LOCATION ANALYSIS OF THE MOBILE/24 EMERGENCY SERVICE VEHICLES OF A CASE COMPANY

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submitted by **RAİFE MELTEM YETKİN** in partial fulfillment of the requirements for the degree of **Master of Science in Industrial Engineering Department, Middle East Technical University** by,

Prof. Dr. Canan Özgen ___________
Dean, Graduate School of **Natural and Applied Sciences**

Prof. Dr. Sinan Kayalıgil ___________
Head of Department, **Industrial Engineering**

Assist. Prof. Dr. Cem İyigün ___________
Supervisor, **Industrial Engineering Department, METU**

Examining Committee Members:

Assoc. Prof. Dr. Canan Sepil ___________
Industrial Engineering, METU

Assist. Prof. Dr. Cem İyigün ___________
Industrial Engineering, METU

Assist. Prof. Dr. Pelin Bayındır ___________
Industrial Engineering, METU

Assist. Prof. Dr. Serhan Duran ___________
Industrial Engineering, METU

Özen Ergezer, M.Sc. ___________
Service Network & Business Development Manager, MAN

Date: June 14, 2012

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last Name : RAİFE MELTEM YETKİN

Signature :

ABSTRACT

LOCATION ANALYSIS OF THE MOBILE/24 EMERGENCY SERVICE VEHICLES OF A CASE COMPANY

Yetkin, Raife Meltem

M.S., Department of Industrial Engineering

Supervisor : Assist. Prof. Dr. Cem İyigün

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The aim of this study is planning the locations of emergency centers (ECs) as well as the number of vehicles in each EC of Corporation, Man Truck and Bus Group, to respond to the calls (arrival of the mobile/24 emergency service vehicle to the broken vehicle) within the desired time. The company aims to respond to the calls within 90 minutes. If the EC cannot respond to the calls within 90 minutes, they should be satisfied within 180 minutes. We propose a probabilistic programming approach to maximize the number of responded calls in 90 minutes while responding to all the calls in 180 minutes. The model determines the locations of the new ECs addition to the existing ones and also the number of vehicles assigned to those centers. The data source to this study is the emergency service calls of the company within February 2008 and December 2010. There are 30 ECs of the company distributed all over Turkey. By using the data, it is examined if the company can get closer to its target in responding to the calls with the current ECs. Necessary changes are proposed in the number and the locations of emergency centers for the desired target. Furthermore, several scenarios for targets with different quality service levels are generated and the effects of these parameters on the objective are observed.

Keywords: logistics, mixed integer programming, quality service level

ÖZ

VAKA ŞİRKETİNDE MOBİL/24 ACİL SERVİS ARAÇLARININ LOKASYON ANALİZİ

Yetkin, Raife Meltem

Yüksek Lisans, Endüstri Mühendisliği Bölümü

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Bu çalışmanın amacı, Man Kamyon ve Otobüs Ticaret A.Ş.'nin acil servis merkezlerinin lokasyonlarını ve her bir merkezdeki mobil/24 acil servis araçlarının sayısını planlayarak, gelen aramalara istenilen süre içinde cevap vermesini (Mobil/24 acil servis aracının arızalı araç başına varmasını) sağlamaktır. Firmanın hedefi gelen aramalara 90 dakika içinde cevap vermektir. Eğer acil servis merkezi gelen aramalara 90 dakika içinde cevap veremezse, aramalar 180 dakika içinde cevaplanmalıdır. Firma tarafından daha önceden belirlenmiş olan kalite hizmet düzeylerine göre en fazla sayıda aramayı 90 dakika içinde ve gelen bütün aramaları 180 dakika içinde cevaplamak için olasılıksal programlama yaklaşımını öneriyoruz. Önerilen model önceki acil servis merkezlerine ek olarak açılacak yeni acil servis merkezlerinin lokasyonlarını ve bu merkezlere atanacak araçları belirlemektedir. Çalışmaya kaynak olan veri, firmanın Şubat 2008 ve Aralık 2010 tarihleri arasında gerçekleşen acil servis çağrılarıdır. Firmanın Türkiye'ye dağılmış, toplam 30 adet acil servis merkezi bulunmaktadır. Firmaya ait veriler kullanılarak firmanın gelen aramalara cevap verme süresinde istediği hedefi mevcut sayıdaki acil servis merkezleri ile sağlayıp sağlayamadığı incelenmiştir. İstenilen hedef doğrultusunda acil servis merkezlerinin sayısında ve ya lokasyonlarında gereken düzenlemeler önerilmiştir. Ayrıca, hedefler için farklı kalite hizmet düzeylerine göre değişik senaryolar oluşturulmuş ve bu parametrelerin amaç üzerindeki etkileri gözlemlenmiştir.

Anahtar Kelimeler: Lojistik, karışık tamsayı modelleme, kalite hizmet düzeyi

To my parents

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CHAPTER 1

INTRODUCTION & MOTIVATION OF STUDY

Facility location models have been subject of many studies in the literature. Many deterministic and stochastic models were developed to solve the facility location problem of the humans since 1970s. As Drezner et al. (2004) explained that the term ‘facility’ is used as a general term in these models. Facility location may refer to locations of entities such as air and maritime ports, schools, hospitals, police stations, bus stops, retail outlets, warehouses, or factories. At these facilities, there are means that serve to customers. These means or servers can be planes, buses, ambulances, police cars, fire engines, buses, trucks, or emergency service vehicles, and they can be used as interchangeably in the literature for emergency management.

As Drezner et al. (2004) summarize that there is huge and extensive research on locational problems because of several factors. First, these location decisions can be made at all levels of human organizations, such as individuals, households, firms, government agencies, etc. Second, facility location decisions are strategic, that is, these decisions determine the long-run direction of the organization. Third, most of the location problems are not easy to solve, at least optimally. Finally, the structure of the location problems is defined by the problem under investigation, that is, location models are application specific.

The literature review shows that there is limited research for the facility location model applications on the case companies. The researchers concentrate on formulations of new models, or modifications on the existing models. Drezner et al. (2004) explained the reason for this scarce research on the applications. First, applications generally use the existing models, therefore; these studies only employ existing technologies and does not bring advances to the literature. Second, specific applications are mostly conducted with two professions, namely, consultants and planners, who are hardly ever motivated to publish in the academic journals. Finally, the firms do not want to share data with the public, and firms reserve the applications for them to catch the competitive advantage.

The critics above can be overcome by combining the industrial applications with new models or existing models which include some modifications. The researchers should handle the real problems of the firms. Therefore, the researcher may look at the real problem as a system thinker, in other words, may look from broader view. New methods and solutions come into mind of the researcher easily because applications help to visualize the mathematical models. In addition, as discussed before, location models are application specific.

Moreover, today, it is important for the firms to be in touch with the academic community to follow the advancements in the literature and to make the necessary contacts for the solution of their problems. With the legal agreements between the parties, the confidentiality of the firm is provided. Therefore, it becomes easy for the firms to catch the competitive advantage.

As discussed above, little of the literature has been directed to case studies. Therefore, this thesis helps to fill the deficiency about application specific studies in the literature. The case company, MAN Co, Truck and Bus Group, has emergency service vehicles distributed across the specific cities of Turkey. This thesis analyzes the locations of the mobile/24 emergency service vehicles of the case company and finds the optimal distribution of these vehicles to achieve the desired service time for the customers.

The reminder of the thesis is as follow. Chapter 2 presents a review of the literature on facility location. Chapter 3 presents a brief description of the case company, Man Truck and Bus Group. Chapter 4 discusses the proposed model for the problem of the case company. Chapter 5 shows the scenarios generated and analyzed. Chapter 6 presents results and discussions about the application of the proposed model to the problem. Chapter 7 presents the conclusions and directions for the future study.

CHAPTER 2

FACILITY LOCATION: A REVIEW OF THE LITERATURE

The literature for location problems can be divided in two sections. The first section is to locate the facilities using deterministic approach. Most of the early models are concerned with the deterministic approaches. In these models there are parameters as known, constant quantities, and there is no stochastic consideration. The second section contributes the literature by using probabilistic approaches. The probabilistic models focus on the uncertainty in problem input parameters.

2.1 Deterministic location problems

The most basic location problems are deterministic location problems. As Daskin et al. (1998) mentioned that the study of location problems started with the research of Alfred Weber in 1909. In his research, the objective is to minimize the total distance between the single warehouse and its several customers. Location theory became popular again with the publication of Hakimi in 1964. Hakimi (1964) located switching centers in a communication network and police stations in a highway system to minimize the total distance between customers and their closest facility.

Before starting to give the details about locational problems, two different measures used in location models should be explained. The first measure of the distance is the total weighted distance or time from/to facilities. Weighted distance is calculated by considering the demand quantity and the travel distance between demand nodes and facilities. The second measure of distance is the maximal service distance-S which is the distance or time that the most distant user from a facility would have to travel to reach that facility (The use of maximal service distance-S and maximal service time-s are equally applicable in the locational problems) (ReVelle et al., 1971).

Hakimi (1965) introduced the *p-median problem*. The aim is to find the location of p-facilities so as to minimize the total demand-weighted travel distance between demand nodes and facilities. After the introduction of the model by Hakimi in 1965, ReVelle and Swain (1970) modified the model as an integer linear program. A mathematical formulation of this problem can be stated as follows:

Inputs:

i: index of demand node
j: index of candidate facility site
a_i: demand at node-i
d_{ij}: distance between demand node-i and potential site-j
p: number of facilities to be located

Decision variables:

$$x_j = \begin{cases} 1 & \text{if we locate at potential facility site-}j, \\ 0 & \text{if not.} \end{cases}$$

$$y_{ij} = \begin{cases} 1 & \text{if demands at node-}i\text{ are served by a facility at node-}j, \\ 0 & \text{if not.} \end{cases}$$

P-median problem can be written as the following integer linear program:

P.1

Minimize $\sum_i \sum_j a_i d_{ij} y_{ij}$ (1a)

subject to: $\sum_j x_j = p$, (1b)

$\sum_j y_{ij} = 1 \quad \forall\, i,$ (1c)

$y_{ij} - x_j \quad \leq 0 \qquad\qquad \forall i, j, \qquad\qquad (1d)$

$x_j \in \{0, 1\} \qquad\qquad \forall j, \qquad\qquad (1e)$

$y_{ij} \in \{0, 1\} \qquad\qquad \forall i, j. \qquad\qquad (1f)$

The objective (1a) is to minimize the total demand-weighted distance between demand nodes and facilities. Constraint (1b) ensures that exactly *p*-facilities be located. Constraint (1c) requires that every demand node-*i* is assigned to some facility site. Constraint (1d) allows assignments only to sites at which facilities have been located. Constraint (1e) and (1f) are binary requirements for the problem variables.

This is an uncapacitated problem and constraint (1f) can be relaxed to a simple non-negativity constraint because demand node-*i* will naturally be assigned to the closest facility to minimize total demand-weighted distance (assuming $a_i d_{ij} \geq 0 \;\; \forall\; i, j$). In addition, this problem cannot be solved in polynomial time because of its mathematical structure; therefore, it is NP-hard.

As discussed by Drezner and Hamacher (2004), Hakimi (1964, 1965) also introduced *p-center problems* or *minimax problems.* In this problem, the aim is to minimize the maximum distance between the demand node and its closest facility by locating *p*-facilities that cover all demand nodes. Center problems which restrict the candidate locations of the facilities to the nodes of the network are *vertex center problems.* If the facility locations can be anywhere on the network, this center problem type is called as *absolute center problems.* Both versions of the problem can be either *weighted* or *unweighted*. The distances between demand nodes and facilities have weights associated with the demand nodes in the *weighted* version of *center problems*.

The parameters and decision variables are the same as the parameters and decision variables of **P.1** (*p-median problem*) in the integer programming formulation of the *vertex p-center problem*. Only one decision variable which is introduced below is added.

W : maximum distance between a demand node-*i* and its nearest facility-*j*.

The constraints are similar to the constraints of the *p-median problem*. Since the facilities here again are uncapacitated, each demand node will be assigned to the closest facility in the optimal solution.

Location set covering model (LSCP) is the first covering model which was introduced by ReVelle et al. (1971). As ReVelle (1974) mentioned that the total *demand-weighted distance* and the *maximal service distance* are the two measures considered in location problems. The demand-weighted distance is the key issue of *p*-median problems and maximal service distance is the key issue of covering problems. As the name implies that '*coverage*' is important in covering problems which is assessed with the use of maximal service distance. When a demand is served within a specified time, it is said to be covered.

The aim of the location set covering model is to find the location and number of the facilities so as to minimize the total cost (ReVelle et al., 1971). The mathematical formulation of the problem can be seen as below:

Location set covering problem can be written as the following integer linear program:

P.2

Minimize $\sum_j x_j$ (2a)

subject to: $\sum_{j \in N_i} x_j \geq 1 \quad \forall\, i,$ (2b)

$x_j \in \{0,1\} \quad \forall\, j.$ (2c)

where:

N_i: Set of facility sites-*j* within maximal service distance (*S*) of demand node-*i* (i.e., $N_i = \{j \mid d_{ij} \leq S\}$)

$$x_j = \begin{cases} 1 & \text{if we locate at potential facility site-}j, \\ 0 & \text{if not.} \end{cases}$$

In many cases, the fixed costs of establishing facilities are assumed to be equal for candidate facility sites. Therefore, the fixed costs of establishing facilities are not included in the objective function (2a), which is minimizing the number of facilities located. Constraint (2b) illustrates that there should be at least one facility located within the desired distance-*S* of demand node-*i*. Constraint (2c) is for binary variable x_j.

This formulation fails to account for the fact that demands at nodes may differ. Each node must be covered within the desired distance-*S* regardless of demand size. For example, if a covered node has a small demand, the ratio of cost over benefit may be very high.

In practice, the goal of coverage within *S* distance may be infeasible due to the limited budget of the firm. To deal with the shortcomings of the previous model, Church and ReVelle (1974) introduced *maximal covering location problem* (MCLP). This model considers both the limited resources and the differences between demand sizes. The aim is to maximize the amount of demands covered within desired service distance-*S* by locating a fixed number of facilities. The mathematical formulation of this problem is given below:

MCLP can be written as the following integer linear program:

P.3

Maximize	$\sum_i a_i y_i$		(3a)
subject to:	$y_i \leq \sum_{j \in N_i} x_j$	$\forall\, i,$	(3b)
	$\sum_j x_j = p$,		(3c)
	$x_j \in \{0,1\}$	$\forall\, j,$	(3d)
	$y_i \in \{0,1\}$	$\forall\, i.$	(3e)

where:

$$y_i = \begin{cases} 1 & \text{if node-}i\text{ is covered,} \\ 0 & \text{if not.} \end{cases}$$

The objective function (3a) is to maximize the amount of demands covered within the desired service distance-S. Constraint (3b) allows y_i to equal one only when one or more facilities are established at sites in the set N_i. Constraint (3c) ensures that exactly p-facilities be located. Constraints (3d) and (3e) are integrality constraints for x_j and y_i .

Church and Revelle (1974) proposed two solution techniques for the problem **P.2**. The first technique is using heuristic approaches. The first heuristic approach is called the Greedy Adding (GA) Algorithm. This algorithm starts with an empty set and then adds to this set one at a time which covers the most of the total population. The second algorithm is the Greedy Adding with Substitution (GAS), which is the modified version of the GA algorithm. At each iteration, the GAS algorithm determines new facility locations as the GA algorithm does, but also seeks to improve the solution by replacing each facility one at a time with a facility which is free. The second solution technique is linear programming approach.

For the linear programming approach a new variable $\bar{y}_i$ is introduced.

$$\bar{y}_i = \begin{cases} 1 \text{ if demand node-}i\text{ is not covered by a facility within } S\text{-distance} \\ 0 \text{ otherwise} \end{cases}$$

After variable substitution, the model is written as below:

P.4

$$\begin{aligned} \text{Minimize} \quad & z = \textstyle\sum_i a_i \bar{y}_i \\ \text{subject to:} \quad & \textstyle\sum_{j \in N_i} x_j + \bar{y}_i \geq 1 \qquad \forall\, i, \\ & \textstyle\sum_j x_j = p, \\ & x_j \in \{0,1\} \qquad \forall\, j, \\ & \bar{y}_i \in \{0,1\} \qquad \forall\, i. \end{aligned}$$

There are two cases encountered for the solution of **P.4**:

Case 1: All x_j and $\bar{y}_i \in \{0,1\}$, called an 'all-integer answer';

Case 2: Some x_j 's fractional, called 'fractional answer.'

If Case 1 is encountered, then the optimal solution to MCLP has been determined. If Case 2 is encountered, then, the fractional variables are eliminated either by method of inspection or the method of Branch and Bound.

In addition, cost-effectiveness curve can be developed for the decision makers. By assuming the set-up cost of facilities as equal, the cost of the facilities or the number of facilities located and the population covered can be compared.

Church and ReVelle (1974) extended maximal covering location problem with the addition of new constraint. This extended model is called *maximal covering with mandatory closeness constraint*. The aim in this model is to maximize the population covered within *S*-distance while ensuring that no demand is beyond *T* units distance from its nearest facility.

Therefore a new input is added to the inputs of the maximal covering location problem. It is stated as below:

M_i: Set of facility sites-j within mandatory service distance-T of node-i

(i.e., $M_i = \{j \mid d_{ij} \leq T\}$)

Therefore, the formulation of maximal covering location problem with mandatory closeness constraint is as below:

P.5

$$\text{Maximize} \quad \sum_i a_i y_i \qquad (4a)$$

$$\text{subject to:} \quad y_i \leq \sum_{j \in N_i} x_j \qquad \forall\, i, \qquad (4b)$$

$$1 \leq \sum_{j \in M_i} x_j \qquad \forall\, i, \qquad (4c)$$

$$\sum_j x_j = p\,, \qquad (4d)$$

$$x_j \in \{0,1\} \qquad \forall\, j, \qquad (4e)$$

$$y_i \in \{0,1\} \qquad \forall\, i. \qquad (4f)$$

The only difference between P.3 and P.5 is the Constraint (4c).

T is greater than S, *so* N_i is the subset of M_i. Addition of the Constraint (4c) ensures that for each demand node-i, there must be at least one facility within the mandatory distance- T. This constraint is called *mandatory closeness constraint*.

Eaton et al. (1985) have used MCLP in a real-world case in Austin, Texas. They plan the reorganization of the emergency medical service. This model is selected because integer programming formulation can adapt easily to changes such as the changes in the number of vehicles, the response time required to define coverage, and allowable candidate locations. Moreover, the differences in the demand sizes of nodes can be handled with this model. Therefore; the outlined plan in the paper has saved the total cost of emergency services by $3.4 million in construction cost and $1.2 per year in operating cost. In addition, average response time to the calls has been reduced in spite of an increase in the number of calls.

White and Case (1974) showed the relationship between the covering problem and the center location problem. They discussed the total coverage, partial coverage, generalized partial coverage versions of the covering problems and illustrated the relationship between them with the central facilities location problem. They used the same heuristic solution procedure to solve both problems, and compared them with other existing solution techniques.

Church and ReVelle (1976) examined the relationship between the p-median, location set covering, and MCLP theoretically and computationally. Their paper examines the development of these models from a historical perspective. They showed the way of solving MCLP as p-median problem. Similarly, they gave the details of structuring MCLP with mandatory constraints as p-median problem.

They proposed that the methodologies for solving *p*-median problem are general enough to solve other types of location problems.

Narula et al. (1977) proposed a branch-and-bound algorithm for solving the *p*-median problem. Lagrangian relaxation with subgradient optimization method is used to obtain the bounds of branch and bound. They compared the results to show that the proposed algorithm is superior to other methods.

Schilling et al. (1979) presented a model to deal with the issue of multiple coverage. They addressed the problem of simultaneous allocation of both facilities and equipment. They proposed a model called *tandem equipment allocation model* (TEAM). Two types of equipments are located in this model, namely, primary and specialty equipment. The number of these equipments is determined. The aim in this model is again to maximize the number of calls covered. TEAM model is developed for firefighting purposes but it is also applicable in emergency medical services. Brotcorne et al. (2003) showed the modified version of TEAM in their review paper for ambulance location models.

TEAM model is the modification of MCLP except for the one constraint which shows hierarchy between equipments. If this constraint is removed, the model is called as the extended version of MCLP for multiple vehicle types.

Schilling et al. (1979) also introduced the modified version of TEAM. This modified version is called *the multiobjective tandem equipment allocation model* (MOTEAM). The values of coverage by specialty or primary equipment can be expressed as the functions of the coverage by primary equipment and coverage by special equipment.

Another model developed by Schilling et al. (1979) is called the *facility-location, equipment-emplacement technique* (FLEET). The hierarchy constraint in TEAM model is removed from this model. A fixed number of facilities are located and there are various types of equipment and capabilities available in limited quantities. This model can be easily applied to the problems which include more than two types of equipments.

All the models discussed above do not handle the issue of missing calls. Daskin and Stern (1981) proposed a model to locate emergency service vehicles or servers to handle the issue of missing calls. There are two objectives in the model: (1) to minimize the total number of emergency service vehicles needed to satisfy the service requirement, (2) for the given minimum number of emergency service vehicles obtained, to maximize the total number of additional emergency service vehicles for responding to a call in demand node-i within desired service time-s.

Hogan and ReVelle (1986) slightly modified the model of Daskin and Stern, and defined their objective as to maximize the total demand covered twice. They developed two new models called, *backup coverage problem I* (BACOP I) and *backup coverage problem II* (BACOP II). The difference between BACOP I and BACOP II is that BACOP I forces the demand nodes to be covered twice. BACOP II, however, looks for an optimal solution which balances the demand points be covered once or twice by the integration of weight between (0, 1) to the objective function.

Love et al. (1985) proposed a single-facility location model for the distribution network of Thibodeau-Finch Transport Ltd. The aim of the paper is to determine whether the current terminal locations should be maintained for the current demand structure and for the future demands. This application paper concluded that the transportation costs incurred by the optimal locations of the model were so close to the transportation costs of the current locations. Therefore, the current locations of the terminals were maintained.

Gendreau et al. (1997) introduced a model called *double standard model* (DSM). They sought to maximize the demand covered twice within a time standard of r_1 by locating p-emergency service vehicles, and at most p_j-emergency service vehicles are allowable at facility site-j. All of the demands are covered within a radius of r_2, and α-percentage of all demands is covered within a radius of r_1 in the coverage constraints of the model. It is observed that two radii r_1 and r_2 are used, and $r_2 > r_1$. Tabu search heuristic is proposed for the solution of the model.

Doerner et al. (2005) and Doerner and Hartl (2008) developed models based on DSM. The objective function of their models also includes penalty terms related to the unmet coverage requirements and unequal workload (Li et al., 2011).

2.2 Probabilistic location problems

The deterministic and statistic models do not represent the real-world characteristics of the location problem, however; they are easy to solve and understandable. In this section, the stochastic nature of the facility location problems is discussed. In this case, travel times, demand locations and quantities may be uncertain. The issue of missing calls due to the facility unavailability has been examined in many papers.

Chapman and White (1974) first formulated the probabilistic location problem. They proposed the probabilistic version of location set covering model. Daskin et al. (1988) showed the formulation of the model as below:

x_j : number of vehicles to locate
p : the probability of finding a facility busy
β_i : the minimum allowable probability of having a vehicle which is not busy and which is capable of covering node-i
$k(i)$: vehicles that can cover node-i

Probability that at least one vehicle is available = 1- $p^{k(i)}$
This probability should be greater than β_i, therefore;
$k(i) \geq k_{min}(i) = int\left[\frac{\ln(1-\beta_i)}{\ln(p)}\right]$,
and all notations are as introduced before;

P.6

$$\text{Minimize} \quad \sum_j x_j \qquad (5a)$$

$$\text{subject to:} \quad \sum_{j \in N_i} x_j \geq k_{min}(i) \qquad \forall\, i, \qquad (5b)$$

$$x_j \in \{0,1\} \qquad \forall\, j. \qquad (5c)$$

The objective function (5a) is to minimize the number of facilities located. Constraint (5b) illustrates that each demand node-i should be covered at least $k_{min}(i)$ times within the desired distance of demand node-i. Constraint (5c) is for binary variable x_j.

The binary constraint for variable x_j can be relaxed to allow any integer number of facilities. However, as shown by Chapman and White (1974), this model is not feasible because of the Constraint (5b) because this constraint requires multiple coverage of the demand nodes.

Aly and White (1978) also introduced the probabilistic formulation of the location set covering and *p*-center problem. In their model, there is a service level, which is defined as the minimum allowable probability that any incident occurring in subregion-*i* is covered by some emergency service vehicles located at facility-*j*. The randomness in the model is the distance between the locations of the facility and the incident. The results of the probabilistic and the deterministic models are also compared in the paper.

Another probabilistic model was introduced by Daskin (1983), which is called *maximum expected covering location problem* (MEXCLP). In this model, the MCLP is extended and emergency service vehicles are located by considering vehicles may be busy when a call arrives. Therefore, the infeasibility of the model of Chapman and White (1974) is handled. In this model, there are some assumptions. Vehicle availability is assumed to be independent of the number of vehicles which are busy. It is assumed that busy probabilities are the same for all the vehicles in the system, which is called *system-wide busy fraction*.

Drezner et al. (1995) summarized the model MEXCLP as follows: The probability of at least one server or vehicle being available within the facilities of N_i is equal to 1-q^k where there are k servers in N_i. The probability of at least one server being available in N_i if there are k-1 servers is 1-q^{k-1} .Therefore; the increase in the expected coverage for demand node-i when the number of servers in N_i increases from k-1 to k is equal to the difference of these two probabilities, which is $(1-q)q^{k-1}$. As a result, the population (call) weighted expected coverage is equal to:

$$\sum_{k=1}^{n_i} a_i(1-q)q^{k-1}y_{ik}$$

where n_i is the number of servers in N_i.

Hence, the MEXCLP can be formulated as below:

P.7

Maximize	$z = \sum_i \sum_{k=1}^{n_i} a_i(1-q)q^{k-1}y_{ik}$		(6a)
subject to:	$\sum_{k=1}^{n_i} y_{ik} - \sum_{j \in N_i} x_j \leq 0$	$\forall i$,	(6b)
	$\sum_j x_j = p,$		(6c)
	$x_j = \{0,1\}$	$\forall j,$	(6d)
	$y_{ik} \in \{0,1\}$	$\forall\ i, k$.	(6e)

where:

$$y_{ik} = \begin{cases} 1, & \text{if node-}i\text{ is covered by at least }k\text{ facilities,} \\ 0, & \text{if not.} \end{cases}$$

and all other inputs are as defined before.

The objective function (6a) is to maximize population (call)-weighted expected coverage of all demands. Constraint (6b) shows that the number of times that node-i is covered cannot exceed vehicles located around the demand node-i. Constraint (6c) ensures that exactly p-facilities can be located. Constraints (6d) and (6e) are integrality constraints for x_j and y_{ik}.

Daskin et al. (1988) reviewed the issue of vehicle availability. The models in their paper considered the probability that the emergency service vehicles may be unavailable when a call arrives. Some models presented do not account for the unavailability of the vehicles, but again provide additional coverage.

Hogan and ReVelle (1989a) developed two models. The first model locates *p*-servers that minimize the maximum time (or distance) within which service available with α- reliability. For a given reliability-α and *p* (number of vehicles to be located), the model is solved successively for smaller values of *S* (maximum time or distance). When a time value is reached at which the number of facilities increases by one or more, the previous time (distance) is the smallest time(distance) within which the calls are covered with α-reliability by *p* vehicles. The second model finds the position of *p*-servers which provide service within *S*- distance which maximizes minimum reliability of service. In this model, for a given *S* distance standard and *p*, the model is solved successively for larger values of α-reliability. When a level of reliability is reached at which the number of servers increases by one or more, the previous α-reliability is the largest reliability within which the calls are covered within *S* distance by *p* servers.

Hogan and ReVelle (1989b) also introduced *maximum availability location problem* (MALP). There are two versions of the problem which are determined by the calculation of the busy fraction. In the first version, which is MALP-I, the busy fraction is assumed to be same for all the demand nodes and the region around them. In the second version, MALP-II, the busy fraction is defined for the region around node-*i*. Daskin et al. (1982) estimated the average busy fraction in the region around node-*i* via the formula below:

$$q_i = \frac{t' \times \sum_{k \in M_i} f_k}{24 \times \sum_{j \in N_i} x_j} \qquad (7)$$

where:

$q_i =$ the average busy fraction in the region around node-*i*;
t' = the average busy time of a vehicle (hours)
f_k = the frequency of calls at demand node-*i* (calls per day)
x_j = the number of servers located at the emergency center- *j*
N_i= the eligible locations of emergency centers for demand node-*i*
M_i= the set of demand nodes within *S*- distance of node-*i*.

The numerator of the busy fraction shows the daily hours needed in each day for servicing the calls around demand node-*i*; and the denominator is for daily hours of service available within N_i. There are three assumptions considered with the formulation of this *busy fraction.* First, the randomness is considered in the server availability only; travel time is assumed to be as deterministic. Second, server availability is independent of the number of servers actually in use. Third, the servers in N_i are assumed to be fully available for the demands occurred in N_i.

In the light of these definitions, the chance constraint can be written as below:

$$1 - q_i^{\sum_{j \in N_i} x_j} \geq \alpha \qquad \forall i \tag{8}$$

where

α is the probability of finding at least one server available for demand node-*i* and $\alpha \in [0,1]$.

This constraint has a numerical solution, namely, that the number of emergency centers eligible to serve node-*i* must be greater than or equal to the smallest integer which satisfies the above non-linear reliability constraint. Therefore, the equation below can be written:

$$\sum_{j \in N_i} x_j \geq b_i \qquad \forall i \in I \tag{9}$$

where

$$b_i = \left\lceil \frac{\log\ (1-\alpha)}{\log q_i} \right\rceil$$

The linear equivalent of the chance constraint shows that each demand node-*i* requires b_i servers within its coverage area for *S*-distance to achieve service availability for this node-*i* with at least reliability-*α*.

With the light of these findings, the MALP-II is built as below.

Inputs:

b_i = the smallest positive integer which simultaneously satisfies the reliability requirement-*α* and provides a busy fraction- q_i where b_i is equal to:

$$b_i = \left\lceil \frac{\log\ (1-\alpha)}{\log q_i} \right\rceil$$

and q_i is equal to:

$$q_i = \frac{t' \times \sum_{k \in M_i} f_k}{24 \times \sum_{j \in N_i} x_j}$$

The other notations are as before.

Decision variables:

x_j: integer number of servers positioned at site-*j;*

$$y_{ik} = \begin{cases} 1 & \text{if demand node-}i\text{ has at least }k\text{ servers within }S, \\ 0 & \text{if not.} \end{cases}$$

P.8

Maximize	$\sum_i f_i\ y_{ib_i}$		(10a)
subject to:	$\sum_1^{b_i} y_{ik} \leq \sum_{j \in N_i} x_j$	$\forall\ i$,	(10b)
	$y_{ik} \leq y_{ik-1}$	$\forall\ i$, and $k=2,\ldots,b_i$,	(10c)
	$\sum_j x_j = p$,		(10d)
	x_j integer	$\forall\ j$,	(10e)
	$y_{ik} \in \{0,1\}$	$\forall\ i$, and k.	(10f)

The objective function (10a) is to maximize the sum of the products of calls at node-i and the variables y_{ib_i} which shows that whether or not demand area-i is covered within S with α-reliability. Constraint (10b) says that the number of servers available to cover demand node-i within S should be greater than the number of times node-i should be covered within S to provide α-reliability. Constraint (10c) prevents y_{ik} from being one unless y_{ik-1} is also one. Constraint (10d) ensures that exactly p-vehicles be located. Constraint (10e) is for the integer variable x_j and constraint (10f) is integrality constraint for y_{ik}.

The formulation of MALP-I is similar to the formulation of MALP-II. However, the number of emergency service vehicles required is not for each demand node-i. The system-wide requirement should be achieved for each demand node-i. The busy fraction can be estimated via the formula below:

$$q_{system} = \frac{t' \times \sum_i f_i}{24 \times \sum_j x_j}$$

The numerator shows daily hours of service needed in the system and the denominator is daily hours of service available (ReVelle et al., 1989). Therefore, the chance constraint can be written as below:

$$1 - q_{system}{}^{\sum_{j \in N_i} x_j} \geq \alpha \qquad \forall i$$

$$\sum_{j \in N_i} x_j \geq b$$

where

$$b = \left\lceil \frac{\log\,(1-\propto)}{\log q_{system}} \right\rceil$$

MALP I is formulated as **P.8** except for the objective function (10a) and constraint (10b) because b is used as the number of servers for each demand node in MALP I to provide α-reliability whereas b_i is used for each demand node-i in MALP II .

