4	4.1	4.4	4.8	5.5	5.8	5.3	6.3	7.1	3.6	3.0	3.4	3.3	2.9	3.8	5.3	4.7	5.8
300	450	70	35	5.2	5.7	4.4	5.4	5.9	4.6	4.7	5.6	4.7	4.5	4.9	5.8	4.4	5.0	6.4	6.0	6.4	8.0
300	450	70	31	5.2	5.3	4.5	6.0	6.1	5.3	5.9	6.4	5.9	4.6	5.1	4.6	3.8	4.5	4.5	5.2	5.7	6.0
300	450	70	28	4.2	5.3	4.6	5.7	6.7	6.0	6.1	7.6	7.2	4.8	4.6	4.9	4.2	4.1	4.9	6.3	6.0	7.1
300	600	60	27	3.1	4.4	3.8	3.8	5.1	4.5	3.6	5.3	5.1	4.9	5.0	6.1	5.5	5.7	7.4	6.7	6.8	8.7
300	600	60	24	4.1	5.0	4.9	5.5	6.3	6.2	5.9	7.1	7.4	3.4	3.6	3.4	3.4	3.7	4.0	4.4	4.6	5.1
300	600	60	21	3.9	5.7	5.7	5.9	7.7	7.7	6.9	9.1	9.5	3.0	2.5	3.0	3.1	2.8	3.8	4.8	4.3	5.6
300	600	70	31	3.7	4.3	4.5	4.5	5.1	5.3	4.3	5.2	5.9	5.4	5.9	6.8	5.7	6.3	7.8	7.0	7.5	9.1
300	600	70	28	4.8	4.9	5.6	6.1	6.3	7.0	6.5	7.1	8.1	4.2	4.8	4.4	3.8	4.6	4.7	4.9	5.6	5.9
300	600	70	24	5.3	6.4	7.2	7.2	8.3	9.1	8.2	9.7	10.9	3.6	3.5	3.8	3.4	3.4	4.3	5.2	5.1	6.2
300	600	80	36	4.0	5.0	4.1	4.8	5.8	4.9	4.6	6.0	5.5	6.1	6.9	7.8	6.1	7.1	8.4	7.5	8.3	9.9
300	600	80	32	4.9	5.5	5.0	6.3	6.8	6.4	6.7	7.6	7.6	5.0	6.1	5.5	4.4	5.5	5.5	5.6	6.5	6.8
300	600	80	28	5.7	7.2	6.9	7.7	9.2	8.9	8.7	10.6	10.6	4.4	4.6	4.8	3.9	4.3	5.0	5.7	6.0	7.0
450	300	50	30	3.5	4.7	3.9	3.7	4.9	4.1	4.0	5.5	5.1	2.6	2.2	3.3	3.3	2.9	4.6	4.6	4.1	6.0
450	300	50	27	3.8	4.6	4.2	4.7	5.4	5.0	5.5	6.6	6.7	2.3	2.0	1.8	2.3	2.1	2.4	3.4	3.0	3.6
450	300	50	25	2.1	3.8	3.6	3.5	5.2	5.0	5.0	7.1	7.2	2.4	1.3	1.9	2.5	1.6	2.7	4.3	3.2	4.6
450	300	60	36	3.9	4.3	4.3	4.1	4.5	4.5	4.4	5.2	5.6	3.3	3.2	4.2	3.6	3.6	5.2	5.0	4.9	6.6
450	300	60	33	4.2	4.2	4.7	5.0	5.0	5.5	5.9	6.3	7.1	3.3	3.4	3.0	2.9	3.1	3.3	4.1	4.2	4.6
450	300	60	30	3.1	4.1	4.6	4.5	5.5	6.0	5.9	7.3	8.2	3.3	2.7	3.0	3.1	2.6	3.5	5.0	4.3	5.5
450	300	70	42	5.1	5.9	4.8	5.3	6.1	5.0	5.5	6.7	6.0	4.0	4.3	5.2	4.0	4.4	5.8	5.5	5.7	7.4
450	300	70	38	5.2	5.6	4.9	6.0	6.4	5.7	6.8	7.6	7.4	4.3	4.7	4.2	3.6	4.2	4.2	4.9	5.3	5.6
450	300	70	35	4.3	5.6	5.1	5.7	7.0	6.5	7.1	8.9	8.7	4.3	4.0	4.3	3.8	3.6	4.5	5.8	5.4	6.5
450	450	60	33	4.2	5.3	4.5	5.0	6.0	5.2	5.8	7.2	6.8	4.8	4.6	5.9	5.9	5.8	7.6	7.4	7.1	9.2
450	450	60	30	5.0	5.6	5.2	6.3	6.9	6.6	7.7	8.7	8.7	3.9	3.9	3.8	4.4	4.4	4.9	5.6	5.5	6.3
450	450	60	27	4.4	6.0	5.7	6.4	8.0	7.7	8.3	10.4	10.4	3.8	3.0	3.7	4.4	3.7	4.9	6.4	5.5	7.0
450	450	70	38	4.9	5.3	5.3	5.7	6.0	6.0	6.5	7.2	7.5	5.1	5.3	6.5	5.9	6.2	7.9	7.5	7.6	9.5
450	450	70	35	5.6	5.6	6.0	7.0	6.9	7.3	8.4	8.7	9.5	4.6	4.9	4.7	4.7	5.2	5.5	6.1	6.4	6.9
450	450	70	31	5.8	6.8	7.3	7.8	8.7	9.2	9.8	11.1	11.9	4.3	3.9	4.5	4.6	4.3	5.4	6.7	6.2	7.5
450	450	80	44	5.4	6.1	5.0	6.1	6.9	5.7	6.9	8.1	7.3	6.1	6.7	7.7	6.6	7.2	8.8	8.2	8.7	10.5
450	450	80	40	6.0	6.3	5.6	7.3	7.6	6.9	8.7	9.4	9.1	5.8	6.5	6.2	5.6	6.4	6.6	7.1	7.7	8.2
450	450	80	36	6.5	7.8	7.2	8.4	9.7	9.1	10.4	12.1	11.9	5.5	5.4	5.9	5.5	5.5	6.5	7.6	7.5	8.7
450	600	70	35	4.2	5.7	5.3	5.5	7.0	6.5	6.8	8.7	8.6	7.4	7.6	8.9	8.5	8.9	10.7	9.8	10.1	12.1
450	600	70	31	5.8	6.9	6.9	7.7	8.8	8.8	9.6	11.1	11.5	5.4	5.8	5.7	5.9	6.4	6.8	7.0	7.4	8.1
450	600	70	28	6.9	8.9	9.1	9.3	11.4	11.5	11.9	14.3	14.8	4.6	4.2	4.9	5.3	5.0	6.2	7.0	6.7	8.1
450	600	80	40	5.2	6.0	6.4	6.5	7.3	7.7	7.8	9.0	9.8	7.9	8.6	9.6	8.8	9.6	11.2	10.1	10.8	12.6
450	600	80	36	6.9	7.3	8.1	8.8	9.2	10.0	10.7	11.5	12.7	6.2	7.0	6.7	6.4	7.4	7.6	7.6	8.4	8.9
450	600	80	32	8.8	10.1	11.1	11.3	12.6	13.5	13.8	15.5	16.8	5.2	5.3	5.8	5.6	5.8	6.8	7.5	7.5	8.7
450	600	90	45	5.2	6.4	5.7	6.5	7.7	7.0	7.8	9.4	9.1	8.5	9.5	10.5	9.1	10.2	11.7	10.5	11.5	13.2
450	600	90	40	7.0	7.8	7.5	8.9	9.6	9.3	10.8	11.9	12.0	7.0	8.1	7.7	6.9	8.1	8.3	8.1	9.3	9.6
450	600	90	36	9.2	10.9	10.7	11.6	13.4	13.2	14.1	16.3	16.5	5.9	6.3	6.6	5.9	6.5	7.4	7.9	8.3	9.4
600	300	60	39	3.3	4.1	4.1	3.8	4.6	4.6	3.4	4.6	4.9	4.7	4.4	5.7	5.6	5.4	7.2	6.6	6.3	8.4
600	300	60	36	4.1	4.5	4.9	5.2	5.6	6.0	5.4	6.1	6.9	3.4	3.2	3.2	3.6	3.6	4.0	4.5	4.3	5.0
600	300	60	33	3.6	5.0	5.5	5.3	6.7	7.2	6.1	7.8	8.7	3.7	2.8	3.5	4.1	3.3	4.5	5.6	4.6	6.1
600	300	70	45	3.4	3.4	4.2	3.9	3.9	4.7	3.4	3.9	5.0	4.9	5.0	6.1	5.4	5.7	7.3	6.6	6.6	8.5
600	300	70	42	4.1	3.8	5.0	5.2	4.9	6.1	5.4	5.4	7.0	3.9	4.2	4.0	3.8	4.2	4.5	4.8	5.0	5.5
600	300	70	38	4.4	5.1	6.3	6.1	6.8	8.0	6.9	7.9	9.5	4.1	3.6	4.2	4.2	3.8	4.9	5.8	5.3	6.6
600	300	80	52	4.6	5.1	4.7	5.1	5.6	5.2	4.6	5.5	5.5	6.0	6.4	7.4	6.2	6.8	8.3	7.4	7.8	9.6
600	300	80	48	5.3	5.3	5.4	6.4	6.4	6.5	6.5	6.9	7.4	5.3	5.9	5.6	4.9	5.6	5.8	5.9	6.5	6.9
600	300	80	44	5.9	6.9	7.1	7.6	8.6	8.8	8.3	9.7	10.3	5.5	5.3	5.8	5.3	5.2	6.2	7.0	6.8	8.0
600	450	70	42	4.5	5.2	5.1	5.5	6.3	6.2	5.6	6.7	7.0	8.0	7.9	9.4	9.3	9.3	11.3	10.5	10.4	12.7
600	450	70	38	5.8	6.1	6.5	7.5	7.8	8.1	8.2	8.8	9.6	6.1	6.2	6.3	6.8	7.0	7.6	7.8	7.9	8.7
600	450	70	35	6.6	7.9	8.3	8.8	10.1	10.5	10.1	11.7	12.6	6.2	5.5	6.4	7.0	6.4	7.8	8.7	8.0	9.7
600	450	80	48	4.7	4.7	5.4	5.7	5.8	6.4	5.8	6.2	7.3	7.9	8.3	9.6	8.9	9.4	11.2	10.2	10.6	12.6
600	450	80	44	6.1	5.7	6.8	7.7	7.3	8.5	8.4	8.4	9.9	6.4	6.9	6.8	6.7	7.4	7.8	7.9	8.3	9.0
600	450	80	40	7.7	8.2	9.5	9.9	10.5	11.7	11.2	12.1	13.7	6.3	6.1	6.8	6.8	6.7	7.9	8.6	8.4	9.8
600	450	90	54	5.4	5.8	5.4	6.4	6.8	6.4	6.5	7.3	7.2	9.2	9.9	11.1	9.9	10.8	12.5	11.3	12.0	14.0
600	450	90	49	6.8	6.8	6.9	8.5	8.5	8.5	9.1	9.5	9.9	7.9	8.8	8.6	8.0	8.9	9.3	9.2	10.0	10.6
600	450	90	45	8.7	9.7	9.8	11.0	11.9	12.0	12.2	13.6	14.1	7.8	7.9	8.5	8.0	8.2	9.3	9.9	10.0	11.3
600	600	70	38	5.5	6.6	6.9	7.0	8.2	8.5	7.6	9.2	9.9	10.3	10.7	12.1	11.7	12.2	14.1	12.7	13.1	15.3
600	600	70	35	7.2	7.9	8.7	9.3	10.1	10.8	10.5	11.7	12.8	7.5	8.1	8.1	8.3	8.9	9.5	9.1	9.6	10.5
600	600	70	31	9.4	11.1	11.9	12.1	13.8	14.7	13.9	16.0	17.3	6.9	6.7	7.5	7.8	7.7	9.0	9.3	9.1	10.7
600	600	80	44	6.1	6.6	7.7	7.7	8.2	9.3	8.3	9.2	10.7	10.6	11.4	12.6	11.7	12.6	14.4	12.8	13.6	15.6
600	600	80	40	8.1	8.1	9.7	10.2	10.3	11.8	11.4	11.9	13.8	8.1	9.1	8.9	8.5	9.6	10.0	9.5	10.4	11.0
600	600	80	36	10.9	12.0	13.6	13.7	14.7	16.4	15.5	16.9	18.9	7.4	7.6	8.2	8.0	8.3	9.5	9.6	9.8	11.2
600	600	90	49	6.7	7.5	7.5	8.2	9.1	9.1	8.8	10.1	10.5	11.7	12.8	14.0	12.5	13.8	15.4	13.7	14.8	16.7
600	600	90	45	8.3	8.7	9.2	10.5	10.9	11.3	11.7	12.5	13.3	9.5	10.8	10.5	9.6	11.0	11.3	10.6	11.9	12.4
600	600	90	40	11.8	13.2	13.8	14.6	16.0	16.5	16.4	18.2	19.1	8.5	9.1	9.6	8.9	9.5	10.6	10.6	11.1	12.4

TABLE F-2H. MAXIMUM QUEUE LENGTH ON THE INBOUND APPROACH (NO. OF VEHICLES) FOR GEOMETRY 7*6

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS: LOW LEVEL, TRUCKS LOW	LOW LEVEL, TRUCKS MED	LOW LEVEL, TRUCKS HIGH	MEDIUM LEVEL, TRUCKS LOW	MEDIUM LEVEL, TRUCKS MED	MEDIUM LEVEL, TRUCKS HIGH	HIGH LEVEL, TRUCKS LOW	HIGH LEVEL, TRUCKS MED	HIGH LEVEL, TRUCKS HIGH	MAJOR STREET LEFT TURNS: LOW LEVEL, TRUCKS LOW	LOW LEVEL, TRUCKS MED	LOW LEVEL, TRUCKS HIGH	MEDIUM LEVEL, TRUCKS LOW	MEDIUM LEVEL, TRUCKS MED	MEDIUM LEVEL, TRUCKS HIGH	HIGH LEVEL, TRUCKS LOW	HIGH LEVEL, TRUCKS MED	HIGH LEVEL, TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	3.6	4.1	2.8	3.7	4.2	2.8	1.6	2.5	1.6	4.4	2.7	3.7	3.3	1.8	3.3	3.6	1.9	3.8
300	300	50	25	3.8	3.9	3.0	4.5	4.6	3.7	3.0	3.5	3.0	4.8	3.3	3.0	3.1	1.7	1.9	3.2	1.7	2.2
300	300	50	22	1.1	2.1	1.3	2.3	3.4	2.6	1.5	2.9	2.5	5.4	3.1	3.6	3.8	1.7	2.6	4.6	2.4	3.6
300	300	60	33	4.8	4.6	4.1	4.9	4.7	4.2	2.9	3.1	2.9	4.2	3.0	3.8	2.8	1.7	3.1	3.3	2.0	3.6
300	300	60	30	5.0	4.4	4.3	5.7	5.0	4.9	4.2	4.0	4.3	5.0	3.9	3.4	2.9	2.0	2.0	3.2	2.1	2.4
300	300	60	27	2.8	3.2	3.2	4.1	4.5	4.5	3.3	4.0	4.4	5.5	3.7	3.9	3.6	1.9	2.7	4.5	2.7	3.7
300	300	70	38	5.9	6.1	4.4	6.0	6.2	4.5	3.9	4.5	3.3	4.7	3.8	4.6	3.0	2.2	3.5	3.5	2.6	4.1
300	300	70	35	5.7	5.4	4.3	6.4	6.1	4.9	4.9	5.1	4.3	5.8	5.1	4.5	3.5	2.8	2.8	3.8	3.0	3.2
300	300	70	31	3.9	4.7	3.6	5.2	5.9	4.8	4.4	5.5	4.8	6.2	4.7	4.9	4.0	2.6	3.3	5.0	3.5	4.4
300	450	50	25	3.3	3.7	2.3	3.9	4.3	2.9	2.4	3.2	2.2	4.6	3.2	4.3	3.9	2.7	4.4	4.5	3.0	5.0
300	450	50	22	3.6	3.6	2.7	4.8	4.8	3.9	3.9	4.3	3.7	4.6	3.3	3.1	3.3	2.2	2.5	3.6	2.3	2.9
300	450	50	20	1.8	2.8	2.0	3.6	4.6	3.8	3.4	4.7	4.3	5.0	3.0	3.6	3.9	2.1	3.2	4.9	2.9	4.3
300	450	60	30	4.9	4.6	4.0	5.5	5.2	4.6	4.0	4.1	3.9	4.3	3.3	4.3	3.3	2.5	4.0	4.0	3.0	4.7
300	450	60	27	5.2	4.5	4.3	6.4	5.7	5.5	5.5	5.2	5.4	4.6	3.8	3.4	3.0	2.3	2.5	3.4	2.6	3.0
300	450	60	24	4.0	4.3	4.2	5.8	6.1	6.0	5.5	6.2	6.5	5.0	3.4	3.8	3.6	2.1	3.1	4.7	3.1	4.3
300	450	70	35	5.3	5.5	3.8	6.0	6.1	4.4	4.5	5.0	3.7	5.2	4.5	5.4	3.9	3.4	4.8	4.6	3.9	5.6
300	450	70	31	5.4	5.1	3.9	6.6	6.3	5.1	5.7	5.8	5.0	5.7	5.2	4.8	3.8	3.4	3.5	4.3	3.8	4.1
300	450	70	28	4.5	5.1	4.0	6.3	7.0	5.8	6.0	7.0	6.3	6.0	4.8	5.1	4.3	3.2	4.0	5.5	4.2	5.3
300	600	60	27	2.2	3.0	2.1	3.3	4.2	3.2	2.3	3.6	3.0	5.4	4.5	5.6	4.9	4.1	5.7	5.2	4.3	6.2
300	600	60	24	3.2	3.7	3.2	5.0	5.4	4.9	4.6	5.5	5.4	4.4	3.6	3.4	3.2	2.6	2.9	3.4	2.6	3.1
300	600	60	21	3.1	4.5	4.1	5.4	6.8	6.4	5.6	7.5	7.4	4.1	2.6	3.1	3.1	1.7	2.8	4.0	2.4	3.7
300	600	70	31	4.2	4.4	4.2	5.4	5.5	5.4	4.4	5.0	5.2	5.2	4.7	5.7	4.4	4.0	5.5	4.8	4.3	6.0
300	600	70	28	5.3	5.0	5.3	7.0	6.8	7.1	6.7	6.8	7.5	4.5	4.2	3.8	3.0	2.8	2.9	3.3	2.9	3.3
300	600	70	24	5.8	6.5	6.9	8.2	8.9	9.3	8.4	9.5	10.3	4.1	3.0	3.3	2.7	1.8	2.6	3.7	2.5	3.7
300	600	80	36	4.2	4.7	3.5	5.3	5.9	4.6	4.3	5.3	4.4	5.8	5.6	6.5	4.6	4.6	6.0	5.1	5.0	6.6
300	600	80	32	5.1	5.2	4.4	6.8	7.0	6.1	6.4	7.0	6.5	5.3	5.2	4.7	3.4	3.5	3.6	3.8	3.7	4.0
300	600	80	28	5.9	7.0	6.3	8.2	9.4	8.6	8.5	10.0	9.6	4.7	3.9	4.2	3.1	2.4	3.2	4.1	3.3	4.3
450	300	50	30	2.9	3.7	2.5	3.5	4.3	3.1	3.0	4.1	3.3	4.4	2.9	4.1	3.9	2.5	4.2	4.3	2.8	4.8
450	300	50	27	3.3	3.6	2.9	4.5	4.8	4.0	4.6	5.3	4.9	4.6	3.2	3.0	3.4	2.1	2.5	3.6	2.2	2.9
450	300	50	25	1.6	2.9	2.2	3.4	4.7	4.0	4.1	5.7	5.5	4.8	2.7	3.3	3.8	1.8	2.9	4.7	2.6	3.9
450	300	60	36	4.7	4.7	4.4	5.3	5.3	4.9	4.8	5.2	5.2	4.4	3.3	4.3	3.5	2.6	4.1	4.1	3.0	4.7
450	300	60	33	5.1	4.7	4.7	6.3	5.9	5.9	6.3	6.3	6.8	4.9	3.9	3.6	3.4	2.6	2.8	3.7	2.8	3.2
450	300	60	30	3.9	4.5	4.7	5.7	6.3	6.5	6.4	7.4	7.9	5.1	3.4	3.8	3.7	2.2	3.1	4.7	3.0	4.2
450	300	70	42	5.5	5.9	4.4	6.1	6.5	5.0	5.6	6.4	5.3	4.9	4.2	5.1	3.8	3.2	4.6	4.4	3.6	5.3
450	300	70	38	5.6	5.6	4.6	6.8	6.8	5.8	6.9	7.3	6.6	5.7	5.1	4.7	3.9	3.5	3.5	4.3	3.7	4.1
450	300	70	35	4.7	5.7	4.8	6.5	7.5	6.6	7.2	8.6	8.0	5.9	4.5	4.9	4.3	3.0	3.9	5.3	4.0	5.1
450	450	60	33	3.6	4.3	3.0	4.7	5.4	4.1	4.7	5.8	4.9	5.6	4.4	5.7	5.6	4.5	6.3	6.2	4.9	7.0
450	450	60	30	4.3	4.6	3.8	6.1	6.3	5.5	6.7	7.3	6.9	5.3	4.2	4.2	4.5	3.6	4.1	5.0	3.9	4.6
450	450	60	27	3.8	5.0	4.3	6.1	7.4	6.7	7.4	9.0	8.7	5.3	3.4	4.2	4.7	3.0	4.3	5.8	4.0	5.5
450	450	70	38	5.7	5.7	5.2	6.8	6.8	6.3	6.8	7.2	7.1	5.3	4.5	5.7	4.9	4.3	5.9	5.6	4.8	6.7
450	450	70	35	6.4	6.0	6.0	8.1	7.7	7.7	8.8	8.7	9.1	5.3	4.6	4.4	4.2	3.7	4.0	4.8	4.1	4.6
450	450	70	31	6.6	7.2	7.3	9.0	9.5	9.6	10.2	11.1	11.6	5.2	3.7	4.3	4.3	3.0	4.1	5.5	4.0	5.4
450	450	80	44	5.7	6.1	4.6	6.9	7.2	5.7	6.9	7.7	6.5	6.1	5.7	6.7	5.5	5.1	6.7	6.2	5.7	7.6
450	450	80	40	6.3	6.3	5.2	8.1	8.0	6.9	8.7	9.0	8.3	6.3	6.0	5.7	5.0	4.8	5.0	5.6	5.2	5.7
450	450	80	36	6.9	7.8	6.8	9.2	10.1	9.1	10.4	11.7	11.1	6.2	5.1	5.5	5.0	4.0	5.0	6.3	5.2	6.4
450	600	70	35	3.5	4.6	3.8	5.1	6.2	5.4	5.7	7.2	6.8	7.3	6.5	7.8	7.3	6.7	8.5	7.8	6.9	9.0
450	600	70	31	5.1	5.8	5.5	7.4	8.1	7.7	8.6	9.6	9.7	5.8	5.2	5.1	5.2	4.7	5.1	5.4	4.8	5.5
450	600	70	28	6.2	7.9	7.6	9.1	10.7	10.5	10.8	12.9	13.0	5.1	3.7	4.4	4.7	3.4	4.6	5.6	4.2	5.6
450	600	80	40	5.9	6.3	6.3	7.6	8.0	8.0	8.1	8.9	9.3	7.2	6.8	7.9	6.9	6.7	8.3	7.4	7.0	8.9
450	600	80	36	7.6	7.6	8.1	9.9	9.9	10.3	11.1	11.4	12.3	6.0	5.8	5.6	5.1	5.0	5.3	5.4	5.2	5.7
450	600	80	32	9.5	10.5	11.0	12.4	13.3	13.9	14.1	15.5	16.4	5.1	4.2	4.7	4.4	3.5	4.6	5.4	4.4	5.7
450	600	90	45	5.6	6.4	5.3	7.2	8.0	6.9	7.8	9.0	8.2	7.6	7.6	8.6	7.0	7.1	8.7	7.6	7.6	9.4
450	600	90	40	7.3	7.7	7.0	9.6	10.0	9.3	10.7	11.5	11.2	6.6	6.7	6.4	5.3	5.6	5.8	5.7	5.8	6.3
450	600	90	36	9.5	10.9	10.3	12.4	13.7	13.2	14.1	15.9	15.7	5.6	5.0	5.4	4.5	4.0	5.0	5.6	5.0	6.2
600	300	60	39	3.5	4.0	3.5	4.4	4.8	4.4	3.2	4.0	3.9	5.5	4.2	5.6	5.3	4.0	5.9	5.5	4.1	6.2
600	300	60	36	4.4	4.3	4.3	5.9	5.8	5.8	5.2	5.6	6.0	4.8	3.6	3.6	3.8	2.7	3.3	3.8	2.6	3.4
600	300	60	33	3.9	4.9	4.9	6.0	6.9	7.0	6.0	7.3	7.8	5.2	3.2	4.0	4.4	2.6	3.8	5.1	3.1	4.6
600	300	70	45	5.0	4.7	5.0	5.9	5.6	5.9	4.7	4.7	5.5	5.1	4.2	5.3	4.5	3.7	5.4	4.8	3.8	5.8
600	300	70	42	5.8	5.0	5.8	7.3	6.5	7.3	6.7	6.3	7.5	4.6	3.9	3.7	3.4	2.7	3.1	3.5	2.7	3.3
600	300	70	38	6.1	6.3	7.2	8.2	8.4	9.3	8.2	8.8	10.0	5.0	3.5	4.0	3.9	2.5	3.6	4.7	3.1	4.5
600	300	80	52	5.8	5.9	5.1	6.7	6.8	6.0	5.5	6.0	5.6	6.0	5.4	6.5	5.1	4.6	6.2	5.4	4.8	6.7
600	300	80	48	6.5	6.2	5.9	8.0	7.7	7.4	7.4	7.4	7.5	5.9	5.4	5.1	4.3	4.0	4.2	4.5	4.0	4.5
600	300	80	44	7.2	7.8	7.6	9.3	9.9	9.7	9.2	10.3	10.4	6.2	5.0	5.5	4.8	3.7	4.7	5.6	4.4	5.7
600	450	70	42	4.7	5.0	4.5	6.1	6.4	5.9	5.4	6.1	6.0	7.9	6.8	8.3	8.1	7.1	9.1	8.4	7.3	9.6
600	450	70	38	6.0	5.9	5.9	8.0	8:0	7.9	8.0	8.3	8.6	6.5	5.6	5.7	6.0	5.2	5.9	6.2	5.3	6.2
600	450	70	35	6.8	7.7	7.7	9.4	10.3	10.3	9.9	11.2	11.6	6.7	5.0	5.9	6.4	4.8	6.3	7.3	5.5	7.2
600	450	80	48	6.3	5.9	6.2	7.7	7.3	7.6	7.0	7.0	7.7	7.2	6.5	7.9	7.1	6.5	8.4	7.5	6.8	8.9
600	450	80	44	7.7	6.9	7.6	9.7	8.9	9.7	9.6	9.2	10.3	6.2	5.7	5.6	5.4	5.0	5.5	5.6	5.1	5.8
600	450	80	40	9.3	9.5	10.3	11.9	12.1	12.9	12.4	13.0	14.2	6.2	5.0	5.7	5.6	4.5	5.7	6.6	5.3	6.8
600	450	90	54	6.5	6.6	5.8	8.0	8.0	7.2	7.3	7.7	7.3	8.4	8.0	9.3	7.9	7.7	9.5	8.4	8.1	10.1
600	450	90	49	8.0	7.7	7.3	10.1	9.7	9.3	10.0	10.0	10.0	7.5	7.4	7.2	6.4	6.4	6.8	6.8	6.6	7.2
600	450	90	45	10.0	10.5	10.3	12.6	13.2	12.9	13.1	14.1	14.2	7.6	6.6	7.3	6.6	5.8	7.0	7.6	6.7	8.1
600	600	70	38	5.6	6.3	6.3	7.5	8.3	8.2	7.4	8.5	8.8	9.3	8.6	10.1	9.5	9.0	11.0	9.7	9.1	11.3
600	600	70	35	7.3	7.6	8.0	9.8	10.2	10.6	10.3	11.0	11.8	7.0	6.6	6.6	6.6	6.3	6.9	6.6	6.1	7.0
600	600	70	31	9.5	10.8	11.3	12.7	14.0	14.4	13.7	15.4	16.3	6.5	5.3	6.1	6.3	5.2	6.6	7.0	5.7	7.3
600	600	80	44	7.7	7.7	8.4	9.6	9.7	10.4	9.5	9.9	11.0	9.0	8.8	10.0	8.9	8.8	10.6	9.2	9.0	11.0
600	600	80	40	9.6	9.2	10.4	12.2	11.8	13.0	12.6	12.6	14.2	7.0	6.9	6.8	6.3	6.3	6.7	6.3	6.3	6.9
600	600	80	36	12.5	13.1	14.4	15.7	16.3	17.5	16.7	17.7	19.3	6.4	5.6	6.3	5.9	5.2	6.4	6.6	5.8	7.2
600	600	90	49	7.8	8.3	7.9	9.8	10.2	9.8	9.6	10.4	10.4	9.9	10.0	11.2	9.5	9.8	11.5	9.9	10.0	11.9
600	600	90	45	9.5	9.5	9.6	12.0	12.0	12.1	12.5	12.9	13.3	8.2	8.5	8.3	7.2	7.6	7.9	7.3	7.6	8.2
6^)	600	90	40	13.0	14.0	14.2	16.2	17.2	17.3	17.2	18.6	19.1	7.4	6.9	7.5	6.5	6.2	7.3	7.4	6.9	8.2

TABLE F-21. MAXIMUM QUEUE LENGTH ON THE INBOUND APPROACH (NO. OF VEHICLES) FOR GEOMETRY 7*7

INTERSECTION ENVIRONMENT				MINOR LEFT STREET TURNS									MAJOR LEFT STREE TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	7.8	8.3	6.9	5.6	6.1	4.8	2.5	3.4	2.5	3.9	2.4	3.4	2.7	1.3	2.8	3.2	1.6	3.4
300	300	50	25	7.1	7.1	6.2	5.5	5.6	4.7	3.0	3.5	3.0	5.0	3.6	3.2	3.1	1.8	2.0	3.4	2.0	2.4
300	300	50	22	3.4	4.4	3.6	2.5	3.5	2.7	.6	2.0	1.6	5.6	3.4	3.8	3.9	1.8	2.8	4.9	2.7	3.8
300	300	60	33	8.6	8.3	7.8	6.4	6.2	5.6	3.3	3.5	3.3	4.4	3.3	4.1	2.9	1.9	3.2	3.5	2.3	3.9
300	300	60	30	7.8	7.1	7.1	6.3	5.6	5.5	3.8	3.5	3.8	5.8	4.8	4.3	3.6	2.8	2.7	4.0	3.0	3.2
300	300	60	27	4.7	5.1	5.1	3.8	4.1	4.1	1.9	2.6	3.0	6.4	4.6	4.8	4.3	2.7	3.5	5.4	3.7	4.6
300	300	70	38	9.0	9.2	7.6	6.9	7.1	5.4	3.8	4.4	3.1	5.1	4.3	5.0	3.3	2.6	3.8	3.9	3.1	4.6
300	300	70	35	7.9	7.7	6.5	6.4	6.1	4.9	3.9	4.0	3.2	6.8	6.2	5.5	4.3	3.8	3.6	4.8	4.1	4.2
300	300	70	31	5.2	5.9	4.8	4.3	5.0	3.9	2.4	3.5	2.8	7.2	5.8	5.9	4.9	3.6	4.3	6.0	4.6	5.5
300	450	50	25	6.9	7.3	5.9	5.3	5.7	4.3	2.7	3.5	2.5	4.0	2.7	3.9	3.3	2.1	3.7	3.9	2.6	4.5
300	450	50	22	6.3	6.3	5.3	5.2	5.3	4.3	3.3	3.7	3.1	4.6	3.5	3.2	3.2	2.2	2.5	3.7	2.5	3.1
300	450	50	20	3.6	4.6	3.7	3.2	4.2	3.3	1.8	3.2	2.7	5.1	3.2	3.8	3.9	2.1	3.2	5.0	3.1	4.4
300	450	60	30	8.0	7.7	7.1	6.4	6.1	5.5	3.9	4.0	3.7	4.4	3.5	4.5	3.3	2.6	4.0	4.1	3.2	4.9
300	450	60	27	7.4	6.7	6.5	6.4	5.7	5.5	4.4	4.1	4.3	5.3	4.6	4.2	3.6	3.0	3.1	4.1	3.4	3.7
300	450	60	24	5.3	5.5	5.5	4.9	5.1	5.1	3.5	4.2	4.5	5.7	4.3	4.6	4.2	2.8	3.7	5.4	3.9	5.0
300	450	70	35	7.9	8.1	6.3	6.3	6.4	4.7	3.8	4.3	2.9	5.4	4.9	5.7	4.1	3.7	5.0	4.9	4.3	6.0
300	450	70	31	7.1	6.8	5.5	6.0	5.7	4.5	4.1	4.2	3.3	6.6	6.2	5.7	4.5	4.3	4.3	5.2	4.8	5.0
300	450	70	28	5.2	5.8	4.7	4.8	5.4	4.3	3.4	4.5	3.7	6.9	5.8	6.1	5.1	4.1	4.9	6.4	5.3	6.3
300	600	60	27	5.2	6.1	5.1	4.1	5.0	4.0	2.1	3.3	2.7	4.8	3.9	5.0	4.1	3.4	5.0	4.6	3.7	5.6
300	600	60	24	5.3	5.8	5.3	4.9	5.3	4.8	3.4	4.3	4.1	4.4	3.7	3.4	3.0	2.5	2.7	3.3	2.6	3.1
300	600	60	21	4.2	5.6	5.2	4.3	5.8	5.3	3.5	5.3	5.3	4.1	2.7	3.2	3.0	1.7	2.7	4.0	2.5	3.7
300	600	70	31	6.8	6.9	6.8	5.7	5.9	5.7	3.7	4.2	4.4	5.2	4.8	5.7	4.3	4.0	5.4	4.8	4.4	6.1
300	600	70	28	6.9	6.7	6.9	6.5	6.2	6.5	5.0	5.1	5.8	5.1	4.9	4.4	3.5	3.4	3.4	3.9	3.6	3.9
300	600	70	24	6.5	7.2	7.6	6.6	7.3	7.7	5.8	6.9	7.6	4.7	3.7	4.0	3.2	2.4	3.2	4.3	3.3	4.3
300	600	80	36	6.1	6.7	5.4	5.1	5.6	4.3	3.0	4.0	3.1	5.9	5.9	6.7	4.7	4.7	6.0	5.3	5.2	6.8
300	600	80	32	6.1	6.2	5.4	5.6	5.8	4.9	4.2	4.7	4.3	6.0	6.1	5.5	4.1	4.3	4.2	4.5	4.6	4.8
300	600	80	28	6.0	7.1	6.4	6.1	7.3	6.5	5.3	6.8	6.4	5.5	4.8	5.0	3.7	3.2	3.9	4.9	4.2	5.1
450	300	50	30	6.0	6.8	5.6	4.4	5.2	4.0	2.8	4.0	3.1	3.9	2.5	3.6	3.2	1.9	3.6	3.8	2.4	4.3
450	300	50	27	5.5	5.8	5.0	4.4	4.7	4.0	3.5	4.2	3.8	4.6	3.4	3.1	3.3	2.2	2.5	3.7	2.4	3.0
450	300	50	25	2.8	4.1	3.5	2.4	3.7	3.0	2.0	3.7	3.4	4.9	2.9	3.4	3.7	1.9	2.9	4.8	2.8	4.1
450	300	60	36	7.4	7.4	7.0	5.8	5.8	5.4	4.2	4.6	4.6	4.5	3.5	4.5	3.5	2.7	4.1	4.2	3.2	4.9
450	300	60	33	6.8	6.4	6.5	5.8	5.4	5.4	4.8	4.8	5.2	5.6	4.8	4.3	3.9	3.2	3.4	4.4	3.6	3.9
450	300	60	30	4.8	5.3	5.5	4.3	4.9	5.0	3.9	4.9	5.4	5.8	4.2	4.6	4.3	2.9	3.8	5.5	3.9	5.0
450	300	70	42	7.6	8.0	6.5	6.0	6.4	4.9	4.4	5.2	4.1	5.2	4.6	5.4	3.9	3.4	4.8	4.7	4.0	5.6
450	300	70	38	6.8	6.8	5.7	5.8	5.8	4.7	4.8	5.2	4.5	6.6	6.1	5.6	4.7	4.3	4.3	5.2	4.7	5.0
450	300	70	35	5.0	6.0	5.0	4.6	5.5	4.6	4.2	5.5	5.0	6.8	5.6	5.8	5.0	3.9	4.7	6.3	5.0	6.0
450	450	60	33	6.1	6.8	5.5	5.0	5.7	4.4	4.0	5.0	4.2	5.0	3.8	5.1	4.8	3.8	5.6	5.5	4.4	6.4
450	450	60	30	5.9	6.2	5.4	5.4	5.7	4.9	5.0	5.6	5.2	5.2	4.2	4.2	4.4	3.5	3.9	4.9	3.9	4.6
450	450	60	27	4.5	5.7	5.0	4.6	5.8	5.1	4.8	6.4	6.0	5.3	3.5	4.2	4.6	3.0	4.2	5.8	4.0	5.5
450	450	70	38	7.8	7.7	7.3	6.7	6.6	6.2	5.6	6.0	5.9	5.3	4.6	5.7	4.8	4.2	5.8	5.6	4.9	6.8
450	450	70	35	7.6	7.1	7.1	7.1	6.6	6.6	6.6	6.6	6.9	5.9	5.3	5.0	4.7	4.3	4.5	5.4	4.8	5.3
450	450	70	31	6.9	7.4	7.5	7.0	7.5	7.6	7.1	8.0	8.5	5.8	4.5	5.0	4.8	3.6	4.6	6.1	4.8	6.0
450	450	80	44	7.3	7.6	6.1	6.2	6.5	5.0	5.1	5.9	4.7	6.3	5.9	6.9	5.5	5.2	6.8	6.4	6.0	7.8
450	450	80	40	6.9	6.9	5.8	6.4	6.4	5.3	6.0	6.3	5.6	7.1	6.9	6.5	5.6	5.5	5.7	6.4	6.1	6.5
450	450	80	36	6.5	7.5	6.4	6.7	7.6	6.5	6.8	8.1	7.5	6.9	6.0	6.4	5.6	4.8	5.7	7.0	6.1	7.2
450	600	70	35	5.4	6.5	5.7	4.9	6.0	5.1	4.4	5.8	5.4	6.5	5.9	7.1	6.4	5.9	7.6	7.0	6.3	8.3
450	600	70	31	6.2	6.8	6.5	6.2	6.9	6.5	6.3	7.3	7.4	5.7	5.1	5.0	4.9	4.5	4.9	5.3	4.7	5.4
450	600	70	28	6.3	8.0	7.7	6.9	8.6	8.3	7.6	9.7	9.8	5.0	3.7	4.3	4.4	3.2	4.4	5.5	4.2	5.6
450	600	80	40	7.4	7.8	7.8	6.8	7.2	7.2	6.3	7.1	7.5	7.1	6.8	7.8	6.6	6.5	8.1	7.3	7.0	8.8
450	600	80	36	8.2	8.2	8.6	8.3	8.2	8.6	8.3	8.7	9.5	6.5	6.4	6.1	5.4	5.4	5.6	5.9	5.8	6.2
450	600	80	32	9.2	10.1	10.6	9.8	10.7	11.3	10.5	11.8	12.7	5.6	4.8	5.2	4.7	4.0	5.0	5.9	5.0	6.2
450	600	90	45	6.5	7.3	6.2	5.9	6.7	5.6	5.4	6.6	5.8	7.7	7.7	8.7	6.9	7.2	8.6	7.7	7.7	9.5
450	600	90	40	7.3	7.7	7.0	7.4	7.7	7.0	7.5	8.2	7.9	7.2	7.5	7.0	5.8	6.2	6.3	6.4	6.6	6.9
450	600	90	36	8.6	9.9	9.3	9.2	10.6	10.0	9.9	11.6	11.4	6.3	5.8	6.1	5.1	4.7	5.5	6.3	5.8	6.9
600	300	60	39	6.2	6.6	6.2	4.9	5.3	4.8	2.6	3.4	3.3	4.6	3.3	4.6	4.2	3.0	4.8	4.5	3.2	5.3
600	300	60	36	6.1	6.1	6.1	5.4	5.3	5.3	3.7	4.0	4.4	4.4	3.3	3.2	3.3	2.3	2.8	3.5	2.3	3.0
600	300	60	33	4.7	5.7	5.7	4.6	5.5	5.6	3.5	4.8	5.3	4.8	3.0	3.7	3.9	2.2	3.4	4.7	2.9	4.3
600	300	70	45	7.2	6.9	7.2	5.9	5.5	5.9	3.6	3.6	4.4	4.8	3.9	5.0	4.0	3.3	5.0	4.4	3.6	5.5
600	300	70	42	7.1	6.3	7.1	6.4	5.6	6.4	4.7	4.3	5.5	4.9	4.2	4.0	3.5	3.0	3.2	3.7	3.1	3.6
600	300	70	38	6.5	6.7	7.6	6.3	6.5	7.4	5.2	5.8	7.1	5.3	3.9	4.4	4.1	2.8	3.8	5.0	3.5	4.8
600	300	80	52	7.5	7.6	6.8	6.1	6.2	5.4	3.9	4.3	3.9	5.8	5.3	6.4	4.8	4.4	6.0	5.3	4.8	6.6
600	300	80	48	7.2	6.9	6.6	6.5	6.2	5.8	4.8	4.9	4.9	6.3	6.0	5.6	4.6	4.4	4.6	4.9	4.5	5.0
600	300	80	44	7.0	7.6	7.4	6.8	7.4	7.2	5.7	6.7	6.9	6.6	5.6	6.0	5.1	4.2	5.1	6.1	5.0	6.2
600	450	70	42	6.8	7.1	6.6	6.0	6.3	5.8	4.2	4.9	4.8	6.8	5.8	7.3	6.8	6.0	7.9	7.4	6.3	8.5
600	450	70	38	7.2	7.1	7.0	7.0	6.9	6.8	5.8	6.1	6.4	6.1	5.2	5.3	5.4	4.7	5.3	5.7	4.9	5.7
600	450	70	35	7.0	7.9	7.9	7.4	8.3	8.3	6.9	8.1	8.5	6.3	4.7	5.5	5.8	4.3	5.7	6.8	5.2	6.8
600	450	80	48	7.9	7.5	7.8	7.1	6.7	7.0	5.3	5.3	6.0	6.8	6.2	7.4	6.5	6.0	7.8	7.1	6.5	8.5
600	450	80	44	8.4	7.6	8.3	8.2	7.4	8.1	7.1	6.6	7.7	6.3	5.9	5.8	5.4	5.1	5.5	5.8	5.4	6.0
600	450	80	40	9.1	9.2	10.1	9.5	9.6	10.4	8.9	9.5	10.7	6.4	5.3	5.9	5.7	4.6	5.8	6.7	5.6	7.0
600	450	90	54	7.6	7.6	6.8	6.8	6.8	6.0	5.1	5.5	5.0	8.1	7.9	9.0	7.5	7.4	9.1	8.2	7.9	9.8
600	450	90	49	8.2	7.8	7.4	8.0	7.6	7.2	6.8	6.8	6.8	7.9	7.8	7.6	6.6	6.7	7.0	7.1	7.0	7.6
600	450	90	45	9.2	9.7	9.4	9.6	10.1	9.8	9.0	10.0	10.0	7.9	7.1	7.6	6.8	6.1	7.2	8.0	7.2	8.5
600	600	70	38	7.1	7.8	7.7	6.8	7.6	7.5	5.6	6.7	7.0	8.1	7.5	8.9	8.2	7.8	9.7	8.5	8.0	10.1
600	600	70	35	7.9	8.2	8.6	8.2	8.5	8.9	7.6	8.3	9.0	6.4	6.1	6.1	5.9	5.6	6.2	6.0	5.6	6.4
600	600	70	31	9.2	10.5	10.9	10.1	11.4	11.8	10.1	11.8	12.6	5.9	4.8	5.6	5.6	4.6	5.9	6.4	5.3	6.8
600	600	80	44	8.7	8.8	9.5	8.4	8.5	9.2	7.2	7.7	8.7	8.4	8.3	9.5	8.2	8.2	10.0	8.6	8.5	10.5
600	600	80	40	9.7	9.3	10.5	10.1	9.7	10.8	9.4	9.4	11.0	7.0	7.0	6.9	6.1	6.3	6.7	6.4	6.4	7.0
600	600	80	36	11.7	12.3	13.5	12.6	13.2	14.5	12.6	13.6	15.2	6.4	5.8	6.4	5.8	5.2	6.3	6.7	6.0	7.3
600	600	90	49	8.3	8.7	8.3	8.0	8.5	8.0	6.8	7.6	7.6	9.5	9.7	10.8	9.0	9.4	11.0	9.5	9.7	11.6
600	600	90	45	9.0	9.0	9.1	9.3	9.4	9.4	8.7	9.1	9.5	8.4	8.8	8.5	7.2	7.7	8.0	7.5	7.9	8.4
600	600	90	40	11.6	12.6	12.8	12.5	13.5	13.7	12.5	13.9	14.4	7.6	7.3	7.8	6.6	6.4	7.4	7.6	7.2	8.5

TABLE F-3A. TOTAL CO EMITTED ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 4*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	1.09	1.50	1.72	.93	1.43	1.56	1.20	1.79	1.84	.31	.77	1.23	.23	.74	1.25	.60	1.15	1.70
300	300	50	25	1.00	1.47	1.95	.93	1.49	1.89	1.30	1.95	2.26	.57	.97	1.10	.43	.88	1.06	.75	1.24	1.46
300	300	50	22	.76	1.50	2.04	.79	1.61	2.07	1.26	2.16	2.54	.62	.69	.76	.54	.65	.77	.90	1.06	1.23
300	300	60	33	1.03	1.23	1.52	.84	1.12	1.33	1.15	1.51	1.63	.66	1.21	1.45	.49	1.08	1.37	.80	1.44	1.77
300	300	60	30	.92	1.18	1.73	.82	1.16	1.63	1.22	1.65	2.03	1.12	1.60	1.52	.89	1.42	1.38	1.15	1.73	1.73
300	300	60	27	.86	1.38	1.99	.86	1.46	1.99	1.36	2.05	2.49	1.09	1.25	1.10	.92	1.12	1.02	1.23	1.48	1.42
300	300	70	38	1.18	1.45	1.53	1.20	1.55	1.54	1.30	1.73	1.64	.75	1.22	1.68	.35	.86	1.37	.75	1.30	1.86
300	300	70	35	.91	1.24	1.58	1.02	1.44	1.69	1.22	1.72	1.88	1.14	1.53	1.67	.68	1.13	1.31	1.03	1.52	1.74
300	300	70	31	.82	1.41	1.81	1.02	1.70	2.01	1.31	2.07	2.30	1.25	1.32	1.39	.85	.97	1.09	1.25	1.41	1.57
300	450	50	25	.70	1.27	1.65	.66	1.32	1.62	1.06	1.81	2.02	.70	1.75	2.79	.62	1.72	2.81	.99	2.13	3.26
300	450	50	22	.73	1.36	2.00	.79	1.51	2.06	1.28	2.09	2.56	.86	1.85	2.56	.73	1.76	2.52	1.04	2.12	2.92
300	450	50	20	.59	1.49	2.19	.75	1.72	2.34	1.34	2.40	2.93	.69	1.35	2.00	.61	1.32	2.02	.98	1.73	2.47
300	450	60	30	.78	1.13	1.58	.71	1.15	1.51	1.14	1.67	1.94	1.05	2.17	3.00	.87	2.05	2.92	1.19	2.41	3.32
300	450	60	27	.85	1.27	1.98	.88	1.38	2.01	1.40	1.99	2.53	1.33	2.40	2.90	1.11	2.22	2.76	1.36	2.52	3.11
300	450	60	24	.81	1.49	2.26	.93	1.70	2.38	1.55	2.40	3.01	1.13	1.87	2.31	.96	1.75	2.23	1.27	2.10	2.63
300	450	70	35	.78	1.21	1.44	.92	1.43	1.58	1.14	1.74	1.80	1.22	2.27	3.31	.83	1.92	3.01	1.22	2.36	3.49
300	450	70	31	.69	1.18	1.67	.92	1.49	1.90	1.24	1.90	2.22	1.45	2.43	3.15	1.00	2.03	2.79	1.34	2.41	3.22
300	450	70	28	.62	1.37	1.93	.95	1.78	2.25	1.36	2.28	2.67	1.37	2.02	2.68	.97	1.67	2.37	1.36	2.11	2.86
300	600	60	27	.58	1.31	1.85	.67	1.49	1.94	1.19	2.09	2.46	.97	2.60	4.23	.89	2.57	4.24	1.26	2.98	4.70
300	600	60	24	.65	1.45	2.25	.84	1.72	2.43	1.46	2.42	3.05	.91	2.47	3.77	.77	2.38	3.73	1.08	2.74	4.13
300	600	60	21	1.13	2.18	3.05	1.41	2.55	3.32	2.12	3.35	4.04	.56	1.79	3.03	.48	1.76	3.04	.84	2.17	3.50
300	600	70	31	.81	1.32	1.93	.86	1.46	1.99	1.42	2.11	2.55	1.16	2.87	4.28	.99	2.75	4.20	1.30	3.10	4.60
300	600	70	28	.93	1.51	2.37	1.08	1.74	2.52	1.73	2.48	3.18	1.21	2.86	3.94	.98	2.68	3.81	1.24	2.98	4.16
300	600	70	24	1.55	2.39	3.32	1.79	2.72	3.56	2.54	3.55	4.31	.76	2.09	3.11	.59	1.96	3.03	.90	2.32	3.43
300	600	80	36	.66	1.25	1.65	.93	1.60	1.91	1.28	2.03	2.26	1.32	2.94	4.57	.92	2.59	4.26	1.31	3.03	4.75
300	600	80	32	.64	1.29	1.94	1.00	1.73	2.30	1.44	2.26	2.74	1.27	2.84	4.14	.82	2.43	3.78	1.16	2.82	4.21
300	600	80	28	1.26	2.17	2.89	1.71	2.71	3.34	2.25	3.33	3.88	.92	2.16	3.40	.53	1.81	3.09	.92	2.25	3.58
450	300	50	30	1.09	2.28	3.01	.92	2.20	2.84	1.53	2.89	3.44	.42	1.04	1.66	.39	1.05	1.72	.80	1.51	2.22
450	300	50	27	.97	2.23	3.21	.90	2.24	3.14	1.60	3.03	3.84	.65	1.20	1.50	.56	1.16	1.50	.92	1.57	1.95
450	300	50	25	.99	2.51	3.55	1.02	2.61	3.58	1.81	3.50	4.37	.70	.93	1.16	.66	.94	1.22	1.07	1.40	1.72
450	300	60	36	1.07	2.05	2.84	.87	1.93	2.64	1.51	2.66	3.28	.73	1.44	1.84	.61	1.36	1.81	.97	1.76	2.26
450	300	60	33	1.01	2.05	3.10	.90	2.03	2.99	1.64	2.85	3.73	1.10	1.74	1.81	.92	1.61	1.73	1.22	1.96	2.12
450	300	60	30	1.13	2.43	3.55	1.12	2.50	3.54	1.95	3.42	4.37	1.15	1.46	1.47	1.02	1.38	1.44	1.38	1.78	1.89
450	300	70	42	1.27	2.31	2.89	1.27	2.40	2.90	1.70	2.92	3.33	1.04	1.66	2.28	.69	1.35	2.02	1.13	1.84	2.55
450	300	70	38	1.05	2.16	3.00	1.15	2.34	3.10	1.68	2.96	3.62	1.38	1.94	2.23	.97	1.58	1.91	1.36	2.01	2.39
450	300	70	35	1.15	2.52	3.42	1.35	2.80	3.62	1.97	3.51	4.24	1.55	1.78	2.01	1.20	1.48	1.75	1.64	1.96	2.28
450	450	60	33	.68	2.03	2.91	.63	2.07	2.87	1.36	2.88	3.60	.92	2.12	3.33	.89	2.14	3.38	1.30	2.59	3.89
450	450	60	30	.85	2.26	3.40	.90	2.40	3.45	1.72	3.31	4.28	.93	2.07	2.95	.84	2.03	2.95	1.20	2.43	3.40
450	450	60	27	.90	2.57	3.78	1.05	2.81	3.93	1.97	3.81	4.85	.83	1.64	2.46	.79	1.65	2.51	1.21	2.11	3.02
450	450	70	38	.76	1.89	2.85	.68	1.90	2.77	1.45	2.75	3.53	1.15	2.43	3.42	1.02	2.36	3.39	1.38	2.76	3.84
450	450	70	35	.98	2.18	3.39	1.00	2.28	3.41	1.85	3.22	4.27	1.28	2.51	3.17	1.11	2.38	3.08	1.41	2.73	3.48
450	450	70	31	1.19	2.65	3.93	1.31	2.85	4.04	2.26	3.89	5.00	1.12	2.02	2.62	1.00	1.94	2.58	1.36	2.34	3.03
450	450	80	44	.75	1.95	2.69	.88	2.17	2.82	1.43	2.81	3.38	1.48	2.68	3.88	1.12	2.37	3.62	1.56	2.86	4.15
450	450	80	40	.84	2.11	3.11	1.06	2.42	3.33	1.72	3.16	3.98	1.56	2.70	3.58	1.16	2.34	3.26	1.54	2.78	3.74
450	450	80	36	1.06	2.59	3.65	1.38	3.00	3.97	2.13	3.83	4.72	1.51	2.32	3.14	1.16	2.02	2.87	1.60	2.50	3.41
450	600	70	35	.96	2.47	3.52	1.04	2.64	3.60	1.90	3.58	4.45	1.53	3.32	5.11	1.50	3.33	5.16	1.91	3.79	5.67
450	600	70	31	1.16	2.74	4.04	1.34	3.00	4.22	2.29	4.03	5.17	1.34	3.06	4.52	1.25	3.02	4.52	1.61	3.42	4.97
450	600	70	28	1.91	3.74	5.11	2.18	4.10	5.38	3.22	5.23	6.42	1.00	2.39	3.79	.96	2.41	3.85	1.37	2.86	4.35
450	600	80	40	1.22	2.51	3.63	1.26	2.64	3.67	2.15	3.62	4.56	1.59	3.46	5.03	1.47	3.38	5.00	1.82	3.79	5.45
450	600	80	36	1.50	2.85	4.23	1.64	3.08	4.37	2.62	4.15	5.35	1.50	3.31	4.55	1.32	3.18	4.46	1.63	3.52	4.86
450	600	80	32	2.42	4.04	5.48	2.66	4.37	5.72	3.74	5.53	6.80	1.07	2.55	3.73	.95	2.47	3.70	1.30	2.87	4.14
450	600	90	45	1.05	2.41	3.31	1.31	2.76	3.57	1.99	3.52	4.25	1.94	3.73	5.51	1.59	3.42	5.25	2.03	3.91	5.78
450	600	90	40	1.25	2.68	3.84	1.60	3.12	4.19	2.38	3.98	4.97	1.73	3.46	4.92	1.33	3.10	4.60	1.71	3.53	5.08
450	600	90	36	2.18	3.87	5.09	2.63	4.40	5.54	3.50	5.36	6.41	1.40	2.79	4.19	1.04	2.49	3.93	1.49	2.97	4.46
600	300	60	39	1.06	2.51	3.77	.98	2.51	3.69	1.33	2.95	4.04	1.11	1.89	2.67	1.12	1.95	2.77	1.58	2.45	3.32
600	300	60	36	.98	2.49	4.01	.99	2.59	4.02	1.43	3.12	4.47	.95	1.67	2.12	.91	1.67	2.17	1.31	2.12	2.66
600	300	60	33	1.61	3.39	4.97	1.72	3.58	5.08	2.26	4.20	5.62	.85	1.24	1.63	.86	1.30	1.73	1.32	1.80	2.28
600	300	70	45	.98	2.22	3.55	.87	2.19	3.43	1.25	2.66	3.82	1.09	1.95	2.51	1.01	1.92	2.53	1.41	2.37	3.02
600	300	70	42	.95	2.25	3.84	.93	2.31	3.82	1.41	2.88	4.30	1.07	1.87	2.10	.94	1.78	2.06	1.29	2.18	2.50
600	300	70	38	1.76	3.32	4.97	1.83	3.48	5.05	2.41	4.14	5.62	.95	1.42	1.59	.87	1.39	1.60	1.27	1.83	2.10
600	300	80	52	1.09	2.39	3.51	1.18	2.57	3.60	1.35	2.83	3.78	1.30	2.08	2.85	.99	1.82	2.64	1.48	2.35	3.22
600	300	80	48	.94	2.31	3.69	1.12	2.58	3.87	1.39	2.94	4.14	1.26	1.98	2.43	.90	1.67	2.16	1.34	2.15	2.69
600	300	80	44	1.76	3.39	4.83	2.04	3.76	5.11	2.41	4.21	5.48	1.26	1.65	2.04	.96	1.39	1.83	1.44	1.92	2.40
600	450	70	42	1.00	2.61	4.03	1.03	2.73	4.07	1.51	3.29	4.54	1.95	3.31	4.67	1.96	3.37	4.77	2.42	3.87	5.32
600	450	70	38	1.19	2.86	4.54	1.32	3.08	4.68	1.89	3.74	5.25	1.62	2.92	3.95	1.58	2.92	4.00	1.98	3.37	4.50
600	450	70	35	1.93	3.87	5.61	2.16	4.18	5.84	2.83	4.93	6.51	1.29	2.26	3.23	1.30	2.32	3.34	1.76	2.82	3.89
600	450	80	48	1.03	2.43	3.92	1.03	2.52	3.92	1.54	3.11	4.43	1.80	3.25	4.39	1.72	3.21	4.40	2.13	3.66	4.90
600	450	80	44	1.31	2.77	4.52	1.41	2.95	4.62	2.01	3.64	5.22	1.59	2.98	3.79	1.46	2.89	3.75	1.81	3.28	4.19
600	450	80	40	2.25	3.97	5.78	2.45	4.25	5.98	3.15	5.04	6.68	1.21	2.27	3.02	1.14	2.24	3.04	1.54	2.69	3.53
600	450	90	54	.93	2.39	3.67	1.14	2.69	3.88	1.44	3.08	4.18	2.10	3.46	4.82	1.79	3.20	4.61	2.28	3.73	5.19
600	450	90	49	1.15	2.68	4.21	1.45	3.07	4.52	1.85	3.55	4.92	1.82	3.12	4.16	1.46	2.81	3.89	1.89	3.29	4.41
600	450	90	45	2.10	3.89	5.48	2.50	4.38	5.89	2.99	4.95	6.38	1.55	2.52	3.50	1.24	2.26	3.28	1.73	2.79	3.86
600	600	70	38	1.59	3.36	4.94	1.75	3.61	5.10	2.35	4.29	5.70	2.80	4.74	6.69	2.81	4.80	6.79	3.27	5.30	7.34
600	600	70	35	1.74	3.57	5.41	2.00	3.92	5.67	2.69	4.70	6.37	2.24	4.13	5.74	2.20	4.13	5.79	2.61	4.58	6.29
600	600	70	31	3.07	5.16	7.06	3.42	5.60	7.42	4.21	6.48	8.21	1.76	3.32	4.87	1.77	3.37	4.98	2.23	3.88	5.52
600	600	80	44	1.86	3.42	5.07	1.99	3.63	5.20	2.62	4.35	5.83	2.57	4.59	6.32	2.49	4.56	6.33	2.89	5.01	6.83
600	600	80	40	2.08	3.70	5.61	2.31	4.01	5.84	3.04	4.83	6.57	2.16	4.13	5.53	2.03	4.04	5.48	2.38	4.43	5.93
600	600	80	36	3.62	5.50	7.47	3.94	5.90	7.79	4.76	6.81	8.61	1.59	3.22	4.56	1.51	3.19	4.57	1.91	3.64	5.07
600	600	90	49	1.71	3.33	4.77	2.04	3.76	5.11	2.47	4.27	5.53	2.95	4.90	6.84	2.65	4.64	6.63	3.13	5.17	7.21
600	600	90	45	1.81	3.50	5.19	2.24	4.02	5.63	2.76	4.62	6.15	2.46	4.34	5.96	2.10	4.02	5.69	2.53	4.50	6.21
600	600	90	40	3.39	5.34	7.10	3.92	5.96	7.63	4.54	6.66	8.24	1.97	3.52	5.08	1.66	3.26	4.86	2.14	3.79	5.44

TABLE F-3B. TOTAL CO EMITTED ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 5*4

