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The Sensitivity of Evacuation Time Estimates to Changes in Input Parameters for the I-DYNEV Computer Code

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Operated by
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ABSTRACT

A study performed by the Pacific Northwest Laboratory (PNL) with the assistance of the Texas Transportation Institute for the U.S. Nuclear Regulatory Commission (NRC) identifies the key input parameters to I-DYNEV affecting evacuation time estimates (ETEs). This study attempts to determine the sensitivity of ETEs to changes in input parameters when applied to two different evacuation networks. This information could then be used to determine parameters requiring additional research and to assist in the evaluation of ETEs submitted by licensees and applicants.

The parameters analyzed for the study included vehicle population, network capacity, loading time, the capacity reduction factor, the time interval of processing, and free-flow velocity. These parameters were applied to two evacuation networks with different characteristics. Changes in each of the six input parameters evaluated for this study affected to some degree the estimates of evacuation times. In general, however, the results obtained revealed that the sensitivity of the evacuation time estimates to changes in the input parameters is consistent with traffic modeling theory and documented algorithms included in the model.

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PREFACE

Two studies were performed to evaluate the I-DYNEV model. The study described in this report documents the sensitivity of evacuation time estimates calculated by the I-DYNEV model to changes in key input parameters to the code. The other study, as documented in NUREG/CR-4873 (PNL-6171), is titled Benchmark Study of the I-DYNEV Evacuation Time Estimate Computer Code. It documents a comparison of observed vehicle movement on a highway network during periods of peak commuter traffic with a simulation of the traffic flow produced using the I-DYNEV computer model.

SUMMARY

Licensees of nuclear power plants are currently required to provide evacuation time estimates (ETEs) for the site's emergency planning zone (EPZ) to the U.S. Nuclear Regulatory Commission (NRC) and to the Federal Emergency Management Agency (FEMA). An ETE is one means by which the two agencies attempt to ensure that adequate protective measures can be implemented in case of a significant release of radioactive materials from a plant site. At present, regulatory guidance for evacuation time studies does not specify an exact methodology. As a result, the licensees have developed their own methodologies and have made their own assumptions when calculating ETEs for their individual plants. To date, most submitted ETEs have been evaluated on a case-by-case basis using professional judgment to determine the adequacy of each.

The NRC requires that evacuation time estimates be made for two reasons. First, during the process of making estimates, situations requiring special resources can be identified because optimal use of available resources can reduce traffic delays. For example, providing traffic controls at critical intersections can substantially reduce evacuation times by minimizing the queues formed at those intersections. Second, during the course of an accident at a nuclear power plant site, evacuation time estimates made in advance for various conditions may be invaluable for decisionmakers who must select the most appropriate protective action. These protective actions include evacuation, sheltering, or sheltering followed by later relocation in order to minimize exposures to the population.

To aid in an evaluation, FEMA sponsored the development of the I-DYNEV computer model. I-DYNEV is a macroscopic model whose results describe the changing traffic conditions that prevail over a transportation network as an evacuation progresses. In order to prepare the mathematical algorithms for the code, the model developer used state-of-the-art techniques resulting from years of research sponsored by the U.S Department of Transportation. This study represents extensive testing of the parameters comprising some of the mathematical algorithms incorporated in the model.

The study is designed to identify input parameters that impact the estimated evacuation time and to evaluate the sensitivity of the evacuation time estimate to changes in each parameter. The input parameters identified for analysis in this study include vehicle population, network capacity, loading time, the capacity reduction factor, the time interval of processing, and free-flow velocity.

To perform a parameter sensitivity study, all input parameters except the one being evaluated remained constant for a series of simulations. Many input parameters, however, are determined by the specific transportation network used and by its associated vehicle population. In an effort to identify any effects of the roadway system on the evacuation time estimates, two distinct transportation networks were used. The two sites are referred to as Site A and Site B in the study. They differ in population distribution, size, number of segments, number of intersections, and roadway speeds.

Changes in each of the six input parameters evaluated for this study affected the estimate of evacuation time to some degree. In general, the sensitivity of evacuation time estimates to changes in the input parameters is consistent with traffic modeling theory and documented algorithms included in the model. In addition the roadway system was shown to affect evacuation times, making it important for the analyst to appropriately code the network.

The major conclusions associated with the six input parameters evaluated are presented below:

- Changes in the vehicle population suggested two major findings. First, for vehicle populations resulting in traffic delays, evacuation time increases at an approximately linear rate with increasing population. The rate of increase is dependent upon the characteristics of the transportation network. This finding is consistent with traffic modeling theory. Second. I-DYNEV contains a traffic assignment model (algorithm) that is affected by roadway system characteristics. The assignment algorithm can produce results which are potentially unreasonable if the analyst is unfamiliar with the theory.

- The effective transportation network capacity was varied for Sites A and B. Changes in the network capacity affected the evacuation time estimate in a linear manner reflecting the direct relationship between vehicle demand and capacity. This is consistent with the first finging listed above.

- The evacuation time estimate can be sensitive to the time necessary for loading vehicles onto the network. The magnitude of this sensitivity is related to the vehicle demand on the transportation network. The general trend observed appears to be consistent with traffic modeling theory. The data suggest that loading time only affects the calculation of the evacuation time when all vehicles have not been loaded by what is eventually 50% of the evacuation time. As loading time approaches evacuation time, evacuation time increases proportionally to loading time. The results indicate that loading time will most likely affect evacuation time at low population sites. This is also consistent with the first two findings listed above.

- Although not currently an input value to the I-DYNEV model, the simulations indicate that changes in the percentage reduction of the network capacity under congested traffic conditions (capacity reduction factor) can have a significant impact on the estimated evacuation time. As expected, the significance increases as the vehicle demand increases.

- Although it appears that the time interval of processing, which is used by the model to simulate network activities in discrete time intervals, affects the rate of change of vehicles traveling on a roadway segment, the data suggest that the impact on the calculated evacuation time estimate is minimal.

- Changes in the input value for free-flow velocity had a minimal affect on the estimated evacuation time.

Analysis of the results suggests that the estimated evacuation time is sensitive both to changes in the input parameters as well as to the characteristics of the transportation network. Consequently, use of the I-DYNEV model should be limited to analysts familiar with the code, willing to evaluate the results, and competent to determine their adequacy. The model may produce in appropriate time estimates if the analyst is not familiar with traffic modelling or is not careful in coding the network. The current I-DYNEV documentation is not sufficient to ensure that the model's limitations are understood. A more complete documentation of the model's input parameters is needed if it is intended to be used by other than experienced traffic modellers.

INTRODUCTION

Licensees of nuclear power plants are currently required to provide evacuation time estimates (ETEs) for the site's emergency planning zone (EPZ) to the Nuclear Regulatory Commission (NRC) and the Federal Emergency Management Agency (FEMA). These estimates are part of the process by which the two agencies attempt to ensure that adequate protective measures can be implemented in case of a significant release of radioactive materials from a plant site. At present, regulatory guidance for evacuation time studies do not specify an exact methodology. As a result, the licensees have developed their own methodologies and have made their own assumptions when calculating ETEs for their individual plants. To date, the submitted ETEs have been evaluated on a case-by-case basis using professional judgment to determine the adequacy of each. To assist in the evaluation of ETEs, computer codes such as I-DYNEV have been developed.

The I-DYNEV model was developed for the FEMA to simulate traffic conditions that prevail over a transportation network as an evacuation progresses. Output of the model includes an estimate of evacuation time as well as a variety of measures of effectiveness including speed, vehicle counts, queues, and delays. The I-DYNEV model is an adaptation of the TRAFLO Level II simulation model that was developed by KLD Associates for the Federal Highway Administration (FHWA). Consequently, the model is based on previous traffic modeling codes as well as documented traffic modeling theory. The FEMA is demonstrating the model and providing training on its use to state and local agencies of emergency response and preparedness planning.

A study performed by the Pacific Northwest Laboratory (PNL) with the assistance of the Texas Transportation Institute for the NRC identifies the key input parameters to I-DYNEV affecting ETEs. This study attempts to determine the sensitivity of ETEs to changes in those parameters when applied to two different evacuation networks. This information should be useful to determine parameters requiring additional study and to assist in the evaluation of ETEs calculated using I-DYNEV.

The parameters analyzed for the study included vehicle population, network capacity, loading time, the capacity reduction factor, the time interval of processing, and free-flow velocity. These parameters were applied to two evacuation networks with significantly different roadway characteristics.

The NRC and FEMA require that evacuation time estimates be made for two reasons. First, during the process of making estimates, situations requiring special resources can be identified because optimal use of available resources can reduce traffic delays. For example, providing traffic controls at critical intersections can substantially reduce evacuation times by minimizing the queues formed at those intersections. Second, during the course of an accident at a nuclear power plant site, evacuation time estimates made in advance for various conditions may be invaluable for decisionmakers who must select the most appropriate protective action. These protective actions include evacuation, sheltering, or sheltering followed by later relocation in order to minimize exposures to the population.

INPUT PARAMETERS

To perform a parameter sensitivity study, all input parameters except the one being evaluated remained constant for a series of simulations. Many input parameters, however, are determined by the specific transportation network used and by its associated vehicle population. In an effort to evaluate the effects of the roadway system on evacuation times, two distinct transportation networks were used. The two sites are referred to as Site A and Site B in the study. They differ in population distribution, size, number of segments, number of intersections, and roadway speeds. The remainder of this section presents a discussion of the differences in these transportation networks as well as a review of other input parameters including vehicle population.

TRANSPORTATION NETWORKS

The two transportation networks were developed to represent significantly different siting characteristics. The two networks are not, however, entirely conceptual. They are based on existing networks from two nuclear power plant sites, although they have been extensively modified. In fact, the transportation networks were modified to the extent that they no longer represent the sites from which they were derived. This procedure was followed to develop a reasonably realistic transportation network, yet to avoid potential problems that could result from generating additional evacuation time estimates different from those incorporated into an actual emergency plan. Consequently, the results described in this report are not applicable to the sites from which they were derived.

Differences in the transportation network between Site A and Site B include the vehicle demand on the network, the number of outbound lanes, the number of intersections, and the average free-flow speed. The number of nodes and links along with the number of miles of roadway network are similar for both sites and are listed in Table 1. The number of destination nodes, centroids and entry links, and populations are also listed for the two sites. Site A has fewer destination nodes, fewer centroids and entry links, and a lower vehicle population than does Site B. The larger ratio of vehicles per destination for Site B corresponds to its higher initial vehicle demand on the network. Figure 1 illustrates the vehicle population demand with respect to radial distance from the plant. It can be seen that Site B has a much larger initial vehicle demand on the network than Site A. Figure 2 illustrates the number of outbound lanes by 1-mile increments radially from the plant sites. Site B has almost twice as many outbound lanes for each 1 mile annulus as does Site A.

TABLE 1. Specific Site Information

Site Characteristics	Site A	Site B
Number of Nodes	55	87
Number of Links	138	121
Miles of Roadway in Network	149	114
Number of Destination Nodes	2	5
Number of Centroids and Entry Links	26	51
Vehicle Population	3,825	34,515