There are several articles devoted to the estimation of busy fraction. Batta et al. (1989) introduced the *adjusted*-MEXCLP (AMEXCLP). They handled three assumptions. First, the servers operate independently. Second, the servers have equal busy fractions. Third, these busy fractions are system-wide busy fractions. With the relaxation of all these three assumptions, they applied hypercube model (Larson, 1974) by considering the servers as being in a queuing system. Marianov and ReVelle (1994) developed the *queuing probabilistic location set covering problem* (QPLSCP). In this model, the busy fraction is calculated as node-based and again the prior assumption of independency of server availability is corrected. They also introduced a solving technique called as *maximum availability siting heuristic* (MASH).

Marianov and ReVelle (1995) also developed the *queuing maximal availability location problem* (Q-MALP). In this paper, the independency assumption of the servers is relaxed in the formulation of busy fractions and the travel times between the demand nodes and the emergency centers are considered as random.

Ball and Lin (1993) developed a model called *Rel-P*, which is the extension of LSCP. In this model, in order to achieve a reliability level, there is a linear constraint developed for the number of emergency service vehicles.

Dessouky (2006), Jia et al. (2007a) and Jia et al. (2007b) introduced extensions of MCLP to the literature. They studied multiple quality service levels and multiple quantities of facilities at each quality level. The objective of the model is to maximize the number of calls covered for different quality levels (Li et al., 2010).

Sorensen and Church (2009) developed a hybrid model by combining local busy fraction estimation of MALP with the maximum coverage objective of MEXCLP. Their model is called LR-MEXCLP. In their paper, a series of problems are solved with these three models and the results of them are compared. They found that LR-MEXCLP results in modest but stable percentage coverage over both MALP and MEXCLP.

The models introduced so far deal with the situations for a single period not for multiple periods. The models that will be introduced hereafter handle the issue of uncertainty in the input parameters for multiple periods.

The first article for dealing with multiple periods is published by Ballou (1968). In the article, static and deterministic facility location problems constitute a basis for dynamic location analysis for a single warehouse. For each period, a set of potential optimal facility sites are determined. Then, dynamic programming is used to determine the best plan for the optimal facility location and relocation strategy for the planning period.

Sweeney and Tatham (1976) extended the method of Ballou. Their model combines the deterministic facility location model for single-period (t) with the dynamic programming approach over multiple periods. They demonstrated that the inputs of the multi-period solution should be the best rank order solutions (R_t) in any single period. The best rank order solution is found by an iterative procedure for solving mixed integer programs in each period t.

Wesolowsky (1974) extended the probabilistic models above to a model which explicitly considers relocation costs. The changes in construction costs, volumes and locations are forecasted for r-time periods ahead and optimal locations of the facilities are found by the use of binary integer programming formulation. Enumeration techniques are suggested for solving the problem optimally.

Wesolowsky and Truscott (1975) dealt with locating multiple facilities in a dynamic environment. They developed a multiperiod location-allocation formulation and this model enables the distribution plan to be changed according to the predicted changes in demand. The objective is to determine a distribution plan which minimizes the costs of facility locations and relocations. They proposed two solution methods. The first one is mixed integer programming with a constraint that allows limited number of location changes in each period. The second one is dynamic programming approach which is effective when the state space is quite limited by the relative values of number of facilities to be located and possible location sites.

Tapiero (1971) introduced a model which solves the dynamic transportation location allocation problem when there are possible facility capacities and shipping costs. In the paper, it is considered that the Euclidean distance between sources and destinations is proportional and linear to the shipping costs. The objective of this problem is to locate facilities and allocate demands to sources and make the quantities to be shipped between facilities and demand points.

Sheppard (1974) included spatial and temporal aspects of the real world problems into the dynamic location-allocation analysis. The author also considered the capacity expansion, size of the facilities, and the timing of the construction in the models he presented. The models of Sheppard are the derivations of the deterministic facility location models and they capture most aspects of the real world problems, however; most of his formulations are nonlinear and dynamic which is computationally difficult.

Erlenkotter (1978) compared the performance of seven heuristic solution approaches on a problem which aims to minimize the total discounted costs of meeting growing demands at several locations. The performance of these approximate methods are based on the results of two planning problems which are given for both discrete-time and continuous-time frameworks. Performance of the hybrid methods is also discussed in the paper by combining some heuristics.

Roy and Erlenkotter (1982) formulated a particular dynamic facility location problem which allows both opening a new facility and closing the existing one over the time horizon. The objective is to minimize the sum of the costs of facility location, operating and transportation to satisfy customer demands specified over time at various locations. A branch and bound with a dual ascent method is presented as a solution method in the paper.

Campbell (1989) developed a model for locating and relocating facilities. The model is for a general freight carrier service with an increasing density at a fixed region. When the demand for the freight carrier service increases, the transportation terminals are located to decrease the shipping costs. Therefore, the author developed a continuous distribution model which includes economies of scale for linehaul transportation between terminals. The author also developed bounds on the optimal objective value using myopic strategies which may give nearly optimal solutions unless relocations costs are high.

Schilling (1980) brought an alternative approach to the models discussed above. The models above try to find an optimal or near optimal solutions to the facility location problem. However, Schilling suggested a multiobjective maximal covering problem formulation. This paper uses a general methodology by using multiobjective analysis in order to plan public sector facility systems which are operating in a dynamic environment. The author proposed a set of efficient solutions by using the model and the decision maker can select one of these solutions for implementation.

ReVelle et al. (1997) developed a model for the case where the total number of facilities is uncertain. Two approaches are presented in this paper for this situation. They called the problem where the number of facilities to be located is uncertain as *number of facilities uncertain* (NOFUN). For this type of problem, two criteria are used. The first one is the minimization of the expected opportunity loss (EOL). The second criterion is the minimization of the maximum regret. Both of these criteria assume that the number of decision options and the number of possible states of nature are finite. The first criterion (EOL) assumes that the probabilities for the occurrence of the various states of nature can be assigned and, so the initial set of facility locations that minimize the sum of expected losses can be minimized. The second criterion determines the pattern of the initial facility location whose maximum loss is minimized.

Min (2003) also used multi-objective decision making approach, which is interactive fuzzy goal programming model. This model helps determining the dynamic relocation and expansion of capacitated public facilities. This fuzzy goal programming is formulated as a mixed integer programming in the paper. This model is fed by inputs of the decision maker and solved so many times to illustrate the trade-offs between the objectives.

CHAPTER 3

CASE COMPANY: MAN TRUCK AND BUS GROUP

In this chapter, the case company is introduced briefly, the problem of the case company is defined, and the current situation of the company is explained.

3.1 Brief information about the case company

Based in Munich, Germany, the MAN Truck and Bus Group is the largest company in the MAN Group and one of the leading international providers of commercial vehicles and transport solutions. As a supplier of trucks, buses, diesel engines, turbo machines, and special gear units, MAN employs approximately 52,500 people worldwide by the year 2012. Its divisions hold leading positions in their respective markets. MAN SE, Munich, is listed in the DAX equity index, which comprises Germany's thirty leading stock corporations (http://www.man.eu/MAN/en/). Man Truck and Bus Group sells MAN and NEOPLAN buses which are produced by Man Türkiye A.Ş.; superclass NEOPLAN buses, trucks (above 8 tons in weight) and towing vehicles which are produced by Man Ticari Araçlar (http://www.man.com.tr/).

In Turkey, Man Truck and Bus Group, which is located at Ankara, has 131 employees and responsible for the sales and after-sales services with the help of 30 emergency service centers which are located at 25 different cities dispersed across the country. The number of trucks and buses in 2008 equals to 43,094. It is increased to 44,594 in 2009 and 47,141 in 2010. The information of the number of trucks and buses recorded in each city is also available.

3.2 Problem definition

The buses or trucks of Man Truck and Bus Group can travel anywhere in Turkey for different purposes. When a truck or bus is broken anywhere, a call comes to the closest emergency center (EC), and a mobile/24 emergency service vehicle (vehicle or server) travels to the scene to help the broken vehicle. There can be various causes for the call such as breakdown, accident, tire, fuel, keys, battery or others. These causes are analyzed in part 3.3.5.

After-sales service team of Man Truck and Bus Group sets some goals for the response time to these calls. Response time (call coverage time) refers to the time between each call to the EC and the arrival time to the broken vehicle. These response times are recorded by the team at the monthly reports of the firm. These reports are analyzed in part 3.3.2.

After-sales service team's first goal for the response time is that each call should be responded within 90 minutes (desired service time). If a call cannot be responded within 90 minutes, it should be responded within 180 minutes (mandatory service time). The response times beyond 180 minutes are absolutely not desired. Moreover, the team wants to be sure that the calls are responded with some reliability levels within these time limits. As the current situation of Man Truck and Bus Group analyzed below shows that the response times of the company is higher than the desired service time.

3.3 The current situation of Man Truck and Bus Group

The data set derived from the monthly reports of Man Truck and Bus Group has been studied to analyze the current situation of the company. These monthly reports are between February 2008 and December 2010. These reports show the type and number of the services, such as roadside help, towing, etc.; the causes of the calls according to the regions, cities, and type of the buses; and the response time of each emergency center to the customer call. The information derived from these monthly reports is summarized below.

3.3.1 The current number of emergency centers and vehicles

As discussed above, Man Truck and Bus Group in Turkey has 30 ECs currently which are dispersed across the country. These ECs have emergency service vehicles to respond to the calls. Figure 1 shows the current ECs and their locations.

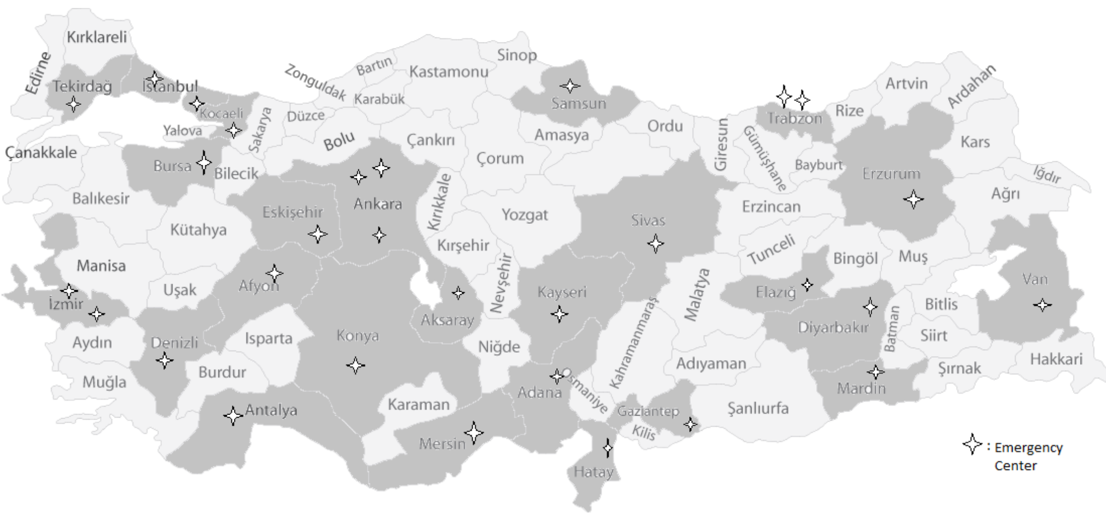

Figure 1: Emergency Centers and Locations

- There are 30 ECs dispersed around Turkey.
- One of the ECs located at Ankara and an EC located at Sivas have no vehicles.
- There are 4 vehicles located at İzmir; 3 vehicles located at Afyon, Ankara, Trabzon, İstanbul; 2 vehicles located at Bursa, Denizli, Tekirdağ; and 1 vehicle located at the remaining ECs.

The data of the number of vehicles for each EC and the locations are available in Appendix A.

3.3.2 Descriptive statistics for average response times of emergency centers

The monthly reports of Man Truck and Bus Group include response times per call for each EC. These response times are available for the time between June 2008 and December 2010; excluding the months November 2008 and December 2008.

In addition, response times above 500 minutes are assumed to be outliers. Some customers request the vehicles of specific ECs due to their sincere relationship. Therefore, response times are very high. Similarly, response times below 10 minutes are also assumed to be outliers. This is because of incomplete recordings of the response times, that is, the number of calls come to the ECs was recorded, however, some of the response times for these calls were not recorded. Therefore, response time for this EC is underestimated. Fortunately, on April 2009, the number of calls with recorded response times were started to be followed. Therefore, there were two separate columns related with the number of calls after April 2009, namely, “number of calls” and “number of calls with recorded response times”.

Table 1 exhibits the descriptive statistics for average response times. The total count of response times used in the analysis is 460. As seen from the Table 1, the mean of the response times is 145.58 minutes. Mean is below the mandatory response time of Man Truck and Bus Group, which is 180 minutes. However, it is greater than the desired or maximal response time, which is 90 minutes.

Moreover, the standard deviation of response times is moderately high, which is 98. 71 minutes.

Table 1: Descriptive Statistics for the Response Times

Response Times (Min.)					
Mean	**St. Dev.**	**Minimum**	**Median**	**Maximum**	**Range**
145.58	98.71	10.33	120.50	498.33	488

The median is less than the mean which shows us that average response times have positive skewed distribution. It is also seen from Figure 2.

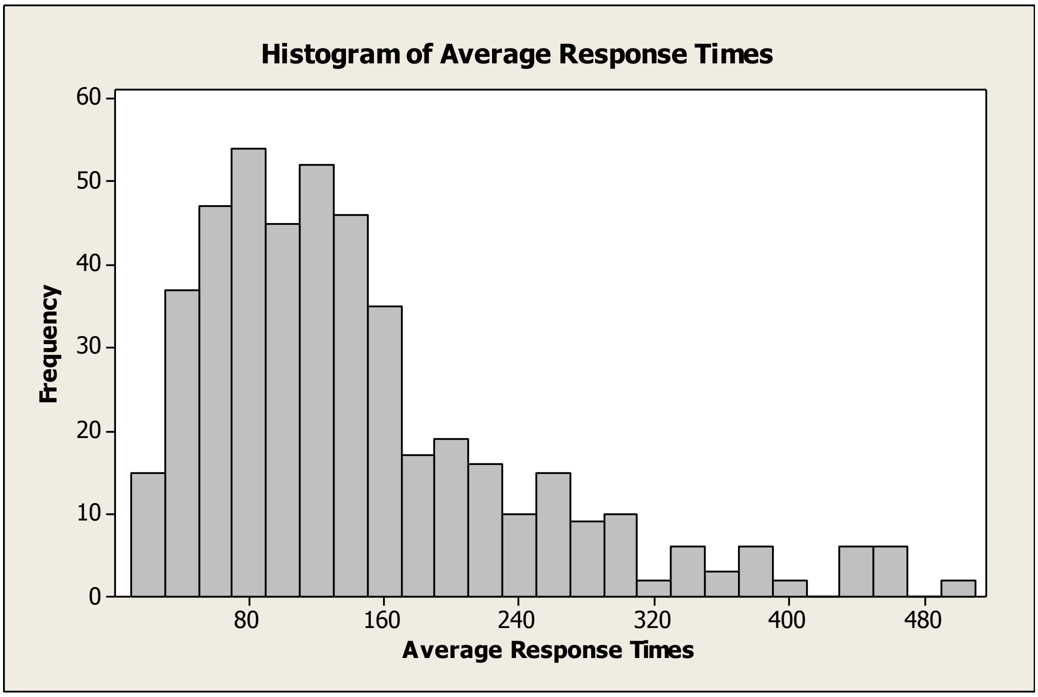

Figure 2: Histogram of Response Times

3.3.3 Average response time per call for each emergency center

Average response time per call for each EC is calculated by dividing total response times related to an EC by the number of periods that all response times are summed for this EC. This calculation is available in Appendix B. Tekman Otomotiv- Mardin has the highest response time per call with response time of 338.56 minutes.

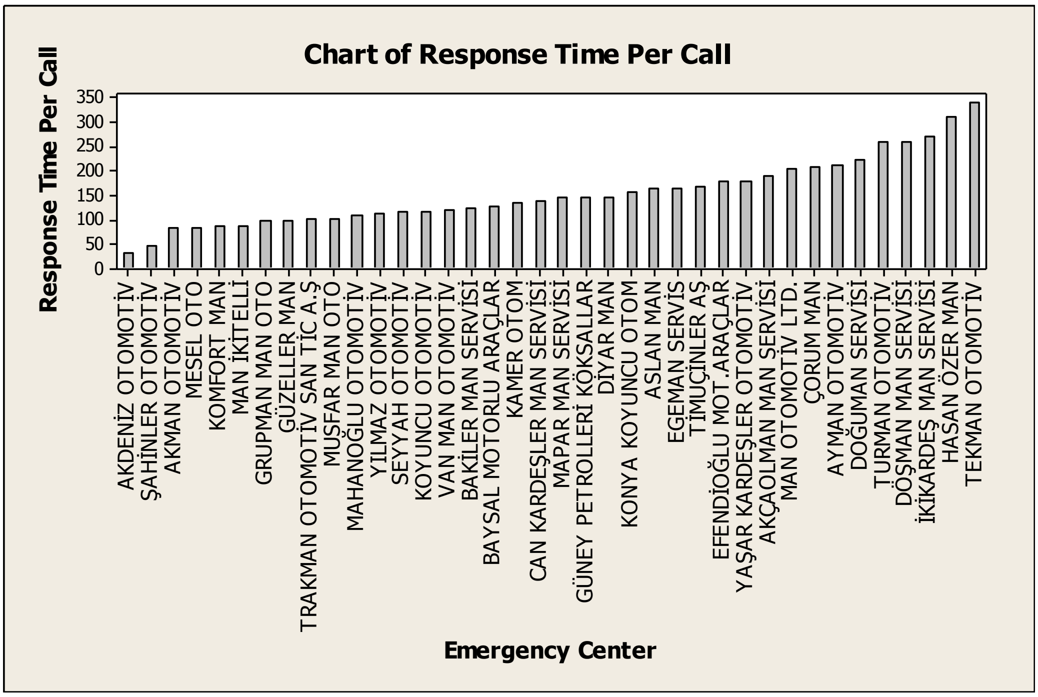

Figure 3: Average Response Time vs. Emergency Center

3.3.4 Number of calls per month for each city in Turkey

Figure 4 shows the number of calls coming from the cities per month to the ECs for 3 years (2008, 2009, and 2010). The data for the month January of 2008 is not available, but it is estimated from the remaining data available and the number of calls for each city is calculated for 3 years. The number of calls per month is calculated by dividing the total number of calls coming from the cities to the ECs by total number of months the calls are recorded. See Appendix C.

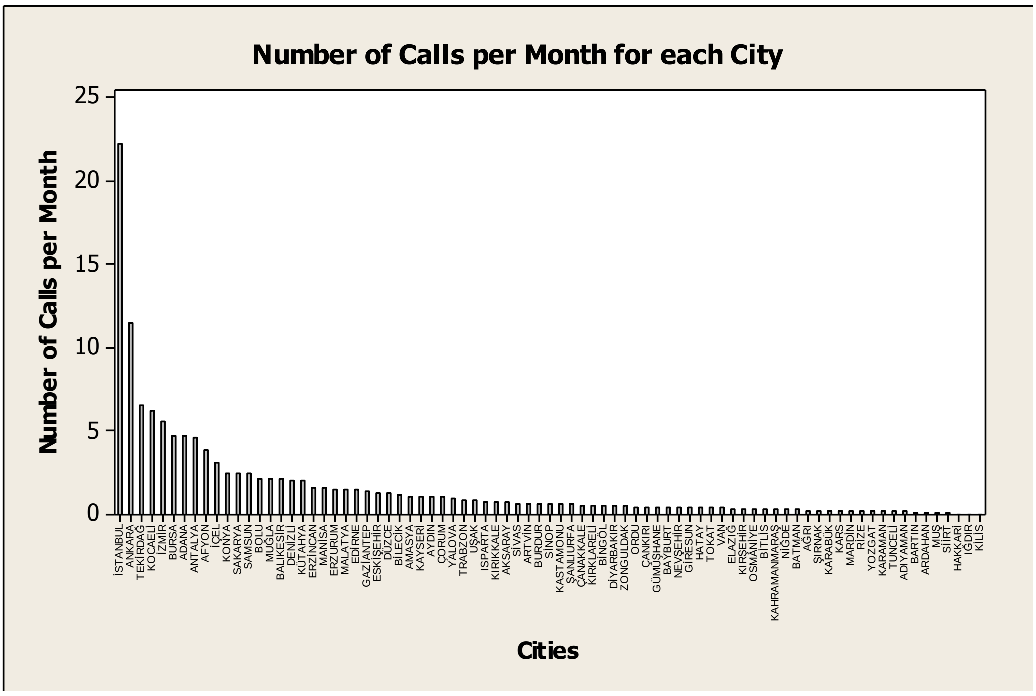

Figure 4: Number of Calls per Month for Each City vs. Number of Calls per Month

3.3.5 Number of calls vs. causes

It is seen from Figure 5 that the higher number of the calls comes from the breakdowns. The calls due to accident, tire, and fuel come very rarely. Therefore, the differences in the causes of calls are ignored and it is assumed that all of the calls are due to breakdowns. (In the analysis, the cause 'battery' is counted in the 'breakdown' to catch consistency in the data recordings. Moreover, the causes 'tire' and 'keys' are counted in the 'other' causes.)

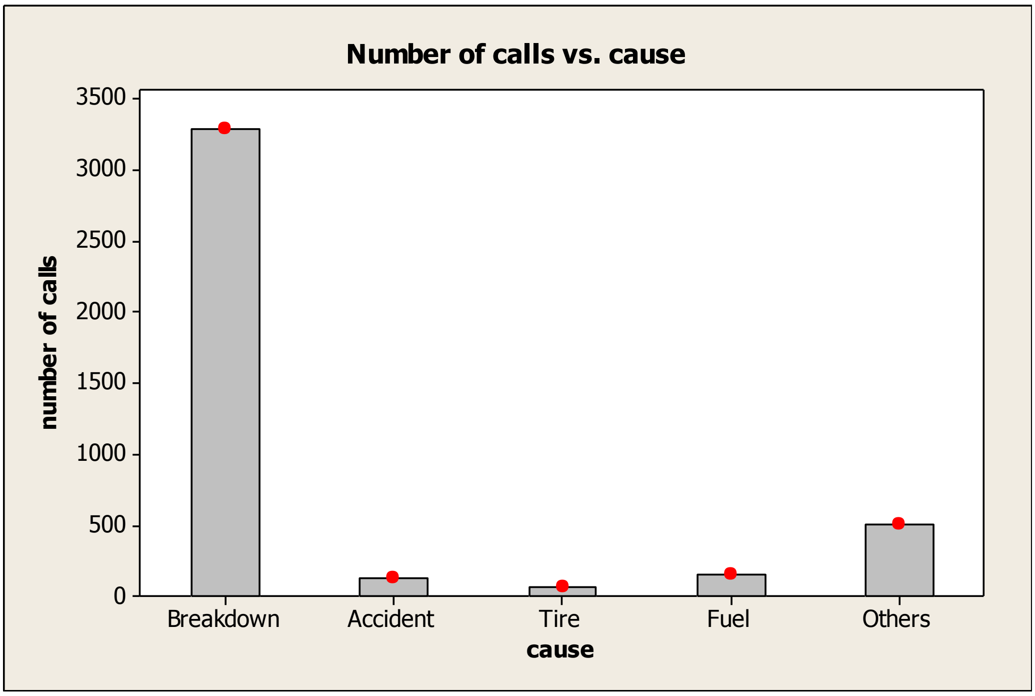

Figure 5: Number of Calls vs. Causes

CHAPTER 4

THE PROPOSED MODEL FOR THE CASE

The case company wants that each call should be responded within 90 minutes (desired service time or distance) and if a call cannot be responded within 90 minutes, it should be responded within 180 minutes (mandatory service time or distance). The response times beyond 180 minutes are absolutely not desired. Therefore, the company's target can be summarized as below:

- Maximizing the number of responded calls within 90 minutes
- If a call cannot be covered within 90 minutes, it should be covered within 180 minutes

The goal listed above can be considered in the following way:

- To maximize the number calls served in 90 minutes while each call should be covered by at least one EC in 180 minutes vicinity.

Firstly, each call should be covered by at least one EC in 180 minutes (mandatory coverage) vicinity can be thought as there should be at least one EC_j in the T km vicinity of D_i

where

i: index of demand node ***(D)***
j: index of candidate facility site ***(EC)***
T: mandatory coverage distance

Figure 6 shows a demand node covered within *T* km vicinity. For example, D_2 is covered by EC_3, D_3 is covered by EC_1 and EC_2, D_4 is covered by EC_2. However, D_1 is not covered by any ECs which is not desired by the case company because every demand node should be covered by at least one EC.

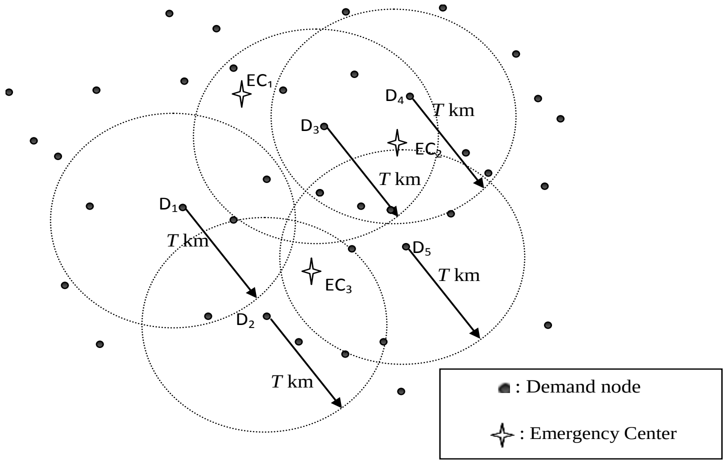

Figure 6: Mandatory Coverage within *T* km Vicinity

Secondly, the number of calls covered by an EC_j in the *S* km vicinity should be maximized.

where

S: desired coverage distance (maximal service distance).

Figure 7 shows how an EC can cover demand nodes within *S* km vicinity. For example, opening EC_2 instead of EC_1 or EC_3 enables to cover more number of calls.

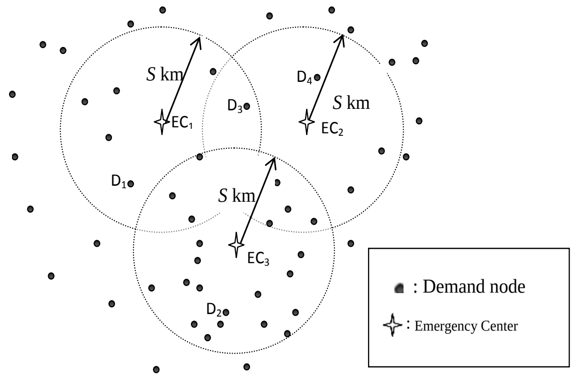

Figure 7: Desired Coverage within *S* km Vicinity

If the target of the company is considered as a probabilistic case, β and α-reliability levels should be introduced. The target of the company discussed above can be considered probabilistically in the following way:

- There should be at least one EC_j in the *T* km vicinity of D_i with β-reliability level (quality service level). In other words, all the calls should be covered by at least one EC_j with β-reliability level and $\beta \in [0,1]$.
- The number of calls covered by an EC_j in the *S* km vicinity should be maximized with α-reliability level and $\alpha \in [0,1]$.

These reliability levels are introduced to the models as the chance constraints.

Chance constraint can be written as below:

P [one or more servers (vehicles) available within S (or T)] ≥ α (or β)

If the probability- p_j of an individual server being busy at each EC_j is known in advance, the probability that one or more servers which are able to serve node-*i* within *S*-distance are free to serve demand node-*i* is at least α-probability.

$$1 - \prod_{j \in N_i} {p_j}^{x_j} \geq \alpha \qquad \forall i \in I$$

where

$x_j = 0,1,2, \ldots$ is the number of servers (vehicles) at EC_j

N_i = the eligible locations of emergency centers for demand node-*i*.

However, this constraint only gives a conceptual meaning rather than applicable in the models, because the probability p_j can only be defined with the prior knowledge of the ECs' locations (Drezner et al., 2004).

In order to develop an alternative to the constraint above, the *busy fraction* should be defined for the region around node-*i*.

Busy fraction, q, can be defined in two ways:

- *System-wide busy fraction*: Busy fractions are the same in various regions of the system and denoted by q_{system}.
- *Local busy fraction*: Busy fractions in the region around node-*i* differ for each demand node-*i* and denoted by q_i.

ReVelle (1989) explained that using busy fractions in the region around node-*i* enables more realistic solutions. Therefore, local busy fractions are used in this study.

Daskin et al. (1982) estimated the average busy fraction in the region around node-*i* via the formula introduced in (7):

$$q_i = \frac{t' \times \sum_{k \in M_i} f_k}{24 \times \sum_{j \in N_i} x_j}$$

where

$q_i =$ the average busy fraction in the region around node-*i*

t' = the average busy time of a vehicle (the time passed between departure of a vehicle from an EC and arrival back to this EC) (hours)

f_k = the frequency of calls at demand node-i (calls per day)

x_j = the number of servers located at the emergency center-j

N_i= the eligible locations of emergency centers for demand node-i

M_i= the set of demand nodes within S or T distance of node-i

The numerator of the busy fraction shows the daily hours needed in each day for servicing the calls around demand node-i; and the denominator is for daily hours of service available within N_i.

However, the formulation of busy fraction provides estimation instead of being exact. It is assumed that the servers in N_i are fully available to the calls occurred in the region around demand node-i. Indeed, some peripheral vehicles in N_i provide service to the demand nodes outside the region around demand node-i. Therefore, the service available within N_i should be reduced. Similarly, not all of the calls occurred in the region around demand node-i will be responded by the vehicles in N_i. Some calls may be responded by the vehicles outside of N_i. Therefore, the hours of service needed for the region around demand node-i should also be reduced (Hogan & ReVelle, 1989b).

With these definitions, the chance constraint can be written as discussed in (8):

$$1 - {q_i}^{\sum_{j \epsilon N_i} x_j} \geq \alpha \text{ or } \beta \qquad \forall i \in I$$

By taking the logarithms of both sides, the chance constraint can be transformed to the constraint as introduced in (9):

$$\sum_{j \in N_i} x_j \geq b_i \qquad \forall i \in I$$

where

$$b_i = \left\lceil \frac{\log\ (1-\alpha)}{\log q_i} \right\rceil$$

The linear equivalent of the chance constraint shows that each D_i requires b_i servers within its coverage area for S or T -distance to achieve service availability for this node-i with at least reliability-α or β.

There are three assumptions considered with the formulation of this *busy fraction.* First, only the randomness originated in the server availability is considered; travel time is assumed to be deterministic. Second, server availability is independent of the number of servers actually in use. Third, the servers in N_i are assumed to be fully available for the demands occurred in N_i.

For the problem of Corporation MAN, a model which emphasizes call coverage should be proposed. Call coverage should be for two different distances as discussed above, namely, desired service distance-*S* and mandatory service distance-*T*. In addition, calls are covered with different reliability levels within desired service distance and mandatory service distance. Since the probability of vehicle busyness is not known in advance, the local busy fractions for the region around demand node-*i* are used to determine the probability of vehicle busyness by analyzing the past calls based on each demand node. An extension of MALP II from the literature is appropriate for problem of the case company. MALP II should be extended to provide mandatory coverage with some reliability level because in MALP II the calls responded within desired service distance with some reliability levels are maximized without considering the mandatory coverage. The proposed model is explained in Section 4.1.