INTERSECTION ENVIRONMENT				MINOR STREET									MAJOR STREET								
				LEFT TURNS									LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	.97	1.31	1.72	.78	1.20	1.53	1.02	1.53	1.77	.62	.94	1.43	.37	.74	1.27	.56	.98	1.56
300	300	50	25	.88	1.29	1.96	.79	1.28	1.86	1.13	1.70	2.20	.85	1.11	1.28	.55	.85	1.06	.69	1.04	1.29
300	300	50	22	.66	1.32	2.06	.66	1.41	2.06	1.09	1.93	2.49	.93	.86	.96	.67	.65	.80	.87	.89	1.08
300	300	60	33	1.00	1.12	1.60	.77	.98	1.38	1.05	1.35	1.66	.80	1.20	1.48	.46	.91	1.23	.59	1.09	1.46
300	300	60	30	.89	1.08	1.82	.76	1.03	1.69	1.13	1.49	2.06	1.23	1.57	1.52	.83	1.22	1.21	.92	1.36	1.39
300	300	60	27	.84	1.29	2.09	.81	1.34	2.06	1.28	1.89	2.53	1.23	1.25	1.13	.89	.95	.88	1.02	1.13	1.11
300	300	70	38	1.39	1.59	1.85	1.38	1.66	1.84	1.44	1.81	1.91	.72	1.04	1.53	.15	.52	1.05	.37	.79	1.37
300	300	70	35	1.13	1.39	1.92	1.21	1.55	1.99	1.37	1.80	2.16	1.08	1.34	1.50	.45	.76	.97	.62	.97	1.23
300	300	70	31	1.04	1.56	2.15	1.22	1.82	2.33	1.48	2.17	2.58	1.22	1.15	1.25	.65	.62	.77	.87	.89	1.08
300	450	50	25	.53	1.03	1.60	.47	1.05	1.54	.83	1.51	1.91	.86	1.77	2.84	.61	1.56	2.68	.80	1.80	2.96
300	450	50	22	.57	1.13	1.96	.60	1.24	1.99	1.06	1.79	2.45	1.00	1.84	2.59	.69	1.58	2.37	.83	1.77	2.60
300	450	50	20	.44	1.26	2.16	.56	1.47	2.28	1.12	2.12	2.84	.85	1.37	2.05	.60	1.16	1.89	.79	1.40	2.18
300	450	60	30	.69	.98	1.62	.59	.96	1.52	.99	1.45	1.92	1.03	2.02	2.88	.69	1.72	2.62	.83	1.91	2.86
300	450	60	27	.78	1.12	2.02	.77	1.20	2.02	1.27	1.79	2.52	1.29	2.22	2.75	.90	1.87	2.44	.98	2.00	2.62
300	450	60	24	.74	1.35	2.31	.83	1.53	2.40	1.43	2.20	3.00	1.12	1.72	2.18	.78	1.42	1.93	.91	1.61	2.16
300	450	70	35	.94	1.30	1.72	1.05	1.49	1.83	1.24	1.77	2.02	1.04	1.94	3.02	.47	1.42	2.54	.69	1.69	2.85
300	450	70	31	.86	1.27	1.96	1.06	1.56	2.16	1.35	1.94	2.45	1.24	2.08	2.83	.62	1.51	2.30	.79	1.72	2.56
300	450	70	28	.79	1.47	2.22	1.09	1.86	2.52	1.48	2.33	2.90	1.18	1.70	2.38	.61	1.17	1.90	.83	1.44	2.22
300	600	60	27	.37	1.03	1.76	.42	1.17	1.81	.92	1.75	2.31	1.19	2.68	4.34	.94	2.48	4.18	1.13	2.71	4.46
300	600	60	24	.45	1.17	2.16	.60	1.41	2.31	1.19	2.08	2.90	1.10	2.53	3.86	.80	2.27	3.64	.94	2.45	3.87
300	600	60	21	.93	1.91	2.97	1.18	2.25	3.21	1.86	3.01	3.90	.78	1.88	3.14	.52	1.67	2.98	.72	1.91	3.27
300	600	70	31	.68	1.12	1.92	.70	1.23	1.95	1.23	1.84	2.47	1.21	2.78	4.22	.86	2.48	3.97	1.00	2.67	4.20
300	600	70	28	.80	1.31	2.37	.92	1.52	2.49	1.54	2.22	3.11	1.23	2.74	3.85	.84	2.39	3.55	.92	2.52	3.73
300	600	70	24	1.43	2.20	3.32	1.65	2.50	3.54	2.36	3.30	4.26	.81	2.00	3.04	.47	1.70	2.79	.61	1.88	3.02
300	600	80	36	.78	1.29	1.88	1.01	1.61	2.11	1.33	2.01	2.43	1.19	2.68	4.34	.62	2.16	3.86	.84	2.43	4.17
300	600	80	32	.76	1.34	2.18	1.09	1.75	2.51	1.50	2.25	2.92	1.13	2.55	3.88	.50	1.97	3.35	.67	2.19	3.61
300	600	80	28	1.39	2.23	3.14	1.81	2.74	3.56	2.32	3.33	4.07	.80	1.90	3.17	.23	1.38	2.69	.45	1.64	3.00
450	300	50	30	1.01	2.13	3.04	.81	2.01	2.84	1.38	2.67	3.42	.62	1.10	1.75	.41	.94	1.64	.65	1.22	1.97
450	300	50	27	.90	2.08	3.26	.80	2.06	3.15	1.47	2.82	3.82	.82	1.24	1.56	.56	1.03	1.39	.75	1.26	1.67
450	300	50	25	.93	2.37	3.61	.92	2.44	3.60	1.68	3.30	4.36	.90	.99	1.25	.69	.83	1.13	.93	1.11	1.46
450	300	60	36	1.07	1.98	2.96	.84	1.83	2.73	1.45	2.52	3.34	.76	1.33	1.76	.47	1.08	1.55	.65	1.31	1.83
450	300	60	33	1.02	1.98	3.23	.88	1.93	3.09	1.58	2.72	3.80	1.10	1.60	1.71	.75	1.30	1.45	.88	1.48	1.67
450	300	60	30	1.15	2.38	3.68	1.11	2.42	3.64	1.91	3.30	4.44	1.17	1.35	1.39	.88	1.10	1.18	1.06	1.33	1.46
450	300	70	42	1.51	2.49	3.26	1.49	2.55	3.23	1.89	3.03	3.63	.89	1.38	2.02	.37	.90	1.59	.64	1.21	1.95
450	300	70	38	1.30	2.34	3.37	1.37	2.50	3.44	1.87	3.08	3.94	1.21	1.63	1.95	.63	1.10	1.46	.85	1.36	1.77
450	300	70	35	1.41	2.71	3.80	1.58	2.96	3.97	2.17	3.64	4.56	1.41	1.50	1.76	.88	1.02	1.33	1.15	1.33	1.68
450	450	60	33	.55	1.82	2.90	.47	1.83	2.82	1.17	2.62	3.52	.97	2.03	3.26	.76	1.87	3.15	1.00	2.16	3.48
450	450	60	30	.72	2.07	3.40	.74	2.17	3.42	1.54	3.05	4.21	.95	1.96	2.86	.69	1.74	2.69	.88	1.97	2.97
450	450	60	27	.79	2.39	3.79	.90	2.59	3.90	1.79	3.57	4.79	.88	1.55	2.39	.67	1.39	2.28	.91	1.67	2.61
450	450	70	38	.71	1.78	2.92	.61	1.75	2.81	1.34	2.57	3.55	1.02	2.17	3.18	.73	1.92	2.98	.91	2.15	3.26
450	450	70	35	.94	2.07	3.47	.93	2.14	3.46	1.76	3.05	4.29	1.13	2.22	2.91	.78	1.92	2.65	.92	2.09	2.87
450	450	70	31	1.16	2.55	4.02	1.25	2.72	4.10	2.17	3.73	5.02	1.00	1.76	2.38	.70	1.51	2.18	.89	1.74	2.45
450	450	80	44	.95	2.08	3.01	1.05	2.27	3.11	1.57	2.88	3.64	1.18	2.24	3.48	.66	1.77	3.04	.92	2.08	3.40
450	450	80	40	1.05	2.24	3.43	1.24	2.52	3.63	1.86	3.23	4.25	1.24	2.24	3.15	.66	1.71	2.66	.88	1.97	2.97
450	450	80	36	1.28	2.73	3.98	1.57	3.11	4.28	2.28	3.91	4.99	1.21	1.89	2.73	.69	1.41	2.30	.96	1.72	2.66
450	600	70	35	.79	2.22	3.46	.84	2.36	3.51	1.66	3.27	4.33	1.64	3.29	5.11	1.44	3.13	4.99	1.68	3.42	5.32
450	600	70	31	.99	2.49	3.99	1.14	2.73	4.13	2.06	3.73	5.05	1.42	3.01	4.49	1.16	2.79	4.33	1.35	3.02	4.60
450	600	70	28	1.75	3.51	5.06	1.99	3.83	5.30	3.00	4.93	6.32	1.11	2.36	3.79	.90	2.20	3.67	1.14	2.49	4.00
450	600	80	40	1.12	2.35	3.65	1.14	2.45	3.67	2.00	3.39	4.52	1.53	3.26	4.86	1.23	3.01	4.65	1.42	3.24	4.93
450	600	80	36	1.41	2.70	4.26	1.52	2.89	4.37	2.48	3.93	5.33	1.41	3.08	4.35	1.06	2.78	4.09	1.19	2.95	4.32
450	600	80	32	2.35	3.89	5.52	2.55	4.19	5.73	3.60	5.32	6.78	1.01	2.35	3.56	.71	2.10	3.35	.90	2.33	3.63
450	600	90	45	1.20	2.49	3.58	1.43	2.80	3.81	2.08	3.54	4.46	1.71	3.35	5.17	1.18	2.87	4.74	1.45	3.19	5.09
450	600	90	40	1.41	2.77	4.12	1.73	3.17	4.44	2.48	4.00	5.18	1.47	3.06	4.55	.90	2.53	4.06	1.11	2.79	4.37
450	600	90	36	2.35	3.97	5.38	2.77	4.47	5.79	3.61	5.39	6.63	1.16	2.42	3.85	.64	1.94	3.41	.91	2.26	3.77
600	300	60	39	1.18	2.56	4.01	1.06	2.53	3.89	1.38	2.93	4.21	1.20	1.84	2.64	1.04	1.72	2.58	1.32	2.05	2.95
600	300	60	36	1.10	2.54	4.25	1.08	2.61	4.23	1.49	3.11	4.65	1.02	1.59	2.07	.80	1.43	1.95	1.03	1.70	2.27
600	300	60	33	1.74	3.45	5.22	1.82	3.61	5.30	2.33	4.20	5.81	.94	1.19	1.61	.78	1.08	1.54	1.06	1.41	1.91
600	300	70	45	1.18	2.35	3.87	1.03	2.29	3.72	1.39	2.72	4.07	1.01	1.73	2.32	.76	1.52	2.16	.99	1.80	2.48
600	300	70	42	1.16	2.39	4.17	1.10	2.42	4.11	1.55	2.95	4.56	.96	1.62	1.88	.66	1.36	1.67	.83	1.59	1.94
600	300	70	38	1.98	3.46	5.31	2.02	3.59	5.35	2.56	4.22	5.89	.86	1.20	1.40	.61	.99	1.24	.84	1.27	1.56
600	300	80	52	1.53	2.77	4.07	1.59	2.91	4.13	1.74	3.14	4.28	1.04	1.68	2.49	.56	1.25	2.10	.88	1.61	2.51
600	300	80	48	1.39	2.69	4.26	1.55	2.93	4.41	1.79	3.26	4.65	.98	1.56	2.04	.45	1.08	1.60	.71	1.38	1.95
600	300	80	44	2.22	3.78	5.41	2.47	4.12	5.66	2.81	4.54	5.99	1.01	1.26	1.68	.53	.82	1.29	.84	1.18	1.69
600	450	70	42	1.06	2.60	4.21	1.07	2.70	4.22	1.52	3.23	4.67	1.88	3.11	4.50	1.72	2.99	4.43	2.01	3.32	4.80
600	450	70	38	1.26	2.87	4.74	1.37	3.06	4.84	1.91	3.68	5.38	1.53	2.69	3.75	1.32	2.52	3.63	1.55	2.80	3.95
600	450	70	35	2.02	3.88	5.81	2.22	4.16	6.01	2.85	4.88	6.65	1.23	2.06	3.06	1.07	1.95	2.99	1.35	2.28	3.37
600	450	80	48	1.18	2.51	4.19	1.16	2.57	4.16	1.63	3.13	4.64	1.57	2.87	4.05	1.31	2.67	3.89	1.55	2.94	4.21
600	450	80	44	1.47	2.86	4.80	1.54	3.01	4.87	2.11	3.67	5.44	1.33	2.58	3.42	1.03	2.32	3.21	1.21	2.54	3.48
600	450	80	40	2.42	4.07	6.07	2.58	4.32	6.24	3.25	5.07	6.90	.98	1.90	2.68	.73	1.69	2.52	.96	1.97	2.84
600	450	90	54	1.33	2.72	4.19	1.51	2.99	4.37	1.78	3.34	4.64	1.69	2.92	4.31	1.21	2.48	3.92	1.53	2.84	4.32
600	450	90	49	1.55	3.01	4.73	1.83	3.37	5.01	2.19	3.82	5.38	1.39	2.55	3.61	.86	2.06	3.17	1.12	2.37	3.52
600	450	90	45	2.51	4.23	6.02	2.88	4.69	6.39	3.34	5.23	6.85	1.14	1.98	2.98	.66	1.54	2.59	.98	1.90	3.00
600	600	70	38	1.61	3.31	5.08	1.74	3.53	5.21	2.31	4.18	5.78	2.80	4.60	6.58	2.64	4.49	6.51	2.92	4.82	6.88
600	600	70	35	1.77	3.53	5.56	2.00	3.84	5.79	2.66	4.59	6.45	2.22	3.96	5.61	2.00	3.79	5.49	2.24	4.07	5.81
600	600	70	31	3.10	5.13	7.22	3.43	5.53	7.54	4.19	6.38	8.30	1.76	3.18	4.76	1.60	3.06	4.69	1.88	3.39	5.07
600	600	80	44	1.97	3.45	5.29	2.06	3.63	5.39	2.67	4.32	5.99	2.39	4.28	6.04	2.14	4.08	5.88	2.37	4.35	6.20
600	600	80	40	2.20	3.74	5.84	2.39	4.02	6.04	3.09	4.81	6.74	1.96	3.79	5.22	1.66	3.53	5.00	1.83	3.75	5.27
600	600	80	36	3.74	5.55	7.71	4.03	5.92	8.00	4.82	6.80	8.79	1.41	2.91	4.28	1.16	2.71	4.12	1.39	2.98	4.44
600	600	90	49	2.06	3.61	5.23	2.36	4.00	5.54	2.76	4.48	5.94	2.61	4.41	6.39	2.13	3.98	6.00	2.44	4.34	6.41
600	600	90	45	2.16	3.78	5.67	2.57	4.27	6.07	3.06	4.85	6.56	2.09	3.83	5.48	1.55	3.34	5.03	1.81	3.65	5.39
600	600	90	40	3.76	5.63	7.58	4.26	6.22	8.08	4.84	6.89	8.67	1.62	3.04	4.62	1.14	2.60	4.23	1.46	2.96	4.64

TABLE F-3C. TOTAL CO EMITTED ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 5*5

INTERSECTION ENVIRONMENT				MINOR STREET									MAJOR STREET								
				LEFT TURNS LOW LEVEL			LEFT TURNS MEDIUM LEVEL			LEFT TURNS HIGH LEVEL			LEFT TURNS LOW LEVEL			LEFT TURNS MEDIUM LEVEL			LEFT TURNS HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	1.43	1.75	1.87	.94	1.34	1.38	.88	1.37	1.32	.60	.89	1.52	.30	.64	1.32	.45	.84	1.56
300	300	50	25	1.21	1.59	1.98	.81	1.28	1.58	.85	1.40	1.62	1.00	1.24	1.54	.65	.93	1.28	.75	1.07	1.46
300	300	50	22	.85	1.49	1.94	.55	1.28	1.64	.68	1.49	1.77	.91	.81	1.05	.61	.56	.84	.75	.75	1.08
300	300	60	33	1.56	1.66	1.86	1.03	1.22	1.33	1.01	1.28	1.31	.95	1.33	1.74	.56	.99	1.44	.66	1.12	1.63
300	300	60	30	1.32	1.48	1.94	.88	1.14	1.51	.96	1.29	1.58	1.55	1.87	1.95	1.11	1.47	1.60	1.15	1.56	1.73
300	300	60	27	1.14	1.56	2.08	.80	1.31	1.75	.97	1.56	1.91	1.38	1.37	1.39	.99	1.03	1.09	1.09	1.16	1.28
300	300	70	38	1.52	1.69	1.68	1.20	1.46	1.36	.97	1.31	1.13	1.04	1.34	1.97	.43	.77	1.44	.60	.99	1.71
300	300	70	35	1.13	1.36	1.61	.90	1.23	1.38	.77	1.17	1.25	1.57	1.80	2.11	.90	1.18	1.53	1.03	1.35	1.74
300	300	70	31	.91	1.40	1.71	.78	1.36	1.58	.74	1.40	1.54	1.54	1.45	1.68	.92	.87	1.16	1.10	1.10	1.43
300	450	50	25	.94	1.42	1.71	.58	1.14	1.34	.64	1.29	1.41	.90	1.78	2.99	.61	1.53	2.79	.75	1.72	3.03
300	450	50	22	.84	1.39	1.93	.57	1.20	1.66	.73	1.45	1.82	1.21	2.03	2.91	.86	1.72	2.65	.95	1.86	2.84
300	450	50	20	.58	1.38	1.99	.40	1.29	1.82	.66	1.63	2.07	.89	1.38	2.20	.60	1.13	2.00	.74	1.32	2.24
300	450	60	30	1.21	1.47	1.83	.80	1.15	1.42	.90	1.34	1.52	1.25	2.21	3.20	.86	1.86	2.90	.95	2.00	3.09
300	450	60	27	1.15	1.48	2.10	.85	1.26	1.79	1.04	1.54	1.99	1.68	2.58	3.24	1.24	2.18	2.89	1.28	2.27	3.02
300	450	60	24	.99	1.57	2.25	.78	1.45	2.04	1.07	1.83	2.33	1.33	1.90	2.51	.94	1.56	2.21	1.04	1.70	2.40
300	450	70	35	1.02	1.36	1.50	.83	1.25	1.30	.72	1.22	1.20	1.42	2.30	3.51	.81	1.73	2.99	.99	1.95	3.26
300	450	70	31	.80	1.20	1.60	.70	1.19	1.50	.69	1.26	1.49	1.80	2.61	3.50	1.13	1.99	2.92	1.25	2.16	3.13
300	450	70	28	.61	1.26	1.73	.61	1.35	1.73	.69	1.52	1.81	1.57	2.06	2.88	.95	1.49	2.35	1.13	1.71	2.62
300	600	60	27	.73	1.37	1.81	.48	1.21	1.57	.68	1.48	1.76	1.08	2.54	4.34	.79	2.29	4.13	.93	2.48	4.37
300	600	60	24	.68	1.38	2.08	.53	1.31	1.93	.81	1.69	2.22	1.16	2.56	4.03	.81	2.26	3.77	.91	2.40	3.96
300	600	60	21	1.03	1.99	2.75	.97	2.02	2.70	1.35	2.49	3.08	.67	1.74	3.14	.37	1.49	2.94	.52	1.68	3.18
300	600	70	31	1.14	1.57	2.08	.87	1.37	1.80	1.09	1.68	2.03	1.27	2.81	4.39	.88	2.47	4.09	.98	2.61	4.28
300	600	70	28	1.13	1.62	2.40	.95	1.52	2.21	1.27	1.93	2.53	1.47	2.95	4.20	1.02	2.55	3.85	1.06	2.64	3.98
300	600	70	24	1.63	2.38	3.22	1.54	2.38	3.13	1.96	2.88	3.54	.88	2.03	3.22	.49	1.69	2.92	.58	1.83	3.11
300	600	80	36	.81	1.30	1.61	.74	1.32	1.54	.76	1.42	1.55	1.43	2.89	4.68	.81	2.32	4.16	.99	2.54	4.43
300	600	80	32	.66	1.22	1.78	.69	1.33	1.80	.80	1.53	1.92	1.53	2.93	4.40	.86	2.31	3.82	.99	2.48	4.04
300	600	80	28	1.16	1.97	2.60	1.28	2.18	2.72	1.49	2.47	2.93	1.04	2.11	3.51	.42	1.54	2.99	.60	1.76	3.26
450	300	50	30	1.27	2.36	3.00	.77	1.95	2.50	1.04	2.31	2.77	.49	.94	1.73	.24	.74	1.57	.43	.97	1.85
450	300	50	27	1.03	2.19	3.08	.62	1.87	2.67	.99	2.32	3.04	.86	1.25	1.71	.56	.99	1.50	.70	1.18	1.73
450	300	50	25	.92	2.34	3.29	.61	2.11	2.98	1.07	2.66	3.45	.77	.83	1.23	.51	.62	1.07	.71	.86	1.35
450	300	60	36	1.44	2.32	3.02	.90	1.87	2.48	1.21	2.26	2.79	.80	1.34	1.91	.46	1.04	1.66	.60	1.23	1.89
450	300	60	33	1.25	2.19	3.15	.81	1.84	2.71	1.21	2.33	3.12	1.31	1.79	2.03	.92	1.44	1.72	1.00	1.57	1.90
450	300	60	30	1.25	2.45	3.47	.90	2.19	3.13	1.40	2.78	3.63	1.21	1.36	1.54	.87	1.06	1.29	1.01	1.25	1.52
450	300	70	42	1.44	2.40	2.88	1.12	2.16	2.56	1.22	2.34	2.66	1.11	1.56	2.35	.54	1.03	1.87	.76	1.30	2.18
450	300	70	38	1.10	2.11	2.86	.87	1.97	2.63	1.06	2.25	2.82	1.59	1.98	2.44	.97	1.41	1.91	1.14	1.62	2.17
450	300	70	35	1.07	2.35	3.16	.94	2.30	3.02	1.23	2.67	3.31	1.62	1.68	2.08	1.05	1.16	1.60	1.27	1.43	1.92
450	450	60	33	.76	2.01	2.80	.38	1.72	2.43	.78	2.21	2.83	.90	1.93	3.31	.65	1.73	3.15	.84	1.97	3.43
450	450	60	30	.80	2.12	3.17	.52	1.93	2.89	1.01	2.51	3.38	1.06	2.03	3.07	.75	1.77	2.86	.89	1.96	3.09
450	450	60	27	.73	2.31	3.43	.55	2.21	3.24	1.14	2.89	3.83	.81	1.45	2.43	.56	1.25	2.27	.75	1.49	2.56
450	450	70	38	1.03	2.07	2.93	.62	1.74	2.52	1.05	2.26	2.95	1.13	2.25	3.40	.78	1.95	3.15	.92	2.13	3.38
450	450	70	35	1.12	2.23	3.35	.81	2.00	3.03	1.33	2.61	3.56	1.41	2.47	3.29	1.01	2.12	2.99	1.10	2.25	3.17
450	450	70	31	1.21	2.58	3.76	.99	2.44	3.54	1.61	3.15	4.16	1.10	1.83	2.60	.76	1.53	2.34	.90	1.72	2.58
450	450	80	44	.93	1.94	2.59	.63	1.83	2.39	.85	2.13	2.61	1.46	2.49	3.86	.89	1.97	3.38	1.11	2.24	3.70
450	450	80	40	.79	1.97	2.88	.69	1.95	2.77	1.01	2.35	3.09	1.69	2.66	3.70	1.06	2.08	3.17	1.23	2.30	3.43
450	450	80	36	.89	2.33	3.30	.88	2.40	3.28	1.30	2.90	3.70	1.49	2.13	3.12	.92	1.61	2.64	1.14	1.88	2.95
450	600	70	35	.95	2.37	3.32	.70	2.20	3.06	1.22	2.81	3.59	1.42	3.04	5.00	1.17	2.84	4.84	1.37	3.08	5.12
450	600	70	31	1.02	2.50	3.71	.87	2.43	3.56	1.49	3.14	4.18	1.37	2.93	4.55	1.07	2.67	4.34	1.21	2.85	4.57
450	600	70	28	1.64	3.38	4.65	1.58	3.41	4.59	2.30	4.21	5.31	.89	2.12	3.68	.63	1.91	3.52	.83	2.15	3.80
450	600	80	40	1.39	2.59	3.61	1.10	2.39	3.33	1.66	3.03	3.88	1.48	3.18	4.92	1.14	2.89	4.67	1.28	3.07	4.90
450	600	80	36	1.54	2.81	4.09	1.35	2.70	3.90	2.01	3.44	4.55	1.54	3.18	4.58	1.14	2.83	4.28	1.23	2.96	4.46
450	600	80	32	2.35	3.87	5.21	2.25	3.86	5.12	3.00	4.69	5.87	.96	2.27	3.62	.62	1.98	3.37	.76	2.16	3.60
450	600	90	45	1.04	2.31	3.11	.96	2.32	3.04	1.31	2.75	3.38	1.83	3.45	5.40	1.26	2.92	4.92	1.48	3.19	5.24
450	600	90	40	1.11	2.45	3.51	1.13	2.55	3.53	1.57	3.08	3.97	1.77	3.33	4.95	1.15	2.75	4.42	1.32	2.96	4.68
450	600	90	36	1.92	3.51	4.64	2.03	3.71	4.75	2.57	4.34	5.29	1.29	2.52	4.08	.72	1.99	3.60	.94	2.26	3.92
600	300	60	39	1.40	2.76	3.93	.98	2.43	3.51	1.00	2.53	3.53	.96	1.57	2.51	.75	1.41	2.40	.99	1.69	2.73
600	300	60	36	1.19	2.61	4.04	.87	2.37	3.71	.98	2.57	3.83	.95	1.49	2.11	.69	1.28	1.95	.87	1.51	2.22
600	300	60	33	1.70	3.38	4.87	1.47	3.24	4.64	1.68	3.53	4.85	.70	.92	1.48	.49	.76	1.36	.73	1.04	1.69
600	300	70	45	1.51	2.65	3.89	1.06	2.29	3.44	1.11	2.42	3.49	.94	1.63	2.36	.64	1.38	2.16	.83	1.61	2.43
600	300	70	42	1.35	2.56	4.05	.99	2.29	3.70	1.14	2.52	3.84	1.06	1.70	2.10	.71	1.39	1.84	.85	1.57	2.06
600	300	70	38	2.03	3.50	5.06	1.77	3.33	4.80	2.02	3.65	5.04	.79	1.10	1.44	.50	.85	1.23	.68	1.08	1.51
600	300	80	52	1.43	2.64	3.66	1.18	2.48	3.42	1.03	2.41	3.26	1.14	1.76	2.70	.62	1.28	2.27	.89	1.59	2.63
600	300	80	48	1.15	2.43	3.71	1.00	2.37	3.56	.94	2.39	3.50	1.26	1.81	2.43	.68	1.27	1.94	.90	1.54	2.25
600	300	80	44	1.85	3.39	4.73	1.80	3.42	4.68	1.83	3.54	4.71	1.11	1.33	1.89	.58	.85	1.45	.85	1.17	1.81
600	450	70	42	1.24	2.76	4.08	.95	2.55	3.79	1.09	2.78	3.93	1.71	2.90	4.43	1.50	2.74	4.31	1.74	3.02	4.64
600	450	70	38	1.31	2.89	4.47	1.11	2.78	4.28	1.35	3.10	4.51	1.52	2.65	3.86	1.26	2.44	3.69	1.45	2.67	3.96
600	450	70	35	1.93	3.77	5.42	1.82	3.75	5.31	2.16	4.17	5.65	1.05	1.85	2.99	.84	1.69	2.88	1.08	1.98	3.21
600	450	80	48	1.46	2.76	4.16	1.13	2.52	3.83	1.31	2.78	4.01	1.56	2.84	4.15	1.26	2.59	3.94	1.45	2.82	4.22
600	450	80	44	1.61	2.98	4.63	1.38	2.83	4.40	1.65	3.19	4.67	1.50	2.71	3.70	1.15	2.41	3.44	1.28	2.59	3.66
600	450	80	40	2.43	4.06	5.78	2.29	4.01	5.64	2.66	4.46	6.01	.97	1.86	2.78	.68	1.61	2.58	.86	1.84	2.85
600	450	90	54	1.17	2.54	3.73	1.05	2.51	3.61	1.02	2.56	3.57	1.86	3.05	4.58	1.33	2.57	4.15	1.60	2.89	4.51
600	450	90	49	1.26	2.70	4.14	1.24	2.76	4.12	1.30	2.91	4.18	1.73	2.86	4.06	1.15	2.33	3.57	1.36	2.59	3.88
600	450	90	45	2.09	3.78	5.29	2.16	3.94	5.36	2.32	4.19	5.52	1.31	2.11	3.25	.78	1.63	2.82	1.05	1.95	3.18
600	600	70	38	1.74	3.41	4.90	1.57	3.33	4.73	1.83	3.68	5.00	2.47	4.24	6.35	2.26	4.08	6.24	2.50	4.37	6.57
600	600	70	35	1.76	3.50	5.25	1.69	3.52	5.18	2.05	3.96	5.54	2.06	3.77	5.56	1.80	3.56	5.39	1.98	3.79	5.67
600	600	70	31	2.96	4.96	6.77	2.99	5.07	6.80	3.44	5.62	7.25	1.43	2.82	4.54	1.22	2.66	4.43	1.46	2.94	4.76
600	600	80	44	2.20	3.66	5.21	1.99	3.54	5.01	2.29	3.93	5.31	2.23	4.09	5.99	1.94	3.84	5.78	2.12	4.07	6.06
600	600	80	40	2.29	3.82	5.63	2.19	3.80	5.53	2.58	4.28	5.92	1.97	3.77	5.34	1.62	3.47	5.08	1.76	3.65	5.30
600	600	80	36	3.70	5.49	7.37	3.69	5.56	7.36	4.18	6.14	7.85	1.25	2.72	4.23	.96	2.47	4.02	1.14	2.70	4.30
600	600	90	49	1.85	3.39	4.73	1.86	3.48	4.73	1.95	3.65	4.83	2.62	4.40	6.51	2.10	3.92	6.08	2.37	4.23	6.44
600	600	90	45	1.83	3.43	5.03	1.93	3.61	5.13	2.12	3.89	5.32	2.27	3.99	5.77	1.69	3.45	5.28	1.91	3.71	5.59
600	600	90	40	3.29	5.14	6.81	3.49	5.43	7.01	3.77	5.80	7.29	1.63	3.02	4.74	1.11	2.54	4.31	1.38	2.86	4.67

TABLE F-3D. TOTAL CO EMITTED ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 6*4

INTERSECTION				MINOR STREET									MAJOR STREET								
ENVIRONMENT				LEFT TURNS									LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	1.28	1.80	2.29	.91	1.51	1.91	1.03	1.71	2.03	.33	1.40	2.46	.38	1.50	2.61	.61	1.77	2.93
300	300	50	25	1.08	1.66	2.41	.81	1.47	2.13	1.02	1.77	2.34	.35	1.36	2.10	.35	1.40	2.19	.53	1.63	2.46
300	300	50	22	.96	1.79	2.60	.78	1.70	2.42	1.08	2.09	2.73	.39	1.07	1.75	.44	1.17	1.89	.68	1.44	2.21
300	300	60	33	1.18	1.47	2.03	.77	1.15	1.63	.92	1.39	1.78	.78	1.93	2.78	.74	1.94	2.83	.92	2.16	3.10
300	300	60	30	.95	1.32	2.13	.64	1.09	1.82	.89	1.42	2.07	1.00	2.09	2.61	.91	2.04	2.61	1.03	2.21	2.83
300	300	60	27	1.00	1.63	2.51	.79	1.50	2.29	1.13	1.92	2.63	.96	1.72	2.18	.93	1.73	2.24	1.10	1.96	2.51
300	300	70	38	1.28	1.65	1.99	1.08	1.53	1.79	1.02	1.56	1.73	.77	1.84	2.91	.51	1.62	2.73	.77	1.93	3.09
300	300	70	35	.90	1.34	1.94	.80	1.32	1.84	.84	1.44	1.87	.92	1.93	2.66	.60	1.65	2.44	.81	1.91	2.74
300	300	70	31	.91	1.60	2.27	.91	1.68	2.26	1.04	1.90	2.40	1.03	1.70	2.38	.76	1.48	2.21	1.02	1.79	2.56
300	450	50	25	.90	1.57	2.22	.65	1.40	1.97	.89	1.73	2.21	.96	2.61	4.26	1.01	2.71	4.40	1.24	2.98	4.72
300	450	50	22	.82	1.55	2.46	.66	1.49	2.31	1.00	1.91	2.64	.88	2.47	3.79	.88	2.51	3.88	1.06	2.74	4.15
300	450	50	20	.78	1.78	2.75	.73	1.81	2.69	1.16	2.33	3.13	.70	1.96	3.22	.75	2.06	3.37	.99	2.34	3.69
300	450	60	30	.92	1.38	2.10	.64	1.18	1.81	.91	1.54	2.09	1.40	3.13	4.56	1.36	3.14	4.62	1.54	3.36	4.89
300	450	60	27	.89	1.41	2.39	.70	1.31	2.20	1.07	1.77	2.57	1.45	3.12	4.22	1.36	3.07	4.22	1.48	3.24	4.44
300	450	60	24	.95	1.73	2.78	.86	1.73	2.68	1.33	2.28	3.15	1.24	2.58	3.62	1.20	2.59	3.68	1.38	2.81	3.95
300	450	70	35	.87	1.40	1.91	.80	1.41	1.83	.87	1.57	1.90	1.48	3.13	4.78	1.21	2.91	4.60	1.47	3.21	4.95
300	450	70	31	.68	1.27	2.03	.70	1.37	2.05	.86	1.62	2.21	1.47	3.06	4.38	1.15	2.78	4.15	1.36	3.04	4.45
300	450	70	28	.71	1.56	2.39	.83	1.77	2.51	1.09	2.11	2.76	1.37	2.64	3.90	1.11	2.42	3.72	1.37	2.72	4.07
300	600	60	27	.78	1.61	2.41	.65	1.57	2.29	1.02	2.02	2.66	1.55	3.78	6.02	1.60	3.88	6.16	1.84	4.16	6.48
300	600	60	24	.74	1.64	2.71	.71	1.70	2.68	1.18	2.24	3.14	1.25	3.42	5.33	1.25	3.47	5.42	1.43	3.69	5.69
300	600	60	21	1.32	2.48	3.61	1.39	2.63	3.68	1.95	3.27	4.23	.89	2.73	4.58	.94	2.83	4.72	1.17	3.11	5.04
300	600	70	31	.95	1.57	2.45	.80	1.50	2.29	1.20	1.98	2.69	1.84	4.15	6.17	1.80	4.16	6.22	1.98	4.38	6.49
300	600	70	28	.96	1.65	2.78	.90	1.67	2.72	1.40	2.25	3.22	1.65	3.90	5.59	1.56	3.86	5.59	1.68	4.03	5.81
300	600	70	24	1.69	2.63	3.83	1.73	2.75	3.87	2.32	3.43	4.46	1.20	3.12	4.75	1.16	3.13	4.80	1.34	3.36	5.07
300	600	80	36	.76	1.45	2.11	.81	1.58	2.16	1.00	1.86	2.35	1.89	4.13	6.36	1.63	3.91	6.19	1.89	4.22	6.54
300	600	80	32	.63	1.38	2.30	.77	1.61	2.45	1.06	1.98	2.74	1.62	3.79	5.69	1.30	3.52	5.47	1.51	3.77	5.77
300	600	80	28	1.36	2.37	3.35	1.60	2.69	3.59	1.98	3.16	3.98	1.26	3.10	4.94	.99	2.88	4.77	1.25	3.19	5.12
450	300	50	30	1.30	2.59	3.58	.92	2.29	3.20	1.37	2.83	3.65	.50	1.73	2.95	.60	1.87	3.15	.88	2.20	3.51
450	300	50	27	1.08	2.43	3.68	.79	2.23	3.40	1.34	2.86	3.94	.49	1.66	2.56	.54	1.75	2.69	.76	2.02	3.01
450	300	50	25	1.20	2.81	4.13	1.01	2.71	3.94	1.65	3.44	4.58	.53	1.37	2.21	.63	1.52	2.40	.91	1.84	2.77
450	300	60	36	1.23	2.30	3.37	.81	1.98	2.95	1.30	2.54	3.44	.92	2.23	3.23	.92	2.28	3.33	1.15	2.55	3.65
450	300	60	33	1.06	2.20	3.52	.74	1.97	3.20	1.32	2.63	3.78	1.04	2.29	2.97	1.00	2.29	3.02	1.17	2.51	3.28
450	300	60	30	1.29	2.69	4.07	1.07	2.55	3.85	1.74	3.31	4.52	1.08	2.00	2.62	1.09	2.06	2.72	1.31	2.33	3.04
450	300	70	42	1.37	2.52	3.37	1.17	2.40	3.16	1.44	2.76	3.44	1.12	2.35	3.57	.90	2.17	3.44	1.21	2.53	3.84
450	300	70	38	1.05	2.26	3.37	.94	2.24	3.26	1.31	2.69	3.63	1.23	2.39	3.29	.95	2.16	3.11	1.21	2.46	3.45
450	300	70	35	1.25	2.72	3.90	1.24	2.80	3.88	1.71	3.35	4.35	1.39	2.23	3.06	1.17	2.05	2.93	1.48	2.41	3.33
450	450	60	33	.88	2.33	3.48	.63	2.16	3.23	1.20	2.82	3.80	1.23	3.04	4.85	1.33	3.19	5.04	1.61	3.51	5.41
450	450	60	30	.95	2.46	3.87	.79	2.39	3.71	1.46	3.14	4.38	1.01	2.76	4.24	1.06	2.85	4.38	1.28	3.12	4.69
450	450	60	27	1.11	2.88	4.36	1.04	2.90	4.29	1.81	3.75	5.06	.90	2.32	3.74	1.00	2.46	3.93	1.27	2.79	4.30
450	450	70	38	.92	2.15	3.37	.63	1.95	3.08	1.23	2.64	3.69	1.56	3.45	5.04	1.57	3.51	5.14	1.79	3.78	5.46
450	450	70	35	1.03	2.33	3.81	.84	2.22	3.62	1.54	3.01	4.32	1.46	3.29	4.56	1.42	3.29	4.60	1.59	3.51	4.87
450	450	70	31	1.35	2.91	4.45	1.25	2.90	4.36	2.05	3.78	5.15	1.29	2.79	4.00	1.30	2.85	4.10	1.52	3.12	4.41
450	450	80	44	.86	2.16	3.17	.77	2.17	3.09	1.17	2.65	3.49	1.79	3.60	5.41	1.57	3.43	5.28	1.88	3.78	5.68
450	450	80	40	.84	2.21	3.48	.86	2.31	3.49	1.35	2.89	3.99	1.64	3.39	4.87	1.37	3.16	4.69	1.62	3.46	5.03
450	450	80	36	1.17	2.80	4.13	1.28	2.99	4.24	1.87	3.67	4.83	1.58	3.00	4.42	1.36	2.82	4.29	1.67	3.18	4.69
450	600	70	35	1.17	2.78	4.09	1.04	2.73	3.96	1.74	3.52	4.66	2.18	4.57	6.96	2.27	4.71	7.15	2.55	5.04	7.52
450	600	70	31	1.27	2.94	4.51	1.23	2.99	4.47	2.02	3.87	5.27	1.74	4.07	6.14	1.79	4.16	6.27	2.01	4.43	6.59
450	600	70	28	2.11	4.05	5.68	2.17	4.19	5.74	3.06	5.17	6.63	1.39	3.40	5.40	1.49	3.54	5.59	1.77	3.86	5.96
450	600	80	40	1.37	2.77	4.15	1.21	2.69	3.99	1.94	3.51	4.72	2.33	4.81	6.98	2.34	4.86	7.08	2.56	5.13	7.40
450	600	80	36	1.55	3.01	4.65	1.48	3.02	4.58	2.31	3.94	5.41	2.01	4.42	6.26	1.96	4.42	6.31	2.13	4.64	6.57
450	600	80	32	2.58	4.30	6.00	2.61	4.41	6.03	3.53	5.42	6.95	1.57	3.65	5.44	1.57	3.71	5.54	1.80	3.98	5.85
450	600	90	45	1.16	2.62	3.79	1.20	2.75	3.83	1.72	3.36	4.36	2.58	4.97	7.36	2.36	4.80	7.24	2.67	5.15	7.64
450	600	90	40	1.25	2.78	4.21	1.39	3.01	4.35	2.01	3.71	4.97	2.14	4.47	6.53	1.87	4.24	6.35	2.12	4.54	6.70
450	600	90	36	2.29	4.08	5.57	2.52	4.40	5.80	3.24	5.20	6.52	1.79	3.80	5.80	1.57	3.62	5.67	1.88	3.98	6.07
600	300	60	39	1.17	2.72	4.25	.87	2.51	3.95	1.06	2.79	4.14	1.25	2.64	4.02	1.40	2.83	4.26	1.72	3.20	4.67
600	300	60	36	.98	2.59	4.38	.77	2.48	4.18	1.06	2.85	4.47	.86	2.18	3.24	.95	2.32	3.43	1.22	2.64	3.79
600	300	60	33	1.72	3.59	5.45	1.61	3.57	5.34	2.00	4.04	5.72	.75	1.75	2.74	.90	1.94	2.98	1.22	2.31	3.39
600	300	70	45	1.04	2.38	3.98	.71	2.13	3.65	.94	2.44	3.87	1.33	2.80	3.97	1.39	2.90	4.11	1.66	3.22	4.48
600	300	70	42	.90	2.30	4.16	.67	2.15	3.93	.99	2.56	4.25	1.08	2.48	3.32	1.08	2.53	3.42	1.30	2.79	3.72
600	300	70	38	1.82	3.48	5.40	1.68	3.42	5.26	2.09	3.93	5.68	.95	2.02	2.80	1.00	2.12	2.95	1.27	2.44	3.31
600	300	80	52	1.09	2.50	3.89	.97	2.47	3.76	.99	2.57	3.78	1.44	2.83	4.21	1.27	2.70	4.13	1.62	3.10	4.57
600	300	80	48	.84	2.31	3.96	.81	2.37	3.93	.93	2.57	4.04	1.18	2.50	3.55	.95	2.32	3.42	1.25	2.66	3.81
600	300	80	44	1.77	3.50	5.21	1.84	3.65	5.27	2.05	3.95	5.48	1.16	2.16	3.15	.99	2.03	3.07	1.34	2.43	3.51
600	450	70	42	1.10	2.81	4.50	.93	2.73	4.33	1.25	3.13	4.65	2.33	4.29	6.26	2.47	4.48	6.50	2.79	4.85	6.91
600	450	70	38	1.19	2.97	4.91	1.11	2.97	4.84	1.53	3.47	5.25	1.76	3.67	5.30	1.85	3.80	5.49	2.12	4.12	5.85
600	450	70	35	2.04	4.07	6.09	2.06	4.18	6.10	2.57	4.77	6.61	1.42	3.00	4.58	1.57	3.19	4.82	1.89	3.56	5.23
600	450	80	48	1.08	2.58	4.34	.88	2.46	4.13	1.23	2.90	4.48	2.28	4.33	6.08	2.33	4.43	6.22	2.60	4.74	6.59
600	450	80	44	1.26	2.82	4.84	1.15	2.79	4.73	1.59	3.33	5.17	1.83	3.82	5.24	1.83	3.87	5.34	2.05	4.13	5.65
600	450	80	40	2.31	4.13	6.21	2.29	4.20	6.19	2.83	4.83	6.74	1.45	3.11	4.47	1.50	3.21	4.61	1.77	3.52	4.97
600	450	90	54	.93	2.50	4.05	.94	2.59	4.05	1.08	2.82	4.19	2.48	4.45	6.41	2.30	4.32	6.33	2.66	4.72	6.77
600	450	90	49	1.05	2.68	4.48	1.14	2.86	4.58	1.38	3.19	4.82	1.96	3.87	5.51	1.74	3.69	5.37	2.04	4.03	5.77
600	450	90	45	2.10	3.99	5.86	2.30	4.27	6.05	2.63	4.69	6.39	1.68	3.26	4.84	1.51	3.13	4.76	1.86	3.53	5.20
600	600	70	38	1.69	3.57	5.41	1.65	3.60	5.37	2.09	4.13	5.81	3.50	6.05	8.60	3.65	6.24	8.84	3.97	6.61	9.25
600	600	70	35	1.74	3.68	5.78	1.79	3.81	5.83	2.33	4.43	6.37	2.71	5.20	7.42	2.80	5.34	7.61	3.07	5.65	7.97
600	600	70	31	3.17	5.37	7.54	3.32	5.60	7.68	3.95	6.32	8.31	2.22	4.38	6.54	2.37	4.57	6.78	2.69	4.94	7.19
600	600	80	44	1.92	3.57	5.49	1.84	3.58	5.41	2.31	4.14	5.89	3.37	6.00	8.33	3.42	6.10	8.48	3.69	6.42	8.84
600	600	80	40	2.03	3.76	5.93	2.05	3.86	5.95	2.62	4.51	6.52	2.73	5.30	7.30	2.73	5.35	7.40	2.94	5.61	7.70
600	600	80	36	3.67	5.65	7.89	3.78	5.85	8.00	4.45	6.60	8.67	2.14	4.39	6.33	2.20	4.49	6.48	2.47	4.80	6.84
600	600	90	49	1.71	3.44	5.14	1.84	3.65	5.27	2.11	4.00	5.54	3.66	6.21	8.76	3.48	6.08	8.68	3.84	6.48	9.12
600	600	90	45	1.71	3.50	5.46	1.93	3.81	5.68	2.29	4.26	6.05	2.93	5.41	7.64	2.70	5.23	7.50	3.00	5.58	7.89
600	600	90	40	3.40	5.45	7.47	3.72	5.85	7.79	4.17	6.40	8.25	2.42	4.59	6.75	2.25	4.46	6.66	2.60	4.86	7.11

TABLE F-3E. TOTAL CO EMITTED ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS LOW LEVEL			MINOR STREET LEFT TURNS MEDIUM LEVEL			MINOR STREET LEFT TURNS HIGH LEVEL			MAJOR STREET LEFT TURNS LOW LEVEL			MAJOR STREET LEFT TURNS MEDIUM LEVEL			MAJOR STREET LEFT TURNS HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	1.20	1.65	2.32	.80	1.33	1.92	.89	1.50	2.01	.68	1.61	2.71	.56	1.54	2.68	.62	1.64	2.83
300	300	50	25	1.01	1.52	2.46	.71	1.30	2.15	.89	1.56	2.33	.68	1.55	2.31	.51	1.42	2.23	.51	1.47	2.33
300	300	50	22	.89	1.66	2.66	.68	1.53	2.45	.96	1.89	2.72	.74	1.28	1.99	.62	1.21	1.96	.68	1.31	2.11
300	300	60	33	1.18	1.41	2.16	.75	1.06	1.72	.87	1.26	1.84	.96	1.97	2.85	.75	1.81	2.73	.75	1.86	2.83
300	300	60	30	.97	1.26	2.27	.63	1.00	1.93	.84	1.30	2.14	1.16	2.10	2.66	.89	1.89	2.48	.85	1.89	2.53
300	300	60	27	1.03	1.58	2.65	.78	1.41	2.40	1.09	1.81	2.71	1.14	1.77	2.25	.93	1.60	2.14	.94	1.65	2.23
300	300	70	38	1.53	1.82	2.36	1.30	1.68	2.13	1.21	1.68	2.04	.78	1.71	2.80	.34	1.32	2.46	.43	1.45	2.64
300	300	70	35	1.16	1.52	2.32	1.03	1.47	2.18	1.04	1.57	2.19	.90	1.77	2.54	.41	1.32	2.14	.45	1.41	2.27
300	300	70	31	1.18	1.80	2.65	1.14	1.85	2.62	1.24	2.03	2.72	1.03	1.57	2.28	.60	1.18	1.93	.68	1.31	2.11
300	450	50	25	.77	1.37	2.21	.49	1.18	1.93	.70	1.47	2.14	1.16	2.67	4.34	1.04	2.59	4.32	1.10	2.70	4.47
300	450	50	22	.70	1.36	2.46	.51	1.26	2.28	.82	1.66	2.58	1.06	2.50	3.86	.88	2.38	3.78	.89	2.43	3.87
300	450	50	20	.67	1.60	2.76	.59	1.59	2.67	.99	2.08	3.07	.90	2.02	3.31	.78	1.95	3.28	.84	2.05	3.43
300	450	60	30	.88	1.26	2.17	.57	1.04	1.86	.81	1.37	2.10	1.42	3.02	4.48	1.21	2.85	4.36	1.22	2.91	4.46
300	450	60	27	.85	1.30	2.47	.64	1.17	2.26	.98	1.60	2.60	1.45	2.98	4.11	1.19	2.76	3.94	1.14	2.76	3.99
300	450	60	24	.93	1.64	2.87	.81	1.60	2.75	1.24	2.12	3.18	1.27	2.47	3.54	1.06	2.31	3.42	1.06	2.36	3.52
300	450	70	35	1.08	1.53	2.23	.97	1.51	2.12	1.01	1.64	2.16	1.33	2.84	4.52	.89	2.45	4.17	.98	2.59	4.36
300	450	70	31	.89	1.41	2.36	.88	1.48	2.35	1.01	1.70	2.48	1.30	2.75	4.10	.81	2.30	3.70	.84	2.38	3.83
300	450	70	28	.93	1.71	2.72	1.02	1.88	2.81	1.24	2.19	3.04	1.23	2.35	3.64	.79	1.96	3.29	.88	2.09	3.48
300	600	60	27	.60	1.36	2.36	.45	1.29	2.20	.78	1.71	2.54	1.81	3.91	6.17	1.69	3.83	6.14	1.75	3.94	6.29
300	600	60	24	.58	1.40	2.66	.52	1.43	2.60	.95	1.94	3.03	1.49	3.52	5.45	1.32	3.39	5.37	1.32	3.44	5.47
300	600	60	21	1.16	2.25	3.57	1.20	2.37	3.60	1.73	2.98	4.13	1.15	2.86	4.73	1.03	2.78	4.70	1.09	2.89	4.85
300	600	70	31	.86	1.41	2.48	.68	1.31	2.29	1.04	1.76	2.66	1.93	4.10	6.15	1.72	3.94	6.03	1.72	3.99	6.13
300	600	70	28	.88	1.49	2.82	.79	1.49	2.73	1.25	2.04	3.19	1.72	3.83	5.55	1.45	3.61	5.38	1.40	3.61	5.42
300	600	70	24	1.62	2.49	3.88	1.62	2.57	3.88	2.18	3.22	4.44	1.29	3.07	4.73	1.08	2.91	4.61	1.08	2.96	4.71
300	600	80	36	.91	1.53	2.38	.93	1.64	2.40	1.09	1.88	2.56	1.81	3.91	6.17	1.38	3.52	5.82	1.46	3.65	6.00
300	600	80	32	.79	1.47	2.58	.91	1.67	2.70	1.16	2.01	2.95	1.51	3.54	5.48	1.02	3.10	5.08	1.06	3.18	5.21
300	600	80	28	1.53	2.46	3.64	1.74	2.76	3.85	2.09	3.20	4.20	1.18	2.88	4.75	.74	2.49	4.41	.83	2.62	4.59
450	300	50	30	1.26	2.47	3.66	.84	2.15	3.25	1.26	2.65	3.66	.74	1.83	3.08	.67	1.80	3.10	.78	1.95	3.30
450	300	50	27	1.04	2.32	3.77	.73	2.09	3.45	1.24	2.69	3.96	.71	1.74	2.66	.58	1.66	2.63	.64	1.75	2.77
450	300	50	25	1.17	2.71	4.22	.95	2.58	4.00	1.56	3.27	4.61	.78	1.47	2.34	.70	1.45	2.36	.81	1.60	2.55
450	300	60	36	1.27	2.28	3.53	.83	1.92	3.08	1.28	2.45	3.53	.98	2.16	3.19	.82	2.04	3.12	.87	2.13	3.26
450	300	60	33	1.11	2.18	3.69	.76	1.91	3.34	1.31	2.55	3.89	1.09	2.20	2.91	.87	2.02	2.78	.87	2.07	2.87
450	300	60	30	1.35	2.67	4.25	1.09	2.51	4.00	1.74	3.23	4.64	1.15	1.93	2.58	.99	1.81	2.51	1.04	1.91	2.65
450	300	70	42	1.66	2.74	3.77	1.42	2.58	3.54	1.67	2.91	3.78	1.02	2.10	3.36	.63	1.76	3.06	.76	1.94	3.28
450	300	70	38	1.34	2.48	3.78	1.20	2.43	3.64	1.54	2.85	3.98	1.10	2.12	3.05	.65	1.72	2.70	.74	1.85	2.87
450	300	70	35	1.56	2.95	4.32	1.51	3.00	4.27	1.95	3.51	4.71	1.29	1.98	2.85	.90	1.64	2.55	1.03	1.82	2.78
450	450	60	33	.79	2.17	3.51	.51	1.97	3.23	1.05	2.60	3.77	1.32	2.99	4.83	1.25	2.97	4.85	1.36	3.12	5.05
450	450	60	30	.87	2.31	3.91	.67	2.20	3.72	1.31	2.93	4.36	1.08	2.68	4.19	.95	2.60	4.16	1.00	2.70	4.30
450	450	60	27	1.03	2.73	4.40	.94	2.72	4.30	1.67	3.54	5.04	.99	2.27	3.71	.91	2.24	3.73	1.02	2.39	3.93
450	450	70	38	.91	2.07	3.49	.59	1.84	3.17	1.17	2.50	3.74	1.48	3.23	4.85	1.31	3.11	4.78	1.37	3.21	4.92
450	450	70	35	1.03	2.26	3.93	.81	2.12	3.71	1.48	2.88	4.38	1.36	3.05	4.34	1.14	2.87	4.21	1.14	2.92	4.30
450	450	70	31	1.36	2.85	4.58	1.23	2.80	4.45	2.00	3.66	5.22	1.21	2.57	3.80	1.04	2.45	3.73	1.10	2.55	3.87
450	450	80	44	1.09	2.33	3.53	.98	2.30	3.42	1.35	2.76	3.78	1.54	3.21	5.04	1.14	2.86	4.74	1.28	3.04	4.97
450	450	80	40	1.09	2.39	3.84	1.07	2.46	3.83	1.53	3.00	4.29	1.36	2.97	4.48	.92	2.57	4.13	1.00	2.70	4.30
450	450	80	36	1.42	2.98	4.50	1.50	3.14	4.58	2.06	3.79	5.14	1.32	2.60	4.05	.93	2.26	3.75	1.07	2.44	3.98
450	600	70	35	1.03	2.57	4.07	.87	2.49	3.91	1.54	3.25	4.58	2.33	4.58	7.00	2.25	4.55	7.02	2.36	4.70	7.21
450	600	70	31	1.14	2.74	4.50	1.07	2.76	4.43	1.83	3.60	5.19	1.87	4.06	6.15	1.74	3.98	6.12	1.79	4.08	6.26
450	600	70	28	1.99	3.85	5.68	2.02	3.97	5.71	2.88	4.91	6.56	1.54	3.41	5.44	1.47	3.38	5.46	1.58	3.53	5.65
450	600	80	40	1.32	2.64	4.22	1.12	2.53	4.02	1.82	3.32	4.72	2.31	4.65	6.85	2.15	4.53	6.78	2.20	4.63	6.92
450	600	80	36	1.50	2.89	4.72	1.40	2.88	4.62	2.20	3.76	5.42	1.96	4.23	6.11	1.74	4.06	5.98	1.74	4.11	6.07
450	600	80	32	2.54	4.19	6.09	2.54	4.27	6.08	3.43	5.25	6.97	1.55	3.49	5.30	1.38	3.37	5.23	1.43	3.47	5.37
450	600	90	45	1.35	2.74	4.10	1.36	2.84	4.11	1.85	3.42	4.60	2.39	4.64	7.06	2.00	4.30	6.76	2.13	4.48	6.99
450	600	90	40	1.45	2.91	4.53	1.56	3.11	4.64	2.15	3.78	5.22	1.92	4.11	6.21	1.48	3.71	5.85	1.56	3.84	6.03
450	600	90	36	2.50	4.21	5.89	2.70	4.50	6.10	3.38	5.27	6.78	1.60	3.46	5.49	1.21	3.12	5.19	1.34	3.30	5.42
600	300	60	39	1.32	2.80	4.52	.99	2.56	4.19	1.16	2.81	4.36	1.38	2.63	4.04	1.36	2.65	4.11	1.51	2.84	4.35
600	300	60	36	1.14	2.68	4.66	.91	2.54	4.43	1.16	2.88	4.69	.97	2.15	3.24	.89	2.12	3.25	.99	2.26	3.44
600	300	60	33	1.89	3.69	5.74	1.75	3.64	5.60	2.11	4.08	5.95	.88	1.74	2.76	.86	1.76	2.83	1.01	1.95	3.07
600	300	70	45	1.28	2.55	4.34	.92	2.27	3.97	1.11	2.55	4.17	1.29	2.62	3.82	1.17	2.55	3.79	1.27	2.69	3.98
600	300	70	42	1.15	2.48	4.53	.88	2.30	4.26	1.17	2.68	4.55	1.01	2.28	3.15	.84	2.15	3.07	.89	2.24	3.20
600	300	70	38	2.07	3.66	5.77	1.90	3.58	5.60	2.29	4.05	5.99	.90	1.84	2.65	.79	1.77	2.62	.88	1.91	2.81
600	300	80	52	1.58	2.92	4.49	1.43	2.85	4.34	1.41	2.92	4.32	1.23	2.47	3.89	.88	2.17	3.63	1.06	2.40	3.90
600	300	80	48	1.33	2.73	4.57	1.28	2.76	4.51	1.36	2.93	4.59	.94	2.12	3.21	.54	1.77	2.90	.67	1.94	3.12
600	300	80	44	2.27	3.93	5.82	2.31	4.05	5.86	2.48	4.32	6.04	.95	1.81	2.83	.60	1.51	2.57	.78	1.73	2.85
600	450	70	42	1.21	2.85	4.73	1.01	2.73	4.52	1.29	3.10	4.81	2.30	4.13	6.13	2.28	4.15	6.19	2.43	4.35	6.43
600	450	70	38	1.31	3.01	5.15	1.20	2.99	5.04	1.58	3.46	5.42	1.71	3.48	5.15	1.63	3.44	5.16	1.73	3.59	5.35
600	450	70	35	2.16	4.13	6.33	2.15	4.20	6.31	2.63	4.76	6.79	1.40	2.84	4.45	1.37	2.86	4.51	1.53	3.06	4.75
600	450	80	48	1.28	2.70	4.65	1.04	2.55	4.41	1.36	2.96	4.73	2.08	4.00	5.77	1.97	3.92	5.75	2.06	4.07	5.94
600	450	80	44	1.46	2.95	5.16	1.32	2.89	5.01	1.73	3.39	5.43	1.62	3.46	4.92	1.44	3.34	4.84	1.49	3.43	4.97
600	450	80	40	2.51	4.26	6.53	2.47	4.30	6.49	2.98	4.90	7.00	1.25	2.77	4.16	1.13	2.70	4.14	1.23	2.85	4.32
600	450	90	54	1.37	2.87	4.60	1.34	2.92	4.57	1.45	3.12	4.68	2.11	3.94	5.94	1.77	3.64	5.68	1.95	3.87	5.95
600	450	90	49	1.49	3.05	5.04	1.56	3.20	5.11	1.77	3.50	5.32	1.57	3.34	5.01	1.17	2.99	4.70	1.30	3.16	4.92
600	450	90	45	2.56	4.37	6.43	2.72	4.62	6.59	3.02	5.01	6.90	1.32	2.76	4.36	.97	2.46	4.11	1.15	2.68	4.38
600	600	70	38	1.75	3.55	5.59	1.68	3.56	5.51	2.09	4.06	5.92	3.54	5.95	8.53	3.51	5.97	8.60	3.67	6.17	8.84
600	600	70	35	1.81	3.67	5.97	1.83	3.78	5.99	2.33	4.37	6.49	2.73	5.08	7.33	2.65	5.04	7.34	2.75	5.19	7.53
600	600	70	31	3.25	5.37	7.73	3.36	5.57	7.84	3.96	6.26	8.45	2.26	4.28	6.47	2.23	4.30	6.54	2.39	4.50	6.78
600	600	80	44	2.06	3.65	5.75	1.95	3.62	5.64	2.39	4.15	6.09	3.24	5.73	8.09	3.12	5.66	8.07	3.22	5.80	8.25
600	600	80	40	2.19	3.84	6.20	2.17	3.91	6.19	2.71	4.53	6.73	2.57	5.00	7.04	2.40	4.88	6.96	2.44	4.97	7.09
600	600	80	36	3.83	5.74	8.17	3.91	5.91	8.25	4.55	6.63	8.89	2.01	4.12	6.09	1.89	4.04	6.06	1.99	4.19	6.25
600	600	90	49	2.10	3.76	5.65	2.20	3.94	5.75	2.43	4.26	5.98	3.35	5.77	8.34	3.01	5.47	8.09	3.19	5.69	8.36
600	600	90	45	2.11	3.83	5.98	2.30	4.10	6.17	2.63	4.52	6.50	2.60	4.95	7.20	2.20	4.59	6.89	2.33	4.77	7.11
600	600	90	40	3.80	5.78	8.00	4.09	6.15	8.29	4.52	6.67	8.71	2.12	4.14	6.33	1.78	3.84	6.08	1.96	4.07	6.35

TABLE F-3F. TOTAL CO EMITTED ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*5

INTERSECTION				MINOR STREET									MAJOR STREET								
ENVIRONMENT				LEFT TURNS									LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	1.70	2.12	2.52	1.00	1.50	1.81	.78	1.37	1.60	.70	1.60	2.84	.54	1.48	2.76	.55	1.54	2.87
300	300	50	25	1.38	1.86	2.51	.77	1.34	1.91	.65	1.30	1.79	.87	1.71	2.62	.66	1.54	2.49	.62	1.54	2.54
300	300	50	22	1.12	1.87	2.58	.61	1.44	2.07	.59	1.50	2.05	.76	1.27	2.12	.60	1.15	2.05	.61	1.21	2.15
300	300	60	33	1.78	1.99	2.45	1.04	1.33	1.71	.86	1.24	1.53	1.15	2.13	3.15	.90	1.93	2.99	.86	1.93	3.04
300	300	60	30	1.44	1.70	2.43	.79	1.15	1.78	.71	1.15	1.70	1.52	2.44	3.13	1.21	2.18	2.91	1.12	2.13	2.91
300	300	60	27	1.36	1.89	2.67	.81	1.43	2.13	.82	1.52	2.14	1.34	1.93	2.56	1.08	1.72	2.39	1.04	1.73	2.45
300	300	70	38	1.70	1.97	2.22	1.17	1.53	1.69	.78	1.22	1.30	1.15	2.05	3.28	.66	1.61	2.89	.71	1.70	3.02
300	300	70	35	1.20	1.54	2.04	.76	1.19	1.61	.47	.98	1.32	1.44	2.28	3.18	.90	1.79	2.74	.89	1.82	2.82
300	300	70	31	1.08	1.68	2.25	.74	1.42	1.91	.54	1.31	1.71	1.40	1.91	2.75	.92	1.47	2.36	.96	1.56	2.50
300	450	50	25	1.22	1.80	2.35	.64	1.30	1.77	.55	1.30	1.68	1.24	2.72	4.54	1.08	2.60	4.47	1.09	2.66	4.57
300	450	50	22	1.01	1.66	2.47	.53	1.26	1.98	.53	1.35	1.99	1.31	2.73	4.22	1.09	2.56	4.10	1.05	2.57	4.15
300	450	50	20	.86	1.76	2.64	.47	1.45	2.25	.57	1.64	2.35	.99	2.08	3.51	.82	1.96	3.43	.83	2.02	3.54
300	450	60	30	1.43	1.79	2.42	.82	1.27	1.80	.76	1.29	1.75	1.68	3.25	4.85	1.42	3.04	4.68	1.38	3.04	4.73
300	450	60	27	1.27	1.70	2.59	.76	1.27	2.07	.79	1.39	2.11	1.88	3.38	4.65	1.57	3.12	4.44	1.48	3.07	4.43
300	450	60	24	1.21	1.90	2.85	.79	1.56	2.42	.92	1.78	2.56	1.52	2.70	3.91	1.27	2.49	3.74	1.23	2.49	3.80
300	450	70	35	1.20	1.63	2.04	.79	1.31	1.64	.53	1.13	1.37	1.76	3.24	5.06	1.28	2.80	4.67	1.32	2.89	4.80
300	450	70	31	.87	1.37	2.04	.56	1.15	1.73	.39	1.06	1.56	1.90	3.32	4.81	1.36	2.83	4.36	1.35	2.86	4.45
300	450	70	28	.78	1.54	2.27	.57	1.41	2.06	.49	1.42	1.98	1.66	2.75	4.18	1.18	2.31	3.79	1.22	2.40	3.92
300	600	60	27	1.00	1.74	2.45	.55	1.37	2.00	.58	1.49	2.03	1.74	3.81	6.21	1.58	3.69	6.14	1.59	3.75	6.24
300	600	60	24	.84	1.65	2.62	.48	1.37	2.26	.61	1.59	2.39	1.59	3.59	5.67	1.37	3.42	5.54	1.33	3.43	5.59
300	600	60	21	1.30	2.36	3.40	1.03	2.18	3.13	1.26	2.49	3.36	1.08	2.76	4.77	.92	2.64	4.70	.93	2.70	4.80
300	600	70	31	1.37	1.89	2.67	.88	1.49	2.19	.95	1.64	2.25	2.03	4.18	6.36	1.77	3.97	6.20	1.73	3.98	6.25
300	600	70	28	1.25	1.84	2.88	.86	1.53	2.49	1.02	1.78	2.65	1.99	4.08	5.93	1.68	3.81	5.72	1.59	3.77	5.71
300	600	70	24	1.85	2.70	3.81	1.56	2.49	3.51	1.82	2.83	3.77	1.39	3.15	4.94	1.14	2.94	4.78	1.10	2.95	4.83
300	600	80	36	.99	1.58	2.15	.71	1.38	1.87	.56	1.33	1.73	2.09	4.15	6.55	1.61	3.72	6.16	1.65	3.81	6.30
300	600	80	32	.73	1.39	2.22	.54	1.29	2.03	.50	1.33	1.99	1.96	3.96	6.04	1.42	3.47	5.59	1.41	3.51	5.67
300	600	80	28	1.33	2.25	3.14	1.24	2.24	3.05	1.29	2.38	3.10	1.45	3.13	5.14	.97	2.69	4.75	1.01	2.78	4.88
450	300	50	30	1.55	2.75	3.65	.84	2.13	2.94	.96	2.33	3.06	.65	1.71	3.11	.54	1.64	3.08	.60	1.75	3.23
450	300	50	27	1.21	2.47	3.63	.59	1.94	3.01	.80	2.24	3.22	.79	1.79	2.85	.62	1.66	2.77	.63	1.72	2.87
450	300	50	25	1.21	2.73	3.95	.68	2.29	3.43	.99	2.68	3.73	.69	1.35	2.36	.57	1.28	2.33	.63	1.39	2.48
450	300	60	36	1.67	2.66	3.62	.93	2.00	2.88	1.08	2.23	3.03	1.07	2.21	3.38	.86	2.05	3.27	.86	2.10	3.36
450	300	60	33	1.38	2.42	3.65	.73	1.86	3.00	.97	2.19	3.25	1.34	2.42	3.27	1.08	2.20	3.10	1.03	2.20	3.14
450	300	60	30	1.48	2.79	4.08	.93	2.32	3.52	1.27	2.74	3.87	1.23	1.99	2.77	1.02	1.82	2.65	1.03	1.87	2.75
450	300	70	42	1.63	2.68	3.44	1.09	2.23	2.90	1.04	2.26	2.84	1.27	2.33	3.72	.84	1.94	3.38	.92	2.07	3.56
450	300	70	38	1.18	2.30	3.31	.74	1.94	2.87	.78	2.06	2.91	1.52	2.52	3.59	1.03	2.08	3.19	1.07	2.16	3.32
450	300	70	35	1.26	2.64	3.71	.91	2.38	3.37	1.05	2.59	3.50	1.54	2.21	3.21	1.10	1.82	2.87	1.19	1.95	3.05
450	450	60	33	1.04	2.40	3.46	.46	1.90	2.87	.70	2.22	3.11	1.30	2.94	4.91	1.18	2.87	4.89	1.24	2.97	5.04
450	450	60	30	.98	2.40	3.72	.49	2.00	3.23	.83	2.42	3.57	1.22	2.80	4.45	1.05	2.67	4.37	1.05	2.73	4.47
450	450	60	27	1.02	2.70	4.08	.62	2.39	3.68	1.05	2.90	4.12	.96	2.21	3.80	.84	2.14	3.77	.90	2.24	3.92
450	450	70	38	1.26	2.41	3.54	.64	1.87	2.91	.92	2.23	3.19	1.62	3.35	5.11	1.41	3.18	4.99	1.42	3.24	5.09
450	450	70	35	1.25	2.46	3.85	.73	2.02	3.32	1.10	2.47	3.69	1.67	3.33	4.77	1.41	3.12	4.59	1.36	3.12	4.64
450	450	70	31	1.45	2.91	4.36	1.02	2.57	3.93	1.48	3.12	4.40	1.35	2.69	4.06	1.14	2.53	3.94	1.15	2.58	4.04
450	450	80	44	1.02	2.23	3.14	.60	1.90	2.73	.67	2.05	2.80	1.85	3.49	5.47	1.42	3.10	5.13	1.51	3.24	5.31
450	450	80	40	.88	2.15	3.33	.56	1.92	3.01	.72	2.17	3.17	1.85	3.43	5.08	1.36	2.99	4.68	1.40	3.07	4.81
450	450	80	36	1.08	2.61	3.85	.86	2.48	3.63	1.11	2.82	3.89	1.64	2.89	4.48	1.20	2.50	4.13	1.29	2.64	4.31
450	600	70	35	1.24	2.75	3.97	.77	2.37	3.51	1.14	2.83	3.87	2.15	4.37	6.93	2.03	4.30	6.90	2.09	4.40	7.06
450	600	70	31	1.21	2.79	4.26	.84	2.50	3.90	1.30	3.05	4.36	1.86	4.02	6.26	1.69	3.90	6.17	1.70	3.95	6.27
450	600	70	28	1.93	3.77	5.31	1.66	3.58	5.04	2.21	4.22	5.59	1.37	3.20	5.37	1.25	3.13	5.34	1.31	3.23	5.49
450	600	80	40	1.63	2.93	4.22	1.13	2.52	3.72	1.53	3.00	4.12	2.30	4.61	6.95	2.09	4.45	6.83	2.10	4.50	6.93
450	600	80	36	1.68	3.04	4.59	1.27	2.73	4.19	1.77	3.31	4.68	2.12	4.37	6.38	1.86	4.15	6.21	1.81	4.15	6.26
450	600	80	32	2.58	4.21	5.82	2.28	3.99	5.51	2.87	4.66	6.10	1.54	3.46	5.41	1.33	3.29	5.29	1.33	3.34	5.39
450	600	90	45	1.22	2.60	3.67	.93	2.39	3.38	1.13	2.67	3.57	2.55	4.78	7.34	2.12	4.39	6.99	2.21	4.52	7.17
450	600	90	40	1.20	2.63	3.96	1.00	2.52	3.77	1.29	2.90	4.06	2.26	4.42	6.65	1.77	3.98	6.25	1.80	4.06	6.38
450	600	90	36	2.10	3.80	5.20	2.01	3.79	5.10	2.39	4.25	5.48	1.77	3.60	5.77	1.33	3.21	5.42	1.42	3.34	5.61
600	300	60	39	1.59	3.04	4.48	.96	2.50	3.85	.82	2.45	3.71	1.18	2.40	3.95	1.11	2.37	3.97	1.22	2.52	4.17
600	300	60	36	1.27	2.79	4.49	.74	2.34	3.95	.69	2.39	3.91	.94	2.09	3.32	.81	2.01	3.29	.87	2.11	3.43
600	300	60	33	1.89	3.67	5.43	1.45	3.32	4.99	1.50	3.45	5.04	.68	1.51	2.67	.61	1.48	2.69	.71	1.63	2.89
600	300	70	45	1.65	2.89	4.39	.98	2.31	3.73	.88	2.29	3.63	1.26	2.56	3.90	1.10	2.45	3.83	1.15	2.54	3.97
600	300	70	42	1.38	2.69	4.45	.81	2.21	3.89	.80	2.28	3.88	1.16	2.39	3.40	.94	2.22	3.28	.94	2.27	3.37
600	300	70	38	2.17	3.74	5.57	1.70	3.35	5.09	1.78	3.52	5.18	.88	1.79	2.73	.71	1.67	2.66	.76	1.77	2.80
600	300	80	52	1.51	2.83	4.12	1.06	2.46	3.66	.74	2.23	3.35	1.37	2.59	4.14	.98	2.24	3.84	1.12	2.42	4.07
600	300	80	48	1.13	2.51	4.06	.77	2.24	3.70	.56	2.11	3.48	1.25	2.41	3.63	.81	2.01	3.28	.89	2.14	3.45
600	300	80	44	1.94	3.57	5.19	1.67	3.40	4.92	1.55	3.36	4.80	1.09	1.92	3.08	.70	1.57	2.78	.84	1.76	3.01
600	450	70	42	1.42	3.04	4.64	.92	2.62	4.13	.90	2.69	4.12	2.17	3.97	6.10	2.09	3.94	6.12	2.20	4.09	6.32
600	450	70	38	1.39	3.07	4.92	.98	2.75	4.51	1.06	2.91	4.59	1.75	3.48	5.29	1.62	3.40	5.26	1.67	3.50	5.40
600	450	70	35	2.11	4.05	5.97	1.80	3.82	5.66	1.97	4.09	5.83	1.26	2.67	4.42	1.19	2.65	4.44	1.30	2.80	4.63
600	450	80	48	1.59	3.00	4.66	1.06	2.55	4.12	1.07	2.65	4.14	2.12	4.00	5.92	1.95	3.88	5.85	2.01	3.98	5.99
600	450	80	44	1.64	3.11	5.03	1.20	2.75	4.59	1.31	2.95	4.70	1.82	3.64	5.23	1.60	3.47	5.11	1.60	3.52	5.20
600	450	80	40	2.57	4.29	6.28	2.22	4.03	5.93	2.43	4.33	6.14	1.29	2.78	4.31	1.12	2.66	4.24	1.17	2.76	4.38
600	450	90	54	1.26	2.73	4.18	.93	2.49	3.85	.74	2.38	3.66	2.32	4.12	6.25	1.93	3.77	5.95	2.06	3.95	6.18
600	450	90	49	1.24	2.78	4.49	1.01	2.63	4.26	.92	2.63	4.16	1.95	3.69	5.50	1.51	3.29	5.14	1.59	3.42	5.32
600	450	90	45	2.18	3.97	5.74	2.04	3.92	5.61	2.04	4.01	5.61	1.52	2.93	4.68	1.13	2.59	4.38	1.27	2.77	4.61
600	600	70	38	1.92	3.70	5.45	1.54	3.41	5.07	1.65	3.60	5.18	3.25	5.63	8.35	3.18	5.61	8.37	3.28	5.76	8.57
600	600	70	35	1.84	3.69	5.70	1.56	3.49	5.41	1.76	3.78	5.62	2.61	4.93	7.32	2.48	4.85	7.29	2.54	4.95	7.43
600	600	70	31	3.15	5.25	7.33	2.96	5.15	7.14	3.26	5.53	7.44	1.97	3.96	6.29	1.90	3.94	6.31	2.00	4.09	6.51
600	600	80	44	2.33	3.89	5.72	1.92	3.57	5.30	2.06	3.80	5.45	3.12	5.58	8.08	2.95	5.47	8.01	3.01	5.56	8.16
600	600	80	40	2.32	3.95	6.03	2.01	3.72	5.72	2.24	4.04	5.95	2.63	5.03	7.20	2.41	4.86	7.08	2.41	4.90	7.17
600	600	80	36	3.84	5.72	7.87	3.62	5.59	7.65	3.95	6.01	7.98	1.89	3.97	6.08	1.73	3.85	6.01	1.78	3.95	6.15
600	600	90	49	1.94	3.57	5.18	1.73	3.45	4.98	1.67	3.47	4.91	3.41	5.79	8.51	3.02	5.45	8.21	3.15	5.63	8.44
600	600	90	45	1.81	3.51	5.38	1.70	3.48	5.27	1.73	3.60	5.30	2.82	5.14	7.53	2.38	4.74	7.18	2.46	4.87	7.35
600	600	90	40	3.38	5.33	7.26	3.36	5.40	7.25	3.49	5.61	7.38	2.18	4.17	6.50	1.78	3.82	6.20	1.92	4.00	6.42