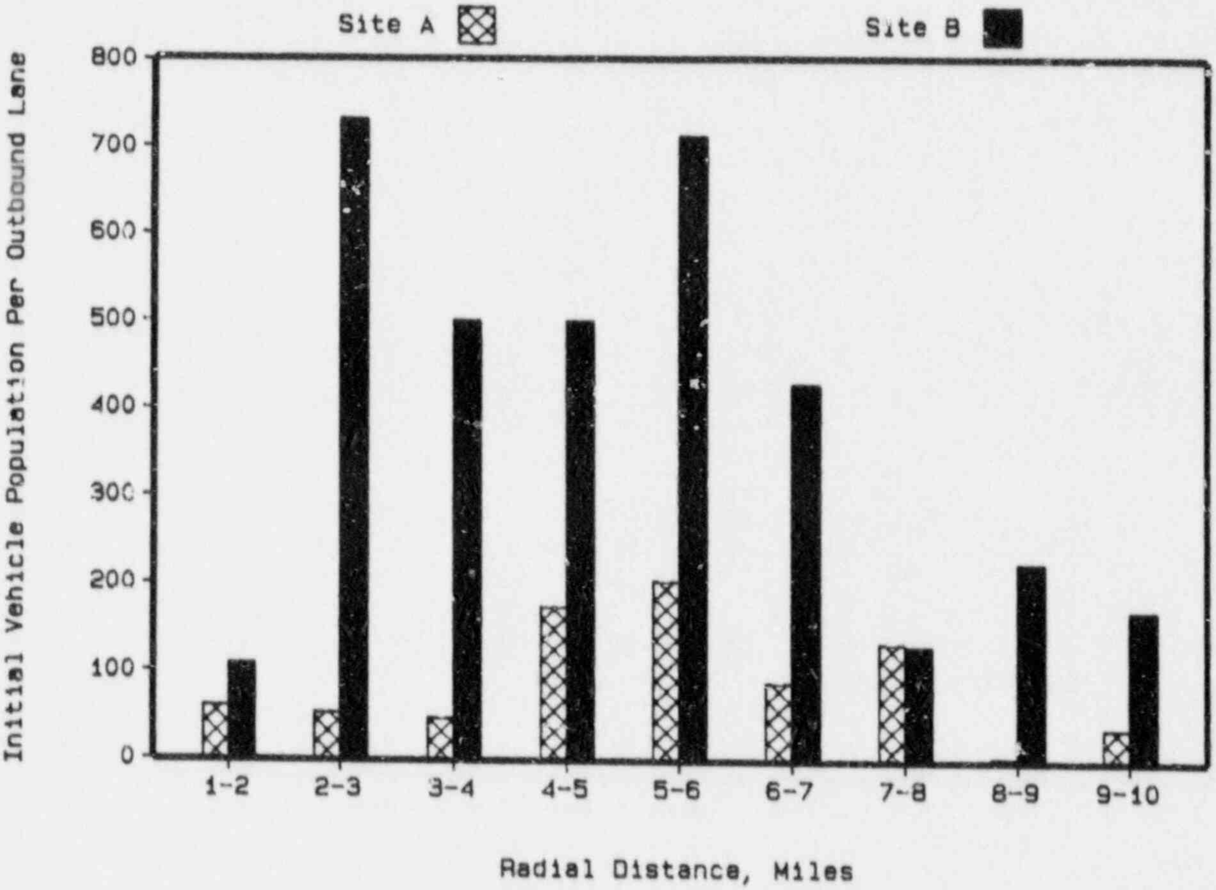

FIGURE 1. Initial Vehicle Demand Versus Distance From Plant

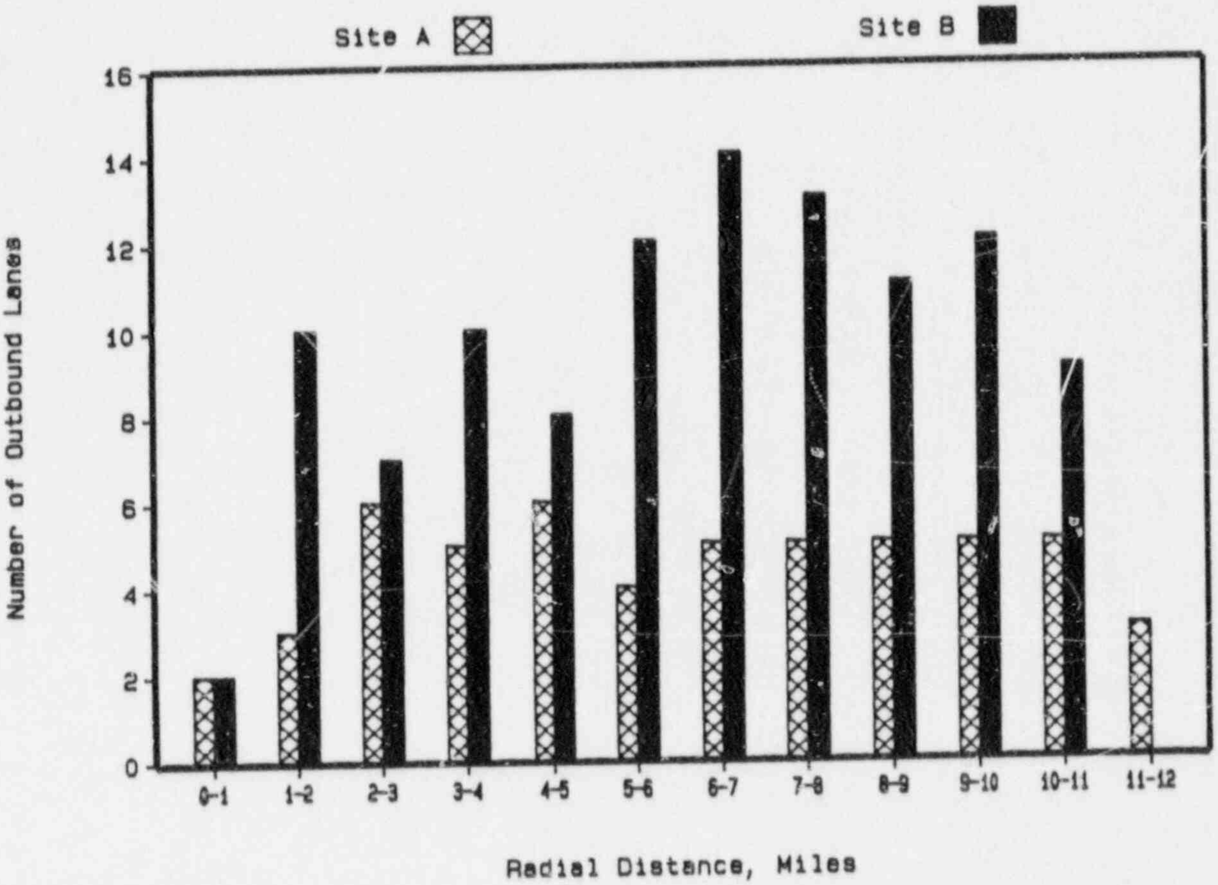

FIGURE 2. Number of Outbound Lanes Versus Distance From Plant

The transportation network developed for Site A is shown in Figure 3, that for Site B appears in Figure 4. These link-node descriptions of Site A and Site B were used as input for the I-DYNEV simulation The details of each link and node are presented in the Appendix.

VEHICLE POPULATION

The initial vehicle population is illustrated in Figure 5 for each site according to the radial distance from the plant. As the figure indicates, the initial vehicle population for Site B is nearly ten times that of Site A. Because Site B has less than twice the number of outbound lanes and nearly ten times the initial vehicles population as Site A, evacuation time estimates for Site B should be longer than those for Site A. Under the base conditions stated in Table 1 and the Appendix.

BASE CASE PARAMETERS

The base case or original input parameters are listed in the Appendix for both Sites A and B. The categories of parameters include link data, turning movements, intersection control, and loading data.

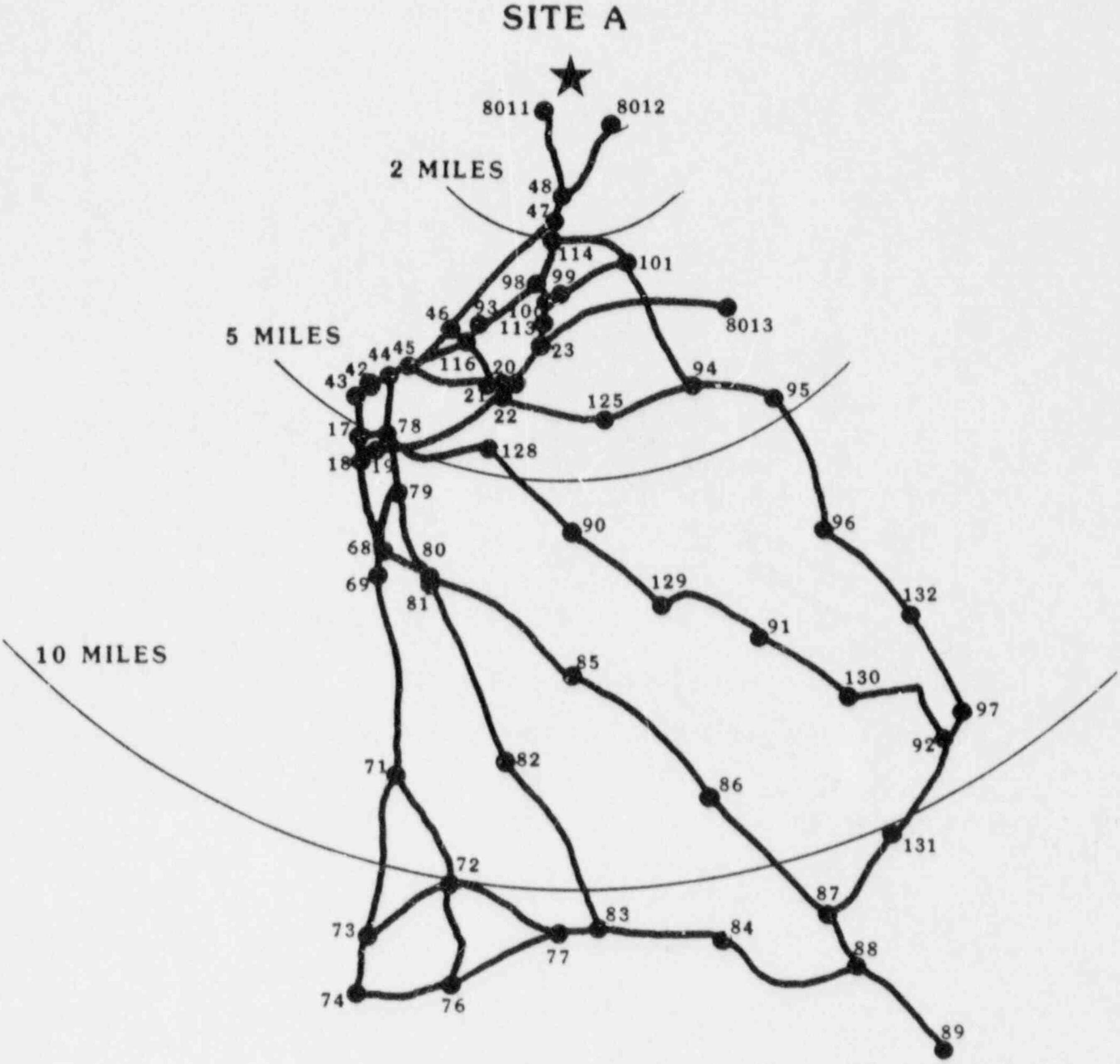

FIGURE 3. Site A Link Node Diagram

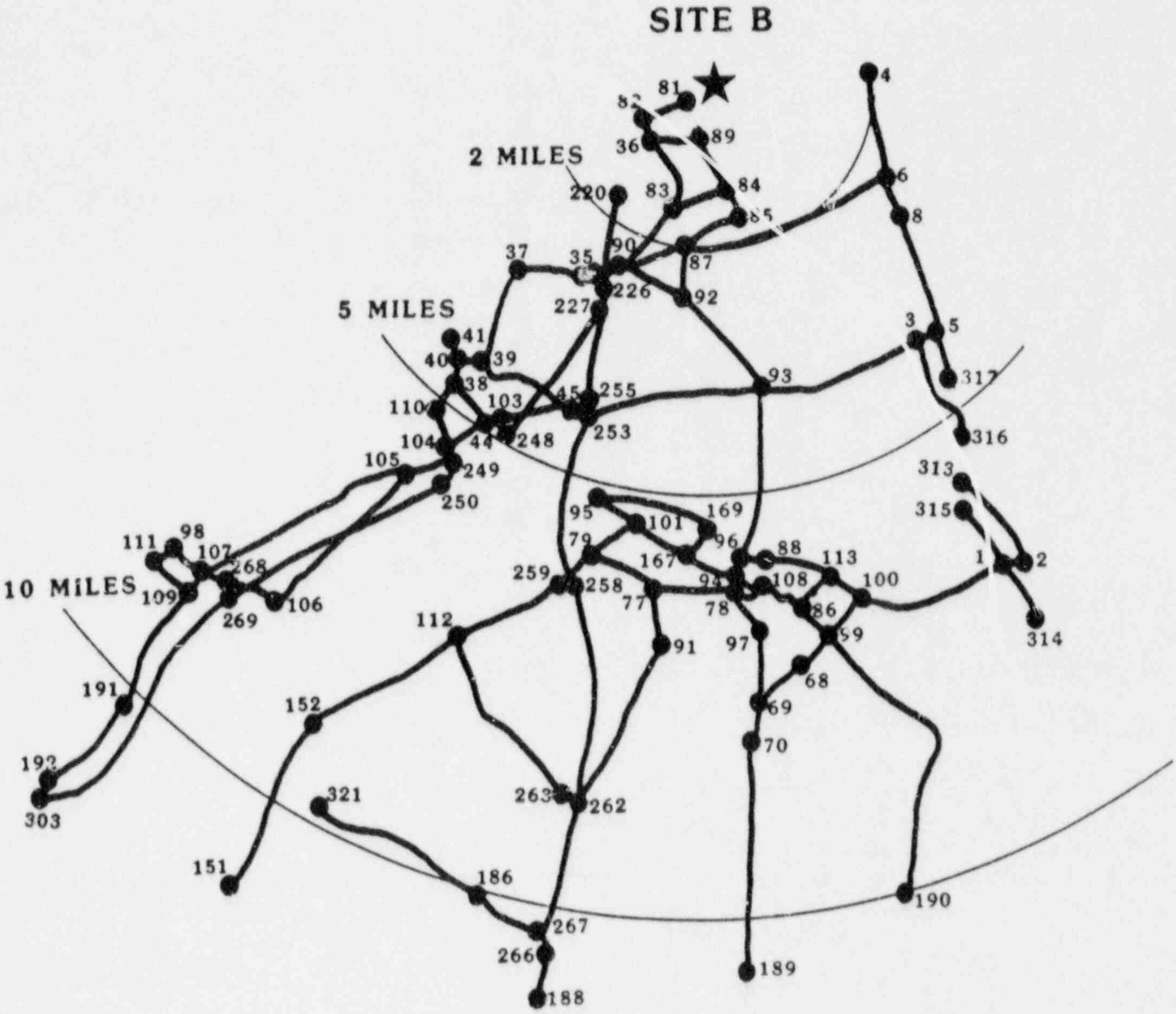

FIGURE 4. Site B Link Node Diagram

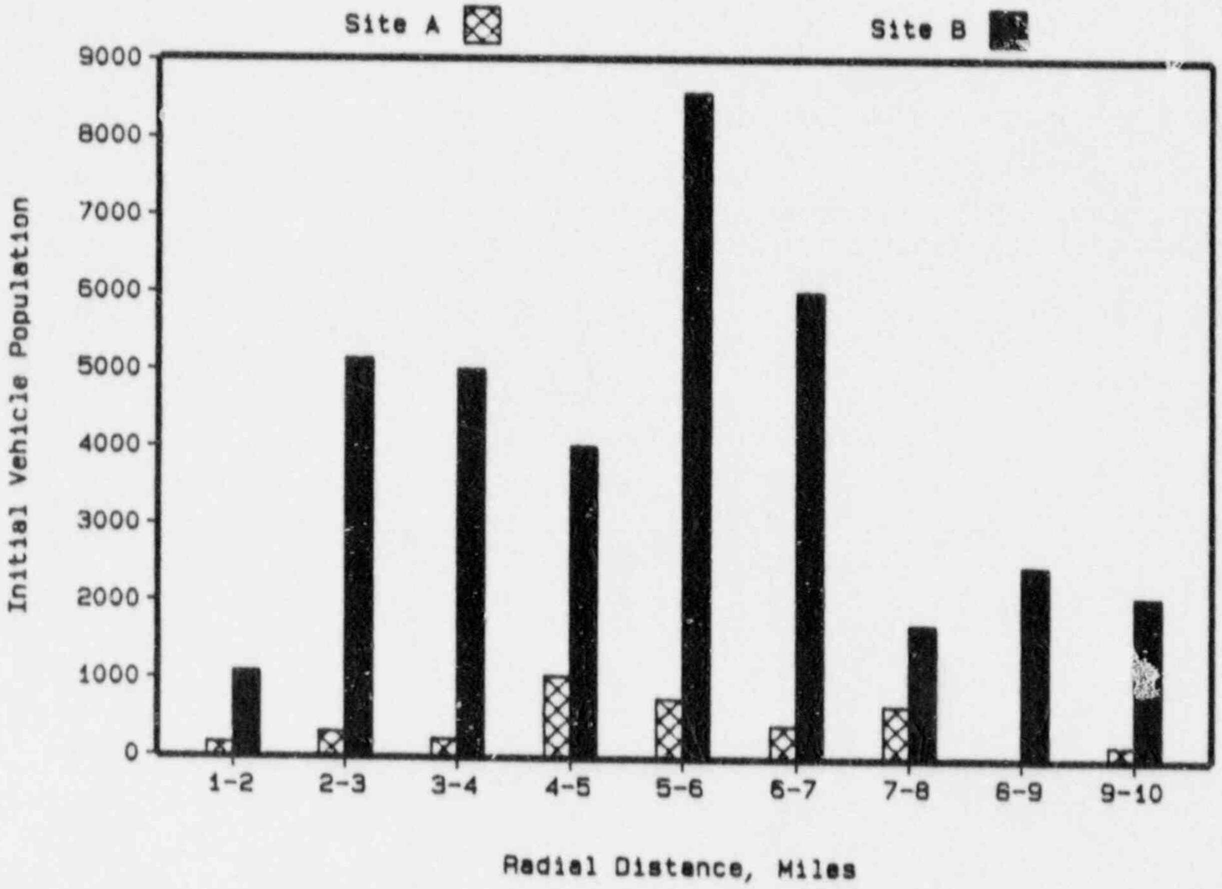

FIGURE 5. Initial Vehicle Population Versus Distance From Plant

Specific link attributes such as length, number of lanes, lost time, grade, right turn on red code, and pedestrian volumes were held constant for both sites. The network's capacity is the mean queue discharge headway, which is the minimum time spacing between vehicles exiting the transportation network. The mean queue discharge headways varied from 2.0 to 3.6 seconds (averaging 2.4 seconds) for Site A and from 2.1 to 3.1 seconds (also averaging of 2.4 seconds) for Site B. The free-flow speeds for Site A covered a range of 30 to 60 mph, with the average approximately 35 to 40 mph. Site B had free-flow speeds with a range of 25 to 60 mph, with the average also approximately 35 to 40 mph.