4.1 Maximum availability location problem II with mandatory closeness constraint

The '*MALP II with mandatory closeness constraint'* is proposed. The formulation is given below:

Inputs:

i, I = index of demand node ;

j, J = index of candidate emergency center ;

k, K = index of the number of servers for any demand node;

t_{ji} = shortest time (or distance) from facility site-j to demand node-i;

S = maximal service distance (desired service distance);

T = mandatory service distance;

$N_i^S = \{j | t_{ji} \leq S\}$ = potential facility sites within S-distance of demand area-i;

$N_i^T = \{j | t_{ji} \leq T\}$ = potential facility sites within T-distance of demand area-i;

f_i = the population (or calls/day) at node-i;

p = number of servers to locate;

b_i^S= the smallest positive integer which simultaneously satisfies the reliability requirement α and provide a busy fraction q_i^S where b_i^S is equal to:

$$b_i^S = \left\lceil \frac{\log\ (1-\propto)}{\log q_i^S} \right\rceil$$

and q_i^S is equal to:

$$q_i^S = \frac{t' \times \sum_{k \in M_i^S} f_k}{24 \times \sum_{j \in N_i^S} x_j}$$

b_i^T= the smallest positive integer which simultaneously satisfies the reliability requirement β and provide a busy fraction q_i^T where b_i^T is equal to;

$$b_i^T = \left\lceil \frac{\log\ (1-\beta)}{\log q_i^T} \right\rceil$$

and q_i^T is equal to:

$$q_i^T = \frac{t' \times \sum_{k \in M_i^T} f_k}{24 \times \sum_{j \in N_i^T} x_j}$$

Decision variables:

x_j: integer number of servers positioned at site-j;

$$y_{ik} = \begin{cases} 1 & \text{if demand node-}i\text{ has at least }k\text{- servers within }S, \\ 0 & \text{if not.} \end{cases}$$

P.9

Maximize	$\sum_i f_i \, y_{ib_i^S}$		(11a)
subject to:	$\sum_1^{b_i^S} y_{ik} \le \sum_{j \in N_i^S} x_j$	$\forall\, i,$	(11b)
	$b_i^T \le \sum_{j \in N_i^T} x_j$	$\forall\, i,$	(11c)
	$y_{ik} \le y_{ik-1}$	$\forall\, i$ and $k=2,\ldots,b_i^S,$	(11d)
	$\sum_j x_j = p\,,$		(11e)
	x_j integer	$\forall\, j\,,$	(11f)
	$y_{ik} \in \{0,1\}$	$\forall\, i,$ and $k=1,\ldots,b_i^S.$	(11g)

The objective function (11a) is to maximize the sum of the products of calls at node-i and the variable $y_{ib_i^S}$ which shows that whether or not demand area-i is covered within S-distance with α-reliability. Constraint (11b) says that the number of servers available to cover demand node-i within S-distance should be greater than the number of times node-i should be covered within S-distance to provide α-reliability. Constraint (11c) shows that for each demand node-i, there should be at least b_i^T servers located within the mandatory service distance-T to provide β-reliability. Constraint (11d) prevents y_{ik} from being one unless y_{ik-1} is also one. Constraint (11e) ensures that exactly p emergency service vehicles or servers be located. Constraint (11f) is for the integer variable x_j and constraint (11g) is integrality constraint for y_{ik}.

In **P.9**, the number of servers-p in Constraint (11e) is a parameter and it needs to be determined by the extension of *location set covering problem* introduced in **P.2**. In our study, p is the minimum number of servers for covering all the calls in T km vicinity for the given quality service level. Therefore, an extension of set covering model in **P.10** is solved to determine the value of p for the given T km closeness and service level.

P.10

$$\text{Minimize} \quad \sum_j x_j \qquad (12a)$$

$$\text{subject to:} \quad b_i^T \leq \sum_{j \in N_i^T} x_j \qquad \forall\, i, \qquad (12b)$$

$$x_j \text{ integer} \qquad \forall\, j. \qquad (12c)$$

Objective function (12a) is to minimize the number of vehicles to be located. Constraint (12b) illustrates that there should be at least one vehicle located within the mandatory service distance-T of demand node-i to provide β-reliability level. Constraint (12c) is for integer variable x_j.

The solution methodology is represented in the following flow chart.

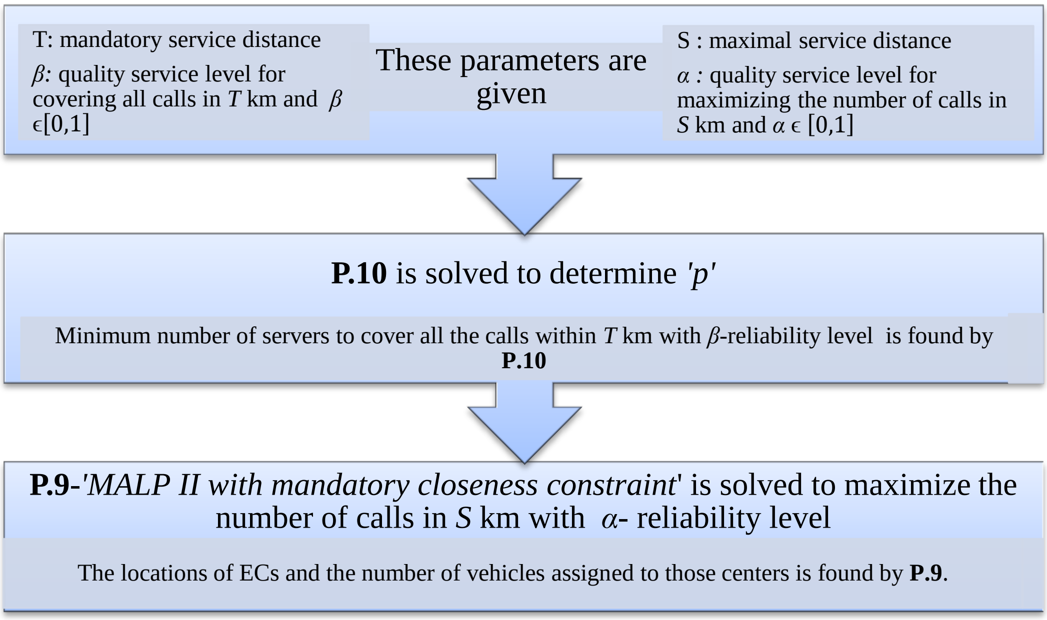

Figure 8 : Flow Chart for the Solution Methodology

If the α and β- reliability levels are given as 1, then the formulation turns into a deterministic problem which is the *maximal covering location problem with mandatory closeness constraint* introduced in **P.5**.

CHAPTER 5

SCENARIO GENERATION AND ANALYSIS

According to the past data of the company (for 3 years), an emergency service vehicle approximately spends 150 minutes (2.5 hours) in order to reach the breakdown vehicle on the road (average response time of a service vehicle). Therefore, total travel time for a call is approximately 5 hours. According to the information given by the authorized person from the company, maintenance on the road takes approximately 2 hours. Therefore, average busy time of a service vehicle is approximately 7 hours.

The total number of calls is equal to 1678 for the year 2008, 1178 for the year 2009 and 1174 for the year 2010. Therefore, the total number of calls comes to the system for 3 years is equal to 4630. Thus, the total number of calls per day in the system is approximately equal to 4.23. Data of the number of calls that comes to each city per month is also available. Therefore, number of calls per day for each demand node-*i* can be calculated.

ECs can be located at the center of each city in Turkey (*j*=1, 2, .., 81). The name of the cities for each EC_j is available in Appendix D. For demand nodes, some cities are divided in few parts. One of the parts is always city center. These cities are selected by examining the area of the city and the number of calls that come to each city. The cities that are large in size and have high number of calls are selected to be divided. Therefore, there are 170 demand nodes (*i*= 1, 2, .., 170). The calls are distributed uniformly across the determined districts of the cities. The cities and their districts can be seen in Appendix E.

The distance matrix between cities is obtained from the web site: www.kgm.gov.tr. The distances between districts are obtained from www.illerarasimesafe.com.

The assumptions made when the problem is solved are stated below:

- The average speed of the vehicle is 90 km/hour.
- Calls come from the centers of the cities or the districts because calls are recorded based on the city centers in the monthly reports of Corporation Man.
- ECs are located at the centers of the cities.
- The number of ECs in each city can be at most 1. If there are more than one ECs located at any city, it is assumed as one big EC and all vehicles are aggregated.
- The maximum number of vehicles that can be located to an EC can be at most 3 because of the agreements between the Corporation Man and their partners.

The model is solved for different desired and mandatory service distances for different α and β requirement levels. These different levels of the inputs are shown in Table 2.

Table 2: Inputs for Different Scenarios

Mandatory Service Distance (*T*)	**Reliability Requirement-β**	**Desired Service Distance (*S*)**	**Reliability Requirement-α**
225 km (150 min.)	0.6	90 km (60 min.)	0.60
270 km (180 min.)	0.7	135 km (90 min.)	0.70
315 km (210 min.)	0.8	180 km (120 min.)	0.80
	0.9		0.85
	0.99		0.9
			0.95
			0.99

The model is solved by combining each of the alternatives of the inputs. Therefore, the model is solved for 3×5×3×7 scenarios, that is, 315 different scenarios.

The problem is solved for 3 different cases:

Case I: With the existing ECs

There are 28 ECs which have service vehicles and these ECs are distributed across 24 different cities with 38 service vehicles. In the model, the number of service vehicles that can be located at the current ECs is introduced to the model as greater than or equal to the current number of service vehicles located at these ECs. For example, the number of vehicles that can be located at the EC in Tekirdağ should be greater than or equal to 2.

Therefore, the number of servers- p should be greater than 38 and at the same time, it is determined by **P.10** which is introduced in Section 4.1. Thus, the model decides either to open new ECs or to locate new vehicles for the given coverage parameters.

Case II: From scratch with current number of emergency service vehicles

The problem is solved from scratch without introducing the current locations of ECs. The total number of servers is set as 38. Therefore, **P.10** is not solved to determine the number of servers but instead, it is set by the user as equal to the current number of servers. Moreover, the number of vehicles located at the ECs in İstanbul, Ankara and İzmir is set as equal or greater than 1 because these cities are the most crowded cities of Turkey and the ECs at these cities receive the highest number of calls.

Existing ECs have been opened by the company not only for call coverage but also for operational, sales, or marketing purposes. By solving the problem from scratch, we want to evaluate the accuracy of the decision of the company for selecting those locations for ECs in terms of call coverage.

Case III: Only from scratch

The number of vehicles located at the ECs in İstanbul, Ankara and İzmir is again set as equal or greater than 1. The problem is solved from scratch and the number of calls is maximized with the minimum number of servers which should be greater than 3 because of the vehicles at İstanbul, Ankara, İzmir. Therefore, the current situation can be analyzed by comparing the number of calls covered by the minimum number of servers with the number of calls covered by the current ECs.

Table 3 summarizes 3 different cases encountered in problem solution.

Table 3: Different Cases in Problem Solution

	Cases	**The number of servers**	**The locations of ECs**	**The number of ECs**
Case I	With the existing ECs	Greater than or equal to 38 and determined by P.10	Locations of the existing ECs + locations of new ECs (if opened) anywhere in Turkey	Greater than or equal to 24 (current number of ECs with vehicles)
Case II	From scratch with current number of emergency service vehicles	38	İstanbul, Ankara, İzmir and anywhere in Turkey	Greater than or equal to 3
Case III	Only from scratch	Greater than or equal to 3 and determined by P.10	İstanbul, Ankara İzmir, and anywhere in Turkey	Greater than or equal to 3

CHAPTER 6

RESULTS AND DISCUSSIONS

The results are obtained by solving the problem for each scenario in three different cases. The results of the proposed model which is solved for three different cases for all scenarios are available in Appendix H.

Model inputs that affect the number of vehicles, the number of ECs and locations, percentage coverage are analyzed for each scenario for three cases. It is seen that the effects of the input parameters on these outputs can be best seen in the case of ‘only from scratch’ because the number of vehicles is not determined by the user before the problem is solved. Therefore, the illustrative graphs provided below are drawn with the results of the problem solved for Case III. The findings drawn from these analyses are summarized and discussed in the following section.

6.1 The number of vehicles

The number of vehicles is determined by T- distance and the reliability level-β. When the mandatory service distance-T decreases or the higher reliability level-β is desired, achieving mandatory closeness coverage becomes more difficult and the problem becomes stricter. Therefore, the system needs higher number of vehicles to provide the required mandatory coverage.

There is no effect of the maximal service distance-S on determining the number of vehicles required. Therefore, the reliability level-α has also no effect on the number of vehicles.

In Figure 9, the results in which the reliability level- β is 0.99 are used when the plots are drawn. Figure 9.a shows the number of vehicles required for different reliability levels of α when T=315 km and Figure 9.b is for T=270 km and Figure 9.c is for T=225 km. When these plots are compared, it is seen that when T-value decreases, the number of vehicles increases. Moreover, in all plots, it is seen that when all other parameters are constant, the change in the reliability level- α has no effect on the number of vehicles.

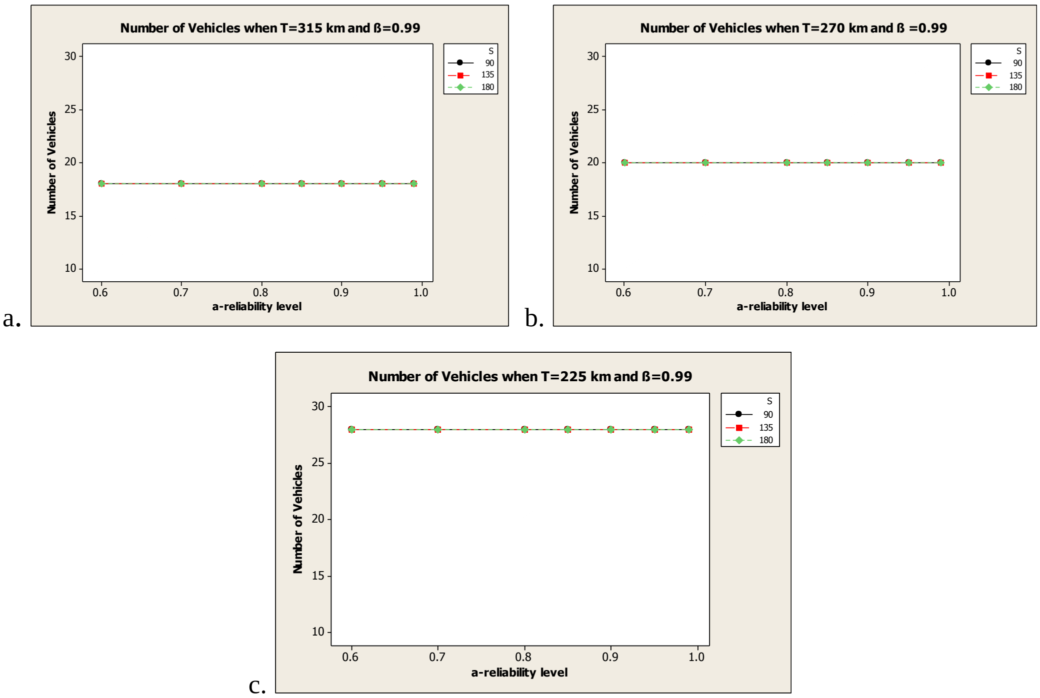

Figure 9: The Change in the Number of Vehicles for Different T values and α-Reliability Levels

The results in which the reliability level- α is 0.85 are used when the plots are drawn in Figure 10. Figure 10.a shows the number of vehicles required for different reliability levels of β when S=180 km and Figure 10.b is for S=135 km and Figure 10.c is for *S*=90 km. When these plots are compared by holding other three parameters constant (α, β, and *T*), it is seen that the change in *S*-value has no effect on the number of vehicles. Moreover, an increase in β- reliability level changes the number of vehicles. When β- reliability level increases from 0.90 to 0.99, the number of vehicles increases from 19 to 27 when *T*=225, from 14 to 20 when *T*=270 km, and from 11 to 18 when *T*=315.

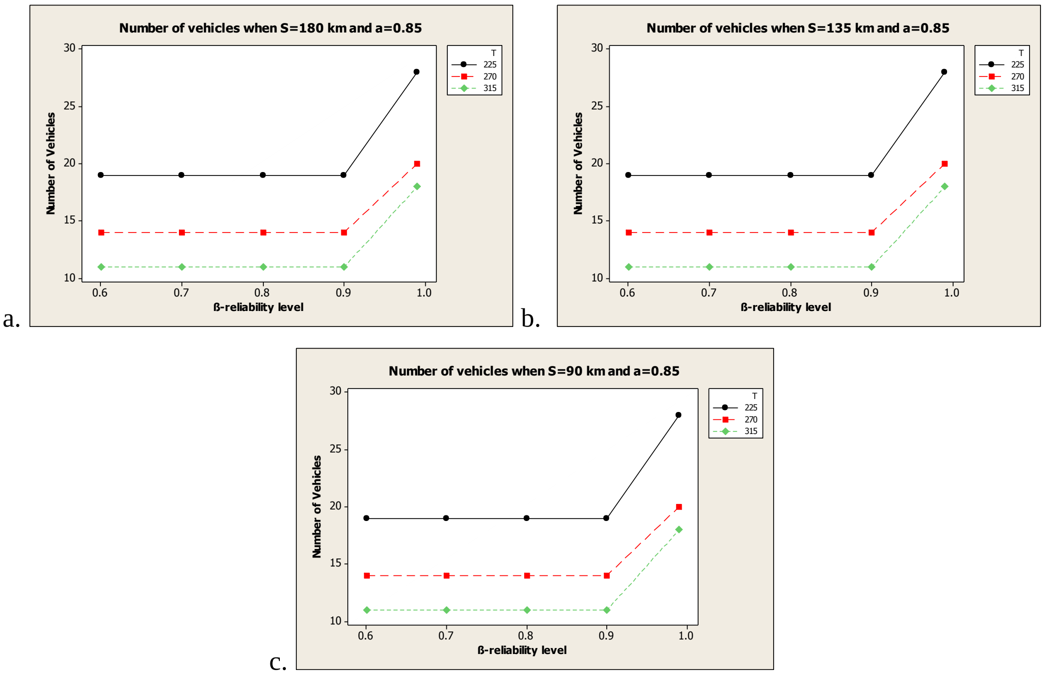

Figure 10: The Change in the Number of Vehicles for Different *S* values and β-Reliability Levels

6.2 The number of emergency centers and locations

The number of ECs and their locations are affected by *T*-value. When the mandatory service distance-*T* decreases or the higher reliability level- β is desired, achieving mandatory closeness coverage becomes more difficult and the problem becomes stricter. Therefore, the system needs higher number of ECs to provide the required mandatory coverage. Therefore, when T-value decreases or β-value increases, the number of ECs increases.

S-values and α-reliability levels do not affect the number of ECs significantly. Their effects are significant on the locations of ECs. The locations of ECs usually change for different S-values and α-reliability levels to maximize the number of calls covered.

In Figure 11, the results in which the reliability level- β is 0.80 are used when the plots are drawn. Figure 11.a shows the number of ECs required for different reliability levels of α when T=315 km and Figure 11.b is for T=270 km and Figure 11.c is for T=225 km. It is seen that when T-value decreases, the number of ECs increases. Moreover, α-reliability level does not also affect the number of ECs significantly. However, the locations of ECs generally differ for different α-reliability levels.

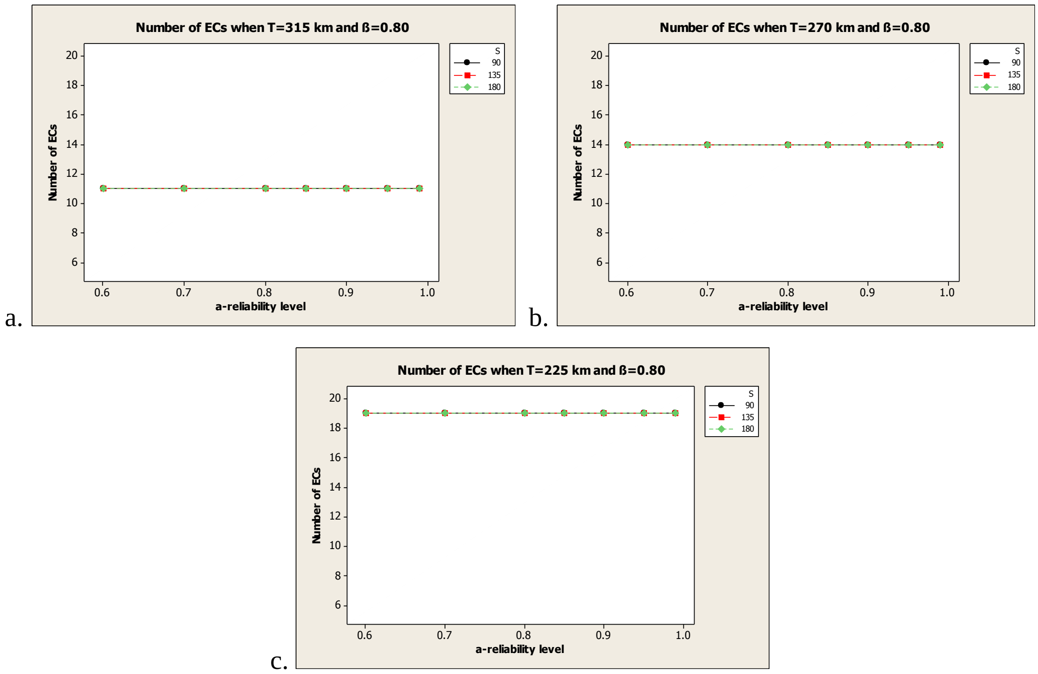

Figure 11: The Change in the Number of Emergency Centers for Different *T* values and *α*- Reliability Levels

In Figure 12, the results in which the reliability level- *α* is 0.99 are used when the plots are drawn. Figure 12.a shows the number of ECs required for different reliability levels of *β* when *S*=180 km and Figure 12.b is for *S*=135 km and Figure 12.c is for *S*=90 km. When these plots are compared, it is seen that *S*-value does not affect the number of ECs. However, when the locations of the ECs are analyzed, it is seen that although the number of ECs does not change, the locations of them are generally different for different *S* values.

The increase in *β*- reliability level affects the number of ECs. When *β*- reliability level increases, the number of ECs also increases. If there is no change in the number of ECs for different *β*- reliability levels, it is observed that there is also no change in their locations.

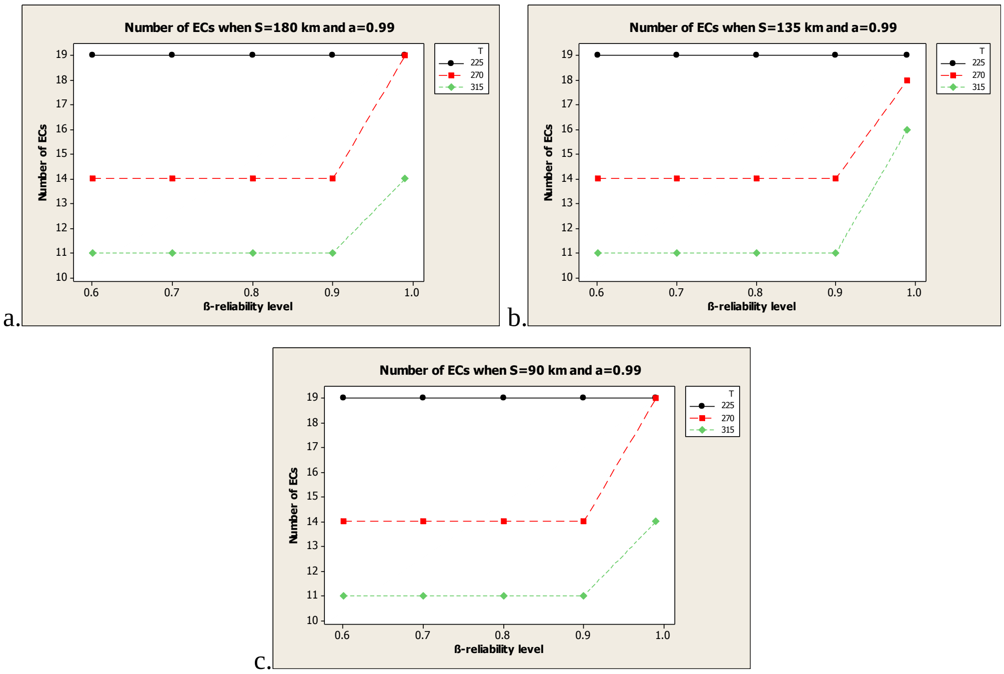

Figure 12: The Change in Number of Emergency Centers for Different *S* values and *β*- Reliability Levels

6.3 The percentage coverage

The number of calls covered is directly affected by *S*-value and reliability level-*α*. When *S*-value decreases, percentage coverage also decreases because less number of calls can be covered within small maximal service distances. In addition, when reliability level-*α* increases, percentage coverage decreases because less number of calls can be covered with higher reliabilities.

T-value and reliability level-*β* indirectly affect percentage coverage. When these values increase, the number of vehicles increases; therefore, more number of calls can be covered with higher number of vehicles. However, the effects of *T*-value and reliability level-*β* are not so significant as the effects of *S*-value and reliability level-*α*. Moreover, if there is no change in the number of servers for different T-values and β- reliability levels, there is also no change in percentage coverage because these values do not have effect on the locations of ECs.

In Figure 13, the results in which the reliability level- β is 0.60 are used when the plots are drawn. Figure 13.a shows the percentage coverage obtained for different reliability levels of α when *T*=315 km and Figure 13.b is for *T*=270 km and Figure 13.c is for *T*=225 km. It is seen that when *T*-value decreases, percentage coverage increases due to the increase in number of vehicles. Moreover, when α-reliability level increases, percentage coverage decreases.

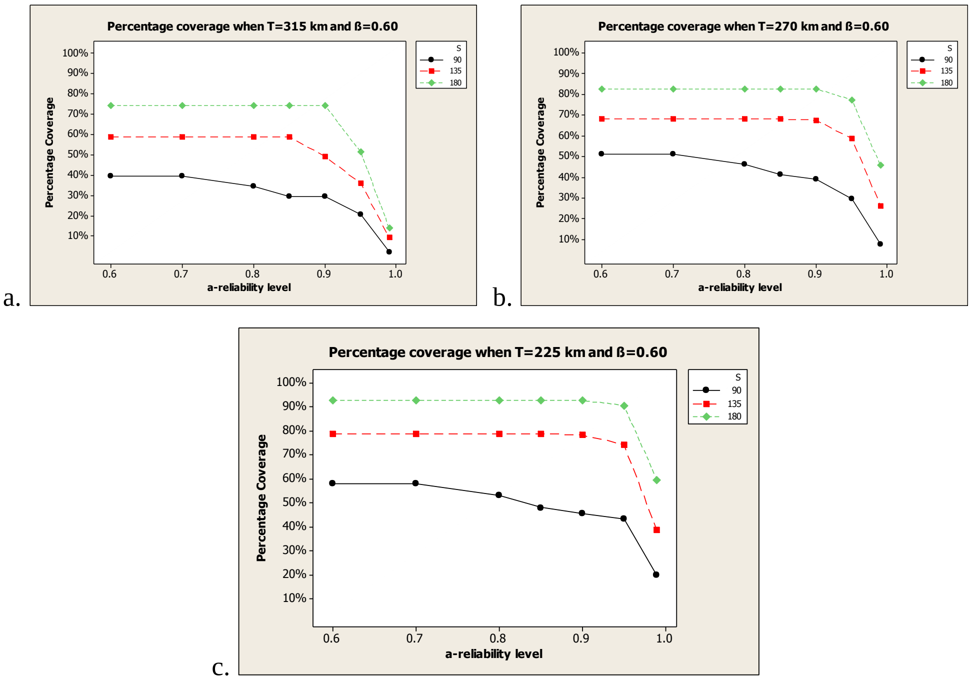

Figure 13: The Change in the Percentage Coverage for Different *T* values and α-Reliability Levels

In Figure 14, the results in which the reliability level- α is 0.99 are used when the plots are drawn. Figure 14.a shows the percentage coverage obtained for different reliability levels of β when S=180 km and Figure 14.b is for S=135 km and Figure 14.c is for S=90 km. When these plots are compared, it is seen that when S decreases, the percentage coverage also decreases. Moreover, an increase in β- reliability level results in an increase in the percentage coverage because of its effect on the number of vehicles.

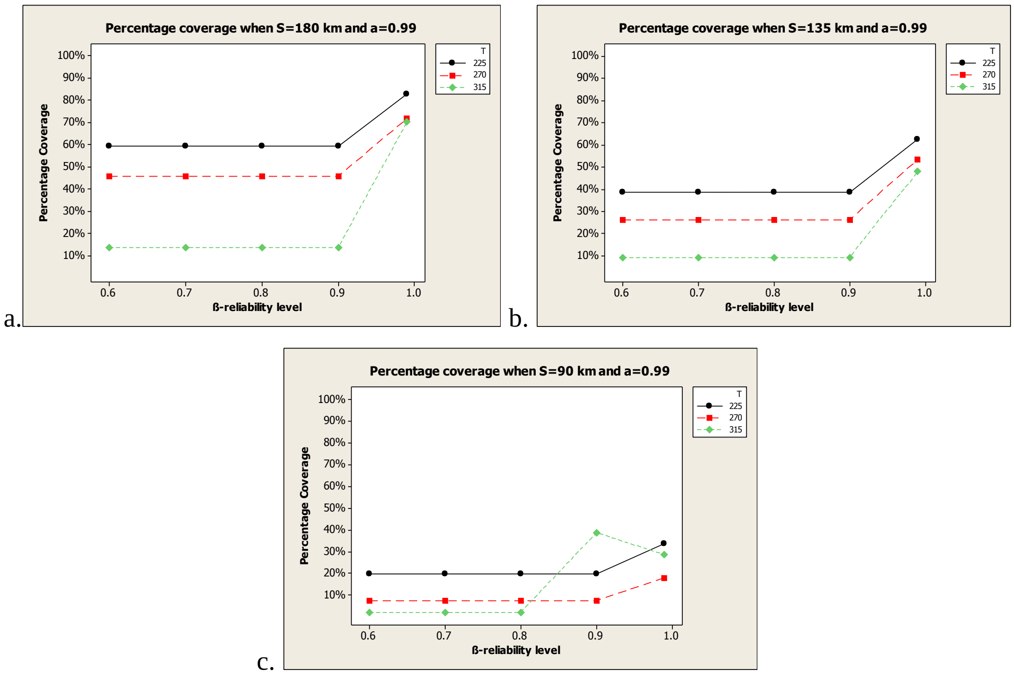

Figure 14: The Change in the Percentage Coverage for Different *S* values and β-Reliability Levels

6.4 Factorial design for the factors: *S*, *T*, *α* and *β*

In this part, to study the effects of the factors S, T, α, and β on the responses, namely, the number of vehicles, the number of ECs, and the percentage coverage, a factorial design is employed for the Case III. Different values of the factors S, T, α, and β are treated as the levels of each factor. Therefore, factor S

has 3 levels, factor *T* has 3 levels, factor *α* has 7 levels, and factor *β* has 5 levels. Then, general full factorial design is created.

The results and analysis are provided below:

In Table 4, it is seen that according to the F-test, since p-value =0 < 0.05, there is a significant effect of *β*-reliability level and *T*-values on the mean number of vehicles. However, there is insufficient evidence for the effects of *S* values and *α*-reliability levels on the mean number of vehicles.

Table 4: Analysis of Variance for the Number of Vehicles vs. *S, T, α* and *β*

Analysis of Variance for Number of Vehicles, using Adjusted SS for Tests						
Source	DF	Seq SS	Adj SS	Adj MS	F	P
α-reliability level	6	0.93	0.93	0.16	0.37	0.898
β-reliability level	4	2690.49	2690.49	672.62	1601.48	0
T	2	3789.64	3789.64	1894.82	4511.48	0
S	2	0.31	0.31	0.16	0.37	0.691
Error	300	126	126	0.42		
Total	314	6607.38				
S = 0.648074 R-Sq = 98.09% R-Sq(adj) = 98.00%						

In Table 5, it is seen that according to the F-test, since p-value =0 < 0.05, there is an evidence to conclude that *β*-reliability level and *T*-values affect the mean number of ECs. However, there is insufficient evidence of an effect of *S* values and *α*-reliability levels on the mean number of ECs.