TABLE F-3G. TOTAL CO EMITTED ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 6*6

INTERSECTION				MINOR			STREET						MAJOR			STREET					
ENVIRONMENT				LEFT			TURNS						LEFT			TURNS					
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	1.14	2.34	2.96	1.33	2.61	3.15	.95	2.32	2.76	.35	1.54	2.72	.27	1.50	2.73	.64	1.91	3.19
300	300	50	25	1.25	2.51	3.39	1.54	2.88	3.67	1.25	2.68	3.38	.31	1.43	2.28	.17	1.34	2.24	.48	1.70	2.64
300	300	50	22	.82	2.34	3.28	1.20	2.80	3.66	1.00	2.69	3.46	.50	1.29	2.08	.42	1.26	2.09	.78	1.67	2.55
300	300	60	33	.99	1.97	2.65	1.14	2.21	2.81	.79	1.94	2.46	.70	1.97	2.94	.53	1.85	2.86	.85	2.20	3.26
300	300	60	30	1.07	2.12	3.06	1.32	2.45	3.31	1.07	2.28	3.06	.85	2.06	2.70	.63	1.88	2.56	.89	2.18	2.91
300	300	60	27	.81	2.12	3.13	1.16	2.55	3.48	1.00	2.48	3.32	.97	1.85	2.42	.80	1.72	2.34	1.11	2.08	2.75
300	300	70	38	1.04	2.09	2.56	1.40	2.54	2.93	.84	2.06	2.37	.80	1.98	3.16	.40	1.63	2.86	.79	2.07	3.34
300	300	70	35	.97	2.09	2.82	1.43	2.63	3.28	.97	2.25	2.81	.87	1.99	2.85	.42	1.59	2.49	.76	1.98	2.92
300	300	70	31	.67	2.05	2.84	1.23	2.69	3.40	.86	2.41	3.03	1.13	1.93	2.72	.73	1.57	2.41	1.13	2.01	2.90
300	450	50	25	.76	2.11	2.89	1.07	2.51	3.20	.81	2.34	2.94	1.13	2.89	4.66	1.05	2.86	4.67	1.41	3.27	5.13
300	450	50	22	.98	2.40	3.44	1.39	2.90	3.85	1.23	2.82	3.68	.98	2.68	4.12	.85	2.60	4.08	1.16	2.95	4.48
300	450	50	20	.64	2.32	3.42	1.15	2.91	3.93	1.08	2.93	3.86	.95	2.33	3.71	.87	2.30	3.72	1.24	2.71	4.17
300	450	60	30	.73	1.87	2.72	1.01	2.24	3.00	.78	2.10	2.77	1.47	3.32	4.86	1.30	3.19	4.79	1.61	3.55	5.19
300	450	60	27	1.01	2.21	3.32	1.38	2.67	3.69	1.25	2.63	3.56	1.45	3.23	4.45	1.22	3.05	4.32	1.48	3.36	4.67
300	450	60	24	.76	2.23	3.40	1.24	2.78	3.87	1.20	2.83	3.83	1.39	2.85	4.01	1.22	2.73	3.93	1.53	3.08	4.33
300	450	70	35	.64	1.85	2.48	1.12	2.42	2.97	.69	2.07	2.53	1.65	3.41	5.18	1.25	3.06	4.87	1.64	3.50	5.36
300	450	70	31	.74	2.02	2.91	1.33	2.69	3.49	.99	2.43	3.15	1.57	3.27	4.71	1.11	2.86	4.35	1.46	3.25	4.78
300	450	70	28	.47	2.01	2.96	1.15	2.77	3.64	.91	2.61	3.40	1.63	3.00	4.38	1.23	2.65	4.07	1.62	3.09	4.56
300	600	60	27	.64	2.15	3.09	1.07	2.67	3.52	.94	2.62	3.39	1.47	3.82	6.17	1.39	3.78	6.18	1.75	4.19	6.63
300	600	60	24	.91	2.49	3.68	1.44	3.11	4.22	1.40	3.15	4.18	1.10	3.38	5.40	.96	3.30	5.36	1.28	3.65	5.77
300	600	60	21	1.18	3.02	4.28	1.81	3.74	4.91	1.87	3.88	4.96	.89	2.85	4.81	.81	2.82	4.82	1.18	3.23	5.28
300	600	70	31	.76	2.06	3.07	1.17	2.55	3.47	1.07	2.54	3.37	1.66	4.09	6.22	1.48	3.96	6.14	1.80	4.32	6.54
300	600	70	28	1.08	2.45	3.71	1.58	3.03	4.21	1.58	3.11	4.20	1.40	3.77	5.57	1.17	3.59	5.44	1.43	3.89	5.79
300	600	70	24	1.50	3.12	4.45	2.10	3.81	5.05	2.19	3.98	5.14	1.10	3.14	4.88	.93	3.02	4.80	1.24	3.37	5.21
300	600	80	36	.52	1.89	2.68	1.13	2.59	3.29	.82	2.36	2.98	1.81	4.16	6.51	1.41	3.81	6.20	1.81	4.25	6.69
300	600	80	32	.70	2.13	3.18	1.40	2.92	3.89	1.19	2.79	3.67	1.47	3.75	5.77	1.01	3.35	5.41	1.36	3.73	5.85
300	600	80	28	1.12	2.81	3.92	1.92	3.70	4.73	1.80	3.67	4.61	1.26	3.22	5.18	.86	2.87	4.87	1.25	3.31	5.36
450	300	50	30	1.51	3.49	4.61	1.70	3.75	4.79	1.64	3.79	4.74	.46	1.81	3.15	.43	1.82	3.20	.84	2.27	3.71
450	300	50	27	1.60	3.64	5.02	1.88	4.00	5.29	1.92	4.13	5.34	.38	1.66	2.68	.30	1.62	2.68	.66	2.03	3.13
450	300	50	25	1.42	3.71	5.16	1.79	4.17	5.53	1.93	4.39	5.67	.58	1.53	2.48	.54	1.54	2.54	.95	2.00	3.04
450	300	60	36	1.39	3.15	4.34	1.54	3.39	4.49	1.52	3.45	4.47	.78	2.20	3.33	.65	2.12	3.29	1.01	2.53	3.74
450	300	60	33	1.53	3.35	4.80	1.78	3.68	5.05	1.85	3.85	5.12	.84	2.20	2.99	.66	2.07	2.91	.96	2.42	3.30
450	300	60	30	1.45	3.54	5.05	1.79	3.96	5.39	1.97	4.22	5.56	1.03	2.06	2.80	.90	1.98	2.76	1.26	2.39	3.21
450	300	70	42	1.49	3.32	4.30	1.85	3.76	4.65	1.62	3.62	4.43	1.08	2.42	3.77	.73	2.12	3.50	1.17	2.60	4.04
450	300	70	38	1.47	3.37	4.60	1.93	3.90	5.05	1.79	3.86	4.92	1.12	2.40	3.41	.71	2.04	3.10	1.10	2.47	3.57
450	300	70	35	1.37	3.52	4.82	1.92	4.16	5.37	1.88	4.21	5.33	1.43	2.39	3.34	1.08	2.08	3.08	1.52	2.57	3.61
450	450	60	33	1.10	3.23	4.51	1.40	3.62	4.82	1.48	3.78	4.89	1.34	3.27	5.19	1.31	3.28	5.25	1.72	3.73	5.75
450	450	60	30	1.47	3.67	5.21	1.87	4.15	5.61	2.04	4.41	5.78	1.05	2.91	4.51	.96	2.87	4.51	1.32	3.27	4.96
450	450	60	27	1.32	3.78	5.38	1.82	4.36	5.88	2.08	4.71	6.14	1.09	2.62	4.16	1.05	2.63	4.21	1.46	3.09	4.72
450	450	70	38	1.08	3.00	4.35	1.36	3.36	4.62	1.46	3.55	4.73	1.57	3.58	5.28	1.44	3.50	5.25	1.80	3.90	5.70
450	450	70	35	1.50	3.48	5.09	1.87	3.94	5.46	2.07	4.23	5.66	1.40	3.35	4.72	1.22	3.21	4.64	1.53	3.56	5.03
450	450	70	31	1.52	3.76	5.43	1.98	4.31	5.90	2.28	4.69	6.19	1.38	3.00	4.32	1.26	2.92	4.28	1.61	3.32	4.73
450	450	80	44	.97	2.96	4.10	1.45	3.53	4.58	1.35	3.51	4.47	1.90	3.82	5.75	1.55	3.52	5.49	1.99	4.00	6.02
450	450	80	40	1.26	3.32	4.71	1.84	3.98	5.29	1.83	4.06	5.28	1.68	3.54	5.14	1.27	3.18	4.82	1.66	3.61	5.30
450	450	80	36	1.28	3.60	5.05	1.96	4.35	5.73	2.04	4.53	5.81	1.77	3.30	4.84	1.41	3.00	4.58	1.85	3.48	5.11
450	600	70	35	1.39	3.68	5.12	1.82	4.20	5.55	2.01	4.48	5.75	2.03	4.54	7.05	2.00	4.55	7.10	2.41	5.01	7.61
450	600	70	31	1.79	4.14	5.84	2.31	4.76	6.37	2.61	5.13	6.66	1.53	3.97	6.15	1.44	3.93	6.16	1.80	4.33	6.61
450	600	70	28	2.33	4.94	6.71	2.95	5.65	7.33	3.34	6.13	7.72	1.33	3.45	5.57	1.30	3.46	5.62	1.71	3.92	6.13
450	600	80	40	1.54	3.62	5.13	1.94	4.10	5.53	2.17	4.42	5.75	2.09	4.68	6.97	1.96	4.60	6.94	2.32	5.00	7.38
450	600	80	36	2.02	4.16	5.93	2.51	4.74	6.43	2.84	5.15	6.75	1.69	4.22	6.18	1.51	4.09	6.10	1.82	4.44	6.49
450	600	80	32	2.75	5.15	6.98	3.34	5.82	7.57	3.76	6.33	7.99	1.40	3.61	5.51	1.28	3.53	5.47	1.64	3.93	5.92
450	600	90	45	1.27	3.42	4.72	1.88	4.11	5.32	1.90	4.22	5.34	2.44	4.94	7.45	2.08	4.64	7.19	2.53	5.12	7.72
450	600	90	40	1.68	3.89	5.44	2.38	4.68	6.15	2.50	4.88	6.26	1.92	4.37	6.55	1.52	4.01	6.24	1.91	4.44	6.71
450	600	90	36	2.41	4.88	6.50	3.20	5.76	7.29	3.42	6.06	7.50	1.73	3.85	5.97	1.38	3.54	5.71	1.82	4.03	6.24
600	300	60	39	1.63	3.86	5.52	1.89	4.21	5.78	1.58	3.99	5.47	1.15	2.65	4.15	1.16	2.71	4.26	1.62	3.21	4.80
600	300	60	36	1.74	4.04	5.96	2.10	4.49	6.32	1.89	4.36	6.10	.69	2.13	3.30	.65	2.13	3.35	1.05	2.58	3.85
600	300	60	33	2.18	4.74	6.71	2.63	5.28	7.17	2.52	5.24	7.05	.73	1.84	2.95	.74	1.90	3.06	1.20	2.40	3.60
600	300	70	45	1.45	3.47	5.20	1.68	3.79	5.43	1.41	3.60	5.15	1.13	2.72	4.00	1.05	2.68	4.01	1.46	3.13	4.51
600	300	70	42	1.62	3.70	5.69	1.94	4.11	6.01	1.76	4.02	5.83	.81	2.33	3.28	.68	2.24	3.24	1.02	2.64	3.68
600	300	70	38	2.23	4.57	6.62	2.65	5.08	7.04	2.56	5.08	6.96	.83	2.02	2.91	.75	1.99	2.93	1.15	2.44	3.42
600	300	80	52	1.45	3.54	5.06	1.89	4.07	5.50	1.41	3.67	5.01	1.34	2.84	4.34	1.03	2.58	4.13	1.52	3.11	4.70
600	300	80	48	1.51	3.66	5.43	2.04	4.28	5.97	1.66	3.98	5.58	1.00	2.44	3.61	.64	2.13	3.34	1.08	2.60	3.87
600	300	80	44	2.13	4.54	6.38	2.76	5.26	7.01	2.47	5.05	6.71	1.14	2.25	3.36	.84	1.99	3.15	1.32	2.53	3.73
600	450	70	42	1.56	3.96	5.77	1.95	4.43	6.16	1.77	4.33	5.98	2.37	4.45	6.53	2.38	4.51	6.64	2.84	5.01	7.19
600	450	70	38	1.96	4.41	6.49	2.44	4.99	6.98	2.35	4.98	6.89	1.73	3.75	5.51	1.69	3.76	5.56	2.09	4.21	6.05
600	450	70	35	2.50	5.22	7.36	3.08	5.88	7.94	3.09	5.97	7.94	1.55	3.24	4.94	1.56	3.30	5.04	2.02	3.80	5.59
600	450	80	48	1.49	3.67	5.56	1.85	4.12	5.92	1.70	4.05	5.77	2.22	4.39	6.25	2.14	4.36	6.27	2.55	4.80	6.76
600	450	80	44	1.97	4.22	6.36	2.43	4.76	6.81	2.37	4.79	6.76	1.71	3.81	5.35	1.58	3.73	5.31	1.93	4.12	5.75
600	450	80	40	2.72	5.22	7.43	3.26	5.85	7.98	3.30	5.98	8.02	1.47	3.25	4.73	1.39	3.22	4.74	1.80	3.67	5.23
600	450	90	54	1.29	3.54	5.22	1.86	4.19	5.78	1.50	3.92	5.42	2.52	4.60	6.69	2.21	4.34	6.47	2.70	4.88	7.05
600	450	90	49	1.71	4.03	5.96	2.37	4.77	6.62	2.11	4.60	6.35	1.94	3.96	5.71	1.58	3.64	5.44	2.01	4.12	5.97
600	450	90	45	2.46	5.04	7.03	3.22	5.88	7.79	3.05	5.79	7.62	1.81	3.50	5.20	1.50	3.24	4.98	1.99	3.77	5.56
600	600	70	38	2.15	4.71	6.68	2.67	5.31	7.20	2.61	5.33	7.14	3.29	5.96	8.63	3.31	6.02	8.73	3.76	6.52	9.28
600	600	70	35	2.51	5.12	7.36	3.12	5.82	7.97	3.15	5.94	8.01	2.43	5.04	7.38	2.39	5.04	7.43	2.80	5.49	7.92
600	600	70	31	3.63	6.51	8.81	4.34	7.30	9.51	4.47	7.52	9.64	2.10	4.37	6.65	2.11	4.43	6.75	2.56	4.93	7.30
600	600	80	44	2.33	4.67	6.71	2.81	5.23	7.19	2.78	5.29	7.17	3.06	5.81	8.26	2.98	5.78	8.27	3.39	6.23	8.77
600	600	80	40	2.75	5.15	7.46	3.33	5.82	8.04	3.40	5.97	8.10	2.35	5.04	7.16	2.22	4.95	7.12	2.57	5.35	7.56
600	600	80	36	4.08	6.75	9.11	4.76	7.50	9.79	4.92	7.75	9.95	1.92	4.28	6.34	1.84	4.25	6.35	2.24	4.69	6.84
600	600	90	49	2.07	4.48	6.31	2.76	5.26	7.00	2.53	5.11	6.77	3.45	6.12	8.78	3.14	5.86	8.57	3.63	6.39	9.14
600	600	90	45	2.38	4.85	6.94	3.16	5.72	7.72	3.02	5.67	7.58	2.65	5.25	7.59	2.29	4.94	7.32	2.72	5.42	7.85
600	600	90	40	3.76	6.49	8.65	4.64	7.46	9.53	4.60	7.50	9.48	2.30	4.58	6.85	1.99	4.31	6.64	2.48	4.85	7.21

TABLE F-3H. TOTAL CO EMITTED ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*6

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	1.10	2.23	3.04	1.26	2.47	3.19	.85	2.14	2.78	.75	1.79	3.00	.50	1.59	2.84	.69	1.82	3.13
300	300	50	25	1.22	2.41	3.47	1.47	2.75	3.73	1.15	2.51	3.41	.67	1.66	2.54	.37	1.40	2.33	.51	1.58	2.56
300	300	50	22	.79	2.24	3.37	1.14	2.68	3.72	.92	2.54	3.50	.89	1.54	2.37	.64	1.34	2.21	.83	1.58	2.49
300	300	60	33	1.03	1.94	2.82	1.16	2.15	2.94	.78	1.86	2.56	.93	2.05	3.05	.58	1.76	2.80	.72	1.94	3.03
300	300	60	30	1.13	2.10	3.23	1.35	2.40	3.46	1.06	2.20	3.17	1.05	2.12	2.78	.66	1.77	2.48	.74	1.90	2.66
300	300	60	27	.88	2.11	3.31	1.19	2.51	3.62	1.00	2.40	3.43	1.19	1.93	2.53	.85	1.63	2.28	.99	1.82	2.51
300	300	70	38	1.33	2.31	2.97	1.66	2.73	3.30	1.07	2.22	2.71	.85	1.89	3.10	.28	1.37	2.62	.50	1.63	2.94
300	300	70	35	1.27	2.31	3.23	1.70	2.83	3.66	1.20	2.42	3.17	.90	1.88	2.76	.27	1.30	2.23	.44	1.52	2.49
300	300	70	31	.98	2.28	3.27	1.50	2.89	3.79	1.10	2.58	3.39	1.18	1.84	2.66	.61	1.31	2.18	.83	1.58	2.49
300	450	50	25	.67	1.95	2.92	.95	2.32	3.20	.66	2.11	2.91	1.37	2.99	4.79	1.11	2.79	4.63	1.31	3.03	4.91
300	450	50	22	.90	2.25	3.48	1.28	2.71	3.86	1.09	2.61	3.66	1.20	2.76	4.23	.89	2.50	4.01	1.03	2.69	4.24
300	450	50	20	.57	2.18	3.47	1.05	2.74	3.94	.95	2.72	3.84	1.19	2.43	3.84	.94	2.22	3.68	1.13	2.46	3.96
300	450	60	30	.73	1.80	2.83	.98	2.13	3.08	.72	1.96	2.83	1.54	3.25	4.82	1.19	2.95	4.57	1.33	3.13	4.80
300	450	60	27	1.01	2.14	3.44	1.36	2.58	3.79	1.20	2.50	3.62	1.49	3.14	4.39	1.09	2.79	4.08	1.18	2.92	4.26
300	450	60	24	.78	2.17	3.53	1.22	2.70	3.97	1.15	2.71	3.90	1.46	2.78	3.97	1.12	2.48	3.72	1.26	2.67	3.95
300	450	70	35	.88	2.02	2.84	1.34	2.56	3.30	.87	2.18	2.83	1.54	3.17	4.96	.97	2.64	4.48	1.19	2.91	4.80
300	450	70	31	.99	2.19	3.28	1.55	2.83	3.83	1.18	2.55	3.46	1.44	3.00	4.47	.81	2.42	3.94	.98	2.64	4.20
300	450	70	28	.73	2.19	3.34	1.38	2.93	3.99	1.10	2.74	3.71	1.52	2.76	4.16	.95	2.24	3.69	1.17	2.50	4.00
300	600	60	27	.50	1.94	3.07	.91	2.44	3.48	.74	2.36	3.31	1.77	3.98	6.36	1.52	3.78	6.20	1.71	4.01	6.48
300	600	60	24	.78	2.29	3.67	1.29	2.88	4.18	1.22	2.89	4.11	1.38	3.52	5.57	1.07	3.26	5.36	1.21	3.45	5.59
300	600	60	21	1.06	2.83	4.28	1.66	3.51	4.88	1.69	3.62	4.90	1.19	3.01	5.00	.94	2.81	4.84	1.13	3.05	5.12
300	600	70	31	.71	1.94	3.14	1.09	2.40	3.51	.96	2.35	3.38	1.79	4.08	6.24	1.44	3.78	5.99	1.58	3.97	6.22
300	600	70	28	1.04	2.33	3.79	1.51	2.89	4.26	1.47	2.94	4.22	1.51	3.74	5.57	1.11	3.39	5.26	1.20	3.52	5.44
300	600	70	24	1.47	3.02	4.54	2.03	3.67	5.10	2.09	3.81	5.16	1.23	3.13	4.90	.89	2.84	4.65	1.03	3.02	4.88
300	600	80	36	.71	2.01	2.99	1.30	2.68	3.58	.96	2.43	3.24	1.77	3.98	6.36	1.20	3.46	5.88	1.42	3.73	6.19
300	600	80	32	.90	2.26	3.50	1.58	3.02	4.18	1.33	2.86	3.93	1.40	3.55	5.60	.78	2.97	5.07	.95	3.18	5.33
300	600	80	28	1.33	2.95	4.25	2.10	3.81	5.03	1.95	3.74	4.88	1.22	3.04	5.03	.65	2.51	4.55	.87	2.78	4.86
450	300	50	30	1.51	3.41	4.72	1.66	3.65	4.88	1.58	3.65	4.79	.75	1.95	3.32	.54	1.79	3.20	.78	2.07	3.53
450	300	50	27	1.60	3.57	5.14	1.85	3.90	5.39	1.86	4.00	5.40	.64	1.78	2.83	.38	1.57	2.66	.57	1.80	2.93
450	300	50	25	1.43	3.65	5.29	1.77	4.08	5.63	1.88	4.27	5.74	.86	1.67	2.65	.65	1.51	2.54	.89	1.80	2.87
450	300	60	36	1.48	3.16	4.54	1.59	3.37	4.66	1.54	3.40	4.61	.89	2.18	3.33	.59	1.92	3.12	.78	2.15	3.40
450	300	60	33	1.62	3.37	5.01	1.84	3.67	5.23	1.88	3.80	5.27	.92	2.14	2.97	.57	1.84	2.71	.70	2.02	2.93
450	300	60	30	1.55	3.56	5.27	1.86	3.96	5.58	2.00	4.18	5.72	1.14	2.03	2.80	.84	1.78	2.59	1.03	2.01	2.87
450	300	70	42	1.82	3.57	4.74	2.14	3.99	5.07	1.89	3.81	4.81	1.02	2.22	3.59	.50	1.74	3.16	.76	2.06	3.52
450	300	70	38	1.81	3.63	5.05	2.23	4.14	5.48	2.07	4.06	5.31	1.03	2.17	3.21	.45	1.64	2.73	.67	1.90	3.03
450	300	70	35	1.71	3.79	5.28	2.23	4.40	5.80	2.16	4.41	5.73	1.37	2.19	3.17	.85	1.71	2.73	1.12	2.02	3.09
450	450	60	33	1.05	3.11	4.58	1.32	3.47	4.86	1.36	3.60	4.90	1.47	3.26	5.21	1.27	3.10	5.09	1.50	3.38	5.42
450	450	60	30	1.43	3.55	5.28	1.80	4.01	5.65	1.94	4.23	5.79	1.15	2.88	4.50	.89	2.66	4.33	1.08	2.89	4.61
450	450	60	27	1.29	3.67	5.47	1.76	4.23	5.93	1.99	4.54	6.17	1.22	2.61	4.18	1.01	2.45	4.06	1.25	2.74	4.39
450	450	70	38	1.12	2.96	4.50	1.36	3.29	4.75	1.43	3.45	4.82	1.53	3.40	5.13	1.23	3.14	4.93	1.41	3.38	5.20
450	450	70	35	1.54	3.46	5.26	1.88	3.88	5.59	2.05	4.13	5.76	1.33	3.14	4.55	.98	2.84	4.29	1.11	3.01	4.51
450	450	70	31	1.57	3.74	5.60	2.00	4.25	6.03	2.26	4.61	6.30	1.34	2.82	4.17	1.04	2.57	3.96	1.23	2.80	4.24
450	450	80	44	1.25	3.17	4.49	1.70	3.70	4.94	1.57	3.66	4.81	1.68	3.47	5.42	1.16	2.99	4.99	1.43	3.30	5.35
450	450	80	40	1.55	3.53	5.12	2.10	4.16	5.66	2.06	4.21	5.62	1.44	3.16	4.79	.86	2.63	4.30	1.08	2.89	4.61
450	450	80	36	1.58	3.82	5.47	2.22	4.55	6.11	2.28	4.69	6.17	1.55	2.95	4.51	1.03	2.47	4.08	1.30	2.78	4.44
450	600	70	35	1.29	3.51	5.14	1.69	3.99	5.54	1.85	4.25	5.70	2.22	4.59	7.13	2.02	4.43	7.01	2.26	4.72	7.34
450	600	70	31	1.70	3.98	5.87	2.19	4.56	6.37	2.45	4.91	6.63	1.69	4.00	6.21	1.44	3.79	6.04	1.62	4.02	6.32
450	600	70	28	2.25	4.79	6.74	2.84	5.47	7.34	3.19	5.91	7.69	1.52	3.50	5.65	1.32	3.34	5.53	1.56	3.63	5.86
450	600	80	40	1.53	3.53	5.23	1.89	3.98	5.60	2.09	4.27	5.80	2.11	4.56	6.88	1.81	4.31	6.67	2.00	4.54	6.95
450	600	80	36	2.02	4.09	6.04	2.48	4.63	6.51	2.77	5.01	6.80	1.69	4.08	6.07	1.34	3.77	5.81	1.47	3.95	6.03
450	600	80	32	2.75	5.08	7.10	3.31	5.72	7.66	3.70	6.20	8.05	1.43	3.49	5.42	1.13	3.24	5.21	1.31	3.47	5.49
450	600	90	45	1.51	3.58	5.07	2.08	4.24	5.64	2.07	4.32	5.63	2.29	4.65	7.19	1.76	4.18	6.76	2.03	4.49	7.12
450	600	90	40	1.92	4.06	5.80	2.59	4.81	6.47	2.67	4.98	6.56	1.75	4.05	6.26	1.17	3.52	5.78	1.39	3.78	6.08
450	600	90	36	2.65	5.05	6.86	3.42	5.90	7.63	3.60	6.17	7.81	1.58	3.56	5.71	1.06	3.08	5.27	1.32	3.39	5.63
600	300	60	39	1.82	3.99	5.83	2.06	4.31	6.07	1.72	4.05	5.73	1.32	2.69	4.21	1.16	2.57	4.14	1.45	2.90	4.52
600	300	60	36	1.95	4.17	6.28	2.28	4.59	6.61	2.03	4.43	6.36	.84	2.14	3.34	.62	1.97	3.22	.85	2.24	3.54
600	300	60	33	2.39	4.87	7.04	2.81	5.39	7.47	2.67	5.32	7.32	.90	1.88	3.01	.74	1.76	2.95	1.03	2.09	3.32
600	300	70	45	1.73	3.68	5.60	1.93	3.97	5.80	1.62	3.74	5.49	1.13	2.58	3.89	.88	2.37	3.73	1.11	2.65	4.05
600	300	70	42	1.91	3.92	6.09	2.20	4.30	6.39	1.99	4.17	6.18	.78	2.17	3.15	.48	1.91	2.94	.66	2.13	3.20
600	300	70	38	2.52	4.79	7.03	2.91	5.27	7.43	2.80	5.24	7.31	.83	1.88	2.80	.58	1.68	2.64	.81	1.95	2.97
600	300	80	52	1.98	4.00	5.70	2.39	4.49	6.11	1.87	4.06	5.59	1.17	2.53	4.06	.69	2.10	3.67	1.00	2.46	4.08
600	300	80	48	2.04	4.12	6.08	2.55	4.71	6.59	2.13	4.38	6.17	.81	2.10	3.31	.27	1.62	2.86	.53	1.92	3.22
600	300	80	44	2.67	5.01	7.04	3.27	5.70	7.64	2.95	5.46	7.31	.97	1.94	3.08	.49	1.51	2.69	.81	1.87	3.10
600	450	70	42	1.71	4.03	6.04	2.07	4.48	6.40	1.85	4.35	6.18	2.39	4.33	6.44	2.23	4.22	6.37	2.51	4.55	6.75
600	450	70	38	2.11	4.50	6.76	2.57	5.04	7.22	2.45	5.00	7.10	1.73	3.61	5.39	1.51	3.44	5.27	1.74	3.72	5.59
600	450	70	35	2.66	5.31	7.64	3.21	5.94	8.19	3.19	6.00	8.16	1.57	3.12	4.84	1.41	3.01	4.78	1.69	3.34	5.15
600	450	80	48	1.73	3.83	5.91	2.05	4.25	6.24	1.87	4.15	6.06	2.07	4.10	5.99	1.82	3.89	5.83	2.05	4.17	6.15
600	450	80	44	2.21	4.39	6.72	2.64	4.89	7.14	2.55	4.89	7.06	1.53	3.50	5.06	1.23	3.24	4.85	1.40	3.46	5.12
600	450	80	40	2.96	5.40	7.79	3.48	6.00	8.31	3.49	6.09	8.32	1.32	2.96	4.46	1.07	2.75	4.30	1.30	3.03	4.62
600	450	90	54	1.77	3.95	5.81	2.31	4.57	6.35	1.92	4.26	5.96	2.20	4.14	6.25	1.72	3.71	5.87	2.03	4.07	6.27
600	450	90	49	2.20	4.44	6.56	2.83	5.16	7.19	2.53	4.95	6.90	1.59	3.47	5.25	1.06	2.98	4.81	1.32	3.29	5.16
600	450	90	45	2.96	5.46	7.64	3.68	6.27	8.37	3.48	6.15	8.17	1.48	3.04	4.76	1.01	2.61	4.37	1.32	2.97	4.78
600	600	70	38	2.25	4.74	6.90	2.74	5.31	7.39	2.65	5.30	7.30	3.38	5.90	8.60	3.22	5.79	8.53	3.50	6.12	8.90
600	600	70	35	2.61	5.16	7.59	3.19	5.83	8.17	3.20	5.92	8.17	2.49	4.96	7.32	2.28	4.79	7.20	2.51	5.07	7.52
600	600	70	31	3.75	6.55	9.04	4.42	7.31	9.72	4.52	7.50	9.82	2.18	4.31	6.62	2.02	4.20	6.55	2.30	4.53	6.93
600	600	80	44	2.51	4.78	7.01	2.96	5.31	7.46	2.90	5.34	7.41	2.97	5.58	8.06	2.72	5.38	7.90	2.95	5.65	8.22
600	600	80	40	2.94	5.27	7.77	3.49	5.91	8.32	3.53	6.03	8.35	2.24	4.78	6.93	1.93	4.53	6.72	2.11	4.75	6.99
600	600	80	36	4.28	6.87	9.43	4.93	7.60	10.08	5.06	7.82	10.21	1.83	4.05	6.14	1.58	3.84	5.98	1.81	4.12	6.30
600	600	90	49	2.50	4.84	6.86	3.16	5.58	7.52	2.89	5.40	7.25	3.19	5.72	8.41	2.71	5.28	8.02	3.02	5.64	8.43
600	600	90	45	2.81	5.21	7.49	3.57	6.05	8.25	3.40	5.97	8.08	2.36	4.83	7.19	1.83	4.34	6.75	2.09	4.64	7.10
600	600	90	40	4.20	6.86	9.21	5.05	7.80	10.06	4.98	7.81	9.98	2.04	4.17	6.48	1.56	3.74	6.09	1.87	4.10	6.50

TABLE F-31. TOTAL CO EMITTED ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*7

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	1.64	2.74	3.27	1.50	2.69	3.12	.78	2.06	2.41	.81	1.83	3.18	.51	1.57	2.97	.66	1.77	3.21
300	300	50	25	1.62	2.79	3.57	1.58	2.83	3.52	.96	2.29	2.90	.91	1.86	2.89	.56	1.56	2.63	.65	1.70	2.81
300	300	50	22	1.06	2.49	3.34	1.11	2.62	3.38	.59	2.18	2.86	.95	1.58	2.54	.66	1.33	2.33	.80	1.52	2.57
300	300	60	33	1.67	2.56	3.15	1.50	2.47	2.98	.81	1.87	2.29	1.16	2.26	3.39	.77	1.92	3.10	.87	2.06	3.28
300	300	60	30	1.63	2.58	3.44	1.55	2.59	3.36	.96	2.09	2.77	1.46	2.49	3.30	1.02	2.10	2.95	1.06	2.18	3.08
300	300	60	27	1.25	2.46	3.38	1.26	2.56	3.39	.77	2.15	2.90	1.43	2.14	2.88	1.04	1.79	2.58	1.13	1.93	2.77
300	300	70	38	1.54	2.49	2.87	1.57	2.61	2.90	.68	1.81	2.01	1.25	2.27	3.62	.64	1.70	3.09	.81	1.92	3.36
300	300	70	35	1.34	2.36	3.00	1.47	2.58	3.13	.68	1.87	2.33	1.48	2.43	3.45	.81	1.81	2.87	.93	1.98	3.09
300	300	70	31	.92	2.20	2.90	1.14	2.51	3.13	.44	1.89	2.42	1.59	2.21	3.17	.97	1.64	2.65	1.15	1.87	2.92
300	450	50	25	1.16	2.42	3.10	1.14	2.49	3.08	.55	1.98	2.49	1.49	3.09	5.02	1.19	2.84	4.82	1.34	3.03	5.06
300	450	50	22	1.26	2.59	3.53	1.34	2.75	3.60	.84	2.34	3.11	1.49	3.03	4.63	1.14	2.72	4.38	1.24	2.86	4.56
300	450	50	20	.80	2.38	3.39	.97	2.64	3.56	.57	2.32	3.16	1.32	2.53	4.07	1.02	2.28	3.87	1.17	2.47	4.10
300	450	60	30	1.32	2.37	3.12	1.27	2.40	3.07	.71	1.93	2.51	1.83	3.52	5.23	1.44	3.17	4.93	1.54	3.31	5.12
300	450	60	27	1.47	2.58	3.59	1.52	2.71	3.64	1.05	2.33	3.17	1.96	3.58	4.97	1.52	3.18	4.62	1.56	3.27	4.75
300	450	60	24	1.10	2.47	3.55	1.24	2.70	3.69	.87	2.42	3.32	1.76	3.05	4.38	1.37	2.71	4.08	1.46	2.85	4.26
300	450	70	35	1.04	2.15	2.69	1.19	2.40	2.85	.43	1.72	2.08	2.01	3.61	5.54	1.40	3.04	5.02	1.57	3.26	5.29
300	450	70	31	1.02	2.20	3.00	1.27	2.54	3.25	.60	1.95	2.58	2.08	3.62	5.22	1.41	2.99	4.64	1.53	3.16	4.86
300	450	70	28	.62	2.06	2.92	.97	2.50	3.27	.40	2.01	2.70	1.99	3.20	4.74	1.38	2.63	4.22	1.55	2.85	4.49
300	600	60	27	.94	2.36	3.21	1.05	2.56	3.31	.58	2.17	2.84	1.75	3.93	6.44	1.45	3.68	6.24	1.60	3.87	6.48
300	600	60	24	1.09	2.58	3.68	1.29	2.86	3.88	.92	2.58	3.51	1.52	3.64	5.83	1.17	3.33	5.57	1.26	3.47	5.75
300	600	60	21	1.24	2.98	4.15	1.54	3.37	4.45	1.26	3.17	4.17	1.17	2.96	5.09	.87	2.71	4.88	1.02	2.90	5.12
300	600	70	31	1.26	2.46	3.38	1.33	2.62	3.45	.90	2.27	3.01	1.93	4.20	6.50	1.54	3.85	6.20	1.64	3.99	6.38
300	600	70	28	1.45	2.72	3.89	1.62	2.98	4.06	1.28	2.72	3.72	1.82	4.02	6.00	1.38	3.63	5.65	1.42	3.71	5.78
300	600	70	24	1.75	3.27	4.51	2.01	3.62	4.77	1.77	3.47	4.53	1.38	3.25	5.16	.99	2.91	4.86	1.08	3.05	5.05
300	600	80	36	.83	2.10	2.80	1.11	2.47	3.08	.47	1.91	2.44	2.09	4.27	6.79	1.47	3.70	6.26	1.65	3.92	6.53
300	600	80	32	.88	2.22	3.17	1.25	2.68	3.55	.71	2.22	3.00	1.89	4.01	6.20	1.22	3.38	5.62	1.34	3.55	5.83
300	600	80	28	1.17	2.77	3.79	1.65	3.33	4.27	1.19	2.96	3.81	1.54	3.33	5.45	.92	2.76	4.93	1.10	2.98	5.20
450	300	50	30	1.85	3.73	4.76	1.70	3.67	4.61	1.32	3.37	4.22	.70	1.87	3.38	.45	1.67	3.22	.64	1.91	3.51
450	300	50	27	1.81	3.75	5.04	1.76	3.78	4.99	1.47	3.58	4.70	.77	1.88	3.06	.46	1.62	2.85	.60	1.80	3.08
450	300	50	25	1.50	3.70	5.05	1.54	3.83	5.10	1.35	3.72	4.90	.81	1.60	2.72	.56	1.39	2.56	.75	1.63	2.84
450	300	60	36	1.92	3.58	4.68	1.74	3.49	4.50	1.38	3.22	4.15	1.01	2.27	3.56	.67	1.97	3.31	.81	2.16	3.54
450	300	60	33	1.93	3.66	5.02	1.84	3.66	4.93	1.59	3.49	4.67	1.22	2.41	3.38	.82	2.06	3.07	.91	2.19	3.25
450	300	60	30	1.73	3.72	5.14	1.74	3.81	5.14	1.57	3.73	4.98	1.26	2.13	3.03	.92	1.83	2.78	1.06	2.02	3.01
450	300	70	42	1.83	3.56	4.45	1.85	3.67	4.47	1.29	3.20	3.91	1.32	2.49	4.00	.75	1.97	3.52	.97	2.23	3.84
450	300	70	38	1.68	3.48	4.63	1.80	3.69	4.75	1.34	3.31	4.28	1.50	2.61	3.79	.87	2.03	3.26	1.04	2.25	3.52
450	300	70	35	1.46	3.52	4.72	1.67	3.82	4.94	1.30	3.53	4.57	1.67	2.45	3.57	1.10	1.93	3.09	1.32	2.20	3.41
450	450	60	33	1.34	3.38	4.57	1.31	3.44	4.54	1.05	3.26	4.28	1.49	3.24	5.34	1.23	3.04	5.17	1.43	3.28	5.46
450	450	60	30	1.59	3.69	5.14	1.66	3.84	5.21	1.49	3.77	5.04	1.34	3.03	4.80	1.03	2.77	4.58	1.17	2.96	4.82
450	450	60	27	1.31	3.68	5.19	1.48	3.93	5.35	1.41	3.94	5.28	1.23	2.60	4.30	.98	2.39	4.14	1.17	2.63	4.43
450	450	70	38	1.51	3.34	4.59	1.45	3.36	4.53	1.22	3.22	4.31	1.71	3.55	5.43	1.37	3.26	5.18	1.51	3.44	5.41
450	450	70	35	1.81	3.69	5.21	1.84	3.82	5.25	1.71	3.77	5.12	1.69	3.47	5.02	1.30	3.12	4.71	1.38	3.25	4.89
450	450	70	31	1.69	3.84	5.42	1.83	4.06	5.55	1.79	4.11	5.52	1.53	2.98	4.46	1.18	2.68	4.21	1.32	2.87	4.44
450	450	80	44	1.21	3.11	4.15	1.36	3.34	4.30	.93	2.99	3.86	2.04	3.80	5.89	1.47	3.28	5.41	1.70	3.54	5.73
450	450	80	40	1.38	3.34	4.64	1.63	3.67	4.89	1.29	3.41	4.55	1.97	3.66	5.43	1.35	3.09	4.90	1.52	3.30	5.16
450	450	80	36	1.28	3.49	4.86	1.62	3.92	5.20	1.37	3.76	4.95	1.91	3.28	4.98	1.34	2.75	4.50	1.56	3.02	4.82
450	600	70	35	1.53	3.73	5.08	1.63	3.92	5.18	1.49	3.86	5.04	2.09	4.43	7.10	1.83	4.22	6.94	2.03	4.46	7.23
450	600	70	31	1.81	4.07	5.68	2.00	4.35	5.87	1.96	4.40	5.83	1.73	4.01	6.35	1.42	3.75	6.14	1.56	3.93	6.37
450	500	70	28	2.22	4.75	6.42	2.51	5.12	6.71	2.57	5.26	6.76	1.39	3.34	5.62	1.13	3.13	5.46	1.33	3.37	5.75
450	600	80	40	1.87	3.86	5.27	1.94	4.01	5.34	1.84	3.99	5.24	2.14	4.57	7.02	1.80	4.27	6.77	1.94	4.45	7.00
450	600	80	36	2.23	4.28	5.95	2.39	4.52	6.11	2.38	4.60	6.11	1.89	4.25	6.38	1.50	3.90	6.08	1.58	4.04	6.26
450	600	80	32	2.83	5.14	6.88	3.09	5.48	7.13	3.17	5.65	7.22	1.46	3.49	5.56	1.12	3.20	5.31	1.26	3.38	5.54
450	600	90	45	1.42	3.47	4.68	1.69	3.83	4.95	1.38	3.61	4.64	2.49	4.83	7.51	1.92	4.31	7.03	2.14	4.58	7.34
450	600	90	40	1.70	3.82	5.28	2.07	4.27	5.65	1.85	4.14	5.43	2.13	4.40	6.75	1.50	3.83	6.22	1.67	4.04	6.48
450	600	90	36	2.30	4.68	6.20	2.77	5.23	6.67	2.65	5.19	6.55	1.79	3.74	6.02	1.22	3.21	5.54	1.44	3.48	5.86
600	300	60	39	2.12	4.27	5.83	2.06	4.28	5.76	1.42	3.73	5.12	1.17	2.50	4.17	.96	2.34	4.05	1.20	2.62	4.38
600	300	60	36	2.11	4.32	6.14	2.14	4.43	6.17	1.60	3.97	5.63	.85	2.12	3.46	.59	1.91	3.29	.78	2.14	3.57
600	300	60	33	2.42	4.89	6.78	2.55	5.10	6.90	2.10	4.73	6.45	.75	1.69	2.97	.54	1.53	2.85	.78	1.81	3.18
600	300	70	45	2.13	4.06	5.69	2.03	4.05	5.59	1.43	3.52	4.99	1.15	2.56	4.01	.85	2.31	3.81	1.04	2.54	4.08
600	300	70	42	2.18	4.17	6.06	2.17	4.25	6.06	1.66	3.82	5.54	.97	2.32	3.44	.62	2.02	3.19	.75	2.19	3.41
600	300	70	38	2.66	4.91	6.87	2.75	5.09	6.96	2.33	4.76	6.54	.84	1.87	2.93	.54	1.62	2.72	.73	1.85	3.00
600	300	80	52	1.95	3.95	5.37	2.06	4.14	5.48	1.24	3.41	4.66	1.35	2.69	4.35	.83	2.21	3.92	1.10	2.52	4.28
600	300	80	48	1.88	3.94	5.62	2.08	4.23	5.82	1.36	3.60	5.10	1.16	2.43	3.77	.58	1.90	3.29	.80	2.16	3.59
600	300	80	44	2.38	4.70	6.44	2.67	5.08	6.74	2.05	4.54	6.11	1.16	2.10	3.38	.63	1.62	2.94	.90	1.94	3.30
600	450	70	42	1.96	4.26	5.99	2.02	4.41	6.04	1.50	3.98	5.53	2.29	4.21	6.46	2.09	4.05	6.34	2.33	4.33	6.67
600	450	70	38	2.23	4.60	6.58	2.39	4.84	6.73	1.97	4.50	6.31	1.80	3.66	5.58	1.54	3.44	5.41	1.73	3.67	5.69
600	450	70	35	2.65	5.27	7.32	2.90	5.61	7.57	2.57	5.37	7.24	1.47	3.00	4.86	1.27	2.84	4.74	1.51	3.12	5.07
600	450	80	48	2.08	4.17	5.96	2.11	4.28	5.99	1.63	3.88	5.50	2.15	4.15	6.18	1.85	3.89	5.97	2.03	4.13	6.25
600	450	80	44	2.44	4.59	6.64	2.56	4.79	6.76	2.17	4.49	6.37	1.78	3.71	5.42	1.43	3.41	5.16	1.56	3.59	5.39
600	450	80	40	3.06	5.46	7.58	3.27	5.77	7.80	2.98	5.56	7.50	1.40	3.01	4.65	1.10	2.75	4.44	1.28	2.99	4.72
600	450	90	54	1.70	3.85	5.43	1.93	4.17	5.66	1.24	3.57	4.97	2.45	4.36	6.61	1.92	3.88	6.18	2.19	4.20	6.54
600	450	90	49	1.99	4.21	6.05	2.32	4.62	6.38	1.72	4.11	5.78	2.01	3.86	5.78	1.43	3.33	5.30	1.64	3.59	5.60
600	450	90	45	2.61	5.09	6.99	3.04	5.60	7.42	2.54	5.19	6.92	1.73	3.26	5.12	1.21	2.78	4.69	1.48	3.09	5.05
600	600	70	38	2.46	4.92	6.80	2.64	5.19	6.99	2.25	4.88	6.59	3.13	5.63	8.46	2.92	5.47	8.35	3.16	5.75	8.68
600	600	70	35	2.69	5.21	7.35	2.97	5.58	7.63	2.67	5.37	7.34	2.42	4.85	7.36	2.16	4.64	7.19	2.34	4.87	7.47
600	600	70	31	3.69	6.47	8.68	4.06	6.93	9.05	3.86	6.82	8.85	1.93	4.04	6.48	1.72	3.88	6.37	1.96	4.16	6.70
600	600	80	44	2.82	5.07	7.02	2.97	5.30	7.17	2.61	5.03	6.81	2.90	5.48	8.09	2.60	5.23	7.89	2.78	5.46	8.16
600	500	80	40	3.12	5.43	7.64	3.36	5.76	7.89	3.10	5.58	7.62	2.33	4.85	7.14	1.98	4.55	6.88	2.11	4.72	7.10
600	600	80	36	4.33	6.90	9.17	4.67	7.32	9.51	4.50	7.24	9.34	1.75	3.95	6.17	1.46	3.69	5.97	1.64	3.93	6.24
600	600	90	49	2.38	4.69	6.43	2.74	5.14	6.79	2.17	4.66	6.22	3.28	5.78	8.62	2.76	5.30	8.18	3.03	5.62	8.54
600	600	90	45	2.56	4.94	6.93	3.01	5.48	7.39	2.54	5.09	6.91	2.63	5.06	7.57	2.05	4.53	7.08	2.26	4.79	7.39
600	600	90	40	3.81	6.45	8.51	4.36	7.09	9.06	3.99	6.80	8.69	2.13	4.24	6.69	1.61	3.76	6.25	1.88	4.08	6.61

TABLE F-4A. TOTAL HC EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 4*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	32	37	37	29	35	36	35	42	43	19	28	35	22	32	45	34	43	57
300	300	50	25	37	42	47	37	43	48	46	53	59	21	32	26	19	29	30	27	38	39
300	300	50	22	20	30	34	25	36	41	39	51	57	22	24	24	20	23	28	33	35	41
300	300	60	33	26	25	31	21	21	28	30	30	38	22	34	39	21	33	45	33	46	58
300	300	60	30	30	30	40	28	28	40	39	40	52	29	42	35	23	36	35	32	45	45
300	300	60	27	18	22	33	22	26	38	38	44	56	30	34	32	24	29	33	37	42	46
300	300	70	38	35	36	35	33	34	34	39	41	42	26	37	44	22	32	47	34	45	59
300	300	70	35	36	37	41	36	38	43	45	47	53	37	48	43	26	38	40	36	47	50
300	300	70	31	25	30	34	30	36	42	45	51	58	36	40	40	27	30	37	40	43	51
300	450	50	25	30	36	37	29	36	38	38	46	49	41	56	68	45	60	79	56	71	90
300	450	50	22	36	42	48	38	46	52	50	58	65	40	56	55	39	54	61	46	62	69
300	450	50	20	23	34	40	31	43	49	48	61	68	39	46	51	38	46	57	49	57	69
300	450	60	30	26	26	33	24	25	33	35	36	45	46	64	74	47	64	82	58	75	93
300	450	60	27	33	34	45	33	35	47	47	49	62	48	67	65	43	62	66	51	70	75
300	450	60	24	24	29	41	29	35	48	48	55	69	48	58	61	43	53	63	55	65	75
300	450	70	35	33	34	35	33	35	36	41	44	47	51	67	80	47	63	83	58	75	95
300	450	70	31	36	38	43	39	41	47	50	53	60	56	74	74	47	64	72	55	73	80
300	450	70	28	28	34	39	36	42	49	52	60	67	54	63	69	46	55	67	58	67	80
300	600	60	27	24	34	39	29	39	45	42	54	61	68	93	114	74	98	126	84	108	136
300	600	60	24	33	43	53	40	51	62	57	69	80	56	81	90	55	80	96	62	87	103
300	600	60	21	41	56	66	54	70	80	76	93	104	47	64	78	48	65	85	58	75	96
300	600	70	31	23	28	39	26	31	43	42	48	61	72	99	119	74	101	127	84	111	138
300	600	70	28	33	38	53	39	44	60	57	63	81	62	90	97	58	86	100	65	93	107
300	600	70	24	46	55	71	57	67	84	81	92	110	52	72	85	49	68	88	59	79	99
300	600	80	36	28	33	38	33	39	45	47	54	60	74	100	122	72	97	126	82	108	137
300	600	80	32	35	41	50	43	49	59	59	66	77	66	93	103	58	85	101	65	92	109
300	600	80	28	50	60	69	63	74	84	85	96	108	55	73	88	47	66	87	58	77	99
450	300	50	30	39	53	57	38	53	57	52	67	73	22	34	43	30	42	57	43	55	71
450	300	50	27	44	58	66	46	61	70	62	78	88	23	36	33	26	38	41	36	48	52
450	300	50	25	35	54	63	43	62	72	64	85	95	21	26	27	24	29	37	38	43	51
450	300	60	36	37	45	54	34	42	53	49	59	70	26	40	48	30	44	58	43	58	72
450	300	60	33	43	51	65	42	51	66	60	70	86	31	46	41	29	44	46	39	55	57
450	300	60	30	37	50	65	42	56	71	66	81	97	29	37	37	28	35	42	43	50	57
450	300	70	42	45	54	57	44	54	58	57	68	73	31	44	54	31	44	61	45	58	75
450	300	70	38	47	57	65	49	59	68	65	76	86	40	54	52	34	48	52	45	59	64
450	300	70	35	43	57	65	50	65	74	72	87	97	38	44	46	33	39	48	48	53	63
450	450	60	33	38	53	58	40	56	61	56	72	79	51	68	82	60	77	98	72	89	111
450	450	60	30	49	64	73	53	69	79	71	88	99	46	64	66	49	67	76	58	76	85
450	450	60	27	43	63	73	53	74	84	77	99	110	43	53	60	47	57	70	60	70	84
450	450	70	38	38	46	57	37	47	59	55	66	78	54	74	87	60	80	99	72	92	112
450	450	70	35	49	58	74	51	61	77	72	83	100	53	74	74	52	73	80	61	82	90
450	450	70	31	49	62	78	56	71	87	82	98	115	49	62	68	49	62	74	62	75	88
450	450	80	44	42	52	56	43	54	60	59	71	77	58	77	92	59	78	100	72	91	113
450	450	80	40	51	61	70	55	66	76	73	85	96	60	79	83	55	75	84	65	84	95
450	450	80	36	52	67	76	62	77	88	86	102	114	55	66	75	51	62	77	65	76	91
450	600	70	35	42	61	70	49	69	79	70	91	101	88	115	138	98	125	155	109	136	167
450	600	70	31	55	75	88	65	85	99	88	109	124	71	99	110	75	103	121	83	111	129
450	600	70	28	73	97	110	88	113	127	117	143	158	60	79	95	65	84	107	76	96	119
450	600	80	40	45	58	73	50	64	79	73	88	104	90	119	141	96	125	154	107	137	166
450	600	80	36	60	73	93	67	81	102	93	108	129	75	106	116	76	106	122	84	114	131
450	600	80	32	84	101	121	96	115	135	128	147	169	63	85	100	64	86	107	76	98	120
450	600	90	45	47	61	70	54	69	78	75	91	101	92	120	145	94	122	153	106	134	165
450	600	90	40	61	75	89	70	86	100	94	110	125	79	108	121	76	104	123	84	113	133
450	600	90	36	86	105	119	101	121	135	130	151	166	65	85	103	62	82	107	74	95	119
600	300	60	39	47	65	77	47	66	79	57	76	91	44	59	70	54	68	86	66	80	98
600	300	60	36	55	73	90	58	77	95	70	90	108	34	49	48	38	53	58	47	62	67
600	300	60	33	63	85	103	71	95	113	89	113	132	32	39	43	37	43	54	49	56	67
600	300	70	45	41	53	71	39	52	71	51	64	85	44	60	70	49	66	82	61	78	95
600	300	70	42	50	62	85	51	64	88	65	79	104	37	54	52	37	54	58	46	63	68
600	300	70	38	63	80	103	70	87	111	89	108	133	35	44	47	36	45	54	48	58	67
600	300	80	52	49	62	74	50	63	77	59	74	88	51	66	79	53	68	87	65	81	100
600	300	80	48	56	69	86	59	73	91	71	86	104	49	65	65	45	61	67	54	71	77
600	300	80	44	71	88	106	79	98	116	97	116	135	46	54	59	43	51	63	56	64	76
600	450	70	42	53	72	86	56	76	91	68	89	104	82	102	119	93	113	136	104	123	147
600	450	70	38	67	86	104	72	92	111	87	108	128	67	87	91	71	92	103	79	100	111
600	450	70	35	80	104	122	91	116	135	111	137	157	62	74	83	67	80	96	79	91	108
600	450	80	48	49	62	82	50	64	84	64	79	100	80	103	118	87	109	131	98	121	143
600	450	80	44	65	78	102	68	82	107	85	100	126	68	91	94	69	92	101	77	100	110
600	450	80	40	84	101	126	93	111	137	115	135	161	63	78	86	64	79	94	76	91	106
600	450	90	54	54	67	81	57	71	86	69	84	99	88	109	127	91	112	136	102	123	148
600	450	90	49	68	82	100	74	89	108	88	104	124	79	101	106	76	97	109	84	106	118
600	450	90	45	89	108	126	100	120	139	121	141	161	72	86	96	70	84	101	82	96	113
600	600	70	38	68	91	109	77	100	119	94	118	137	125	154	180	137	165	198	146	175	208
600	600	70	35	82	105	127	93	117	139	112	137	161	97	127	140	103	133	153	109	140	160
600	600	70	31	115	143	165	132	160	183	157	186	210	86	107	126	92	114	139	103	125	150
600	600	80	44	69	86	110	75	93	117	95	113	138	123	155	179	131	163	194	141	173	204
600	600	80	40	84	102	130	93	111	140	115	134	164	99	132	144	101	133	152	108	141	160
600	600	80	36	124	146	174	138	161	190	166	189	219	86	111	128	89	113	137	100	124	149
600	600	90	49	74	92	109	82	101	119	99	118	138	131	162	189	135	165	199	145	176	210
600	600	90	45	86	105	127	97	116	139	117	137	160	110	141	156	108	139	160	115	146	168
600	600	90	40	129	152	174	146	169	192	171	195	219	95	118	138	94	117	143	105	128	155

TABLE F-4B. TOTAL HC EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 5*4

INTERSECTION				MINOR STREET									MAJOR STREET								
ENVIRONMENT				LEFT TURNS									LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	26	30	29	24	28	28	30	35	36	20	25	31	18	23	35	24	28	41
300	300	50	25	30	34	37	30	35	39	38	44	49	26	31	25	17	23	23	20	26	26
300	300	50	22	15	24	27	20	30	34	35	45	50	27	25	23	20	17	22	26	24	30
300	300	60	33	27	25	30	22	21	26	30	30	36	19	26	30	12	20	31	19	26	37
300	300	60	30	29	27	37	27	26	36	38	38	49	29	37	29	17	25	24	20	28	27
300	300	60	27	20	22	32	23	26	37	39	44	55	30	30	27	19	18	22	25	25	30
300	300	70	38	39	38	36	36	36	35	42	43	43	22	28	35	12	18	31	18	24	38
300	300	70	35	38	37	40	37	38	41	46	47	52	35	42	37	19	26	27	23	30	31
300	300	70	31	29	33	36	34	39	43	48	54	59	36	34	34	21	19	25	28	26	33
300	450	50	25	23	28	28	23	29	30	32	38	40	34	44	56	33	43	61	38	48	67
300	450	50	22	28	33	37	30	36	41	41	48	54	36	48	47	29	40	46	31	42	48
300	450	50	20	18	27	32	25	36	42	42	54	60	36	39	43	30	32	43	35	38	49
300	450	60	30	26	25	31	23	23	30	34	35	43	35	48	58	30	42	59	35	48	65
300	450	60	27	31	30	41	31	31	43	45	46	58	40	54	52	29	43	47	31	45	50
300	450	60	24	24	28	39	30	34	46	49	54	67	40	45	48	30	35	44	35	41	51
300	450	70	35	35	35	35	35	36	36	43	45	47	39	50	63	29	41	60	35	46	66
300	450	70	31	37	37	41	39	40	45	50	52	58	47	60	60	32	44	51	35	47	54
300	450	70	28	31	35	40	38	44	49	55	62	68	46	50	55	32	36	48	38	42	54
300	600	60	27	17	26	29	21	31	36	35	46	51	58	77	98	58	77	104	61	81	109
300	600	60	24	24	33	41	31	41	50	47	58	68	48	68	76	42	62	77	42	63	78
300	600	60	21	35	48	57	48	62	72	69	85	95	40	52	66	35	47	67	39	51	72
300	600	70	31	22	25	35	25	29	40	41	46	57	57	79	98	52	75	101	56	79	105
300	600	70	28	30	34	48	36	40	55	54	59	75	49	72	79	39	62	76	40	63	77
300	600	70	24	46	54	68	57	65	81	81	90	107	40	55	67	31	46	64	36	51	70
300	600	80	36	29	33	37	34	39	44	48	54	59	58	78	100	50	70	99	54	75	104
300	600	80	32	34	39	47	42	47	56	58	64	74	53	74	84	39	60	77	40	62	78
300	600	80	28	52	61	69	65	75	84	87	97	107	42	55	70	29	42	63	34	47	69
450	300	50	30	34	47	49	33	47	50	46	61	65	19	26	34	21	28	43	28	35	51
450	300	50	27	37	50	57	39	52	60	55	69	78	23	31	27	19	27	29	24	32	34
450	300	50	25	31	48	56	38	57	65	60	79	88	22	21	22	19	18	26	27	26	34
450	300	60	36	38	44	53	35	42	52	50	59	69	18	27	34	16	25	39	24	33	47
450	300	60	33	42	49	62	41	49	63	59	68	83	25	36	30	18	28	29	22	33	34
450	300	60	30	39	51	64	44	56	71	68	81	96	25	27	27	18	20	26	26	29	35
450	300	70	42	48	56	59	47	56	59	61	70	74	22	30	39	16	24	40	24	32	49
450	300	70	38	49	57	64	50	59	67	66	76	85	34	43	40	22	31	35	27	36	40
450	300	70	35	47	60	67	54	68	76	76	90	99	33	34	36	22	23	31	31	31	41
450	450	60	33	32	46	50	34	48	53	50	65	71	39	52	66	43	55	75	49	61	82
450	450	60	30	41	55	63	45	60	69	63	79	89	37	51	52	35	48	56	38	51	60
450	450	60	27	38	57	65	48	67	77	72	92	102	35	40	47	33	38	51	40	46	59
450	450	70	38	38	45	55	37	46	56	55	65	76	38	54	66	38	53	72	44	59	79
450	450	70	35	47	55	69	49	58	73	70	79	95	39	55	55	33	49	55	36	52	59
450	450	70	31	49	62	77	57	70	86	83	97	114	37	45	50	31	39	50	38	46	58
450	450	80	44	44	53	57	46	56	60	62	72	78	41	55	70	37	50	72	43	57	79
450	450	80	40	51	60	68	55	65	74	74	85	94	46	60	63	35	50	59	39	54	63
450	450	80	36	55	69	77	65	79	89	89	104	114	42	48	56	32	38	53	40	46	61
450	600	70	35	36	53	61	42	61	69	63	83	92	72	94	117	77	99	128	82	104	134
450	600	70	31	47	65	77	56	75	88	79	99	113	58	81	92	57	79	97	59	82	99
450	600	70	28	67	90	102	82	105	118	111	135	149	48	62	78	47	61	84	53	67	90
450	600	80	40	45	56	70	49	62	76	72	86	101	69	94	115	70	94	122	75	100	128
450	600	80	36	57	69	88	64	77	96	90	104	124	58	83	[illegible]	52	78	93	55	80	96
450	600	80	32	84	100	119	96	114	133	127	146	166	46	63	77	41	58	79	47	64	86
450	600	90	45	49	62	69	56	69	78	76	91	100	70	93	118	67	90	121	73	96	127
450	600	90	40	61	74	86	70	84	97	94	108	122	61	85	97	51	75	94	54	78	97
450	600	90	36	89	106	119	103	122	135	132	152	166	47	63	80	38	54	78	45	61	85
600	300	60	39	47	64	75	47	65	77	57	75	88	34	43	53	38	47	64	44	53	70
600	300	60	36	53	70	85	56	74	90	68	86	104	26	36	34	24	34	39	27	37	42
600	300	60	33	64	85	101	72	94	111	90	113	131	25	27	30	24	25	35	30	32	42
600	300	70	45	47	58	75	45	57	75	57	69	88	28	40	49	28	40	55	34	46	62
600	300	70	42	54	65	87	55	66	89	69	81	105	24	37	33	18	31	34	21	34	38
600	300	70	38	70	85	107	76	92	116	96	113	137	23	27	29	18	22	31	25	29	38
600	300	80	52	58	69	81	58	71	83	68	81	94	35	45	57	31	41	59	37	48	67
600	300	80	48	62	74	90	65	78	95	77	91	108	35	47	46	25	37	43	29	40	47
600	300	80	44	80	96	112	89	106	123	106	124	142	33	37	41	24	27	38	32	35	46
600	450	70	42	53	70	83	56	74	87	68	87	101	63	78	94	68	83	106	73	88	111
600	450	70	38	64	82	99	69	88	106	84	104	122	51	66	70	50	65	76	52	67	78
600	450	70	35	80	102	120	91	114	132	111	135	154	47	54	63	47	54	69	52	60	75
600	450	80	48	55	66	85	55	68	87	69	83	103	57	74	89	58	75	96	63	80	102
600	450	80	44	68	80	103	71	84	108	88	101	126	47	65	68	42	60	69	44	63	72
600	450	80	40	90	106	130	99	116	140	121	139	164	43	53	60	39	49	63	44	55	69
600	450	90	54	61	74	86	64	78	91	76	91	105	64	80	97	61	77	101	66	82	107
600	450	90	49	74	87	104	79	93	111	94	109	127	57	74	79	48	65	77	51	68	80
600	450	90	45	98	115	132	109	127	145	129	148	167	51	60	70	43	52	69	50	58	75
600	600	70	38	67	88	105	75	97	115	92	115	133	102	126	151	108	132	164	111	136	168
600	600	70	35	78	100	121	89	112	133	108	132	155	77	102	115	77	102	121	78	103	123
600	600	70	31	114	141	162	130	158	180	156	184	207	66	83	101	67	84	109	72	89	114
600	600	80	44	74	89	112	80	96	119	99	116	140	95	122	146	97	124	154	101	128	159
600	600	80	40	87	103	130	95	112	140	117	135	163	74	101	113	70	98	116	71	99	117
600	600	80	36	129	149	177	143	164	192	170	192	221	62	81	98	59	78	102	64	83	107
600	600	90	49	80	97	113	89	106	123	106	124	142	102	128	154	101	126	159	105	131	164
600	600	90	45	91	108	129	102	120	141	121	140	163	84	110	124	76	102	123	77	104	125
600	600	90	40	137	158	179	153	175	197	178	201	224	70	88	107	63	81	107	68	86	113