The turning movements for Site A were held constant except as noted in the population section. Details of this procedure will be described later. The turning movements for each link were held constant for Site B. Four time periods were used for loading vehicles onto the transportation network. A fifth time period was used, but it is required by the model to indicate loading is complete and to allow clearing of the network. The first four time periods were each 5 minutes in length, and the last was set at 600 minutes. For both Sites A and B, the four time periods loaded, in order, 10%, 25%, 40%, and 25% of the vehicle population onto the transportation network. The vehicle population is loaded in terms of vehicles per hour during each of the time periods. For this study, the vehicle loading rate for each time period was the same for all runs except for the sensitivity study of loading rate. The fifth time period was used to clear the system, and no vehicles were input during this period.

For this study, six parameters were evaluated. These parameters are vehicle population, network capacity, loading time, the capacity reduction factor, and the time interval of processing and free-flow velocity.

RESULTS

VEHICLE POPULATION

With all other parameters held constant, the vehicle populations of both sites were varied from a few hundred vehicles to over 19,000 vehicles. The resulting evacuation times were graphed and are shown in Figure 6. Site A had a base population of about 3800 vehicles. The base population represents the population associated with the network prior to modifications. The base population was assigned in this manner because roadway networks do, to some extent, relate to the population served. For example, high-density urban areas have more roads than low-density rural areas. Evacuation time estimates were calculated for Site A while varying the vehicle populations from 10% to 500% of the base vehicle population of 3800 vehicles.

The results of vehicle population variations are presented in Figure 6. The three curves for Site A represent results using three distinct traffic assignments. The traffic assignment determines the vehicle evacuation routes by determining the frequency of vehicles making turns at each intersection. The first assignment, whose results are represented by Curve 1, was to utilize the traffic assignments determined by the I-DYNEV model based on a vehicle population of 3800 vehicles and the original network topology. It is important to note that the I-DYNEV traffic assignment model determines the evacuation routes requiring the minimum time based on a vehicle population of specific size and distribution. The vehicle population distribution was never changed as part of this study.

The effect of the I-DYNEV traffic assignment model is to balance traffic on the network which results in a minimum time estimate for that specific population. An example of the I-DYNEV traffic assignment model is represented by the movement of vehicles from intersection 71 to intersection 73 on Site A as labeled in Figure 3. The I-DYNEV traffic assignment model may determine that traffic moving from intersection 73 to intersection 74 is badly congested and that the delay is sufficient to make travel through intersections labeled 72, 77, 76, and 74 just as fast as waiting to travel through intersections 73 and 74. The traffic assignment model, therefore, assigns some traffic to the alternate route in order to balance traffic flow or congestion.

The rationality of the alternative routing is dependent on a number of considerations. First, is the alternative route reasonable? In the case described, the alternative route would appear to be unreasonable. At intersection 73, a vehicle would be beyond the 10-mile distance of the recommended evacuation area. The idea of the I-DYNEV traffic assignment model directing the vehicle toward intersection 72 results in movement parallel and even slightly towards the plant. For this reason, the traffic assignment appears unreasonable. A second consideration in routing is whether a traffic control exists to divert and direct traffic or whether motorists need to be aware of alternative routing. Therefore, when considering the appropriateness of the network and allowable turning movement, the traffic controls and the familiarity of the driver with the entire transportation network are issues.

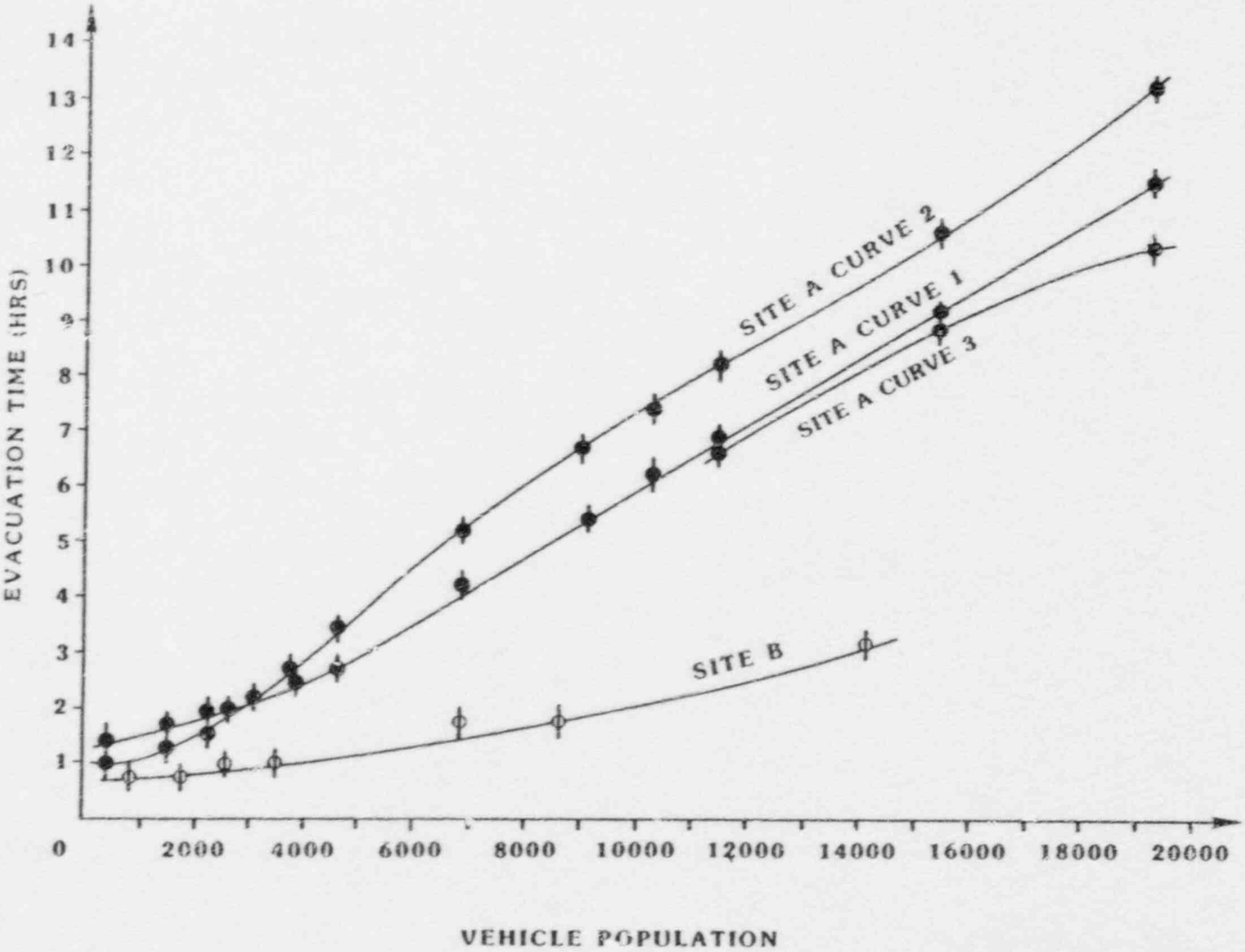

FIGURE 6. Evacuation Time Versus Vehicle Population

The second traffic assignment used in the analysis, represented by Curve 2 in Figure 6, was to manually adjust some vehicle routings in order to eliminate any routings which appear unreasonable. For this reason, evacuation times estimated for Curve 1 are generally shorter than those estimated for Curve 2. Interestingly, at very low volumes the estimates calculated for Curve 1 are longer than those calculated for Curve 2. This may occur because travel distance, not capacity, controls evacuation time at very low volumes.

The third traffic assignment used, represented by Curve 3 in Figure 6, is based on traffic assignments calculated for the vehicle population size evaluated. As stated, Curve 1 in Figure 6 is based on traffic assignments developed using a vehicle population of 3800 vehicles. For Curve 2, these traffic assignments were manually adjusted to avoid unreasonable routings. Each curve represents the sensitivity of the evacuation time estimate to changes in the vehicle population which is a function of the transportation network. Differences between the curves represents the sensitivity of the evacuation time estimate to changes in the traffic assignment.

In actual use, the traffic assignment model would be run for the appropriate vehicle population represented by Curve 3. Differences in the curves indicate that the evacuation time is affected by the traffic assignment. Therefore, the traffic assignment algorithm may not be appropriate in specific cases. As a result, the analyst must evaluate the appropriateness of the routings generated by I-DYNEV and manually correct unreasonable routings in order to generate meaningful evacuation time estimates.

In addition to evaluating the rationality of alternative routings, an analyst must determine whether the vehicle turning percentages generated by I-DYNEV could be implemented during an evacuation given available traffic control and resources. For example, if traffic can not be routed according to the same percentage as assumed in the model, the analyst is obligated to modify the turning percentages and rerun the simulation to obtain a more reasonable evacuation time estimate.

Evacuation time estimates for a transportation network have a postulated relationship with the vehicle population. This relationship is illustrated in Figure 7. For any transportation network it is desirable to identify Point A, indicated on the figure because it represents the point where evacuation time is capacity constrained. All vehicle populations of fewer vehicles, represented to the left of Point A, can be termed not capacity constrained. In other words, the evacuation time estimate will remain nearly constant even if the vehicle population is slightly increased. This is possible because the evacuation time estimate is a function of preparation time and response time. As defined, preparation time is the time required for individuals to prepare to evacuate, and the response time is the travel time for individuals to physically move through the evacuation network. In a noncapacity constrained network, the number of vehicles present on the transportation network does not cause any significant vehicle congestion delay. In reality, there are some additional delays due to vehicle interactions.

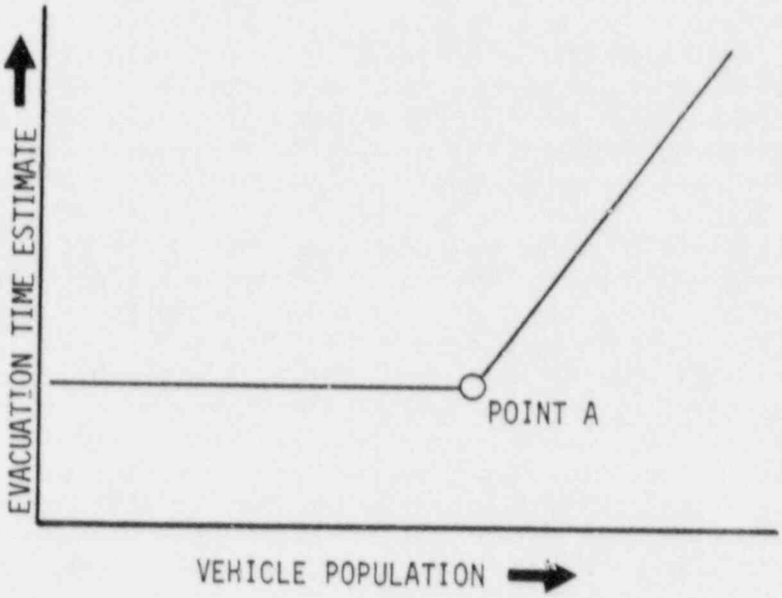

FIGURE 7. The Theoretical Relationship of Vehicle Population and Evacuation Time Estimates

The area to the right of Point A represents a transportation network that is capacity constrained. As represented, the evacuation time estimate will increase as the vehicle population increases. The rate of this increase, which is represented by the slope of the line to the right of Point A, is determined by the characteristics of the transportation network. At this stage, the evacuation time estimate has become a function of the delay time caused by traffic congestion.

For the I-DYNEV simulations, preparation time was not modeled in a manner that results in a constant value to the left of Point A. Although not constant, the rate of increase is much less than that to the right of Point A where traffic congestion and delay influence evacuation time. As presented in Figure 6, Curve 1 is relatively constant initially because the network is not capacity constrained. At a vehicle population of approximately 4000 vehicles, Curve 1 appears to indicate an increased slope as a result of a capacity constrained network.

The graphs of the evacuation time versus vehicle population indicates that an increase in vehicle population has less effect on the estimated evacuation time for Site B than for Site A. The evacuation time estimates increase at a relatively constant rate from about 800 vehicles to over 34,000 vehicles. Although not indicated on Figure 6, Site B had a base vehicle population of over 34,000 vehicles. The graph of Site B presented in Figure 6 is truncated at 20,000 vehicles to correspond to the range presented for Site A. Simulations were run using up to 34,000 vehicles, and the general trend continued.

NETWORK CAPACITY

The capacity of roadway segments on the transportation network was varied for Site A and Site B. The capacity of each roadway segment is input in the I-DYNEV computer code in terms of the mean queue discharge headway (discharge headway). One of the most critical input parameters for the model was the discharge headway which is the minimum time spacing between vehicles. Because the discharge headway is the means of setting roadway capacity, the value used for this parameter has a dramatic impact on the simulation. The network capacity at each site was varied from 50% to 200% of the original capacity.