Table 5: Analysis of Variance for the Number of ECs vs. *S*, *T*, *α* and *β*

Analysis of Variance for Number of ECs, using Adjusted SS for Tests						
Source	DF	Seq SS	Adj SS	Adj MS	F	P
α-reliability level	6	1.31	1.31	0.22	0.16	0.986
β-reliability level	4	698.34	698.34	174.58	130.97	0
T	2	2392.99	2392.99	1196.5	897.56	0
S	2	0.13	0.13	0.07	0.05	0.951
Error	300	399.92	399.92	1.33		
Total	314	3492.69				
S = 1.15458 R-Sq = 88.55% R-Sq(adj) = 88.02%						

In Table 6, it is seen that according to the F-test, since all p-values =0 < 0.05, there is an evidence to conclude that S,T, *α*, β affect the mean percentage coverage.

Table 6: Analysis of Variance for the Percentage Coverage vs. *S*, *T*, *α* and *β*

Analysis of Variance for Percentage Coverage, using Adjusted SS for Tests						
Source	DF	Seq SS	Adj SS	Adj MS	F	P
α-reliability level	6	5.0874	5.0874	0.8479	212.78	0
β-reliability level	4	1.0681	1.0681	0.267	67.01	0
T	2	1.9252	1.9252	0.9626	241.57	0
S	2	7.5194	7.5194	3.7597	943.5	0
Error	300	1.1955	1.1955	0.004		
Total	314	16.7956				
S = 0.0631258 R-Sq = 92.88% R-Sq(adj) = 92.55%						

In the following sections, main effects plots are illustrated for 3 different cases.

6.4.1 Overall analysis of Case I

Figure 15.a shows effects of the factors on the mean number of vehicles, Figure 15.b is for the mean number of ECs and Figure 15.c is for the mean percentage coverage.

It is seen from Figure 15.a and 15.b that the mean values of the number of vehicles and the ECs are affected by T and β values. S-values and α-levels do not have significant effect on the average number of vehicles and the ECs. Figure 15.c shows that the mean percentage coverage is significantly affected from S-values and α-levels. However, there is not a significant effect of T and β on the mean percentage coverage.

When T-mandatory coverage distance increases or β-reliability level decreases, the mean number of vehicles needed decreases. Therefore, less mean number of calls can be covered with small mean number of vehicles. However, this effect is not observed easily from Figure 15 because the number of servers is not determined only by **P.10** since the current ECs are introduced as open to the model. The effect of T and β on the mean number of vehicles and mean percentage coverage can be seen more clearly in Figure 17 which is for Case III. Moreover, when S-maximal service distance increases or α-reliability level decreases, more mean number of calls can be covered.

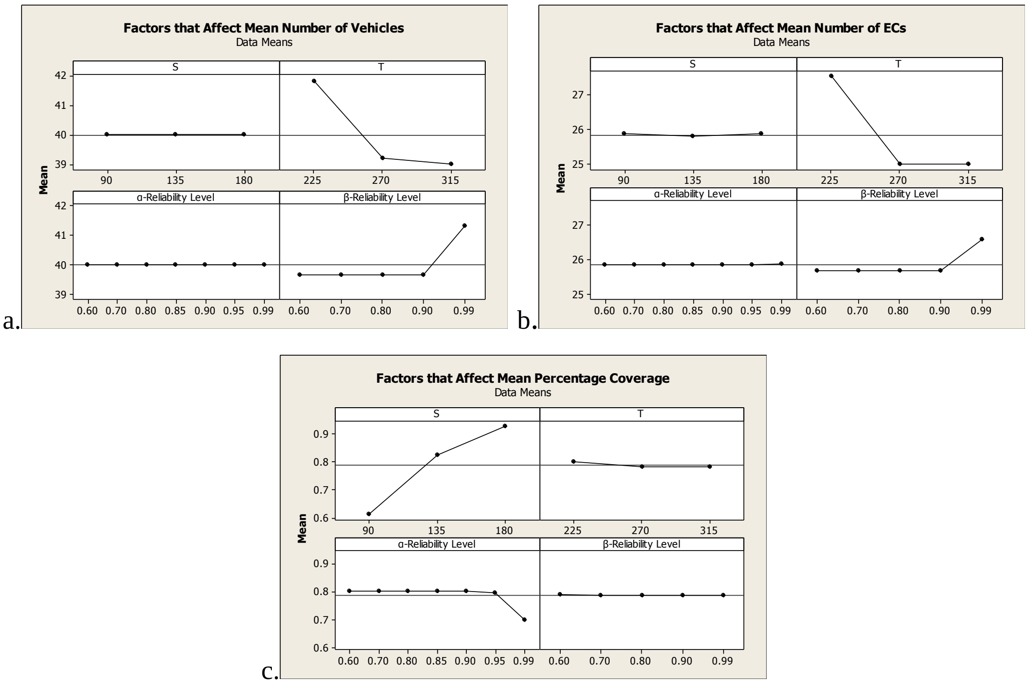

Figure 15: Main Effects Plot of the Problem in Case I

6.4.2 Overall analysis of Case II

Figure 16.a shows that the mean values of ECs are affected by *S*-values and α-levels. Since the number of vehicles is set as 38, the model changes the number of ECs or the locations of them to maximize the objective function for different *S*-values and α-levels. In addition, there is no effect of *T*-values on the number of vehicles because the number of servers is set as 38 in Case II, therefore, the effect of *T* cannot be observed easily on the mean number of ECs.

It is seen from Figure 16.b that the mean percentage coverage is again significantly affected from *S*-values and α-levels. However, there is not a significant effect of *T* and β on the mean percentage coverage.

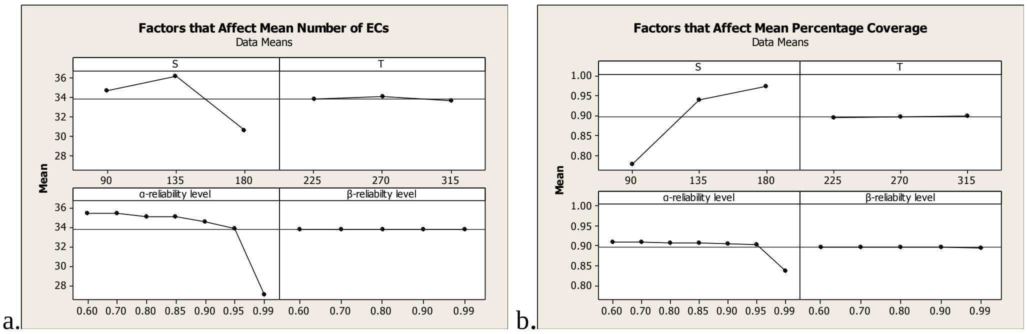

Figure 16: Main Effects Plot of the Problem in Case II

6.4.3 Overall analysis of Case III

Figure 17.a shows effects of the factors on the mean number of vehicles, Figure 17.b is for the mean number of ECs and Figure 17.c is for the mean percentage coverage.

It is seen from Figure 17.a and 17.b that the mean values of the number of vehicles and the ECs are affected by *T* and *β* values. *S*-values and *α*-levels do not have significant effect on the average number of vehicles and the ECs.

Figure 17.c shows that the mean percentage coverage is significantly affected from *S*, *T*, *α* and *β*.When *T*-mandatory coverage distance increases or *β*-reliability level decreases, the mean number of vehicles needed decreases. Therefore, less mean number of calls can be covered with small mean number of vehicles. Moreover, when *S*-maximal service distance increases or *α*-reliability level decreases, more mean number of calls can be covered.

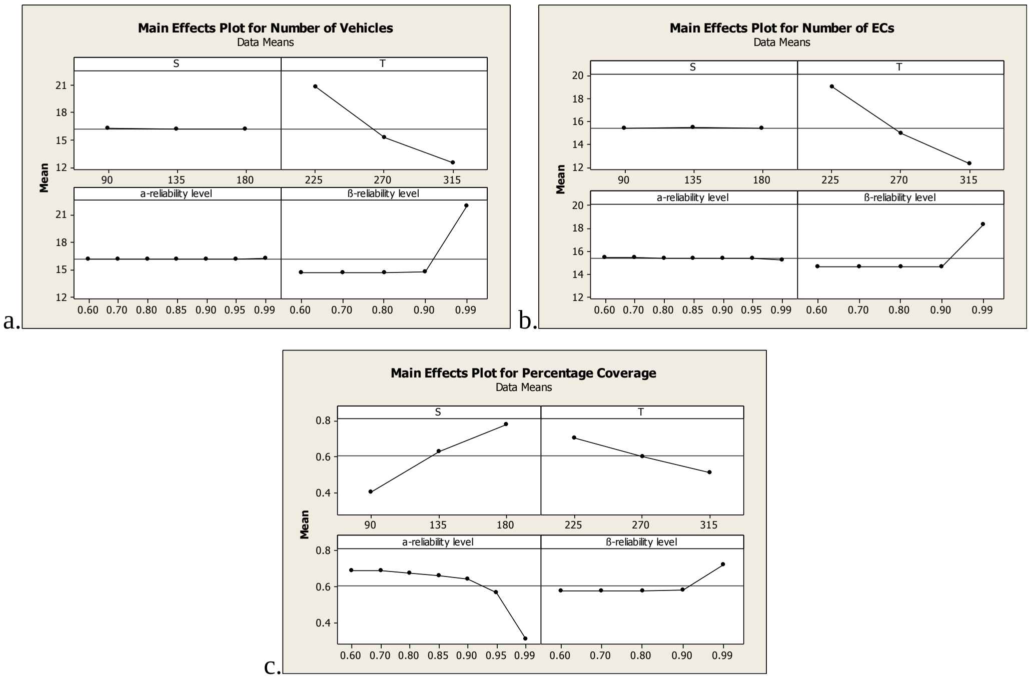

Figure 17: Main Effects Plot of the Problem in Case III

6.5 Comparison of the results for Case I, Case II and Case III

First, the problem is solved for Case I and the number of calls covered is determined for different scenarios. Then, for each scenario, this solution is compared with the results of Case II and Case III. The minimum and maximum percentage of calls covered out of 315 scenarios in Case I; and the corresponding percentage coverage obtained from Case II and Case III for the same scenarios are illustrated in Table 7.

When Case I and Case II are compared, it is seen that by locating less vehicles, but distributing them to the more locations, percentage coverage can be increased. However, this increase is not so significant for the scenarios that provide maximum coverage. The increase in the percentage coverage is significant for the scenarios that provide minimum coverage.

The results of Case III show the maximum percentage coverage obtained with the minimum number of vehicles for each scenario. The scenarios that provide the minimum and maximum percentage coverage out of 315 scenarios in Case I are compared with the results of the corresponding scenarios in Case III. It is seen that although there is not a significant difference in the percentage coverage, the number of vehicles and ECs in Case III are significantly less than the number of vehicles and ECs in Case I for the scenarios that provide maximum coverage. However, there is a significant difference in the percentage coverage between Case I and Case III for the scenarios that provide minimum coverage. The percentage coverage, the number of vehicles and ECs in Case III are significantly less than the percentage coverage, the number of vehicles and ECs in Case I.

It can be concluded from these comparisons that some vehicles and ECs are redundant in the current setup. However, this redundancy is not significant in some scenarios as discussed above.

Table 7: Results for Different Scenarios

					Case I			**Case II**			**Case III**		
	T	***β***	***S***	***α***	**Percentage Coverage**	**# of ECs**	**# of Vehicles**	**Percentage Coverage**	**# of ECs**	**# of Vehicles**	**Percentage Coverage**	**# of ECs**	**# of Vehicles**
Maximum	225	0.99	180	0.6	95.03%	30	45	97.40%	32	38	93.98%	19	28
	225	0.99	180	0.7	95.03%	30	45	97.40%	32	38	93.98%	19	28
	225	0.99	180	0.8	95.03%	30	45	97.40%	32	38	93.98%	19	28
	225	0.99	180	0.85	95.03%	30	45	97.40%	32	38	93.98%	19	28
	225	0.99	180	0.9	95.03%	30	45	97.40%	32	38	93.98%	19	28
	225	0.99	180	0.95	95.03%	30	45	97.40%	33	38	93.98%	19	28
Minimum	270	0.6	90	0.99	45.42%	25	39	66.64%	23	38	7.54%	14	14
	270	0.7	90	0.99	45.42%	25	39	66.64%	23	38	7.54%	14	14
	270	0.8	90	0.99	45.42%	25	39	66.64%	23	38	7.54%	14	14
	270	0.9	90	0.99	45.42%	25	39	66.64%	23	38	7.54%	14	14

The problem is solved for Case I and the results are analyzed for the company's desired *S* and *T* values for different *α* and *β*-reliability levels. As discussed before, the desired service distance- *S* is 135 km (90 min.) and mandatory coverage distance- *T* is 270 km (180 min.) for the case company. Percentage coverage for these distances is analyzed and it is seen that the maximum percentage coverage can be obtained for the scenarios illustrated in Table 8. Maximum percentage coverage is equal to 83.17%, in other words, 3.51 calls out of 4.23 per day are responded within 90 minutes with different *α*-reliability levels and all of the calls are responded within 180 minutes with different *β*-reliability levels. These reliability levels are seen in Table 8.

Table 8: Scenarios that Provide Maximum Percentage Coverage for Case I for the desired *S* and *T* Distances

Mandatory Service Distance (*T*)	**Reliability Requirement-*β***	**Desired Service Distance (*S*)**	**Reliability Requirement-*α***
270 km (180 min.)	0.6	135 km (90 min.)	0.60
	0.7		0.70
	0.8		0.80
	0.9		0.85
			0.9
			0.95

As seen in Table 8, there are more than one *α* and *β* levels that provide 83.17% coverage. Therefore, the highest *α* and *β* levels are selected because if the maximum coverage can be obtained with these levels, same coverage can also be obtained for the lower reliability levels.

When the locations of ECs are analyzed for the highest reliability levels (α=0.95 and β=0.90) for Case I, it is seen that 83.17% coverage can be obtained for the current set-up with an additional one EC with one vehicle. In other words, 83.17% of the calls can be covered within 90 minutes with 39 vehicles located at 25 different cities. Then; the minimum number of servers that provide 83.17% call coverage for S=135 km, T=270 km, α =0.95, and β =0.90 is determined in Case III. For these S, T, α and β-values, the problem is solved for Case III and the locations of the ECs are analyzed. 83.17% call coverage can be provided by 21 vehicles located at 21 ECs. The locations are illustrated in Figure 18. The bold ones are the locations which exist currently and also selected by the model.

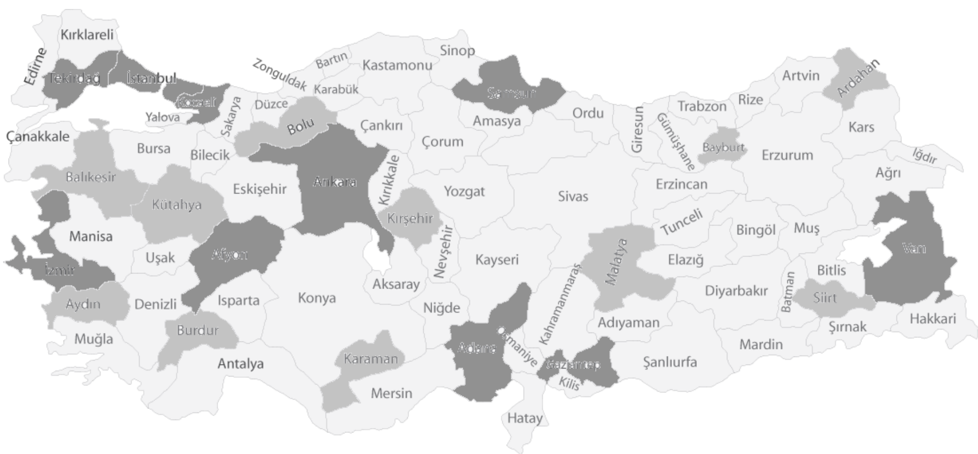

Figure 18: Locations of Emergency Centers of the Problem Solved for Case III

It can be concluded that instead of having 39 vehicles located at 25 cities, the company can obtain the same coverage for the same scenario by having 21 vehicles located at 21 cities. 10 of these ECs are not required to be changed as it is seen in Figure 18. However, 14 of current ECs should be changed with new 11 ECs.

6.6 Managerial decisions

The results of the model with the existing ECs for different scenarios are analyzed and the locations selected more than once are determined. These locations and the number of times that are selected are illustrated in the Table 9.

Table 9: Additional Locations and Their Frequencies

Locations	**Karabük**	**Ardahan**	**Kastamonu**	**Amasya**	**Bolu**	**Sivas**	**Artvin**	**Çorum**	**Sinop**	**Karaman**	**Bartın**	**Düzce**	**Çankırı**	**Ordu**	**Sakarya**
Frequency	164	70	68	57	57	45	35	22	15	15	14	9	6	3	2

Among 315 scenarios, Karabük is selected as additional EC for 164 times. Opening new ECs from scratch is very costly for the firm; therefore, the proposed solution is to open new ECs additional to the existing ones because the current situation does not satisfy the target. The company can open or close ECs to satisfy the customers with the desired reliability levels.

The scenario that S=135 km (90 min.), T=270 km (180 min.), α=0.60 and β=0.60 is analyzed. For this scenario, the following questions can be answered: If the company invests in buying new vehicles, what is the effect of it on the percentage coverage, does it necessary to open new ECs or should the company locate them at the existing ECs? Therefore, the model is solved for this scenario for different number of vehicle buying decisions. Table 10 shows the increase in the percentage coverage and locations of the new vehicles for different vehicle buying decisions.

Table 10: Locations of the New Vehicles for the Scenario S=135 km, T=270 km, α=0.60 and β=0.60

Number of Vehicles to Buy	ECs	Vehicles	% Coverage	Increase in % Coverage	Locations of New Vehicles									
1	25	39	83.17%		Karabük									
2	26	40	84.88%	1.71%	Karabük	Muğla								
3	27	41	86.14%	1.27%	Balıkesir	Muğla	Karabük							
4	28	42	87.03%	0.89%	Balıkesir	Kastamonu	Muğla	Düzce						
5	29	43	87.83%	0.80%	Balıkesir	Kastamonu	Muğla	Ordu	Düzce					
6	30	44	88.63%	0.80%	Balıkesir	Kastamonu	Muğla	Ordu	Ardahan	Düzce				
7	31	45	89.35%	0.72%	Balıkesir	Kastamonu	Muğla	Muş	Ordu	Ardahan	Düzce			
8	32	46	90.04%	0.69%	Balıkesir	Kastamonu	Malatya	Muğla	Muş	Ordu	Ardahan	Düzce		
9	33	47	90.70%	0.66%	Balıkesir	Çorum	Malatya	Muğla	Muş	Ordu	Sinop	Ardahan	Karabük	
10	34	48	91.33%	0.63%	Balıkesir	Çorum	Malatya	Muğla	Muş	Ordu	Sinop	Sivas	Ardahan	Karabük

It is seen from Table 10 that 39 vehicles located at 25 ECs (cities) can cover 83.17% of the calls within 90 minutes with %60 reliability level and all of the calls within 180 minutes with %60 reliability level, in other words, a new vehicle should be bought additional to the existing ones and should be located at the EC located at Karabük.

If the management decides to invest in buying 2 vehicles, the percentage coverage will increase by 1.71. These two vehicles should be located at Karabük and Muğla.

Effects of the additional vehicles on the percentage coverage are seen in Figure 19.

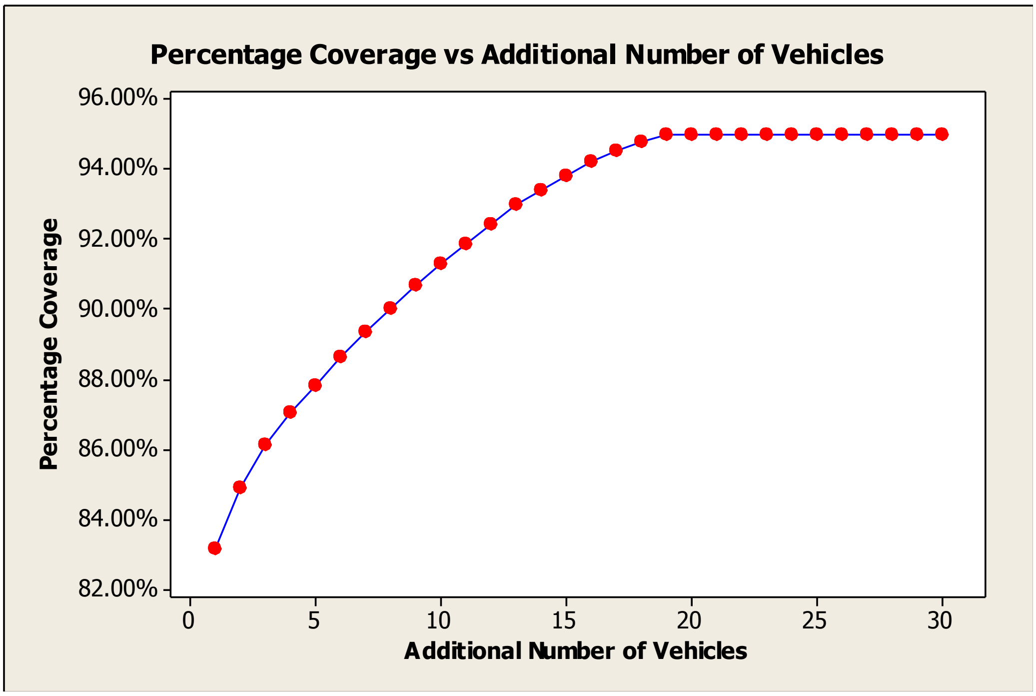

Figure 19: Effects of the Additional Vehicles on the Percentage Coverage for the Scenario S=135 km, T=270 km, α=0.60 and β=0.60

It is seen from Figure 19 that the increase in the percentage coverage is high for additional vehicles between 1 and 5. The increase is in small percentages after the additional number of vehicles between 5 and 20. There is not an increase in the percentage coverage after addition of 20 vehicles because the maximum coverage for this scenario is obtained.

The scenario that S=135 km (90 min.), T=270 km (180 min.), α=0.99 and β=0.99 is also examined. For this scenario, the number of new vehicles and locations, their effects on the percentage coverage is analyzed. Therefore, the model is solved for this scenario for different number of vehicles. Table 11 shows the increase in the percentage coverage and locations of the new vehicles for different vehicle buying decisions.

Table 11: Locations of the New vehicles for the Scenario *S*=135 km, *T*=270 km, α=0.99 and β=0.99

Number of Vehicles to Buy	ECs	Vehicles	% Coverage	Increase in % Coverage	Locations of New Vehicles									
2	25	40	71.13%		Antalya*	Kastamonu								
3	25	41	76.55%	5.43%	Antalya*	Samsun*	Bolu							
4	26	42	79.00%	2.44%	Antalya*	Samsun*	Karabük	Düzce						
5	27	43	81.11%	2.11%	Antalya*	Kırşehir	Samsun*	Karabük	Düzce					
6	29	44	82.49%	1.38%	Antalya*	Amasya	Kırşehir	Ordu	Karabük	Düzce				
7	29	45	83.46%	0.97%	Antalya*	Amasya	Kırşehir	Konya*	Ordu	Karabük	Düzce			
8	30	46	84.37%	0.91%	Antalya*	Amasya	Kırşehir	Konya*	Ordu	Karabük	Osmaniye	Düzce		
9	31	47	85.17%	0.80%	Antalya*	Amasya	Kırşehir	Konya*	Ordu	Ardahan	Karabük	Osmaniye	Düzce	
10	31	48	86.07%	0.91%	Antalya*	Amasya	Kırşehir	Konya*	Muğla(2)	Ordu	Karabük	Osmaniye	Düzce	
11	32	49	86.87%	0.80%	Antalya*	Amasya	Kırşehir	Konya*	Muğla(2)	Ordu	Ardahan	Karabük	Osmaniye	Düzce

Notes: * Existing EC

(2) Number of vehicles

It is seen from Table 11 that 40 vehicles located at 25 ECs (cities) can cover 71.13% of the calls within 90 minutes with %99 reliability level and all of the calls within 180 minutes with %99 reliability level, in other words, two vehicles should be bought additional to the existing ones and should be located at the ECs located at Karabük (new EC) and the existing EC located at Antalya.

If the management decides to invest in buying 3 vehicles, the percentage coverage will increase by 5.43. These three vehicles should be located at Antalya, Samsun and Bolu.

Effects of additional vehicles on percentage coverage are seen in Figure 20.

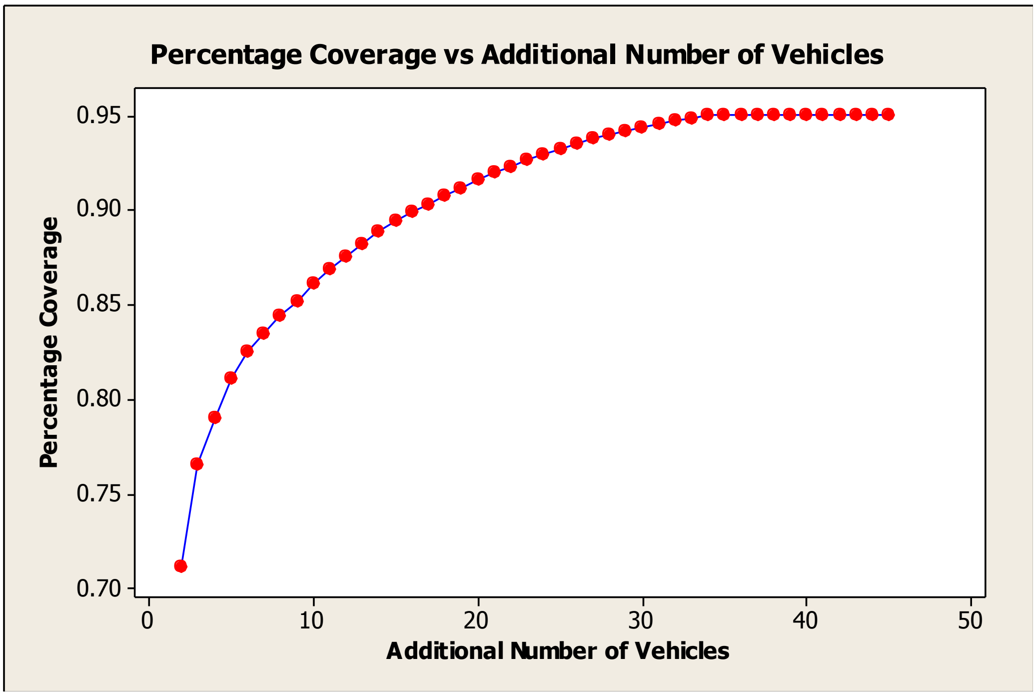

Figure 20: Effects of the Additional Number of Vehicles on the Percentage Coverage for the Scenario S=135 km, T=270 km, α=0.99 and β=0.99

It is seen from Figure 20 that the increase in the percentage coverage is high for the additional number of vehicles between 2 and 4. The increase is in small percentages after the additional number of vehicles between 4 and 36. There is not an increase in percentage coverage after addition of 36 vehicles because the maximum coverage for this scenario is obtained.

CHAPTER 7

CONCLUSIONS AND DIRECTIONS FOR THE FUTURE STUDY

This thesis investigates the locations of emergency centers of Man Truck and Bus Group to respond the calls within the desired time with some quality service level. A data set of emergency service calls of the company within February 2008 and December 2010 is analyzed.

In Chapter 1, the importance of the application studies is emphasized and the motivation of the thesis is explained. A review of the literature in facility location is presented in three parts, namely; deterministic location problems, probabilistic location problems, and dynamic location problems, in Chapter 2. In Chapter 3, a brief description of the case company is presented, the problem of the company is defined, and the current situation of the company is explained. In Chapter 4, the proposed model for the problem is introduced which is named as *maximum availability location problem II with mandatory closeness constraint*. In Chapter 5, 315 different scenarios are generated for different parameter values of the model and these scenarios are analyzed for 3 different cases. In Case I, the problem is solved with the existing emergency centers. In Case II, the problem is solved from scratch with using the current number of emergency service vehicles. In Case III, the minimum number of vehicles that maximizes the number of calls covered for each scenario is determined. The results are discussed in Chapter 6. The determinants of the number of vehicles, emergency centers and the number of calls covered are explained. Overall effects of the maximal service distance and reliability level-α; the mandatory service distance and reliability level-β are analyzed. The factorial design is created by considering *S, T, α,* and *β* as factors; number of vehicles and ECs, and percentage coverage as responses. The effects of the factors on the mean number of vehicles, ECs and mean percentage coverage are determined for 3 cases. The results of the some managerial decisions are examined.

The results show that the number of vehicles is determined by the mandatory service distance- *T* and reliability level- *β*. There is a negative relationship between *T* and the number of vehicles; and a positive relationship between *β* and the number of vehicles. Maximal service distance- *S* and reliability level- *α* do not affect the number of vehicles to locate.

The number of ECs is affected by *T*-value and *β*-reliability level. There is a negative relationship between *T* and the number of ECs and a positive relationship between *β* and the number of ECs. There is no effect of *S*-value and *α*-reliability level on the number of ECs; however their effects are on the locations of ECs.

The number of calls covered or percentage coverage is directly affected by *S*-value and reliability level-*α.* There is a positive relationship between *S*-value and the percentage coverage but there is a negative relationship between the reliability level-*α* and the percentage coverage. *T*-value and reliability level-*β* indirectly affect percentage coverage. When *T*-value or *β*-reliability level increases, if the number of vehicles or the ECs increases, more number of calls can be covered with higher number of vehicles. However, when *T*-value or *β*-reliability level increases, if the number of vehicles or the ECs does not change, percentage coverage does not also change because there is no effect of *T*-value or *β*-reliability level on the locations of ECs.

The results of the problem solved for Case I and Case III are also compared. It is seen that the same coverage can be obtained by locating less number of vehicles than the current number of vehicles. However, closing all the ECs and locating them from scratch is very costly for the firm.

It is proposed to add new vehicles to the existing setup or make some little changes in the locations of ECs which make the company get closer to its targets. It is seen that percentage coverage can be increased by adding new vehicles to the system. However, the increase in percentage coverage is higher for the additional vehicles between approximately 1 and 5 and is stabilized after a point for each scenario.

The model is selected because it is adaptable for the changes in the input parameters and the company encounters changes in its environment often. Therefore, MALP II with mandatory constraint responds the needs of the company and understandable for all levels of the management. For future advancement in the model, the assumptions underlying the formation of the model can be relaxed. The assumption that the probability of different servers being busy is independent can be relaxed by using the formulation of Marianov et al. (1993), which is Q - MALP. Therefore, the only difference will be in the calculations of busy fractions. In addition, travel times can be considered as coming from a probability distribution. Therefore, travel times of the vehicles are not assumed to be as deterministic. Moreover, the assumption that the vehicles in the region around a demand node are fully available for the calls can be relaxed. The probability of the unavailability of the vehicles can be considered in the formulation of the model.

Furthermore, the cost of opening a new EC is assumed to be same. However, there are differences in the cost of opening new ECs according to the cities. Therefore, these costs based on the cities can be minimized in the objective. In addition, the seasonality in the number of calls can be considered and the coordinates of the calls and eligible emergency centers can be used while determining distance matrix.