TABLE F-4C. TOTAL HC EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 5*5

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS: LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			MAJOR STREET LEFT TURNS: LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	43	45	43	31	35	33	28	33	32	16	19	27	13	16	31	18	21	37
300	300	50	25	43	46	48	34	38	41	34	39	42	27	31	27	18	22	24	21	25	28
300	300	50	22	20	28	30	17	25	29	23	32	36	26	22	23	19	14	22	25	20	29
300	300	60	33	45	42	45	31	29	33	31	29	34	20	26	33	14	19	33	19	25	39
300	300	60	30	44	41	49	33	31	40	35	34	44	36	43	37	24	30	31	27	33	35
300	300	60	27	27	29	37	21	24	33	29	32	42	35	33	33	23	21	28	30	28	35
300	300	70	38	46	44	41	35	33	32	32	32	31	26	30	39	15	19	35	21	25	42
300	300	70	35	42	40	42	33	32	35	33	33	37	45	50	47	28	33	37	31	37	41
300	300	70	31	26	28	30	22	26	29	28	32	36	43	40	42	27	24	33	34	31	40
300	450	50	25	36	40	39	27	32	31	27	33	33	30	39	53	29	37	58	33	42	63
300	450	50	22	38	42	45	31	36	40	34	39	44	38	48	49	31	40	48	32	42	50
300	450	50	20	20	28	32	19	28	33	27	37	42	36	37	43	29	30	43	34	35	49
300	450	60	30	41	39	43	30	28	34	32	31	38	37	48	61	32	42	62	36	47	67
300	450	60	27	43	41	50	34	33	43	39	39	50	48	60	60	37	48	55	38	50	58
300	450	60	24	28	31	40	25	29	39	35	40	51	46	49	55	35	39	50	40	44	57
300	450	70	35	40	38	37	30	30	30	30	31	31	43	52	68	33	43	65	38	48	70
300	450	70	31	38	37	40	32	32	36	34	35	40	57	68	71	42	52	62	44	55	64
300	450	70	28	24	28	31	23	28	32	31	37	42	54	56	64	39	41	56	45	47	62
300	600	60	27	26	34	37	22	31	34	27	37	41	51	69	92	50	68	98	54	71	102
300	600	60	24	30	38	45	29	38	46	37	46	55	46	65	76	40	59	76	40	59	77
300	600	60	21	34	46	53	38	51	59	51	65	74	37	47	63	31	41	64	35	46	69
300	600	70	31	34	36	44	28	31	40	35	39	49	56	76	98	51	71	100	55	75	104
300	600	70	28	39	41	54	35	38	52	45	49	64	54	76	85	44	65	81	44	66	82
300	600	70	24	47	53	67	49	56	71	64	72	88	43	56	70	33	46	67	38	51	72
300	600	80	36	31	34	36	27	30	34	32	36	40	59	78	102	50	69	100	54	73	105
300	600	80	32	33	36	43	31	35	43	39	44	52	60	80	92	46	65	84	46	66	86
300	600	80	28	42	50	57	47	55	63	60	69	78	47	58	76	33	45	69	38	50	74
450	300	50	30	45	57	58	35	48	50	40	53	56	14	19	29	15	20	38	22	28	45
450	300	50	27	45	57	63	38	51	57	45	59	66	24	30	28	20	26	30	23	30	35
450	300	50	25	31	48	54	30	47	54	42	60	68	20	18	21	17	14	24	24	22	33
450	300	60	36	51	56	64	39	45	53	46	53	62	19	26	36	17	24	40	24	32	48
450	300	60	33	52	57	69	42	49	62	52	59	73	32	41	38	24	33	36	28	37	41
450	300	60	30	41	52	64	37	49	62	52	64	78	29	30	32	22	23	31	30	31	40
450	300	70	42	51	57	59	41	49	51	46	54	57	25	31	43	19	25	44	26	33	52
450	300	70	38	48	55	61	41	49	56	48	57	65	43	50	49	31	38	44	35	43	49
450	300	70	35	39	50	56	37	50	56	50	63	71	39	38	43	28	27	38	36	36	47
450	450	60	33	40	53	55	33	46	50	40	54	58	35	45	62	38	48	71	44	54	78
450	450	60	30	45	58	65	41	55	62	51	65	74	39	50	54	36	47	57	38	50	61
450	450	60	27	35	52	60	36	54	62	51	70	79	34	37	46	32	35	51	38	42	58
450	450	70	38	47	54	63	38	45	55	47	56	66	40	53	68	39	52	74	45	58	80
450	450	70	35	54	61	74	47	55	69	59	67	82	47	61	63	40	54	63	43	57	67
450	450	70	31	48	60	73	47	59	74	65	78	93	42	48	55	36	42	56	43	49	63
450	450	80	44	44	51	54	36	45	48	43	53	57	45	57	74	40	52	76	46	58	83
450	450	80	40	47	55	62	43	52	59	52	62	71	55	68	73	44	57	69	48	61	73
450	450	80	36	44	56	64	45	58	66	60	74	83	49	54	64	39	43	60	46	51	68
450	600	70	35	40	57	63	38	55	63	50	69	77	65	85	110	69	89	121	73	94	126
450	600	70	31	48	65	76	49	66	78	63	82	95	57	78	91	55	76	95	56	77	98
450	600	70	28	61	82	93	67	89	101	87	110	123	44	56	75	42	55	80	48	61	86
450	600	80	40	51	62	74	47	58	72	61	73	88	68	90	115	68	90	121	73	96	127
450	600	80	36	61	72	89	59	71	89	76	89	108	62	86	97	56	80	98	58	82	101
450	600	80	32	79	95	112	83	99	118	106	123	142	48	63	80	43	58	81	48	64	88
450	600	90	45	45	57	63	43	55	63	55	68	76	71	92	119	67	88	122	72	94	128
450	600	90	40	54	66	77	54	67	79	69	83	95	67	89	104	57	80	100	60	82	103
450	600	90	36	74	91	102	80	97	109	100	119	131	51	65	85	42	56	82	48	62	89
600	300	60	39	58	73	83	49	66	77	50	67	79	25	33	46	29	36	56	34	42	62
600	300	60	36	60	76	91	55	71	87	58	75	92	24	32	32	21	29	37	24	32	40
600	300	60	33	64	84	99	63	84	100	72	94	111	20	20	26	18	18	31	25	25	38
600	300	70	45	60	69	85	49	59	77	52	63	81	26	36	47	25	35	53	31	41	60
600	300	70	42	64	73	94	56	66	88	61	72	95	27	38	37	21	32	38	24	35	41
600	300	70	38	72	86	107	69	84	106	80	96	119	24	27	31	19	21	32	25	28	39
600	300	80	52	60	70	81	52	63	74	52	65	76	34	43	57	30	39	59	36	45	66
600	300	80	48	61	72	87	56	67	83	59	71	88	41	50	52	31	40	48	34	43	52
600	300	80	44	71	87	102	71	87	103	80	97	114	37	38	45	27	29	42	34	36	50
600	450	70	42	60	77	88	54	72	84	58	76	89	56	68	87	60	73	98	65	78	103
600	450	70	38	68	85	101	65	83	100	71	90	107	49	62	69	47	61	74	49	63	76
600	450	70	35	77	98	114	79	101	118	90	113	131	42	48	59	42	47	65	47	53	71
600	450	80	48	64	74	92	56	67	86	61	74	93	55	70	88	56	71	95	60	76	100
600	450	80	44	74	85	107	69	80	103	77	89	113	51	67	72	46	62	73	48	64	76
600	450	80	40	88	104	126	89	105	128	102	119	143	44	53	63	40	48	65	45	54	71
600	450	90	54	60	72	83	55	67	79	58	71	84	64	78	98	61	75	101	66	80	107
600	450	90	49	70	82	97	67	79	96	72	86	103	63	78	86	54	69	83	56	71	86
600	450	90	45	86	102	118	88	105	122	100	118	135	55	62	75	47	54	73	53	60	79
600	600	70	38	71	91	107	70	92	108	79	101	118	91	113	141	96	119	153	100	122	157
600	600	70	35	79	100	120	81	103	124	92	115	136	72	95	110	71	95	117	72	95	118
600	600	70	31	108	133	153	115	141	162	132	159	180	59	74	94	59	74	101	64	79	106
600	600	80	44	80	94	116	77	92	115	87	104	127	90	115	142	92	117	150	96	121	154
600	600	80	40	90	105	131	90	105	132	103	119	147	75	101	115	71	96	117	71	97	118
600	600	80	36	125	144	170	130	150	177	148	169	197	61	78	98	57	75	101	62	80	106
600	600	90	49	76	92	107	76	92	108	84	101	118	100	123	152	98	121	157	102	125	161
600	600	90	45	84	100	119	86	103	123	97	114	136	87	111	128	79	103	126	80	104	128
600	600	90	40	122	142	162	129	150	171	146	168	189	71	87	109	63	80	108	68	85	113

TABLE F-4D. TOTAL HC EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 6*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS: LOW LEVEL, TRUCKS LOW	MINOR LOW LEVEL, TRUCKS MED	MINOR LOW LEVEL, TRUCKS HIGH	MINOR MEDIUM LEVEL, TRUCKS LOW	MINOR MEDIUM LEVEL, TRUCKS MED	MINOR MEDIUM LEVEL, TRUCKS HIGH	MINOR HIGH LEVEL, TRUCKS LOW	MINOR HIGH LEVEL, TRUCKS MED	MINOR HIGH LEVEL, TRUCKS HIGH	MAJOR STREET LEFT TURNS: LOW LEVEL, TRUCKS LOW	MAJOR LOW LEVEL, TRUCKS MED	MAJOR LOW LEVEL, TRUCKS HIGH	MAJOR MEDIUM LEVEL, TRUCKS LOW	MAJOR MEDIUM LEVEL, TRUCKS MED	MAJOR MEDIUM LEVEL, TRUCKS HIGH	MAJOR HIGH LEVEL, TRUCKS LOW	MAJOR HIGH LEVEL, TRUCKS MED	MAJOR HIGH LEVEL, TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	34	41	43	24	33	35	26	36	40	23	33	46	26	37	56	38	48	68
300	300	50	25	36	44	51	29	38	45	34	44	52	23	35	35	21	32	39	30	41	48
300	300	50	22	22	34	41	20	34	41	31	45	53	23	26	31	21	24	36	33	37	49
300	300	60	33	33	35	42	21	24	32	26	29	39	27	40	51	26	39	57	38	51	69
300	300	60	30	34	36	49	25	28	41	32	36	50	32	46	45	26	40	45	35	49	54
300	300	60	27	25	32	44	21	29	42	34	42	57	31	36	40	25	31	41	38	44	54
300	300	70	38	41	44	46	32	35	38	34	39	42	31	43	57	27	38	59	39	51	72
300	300	70	35	39	43	49	32	37	44	37	42	50	40	53	54	30	42	50	39	52	60
300	300	70	31	31	39	45	29	38	45	40	49	58	38	42	49	29	33	46	41	46	59
300	450	50	25	31	40	43	24	34	38	29	40	45	49	65	83	53	69	94	64	80	105
300	450	50	22	35	44	52	30	41	49	38	49	58	46	63	69	45	62	74	52	69	82
300	450	50	20	25	39	47	26	41	49	39	55	64	43	52	63	43	51	68	54	63	80
300	450	60	30	33	36	45	23	27	37	31	35	46	55	73	90	56	74	97	66	85	109
300	450	60	27	37	40	54	30	34	49	40	45	60	55	75	79	50	70	80	58	78	89
300	450	60	24	30	38	52	29	38	52	44	54	69	53	64	73	48	59	75	60	71	87
300	450	70	35	39	43	46	31	36	40	36	42	47	60	77	96	57	74	99	68	85	111
300	450	70	31	39	44	51	35	40	48	42	49	57	64	82	89	55	73	86	63	81	95
300	450	70	28	33	42	50	34	44	53	48	58	67	60	70	82	52	61	80	64	74	92
300	600	60	27	26	38	45	24	37	45	34	48	57	78	103	130	83	108	142	93	118	152
300	600	60	24	32	45	56	32	46	59	45	60	73	63	89	104	63	89	110	69	95	117
300	600	60	21	43	61	72	49	68	80	67	87	100	53	71	91	53	71	98	63	82	109
300	600	70	31	30	37	50	26	34	47	38	47	61	82	110	136	84	111	144	93	121	154
300	600	70	28	37	44	62	36	44	62	50	59	79	70	99	112	66	94	114	72	101	122
300	600	70	24	53	65	83	57	70	88	77	91	110	58	79	97	55	75	100	65	86	112
300	600	80	36	34	42	49	32	41	48	42	52	60	84	111	139	82	108	144	92	119	154
300	600	80	32	38	46	58	39	48	60	51	61	74	75	102	118	67	94	117	74	101	124
300	600	80	28	56	69	80	62	75	88	80	95	108	61	81	102	54	73	101	65	84	112
450	300	50	30	42	59	64	34	52	58	44	62	70	27	39	54	35	47	68	48	60	82
450	300	50	27	44	61	71	39	57	68	51	70	82	26	40	42	28	42	51	38	52	61
450	300	50	25	38	60	70	39	61	72	56	80	92	22	28	35	25	30	44	39	44	59
450	300	60	36	44	55	67	34	46	59	46	59	72	31	46	60	35	50	70	48	64	84
450	300	60	33	47	58	75	40	52	69	55	67	85	34	50	51	32	48	56	42	59	67
450	300	60	30	45	60	77	43	59	77	63	80	99	31	39	45	30	38	50	44	52	65
450	300	70	42	52	63	69	44	56	63	54	67	74	36	50	66	37	50	73	50	64	87
450	300	70	38	51	63	74	46	59	70	58	72	84	44	59	62	38	53	63	49	64	74
450	300	70	35	50	66	77	50	68	79	68	86	98	40	47	55	35	42	57	50	56	72
450	450	60	33	41	59	66	36	54	62	48	67	76	59	77	98	68	86	113	80	99	126
450	450	60	30	49	67	78	46	65	77	61	81	94	52	72	79	56	75	89	65	84	99
450	450	60	27	46	69	80	49	72	85	69	94	107	48	59	72	52	63	82	64	76	95
450	450	70	38	45	57	70	38	50	64	52	65	80	64	84	103	69	90	115	81	102	128
450	450	70	35	54	66	83	49	62	80	66	80	99	60	82	88	59	81	94	68	90	104
450	450	70	31	56	73	90	57	74	93	79	98	117	55	68	80	55	68	86	68	82	100
450	450	80	44	48	61	68	43	57	64	55	70	78	68	87	109	69	88	116	82	101	130
450	450	80	40	54	68	79	52	66	78	67	81	94	68	88	97	63	83	99	73	93	109
450	450	80	36	59	76	88	62	80	93	82	101	115	61	73	88	57	69	90	71	83	104
450	600	70	35	45	67	78	45	68	79	62	86	98	97	125	155	108	135	171	118	146	183
450	600	70	31	55	77	93	58	81	97	78	102	118	79	107	125	83	112	135	91	120	144
450	600	70	28	76	102	118	84	111	128	109	138	155	66	86	108	71	91	120	82	103	132
450	600	80	40	53	69	85	50	67	85	70	87	106	100	130	158	106	136	171	117	148	183
450	600	80	36	65	81	102	65	82	104	87	105	128	84	115	131	84	115	137	92	124	146
450	600	80	32	91	112	133	97	118	141	125	147	170	69	92	113	70	93	120	82	105	133
450	600	90	45	54	71	81	54	71	83	71	90	102	102	131	162	105	133	171	116	145	183
450	600	90	40	65	82	97	67	95	101	87	106	123	88	118	136	84	114	139	93	123	148
450	600	90	36	93	115	130	101	124	140	126	150	167	72	93	117	69	90	120	81	103	133
600	300	60	39	46	66	81	39	61	76	45	67	83	49	64	81	59	74	98	71	86	110
600	300	60	36	51	72	91	47	69	88	55	78	98	37	53	58	41	57	68	50	66	77
600	300	60	33	62	87	106	63	90	110	77	104	125	33	41	51	38	45	62	50	58	75
600	300	70	45	44	59	80	36	51	73	44	60	82	49	67	82	55	72	94	67	85	107
600	300	70	42	50	65	90	44	60	86	55	72	98	40	59	62	40	59	68	49	68	78
600	300	70	38	67	86	111	66	86	113	82	103	130	37	47	55	37	48	63	50	61	76
600	300	80	52	52	67	82	45	62	77	51	69	85	57	73	92	59	75	100	71	88	113
600	300	80	48	55	71	90	52	69	88	60	78	98	53	70	76	49	66	78	58	76	88
600	300	80	44	73	94	113	75	97	117	89	111	132	49	58	69	45	54	72	59	68	85
600	450	70	42	52	74	89	48	71	87	57	80	97	91	112	134	102	122	151	112	133	163
600	450	70	38	63	85	105	61	84	105	72	96	118	74	95	105	79	100	117	86	108	125
600	450	70	35	79	105	126	83	110	132	100	128	150	67	80	96	73	86	108	84	98	120
600	450	80	48	53	68	90	47	63	86	57	75	98	90	113	134	97	120	147	108	131	159
600	450	80	44	65	81	107	62	79	106	75	92	120	75	99	108	76	100	116	84	109	124
600	450	80	40	87	108	134	89	111	138	108	130	158	68	84	98	70	86	106	82	98	119
600	450	90	54	56	73	89	52	70	86	61	79	96	98	120	144	101	123	153	112	134	165
600	450	90	49	68	85	105	67	85	105	78	96	118	87	110	121	84	107	125	92	115	133
600	450	90	45	92	114	134	96	119	140	113	136	158	79	93	110	77	91	114	89	103	127
600	600	70	38	67	93	112	68	95	115	82	109	130	134	164	196	146	176	215	156	186	225
600	600	70	35	78	104	128	82	108	133	98	125	151	105	136	155	111	142	168	117	148	175
600	600	70	31	114	144	169	123	155	180	145	177	203	92	115	139	99	121	152	109	132	163
600	600	80	44	73	92	118	72	92	119	87	109	136	133	166	196	141	174	211	151	184	221
600	600	80	40	85	105	135	87	108	139	105	127	158	108	141	159	110	143	168	116	150	175
600	600	80	36	128	152	182	135	160	191	158	184	217	93	118	142	96	121	151	107	132	162
600	600	90	49	76	97	117	78	99	119	91	113	135	142	173	206	146	177	217	156	188	228
600	600	90	45	86	107	131	90	112	137	106	129	154	119	151	172	117	149	176	124	156	184
600	600	90	40	132	157	182	141	168	193	163	190	216	103	126	152	101	125	158	112	136	169

TABLE F-4E. TOTAL HC EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS LOW LEVEL TRUCKS LOW	MINOR LOW LEVEL TRUCKS MED	MINOR LOW LEVEL TRUCKS HIGH	MINOR MEDIUM LEVEL TRUCKS LOW	MINOR MEDIUM LEVEL TRUCKS MED	MINOR MEDIUM LEVEL TRUCKS HIGH	MINOR HIGH LEVEL TRUCKS LOW	MINOR HIGH LEVEL TRUCKS MED	MINOR HIGH LEVEL TRUCKS HIGH	MAJOR STREET LEFT TURNS LOW LEVEL TRUCKS LOW	MAJOR LOW LEVEL TRUCKS MED	MAJOR LOW LEVEL TRUCKS HIGH	MAJOR MEDIUM LEVEL TRUCKS LOW	MAJOR MEDIUM LEVEL TRUCKS MED	MAJOR MEDIUM LEVEL TRUCKS HIGH	MAJOR HIGH LEVEL TRUCKS LOW	MAJOR HIGH LEVEL TRUCKS MED	MAJOR HIGH LEVEL TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	29	36	37	20	27	29	22	30	33	39	45	57	37	43	61	43	49	67
300	300	50	25	30	37	42	23	31	37	28	36	43	43	50	49	35	41	47	38	44	51
300	300	50	22	18	30	35	16	29	35	27	40	47	43	41	46	36	34	45	42	40	52
300	300	60	33	34	35	42	23	24	32	27	30	38	38	47	57	32	40	57	38	47	64
300	300	60	30	34	35	46	25	27	39	32	35	47	47	56	54	35	44	48	38	47	52
300	300	60	27	27	33	44	24	30	42	36	43	57	46	47	50	35	36	45	42	43	53
300	300	70	38	45	47	48	36	38	40	38	42	44	42	49	62	32	39	59	39	45	66
300	300	70	35	42	44	49	34	37	43	39	43	50	54	62	62	38	46	53	41	49	57
300	300	70	31	36	42	48	34	41	48	45	53	60	53	52	58	37	37	49	45	44	57
300	450	50	25	26	34	36	19	28	30	24	34	37	58	69	86	56	67	91	61	72	97
300	450	50	22	28	36	42	23	32	39	31	40	48	58	70	75	51	63	74	52	65	77
300	450	50	20	21	33	40	21	35	42	35	49	57	56	59	70	49	53	70	55	59	76
300	450	60	30	34	35	43	24	27	36	31	35	44	59	73	89	54	67	90	59	73	96
300	450	60	27	36	38	50	29	32	45	39	43	57	62	77	80	51	66	76	53	68	78
300	450	60	24	32	38	51	31	38	52	46	54	68	60	67	75	50	56	72	56	62	78
300	450	70	35	42	45	47	35	39	41	40	44	48	63	75	94	54	66	91	59	72	97
300	450	70	31	41	44	50	36	40	47	43	48	56	70	83	89	55	68	81	57	71	84
300	450	70	28	37	45	52	38	47	54	51	61	69	67	72	83	53	57	75	59	64	82
300	600	60	27	20	31	37	17	30	37	27	41	48	82	102	129	82	102	135	85	106	140
300	600	60	24	24	36	46	24	37	48	37	51	63	70	91	106	64	85	106	65	86	107
300	600	60	21	38	54	65	44	61	72	62	80	92	61	74	93	55	68	94	60	73	99
300	600	70	31	30	36	48	26	32	45	38	45	59	81	104	130	77	100	132	81	104	137
300	600	70	28	35	41	58	33	40	57	48	56	74	72	96	109	62	86	106	63	87	107
300	600	70	24	54	64	81	58	69	86	78	90	108	61	77	95	52	68	92	57	73	98
300	600	80	36	36	43	49	34	42	48	44	53	60	83	105	133	75	96	131	79	101	136
300	600	80	32	38	46	56	39	47	58	52	60	72	76	99	114	62	85	107	64	86	109
300	600	80	28	59	70	81	65	77	89	83	96	108	64	78	99	51	65	92	56	70	98
450	300	50	30	38	53	58	30	46	52	40	57	63	38	46	60	41	48	69	48	56	77
450	300	50	27	38	54	63	33	49	59	45	62	73	41	50	51	37	46	54	41	50	59
450	300	50	25	35	55	65	35	56	66	53	75	86	38	38	45	35	35	48	43	43	57
450	300	60	36	46	56	67	36	47	58	48	59	72	38	48	61	36	47	66	44	54	74
450	300	60	33	47	57	72	40	51	67	54	66	83	44	55	55	36	47	54	41	52	59
450	300	60	30	48	62	77	46	61	77	66	82	99	42	45	50	35	38	50	43	46	59
450	300	70	42	56	67	71	48	60	65	58	70	76	43	52	67	37	46	68	45	54	76
450	300	70	38	54	65	74	48	60	70	61	73	84	53	63	66	41	51	61	46	56	66
450	300	70	35	55	70	79	55	71	81	73	90	101	50	52	60	39	41	55	48	50	65
450	450	60	33	36	53	58	31	48	55	43	61	69	63	77	96	66	80	106	72	86	113
450	450	60	30	42	59	69	39	57	68	54	72	84	59	74	81	57	71	85	60	74	88
450	450	60	27	42	63	74	45	67	78	65	88	100	55	61	74	53	59	78	60	67	86
450	450	70	38	46	57	69	39	50	63	53	65	79	63	79	97	62	78	103	68	85	110
450	450	70	35	53	64	80	48	60	77	65	77	95	62	79	85	55	72	85	59	76	89
450	450	70	31	58	73	90	59	75	92	81	98	116	57	66	77	52	60	78	59	68	86
450	450	80	44	52	64	69	47	59	66	59	72	79	66	81	102	61	76	103	68	88	111
450	450	80	40	56	68	78	53	66	77	68	82	93	69	84	93	58	74	89	62	78	93
450	450	80	36	63	79	90	66	83	94	86	104	116	63	70	84	53	61	81	61	68	89
450	600	70	35	40	60	70	39	61	71	56	79	90	97	120	149	101	124	160	106	129	165
450	600	70	31	48	69	83	50	72	87	70	92	108	81	105	121	80	103	126	82	106	129
450	600	70	28	71	96	111	79	105	120	104	131	147	69	84	106	68	83	112	74	89	118
450	600	80	40	53	68	83	51	66	83	70	86	104	94	120	147	95	120	154	100	126	160
450	600	80	36	63	78	98	63	79	100	85	102	124	81	107	123	76	102	124	78	104	127
450	600	80	32	92	112	132	98	118	139	125	146	169	67	85	106	63	80	107	69	87	114
450	600	90	45	57	72	82	56	73	83	74	91	102	96	120	150	93	116	153	98	122	160
450	600	90	40	66	82	96	68	85	100	88	106	121	85	110	127	75	100	124	78	103	128
450	600	90	36	96	117	131	104	126	141	130	152	168	69	86	109	60	77	107	67	84	114
600	300	60	39	47	66	79	40	61	75	46	67	82	54	64	80	58	68	91	63	74	97
600	300	60	36	50	69	87	46	66	85	54	76	95	44	55	59	42	53	64	45	56	67
600	300	60	33	63	88	106	65	90	109	79	105	125	41	44	53	40	43	58	47	50	66
600	300	70	45	52	65	84	43	57	77	51	66	87	48	61	76	48	61	83	55	68	90
600	300	70	42	56	69	93	49	64	89	60	75	101	43	56	59	37	50	59	40	54	63
600	300	70	38	74	92	117	74	93	118	90	110	136	40	45	53	35	40	54	42	47	62
600	300	80	52	61	76	89	55	70	84	61	77	92	56	67	85	52	63	87	58	70	94
600	300	80	48	63	78	95	59	75	93	67	84	103	54	67	72	45	57	69	48	61	73
600	300	80	44	84	103	121	85	105	124	99	120	140	51	55	65	42	46	63	49	53	71
600	450	70	42	52	73	87	49	70	85	57	79	95	87	103	125	92	108	137	97	113	142
600	450	70	38	61	82	101	60	81	101	70	93	113	73	90	99	72	88	105	74	91	107
600	450	70	35	80	105	124	84	110	130	100	127	148	67	75	90	67	75	96	72	81	103
600	450	80	48	59	74	94	53	68	90	63	79	102	81	100	120	82	101	128	87	106	134
600	450	80	44	69	84	109	66	81	107	79	95	122	70	89	97	65	84	99	67	86	102
600	450	80	40	94	114	139	96	116	143	115	136	163	64	75	88	60	70	90	65	77	97
600	450	90	54	65	81	95	61	77	93	69	87	103	89	106	129	86	103	133	91	109	139
600	450	90	49	75	91	109	73	90	110	84	102	122	80	98	109	72	89	107	74	92	110
600	450	90	45	101	122	141	105	127	147	122	144	165	73	83	99	65	75	97	71	81	104
600	600	70	38	67	91	109	68	93	112	81	107	127	126	151	183	132	157	195	136	161	200
600	600	70	35	75	100	123	79	104	128	95	121	146	100	126	145	100	126	151	101	127	153
600	600	70	31	114	143	167	123	153	177	145	176	201	87	105	129	88	106	137	93	111	142
600	600	80	44	78	97	121	77	96	122	93	113	139	120	148	178	123	150	187	127	154	191
600	600	80	40	88	107	136	90	110	139	108	129	159	97	126	144	94	122	146	95	123	148
600	600	80	36	134	157	186	141	165	195	164	189	220	84	104	127	81	101	130	86	106	136
600	600	90	49	84	104	122	85	106	125	99	120	140	128	155	187	127	153	192	131	157	197
600	600	90	45	92	112	135	96	116	140	112	133	158	108	135	155	100	127	154	102	129	156
600	600	90	40	140	165	188	150	175	199	171	197	222	92	111	137	85	104	136	91	110	142

TABLE F-4F. TOTAL HC EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*5

INTERSECTION ENVIRONMENT				MINOR STREET									MAJOR STREET								
				LEFT TURNS: LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LEFT TURNS: LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	46	52	52	28	34	35	22	29	30	35	38	53	32	35	56	37	41	62
300	300	50	25	44	50	54	28	35	40	24	32	38	44	49	50	35	40	48	38	43	51
300	300	50	22	24	35	39	14	25	30	16	28	34	42	38	45	34	30	44	40	37	51
300	300	60	33	53	53	59	33	33	40	29	30	37	40	46	59	33	39	59	39	45	65
300	300	60	30	50	50	60	32	33	44	30	32	44	54	61	62	41	49	56	44	52	59
300	300	60	27	36	40	50	23	28	40	27	33	45	51	50	56	39	38	50	46	45	57
300	300	70	38	54	55	54	36	37	37	29	32	33	46	51	66	35	40	62	41	46	69
300	300	70	35	47	48	52	31	33	38	28	30	36	63	69	72	47	52	62	50	56	66
300	300	70	31	34	39	43	23	30	35	25	32	38	59	57	65	44	41	56	51	48	64
300	450	50	25	40	47	48	24	32	33	20	29	31	53	62	82	52	61	87	56	65	92
300	450	50	22	39	46	51	25	33	39	24	33	39	59	70	77	52	62	76	53	64	78
300	450	50	20	24	35	41	16	28	34	20	33	40	55	57	69	48	50	69	53	55	75
300	450	60	30	49	50	57	31	33	40	30	32	40	60	72	91	55	67	92	60	72	97
300	450	60	27	49	50	61	33	35	47	34	37	50	70	83	89	58	71	84	60	73	86
300	450	60	24	37	42	54	27	33	46	33	41	54	66	70	81	55	59	77	60	65	83
300	450	70	35	47	49	50	31	34	35	28	31	33	67	77	98	57	68	95	62	73	101
300	450	70	31	43	45	50	30	33	38	28	32	39	79	91	100	64	76	91	66	78	93
300	450	70	28	32	39	44	24	32	38	29	37	44	74	77	91	60	63	83	65	69	89
300	600	60	27	30	41	45	19	31	36	21	33	39	75	93	122	74	93	128	77	96	132
300	600	60	24	31	42	51	23	35	45	27	40	50	68	88	105	62	81	105	62	82	106
300	600	60	21	37	53	62	35	51	61	44	61	72	57	68	90	51	62	91	55	67	96
300	600	70	31	43	47	58	30	35	47	33	39	52	80	101	129	76	97	131	79	101	135
300	600	70	28	45	50	65	34	40	56	40	47	64	77	99	114	66	89	110	67	89	112
300	600	70	24	56	65	80	51	61	77	62	73	90	64	78	98	54	68	95	58	72	100
300	600	80	36	39	44	49	28	34	39	29	36	42	84	104	134	75	95	132	79	99	137
300	600	80	32	38	44	53	29	36	46	33	41	52	83	104	122	69	89	114	70	91	116
300	600	80	28	50	61	70	48	59	69	57	69	80	68	81	104	55	67	97	59	72	102
450	300	50	30	50	64	68	33	48	53	34	50	55	33	39	55	35	41	64	41	48	71
450	300	50	27	47	62	69	33	48	57	36	53	62	41	48	52	37	44	55	41	48	59
450	300	50	25	36	55	63	28	48	57	37	57	67	35	34	44	32	31	47	40	39	55
450	300	60	36	60	69	78	41	51	61	45	55	66	38	47	62	36	45	67	43	52	74
450	300	60	33	58	67	81	42	52	66	48	58	74	50	60	62	42	51	61	46	56	66
450	300	60	30	51	64	78	40	54	69	51	66	82	46	47	55	38	40	54	46	48	63
450	300	70	42	60	69	72	43	53	57	44	55	60	45	52	70	39	46	71	47	54	79
450	300	70	38	54	64	72	40	51	59	44	55	65	61	69	75	49	57	69	54	62	75
450	300	70	35	48	62	70	39	54	63	48	64	74	56	56	66	45	45	62	53	53	71
450	450	60	33	45	60	65	31	47	52	34	51	57	58	70	92	61	72	101	67	78	108
450	450	60	30	48	63	72	36	53	62	42	59	70	60	72	82	57	69	86	60	72	89
450	450	60	27	40	60	70	34	55	65	46	67	78	54	58	73	52	56	77	58	62	84
450	450	70	38	57	66	77	41	51	62	46	57	70	64	78	99	63	77	104	69	83	111
450	450	70	35	60	70	85	47	57	73	55	66	83	69	84	92	62	77	92	65	80	95
450	450	70	31	58	72	88	50	65	81	63	79	96	62	69	82	56	63	83	63	70	90
450	450	80	44	52	63	67	38	50	55	42	54	60	69	82	105	64	77	107	71	84	114
450	450	80	40	53	64	73	42	54	63	48	60	71	78	92	103	67	81	98	70	84	102
450	450	80	36	53	68	77	47	63	73	58	75	86	70	75	91	60	65	88	67	73	96
450	600	70	35	45	64	73	36	56	66	45	66	76	89	110	141	93	114	152	98	119	157
450	600	70	31	50	70	83	44	64	78	55	76	91	79	101	120	77	99	124	79	101	127
450	600	70	28	66	90	103	65	90	104	81	107	122	64	78	102	63	77	107	68	82	113
450	600	80	40	61	74	89	49	64	79	60	75	91	92	116	146	92	116	153	97	121	158
450	600	80	36	68	81	100	59	74	93	72	88	108	85	110	127	79	104	128	81	106	131
450	600	80	32	89	107	126	86	105	125	105	125	146	69	85	108	64	80	109	70	86	116
450	600	90	45	54	68	77	45	60	69	53	69	79	96	118	151	92	114	154	98	120	160
450	600	90	40	60	75	87	53	69	83	64	81	95	91	114	134	81	104	131	83	107	134
450	600	90	36	83	102	115	82	102	116	99	120	134	73	88	113	64	79	111	70	85	117
600	300	60	39	59	77	89	43	62	75	40	60	74	45	53	72	48	56	82	54	62	88
600	300	60	36	58	77	94	46	65	83	45	66	84	41	50	57	39	48	61	41	51	64
600	300	60	33	64	87	104	57	81	99	62	87	106	36	37	48	34	35	53	40	42	60
600	300	70	45	65	77	96	48	61	80	47	61	81	46	57	74	45	56	80	51	62	87
600	300	70	42	66	79	101	51	65	88	53	67	92	45	57	62	39	51	63	42	54	66
600	300	70	38	77	94	117	68	86	110	75	94	119	41	44	54	35	39	55	42	45	63
600	300	80	52	65	78	90	50	64	77	46	61	75	55	64	85	51	60	87	57	67	94
600	300	80	48	63	77	93	51	65	83	50	66	84	60	70	78	49	60	74	53	63	78
600	300	80	44	76	94	111	69	88	106	74	94	113	54	56	69	44	46	66	51	54	73
600	450	70	42	61	80	94	48	68	83	48	69	84	79	93	117	84	97	129	88	102	134
600	450	70	38	66	86	104	56	77	95	58	80	99	70	85	97	69	84	102	70	85	104
600	450	70	35	78	102	120	73	98	117	81	106	126	62	69	86	62	68	92	67	74	98
600	450	80	48	69	83	102	55	69	89	56	71	92	79	96	119	80	96	126	84	101	131
600	450	80	44	77	90	114	65	79	104	69	84	110	73	91	101	68	85	103	70	87	105
600	450	80	40	94	112	136	87	106	131	97	117	143	65	74	90	60	70	92	66	75	98
600	450	90	54	65	79	93	52	68	82	52	68	83	89	104	130	86	101	133	91	106	139
600	450	90	49	72	86	104	62	77	96	64	80	99	86	102	115	77	93	113	79	95	116
600	450	90	45	91	110	128	86	106	125	94	115	134	76	84	103	68	76	101	74	82	107
600	600	70	38	72	95	112	64	88	106	69	94	113	115	138	172	121	144	184	124	147	188
600	600	70	35	77	101	123	72	97	119	80	105	128	94	118	140	94	118	146	94	119	147
600	600	70	31	109	137	159	109	138	161	122	152	175	80	96	122	80	96	129	84	100	134
600	600	80	44	85	103	126	76	94	118	82	101	126	115	141	174	117	143	182	121	147	186
600	600	80	40	93	110	138	86	104	133	95	114	144	98	125	145	94	121	147	95	122	149
600	600	80	36	130	152	180	128	151	180	143	167	197	82	101	126	79	97	129	83	102	134
600	600	90	49	81	99	117	73	93	111	78	98	117	125	150	185	123	148	189	127	152	194
600	600	90	45	86	105	126	81	100	123	88	108	132	111	136	159	103	128	157	104	129	159
600	600	90	40	127	150	172	127	151	174	140	165	188	93	110	138	86	103	137	90	108	142

TABLE F-4G. TOTAL HC EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 6*6

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS: LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			MAJOR STREET LEFT TURNS: LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	45	60	60	48	63	64	38	54	56	21	33	43	24	37	53	36	49	65
300	300	50	25	51	65	70	56	71	77	49	65	72	23	37	34	21	34	38	29	43	47
300	300	50	22	34	53	58	44	64	70	43	63	70	24	30	32	23	28	37	35	40	50
300	300	60	33	40	48	54	40	49	56	33	43	51	25	40	49	25	40	55	37	52	67
300	300	60	30	44	53	64	47	56	68	42	53	65	33	49	45	26	42	45	35	51	54
300	300	60	27	32	45	56	40	54	66	41	56	69	33	41	42	27	35	43	40	48	56
300	300	70	38	49	58	59	51	62	63	42	53	55	30	44	55	26	40	57	38	52	70
300	300	70	35	50	60	65	55	66	71	48	60	66	41	56	54	31	45	50	40	55	60
300	300	70	31	39	53	58	49	64	70	48	64	70	41	47	51	31	38	48	44	51	61
300	450	50	25	43	59	60	48	64	67	41	58	61	48	66	81	53	71	92	63	81	104
300	450	50	22	50	65	71	57	73	80	53	70	78	47	66	69	46	65	74	54	73	82
300	450	50	20	37	57	63	50	71	78	51	73	81	46	57	65	46	56	71	57	68	83
300	450	60	30	40	49	57	42	53	61	38	49	58	55	76	89	55	76	96	66	87	108
300	450	60	27	47	57	69	52	63	76	50	62	75	57	79	80	52	73	81	60	82	90
300	450	60	24	38	52	64	48	63	76	52	68	82	56	70	76	52	65	78	63	77	90
300	450	70	35	47	57	58	51	63	65	45	57	60	60	80	96	57	76	99	68	88	111
300	450	70	31	50	61	67	58	69	76	53	66	73	66	87	90	57	77	88	65	86	96
300	450	70	28	41	57	63	54	70	77	56	73	80	64	76	85	56	68	83	68	80	96
300	600	60	27	37	57	62	47	67	74	46	67	74	75	103	127	81	108	139	90	118	149
300	600	60	24	47	66	76	59	79	90	60	81	93	62	91	103	62	90	109	68	97	116
300	600	60	21	55	79	89	73	98	109	79	105	117	54	74	91	54	74	98	64	85	109
300	600	70	31	37	50	62	45	59	71	45	60	74	80	110	133	82	112	141	91	122	152
300	600	70	28	47	61	77	57	72	89	61	76	93	70	101	111	65	96	114	72	103	121
300	600	70	24	60	78	95	76	95	112	85	104	122	60	83	98	56	79	101	67	90	113
300	600	80	36	42	56	61	52	67	73	50	66	73	83	112	137	91	109	142	91	120	152
300	600	80	32	49	64	73	61	77	87	62	79	90	75	105	118	67	97	116	74	104	124
300	600	80	28	64	83	93	82	102	113	88	109	121	64	85	103	56	78	103	67	89	114
450	300	50	30	58	81	86	63	86	91	60	85	91	23	38	50	31	46	64	44	59	78
450	300	50	27	63	87	95	70	94	104	71	96	106	24	40	39	26	42	48	36	52	59
450	300	50	25	55	83	92	67	96	105	73	102	113	22	30	34	25	32	43	39	46	58
450	300	60	36	56	73	83	58	76	87	58	77	89	28	45	56	32	49	66	45	63	80
450	300	60	33	62	79	94	67	85	100	69	88	105	33	51	49	31	49	54	41	60	65
450	300	60	30	57	79	94	67	89	105	75	99	115	31	42	45	30	40	50	44	55	65
450	300	70	42	64	82	86	68	87	92	66	86	92	34	50	63	34	50	70	48	64	84
450	300	70	38	67	85	94	73	93	102	74	94	104	43	60	61	37	54	62	48	65	73
450	300	70	35	62	85	94	75	98	108	81	105	116	41	50	56	36	45	57	51	60	72
450	450	60	33	57	82	87	64	89	95	65	90	97	57	77	95	66	86	110	78	98	123
450	450	60	30	68	92	102	77	102	113	80	106	118	52	73	78	55	76	88	64	85	97
450	450	60	27	63	92	102	77	107	118	86	117	128	49	62	72	53	66	83	66	79	96
450	450	70	38	57	75	86	61	80	92	64	84	97	62	85	101	67	90	112	79	102	125
450	450	70	35	68	87	103	75	95	111	81	101	118	60	84	87	59	83	93	68	93	103
450	450	70	31	68	91	107	81	104	121	91	116	134	57	72	81	57	72	87	70	85	101
450	450	80	44	61	90	85	68	88	94	68	89	96	67	88	107	68	89	115	80	102	128
450	450	80	40	70	89	99	79	99	110	82	103	115	68	91	97	64	96	99	73	96	109
450	450	80	36	71	95	105	86	111	122	95	120	132	64	78	89	60	74	92	73	88	106
450	600	70	35	62	90	99	73	102	112	79	109	120	93	123	150	103	133	166	114	144	178
450	600	70	31	75	103	117	89	118	133	97	127	143	76	107	121	81	111	132	89	119	141
450	600	70	28	93	125	139	112	146	161	126	161	176	65	87	107	70	92	118	82	104	131
450	600	80	40	65	87	102	74	97	113	82	106	123	96	128	154	102	135	167	114	146	178
450	600	80	36	80	102	122	92	115	136	102	126	148	82	115	128	82	115	135	90	124	144
450	600	80	32	103	130	150	121	148	169	137	165	187	69	94	112	70	95	120	82	107	132
450	600	90	45	67	90	99	78	102	112	84	109	119	99	130	158	102	132	167	113	144	179
450	600	90	40	80	104	118	95	119	134	103	128	143	87	119	134	83	115	137	92	124	146
450	600	90	36	106	134	148	126	154	169	139	169	184	72	96	117	69	93	120	82	105	133
600	300	60	39	72	99	112	77	105	119	71	100	115	44	61	75	54	71	91	65	83	104
600	300	60	36	80	107	124	88	116	134	84	113	132	34	52	53	37	55	64	46	64	73
600	300	60	33	88	119	137	101	134	152	103	137	156	31	41	48	36	46	59	48	58	72
600	300	70	45	66	87	106	69	91	111	65	88	109	44	64	77	50	70	89	62	82	102
600	300	70	42	75	96	119	81	103	127	79	102	128	37	58	58	37	58	65	46	67	74
600	300	70	38	88	114	138	99	126	151	104	131	157	36	48	53	36	49	61	49	62	74
600	300	80	52	74	96	109	80	102	116	74	97	112	53	71	87	55	73	95	67	86	108
600	300	80	48	80	103	120	89	112	130	85	109	128	51	70	73	47	66	75	56	75	85
600	300	80	44	96	122	140	109	137	155	111	140	159	48	59	67	45	56	70	58	69	84
600	450	70	42	78	106	120	86	115	130	83	112	128	87	110	129	98	120	147	108	131	158
600	450	70	38	92	120	138	102	131	151	101	131	152	71	95	102	76	100	114	84	108	122
600	450	70	35	105	138	157	121	155	174	126	160	181	67	82	94	72	88	107	84	99	119
600	450	80	48	74	96	116	80	103	124	79	102	124	86	112	130	93	118	143	104	130	155
600	450	80	44	89	112	136	98	121	146	99	123	149	74	100	106	75	101	113	83	109	122
600	450	80	40	109	136	161	123	150	176	130	158	185	69	87	98	70	88	106	82	100	118
600	450	90	54	78	102	116	86	110	125	83	108	123	95	119	140	98	122	150	110	134	162
600	450	90	49	93	116	135	104	128	147	103	128	148	86	111	119	83	108	123	91	116	132
600	450	90	45	114	142	161	130	159	179	135	165	185	79	96	110	77	94	114	89	106	127
600	600	70	38	93	125	143	106	139	158	108	142	161	128	161	190	140	172	208	150	182	218
600	600	70	35	107	139	162	122	156	179	127	161	185	101	134	150	107	140	163	113	146	170
600	600	70	31	140	177	200	161	199	223	171	210	234	90	114	136	96	121	149	107	132	160
600	600	80	44	94	120	144	105	132	157	109	137	162	128	163	190	136	171	205	146	181	215
600	600	80	40	109	136	164	123	150	179	129	157	188	104	140	155	106	142	163	113	149	171
600	600	80	36	149	180	209	168	200	229	180	212	243	91	119	139	94	122	148	105	132	160
600	600	90	49	99	126	144	112	140	158	113	142	162	137	171	201	142	175	212	152	185	222
600	600	90	45	111	139	161	127	155	178	131	160	184	116	150	168	114	148	173	121	156	180
600	600	90	40	154	186	209	175	208	232	185	219	243	101	127	150	100	126	156	111	137	167

TABLE F-4H. TOTAL HC EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*6

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL TRUCKS			MEDIUM LEVEL TRUCKS			HIGH LEVEL TRUCKS			LOW LEVEL TRUCKS			MEDIUM LEVEL TRUCKS			HIGH LEVEL TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	42	55	55	45	58	58	35	50	51	38	46	55	36	43	59	42	49	65
300	300	50	25	46	59	63	50	65	69	44	59	64	43	52	49	35	44	47	38	47	50
300	300	50	22	31	49	53	41	60	65	40	60	65	45	46	47	38	38	46	44	45	53
300	300	60	33	43	50	55	43	51	57	36	44	51	38	48	56	31	42	56	37	48	63
300	300	60	30	45	52	62	48	56	66	43	52	63	48	59	54	36	47	49	39	50	52
300	300	60	27	36	47	57	44	56	67	45	58	70	49	52	52	38	40	47	44	47	55
300	300	70	38	54	63	62	57	66	66	47	57	58	42	51	61	32	41	58	38	47	65
300	300	70	35	53	62	65	58	67	72	51	62	67	55	65	63	39	49	53	43	53	58
300	300	70	31	45	58	61	55	69	73	54	68	74	56	58	60	41	42	52	48	50	59
300	450	50	25	39	53	54	44	59	60	37	53	55	57	71	85	56	69	90	61	74	96
300	450	50	22	44	58	63	51	66	72	47	63	69	60	74	76	52	66	75	54	68	77
300	450	50	20	33	52	57	46	66	72	48	68	75	59	65	72	53	59	72	58	64	78
300	450	60	30	42	50	56	44	53	60	40	49	58	59	75	88	54	70	90	59	75	95
300	450	60	27	47	55	66	52	61	73	50	60	73	64	81	82	53	70	77	55	72	80
300	450	60	24	40	53	64	51	64	76	54	69	82	64	73	79	54	62	75	60	68	81
300	450	70	35	51	60	60	56	66	67	49	60	62	64	79	94	55	69	92	60	75	98
300	450	70	31	52	62	67	60	70	76	55	67	73	73	88	91	58	73	83	60	76	86
300	450	70	28	46	60	65	59	74	80	60	76	83	71	79	87	57	64	79	63	71	86
300	600	60	27	33	51	55	42	61	66	41	60	66	80	103	127	80	102	133	83	106	137
300	600	60	24	40	58	67	52	71	81	53	73	83	70	93	105	64	87	105	64	88	106
300	600	60	21	50	73	82	68	92	102	75	99	110	62	78	94	57	72	95	61	77	100
300	600	70	31	38	50	61	46	59	70	46	60	72	80	105	128	76	101	130	80	105	135
300	600	70	28	46	59	73	56	70	85	59	73	90	73	99	109	63	89	105	64	90	107
300	600	70	24	62	79	94	78	95	111	86	105	122	63	81	97	54	72	94	59	77	99
300	600	80	36	45	58	63	55	69	74	53	68	74	82	106	131	74	98	130	78	102	134
300	600	80	32	50	64	72	63	77	86	64	79	89	77	102	115	63	88	107	65	90	109
300	600	80	28	68	86	95	86	104	114	92	112	122	66	83	101	53	70	94	58	75	100
450	300	50	30	56	77	80	60	82	86	57	81	86	35	45	57	37	47	65	45	55	73
450	300	50	27	58	81	88	65	88	96	65	89	98	39	50	49	36	47	52	40	51	57
450	300	50	25	52	79	87	65	92	101	71	99	108	38	41	45	35	38	48	43	46	57
450	300	60	36	59	75	84	61	78	88	61	79	89	35	48	58	34	46	63	41	54	71
450	300	60	33	63	79	93	68	84	99	70	88	103	43	56	54	35	49	53	40	53	58
450	300	60	30	60	81	95	70	92	107	79	101	116	43	48	50	36	41	50	44	49	59
450	300	70	42	70	87	90	74	92	95	72	90	95	41	52	64	35	46	65	43	54	74
450	300	70	38	70	87	95	77	95	103	77	96	105	53	65	65	41	53	60	46	58	65
450	300	70	35	68	90	98	81	103	112	87	110	119	51	55	61	41	45	56	49	53	66
450	450	60	33	54	77	81	60	84	89	61	85	91	61	77	94	65	80	103	71	86	110
450	450	60	30	62	85	94	71	95	105	74	99	109	59	76	80	56	73	84	60	76	88
450	450	60	27	60	87	96	74	103	112	83	112	123	57	65	75	55	63	79	62	70	87
450	450	70	38	59	76	86	63	81	92	66	85	97	61	80	95	61	79	101	67	85	108
450	450	70	35	68	86	100	75	93	109	81	99	116	62	81	84	56	75	84	59	79	88
450	450	70	31	71	93	108	83	106	122	94	117	134	60	71	79	54	65	79	61	72	87
450	450	80	44	66	84	88	72	91	96	73	92	98	65	82	100	61	77	102	68	84	110
450	450	80	40	72	91	99	82	101	110	85	105	115	70	88	93	59	77	89	63	81	94
450	450	80	36	77	99	108	91	115	125	100	124	135	66	75	86	56	66	83	64	73	91
450	600	70	35	57	84	92	69	96	105	74	103	112	93	118	144	98	122	155	103	128	161
450	600	70	31	68	95	108	82	110	124	90	119	133	79	105	119	78	103	124	80	106	126
450	600	70	28	88	120	133	108	141	154	122	155	170	68	86	105	68	85	111	74	91	117
450	600	80	40	66	87	101	75	97	112	83	106	122	91	119	144	92	119	150	97	125	157
450	600	80	36	79	100	119	91	113	132	101	124	144	80	108	121	74	103	122	77	105	125
450	600	80	32	105	131	150	123	149	169	138	166	186	68	88	105	63	83	107	69	89	114
450	600	90	45	70	92	100	82	105	114	87	111	121	94	120	147	90	116	150	96	122	156
450	600	90	40	82	104	117	96	120	133	104	128	143	84	111	126	75	102	123	77	104	126
450	600	90	36	110	137	150	130	157	171	143	172	186	70	89	109	61	80	107	68	87	114
600	300	60	39	74	100	111	79	106	119	73	101	114	49	61	75	53	65	85	59	71	92
600	300	60	36	80	106	122	88	115	132	84	112	130	41	54	56	39	52	60	42	55	64
600	300	60	33	90	121	138	104	135	153	106	138	157	40	45	51	39	44	56	45	50	64
600	300	70	45	74	94	112	77	98	117	73	95	114	44	59	71	44	59	78	50	65	85
600	300	70	42	81	101	123	87	108	131	85	107	131	40	56	56	34	50	56	37	53	60
600	300	70	38	97	121	144	108	133	157	112	139	163	39	47	52	34	42	53	41	49	61
600	300	80	52	85	105	117	90	112	124	84	106	120	52	66	80	48	62	83	55	68	90
600	300	80	48	89	110	126	97	119	136	94	116	134	53	67	69	43	57	66	46	61	70
600	300	80	44	107	132	149	120	147	164	122	150	168	51	57	64	42	48	62	49	55	70
600	450	70	42	80	106	119	88	115	129	84	112	127	84	102	121	89	107	132	94	112	138
600	450	70	38	91	118	135	101	129	148	100	129	148	71	90	97	70	89	102	72	91	105
600	450	70	35	107	138	156	123	155	174	127	161	180	67	78	89	67	77	96	72	83	102
600	450	80	48	81	102	121	87	109	129	86	108	129	78	99	117	79	100	124	85	105	130
600	450	80	44	95	116	139	103	125	149	104	127	152	69	90	95	64	85	97	66	87	100
600	450	80	40	117	142	166	131	157	182	137	165	190	64	77	88	60	73	90	66	79	97
600	450	90	54	88	110	123	96	119	133	93	116	131	87	106	126	84	103	130	89	108	136
600	450	90	49	101	123	140	111	134	152	110	134	153	80	100	108	71	91	105	74	94	109
600	450	90	45	124	151	169	141	168	187	145	173	193	74	86	99	66	78	98	72	84	104
600	600	70	38	94	124	141	107	138	156	108	141	159	121	148	177	127	154	189	131	158	194
600	600	70	35	105	136	158	121	153	175	125	158	181	96	124	140	96	124	147	97	125	148
600	600	70	31	141	177	198	162	199	221	172	209	233	86	106	127	87	106	134	91	111	139
600	600	80	44	101	125	148	111	137	161	115	142	166	116	146	173	118	148	181	122	152	186
600	600	80	40	114	139	166	127	153	181	133	160	189	94	125	140	91	121	143	92	123	144
600	600	80	36	156	185	213	175	205	234	187	218	247	83	105	125	80	102	128	84	107	134
600	600	90	49	107	133	150	120	147	165	122	150	168	124	153	182	123	151	187	127	155	192
600	600	90	45	118	144	165	134	161	183	138	166	189	106	135	152	98	127	151	99	129	153
600	600	90	40	164	194	216	185	216	239	194	227	250	92	113	135	85	106	135	90	111	141

TABLE F-41. TOTAL HC EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*7

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS: LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			MAJOR STREET LEFT TURNS: LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	60	72	70	54	67	65	36	49	49	35	41	53	32	38	56	38	44	62
300	300	50	25	61	73	75	57	70	73	41	55	59	46	53	52	38	44	50	40	47	53
300	300	50	22	38	55	58	40	57	61	30	48	53	46	44	49	38	36	47	44	43	54
300	300	60	33	63	69	73	54	61	66	38	46	51	41	49	59	34	43	59	40	49	66
300	300	60	30	62	68	77	56	63	72	43	50	61	57	66	64	44	54	58	47	57	61
300	300	60	27	45	56	64	44	56	65	36	49	59	56	57	60	44	45	54	50	52	62
300	300	70	38	64	71	69	58	65	64	39	48	48	47	54	67	37	44	63	43	50	70
300	300	70	35	60	67	70	56	64	67	41	50	54	67	75	75	50	58	65	53	61	69
300	300	70	31	44	55	58	45	58	61	35	49	53	65	65	70	49	49	61	56	56	68
300	450	50	25	54	67	66	50	64	64	35	49	50	55	66	84	53	65	88	58	69	93
300	450	50	22	55	69	72	54	68	72	41	56	61	63	75	80	55	68	79	57	69	81
300	450	50	20	38	55	59	42	60	65	34	54	59	60	64	74	53	58	74	59	63	80
300	450	60	30	59	66	71	52	60	66	39	48	55	63	77	93	57	71	94	62	76	99
300	450	60	27	61	68	78	57	65	76	46	55	67	74	89	92	63	77	87	64	79	90
300	450	60	24	46	58	68	48	61	71	43	56	68	72	78	87	61	68	82	66	73	89
300	450	70	35	57	65	64	53	62	62	38	48	48	70	83	101	60	73	98	65	78	103
300	450	70	31	56	64	68	54	64	68	41	52	57	84	98	104	69	82	95	71	85	98
300	450	70	28	42	55	59	46	60	65	39	53	59	81	86	97	66	71	89	72	77	95
300	600	60	27	44	61	64	45	63	67	35	53	58	75	95	122	74	95	128	77	98	132
300	600	60	24	48	65	73	52	70	78	44	63	72	70	92	106	64	85	106	64	86	107
300	600	60	21	51	73	81	61	83	92	58	82	91	60	74	93	55	68	94	59	72	98
300	600	70	31	52	63	72	51	63	73	42	55	66	81	104	129	76	100	131	80	103	135
300	600	70	28	57	68	82	58	70	85	53	65	81	79	104	116	69	93	112	69	94	113
300	600	70	24	65	81	94	72	88	103	72	89	105	68	84	102	58	74	98	63	79	104
300	600	80	36	49	61	63	50	62	66	39	53	57	85	107	135	77	98	133	80	103	137
300	600	80	32	51	63	70	54	67	76	46	60	69	86	109	124	72	95	116	73	96	118
300	600	80	28	60	77	85	69	87	96	67	86	95	73	88	108	59	74	101	64	79	106
450	300	50	30	68	89	91	64	85	88	53	75	79	32	40	54	33	42	62	40	49	69
450	300	50	27	68	89	96	66	88	95	58	81	89	42	51	52	38	47	55	41	51	59
450	300	50	25	55	80	87	58	84	92	55	82	91	38	39	45	35	35	48	42	43	57
450	300	60	36	74	89	97	67	83	91	59	75	85	38	49	61	36	46	65	43	54	73
450	300	60	33	75	90	102	71	87	100	65	81	95	51	63	63	43	55	61	47	59	66
450	300	60	30	65	84	97	66	86	100	65	86	101	49	52	57	41	45	56	49	53	65
450	300	70	42	74	90	92	70	86	89	59	76	80	45	55	70	39	49	70	47	56	78
450	300	70	38	72	88	94	70	87	94	61	79	87	63	73	76	51	61	71	56	66	76
450	300	70	35	62	83	89	66	87	94	63	85	93	60	62	69	48	50	65	57	59	74
450	450	60	33	63	85	88	61	84	88	53	76	81	58	72	91	61	75	101	67	81	107
450	450	60	30	69	91	98	69	92	100	64	87	96	62	77	84	59	73	87	62	77	90
450	450	60	27	59	85	93	64	92	100	64	92	102	57	64	76	55	62	80	62	68	87
450	450	70	38	71	87	96	66	83	93	60	78	88	64	81	99	63	80	104	70	86	111
450	450	70	35	77	93	107	75	92	107	72	90	105	71	89	94	64	82	94	67	85	97
450	450	70	31	72	92	106	76	97	112	77	100	115	66	75	86	60	69	86	67	76	94
450	450	80	44	67	84	87	65	82	86	56	75	80	70	85	106	66	80	108	72	87	115
450	450	80	40	71	88	95	71	89	97	65	84	93	81	97	105	70	86	101	74	90	105
450	450	80	36	67	89	97	73	96	104	73	96	106	75	82	96	65	72	92	72	80	100
450	600	70	35	64	89	96	67	93	101	63	91	99	87	110	139	91	114	149	96	119	155
450	600	70	31	72	98	109	77	104	116	76	104	117	79	103	119	77	101	124	79	103	126
450	600	70	28	84	115	127	95	127	139	100	132	146	66	82	103	65	81	109	70	86	115
450	600	80	40	75	94	107	75	96	110	74	95	110	91	117	144	91	117	151	96	122	157
450	600	80	36	84	104	122	88	108	127	89	111	130	86	112	127	80	106	128	82	109	131
450	600	80	32	103	127	145	112	137	156	119	145	164	71	90	110	66	85	111	72	91	118
450	600	90	45	68	89	96	71	93	101	68	91	99	96	120	150	92	116	153	97	122	159
450	600	90	40	77	98	110	83	105	117	82	105	118	92	117	135	82	107	131	85	110	134
450	600	90	36	98	123	135	109	135	147	113	141	154	76	93	115	67	84	113	73	90	120
600	300	60	39	87	111	122	83	109	120	69	95	107	42	52	68	45	56	78	51	62	95
600	300	60	36	89	114	129	89	114	130	77	103	120	40	52	55	38	49	59	40	52	63
600	300	60	33	93	122	137	97	127	144	91	122	139	36	40	48	35	38	53	41	45	60
600	300	70	45	89	107	124	83	103	120	71	91	109	43	56	71	43	56	77	49	62	84
600	300	70	42	93	111	133	90	109	131	80	100	123	45	59	61	39	53	62	42	56	65
600	300	70	38	101	124	146	103	127	150	99	124	147	42	48	55	36	42	56	43	49	63
600	300	80	52	89	109	119	86	106	117	71	92	104	53	65	82	49	61	85	55	67	91
600	300	80	48	90	110	125	90	110	126	77	99	116	60	72	77	50	62	74	53	65	77
600	300	80	44	100	125	140	105	131	147	99	125	142	56	60	70	46	51	67	53	58	75
600	450	70	42	89	115	127	88	115	127	76	103	117	77	94	115	82	98	126	87	103	131
600	450	70	38	97	123	140	99	126	143	89	117	135	71	88	97	69	86	102	71	88	104
600	450	70	35	106	136	153	113	144	162	109	141	159	64	73	87	64	72	93	69	78	99
600	450	80	48	93	113	130	90	110	129	80	101	121	78	97	117	79	97	124	84	102	130
600	450	80	44	103	123	145	103	124	147	95	117	141	74	94	102	69	88	103	71	90	105
600	450	80	40	117	142	165	123	148	171	121	147	171	67	79	92	63	74	94	69	80	100
600	450	90	54	89	110	122	89	110	123	76	99	112	88	106	129	85	102	132	90	108	138
600	450	90	49	99	120	136	101	122	139	91	114	131	88	106	116	78	97	114	81	99	116
600	450	90	45	115	140	157	122	149	166	118	145	163	80	90	105	71	81	103	77	87	110
600	600	70	38	100	130	145	104	135	151	97	128	146	112	137	168	117	143	180	121	146	184
600	600	70	35	108	138	159	115	146	167	111	142	164	93	119	138	92	119	144	93	119	145
600	600	70	31	137	171	192	149	184	206	150	186	208	80	98	122	80	98	129	85	103	134
600	600	80	44	109	132	154	111	135	158	106	131	155	112	140	170	114	142	178	118	146	183
600	600	80	40	119	143	169	124	148	176	121	147	175	97	126	143	93	122	145	94	123	147
600	600	80	36	154	182	208	164	193	220	167	197	225	83	104	126	80	100	129	84	105	134
600	600	90	49	105	130	146	110	135	152	102	129	146	123	150	182	121	148	186	125	152	191
600	600	90	45	113	138	158	120	146	167	115	142	164	110	138	158	102	130	156	103	131	158
600	600	90	40	151	180	201	163	194	215	164	195	217	94	113	138	87	106	138	92	111	143

TABLE F-5A. TOTAL NOX EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 4*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	91	106	113	83	102	108	88	106	116	60	84	91	57	79	92	66	90	105
300	300	50	25	97	115	125	89	111	120	100	121	134	54	78	77	47	69	74	53	76	84
300	300	50	22	84	105	118	81	107	118	92	116	133	56	79	71	51	71	69	57	79	80
300	300	60	33	83	92	105	76	91	103	80	93	109	52	77	84	49	72	85	58	83	98
300	300	60	30	86	99	115	80	98	112	89	105	124	56	80	80	49	71	78	55	79	87
300	300	60	27	79	95	114	78	99	117	87	106	129	56	79	72	50	71	71	56	79	81
300	300	70	38	85	97	102	81	98	101	82	97	105	52	78	87	49	73	88	58	84	101
300	300	70	35	83	99	107	79	100	106	86	105	116	59	84	85	52	75	82	57	82	92
300	300	70	31	73	92	103	75	98	107	81	103	117	61	85	79	55	77	78	61	86	88
300	450	50	25	86	103	113	80	102	110	88	108	121	89	127	147	87	123	150	97	135	164
300	450	50	22	91	112	124	85	110	121	98	122	138	82	119	133	76	112	131	83	120	142
300	450	50	20	85	108	124	84	112	126	97	124	143	80	117	123	76	110	123	83	119	134
300	450	60	30	79	91	107	75	92	106	80	96	115	85	124	146	83	121	148	94	133	163
300	450	60	27	86	101	120	81	101	118	93	111	133	84	122	136	78	114	135	85	123	146
300	450	60	24	80	99	121	82	105	125	93	115	140	83	121	128	79	114	127	86	123	139
300	450	70	35	79	94	101	77	97	103	81	99	110	86	126	148	84	122	150	94	134	165
300	450	70	31	79	97	107	76	100	108	86	107	121	88	127	142	83	120	141	89	128	152
300	450	70	28	73	94	107	76	102	114	85	110	126	88	126	135	83	120	134	91	129	146
300	600	60	27	79	103	119	80	109	123	86	113	132	95	158	203	95	155	206	106	169	222
300	600	60	24	87	114	133	87	119	137	99	129	152	75	137	174	71	130	174	78	140	186
300	600	60	21	95	125	147	100	135	156	112	145	171	68	129	160	65	124	161	73	134	173
300	600	70	31	74	93	115	76	100	121	80	102	128	90	153	199	89	151	203	101	164	218
300	600	70	28	83	105	130	85	112	136	95	120	149	74	137	175	70	130	175	78	140	187
300	600	70	24	93	119	147	101	132	158	111	139	171	65	127	159	62	121	159	70	132	172
300	600	80	36	72	94	108	77	104	116	78	103	121	85	150	196	85	147	200	96	161	216
300	600	80	32	75	100	117	79	109	124	87	115	135	72	135	175	67	129	175	75	139	187
300	600	80	28	86	114	134	96	129	147	103	134	157	62	125	157	59	119	158	67	130	171
450	300	50	30	111	139	160	109	143	162	122	153	177	60	88	98	62	88	105	72	100	119
450	300	50	27	114	145	169	112	148	170	130	165	192	54	81	85	53	78	88	59	86	98
450	300	50	25	113	147	174	117	156	182	134	172	203	52	79	75	52	76	79	59	85	90
450	300	60	36	106	130	156	107	135	160	117	144	174	54	83	95	57	84	101	66	96	115
450	300	60	33	110	137	167	111	142	171	127	156	190	54	83	87	53	79	90	59	87	100
450	300	60	30	112	141	174	118	152	184	133	166	202	55	83	80	55	80	84	62	89	95
450	300	70	42	107	134	152	110	142	158	118	148	169	54	84	96	56	85	103	66	96	117
450	300	70	38	105	134	156	108	142	162	121	154	179	60	89	94	58	85	97	64	93	107
450	300	70	35	106	138	163	114	151	174	127	163	191	61	89	88	61	87	91	68	96	102
450	450	60	33	103	134	157	103	139	161	118	152	179	90	132	157	93	134	165	104	147	180
450	450	60	30	112	146	172	112	151	176	133	170	200	76	117	135	76	115	139	83	125	151
450	450	60	27	113	150	179	118	161	188	139	179	212	76	116	127	77	115	132	85	125	144
450	450	70	38	98	124	153	100	131	159	113	142	175	86	129	154	89	131	162	100	144	177
450	450	70	35	109	138	170	111	145	176	129	162	198	77	120	138	77	118	142	84	127	154
450	450	70	31	113	145	181	121	158	192	139	175	213	76	118	129	77	117	134	85	127	147
450	450	80	44	95	124	145	100	134	153	110	142	167	83	127	154	87	129	161	97	142	176
450	450	80	40	100	132	156	105	142	164	121	156	183	78	122	141	78	120	145	85	129	156
450	450	80	36	105	140	167	115	155	181	131	169	200	77	120	132	78	119	137	86	129	149
450	600	70	35	103	141	171	110	153	181	123	164	197	111	178	227	116	181	236	129	195	253
450	600	70	31	113	153	186	119	165	197	138	182	218	86	152	193	87	151	199	95	161	211
450	600	70	28	131	175	212	144	193	227	162	209	249	76	141	176	79	141	183	88	153	196
450	600	80	40	102	135	171	111	149	183	122	158	197	103	171	221	108	174	230	120	188	246
450	600	80	36	114	150	189	123	164	202	139	179	221	82	149	192	83	148	197	92	158	209
450	600	80	32	138	177	219	152	196	237	168	211	256	70	136	172	73	136	178	82	148	192
450	600	90	45	95	131	159	107	148	174	115	154	185	99	167	218	104	170	227	116	184	243
450	600	90	40	104	142	173	115	159	188	129	171	205	78	145	189	79	145	194	87	155	207
450	600	90	36	127	169	203	144	191	223	158	203	240	66	132	169	68	132	175	77	144	189
600	300	60	39	119	168	209	116	169	209	126	178	222	73	106	120	75	105	126	79	112	135
600	300	60	36	126	178	222	122	179	221	139	194	241	61	93	100	59	89	102	59	91	107
600	300	60	33	133	188	235	135	195	240	151	209	259	62	93	93	61	89	96	62	93	102
600	300	70	45	108	152	199	107	156	201	115	162	212	62	95	111	64	95	117	68	101	125
600	300	70	42	117	163	214	115	167	215	129	179	233	55	88	96	53	84	99	54	86	103
600	300	70	38	128	178	231	132	187	238	146	199	255	57	89	90	56	86	94	58	89	99
600	300	80	52	109	156	195	110	162	199	116	166	208	65	99	116	67	99	122	71	105	130
600	300	80	48	113	162	204	114	168	208	125	178	223	64	98	107	62	94	109	63	96	114
600	300	80	44	125	177	222	131	189	232	143	199	247	67	99	102	66	96	105	67	100	110
600	450	70	42	121	173	216	120	176	218	133	188	235	114	161	190	117	162	197	123	169	207
600	450	70	38	133	187	234	131	191	236	150	208	258	97	143	164	96	140	168	98	144	174
600	450	70	35	145	203	252	149	212	260	168	229	282	95	139	154	95	138	159	97	142	165
600	450	80	48	112	158	208	113	164	212	124	173	226	101	149	178	104	150	186	110	157	195
600	450	80	44	127	176	229	127	182	232	144	196	252	89	136	158	88	133	162	90	136	167
600	450	80	40	144	197	252	150	208	262	167	222	282	86	132	147	86	130	152	89	134	158
600	450	90	54	108	157	198	111	165	205	120	172	217	106	155	185	109	156	192	115	163	202
600	450	90	49	119	171	216	122	179	222	137	192	240	96	144	168	96	141	171	97	145	177
600	450	90	45	137	193	240	146	206	252	160	218	269	94	140	157	94	138	161	96	143	168
600	600	70	38	129	187	237	134	197	246	145	207	260	139	210	263	144	212	272	150	221	283
600	600	70	35	142	203	256	147	213	264	163	228	284	108	178	224	108	176	228	111	181	236
600	600	70	31	167	231	287	178	247	301	194	261	321	102	171	210	103	170	215	107	176	223
600	600	80	44	126	179	236	134	192	247	143	199	259	126	198	252	130	200	260	137	209	271
600	600	80	40	140	196	255	147	208	266	161	221	284	102	172	219	102	171	224	105	176	231
600	600	80	36	172	231	294	185	249	310	199	262	328	92	162	202	93	161	208	97	167	215
600	600	90	49	123	178	226	132	193	240	139	198	249	131	204	259	136	206	268	142	215	278
600	600	90	45	132	191	242	141	205	255	154	216	270	108	180	228	109	178	232	111	183	240
600	600	90	40	165	227	281	180	247	299	192	257	315	98	169	210	100	168	216	103	174	223