The corresponding evacuation times for the two sites are shown in Figure 8. The graph shows that increases in capacity decrease the evacuation time, but at continually decreasing rates. This result is consistent with traffic modeling theory.

LOADING TIME

The next task was to evaluate the sensitivity of the evacuation time to changes in the time for loading vehicles onto the network. The loading time is I-DYNEV's method of representing preparation time. Although I-DYNEV does not have an input parameter for preparation time, loading time accounts for preparation time by allowing only a limited number of vehicles onto the network during the initial time periods. Subsequent time periods may load any percentage of the vehicle population onto network as would represent the conditions of the evacuation. For this study, the loading time was varied from 20 minutes to 8 hours. The 20-minute loading time essentially corresponded to instantaneous loading of the entire vehicle population. The results are presented in Figure 9. The evacuation time estimates calculated for Site A appear unaffected by increases in the loading time until the loading time exceeds 1 hour 20 min. From this value on, the evacuation time is determined by the input value for the loading time. In effect, the evacuation time has become equal to the loading time plus the amount of time necessary for the last loaded vehicle to exit the transportation network thereby clearing the system. The Site B curve also follows the same general trend.

CONGESTED CAPACITY REDUCTION FACTOR

The I-DYNEV model contains an algorithm that reduces the network capacity by 15% under congested flow conditions. An earlier report (Urbanik, Moeller, and Barnes 1987) indicated that the use of such a congestion factor for freeway conditions was not warranted for the data set evaluated. Although not currently an I-DYNEV input parameter, a sensitivity analysis of this factor appeared appropriate. For this study, the capacity reduction factor was varied from 40% to 100% for both sites. The 40% value corresponds to a reduction in capacity to 40% of the original capacity under congested conditions. The graph of the sensitivity of the evacuation time to the congested capacity reduction factor is shown in Figure 10.

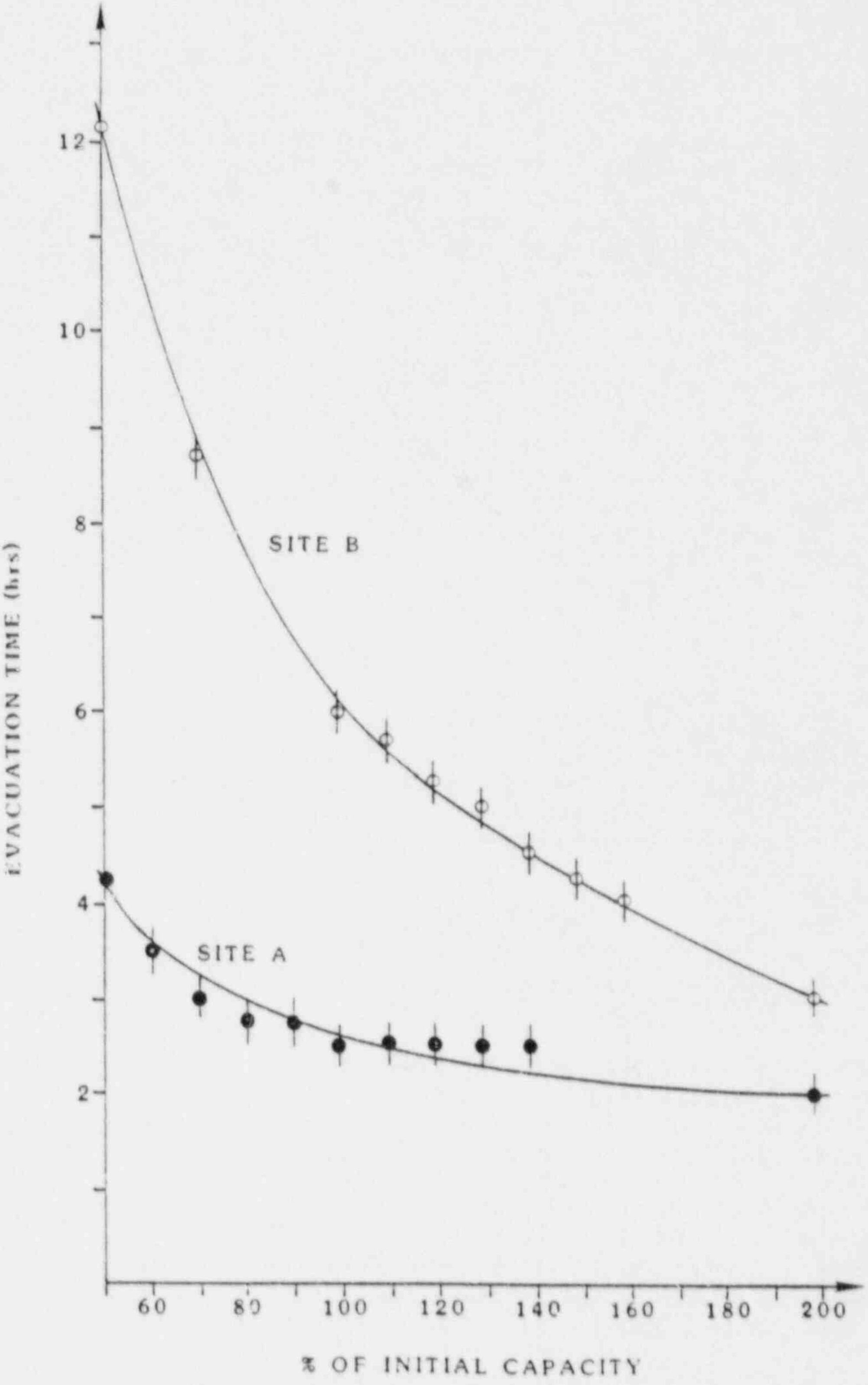

FIGURE 8. Evacuation Time Versus Percentage of Base Population for Each Site

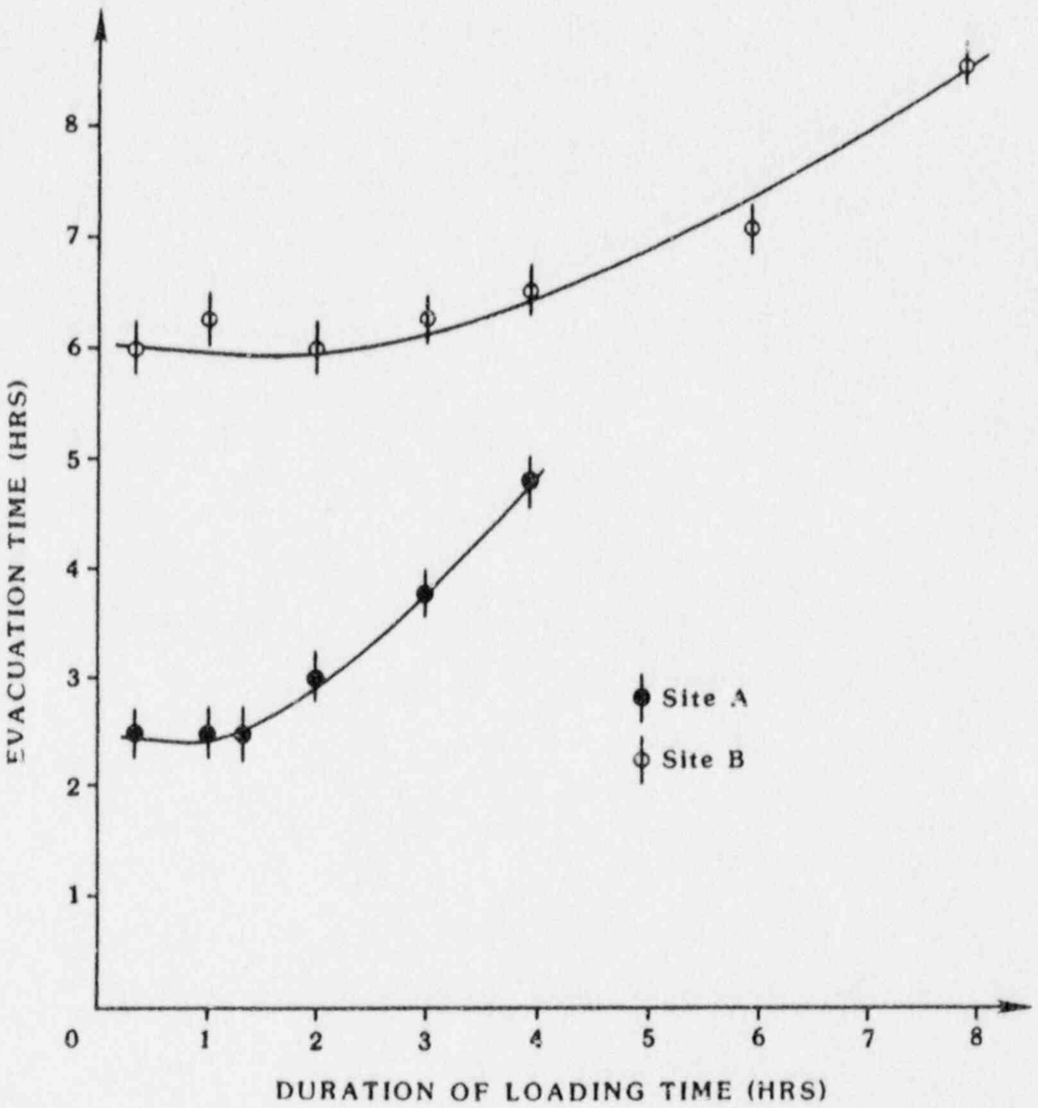

FIGURE 9. Evacuation Time Versus Duration of Loading Time

Examining the curve for Site A indicates that, for a capacity reduction up to 30% under congested flow conditions, the evacuation time is not affected. In fact, when capacity was reduced 30% to 60% (a capacity reduction factor of 70% to 40%), the evacuation time increases by only 45 minutes. The evacuation time for Site B, however, appears to be extremely sensitive to capacity reduction. For changes in the capacity reduction factor from 40% to 100%, the evacuation times are from 14 hours to 6 hours. This variation may occur because the vehicle population of Site B makes the network capacity constrained and the vehicle population of the Site A simulation is not capacity constrained.

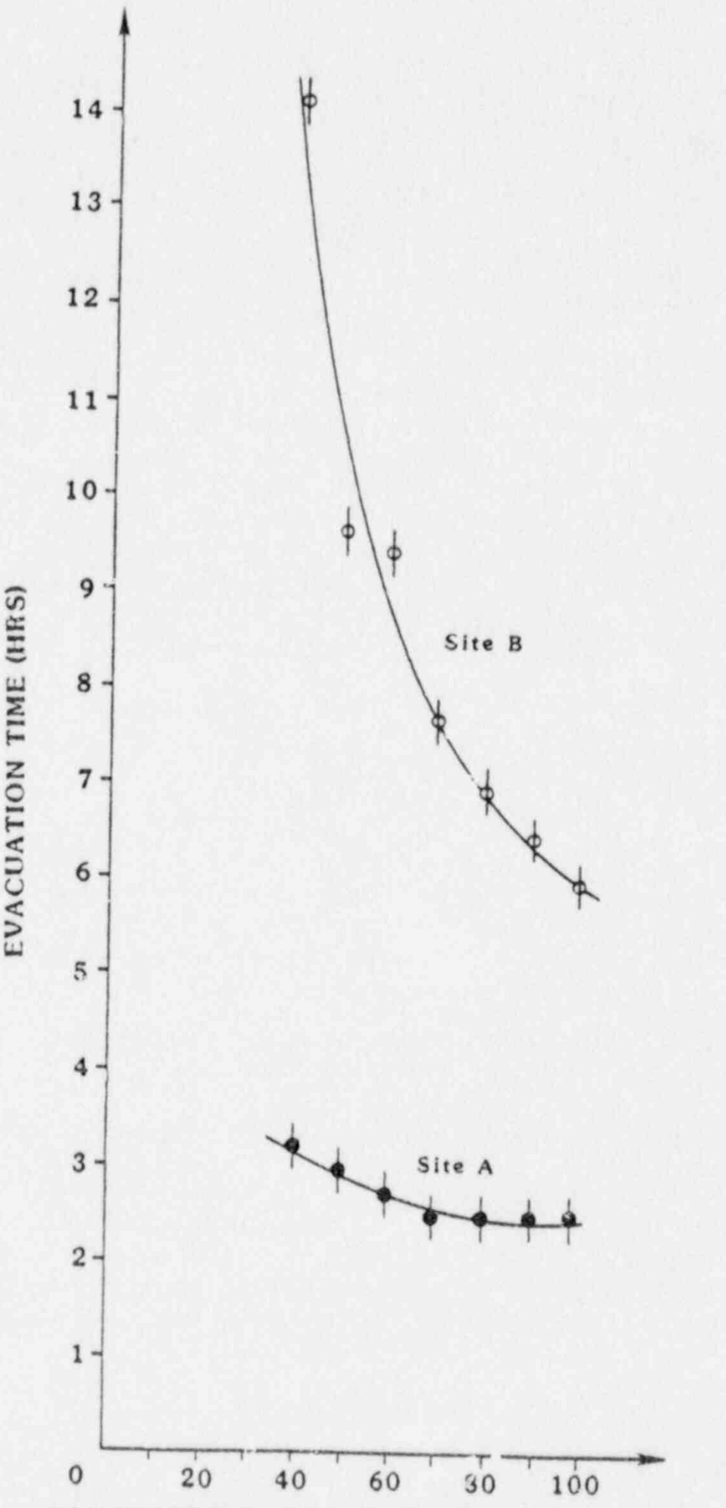

FIGURE 10. Evacuation Time Versus Congestion Capacity Reduction Factor

TIME INTERVAL OF PROCESSING

During the many simulations performed previously (Urbanik, Moeller, and Barnes 1987) it was realized that the rate at which vehicles were allowed to respond to the changing traffic conditions was restricted by the input value for the time interval of processing. Traffic simulation codes provide output information by taking a "snapshot" of the status of vehicles on the network at discrete time intervals. Between these "snapshots", vehicles are processed through the network. For I-DYNEV, the time interval of processing is a value input by the user. This input value is not intended to affect the results. Within the algorithms of I-DYNEV, the change in vehicle travel time over a link (roadway segment) in any processing is limited to 25% of the time interval of processing. Consequently, the time interval of processing, which is selected by the user, affects the speed of vehicles traveling throughout the transportation network. Time intervals of 60, 150, and 300 seconds were used to evaluate the sensitivity of the evacuation times for Sites A and B. Table 2 indicates that the length of the time interval had relatively no effect on the evacuation time for either site.