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APPENDIX A

NUMBER OF VEHICLES FOR EACH EMERGENCY CENTER

Table A.1: Number of Vehicles for each Emergency Center

NUMBER OF VEHICLES	NAME OF EMERGENCY CENTER
3	MUSFAR MAN OTO / AFYON
2	MAN OTO OSTİM / ANKARA
2	MAPAR MAN SERVİSİ / BURSA
2	CAN KARDEŞLER MAN SERVİSİ / DENİZLİ
2	MAN İKİTELLİ / İSTANBUL
2	EGEMAN SERVİS / İZMİR
2	KOYUNCU OTOMOTİV / İZMİR
2	TRAKMAN OTOMOTİV A.Ş / TEKİRDAĞ
2	TURMAN OTOMOTİV / TRABZON
1	İKİKARDEŞ MAN SERVİSİ / ADANA
1	GÜZELLER MAN / AKSARAY
1	MAN OTOMOTİV LTD. / ANKARA
1	BAYSAL MOTORLU ARAÇLAR / ANTALYA
1	DİYAR MAN / DİYARBAKIR
1	AYMAN OTOMOTİV / ELAZIĞ
1	DOĞUMAN SERVİSİ / ERZURUM
1	SEYYAH OTOMOTİV / ESKİŞEHİR
1	DÖŞMAN MAN SERVİSİ / GAZİANTEP
1	MAHANOĞLU OTOMOTİV / HATAY
1	GÜNEY PETROLLERİ KÖKSALLAR / MERSİN
1	MESEL OTO / İSTANBUL
1	YAŞAR KARDEŞLER OTOMOTİV / KAYSERİ
1	BAKİLER MAN SERVİSİ / KOCAELİ

Table A.1 (cont'd)

NUMBER OF VEHICLES	NAME OF EMERGENCY CENTER
1	KONYA KOYUNCU OTOM /KONYA
1	TEKMAN OTOMOTİV / MARDİN
1	KAMER OTO / SAMSUN
1	HASAN ÖZER MAN / TRABZON
1	VAN MAN OTOMOTİV / VAN
0	ANKARA KAZAN / ANKARA
0	YAŞAR KARDEŞLER / SİVAS

APPENDIX B

AVERAGE RESPONSE TIME PER CALL FOR EACH EMERGENCY CENTER

Table B.1: Average Response Time per Call for Each Emergency Center

EMERGENCY CENTER	CITY	NUMBER OF CALLS WITH RECORDED RESPONSE TIMES	TOTAL RESPONSE TIMES (IN MINUTES)	RESPONSE TIME PER CALL (IN MINUTES)
AKÇAOLMAN MAN SERVİSİ	DÜZCE	59	11115.18	188.39
AKDENİZ OTOMOTİV	KOCAELİ	2	59.00	29.50
AKMAN OTOMOTİV	KOCAELİ	19	1519.80	79.99
ASLAN MAN	GAZİANTEP	36	5850.47	162.51
AYMAN OTOMOTİV	ELAZIĞ	29	6126.98	211.28
BAKİLER MAN SERVİSİ	KOCAELİ	119	14334.45	120.46
BAYSAL MOTORLU ARAÇLAR	ANTALYA	125	15589.01	124.71
CAN KARDEŞLER MAN SERVİSİ	DENİZLİ	46	6243.91	135.74
ÇORUM MAN	ÇORUM	33	6822.96	206.76
DİYAR MAN	DİYARBAKIR	26	3770.98	145.04
DOĞUMAN SERVİSİ	ERZURUM	15	3318.98	221.27
DÖŞMAN MAN SERVİSİ	GAZİANTEP	11	2850.50	259.14
EFENDİOĞLU MOT.ARAÇLAR	ERZURUM	14	2462.98	175.93
EGEMAN SERVİS	İZMİR	107	17588.97	164.38
GRUPMAN MAN OTO	ANKARA	17	1651.96	97.17
GÜZELLER MAN	AKSARAY	6	588.00	98.00

Table B.1(cont'd)

EMERGENCY CENTER	CITY	NUMBER OF CALLS WITH RECORDED RESPONSE TIMES	TOTAL RESPONSE TIMES (IN MINUTES)	RESPONSE TIME PER CALL (IN MINUTES)
GÜNEY PETROLLERİ KÖKSALLAR	MERSİN	110	15712.00	142.84
HASAN ÖZER MAN	TRABZON	5	1554.00	310.80
KAMER OTO.	SAMSUN	79	10390.44	131.52
KOMFORT MAN	BURSA	88	7426.58	84.39
KONYA KOYUNCU OTO.	KONYA	40	6157.99	153.95
KOYUNCU OTOMOTİV	İZMİR	58	6723.80	115.93
MAHANOĞLU OTOMOTİV	HATAY	4	426.00	106.50
MAN İKİTELLİ	İSTANBUL	197	16799.45	85.28
MAN OTOMOTİV LTD.	ANKARA	326	66495.98	203.98
MAPAR MAN SERVİSİ	BURSA	61	8700.07	142.62
MESEL OTO	İSTANBUL	215	17337.67	80.64
MUSFAR MAN OTO	AFYON	115	11647.66	101.28
SEYYAH OTOMOTİV	ESKİŞEHİR	28	3224.89	115.17
ŞAHİNLER OTOMOTİV	İSTANBUL	31	1432.56	46.21
TEKMAN OTOMOTİV	MARDİN	8	2708.50	338.56
TİMUÇİNLER AŞ	KAYSERİ	1	166.00	166.00
TRAKMAN OTOMOTİV A.Ş	TEKİRDAĞ	206	20613.24	100.06
TURMAN OTOMOTİV	TRABZON	85	21887.14	257.50
VAN MAN OTOMOTİV	VAN	1	120.00	120.00
YAŞAR KARDEŞLER OTOMOTİV	KAYSERİ	37	6557.05	177.22
YILMAZ OTOMOTİV	DENİZLİ	22	2405.98	109.36

APPENDIX C

NUMBER OF CALLS PER MONTH FOR EACH CITY

Table C.1: Number of Calls per Month for Each City

CITIES	TOTAL CALLS FOR 3 YEARS	CALLS PER MONTH
ADANA	169	4.69
ADIYAMAN	7.1	0.20
AFYON	138	3.83
AĞRI	9.1	0.25
AMASYA	40	1.11
ANKARA	414	11.50
ANTALYA	167	4.64
ARTVİN	24	0.67
AYDIN	39	1.08
BALIKESİR	78	2.17
BİLECİK	43	1.19
BİNGÖL	19.1	0.53
BİTLİS	10	0.28
BOLU	79	2.19
BURDUR	24	0.67
BURSA	171	4.75
ÇANAKKALE	20	0.56
ÇANKIRI	16	0.44
ÇORUM	38	1.06
DENİZLİ	73	2.03
DİYARBAKIR	19	0.53
EDİRNE	53	1.47
ELAZIĞ	13	0.36

Table C.1 (cont'd)

CITIES	TOTAL CALLS FOR 3 YEARS	CALLS PER MONTH
ERZİNCAN	59	1.64
ERZURUM	54	1.50
ESKİŞEHİR	47	1.31
GAZİANTEP	51	1.42
GİRESUN	14	0.39
GÜMÜŞHANE	16	0.44
HAKKARİ	1.2	0.03
HATAY	14	0.39
ISPARTA	28	0.78
İÇEL	111	3.08
İSTANBUL	800	22.22
İZMİR	202	5.61
KARS	8	0.22
KASTAMONU	23	0.64
KAYSERİ	40	1.11
KIRKLARELİ	20	0.56
KIRŞEHİR	11.1	0.31
KOCAELİ	225	6.25
KONYA	90	2.50
KÜTAHYA	73	2.03
MALATYA	54	1.50
MANİSA	59	1.64
K.MARAŞ	10	0.28
MARDİN	8	0.22
MUĞLA	79	2.19
MUŞ	4.1	0.11
NEVŞEHİR	15	0.42
NİĞDE	10	0.28
ORDU	17	0.47
RİZE	8	0.22
SAKARYA	89	2.47
SAMSUN	88	2.44
SİİRT	3.1	0.09

Table C.1 (cont'd)

CITIES	TOTAL CALLS FOR 3 YEARS	CALLS PER MONTH
SİNOP	23.1	0.64
SİVAS	25	0.69
TEKİRDAĞ	236	6.56
TOKAT	14	0.39
TRABZON	32	0.89
TUNCELİ	7.2	0.20
ŞANLIURFA	22	0.61
UŞAK	31	0.86
VAN	14	0.39
YOZGAT	8	0.22
ZONGULDAK	18.1	0.50
AKSARAY	26	0.72
BAYBURT	16	0.44
KARAMAN	8	0.22
KIRIKKALE	28	0.78
BATMAN	10	0.28
ŞIRNAK	9	0.25
BARTIN	5.1	0.14
ARDAHAN	5	0.14
IĞDIR	0.3	0.01
YALOVA	34	0.94
KARABÜK	8.1	0.23
KİLİS	0.3	0.01
OSMANİYE	11	0.31
DÜZCE	46	1.28
TOTAL	4630	128.61

APPENDIX D

INDICES AND LOCATIONS OF EMERGENCY CENTERS

Table D.1: Indices and Locations of Emergency Centers

INDEX(j)	CITIES	INDEX(j)	CITIES	INDEX(j)	CITIES
1	ADANA	28	GİRESUN	55	SAMSUN
2	ADIYAMAN	29	GÜMÜŞHANE	56	SİİRT
3	AFYON	30	HAKKARİ	57	SİNOP
4	AĞRI	31	HATAY	58	SİVAS
5	AMASYA	32	ISPARTA	59	TEKİRDAĞ
6	ANKARA	33	İÇEL	60	TOKAT
7	ANTALYA	34	İSTANBUL	61	TRABZON
8	ARTVİN	35	İZMİR	62	TUNCELİ
9	AYDIN	36	KARS	63	ŞANLIURFA
10	BALIKESİR	37	KASTAMONU	64	UŞAK
11	BİLECİK	38	KAYSERİ	65	VAN
12	BİNGÖL	39	KIRKLARELİ	66	YOZGAT
13	BİTLİS	40	KIRŞEHİR	67	ZONGULDAK
14	BOLU	41	KOCAELİ	68	AKSARAY
15	BURDUR	42	KONYA	69	BAYBURT
16	BURSA	43	KÜTAHYA	70	KARAMAN
17	ÇANAKKALE	44	MALATYA	71	KIRIKKALE
18	ÇANKIRI	45	MANİSA	72	BATMAN
19	ÇORUM	46	KAHRAMANMARAŞ	73	ŞIRNAK
20	DENİZLİ	47	MARDİN	74	BARTIN
21	DİYARBAKIR	48	MUĞLA	75	ARDAHAN
22	EDİRNE	49	MUŞ	76	IĞDIR
23	ELAZIĞ	50	NEVŞEHİR	77	YALOVA
24	ERZİNCAN	51	NİĞDE	78	KARABÜK
25	ERZURUM	52	ORDU	79	KİLİS

Table D.1 (cont'd)

INDEX(j)	CITIES	INDEX(j)	CITIES	INDEX(j)	CITIES
26	ESKİŞEHİR	53	RİZE	80	OSMANİYE
27	GAZİANTEP	54	SAKARYA	81	DÜZCE

APPENDIX E

INDICES, DEMAND NODES AND THEIR NAMES

Table E.1: Indices, Demand Nodes and Their Names

INDEX(i)	CITIES	DISTRICTS
1	ADANA	Center
2	ADIYAMAN	Center
3	AFYON	Center
4	AĞRI	Center
5	AMASYA	Center
6	ANKARA	Center
7	ANTALYA	Center
8	ARTVİN	Center
9	AYDIN	Center
10	BALIKESİR	Center
11	BİLECİK	Center
12	BİNGÖL	Center
13	BİTLİS	Center
14	BOLU	Center
15	BURDUR	Center
16	BURSA	Center
17	ÇANAKKALE	Center
18	ÇANKIRI	Center
19	ÇORUM	Center
20	DENİZLİ	Center
21	DİYARBAKIR	Center
22	EDİRNE	Center
23	ELAZIĞ	Center
24	ERZİNCAN	Center
25	ERZURUM	Center
26	ESKİŞEHİR	Center
27	GAZİANTEP	Center

Table E.1 (cont'd)

INDEX(i)	CITIES	DISTRICTS
28	GİRESUN	Center
29	GÜMÜŞHANE	Center
30	HAKKARİ	Center
31	HATAY	Center
32	ISPARTA	Center
33	İÇEL	Center
34	İSTANBUL	Center
35	İZMİR	Center
36	KARS	Center
37	KASTAMONU	Center
38	KAYSERİ	Center
39	KIRKLARELİ	Center
40	KIRŞEHİR	Center
41	KOCAELİ	Center
42	KONYA	Center
43	KÜTAHYA	Center
44	MALATYA	Center
45	MANİSA	Center
46	KAHRAMANMARAŞ	Center
47	MARDİN	Center
48	MUĞLA	Center
49	MUŞ	Center
50	NEVŞEHİR	Center
51	NİĞDE	Center
52	ORDU	Center
53	RİZE	Center
54	SAKARYA	Center
55	SAMSUN	Center
56	SİİRT	Center
57	SİNOP	Center
58	SİVAS	Center
59	TEKİRDAĞ	Center
60	TOKAT	Center
61	TRABZON	Center
62	TUNCELİ	Center
63	ŞANLIURFA	Center
64	UŞAK	Center

Table E.1 (cont'd)

INDEX(i)	CITIES	DISTRICTS
65	VAN	Center
66	YOZGAT	Center
67	ZONGULDAK	Center
68	AKSARAY	Center
69	BAYBURT	Center
70	KARAMAN	Center
71	KIRIKKALE	Center
72	BATMAN	Center
73	ŞIRNAK	Center
74	BARTIN	Center
75	ARDAHAN	Center
76	IĞDIR	Center
77	YALOVA	Center
78	KARABÜK	Center
79	KİLİS	Center
80	OSMANİYE	Center
81	DÜZCE	Center
82	ADANA	Tufanbeyli
83	AFYON	Basmakçı
84	AFYON	Emirdağ
85	ANKARA	Nallıhan
86	ANKARA	Şereflikoçhisar
87	ANTALYA	Kaş
88	ANTALYA	Gazipaşa
89	BALIKESİR	Bandırma
90	BALIKESİR	Dursunbey
91	BALIKESİR	Ayvalık
92	BURSA	İznik
93	BURSA	Harmancık
94	ÇANAKKALE	Gelibolu
95	ERZURUM	İspir
96	ERZURUM	Karayazı
97	İÇEL	Anamur
98	İÇEL	Tarsus
99	İSTANBUL	Çatalca
100	İSTANBUL	Tuzla
101	İZMİR	Bergama

Table E.1 (cont'd)

INDEX(i)	CITIES	DISTRICTS
102	İZMİR	Ödemiş
103	İZMİR	Çeşme
104	KOCAELİ	Gebze
105	KOCAELİ	Karamürsel
106	KONYA	Ereğli
107	KONYA	Cihanbeyli
108	KONYA	Akşehir
109	MUĞLA	Fethiye
110	MUĞLA	Milas
111	TEKİRDAĞ	Çorlu
112	TEKİRDAĞ	Malkara
113	BOLU	Gerede
114	BOLU	Göynük
115	DENİZLİ	Çameli
116	DENİZLİ	Çivrili
117	ESKİŞEHİR	Sivrihisar
118	ESKİŞEHİR	İnönü
119	KAYSERİ	Pınarbaşı
120	KAYSERİ	Yahyalı
121	SAKARYA	Gevye
122	SAKARYA	Akyazı
123	SAMSUN	Vezirköprü
124	SAMSUN	Terme
125	SİVAS	Divriği
126	SİVAS	Gürün
127	SİVAS	Koyulhisar
128	KÜTAHYA	Domaniç
129	KÜTAHYA	Gediz
130	ERZİNCAN	Kemaliye
131	ERZİNCAN	Tercan
132	MANİSA	Demirci
133	MANİSA	Soma
134	MALATYA	Arapkir
135	MALATYA	Darende
136	MALATYA	Doğanşehir
137	EDİRNE	Keşan
138	GAZİANTEP	Araban

Table E.1 (cont'd)

INDEX(i)	CITIES	DISTRICTS
139	GAZİANTEP	İslahiye
140	VAN	Başkale
141	VAN	Çaldıran
142	TRABZON	Çaykara
143	TRABZON	Şalpazarı
144	ÇORUM	Kargı
145	ÇORUM	Sungurlu
146	ŞANLIURFA	Birecik
147	ŞANLIURFA	Siverek
148	KAHRAMANMARAŞ	Elbistan
149	YOZGAT	Akmağdeni
150	YOZGAT	Boğazlıyan
151	KASTAMONU	Cide
152	KASTAMONU	Hanönü
153	ISPARTA	Yalvaç
154	UŞAK	Karahallı
155	AYDIN	Karacasu
156	DİYARBAKIR	Kulp
157	DİYARBAKIR	Çüngüş
158	AĞRI	Doğubeyazıt
159	AMASYA	Gümüşhacıköy
160	ADANA	Kozan
161	ADANA	Pozantı
162	ANKARA	Kalecik
163	ANKARA	Kızılcahamam
164	ANKARA	Polatlı
165	ANTALYA	Akseki
166	İSTANBUL	Büyükçekmece
167	İSTANBUL	Silivri
168	İSTANBUL	Sultanbeyli
169	İSTANBUL	Şile
170	TEKİRDAĞ	Saray

APPENDIX F

GAMS CODE FOR THE MODEL OF CASE I

```
Set
i  demand nodes
/1*170/
j emergency centers
/1*81/
k number of vehicles to cover with some reliability
/1*20/
l parameter
/1/
o(j) locations of current open emergency centers
/1,7,21,23,25,26,27,31,33,38,41,42,47,55,65,68/
u(j) locations of potential emergency centers
/78,75,37,14,5,58,8,19,57,70,74,81,18,52,54,2,4,9,10
11,12,13,15,17,22,24,28,29,30,32,36,39,40,43,44,45,46
48,49,50,51,53,56,60,62,63,64,66,67,69,71,72,73,76,77,79
80/
;
alias(k,k1);
$CALL GDXXRW.EXE Data.xls par= N rng=N!a1:fo171'
Parameter N(i,j) distance matrix for S km vicinity
;
$GDXIN Data.gdx
$LOAD N
$GDXIN
$CALL GDXXRW.EXE Data.xls par= M rng=M!a1:fo171'
Parameter M(i,j)  distance matrix for T km vicinity
;
$GDXIN Data.gdx
$LOAD M
$GDXIN
$CALL GDXXRW.EXE Data.xls par= s rng=S!h2:i172'
Parameter s(i,l)     minumum number of vehicles required for each node i to provide alpha reliability;
```

```
$GDXIN Data.gdx
$LOAD s
$GDXIN
$CALL GDXXRW.EXE Data.xls par= t rng=T!h2:i172'
Parameter t(i,l)      minumum number of vehicles required for each node i to provide beta reliability
;
$GDXIN Data.gdx
$LOAD t
$GDXIN
$CALL GDXXRW.EXE Data.xls par= f rng=calls!f1:g171'
Parameter f(i,l) frequency of calls for each demand node i
;
$GDXIN Data.gdx
$LOAD f
$GDXIN
;
Variables
x(j)       integer number of servers at j
y(i,k)     it is 1 if demand area i has at least k servers in Ni- Zero otherwise
z          total coverage  ;
integer variables x;
Binary variables y;
Scalar
p/45/
;
Equations
objective  define objective function
count(i) the number of times that node i is covered within S must be <= to # of servers within S
must(i,k,k1) yik cannot be one unless yik-1 is one
mand(i)   demand nodes should be covered with some reliability within T
total number of vehicles to locate

current(j) current open emergency centers
currentmax(j) maximum number of vehicles for each emergency center j which contains 1 vehicle

ankara   there are 3 vehicles located at Ankara
istanbul there are 3 vehicles located at İstanbul
izmir    there are 4 vehicles located at İzmir
trabzon  there are 3 vehicles located at Trabzon
afyon there are 3 vehicles located at Afyon
bursa there are 2 vehicles located at Bursa
denizli there are 2 vehicles located at Denizli
```

```
tekirdag there are 2 vehicles located at Tekirdağ


ankaramax   there are at most 12  vehicles located at Ankara
istanbulmax there are at most  9 vehicles located at İstanbul
izmirmax    there are  at most 10 vehicles located at İzmir
trabzonmax  there are  at most 9 vehicles located at Trabzon
afyonmax there are  at most 6 vehicles located at Afyon
bursamax there are  at most 5 vehicles located at Bursa
denizlimax there are  at most 5 vehicles located at Denizli
tekirdagmax there are at most  5 vehicles located at Tekirdağ
maxnum(j) maximum number of additional emergency service vehicles are at most 3;
objective ..z =e= sum ( (i,k) $ (ord(k)=s(i,'1'))  , f(i,'1')*y(i,k)) ;
count(i).. sum(k$(ord(k) le s(i,'1') ), y(i,k)) =l= sum (j, ( N(i,j)* x(j)) ) ;
must(i,k,k1) $ ( (ord (k) >= 2 ) $ (ord (k)<= s(i,'1')) $ ( ord(k1)= ord(k)-1) )..
y(i,k) =l= y (i,k1) ;
mand(i).. sum (j,( M(i,j) * x(j) ) )=g= t(i,'1') ;
current(o).. x(o)=g=1;
maxnum(u)..x(u)=l=3;
currentmax(o)..x(o)=l=4;
ankara.. x('6')=g= 3;
istanbul..x('34')=g=3;
izmir..x('35')=g=4;
trabzon..x('61')=g=3;
afyon..x('3')=g=3;
bursa..x('16')=g=2;
denizli..x('20')=g=2;
tekirdag..x('59')=g=2;
ankaramax.. x('6')=l=12 ;
istanbulmax..x('34')=l=9;
izmirmax..x('35')=l=10;
trabzonmax..x('61')=l=9;
afyonmax..x('3')=l=6;
bursamax..x('16')=l=5;
denizlimax..x('20')=l=5;
tekirdagmax..x('59')=l=5;
total..sum(j,x(j))=l= p ;
Model MCLP /all/ ;
option optca = 0;
option optcr = 0;
solve MCLP using mip maximizing z;
execute_unload "existing.gdx" z.L , x.L
execute 'gdxxrw.exe existing.gdx var=z.L rng=result!f2'
execute 'gdxxrw.exe existing.gdx var=x.L rng=result!h2:ln3'
```

APPENDIX G

GAMS CODE FOR THE MODEL OF CASE II

```
Set
i/1*170/
j/1*81/
k  /1*20/
l /1/
 o(j) other potential emergency center locations
/1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22
23,24,25,26,27,28,29,30,31,32,33,36,37,38,39,40,41,42
43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60
61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78, 79,80,81/;
alias(k,k1);
$CALL GDXXRW.EXE Data.xls par= N rng=N!a1:fo171'
Parameter N(i,j);
$GDXIN Data.gdx
$LOAD N
$GDXIN
$CALL GDXXRW.EXE Data.xls par= M rng=M!a1:fo171'
Parameter M(i,j) ;
$GDXIN Data.gdx
$LOAD M
$GDXIN
$CALL GDXXRW.EXE Data.xls par= s rng=S!h2:i172'
Parameter s(i,l) ;
$GDXIN Data.gdx
$LOAD s
$GDXIN
$CALL GDXXRW.EXE Data.xls par= t rng=T!h2:i172'
Parameter t(i,l) ;
$GDXIN Data.gdx
$LOAD t
$GDXIN
$CALL GDXXRW.EXE Data.xls par= f rng=calls!f1:g171'
Parameter f(i,l) ;
```

```
$GDXIN Data.gdx
$LOAD f
$GDXIN;
Variables
x(j)      integer number of servers at j
y(i,k)    it is 1 if demand area i has at least k servers in Ni Zero otherwise
z         total coverage  ;
integer variables x;
Binary variables y;
Scalar
p/38/;
Equations
objective  define objective function
count(i) the number of times that node i is covered within S must be <= to # of servers within S
must(i,k,k1) yik cannot be one unless yik-1 is one
mand(i)   demand nodes should be covered with some reliability within T
total number of vehicles to locate
ankara   there is at least 1 emergency service vehicles located at Ankara
istanbul there is at least 1 emergency service vehicles located at İstanbul
izmir    there is at least 1 emergency service vehicles located at İzmir
ankaramax
istanbulmax
izmirmax
othermax(j);
objective ..z =e= sum ( (i,k) $ (ord(k)=s(i,'1'))  , f(i,'1')*y(i,k)) ;
count(i).. sum(k$(ord(k) le s(i,'1') ), y(i,k)) =l= sum (j, ( N(i,j)* x(j)) ) ;
must(i,k,k1) $ ( (ord (k) >= 2 ) $ (ord (k)<= s(i,'1')) $ ( ord(k1)= ord(k)-1) )..
y(i,k) =l= y (i,k1) ;
mand(i).. sum (j,( M(i,j) * x(j) ) )=g= t(i,'1') ;
ankara.. x('6')=g= 1;
istanbul..x('34')=g=1;
izmir..x('35')=g=1;
ankaramax.. x('6')=l= 4;
istanbulmax..x('34')=l=4;
izmirmax..x('35')=l=4;
total..sum(j,x(j))=e= p ;
othermax(o)..x(o)=l=3;
Model MCLP /all/ ;
option optca = 0;
option optcr = 0;
solve MCLP using mip maximizing z;
execute_unload "existing.gdx" z.L , x.L
execute 'gdxxrw.exe existing.gdx var=z.L rng=result!f2'
execute 'gdxxrw.exe existing.gdx var=x.L rng=result!h2:ln3'.
```

APPENDIX H

THE RESULTS OF THE PROBLEM SOLVED FOR 3 CASES

The following tables show the results of the problem for 3 cases. Table H.1 is for the results of Case I, Table H.2 is for the results of Case II and Table H.3 is for the results of Case III. The abbreviation list used in the tables is provided below:

#: Scenario number

Z: Number of calls covered

E: Number of emergency centers opened

V: Number of vehicles located

L: Location of each emergency center

N: Number of vehicles located at each emergency center

Table H.1: The Results of the Problem solved for Case I

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these ECs																											
1	225	0.6	90	0.6	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
2	225	0.6	90	0.7	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
3	225	0.6	90	0.8	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
4	225	0.6	90	0.85	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
5	225	0.6	90	0.9	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
6	225	0.6	90	0.95	2.66	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
7	225	0.6	90	0.99	2.66	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
8	225	0.6	135	0.6	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
9	225	0.6	135	0.7	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
10	225	0.6	135	0.8	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
11	225	0.6	135	0.85	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
12	225	0.6	135	0.9	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
13	225	0.6	135	0.95	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
14	225	0.6	135	0.99	3.08	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	74	75
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
15	225	0.6	180	0.6	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
16	225	0.6	180	0.7	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
17	225	0.6	180	0.8	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
18	225	0.6	180	0.85	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
19	225	0.6	180	0.9	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
20	225	0.6	180	0.95	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
21	225	0.6	180	0.99	3.83	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
22	225	0.7	90	0.6	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
23	225	0.7	90	0.7	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
24	225	0.7	90	0.8	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
25	225	0.7	90	0.85	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
26	225	0.7	90	0.9	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
27	225	0.7	90	0.95	2.66	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
28	225	0.7	90	0.99	1.95	27	41	**L**	1	3	6	7	8	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	52	55	59	61	65	68
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1
29	225	0.7	135	0.6	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
30	225	0.7	135	0.7	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
31	225	0.7	135	0.8	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
32	225	0.7	135	0.85	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
33	225	0.7	135	0.9	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
34	225	0.7	135	0.95	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
35	225	0.7	135	0.99	3.08	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	74	75
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1

Table H.1 (cont’d)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these ECs																										
36	225	0.7	180	0.6	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
37	225	0.7	180	0.7	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
38	225	0.7	180	0.8	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
39	225	0.7	180	0.85	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
40	225	0.7	180	0.9	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
41	225	0.7	180	0.95	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
42	225	0.7	180	0.99	3.83	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
43	225	0.8	90	0.6	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
44	225	0.8	90	0.7	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
45	225	0.8	90	0.8	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
46	225	0.8	90	0.85	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
47	225	0.8	90	0.9	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
48	225	0.8	90	0.95	2.66	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
49	225	0.8	90	0.99	1.95	27	41	**L**	1	3	6	7	8	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	52	55	59	61	65	68
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1
50	225	0.8	135	0.6	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
51	225	0.8	135	0.7	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
52	225	0.8	135	0.8	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
53	225	0.8	135	0.85	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
54	225	0.8	135	0.9	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
55	225	0.8	135	0.95	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
56	225	0.8	135	0.99	3.08	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	74	75
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
57	225	0.8	180	0.6	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
58	225	0.8	180	0.7	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
59	225	0.8	180	0.8	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
60	225	0.8	180	0.85	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
61	225	0.8	180	0.9	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
62	225	0.8	180	0.95	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
63	225	0.8	180	0.99	3.83	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
64	225	0.9	90	0.6	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
65	225	0.9	90	0.7	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
66	225	0.9	90	0.8	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
67	225	0.9	90	0.85	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
68	225	0.9	90	0.9	2.73	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
69	225	0.9	90	0.95	2.66	27	41	**L**	1	3	5	6	7	8	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	1	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
70	225	0.9	90	0.99	1.95	27	41	**L**	1	3	6	7	8	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	52	55	59	61	65	68
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1
71	225	0.9	135	0.6	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
72	225	0.9	135	0.7	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
73	225	0.9	135	0.8	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
74	225	0.9	135	0.85	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1
75	225	0.9	135	0.9	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1

Table H.1 (cont'd)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these ECs																														
76	225	0.9	135	0.95	3.58	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78			
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1			
77	225	0.9	135	0.99	3.08	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	74	75			
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1			
78	225	0.9	180	0.6	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75			
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1			
79	225	0.9	180	0.7	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75			
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1			
80	225	0.9	180	0.8	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75			
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1			
81	225	0.9	180	0.85	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75			
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1			
82	225	0.9	180	0.9	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75			
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1			
83	225	0.9	180	0.95	4.00	27	41	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	75			
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1			
84	225	0.9	180	0.99	3.83	27	41	**L**	1	3	5	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	75	78			
								N	1	3	1	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1	1			
85	225	0.99	90	0.6	2.81	30	45	**L**	1	3	6	7	8	14	16	19	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	70
								N	1	3	3	2	1	1	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
86	225	0.99	90	0.7	2.81	30	45	**L**	1	3	6	7	8	14	16	19	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	70
								N	1	3	3	2	1	1	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
87	225	0.99	90	0.8	2.81	30	45	**L**	1	3	6	7	8	14	16	19	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	70
								N	1	3	3	2	1	1	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
88	225	0.99	90	0.85	2.81	30	45	**L**	1	3	6	7	8	14	16	19	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	70
								N	1	3	3	2	1	1	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
89	225	0.99	90	0.9	2.81	30	45	**L**	1	3	6	7	8	14	16	19	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	70
								N	1	3	3	2	1	1	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1
90	225	0.99	90	0.95	2.76	30	45	**L**	1	3	6	7	8	16	19	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	54	55	58	59	61	65	68	70
								N	1	3	3	2	1	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	1	2	3	1	1	1
91	225	0.99	90	0.99	2.23	30	45	**L**	1	3	6	7	8	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	54	55	57	58	59	61	65	68	70
								N	1	3	3	2	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	1	1	2	3	1	1	1
92	225	0.99	135	0.6	3.64	29	45	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	57	58	59	61	65	68	75	78	
								N	1	3	3	2	2	1	2	1	1	1	1	1	1	2	3	4	1	1	1	1	1	1	1	2	3	1	1	1	1	
93	225	0.99	135	0.7	3.64	29	45	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	57	58	59	61	65	68	75	78	
								N	1	3	3	2	2	1	2	1	1	1	1	1	1	2	3	4	1	1	1	1	1	1	1	2	3	1	1	1	1	
94	225	0.99	135	0.8	3.64	29	45	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	57	58	59	61	65	68	75	78	
								N	1	3	3	2	2	1	2	1	1	1	1	1	1	2	3	4	1	1	1	1	1	1	1	2	3	1	1	1	1	
95	225	0.99	135	0.85	3.64	29	45	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	57	58	59	61	65	68	75	78	
								N	1	3	3	2	2	1	2	1	1	1	1	1	1	2	3	4	1	1	1	1	1	1	1	2	3	1	1	1	1	
96	225	0.99	135	0.9	3.64	29	45	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	57	58	59	61	65	68	75	78	
								N	1	3	3	2	2	1	2	1	1	1	1	1	1	2	3	4	1	1	1	1	1	1	1	2	3	1	1	1	1	
97	225	0.99	135	0.95	3.64	29	45	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	57	58	59	61	65	68	75	78	
								N	1	3	3	2	2	1	2	1	1	1	1	1	1	2	3	4	1	1	1	1	1	1	1	2	3	1	1	1	1	
98	225	0.99	135	0.99	3.34	30	45	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	58	59	61	65	68	70	75	81
								N	1	3	3	2	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1	1	1
99	225	0.99	180	0.6	4.02	30	45	**L**	1	3	6	7	16	18	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	57	58	59	61	65	68	70	74	75
								N	1	3	3	2	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1	1	1
100	225	0.99	180	0.7	4.02	30	45	**L**	1	3	6	7	16	18	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	57	58	59	61	65	68	70	74	75
								N	1	3	3	2	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1	1	1
101	225	0.99	180	0.8	4.02	30	45	**L**	1	3	6	7	16	18	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	57	58	59	61	65	68	70	74	75
								N	1	3	3	2	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1	1	1
102	225	0.99	180	0.85	4.02	30	45	**L**	1	3	6	7	16	18	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	57	58	59	61	65	68	70	74	75
								N	1	3	3	2	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1	1	1
103	225	0.99	180	0.9	4.02	30	45	**L**	1	3	6	7	16	18	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	57	58	59	61	65	68	70	74	75
								N	1	3	3	2	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1	1	1
104	225	0.99	180	0.95	4.02	30	45	**L**	1	3	6	7	16	18	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	57	58	59	61	65	68	70	74	75
								N	1	3	3	2	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1	1	1
105	225	0.99	180	0.99	3.92	30	45	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	57	58	59	61	65	68	70	75	78
								N	1	3	3	2	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	1	2	3	1	1	1	1	1
106	270	0.6	90	0.6	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
107	270	0.6	90	0.7	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
108	270	0.6	90	0.8	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
109	270	0.6	90	0.85	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
110	270	0.6	90	0.9	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
111	270	0.6	90	0.95	2.63	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
112	270	0.6	90	0.99	1.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	74					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
113	270	0.6	135	0.6	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
114	270	0.6	135	0.7	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
115	270	0.6	135	0.8	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					