TABLE F-5B. TOTAL NOX EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 5*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	88	100	106	78	96	100	83	99	107	85	104	112	80	97	111	86	105	122
300	300	50	25	94	110	118	84	105	112	94	114	125	79	97	98	70	86	93	73	90	100
300	300	50	22	81	100	111	77	101	110	87	109	124	82	99	93	73	88	89	77	94	97
300	300	60	33	84	92	103	77	90	99	79	90	105	74	93	103	68	86	101	75	94	112
300	300	60	30	88	99	113	80	96	109	88	102	120	78	96	99	68	85	93	71	90	100
300	300	60	27	80	95	112	79	98	113	86	104	124	78	96	91	69	85	87	73	91	94
300	300	70	38	90	101	104	85	101	102	85	99	105	71	92	102	65	84	100	72	92	111
300	300	70	35	89	102	108	83	102	106	89	106	115	77	96	99	67	85	94	70	90	101
300	300	70	31	79	95	104	79	101	108	84	105	117	80	98	94	71	88	90	75	94	98
300	450	50	25	81	96	104	73	94	100	80	99	110	112	145	167	108	139	167	116	148	179
300	450	50	22	86	104	115	78	102	111	91	113	127	105	137	152	97	127	148	101	133	157
300	450	50	20	79	101	115	77	104	116	90	115	132	104	135	143	97	126	140	101	132	149
300	450	60	30	78	89	103	73	89	101	78	92	109	105	139	162	101	133	162	109	142	174
300	450	60	27	85	99	115	80	98	113	90	107	127	103	136	153	95	126	149	99	132	157
300	450	60	24	80	97	117	80	102	120	90	110	134	103	135	145	96	126	142	101	133	151
300	450	70	35	83	96	101	80	98	102	82	99	108	102	137	161	98	131	161	106	140	173
300	450	70	31	82	98	107	79	100	107	87	107	119	104	138	155	96	128	151	100	134	160
300	450	70	28	76	96	107	79	103	113	87	109	124	105	138	148	97	128	145	102	135	154
300	600	60	27	72	94	109	71	98	111	76	102	119	118	175	222	115	170	223	124	181	236
300	600	60	24	80	105	123	79	109	125	90	118	139	97	153	193	90	144	190	95	152	200
300	600	60	21	87	116	136	92	125	144	102	134	158	91	146	179	85	138	177	91	146	187
300	600	70	31	71	89	109	73	95	114	76	96	120	109	167	214	106	162	216	115	173	229
300	600	70	28	80	101	124	82	107	129	90	114	141	93	150	190	86	141	188	91	148	197
300	600	70	24	91	114	141	98	127	151	106	133	163	84	141	174	78	132	172	84	141	183
300	600	80	36	74	94	106	77	102	113	78	101	117	101	160	208	98	155	210	107	166	223
300	600	80	32	76	99	115	80	108	121	86	112	131	87	145	186	80	136	184	85	143	193
300	600	80	28	87	113	132	97	128	144	102	132	154	78	135	169	72	127	168	78	135	178
450	300	50	30	110	136	155	107	139	156	118	148	171	81	104	117	81	102	121	88	111	132
450	300	50	27	112	142	164	110	144	165	127	160	185	75	97	103	71	92	103	75	97	111
450	300	50	25	112	145	170	115	152	176	131	167	196	74	95	94	71	90	95	75	96	103
450	300	60	36	110	131	157	109	136	160	118	143	172	73	96	110	72	94	114	80	103	125
450	300	60	33	114	139	167	113	143	170	128	156	188	72	95	102	69	90	102	72	95	110
450	300	60	30	115	143	174	120	153	183	135	166	201	73	96	95	71	91	96	75	97	104
450	300	70	42	115	139	156	117	146	161	124	151	172	69	94	108	69	92	112	76	101	123
450	300	70	38	113	140	160	114	147	165	127	158	181	74	98	105	70	92	105	74	97	113
450	300	70	35	113	144	167	121	156	177	133	167	193	76	99	99	73	94	100	77	100	109
450	450	60	33	99	129	150	99	133	153	113	145	170	110	147	173	111	146	179	119	156	191
450	450	60	30	109	141	166	108	145	168	128	163	191	95	132	151	93	127	153	98	134	162
450	450	60	27	109	145	173	114	155	181	134	172	203	96	131	143	94	127	146	99	135	156
450	450	70	38	99	124	151	101	131	156	113	140	171	102	140	168	103	139	173	112	150	186
450	450	70	35	110	138	168	112	144	173	129	160	194	93	130	151	91	126	152	95	132	161
450	450	70	31	115	145	179	122	157	189	139	173	210	93	129	142	91	125	145	97	133	155
450	450	80	44	101	128	147	105	137	154	114	144	167	96	135	163	97	134	169	106	144	181
450	450	80	40	106	136	158	109	145	165	125	158	184	91	129	150	88	124	152	93	131	161
450	450	80	36	111	144	169	120	158	182	135	171	200	90	128	142	89	124	144	94	131	154
450	600	70	35	98	134	162	104	145	172	116	155	187	130	192	243	133	192	249	142	204	263
450	600	70	31	108	147	178	113	157	187	131	173	208	104	165	209	103	161	211	109	169	221
450	600	70	28	127	169	203	138	185	218	155	201	238	95	155	192	95	152	195	102	161	206
450	600	80	40	102	133	167	110	146	179	120	154	192	119	181	233	121	182	239	131	193	253
450	600	80	36	114	148	186	122	161	197	137	175	216	97	158	203	96	155	206	102	163	216
450	600	80	32	138	175	215	151	194	232	166	207	251	86	146	184	85	144	188	92	153	199
450	600	90	45	99	133	159	110	149	173	117	154	184	111	174	226	113	174	233	123	186	247
450	600	90	40	107	144	173	118	160	187	131	171	203	89	152	197	88	148	200	94	156	210
450	600	90	36	131	171	203	147	192	223	160	203	239	78	139	178	77	136	181	34	145	192
600	300	60	39	118	165	204	114	166	203	123	174	216	91	119	135	91	116	139	92	119	144
600	300	60	36	125	175	218	121	176	216	136	189	235	79	105	115	74	99	114	72	98	116
600	300	60	33	132	185	231	133	191	235	148	205	253	80	106	108	77	100	109	75	101	112
600	300	70	45	112	154	199	110	157	201	117	163	211	76	105	122	76	102	125	77	105	131
600	300	70	42	121	166	214	118	168	215	131	180	231	70	97	107	65	90	107	63	90	109
600	300	70	38	132	180	232	135	189	238	148	199	254	72	98	102	69	93	102	67	93	105
600	300	80	52	117	162	199	118	167	203	123	171	211	76	105	124	76	103	127	77	106	133
600	300	80	48	121	169	209	121	174	212	132	183	226	75	103	115	71	97	114	69	97	117
600	300	80	44	133	184	227	139	194	236	149	203	250	78	105	110	75	100	110	74	101	113
600	450	70	42	119	168	210	116	171	211	128	181	226	131	172	203	131	171	208	134	175	215
600	450	70	38	131	183	228	128	185	229	146	202	250	113	153	177	110	148	178	109	149	181
600	450	70	35	143	198	246	146	207	253	163	222	274	111	150	167	109	146	169	109	148	173
600	450	80	48	114	159	207	114	164	210	124	172	223	114	156	188	115	155	193	118	160	200
600	450	80	44	129	177	228	128	181	230	144	195	249	101	143	167	98	138	168	97	139	172
600	450	80	40	147	197	251	152	208	260	167	221	278	99	139	157	97	135	159	97	137	163
600	450	90	54	114	162	201	116	169	207	124	175	218	116	159	191	116	157	196	119	162	203
600	450	90	49	126	176	219	127	183	224	141	195	240	106	148	173	102	143	174	102	144	178
600	450	90	45	144	197	243	151	210	254	164	221	270	103	144	163	101	140	165	101	142	169
600	600	70	38	124	181	229	129	190	237	139	198	250	155	220	275	156	220	281	160	226	289
600	600	70	35	137	196	248	141	205	255	157	219	274	123	187	235	121	183	237	121	186	242
600	600	70	31	162	225	279	172	240	292	188	253	311	117	181	222	116	177	225	117	181	230
600	600	80	44	127	178	233	133	190	243	141	196	254	138	204	260	139	204	266	144	210	274
600	600	80	40	140	195	252	146	206	262	160	218	279	113	179	227	111	175	230	111	177	234
600	600	80	36	173	230	291	185	247	306	198	259	323	104	169	210	103	165	213	104	169	219
600	600	90	49	127	181	227	136	195	239	141	199	248	140	207	264	142	207	270	146	213	278
600	600	90	45	136	194	243	145	207	255	156	217	269	116	183	232	114	179	235	114	181	239
600	600	90	40	169	229	282	184	249	299	195	258	314	107	172	215	105	169	218	107	172	223

TABLE F-5C. TOTAL NOX EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 5*5

INTERSECTION				MINOR			STREET						MAJOR			STREET					
ENVIRONMENT						LEFT			TURNS					LEFT			TURNS				
				LOW	LEVEL		MEDIUM LEVEL			HIGH	LEVEL		LOW	LEVEL		MEDIUM LEVEL			HIGH	LEVEL	
					TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS	
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	102	113	117	86	102	104	83	98	105	95	108	118	87	98	115	91	104	123
300	300	50	25	105	119	125	88	107	112	91	109	119	96	109	112	84	95	104	84	97	109
300	300	50	22	88	105	115	77	99	107	80	101	113	91	103	99	80	90	92	81	93	97
300	300	60	33	100	106	116	86	98	105	82	91	104	86	101	112	78	91	108	82	97	116
300	300	60	30	100	110	122	86	100	111	87	100	116	98	111	115	86	98	108	86	100	112
300	300	60	27	89	102	117	81	98	112	82	97	116	91	103	100	80	90	93	81	93	99
300	300	70	38	95	104	106	84	98	97	77	89	94	87	102	114	79	92	110	83	98	119
300	300	70	35	90	102	107	78	95	98	77	92	100	100	115	120	89	101	112	89	103	117
300	300	70	31	77	92	99	70	91	96	69	87	98	96	109	107	85	96	101	86	99	106
300	450	50	25	97	110	116	83	101	106	83	100	109	124	152	176	117	143	173	122	150	183
300	450	50	22	99	115	124	84	106	113	90	110	122	124	151	168	114	138	162	115	142	168
300	450	50	20	88	108	120	79	104	115	85	108	124	116	141	152	106	130	146	108	134	153
300	450	60	30	96	105	117	84	98	109	82	95	110	120	149	174	114	140	172	119	147	181
300	450	60	27	100	111	127	87	104	117	91	106	125	126	154	172	116	141	166	117	145	171
300	450	60	24	91	106	124	84	104	121	88	106	127	118	145	156	109	133	151	111	138	157
300	450	70	35	90	101	105	80	97	99	76	91	98	121	150	177	114	142	174	119	149	183
300	450	70	31	86	100	107	76	95	100	77	95	105	131	159	178	120	146	172	121	150	177
300	450	70	28	76	94	104	72	95	103	73	94	107	123	151	163	114	139	158	116	143	164
300	600	60	27	90	110	123	83	108	119	81	104	120	124	176	225	119	168	223	125	177	234
300	600	60	24	94	118	133	86	115	129	90	117	136	111	162	203	101	150	198	104	155	205
300	600	60	21	98	125	143	96	128	145	100	129	151	97	147	182	89	137	177	92	142	185
300	600	70	31	91	107	126	86	107	124	82	101	123	118	171	221	113	164	219	119	172	230
300	600	70	28	97	115	137	91	115	135	93	115	140	110	162	204	101	151	199	103	155	206
300	600	70	24	104	125	150	104	131	154	105	130	158	94	145	180	86	134	176	89	140	184
300	600	80	36	83	101	112	80	103	112	74	95	109	114	168	218	108	160	217	115	169	227
300	600	80	32	82	103	117	79	105	117	78	103	119	108	161	204	98	149	199	101	154	206
300	600	80	28	89	114	130	92	121	136	91	118	138	91	143	179	83	132	175	36	138	183
450	300	50	30	113	138	156	104	134	150	109	137	157	87	105	119	85	100	121	89	107	130
450	300	50	27	113	141	161	103	136	155	113	144	168	89	105	113	82	97	111	83	100	116
450	300	50	25	108	139	163	104	140	162	114	148	175	80	96	96	74	88	95	76	92	101
450	300	60	36	115	135	159	108	133	155	110	134	160	82	100	116	79	96	117	84	102	126
450	300	60	33	116	139	166	109	137	162	117	143	173	89	107	115	83	98	113	84	101	118
450	300	60	30	114	140	169	112	143	171	120	149	182	83	99	101	77	92	99	79	96	105
450	300	70	42	110	133	148	105	133	146	105	131	149	82	101	117	79	96	119	84	103	128
450	300	70	38	104	130	148	99	130	146	104	134	155	94	113	122	88	104	120	89	107	125
450	300	70	35	101	130	151	101	135	155	107	139	163	89	106	109	83	99	107	85	103	113
450	450	60	33	105	133	153	98	130	148	105	136	159	118	150	178	117	146	181	122	154	191
450	450	60	30	111	141	164	103	139	160	116	150	176	111	142	164	106	135	163	108	139	169
450	450	60	27	108	141	167	106	144	169	118	155	184	104	134	148	100	128	148	103	133	156
450	450	70	38	107	130	156	102	130	154	107	133	162	114	147	176	113	143	179	118	151	189
450	450	70	35	114	140	169	109	140	167	119	148	181	113	144	167	108	137	166	110	141	172
450	450	70	31	115	144	176	115	149	179	126	158	193	105	135	151	100	129	151	103	134	158
450	450	80	44	98	123	140	95	125	141	97	126	147	111	145	175	110	141	178	116	149	188
450	450	80	40	99	127	148	96	129	148	104	136	160	114	146	170	109	139	169	111	143	175
450	450	80	36	100	132	155	103	139	161	111	145	172	106	137	154	101	131	154	104	136	161
450	600	70	35	105	140	166	105	144	169	110	147	177	133	189	242	133	187	246	140	196	257
450	600	70	31	112	149	178	110	153	181	121	162	195	115	170	216	111	164	216	114	169	223
450	600	70	28	127	167	200	132	177	208	142	186	221	98	152	191	95	147	192	99	154	201
450	600	80	40	111	141	173	113	147	178	116	148	184	125	182	236	125	180	240	132	189	251
450	600	80	36	120	152	188	121	159	192	130	165	204	111	167	214	107	161	214	110	166	222
450	600	80	32	140	175	214	147	187	224	155	194	236	92	147	187	89	142	188	93	149	197
450	600	90	45	98	130	154	102	139	161	102	138	165	120	178	233	120	176	237	127	185	248
450	600	90	40	103	138	165	106	146	172	112	151	181	107	164	211	103	158	212	106	163	219
450	600	90	36	123	161	191	132	175	204	138	179	213	87	143	184	84	138	185	89	145	194
600	300	60	39	123	168	206	112	162	198	115	163	204	94	115	134	90	110	135	90	111	138
600	300	60	36	127	175	215	115	168	207	123	175	219	89	110	121	82	101	118	77	98	118
600	300	60	33	130	181	225	124	180	222	132	187	234	82	102	107	76	94	105	73	93	105
600	300	70	45	119	159	203	110	155	197	110	154	201	82	105	124	79	100	125	78	101	129
600	300	70	42	124	167	214	115	163	208	121	167	217	83	105	117	76	96	115	72	93	114
600	300	70	38	132	178	228	128	179	227	134	184	236	78	99	104	72	91	102	68	89	103
600	300	80	52	113	156	192	107	155	188	105	151	190	86	109	130	82	104	130	82	105	134
600	300	80	48	113	159	198	106	157	194	110	160	201	92	115	128	85	106	125	81	103	125
600	300	80	44	122	171	212	120	175	214	124	176	221	87	109	116	81	101	114	78	99	114
600	450	70	42	126	173	213	116	169	207	122	173	216	136	172	204	134	168	206	134	170	211
600	450	70	38	134	184	228	124	180	221	135	189	236	125	160	186	120	153	185	116	151	185
600	450	70	35	142	196	242	139	197	242	149	206	256	116	150	169	111	143	168	108	143	170
600	450	80	48	123	166	212	116	164	208	119	165	215	122	159	193	121	155	195	121	158	200
600	450	80	44	134	180	229	127	178	225	135	185	237	117	153	180	112	145	178	108	144	179
600	450	80	40	148	197	249	146	200	251	155	207	263	107	142	162	102	135	161	100	135	163
600	450	90	54	112	158	196	107	158	194	108	157	198	127	165	200	125	161	202	126	163	206
600	450	90	49	120	169	209	115	168	208	121	173	217	125	162	189	119	154	188	116	153	188
600	450	90	45	134	186	230	135	192	234	141	196	243	115	151	171	110	144	170	107	143	172
600	600	70	38	133	188	234	131	190	235	134	192	242	154	214	271	153	211	275	155	215	280
600	600	70	35	142	200	249	139	202	250	148	209	262	129	189	239	125	182	238	123	182	241
600	600	70	31	164	224	277	167	232	283	175	239	295	116	175	218	113	169	218	111	170	221
600	600	80	44	137	187	240	137	192	243	138	191	247	140	202	259	140	199	263	141	202	269
600	600	80	40	147	200	256	147	204	258	153	209	268	123	184	234	119	177	234	117	177	236
600	600	80	36	176	232	290	181	242	299	187	246	309	107	166	210	103	160	210	102	161	213
600	600	90	49	127	179	224	129	186	229	127	183	231	146	208	267	145	205	270	147	209	276
600	600	90	45	133	188	235	134	195	240	139	197	248	130	191	243	125	184	242	123	184	244
600	600	90	40	162	220	271	169	233	281	173	235	289	113	173	218	109	167	218	108	168	221

TABLE F-5D. TOTAL NOX EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 6*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			MAJOR STREET LEFT TURNS LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	94	111	121	80	102	110	81	101	114	119	155	173	116	150	175	125	161	188
300	300	50	25	98	118	130	83	109	119	90	113	129	111	146	157	104	137	155	109	144	164
300	300	50	22	90	113	129	81	110	123	87	114	133	111	145	149	105	137	147	111	145	158
300	300	60	33	89	101	116	77	94	108	75	91	110	111	148	167	108	143	168	117	154	181
300	300	60	30	90	105	123	78	98	115	82	100	122	113	149	161	106	140	158	111	147	168
300	300	60	27	88	106	128	82	105	125	85	107	132	110	145	150	104	137	149	110	145	159
300	300	70	38	94	109	116	84	104	110	81	99	109	112	149	169	109	144	171	118	155	184
300	300	70	35	90	108	118	80	103	111	82	103	117	115	152	165	109	143	163	114	151	172
300	300	70	31	85	106	119	81	107	119	83	107	124	115	151	157	109	143	156	116	152	166
300	450	50	25	91	111	123	79	104	114	82	105	121	165	215	247	163	211	249	173	223	264
300	450	50	22	94	116	131	81	109	122	90	116	135	155	205	230	150	197	229	156	205	239
300	450	50	20	92	118	136	86	117	133	95	124	145	151	200	218	147	193	217	154	202	229
300	450	60	30	87	102	120	77	97	113	78	96	118	161	212	245	159	208	248	170	221	262
300	450	60	27	91	109	130	81	104	123	88	109	133	157	207	234	152	200	232	158	208	243
300	450	60	24	91	112	136	87	113	135	94	118	145	154	203	223	149	197	222	157	206	234
300	450	70	35	90	108	118	83	106	114	82	103	116	162	214	248	160	210	250	170	222	265
300	450	70	31	87	108	120	79	105	116	84	108	124	161	213	240	156	205	238	162	213	249
300	450	70	28	87	110	126	85	113	127	89	116	135	159	209	229	154	202	229	162	212	240
300	600	60	27	86	113	131	81	113	130	82	112	134	181	256	312	181	253	316	192	266	332
300	600	60	24	91	121	143	86	120	140	93	126	151	158	232	281	154	225	281	161	235	293
300	600	60	21	104	137	162	105	142	165	111	147	175	149	222	264	146	216	265	154	227	278
300	600	70	31	84	105	130	81	108	131	80	105	133	175	251	308	175	248	312	186	262	328
300	600	70	28	90	115	143	87	117	143	92	120	151	157	232	282	153	225	282	161	235	294
300	600	70	24	106	134	165	109	142	171	113	144	178	146	219	263	142	214	264	151	225	277
300	600	80	36	85	110	126	85	114	129	82	109	129	171	247	306	170	245	309	182	258	325
300	600	80	32	85	113	132	84	117	134	87	117	140	155	230	282	151	224	282	158	234	294
300	600	80	28	102	132	155	107	142	163	109	142	168	143	217	262	140	212	263	148	223	275
450	300	50	30	118	149	172	111	147	169	119	153	179	119	159	181	121	159	188	131	171	202
450	300	50	27	118	152	178	111	150	174	124	161	191	111	150	165	109	147	168	115	154	178
450	300	50	25	123	160	189	121	163	191	134	174	207	106	145	153	106	142	157	113	151	168
450	300	60	36	116	142	172	112	143	170	117	146	179	113	154	178	116	155	184	125	167	198
450	300	60	33	118	147	179	113	147	178	124	156	192	111	151	168	110	148	170	116	156	181
450	300	60	30	125	157	192	125	162	196	136	171	210	109	149	158	109	146	162	116	155	173
450	300	70	42	121	149	171	118	152	171	121	153	178	113	155	179	116	156	186	125	167	200
450	300	70	38	116	148	172	113	150	172	122	157	184	116	157	174	115	154	177	121	162	187
450	300	70	35	122	157	184	125	165	190	133	171	202	115	156	166	115	153	169	122	162	180
450	450	60	33	112	145	171	107	145	169	117	154	183	166	220	256	169	222	264	180	234	279
450	450	60	30	119	155	184	113	155	182	129	169	201	149	203	232	149	201	236	156	210	248
450	450	60	27	125	164	196	125	170	200	140	183	219	147	199	222	147	198	227	155	208	239
450	450	70	38	110	139	171	107	141	171	115	147	182	162	217	254	165	218	262	176	231	277
450	450	70	35	118	150	185	115	152	185	129	164	202	151	205	235	151	203	239	158	212	251
450	450	70	31	128	163	201	131	170	207	144	182	223	147	201	224	148	199	229	156	209	241
450	450	80	44	111	142	165	110	146	168	116	150	177	159	215	253	162	217	261	173	229	276
450	450	80	40	113	147	174	112	151	176	123	161	191	152	207	238	152	205	242	159	214	254
450	450	80	36	123	161	190	128	171	198	139	180	213	148	203	227	149	201	232	157	211	244
450	600	70	35	114	155	187	116	161	192	124	167	203	197	276	337	202	279	346	214	293	362
450	600	70	31	121	164	200	123	171	205	136	183	222	169	247	300	170	246	306	178	256	318
450	600	70	28	146	192	231	153	204	241	166	216	258	157	234	281	159	234	287	168	245	300
450	600	80	40	116	152	190	120	161	198	126	165	207	189	269	330	194	272	339	206	286	356
450	600	80	36	126	164	206	130	173	213	141	183	228	165	244	299	166	243	304	175	253	316
450	600	80	32	155	196	241	164	211	254	176	220	268	151	229	277	153	229	283	162	240	296
450	600	90	45	113	151	181	119	162	191	123	164	198	184	265	327	189	268	336	201	282	353
450	600	90	40	119	160	193	124	170	202	134	178	215	161	240	296	162	240	301	170	250	314
450	600	90	36	148	192	228	159	209	243	168	216	256	146	225	273	148	225	280	158	236	293
600	300	60	39	121	172	215	112	168	210	118	172	219	132	177	203	134	176	209	138	183	217
600	300	60	36	125	179	226	116	175	220	127	185	235	118	161	181	116	157	183	116	159	187
600	300	60	33	137	195	244	134	196	244	145	205	258	116	159	171	115	155	174	116	159	180
600	300	70	45	113	159	208	106	157	205	110	159	212	121	166	193	123	166	199	127	172	208
600	300	70	42	119	168	220	112	166	217	121	173	229	112	156	177	110	152	179	111	155	184
600	300	70	38	135	188	243	134	192	245	143	199	258	111	155	168	110	152	171	112	155	177
600	300	80	52	117	166	207	113	167	206	114	166	211	124	170	199	126	170	205	130	176	213
600	300	80	48	118	170	214	113	170	213	120	176	223	121	166	188	119	162	190	119	165	194
600	300	80	44	136	191	238	137	197	242	143	202	252	121	165	180	120	162	183	121	166	188
600	450	70	42	125	179	225	118	177	221	127	184	233	190	249	289	193	250	297	199	257	306
600	450	70	38	134	191	240	127	189	236	141	201	253	170	228	262	170	225	265	171	229	271
600	450	70	35	152	212	264	150	215	266	164	227	283	166	222	249	166	220	253	168	225	260
600	450	80	48	119	168	220	114	168	218	120	172	228	177	237	278	180	238	285	186	245	295
600	450	80	44	131	183	238	126	183	236	138	193	251	162	221	255	162	218	259	163	222	265
600	450	80	40	154	209	267	155	215	271	166	224	286	157	214	242	157	213	246	160	217	253
600	450	90	54	118	170	213	116	172	214	120	174	222	182	242	285	185	243	292	191	251	302
600	450	90	49	127	181	228	124	184	229	134	191	242	170	229	265	169	226	268	171	230	274
600	450	90	45	150	208	258	153	216	264	163	223	277	164	223	251	165	221	256	167	226	262
600	600	70	38	135	195	248	135	200	251	141	205	261	225	308	373	229	310	381	236	319	392
600	600	70	35	145	208	264	144	213	267	156	223	282	191	273	331	191	271	335	194	276	342
600	600	70	31	175	242	301	181	252	309	192	262	324	182	263	314	184	263	320	187	268	328
600	600	80	44	135	191	250	137	198	255	141	200	262	211	295	361	216	297	370	222	306	380
600	600	80	40	146	205	266	148	211	272	158	219	285	185	267	326	185	266	331	188	271	338
600	600	80	36	184	246	310	191	258	321	201	266	334	173	255	306	174	254	312	178	260	320
600	600	90	49	135	193	244	139	202	251	141	202	256	217	302	368	221	304	377	228	313	388
600	600	90	45	141	203	256	145	212	264	153	218	274	191	275	335	192	273	339	195	278	346
600	600	90	40	180	244	301	190	259	314	197	264	324	179	262	314	180	261	320	184	267	328

TABLE F-5E. TOTAL NOX EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*4

INTERSECTION				MINOR STREET									MAJOR STREET								
ENVIRONMENT				LEFT TURNS									LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	88	103	111	73	93	99	73	91	102	128	159	179	122	151	177	129	159	188
300	300	50	25	91	110	120	76	100	108	81	103	117	119	149	162	110	138	157	113	142	164
300	300	50	22	84	105	119	74	101	113	79	104	121	119	148	154	111	138	150	114	143	158
300	300	60	33	87	98	111	75	90	102	72	86	103	116	148	169	111	140	167	117	149	178
300	300	60	30	88	102	118	75	94	109	78	95	115	118	148	162	108	137	157	111	142	164
300	300	60	27	86	103	123	79	101	119	82	102	125	115	145	152	107	135	148	110	140	156
300	300	70	38	96	109	115	86	104	108	81	98	106	113	146	168	108	138	166	114	147	177
300	300	70	35	92	108	117	82	103	109	82	102	114	117	148	163	107	137	158	110	142	165
300	300	70	31	88	107	118	83	107	117	83	106	121	117	148	156	109	137	151	112	143	159
300	450	50	25	83	101	111	70	93	101	72	93	107	171	216	250	167	210	250	175	220	262
300	450	50	22	85	106	120	72	98	110	80	105	121	162	206	233	154	196	229	158	201	237
300	450	50	20	84	108	125	77	106	120	85	112	131	158	201	221	151	192	218	156	199	227
300	450	60	30	84	97	113	73	91	106	73	89	109	164	210	245	160	204	245	168	214	257
300	450	60	27	88	104	123	77	98	115	83	102	124	160	205	233	152	195	229	156	201	237
300	450	60	24	88	107	130	83	107	128	88	111	136	157	201	223	150	192	220	155	199	229
300	450	70	35	91	107	115	83	103	110	81	100	111	162	208	244	157	202	244	165	212	256
300	450	70	31	88	107	118	79	103	112	83	105	119	161	207	236	153	197	232	157	203	240
300	450	70	28	88	109	123	85	111	124	88	113	130	159	204	226	152	194	223	157	201	232
300	600	60	27	76	101	118	70	100	115	70	98	119	187	256	315	184	251	316	193	262	329
300	600	60	24	81	109	129	75	108	126	81	112	135	163	232	283	156	223	281	162	230	290
300	600	60	21	94	125	148	94	129	151	99	133	160	155	222	267	149	214	265	155	222	275
300	600	70	31	79	99	122	75	100	121	73	96	122	178	248	307	175	243	308	184	254	321
300	600	70	28	85	108	134	81	109	133	85	111	140	159	228	281	152	219	278	157	227	287
300	600	70	24	101	127	156	103	134	161	106	135	168	148	216	262	142	208	260	148	216	270
300	600	80	36	84	107	121	83	110	123	78	104	122	170	241	301	167	236	302	176	247	315
300	600	80	32	84	110	128	82	113	129	84	113	134	153	223	277	147	215	274	152	222	284
300	600	80	28	101	129	150	105	138	157	106	137	162	142	211	257	136	203	255	142	211	266
450	300	50	30	114	143	165	106	140	160	113	145	170	124	159	183	124	157	187	131	166	198
450	300	50	27	114	146	171	106	143	166	118	154	181	115	149	167	111	143	167	115	149	174
450	300	50	25	119	154	182	116	157	182	128	167	198	111	145	155	109	140	156	113	146	165
450	300	60	36	117	142	169	111	141	167	116	143	174	115	151	176	115	149	180	122	158	191
450	300	60	33	119	146	177	113	145	174	123	153	187	112	147	165	109	141	166	112	147	173
450	300	60	30	126	156	190	125	161	193	135	169	206	111	145	156	108	140	157	112	146	166
450	300	70	42	126	153	172	122	154	172	124	154	177	111	148	174	111	146	178	118	155	190
450	300	70	38	121	151	173	117	152	173	125	158	184	114	150	169	110	144	169	114	149	177
450	300	70	35	127	160	185	129	167	190	136	172	201	114	148	160	111	143	162	115	150	170
450	450	60	33	106	138	162	100	137	159	109	144	172	169	218	256	170	217	262	178	227	274
450	450	60	30	113	147	175	106	146	171	121	159	190	152	200	232	150	196	233	154	202	242
450	450	60	27	119	157	187	118	161	189	133	174	207	150	197	221	148	193	224	154	201	234
450	450	70	38	109	136	166	105	137	166	112	142	176	161	211	251	163	210	256	171	221	269
450	450	70	35	117	147	180	113	148	179	126	159	195	150	199	231	147	194	233	152	201	242
450	450	70	31	127	160	196	129	167	201	141	177	217	147	195	220	145	191	223	151	199	233
450	450	80	44	114	143	165	112	147	167	117	150	175	155	206	246	156	205	252	165	215	264
450	450	80	40	116	149	173	114	152	175	124	160	189	148	198	231	145	193	232	150	200	241
450	450	80	36	126	162	190	130	171	197	140	179	210	145	194	220	143	190	222	149	197	232
450	600	70	35	107	145	176	107	151	180	114	156	190	199	273	335	202	273	342	211	285	356
450	600	70	31	114	155	189	114	160	193	127	171	209	171	243	299	169	240	302	175	247	312
450	600	70	28	138	183	219	144	194	229	157	204	245	159	231	280	159	228	283	166	237	294
450	600	80	40	114	147	184	117	155	190	121	158	198	188	262	326	190	262	332	200	274	346
450	600	80	36	123	160	200	126	167	206	136	176	219	163	237	293	162	233	296	168	241	306
450	600	80	32	152	192	235	161	205	246	171	214	260	150	222	272	149	220	276	156	228	287
450	600	90	45	114	151	179	119	161	188	122	162	193	179	255	319	182	255	326	192	267	340
450	600	90	40	120	159	191	125	169	199	133	175	210	156	230	288	154	227	290	160	234	300
450	600	90	36	149	191	226	160	207	240	168	213	251	142	215	265	141	212	269	148	221	280
600	300	60	39	117	167	208	107	162	202	112	165	210	134	173	201	133	170	205	135	174	211
600	300	60	36	122	174	219	111	169	212	122	178	226	119	157	178	114	150	178	112	150	180
600	300	60	33	134	189	237	130	190	236	140	198	249	118	155	169	114	149	170	113	150	173
600	300	70	45	114	159	206	107	156	202	109	157	208	119	159	188	118	156	192	120	160	198
600	300	70	42	120	168	218	112	165	214	120	171	225	110	149	171	105	142	171	103	142	173
600	300	70	38	137	187	241	135	190	242	143	196	254	110	148	163	106	142	164	105	143	167
600	300	80	52	123	170	209	117	170	207	118	168	211	119	160	190	118	157	193	120	161	199
600	300	80	48	123	174	216	118	173	214	124	177	223	115	155	179	111	149	178	109	149	180
600	300	80	44	141	194	240	141	199	243	147	203	252	116	155	171	112	149	172	111	150	175
600	450	70	42	120	172	216	112	169	212	119	175	222	190	243	286	191	242	291	193	247	298
600	450	70	38	129	184	231	121	181	226	134	192	243	170	222	258	167	217	259	166	218	262
600	450	70	35	147	205	255	144	207	256	157	218	272	165	217	245	163	212	247	163	214	251
600	450	80	48	119	166	216	113	165	214	118	168	222	173	228	271	174	226	276	177	231	283
600	450	80	44	130	180	234	124	180	231	135	189	245	158	211	248	155	206	249	154	207	252
600	450	80	40	154	207	263	153	212	266	164	220	280	153	205	235	151	201	237	151	203	241
600	450	90	54	122	171	213	118	173	213	121	174	220	175	230	274	175	228	279	178	233	286
600	450	90	49	130	183	228	127	184	228	135	191	240	162	216	254	159	211	255	158	212	258
600	450	90	45	154	210	258	156	217	263	164	223	275	157	210	241	155	206	243	155	208	247
600	600	70	38	128	186	237	127	190	240	132	194	248	224	301	368	225	301	374	229	307	382
600	600	70	35	138	199	253	136	203	255	147	212	269	189	266	326	187	262	328	187	264	332
600	600	70	31	168	233	290	173	243	298	183	251	312	181	257	309	180	253	313	181	257	318
600	600	80	44	133	187	244	134	193	248	137	194	255	207	285	353	208	285	359	213	291	367
600	600	80	40	144	201	261	145	206	265	153	213	277	179	257	318	177	253	320	178	255	325
600	600	80	36	182	242	305	188	253	315	197	260	326	168	244	298	167	241	301	168	244	307
600	600	90	49	136	193	242	140	201	248	141	200	252	209	288	357	211	288	363	215	294	371
600	600	90	45	143	203	255	146	211	261	153	216	271	183	261	323	181	257	325	181	259	329
600	600	90	40	182	244	299	190	258	311	197	262	321	171	248	303	169	245	306	171	248	311

TABLE F-5F. TOTAL NOX EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*5

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	105	118	124	83	102	106	76	93	102
300	300	50	25	105	121	130	83	104	112	81	101	113
300	300	50	22	93	113	125	77	102	112	75	98	114
300	300	60	33	106	115	127	87	101	111	77	89	105
300	300	60	30	104	115	130	84	101	114	80	95	113
300	300	60	27	98	113	131	84	104	120	80	98	120
300	300	70	38	105	116	120	87	104	106	76	90	97
300	300	70	35	97	111	118	79	99	104	73	91	101
300	300	70	31	89	106	116	77	99	107	71	91	104
300	450	50	25	102	118	126	82	103	110	78	97	109
300	450	50	22	101	120	131	81	105	115	82	104	119
300	450	50	20	96	118	133	82	109	122	83	108	126
300	450	60	30	105	116	130	87	103	116	80	95	113
300	450	60	27	105	119	137	87	106	122	86	104	125
300	450	60	24	102	119	140	90	112	131	88	109	133
300	450	70	35	101	115	121	86	105	109	77	94	104
300	450	70	31	94	111	121	79	101	108	76	96	108
300	450	70	28	90	110	123	81	106	116	77	100	116
300	600	60	27	97	120	135	84	112	125	78	104	122
300	600	60	24	99	124	143	85	116	133	84	114	135
300	600	60	21	108	137	158	100	134	154	99	131	156
300	600	70	31	102	120	141	91	114	133	82	103	128
300	600	70	28	104	125	150	93	119	142	90	114	142
300	600	70	24	117	141	168	112	141	166	108	135	166
300	600	80	36	96	117	130	88	113	125	77	101	117
300	600	80	32	93	116	132	84	113	127	78	105	125
300	600	80	28	105	132	151	102	134	151	97	127	149
450	300	50	30	121	148	168	106	138	156	105	136	159
450	300	50	27	117	148	170	102	137	158	107	141	167
450	300	50	25	118	152	177	109	147	171	114	151	180
450	300	60	36	126	148	174	113	141	165	111	136	165
450	300	60	33	124	149	178	111	142	169	114	143	175
450	300	60	30	127	155	187	120	153	183	122	154	190
450	300	70	42	123	149	166	113	143	159	108	137	157
450	300	70	38	115	143	164	104	137	156	105	137	160
450	300	70	35	117	148	172	112	149	170	113	147	174
450	450	60	33	115	144	167	102	137	157	104	137	163
450	450	60	30	117	150	176	104	142	166	112	149	177
450	450	60	27	120	156	184	112	154	180	120	159	191
450	450	70	38	120	145	173	109	139	166	109	137	169
450	450	70	35	124	152	184	113	146	176	119	150	185
450	450	70	31	130	161	196	125	161	194	131	165	203
450	450	80	44	113	141	161	105	138	156	103	134	157
450	450	80	40	112	143	166	103	139	160	107	141	167
450	450	80	36	119	152	179	116	155	179	119	156	185
450	600	70	35	117	154	183	111	153	180	111	151	183
450	600	70	31	120	160	192	114	159	189	120	163	198
450	600	70	28	141	184	219	140	188	221	146	192	230
450	600	80	40	126	158	193	122	159	192	120	155	193
450	600	80	36	132	167	205	128	167	204	131	169	211
450	600	80	32	157	195	236	159	202	241	162	203	248
450	600	90	45	116	150	177	114	154	179	110	147	178
450	600	90	40	118	155	185	116	158	186	117	158	191
450	600	90	36	143	184	217	147	193	224	148	192	228
600	300	60	39	125	172	212	108	161	199	106	157	200
600	300	60	36	125	176	219	108	164	205	112	166	212
600	300	60	33	134	188	234	123	182	226	126	183	233
600	300	70	45	124	166	212	109	157	201	105	151	200
600	300	70	42	126	172	221	111	162	209	113	162	214
600	300	70	38	139	188	240	130	184	234	131	183	239
600	300	80	52	121	167	205	109	160	196	103	151	192
600	300	80	48	119	167	208	106	160	199	105	157	201
600	300	80	44	132	184	228	126	182	224	124	179	226
600	450	70	42	129	180	222	115	170	211	115	169	214
600	450	70	38	135	188	233	120	178	222	126	182	231
600	450	70	35	149	205	254	140	201	248	145	205	257
600	450	80	48	130	175	224	118	168	215	116	164	216
600	450	80	44	138	187	238	125	179	229	129	181	236
600	450	80	40	158	209	264	151	207	260	154	209	267
600	450	90	54	122	170	211	112	165	204	108	159	203
600	450	90	49	127	178	222	117	173	214	118	173	219
600	450	90	45	147	201	248	142	202	246	144	201	251
600	600	70	38	139	196	245	131	193	241	129	190	242
600	600	70	35	145	205	257	137	202	252	141	204	260
600	600	70	31	172	235	291	170	238	291	174	240	299
600	600	80	44	146	198	254	141	198	251	137	192	251
600	600	80	40	153	208	267	147	207	264	149	208	269
600	600	80	36	188	246	307	187	251	310	189	250	315
600	600	90	49	139	194	241	136	195	241	129	187	238
600	600	90	45	142	200	250	138	201	249	138	199	252
600	600	90	40	177	237	291	179	244	296	178	242	298

INTERSECTION ENVIRONMENT				MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	137	162	184	129	152	181	133	158	189
300	300	50	25	136	160	175	124	146	168	124	149	172
300	300	50	22	128	152	160	117	139	153	118	142	158
300	300	60	33	129	155	178	121	145	174	125	151	182
300	300	60	30	138	163	179	126	149	171	126	151	176
300	300	60	27	128	152	161	117	139	154	118	142	160
300	300	70	38	129	156	180	121	146	176	125	152	185
300	300	70	35	140	166	183	128	153	176	129	155	180
300	300	70	31	133	158	168	122	145	162	123	148	167
300	450	50	25	183	222	259	176	214	256	181	221	265
300	450	50	22	181	219	249	170	207	242	172	210	248
300	450	50	20	170	207	229	160	195	224	162	200	230
300	450	60	30	179	220	257	173	211	254	178	218	264
300	450	60	27	183	222	252	172	210	246	174	213	252
300	450	60	24	172	211	234	163	199	229	165	204	235
300	450	70	35	180	221	259	173	212	257	178	220	266
300	450	70	31	187	227	258	176	215	252	178	218	258
300	450	70	28	177	217	241	168	205	235	170	209	242
300	600	60	27	193	257	317	187	249	316	194	258	326
300	600	60	24	177	240	293	168	229	288	170	233	295
300	600	60	21	161	223	269	152	212	265	156	218	273
300	600	70	31	187	252	313	182	244	312	188	253	323
300	600	70	28	176	240	294	167	229	289	170	233	296
300	600	70	24	158	221	268	149	210	264	153	216	272
300	600	80	36	183	248	311	177	241	309	184	249	320
300	600	80	32	174	239	294	165	227	289	167	232	296
300	600	80	28	155	219	267	146	208	263	150	214	270
450	300	50	30	129	159	185	127	154	187	131	161	196
450	300	50	27	128	157	176	122	149	174	123	151	179
450	300	50	25	117	145	157	112	137	156	113	141	162
450	300	60	36	124	154	182	121	150	183	126	156	192
450	300	60	33	129	158	179	123	150	176	123	153	181
450	300	60	30	120	149	162	114	141	160	116	145	166
450	300	70	42	124	155	183	121	150	185	126	157	194
450	300	70	38	134	164	185	128	156	183	129	159	188
450	300	70	35	126	156	170	121	148	168	122	152	174
450	450	60	33	177	221	261	176	217	264	181	225	274
450	450	60	30	168	211	244	163	203	243	165	208	249
450	450	60	27	158	200	226	154	193	226	157	198	233
450	450	70	38	173	217	259	171	214	262	177	222	272
450	450	70	35	169	213	247	164	206	246	166	210	252
450	450	70	31	159	201	229	154	195	229	157	200	236
450	450	80	44	170	216	258	169	212	261	175	220	271
450	450	80	40	170	215	250	165	208	249	167	212	255
450	450	80	36	160	203	231	155	197	231	158	202	239
450	600	70	35	202	270	335	202	268	339	209	277	350
450	600	70	31	181	248	306	177	242	306	180	247	313
450	600	70	28	162	228	279	159	223	280	163	229	288
450	600	80	40	194	263	328	194	261	332	201	270	344
450	600	80	36	177	245	304	173	239	304	177	244	312
450	600	80	32	156	223	275	153	218	276	157	224	284
450	600	90	45	189	259	325	189	257	329	196	266	341
450	600	90	40	173	242	301	169	236	302	172	241	309
450	600	90	36	151	219	271	148	214	273	152	220	281
600	300	60	39	136	170	200	133	164	201	132	165	204
600	300	60	36	128	161	185	121	152	182	117	150	181
600	300	60	33	120	152	168	114	143	166	110	142	166
600	300	70	45	124	159	190	121	154	191	120	155	195
600	300	70	42	123	157	181	116	147	178	111	145	178
600	300	70	38	115	148	165	109	140	163	105	138	164
600	300	80	52	128	163	196	125	158	196	124	159	200
600	300	80	48	132	166	192	125	157	189	120	155	188
600	300	80	44	125	158	177	119	150	175	115	148	175
600	450	70	42	195	242	287	193	238	289	193	241	294
600	450	70	38	182	229	266	176	221	265	173	220	266
600	450	70	35	170	216	246	165	209	246	162	208	247
600	450	80	48	181	230	276	179	226	278	180	229	282
600	450	80	44	174	222	260	168	214	258	165	212	259
600	450	80	40	161	208	240	156	201	239	154	201	241
600	450	90	54	186	236	282	184	232	285	185	234	289
600	450	90	49	181	230	269	176	222	268	172	221	269
600	450	90	45	169	217	249	164	210	248	161	209	250
600	600	70	38	223	295	364	222	292	367	223	296	373
600	600	70	35	196	267	329	191	260	328	189	260	331
600	600	70	31	180	250	305	176	245	306	175	245	309
600	600	80	44	209	282	352	208	279	355	210	283	361
600	600	80	40	190	262	324	185	255	324	183	255	326
600	600	80	36	170	242	297	167	236	298	165	237	301
600	600	90	49	215	289	359	214	286	363	216	290	369
600	600	90	45	196	269	333	192	263	332	189	262	335
600	600	90	40	177	249	305	173	243	306	172	244	309

TABLE F-5G. TOTAL NOX EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 6*6

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			MAJOR STREET LEFT TURNS LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	MED	HIGH	TRUCKS LOW	MED	HIGH	TRUCKS LOW	MED	HIGH	TRUCKS LOW	MED	HIGH	TRUCKS LOW	MED	HIGH	TRUCKS LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	135	163	183	132	165	184	122	154	177	121	158	176	118	153	177	127	164	190
300	300	50	25	144	175	199	141	177	199	137	171	198	116	151	162	109	142	160	114	149	169
300	300	50	22	133	168	194	136	175	200	132	169	199	118	152	157	112	144	155	118	152	165
300	300	60	33	126	150	176	126	154	179	114	140	170	113	150	170	110	145	171	119	156	184
300	300	60	30	133	159	189	132	163	191	126	155	188	117	154	166	111	145	163	116	152	173
300	300	60	27	128	158	190	133	167	198	127	159	195	117	153	158	111	145	156	117	153	166
300	300	70	38	128	154	172	130	161	177	116	145	166	114	152	172	111	147	173	120	158	186
300	300	70	35	130	159	180	131	165	184	123	155	179	120	157	170	113	148	168	118	155	177
300	300	70	31	122	154	179	129	166	189	121	156	184	122	159	165	117	151	163	123	159	173
300	450	50	25	130	160	183	129	164	186	122	156	182	171	221	254	169	217	256	179	230	271
300	450	50	22	138	172	198	136	175	199	135	172	202	164	214	239	159	206	238	165	214	248
300	450	50	20	134	171	200	138	180	207	137	177	209	162	211	230	158	204	229	165	214	241
300	450	60	30	123	148	177	124	155	182	115	144	176	167	219	252	166	215	254	176	227	269
300	450	60	27	132	161	193	133	167	197	129	162	197	166	216	243	160	209	241	167	217	252
300	450	60	24	130	161	197	136	173	207	133	168	206	165	215	234	161	208	234	168	217	245
300	450	70	35	123	151	172	126	160	179	115	147	171	168	220	254	166	216	257	176	229	271
300	450	70	31	125	157	180	128	165	187	123	157	184	170	222	249	165	214	247	171	222	258
300	450	70	28	122	157	183	131	170	196	125	163	193	170	221	241	166	214	240	173	223	252
300	600	60	27	123	160	190	129	171	199	120	160	193	185	259	316	184	257	320	196	270	335
300	600	60	24	134	174	207	139	184	215	136	179	215	164	238	288	160	231	288	167	241	299
300	600	60	21	144	187	223	155	203	237	151	198	237	157	230	273	154	225	274	163	235	287
300	600	70	31	117	150	186	125	163	197	114	150	189	179	255	312	178	252	316	190	265	332
300	600	70	28	129	165	204	137	178	215	131	170	212	163	238	289	159	232	289	167	241	300
300	600	70	24	143	181	223	156	200	240	150	192	237	154	228	272	151	223	273	160	233	285
300	600	80	36	116	151	178	126	166	192	112	151	182	174	251	310	174	248	313	185	262	329
300	600	80	32	121	160	190	131	174	203	123	165	199	161	236	288	157	230	288	164	240	300
300	600	80	28	135	176	210	151	197	229	142	187	224	151	226	271	148	221	271	157	231	284
450	300	50	30	176	218	253	180	227	260	177	223	260	121	161	184	123	162	190	133	173	204
450	300	50	27	182	227	264	186	236	271	188	237	277	115	155	170	114	151	173	120	159	183
450	300	50	25	184	232	272	193	246	285	196	247	291	114	152	161	113	150	164	120	158	175
450	300	60	36	172	209	249	178	220	258	173	213	256	115	157	180	118	157	187	128	169	201
450	300	60	33	179	219	262	184	230	271	185	229	275	116	156	173	114	153	175	120	161	186
450	300	60	30	183	226	272	194	242	287	194	241	291	116	156	165	116	153	169	123	162	180
450	300	70	42	173	213	245	181	226	256	174	217	252	115	157	182	118	158	188	127	170	202
450	300	70	38	173	216	251	181	229	262	180	226	264	121	162	179	120	159	182	125	167	192
450	300	70	35	177	222	261	190	241	278	188	238	279	122	163	173	122	160	177	129	169	188
450	450	60	33	168	213	249	174	224	259	174	222	262	172	226	263	176	228	271	186	241	286
450	450	60	30	180	228	268	186	238	276	191	242	285	158	212	241	158	210	246	165	219	257
450	450	60	27	184	234	277	195	250	291	200	254	300	158	211	233	159	209	238	167	219	250
450	450	70	38	163	203	246	171	216	257	169	212	258	168	223	261	172	225	269	182	238	284
450	450	70	35	177	219	265	185	232	276	188	234	283	159	214	245	159	212	249	167	221	260
450	450	70	31	184	230	279	197	248	295	200	249	302	159	212	236	159	211	241	167	221	253
450	450	80	44	161	203	237	171	218	251	166	212	250	165	221	260	169	223	268	180	236	283
450	450	80	40	168	214	251	178	229	265	179	228	269	160	216	247	160	214	252	168	223	263
450	450	80	36	176	224	265	192	245	284	192	244	288	160	214	239	160	213	244	168	223	256
450	600	70	35	168	220	263	181	237	279	179	233	280	201	279	340	206	282	350	218	296	366
450	600	70	31	181	235	282	193	252	297	197	254	304	175	253	307	176	252	312	184	262	325
450	600	70	28	202	260	309	220	283	331	224	284	337	166	243	290	168	243	296	177	254	309
450	600	80	40	167	214	263	182	234	281	178	227	280	193	272	334	197	275	343	210	289	360
450	600	80	36	182	232	284	197	251	302	198	251	307	171	250	305	172	249	310	181	259	323
450	600	80	32	209	261	317	229	286	340	230	285	344	160	238	285	162	238	292	171	249	305
450	600	90	45	161	210	251	178	232	272	171	223	268	188	268	331	193	271	340	205	285	357
450	600	90	40	172	224	268	189	246	288	188	243	291	167	247	302	168	246	308	176	256	320
450	600	90	36	198	254	301	221	281	327	220	278	329	155	234	282	157	234	289	166	245	302
600	300	60	39	187	249	303	189	256	309	184	249	307	134	179	206	136	179	212	140	185	220
600	300	60	36	196	261	319	198	268	324	199	268	328	122	166	186	120	162	188	121	164	192
600	300	60	33	206	274	335	213	287	345	214	286	349	123	166	179	122	163	182	123	166	187
600	300	70	45	175	233	293	180	242	301	173	233	297	123	168	196	125	168	202	129	174	210
600	300	70	42	187	247	311	191	256	318	190	253	320	117	161	182	115	157	184	115	160	189
600	300	70	38	201	264	331	210	279	344	209	276	346	119	162	176	118	159	179	119	162	184
600	300	80	52	177	237	289	183	248	299	174	237	293	126	173	201	128	172	207	132	179	216
600	300	80	48	183	246	301	189	257	311	186	252	311	126	171	193	124	167	195	124	170	199
600	300	80	44	198	264	322	210	281	337	206	275	337	128	173	187	127	170	190	128	173	196
600	450	70	42	189	254	311	193	263	318	191	259	319	197	255	296	200	256	303	205	264	313
600	450	70	38	203	271	331	207	280	338	211	282	345	179	237	271	178	234	274	180	238	280
600	450	70	35	218	289	352	228	304	365	231	305	372	177	234	261	177	232	265	179	236	272
600	450	80	48	179	239	302	186	251	312	182	245	311	183	243	285	187	244	292	192	251	302
600	450	80	44	197	260	326	203	271	335	204	270	340	171	230	265	170	227	268	172	231	274
600	450	80	40	217	283	352	229	300	367	230	299	372	168	226	254	168	224	258	171	229	265
600	450	90	54	176	238	293	184	252	305	178	243	301	188	249	292	191	250	299	197	257	308
600	450	90	49	190	255	313	198	268	324	197	266	327	179	238	274	178	235	277	180	239	283
600	450	90	45	210	279	340	224	298	357	223	295	359	176	234	263	176	233	267	178	237	274
600	600	70	38	196	268	332	207	284	346	203	278	345	228	311	377	233	314	385	239	322	396
600	600	70	35	212	286	353	222	302	367	224	302	372	197	279	337	197	277	342	200	282	349
600	600	70	31	240	317	387	256	339	407	257	338	411	191	272	323	192	271	329	196	277	337
600	600	80	44	194	260	330	207	278	346	200	270	343	215	299	365	219	301	373	226	310	384
600	600	80	40	210	280	352	223	297	368	222	295	371	191	274	333	191	272	337	194	277	344
600	600	80	36	245	318	394	263	341	415	263	338	418	181	263	315	182	263	321	186	268	329
600	600	90	49	190	259	321	205	280	339	197	269	334	221	305	372	225	308	381	231	316	392
600	600	90	45	202	274	339	217	294	357	214	290	358	197	281	341	198	280	346	201	284	353
600	600	90	40	238	313	381	258	339	405	255	334	405	187	270	323	189	270	329	192	275	337

TABLE F-5H. TOTAL NOX EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*6

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	131	158	176	127	159	176	117	146	168	130	161	181	124	153	180	131	162	191
300	300	50	25	140	170	191	136	171	190	131	164	189	124	154	167	114	142	162	117	147	169
300	300	50	22	130	162	187	131	169	192	126	162	190	126	155	162	118	145	158	122	151	165
300	300	60	33	128	149	174	126	152	175	113	138	166	118	150	171	113	143	170	119	151	181
300	300	60	30	134	159	186	132	162	188	125	153	184	122	153	167	113	142	162	116	146	169
300	300	60	27	130	157	188	133	166	195	126	157	191	122	152	160	114	142	155	118	147	163
300	300	70	38	134	158	174	134	163	178	119	146	166	115	148	170	110	141	169	116	149	180
300	300	70	35	135	162	182	135	167	185	126	156	179	121	153	168	112	142	163	115	146	170
300	300	70	31	128	158	180	134	169	190	124	158	183	124	155	163	116	145	159	119	150	167
300	450	50	25	124	153	174	122	156	176	114	147	171	178	223	257	173	216	257	181	226	269
300	450	50	22	132	164	189	130	167	190	128	163	191	170	215	242	162	205	238	166	210	246
300	450	50	20	129	164	191	132	172	197	129	168	198	169	212	233	162	203	230	167	210	239
300	450	60	30	122	146	173	122	151	177	112	139	170	171	217	252	166	210	252	174	220	264
300	450	60	27	132	159	189	131	164	192	127	157	191	169	214	242	161	204	238	165	210	247
300	450	60	24	129	159	193	135	170	202	130	163	200	169	213	234	162	204	231	166	210	240
300	450	70	35	126	153	172	129	161	178	116	146	169	168	215	251	164	208	251	171	218	263
300	450	70	31	129	158	180	131	166	186	124	157	182	170	216	245	162	206	241	166	212	249
300	450	70	28	126	158	183	133	171	194	126	162	191	170	215	237	163	206	234	168	213	243
300	600	60	27	116	151	179	120	161	187	110	149	180	190	260	318	187	255	320	196	265	333
300	600	60	24	126	165	196	131	174	204	126	168	203	169	238	290	162	229	287	168	236	296
300	600	60	21	136	178	212	147	193	226	142	187	224	163	231	275	157	223	274	163	231	284
300	600	70	31	115	146	180	122	158	190	110	144	181	181	251	311	178	246	312	187	257	325
300	600	70	28	127	161	198	134	172	208	127	164	204	165	234	287	158	226	284	163	233	294
300	600	70	24	140	177	217	153	195	233	146	186	229	157	225	271	151	217	269	157	225	279
300	600	80	36	117	151	177	127	165	189	112	149	178	173	244	305	170	239	306	179	250	319
300	600	80	32	123	159	188	132	173	200	123	163	195	159	230	283	152	221	281	158	228	290
300	600	80	28	137	176	208	151	196	226	142	185	220	150	220	266	144	212	264	150	220	275
450	300	50	30	175	215	248	178	223	254	174	218	253	126	161	185	126	159	190	133	168	201
450	300	50	27	181	224	259	183	232	265	185	232	271	120	154	172	116	148	172	119	154	180
450	300	50	25	183	229	267	191	242	279	193	242	284	119	152	162	116	147	164	120	153	172
450	300	60	36	175	210	249	180	221	257	174	213	255	117	153	179	117	151	183	124	160	194
450	300	60	33	182	221	262	187	231	270	187	228	273	117	152	170	113	146	171	117	152	178
450	300	60	30	186	228	272	197	243	286	196	241	289	118	152	164	115	147	165	119	153	173
450	300	70	42	180	218	249	188	231	259	190	221	254	113	150	177	113	148	181	121	157	192
450	300	70	38	181	222	255	188	234	266	185	230	266	119	155	174	115	149	174	118	154	182
450	300	70	35	184	228	265	197	246	281	194	241	281	121	156	168	118	151	169	122	157	178
450	450	60	33	165	208	243	170	218	251	169	215	253	175	224	263	176	224	268	185	234	281
450	450	60	30	177	223	261	182	232	269	186	235	277	161	209	241	158	205	243	163	211	251
450	450	60	27	180	229	270	191	245	284	195	247	291	161	209	233	159	205	236	165	212	245
450	450	70	38	165	203	244	172	215	254	169	210	254	168	218	257	169	217	263	177	227	275
450	450	70	35	179	219	264	185	231	274	188	232	279	159	208	241	156	203	242	161	210	251
450	450	70	31	186	230	277	198	247	293	200	247	298	158	207	232	157	203	235	162	210	244
450	450	80	44	166	207	240	176	221	252	170	214	250	161	213	253	163	212	258	171	222	271
450	450	80	40	174	218	254	183	232	266	183	230	269	157	207	240	154	202	242	159	209	250
450	450	80	36	182	228	267	196	248	285	196	246	288	156	205	232	154	201	234	160	209	244
450	600	70	35	163	213	255	175	229	269	172	224	270	203	276	339	205	277	346	215	288	360
450	600	70	31	176	228	273	187	245	288	190	245	293	177	249	305	175	246	308	181	254	318
450	600	70	28	198	253	301	215	275	321	217	275	327	168	239	288	167	237	292	174	246	303
450	600	80	40	167	212	260	181	231	277	176	223	275	191	266	330	194	266	336	203	278	350
450	600	80	36	182	230	281	196	248	298	196	247	301	169	243	300	168	240	303	174	247	313
450	600	80	32	209	259	313	228	284	336	228	282	339	158	231	281	158	228	284	165	237	295
450	600	90	45	165	212	252	181	233	271	173	224	266	183	258	323	185	259	330	195	270	343
450	600	90	40	176	226	269	191	247	288	189	243	289	162	236	294	160	233	297	166	241	307
450	600	90	36	202	256	301	224	282	326	221	278	327	150	223	274	150	221	278	156	230	289
600	300	60	39	186	246	299	187	252	303	181	245	301	136	175	204	135	172	207	137	176	213
600	300	60	36	196	259	315	196	265	319	196	263	322	123	162	183	119	155	183	117	155	185
600	300	60	33	205	272	330	212	283	340	211	281	343	125	162	177	121	157	177	120	157	180
600	300	70	45	180	235	294	183	243	300	175	234	296	121	161	191	120	159	194	122	162	200
600	300	70	42	191	249	311	194	258	318	192	254	319	114	154	176	110	147	176	108	147	178
600	300	70	38	205	267	331	214	280	343	211	276	344	117	155	171	113	149	171	112	150	174
600	300	80	52	185	243	294	190	254	302	180	242	296	121	162	193	120	159	196	122	163	202
600	300	80	48	191	252	306	196	263	315	192	257	313	120	160	184	116	154	183	113	153	185
600	300	80	44	206	270	327	217	286	341	212	280	340	123	162	179	119	157	179	118	157	182
600	450	70	42	186	249	304	189	257	311	186	253	311	196	250	293	197	248	297	200	253	304
600	450	70	38	201	267	325	204	275	331	206	276	337	179	231	267	175	226	268	174	227	271
600	450	70	35	216	285	346	224	298	358	227	299	364	177	228	257	174	224	259	174	226	263
600	450	80	48	182	240	301	187	250	310	182	243	308	180	234	278	180	233	282	183	237	290
600	450	80	44	199	260	325	204	270	333	205	269	337	167	220	257	164	215	258	163	216	261
600	450	80	40	220	284	351	230	299	365	230	298	369	165	217	247	162	213	248	162	215	253
600	450	90	54	182	243	296	189	255	306	182	246	302	181	236	281	182	235	286	185	240	293
600	450	90	49	196	260	316	203	272	326	201	269	328	171	225	263	168	220	264	167	221	267
600	450	90	45	217	284	343	230	302	359	228	298	360	169	222	253	166	218	254	166	220	259
600	600	70	38	192	262	324	202	277	337	197	270	335	227	305	372	229	304	378	233	311	386
600	600	70	35	207	280	345	217	295	358	217	293	362	195	272	332	193	268	334	193	270	339
600	600	70	31	235	311	379	251	331	398	251	330	401	189	265	318	188	262	321	189	265	327
600	600	80	44	194	259	327	206	276	342	199	267	338	210	289	357	212	288	363	216	295	371
600	600	80	40	210	278	349	222	295	364	221	292	366	185	263	324	183	259	326	184	261	331
600	600	80	36	246	316	391	263	339	411	261	335	413	176	253	307	175	250	310	176	253	316
600	600	90	49	195	262	322	209	281	339	199	270	333	212	292	361	214	292	367	218	298	375
600	600	90	45	207	277	340	221	296	357	217	291	357	189	267	329	187	263	331	187	265	336
600	600	90	40	242	316	382	262	341	405	258	335	404	179	257	312	178	254	315	179	257	320

TABLE F-51. TOTAL NOX EMITTED ON THE INBOUND APPROACH (GRAMS) IN 15 MINUTES FOR GEOMETRY 7*7

INTERSECTION ENVIRONMENT				MINOR STREET									MAJOR STREET								
				LEFT TURNS									LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	146	170	187	135	165	180	117	145	166	144	169	192	136	159	188	140	165	196
300	300	50	25	151	179	199	140	173	191	128	159	182	145	170	185	133	156	177	133	158	182
300	300	50	22	137	168	191	132	167	189	120	153	180	140	164	172	129	151	165	130	154	171
300	300	60	33	144	164	187	135	160	181	116	139	165	135	162	185	127	152	181	131	158	189
300	300	60	30	147	170	196	138	166	190	124	150	179	147	173	189	135	159	181	135	161	185
300	300	60	27	139	164	193	136	166	194	121	150	183	140	164	173	129	151	167	130	154	172
300	300	70	38	139	162	176	133	160	173	111	137	155	136	164	188	128	153	184	132	159	192
300	300	70	35	137	162	180	130	161	177	114	143	164	149	176	193	138	162	185	138	164	190
300	300	70	31	126	154	175	125	159	178	109	140	164	145	170	180	134	157	174	135	161	179
300	450	50	25	141	168	187	132	164	182	117	147	170	194	234	270	187	225	267	192	232	277
300	450	50	22	145	175	198	136	171	192	127	160	186	194	233	263	184	220	256	185	224	262
300	450	50	20	137	171	196	134	172	196	125	161	190	185	223	246	176	212	240	178	216	247
300	450	60	30	140	162	188	134	161	185	117	142	171	190	231	268	184	222	266	189	229	275
300	450	60	27	146	171	200	139	169	196	128	156	188	196	236	266	186	223	260	187	227	265
300	450	60	24	140	168	200	139	172	202	127	159	194	188	227	251	179	215	245	181	220	252
300	450	70	35	134	159	176	129	159	175	110	138	159	191	233	271	184	224	268	189	231	277
300	450	70	31	132	160	181	128	161	179	114	145	169	200	241	272	190	228	266	191	232	272
300	450	70	28	126	157	180	127	163	184	113	147	174	193	233	257	184	221	252	186	226	258
300	600	60	27	134	168	194	132	171	195	115	152	181	201	265	326	195	257	324	202	266	335
300	600	60	24	141	178	207	138	180	208	127	167	200	188	251	305	178	239	299	181	244	306
300	600	60	21	147	187	219	151	196	226	139	182	218	174	236	283	165	226	279	169	231	286
300	600	70	31	135	164	196	135	169	200	116	148	184	195	260	322	190	253	321	196	261	331
300	600	70	28	143	175	211	143	180	214	130	165	204	187	251	306	178	240	300	180	244	307
300	600	70	24	153	188	226	159	199	235	145	183	225	171	234	282	162	223	277	166	229	285
300	600	80	36	127	158	182	129	166	188	108	143	170	191	257	319	185	249	318	192	258	329
300	600	80	32	129	163	190	131	170	195	115	153	183	185	249	305	175	238	300	178	243	307
300	600	80	28	138	176	206	146	189	217	130	171	205	168	232	280	159	221	276	163	227	284
450	300	50	30	179	217	248	175	219	248	164	206	240	136	166	192	134	161	194	138	168	203
450	300	50	27	181	222	256	177	223	255	172	216	254	138	167	186	131	158	184	132	161	189
450	300	50	25	179	224	260	181	230	265	175	223	263	129	157	169	123	149	168	125	153	174
450	300	60	36	181	215	251	179	218	253	166	203	243	131	161	189	128	157	190	133	163	199
450	300	60	33	185	221	261	182	224	262	175	215	258	138	168	188	132	160	186	133	162	191
450	300	60	30	185	224	267	188	233	274	181	224	270	132	161	174	126	153	173	128	157	179
450	300	70	42	175	212	240	176	217	244	161	200	232	131	162	190	128	158	192	133	164	201
450	300	70	38	172	212	243	173	217	247	163	206	240	143	174	195	137	166	193	138	168	198
450	300	70	35	172	214	249	178	225	258	168	214	252	138	168	182	132	160	180	134	164	186
450	450	60	33	171	212	245	169	215	246	161	205	242	188	232	272	187	228	275	192	236	285
450	450	60	30	179	223	259	177	226	260	175	222	261	181	224	258	176	217	257	178	221	263
450	450	60	27	179	226	265	182	234	272	180	230	273	174	216	242	170	210	242	173	215	250
450	450	70	38	173	209	248	173	214	252	163	202	245	184	229	270	182	225	273	188	233	283
450	450	70	35	183	222	264	183	227	267	178	220	266	183	226	261	178	219	260	180	223	266
450	450	70	31	186	228	274	192	239	283	187	232	281	175	217	245	170	211	245	173	216	252
450	450	80	44	163	202	233	166	209	239	153	195	230	181	227	269	180	223	272	186	231	282
450	450	80	40	167	209	243	169	216	249	163	208	245	184	228	264	179	221	263	181	225	269
450	450	80	36	171	216	253	179	229	264	172	220	261	176	219	248	171	213	248	174	218	255
450	600	70	35	171	219	259	176	228	267	166	217	260	210	278	343	210	276	347	217	285	359
450	600	70	31	180	231	274	184	240	281	180	234	280	191	259	317	188	253	317	191	258	324
450	600	70	28	198	252	298	208	267	311	203	260	310	175	241	292	172	236	293	176	243	302
450	600	80	40	177	220	266	184	232	276	171	218	267	202	271	337	202	269	341	209	278	352
450	600	80	36	188	234	283	195	246	293	188	237	290	188	256	315	184	250	315	187	255	323
450	600	80	32	211	260	312	223	277	328	216	268	324	169	236	288	166	231	289	170	237	298
450	600	90	45	164	209	247	173	223	259	158	207	248	197	267	334	197	265	338	204	274	349
450	600	90	40	171	219	260	180	233	272	171	223	267	183	253	312	180	247	313	183	252	320
450	600	90	36	194	245	289	208	265	307	199	254	301	164	232	285	161	227	286	165	233	295
600	300	60	39	191	249	300	185	249	298	173	234	289	143	177	207	139	171	208	139	172	211
600	300	60	36	197	258	312	191	257	310	184	249	306	138	171	194	131	162	192	126	159	191
600	300	60	33	203	267	324	202	272	327	195	263	324	131	164	180	125	155	178	122	154	179
600	300	70	45	186	240	297	183	242	297	168	225	286	131	166	198	128	161	199	127	162	202
600	300	70	42	194	251	311	190	252	310	181	241	305	132	166	191	125	157	188	121	154	187
600	300	70	38	205	264	327	206	271	333	197	260	327	127	160	177	121	152	175	117	150	176
600	300	80	52	181	237	286	180	241	288	163	222	275	135	170	203	131	165	204	131	166	207
600	300	80	48	184	243	295	182	247	297	171	234	289	141	176	201	134	167	199	130	164	198
600	300	80	44	195	257	312	199	266	319	187	253	311	137	170	189	130	162	187	127	160	187
600	450	70	42	193	254	308	189	255	307	179	244	301	206	254	298	204	250	301	204	252	305
600	450	70	38	204	268	325	200	269	324	196	263	323	195	242	280	190	235	279	186	233	279
600	450	70	35	215	283	342	217	289	347	212	283	346	186	232	263	181	225	262	178	225	264
600	450	80	48	191	247	306	189	250	308	177	237	299	192	241	287	190	237	289	191	240	294
600	450	80	44	204	264	326	202	267	328	196	259	325	187	235	274	181	227	272	178	226	273
600	450	80	40	221	283	349	225	292	356	218	284	353	177	224	256	172	217	255	170	217	257
600	450	90	54	180	239	290	180	244	294	166	228	283	197	247	294	195	243	296	196	246	300
600	450	90	49	190	252	307	191	258	310	182	247	305	195	244	283	189	236	282	186	235	283
600	450	90	45	207	272	330	213	284	339	205	273	334	185	233	265	180	226	265	177	225	266
600	600	70	38	201	269	329	204	277	335	192	263	326	231	303	372	230	300	376	232	304	381
600	600	70	35	212	283	347	215	291	352	209	283	350	206	278	340	202	271	340	200	271	342
600	600	70	31	237	311	377	245	324	389	239	316	385	193	264	319	189	258	319	188	259	322
600	600	80	44	205	268	334	210	278	343	196	262	332	217	291	361	217	288	364	218	291	370
600	600	80	40	217	283	353	222	293	361	214	283	356	200	273	335	196	266	335	194	266	337
600	600	80	36	249	318	390	259	334	404	251	323	399	183	255	311	180	249	311	179	250	314
600	600	90	49	194	260	318	202	272	329	185	254	316	223	297	368	222	294	371	224	298	377
600	600	90	45	203	272	333	210	284	343	199	271	336	207	280	344	202	273	344	200	273	346
600	600	90	40	235	306	371	248	324	387	237	312	379	190	262	319	186	256	319	185	257	322