TABLE 2. Evacuation Times for a Range of Time Intervals

Time Interval, sec	Evacuation Time, hr Site A	 Site B
60	2.25	6
150	2.25	6
300	2.50	6

FREE-FLOW VELOCITY

Free-flow velocity appears to have minimal effect on the evacuation time estimates. According to the data presented in Table 3, it is evident that an increase or a decrease in the free-flow velocity results in an increase in the evacuation time estimate. This phenomenon may be the result of the interaction of the time interval of processing, 2) the capacity reduction factor, and 3) a function that limits the rate of change for vehicle travel time on a segment.

TABLE 3. Evacuation Times for a Range of Free-Flow Speeds

Free-Flow Speeds, mph	Evacuation Time, hr Site A	 Site B
All 30 mph	2.75	6.25
Base less 5 mph	2.50	6
Base Case	2.50	6
Base plus 5 mph	2.50	6.25
All 60 mph	2.75	6.50

CONCLUSIONS

Changes in each of the six input parameters evaluated in this study affected the estimates of evacuation times to some degree. In addition, care in coding the network is required or the traffic assignment algorithm within the I-DYNEV model may route traffic in a potentially unreasonable manner in order to balance the system demand. In general, the sensitivity of evacuation time estimates to changes in the input parameters is consistent with expectations.

The major conclusions associated with the six input parameters evaluated are presented below:

- Changes in the vehicle population suggested two major findings. First, for vehicle populations resulting in traffic delays, evacuation times essentially increase linearly with increasing population. The rate of increase is dependent upon the characteristics of the transportation network. This finding is consistent with traffic modeling theory. Second, I-DYNEV contains a traffic assignment model (algorithm) that is affected by roadway characteristics. The algorithm can produce results which are potentially unreasonable if the analyst is unfamiliar with the theory.

- The effective network capacity was varied for Sites A and B. Changes in the network capacity affected evacuation time in a linear manner, reflecting the direct relationship between vehicle demand and capacity. This is consistent with the first finding listed above.

- The evacuation time estimate can be sensitive to the loading time of vehicles onto the network. The magnitude of this sensitivity is related to the vehicle demand on the transportation network. The general trend observed appears to be consistent with traffic modeling theory. The data suggest that loading time only affects the calculation of the evacuation time when all vehicles have not been loaded by what is eventually 50% of the evacuation time. As loading time approaches evacuation time, evacuation time increases proportionally to loading time. The results indicate that loading time is most likely to affect evacuation time at low population sites. This is consistent with the first two findings above.

- Although not currently an input value to the I-DYNEV model, the simulations indicate that changes in the percentage reduction of the network capacity under congested traffic conditions (capacity reduction factor) can have a significant impact on the estimated evacuation time. As expected, the significance increases as the vehicle demand increases.

- Although it appears that the time interval of processing affects the rate of change of vehicles traveling on a roadway segment, the data suggest that the impact on the calculated evacuation time estimate is minimal.

- Changes in the input value for free-flow velocity had a minimal effect on the estimated evacuation time.

Analysis of the results suggests that the estimated evacuation time is sensitive both to changes in the input parameters as well as to the characteristics of the transportation network. Consequently, use of the I-DYNEV computer code should be limited to analysts who are willing to evaluate the results and competent to determine their adequacy. To provide a meaningful time estimate, the results of any evaluation should be inspected in detail. The current I-DYNEV documentation is not sufficient to ensure that the limitations in the model are understood by those not experienced in traffic modelling. A more complete documentation of the I-DYNEV input parameters is recommended if it is intended to be used by other than experienced traffic modellers.

REFERENCE

Urbanik II, T., M. P. Moeller and K. Barnes. 1987. Benchmark Study of the I-DYNEV Evacuation Time Estimate Computer Code. NUREG/CR-4873, PNL-6171, Pacific Northwest Laboratory, Richland, Washington.

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APPENDIX

INPUT VALUES FOR I-DYNEV COMPUTER CODE SIMULATIONS

APPENDIX

INPUT VALUES FOR I-DYNEV COMPUTER CODE SIMULATIONS

Input values used in the development of the evacuation time estimates referenced in this report are presented according to the input and output schemes of the I-DYNEV computer code.

```
********************************************************************************
                        BASE CASE INPUT DATA FOR SITE A
********************************************************************************

 7581     RANDOM NUMBER SEED

  300     DURATION (SEC) OF TIME PERIOD NO.  1
  300     DURATION (SEC) OF TIME PERIOD NO.  2
  300     DURATION (SEC) OF TIME PERIOD NO.  3
  300     DURATION (SEC) OF TIME PERIOD NO.  4
36000     DURATION (SEC) OF TIME PERIOD NO.  5

  300     LENGTH OF A TIME INTERVAL, SECONDS

   12     MAXIMUM INITIALIZATION TIME, NUMBER OF INTERVALS

    3     NUMBER OF TIME INTERVALS BETWEEN SUCCESSIVE STANDARD OUTPUTS

    1     PERCENT OF HOURLY FLOW RATES DURING INITIALIZATION
          (NO INITIALIZATION)

   99     PERCENT OF CAPACITY UNDER CONGESTED CONDITIONS
```