Table H.1 (cont'd)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these ECs																														
116	270	0.6	135	0.85	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
117	270	0.6	135	0.9	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
118	270	0.6	135	0.95	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
119	270	0.6	135	0.99	3.13	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
120	270	0.6	180	0.6	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
121	270	0.6	180	0.7	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
122	270	0.6	180	0.8	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
123	270	0.6	180	0.85	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
124	270	0.6	180	0.9	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
125	270	0.6	180	0.95	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
126	270	0.6	180	0.99	3.71	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
127	270	0.7	90	0.6	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
128	270	0.7	90	0.7	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
129	270	0.7	90	0.8	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
130	270	0.7	90	0.85	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
131	270	0.7	90	0.9	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
132	270	0.7	90	0.95	2.63	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
133	270	0.7	90	0.99	1.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	74					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
134	270	0.7	135	0.6	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
135	270	0.7	135	0.7	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
136	270	0.7	135	0.8	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
137	270	0.7	135	0.85	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
138	270	0.7	135	0.9	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
139	270	0.7	135	0.95	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
140	270	0.7	135	0.99	3.13	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
141	270	0.7	180	0.6	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
142	270	0.7	180	0.7	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
143	270	0.7	180	0.8	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
144	270	0.7	180	0.85	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
145	270	0.7	180	0.9	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
146	270	0.7	180	0.95	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
147	270	0.7	180	0.99	3.71	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
148	270	0.8	90	0.6	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
149	270	0.8	90	0.7	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
150	270	0.8	90	0.8	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
151	270	0.8	90	0.85	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
152	270	0.8	90	0.9	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
153	270	0.8	90	0.95	2.63	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
154	270	0.8	90	0.99	1.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	74					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
155	270	0.8	135	0.6	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					

Table H.1 (cont'd)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these ECs																														
156	270	0.8	135	0.7	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
157	270	0.8	135	0.8	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
158	270	0.8	135	0.85	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
159	270	0.8	135	0.9	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
160	270	0.8	135	0.95	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
161	270	0.8	135	0.99	3.13	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
162	270	0.8	180	0.6	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
163	270	0.8	180	0.7	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
164	270	0.8	180	0.8	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
165	270	0.8	180	0.85	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
166	270	0.8	180	0.9	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
167	270	0.8	180	0.95	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
168	270	0.8	180	0.99	3.71	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
169	270	0.9	90	0.6	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
170	270	0.9	90	0.7	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
171	270	0.9	90	0.8	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
172	270	0.9	90	0.85	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
173	270	0.9	90	0.9	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
174	270	0.9	90	0.95	2.63	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
175	270	0.9	90	0.99	1.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	74					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
176	270	0.9	135	0.6	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
177	270	0.9	135	0.7	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
178	270	0.9	135	0.8	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
179	270	0.9	135	0.85	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
180	270	0.9	135	0.9	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
181	270	0.9	135	0.95	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
182	270	0.9	135	0.99	3.13	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
183	270	0.9	180	0.6	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
184	270	0.9	180	0.7	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
185	270	0.9	180	0.8	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
186	270	0.9	180	0.85	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
187	270	0.9	180	0.9	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
188	270	0.9	180	0.95	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
189	270	0.9	180	0.99	3.71	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
190	270	0.99	90	0.6	2.62	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
191	270	0.99	90	0.7	2.62	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
192	270	0.99	90	0.8	2.62	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
193	270	0.99	90	0.85	2.62	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
194	270	0.99	90	0.9	2.62	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
195	270	0.99	90	0.95	2.55	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					

Table H.1 (cont'd)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these ECs																									
196	270	0.99	90	0.99	1.94	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1
197	270	0.99	135	0.6	3.49	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1
198	270	0.99	135	0.7	3.49	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1
199	270	0.99	135	0.8	3.49	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1
200	270	0.99	135	0.85	3.49	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1
201	270	0.99	135	0.9	3.49	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1
202	270	0.99	135	0.95	3.49	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1
203	270	0.99	135	0.99	3.01	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1
204	270	0.99	180	0.6	3.92	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1
205	270	0.99	180	0.7	3.92	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1
206	270	0.99	180	0.8	3.92	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1
207	270	0.99	180	0.85	3.92	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1
208	270	0.99	180	0.9	3.92	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1
209	270	0.99	180	0.95	3.92	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1
210	270	0.99	180	0.99	3.67	25	40	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68
								N	1	3	3	2	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1
211	315	0.6	90	0.6	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1
212	315	0.6	90	0.7	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1
213	315	0.6	90	0.8	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1
214	315	0.6	90	0.85	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1
215	315	0.6	90	0.9	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1
216	315	0.6	90	0.95	2.63	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1
217	315	0.6	90	0.99	1.94	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	81
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
218	315	0.6	135	0.6	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
219	315	0.6	135	0.7	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
220	315	0.6	135	0.8	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
221	315	0.6	135	0.85	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
222	315	0.6	135	0.9	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
223	315	0.6	135	0.95	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
224	315	0.6	135	0.99	3.17	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	81
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
225	315	0.6	180	0.6	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
226	315	0.6	180	0.7	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
227	315	0.6	180	0.8	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
228	315	0.6	180	0.85	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
229	315	0.6	180	0.9	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
230	315	0.6	180	0.95	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
231	315	0.6	180	0.99	3.71	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1
232	315	0.7	90	0.6	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1
233	315	0.7	90	0.7	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1
234	315	0.7	90	0.8	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1
235	315	0.7	90	0.85	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1

Table H.1 (cont'd)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these ECs																														
236	315	0.7	90	0.9	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
237	315	0.7	90	0.95	2.63	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
238	315	0.7	90	0.99	1.94	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	81					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
239	315	0.7	135	0.6	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
240	315	0.7	135	0.7	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
241	315	0.7	135	0.8	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
242	315	0.7	135	0.85	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
243	315	0.7	135	0.9	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
244	315	0.7	135	0.95	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
245	315	0.7	135	0.99	3.17	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	81					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
246	315	0.7	180	0.6	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
247	315	0.7	180	0.7	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
248	315	0.7	180	0.8	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
249	315	0.7	180	0.85	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
250	315	0.7	180	0.9	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
251	315	0.7	180	0.95	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
252	315	0.7	180	0.99	3.71	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
253	315	0.8	90	0.6	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
254	315	0.8	90	0.7	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
255	315	0.8	90	0.8	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
256	315	0.8	90	0.85	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
257	315	0.8	90	0.9	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
258	315	0.8	90	0.95	2.63	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
259	315	0.8	90	0.99	1.94	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	81					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
260	315	0.8	135	0.6	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
261	315	0.8	135	0.7	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
262	315	0.8	135	0.8	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
263	315	0.8	135	0.85	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
264	315	0.8	135	0.9	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
265	315	0.8	135	0.95	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
266	315	0.8	135	0.99	3.17	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	81					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
267	315	0.8	180	0.6	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
268	315	0.8	180	0.7	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
269	315	0.8	180	0.8	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
270	315	0.8	180	0.85	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
271	315	0.8	180	0.9	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
272	315	0.8	180	0.95	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
273	315	0.8	180	0.99	3.71	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
274	315	0.9	90	0.6	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
275	315	0.9	90	0.7	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					

Table H.1 (cont’d)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these ECs																														
276	315	0.9	90	0.8	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
277	315	0.9	90	0.85	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
278	315	0.9	90	0.9	2.69	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
279	315	0.9	90	0.95	2.63	25	39	**L**	1	3	6	7	14	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
280	315	0.9	90	0.99	1.94	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	81					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
281	315	0.9	135	0.6	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
282	315	0.9	135	0.7	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
283	315	0.9	135	0.8	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
284	315	0.9	135	0.85	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
285	315	0.9	135	0.9	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
286	315	0.9	135	0.95	3.52	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
287	315	0.9	135	0.99	3.17	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	81					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
288	315	0.9	180	0.6	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
289	315	0.9	180	0.7	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
290	315	0.9	180	0.8	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
291	315	0.9	180	0.85	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
292	315	0.9	180	0.9	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
293	315	0.9	180	0.95	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
294	315	0.9	180	0.99	3.71	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68	78					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1	1					
295	315	0.99	90	0.6	2.65	25	39	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
296	315	0.99	90	0.7	2.65	25	39	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
297	315	0.99	90	0.8	2.65	25	39	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
298	315	0.99	90	0.85	2.65	25	39	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
299	315	0.99	90	0.9	2.65	25	39	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
300	315	0.99	90	0.95	2.58	25	39	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
301	315	0.99	90	0.99	1.91	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	57	59	61	65	68					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
302	315	0.99	135	0.6	3.49	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
303	315	0.99	135	0.7	3.49	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
304	315	0.99	135	0.8	3.49	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
305	315	0.99	135	0.85	3.49	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
306	315	0.99	135	0.9	3.49	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
307	315	0.99	135	0.95	3.49	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
308	315	0.99	135	0.99	2.98	25	39	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					
309	315	0.99	180	0.6	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
310	315	0.99	180	0.7	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
311	315	0.99	180	0.8	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
312	315	0.99	180	0.85	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
313	315	0.99	180	0.9	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
314	315	0.99	180	0.95	3.92	25	39	**L**	1	3	6	7	16	20	21	23	25	26	27	31	33	34	35	37	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	1	2	3	1	1					
315	315	0.99	180	0.99	3.69	25	39	**L**	1	3	6	7	16	19	20	21	23	25	26	27	31	33	34	35	38	41	42	47	55	59	61	65	68					
								N	1	3	3	1	2	1	2	1	1	1	1	1	1	1	3	4	1	1	1	1	1	2	3	1	1					

Table H.2: The Results of the Problem Solved for Case II

#	T	β	S	α	Z	E	V		Locations of ECs and number of vehicles located at these ECs																																					
1	225	0.6	90	0.6	3.39	38	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	42	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	225	0.6	90	0.7	3.39	38	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	42	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	225	0.6	90	0.8	3.37	37	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
4	225	0.6	90	0.85	3.37	37	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
5	225	0.6	90	0.9	3.35	36	38	**L**	1	3	5	6	7	8	10	11	19	20	24	25	27	32	34	35	38	39	43	44	45	48	52	55	59	61	64	65	68	69	70	72	74	77	78	81	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0	0
6	225	0.6	90	0.95	3.32	35	38	**L**	1	3	5	6	7	8	10	14	20	24	25	26	27	32	34	35	38	39	43	44	45	48	52	54	55	59	61	64	65	68	69	70	72	74	77	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0	0
7	225	0.6	90	0.99	2.73	23	38	**L**	1	3	5	6	7	24	34	35	36	43	44	45	46	54	57	59	61	65	68	70	72	74	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	2	2	2	2	1	1	4	2	1	2	1	2	1	2	1	3	1	1	2	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	225	0.6	135	0.6	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	225	0.6	135	0.7	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	225	0.6	135	0.8	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	225	0.6	135	0.85	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	225	0.6	135	0.9	4.02	38	38	**L**	3	4	6	7	10	17	19	20	22	26	30	33	34	35	38	41	42	43	44	47	48	49	52	53	55	56	57	58	59	62	63	65	68	69	74	75	78	80
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	225	0.6	135	0.95	4.02	37	38	**L**	3	4	6	7	10	17	19	20	22	33	34	35	37	38	41	42	43	44	47	48	49	52	53	55	56	57	58	59	62	63	65	68	69	74	75	80	81	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
14	225	0.6	135	0.99	3.70	29	38	**L**	1	3	5	6	7	15	16	20	22	24	25	33	34	35	37	40	44	48	52	53	55	56	59	63	65	68	75	80	81	0	0	0	0	0	0	0	0	0
								N	1	2	1	2	1	1	2	2	1	1	1	1	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2	0	0	0	0	0	0	0	0	0
15	225	0.6	180	0.6	4.12	30	38	**L**	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
16	225	0.6	180	0.7	4.12	30	38	**L**	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
17	225	0.6	180	0.8	4.12	30	38	**L**	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
18	225	0.6	180	0.85	4.12	30	38	**L**	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
19	225	0.6	180	0.9	4.12	30	38	**L**	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
20	225	0.6	180	0.95	4.12	29	38	**L**	6	7	17	25	26	30	31	33	34	35	37	38	39	42	44	47	48	54	55	56	60	61	62	63	64	65	74	75	76	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
21	225	0.6	180	0.99	4.12	31	38	**L**	4	6	7	14	17	21	23	32	33	34	35	37	38	39	41	42	43	44	46	48	55	56	57	58	61	64	65	68	69	71	75	0	0	0	0	0	0	0
								N	1	1	1	1	2	1	1	1	2	1	2	1	1	2	1	1	2	1	1	2	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
22	225	0.7	90	0.6	3.39	38	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	42	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
23	225	0.7	90	0.7	3.39	38	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	42	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
24	225	0.7	90	0.8	3.37	37	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
25	225	0.7	90	0.85	3.37	37	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
26	225	0.7	90	0.9	3.35	36	38	**L**	1	3	5	6	7	8	10	11	19	20	24	25	27	32	34	35	38	39	43	44	45	48	52	55	59	61	64	65	68	69	70	72	74	77	78	81	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0	0
27	225	0.7	90	0.95	3.32	35	38	**L**	1	3	5	6	7	8	10	14	20	24	25	26	27	32	34	35	38	39	43	44	45	48	52	54	55	59	61	64	65	68	69	70	72	74	77	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0	0
28	225	0.7	90	0.99	2.73	23	38	**L**	1	3	5	6	7	24	34	35	36	43	44	45	46	54	57	59	61	65	68	70	72	74	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	2	2	2	2	1	1	4	2	1	2	1	2	1	2	1	3	1	1	2	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	225	0.7	135	0.6	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
30	225	0.7	135	0.7	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
31	225	0.7	135	0.8	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
32	225	0.7	135	0.85	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
33	225	0.7	135	0.9	4.02	38	38	**L**	3	4	6	7	10	17	19	20	22	26	30	33	34	35	38	41	42	43	44	47	48	49	52	53	55	56	57	58	59	62	63	65	68	69	74	75	78	80
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
34	225	0.7	135	0.95	4.02	37	38	**L**	3	4	6	7	10	17	19	20	22	33	34	35	37	38	41	42	43	44	47	48	49	52	53	55	56	57	58	59	62	63	65	68	69	74	75	80	81	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
35	225	0.7	135	0.99	3.70	29	38	**L**	1	3	5	6	7	15	16	20	22	24	25	33	34	35	37	40	44	48	52	53	55	56	59	63	65	68	75	80	81	0	0	0	0	0	0	0	0	0
								N	1	2	1	2	1	1	2	2	1	1	1	1	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2	0	0	0	0	0	0	0	0	0

Table H.2 (cont'd)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these ECs																																						
36	225	0.7	180	0.6	4.12	30	38	**L**	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
37	225	0.7	180	0.7	4.12	30	38	**L**	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
38	225	0.7	180	0.8	4.12	30	38	**L**	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
39	225	0.7	180	0.85	4.12	30	38	**L**	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
40	225	0.7	180	0.9	4.12	30	38	**L**	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
41	225	0.7	180	0.95	4.12	29	38	**L**	6	7	17	25	26	30	31	33	34	35	37	38	39	42	44	47	48	54	55	56	60	61	62	63	64	65	74	75	76	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
42	225	0.7	180	0.99	4.12	31	38	**L**	4	6	7	14	17	21	23	32	33	34	35	37	38	39	41	42	43	44	46	48	55	56	57	58	61	64	65	68	69	71	75	0	0	0	0	0	0	0
								N	1	1	1	1	2	1	1	1	2	1	2	1	1	2	1	1	2	1	1	2	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
43	225	0.8	90	0.6	3.39	38	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	42	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
44	225	0.8	90	0.7	3.39	38	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	42	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
45	225	0.8	90	0.8	3.37	37	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
46	225	0.8	90	0.85	3.37	37	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
47	225	0.8	90	0.9	3.35	36	38	**L**	1	3	5	6	7	8	10	11	19	20	24	25	27	32	34	35	38	39	43	44	45	48	52	55	59	61	64	65	68	69	70	72	74	77	78	81	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0	0
48	225	0.8	90	0.95	3.32	35	38	**L**	1	3	5	6	7	8	10	14	20	24	25	26	27	32	34	35	38	39	43	44	45	48	52	54	55	59	61	64	65	68	69	70	72	74	77	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0	0
49	225	0.8	90	0.99	2.73	23	38	**L**	1	3	5	6	7	24	34	35	36	43	44	45	46	54	57	59	61	65	68	70	72	74	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	2	2	2	2	1	1	4	2	1	2	1	2	1	2	1	3	1	1	2	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	225	0.8	135	0.6	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
51	225	0.8	135	0.7	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
52	225	0.8	135	0.8	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
53	225	0.8	135	0.85	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
54	225	0.8	135	0.9	4.02	38	38	**L**	3	4	6	7	10	17	19	20	22	26	30	33	34	35	38	41	42	43	44	47	48	49	52	53	55	56	57	58	59	62	63	65	68	69	74	75	78	80
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
55	225	0.8	135	0.95	4.02	37	38	**L**	3	4	6	7	10	17	19	20	22	33	34	35	37	38	41	42	43	44	47	48	49	52	53	55	56	57	58	59	62	63	65	68	69	74	75	80	81	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
56	225	0.8	135	0.99	3.70	29	38	**L**	1	3	5	6	7	15	16	20	22	24	25	33	34	35	37	40	44	48	52	53	55	56	59	63	65	68	75	80	81	0	0	0	0	0	0	0	0	0
								N	1	2	1	2	1	1	2	2	1	1	1	1	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2	0	0	0	0	0	0	0	0	0
57	225	0.8	180	0.6	4.12	30	38	**L**	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
58	225	0.8	180	0.7	4.12	30	38	**L**	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
59	225	0.8	180	0.8	4.12	30	38	**L**	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
60	225	0.8	180	0.85	4.12	30	38	**L**	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
61	225	0.8	180	0.9	4.12	30	38	**L**	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
62	225	0.8	180	0.95	4.12	29	38	**L**	6	7	17	25	26	30	31	33	34	35	37	38	39	42	44	47	48	54	55	56	60	61	62	63	64	65	74	75	76	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
63	225	0.8	180	0.99	4.12	31	38	**L**	4	6	7	14	17	21	23	32	33	34	35	37	38	39	41	42	43	44	46	48	55	56	57	58	61	64	65	68	69	71	75	0	0	0	0	0	0	0
								N	1	1	1	1	2	1	1	1	2	1	2	1	1	2	1	1	2	1	1	2	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
64	225	0.9	90	0.6	3.39	38	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	42	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
65	225	0.9	90	0.7	3.39	38	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	42	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
66	225	0.9	90	0.8	3.37	37	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
67	225	0.9	90	0.85	3.37	37	38	**L**	1	3	5	6	7	8	10	11	14	19	20	24	25	27	32	34	35	38	39	43	44	45	48	52	55	57	59	61	64	65	68	69	70	72	74	77	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
68	225	0.9	90	0.9	3.35	36	38	**L**	1	3	5	6	7	8	10	11	19	20	24	25	27	32	34	35	38	39	43	44	45	48	52	55	59	61	64	65	68	69	70	72	74	77	78	81	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0	0
69	225	0.9	90	0.95	3.32	35	38	**L**	1	3	5	6	7	8	10	14	20	24	25	26	27	32	34	35	38	39	43	44	45	48	52	54	55	59	61	64	65	68	69	70	72	74	77	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0	0
70	225	0.9	90	0.99	2.73	23	38	**L**	1	3	5	6	7	24	34	35	36	43	44	45	46	54	57	59	61	65	68	70	72	74	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	2	2	2	2	1	1	4	2	1	2	1	2	1	2	1	3	1	1	2	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71	225	0.9	135	0.6	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
72	225	0.9	135	0.7	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
73	225	0.9	135	0.8	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
74	225	0.9	135	0.85	4.02	38	38	**L**	3	4	6	7	10	16	17	19	20	24	30	33	34	35	37	38	39	42	43	44	47	48	49	52	55	56	57	58	61	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
75	225	0.9	135	0.9	4.02	38	38	**L**	3	4	6	7	10	17	19	20	22	26	30	33	34	35	38	41	42	43	44	47	48	49	52	53	55	56	57	58	59	62	63	65	68	69	74	75	78	80
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table H.2 (cont'd)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these ECs																																						
76	225	0.9	135	0.95	4.02	37	38	L	3	4	6	7	10	17	19	20	22	33	34	35	37	38	41	42	43	44	47	48	49	52	53	55	56	57	58	59	62	63	65	68	69	74	75	80	81	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
77	225	0.9	135	0.99	3.70	29	38	L	1	3	5	6	7	15	16	20	22	24	25	33	34	35	37	40	44	48	52	53	55	56	59	63	65	68	75	80	81	0	0	0	0	0	0	0	0	0
								N	1	2	1	2	1	1	2	2	1	1	1	1	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2	0	0	0	0	0	0	0	0	0
78	225	0.9	180	0.6	4.12	30	38	L	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
79	225	0.9	180	0.7	4.12	30	38	L	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
80	225	0.9	180	0.8	4.12	30	38	L	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
81	225	0.9	180	0.85	4.12	30	38	L	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
82	225	0.9	180	0.9	4.12	30	38	L	6	7	17	25	26	30	31	33	34	35	38	39	42	44	47	48	53	54	55	56	57	60	61	62	63	64	65	75	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
83	225	0.9	180	0.95	4.12	29	38	L	6	7	17	25	26	30	31	33	34	35	37	38	39	42	44	47	48	54	55	56	60	61	62	63	64	65	74	75	76	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	3	3	3	1	1	3	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
84	225	0.9	180	0.99	4.12	31	38	L	4	6	7	14	17	21	23	32	33	34	35	37	38	39	41	42	43	44	46	48	55	56	57	58	61	64	65	68	69	71	75	0	0	0	0	0	0	0
								N	1	1	1	1	2	1	1	1	2	1	2	1	1	2	1	1	2	1	1	2	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
85	225	0.99	90	0.6	3.34	37	38	L	3	5	6	7	8	10	11	14	15	19	20	22	23	25	28	33	34	35	38	43	44	45	46	48	55	59	61	64	65	68	69	70	72	74	77	80	81	0
								N	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
86	225	0.99	90	0.7	3.34	37	38	L	3	5	6	7	8	10	11	14	15	19	20	22	23	25	28	33	34	35	38	43	44	45	46	48	55	59	61	64	65	68	69	70	72	74	77	80	81	0
								N	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
87	225	0.99	90	0.8	3.31	36	38	L	3	5	6	7	8	10	11	15	19	20	22	23	25	28	33	34	35	38	43	44	45	46	48	55	59	61	64	65	68	69	70	72	77	78	80	81	0	0
								N	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
88	225	0.99	90	0.85	3.31	36	38	L	1	3	5	6	7	8	10	11	15	19	20	22	23	25	28	33	34	35	38	43	44	45	46	48	55	59	61	64	65	68	69	70	72	77	78	81	0	0
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
89	225	0.99	90	0.9	3.29	35	38	L	1	3	5	6	7	8	10	11	15	19	20	22	23	25	33	34	35	38	43	44	45	46	48	52	55	59	64	65	68	69	70	72	77	78	81	0	0	0
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0	0
90	225	0.99	90	0.95	3.25	34	38	L	1	3	5	6	7	8	11	14	15	19	20	23	25	33	34	35	38	39	41	43	44	45	46	48	55	59	64	65	68	69	70	72	74	77	0	0	0	0
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	0	0	0	0
91	225	0.99	90	0.99	2.64	24	38	L	1	5	6	7	23	29	33	34	35	36	38	43	44	45	46	54	57	59	65	68	70	72	74	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	2	2	2	1	1	1	4	2	1	1	2	1	2	1	2	1	3	1	2	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
92	225	0.99	135	0.6	3.99	36	38	L	3	6	7	10	17	19	20	24	25	27	28	33	34	35	37	38	39	41	42	43	44	48	49	53	55	56	57	58	59	63	65	68	70	75	80	81	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
93	225	0.99	135	0.7	3.99	36	38	L	3	6	7	10	17	19	20	24	25	27	28	33	34	35	37	38	39	41	42	43	44	48	49	53	55	56	57	58	59	63	65	68	70	75	80	81	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
94	225	0.99	135	0.8	3.99	36	38	L	3	6	7	10	17	19	20	24	25	27	28	33	34	35	37	38	39	41	42	43	44	48	49	53	55	56	57	58	59	63	65	68	70	75	80	81	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
95	225	0.99	135	0.85	3.99	36	38	L	3	6	7	10	17	19	20	24	25	27	28	33	34	35	37	38	39	41	42	43	44	48	49	53	55	56	57	58	59	63	65	68	70	75	80	81	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
96	225	0.99	135	0.9	3.99	35	38	L	3	6	7	10	17	19	20	24	25	27	28	33	34	35	37	38	39	41	42	43	44	48	49	53	55	56	57	58	59	63	65	68	75	80	81	0	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
97	225	0.99	135	0.95	3.98	36	38	L	3	4	5	6	7	9	10	12	17	20	22	27	29	33	34	35	37	38	40	41	42	43	44	48	52	56	57	58	59	63	65	69	70	75	80	81	0	0
								N	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
98	225	0.99	135	0.99	3.64	27	38	L	1	3	5	6	7	16	20	22	24	25	27	34	35	37	40	44	50	52	53	55	59	65	70	71	72	75	81	0	0	0	0	0	0	0	0	0	0	0
								N	2	2	1	2	2	2	2	1	1	1	1	2	2	1	1	2	1	1	1	1	1	1	2	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0
99	225	0.99	180	0.6	4.12	32	38	L	1	4	6	7	10	13	14	15	17	18	21	22	23	30	34	35	37	38	40	41	42	43	45	46	48	55	58	61	69	70	73	75	0	0	0	0	0	0
								N	2	1	1	2	1	1	1	1	3	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	0
100	225	0.99	180	0.7	4.12	32	38	L	1	4	6	7	10	13	14	15	17	18	21	22	23	30	34	35	37	38	40	41	42	43	45	46	48	55	58	61	69	70	73	75	0	0	0	0	0	0
								N	2	1	1	2	1	1	1	1	3	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	0
101	225	0.99	180	0.8	4.12	32	38	L	1	4	6	7	10	13	14	15	17	18	21	22	23	30	34	35	37	38	40	41	42	43	45	46	48	55	58	61	69	70	73	75	0	0	0	0	0	0
								N	2	1	1	2	1	1	1	1	3	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	0
102	225	0.99	180	0.85	4.12	32	38	L	1	4	6	7	10	13	14	15	17	18	21	22	23	30	34	35	37	38	40	41	42	43	45	46	48	55	58	61	69	70	73	75	0	0	0	0	0	0
								N	2	1	1	2	1	1	1	1	3	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	0
103	225	0.99	180	0.9	4.12	32	38	L	1	4	6	7	10	13	14	15	17	18	21	22	23	30	34	35	37	38	40	41	42	43	45	46	48	55	58	61	69	70	73	75	0	0	0	0	0	0
								N	2	1	1	2	1	1	1	1	3	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	0
104	225	0.99	180	0.95	4.12	33	38	L	1	2	3	6	7	8	13	17	25	30	31	33	34	35	38	39	40	41	42	43	44	45	47	48	55	57	60	61	62	70	73	76	78	0	0	0	0	0
								N	1	1	1	1	2	2	1	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	0	0	0	0	0
105	225	0.99	180	0.99	4.11	32	38	L	3	6	7	17	21	22	23	25	29	33	34	35	37	38	39	42	43	44	45	46	48	54	55	56	58	64	65	68	70	75	80	81	0	0	0	0	0	0
								N	1	2	2	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
106	270	0.6	90	0.6	3.39	38	38	L	1	3	5	6	7	8	10	11	14	17	19	20	22	27	32	34	35	38	41	42	43	44	45	48	49	52	55	57	59	61	64	65	68	69	70	72	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
107	270	0.6	90	0.7	3.39	38	38	L	1	3	5	6	7	8	10	11	14	17	19	20	22	27	32	34	35	38	41	42	43	44	45	48	49	52	55	57	59	61	64	65	68	69	70	72	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
108	270	0.6	90	0.8	3.37	37	38	L	1	3	5	6	7	8	10	11	19	20	22	27	29	32	34	35	38	42	43	44	45	48	49	52	55	56	57	59	61	64	65	68	70	74	77	78	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
109	270	0.6	90	0.85	3.37	37	38	L	1	3	5	6	7	8	10	11	19	20	22	27	29	32	34	35	38	42	43	44	45	48	49	52	55	56	57	59	61	64	65	68	70	74	77	78	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
110	270	0.6	90	0.9	3.35	36	38	L	1	3	5	6	7	8	10	11	19	20	22	27	32	34	35	38	42	43	44	45	48	52	55	56	57	59	61	64	65	68	69	70	74	77	78	81	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	0	0
111	270	0.6	90	0.95	3.33	35	38	L	1	3	5	6	7	8	10	14	19	20	22	26	27	32	34	35	38	43	44	45	48	52	54	55	56	57	59	61	64	65	68	69	70	74	77	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	0	0	0
112	270	0.6	90	0.99	2.82	23	38	L	1	3	5	6	8	15	27	32	34	35	43	44	45	52	54	56	59	65	68	69	70	74	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	2	2	2	2	1	1	1	1	4	2	2	1	2	1	2	1	3	1	2	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
113	270	0.6	135	0.6	4.02	38	38	L	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
114	270	0.6	135	0.7	4.02	38	38	L	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
115	270	0.6	135	0.8	4.02	38	38	L	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table H.2 (cont'd)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these ECs																																						
116	270	0.6	135	0.85	4.02	38	38	**L**	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
117	270	0.6	135	0.9	4.02	37	38	**L**	3	4	6	7	10	17	19	20	22	30	33	34	35	37	38	41	42	43	44	47	48	49	52	53	55	56	57	58	62	63	65	68	69	74	75	80	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
118	270	0.6	135	0.95	4.02	36	38	**L**	3	4	6	7	10	17	18	19	20	22	33	34	35	38	41	42	43	44	47	48	49	52	53	55	56	57	58	62	63	65	68	69	74	75	80	81	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
119	270	0.6	135	0.99	3.72	28	38	**L**	1	3	5	6	7	10	14	16	20	33	34	35	40	41	43	44	48	52	55	56	59	63	65	68	69	75	80	81	0	0	0	0	0	0	0	0	0	0
								N	1	2	1	2	2	2	1	1	2	1	1	2	1	1	2	2	2	1	1	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
120	270	0.6	180	0.6	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
121	270	0.6	180	0.7	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
122	270	0.6	180	0.8	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
123	270	0.6	180	0.85	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
124	270	0.6	180	0.9	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
125	270	0.6	180	0.95	4.12	31	38	**L**	6	7	17	22	26	30	31	33	34	35	36	37	38	39	42	44	47	48	53	54	55	56	60	61	62	63	64	65	69	74	76	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	1	1	3	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0
126	270	0.6	180	0.99	4.12	31	38	**L**	6	7	14	17	21	22	23	25	29	32	33	34	35	37	38	39	42	43	44	46	48	54	55	56	57	58	64	65	68	75	76	0	0	0	0	0	0	0
								N	2	1	1	2	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	1	2	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
127	270	0.7	90	0.6	3.39	38	38	**L**	1	3	5	6	7	8	10	11	14	17	19	20	22	27	32	34	35	38	41	42	43	44	45	48	49	52	55	57	59	61	64	65	68	69	70	72	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
128	270	0.7	90	0.7	3.39	38	38	**L**	1	3	5	6	7	8	10	11	14	17	19	20	22	27	32	34	35	38	41	42	43	44	45	48	49	52	55	57	59	61	64	65	68	69	70	72	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
129	270	0.7	90	0.8	3.37	37	38	**L**	1	3	5	6	7	8	10	11	19	20	22	27	29	32	34	35	38	42	43	44	45	48	49	52	55	56	57	59	61	64	65	68	70	74	77	78	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
130	270	0.7	90	0.85	3.37	37	38	**L**	1	3	5	6	7	8	10	11	19	20	22	27	29	32	34	35	38	42	43	44	45	48	49	52	55	56	57	59	61	64	65	68	70	74	77	78	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
131	270	0.7	90	0.9	3.35	36	38	**L**	1	3	5	6	7	8	10	11	19	20	22	27	32	34	35	38	42	43	44	45	48	52	55	56	57	59	61	64	65	68	69	70	74	77	78	81	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	0	0
132	270	0.7	90	0.95	3.33	35	38	**L**	1	3	5	6	7	8	10	14	19	20	22	26	27	32	34	35	38	43	44	45	48	52	54	55	56	57	59	61	64	65	68	69	70	74	77	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	0	0	0
133	270	0.7	90	0.99	2.82	23	38	**L**	1	3	5	6	8	15	27	32	34	35	43	44	45	52	54	56	59	65	68	69	70	74	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	2	2	2	2	1	1	1	1	4	2	2	1	2	1	2	1	3	1	2	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
134	270	0.7	135	0.6	4.02	38	38	**L**	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
135	270	0.7	135	0.7	4.02	38	38	**L**	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
136	270	0.7	135	0.8	4.02	38	38	**L**	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
137	270	0.7	135	0.85	4.02	38	38	**L**	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
138	270	0.7	135	0.9	4.02	37	38	**L**	3	4	6	7	10	17	19	20	22	30	33	34	35	37	38	41	42	43	44	47	48	49	52	53	55	56	57	58	62	63	65	68	69	74	75	80	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
139	270	0.7	135	0.95	4.02	36	38	**L**	3	4	6	7	10	17	18	19	20	22	33	34	35	38	41	42	43	44	47	48	49	52	53	55	56	57	58	62	63	65	68	69	74	75	80	81	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
140	270	0.7	135	0.99	3.72	28	38	**L**	1	3	5	6	7	10	14	16	20	33	34	35	40	41	43	44	48	52	55	56	59	63	65	68	69	75	80	81	0	0	0	0	0	0	0	0	0	0
								N	1	2	1	2	2	2	1	1	2	1	1	2	1	1	2	2	2	1	1	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
141	270	0.7	180	0.6	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
142	270	0.7	180	0.7	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
143	270	0.7	180	0.8	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
144	270	0.7	180	0.85	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
145	270	0.7	180	0.9	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
146	270	0.7	180	0.95	4.12	31	38	**L**	6	7	17	22	26	30	31	33	34	35	36	37	38	39	42	44	47	48	53	54	55	56	60	61	62	63	64	65	69	74	76	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	1	1	3	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0
147	270	0.7	180	0.99	4.12	31	38	**L**	6	7	14	17	21	22	23	25	29	32	33	34	35	37	38	39	42	43	44	46	48	54	55	56	57	58	64	65	68	75	76	0	0	0	0	0	0	0
								N	2	1	1	2	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	1	2	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
148	270	0.8	90	0.6	3.39	38	38	**L**	1	3	5	6	7	8	10	11	14	17	19	20	22	27	32	34	35	38	41	42	43	44	45	48	49	52	55	57	59	61	64	65	68	69	70	72	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
149	270	0.8	90	0.7	3.39	38	38	**L**	1	3	5	6	7	8	10	11	14	17	19	20	22	27	32	34	35	38	41	42	43	44	45	48	49	52	55	57	59	61	64	65	68	69	70	72	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
150	270	0.8	90	0.8	3.37	37	38	**L**	1	3	5	6	7	8	10	11	19	20	22	27	29	32	34	35	38	42	43	44	45	48	49	52	55	56	57	59	61	64	65	68	70	74	77	78	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
151	270	0.8	90	0.85	3.37	37	38	**L**	1	3	5	6	7	8	10	11	19	20	22	27	29	32	34	35	38	42	43	44	45	48	49	52	55	56	57	59	61	64	65	68	70	74	77	78	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
152	270	0.8	90	0.9	3.35	36	38	**L**	1	3	5	6	7	8	10	11	19	20	22	27	32	34	35	38	42	43	44	45	48	52	55	56	57	59	61	64	65	68	69	70	74	77	78	81	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	0	0
153	270	0.8	90	0.95	3.33	35	38	**L**	1	3	5	6	7	8	10	14	19	20	22	26	27	32	34	35	38	43	44	45	48	52	54	55	56	57	59	61	64	65	68	69	70	74	77	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	0	0	0
154	270	0.8	90	0.99	2.82	23	38	**L**	1	3	5	6	8	15	27	32	34	35	43	44	45	52	54	56	59	65	68	69	70	74	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	2	2	2	2	1	1	1	1	4	2	2	1	2	1	2	1	3	1	2	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155	270	0.8	135	0.6	4.02	38	38	**L**	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table H.2 (cont'd)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these ECs																																						
156	270	0.8	135	0.7	4.02	38	38	**L**	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
157	270	0.8	135	0.8	4.02	38	38	**L**	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
158	270	0.8	135	0.85	4.02	38	38	**L**	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
159	270	0.8	135	0.9	4.02	37	38	**L**	3	4	6	7	10	17	19	20	22	30	33	34	35	37	38	41	42	43	44	47	48	49	52	53	55	56	57	58	62	63	65	68	69	74	75	80	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
160	270	0.8	135	0.95	4.02	36	38	**L**	3	4	6	7	10	17	18	19	20	22	33	34	35	38	41	42	43	44	47	48	49	52	53	55	56	57	58	62	63	65	68	69	74	75	80	81	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
161	270	0.8	135	0.99	3.72	28	38	**L**	1	3	5	6	7	10	14	16	20	33	34	35	40	41	43	44	48	52	55	56	59	63	65	68	69	75	80	81	0	0	0	0	0	0	0	0	0	0
								N	1	2	1	2	2	2	1	1	2	1	1	2	1	1	2	2	2	1	1	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
162	270	0.8	180	0.6	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
163	270	0.8	180	0.7	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
164	270	0.8	180	0.8	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
165	270	0.8	180	0.85	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
166	270	0.8	180	0.9	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
167	270	0.8	180	0.95	4.12	31	38	**L**	6	7	17	22	26	30	31	33	34	35	36	37	38	39	42	44	47	48	53	54	55	56	60	61	62	63	64	65	69	74	76	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	1	1	3	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0
168	270	0.8	180	0.99	4.12	31	38	**L**	6	7	14	17	21	22	23	25	29	32	33	34	35	37	38	39	42	43	44	46	48	54	55	56	57	58	64	65	68	75	76	0	0	0	0	0	0	0
								N	2	1	1	2	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	1	2	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
169	270	0.9	90	0.6	3.39	38	38	**L**	1	3	5	6	7	8	10	11	14	17	19	20	22	27	32	34	35	38	41	42	43	44	45	48	49	52	55	57	59	61	64	65	68	69	70	72	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
170	270	0.9	90	0.7	3.39	38	38	**L**	1	3	5	6	7	8	10	11	14	17	19	20	22	27	32	34	35	38	41	42	43	44	45	48	49	52	55	57	59	61	64	65	68	69	70	72	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
171	270	0.9	90	0.8	3.37	37	38	**L**	1	3	5	6	7	8	10	11	19	20	22	27	29	32	34	35	38	42	43	44	45	48	49	52	55	56	57	59	61	64	65	68	70	74	77	78	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
172	270	0.9	90	0.85	3.37	37	38	**L**	1	3	5	6	7	8	10	11	19	20	22	27	29	32	34	35	38	42	43	44	45	48	49	52	55	56	57	59	61	64	65	68	70	74	77	78	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
173	270	0.9	90	0.9	3.35	36	38	**L**	1	3	5	6	7	8	10	11	19	20	22	27	32	34	35	38	42	43	44	45	48	52	55	56	57	59	61	64	65	68	69	70	74	77	78	81	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	0	0
174	270	0.9	90	0.95	3.33	35	38	**L**	1	3	5	6	7	8	10	14	19	20	22	26	27	32	34	35	38	43	44	45	48	52	54	55	56	57	59	61	64	65	68	69	70	74	77	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	0	0	0
175	270	0.9	90	0.99	2.82	23	38	**L**	1	3	5	6	8	15	27	32	34	35	43	44	45	52	54	56	59	65	68	69	70	74	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	2	2	2	2	1	1	1	1	4	2	2	1	2	1	2	1	3	1	2	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
176	270	0.9	135	0.6	4.02	38	38	**L**	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
177	270	0.9	135	0.7	4.02	38	38	**L**	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
178	270	0.9	135	0.8	4.02	38	38	**L**	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
179	270	0.9	135	0.85	4.02	38	38	**L**	3	4	5	6	7	10	17	18	20	22	30	33	34	35	38	40	41	42	43	44	47	48	49	52	56	57	58	61	62	63	65	68	69	74	75	76	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
180	270	0.9	135	0.9	4.02	37	38	**L**	3	4	6	7	10	17	19	20	22	30	33	34	35	37	38	41	42	43	44	47	48	49	52	53	55	56	57	58	62	63	65	68	69	74	75	80	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
181	270	0.9	135	0.95	4.02	36	38	**L**	3	4	6	7	10	17	18	19	20	22	33	34	35	38	41	42	43	44	47	48	49	52	53	55	56	57	58	62	63	65	68	69	74	75	80	81	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
182	270	0.9	135	0.99	3.72	28	38	**L**	1	3	5	6	7	10	14	16	20	33	34	35	40	41	43	44	48	52	55	56	59	63	65	68	69	75	80	81	0	0	0	0	0	0	0	0	0	0
								N	1	2	1	2	2	2	1	1	2	1	1	2	1	1	2	2	2	1	1	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
183	270	0.9	180	0.6	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
184	270	0.9	180	0.7	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
185	270	0.9	180	0.8	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
186	270	0.9	180	0.85	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
187	270	0.9	180	0.9	4.12	31	38	**L**	6	7	17	24	26	30	31	33	34	35	37	38	39	42	44	47	48	49	52	53	55	60	63	64	65	68	69	73	75	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0
188	270	0.9	180	0.95	4.12	31	38	**L**	6	7	17	22	26	30	31	33	34	35	36	37	38	39	42	44	47	48	53	54	55	56	60	61	62	63	64	65	69	74	76	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	1	1	3	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0
189	270	0.9	180	0.99	4.12	31	38	**L**	6	7	14	17	21	22	23	25	29	32	33	34	35	37	38	39	42	43	44	46	48	54	55	56	57	58	64	65	68	75	76	0	0	0	0	0	0	0
								N	2	1	1	2	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	1	2	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
190	270	0.99	90	0.6	3.39	38	38	**L**	1	3	5	6	7	8	10	14	17	19	20	26	27	29	32	34	35	38	39	42	43	44	45	48	49	52	54	55	56	57	59	61	64	65	68	70	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
191	270	0.99	90	0.7	3.39	38	38	**L**	1	3	5	6	7	8	10	14	17	19	20	26	27	29	32	34	35	38	39	42	43	44	45	48	49	52	54	55	56	57	59	61	64	65	68	70	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
192	270	0.99	90	0.8	3.37	37	38	**L**	1	3	5	6	7	8	10	14	19	20	26	27	29	32	34	35	38	39	41	42	43	44	45	48	49	52	55	56	57	59	61	64	65	68	70	74	77	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
193	270	0.99	90	0.85	3.37	37	38	**L**	1	3	5	6	7	8	10	14	19	20	26	27	29	32	34	35	38	39	41	42	43	44	45	48	49	52	55	56	57	59	61	64	65	68	70	74	77	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
194	270	0.99	90	0.9	3.35	36	38	**L**	1	3	5	6	7	8	10	14	19	20	26	27	32	34	35	38	39	42	43	44	45	48	52	54	55	57	59	61	64	65	68	69	70	72	74	77	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0
195	270	0.99	90	0.95	3.33	35	38	**L**	1	3	5	6	7	8	10	14	19	20	26	27	32	34	35	38	39	43	44	45	48	52	54	55	57	59	61	64	65	68	69	70	72	74	77	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0	0