TABLE F-6A. TOTAL FUEL CONSUMPTION ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 4*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	5.2	5.8	5.8	5.1	5.7	5.9	5.5	6.3	6.5	3.7	4.9	5.8	3.9	5.2	6.6	4.9	6.1	7.7
300	300	50	25	5.8	6.6	6.9	5.9	6.8	7.2	6.5	7.6	8.1	3.6	4.8	4.4	3.1	4.5	4.6	3.9	5.1	5.4
300	300	50	22	4.1	5.2	5.7	4.7	5.9	6.5	5.9	7.2	7.9	4.0	4.4	4.6	3.7	4.2	4.9	4.8	5.2	6.0
300	300	60	33	4.6	4.5	5.2	4.2	4.3	5.0	4.8	5.0	5.9	4.0	5.4	6.0	3.8	5.3	6.5	4.8	6.2	7.6
300	300	60	30	4.9	5.2	6.1	4.8	5.1	6.1	5.7	6.1	7.2	4.5	6.0	5.4	3.7	5.3	5.2	4.5	5.9	6.0
300	300	60	27	3.8	4.2	5.4	4.2	4.7	6.0	5.6	6.3	7.6	4.9	5.5	5.4	4.1	4.9	5.3	5.3	5.9	6.5
300	300	70	38	5.5	5.6	5.6	5.3	5.5	5.7	5.8	6.1	6.3	4.4	5.5	6.4	3.8	5.1	6.5	4.9	6.0	7.6
300	300	70	35	5.6	5.9	6.2	5.6	6.1	6.5	6.3	6.8	7.3	5.2	6.4	6.0	4.0	5.4	5.5	4.8	6.0	6.3
300	300	70	31	4.4	4.9	5.5	5.0	5.7	6.3	6.2	6.9	7.7	5.6	6.0	6.1	4.5	5.0	5.7	5.6	6.1	6.9
300	450	50	25	4.9	5.6	5.8	5.1	5.9	6.2	5.9	6.8	7.2	7.0	8.7	10.3	7.2	9.1	11.2	8.3	10.1	12.3
300	450	50	22	5.4	6.4	6.8	5.9	6.9	7.4	6.9	8.0	8.7	6.6	8.5	8.7	6.2	8.3	9.0	7.0	8.9	9.8
300	450	50	20	4.4	5.6	6.2	5.3	6.6	7.4	6.9	8.3	9.1	6.6	7.7	8.4	6.3	7.5	8.8	7.5	8.5	10.0
300	450	60	30	4.4	4.5	5.3	4.4	4.6	5.5	5.3	5.7	6.6	7.5	9.5	10.8	7.4	9.5	11.3	8.4	10.5	12.5
300	450	60	27	5.0	5.4	6.4	5.3	5.7	6.9	6.5	7.0	8.3	7.4	9.5	9.6	6.7	8.9	9.5	7.5	9.6	10.3
300	450	60	24	4.2	4.8	6.1	4.9	5.6	7.0	6.7	7.5	9.0	7.7	8.9	9.5	7.0	8.4	9.5	8.2	9.4	10.7
300	450	70	35	5.1	5.4	5.5	5.3	5.7	5.9	6.1	6.5	6.9	8.0	9.8	11.3	7.5	9.4	11.4	8.6	10.4	12.6
300	450	70	31	5.3	5.8	6.2	5.8	6.3	6.8	6.8	7.4	8.1	8.4	10.3	10.5	7.3	9.3	10.0	8.1	10.0	10.9
300	450	70	28	4.6	5.3	5.9	5.5	6.3	7.1	7.1	8.0	8.8	8.5	9.5	10.3	7.4	8.6	9.9	8.6	9.7	11.1
300	600	60	27	4.5	5.6	6.2	5.0	6.2	6.9	6.1	7.5	8.2	10.4	13.4	16.1	10.7	13.8	17.0	11.8	14.8	18.2
300	600	60	24	5.3	6.7	7.5	6.1	7.6	8.5	7.4	9.0	10.0	8.7	11.8	13.2	8.4	11.6	13.5	9.3	12.3	14.4
300	600	60	21	6.2	7.8	8.9	7.5	9.2	10.4	9.4	11.2	12.5	8.2	10.4	12.3	7.9	10.3	12.7	9.1	11.4	14.0
300	600	70	31	4.2	4.7	5.9	4.5	5.2	6.5	5.9	6.6	8.0	10.7	13.9	16.4	10.7	14.0	17.0	11.8	15.0	18.2
300	600	70	28	5.2	5.9	7.4	5.7	6.6	8.1	7.3	8.3	9.9	9.3	12.6	13.8	8.6	12.1	13.8	9.5	12.8	14.7
300	600	70	24	6.4	7.5	9.2	7.5	8.7	10.4	9.6	10.9	12.8	8.7	11.1	12.9	8.1	10.7	12.9	9.3	11.8	14.2
300	600	80	36	4.8	5.4	6.0	5.4	6.1	6.8	6.5	7.3	8.1	11.0	13.9	16.6	10.5	13.6	16.8	11.7	14.7	18.1
300	600	80	32	5.4	6.3	7.1	6.2	7.1	8.1	7.5	8.6	9.6	9.9	13.0	14.4	8.9	12.1	14.0	9.8	12.8	14.9
300	600	80	28	6.9	8.0	9.1	8.2	9.4	10.6	10.1	11.4	12.7	9.1	11.3	13.2	8.1	10.4	12.9	9.4	11.6	14.2
450	300	50	30	6.9	8.2	9.0	7.0	8.4	9.3	8.1	9.6	10.6	4.0	5.4	6.5	4.7	6.3	7.9	5.8	7.3	9.1
450	300	50	27	7.2	8.8	9.9	7.6	9.3	10.4	9.0	10.8	12.0	3.9	5.4	5.2	4.0	5.6	6.0	4.8	6.3	6.9
450	300	50	25	6.6	8.4	9.7	7.4	9.4	10.8	9.3	11.4	12.9	3.9	4.5	4.9	4.0	4.8	5.7	5.2	5.9	7.0
450	300	60	36	6.5	7.3	8.7	6.4	7.2	8.8	7.7	8.7	10.3	4.4	6.0	6.9	4.7	6.5	7.9	5.9	7.5	9.1
450	300	60	33	7.0	8.0	9.7	7.2	8.3	10.0	8.7	9.9	11.8	4.6	6.3	5.9	4.3	6.2	6.3	5.2	6.9	7.2
450	300	60	30	6.6	7.8	9.7	7.2	8.6	10.6	9.3	10.8	12.9	4.9	5.7	5.9	4.6	5.6	6.3	5.9	6.7	7.6
450	300	70	42	7.4	8.3	9.1	7.5	8.5	9.4	8.7	9.7	10.7	4.8	6.2	7.3	4.7	6.3	7.9	5.9	7.3	9.1
450	300	70	38	7.5	8.6	9.7	7.9	9.1	10.2	9.2	10.5	11.8	5.6	7.0	6.9	4.9	6.5	6.9	5.8	7.3	7.8
450	300	70	35	7.2	8.5	9.8	8.0	9.5	10.9	9.9	11.5	13.0	5.7	6.3	6.7	5.1	5.9	6.8	6.4	7.0	8.1
450	450	60	33	6.6	8.1	9.0	7.1	8.6	9.7	8.5	10.2	11.3	7.9	9.9	11.6	8.6	10.8	13.1	9.8	11.9	14.3
450	450	60	30	7.6	9.3	10.5	8.3	10.1	11.4	10.0	11.9	13.3	7.0	9.1	9.6	7.2	9.4	10.4	8.1	10.2	11.4
450	450	60	27	7.2	9.1	10.6	8.4	10.5	12.0	10.6	12.8	14.4	7.0	8.3	9.3	7.2	8.7	10.2	8.5	9.8	11.5
450	450	70	38	6.3	7.2	8.8	6.5	7.5	9.2	8.2	9.3	11.1	8.3	10.5	12.1	8.7	11.0	13.1	9.9	12.1	14.4
450	450	70	35	7.4	8.6	10.4	7.9	9.1	11.0	9.9	11.2	13.2	7.7	10.0	10.3	7.5	10.0	10.7	8.4	10.8	11.7
450	450	70	31	7.4	8.8	10.8	8.4	9.9	12.0	10.9	12.5	14.7	7.8	9.3	10.1	7.6	9.3	10.6	8.9	10.4	11.9
450	450	80	44	6.9	7.9	8.8	7.3	8.4	9.5	8.8	10.0	11.1	8.6	10.6	12.4	8.6	10.8	13.0	9.8	11.9	14.3
450	450	80	40	7.7	8.9	10.1	8.4	9.7	11.0	10.1	11.5	12.9	8.5	10.6	11.1	7.9	10.2	11.1	8.9	11.0	12.1
450	450	80	36	7.9	9.3	10.8	9.1	10.7	12.2	11.3	13.0	14.6	8.4	9.7	10.7	7.8	9.3	10.8	9.2	10.5	12.2
450	600	70	35	7.1	9.0	10.4	7.9	9.9	11.4	9.7	11.8	13.4	12.4	15.6	18.5	13.2	16.6	20.0	14.5	17.7	21.3
450	600	70	31	8.3	10.4	12.0	9.3	11.6	13.3	11.4	13.7	15.5	10.4	13.7	15.3	10.6	14.0	16.2	11.6	14.9	17.2
450	600	70	28	10.2	12.6	14.4	11.7	14.2	16.2	14.3	16.9	19.0	9.5	11.9	14.1	9.7	12.3	15.0	11.1	13.5	16.4
450	600	80	40	7.3	8.6	10.5	7.8	9.2	11.3	9.9	11.4	13.5	12.5	15.8	18.6	12.9	16.4	19.7	14.2	17.6	21.0
450	600	80	36	8.6	10.2	12.4	9.5	11.1	13.4	11.7	13.5	15.9	10.7	14.2	15.6	10.5	14.1	16.1	11.5	15.0	17.1
450	600	80	32	11.0	12.8	15.3	12.4	14.3	16.8	15.2	17.2	19.8	9.7	12.3	14.3	9.6	12.4	14.9	11.0	13.6	16.3
450	600	90	45	7.5	8.9	10.3	8.3	9.8	11.3	10.1	11.7	13.3	12.7	15.9	18.9	12.8	16.2	19.6	14.1	17.3	20.9
450	600	90	40	8.8	10.4	12.0	9.8	11.5	13.2	11.9	13.7	15.5	11.2	14.5	16.1	10.7	14.1	16.2	11.7	15.0	17.3
450	600	90	36	11.4	13.2	15.1	12.9	14.9	16.9	15.5	17.6	19.6	10.0	12.4	14.6	9.5	12.1	14.8	10.9	13.4	16.3
600	300	60	39	8.7	10.8	12.4	8.9	11.1	12.8	9.7	12.0	13.8	6.2	7.8	9.2	7.0	8.8	10.7	7.9	9.6	11.6
600	300	60	36	9.5	11.8	13.7	9.9	12.4	14.3	11.0	13.6	15.6	4.9	6.6	6.7	5.1	7.0	7.6	5.7	7.5	8.2
600	300	60	33	10.3	13.0	15.0	11.3	14.1	16.2	12.9	15.7	18.0	5.0	5.9	6.5	5.3	6.3	7.4	6.3	7.2	8.5
600	300	70	45	7.9	9.4	11.6	7.9	9.5	11.8	8.9	10.6	13.0	6.2	8.0	9.2	6.6	8.6	10.3	7.6	9.4	11.3
600	300	70	42	8.8	10.6	13.0	9.1	10.9	13.5	10.3	12.3	14.9	5.2	7.1	7.0	5.1	7.1	7.5	5.7	7.7	8.2
600	300	70	38	10.1	12.1	14.8	10.9	13.0	15.8	12.7	14.9	17.8	5.5	6.6	7.0	5.4	6.7	7.6	6.4	7.5	8.6
600	300	80	52	8.8	10.5	12.0	9.1	10.8	12.5	9.9	11.7	13.5	6.7	8.4	9.7	6.8	8.6	10.5	7.8	9.4	11.5
600	300	80	48	9.4	11.3	13.1	9.9	11.9	13.8	11.0	13.0	15.0	6.4	8.1	8.1	5.8	7.7	8.3	6.5	8.3	9.0
600	300	80	44	11.0	13.1	15.2	12.0	14.2	16.4	13.6	15.9	18.1	6.5	7.4	8.0	6.0	7.1	8.2	7.1	8.0	9.3
600	450	70	42	9.3	11.5	13.2	9.9	12.2	14.0	11.0	13.5	15.4	11.0	13.3	15.3	11.9	14.4	16.9	12.9	15.2	17.9
600	450	70	38	10.5	13.0	15.0	11.4	13.9	16.0	12.7	15.4	17.6	9.2	11.6	12.3	9.5	12.0	13.3	10.2	12.6	14.0
600	450	70	35	12.0	14.7	16.9	13.3	16.2	18.5	15.3	18.2	20.6	9.0	10.5	11.7	9.4	11.0	12.8	10.4	11.9	13.9
600	450	80	48	8.7	10.3	12.7	9.0	10.8	13.2	10.4	12.3	14.8	10.8	13.3	15.1	11.3	14.0	16.2	12.3	14.8	17.3
600	450	80	44	10.2	12.1	14.7	10.8	12.8	15.4	12.4	14.5	17.3	9.3	11.8	12.3	9.2	11.9	12.9	9.9	12.5	13.7
600	450	80	40	12.2	14.3	17.1	13.3	15.6	18.5	15.5	17.8	20.8	9.1	10.8	11.9	9.1	11.0	12.5	10.2	11.9	13.7
600	450	90	54	9.2	10.9	12.6	9.7	11.6	13.4	10.9	12.8	14.7	11.6	13.9	15.9	11.7	14.2	16.7	12.8	15.1	17.7
600	450	90	49	10.5	12.5	14.5	11.4	13.4	15.5	12.7	14.9	17.1	10.5	12.8	13.5	10.0	12.5	13.7	10.8	13.1	14.5
600	450	90	45	12.8	15.0	17.2	14.1	16.5	18.7	16.0	18.5	20.9	10.1	11.6	12.9	9.7	11.4	13.2	10.9	12.4	14.3
600	600	70	38	10.8	13.5	15.6	11.8	14.5	16.7	13.3	16.1	18.4	16.2	19.6	22.7	17.1	20.7	24.4	18.1	21.6	25.4
600	600	70	35	12.2	15.1	17.5	13.4	16.4	18.8	15.1	18.2	20.8	13.0	16.5	18.4	13.3	17.0	19.4	14.1	17.6	20.2
600	600	70	31	15.5	18.7	21.3	17.2	20.5	23.2	19.5	22.9	25.7	12.2	14.9	17.3	12.6	15.5	18.4	13.7	16.4	19.5
600	600	80	44	10.8	12.9	15.6	11.5	13.7	16.5	13.3	15.5	18.4	15.8	19.4	22.4	16.4	20.2	23.6	17.4	21.1	24.7
600	600	80	40	12.3	14.6	17.6	13.2	15.7	18.7	15.2	17.7	20.9	13.1	16.8	18.5	13.1	16.9	19.1	13.8	17.6	19.9
600	600	80	36	16.3	18.9	22.1	17.8	20.4	23.8	20.3	23.0	26.4	12.1	15.0	17.2	12.2	15.2	18.0	13.3	16.2	19.1
600	600	90	49	11.3	13.5	15.6	12.2	14.5	16.7	13.7	16.1	18.4	16.8	20.2	23.4	17.0	20.6	24.3	18.1	21.5	25.4
600	600	90	45	12.6	15.0	17.3	13.7	16.2	18.7	15.5	18.1	20.6	14.3	17.8	19.7	13.9	17.6	20.0	14.7	18.2	20.8
600	600	90	40	16.8	19.5	22.1	18.5	21.3	24.0	20.8	23.7	26.5	13.2	15.9	18.3	12.9	15.7	18.6	14.1	16.8	19.9

TABLE F-6B. TOTAL FUEL CONSUMPTION ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 5*4

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	4.7	5.1	5.1	4.5	5.1	5.1	4.9	5.6	5.7	4.1	4.7	5.6	3.7	4.5	5.8	4.1	4.8	6.3
300	300	50	25	5.1	5.8	5.9	5.1	5.9	6.2	5.8	6.7	7.0	4.4	5.1	4.7	3.4	4.3	4.3	3.5	4.3	4.5
300	300	50	22	3.6	4.6	5.0	4.2	5.3	5.8	5.4	6.5	7.1	4.7	4.6	4.7	3.7	3.8	4.4	4.3	4.2	5.0
300	300	60	33	4.7	4.5	5.0	4.3	4.2	4.8	4.9	4.9	5.7	3.9	4.7	5.4	3.1	4.1	5.3	3.6	4.4	5.8
300	300	60	30	4.8	4.9	5.7	4.7	4.9	5.7	5.5	5.8	6.8	4.8	5.8	5.2	3.5	4.6	4.4	3.6	4.6	4.7
300	300	60	27	3.9	4.3	5.3	4.3	4.7	5.9	5.7	6.2	7.5	5.1	5.2	5.1	3.7	4.0	4.4	4.3	4.4	5.0
300	300	70	38	5.9	5.8	5.7	5.7	5.8	5.8	6.1	6.2	6.4	4.2	4.8	5.7	3.0	3.8	5.2	3.5	4.2	5.7
300	300	70	35	5.7	5.9	6.1	5.8	6.1	6.3	6.4	6.8	7.2	5.5	6.2	5.8	3.7	4.6	4.7	3.9	4.7	4.9
300	300	70	31	4.8	5.2	5.6	5.4	5.9	6.4	6.6	7.2	7.8	5.7	5.6	5.7	4.0	4.1	4.7	4.6	4.5	5.3
300	450	50	25	4.2	4.8	4.8	4.4	5.1	5.2	5.1	5.9	6.1	6.5	7.8	9.2	6.1	7.6	9.6	6.6	7.9	10.1
300	450	50	22	4.5	5.3	5.6	4.9	5.9	6.2	5.9	6.9	7.4	6.6	8.0	8.1	5.6	7.2	7.9	5.8	7.2	8.1
300	450	50	20	3.7	4.8	5.3	4.7	5.8	6.5	6.2	7.5	8.2	6.5	7.0	7.7	5.6	6.3	7.5	6.2	6.7	8.2
300	450	60	30	4.3	4.3	4.9	4.3	4.3	5.1	5.2	5.4	6.3	6.5	8.0	9.3	5.8	7.5	9.3	6.3	7.9	9.8
300	450	60	27	4.7	5.0	5.9	4.9	5.3	6.3	6.2	6.6	7.7	7.0	8.5	8.5	5.6	7.4	7.9	5.9	7.5	8.2
300	450	60	24	4.1	4.6	5.8	4.9	5.4	6.7	6.6	7.3	8.6	7.0	7.8	8.3	5.8	6.7	7.7	6.4	7.2	8.4
300	450	70	35	5.3	5.4	5.5	5.5	5.7	5.8	6.2	6.5	6.8	7.0	8.2	9.7	5.9	7.3	9.3	6.4	7.7	9.9
300	450	70	31	5.3	5.6	5.9	5.7	6.1	6.5	6.7	7.2	7.7	7.8	9.2	9.4	6.1	7.7	8.4	6.4	7.8	8.7
300	450	70	28	4.8	5.4	5.9	5.8	6.4	7.1	7.3	8.1	8.8	7.8	8.3	9.0	6.1	6.8	8.1	6.8	7.3	8.8
300	600	60	27	3.6	4.6	5.0	4.1	5.2	5.8	5.2	6.4	7.0	9.5	11.9	14.6	9.2	11.8	15.0	9.8	12.2	15.6
300	600	60	24	4.2	5.5	6.2	5.0	6.3	7.1	6.3	7.8	8.6	8.3	10.8	12.2	7.4	10.1	12.0	7.7	10.2	12.3
300	600	60	21	5.4	6.9	7.8	6.7	8.3	9.3	8.5	10.2	11.4	7.6	9.3	11.2	6.7	8.6	11.0	7.4	9.1	11.7
300	600	70	31	3.9	4.3	5.4	4.2	4.7	5.9	5.6	6.2	7.4	9.4	12.0	14.5	8.7	11.5	14.5	9.3	12.0	15.1
300	600	70	28	4.7	5.3	6.6	5.2	6.0	7.4	6.8	7.6	9.1	8.4	11.2	12.3	7.2	10.1	11.7	7.4	10.2	12.1
300	600	70	24	6.2	7.1	8.7	7.3	8.3	10.0	9.4	10.5	12.3	7.6	9.6	11.3	6.5	8.5	10.7	7.1	9.1	11.5
300	600	80	36	4.8	5.3	5.8	5.3	5.9	6.5	6.4	7.1	7.8	9.5	12.0	14.6	8.5	11.1	14.3	9.1	11.6	14.9
300	600	80	32	5.2	5.9	6.6	5.9	6.8	7.6	7.3	8.2	9.1	8.9	11.5	12.8	7.3	10.0	11.9	7.6	10.2	12.3
300	600	80	28	6.9	7.9	8.9	8.2	9.3	10.4	10.1	11.3	12.4	8.0	9.7	11.6	6.4	8.3	10.7	7.1	8.8	11.4
450	300	50	30	6.5	7.7	8.4	6.6	7.9	8.7	7.7	9.1	10.0	3.9	4.8	5.8	4.0	5.0	6.6	4.5	5.5	7.2
450	300	50	27	6.7	8.1	9.1	7.0	8.6	9.6	8.3	10.0	11.1	4.2	5.2	5.0	3.7	4.9	5.2	4.0	5.0	5.5
450	300	50	25	6.3	8.0	9.2	7.1	8.9	10.2	9.0	10.9	12.3	4.0	4.2	4.5	3.6	3.9	4.7	4.3	4.4	5.5
450	300	60	36	6.8	7.4	8.7	6.6	7.4	8.8	8.0	8.8	10.3	3.8	4.9	5.8	3.5	4.8	6.2	4.1	5.2	6.8
450	300	60	33	7.1	8.0	9.5	7.2	8.2	9.8	8.8	9.8	11.6	4.5	5.6	5.2	3.6	4.9	5.0	3.9	5.1	5.4
450	300	60	30	6.9	8.0	9.8	7.5	8.7	10.6	9.6	10.9	12.9	4.6	4.9	5.0	3.7	4.3	4.9	4.4	4.8	5.6
450	300	70	42	8.0	8.7	9.4	8.1	8.9	9.7	9.2	10.1	10.9	4.1	5.0	6.1	3.4	4.5	6.1	4.1	5.0	6.8
450	300	70	38	7.8	8.8	9.7	8.2	9.2	10.2	9.5	10.7	11.8	5.3	6.3	6.1	4.1	5.2	5.5	4.4	5.4	5.9
450	300	70	35	7.8	9.0	10.1	8.6	9.9	11.2	10.5	11.9	13.3	5.3	5.5	5.8	4.1	4.4	5.3	4.9	5.0	6.1
450	450	60	33	6.1	7.4	8.2	6.5	8.0	8.9	8.0	9.5	10.5	6.9	8.4	10.1	7.1	8.7	11.0	7.7	9.2	11.6
450	450	60	30	6.9	8.5	9.5	7.5	9.2	10.4	9.2	11.0	12.3	6.5	8.1	8.5	6.1	7.8	8.8	6.4	8.0	9.2
450	450	60	27	6.7	8.5	9.8	7.9	9.8	11.2	10.1	12.2	13.7	6.3	7.1	8.1	6.0	6.9	8.4	6.7	7.5	9.2
450	450	70	38	6.4	7.2	8.6	6.6	7.5	9.0	8.3	9.2	10.9	6.8	8.6	10.1	6.6	8.5	10.5	7.3	9.0	11.2
450	450	70	35	7.3	8.3	10.0	7.9	8.9	10.6	9.7	10.9	12.8	6.7	8.6	8.8	5.9	7.9	8.7	6.3	8.1	9.1
450	450	70	31	7.6	8.8	10.7	8.6	9.9	11.9	11.0	12.4	14.6	6.7	7.6	8.4	5.9	7.1	8.3	6.7	7.7	9.1
450	450	80	44	7.2	8.1	8.9	7.7	8.6	9.5	9.1	10.2	11.2	7.1	8.6	10.3	6.5	8.2	10.4	7.2	8.7	11.1
450	450	80	40	7.8	8.9	10.0	8.5	9.7	10.8	10.2	11.5	12.7	7.5	9.1	9.5	6.3	8.0	9.0	6.7	8.3	9.4
450	450	80	36	8.3	9.6	10.9	9.5	10.9	12.3	11.7	13.2	14.7	7.2	8.0	8.9	6.1	7.0	8.5	6.9	7.6	9.3
450	600	70	35	6.4	8.2	9.4	7.2	9.1	10.4	9.0	11.0	12.4	11.0	13.7	16.6	11.2	14.1	17.5	11.9	14.6	18.2
450	600	70	31	7.3	9.4	10.8	8.4	10.5	12.0	10.4	12.6	14.3	9.4	12.2	13.8	9.1	12.0	14.1	9.5	12.3	14.6
450	600	70	28	9.5	11.8	13.5	11.1	13.4	15.2	13.6	16.1	18.0	8.4	10.3	12.4	8.1	10.2	12.8	8.8	10.8	13.6
450	600	80	40	7.2	8.3	10.2	7.7	9.0	10.9	9.7	11.1	13.1	10.6	13.5	16.2	10.4	13.5	16.7	11.1	14.1	17.4
450	600	80	36	8.3	9.7	11.8	9.1	10.6	12.8	11.4	13.0	15.3	9.3	12.2	13.6	8.5	11.7	13.6	8.9	11.9	14.0
450	600	80	32	11.0	12.7	15.0	12.3	14.1	16.5	15.1	17.0	19.5	8.1	10.3	12.2	7.4	9.8	12.2	8.3	10.4	13.1
450	600	90	45	7.7	9.0	10.2	8.5	9.8	11.2	10.3	11.7	13.2	10.8	13.5	16.4	10.3	13.1	16.5	11.0	13.7	17.3
450	600	90	40	8.7	10.2	11.7	9.7	11.3	12.9	11.8	13.5	15.1	9.7	12.5	14.1	8.6	11.6	13.7	9.1	11.9	14.2
450	600	90	36	11.6	13.4	15.1	13.1	15.0	16.8	15.7	17.7	19.6	8.4	10.3	12.5	7.3	9.4	12.1	8.2	10.1	13.0
600	300	60	39	8.6	10.6	12.0	8.8	10.9	12.4	9.6	11.7	13.4	5.3	6.4	7.8	5.6	6.9	8.7	5.9	7.1	9.1
600	300	60	36	9.1	11.4	13.1	9.6	11.9	13.7	10.6	13.0	14.9	4.5	5.7	5.7	4.1	5.5	6.0	4.2	5.4	6.1
600	300	60	33	10.3	12.8	14.7	11.3	13.8	15.9	12.8	15.5	17.6	4.4	4.8	5.4	4.1	4.7	5.8	4.6	5.0	6.2
600	300	70	45	8.4	9.8	11.8	8.4	9.9	12.0	9.4	11.0	13.2	4.8	6.2	7.3	4.7	6.2	7.8	5.1	6.4	8.2
600	300	70	42	9.1	10.7	13.0	9.3	11.1	13.5	10.6	12.4	14.9	4.3	5.7	5.6	3.6	5.2	5.5	3.7	5.1	5.6
600	300	70	38	10.7	12.6	15.1	11.4	13.4	16.1	13.2	15.3	18.0	4.5	5.0	5.4	3.8	4.5	5.4	4.3	4.9	5.9
600	300	80	52	9.6	11.1	12.5	9.8	11.4	12.9	10.6	12.3	13.9	5.3	6.4	7.8	4.8	6.1	7.9	5.2	6.4	8.4
600	300	80	48	10.0	11.7	13.4	10.4	12.3	14.1	11.5	13.4	15.3	5.4	6.6	6.7	4.3	5.7	6.2	4.4	5.7	6.4
600	300	80	44	11.8	13.8	15.7	12.8	14.9	16.9	14.3	16.5	18.7	5.4	5.8	6.4	4.4	4.9	6.0	4.9	5.3	6.5
600	450	70	42	9.0	11.1	12.7	9.5	11.7	13.4	10.7	13.0	14.7	9.3	11.1	13.0	9.6	11.6	14.0	10.0	11.8	14.5
600	450	70	38	10.0	12.4	14.2	10.8	13.3	15.2	12.2	14.7	16.8	8.0	9.8	10.5	7.7	9.7	10.9	7.8	9.7	11.1
600	450	70	35	11.8	14.4	16.4	13.1	15.8	18.0	15.0	17.8	20.1	7.6	8.6	9.8	7.4	8.6	10.3	7.9	8.9	10.8
600	450	80	48	9.0	10.5	12.7	9.3	11.0	13.2	10.7	12.4	14.8	8.6	10.6	12.3	8.6	10.7	13.0	9.0	11.0	13.4
600	450	80	44	10.3	12.1	14.5	10.9	12.7	15.3	12.5	14.4	17.1	7.6	9.6	10.1	6.9	9.1	10.1	7.0	9.1	10.3
600	450	80	40	12.6	14.6	17.3	13.7	15.8	18.6	15.8	18.0	20.9	7.3	8.5	9.5	6.7	8.1	9.6	7.2	8.4	10.1
600	450	90	54	9.7	11.4	12.9	10.3	12.0	13.7	11.4	13.2	15.0	9.4	11.1	13.1	8.9	10.9	13.3	9.4	11.2	13.8
600	450	90	49	10.9	12.8	14.6	11.7	13.7	15.6	13.1	15.1	17.2	8.7	10.6	11.2	7.7	9.7	10.9	7.8	9.7	11.1
600	450	90	45	13.4	15.5	17.6	14.7	16.9	19.1	16.6	18.9	21.2	8.2	9.2	10.4	7.3	8.4	10.1	7.8	8.8	10.7
600	600	70	38	10.3	12.9	14.9	11.2	13.9	16.0	12.7	15.5	17.6	14.0	16.9	20.1	14.4	17.5	21.1	14.8	17.8	21.6
600	600	70	35	11.5	14.3	16.5	12.6	15.5	17.8	14.4	17.3	19.8	11.3	14.3	16.1	11.1	14.3	16.6	11.2	14.3	16.8
600	600	70	31	15.1	18.1	20.6	16.8	19.9	22.5	19.0	22.3	24.9	10.4	12.6	14.9	10.2	12.6	15.4	10.8	13.0	16.0
600	600	80	44	11.0	12.9	15.5	11.7	13.7	16.4	13.4	15.5	18.3	13.2	16.3	19.3	13.2	16.5	19.9	13.7	16.8	20.5
600	600	80	40	12.2	14.4	17.3	13.1	15.4	18.4	15.1	17.5	20.5	10.9	14.2	15.8	10.3	13.7	15.9	10.5	13.8	16.1
600	600	80	36	16.5	18.9	22.0	18.0	20.5	23.7	20.4	23.1	26.3	9.9	12.2	14.4	9.3	11.9	14.6	9.9	12.3	15.2
600	600	90	49	11.7	13.7	15.7	12.6	14.7	16.8	14.1	16.3	18.5	14.1	17.1	20.2	13.8	16.9	20.5	14.3	17.2	21.0
600	600	90	45	12.8	15.0	17.3	13.9	16.3	18.6	15.6	18.1	20.5	12.1	15.1	17.0	11.1	14.3	16.7	11.4	14.4	16.9
600	600	90	40	17.3	19.8	22.3	19.0	21.6	24.2	21.2	24.0	26.6	10.9	13.1	15.4	10.0	12.3	15.2	10.6	12.8	15.8

TABLE F-6C. TOTAL FUEL CONSUMPTION ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 5*5

INTERSECTION				MINOR			STREET							MAJOR			STREET				
ENVIRONMENT				LEFT			TURNS							LEFT			TURNS				
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	6.3	6.6	6.4	5.2	5.7	5.6	4.8	5.3	5.3	3.8	4.3	5.4	3.4	4.0	5.6	3.8	4.2	6.0
300	300	50	25	6.4	7.0	7.0	5.6	6.2	6.4	5.3	6.1	6.3	4.6	5.1	4.9	3.6	4.2	4.5	3.7	4.2	4.7
300	300	50	22	4.2	5.0	5.2	3.9	4.8	5.2	4.2	5.2	5.7	4.8	4.4	4.8	3.8	3.6	4.5	4.3	4.0	5.0
300	300	60	33	6.5	6.2	6.6	5.2	5.0	5.5	5.0	4.9	5.5	4.3	4.9	5.8	3.4	4.2	5.6	3.9	4.5	6.1
300	300	60	30	6.3	6.3	7.0	5.3	5.4	6.1	5.3	5.5	6.3	5.7	6.4	6.0	4.3	5.2	5.3	4.4	5.2	5.4
300	300	60	27	4.7	4.9	5.8	4.2	4.5	5.5	4.7	5.1	6.2	5.8	5.6	5.8	4.4	4.5	5.1	4.9	4.8	5.6
300	300	70	38	6.6	6.4	6.2	5.5	5.5	5.3	5.1	5.1	5.1	4.8	5.2	6.3	3.6	4.2	5.8	4.0	4.5	6.3
300	300	70	35	6.1	6.2	6.2	5.3	5.5	5.6	5.1	5.4	5.6	6.5	7.0	6.8	4.7	5.4	5.7	4.9	5.4	5.9
300	300	70	31	4.4	4.8	5.0	4.2	4.6	5.0	4.5	5.0	5.5	6.6	6.3	6.7	4.9	4.8	5.6	5.5	5.2	6.2
300	450	50	25	5.6	6.1	6.0	4.9	5.5	5.5	4.8	5.5	5.6	6.3	7.4	9.1	5.9	7.2	9.4	6.4	7.5	9.9
300	450	50	22	5.7	6.4	6.5	5.2	6.0	6.3	5.3	6.2	6.6	6.9	8.0	8.5	5.9	7.2	8.2	6.1	7.2	8.4
300	450	50	20	4.1	5.0	5.4	4.2	5.2	5.7	4.8	6.0	6.6	6.6	6.9	7.9	5.7	6.2	7.7	6.3	6.6	8.3
300	450	60	30	5.9	5.8	6.3	5.0	5.0	5.6	5.1	5.2	5.9	7.0	8.3	9.8	6.2	7.7	9.7	6.7	8.0	10.2
300	450	60	27	6.1	6.2	7.0	5.4	5.6	6.5	5.8	6.1	7.0	7.9	9.2	9.5	6.5	8.0	8.8	6.7	8.1	9.0
300	450	60	24	4.7	5.1	6.1	4.6	5.0	6.1	5.4	6.0	7.2	7.8	8.3	9.1	6.5	7.2	8.5	7.1	7.6	9.1
300	450	70	35	5.9	5.8	5.7	5.2	5.2	5.2	5.0	5.2	5.3	7.6	8.7	10.4	6.5	7.7	9.9	7.0	8.1	10.5
300	450	70	31	5.5	5.8	5.9	5.1	5.4	5.7	5.2	5.6	6.0	9.0	10.1	10.6	7.2	8.6	9.5	7.5	8.6	9.8
300	450	70	28	4.3	4.7	5.1	4.4	4.9	5.4	5.0	5.7	6.3	8.8	9.1	10.0	7.1	7.6	9.0	7.7	8.0	9.7
300	600	60	27	4.8	5.7	6.0	4.5	5.5	5.9	4.7	5.8	6.3	9.0	11.2	14.1	8.7	11.1	14.5	9.2	11.5	15.0
300	600	60	24	5.2	6.3	6.9	5.1	6.3	6.9	5.5	6.8	7.6	8.3	10.6	12.2	7.3	9.8	11.9	7.6	9.9	12.2
300	600	60	21	5.6	6.9	7.7	6.0	7.4	8.4	7.0	8.5	9.6	7.4	8.9	11.0	6.5	8.2	10.8	7.2	8.7	11.5
300	600	70	31	5.4	5.7	6.6	4.8	5.2	6.2	5.3	5.7	6.9	9.5	11.9	14.6	8.8	11.4	14.6	9.3	11.8	15.2
300	600	70	28	5.9	6.4	7.6	5.5	6.1	7.4	6.2	6.9	8.3	9.0	11.5	12.9	7.7	10.4	12.3	8.0	10.5	12.6
300	600	70	24	6.6	7.4	8.8	6.8	7.7	9.2	8.1	9.0	10.6	8.1	9.8	11.7	6.9	8.7	11.2	7.5	9.2	11.8
300	600	80	36	5.2	5.5	5.9	4.8	5.3	5.7	5.1	5.6	6.1	9.9	12.1	15.0	8.8	11.2	14.6	9.4	11.6	15.2
300	600	80	32	5.2	5.9	6.4	5.1	5.9	6.5	5.6	6.4	7.2	9.8	12.1	13.7	8.1	10.6	12.7	8.4	10.7	13.0
300	600	80	28	6.2	7.1	7.9	6.7	7.6	8.5	7.7	8.7	9.7	8.6	10.1	12.2	7.0	8.7	11.3	7.7	9.2	12.0
450	300	50	30	7.3	8.4	8.9	6.5	7.7	8.4	6.8	8.0	8.8	3.5	4.2	5.5	3.6	4.4	6.3	4.1	4.8	6.8
450	300	50	27	7.2	8.5	9.3	6.6	8.1	9.0	7.1	8.7	9.6	4.3	5.1	5.1	3.8	4.7	5.3	4.0	4.8	5.5
450	300	50	25	6.0	7.6	8.6	6.0	7.7	8.8	7.0	8.8	10.0	4.0	3.9	4.5	3.5	3.6	4.7	4.2	4.1	5.4
450	300	60	36	7.8	8.3	9.4	6.8	7.4	8.6	7.2	7.9	9.3	4.1	4.9	6.0	3.8	4.8	6.4	4.3	5.2	7.0
450	300	60	33	7.8	8.5	10.0	7.0	7.9	9.4	7.7	8.7	10.3	5.2	6.2	6.0	4.3	5.4	5.8	4.6	5.5	6.1
450	300	60	30	6.8	7.8	9.5	6.6	7.7	9.4	7.8	9.0	10.9	5.1	5.3	5.6	4.3	4.6	5.5	5.0	5.1	6.2
450	300	70	42	7.9	8.5	9.0	7.1	7.8	8.4	7.3	8.1	8.9	4.6	5.2	6.6	3.9	4.7	6.5	4.5	5.2	7.2
450	300	70	38	7.4	8.3	9.1	6.9	7.8	8.7	7.4	8.4	9.4	6.3	7.0	7.1	5.0	5.9	6.5	5.3	6.1	6.8
450	300	70	35	6.6	7.7	8.7	6.6	7.8	8.9	7.6	8.9	10.1	6.1	6.0	6.6	4.9	5.0	6.1	5.6	5.5	6.8
450	450	60	33	6.7	7.9	8.6	6.2	7.6	8.3	6.8	8.2	9.1	6.6	7.9	9.9	6.7	8.2	10.7	7.3	8.7	11.3
450	450	60	30	7.2	8.6	9.6	7.0	8.6	9.6	7.8	9.5	10.6	6.7	8.1	8.7	6.2	7.8	8.9	6.5	7.9	9.3
450	450	60	27	6.2	8.0	9.1	6.6	8.4	9.7	7.9	9.8	11.2	6.4	6.9	8.1	6.0	6.7	8.4	6.7	7.2	9.1
450	450	70	38	7.2	7.9	9.2	6.6	7.3	8.7	7.4	8.2	9.7	7.2	8.7	10.4	6.9	8.6	10.9	7.6	9.1	11.5
450	450	70	35	7.9	8.7	10.3	7.4	8.4	10.0	8.5	9.6	11.3	7.6	9.2	9.6	6.7	8.5	9.4	7.0	8.7	9.8
450	450	70	31	7.3	8.4	10.2	7.4	8.7	10.5	9.0	10.3	12.3	7.3	8.1	9.1	6.6	7.5	9.0	7.3	8.0	9.7
450	450	80	44	7.0	7.7	8.4	6.5	7.3	8.1	7.1	8.0	8.9	7.6	8.9	10.9	7.0	8.5	10.9	7.6	9.0	11.6
450	450	80	40	7.2	8.2	9.1	7.0	8.1	9.1	7.9	9.0	10.2	8.5	9.9	10.5	7.2	8.8	10.0	7.6	9.0	10.4
450	450	80	36	6.9	8.2	9.3	7.3	8.6	9.9	8.6	10.0	11.4	8.1	8.6	9.8	6.9	7.6	9.3	7.7	8.2	10.1
450	600	70	35	6.8	8.5	9.6	6.8	8.5	9.7	7.7	9.5	10.8	10.4	12.9	16.0	10.6	13.2	16.9	11.2	13.7	17.6
450	600	70	31	7.5	9.4	10.7	7.6	9.6	11.1	8.8	10.9	12.4	9.3	11.9	13.7	8.9	11.6	14.0	9.3	11.9	14.4
450	600	70	28	8.9	11.0	12.6	9.6	11.8	13.5	11.3	13.6	15.4	8.1	9.8	12.2	7.8	9.6	12.5	8.5	10.2	13.3
450	600	80	40	7.8	8.8	10.5	7.5	8.6	10.4	8.7	9.9	11.8	10.6	13.3	16.2	10.4	13.3	16.7	11.1	13.8	17.4
450	600	80	36	8.7	10.0	11.9	8.6	10.0	12.0	10.0	11.5	13.6	9.7	12.5	14.1	9.0	11.9	14.0	9.3	12.1	14.5
450	600	80	32	10.6	12.1	14.3	11.0	12.7	15.0	13.0	14.7	17.1	8.5	10.4	12.6	7.8	9.8	12.5	8.5	10.5	13.3
450	600	90	45	7.2	8.4	9.5	7.2	8.4	9.6	8.1	9.4	10.7	11.0	13.5	16.6	10.5	13.1	16.7	11.2	13.7	17.5
450	600	90	40	8.0	9.4	10.7	8.1	9.6	11.0	9.3	10.9	12.4	10.4	13.0	14.8	9.3	12.0	14.3	9.7	12.3	14.8
450	600	90	36	10.1	11.7	13.3	10.8	12.5	14.2	12.5	14.3	16.1	8.9	10.7	13.0	7.8	9.7	12.6	8.7	10.4	13.5
600	300	60	39	9.5	11.3	12.6	8.8	10.8	12.2	8.7	10.8	12.3	4.6	5.5	7.1	4.8	5.9	8.0	5.1	6.1	8.3
600	300	60	36	9.7	11.8	13.4	9.3	11.5	13.2	9.5	11.8	13.5	4.2	5.2	5.5	3.9	5.0	5.8	3.9	4.9	5.8
600	300	60	33	10.1	12.4	14.3	10.2	12.7	14.6	10.9	13.4	15.4	4.0	4.2	5.0	3.7	4.1	5.4	4.1	4.3	5.8
600	300	70	45	9.5	10.7	12.7	8.6	10.0	12.0	8.8	10.2	12.3	4.8	5.9	7.2	4.6	5.9	7.7	4.9	6.1	8.1
600	300	70	42	9.9	11.4	13.6	9.3	10.9	13.1	9.6	11.3	13.7	4.7	5.9	6.0	3.9	5.3	5.9	4.0	5.2	6.0
600	300	70	38	10.7	12.5	14.9	10.6	12.4	15.0	11.5	13.5	16.1	4.7	5.1	5.7	4.0	4.5	5.6	4.4	4.8	6.1
600	300	80	52	9.6	11.0	12.3	8.9	10.4	11.8	8.9	10.4	11.9	5.5	6.4	7.9	4.9	6.0	8.1	5.3	6.2	8.5
600	300	80	48	9.7	11.3	12.9	9.3	11.0	12.6	9.4	11.2	13.0	6.0	7.0	7.3	4.9	6.0	6.8	4.9	6.0	6.9
600	300	80	44	10.7	12.6	14.4	10.8	12.8	14.7	11.5	13.6	15.6	5.9	6.0	6.8	4.8	5.1	6.4	5.2	5.4	6.9
600	450	70	42	9.7	11.7	13.1	9.4	11.5	13.0	9.6	11.8	13.5	8.7	10.2	12.4	9.0	10.7	13.4	9.3	10.9	13.8
600	450	70	38	10.4	12.7	14.4	10.4	12.7	14.5	10.9	13.3	15.2	7.8	9.5	10.4	7.5	9.3	10.7	7.6	9.2	10.8
600	450	70	35	11.4	13.9	15.8	11.9	14.4	16.5	12.9	15.6	17.7	7.3	8.1	9.5	7.1	8.0	9.9	7.5	8.3	10.4
600	450	80	48	9.9	11.3	13.4	9.4	10.9	13.0	9.9	11.5	13.7	8.6	10.4	12.4	8.5	10.4	12.9	8.9	10.7	13.4
600	450	80	44	10.9	12.6	14.9	10.6	12.4	14.8	11.4	13.2	15.7	8.0	9.9	10.6	7.3	9.3	10.5	7.4	9.3	10.7
600	450	80	40	12.4	14.3	16.9	12.7	14.6	17.3	13.9	16.0	18.7	7.6	8.6	9.8	6.9	8.1	9.8	7.4	8.4	10.4
600	450	90	54	9.6	11.0	12.5	9.2	10.8	12.4	9.5	11.2	12.8	9.6	11.1	13.3	9.1	10.8	13.5	9.5	11.1	14.0
600	450	90	49	10.4	12.2	13.9	10.4	12.2	14.0	10.9	12.8	14.7	9.4	11.0	11.9	8.3	10.1	11.5	8.4	10.1	11.7
600	450	90	45	12.2	14.1	16.1	12.6	14.7	16.7	13.6	15.8	18.0	8.8	9.5	11.0	7.7	8.7	10.6	8.3	9.1	11.2
600	600	70	38	10.9	13.3	15.1	10.9	13.4	15.4	11.5	14.1	16.2	13.1	15.8	19.1	13.4	16.3	20.2	13.8	16.6	20.6
600	600	70	35	11.7	14.4	16.5	12.0	14.8	17.0	12.9	15.7	18.0	10.8	13.6	15.7	10.5	13.5	16.1	10.7	13.5	16.3
600	600	70	31	14.6	17.5	19.8	15.4	18.4	20.8	16.8	19.8	22.4	9.8	11.7	14.3	9.6	11.7	14.8	10.1	12.1	15.4
600	600	80	44	11.7	13.5	16.0	11.5	13.4	16.0	12.4	14.3	17.0	12.9	15.8	18.9	12.8	15.9	19.6	13.3	16.2	20.1
600	600	80	40	12.7	14.7	17.4	12.7	14.9	17.7	13.8	16.0	19.0	11.1	14.1	15.9	10.4	13.6	16.0	10.6	13.6	16.2
600	600	80	36	16.2	18.5	21.4	16.8	19.2	22.2	18.4	20.9	24.0	9.9	12.0	14.4	9.3	11.6	14.5	9.8	12.0	15.1
600	600	90	49	11.3	13.2	15.1	11.4	13.4	15.3	12.0	14.1	16.1	14.0	16.7	20.1	13.6	16.5	20.3	14.1	16.8	20.9
600	600	90	45	12.1	14.3	16.4	12.4	14.6	16.8	13.2	15.6	17.9	12.5	15.3	17.3	11.4	14.4	17.0	11.6	14.5	17.2
600	600	90	40	15.9	18.3	20.6	16.7	19.2	21.6	18.1	20.7	23.2	11.1	13.0	15.6	10.1	12.3	15.4	10.7	12.7	16.0

TABLE F-6D. TOTAL FUEL CONSUMPTION ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 6*4

INTERSECTION				MINOR			STREET						MAJOR			STREET					
ENVIRONMENT					LEFT			TURNS						LEFT			TURNS				
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
					TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS	
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	5.5	6.4	6.7	4.6	5.6	6.0	4.6	5.7	6.2	5.5	6.8	8.3	5.6	7.1	9.2	6.6	8.0	10.2
300	300	50	25	5.7	6.9	7.5	5.1	6.4	7.0	5.4	6.7	7.5	5.1	6.5	6.8	4.7	6.3	7.0	5.4	6.8	7.8
300	300	50	22	4.3	5.7	6.5	4.2	5.7	6.6	5.0	6.6	7.6	5.4	6.0	6.8	5.0	5.8	7.1	6.1	6.7	8.2
300	300	60	33	5.3	5.6	6.5	4.2	4.6	5.6	4.4	4.9	6.1	5.7	7.3	8.6	5.5	7.2	9.1	6.6	8.1	10.2
300	300	60	30	5.3	5.9	7.0	4.5	5.1	6.4	5.0	5.7	7.1	6.1	7.7	7.7	5.3	7.0	7.6	6.0	7.6	8.4
300	300	60	27	4.5	5.3	6.7	4.2	5.0	6.6	5.2	6.2	7.8	6.2	7.0	7.6	5.5	6.4	7.5	6.6	7.4	8.7
300	300	70	38	6.1	6.5	6.9	5.3	5.8	6.2	5.3	5.9	6.4	6.1	7.4	9.0	5.5	7.0	9.1	6.6	7.9	10.2
300	300	70	35	5.9	6.5	7.1	5.3	6.0	6.7	5.5	6.4	7.1	6.7	8.1	8.4	5.6	7.1	7.9	6.3	7.8	8.7
300	300	70	31	5.0	5.9	6.7	4.9	5.9	6.8	5.7	6.8	7.8	7.0	7.5	8.4	5.9	6.6	7.9	7.0	7.6	9.1
300	450	50	25	5.2	6.2	6.6	4.6	5.8	6.3	5.0	6.2	6.9	9.6	11.6	13.8	9.9	12.0	14.7	10.9	12.9	15.8
300	450	50	22	5.4	6.6	7.4	5.1	6.5	7.3	5.7	7.2	8.1	9.1	11.1	12.0	8.7	10.9	12.3	9.5	11.6	13.2
300	450	50	20	4.6	6.1	7.1	4.9	6.5	7.5	6.0	7.7	8.9	9.0	10.1	11.6	8.6	10.0	12.0	9.8	11.0	13.2
300	450	60	30	5.1	5.5	6.6	4.4	4.9	6.0	4.9	5.6	6.8	10.2	12.3	14.3	10.0	12.3	14.8	11.1	13.3	16.0
300	450	60	27	5.4	6.1	7.4	4.9	5.7	7.1	5.8	6.6	8.2	9.9	12.2	12.9	9.2	11.6	12.8	10.0	12.3	13.7
300	450	60	24	4.9	5.8	7.4	4.9	5.9	7.6	6.3	7.4	9.2	10.0	11.4	12.6	9.3	10.9	12.6	10.5	11.9	13.8
300	450	70	35	5.8	6.3	6.8	5.3	5.9	6.5	5.6	6.4	7.0	10.6	12.6	14.8	10.1	12.2	14.9	11.2	13.2	16.1
300	450	70	31	5.7	6.4	7.1	5.4	6.3	7.1	6.0	7.0	7.9	10.9	12.9	13.8	9.8	12.0	13.4	10.6	12.7	14.3
300	450	70	28	5.2	6.2	7.2	5.5	6.6	7.6	6.6	7.8	9.0	10.8	12.0	13.4	9.7	11.1	13.0	10.9	12.2	14.3
300	600	60	27	4.7	6.2	7.0	4.6	6.1	7.1	5.3	6.9	8.0	13.7	16.8	20.1	13.9	17.2	21.1	15.1	18.2	22.3
300	600	60	24	5.3	6.9	8.0	5.3	7.1	8.3	6.3	8.2	9.5	11.8	15.0	17.1	11.5	14.9	17.4	12.3	15.6	18.3
300	600	60	21	6.5	8.4	9.8	7.1	9.1	10.6	8.6	10.7	12.2	11.0	13.4	16.0	10.8	13.3	16.5	12.0	14.4	17.7
300	600	70	31	4.9	5.7	7.2	4.5	5.5	7.0	5.5	6.5	8.2	14.0	17.3	20.5	13.9	17.4	21.1	15.1	18.4	22.3
300	600	70	28	5.6	6.6	8.4	5.4	6.6	8.4	6.6	7.9	9.8	12.4	15.8	17.7	11.7	15.3	17.7	12.6	16.0	18.6
300	600	70	24	7.2	8.5	10.5	7.5	9.0	11.0	9.2	10.8	12.9	11.6	14.2	16.6	11.0	13.7	16.6	12.2	14.8	17.9
300	600	80	36	5.5	6.4	7.3	5.3	6.3	7.3	6.0	7.1	8.2	14.2	17.3	20.7	13.8	17.0	20.9	14.9	18.1	22.1
300	600	80	32	5.7	6.9	8.0	5.8	7.1	8.3	6.8	8.1	9.4	13.0	16.2	18.3	11.9	15.3	17.9	12.8	16.1	18.8
300	600	80	28	7.5	9.0	10.3	8.1	9.7	11.1	9.6	11.2	12.8	12.0	14.3	17.0	11.0	13.5	16.6	12.3	14.6	18.0
450	300	50	30	7.2	8.8	9.9	6.6	8.3	9.5	7.3	9.2	10.5	5.7	7.2	9.0	6.4	8.1	10.4	7.5	9.1	11.6
450	300	50	27	7.3	9.2	10.5	6.9	8.9	10.3	7.9	10.0	11.5	5.4	7.0	7.5	5.5	7.3	8.3	6.3	8.0	9.2
450	300	50	25	6.9	9.0	10.6	7.0	9.3	11.0	8.5	10.9	12.7	5.2	6.0	7.0	5.3	6.3	7.8	6.6	7.4	9.1
450	300	60	36	7.3	8.3	10.1	6.5	7.6	9.4	7.4	8.7	10.6	6.1	7.8	9.4	6.4	8.3	10.4	7.5	9.3	11.6
450	300	60	33	7.5	8.8	10.8	6.9	8.3	10.4	8.1	9.6	11.8	6.1	8.0	8.3	5.8	7.8	8.6	6.7	8.6	9.6
450	300	60	30	7.3	8.9	11.1	7.3	8.9	11.2	9.0	10.8	13.1	6.2	7.2	8.0	5.9	7.1	8.5	7.2	8.2	9.8
450	300	70	42	8.1	9.3	10.4	7.5	8.8	10.0	8.3	9.6	10.9	6.4	8.0	9.8	6.4	8.1	10.4	7.6	9.1	11.6
450	300	70	38	7.9	9.3	10.7	7.5	9.1	10.5	8.5	10.1	11.7	7.0	8.7	9.2	6.4	8.2	9.2	7.3	9.0	10.2
450	300	70	35	7.9	9.5	11.1	8.0	9.8	11.5	9.5	11.4	13.2	7.0	7.8	8.8	6.4	7.4	8.9	7.7	8.5	10.2
450	450	60	33	6.9	8.7	9.9	6.7	8.6	9.9	7.7	9.7	11.2	10.5	12.6	15.1	11.2	13.6	16.5	12.4	14.6	17.7
450	450	60	30	7.6	9.7	11.1	7.6	9.7	11.3	8.9	11.2	12.8	9.4	11.7	12.8	9.6	12.0	13.7	10.5	12.8	14.6
450	450	60	27	7.5	9.8	11.5	8.0	10.4	12.2	9.9	12.3	14.2	9.3	10.7	12.4	9.5	11.1	13.2	10.8	12.2	14.6
450	450	70	38	7.1	8.3	10.1	6.6	7.9	9.8	7.9	9.3	11.3	10.9	13.3	15.5	11.2	13.8	16.5	12.5	14.9	17.8
450	450	70	35	7.9	9.3	11.4	7.7	9.2	11.4	9.2	10.8	13.1	10.1	12.6	13.6	9.9	12.6	14.0	10.9	13.4	15.0
450	450	70	31	8.2	9.9	12.2	8.5	10.3	12.7	10.6	12.4	15.0	10.0	11.7	13.1	9.9	11.7	13.6	11.2	12.8	15.0
450	450	80	44	7.6	8.9	10.1	7.3	8.7	10.1	8.4	9.9	11.3	11.2	13.4	15.8	11.2	13.5	16.4	12.4	14.6	17.7
450	450	80	40	8.1	9.6	11.1	8.0	9.7	11.3	9.4	11.1	12.8	10.9	13.2	14.3	10.3	12.7	14.4	11.3	13.6	15.4
450	450	80	36	8.6	10.4	12.1	9.1	11.0	12.8	10.9	12.9	14.8	10.6	12.1	13.7	10.1	11.7	13.9	11.4	12.9	15.3
450	600	70	35	7.5	9.7	11.3	7.5	9.8	11.6	9.0	11.4	13.2	15.6	18.9	22.5	16.4	19.9	24.0	17.6	21.0	25.3
450	600	70	31	8.3	10.7	12.6	8.6	11.2	13.2	10.3	12.9	15.0	13.4	16.8	19.2	13.6	17.2	20.0	14.6	18.0	21.0
450	600	70	28	10.5	13.2	15.3	11.4	14.2	16.4	13.6	16.4	18.8	12.3	14.9	17.7	12.6	15.3	18.7	13.9	16.5	20.1
450	600	80	40	8.0	9.6	11.9	7.9	9.6	11.9	9.5	11.3	13.8	15.6	19.2	22.6	16.1	19.8	23.7	17.3	20.9	25.0
450	600	80	36	9.1	11.0	13.4	9.2	11.2	13.8	11.1	13.1	15.8	13.7	17.3	19.4	13.5	17.3	19.9	14.5	18.2	21.0
450	600	80	32	11.8	13.9	16.6	12.5	14.6	17.5	14.9	17.2	20.1	12.5	15.3	18.0	12.4	15.4	18.5	13.8	16.6	20.0
450	600	90	45	8.2	9.9	11.6	8.3	10.1	11.9	9.8	11.7	13.5	15.9	19.3	22.9	16.0	19.5	23.6	17.3	20.7	25.0
450	600	90	40	9.2	11.1	13.0	9.5	11.5	13.5	11.2	13.3	15.4	14.2	17.7	20.0	13.7	17.3	20.1	14.7	18.2	21.2
450	600	90	36	12.1	14.3	16.4	12.9	15.2	17.5	15.1	17.5	19.8	12.8	15.4	18.3	12.3	15.1	18.5	13.8	16.4	19.9
600	300	60	39	8.7	11.1	13.0	8.2	10.7	12.7	8.6	11.2	13.3	7.8	9.6	11.6	8.6	10.6	13.1	9.5	11.3	14.1
600	300	60	36	9.1	11.8	13.9	8.9	11.7	13.9	9.6	12.4	14.7	6.3	8.2	8.9	6.5	8.6	9.8	7.2	9.1	10.5
600	300	60	33	10.3	13.2	15.6	10.6	13.6	16.1	11.8	14.9	17.5	6.2	7.3	8.5	6.5	7.7	9.5	7.5	8.6	10.6
600	300	70	45	8.3	10.2	12.6	7.6	9.6	12.1	8.3	10.3	13.0	7.8	9.8	11.6	8.2	10.4	12.7	9.2	11.2	13.7
600	300	70	42	8.9	11.0	13.7	8.5	10.6	13.5	9.3	11.6	14.5	6.6	8.7	9.2	6.5	8.7	9.8	7.1	9.2	10.5
600	300	70	38	10.5	12.9	15.8	10.6	13.0	16.1	12.0	14.5	17.7	6.7	8.0	9.0	6.6	8.1	9.6	7.7	8.9	10.7
600	300	80	52	9.2	11.1	13.0	8.7	10.8	12.7	9.1	11.3	13.3	8.3	10.1	12.2	8.4	10.4	12.9	9.4	11.2	13.9
600	300	80	48	9.5	11.7	13.8	9.3	11.5	13.7	9.9	12.3	14.6	7.8	9.7	10.4	7.2	9.3	10.5	7.9	9.8	11.3
600	300	80	44	11.3	13.8	16.1	11.6	14.2	16.6	12.8	15.4	18.0	7.7	8.8	10.1	7.3	8.5	10.3	8.3	9.4	11.4
600	450	70	42	9.3	11.8	13.8	9.1	11.8	13.9	9.9	12.6	14.8	13.6	16.0	18.6	14.5	17.0	20.2	15.4	17.9	21.2
600	450	70	38	10.2	13.0	15.2	10.3	13.2	15.6	11.3	14.3	16.7	11.6	14.1	15.5	11.9	14.6	16.4	12.6	15.1	17.2
600	450	70	35	12.0	15.0	17.5	12.6	15.8	18.4	14.2	17.4	20.1	11.2	12.8	14.8	11.5	13.4	15.8	12.6	14.3	16.9
600	450	80	48	9.1	11.1	13.7	8.8	10.8	13.5	9.7	11.9	14.7	13.3	16.0	18.4	13.8	16.6	19.6	14.8	17.5	20.7
600	450	80	44	10.3	12.5	15.4	10.2	12.5	15.4	11.4	13.8	16.9	11.6	14.3	15.5	11.5	14.4	16.1	12.3	15.0	16.9
600	450	80	40	12.6	15.1	18.2	13.0	15.6	18.8	14.8	17.4	20.7	11.3	13.2	14.9	11.3	13.3	15.5	12.4	14.3	16.7
600	450	90	54	9.5	11.6	13.6	9.4	11.6	13.6	10.2	12.4	14.6	14.1	16.6	19.2	14.3	16.9	20.0	15.3	17.7	21.1
600	450	90	49	10.6	12.9	15.1	10.7	13.1	15.4	11.7	14.2	16.6	12.8	15.3	16.7	12.4	15.0	16.9	13.1	15.6	17.7
600	450	90	45	13.1	15.7	18.2	13.8	16.4	19.0	15.3	18.0	20.7	12.3	14.0	15.9	11.9	13.8	16.2	13.0	14.7	17.3
600	600	70	38	10.8	13.8	16.2	11.0	14.1	16.6	12.1	15.3	17.9	19.3	22.9	26.7	20.2	24.0	28.3	21.2	24.9	29.4
600	600	70	35	11.9	15.1	17.7	12.3	15.6	18.4	13.7	17.1	19.9	15.9	19.6	22.1	16.2	20.1	23.1	17.0	20.7	23.9
600	600	70	31	15.5	19.0	21.9	16.5	20.1	23.1	18.4	22.0	25.1	15.0	17.8	20.9	15.4	18.4	22.0	16.5	19.4	23.1
600	600	80	44	11.3	13.6	16.7	11.3	13.7	16.8	12.6	15.2	18.4	18.9	22.7	26.3	19.5	23.4	27.6	20.5	24.4	28.7
600	600	80	40	12.4	15.0	18.3	12.7	15.4	18.7	14.2	17.0	20.5	16.0	19.9	22.2	16.0	20.0	22.9	16.8	20.7	23.7
600	600	80	36	16.7	19.6	23.1	17.5	20.5	24.1	19.6	22.7	26.4	14.9	17.9	20.8	14.9	18.2	21.5	16.1	19.2	22.7
600	600	90	49	11.7	14.2	16.6	11.9	14.5	17.0	13.0	15.7	18.3	19.9	23.5	27.3	20.1	23.9	28.2	21.2	24.8	29.3
600	600	90	45	12.6	15.3	18.0	13.1	15.9	18.6	14.4	17.3	20.2	17.2	20.9	23.5	16.8	20.7	23.7	17.6	21.3	24.6
600	600	90	40	17.2	20.2	23.1	18.2	21.3	24.3	20.1	23.2	26.3	16.0	18.8	21.9	15.6	18.7	22.2	16.8	19.7	23.5

TABLE F-6E. TOTAL FUEL CONSUMPTION ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*4