DYNEV LINKS

```
                      PKT LENGTH         PKT                                                                    LOST   Q DIS   FREE
             LENGTH      FEET     FULL   LANES           LANE CHAN        DESTINATION NODES      OPP    TIME    HDWY.   SPD    RTOR    PED
     LINK    MI*100    L      R   LANES  L R   GRD    1 2 3 4 5 6    LEFT  THRU  RGHT   DIAG   NODE    SEC     SEC    MPH    CODE    CODE
(  18,   17)    10     0      0     1    0 0    0     0 0 0 0 0 0       0    43     0     78      0   2.5*    2.4     30      0       0
(  43,   17)    70     0      0     1    0 0    0     0 0 0 0 0 0       0    18     0    -78     18   2.5*    2.4     30      0       0
(  78,   17)    40     0      0     1    0 0    0     0 0 0 0 0 0       0     0    43    -18      0   2.5*    2.4     30      0       0
(  17,   18)    10     0      0     1    0 0    0     0 0 0 0 0 0      19    68     0      0     68   2.5*    2.4     30      0       0
(  19,   18)    20     0      0     1    0 1    0     0 0 0 0 0 0      68     0    17      0      0   2.5*    2.4     30      0       0
(  68,   18)   120     0      0     1    0 0    0     0 0 0 0 0 0       0    17    19      0      0   2.5*    2.4     35      0       0
(  18,   19)    20     0      0     1    0 0    0     0 0 0 0 0 0       0    21     0      0      0   2.5*    2.4     30      0       0
(  21,   19)   155     0      0     2    0 1    0     0 0 0 0 0 0       0    18     0      0      0   2.5*    2.4     60      0       0
(  21,   20)    10     0      0     1    0 0    0     0 0 0 0 0 0       0   116     0      0      0   2.5*    2.4     35      0       0
( 116,   20)    20     0      0     1    0 0    0     0 0 0 0 0 0       0    21     0      0     21   2.5*    2.4     35      0       0
(  20,   21)    10     0      0     1    0 0    0     0 0 0 0 0 0      22   125    19      C      0   2.5*    2.4     35      0       0
(  22,   21)    25     0      0     1    0 1    0     0 0 0 0 0 0     125    19    20      0      0   2.5*    2.4     30      0       0
( 125,   21)   140     0      0     1    0 0    0     0 0 0 0 0 0      19    20    22      0     20   2.5*    2.4     35      0       0
(  19,   21)   155     0      0     2    0 1    0     0 0 0 0 0 0      20    22   125      0      0   2.5*    2.0     60      0       0
(  21,   22)    25     0      0     1    0 0    0     0 0 0 0 0 0       0    23     0      0      0   2.5*    2.4     30      0       0
(  23,   22)    85     0      0     2    0 1    0     0 0 0 0 0 0       0    21     0      0      0   2.5*    2.0     60      0       0
(  22,   23)    85     0      0     2    0 1    0     0 0 0 0 0 0       0     0     0    113      0   2.5*    2.0     60      0       0
(8013,   23)     0     0      0     2    0 1    0     0 0 0 0 0 0       0    22     0    113      0   2.5*    2.0      0      0       0
( 113,   23)    30     0      0     2    0 0    0     0 1 0 0 0 0       0    22     0      0      0   2.5*    2.0     60      0       0
(  17,   43)    70     0      0     1    1 0    0     0 0 0 0 0 0       0     0    44      0      0   2.5*    2.4     30      0       0
(  44,   43)    45     0      0     1    0 0    0     0 0 0 0 0 0      17     0     0      0      0   2.5*    2.4     35      0       0
(  43,   44)    45     0      0     1    0 0    0     0 0 0 0 0 0       0    45    78      0      0   2.5*    2.4     35      0       0
(  45,   44)    35     0      0     1    0 0    0     0 0 0 0 0 0      78    43     0      0     43   2.5*    2.4     35      0       0
(  78,   44)    90     0      0     1    0 0    0     0 0 0 0 0 0      43     0    45      0      0   2.5*    2.4     30      0       0
(  44,   45)    35     0      0     1    0 0    0     0 0 0 0 0 0       0    46   116      0      0   2.5*    2.4     35      0       0
(  46,   45)    85     0      0     1    0 0    0     0 0 0 0 0 0     116    44     0      0     44   2.5*    2.4     35      0       0
( 116,   45)   120     0      0     1    0 0    0     0 0 0 0 0 0      44     0    46      0      0   2.5*    2.4     30      0       0
(  45,   46)    85     0      0     1    0 0    0     0 0 0 0 0 0       0    47    93      0      0   2.5*    2.4     35      0       0
(  47,   46)   200     0      0     1    0 0    0     0 0 0 0 0 0      93    45     0      0     45   2.5*    2.4     40      0       0
(  93,   46)    10     0      0     1    0 0    0     0 0 0 0 0 0      45     0    47      0      0   2.5*    2.4     40      0       0
(  46,   47)   200     0      0     1    1 0    0     0 0 0 0 0 0       0     0     0   -114      0   2.5*    2.4     40      0       0
(  48,   47)    20     0      0     1    1 0    0     0 0 0 0 0 0       0    46     0   -114      0   2.5*    2.4     40      0       0
( 114,   47)    30     0      0     1    0 0    0     0 0 0 0 0 0       0     0     0    -46      0   2.5*    2.0     50      0       0
(8012,   48)     0     0      0     1    0 0    0     0 0 0 0 0 0       0    47     0      0      0   2.5*    2.4      0      0       0
(8011,   48)     0     0      0     1    0 0    0     0 0 0 0 0 0       0     0    47      0      0   2.5*    2.4      0      0       0
(  18,   68)   120     0      0     1    0 0    0     0 0 0 0 0 0      79    69     0    -80     69   2.5*    2.4     35      0       0
(  69,   68)    35     0      0     1    0 0    0     0 0 0 0 0 0       0    18    80    -79      0   2.5*    2.4     40      0       0
(  79,   68)    50     0      0     1    0 0    0     0 0 0 0 0 0      80     0    18    -69      0   2.5*    2.4     35      0       0
(  80,   68)    65     0      0     1    0 0    0     0 0 0 0 0 0      69     0    79     18      0   2.5*    2.4     40      0       0
(  68,   69)    35     0      0     1    0 0    0     0 0 0 0 0 0       0    71     0      0      0   2.5*    2.4     40      0       0
(  71,   69)   275     0      0     1    0 0    0     0 0 0 0 0 0       0    68     0      0     68   2.5*    2.4     45      0       0
(  69,   71)   275     0      0     1    0 0    0     0 0 0 0 0,0       0    72    73      0      0   2.5*    2.4     45      0       0
(  72,   71)   130     0      0     1    0 0    0     0 0 0 0 0 0      73    69     0      0     69   2.5*    2.4     40      0       0
(  73,   71)   230     0      0     1    0 0    0     0 0 0 0 0 0      69     0    72      0      0   2.5*    3.0     37      0       0
(  71,   72)   130     0      0     1    0 0    0     0 0 0 0 0 0      77     0    73      0      0   2.5*    2.4     40      0       0
(  73,   72)   140     0      0     1    0 0    0     0 0 0 0 0 0      71    77     0      0     77   2.5*    2.4     40      0       0
(  77,   72)   145     0      0     1    0 0    0     0 0 0 0 0 0       0    73    71      0      0   2.5*    2.4     40      0       0
(  71,   73)   230     0      0     1    0 0    0     0 0 0 0 0 0      72    74     0      0     74   2.5*    3.0     37      0       0
(  72,   73)   140     0      0     1    0 0    0     0 0 0 0 0 0       0    74    71      0      0   2.5*    2.4     40      0       0
(  74,   73)    80     0      0     1    0 0    0     0 0 0 0 0 0       0    71     0     72      0   2.5*    2.4     30      0       0
(  73,   74)    80     0      0     1    0 0    0     0 0 0 0 0 0      76  8009     0      0      0   2.5*    2.4     30      0       0
(  76,   74)   135     0      0     1    0 0    0     0 0 0 0 0 0    8009     0    73      0      0   2.5*    2.0     50      0       0
(  74,   76)   135     0      0     1    0 0    0     0 0 0 0 0 0       0    77     0      0      0   2.5*    2.0     50      0       0
(  77,   76)   145     0      0     1    0 0    0     0 0 0 0 0 0       0    74     0      0      0   2.5*    2.0     50      0       0
(  72,   77)   145     0      0     1    0 0    0     0 0 0 0 0 0      83     0    76      0      0   2.5*    2.4     40      0       0
(  76,   77)   145     0      0     1    0 0    0     0 0 0 0 0 0      72    83     0      0     83   2.5*    2.0     50      0       0
(  83,   77)    55     0      0     1    0 0    0     0 0 0 0 0 0       0    76    72      0      0   2.5*    2.0     50      0       0
(  44,   78)    90     0      0     1    0 0    0     0 0 0 0 0 0     128    79    17      0     79   2.5*    2.4     30      0       0
(  79,   78)    70     0      0     1    0 0    0     0 0 0 0 0 0      17    44   128      0     44   2.5*    2.4     40      0       0
( 128,   78)   150     0      0     1    0 0    0     0 0 0 0 0 0      79    17    44      0     17   2.5*    3.6     30      0       0
(  17,   78)    40     0      0     1    0 0    0     0 0 0 0 0 0      44   128    79      0    128   2.5*    2.4     30      0       0
(  68,   79)    50     0      0     1    0 0    0     0 0 0 0 0 0      78     0    80      0      0   2.5*    2.4     35      0       0
(  78,   79)    70     0      0     1    0 0    0     0 0 0 0 0 0       0    80    68      0      0   2.5*    2.4     40      0       0
(  80,   79)   100     0      0     1    0 0    0     0 0 0 0 0 0      68    78     0      0     78   2.5*    2.4     40      0       0
(  68,   80)    65     0      0     1    0 0    0     0 0 0 0 0 0      79     0    81      0      0   2.5*    2.4     40      0       0
(  79,   80)   100     0      0     1    0 0    0     0 0 0 0 0 0       0    81    68      0      0   2.5*    2.4     40      0       0
(  81,   80)    10     0      0     1    0 0    0     0 0 0 0 0 0      68    79     0      0     79   2.5*    2.4     40      0       0
(  80,   81)    10     0      0     1    0 0    0     0 0 0 0 0 0       0    85    82      0      0   2.5*    2.4     40      0       0
(  82,   81)   250     0      0     1    0 0    0     0 0 0 0 0 0      80     0    85      0      0   2.5*    2.4     40      0       0
(  85,   81)   225     0      0     1    0 0    0     0 0 0 0 0 0      82    80     0      0     80   2.5*    2.4     45      0       0
(  81,   82)   250     0      0     1    0 0    0     0 0 0 0 0 0       0    83     0      0      0   2.5*    2.4     40      0       0
(  83,   82)   250     0      0     1    0 0    0     0 0 0 0 0 0       0    81     0      0      0   2.5*    2.4     45      0       0
(  77,   83)    55     0      0     1    0 0    0     0 0 0 0 0 0      82    84     0      0     84   2.5*    2.0     50      0       0
(  82,   83)   250     0      0     1    0 0    0     0 0 0 0 0 0      84     0    77      0      0   2.5*    2.4     45      0       0
(  84,   83)   185     0      0     1    0 0    0     0 0 0 0 0 0       0    77    82      0      0   2.5*    2.0     50      0       0
(  83,   84)   185     0      0     1    0 0    0     0 0 0 0 0 0       0    88     0      0      0   2.5*    2.0     50      0       0
(  88,   84)   185     0      0     1    0 0    0     0 0 0 0 0 0       0    83     0      0      0   2.5*    2.0     50      0       0
(  81,   85)   225     0      0     1    0 0    0     0 0 0 0 0 0       0    86     0      0      0   2.5*    2.4     45      0       0
(  86,   85)   225     0      0     1    0 0    0     0 0 0 0 0 0       0    81     0      0      0   2.5*    2.4     45      0       0
(  85,   86)   225     0      0     1    0 0    0     0 0 0 0 0 0       0    87     0      0      0   2.5*    2.4     45      0       0
(  87,   86)   225     0      0     1    0 0    0     0 0 0 0 0 0       0    85     0      0      0   2.5*    2.4     50      0       0
(  86,   87)   225     0      0     1    0 0    0     0 0 0 0 0 0     121    88     0      0     88   2.5*    2.4     50      0       0
(  88,   87)    80     0      0     1    0 0    0     0 0 0 0 0 0       0    86   131      0      0   2.5*    2.4     30      0       0
```

```
                                      DYNEV LINKS (CONT.)

                    PKT LENGTH       PKT                                                              LOST   Q DIS  FREE
            LENGTH     FEET    FULL  LANES        LANE CHAN       DESTINATION NODES   OPP    TIME   HDWY   SPD    RTOR   PED
   LINK     MI*100   L      R  LANES  L R  GRD   1 2 3 4 5 6   LEFT THRU RGHT  DIAG NODE    SEC    SEC    MPH    CODE   CODE
( 131,  87)  140     0      0    1    0 0   0    0 0 0 0 0 0     88    0   86     0    0   2.5*   3.0    35      0      0
(  84,  88)  185     0      0    1    0 0   0    0 0 0 0 0 0     87    0   89     0    0   2.5*   2.0    50      0      0
(  87,  88)   80     0      0    1    0 0   0    0 0 0 0 0 0      0   89   84     0    0   2.5*   2.4    30      0      0
(  89,  88)  160     0      0    1    0 0   0    0 0 0 0 0 0     84   87    0     0   87   2.5*   2.0    50      0      0
(  88,  89)  160     0      0    1    0 0   0    0 0 0 0 0 0      0 8010    0     0    0   2.5*   2.0    50      0      0
( 128,  90)  150     0      0    1    0 0   0    0 0 0 0 0 0      0  129    0     0    0   2.5*   3.6    30      0      0
( 129,  90)  150     0      0    1    0 0   0    0 0 0 0 0 0      0  128    0     0    0   2.5*   3.0    35      0      0
( 129,  91)  150     0      0    1    0 0   0    0 0 0 0 0 0      0  130    0     0    0   2.5*   3.0    35      0      0
( 130,  91)  150     0      0    1    0 0   0    0 0 0 0 0 0      0  129    0     0    0   2.5*   3.0    35      0      0
( 131,  92)  140     0      0    1    0 0   0    0 0 0 0 0 0    130   97    0     0   97   2.5*   3.0    35      0      0
( 130,  92)  150     0      0    1    0 0   0    0 0 0 0 0 0     97    0  131     0    0   2.5*   3.0    35      0      0
(  97,  92)   55     0      0    1    0 0   0    0 0 0 0 0 0      0  131  130     0    0   2.5*   3.0    40      0      0
(  46,  93)   10     0      0    1    0 0   0    0 0 0 0 0 0      0   98  116     0    0   2.5*   2.4    40      0      0
(  98,  93)  130     0      0    1    0 0   0    0 0 0 0 0 0    116   46    0     0   46   2.5*   2.4    40      0      0
( 116,  93)   80     0      0    1    0 0   0    0 0 0 0 0 0     46    0   98     0    0   2.5*   2.4    35      0      0
( 125,  94)  140     0      0    1    0 0   0    0 0 0 0 0 0    101   95    0     0   95   2.5*   2.4    35      0      0
(  95,  94)  100     0      0    1    0 0   0    0 0 0 0 0 0      0  125  101     0    0   2.5*   2.4    35      0      0
( 101,  94)  195     0      0    1    0 0   0    0 0 0 0 0 0     95    0  125     0    0   2.5*   2.4    35      0      0
(  94,  95)  100     0      0    1    0 0   0    0 0 0 0 0 0      0    0   96     0    0   2.5*   2.4    35      0      0
(  96,  95)  180     0      0    1    0 0   0    0 0 0 0 0 0     94    0    0     0    0   2.5*   2.4    40      0      0
(  95,  96)  130     0      0    1    0 0   0    0 0 0 0 0 0    132    0    0     0    0   2.5*   2.4    40      0      0
( 132,  96)  150     0      0    1    0 0   0    0 0 0 0 0 0      0    0   95     0    0   2.5*   3.0    40      0      0
(  92,  97)   55     0      0    1    0 0   0    0 0 0 0 0 0    132    0    0     0    0   2.5*   3.0    40      0      0
( 132,  97)  150     0      0    1    0 0   0    0 0 0 0 0 0      0    0   92     0    0   2.5*   3.0    40      0      0
(  93,  98)  130     0      0    1    0 0   0    0 0 0 0 0 0      0  100    0     0    0   2.5*   2.4    40      0      0
( 100,  98)   15     0      0    1    0 0   0    0 0 0 0 0 0      0   93    0     0    0   2.5*   2.4    30      0      0
( 100,  99)   15     0      0    1    0 0   0    0 0 0 0 0 0      0  101    0     0    0   2.5*   2.4    30      0      0
( 101,  99)  105     0      0    1    0 0   0    0 0 0 0 0 0      0  100    0     0    0   2.5*   3.0    30      0      0
(  98, 100)   15     0      0    1    0 0   0    0 0 0 0 0 0    114   99  113     0    0   2.5*   2.4    30      0      0
(  99, 100)   15     0      0    1    0 0   0    0 0 0 0 0 0    113   98  114     0    0   2.5*   2.4    30      0      0
( 113, 100)   60     0      0    1    0 1   0    0 0 0 0 0 0     98  114   99     0    0   2.5*   2.0    60      0      0
( 114, 100)   75     0      0    1    0 1   0    0 0 0 0 0 0     99  113   93     0    0   2.5*   2.0    60      0      0
(  94, 101)  195     0      0    1    0 0   0    0 0 0 0 0 0     99    0    0     0    0   2.5*   2.4    35      0      0
(  99, 101)  105     0      0    1    0 0   0    0 0 0 0 0 0      0    0   94     0    0   2.5*   3.0    30      0      0
(  23, 113)   30     0      0    2    0 0   0    0 0 0 0 0 0      0  100    0     0    0   2.5*   2.0    60      0      0
( 100, 113)   60     0      0    1    0 0   0    0 0 0 0 0 0      0   23    0     0    0   2.5*   2.0    60      0      0
(  47, 114)   30     0      0    2    0 0   0    0 0 0 0 0 0      0  100    0     0    0   2.5*   2.0    50      0      0
( 100, 114)   75     0      0    1    0 0   0    0 0 0 0 0 0      0   47    0     0    0   2.5*   2.0    60      0      0
(  20, 116)   20     0      0    1    0 0   0    0 0 0 0 0 0      0   45   93     0    0   2.5*   2.4    35      0      0
(  45, 116)  120     0      0    1    0 0   0    0 0 0 0 0 0     93   20    0     0   20   2.5*   2.4    30      0      0
(  93, 116)   80     0      0    1    0 0   0    0 0 0 0 0 0     20    0   45     0    0   2.5*   2.4    35      0      0
(  21, 125)  140     0      0    1    0 0   0    0 0 0 0 0 0      0   94    0     0    0   2.5*   2.4    35      0      0
(  94, 125)  140     0      0    1    0 0   0    0 0 0 0 0 0      0   21    0     0    0   2.5*   2.4    35      0      0
(  78, 128)  150     0      0    1    0 0   0    0 0 0 0 0 0      0   90    0     0    0   2.5*   3.6    30      0      0
(  90, 128)  150     0      0    1    0 0   0    0 0 0 0 0 0      0   78    0     0    0   2.5*   3.6    30      0      0
(  90, 129)  150     0      0    1    0 0   0    0 0 0 0 0 0      0   91    0     0    0   2.5*   3.0    35      0      0
(  91, 129)  150     0      0    1    0 0   0    0 0 0 0 0 0      0   90    0     0    0   2.5*   3.0    35      0      0
(  91, 130)  150     0      0    1    0 0   0    0 0 0 0 0 0      0   92    0     0    0   2.5*   3.0    35      0      0
(  92, 130)  150     0      0    1    0 0   0    0 0 0 0 0 0      0   91    0     0    0   2.5*   3.0    35      0      0
(  92, 131)  140     0      0    1    0 0   0    0 0 0 0 0 0      0   87    0     0    0   2.5*   3.0    35      0      0
(  87, 131)  140     0      0    1    0 0   0    0 0 0 0 0 0      0   92    0     0    0   2.5*   3.0    35      0      0
(  96, 132)  150     0      0    1    0 0   0    0 0 0 0 0 0      0   97    0     0    0   2.5*   3.0    40      0      0
(  97, 132)  150     0      0    1    0 0   0    0 0 0 0 0 0      0   96    0     0    0   2.5*   3.0    40      0      0


                               * INDICATES DEFAULT VALUES WERE SPECIFIED


             LANE CHANNELIZATION                   RTOR                        PEDESTRIAN
                   CODES                           CODES                          CODES

           0  UNRESTRICTED                  0  RTOR PERMITTED              0  NO PEDESTRIANS
           1  LEFT TURNS ONLY               1  RTOR PROHIBITED             1  LIGHT
           2  BUSES ONLY                                                   2  MODERATE
           3  CLOSED                                                       3  HEAVY
           4  RIGHT TURNS ONLY
           5  CAR - POOLS
           6  CAR - POOLS + BUSES
```