Table H.2 (cont'd)

#	T	β	S	α	Z	E	V		Locations of ECs and number of vehicles located at these ECs																																					
196	270	0.99	90	0.99	2.80	21	38	L	1	3	5	6	7	23	27	29	32	34	35	43	45	54	59	61	68	73	74	76	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	2	2	2	2	2	1	1	1	2	4	2	2	2	2	3	1	2	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
197	270	0.99	135	0.6	4.02	38	38	L	1	2	3	4	5	6	7	10	14	17	18	20	21	22	24	27	30	31	34	35	38	40	42	43	44	48	49	52	53	57	58	65	69	70	73	74	75	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
198	270	0.99	135	0.7	4.02	38	38	L	1	2	3	4	5	6	7	10	14	17	18	20	21	22	24	27	30	31	34	35	38	40	42	43	44	48	49	52	53	57	58	65	69	70	73	74	75	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
199	270	0.99	135	0.8	4.02	38	38	L	1	2	3	4	5	6	7	10	14	17	18	20	21	22	24	27	30	31	34	35	38	40	42	43	44	48	49	52	53	57	58	65	69	70	73	74	75	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
200	270	0.99	135	0.85	4.02	38	38	L	1	2	3	4	5	6	7	10	14	17	18	20	21	22	24	27	30	31	34	35	38	40	42	43	44	48	49	52	53	57	58	65	69	70	73	74	75	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
201	270	0.99	135	0.9	4.02	37	38	L	2	3	4	5	6	7	10	14	17	18	20	21	22	30	33	34	35	38	40	42	43	44	48	49	52	53	57	58	62	65	69	70	73	74	75	77	80	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
202	270	0.99	135	0.95	4.02	36	38	L	2	3	4	5	6	7	10	14	17	18	20	21	22	33	34	35	38	40	42	43	44	48	49	52	53	57	58	62	65	69	70	73	74	75	77	80	0	0
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
203	270	0.99	135	0.99	3.72	28	38	L	1	3	5	6	7	10	14	16	20	33	34	35	40	41	43	44	48	52	55	56	59	63	65	68	69	75	80	81	0	0	0	0	0	0	0	0	0	0
								N	1	2	1	2	2	2	1	1	2	1	1	2	1	1	2	2	2	1	1	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
204	270	0.99	180	0.6	4.12	32	38	L	1	2	6	7	8	10	15	17	22	26	30	31	34	35	37	38	41	42	44	47	48	49	52	55	60	62	65	69	70	73	74	76	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
205	270	0.99	180	0.7	4.12	32	38	L	1	2	6	7	8	10	15	17	22	26	30	31	34	35	37	38	41	42	44	47	48	49	52	55	60	62	65	69	70	73	74	76	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
206	270	0.99	180	0.8	4.12	32	38	L	1	2	6	7	8	10	15	17	22	26	30	31	34	35	37	38	41	42	44	47	48	49	52	55	60	62	65	69	70	73	74	76	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
207	270	0.99	180	0.85	4.12	32	38	L	1	2	6	7	8	10	15	17	22	26	30	31	34	35	37	38	41	42	44	47	48	49	52	55	60	62	65	69	70	73	74	76	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
208	270	0.99	180	0.9	4.12	32	38	L	1	2	6	7	8	10	15	17	22	26	30	31	34	35	37	38	41	42	44	47	48	49	52	55	60	62	65	69	70	73	74	76	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
209	270	0.99	180	0.95	4.12	30	38	L	2	3	6	7	8	10	13	17	22	23	30	33	34	35	36	37	38	39	42	46	47	48	52	55	58	69	73	74	76	81	0	0	0	0	0	0	0	0
								N	1	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	3	1	1	1	3	1	1	1	1	3	1	1	1	0	0	0	0	0	0	0	0
210	270	0.99	180	0.99	4.11	31	38	L	3	6	7	14	17	21	22	23	25	29	33	34	35	37	38	41	42	43	44	46	48	55	56	57	58	64	65	68	71	75	77	0	0	0	0	0	0	0
								N	1	1	2	1	2	1	2	1	1	1	2	1	2	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
211	315	0.6	90	0.6	3.40	38	38	L	1	3	5	6	7	8	10	11	14	15	17	19	20	25	27	29	34	35	38	39	41	42	43	44	45	48	49	52	55	56	57	59	61	64	68	70	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
212	315	0.6	90	0.7	3.40	38	38	L	1	3	5	6	7	8	10	11	14	15	17	19	20	25	27	29	34	35	38	39	41	42	43	44	45	48	49	52	55	56	57	59	61	64	68	70	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
213	315	0.6	90	0.8	3.38	37	38	L	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	42	43	44	45	48	49	54	55	56	57	59	61	64	68	70	74	77	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
214	315	0.6	90	0.85	3.38	37	38	L	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	42	43	44	45	48	49	54	55	56	57	59	61	64	68	70	74	77	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
215	315	0.6	90	0.9	3.36	36	38	L	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	43	44	45	48	49	54	55	56	57	59	61	64	68	70	74	77	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	0	0
216	315	0.6	90	0.95	3.34	35	38	L	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	43	44	45	48	49	54	55	56	59	61	64	68	70	74	77	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0	0	0
217	315	0.6	90	0.99	2.84	21	38	L	1	3	5	6	15	25	27	34	35	43	44	45	49	54	56	59	64	68	69	74	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	2	2	2	2	2	1	1	4	2	2	1	2	1	2	1	3	2	2	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
218	315	0.6	135	0.6	4.02	38	38	L	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
219	315	0.6	135	0.7	4.02	38	38	L	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
220	315	0.6	135	0.8	4.02	38	38	L	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
221	315	0.6	135	0.85	4.02	38	38	L	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
222	315	0.6	135	0.9	4.02	37	38	L	3	4	6	7	10	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	53	55	56	57	58	62	63	65	68	69	74	75	77	78	80	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
223	315	0.6	135	0.95	4.02	36	38	L	3	4	6	7	10	17	19	20	22	28	33	34	35	37	38	42	43	44	47	48	49	53	55	56	57	58	62	63	65	68	69	75	77	78	80	81	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
224	315	0.6	135	0.99	3.74	28	38	L	1	3	5	6	9	10	15	16	29	33	34	35	37	40	41	43	44	49	52	55	56	59	63	68	69	75	80	81	0	0	0	0	0	0	0	0	0	0
								N	1	2	1	2	2	2	2	1	1	1	1	2	1	1	1	2	2	1	1	1	1	1	2	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0
225	315	0.6	180	0.6	4.12	30	38	L	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
226	315	0.6	180	0.7	4.12	30	38	L	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
227	315	0.6	180	0.8	4.12	30	38	L	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
228	315	0.6	180	0.85	4.12	30	38	L	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
229	315	0.6	180	0.9	4.12	30	38	L	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
230	315	0.6	180	0.95	4.12	31	38	L	6	10	15	17	22	23	25	26	30	33	34	35	36	38	39	42	46	47	48	52	53	54	55	56	57	58	62	63	65	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	3	3	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
231	315	0.6	180	0.99	4.12	30	38	L	4	6	7	14	15	17	21	22	23	29	32	33	34	35	37	38	42	43	44	46	48	54	55	56	58	59	65	68	69	75	0	0	0	0	0	0	0	0
								N	1	2	1	1	1	2	1	1	1	1	1	2	1	2	2	1	1	2	1	1	2	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
232	315	0.7	90	0.6	3.40	38	38	L	1	3	5	6	7	8	10	11	14	15	17	19	20	25	27	29	34	35	38	39	41	42	43	44	45	48	49	52	55	56	57	59	61	64	68	70	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
233	315	0.7	90	0.7	3.40	38	38	L	1	3	5	6	7	8	10	11	14	15	17	19	20	25	27	29	34	35	38	39	41	42	43	44	45	48	49	52	55	56	57	59	61	64	68	70	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
234	315	0.7	90	0.8	3.38	37	38	L	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	42	43	44	45	48	49	54	55	56	57	59	61	64	68	70	74	77	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
235	315	0.7	90	0.85	3.38	37	38	L	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	42	43	44	45	48	49	54	55	56	57	59	61	64	68	70	74	77	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0

Table H.2 (cont'd)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these ECs																																						
236	315	0.7	90	0.9	3.36	36	38	**L**	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	43	44	45	48	49	54	55	56	57	59	61	64	68	70	74	77	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0	0
237	315	0.7	90	0.95	3.34	35	38	**L**	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	43	44	45	48	49	54	55	56	59	61	64	68	70	74	77	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0	0	0
238	315	0.7	90	0.99	2.84	21	38	**L**	1	3	5	6	15	25	27	34	35	43	44	45	49	54	56	59	64	68	69	74	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	2	2	2	2	2	1	1	4	2	2	1	2	1	2	1	3	2	2	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
239	315	0.7	135	0.6	4.02	38	38	**L**	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
240	315	0.7	135	0.7	4.02	38	38	**L**	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
241	315	0.7	135	0.8	4.02	38	38	**L**	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
242	315	0.7	135	0.85	4.02	38	38	**L**	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
243	315	0.7	135	0.9	4.02	37	38	**L**	3	4	6	7	10	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	53	55	56	57	58	62	63	65	68	69	74	75	77	78	80	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
244	315	0.7	135	0.95	4.02	36	38	**L**	3	4	6	7	10	17	19	20	22	28	33	34	35	37	38	42	43	44	47	48	49	53	55	56	57	58	62	63	65	68	69	75	77	78	80	81	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
245	315	0.7	135	0.99	3.74	28	38	**L**	1	3	5	6	9	10	15	16	29	33	34	35	37	40	41	43	44	49	52	55	56	59	63	68	69	75	80	81	0	0	0	0	0	0	0	0	0	0
								N	1	2	1	2	2	2	2	1	1	1	1	2	1	1	1	2	2	1	1	1	1	2	1	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0
246	315	0.7	180	0.6	4.12	30	38	**L**	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
247	315	0.7	180	0.7	4.12	30	38	**L**	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
248	315	0.7	180	0.8	4.12	30	38	**L**	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
249	315	0.7	180	0.85	4.12	30	38	**L**	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
250	315	0.7	180	0.9	4.12	30	38	**L**	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
251	315	0.7	180	0.95	4.12	31	38	**L**	6	10	15	17	22	23	25	26	30	33	34	35	36	38	39	42	46	47	48	52	53	54	55	56	57	58	62	63	65	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	3	3	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
252	315	0.7	180	0.99	4.12	30	38	**L**	4	6	7	14	15	17	21	22	23	29	32	33	34	35	37	38	42	43	44	46	48	54	55	56	58	59	65	68	69	75	0	0	0	0	0	0	0	0
								N	1	2	1	1	1	2	1	1	1	1	1	2	1	2	2	1	1	2	1	1	2	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
253	315	0.8	90	0.6	3.40	38	38	**L**	1	3	5	6	7	8	10	11	14	15	17	19	20	25	27	29	34	35	38	39	41	42	43	44	45	48	49	52	55	56	57	59	61	64	68	70	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
254	315	0.8	90	0.7	3.40	38	38	**L**	1	3	5	6	7	8	10	11	14	15	17	19	20	25	27	29	34	35	38	39	41	42	43	44	45	48	49	52	55	56	57	59	61	64	68	70	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
255	315	0.8	90	0.8	3.38	37	38	**L**	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	42	43	44	45	48	49	54	55	56	57	59	61	64	68	70	74	77	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
256	315	0.8	90	0.85	3.38	37	38	**L**	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	42	43	44	45	48	49	54	55	56	57	59	61	64	68	70	74	77	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
257	315	0.8	90	0.9	3.36	36	38	**L**	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	43	44	45	48	49	54	55	56	57	59	61	64	68	70	74	77	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0	0
258	315	0.8	90	0.95	3.34	35	38	**L**	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	43	44	45	48	49	54	55	56	59	61	64	68	70	74	77	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0	0	0
259	315	0.8	90	0.99	2.84	21	38	**L**	1	3	5	6	15	25	27	34	35	43	44	45	49	54	56	59	64	68	69	74	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	2	2	2	2	2	1	1	4	2	2	1	2	1	2	1	3	2	2	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
260	315	0.8	135	0.6	4.02	38	38	**L**	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
261	315	0.8	135	0.7	4.02	38	38	**L**	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
262	315	0.8	135	0.8	4.02	38	38	**L**	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
263	315	0.8	135	0.85	4.02	38	38	**L**	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
264	315	0.8	135	0.9	4.02	37	38	**L**	3	4	6	7	10	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	53	55	56	57	58	62	63	65	68	69	74	75	77	78	80	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
265	315	0.8	135	0.95	4.02	36	38	**L**	3	4	6	7	10	17	19	20	22	28	33	34	35	37	38	42	43	44	47	48	49	53	55	56	57	58	62	63	65	68	69	75	77	78	80	81	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
266	315	0.8	135	0.99	3.74	28	38	**L**	1	3	5	6	9	10	15	16	29	33	34	35	37	40	41	43	44	49	52	55	56	59	63	68	69	75	80	81	0	0	0	0	0	0	0	0	0	0
								N	1	2	1	2	2	2	2	1	1	1	1	2	1	1	1	2	2	1	1	1	1	2	1	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0
267	315	0.8	180	0.6	4.12	30	38	**L**	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
268	315	0.8	180	0.7	4.12	30	38	**L**	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
269	315	0.8	180	0.8	4.12	30	38	**L**	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
270	315	0.8	180	0.85	4.12	30	38	**L**	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
271	315	0.8	180	0.9	4.12	30	38	**L**	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
272	315	0.8	180	0.95	4.12	31	38	**L**	6	10	15	17	22	23	25	26	30	33	34	35	36	38	39	42	46	47	48	52	53	54	55	56	57	58	62	63	65	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	3	3	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
273	315	0.8	180	0.99	4.12	30	38	**L**	4	6	7	14	15	17	21	22	23	29	32	33	34	35	37	38	42	43	44	46	48	54	55	56	58	59	65	68	69	75	0	0	0	0	0	0	0	0
								N	1	2	1	1	1	2	1	1	1	1	1	2	1	2	2	1	1	2	1	1	2	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
274	315	0.9	90	0.6	3.40	38	38	**L**	1	3	5	6	7	8	10	11	14	15	17	19	20	25	27	29	34	35	38	39	41	42	43	44	45	48	49	52	55	56	57	59	61	64	68	70	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
275	315	0.9	90	0.7	3.40	38	38	**L**	1	3	5	6	7	8	10	11	14	15	17	19	20	25	27	29	34	35	38	39	41	42	43	44	45	48	49	52	55	56	57	59	61	64	68	70	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table H.2 (cont'd)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these ECs																																						
276	315	0.9	90	0.8	3.38	37	38	L	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	42	43	44	45	48	49	54	55	56	57	59	61	64	68	70	74	77	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
277	315	0.9	90	0.85	3.38	37	38	L	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	42	43	44	45	48	49	54	55	56	57	59	61	64	68	70	74	77	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
278	315	0.9	90	0.9	3.36	36	38	L	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	43	44	45	48	49	54	55	56	57	59	61	64	68	70	74	77	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0	0
279	315	0.9	90	0.95	3.34	35	38	L	1	3	5	6	7	8	10	11	14	15	19	20	22	25	27	28	29	34	35	38	43	44	45	48	49	54	55	56	59	61	64	68	70	74	77	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0	0	0
280	315	0.9	90	0.99	2.84	21	38	L	1	3	5	6	15	25	27	34	35	43	44	45	49	54	56	59	64	68	69	74	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	2	2	2	2	2	1	1	4	2	2	1	2	1	2	1	3	2	2	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
281	315	0.9	135	0.6	4.02	38	38	L	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
282	315	0.9	135	0.7	4.02	38	38	L	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
283	315	0.9	135	0.8	4.02	38	38	L	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
284	315	0.9	135	0.85	4.02	38	38	L	3	4	6	7	10	11	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	55	56	57	58	61	62	63	65	68	69	74	75	78	79	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
285	315	0.9	135	0.9	4.02	37	38	L	3	4	6	7	10	17	19	20	22	28	30	33	34	35	38	42	43	44	47	48	49	53	55	56	57	58	62	63	65	68	69	74	75	77	78	80	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
286	315	0.9	135	0.95	4.02	36	38	L	3	4	6	7	10	17	19	20	22	28	33	34	35	37	38	42	43	44	47	48	49	53	55	56	57	58	62	63	65	68	69	75	77	78	80	81	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
287	315	0.9	135	0.99	3.74	28	38	L	1	3	5	6	9	10	15	16	29	33	34	35	37	40	41	43	44	49	52	55	56	59	63	68	69	75	80	81	0	0	0	0	0	0	0	0	0	0
								N	1	2	1	2	2	2	2	1	1	1	1	2	1	1	1	2	2	1	1	1	1	2	1	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0
288	315	0.9	180	0.6	4.12	30	38	L	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
289	315	0.9	180	0.7	4.12	30	38	L	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
290	315	0.9	180	0.8	4.12	30	38	L	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
291	315	0.9	180	0.85	4.12	30	38	L	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
292	315	0.9	180	0.9	4.12	30	38	L	6	10	15	17	23	25	26	29	30	33	34	35	36	37	38	39	42	46	47	48	52	53	55	56	58	61	63	65	76	78	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0
293	315	0.9	180	0.95	4.12	31	38	L	6	10	15	17	22	23	25	26	30	33	34	35	36	38	39	42	46	47	48	52	53	54	55	56	57	58	62	63	65	76	78	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	3	3	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
294	315	0.9	180	0.99	4.12	30	38	L	4	6	7	14	15	17	21	22	23	29	32	33	34	35	37	38	42	43	44	46	48	54	55	56	58	59	65	68	69	75	0	0	0	0	0	0	0	0
								N	1	2	1	1	1	2	1	1	1	1	1	2	1	2	2	1	1	2	1	1	2	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
295	315	0.99	90	0.6	3.40	38	38	L	1	3	5	6	7	8	10	11	14	15	17	19	20	22	25	27	28	34	35	38	41	42	43	44	45	48	49	55	56	57	59	61	64	68	69	70	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
296	315	0.99	90	0.7	3.40	38	38	L	1	3	5	6	7	8	10	11	14	15	17	19	20	22	25	27	28	34	35	38	41	42	43	44	45	48	49	55	56	57	59	61	64	68	69	70	74	77
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
297	315	0.99	90	0.8	3.38	37	38	L	1	3	5	6	7	8	10	11	14	19	20	22	25	27	29	32	34	35	38	42	43	44	45	48	49	52	55	56	57	59	61	64	68	70	74	77	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
298	315	0.99	90	0.85	3.38	37	38	L	1	3	5	6	7	8	10	11	14	19	20	22	25	27	29	32	34	35	38	42	43	44	45	48	49	52	55	56	57	59	61	64	68	70	74	77	81	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
299	315	0.99	90	0.9	3.36	36	38	L	1	3	5	6	7	8	10	11	14	19	20	22	25	27	28	29	32	34	35	38	43	44	45	48	49	55	56	57	59	61	64	68	70	74	77	81	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	0	0
300	315	0.99	90	0.95	3.34	35	38	L	1	3	5	6	7	8	10	11	14	19	20	22	25	27	28	29	32	34	35	38	41	43	44	45	48	49	55	56	59	61	64	68	70	74	77	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0	0	0
301	315	0.99	90	0.99	2.84	21	38	L	1	3	5	6	25	27	32	34	35	43	44	45	49	54	56	59	64	68	69	74	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	2	2	2	2	1	1	2	4	2	2	1	2	1	2	1	3	2	2	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
302	315	0.99	135	0.6	4.02	38	38	L	4	6	10	16	17	19	20	22	26	27	30	32	33	34	35	38	42	44	47	48	49	52	53	54	55	56	57	58	62	63	64	65	68	69	74	75	78	80
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
303	315	0.99	135	0.7	4.02	38	38	L	4	6	10	16	17	19	20	22	26	27	30	32	33	34	35	38	42	44	47	48	49	52	53	54	55	56	57	58	62	63	64	65	68	69	74	75	78	80
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
304	315	0.99	135	0.8	4.02	38	38	L	4	6	10	16	17	19	20	22	26	27	30	32	33	34	35	38	42	44	47	48	49	52	53	54	55	56	57	58	62	63	64	65	68	69	74	75	78	80
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
305	315	0.99	135	0.85	4.02	38	38	L	4	6	10	16	17	19	20	22	26	27	30	32	33	34	35	38	42	44	47	48	49	52	53	54	55	56	57	58	62	63	64	65	68	69	74	75	78	80
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
306	315	0.99	135	0.9	4.02	38	38	L	3	4	6	10	11	15	17	19	20	22	28	30	33	34	35	37	38	42	43	44	47	48	49	55	56	57	58	59	61	62	63	65	68	69	75	78	80	81
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
307	315	0.99	135	0.95	4.02	36	38	L	3	4	6	10	15	17	19	20	22	33	34	35	38	41	42	43	44	47	48	49	52	55	56	57	58	61	62	63	65	68	69	74	75	78	80	81	0	0
								N	1	1	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
308	315	0.99	135	0.99	3.74	29	38	L	1	3	5	6	9	10	11	14	15	29	33	34	35	37	40	41	43	44	49	52	55	56	59	63	68	69	75	80	81	0	0	0	0	0	0	0	0	0
								N	1	2	1	2	2	2	1	1	2	1	1	1	2	1	1	1	2	2	1	1	1	1	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
309	315	0.99	180	0.6	4.12	30	38	L	6	7	8	17	23	26	30	33	34	35	37	40	42	46	47	48	49	50	52	54	55	58	59	63	64	65	69	73	74	76	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0	0
310	315	0.99	180	0.7	4.12	30	38	L	6	7	8	17	23	26	30	33	34	35	37	40	42	46	47	48	49	50	52	54	55	58	59	63	64	65	69	73	74	76	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0	0
311	315	0.99	180	0.8	4.12	30	38	L	6	7	8	17	23	26	30	33	34	35	37	40	42	46	47	48	49	50	52	54	55	58	59	63	64	65	69	73	74	76	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0	0
312	315	0.99	180	0.85	4.12	30	38	L	6	7	8	17	23	26	30	33	34	35	37	40	42	46	47	48	49	50	52	54	55	58	59	63	64	65	69	73	74	76	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0	0
313	315	0.99	180	0.9	4.12	30	38	L	6	7	8	17	23	26	30	33	34	35	37	40	42	46	47	48	49	50	52	54	55	58	59	63	64	65	69	73	74	76	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0	0
314	315	0.99	180	0.95	4.12	31	38	L	6	10	13	15	17	23	26	30	33	34	35	36	37	40	42	46	47	48	50	52	53	54	55	58	59	60	63	69	73	74	76	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	3	1	1	2	3	1	1	1	1	1	0	0	0	0	0	0	0
315	315	0.99	180	0.99	4.12	31	38	L	6	7	14	17	21	22	23	25	29	32	33	34	35	37	38	41	42	43	44	46	48	55	56	57	58	64	65	68	71	75	76	0	0	0	0	0	0	0
								N	1	1	1	2	1	2	1	1	1	1	2	1	2	1	1	1	1	2	1	1	2	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0