INTERSECTION ENVIRONMENT				MINOR STREET									MAJOR STREET								
				LEFT TURNS									LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	5.0	5.8	6.0	4.2	5.0	5.3	4.2	5.1	5.5	7.2	8.0	9.5	6.8	7.8	9.8	7.2	8.0	10.3
300	300	50	25	5.1	6.1	6.6	4.5	5.6	6.1	4.7	5.9	6.6	7.3	8.2	8.4	6.3	7.4	8.1	6.4	7.4	8.3
300	300	50	22	4.0	5.2	5.9	3.9	5.2	6.0	4.6	6.1	7.0	7.4	7.5	8.3	6.5	6.7	8.0	7.0	7.1	8.6
300	300	60	33	5.5	5.6	6.4	4.4	4.6	5.5	4.6	5.0	6.0	7.0	8.0	9.3	6.2	7.4	9.2	6.7	7.7	9.7
300	300	60	30	5.3	5.7	6.8	4.4	5.0	6.1	4.9	5.5	6.8	7.8	8.9	8.9	6.4	7.7	8.2	6.6	7.7	8.4
300	300	60	27	4.7	5.4	6.7	4.4	5.2	6.6	5.4	6.3	7.8	7.8	8.1	8.6	6.5	6.9	8.0	7.0	7.3	8.6
300	300	70	38	6.6	6.9	7.1	5.7	6.1	6.4	5.7	6.2	6.6	7.3	8.1	9.6	6.1	7.1	9.1	6.6	7.5	9.7
300	300	70	35	6.1	6.7	7.1	5.5	6.1	6.6	5.7	6.5	7.1	8.4	9.3	9.5	6.6	7.7	8.4	6.8	7.8	8.7
300	300	70	31	5.5	6.3	7.0	5.4	6.3	7.1	6.2	7.2	8.0	8.5	8.5	9.3	6.8	7.0	8.3	7.4	7.5	8.9
300	450	50	25	4.6	5.5	5.8	4.0	5.0	5.4	4.4	5.5	6.0	10.5	12.0	14.1	10.2	11.8	14.4	10.7	12.1	15.0
300	450	50	22	4.6	5.7	6.3	4.3	5.5	6.2	4.9	6.2	7.0	10.4	12.0	12.8	9.5	11.2	12.6	9.7	11.3	12.8
300	450	50	20	4.1	5.5	6.3	4.3	5.8	6.7	5.4	7.0	8.0	10.2	10.9	12.3	9.3	10.1	12.1	9.9	10.6	12.7
300	450	60	30	5.1	5.4	6.3	4.4	4.7	5.8	4.9	5.4	6.6	10.6	12.2	14.2	9.9	11.7	14.1	10.4	12.1	14.7
300	450	60	27	5.2	5.8	7.0	4.7	5.4	6.7	5.5	6.3	7.7	10.8	12.6	13.2	9.5	11.4	12.6	9.7	11.5	12.9
300	450	60	24	5.0	5.7	7.2	5.0	5.9	7.4	6.3	7.3	8.9	10.7	11.6	12.8	9.5	10.5	12.2	10.1	11.0	12.9
300	450	70	35	6.1	6.5	6.8	5.5	6.0	6.5	5.9	6.5	7.0	11.0	12.4	14.6	9.9	11.5	14.2	10.4	11.9	14.8
300	450	70	31	5.7	6.4	6.9	5.4	6.2	6.8	6.0	6.9	7.6	11.7	13.2	14.1	10.0	11.7	13.1	10.3	11.8	13.4
300	450	70	28	5.6	6.4	7.3	5.8	6.8	7.7	6.9	8.0	9.0	11.5	12.2	13.6	9.8	10.7	12.6	10.5	11.2	13.3
300	600	60	27	3.9	5.3	6.0	3.8	5.2	6.0	4.5	6.0	6.9	14.1	16.7	20.1	13.8	16.6	20.4	14.4	17.0	21.0
300	600	60	24	4.3	5.8	6.8	4.3	6.0	7.0	5.3	7.0	8.2	12.7	15.4	17.5	11.8	14.7	17.3	12.1	14.8	17.6
300	600	60	21	5.7	7.5	8.8	6.3	8.2	9.6	7.8	9.8	11.2	11.8	13.7	16.3	11.0	13.0	16.1	11.7	13.5	16.8
300	600	70	31	4.8	5.5	6.8	4.3	5.1	6.6	5.3	6.2	7.7	14.0	16.8	19.9	13.3	16.3	19.9	13.9	16.8	20.6
300	600	70	28	5.2	6.1	7.7	5.0	6.1	7.8	6.2	7.3	9.1	12.9	15.8	17.6	11.6	14.7	17.0	11.9	14.8	17.4
300	600	70	24	7.1	8.3	10.1	7.4	8.7	10.7	9.1	10.5	12.5	11.9	14.0	16.4	10.7	13.0	15.8	11.4	13.5	16.6
300	600	80	36	5.6	6.4	7.1	5.4	6.3	7.1	6.1	7.1	8.0	14.2	16.8	20.1	13.1	15.9	19.7	13.7	16.4	20.4
300	600	80	32	5.6	6.7	7.6	5.7	6.8	7.9	6.6	7.9	9.0	13.4	16.1	18.1	11.7	14.6	17.2	12.1	14.8	17.5
300	600	80	28	7.7	9.0	10.2	8.3	9.7	11.0	9.8	11.2	12.7	12.2	14.1	16.7	10.6	12.7	15.8	11.4	13.2	16.5
450	300	50	30	6.9	8.5	9.4	6.3	7.9	9.0	7.0	8.8	9.9	6.9	8.0	9.7	7.0	8.2	10.5	7.6	8.6	11.1
450	300	50	27	6.8	8.6	9.8	6.4	8.3	9.6	7.4	9.3	10.7	7.1	8.2	8.7	6.6	7.9	8.9	6.8	8.0	9.2
450	300	50	25	6.7	8.7	10.2	6.8	9.0	10.5	8.3	10.5	12.2	6.7	7.0	8.0	6.3	6.8	8.3	6.9	7.3	9.0
450	300	60	36	7.7	8.6	10.2	6.8	7.8	9.5	7.7	8.9	10.6	6.8	8.1	9.6	6.5	8.0	10.0	7.1	8.4	10.7
450	300	60	33	7.7	8.8	10.7	7.1	8.3	10.2	8.2	9.6	11.6	7.3	8.7	8.9	6.4	8.0	8.7	6.8	8.1	9.1
450	300	60	30	7.8	9.2	11.3	7.7	9.2	11.4	9.4	11.0	13.3	7.2	7.7	8.5	6.4	7.1	8.4	7.1	7.6	9.1
450	300	70	42	8.8	9.8	10.8	8.2	9.3	10.3	8.9	10.1	11.3	7.1	8.2	9.9	6.5	7.7	10.0	7.1	8.2	10.6
450	300	70	38	8.3	9.6	10.8	8.0	9.3	10.6	8.9	10.4	11.8	8.2	9.3	9.8	6.9	8.3	9.2	7.3	8.5	9.6
450	300	70	35	8.6	10.1	11.5	8.7	10.3	11.9	10.2	11.9	13.6	8.0	8.3	9.3	6.8	7.3	8.8	7.5	7.9	9.6
450	450	60	33	6.5	8.2	9.3	6.2	8.0	9.2	7.3	9.1	10.4	10.9	12.5	14.9	11.0	12.9	15.8	11.6	13.4	16.4
450	450	60	30	7.0	8.9	10.2	6.9	8.9	10.4	8.2	10.3	11.9	10.3	12.1	13.2	9.9	11.8	13.4	10.2	12.0	13.8
450	450	60	27	7.1	9.3	10.9	7.6	9.9	11.6	9.4	11.8	13.6	10.0	10.9	12.5	9.6	10.7	12.8	10.3	11.3	13.6
450	450	70	38	7.3	8.4	10.1	6.8	8.0	9.8	8.1	9.3	11.2	10.8	12.7	14.9	10.6	12.7	15.4	11.2	13.2	16.0
450	450	70	35	7.9	9.2	11.2	7.6	9.0	11.1	9.2	10.7	12.8	10.5	12.5	13.4	9.7	11.9	13.3	10.1	12.1	13.7
450	450	70	31	8.5	10.0	12.2	8.7	10.4	12.7	10.8	12.5	14.9	10.3	11.4	12.9	9.5	10.8	12.8	10.3	11.5	13.6
450	450	80	44	8.1	9.2	10.3	7.8	9.0	10.2	8.8	10.2	11.5	11.0	12.7	15.1	10.4	12.3	15.2	11.1	12.8	15.9
450	450	80	40	8.3	9.7	11.1	8.3	9.8	11.2	9.6	11.2	12.7	11.2	13.0	14.1	10.1	12.0	13.6	10.4	12.3	14.0
450	450	80	36	9.1	10.8	12.3	9.6	11.3	13.0	11.4	13.3	15.0	10.8	11.7	13.4	9.7	10.8	12.9	10.5	11.4	13.8
450	600	70	35	6.8	8.9	10.4	6.9	9.1	10.7	8.3	10.6	12.3	15.5	18.4	22.0	15.8	18.8	22.9	16.5	19.3	23.6
450	600	70	31	7.5	9.8	11.5	7.8	10.2	12.0	9.4	11.9	13.9	13.8	16.8	19.0	13.4	16.6	19.3	13.8	16.8	19.8
450	600	70	28	9.9	12.5	14.5	10.8	13.5	15.5	13.0	15.7	17.9	12.6	14.7	17.5	12.3	14.5	17.9	13.0	15.2	18.7
450	600	80	40	8.0	9.5	11.6	7.9	9.5	11.7	9.5	11.2	13.5	15.1	18.2	21.5	15.0	18.2	22.1	15.7	18.8	22.8
450	600	80	36	8.9	10.6	13.0	9.0	10.8	13.3	10.9	12.8	15.3	13.6	16.8	18.9	12.9	16.2	18.8	13.3	16.5	19.2
450	600	80	32	11.9	13.9	16.5	12.5	14.6	17.3	14.9	17.1	19.9	12.3	14.6	17.2	11.6	14.1	17.2	12.5	14.8	18.1
450	600	90	45	8.5	10.1	11.6	8.6	10.3	11.9	10.0	11.8	13.5	15.4	18.2	21.8	14.8	17.9	21.9	15.6	18.5	22.7
450	600	90	40	9.2	11.0	12.8	9.5	11.5	13.3	11.2	13.2	15.1	14.1	17.1	19.3	13.0	16.1	18.9	13.4	16.4	19.4
450	600	90	36	12.4	14.5	16.5	13.3	15.4	17.5	15.4	17.7	19.9	12.6	14.7	17.5	11.5	13.8	17.1	12.4	14.5	18.0
600	300	60	39	8.7	11.0	12.7	8.2	10.6	12.4	8.6	11.0	13.0	8.3	9.6	11.6	8.5	10.0	12.5	8.9	10.2	12.9
600	300	60	36	8.9	11.5	13.4	8.7	11.3	13.4	9.3	12.0	14.2	7.2	8.6	9.3	6.9	8.5	9.7	7.0	8.4	9.8
600	300	60	33	10.4	13.2	15.4	10.6	13.5	15.8	11.8	14.8	17.2	7.0	7.6	8.8	6.8	7.5	9.2	7.2	7.8	9.7
600	300	70	45	8.9	10.6	13.0	8.2	10.0	12.4	8.8	10.7	13.3	7.8	9.3	11.1	7.7	9.3	11.6	8.0	9.6	12.0
600	300	70	42	9.3	11.3	13.8	8.8	10.9	13.6	9.7	11.8	14.6	7.1	8.7	9.2	6.4	8.1	9.1	6.5	8.1	9.3
600	300	70	38	11.2	13.4	16.2	11.3	13.5	16.5	12.6	15.0	18.1	7.1	7.8	8.8	6.4	7.3	8.9	6.9	7.6	9.4
600	300	80	52	10.1	11.9	13.6	9.6	11.5	13.3	10.0	12.0	13.9	8.3	9.6	11.6	7.8	9.2	11.7	8.2	9.5	12.2
600	300	80	48	10.1	12.2	14.2	9.9	12.0	14.1	10.5	12.8	14.9	8.2	9.6	10.3	7.1	8.6	9.9	7.2	8.6	10.0
600	300	80	44	12.3	14.6	16.8	12.6	14.9	17.3	13.7	16.2	18.6	8.0	8.6	9.8	7.0	7.7	9.4	7.5	8.0	10.0
600	450	70	42	9.1	11.5	13.3	8.9	11.4	13.4	9.6	12.3	14.3	13.2	15.1	17.8	13.5	15.6	18.8	13.9	15.9	19.2
600	450	70	38	9.8	12.5	14.6	9.9	12.7	14.9	10.9	13.7	16.0	11.7	13.7	15.1	11.4	13.6	15.5	11.5	13.6	15.6
600	450	70	35	11.8	14.8	17.1	12.5	15.5	17.9	14.0	17.1	19.6	11.2	12.3	14.2	10.9	12.3	14.7	11.4	12.6	15.2
600	450	80	48	9.5	11.4	13.8	9.2	11.1	13.7	10.1	12.2	14.8	12.5	14.7	17.1	12.5	14.8	17.7	12.9	15.0	18.2
600	450	80	44	10.5	12.6	15.3	10.4	12.6	15.4	11.6	13.9	16.8	11.3	13.5	14.6	10.6	13.0	14.7	10.8	13.0	14.8
600	450	80	40	13.1	15.4	18.4	13.5	15.9	19.0	15.2	17.7	20.9	10.8	12.2	13.9	10.2	11.8	13.9	10.7	12.1	14.5
600	450	90	54	10.2	12.1	14.0	10.1	12.1	14.0	10.8	12.9	15.0	13.3	15.2	17.8	12.8	14.9	18.1	13.3	15.2	18.6
600	450	90	49	11.1	13.2	15.3	11.2	13.4	15.6	12.1	14.5	16.8	12.4	14.4	15.8	11.4	13.6	15.4	11.6	13.6	15.6
600	450	90	45	13.9	16.3	18.6	14.5	17.0	19.5	16.0	18.6	21.2	11.8	12.9	14.8	10.8	12.1	14.5	11.3	12.5	15.1
600	600	70	38	10.4	13.3	15.5	10.6	13.6	15.9	11.7	14.7	17.2	18.5	21.6	25.4	18.9	22.1	26.4	19.3	22.4	26.9
600	600	70	35	11.3	14.4	16.9	11.7	14.9	17.5	13.0	16.3	19.0	15.6	18.8	21.3	15.4	18.7	21.7	15.5	18.7	21.9
600	600	70	31	15.2	18.5	21.3	16.2	19.6	22.5	18.0	21.6	24.5	14.5	16.8	19.9	14.3	16.9	20.4	14.9	17.3	21.0
600	600	80	44	11.5	13.7	16.6	11.5	13.8	16.8	12.8	15.2	18.3	17.7	21.0	24.6	17.7	21.1	25.2	18.2	21.5	25.8
600	600	80	40	12.5	14.9	18.1	12.7	15.2	18.5	14.2	16.9	20.2	15.2	18.6	20.9	14.6	18.2	21.0	14.8	18.3	21.3
600	600	80	36	17.0	19.8	23.1	17.8	20.6	24.1	19.9	22.8	26.4	14.0	16.5	19.4	13.5	16.2	19.5	14.0	16.6	20.1
600	600	90	49	12.2	14.5	16.8	12.4	14.8	17.2	13.5	16.0	18.5	18.6	21.7	25.5	18.2	21.5	25.8	18.7	21.9	26.4
600	600	90	45	12.9	15.5	18.0	13.4	16.0	18.7	14.7	17.5	20.2	16.4	19.6	22.1	15.4	18.8	21.8	15.7	18.9	22.1
600	600	90	40	17.8	20.6	23.4	18.8	21.7	24.5	20.6	23.6	26.6	15.0	17.3	20.4	14.1	16.6	20.2	14.7	17.1	20.8

TABLE F-6F. TOTAL FUEL CONSUMPTION ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*5

INTERSECTION ENVIRONMENT				MINOR STREET									MAJOR STREET								
				LEFT TURNS LOW LEVEL			LEFT TURNS MEDIUM LEVEL			LEFT TURNS HIGH LEVEL			LEFT TURNS LOW LEVEL			LEFT TURNS MEDIUM LEVEL			LEFT TURNS HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	6.8	7.4	7.5	5.0	5.7	5.9	4.1	5.0	5.2	6.9	7.5	9.3	6.5	7.3	9.5	6.9	7.5	10.0
300	300	50	25	6.5	7.4	7.7	5.0	6.0	6.4	4.4	5.5	6.0	7.5	8.2	8.7	6.5	7.3	8.3	6.6	7.3	8.5
300	300	50	22	4.6	5.7	6.3	3.6	4.9	5.5	3.6	4.9	5.6	7.5	7.4	8.4	6.5	6.5	8.1	7.0	6.9	8.6
300	300	60	33	7.4	7.4	8.1	5.4	5.5	6.3	4.8	5.0	5.9	7.4	8.2	9.7	6.5	7.5	9.6	7.0	7.8	10.0
300	300	60	30	6.9	7.2	8.1	5.2	5.6	6.6	4.8	5.3	6.4	8.6	9.5	9.8	7.2	8.3	9.0	7.3	8.2	9.2
300	300	60	27	5.6	6.1	7.3	4.4	5.0	6.3	4.5	5.2	6.6	8.5	8.5	9.3	7.1	7.4	8.7	7.7	7.7	9.2
300	300	70	38	7.4	7.6	7.6	5.7	5.9	6.1	4.8	5.2	5.4	7.9	8.5	10.2	6.7	7.4	9.7	7.1	7.8	10.2
300	300	70	35	6.7	7.1	7.4	5.2	5.6	6.1	4.5	5.1	5.6	9.4	10.1	10.6	7.6	8.5	9.5	7.8	8.5	9.7
300	300	70	31	5.3	5.9	6.5	4.3	5.0	5.7	4.2	5.0	5.8	9.4	9.2	10.2	7.7	7.7	9.2	8.2	8.1	9.8
300	450	50	25	6.1	6.9	7.0	4.7	5.6	5.8	4.2	5.1	5.5	10.3	11.6	14.0	10.0	11.4	14.2	10.4	11.7	14.7
300	450	50	22	5.8	6.8	7.3	4.6	5.8	6.3	4.4	5.6	6.2	10.7	12.1	13.2	9.8	11.2	12.8	9.9	11.3	13.1
300	450	50	20	4.5	5.8	6.5	3.9	5.3	6.1	4.2	5.6	6.5	10.3	10.8	12.4	9.4	10.0	12.2	9.9	10.4	12.8
300	450	60	30	6.9	7.0	7.8	5.2	5.5	6.4	4.9	5.3	6.3	11.0	12.5	14.6	10.3	11.9	14.6	10.8	12.2	15.1
300	450	60	27	6.7	7.1	8.2	5.3	5.8	7.0	5.3	5.9	7.1	11.7	13.3	14.1	10.4	12.1	13.5	10.6	12.1	13.7
300	450	60	24	5.6	6.3	7.6	4.8	5.5	6.9	5.3	6.1	7.6	11.5	12.2	13.6	10.2	11.0	13.0	10.8	11.5	13.6
300	450	70	35	6.7	7.0	7.2	5.3	5.7	6.0	4.8	5.3	5.6	11.7	12.9	15.3	10.5	11.9	14.8	11.0	12.3	15.4
300	450	70	31	6.1	6.6	7.0	4.9	5.5	6.1	4.7	5.4	6.0	12.8	14.1	15.2	11.1	12.6	14.2	11.3	12.7	14.5
300	450	70	28	5.1	5.9	6.6	4.5	5.4	6.1	4.8	5.7	6.6	12.5	12.9	14.6	10.8	11.4	13.6	11.4	11.9	14.2
300	600	60	27	5.3	6.5	7.1	4.2	5.5	6.2	4.1	5.5	6.2	13.6	16.0	19.6	13.3	15.9	19.9	13.8	16.2	20.5
300	600	60	24	5.3	6.7	7.6	4.5	6.0	7.0	4.6	6.2	7.2	12.7	15.2	17.5	11.8	14.4	17.2	12.0	14.5	17.5
300	600	60	21	6.0	7.7	8.8	5.8	7.5	8.7	6.4	8.2	9.5	11.7	13.3	16.1	10.8	12.6	15.9	11.4	13.1	16.6
300	600	70	31	6.3	6.9	8.1	5.0	5.7	7.0	5.1	5.9	7.3	14.1	16.7	20.1	13.4	16.2	20.0	14.0	16.6	20.6
300	600	70	28	6.5	7.3	8.7	5.4	6.3	7.9	5.7	6.7	8.4	13.5	16.1	18.2	12.2	15.0	17.6	12.4	15.1	17.9
300	600	70	24	7.6	8.6	10.3	7.0	8.2	10.0	7.9	9.1	11.0	12.4	14.2	16.8	11.1	13.2	16.3	11.8	13.6	16.9
300	600	80	36	6.0	6.7	7.3	5.0	5.7	6.4	4.8	5.7	6.5	14.5	16.9	20.5	13.4	16.0	20.0	14.0	16.4	20.7
300	600	80	32	5.8	6.7	7.6	5.0	6.0	6.9	5.1	6.2	7.2	14.2	16.7	19.0	12.5	15.2	17.9	12.8	15.3	18.3
300	600	80	28	7.1	8.3	9.4	6.8	8.1	9.3	7.4	8.8	10.1	12.9	14.5	17.3	11.3	13.1	16.4	11.9	13.6	17.1
450	300	50	30	7.8	9.2	10.1	6.3	7.8	8.8	6.2	7.8	8.8	6.5	7.4	9.4	6.6	7.6	10.1	7.1	8.0	10.7
450	300	50	27	7.4	9.1	10.1	6.2	7.9	9.1	6.2	8.1	9.4	7.2	8.1	8.8	6.7	7.7	8.9	6.9	7.8	9.2
450	300	50	25	6.5	8.4	9.7	5.8	7.8	9.2	6.4	8.5	10.0	6.7	6.8	8.0	6.2	6.5	8.2	6.8	6.9	8.9
450	300	60	36	8.8	9.6	11.0	7.1	8.0	9.5	7.1	8.1	9.8	7.1	8.1	9.9	6.8	8.0	10.3	7.3	8.4	10.9
450	300	60	33	8.5	9.5	11.2	7.0	8.1	9.9	7.3	8.6	10.4	8.0	9.2	9.7	7.1	8.4	9.4	7.4	8.6	9.8
450	300	60	30	7.8	9.1	11.0	6.9	8.3	10.3	7.7	9.2	11.3	7.8	8.1	9.1	7.0	7.4	9.0	7.6	7.9	9.7
450	300	70	42	8.8	9.7	10.5	7.3	8.3	9.2	7.1	8.2	9.3	7.6	8.4	10.4	6.9	7.9	10.4	7.5	8.4	11.0
450	300	70	38	8.1	9.2	10.3	6.8	8.1	9.2	6.9	8.2	9.5	9.1	10.1	10.8	7.9	8.9	10.2	8.2	9.1	10.5
450	300	70	35	7.5	8.9	10.2	6.8	8.3	9.7	7.4	9.0	10.5	8.8	8.9	10.1	7.6	7.8	9.6	8.3	8.4	10.3
450	450	60	33	7.2	8.7	9.7	6.1	7.7	8.8	6.3	8.0	9.1	10.6	12.0	14.7	10.7	12.3	15.5	11.3	12.8	16.1
450	450	60	30	7.4	9.2	10.4	6.5	8.4	9.7	6.9	8.9	10.3	10.5	12.0	13.4	10.0	11.7	13.6	10.3	11.9	13.9
450	450	60	27	6.8	8.8	10.3	6.4	8.5	10.1	7.4	9.6	11.2	10.0	10.7	12.6	9.6	10.5	12.9	10.3	11.0	13.6
450	450	70	38	8.2	9.2	10.7	6.9	7.9	9.6	7.3	8.4	10.2	11.1	12.8	15.2	10.9	12.7	15.7	11.5	13.2	16.3
450	450	70	35	8.5	9.7	11.5	7.4	8.7	10.6	8.1	9.4	11.4	11.3	13.1	14.2	10.5	12.4	14.1	10.8	12.6	14.4
450	450	70	31	8.3	9.7	11.8	7.7	9.2	11.4	8.9	10.5	12.8	10.9	11.9	13.5	10.2	11.2	13.4	10.9	11.8	14.2
450	450	80	44	7.9	8.9	9.9	6.7	7.9	8.9	6.9	8.2	9.3	11.6	13.1	15.7	11.0	12.6	15.7	11.6	13.1	16.4
450	450	80	40	7.9	9.1	10.3	7.0	8.3	9.6	7.4	8.9	10.3	12.3	13.8	15.1	11.0	12.8	14.6	11.4	13.0	15.0
450	450	80	36	7.9	9.4	10.8	7.5	9.1	10.7	8.4	10.2	11.8	11.7	12.4	14.3	10.5	11.4	13.8	11.3	12.0	14.6
450	600	70	35	7.4	9.3	10.7	6.6	8.6	10.1	7.1	9.3	10.8	15.0	17.6	21.4	15.1	17.9	22.2	15.8	18.4	22.9
450	600	70	31	7.7	9.9	11.5	7.2	9.5	11.2	7.9	10.3	12.1	13.7	16.4	18.9	13.3	16.2	19.2	13.6	16.4	19.6
450	600	70	28	9.4	11.9	13.7	9.4	11.9	13.9	10.7	13.3	15.4	12.3	14.2	17.2	11.9	14.0	17.5	12.7	14.6	18.3
450	600	80	40	8.8	10.1	12.1	7.8	9.2	11.3	8.5	10.1	12.2	15.1	18.0	21.6	15.0	18.0	22.1	15.6	18.5	22.8
450	600	80	36	9.4	11.0	13.2	8.6	10.3	12.6	9.6	11.4	13.8	14.1	17.0	19.3	13.3	16.4	19.2	13.7	16.7	19.7
450	600	80	32	11.6	13.4	15.9	11.3	13.3	15.8	12.9	14.9	17.6	12.7	14.8	17.6	11.9	14.2	17.5	12.7	14.8	18.4
450	600	90	45	8.2	9.6	11.0	7.4	8.9	10.4	7.9	9.5	11.1	15.6	18.2	22.0	15.0	17.8	22.1	15.7	18.4	22.9
450	600	90	40	8.6	10.3	11.9	8.0	9.8	11.5	8.8	10.7	12.5	14.8	17.5	20.0	13.6	16.5	19.5	14.1	16.8	20.0
450	600	90	36	11.0	12.9	14.8	11.0	13.0	15.0	12.3	14.4	16.5	13.1	15.0	18.1	12.0	14.1	17.6	12.8	14.8	18.5
600	300	60	39	9.7	11.8	13.4	8.3	10.5	12.2	7.8	10.2	12.0	7.6	8.6	10.9	7.8	9.0	11.8	8.1	9.2	12.1
600	300	60	36	9.6	12.0	13.9	8.5	11.0	12.9	8.3	10.9	12.9	7.0	8.2	9.1	6.6	8.0	9.4	6.6	7.8	9.5
600	300	60	33	10.3	13.0	15.0	9.7	12.5	14.6	10.0	12.8	15.1	6.7	7.0	8.4	6.3	6.8	8.8	6.7	7.1	9.2
600	300	70	45	10.1	11.7	13.9	8.5	10.2	12.5	8.3	10.1	12.5	7.7	9.0	11.0	7.6	9.0	11.5	7.9	9.2	11.9
600	300	70	42	10.2	12.0	14.5	8.9	10.8	13.3	8.9	10.9	13.5	7.5	8.8	9.6	6.7	8.3	9.5	6.8	8.2	9.6
600	300	70	38	11.4	13.4	16.1	10.5	12.7	15.5	11.0	13.3	16.2	7.3	7.8	9.1	6.6	7.3	9.1	7.0	7.6	9.5
600	300	80	52	10.2	11.8	13.4	8.8	10.6	12.3	8.3	10.2	12.0	8.4	9.5	11.7	7.9	9.1	11.8	8.2	9.3	12.2
600	300	80	48	10.0	11.9	13.7	8.8	10.9	12.8	8.6	10.7	12.7	8.8	9.9	10.9	7.6	9.0	10.4	7.7	8.9	10.5
600	300	80	44	11.3	13.5	15.6	10.7	13.0	15.2	11.0	13.4	15.6	8.5	8.8	10.3	7.4	7.9	9.9	7.9	8.2	10.4
600	450	70	42	9.9	12.2	13.9	8.9	11.2	13.1	8.7	11.2	13.1	12.6	14.3	17.2	12.9	14.7	18.1	13.2	15.0	18.5
600	450	70	38	10.3	12.9	14.8	9.5	12.2	14.2	9.6	12.4	14.5	11.5	13.3	14.9	11.2	13.2	15.3	11.3	13.1	15.4
600	450	70	35	11.6	14.4	16.6	11.3	14.2	16.5	12.0	15.0	17.4	10.8	11.8	13.9	10.6	11.7	14.3	11.0	12.0	14.8
600	450	80	48	10.6	12.3	14.6	9.3	11.1	13.6	9.4	11.3	13.8	12.5	14.4	17.1	12.4	14.5	17.7	12.8	14.7	18.1
600	450	80	44	11.2	13.2	15.8	10.2	12.3	15.0	10.6	12.7	15.5	11.7	13.7	15.1	11.0	13.2	15.1	11.1	13.2	15.2
600	450	80	40	13.1	15.2	18.1	12.6	14.9	17.8	13.5	15.8	18.9	11.1	12.3	14.2	10.5	11.8	14.2	11.0	12.1	14.7
600	450	90	54	10.1	11.9	13.7	9.1	11.0	12.8	9.0	11.0	12.9	13.5	15.2	18.0	13.0	14.9	18.2	13.4	15.1	18.7
600	450	90	49	10.7	12.7	14.7	9.9	12.1	14.1	10.0	12.3	14.4	13.1	14.9	16.5	12.0	14.0	16.0	12.1	14.0	16.2
600	450	90	45	12.7	15.0	17.2	12.5	14.9	17.2	13.1	15.6	18.0	12.3	13.2	15.3	11.3	12.4	15.0	11.8	12.8	15.6
600	600	70	38	11.1	13.8	15.9	10.4	13.2	15.4	10.6	13.5	15.8	17.5	20.4	24.4	17.9	20.9	25.5	18.3	21.2	25.9
600	600	70	35	11.6	14.6	17.0	11.2	14.2	16.7	11.6	14.8	17.4	15.1	18.1	20.8	14.8	18.0	21.2	15.0	18.0	21.4
600	600	70	31	14.8	18.0	20.6	14.9	18.2	20.9	15.9	19.2	22.1	13.9	16.0	19.3	13.7	16.0	19.8	14.2	16.3	20.3
600	600	80	44	12.3	14.5	17.2	11.5	13.7	16.5	11.9	14.2	17.1	17.3	20.4	24.2	17.3	20.6	24.9	17.8	20.9	25.4
600	600	80	40	13.0	15.4	18.4	12.4	14.8	17.9	13.0	15.6	18.8	15.4	18.5	21.1	14.7	18.1	21.1	14.9	18.1	21.3
600	600	80	36	16.8	19.4	22.7	16.7	19.4	22.7	17.9	20.7	24.1	14.0	16.3	19.4	13.4	15.9	19.5	14.0	16.3	20.1
600	600	90	49	11.9	14.1	16.3	11.3	13.6	15.8	11.5	13.9	16.2	18.5	21.4	25.4	18.1	21.1	25.7	18.5	21.4	26.2
600	600	90	45	12.4	14.8	17.2	11.9	14.5	17.0	12.4	15.1	17.6	16.8	19.7	22.5	15.7	18.9	22.1	15.9	18.9	22.4
600	600	90	40	16.5	19.2	21.8	16.6	19.4	22.1	17.6	20.4	23.3	15.2	17.3	20.6	14.3	16.5	20.3	14.8	17.0	20.9

TABLE F-6G. TOTAL FUEL CONSUMPTION ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 6*6

INTERSECTION				MINOR			STREET						MAJOR			STREET					
ENVIRONMENT				LEFT			TURNS						LEFT			TURNS					
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	7.6	9.2	9.4	8.0	9.6	10.0	6.8	8.6	9.0	5.4	6.9	8.1	5.5	7.2	8.9	6.5	8.1	10.0
300	300	50	25	8.2	10.0	10.5	8.8	10.7	11.3	7.9	9.9	10.6	5.2	6.8	6.7	4.8	6.5	7.0	5.5	7.1	7.7
300	300	50	22	6.5	8.6	9.3	7.6	9.8	10.6	7.2	9.5	10.4	5.6	6.4	6.9	5.3	6.2	7.2	6.4	7.1	8.3
300	300	60	33	7.0	7.9	8.8	7.1	8.2	9.1	6.2	7.3	8.4	5.6	7.3	8.4	5.4	7.3	8.8	6.4	8.2	9.9
300	300	60	30	7.4	8.6	9.7	7.7	9.0	10.2	7.0	8.4	9.7	6.1	7.9	7.7	5.3	7.3	7.5	6.1	7.9	8.3
300	300	60	27	6.2	7.6	9.0	7.1	8.6	10.1	6.9	8.6	10.1	6.5	7.4	7.7	5.7	6.9	7.6	6.9	7.8	8.8
300	300	70	38	7.9	9.0	9.2	8.3	9.4	9.8	7.1	8.4	8.8	6.0	7.5	8.7	5.4	7.1	8.8	6.5	8.0	9.9
300	300	70	35	8.0	9.3	9.8	8.6	10.0	10.6	7.7	9.2	9.9	6.8	8.4	8.3	5.6	7.4	7.8	6.4	8.0	8.7
300	300	70	31	6.8	8.3	9.1	7.9	9.6	10.4	7.5	9.3	10.2	7.2	8.0	8.5	6.1	7.0	8.0	7.3	8.0	9.2
300	450	50	25	7.3	9.0	9.4	8.0	9.8	10.3	7.2	9.1	9.7	9.7	11.8	13.7	9.9	12.2	14.6	11.0	13.2	15.7
300	450	50	22	7.9	9.8	10.4	8.8	10.8	11.6	8.2	10.4	11.2	9.3	11.6	12.1	9.0	11.4	12.5	9.8	12.0	13.3
300	450	50	20	6.8	9.0	9.8	8.3	10.5	11.5	8.2	10.6	11.7	9.4	10.8	11.9	9.1	10.6	12.2	10.2	11.6	13.5
300	450	60	30	6.8	7.9	8.9	7.3	8.5	9.6	6.7	8.0	9.2	10.2	12.6	14.2	10.1	12.6	14.8	11.2	13.5	15.9
300	450	60	27	7.5	8.8	10.0	8.2	9.6	11.0	7.8	9.4	10.8	10.2	12.6	13.0	9.4	12.0	12.9	10.2	12.7	13.8
300	450	60	24	6.6	8.2	9.7	7.8	9.5	11.1	8.0	9.8	11.5	10.4	12.0	12.9	9.7	11.5	12.9	10.9	12.5	14.1
300	450	70	35	7.6	8.8	9.1	8.3	9.6	10.0	7.5	8.8	9.4	10.7	12.9	14.7	10.2	12.5	14.9	11.3	13.5	16.0
300	450	70	31	7.8	9.2	9.8	8.7	10.2	10.9	8.1	9.8	10.6	11.1	13.4	13.9	10.0	12.4	13.5	10.8	13.1	14.4
300	450	70	28	7.0	8.7	9.5	8.5	10.2	11.2	8.4	10.3	11.4	11.2	12.6	13.7	10.2	11.7	13.3	11.4	12.8	14.6
300	600	60	27	6.9	9.0	9.8	7.9	10.1	11.0	7.5	9.8	10.8	13.6	16.9	19.9	13.9	17.3	20.9	15.0	18.3	22.1
300	600	60	24	7.7	10.1	11.1	9.0	11.5	12.6	8.8	11.3	12.6	11.9	15.3	17.0	11.6	15.1	17.4	12.4	15.8	18.3
300	600	60	21	8.6	11.2	12.5	10.4	13.1	14.5	10.8	13.6	15.0	11.3	13.9	16.2	11.1	13.8	16.6	12.3	14.9	17.9
300	600	70	31	6.6	8.1	9.5	7.5	9.1	10.6	7.2	8.9	10.5	13.9	17.4	20.3	13.8	17.5	20.8	15.0	18.5	22.0
300	600	70	28	7.6	9.3	11.0	8.7	10.5	12.2	8.7	10.6	12.5	12.5	16.1	17.6	11.8	15.6	17.6	12.7	16.3	18.5
300	600	70	24	8.9	10.9	12.8	10.5	12.6	14.5	11.0	13.2	15.3	11.9	14.6	16.7	11.3	14.2	16.8	12.5	15.3	18.1
300	600	80	36	7.2	8.8	9.6	8.3	10.0	10.9	7.8	9.6	10.6	14.1	17.5	20.5	13.7	17.2	20.7	14.9	18.2	21.9
300	600	80	32	7.8	9.7	10.7	9.1	11.0	12.2	8.9	10.9	12.2	13.1	16.5	18.2	12.0	15.6	17.8	12.9	16.3	18.8
300	600	80	28	9.3	11.4	12.7	11.1	13.3	14.7	11.4	13.7	15.2	12.2	14.8	17.1	11.2	14.0	16.8	12.5	15.1	18.1
450	300	50	30	10.4	12.7	13.8	11.0	13.4	14.5	10.6	13.1	14.3	5.5	7.2	8.7	6.2	8.1	10.1	7.3	9.1	11.3
450	300	50	27	10.8	13.4	14.6	11.6	14.3	15.7	11.4	14.2	15.7	5.4	7.2	7.4	5.5	7.5	8.1	6.3	8.2	9.0
450	300	50	25	10.1	12.9	14.4	11.5	14.4	16.0	11.8	14.8	16.5	5.3	6.3	7.0	5.5	6.6	7.9	6.7	7.7	9.1
450	300	60	36	10.1	11.8	13.4	10.4	12.3	14.0	10.2	12.1	14.0	5.9	7.8	9.1	6.2	8.3	10.1	7.4	9.3	11.3
450	300	60	33	10.6	12.6	14.4	11.2	13.3	15.2	11.2	13.4	15.5	6.1	8.1	8.1	5.8	8.0	8.5	6.7	8.7	9.4
450	300	60	30	10.1	12.3	14.5	11.3	13.6	15.8	11.8	14.2	16.5	6.3	7.5	8.0	6.1	7.5	8.5	7.4	8.6	9.8
450	300	70	42	11.0	12.8	13.8	11.6	13.5	14.6	11.1	13.2	14.4	6.2	8.0	9.5	6.2	8.1	10.1	7.4	9.1	11.3
450	300	70	38	11.1	13.1	14.4	11.9	14.1	15.4	11.7	14.0	15.4	7.0	8.9	9.1	6.4	8.4	9.0	7.3	9.1	10.0
450	300	70	35	10.7	13.0	14.5	12.1	14.5	16.1	12.4	14.9	16.6	7.2	8.2	8.9	6.6	7.7	8.9	7.9	8.9	10.3
450	450	60	33	10.2	12.6	13.8	11.1	13.7	14.9	11.0	13.7	15.0	10.5	12.8	14.9	11.2	13.8	16.4	12.4	14.8	17.6
450	450	60	30	11.2	13.9	15.2	12.3	15.1	16.6	12.5	15.4	17.0	9.6	12.1	12.9	9.8	12.4	13.7	10.7	13.2	14.7
450	450	60	27	10.7	13.7	15.3	12.4	15.5	17.2	13.1	16.3	18.1	9.6	11.2	12.6	9.8	11.6	13.5	11.1	12.8	14.8
450	450	70	38	9.9	11.7	13.5	10.6	12.6	14.4	10.7	12.8	14.7	10.9	13.5	15.4	11.3	14.0	16.4	12.5	15.1	17.7
450	450	70	35	11.0	13.1	15.1	12.0	14.2	16.3	12.3	14.6	16.8	10.3	13.0	13.6	10.1	12.9	14.0	11.0	13.7	15.0
450	450	70	31	11.0	13.3	15.6	12.5	14.9	17.3	13.4	15.9	18.4	10.4	12.2	13.4	10.2	12.2	13.9	11.5	13.4	15.2
450	450	80	44	10.4	12.4	13.5	11.4	13.4	14.7	11.3	13.4	14.8	11.2	13.5	15.7	11.2	13.7	16.3	12.4	14.8	17.6
450	450	80	40	11.2	13.4	14.8	12.4	14.7	16.2	12.5	14.9	16.5	11.1	13.6	14.4	10.5	13.1	14.4	11.5	13.9	15.5
450	450	80	36	11.4	13.9	15.5	13.1	15.7	17.4	13.8	16.4	18.3	11.0	12.6	14.0	10.4	12.2	14.1	11.8	13.4	15.5
450	600	70	35	10.7	13.5	15.1	12.0	14.9	16.6	12.2	15.3	17.0	15.4	19.0	22.3	16.2	19.9	23.7	17.5	21.1	25.0
450	600	70	31	11.8	14.9	16.7	13.4	16.6	18.5	13.9	17.2	19.2	13.4	17.1	19.0	13.6	17.4	19.9	14.6	18.3	20.9
450	600	70	28	13.7	17.1	19.1	15.8	19.2	21.4	16.8	20.4	22.6	12.5	15.3	17.8	12.8	15.7	18.7	14.1	16.9	20.1
450	600	80	40	10.8	13.1	15.2	11.9	14.2	16.5	12.4	14.8	17.2	15.5	19.2	22.3	15.9	19.8	23.4	17.2	21.0	24.7
450	600	80	36	12.2	14.7	17.1	13.5	16.1	18.6	14.2	16.9	19.5	13.7	17.5	19.3	13.5	17.5	19.8	14.5	18.4	20.9
450	600	80	32	14.6	17.3	20.0	16.4	19.3	22.1	17.7	20.6	23.5	12.7	15.7	18.0	12.6	15.8	18.6	14.0	17.0	20.0
450	600	90	45	11.1	13.4	15.0	12.4	14.8	16.5	12.6	15.2	16.9	15.8	19.3	22.6	15.8	19.5	23.3	17.1	20.7	24.7
450	600	90	40	12.3	14.9	16.7	13.8	16.6	18.5	14.3	17.1	19.1	14.2	17.9	19.9	13.7	17.5	20.0	14.7	18.4	21.1
450	600	90	36	14.9	17.8	19.8	17.0	19.9	22.1	18.0	21.1	23.3	13.0	15.8	18.3	12.5	15.5	18.5	14.0	16.8	20.0
600	300	60	39	13.4	16.5	18.2	14.1	17.3	19.2	13.3	16.6	18.6	7.5	9.5	11.2	8.4	10.5	12.7	9.3	11.3	13.7
600	300	60	36	14.1	17.5	19.5	15.1	18.6	20.7	14.6	18.1	20.3	6.2	8.3	8.7	6.5	8.7	9.6	7.1	9.2	10.3
600	300	60	33	15.0	18.6	20.9	16.5	20.2	22.6	16.5	20.3	22.8	6.3	7.5	8.5	6.6	8.0	9.5	7.6	8.9	10.5
600	300	70	45	12.6	15.1	17.5	13.1	15.7	18.2	12.5	15.2	17.8	7.5	9.7	11.2	8.0	10.3	12.3	8.9	11.1	13.3
600	300	70	42	13.5	16.2	18.9	14.2	17.1	19.8	13.9	16.9	19.7	6.5	8.8	9.0	6.4	8.8	9.6	7.0	9.3	10.3
600	300	70	38	14.8	17.8	20.7	16.1	19.1	22.1	16.3	19.5	22.6	6.8	8.2	9.0	6.7	8.3	9.6	7.8	9.2	10.7
600	300	80	52	13.5	16.1	17.9	14.2	16.9	18.8	13.5	16.3	18.2	8.1	10.0	11.8	8.1	10.3	12.5	9.1	11.1	13.5
600	300	80	48	14.1	17.0	19.0	15.1	18.0	20.1	14.6	17.6	19.8	7.7	9.8	10.2	7.2	9.4	10.3	7.8	9.9	11.1
600	300	80	44	15.7	18.7	21.0	17.2	20.3	22.7	17.2	20.4	22.9	7.8	9.1	10.0	7.4	8.8	10.2	8.4	9.7	11.3
600	450	70	42	14.0	17.2	19.1	15.0	18.4	20.4	14.6	18.0	20.1	13.5	16.1	18.4	14.4	17.2	20.0	15.4	18.0	21.0
600	450	70	38	15.2	18.7	20.8	16.5	20.1	22.3	16.3	20.0	22.4	11.7	14.4	15.4	12.0	14.9	16.4	12.7	15.4	17.1
600	450	70	35	16.7	20.4	22.8	18.5	22.3	24.8	18.9	22.8	25.4	11.5	13.3	14.9	11.8	13.8	15.9	12.9	14.8	17.0
600	450	80	48	13.4	16.0	18.5	14.2	16.9	19.6	14.0	16.8	19.6	13.3	16.1	18.2	13.8	16.8	19.4	14.8	17.6	20.4
600	450	80	44	14.9	17.7	20.5	16.0	18.9	21.8	16.0	19.1	22.0	11.7	14.6	15.5	11.7	14.7	16.1	12.4	15.3	16.8
600	450	80	40	16.9	20.0	23.0	18.5	21.7	24.8	19.1	22.4	25.6	11.6	13.6	15.0	11.6	13.8	15.7	12.7	14.7	16.8
600	450	90	54	13.8	16.6	18.5	14.9	17.7	19.7	14.5	17.4	19.5	14.1	16.7	19.0	14.2	17.0	19.8	15.2	17.9	20.9
600	450	90	49	15.2	18.2	20.3	16.5	19.6	21.8	16.3	19.5	21.9	12.9	15.6	16.7	12.5	15.3	16.9	13.2	15.9	17.7
600	450	90	45	17.4	20.6	23.1	19.3	22.6	25.1	19.6	23.0	25.6	12.6	14.5	16.0	12.2	14.2	16.3	13.3	15.2	17.5
600	600	70	38	15.5	19.1	21.5	16.9	20.7	23.1	16.9	20.7	23.2	19.0	22.8	26.3	20.0	23.9	28.0	21.0	24.8	29.0
600	600	70	35	16.9	20.8	23.3	18.5	22.5	25.2	18.7	22.8	25.5	15.8	19.7	21.9	16.2	20.2	23.0	16.9	20.8	23.7
600	600	70	31	20.2	24.3	27.2	22.4	26.6	29.5	23.1	27.4	30.4	15.1	18.1	20.9	15.5	18.7	22.0	16.6	19.7	23.1
600	600	80	44	15.5	18.5	21.5	16.7	19.8	22.9	16.9	20.1	23.2	18.7	22.7	26.0	19.3	23.4	27.2	20.3	24.3	28.3
600	600	80	40	17.0	20.3	23.4	18.4	21.8	25.1	18.8	22.3	25.7	16.0	20.0	22.1	15.9	20.2	22.7	16.7	20.8	23.5
600	600	80	36	21.0	24.5	27.9	23.0	26.6	30.1	23.9	27.6	31.2	15.0	18.3	20.8	15.1	18.5	21.5	16.2	19.5	22.7
600	600	90	49	16.0	19.1	21.4	17.4	20.6	23.1	17.3	20.7	23.2	19.7	23.5	27.0	19.9	23.8	27.8	21.0	24.8	29.0
600	600	90	45	17.2	20.6	23.2	18.9	22.4	25.1	19.1	22.7	25.4	17.2	21.1	23.3	16.8	20.8	23.6	17.6	21.5	24.4
600	600	90	40	21.5	25.2	28.0	23.7	27.4	30.4	24.4	28.2	31.2	16.1	19.1	21.9	15.8	19.0	22.2	17.0	20.0	23.5

TABLE F-6H. TOTAL FUEL CONSUMPTION ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*6

INTERSECTION ENVIRONMENT				MINOR STREET LEFT TURNS									MAJOR STREET LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH	TRUCKS LOW	TRUCKS MED	TRUCKS HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	7.3	8.8	8.9	7.6	9.2	9.4	6.5	8.1	8.4	7.1	8.1	9.3	6.7	7.9	9.6	7.1	8.1	10.0
300	300	50	25	7.7	9.4	9.7	8.3	10.0	10.5	7.3	9.2	9.8	7.4	8.5	8.4	6.4	7.6	8.1	6.5	7.6	8.2
300	300	50	22	6.2	8.2	8.8	7.3	9.4	10.1	6.9	9.1	9.9	7.7	7.9	8.4	6.8	7.2	8.1	7.3	7.6	8.7
300	300	60	33	7.3	8.1	8.9	7.4	8.3	9.1	6.4	7.5	8.4	6.9	8.1	9.1	6.1	7.5	9.0	6.6	7.8	9.5
300	300	60	30	7.4	8.5	9.5	7.8	9.0	10.0	7.1	8.4	9.5	7.9	9.2	8.9	6.5	7.9	8.2	6.7	8.0	8.4
300	300	60	27	6.6	7.9	9.1	7.4	8.9	10.2	7.3	8.8	10.2	8.1	8.5	8.8	6.7	7.4	8.1	7.3	7.8	8.7
300	300	70	38	8.5	9.4	9.6	8.8	9.9	10.1	7.7	8.8	9.1	7.2	8.2	9.4	6.0	7.2	8.9	6.5	7.6	9.5
300	300	70	35	8.3	9.5	9.9	8.9	10.2	10.6	8.0	9.4	9.9	8.5	9.6	9.5	6.7	8.0	8.4	6.9	8.0	8.6
300	300	70	31	7.4	8.8	9.5	8.5	10.0	10.7	8.1	9.7	10.5	8.7	9.0	9.4	7.0	7.5	8.4	7.6	7.9	9.1
300	450	50	25	6.8	8.4	8.6	7.5	9.2	9.5	6.7	8.4	8.9	10.6	12.2	14.1	10.3	12.1	14.4	10.8	12.4	14.9
300	450	50	22	7.1	9.0	9.5	8.1	10.0	10.6	7.5	9.5	10.2	10.7	12.4	13.0	9.8	11.7	12.7	10.0	11.7	13.0
300	450	50	20	6.4	8.4	9.2	7.8	10.0	10.8	7.8	10.0	10.9	10.6	11.5	12.6	9.7	10.8	12.4	10.3	11.2	13.0
300	450	60	30	6.9	7.9	8.8	7.4	8.4	9.4	6.8	7.9	9.0	10.7	12.5	14.2	10.0	12.0	14.1	10.5	12.4	14.7
300	450	60	27	7.4	8.6	9.7	8.1	9.4	10.6	7.7	9.1	10.4	11.1	13.0	13.4	9.8	11.9	12.7	10.0	12.0	13.0
300	450	60	24	6.8	8.2	9.6	8.0	9.6	11.0	8.2	9.8	11.4	11.2	12.3	13.1	9.9	11.2	12.6	10.5	11.6	13.2
300	450	70	35	8.0	9.0	9.3	8.6	9.8	10.1	7.8	9.1	9.5	11.1	12.7	14.6	10.0	11.8	14.1	10.6	12.2	14.7
300	450	70	31	7.9	9.2	9.7	8.8	10.3	10.8	8.3	9.8	10.5	12.0	13.7	14.3	10.3	12.2	13.2	10.5	12.3	13.5
300	450	70	28	7.4	9.0	9.7	8.9	10.5	11.4	8.8	10.6	11.5	11.9	12.8	13.9	10.3	11.3	12.9	10.9	11.8	13.6
300	600	60	27	6.2	8.2	8.9	7.2	9.3	10.1	6.8	8.9	9.8	14.1	16.9	19.9	13.8	16.7	20.3	14.3	17.2	20.9
300	600	60	24	6.8	9.1	10.0	8.1	10.4	11.4	7.9	10.3	11.4	12.8	15.7	17.5	12.0	15.0	17.2	12.2	15.1	17.6
300	600	60	21	8.0	10.5	11.6	9.8	12.4	13.6	10.1	12.8	14.1	12.1	14.2	16.4	11.3	13.5	16.3	11.9	14.0	17.0
300	600	70	31	6.6	8.0	9.2	7.4	8.8	10.2	7.1	8.7	10.2	13.9	16.9	19.7	13.3	16.4	19.8	13.8	16.9	20.4
300	600	70	28	7.3	8.9	10.5	8.4	10.1	11.7	8.4	10.2	11.9	13.0	16.1	17.6	11.7	15.0	17.0	12.0	15.1	17.3
300	600	70	24	8.9	10.7	12.5	10.5	12.4	14.3	11.0	13.0	15.0	12.2	14.5	16.5	11.0	13.4	16.0	11.7	14.0	16.7
300	600	80	36	7.5	8.9	9.6	8.5	10.0	10.8	8.0	9.7	10.5	14.1	16.9	19.9	13.1	16.0	19.5	13.7	16.5	20.2
300	600	80	32	7.8	9.5	10.4	9.1	10.9	11.9	8.8	10.8	11.9	13.5	16.4	18.1	11.9	14.9	17.1	12.2	15.1	17.5
300	600	80	28	9.6	11.6	12.7	11.4	13.4	14.7	11.7	13.8	15.2	12.5	14.6	16.8	10.9	13.2	15.9	11.7	13.7	16.7
450	300	50	30	10.3	12.5	13.3	10.9	13.1	14.1	10.4	12.8	13.9	6.7	8.0	9.4	6.8	8.3	10.2	7.4	8.7	10.8
450	300	50	27	10.4	12.9	14.0	11.3	13.8	15.0	11.0	13.7	15.0	7.1	8.4	8.6	6.6	8.1	8.7	6.9	8.2	9.1
450	300	50	25	10.0	12.7	14.1	11.4	14.2	15.6	11.7	14.6	16.1	6.9	7.4	8.1	6.5	7.1	8.3	7.1	7.6	9.0
450	300	60	36	10.5	12.1	13.6	10.9	12.6	14.2	10.7	12.4	14.1	6.7	8.1	9.3	6.4	8.0	9.7	7.0	8.5	10.4
450	300	60	33	10.9	12.7	14.4	11.4	13.4	15.2	11.4	13.5	15.4	7.3	8.9	8.8	6.5	8.2	8.6	6.8	8.3	9.0
450	300	60	30	10.7	12.7	14.7	11.8	14.0	16.1	12.3	14.6	16.8	7.4	8.1	8.6	6.6	7.5	8.5	7.3	8.0	9.2
450	300	70	42	11.7	13.4	14.3	12.3	14.1	15.1	11.8	13.7	14.8	7.0	8.2	9.6	6.3	7.7	9.7	6.9	8.2	10.3
450	300	70	38	11.6	13.5	14.7	12.4	14.5	15.7	12.2	14.3	15.7	8.2	9.5	9.7	7.0	8.5	9.1	7.3	8.7	9.5
450	300	70	35	11.5	13.7	15.1	12.9	15.2	16.6	13.2	15.6	17.1	8.2	8.7	9.4	7.0	7.7	8.9	7.7	8.2	9.6
450	450	60	33	9.8	12.2	13.2	10.8	13.2	14.3	10.6	13.2	14.4	10.9	12.8	14.8	11.1	13.1	15.7	11.7	13.6	16.3
450	450	60	30	10.6	13.2	14.4	11.8	14.5	15.8	11.9	14.7	16.1	10.5	12.5	13.2	10.1	12.2	13.5	10.4	12.4	13.9
450	450	60	27	10.5	13.3	14.8	12.2	15.1	16.7	12.8	15.8	17.5	10.3	11.5	12.8	10.0	11.3	13.1	10.7	11.8	13.9
450	450	70	38	10.2	11.9	13.5	10.9	12.7	14.4	11.0	12.9	14.7	10.8	12.9	14.8	10.6	12.9	15.2	11.3	13.4	15.9
450	450	70	35	11.1	13.1	14.9	12.0	14.1	16.1	12.4	14.5	16.6	10.7	12.9	13.5	9.9	12.3	13.4	10.3	12.5	13.8
450	450	70	31	11.3	13.6	15.7	12.8	15.1	17.3	13.7	16.1	18.4	10.7	12.0	13.1	9.9	11.4	13.0	10.7	12.0	13.8
450	450	80	44	11.0	12.8	13.8	11.9	13.9	15.0	11.8	13.8	15.0	11.1	12.9	15.0	10.5	12.5	15.1	11.2	13.1	15.8
450	450	80	40	11.6	13.6	14.9	12.7	14.9	16.3	12.9	15.1	16.6	11.4	13.4	14.2	10.3	12.4	13.7	10.7	12.6	14.1
450	450	80	36	12.0	14.4	15.9	13.7	16.2	17.8	14.4	16.9	18.6	11.2	12.3	13.6	10.1	11.4	13.2	10.9	12.0	14.0
450	600	70	35	10.2	12.9	14.3	11.5	14.3	15.8	11.7	14.6	16.2	15.4	18.5	21.7	15.6	18.9	22.6	16.3	19.4	23.3
450	600	70	31	11.1	14.1	15.8	12.6	15.7	17.5	13.1	16.3	18.1	13.9	17.0	19.0	13.5	16.8	19.3	13.9	17.1	19.7
450	600	70	28	13.3	16.5	18.4	15.3	18.7	20.7	16.3	19.8	21.9	12.8	15.1	17.6	12.5	14.9	17.9	13.3	15.6	18.8
450	600	80	40	10.9	13.1	15.1	12.0	14.2	16.4	12.4	14.8	17.0	15.0	18.2	21.3	14.8	18.3	21.8	15.6	18.8	22.6
450	600	80	36	12.1	14.5	16.8	13.4	15.9	18.3	14.1	16.7	19.1	13.7	17.0	18.8	12.9	16.4	18.7	13.4	16.7	19.2
450	600	80	32	14.8	17.4	19.9	16.6	19.3	22.0	17.8	20.6	23.4	12.5	15.0	17.3	11.9	14.5	17.3	12.7	15.2	18.2
450	600	90	45	11.5	13.7	15.1	12.7	15.1	16.6	13.0	15.4	17.0	15.2	18.3	21.5	14.7	17.9	21.7	15.4	18.5	22.4
450	600	90	40	12.5	15.0	16.6	14.0	16.6	18.3	14.5	17.1	19.0	14.2	17.3	19.2	13.0	16.3	18.8	13.5	16.6	19.3
450	600	90	36	15.4	18.1	20.0	17.4	20.2	22.3	18.4	21.3	23.4	12.8	15.1	17.6	11.7	14.2	17.2	12.6	14.9	18.1
600	300	60	39	13.5	16.4	18.1	14.2	17.2	19.0	13.4	16.5	18.4	8.0	9.5	11.2	8.3	9.9	12.1	8.6	10.1	12.5
600	300	60	36	14.0	17.2	19.1	15.0	18.3	20.3	14.4	17.8	19.9	7.2	8.8	9.1	6.9	8.6	9.5	6.9	8.5	9.6
600	300	60	33	15.2	18.6	20.8	16.6	20.2	22.4	16.6	20.3	22.6	7.2	7.9	8.8	6.9	7.8	9.2	7.3	8.1	9.7
600	300	70	45	13.3	15.6	17.9	13.8	16.2	18.6	13.2	15.8	18.2	7.6	9.2	10.7	7.4	9.3	11.3	7.8	9.5	11.7
600	300	70	42	14.0	16.6	19.1	14.7	17.4	20.0	14.4	17.2	19.9	7.0	8.8	9.0	6.3	8.3	9.0	6.4	8.2	9.1
600	300	70	38	15.6	18.4	21.2	16.8	19.8	22.6	17.0	20.1	23.0	7.2	8.1	8.8	6.5	7.6	8.9	7.0	7.9	9.4
600	300	80	52	14.5	16.9	18.6	15.2	17.8	19.5	14.4	17.1	18.9	8.0	9.5	11.2	7.5	9.2	11.4	7.9	9.4	11.8
600	300	80	48	14.9	17.6	19.5	15.8	18.6	20.6	15.3	18.2	20.3	8.1	9.7	10.1	7.0	8.8	9.7	7.1	8.7	9.8
600	300	80	44	16.7	19.6	21.8	18.2	21.2	23.5	18.2	21.3	23.6	8.1	8.9	9.8	7.1	8.0	9.4	7.6	8.3	10.0
600	450	70	42	13.9	16.9	18.7	14.9	18.1	20.0	14.5	17.8	19.7	13.2	15.3	17.6	13.5	15.8	18.6	13.9	16.0	19.0
600	450	70	38	14.9	18.2	20.3	16.2	19.6	21.7	16.0	19.5	21.7	11.8	14.0	15.1	11.6	13.9	15.5	11.7	13.9	15.6
600	450	70	35	16.6	20.2	22.5	18.5	22.1	24.5	18.8	22.6	25.0	11.5	12.8	14.4	11.3	12.8	14.8	11.7	13.1	15.4
600	450	80	48	13.9	16.4	18.8	14.7	17.3	19.8	14.5	17.2	19.8	12.5	14.8	16.9	12.4	14.9	17.5	12.9	15.2	18.0
600	450	80	44	15.2	17.9	20.6	16.2	19.1	21.8	16.3	19.2	22.0	11.4	13.8	14.6	10.8	13.3	14.7	10.9	13.3	14.8
600	450	80	40	17.4	20.4	23.3	19.1	22.1	25.1	19.6	22.8	25.9	11.1	12.7	14.0	10.5	12.3	14.1	11.0	12.6	14.7
600	450	90	54	14.6	17.2	19.0	15.7	18.4	20.2	15.2	18.0	20.0	13.2	15.3	17.6	12.8	15.1	17.9	13.2	15.4	18.4
600	450	90	49	15.8	18.6	20.6	17.1	20.0	22.1	16.9	19.9	22.1	12.6	14.8	15.8	11.5	13.9	15.4	11.7	13.9	15.6
600	450	90	45	18.3	21.4	23.6	20.1	23.3	25.7	20.4	23.7	26.2	12.1	13.4	15.0	11.1	12.6	14.7	11.7	13.0	15.3
600	600	70	38	15.2	18.7	20.9	16.6	20.2	22.5	16.5	20.2	22.6	18.3	21.6	25.1	18.7	22.1	26.1	19.1	22.4	26.6
600	600	70	35	16.4	20.1	22.6	18.0	21.9	24.4	18.2	22.1	24.8	15.6	18.9	21.1	15.3	18.9	21.6	15.5	18.9	21.8
600	600	70	31	20.0	24.0	26.7	22.2	26.3	29.0	22.8	27.0	29.9	14.7	17.2	19.9	14.5	17.2	20.4	15.1	17.6	21.0
600	600	80	44	15.9	18.8	21.6	17.0	20.0	22.9	17.2	20.3	23.3	17.5	21.0	24.2	17.5	21.1	24.9	18.0	21.5	25.4
600	600	80	40	17.1	20.3	23.3	18.5	21.8	24.9	18.9	22.2	25.5	15.2	18.8	20.8	14.6	18.4	20.9	14.8	18.4	21.1
600	600	80	36	21.4	24.8	28.1	23.3	26.8	30.2	24.2	27.8	31.3	14.1	16.9	19.4	13.6	16.5	19.5	14.2	16.9	20.2
600	600	90	49	16.6	19.6	21.8	18.0	21.1	23.4	17.9	21.1	23.5	18.4	21.7	25.2	18.0	21.5	25.5	18.5	21.9	26.0
600	600	90	45	17.6	20.9	23.3	19.3	22.6	25.2	19.4	22.9	25.5	16.4	19.8	21.9	15.4	18.9	21.6	15.6	19.0	21.9
600	600	90	40	22.2	25.7	28.4	24.4	28.0	30.7	25.0	28.7	31.6	15.2	17.7	20.4	14.2	16.9	20.2	14.9	17.4	20.8