	TURN MOVEMENT PERCENTAGES				TURN MOVEMENT POSSIBLE				
LINK	LEFT	THROUGH	RIGHT	DIAGONAL	LEFT	THROUGH	RIGHT	DIAGONAL	CAPACITY REDUCTION (PERCENT)
(8013, 23)	0	0	0	100	NO	YES	NO	YES	0
(8012, 48)	0	100	0	0	NO	YES	NO	NO	0
(8011, 48)	0	0	100	0	NO	NO	YES	NO	0
(23, 22)	0	100	0	0	NO	YES	NO	NO	0
(48, 47)	0	63	0	37	NO	YES	NO	YES	0
(23, 113)	0	100	0	0	NO	YES	NO	NO	0
(47, 114)	0	100	0	0	NO	YES	NO	NO	0
(22, 21)	1	98	1	0	YES	YES	YES	NO	0
(47, 46)	14	86	0	0	YES	YES	NO	NO	0
(46, 93)	0	73	27	0	NO	YES	YES	NO	0
(93, 98)	0	100	0	0	NO	YES	NO	NO	0
(98, 100)	12	22	66	0	YES	YES	YES	NO	0
(113, 100)	0	49	51	0	YES	YES	YES	NO	0
(114, 100)	54	46	0	0	YES	YES	YES	NO	0
(100, 113)	0	100	0	0	NO	YES	NO	NO	0
(100, 114)	0	100	0	0	NO	YES	NO	NO	0
(93, 116)	63	0	37	0	YES	NO	YES	NO	0
(113, 23)	0	100	0	0	NO	YES	NO	NO	0
(46, 45)	23	77	0	0	YES	YES	NO	NO	0
(114, 47)	0	0	0	100	NO	NO	NO	YES	0
(100, 99)	0	100	0	0	NO	YES	NO	NO	0
(21, 19)	0	100	0	0	NO	YES	NO	NO	0
(99, 101)	0	0	100	0	NO	NO	YES	NO	0
(45, 116)	5	95	0	0	YES	YES	NO	NO	0
(19, 18)	66	0	34	0	YES	NO	YES	NO	0
(116, 20)	0	100	0	0	NO	YES	NO	NO	0
(116, 93)	51	0	49	0	YES	NO	YES	NO	0
(101, 94)	4	0	96	0	YES	NO	YES	NO	0
(20, 21)	0	3	97	0	YES	YES	YES	NO	0
(45, 44)	81	19	0	0	YES	YES	NO	NO	0
(21, 125)	0	100	0	0	NO	YES	NO	NO	0
(44, 78)	0	88	12	0	YES	YES	YES	NO	0
(78, 79)	0	79	21	0	NO	YES	YES	NO	0
(79, 80)	0	91	9	0	NO	YES	YES	NO	0
(80, 81)	0	93	7	0	NO	YES	YES	NO	0
(81, 82)	0	100	0	0	NO	YES	NO	NO	0
(82, 83)	42	0	58	0	YES	NO	YES	NO	0
(81, 85)	0	100	0	0	NO	YES	NO	NO	0
(85, 86)	0	100	0	0	NO	YES	NO	NO	0
(86, 87)	0	100	0	0	YES	YES	NO	NO	0
(87, 88)	0	74	26	0	NO	YES	YES	NO	0
(98, 89)	0	100	0	0	NO	YES	NO	NO	0
(125, 94)	0	100	0	0	YES	YES	NO	NO	0
(94, 95)	0	0	100	0	NO	NO	YES	NO	0
(95, 96)	100	0	0	0	YES	NO	NO	NO	0
(44, 43)	100	0	0	0	YES	NO	NO	NO	0
(94, 101)	100	0	0	0	YES	NO	NO	NO	0
(87, 131)	0	100	0	0	NO	YES	NO	NO	0
(96, 132)	0	100	0	0	NO	YES	NO	NO	0
(43, 17)	0	73	0	27	NO	YES	NO	YES	0
(88, 84)	0	100	0	0	NO	YES	NO	NO	0
(79, 68)	8	0	24	68	YES	NO	YES	YES	0
(80, 68)	97	0	3	0	YES	NO	YES	YES	0
(131, 92)	0	100	0	0	YES	YES	NO	NO	0
(92, 97)	100	0	0	0	YES	NO	NO	NO	0
(132, 97)	0	0	100	0	NO	NO	YES	NO	0
(101, 99)	0	100	0	0	NO	YES	NO	NO	0
(99, 100)	31	19	50	0	YES	YES	YES	NO	0
(17, 18)	43	57	0	0	YES	YES	NO	NO	0
(92, 130)	0	100	0	0	NO	YES	NO	NO	0
(97, 132)	0	100	0	0	NO	YES	NO	NO	0
(68, 79)	3	0	97	0	YES	NO	YES	NO	0
(68, 80)	0	0	100	0	YES	NO	YES	NO	0
(18, 68)	0	74	0	26	YES	YES	NO	YES	0
(84, 83)	0	100	0	0	NO	YES	YES	NO	0
(68, 69)	0	100	0	0	NO	YES	NO	NO	0
(69, 71)	0	86	14	0	NO	YES	YES	NO	0
(130, 91)	0	100	0	0	NO	YES	NO	NO	0
(97, 92)	0	37	63	0	NO	YES	YES	NO	0
(71, 72)	7	0	93	0	YES	NO	YES	NO	0
(132, 96)	0	0	100	0	NO	NO	YES	NO	0
(100, 98)	0	100	0	0	NO	YES	NO	NO	0
(83, 77)	0	99	1	0	NO	YES	YES	NO	0
(77, 72)	0	0	100	0	NO	YES	YES	NO	0
(18, 19)	0	100	0	0	NO	YES	NO	NO	0
(91, 129)	0	100	0	0	NO	YES	NO	NO	0
(92, 131)	0	100	0	0	NO	YES	NO	NO	0
(71, 73)	32	68	0	0	YES	YES	NO	NO	0
(72, 73)	0	99	1	0	NO	YES	YES	NO	0
(17, 78)	39	5	56	0	YES	YES	YES	NO	0
(131, 87)	70	0	30	0	YES	NO	YES	NO	0
(129, 90)	0	100	0	0	NO	YES	NO	NO	0
(77, 76)	0	100	0	0	NO	YES	NO	NO	0
(98, 93)	10	90	0	0	YES	YES	NO	NO	0
(72, 71)	0	100	0	0	YES	YES	NO	NO	0
(96, 95)	100	0	0	0	YES	NO	NO	NO	0
(83, 82)	0	100	0	0	NO	YES	NO	NO	0

(73, 72)	21	79	0	0	YES	YES	NO	NO	0
(19, 21)	43	55	2	0	YES	YES	YES	NO	0
(93, 46)	79	0	21	0	YES	NO	YES	NO	0
(21, 22)	0	100	0	0	NO	YES	NO	NO	0
(22, 23)	0	0	0	100	NO	NO	NO	YES	0
(78, 128)	0	100	0	0	NO	YES	NO	NO	0
(90, 128)	0	100	0	0	NO	YES	NO	NO	0
(128, 78)	40	41	19	0	YES	YES	YES	NO	0
(73, 74)	7	93	0	0	YES	YES	NO	NO	0
(76, 74)	90	0	10	0	YES	NO	YES	NO	0
(74, 76)	0	100	0	0	NO	YES	NO	NO	0
(95, 94)	0	100	0	0	NO	YES	YES	NO	0
(71, 69)	0	100	0	0	NO	YES	NO	NO	0
(72, 77)	39	0	61	0	YES	NO	YES	NO	0
(76, 77)	0	100	0	0	YES	YES	NO	NO	0
(77, 83)	56	44	0	0	YES	YES	NO	NO	0
(128, 90)	0	100	0	0	NO	YES	NO	NO	0
(69, 68)	0	0	40	60	NO	YES	YES	YES	0
(74, 73)	0	0	0	100	NO	YES	NO	YES	0
(68, 18)	0	93	7	0	NO	YES	YES	NO	0
(78, 17)	0	0	35	65	NO	NO	YES	YES	0
(94, 125)	0	100	0	0	NO	YES	NO	NO	0
(90, 129)	0	100	0	0	NO	YES	NO	NO	0
(83, 84)	0	100	0	0	NO	YES	NO	NO	0
(82, 81)	0	0	100	0	YES	NO	YES	NO	0
(18, 17)	0	95	0	5	NO	YES	NO	YES	0
(125, 21)	96	3	1	0	YES	YES	YES	NO	0
(73, 71)	100	0	0	0	YES	NO	YES	NO	0
(129, 91)	0	100	0	0	NO	YES	NO	NO	0
(17, 43)	0	0	100	0	NO	NO	YES	NO	0
(21, 20)	0	100	0	0	NO	YES	NO	NO	0
(84, 83)	32	0	68	0	YES	NO	YES	NO	0
(91, 100)	0	100	0	0	NO	YES	NO	NO	0
(43, 44)	0	17	83	0	NO	YES	YES	NO	0
(44, 45)	0	4	96	0	NO	YES	YES	NO	0
(130, 92)	59	0	41	0	YES	NO	YES	NO	0
(45, 46)	0	0	100	0	NO	YES	YES	NO	0
(20, 116)	0	33	67	0	NO	YES	YES	NO	0
(116, 45)	72	0	28	0	YES	NO	YES	NO	0
(46, 47)	0	0	0	100	NO	NO	NO	YES	0
(78, 44)	12	0	88	0	YES	NO	YES	NO	0
(81, 80)	46	54	0	0	YES	YES	NO	NO	0
(80, 79)	83	17	0	0	YES	YES	NO	NO	0
(85, 81)	11	89	0	0	YES	YES	NO	NO	0
(79, 78)	61	39	0	0	YES	YES	YES	NO	0
(88, 87)	0	80	20	0	NO	YES	YES	NO	0
(87, 86)	0	100	0	0	NO	YES	NO	NO	0
(86, 85)	0	100	0	0	NO	YES	NO	NO	0
(89, 88)	100	0	0	0	YES	YES	NO	NO	0

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                    SPECIFIED FIXED-TIME SIGNAL CONTROL, AND SIGN CONTROL, CODES

                                     NODE   17 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  18,   17)    (  43,   17)    (  78,   17)
   1        0     100         1               1               0

                                            NODE    18
             OFFSET    0 SEC                                                CYCLE LENGTH  75 SEC

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  17,   18)    (  19,   18)    (  68,   18)
   1       40      53         1               2               1
   2       35      46         2               1               2

                                     NODE   19 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  18,   19)    (  21,   19)
   1        0     100         1               1

                                     NODE   20 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  21,   20)    ( 116,   20)
   1        0     100         1               1

                                     NODE   21 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  20,   21)    (  22,   21)    ( 125,   21)    (  19,   21)
   1        0     100         1               0               1               1

                                     NODE   22 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  21,   22)    (  23,   22)
   1        0     100         1               1

                                     NODE   23 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  22,   23)    (8013,   23)    ( 113,   23)
   1        0     100         1               1               1

                                     NODE   43 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  17,   43)    (  44,   43)
   1        0     100         0               1

                                     NODE   44 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  43,   44)    (  45,   44)    (  78,   44)
   1        0     100         1               1               0

                                     NODE   45 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  44,   45)    (  46,   45)    ( 116,   45)
   1        0     100         1               1               0

                                     NODE   46 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  45,   46)    (  47,   46)    (  93,   46)
   1        0     100         1               1               0

                                     NODE   47 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  46,   47)    (  48,   47)    ( 114,   47)
   1        0     100         1               1               0

                                     NODE   48 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (8011,   48)    (8012,   48)
   1        0     100         0               1

                                     NODE   68 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  18,   68)    (  69,   68)    (  79,   68)    (  80,   68)
   1        0     100         1               1               0               0
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                                        NODE   69 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)     (  68,   69)     (  71,   69)
   1         0    100           1                1

                                        NODE   71 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)     (  69,   71)     (  72,   71)     (  73,   71)
   1         0    100           1                1                0

                                        NODE   72 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)     (  71,   72)     (  73,   72)     (  77,   72)
   1         0    100           1                0                0

                                        NODE   73 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)     (  71,   73)     (  72,   73)     (  74,   73)
   1         0    100           0                1                0

                                                 NODE   74
              OFFSET    0 SEC                                                CYCLE LENGTH  75 SEC

INTERVAL     DURATION       +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)     (  73,   74)     (  76,   74)
   1        30     40           2                1
   2        45     60           1                2
                                        NODE   76 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)     (  74,   76)     (  77,   76)
   1         0    100           1                1

                                        NODE   77 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)     (  72,   77)     (  76,   77)     (  83,   77)
   1         0    100           0                1                1

                                        NODE   78 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)     (  44,   78)     (  79,   78)     ( 128,   78)     (  17,   78)
   1         0    100           1                1                0                0

                                        NODE   79 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)     (  68,   79)     (  78,   79)     (  80,   79)
   1         0    100           0                1                1

                                        NODE   80 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)     (  68,   80)     (  79,   80)     (  81,   80)
   1         0    100           0                1                1

                                        NODE   81 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)     (  80,   81)     (  82,   81)     (  85,   81)
   1         0    100           1                0                1

                                        NODE   82 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)     (  81,   82)     (  83,   82)
   1         0    100           1                1

                                        NODE   83 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)     (  77,   83)     (  82,   83)     (  84,   83)
   1         0    100           1                0                1

                                        NODE   84 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)     (  63,   84)     (  88,   84)
   1         0    100           1                1

                                        NODE   85 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - -   - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)     (  81,   85)     (  86,   85)
   1         0    100           1                1
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                                        NODE   86 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  85,  86)    (  87,  86)
   1         0     100          1               1

                                        NODE   87 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  86,  87)    (  88,  87)    ( 131,  87)
   1         0     100          1               1               0

                                        NODE   88 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  84,  88)    (  87,  88)    (  89,  88)
   1         0     100          0               1               1

                                        NODE   89 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  88,  89)
   1         0     100          1

                                        NODE   90 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 128,  90)    ( 129,  90)
   1         0     100          1               1

                                        NODE   91 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 129,  91)    ( 130,  91)
   1         0     100          1               1

                                        NODE   92 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 131,  92)    ( 130,  92)    (  97,  92)
   1         0     100          1               0               1

                                        NODE   93 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  46,  93)    (  98,  93)    ( 116,  93)
   1         0     100          1               1               0

                                        NODE   94 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 125,  94)    (  95,  94)    ( 101,  94)
   1         0     100          1               1               0

                                        NODE   95 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  94,  95)    (  96,  95)
   1         0     100          1               0

                                        NODE   96 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  95,  96)    ( 132,  96)
   1         0     100          1               1

                                        NODE   97 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  92,  97)    ( 132,  97)
   1         0     100          1               1

                                        NODE   98 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  93,  98)    ( 100,  98)
   1         0     100          1               1

                                        NODE   99 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 100,  99)    ( 101,  99)
   1         0     100          1               1

                                        NODE  100 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  98, 100)    (  99, 100)    ( 113, 100)    ( 114, 100)
   1         0     100          1               1               0               0
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                                               NODE  101 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)   (  94, 101)    (  99, 101)
   1         0    100         1              1

                                               NODE  113 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)   (  23, 113)    ( 100, 113)
   1         0    100         1              1

                                               NODE  114 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)   (  47, 114)    ( 100, 114)
   1         0    100         1              1

                                               NODE  116 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)   (  20, 116)    (  45, 116)    (  93, 116)
   1         0    100         1              1              0

                                               NODE  125 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)   (  21, 125)    (  94, 125)
   1         0    100         1              1

                                               NODE  128 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)   (  90, 128)    (  78, 128)
   1         0    100         1              1

                                               NODE  129 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)   (  90, 129)    (  91, 129)
   1         0    100         1              1

                                               NODE  130 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)   (  91, 130)    (  92, 130)
   1         0    100         1              1

                                               NODE  131 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)   (  87, 131)    (  92, 131)
   1         0    100         1              1

                                               NODE  132 IS UNDER SIGN CONTROL

INTERVAL     DURATION      +- - - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)   (  96, 132)    (  97, 132)
   1         0    100         1              1

                                                INTERPRETATION OF SIGNAL CODES

                                 0          YIELD OR AMBER

                                 1          GREEN

                                 2          RED

                                 3          RED WITH GREEN RIGHT ARROW

                                 4          RED WITH GREEN LEFT ARROW

                                 5          STOP

                                 6          RED WITH GREEN DIAGONAL ARROW

                                 7          NO TURNS-GREEN THRU ARROW

                                 8          RED WITH LEFT AND RIGHT GREEN ARROW

                                 9          NO LEFT TURN-GREEN THRU AND RIGHT
```

```
                      SOURCE/SINK FLOW RATES

     CENTROID NUMBER     LINK      SOURCE/SINK RATE (VEH/HR)

           2010        ( 101.  94)           43
           2011        (  94. 125)          125
           2012        ( 101.  99)           33
           2013        (  47.  46)          257
           2014        (  98.  93)          133
           2015        (  93. 116)          133
           2016        (  44.  43)          639
           2017        (  44.  78)          296
           2018        (  46.  45)          108
           2019        (  45. 116)           89
           2020        (  45.  44)          144
           2026        (  95.  96)          323
           2027        (  96. 132)          323
           2028        (  78. 128)          125
           2029        (  91. 130)          143
           2030        (  84.  88)           61
           2031        (  81.  85)          255
           2032        (  82.  83)          240
           2033        (  43.  17)          222
           2034        (  78.  79)          111
           2035        (  79.  78)          111
           2036        (  68.  69)          277
           2038        (  69.  71)          318