Table H.3: The Results of the Problem Solved for Case III

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these Ecs																												
1	225	0.6	90	0.6	2.44	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
2	225	0.6	90	0.7	2.44	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
3	225	0.6	90	0.8	2.23	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
4	225	0.6	90	0.85	2.02	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
5	225	0.6	90	0.9	1.92	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
6	225	0.6	90	0.95	1.82	19	19	**L**	5	6	7	24	33	34	35	36	37	41	43	44	46	59	61	65	68	72	77	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
7	225	0.6	90	0.99	0.83	19	19	**L**	6	7	23	27	28	34	35	36	37	41	43	51	58	59	65	69	70	72	77	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
8	225	0.6	135	0.6	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
9	225	0.6	135	0.7	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
10	225	0.6	135	0.8	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
11	225	0.6	135	0.85	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
12	225	0.6	135	0.9	3.30	19	19	**L**	3	5	6	7	16	24	33	34	35	36	37	44	46	59	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
13	225	0.6	135	0.95	3.14	19	19	**L**	3	5	6	7	16	24	33	34	35	36	37	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
14	225	0.6	135	0.99	1.63	19	19	**L**	2	5	6	7	11	23	29	34	35	36	37	38	41	43	59	65	70	72	80	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
15	225	0.6	180	0.6	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
16	225	0.6	180	0.7	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
17	225	0.6	180	0.8	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
18	225	0.6	180	0.85	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
19	225	0.6	180	0.9	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
20	225	0.6	180	0.95	3.82	19	19	**L**	3	6	7	14	29	33	34	35	36	37	46	55	58	59	62	65	68	72	77	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
21	225	0.6	180	0.99	2.52	19	19	**L**	5	6	7	10	23	29	33	34	35	36	37	38	43	46	54	59	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
22	225	0.7	90	0.6	2.44	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
23	225	0.7	90	0.7	2.44	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
24	225	0.7	90	0.8	2.23	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
25	225	0.7	90	0.85	2.02	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
26	225	0.7	90	0.9	1.92	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
27	225	0.7	90	0.95	1.82	19	19	**L**	5	6	7	24	33	34	35	36	37	41	43	44	46	59	61	65	68	72	77	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
28	225	0.7	90	0.99	0.83	19	19	**L**	6	7	23	27	28	34	35	36	37	41	43	51	58	59	65	69	70	72	77	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
29	225	0.7	135	0.6	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
30	225	0.7	135	0.7	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
31	225	0.7	135	0.8	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
32	225	0.7	135	0.85	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
33	225	0.7	135	0.9	3.30	19	19	**L**	3	5	6	7	16	24	33	34	35	36	37	44	46	59	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
34	225	0.7	135	0.95	3.14	19	19	**L**	3	5	6	7	16	24	33	34	35	36	37	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
35	225	0.7	135	0.99	1.63	19	19	**L**	2	5	6	7	11	23	29	34	35	36	37	38	41	43	59	65	70	72	80	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0

Table H.3 (cont’d)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these Ecs																											
36	225	0.7	180	0.6	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
37	225	0.7	180	0.7	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
38	225	0.7	180	0.8	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
39	225	0.7	180	0.85	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
40	225	0.7	180	0.9	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
41	225	0.7	180	0.95	3.82	19	19	**L**	3	6	7	14	29	33	34	35	36	37	46	55	58	59	62	65	68	72	77	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
42	225	0.7	180	0.99	2.52	19	19	**L**	5	6	7	10	23	29	33	34	35	36	37	38	43	46	54	59	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
43	225	0.8	90	0.6	2.44	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
44	225	0.8	90	0.7	2.44	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
45	225	0.8	90	0.8	2.23	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
46	225	0.8	90	0.85	2.02	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
47	225	0.8	90	0.9	1.92	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
48	225	0.8	90	0.95	1.82	19	19	**L**	5	6	7	24	33	34	35	36	37	41	43	44	46	59	61	65	68	72	77	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
49	225	0.8	90	0.99	0.83	19	19	**L**	6	7	23	27	28	34	35	36	37	41	43	51	58	59	65	69	70	72	77	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
50	225	0.8	135	0.6	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
51	225	0.8	135	0.7	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
52	225	0.8	135	0.8	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
53	225	0.8	135	0.85	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
54	225	0.8	135	0.9	3.30	19	19	**L**	3	5	6	7	16	24	33	34	35	36	37	44	46	59	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
55	225	0.8	135	0.95	3.14	19	19	**L**	3	5	6	7	16	24	33	34	35	36	37	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
56	225	0.8	135	0.99	1.63	19	19	**L**	2	5	6	7	11	23	29	34	35	36	37	38	41	43	59	65	70	72	80	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
57	225	0.8	180	0.6	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
58	225	0.8	180	0.7	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
59	225	0.8	180	0.8	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
60	225	0.8	180	0.85	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
61	225	0.8	180	0.9	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
62	225	0.8	180	0.95	3.82	19	19	**L**	3	6	7	14	29	33	34	35	36	37	46	55	58	59	62	65	68	72	77	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
63	225	0.8	180	0.99	2.52	19	19	**L**	5	6	7	10	23	29	33	34	35	36	37	38	43	46	54	59	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
64	225	0.9	90	0.6	2.44	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
65	225	0.9	90	0.7	2.44	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
66	225	0.9	90	0.8	2.23	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
67	225	0.9	90	0.85	2.02	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
68	225	0.9	90	0.9	1.92	19	19	**L**	5	6	7	16	24	33	34	35	36	37	43	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
69	225	0.9	90	0.95	1.82	19	19	**L**	5	6	7	24	33	34	35	36	37	41	43	44	46	59	61	65	68	72	77	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
70	225	0.9	90	0.99	0.83	19	19	**L**	6	7	23	27	28	34	35	36	37	41	43	51	58	59	65	69	70	72	77	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
71	225	0.9	135	0.6	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
72	225	0.9	135	0.7	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
73	225	0.9	135	0.8	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
74	225	0.9	135	0.85	3.33	19	19	**L**	3	5	6	7	16	22	24	33	34	35	36	37	44	46	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
75	225	0.9	135	0.9	3.30	19	19	**L**	3	5	6	7	16	24	33	34	35	36	37	44	46	59	61	65	68	72	81	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0

Table H.3 (cont'd)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these Ecs																											
76	225	0.9	135	0.95	3.14	19	19	**L**	3	5	6	7	16	24	33	34	35	36	37	44	46	54	59	61	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
77	225	0.9	135	0.99	1.63	19	19	**L**	2	5	6	7	11	23	29	34	35	36	37	38	41	43	59	65	70	72	80	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
78	225	0.9	180	0.6	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
79	225	0.9	180	0.7	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
80	225	0.9	180	0.8	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
81	225	0.9	180	0.85	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
82	225	0.9	180	0.9	3.91	19	19	**L**	3	6	7	14	16	29	33	34	35	36	37	46	55	58	59	62	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
83	225	0.9	180	0.95	3.82	19	19	**L**	3	6	7	14	29	33	34	35	36	37	46	55	58	59	62	65	68	72	77	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
84	225	0.9	180	0.99	2.52	19	19	**L**	5	6	7	10	23	29	33	34	35	36	37	38	43	46	54	59	65	68	72	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
85	225	0.99	90	0.6	2.85	19	28	**L**	1	3	5	6	7	9	10	22	23	29	33	34	35	36	38	43	44	46	54	57	59	65	68	70	72	77	78
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
86	225	0.99	90	0.7	2.85	19	28	**L**	1	3	5	6	7	9	10	22	23	29	33	34	35	36	38	43	44	46	54	57	59	65	68	70	72	77	78
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
87	225	0.99	90	0.8	2.64	19	28	**L**	1	3	5	6	7	9	10	22	23	29	33	34	35	36	38	43	44	46	54	57	59	65	68	70	72	77	78
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
88	225	0.99	90	0.85	2.43	19	28	**L**	1	3	5	6	7	9	10	22	23	29	33	34	35	36	38	43	44	46	54	57	59	65	68	70	72	77	78
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
89	225	0.99	90	0.9	2.39	19	28	**L**	1	3	5	6	7	9	10	23	29	33	34	35	36	38	43	44	46	54	57	59	65	68	70	72	77	78	0
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0
90	225	0.99	90	0.95	2.35	19	28	**L**	1	3	5	6	7	9	10	23	29	33	34	35	36	38	41	43	44	46	57	59	65	68	70	72	77	78	0
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0
91	225	0.99	90	0.99	1.42	19	28	**L**	1	3	5	6	7	23	29	33	34	35	36	37	38	41	44	46	59	65	68	70	72	74	77	0	0	0	0
								N	1	2	1	1	2	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	2	0	0	0	0
92	225	0.99	135	0.6	3.62	19	28	**L**	3	5	6	7	9	10	16	22	23	29	33	34	35	36	38	44	46	57	64	65	68	70	72	78	80	81	0
								N	1	1	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
93	225	0.99	135	0.7	3.62	19	28	**L**	3	5	6	7	9	10	16	22	23	29	33	34	35	36	38	44	46	57	64	65	68	70	72	78	80	81	0
								N	1	1	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
94	225	0.99	135	0.8	3.62	19	28	**L**	3	5	6	7	9	10	16	22	23	29	33	34	35	36	38	44	46	57	64	65	68	70	72	78	80	81	0
								N	1	1	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
95	225	0.99	135	0.85	3.62	19	28	**L**	3	5	6	7	9	10	16	22	23	29	33	34	35	36	38	44	46	57	64	65	68	70	72	78	80	81	0
								N	1	1	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
96	225	0.99	135	0.9	3.62	19	28	**L**	3	5	6	7	9	10	16	22	23	29	33	34	35	36	38	44	46	57	59	64	65	68	70	72	78	80	81
								N	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
97	225	0.99	135	0.95	3.50	19	28	**L**	3	5	6	7	9	10	16	22	23	26	29	33	34	35	36	38	41	44	46	57	59	65	68	70	72	78	80
								N	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
98	225	0.99	135	0.99	2.64	19	28	**L**	1	3	5	6	7	16	23	29	33	34	35	36	37	38	44	46	54	59	65	68	70	72	78	0	0	0	0
								N	1	2	1	1	2	2	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	0	0	0	0
99	225	0.99	180	0.6	3.98	19	28	**L**	5	6	7	9	10	17	23	26	27	29	32	33	34	35	36	38	39	41	57	58	65	68	70	72	78	80	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0
100	225	0.99	180	0.7	3.98	19	28	**L**	5	6	7	9	10	17	23	26	27	29	32	33	34	35	36	38	39	41	57	58	65	68	70	72	78	80	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0
101	225	0.99	180	0.8	3.98	19	28	**L**	5	6	7	9	10	17	23	26	27	29	32	33	34	35	36	38	39	41	57	58	65	68	70	72	78	80	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0
102	225	0.99	180	0.85	3.98	19	28	**L**	5	6	7	9	10	17	23	26	27	29	32	33	34	35	36	38	39	41	57	58	65	68	70	72	78	80	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0
103	225	0.99	180	0.9	3.98	19	28	**L**	5	6	7	9	10	17	23	26	27	29	32	33	34	35	36	38	39	41	57	58	65	68	70	72	78	80	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0
104	225	0.99	180	0.95	3.98	19	28	**L**	5	6	7	9	10	17	22	23	26	27	29	32	33	34	35	36	38	41	57	58	65	68	70	72	78	80	0
								N	1	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
105	225	0.99	180	0.99	3.50	19	28	**L**	1	3	5	6	7	16	22	23	29	33	34	35	36	38	46	54	57	58	59	65	68	70	72	78	0	0	0
								N	1	2	1	1	2	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
106	270	0.6	90	0.6	2.17	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
107	270	0.6	90	0.7	2.17	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
108	270	0.6	90	0.8	1.96	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
109	270	0.6	90	0.85	1.75	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
110	270	0.6	90	0.9	1.64	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
111	270	0.6	90	0.95	1.24	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
112	270	0.6	90	0.99	0.32	14	14	**L**	6	7	25	26	34	35	37	44	46	50	52	56	59	65	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
113	270	0.6	135	0.6	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
114	270	0.6	135	0.7	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
115	270	0.6	135	0.8	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Table H.3 (cont'd)

#	T	β	S	α	Z	E	V		Locations of ECs and number of vehicles located at these Ecs																										
116	270	0.6	135	0.85	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
117	270	0.6	135	0.9	2.85	14	14	**L**	4	5	6	7	14	16	23	34	35	53	59	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
118	270	0.6	135	0.95	2.48	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
119	270	0.6	135	0.99	1.11	14	14	**L**	4	5	6	7	14	17	23	27	34	35	51	53	54	73	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
120	270	0.6	180	0.6	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
121	270	0.6	180	0.7	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
122	270	0.6	180	0.8	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
123	270	0.6	180	0.85	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
124	270	0.6	180	0.9	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
125	270	0.6	180	0.95	3.27	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
126	270	0.6	180	0.99	1.94	14	14	**L**	4	5	6	7	14	23	34	35	46	53	59	68	73	77	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
127	270	0.7	90	0.6	2.17	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
128	270	0.7	90	0.7	2.17	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
129	270	0.7	90	0.8	1.96	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
130	270	0.7	90	0.85	1.75	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
131	270	0.7	90	0.9	1.64	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
132	270	0.7	90	0.95	1.24	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
133	270	0.7	90	0.99	0.32	14	14	**L**	6	7	25	26	34	35	37	44	46	50	52	56	59	65	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
134	270	0.7	135	0.6	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
135	270	0.7	135	0.7	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
136	270	0.7	135	0.8	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
137	270	0.7	135	0.85	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
138	270	0.7	135	0.9	2.85	14	14	**L**	4	5	6	7	14	16	23	34	35	53	59	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
139	270	0.7	135	0.95	2.48	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
140	270	0.7	135	0.99	1.11	14	14	**L**	4	5	6	7	14	17	23	27	34	35	51	53	54	73	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
141	270	0.7	180	0.6	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
142	270	0.7	180	0.7	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
143	270	0.7	180	0.8	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
144	270	0.7	180	0.85	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
145	270	0.7	180	0.9	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
146	270	0.7	180	0.95	3.27	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
147	270	0.7	180	0.99	1.94	14	14	**L**	4	5	6	7	14	23	34	35	46	53	59	68	73	77	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
148	270	0.8	90	0.6	2.17	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
149	270	0.8	90	0.7	2.17	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
150	270	0.8	90	0.8	1.96	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
151	270	0.8	90	0.85	1.75	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
152	270	0.8	90	0.9	1.64	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
153	270	0.8	90	0.95	1.24	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
154	270	0.8	90	0.99	0.32	14	14	**L**	6	7	25	26	34	35	37	44	46	50	52	56	59	65	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
155	270	0.8	135	0.6	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Table H.3 (cont'd)

#	T	β	S	α	Z	E	V		Locations of ECs and number of vehicles located at these Ecs																											
156	270	0.8	135	0.7	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
157	270	0.8	135	0.8	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
158	270	0.8	135	0.85	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
159	270	0.8	135	0.9	2.85	14	14	**L**	4	5	6	7	14	16	23	34	35	53	59	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	270	0.8	135	0.95	2.48	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
161	270	0.8	135	0.99	1.11	14	14	**L**	4	5	6	7	14	17	23	27	34	35	51	53	54	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
162	270	0.8	180	0.6	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
163	270	0.8	180	0.7	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
164	270	0.8	180	0.8	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
165	270	0.8	180	0.85	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
166	270	0.8	180	0.9	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
167	270	0.8	180	0.95	3.27	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
168	270	0.8	180	0.99	1.94	14	14	**L**	4	5	6	7	14	23	34	35	46	53	59	68	73	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
169	270	0.9	90	0.6	2.17	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	270	0.9	90	0.7	2.17	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
171	270	0.9	90	0.8	1.96	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
172	270	0.9	90	0.85	1.75	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
173	270	0.9	90	0.9	1.64	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
174	270	0.9	90	0.95	1.24	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175	270	0.9	90	0.99	0.32	14	14	**L**	6	7	25	26	34	35	37	44	46	50	52	56	59	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
176	270	0.9	135	0.6	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
177	270	0.9	135	0.7	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
178	270	0.9	135	0.8	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
179	270	0.9	135	0.85	2.88	14	14	**L**	4	5	6	7	14	16	22	23	34	35	53	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	270	0.9	135	0.9	2.85	14	14	**L**	4	5	6	7	14	16	23	34	35	53	59	68	73	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
181	270	0.9	135	0.95	2.48	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
182	270	0.9	135	0.99	1.11	14	14	**L**	4	5	6	7	14	17	23	27	34	35	51	53	54	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
183	270	0.9	180	0.6	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
184	270	0.9	180	0.7	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
185	270	0.9	180	0.8	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
186	270	0.9	180	0.85	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
187	270	0.9	180	0.9	3.49	14	14	**L**	4	5	6	7	22	23	26	34	35	53	68	73	78	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
188	270	0.9	180	0.95	3.27	14	14	**L**	4	5	6	7	14	23	34	35	53	59	68	73	77	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
189	270	0.9	180	0.99	1.94	14	14	**L**	4	5	6	7	14	23	34	35	46	53	59	68	73	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
190	270	0.99	90	0.6	2.52	19	20	**L**	1	4	5	6	7	17	23	27	34	35	37	43	45	50	53	54	59	68	73	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
191	270	0.99	90	0.7	2.52	19	20	**L**	1	4	5	6	7	17	23	27	34	35	37	43	45	50	53	54	59	68	73	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
192	270	0.99	90	0.8	2.31	19	20	**L**	1	4	5	6	7	17	23	27	34	35	37	43	45	51	53	54	59	68	73	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
193	270	0.99	90	0.85	2.10	19	20	**L**	1	4	5	6	7	17	23	27	34	35	37	43	45	51	53	54	59	68	73	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
194	270	0.99	90	0.9	2.05	18	20	**L**	1	4	5	6	7	23	26	27	34	35	37	45	51	53	54	59	68	73	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0
195	270	0.99	90	0.95	1.70	18	20	**L**	1	4	5	6	7	23	26	27	34	35	37	45	51	53	54	59	68	73	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0

Table H.3 (cont'd)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these Ecs																												
196	270	0.99	90	0.99	0.75	18	20	**L**	4	5	6	7	11	23	33	34	35	37	45	46	50	53	54	59	71	73	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0
197	270	0.99	135	0.6	3.14	19	20	**L**	4	6	7	9	17	22	23	26	33	34	35	37	38	53	54	55	68	73	80	0	0	0	0	0	0	0	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
198	270	0.99	135	0.7	3.14	19	20	**L**	4	6	7	9	17	22	23	26	33	34	35	37	38	53	54	55	68	73	80	0	0	0	0	0	0	0	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
199	270	0.99	135	0.8	3.14	19	20	**L**	4	6	7	9	17	22	23	26	33	34	35	37	38	53	54	55	68	73	80	0	0	0	0	0	0	0	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
200	270	0.99	135	0.85	3.14	19	20	**L**	4	6	7	9	17	22	23	26	33	34	35	37	38	53	54	55	68	73	80	0	0	0	0	0	0	0	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
201	270	0.99	135	0.9	3.11	19	20	**L**	4	6	7	9	17	23	26	33	34	35	37	38	53	54	55	59	68	73	80	0	0	0	0	0	0	0	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
202	270	0.99	135	0.95	3.05	19	20	**L**	4	6	7	9	17	23	26	33	34	35	37	38	53	54	55	59	68	73	80	0	0	0	0	0	0	0	0	0
								N	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
203	270	0.99	135	0.99	2.26	18	20	**L**	4	5	6	7	11	23	33	34	35	37	45	46	51	53	54	59	71	73	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0
204	270	0.99	180	0.6	3.74	19	20	**L**	3	4	6	7	17	23	33	34	35	37	38	39	45	46	53	54	55	68	73	0	0	0	0	0	0	0	0	0
								N	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
205	270	0.99	180	0.7	3.74	19	20	**L**	3	4	6	7	17	23	33	34	35	37	38	39	45	46	53	54	55	68	73	0	0	0	0	0	0	0	0	0
								N	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
206	270	0.99	180	0.8	3.74	19	20	**L**	3	4	6	7	17	23	33	34	35	37	38	39	45	46	53	54	55	68	73	0	0	0	0	0	0	0	0	0
								N	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
207	270	0.99	180	0.85	3.74	19	20	**L**	3	4	6	7	17	23	33	34	35	37	38	39	45	46	53	54	55	68	73	0	0	0	0	0	0	0	0	0
								N	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
208	270	0.99	180	0.9	3.74	19	20	**L**	3	4	6	7	17	23	33	34	35	37	38	39	45	46	53	54	55	68	73	0	0	0	0	0	0	0	0	0
								N	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
209	270	0.99	180	0.95	3.67	19	20	**L**	3	4	6	7	17	23	33	34	35	37	38	45	46	53	54	55	59	68	73	0	0	0	0	0	0	0	0	0
								N	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
210	270	0.99	180	0.99	3.04	19	20	**L**	4	5	6	7	11	22	23	33	34	35	37	45	46	51	53	54	59	71	73	0	0	0	0	0	0	0	0	0
								N	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
211	315	0.6	90	0.6	1.66	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
212	315	0.6	90	0.7	1.66	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
213	315	0.6	90	0.8	1.45	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
214	315	0.6	90	0.85	1.24	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
215	315	0.6	90	0.9	1.24	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
216	315	0.6	90	0.95	0.86	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
217	315	0.6	90	0.99	0.09	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
218	315	0.6	135	0.6	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
219	315	0.6	135	0.7	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
220	315	0.6	135	0.8	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
221	315	0.6	135	0.85	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
222	315	0.6	135	0.9	2.07	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
223	315	0.6	135	0.95	1.52	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
224	315	0.6	135	0.99	0.39	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
225	315	0.6	180	0.6	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
226	315	0.6	180	0.7	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
227	315	0.6	180	0.8	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
228	315	0.6	180	0.85	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
229	315	0.6	180	0.9	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
230	315	0.6	180	0.95	2.17	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
231	315	0.6	180	0.99	0.58	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
232	315	0.7	90	0.6	1.66	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
233	315	0.7	90	0.7	1.66	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
234	315	0.7	90	0.8	1.45	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
235	315	0.7	90	0.85	1.24	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table H.3 (cont’d)

#	T	β	S	α	Z	E	V	Locations of ECs and number of vehicles located at these Ecs																											
236	315	0.7	90	0.9	1.24	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
237	315	0.7	90	0.95	0.86	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
238	315	0.7	90	0.99	0.09	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
239	315	0.7	135	0.6	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240	315	0.7	135	0.7	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
241	315	0.7	135	0.8	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
242	315	0.7	135	0.85	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
243	315	0.7	135	0.9	2.07	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
244	315	0.7	135	0.95	1.52	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
245	315	0.7	135	0.99	0.39	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
246	315	0.7	180	0.6	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
247	315	0.7	180	0.7	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
248	315	0.7	180	0.8	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
249	315	0.7	180	0.85	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
250	315	0.7	180	0.9	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
251	315	0.7	180	0.95	2.17	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
252	315	0.7	180	0.99	0.58	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
253	315	0.8	90	0.6	1.66	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
254	315	0.8	90	0.7	1.66	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
255	315	0.8	90	0.8	1.45	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
256	315	0.8	90	0.85	1.24	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
257	315	0.8	90	0.9	1.24	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
258	315	0.8	90	0.95	0.86	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
259	315	0.8	90	0.99	0.09	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
260	315	0.8	135	0.6	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
261	315	0.8	135	0.7	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
262	315	0.8	135	0.8	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
263	315	0.8	135	0.85	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
264	315	0.8	135	0.9	2.07	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
265	315	0.8	135	0.95	1.52	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
266	315	0.8	135	0.99	0.39	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
267	315	0.8	180	0.6	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
268	315	0.8	180	0.7	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
269	315	0.8	180	0.8	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
270	315	0.8	180	0.85	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
271	315	0.8	180	0.9	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
272	315	0.8	180	0.95	2.17	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
273	315	0.8	180	0.99	0.58	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
274	315	0.9	90	0.6	1.66	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
275	315	0.9	90	0.7	1.66	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table H.3 (cont’d)

#	T	β	S	α	Z	E	V		Locations of ECs and number of vehicles located at these Ecs																										
276	315	0.9	90	0.8	1.45	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
277	315	0.9	90	0.85	1.24	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
278	315	0.9	90	0.9	1.24	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
279	315	0.9	90	0.95	0.86	11	11	**L**	6	15	16	19	33	34	35	44	61	73	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
280	315	0.9	90	0.99	1.64	13	18	**L**	6	7	22	25	34	35	38	46	49	52	54	56	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	2	1	1	1	3	2	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
281	315	0.9	135	0.6	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
282	315	0.9	135	0.7	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
283	315	0.9	135	0.8	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
284	315	0.9	135	0.85	2.49	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
285	315	0.9	135	0.9	2.07	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
286	315	0.9	135	0.95	1.52	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
287	315	0.9	135	0.99	0.39	11	11	**L**	4	6	15	16	19	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
288	315	0.9	180	0.6	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
289	315	0.9	180	0.7	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
290	315	0.9	180	0.8	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
291	315	0.9	180	0.85	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
292	315	0.9	180	0.9	3.13	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
293	315	0.9	180	0.95	2.17	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
294	315	0.9	180	0.99	0.58	11	11	**L**	4	6	16	19	32	33	34	35	44	61	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
295	315	0.99	90	0.6	2.52	18	18	**L**	6	7	16	19	27	32	33	34	35	44	45	54	55	59	61	68	73	76	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
296	315	0.99	90	0.7	2.52	18	18	**L**	6	7	16	19	27	32	33	34	35	44	45	54	55	59	61	68	73	76	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
297	315	0.99	90	0.8	2.36	17	18	**L**	6	7	10	15	19	27	33	34	35	44	54	55	59	61	68	73	76	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
298	315	0.99	90	0.85	2.36	17	18	**L**	6	7	10	15	19	27	33	34	35	44	54	55	59	61	68	73	76	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
299	315	0.99	90	0.9	2.25	17	18	**L**	6	7	10	15	19	27	33	34	35	44	54	55	59	61	68	73	76	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
300	315	0.99	90	0.95	2.05	17	18	**L**	6	7	10	15	16	19	27	33	34	35	44	54	55	61	68	73	76	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
301	315	0.99	90	0.99	1.21	15	18	**L**	1	6	10	15	32	33	34	35	37	38	44	61	71	73	76	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	2	1	1	1	3	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
302	315	0.99	135	0.6	3.34	18	18	**L**	3	4	6	7	16	19	22	27	33	34	35	44	48	55	61	68	73	81	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
303	315	0.99	135	0.7	3.34	18	18	**L**	3	4	6	7	16	19	22	27	33	34	35	44	48	55	61	68	73	81	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
304	315	0.99	135	0.8	3.34	18	18	**L**	3	4	6	7	16	19	22	27	33	34	35	44	48	55	61	68	73	81	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
305	315	0.99	135	0.85	3.34	18	18	**L**	3	4	6	7	16	19	22	27	33	34	35	44	48	55	61	68	73	81	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
306	315	0.99	135	0.9	3.32	18	18	**L**	3	4	6	7	16	19	27	33	34	35	44	48	55	59	61	68	73	81	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
307	315	0.99	135	0.95	3.15	18	18	**L**	3	4	6	7	16	19	27	33	34	35	44	48	54	55	59	61	68	73	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
308	315	0.99	135	0.99	2.03	16	18	**L**	1	4	6	10	15	18	19	33	34	35	38	44	54	59	61	73	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	2	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0
309	315	0.99	180	0.6	3.96	18	18	**L**	3	6	7	16	21	22	25	29	33	34	35	46	48	55	58	65	68	78	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
310	315	0.99	180	0.7	3.96	18	18	**L**	3	6	7	16	21	22	25	29	33	34	35	46	48	55	58	65	68	78	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
311	315	0.99	180	0.8	3.96	18	18	**L**	3	6	7	16	21	22	25	29	33	34	35	46	48	55	58	65	68	78	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
312	315	0.99	180	0.85	3.96	18	18	**L**	3	6	7	16	21	22	25	29	33	34	35	46	48	55	58	65	68	78	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
313	315	0.99	180	0.9	3.96	18	18	**L**	3	6	7	16	21	22	25	29	33	34	35	46	48	55	58	65	68	78	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
314	315	0.99	180	0.95	3.79	18	18	**L**	3	4	6	7	16	19	22	23	33	34	35	41	46	48	55	61	68	73	0	0	0	0	0	0	0	0	0
								N	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
315	315	0.99	180	0.99	2.97	14	18	**L**	4	6	16	32	33	34	35	37	44	45	58	61	71	73	0	0	0	0	0	0	0	0	0	0	0	0	0
								N	1	1	2	2	2	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0