TABLE F-61. TOTAL FUEL CONSUMPTION ON THE INBOUND APPROACH (KILOGRAMS) IN 15 MINUTES FOR GEOMETRY 7*7

INTERSECTION				MINOR STREET									MAJOR STREET								
ENVIRONMENT				LEFT TURNS									LEFT TURNS								
				LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL			LOW LEVEL			MEDIUM LEVEL			HIGH LEVEL		
				TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS			TRUCKS		
				LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
V-2	V-1	CY	GT	LL	LM	LH	ML	MM	MH	HL	HM	HH	LL	LM	LH	ML	MM	MH	HL	HM	HH
300	300	50	27	9.1	10.4	10.4	8.6	10.0	10.1	6.6	8.1	8.2	7.1	7.9	9.3	6.7	7.6	9.5	7.1	7.9	10.0
300	300	50	25	9.2	10.8	11.0	8.9	10.6	10.9	7.1	8.9	9.3	7.9	8.7	8.9	6.8	7.9	8.5	6.9	7.8	8.7
300	300	50	22	7.0	8.8	9.3	7.2	9.1	9.7	6.0	7.9	8.6	8.0	8.1	8.7	7.1	7.2	8.4	7.5	7.6	9.0
300	300	60	33	9.3	10.0	10.6	8.6	9.3	10.0	6.7	7.6	8.4	7.5	8.5	9.7	6.7	7.9	9.6	7.1	8.1	10.1
300	300	60	30	9.2	10.1	11.0	8.7	9.7	10.6	7.1	8.2	9.3	9.0	10.0	10.0	7.5	8.8	9.2	7.7	8.8	9.4
300	300	60	27	7.5	8.7	9.8	7.5	8.8	10.0	6.5	7.9	9.2	9.0	9.2	9.7	7.7	8.1	9.0	8.2	8.4	9.6
300	300	70	38	9.4	10.2	10.2	8.9	9.8	9.9	6.9	7.8	8.0	8.0	8.8	10.3	6.8	7.8	9.7	7.3	8.1	10.2
300	300	70	35	9.0	10.0	10.3	8.7	9.8	10.2	6.9	8.1	8.6	9.8	10.7	10.8	8.0	9.0	9.7	8.1	9.0	9.9
300	300	70	31	7.3	8.6	9.1	7.5	8.9	9.5	6.2	7.7	8.4	9.9	9.9	10.6	8.2	8.4	9.6	8.7	8.8	10.2
300	450	50	25	8.5	9.9	10.0	8.3	9.8	10.0	6.6	8.2	8.5	10.7	12.1	14.2	10.3	11.9	14.5	10.8	12.2	15.0
300	450	50	22	8.5	10.2	10.5	8.5	10.3	10.8	7.1	9.0	9.5	11.3	12.8	13.6	10.3	12.0	13.2	10.5	12.0	13.5
300	450	50	20	6.9	8.9	9.5	7.5	9.5	10.2	6.6	8.7	9.5	11.0	11.7	13.0	10.1	10.9	12.8	10.7	11.3	13.3
300	450	60	30	8.8	9.6	10.3	8.4	9.3	10.1	6.9	7.9	8.9	11.4	13.0	14.9	10.6	12.4	14.8	11.1	12.8	15.3
300	450	60	27	8.9	10.0	11.0	8.8	9.9	11.0	7.5	8.8	10.0	12.3	14.0	14.5	10.9	12.8	13.9	11.1	12.8	14.1
300	450	60	24	7.6	8.9	10.1	7.9	9.3	10.7	7.2	8.7	10.2	12.2	13.1	14.2	10.9	11.9	13.5	11.5	12.4	14.2
300	450	70	35	8.7	9.6	9.8	8.5	9.5	9.8	6.8	8.0	8.3	12.0	13.4	15.5	10.9	12.5	15.0	11.4	12.8	15.6
300	450	70	31	8.4	9.6	9.9	8.4	9.7	10.2	7.0	8.4	8.9	13.4	14.9	15.6	11.6	13.3	14.6	11.9	13.4	14.8
300	450	70	28	7.1	8.6	9.2	7.7	9.2	9.9	6.8	8.4	9.2	13.2	13.8	15.1	11.5	12.3	14.1	12.1	12.8	14.8
300	600	60	27	7.7	9.5	10.0	7.8	9.8	10.4	6.5	8.5	9.2	13.8	16.4	19.6	13.5	16.3	20.0	14.0	16.6	20.6
300	600	60	24	8.0	10.1	10.9	8.4	10.6	11.5	7.3	9.6	10.6	13.1	15.7	17.7	12.2	15.0	17.4	12.4	15.1	17.7
300	600	60	21	8.4	10.7	11.8	9.3	11.8	12.9	8.8	11.3	12.5	12.2	14.0	16.5	11.4	13.4	16.3	12.0	13.8	17.0
300	600	70	31	8.3	9.5	10.6	8.2	9.5	10.8	7.1	8.5	9.8	14.3	17.1	20.1	13.6	16.6	20.1	14.2	17.0	20.7
300	600	70	28	8.7	10.2	11.6	8.9	10.5	11.9	8.0	9.7	11.3	13.8	16.7	18.4	12.5	15.6	17.8	12.8	15.7	18.1
300	600	70	24	9.5	11.2	12.9	10.2	12.0	13.7	9.8	11.8	13.6	12.9	15.0	17.2	11.7	13.9	16.7	12.3	14.4	17.4
300	600	80	36	8.0	9.4	9.9	8.2	9.6	10.2	6.8	8.4	9.1	14.7	17.3	20.5	13.6	16.4	20.1	14.2	16.8	20.7
300	600	80	32	8.1	9.7	10.5	8.5	10.2	11.0	7.4	9.2	10.1	14.6	17.2	19.2	12.9	15.7	18.2	13.2	15.9	18.5
300	600	80	28	9.1	10.9	11.9	10.0	11.9	13.1	9.4	11.5	12.7	13.4	15.3	17.8	11.8	13.8	16.8	12.5	14.3	17.5
450	300	50	30	11.3	13.3	14.1	11.0	13.1	14.0	9.7	11.9	12.9	6.6	7.7	9.3	6.7	7.9	10.1	7.2	8.3	10.6
450	300	50	27	11.2	13.5	14.5	11.1	13.5	14.6	10.0	12.5	13.7	7.4	8.6	8.9	6.9	8.2	9.1	7.2	8.3	9.4
450	300	50	25	10.0	12.5	13.8	10.5	13.1	14.4	9.9	12.6	14.1	7.1	7.4	8.3	6.7	7.1	8.5	7.3	7.6	9.2
450	300	60	36	11.8	13.2	14.6	11.2	12.8	14.3	10.1	11.8	13.4	7.2	8.4	9.9	6.9	8.3	10.2	7.4	8.7	10.8
450	300	60	33	11.8	13.5	15.1	11.5	13.3	15.0	10.6	12.5	14.3	8.3	9.6	9.8	7.4	8.9	9.6	7.7	9.0	9.9
450	300	60	30	10.8	12.8	14.6	11.1	13.1	15.1	10.7	12.9	14.9	8.3	8.7	9.4	7.4	8.1	9.3	8.1	8.6	10.0
450	300	70	42	11.8	13.4	14.2	11.6	13.2	14.1	10.2	12.0	12.9	7.7	8.7	10.4	7.0	8.2	10.4	7.6	8.6	11.0
450	300	70	38	11.4	13.2	14.2	11.4	13.3	14.4	10.3	12.3	13.5	9.4	10.5	10.9	8.1	9.4	10.3	8.4	9.6	10.6
450	300	70	35	10.6	12.6	13.9	11.0	13.2	14.5	10.5	12.7	14.2	9.3	9.5	10.4	8.0	8.5	9.9	8.7	9.0	10.6
450	450	60	33	10.7	12.9	13.7	10.7	13.0	14.0	9.7	12.1	13.2	10.9	12.5	14.8	11.0	12.8	15.6	11.6	13.3	16.2
450	450	60	30	11.2	13.6	14.7	11.5	14.0	15.2	10.7	13.3	14.7	10.9	12.7	13.7	10.5	12.4	13.9	10.8	12.5	14.2
450	450	60	27	10.2	12.9	14.3	11.0	13.8	15.3	10.8	13.7	15.3	10.6	11.5	13.1	10.2	11.3	13.4	10.9	11.8	14.1
450	450	70	38	11.2	12.8	14.3	11.0	12.7	14.3	10.3	12.1	13.8	11.4	13.3	15.4	11.2	13.2	15.8	11.8	13.7	16.5
450	450	70	35	11.8	13.7	15.4	11.9	13.8	15.7	11.4	13.4	15.4	11.8	13.7	14.6	11.0	13.1	14.4	11.3	13.3	14.8
450	450	70	31	11.3	13.4	15.4	11.9	14.1	16.2	11.9	14.2	16.4	11.6	12.7	14.0	10.8	12.1	13.9	11.5	12.6	14.7
450	450	80	44	10.9	12.6	13.5	11.0	12.8	13.8	10.0	11.9	13.0	11.9	13.5	15.8	11.2	13.1	15.9	11.9	13.6	16.6
450	450	80	40	11.2	13.2	14.3	11.5	13.6	14.8	10.8	12.9	14.2	12.7	14.5	15.5	11.5	13.4	14.9	11.9	13.6	15.3
450	450	80	36	10.9	13.1	14.5	11.7	14.0	15.5	11.5	13.9	15.5	12.3	13.2	14.8	11.2	12.2	14.3	11.9	12.8	15.1
450	600	70	35	10.8	13.4	14.7	11.2	13.9	15.3	10.6	13.4	14.9	15.1	17.9	21.4	15.3	18.3	22.2	15.9	18.8	22.9
450	600	70	31	11.5	14.3	15.9	12.1	15.1	16.7	11.7	14.8	16.5	14.0	16.9	19.1	13.6	16.7	19.4	13.9	16.9	19.8
450	600	70	28	12.9	16.0	17.7	14.0	17.2	19.1	14.2	17.5	19.4	12.8	14.8	17.6	12.4	14.7	17.9	13.2	15.3	18.7
450	600	80	40	11.8	13.8	15.7	12.0	14.1	16.1	11.6	13.7	15.9	15.3	18.3	21.6	15.1	18.3	22.1	15.8	18.8	22.8
450	600	80	36	12.7	14.9	17.1	13.1	15.4	17.7	12.9	15.4	17.7	14.4	17.5	19.5	13.6	16.9	19.4	14.0	17.2	19.8
450	600	80	32	14.6	17.1	19.5	15.5	18.1	20.6	15.9	18.6	21.2	13.1	15.4	17.9	12.4	14.9	17.9	13.2	15.5	18.7
450	600	90	45	11.2	13.3	14.6	11.6	13.8	15.2	11.0	13.3	14.8	15.7	18.5	22.0	15.1	18.1	22.1	15.9	18.7	22.9
450	600	90	40	11.9	14.3	15.8	12.6	15.0	16.7	12.2	14.7	16.5	15.1	18.0	20.2	13.9	17.0	19.7	14.4	17.3	20.2
450	600	90	36	14.0	16.6	18.4	15.2	17.9	19.8	15.4	18.2	20.1	13.6	15.7	18.4	12.5	14.8	18.0	13.3	15.4	18.8
600	300	60	39	14.6	17.4	18.9	14.4	17.3	18.9	12.7	15.8	17.5	7.6	8.8	10.8	7.8	9.2	11.7	8.1	9.4	12.0
600	300	60	36	14.8	17.9	19.7	14.9	18.1	19.9	13.5	16.8	18.7	7.2	8.6	9.2	6.8	8.3	9.5	6.8	8.2	9.5
600	300	60	33	15.2	18.5	20.5	15.8	19.2	21.3	14.9	18.4	20.6	7.0	7.5	8.7	6.7	7.4	9.0	7.1	7.6	9.5
600	300	70	45	14.6	16.8	18.9	14.2	16.5	18.8	12.8	15.2	17.5	7.7	9.2	10.9	7.6	9.2	11.4	7.9	9.4	11.8
600	300	70	42	15.0	17.5	19.9	14.9	17.4	19.9	13.7	16.3	18.9	7.7	9.2	9.6	6.9	8.6	9.6	7.0	8.5	9.6
600	300	70	38	15.8	18.5	21.1	16.2	19.0	21.7	15.5	18.4	21.3	7.7	8.4	9.3	7.0	7.9	9.3	7.4	8.1	9.8
600	300	80	52	14.7	17.0	18.5	14.5	17.0	18.6	12.9	15.4	17.1	8.4	9.7	11.6	7.9	9.3	11.7	8.3	9.5	12.1
600	300	80	48	14.8	17.4	19.1	14.9	17.5	19.4	13.5	16.2	18.2	9.0	10.3	10.9	7.8	9.4	10.5	7.9	9.3	10.6
600	300	80	44	15.8	18.7	20.7	16.4	19.4	21.5	15.6	18.6	20.8	8.8	9.3	10.5	7.8	8.4	10.1	8.2	8.8	10.6
600	450	70	42	14.8	17.7	19.4	15.0	18.0	19.8	13.7	16.8	18.6	12.8	14.7	17.2	13.1	15.1	18.2	13.4	15.4	18.6
600	450	70	38	15.5	18.7	20.6	16.0	19.3	21.2	14.9	18.3	20.4	11.9	13.9	15.2	11.6	13.8	15.5	11.7	13.7	15.6
600	450	70	35	16.5	19.9	22.1	17.4	21.0	23.2	16.9	20.6	22.9	11.4	12.5	14.3	11.2	12.5	14.8	11.6	12.8	15.2
600	450	80	48	15.0	17.4	19.6	15.0	17.4	19.8	13.9	16.4	18.9	12.7	14.8	17.2	12.6	14.9	17.7	13.0	15.1	18.2
600	450	80	44	16.0	18.6	21.1	16.2	18.9	21.5	15.4	18.2	20.9	12.1	14.3	15.4	11.4	13.8	15.3	11.5	13.7	15.5
600	450	80	40	17.5	20.4	23.1	18.2	21.2	24.0	17.9	21.0	23.9	11.7	13.0	14.6	11.1	12.6	14.6	11.5	12.9	15.2
600	450	90	54	14.6	17.1	18.8	14.8	17.4	19.1	13.5	16.2	18.0	13.7	15.6	18.1	13.2	15.3	18.3	13.6	15.5	18.8
600	450	90	49	15.5	18.2	20.1	16.0	18.8	20.7	14.9	17.8	19.9	13.5	15.5	16.7	12.4	14.6	16.3	12.5	14.5	16.5
600	450	90	45	17.2	20.2	22.3	18.2	21.3	23.5	17.7	20.8	23.2	12.9	14.0	15.8	11.8	13.1	15.4	12.4	13.5	16.0
600	600	70	38	16.0	19.3	21.4	16.5	20.0	22.1	15.5	19.1	21.4	17.6	20.7	24.4	17.9	21.2	25.4	18.4	21.4	25.8
600	600	70	35	16.8	20.4	22.8	17.6	21.3	23.7	16.9	20.7	23.2	15.3	18.5	20.9	15.1	18.4	21.3	15.2	18.4	21.5
600	600	70	31	19.7	23.5	26.1	21.0	24.9	27.6	20.8	24.8	27.6	14.3	16.6	19.5	14.1	16.6	20.0	14.6	16.9	20.6
600	600	80	44	16.8	19.6	22.2	17.1	20.0	22.7	16.4	19.3	22.2	17.4	20.7	24.2	17.4	20.8	24.8	17.8	21.1	25.3
600	600	80	40	17.8	20.8	23.7	18.3	21.4	24.5	17.8	21.0	24.2	15.6	19.0	21.2	15.0	18.5	21.2	15.1	18.5	21.4
600	600	80	36	21.3	24.5	27.7	22.4	25.7	29.0	22.4	25.8	29.2	14.4	16.9	19.6	13.8	16.5	19.8	14.4	16.9	20.3
600	600	90	49	16.4	19.3	21.4	17.0	19.9	22.1	16.0	19.1	21.3	18.5	21.6	25.3	18.1	21.4	25.6	18.6	21.7	26.1
600	600	90	45	17.2	20.3	22.6	18.0	21.2	23.6	17.3	20.6	23.1	17.0	20.1	22.6	16.0	19.3	22.2	16.2	19.3	22.4
600	600	90	40	21.0	24.3	26.9	22.3	25.7	28.4	22.1	25.7	28.4	15.6	17.9	20.9	14.7	17.1	20.6	15.2	17.6	21.2

APPENDIX G

TESTS OF ASSUMED NORMALITY AND CONSTANT VARIANCE FOR USE IN ANOVA

In order to validate the ANOVA technique used in this study, the basic assumptions of ANOVA that the response variable is normally distributed and has constant variance over all design points are tested.

(A) Shapiro-Wilk Test for Normality

(1) Select a design point which has been used in the experiment. In this case, the design point (0000000000) is selected.

(2) Run 20 replicates of the TEXAS-II simulation model at this design point.

For each response variable

(3) Sort the 20 observations in increasing order

$$Z_1 \leq Z_2 \leq \ldots \leq Z_{20}$$

(4) Compute

$$b = a_1(Z_{20} - Z_1) + a_2(Z_{19} - Z_2) + \ldots + a_{10}(Z_{11} - Z_{10})$$

where the coefficients $\{a_i\}$ are taken from Appendix 9 of Anderson and McLean (1974) [Ref 52].

(5) Compute

$$S^2 = \sum_{i=1}^{20} (Z_i - \bar{Z})^2$$

(6) Compute

$$W = b^2/S^2$$

if $\qquad W > W_{0.01}(n = 20) = 0.868$

accept the assumption that the response variable is normally distributed. The tests are listed in Table G-1.

(7) The five response variables observed on the total intersection system were examined in Table G-1 by the Shapiro-Wilk Test and are all accepted as normally distributed.

(B) Burr-Foster Q Test For Homogeneity of Variance

(1) Select from design points from those used in the major experiment. These four design points should be far enough apart to represent the possible influence of the different design features on the variance of each selected response variable. The four selected design points are

(0000000000) (0200100122)
(0012102102) (0222222000)

For each response variable,

(2) Run five replicates at each selected design point.

(3) Compute the sample variance at each design point

$$S_i^2 = 1/n-1 \sum_{j=1}^{n} (y_{ij} - \bar{y}_i)^2$$

$n = 5$

$1 \leq i \leq p = 4$

TABLE G-1. SHAPIRO-WILK TEST FOR NORMALITY OF TEXAS-II ESTIMATES

20 REPLICATES OF 5 RESPONSE VARIABLES AT (0000000000)										MEAN	S.D.	W
AVERAGE TOTAL DELAY (SEC/VEH)												
11.5	11.8	11.9	11.9	12.0	12.2	12.2	12.3	12.4	12.4	12.4	0.48	.9732
12.5	12.5	12.7	12.7	12.8	12.8	13.0	13.0	13.2	13.2			
TOTAL CO EMISSIONS (KILOGRAMS/ 15 MINUTES)												
2.88	3.02	3.03	3.03	3.04	3.04	3.04	3.07	3.08	3.08	3.10	0.09	.9517
3.12	3.12	3.15	3.16	3.16	3.17	3.18	3.19	3.20	3.25			
TOTAL HC EMISSIONS (GRAMS/ 15 MINUTES)												
136	143	143	143	144	144	145	145	145	146	146	3.69	.9333
147	147	147	148	149	149	149	150	151	152			
TOTAL NOX EMISSIONS (GRAMS/ 15 MINUTES)												
414	423	426	428	428	433	434	436	439	439	437	10.1	.9476
440	440	441	441	442	442	442	443	453	458			
TOTAL FUEL CONSUMPTION (KILOGRAMS/ 15 MINUTES)												
26.2	27.6	27.7	27.7	27.9	28.0	28.0	28.0	28.1	28.2	28.2	0.64	.8827
28.3	28.3	28.4	28.4	28.4	28.4	28.8	29.0	29.0	29.2			

ALL THE RESPONSE VARIABLES ARE BASED ON THE WHOLE INTERSECTION SYSTEM

S.D. : STANDARD DEVIATION

(4) Compute

$$Q = \frac{\sum_{i=1}^{4} S_i^4}{\left(\sum_{i=1}^{4} S_i^2\right)^2}$$

if $Q < Q_{.99}(P = 4, n = 5) = 0.549$

accept the assumption that the variance is homogeneous

if $Q_{.99}(P = 4, n = 5) < Q < Q_{.999}(P = 4, n = 5) = 0.675$

Look for physical reasons that could lead to a particular theoretical distribution for the response. If such a theoretical distribution can be found, a special transformation to normality can be tailored to the situation.

if $Q_{.999}(P = 4, n = 5) < Q$

transform the response variable by an empirically chosen variance - stabilizing technique.

(5) The five response variables selected for test all indicate that the assumption of homogeneous variance is accepted. The tests are listed in Table G-2.

More details about the Shapiro-Wilk Test and the Burr-Foster Q Test can be found in Chapter 1 of Ref 52.

TABLE G-2. HOMOGENEOUS VARIANCE TEST OVER THE DESIGN POINTS

DESIGN POINTS	5 REPLICATES OF EACH RESPONSE VARIABLE					MEAN	S^2	S^4	Q
	AVERAGE TOTAL DELAY (SEC/VEH)								
(0000000000)	12.78	12.15	13.21	12.19	12.81	12.63	.201	.041	
(0012102102)	19.25	19.21	20.23	21.00	20.64	20.07	.662	.438	
(0200100122)	15.84	15.74	15.78	15.80	15.67	15.77	.004	.000	
(0222222000)	28.59	29.79	30.02	30.13	29.57	29.62	.376	.141	
						SUM =	1.243	.620	.4012
	TOTAL CO EMISSIONS (KILOGRAMS/ 15 MINUTES)								
(0000000000)	3.16	3.12	3.18	3.20	3.03	3.14	.004	.000	
(0012102102)	12.77	13.11	14.36	14.12	14.72	13.82	.698	.488	
(0200100122)	7.46	7.43	7.32	7.34	7.38	7.39	.004	.000	
(0222222000)	35.71	36.94	35.95	35.45	37.52	36.32	.773	.598	
						SUM =	1.480	1.086	.4959
	TOTAL HC EMISSIONS (GRAMS/ 15 MINUTES)								
(0000000000)	148.01	147.04	149.18	150.32	143.03	147.52	7.803	60.881	
(0012102102)	348.89	349.13	360.82	364.51	361.47	356.96	54.684	2990.287	
(0200100122)	358.34	356.94	353.11	354.22	355.77	355.68	4.358	18.989	
(0222222000)	858.63	875.88	868.50	873.74	882.81	871.91	81.504	6642.841	
						SUM =	148.347	9712.997	.4414
	TOTAL NOX EMISSIONS (GRAMS/ 15 MINUTES)								
(0000000000)	441.51	439.94	439.67	453.45	427.56	440.42	84.297	7105.978	
(0012102102)	901.04	895.61	920.69	916.26	904.97	907.72	109.994	12098.657	
(0200100122)	1001.65	993.30	981.68	983.48	989.17	989.86	64.728	4189.692	
(0222222000)	2071.64	2078.63	2061.59	2092.06	2107.96	2082.37	327.391	107184.900	
						SUM =	586.410	130579.228	.3797
	TOTAL FUEL CONSUMPTION (KILOGRAMS/ 15 MINUTES)								
(0000000000)	28.28	28.38	28.42	28.98	27.70	28.35	.210	.044	
(0012102102)	57.46	57.42	58.85	59.03	58.69	58.29	.614	.376	
(0200100122)	67.94	67.76	67.31	67.50	67.76	67.66	.061	.004	
(0222222000)	134.66	137.12	136.06	136.61	137.80	136.45	1.413	1.998	
						SUM =	2.298	2.422	.4586

APPENDIX H

DEVELOPMENT OF EMISSIONS AND FUEL CONSUMPTION MODELS FOR HEAVY-DUTY VEHICLES

A new method for estimating instantaneous vehicle emissions and fuel consumption for heavy-duty vehicles, i.e. trucks and buses, at intersection is needed. Experiments conducted at Southwest Research Institute [Refs 28-35] indicate that emission rates from such vehicles are functions of speed, acceleration, engine make, type of pollution control devices, maintenance condition, and engine operating temperature. These experiments involved testing a representative sample of heavy-duty vehicles (HDVs) and measuring the produced emissions for comparison with proposed regulatory standards. A 13-mode steady state test schedule (see Table H-1) was used for diesel engine dynamometer tests [Ref 69] and a 23-mode schedule (see Table H-2) was used for gasoline engines [Ref 34] in steady state operation. For each of these test proc-dures, a test engine was placed on a dynamometer and run through each mode in the prescribed sequence. For the duration of each mode, HC, CO, and NOx exhaust emissions were accumulated into a container (bag) for subsequent weighing while the engine operated at a specified number of revolutions per minute (RPM) and resistive torque (TORQ). These steady state test data for heavy-duty vehicle engines were considered to be the best quantitative information available for model building.

For developing the instantaneous emissions and fuel consumption models, steady state models were adapted by using very small time increments. The accumulation of all steady state emissions or fuel consumption predicted for a series of small time increments closely approximates the integral of an instantaneous emission or fuel consumption function over the same time period. The technique used to translate steady state engine performance data into predictive models for instantaneous emissions and fuel consumption are described below.

MOTION EQUATION

A method of relating vehicle behavior (speed and acceleration) to engine performance by analyzing all forces acting on a typical HDV powered by a heavy-duty engine will be devised. Engine performance is important because the only available emissions data are presented in terms of engine torque and revolutions per minute. A motion equation will be utilized.

TABLE H-1. 13-MODE TEST SCHEDULE FOR HEAVY-DUTY DIESEL ENGINES

Mode Number	Engine Speed (RPM)	Observed Torque (Percent of maximum observed)	Time in Mode (min.)
1	Idle	0	4.5
2	Intermediate	2	4.5
3	Intermediate	25	4.5
4	Intermediate	50	4.5
5	Intermidiate	75	4.5
6	Intermediate	100	4.5
7	Idle	0	4.5
8	Rated[a]	100	4.5
9	Rated	75	4.5
10	Rated	50	4.5
11	Rated	25	4.5
12	Rated	2	4.5
13	Idle	0	4.5

a = RPM at which maximum torque is achieved

TABLE H-2. 23-MODE EXPERIMENTAL TEST SCHEDULE
FOR HEAVY-DUTY GASOLINE ENGINES

Mode Number	Engine Speed (RPM)	Observed Torque (Percent of Maximum observed)	Time in Mode (min.)
1	Idle	0	3
2	Intermediate	2	3
3	Intermediate	8	3
4	Intermediate	18	3
5	Intermediate	25	3
6	Intermediate	50	3
7	Intermediate	75	3
8	Intermediate	82	3
9	Intermediate	92	3
10	Intermediate	100	3
11	Idle	0	3
12	Intermediate	0	12
13	Rated[a]	100	3
14	Rated	92	3
15	Rated	82	3
16	Rated	75	3
17	Rated	50	3
18	Rated	25	3
19	Rated	18	3
20	Rated	8	3
21	Rated	2	3
22	Idle	0	3
23	Rated	0	3

a = RPM at which maximum torque is achieved

DEFINITION

A motion equation is a mathematical experssion which relates vehicle speed and acceleration to engine torque (TORQ) and revolutions per minute (RPM). Because most emissions tests performed on HDVs are based upon control of the engine torque and RPM, models relating engine work to emissions can be successfully developed. However, the work of an HDV largely depends on its road performance, which is represented by the vehicle speed and acceleration. Thus, in order to convert vehicle speed and acceleration to engine work, use of the motion equation is necessary.

ANALYSIS

There are four main resistive forces acting on a moving vehicle (see Fig H-1): (1) rolling resistance (F_{RR}), (2) air resistance (F_{AR}), (3) resistance due to steepness of the road grade (F_G), and (4) drivetrain resistance (F_{DD}) [Ref 70]. Thus, the sum of the resistive forces acting on a moving vehicle will be:

$$F_{RES} = F_{RR} + F_{AR} + F_G + F_{DD} \tag{H-1}$$

However, the motive force (F_{MOT}) of the vehicle must be equal to the above counteracting resistive forces in order to maintain a certain velocity. Thus;

$$F_{MOT} = F_{RES} + m.a \tag{H-2}$$

where m = mass of the vehicle (lbs)

a = acceleration of vehicle (ft/sec^2)

Also it is known that:

$$F_{MOT} = \frac{550 \text{ HP} \cdot \eta_m}{V} \tag{H-3}$$

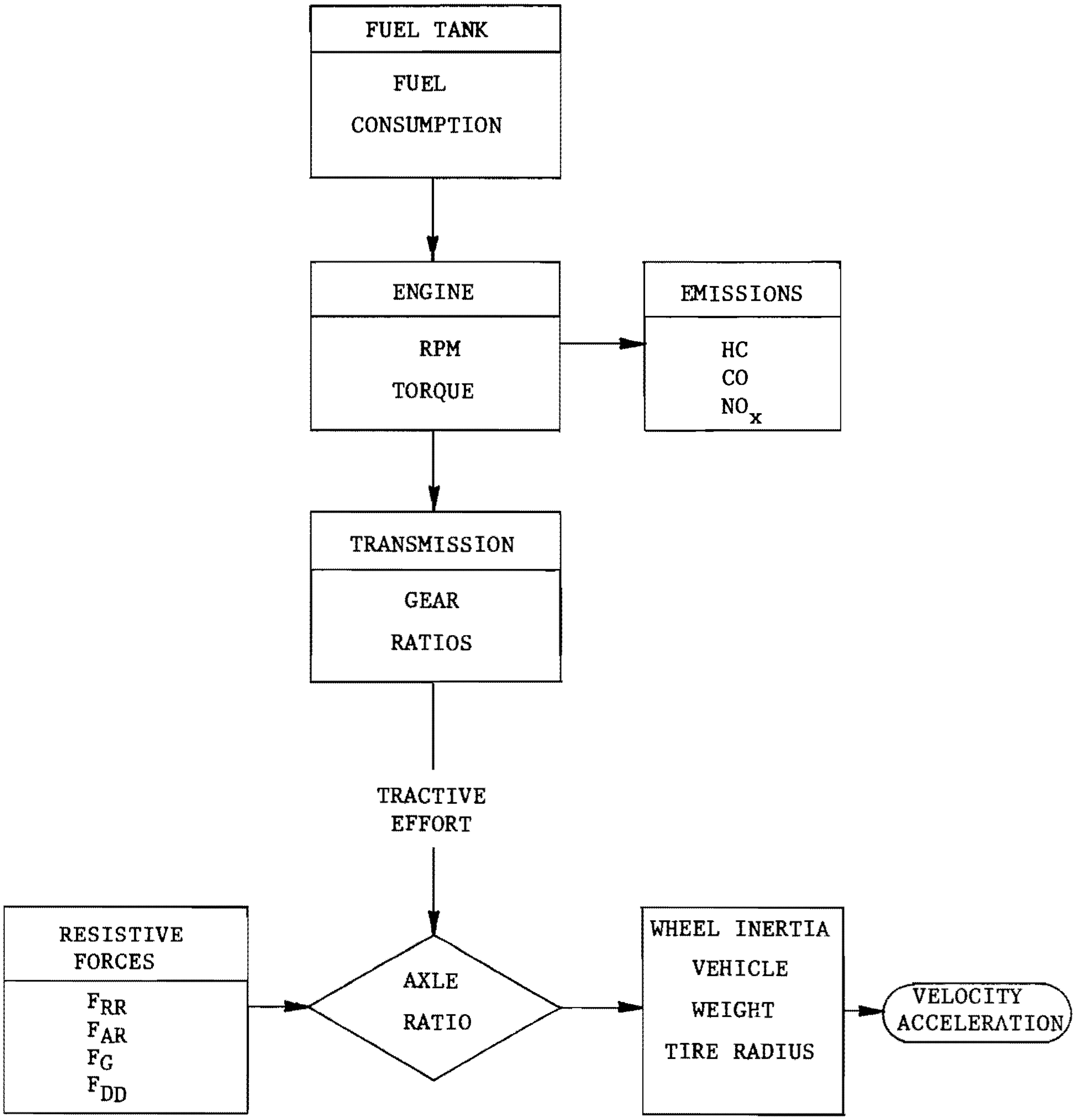


Fig H-1. Vehicle in Motion Simulation

where HP = horsepower

η_m = drivetrain mechanical efficiency (%)

V = velocity (ft/sec)

The power output (HP) of the engine can be expressed as:

$$HP = \frac{(TORQ)(RPM)}{5252} \qquad \text{(H-4)}$$

where TORQ = torque output of the engine (ft-lbs)

RPM = revolutions per minutes of engine

Taking in consideration the vehicle tire radius, the transmission gear ratios, and axle ratio, the velocity of the vehicle can be expressed as:

$$V(\text{ft/sec}) = RPM \left(\frac{1}{60\frac{\text{sec}}{\text{min}}}\right)\left(\frac{1}{DGR}\right)\left(\frac{1}{TR(k)}\right)\left(\frac{1}{TRVM\left(\frac{\text{revs}}{\text{mile}}\right)}\right)(5280(\text{ft/mile})) \qquad \text{(H-5)}$$

$$\text{or} \quad V = RPM \quad \frac{88}{(DGR)(TRVM)(TR(k))} \qquad \text{(H-6)}$$

where DGR = axle ratio in $\left(\frac{\text{revs of drive shaft}}{\text{revs of tire}}\right)$

TRVM = revolutions of tire per mile = $\frac{5280}{2\pi R}$

TR(k) = transmission gear ratio in kth gear

If the overall gear (GRO) ratio is expressed as:

$$GRO = \frac{88}{(DGR)(TRVM)(TR(k))} \qquad \text{(H-6a)}$$

Then:

$$V = (RPM)(GRO) \qquad \text{or} \qquad RPM = \frac{V}{GRO} \qquad \text{(H-7)}$$

The next resistive forces (in pounds) are defined mathematically. Air, drivetrain, and rolling resistances were developed by regression analyses [Ref 71].

$$F_{RR} = (C + D \cdot V)W \qquad \text{(H-8)}$$

$$F_{AR} = \frac{C_D \cdot \rho \cdot A_{FR} \cdot V^2}{2g_c} \qquad \text{(H-9)}$$

$$F_G = W\left(\frac{dh}{ds}\right) \qquad \text{(H-10)}$$

$$F_{DD} = A + B(V) \qquad \text{(H-11)}$$

$$m \cdot a = \left(\frac{W}{g_c} + \frac{nI}{R^2}\right)a \qquad \text{(H-12)}$$

where

W = weight of vehicle (lbs)

g_c = acceleration of gravity = 32.2 (ft/sec^2)

$\frac{dh}{ds}$ = % grade (ft/ft)

ρ = air density = $\frac{P}{2}$ = 0.03744 lbs/ft^3

A_{FR} = frontal area (ft^2)

C_D = aerodynamic drag coefficient = (0.9)

A = driveline drag constant (y-intercept) = 40

B = driveline drag constant (slope) = 0.45

C = rolling resistance constant (y-intercept) 0.0076

D = rolling resistance constant = (slope) 0.00006136

I = moment of inertia of wheel (lb/ft/sec^2)

n = number of tires

R = loaded wheel radius (ft)

From Equation H-3 substituting for HP and V:

$$F_{MOT} = \frac{\frac{550(TORQ)(RPM)(n_m)}{5252}}{RPM(GRO)} = 0.1047\,\frac{(TORQ)(n_m)}{GRO} \qquad \text{(H-13)}$$

Then Equation H-2 becomes:

$$\frac{0.1047(\text{TORQ})(n_m)}{\text{GRO}} = (C + DV)W + \frac{C_D \cdot \rho \cdot A_{FR} \cdot V^2}{2g_c} + W(\frac{dh}{ds}) +$$

$$(A + B \cdot V) + (\frac{W}{g_c} + \frac{nI}{R^2}) a$$

Solving for torque:

$$\text{TORQ} = 11.106(\text{GRO})[(0.0076 + 0.00006136(V))W + (0.09941(V^2))$$

$$+ W(\frac{dh}{ds}) + (40 + 0.45(V)) + (\frac{W}{32.2} + \frac{nI}{R^2})a] \qquad \text{(H-14)}$$

This expression is adopted to estimate, at selected time intervals, the required torque and RPM of a HDV engine given instantaneous velocities and accelerations, which are generated by the simulation processor in the TEXAS Model for Intersection Traffic [Ref 24].

During simulation, each driver-vehicle unit is examined separately after it has been individually characterized. The computer program makes available detailed information to the simulated driver, at selected time intervals. Such information includes: driver's desired speed, destination, current position of vehicle in respect with the specified intersection, velocity of vehicle, acceleration/deceleration, relative position and velocity of adjacent vehicles in the system; critical distances which must be maintained, sight restrictions and the location and status of traffic control devices. The simulated driver may (1) maintain speed, (2) accelerate, (3) decelerate, or (4) maneuver to change lanes. Driver reactions depend largely on his driving abilities, vehicle characteristics, roadway geometry, traffic control, and the action of other driver-vehicle units in the system. Each driver-vehicle unit is injected into the simulation system and is processed in sequence through the intersection and on the approaches, in response to the situation prevailing at the time.

In order to implement Equation H-14, a typical HDV transmission must be adopted. The typical transmission found in HDVs is the 9-gear manual transmission, in which the gear ratios range from 12.5:1 (first gear) to 1:1 (ninth gear).

Based on empirical observations the following criteria were used to determine the most appropriate gear ratio at each instant of the simulation process.

Starting with the transmission in first gear the overall gear ratio and the RPM are calculated from Equations H-6 and H-7. If the RPM exceed the specified RPM that produce maximum torque, the transmission is shifted to the next higher gear. The lower the gear, the higher the torque. This criteria is enforced until transmission is in the highest gear. Beyond this point the engine RPM can exceed the specified RPM that produce maximum torque and can reach the manufacturer's specified maximum RPM.

An algorithim for the emissions simulation process is shown by the flowchart in Figure H-2. Typical vehicle and engine specifications are provided. For each time increment of the simulation a velocity and an acceleration are generated from the TEXAS Model simulation processor, as mentioned previously. From the velocity and acceleration, the operating mode of the vehicle can be determined: acceleration, deceleration, cruise, and idle. During the next step, applying the criteria for gear shifting, torque and RPM are calculated. Knowing engine torque and RPM, emissions and fuel consumption rates are estimated.

Thus far vehicle behavior has been transformed into engine performance necessary to approach emissions and fuel consumption estimation. In the following sections, regression equations are developed to convert engine performance into exhaust emission rates and fuel consumption from diesel and gasoline powered HDVs.

DATA ANALYSIS AND MODEL DEVELOPMENT FOR DIESEL POWERED HDVs

As mentioned previously, the purpose of this section is to describe the procedure that was employed in utilizing engine performance (torque and RPM), as the basis for developing regression models which can be used to estimate emissions and fuel consumption from heavy-duty diesel-powered vehicles.

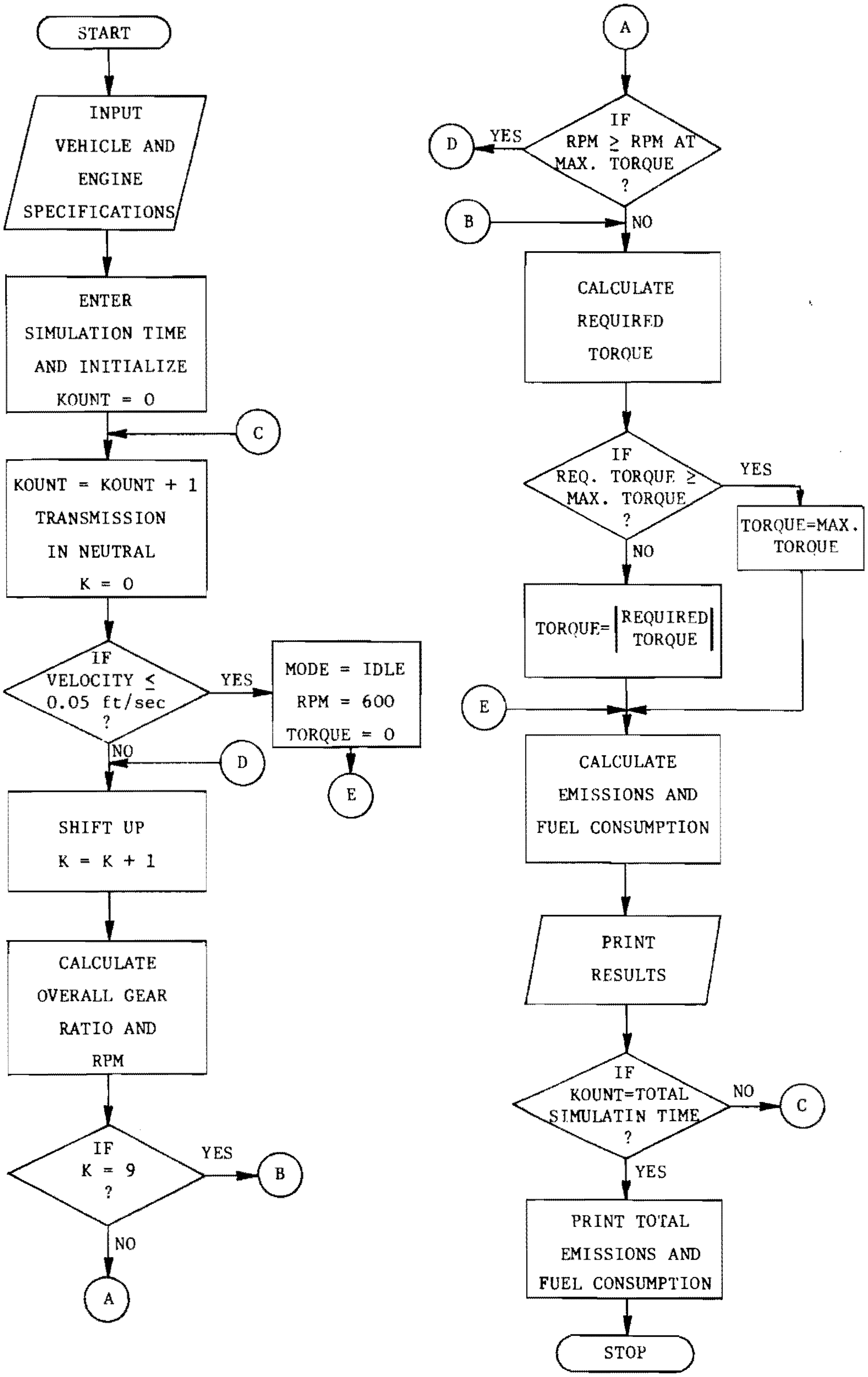


Fig H-2. Emissions Simulation Process

DATA ACQUISITION

Data for the development of emissions models were selected from tests performed at SWRI in San Antonio, Texas [Ref 72]. These tests, utilizing 64 trucks and buses powered by diesel engines, were performed to acquire baseline data on the emission of unburned hydrocarbons, carbon monoxide, and oxides of nitrogen. The engines in the test fleet were among the most popular makes and models which are currently used in automotive diesel applications in the United States. The vehicles in the fleet were selected according to type of service, such as intercity hauling, intercity delivery, and other categories. The test procedure used was the classical version of the 13-mode Federal Test Procedure. Each vehicle was run on a specially-equipped Clayton tandem-axle dynamometer with a power absorption capability of 200 horsepower per axle, and two large flywheels attached to one end of the dynamometer rolls providing up to 41,000 lbs of vehicle intertia simulation.

Because of their reputation for being heavy smoke producers, some engines were included in the sample fleet even though they were not the most prevalent engines. The test results from these engines were considerably different from other engines and were therefore not included in the data list for the development of the emissions models described here. Five basic engine manufacturers were included in the sample fleet of thirty trucks. These are listed in Table H-3 by type of engine, number of engines in the group, and percent of the total sample [Ref 73].

ANALYSIS OF VARIANCE

A two-way analysis of variance (ANOVA) was performed to investigate the variation in the fuel consumption [Ref 74]. At 0.01 significance level, results indicated that engine manufacturer and engine torque did not account for a significant amount of variation in fuel consumption (see Table H-4). Therefore, it was decided to combine engines from all manufacturers and all types and develop a single fuel consumption model for all heavy-duty diesel-powered vehicles. The five major engine manufacturers that represent the truck population in the continental U.S. are: (1) Detroit Diesel, (2) Mack, (3) Caterpillar, (4) General Motors, and (5) Cummins Diesel.

Analyses of variance were also performed to investigate the variation in the emissions caused by different manufacturers and by engine types within

TABLE H-3. REPRESENTATIVE SAMPLE OF THE DIESEL ENGINE GROUP POPULATION

MAKE	TYPE	No. of Copies in Each Type	Percent of Total
DETROIT DIESEL	6V - 71	3	0.3000
	6V - 53	3	
	8V - 71	3	
MACK	ENDT 675	2	0.1333
	ENDT 673B	2	
CATERPILLAR	1145	3	0.2000
	1150	3	
GM	DH 478	2	0.0667
CUMMINS	V 903	1	0.3000
	NTC 335	3	
	NH 250	5	
TOTAL =		30	

TABLE H-4.

* * * * * * * * A N A L Y S I S   O F   V A R I A N C E * * *
FF
BY MANUF   ENGINE MANUFACTURER
TYPE
* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	4.074	6	.679	3.106	.006
MANUF	1.958	4	.489	2.239	.064
TYPE	.333	2	.166	.761	.468
2-WAY INTERACTIONS	3.307	4	.827	3.781	.005
MANUF TYPE	3.307	4	.827	3.781	.005
EXPLAINED	7.381	10	.738	3.376	.001
RESIDUAL	82.861	379	.219		
TOTAL	90.241	389	.232		

TABLE H-5.

* * * * * * * * A N A L Y S I S   O F   V A R I A N C E * * *
HC
BY MANUF   ENGINE MANUFACTURER
TYPE
* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	347.341	6	57.890	43.785	.001
MANUF	229.210	4	57.302	43.340	.001
TYPE	32.189	2	16.095	12.173	.001
2-WAY INTERACTIONS	7.735	4	1.934	1.463	.213
MANUF TYPE	7.735	4	1.934	1.463	.213
EXPLAINED	355.076	10	35.508	26.856	.001
RESIDUAL	501.096	379	1.322		
TOTAL	856.172	389	2.201		

each manufacturer. A two-way ANOVA on HC indicated that variation explained by both manufacturer and engine type was significant at the 0.01 level (see Table H-5). Two-way ANOVA on CO showed however that manufacturer and engine type were not significant (see Table H-6), indicating that neither the manufacturer nor the engine type should be used as independent variables to predict CO rates. Two-way ANOVA on NO_x indicated that most of the variation was explained by the manufacturer and little by the engine type (see Table H-7).

Further analyses of variance were performed to investigate the variation in the emissions caused by different manufacturers and test modes. Results indicated that at the 0.01 significance level, variation in all emissions (HC, CO and NO_x) was explained well be test modes and different engine manufacturers (see Tables H-8 through H-10).

Based on the above results, it was decided to combine all engine types from each manufacturer and develop one emissions model for each manufacturer with mode being the major independent variable.

REGRESSION ANALYSIS

A standard stepwise regression method contained within the SPSS package was used to formulate the models [Ref 75]. In this method the variables are taken into the regression equation in single steps from best to worst. The variable that explains the greatest amount of variation in the dependent variable will enter first; the variable that explains the greatest amount of variation in conjunction with the first will enter second and so on.

Where a stepwise regresion is called for, three statistical criteria can be specified in deciding which variables are to be included. These criteria are: (1) maximum number of independent variables to be entered in the equation, (2) minimum F ratio that the user is willing to accept for variables to be included, and (3) the tolerance of an independent variable being considered for inclusion, which is the proportion of the variance of that variable not explained by the independent variables already in the regression equation. The criteria used for the regression analysis in this case are the default values, for F significance 0.01 and for tolerance 0.001.

The general form of the regression equation is:

$$Y' = A + B_1X_1 + B_2X_2 + \dots + B_kX_k \qquad \text{(H-15)}$$

TABLE H-6.

* * * * * * * * * A N A L Y S I S O F V A R I A N C E * * *
CO
BY MANUF ENGINE MANUFACTURER
TYPE
* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	1557.069	6	259.512	1.302	.255
MANUF	883.927	4	220.982	1.109	.352
TYPE	405.681	2	202.841	1.018	.362
2-WAY INTERACTIONS	605.858	4	151.464	.760	.552
MANUF TYPE	605.858	4	151.464	.760	.552
EXPLAINED	2162.927	10	216.293	1.085	.372
RESIDUAL	75544.377	379	199.326		
TOTAL	77707.304	389	199.762		

TABLE H-7.

* * * * * * * * * A N A L Y S I S O F V A R I A N C E * * *
NO
BY MANUF ENGINE MANUFACTURER
TYPE
* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	3919.809	6	653.302	8.150	.001
MANUF	2921.566	4	730.391	9.111	.001
TYPE	712.799	2	356.399	4.446	.012
2-WAY INTERACTIONS	2388.898	4	597.225	7.450	.001
MANUF TYPE	2388.898	4	597.225	7.450	.001
EXPLAINED	6308.708	10	630.871	7.870	.001
RESIDUAL	30381.582	379	80.162		
TOTAL	36690.289	389	94.320		

TABLE H-8.

* * * * * * * * * A N A L Y S I S   O F   V A R I A N C E * * *

HC
BY MANUF   ENGINE MANUFACTURER
MODE

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	581.929	16	36.371	89.533	.001
MANUF	315.152	4	78.788	193.951	.001
MODE	266.777	12	22.231	54.727	.001
2-WAY INTERACTIONS	142.219	48	2.963	7.294	.001
MANUF MODE	142.219	48	2.963	7.294	.001
EXPLAINED	724.148	64	11.315	27.854	.001
RESIDUAL	132.023	325	.406		
TOTAL	856.172	389	2.201		

TABLE H-9.

* * * * * * * * * A N A L Y S I S   O F   V A R I A N C E * * *

CO
BY MANUF   ENGINE MANUFACTURER
MODE

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	51667.105	16	3229.194	111.393	.001
MANUF	1151.388	4	287.847	9.929	.001
MODE	50515.717	12	4209.643	145.214	.001
2-WAY INTERACTIONS	16618.707	48	346.223	11.943	.001
MANUF MODE	16618.707	48	346.223	11.943	.001
EXPLAINED	68285.812	64	1066.966	36.806	.001
RESIDUAL	9421.492	325	28.989		
TOTAL	77707.304	389	199.762		

TABLE H-10.

* * * * * * * * A N A L Y S I S   O F   V A R I A N C E * * *
NO
BY MANUF   ENGINE MANUFACTURER
MODE
* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	26896.965	16	1681.060	77.603	.001
MANUF	3207.011	4	801.753	37.012	.001
MODE	23689.955	12	1974.163	91.134	.001
2-WAY INTERACTIONS	2753.107	48	57.356	2.648	.001
MANUF MODE	2753.107	48	57.356	2.648	.001
EXPLAINED	29650.073	64	463.282	21.387	.001
RESIDUAL	7040.217	325	21.662		
TOTAL	36690.289	389	94.320		

where Y' = emissions rate or fuel rate (gr/sec)

A = intercept of Y

B_k = regression coefficients

X_k = kth independent variable

For reasons stated previously, torque output TRQ and engine RPM were the main independent variables considered for inclusion in the regression equation. Consideration was also given to transformations of torque and RPM.

RESULTS

The results of the emissions and fuel consumption regression equations are shown on Table H-11. The R^2, being the proportion of variation explained by the variables included in the regression equation, reflects the overall accuracy of each of the prediction equations. The higher the R^2 value, the better the variation in the data can be explained by the prediction equation. The coefficient of variability, being the ratio of the standard deviation over the mean response of the dependent variable expressed as a percent of the mean, reflects the spread of the data around the regression line. The lower this value, the greater the probable accuracy of the estimate produced from the equation.

In Table H-11, low R^2 values and high coefficients of variability indicated that carbon monoxide models have rather poor predictive capability. This is caused by data having large measurement errors and generally small sample sizes. The fuel consumption model is the best in prediction accuracy.
this value, the greater the probable accuracy of the estimate produced from the equation.

In Table 4-9, low R^2 values and high coefficients of variability indicated that carbon monoxide models had rather poor predictive capability. This was caused by data having large measurement errors and generally small sample sizes. The fuel consumption model was the best in prediction accuracy.

Since emissions estimation from the fifteen resulting models (3 models for each of the 5 engines) is rather cumbersome and time consuming, it was desirable to combine these models into one for each pollutant. This was accomplished utilizing weighting factors, representing the percentages of all sample vehicles drawn from each manufacturer (see Table H-3).

TABLE H-11. STATISTICAL RESULTS FROM MODELS FORMULATION

MAKE	EMISSION	R^2	COEFFICIENT OF VARIABILITY
DETROIT DIESEL	HC	0.8619	20.8%
	CO	0.5536	152.7%
	NO_x	0.9389	22.9%
MACK	HC	0.7424	30.7%
	CO	0.8225	46.5%
	NO_x	0.9233	25.5%
CATERPILLAR	HC	0.6626	37.0%
	CO	0.7230	68.7%
	NO_x	0.9608	16.2%
GENERAL MOTORS	HC	0.7377	31.0%
	CO	0.7257	72.1%
	NO_x	0.9184	27.5%
CUMMINS	HC	0.5691	48.0%
	CO	0.7903	81.7%
	NO_x	0.9289	26.5%
FUEL CONSUMPTION FOR ALL ENGINES		0.9818	11.6%

The final three emission models, along with the fuel consumption model, are summarized in Table H-12.

Trial runs of the rpogram described in Fig H-2 were performed to check results from the models. Instantaneous velocities and accelerations, representing the behavior of a heavy-duty vehicle, were provided as input, along with typical diesel powered vehicle specifications. Results that were output from the models included instantaneous emissions, fuel consumption, velocity, acceleration, transmission gear, calculated torque and RPM. At the end of each trial run emissions and fuel consumption were summarized. The model output values for a half-loaded diesel-powered HDV with GVW of 30,000 lbs and a fully-loaded vehicle with GVW of 72,000 lbs are tabulated in Appendix B and C of Ref 38.

DATA ANALYSIS FOR GASOLINE-POWERED HDVS

In this section, the process used for developing a set of regression equations for estimating exhaust emissions and fuel consumption from gasoline-powered HDVs is described. Test data for this purpose is very limited, however.

DATA ACQUISITION

Data which are descriptive of the performance of gasoline-powered HDVs were chosen from tests performed at the SWRI [Ref 34]. The representation of this class of vehicles, however, is recognized as being poor due to the small quantity of available test data. The only suitable data available were from tests of two 1975 Chevrolet engines, both having 350 cubic inches displacement (CID). The test procedure used was the experimental 23-mode emissions test conducted with each engine mounted on two different types of dynamometers: the "Eaton Dynamic" with 373 KW (500 hp) absorbing and 149 W (200 hp) motoring capability, and the "Midwest Eddy" with 130 KW (175 hp) capacity. This second unit enabled constant speed and motoring capability at 1200 and 2300 RPM, the engine speeds of major interest, based on the 23-mode test procedure.

The test results shown in Figs H-3 through H-6 indicate the differences between pollutants by engine operating mode. Note that, modes 12 (1200 RPM

TABLE H-12. REGRESSION EQUATIONS FOR EMISSIONS AND FUEL CONSUMPTION ESTIMATION FROM DIESEL POWERED HD VEHICLES

Hydrocarbons* = $-1.183(10^{-2})+3.459(10^{-5})RPM-7.560(10^{-6})TRQ-4.833(10^{-9})RPM^2$
Carbon Monoxide* = $3.069(10^{-2})-1.107(10^{-3})(TRQ)+2.212(10^{-7})(TRQ)(RPM)+1.103(10^{-5})TRQ^2$
Oxides of Nitrogen* = $2.602(10^{-2})-2.035(10^{-4})TRQ+4.024(10^{-7})(RPM)(TRQ)+6.591(10^{-4})\sqrt{TRQ}$
Fuel Consumption* = $-2.898(10^{-2})+3.726(10^{-3})TRQ+8.097(10^{-6})(RPM)(TRQ)$ $+8.467(10^{-4})(TRQ+RPM)-1.180(10^{-1})\sqrt{TRQ}$

* units grams per second

at ft-lbs torque) and 23 (2300 RPM at 0 ft-lbs torque) were eliminated from the data set used for model development, for they were not thought to represent the real, in-service behavior of a heavy-duty vehicle.

ANALYSIS OF VARIANCE

An analysis of variance was performed to investigate the significance of variation in the emissions and fuel consumption due to the possible differences in the two engine copies and test modes. Results showed that variation in emissions and fuel consumption was explained well by test modes (see Tables H-13 through H-16). The variation that was explained by the two engine copies however, was significant for fuel consumption and HC only. Variation in CO and NOx rates between the two engine copies was very small.

Based on the above results, it was decided to combine the data from the two engine copies, and develop one model for each pollutant and one for fuel consumption, since the explanatory ability of test modes alone is significant at the 0.01 level.

REGRESSION ANALYSIS

The same standard stepwise regression method that was referenced previously, was used again to formulate the models [Ref 75]. Very early in the analysis process, results from fuel consumption and hydrocarbon emission models were found to be satisfactory, but carbon monoxide and oxides of nitrogen models were recognized as being very poor as indicated by a low coefficient of determination (R^2) and a large coefficient of variability.

The general form of the hydrocarbon and fuel consumption regression equation is:

$$Y' = A + B_1X_1 + B_2X_2 + \dots + B_kX_k \qquad \text{(H-16)}$$

where Y' = hydrocarbon or fuel consumption rate in gr/sec

A = intercept of Y

B_k = regression coefficients

X_k = kth independent variable

TABLE H-13.

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * *
FF
BY ENG ENGINE COPY
MODE
* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	902.815	21	42.991	1484.367	.001
ENG	1.639	1	1.639	56.595	.001
MODE	901.176	20	45.059	1555.756	.001
2-WAY INTERACTIONS	1.952	20	.098	3.370	.001
ENG MODE	1.952	20	.098	3.370	.001
EXPLAINED	904.767	41	22.067	761.929	.001
RESIDUAL	4.866	168	.029		
TOTAL	909.633	209	4.352		

TABLE H-14.

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * *
HC
BY ENG ENGINE COPY
MODE
* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	.104	21	.005	130.471	.001
ENG	.001	1	.001	16.245	.001
MODE	.103	20	.005	136.182	.001
2-WAY INTERACTIONS	.001	20	.000	1.723	.034
ENG MODE	.001	20	.000	1.723	.034
EXPLAINED	.105	41	.003	67.667	.001
RESIDUAL	.006	168	.000		
TOTAL	.111	209	.001		

TABLE H-15.

* * * * * * * * A N A L Y S I S   O F   V A R I A N C E * * *
CO
BY ENG   ENGINE COPY
MODE
* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	424.991	21	20.238	91.604	.001
ENG	.070	1	.070	.315	.575
MODE	424.921	20	21.246	96.169	.001
2-WAY INTERACTIONS	5.651	20	.283	1.279	.199
ENG MODE	5.651	20	.283	1.279	.199
EXPLAINED	430.642	41	10.503	47.543	.001
RESIDUAL	37.115	168	.221		
TOTAL	467.757	209	2.238		

TABLE H-16.

* * * * * * * * A N A L Y S I S   O F   V A R I A N C E * * *
NO
BY ENG   ENGINE COPY
MODE
* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	1.330	21	.063	88.232	.001
ENG	.000	1	.000	.000	.994
MODE	1.330	20	.066	92.644	.001
2-WAY INTERACTIONS	.011	20	.001	.793	.719
ENG MODE	.011	20	.001	.793	.719
EXPLAINED	1.341	41	.033	45.579	.001
RESIDUAL	.121	168	.001		
TOTAL	1.461	209	.007		

For the hydrocarbon and fuel consumption model formulation, regression analyses assumed that the underlying relationships among the variables were linear and additive. Thus, for a multivariate case the underlying relationship was assumed to take the form of Equation H-16, which implies not only that each bivariate relationship between Y and X_i is linear, but also that the combined effects of independent variables are additive.

The linear carbon monoxide and oxides of nitrogen models were basically inadequate. Scatterplot examination of CO and NO_x data versus torque and RPM transformations showed clear deviation from linearity, therefore it was decided to transform the original dependent variables (CO and NO_x), to help explain the nonlinearity.

After several trials of different transformations of CO and NO_x a base 10 logarithmic transformation seemed to work best. Thus the new general form for the CO and NO_x regression equations became:

$$\log Y' = A + B_1X_1 + B_2X_2 + \dots + B_kX_k \qquad \text{(H-17)}$$

where $\log Y'$ = logarithm of CO and NO_x rates in gr/sec

RESULTS

Results from emissions and fuel consumption regression equations are shown in Table H-17. The predictive capability of each of the models is indicated by the R^2 value and the coefficient of variability.

Input data for the computer program that is described previously was modified to characterize the gasoline-powered HDV class. Trial runs of the program, as described in Figure H-2, were performed to check results from the models. The model output values for a half-loaded gasoline-powered HDV with GVW of 15,000 lbs and for a fully-loaded vehicle with GVW of 20,000 lbs are shown in Appendices E and F of Ref 38.

TABLE H-17. REGRESSION ANALYSIS RESULTS FOR EMISSIONS AND FUEL CONSUMPTION ESTIMATION FROM GASOLINE POWERED HD VEHICLES

POLLUTANT	R^2	STANDARD ERROR	COEFFICIENT OF VARIABILITY	MODEL
HC	0.88926	0.0077	38.9%	$HC^* = 6.526(10^{-3})+1.088(10^{-8})(TRQ)(RPM)$ $+4.153(10^{-11})(TRQ^4)-5.496(10^{-9})(TRQ^3)$
CO	0.86201	0.26102	38.5%	$\log CO^* = -2.636+3.190(10^{-5})(TRQ^2)$ $+4.257(10^{-2})\sqrt{RPM}-2.205(10^{-6})(TRQ)(RPM)$ $+1.659(10^{-10})(TRQ^4)$
NO_x	0.97863	0.12103	7.5%	$\log NO_x^* = -1.702+2.505(10^{-2})\sqrt{TRQ}-8.991(10^2)\frac{1}{RPM}$ $-3.815(10^{-10})(TRQ^4)+8.504(10^{-3})(TRQ)$
FUEL CONSUMPTION	0.99041	0.2058	6.7%	$FF^* = -1.301+7.409(10^{-6})(TRQ)(RPM)$ $+7.105(10^{-2})\sqrt{RPM}+3.555(10^{-10})(TRQ^4)$

* units grams per second

APPENDIX I

FIELD DATA COLLECTION AND USAGE

Vehicular performance data were collected at field sites in College Station and Houston. Speed measurements, turning movement counts, vehicle classification counts, stopped delay measurements, and signal timing information was recorded onto cassette tapes using special portable delay recording equipment developed for previous research. These data were converted from analog to digital form and written onto a computer tape in a format compatible with the dual CDC Cyber computers at The University of Texas at Austin. Previously written programs were used to compile the data into a desired tabular format. These tabular data were then analyzed and converted into specified input for the TEXAS-II Model in order to simulate actual traffic operations at the test sites. Measures of performance from the model such as stopped delay and queue length were compared with the field data to verify the accuracy of the summary statistics produced by TEXAS-II Model.

Next, the signal phase change data and loop detector occupancy data, that were recorded by TEXAS A&M personnel using a Data General Nova 1200 minicomputer with A/D capabilities, was provided in a format compatible with UT's dual CDC Cyber computers. These loop occupancy data were analyzed and converted into the traffic input parameters needed to run TEXAS-II. The available parameters were entering headways, entering speed, vehicle class, lane distribution, and turning distribution. Some of these were obtained by making certain assumptions about vehicle lengths and calculating selected parameters as functions of speed. The timing from the signal phase change data was input into TEXAS-II along with the traffic data to simulate the behavior of the observed traffic streams.

Comparison of simulation statistics to the recorded field data statistics for the same time period provided a good cross-check on how well

TEXAS-II simulates specific vehicular movements. A detailed description of individually-characterized vehicular behavior is vital in predicting the emissions rates of vehicles due to the very strong correlation between emission rates, speed, and acceleration rats.

EMPRO, the emissions processor in TEXAS-II, takes the position, velocity, and acceleration data from SIMPRO, the simulated processor, and calculates the emission rates for each differential time increment, DT, which is usually one-second. EMPRO then accumulates the CO, HC, NO_x and fuel consumption rates into buckets, or specified lengths of lane, along the path that each vehicle follows through the intersection. These bucket values can be combined into appropriate link values for use in pollution dispersion models such as CALINE-3. Concentrations of pollutants resulting from dispersion modeling have been found to be roughly comparable to sampled field measurements obtained by instrumentation located on three towers adjacent to the test site. The Texas A&M research team collected and recorded meteorological data for the same time periods in which traffic and pollutant concentrations were monitored.

An example of the TEXAS-II intersection geometric configuration for the College Station site and the combination of buckets into appropriate links for CALINE-3 is demonstrated in Figure I-1. The intersection area and the turning paths between lanes are shown in Figure I-2. The buckets shown in Figure I-1 are 100 feet long, but they can be set at any desired length through EMPRO input in TEXAS-II. The link configuration normally used for CALINE-3 can have the emissions resulting from traffic in the intersection proper broken into four parts, each part being associated with a different inbound approach. Each inbound approach can be divided into two links. The 100 feet length nearest the intersection stop line would be one link, and the

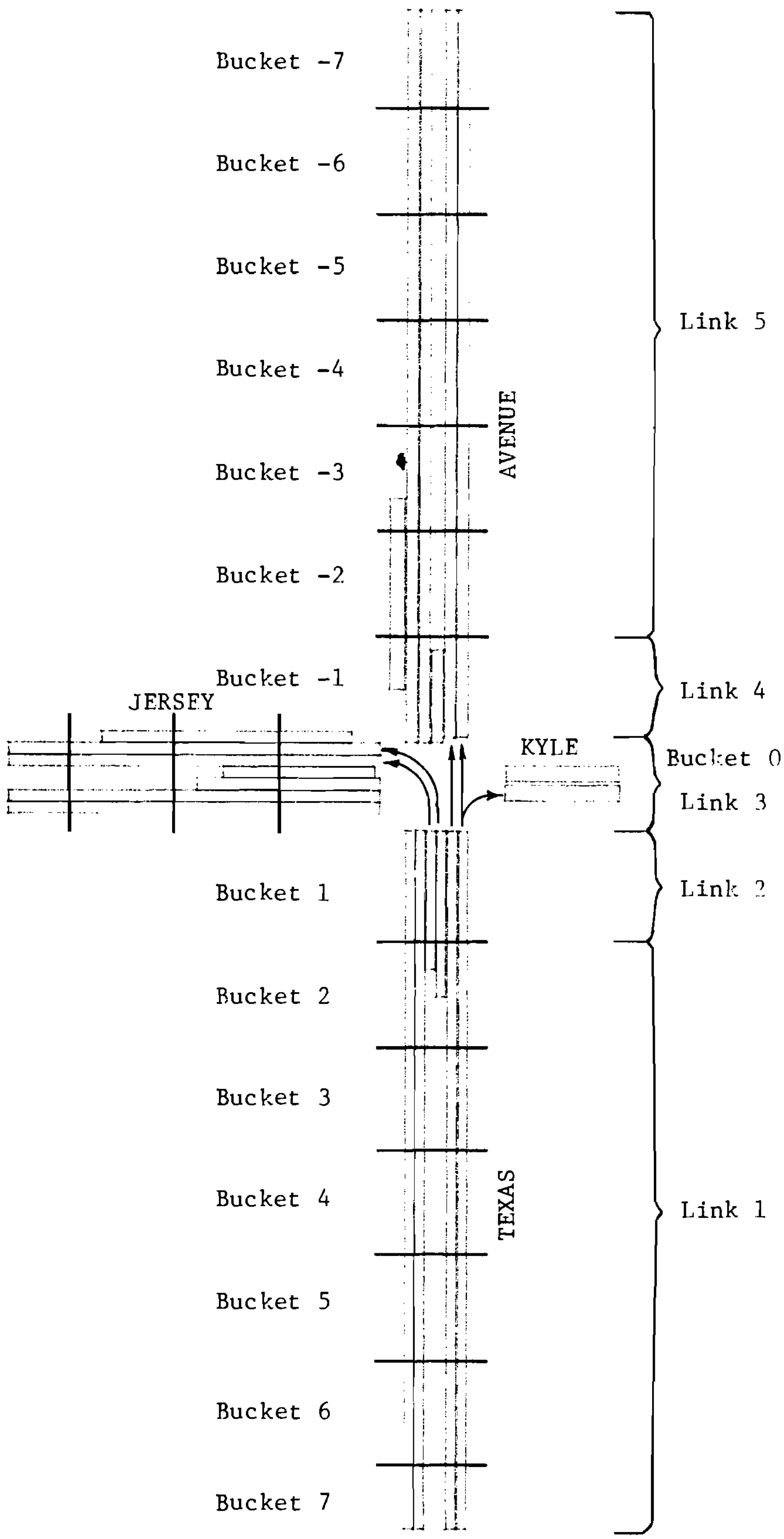
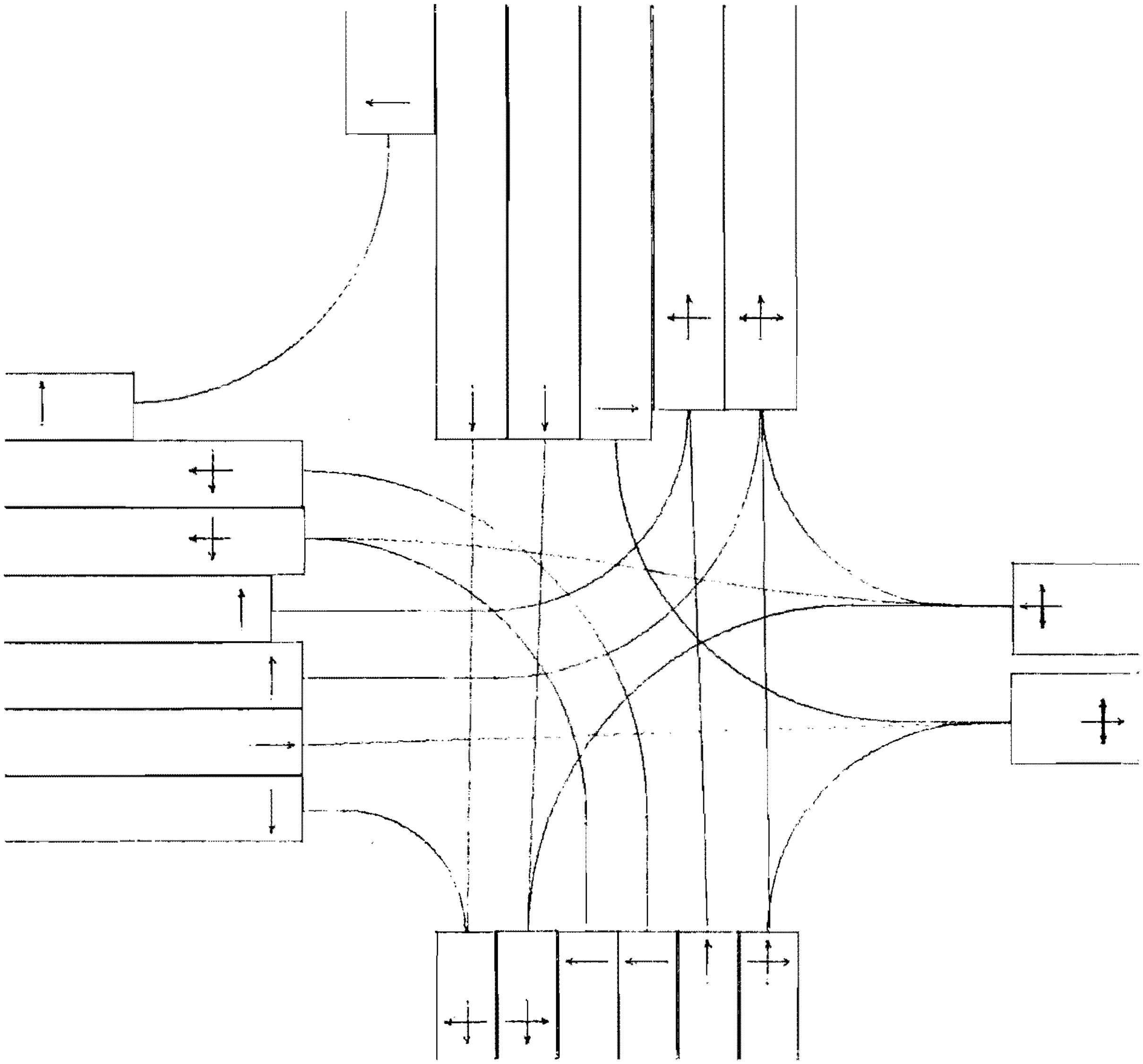


Fig I-1. Example geometry of College Station site showing buckets and links.

TEXAS AVENUE AND KYLE/JERSEY STREETS IN COLLEGE STATION - PROJECT 250



SCALE FACTOR IS 30.0 FEET PER INCH

Fig I-2. Intersection proper geometry at College Station site showing the vehicle paths for each lane.

remaining length of the approach would be the second link. The outbound lanes on each leg would be treated similarly, thereby resulting in five links on each of four approaches or a total of twenty links for the total intersection area. Due to the very light traffic on Kyle, only one bucket 110 feet long was used for the entire approach length; this corresponded to the field loop detector placement. For the example, each intersection approach length was made to correspond to the loop detector placement so that the entering time headways recorded by the field data collection system could be simulated as accurately as possible. The buckets in TEXAS-II can be configured to fit any appropriate link arrangement needed for dispersion modeling or for comparative studies.