                       ENTRY LINK VOLUMES

     LINK                   FLOW RATE      TRUCKS       CAR POOLS
                           (VEH/HOUR)    (PERCENT)     (PERCENT)

    (8011.  48)                80             0             0
    (8012.  48)                57             0             0
    (8013.  23)                 1             0             0

********************************************************************************

              TIME PERIOD   2 - DYNEV DATA FOR SUBNETWORK   1

********************************************************************************


                       ENTRY LINK VOLUMES

     LINK                   FLOW RATE      TRUCKS       CAR POOLS
                           (VEH/HOUR)    (PERCENT)     (PERCENT)

    (8011.  48)               180             0             0
    (8012.  48)               128             0             0
    (8013.  23)                 1             0             0

                      SOURCE/SINK FLOW RATES

     CENTROID NUMBER     LINK      SOURCE/SINK RATE (VEH/HR)

           2010        ( 101.  94)           97
           2011        (  94. 125)           88
           2012        ( 101.  99)           74
           2013        (  47.  46)          578
           2014        (  98.  93)          300
           2015        (  93. 116)          300
           2016        (  44.  43)         1438
           2017        (  44.  78)          666
           2018        (  46.  45)          243
           2019        (  45. 116)          200
           2020        (  45.  44)          324
           2026        (  95.  96)          727
           2027        (  96. 132)          727
           2028        (  78. 128)          281
           2029        (  91. 130)          322
           2030        (  84.  88)          137
           2031        (  81.  55)          574
           2032        (  82.  83)          540
           2033        (  43.  17)          500
           2034        (  78.  79)          250
           2035        (  79.  78)          250
           2036        (  68.  69)          623
           2038        (  69.  71)          716
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****************************************************************************************************

                    TIME PERIOD   3 - DYNEV DATA FOR SUBNETWORK   1

****************************************************************************************************

                          ENTRY LINK VOLUMES

          LINK                 FLOW RATE      TRUCKS      CAR POOLS
                              (VEH/HOUR)    (PERCENT)    (PERCENT)

        (8011,  48)               360           0            0
        (8012,  48)               256           0            0
        (8013,  23)                 1           0            0

                         SOURCE/SINK FLOW RATES

         CENTROID NUMBER    LINK      SOURCE/SINK RATE (VEH/HR)

              2010       ( 101,  94)          194
              2011       (  94, 125)          176
              2012       ( 101,  99)          148
              2013       (  47,  46)         1156
              2014       (  98,  93)          600
              2015       (  93, 116)          600
              2016       (  44,  43)         2876
              2017       (  44,  78)         1333
              2018       (  46,  45)          486
              2019       (  45, 116)          400
              2020       (  45,  44)          648
              2026       (  95,  96)         1454
              2027       (  96, 132)         1454
              2028       (  78, 128)          562
              2029       (  91, 130)          644
              2030       (  84,  88)          274
              2031       (  81,  85)         1148
              2032       (  82,  83)         1080
              2033       (  43,  17)         1000
              2034       (  78,  79)          500
              2035       (  79,  78)          500
              2036       (  68,  69)         1246
              2038       (  69,  71)         1432

****************************************************************************************************

                    TIME PERIOD   4 - DYNEV DATA FOR SUBNETWORK   1

****************************************************************************************************

                          ENTRY LINK VOLUMES

          LINK                 FLOW RATE      TRUCKS      CAR POOLS
                              (VEH/HOUR)    (PERCENT)    (PERCENT)

        (8011,  48)               180           0            0
        (8012,  48)               128           0            0
        (8013,  23)                 1           0            0

                         SOURCE/SINK FLOW RATES

         CENTROID NUMBER    LINK      SOURCE/SINK RATE (VEH/HR)

              2010       ( 101,  94)           97
              2011       (  94, 125)           88
              2012       ( 101,  99)           74
              2013       (  47,  46)          578
              2014       (  98,  93)          300
              2015       (  93, 116)          300
              2016       (  44,  43)         1438
              2017       (  44,  78)          666
              2018       (  46,  45)          243
              2019       (  45, 116)          200
              2020       (  45,  44)          324
              2026       (  95,  96)          727
              2027       (  96, 132)          727
              2028       (  78, 128)          281
              2029       (  91, 130)          322
              2030       (  84,  88)          137
              2031       (  81,  85)          574
              2032       (  82,  83)          540
              2033       (  43,  17)          500
              2034       (  78,  79)          250
              2035       (  79,  78)          250
              2036       (  68,  69)          623
              2038       (  69,  71)          716
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                                  TIME PERIOD   5 - DYNEV DATA FOR SUBNETWORK   1

******************************************************************************************************************
                                               ENTRY LINK VOLUMES

                                  LINK                   FLOW RATE       TRUCKS        CAR POOLS
                                                         (VEH/HOUR)     (PERCENT)      (PERCENT)

                                (8011,  48)                 0              0              0
                                (8012,  48)                 0              0              0
                                (8013,  23)                 0              0              0


                                            SOURCE/SINK FLOW RATES

                                CENTROID NUMBER    LINK      SOURCE/SINK RATE (VEH/HR)

                                     2010        ( 101,  94)               0
                                     2011        (  94, 125)               0
                                     2012        ( 101,  99)               0
                                     2013        (  47,  46)               0
                                     2014        (  98,  93)               0
                                     2015        (  93, 116)               0
                                     2016        (  44,  43)               0
                                     2017        (  44,  78)               0
                                     2018        (  46,  45)               0
                                     2019        (  45, 116)               0
                                     2020        (  45,  44)               0
                                     2026        (  95,  96)               0
                                     2027        (  96, 132)               0
                                     2028        (  78, 128)               0
                                     2029        (  91, 130)               0
                                     2030        (  84,  88)               0
                                     2031        (  81,  85)               0
                                     2032        (  82,  83)               0
                                     2033        (  43,  17)               0
                                     2034        (  78,  79)               0
                                     2035        (  79,  78)               0
                                     2036        (  68,  69)               0
                                     2038        (  69,  71)               0
```

```
**************************************************************************
                      BASE CASE INPUT DATA FOR SITE B
**************************************************************************

  7581    RANDOM NUMBER SEED

   300    DURATION (SEC) OF TIME PERIOD NO.  1
   300    DURATION (SEC) OF TIME PERIOD NO.  2
   300    DURATION (SEC) OF TIME PERIOD NO.  3
   300    DURATION (SEC) OF TIME PERIOD NO.  4
 36000    DURATION (SEC) OF TIME PERIOD NO.  5

   300    LENGTH OF A TIME INTERVAL, SECONDS

    12    MAXIMUM INITIALIZATION TIME, NUMBER OF INTERVALS

     3    NUMBER OF TIME INTERVALS BETWEEN SUCCESSIVE STANDARD OUTPUTS

     1    PERCENT OF HOURLY FLOW RATES DURING INITIALIZATION
          (NO INITIALIZATION)

    99    PERCENT OF CAPACITY UNDER CONGESTED CONDITIONS
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*****************************************************************************************************************************

                              TIME PERIOD   0 - DYNEV DATA FOR SUBNETWORK   1

*****************************************************************************************************************************

                                        SOURCE/SINK FLOW RATES

                          CENTROID NUMBER     LINK      SOURCE/SINK RATE (VEH/HR)

                               2063        (   4,   6)              0
                               2064        (   6,  85)              0
                               2065        (  89,  36)              0
                               2067        (  84,  83)              0
                               2068        (  41,  40)              0
                               2070        (  39,  40)              0
                               2071        (  40,  39)              0
                               2072        (  39,  45)              0
                               2073        (  38, 110)              0
                               2074        ( 110, 104)              0
                               2075        (  37,  35)              0
                               2076        (  98, 107)              0
                               2077        ( 111, 109)              0
                               2078        ( 105, 107)              0
                               2079        (  99, 190)              0
                               2080        (  70, 189)              0
                               2081        ( 313,   2)              0
                               2082        ( 315,   1)              0
                               2083        (  88, 113)              0
                               2084        ( 106,  86)              0
                               2085        (  88,  96)              0
                               2086        (  96,  94)              0
                               2087        ( 113,  86)              0
                               2088        (  96, 169)              0
                               2089        (  78,  77)              0
                               2091        ( 167, 101)              0
                               2093        (   8,   5)              0
                               2094        ( 317,   5)              0
                               2095        ( 316,   3)              0
                               2097        (  93,  96)              0
                               2098        (  93,  45)              0
                               2099        ( 112, 263'              0
                               2100        ( 321, 186)              0
                               2101        ( 112, 157,              0
                               2104        ( 314,   1)              0
                               2114        (  95  101)              0
                               2118        (  38,  44)              0
                               2200        (   1, 100)              0
                               2202        ( 101,  79)              0
                               2203        (  77,  91)              0
                               2204        ( 169, 167)              0
                               2205        ( 112, 259)              0
                               2206        ( 109, 191)              0
                               2207        (  37,  39)              0
                               2208        ( 104, 105)              0
                               2209        (  87,  90)              0
                               2210        (  87,  92)              0
                               2211        (  82,  36)              0
                               2212        (  36,  83)              0
```

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**********************************************************************************************************

                         TIME PERIOD   4 - DYNEV DATA FOR SUBNETWORK   1

**********************************************************************************************************

                              SOURCE/SINK FLOW RATES

                 CENTROID NUMBER     LINK      SOURCE/SINK RATE (VEH/HR)

                      2063        (   4,   6)              6336
                      2064        (   6,  85)              1920
                      2066        (  89,  36)              1920
                      2067        (  84,  83)              1860
                      2068        (  41,  40)              3312
                      2070        (  39,  40)               468
                      2071        (  40,  39)              2388
                      2072        (  39,  45)              1800
                      2073        (  38, 110)              1272
                      2074        ( 110, 104)              1272
                      2075        (  37,  35)              2472
                      2076        (  98, 107)              1800
                      2077        ( 111, 109)              1800
                      2078        ( 105, 107)               720
                      2079        (  99, 190)              2400
                      2080        (  70, 189)              2460
                      2081        ( 313,   2)              2772
                      2082        ( 315,   1)              2508
                      2083        (  88, 113)              1044
                      2084        ( 108,  86)              1044
                      2085        (  88,  96)              1044
                      2086        (  96,  94)              1044
                      2087        ( 113,  66)              1200
                      2088        (  96, 169)              1104
                      2089        (  78,  77)              2604
                      2090        (   8,   5)                 0
                      2091        ( 167, 101)              2160
                      2092        ( 317,   5)                 0
                      2093        (   8,   5)              8988
                      2094        ( 317,   5)              9276
                      2095        ( 316,   3)              1152
                      2096        ( 317,   5)                 0
                      2097        (  93,  96)               744
                      2098        (  93,  45)              2100
                      2099        ( 112, 263)              1308
                      2100        ( 321, 186)              1188
                      2101        ( 112, 152)               984
                      2102        ( 317,   5)                 0
                      2104        ( 314,   1)               912
                      2114        (  95, 101)              1212
                      2118        (  38,  44)              1752
                      2200        (   1, 100)               996
                      2202        ( 101,  79)              1092
                      2203        (  77,  91)              1092
                      2204        ( 169, 167)              1092
                      2205        ( 112, 259)               840
                      2206        ( 109, 191)              1236
                      2207        (  37,  39)              1596
                      2208        ( 104, 105)              1596
                      2209        (  87,  90)              1200
                      2210        (  87,  92)              1200
                      2211        (  82,  36)               648
                      2212        (  36,  83)              1296
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****************************************************************************************************************

                          TIME PERIOD   3 - DYNEV DATA FOR SUBNETWORK    1

****************************************************************************************************************

                                      SOURCE/SINK FLOW RATES

                          CENTROID NUMBER    LINK     SOURCE/SINK RATE (VEH/HR)

                              2063        (   4,   6)           7128
                              2064        (   6,  85)           4320
                              2066        (  89,  36)           4320
                              2067        (  84,  83)           4176
                              2068        (  41,  40)           7452
                              2070        (  39,  40)           1068
                              2071        (  40,  39)           5388
                              2072        (  39,  45)           4056
                              2073        (  38, 110)           2868
                              2074        ( 110, 104)           2868
                              2075        (  37,  35)           5568
                              2076        (  98, 107)           4056
                              2077        ( 111, 109)           4056
                              2078        ( 105, 107)           1620
                              2079        (  99, 190)           5400
                              2080        (  70, 189)           5544
                              2081        ( 313,   2)           6228
                              2082        ( 315,   1)           5640
                              2083        (  88, 113)           2340
                              2084        ( 108,  86)           2340
                              2085        (  88,  96)           2340
                              2086        (  96,  94)           2340
                              2087        ( 113,  86)           2700
                              2088        (  96, 169)           2484
                              2089        (  78,  77)           5856
                              2090        (   8,   5)            222
                              2091        ( 167, 101)           4860
                              2090        (   8,   5)           9999
                              2093        (   8,   5)           9999
                              2094        ( 317,   5)           9999
                              2095        ( 316,   3)           2592
                              2096        ( 317,   5)           9999
                              2097        (  93,  96)           1680
                              2098        (  93,  45)           4716
                              2099        ( 112, 263)           2940
                              2100        ( 321., 186)          2664
                              2101        ( 112, 152)           2220
                              2202        ( 317,   5)            870
                              2104        ( 314,   1)           2052
                              2114        (  95, 101)           2724
                              2118        (  38,  44)           3936
                              2200        (   1, 100)           2256
                              2202        ( 101,  79)           2472
                              2203        (  77,  91)           2472
                              2204        ( 169, 167)           2472
                              2205        ( 112, 259)           1896
                              2206        ( 109, 191)           2772
                              2207        (  37,  39)           3600
                              2208        ( 104, 105)           3600
                              2709        (  87,  90)           2712
                              2710        (  87,  92)           2712
                              2211        (  82,  36)           1452
                              2212        (  36,  83)           2916
```

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****************************************************************************************************************

                  TIME PERIOD   2 - DYNEV DATA FOR SUBNETWORK    1

****************************************************************************************************************

                          SOURCE/SINK FLOW RATES

            CENTROID NUMBER     LINK      SOURCE/SINK RATE (VEH/HR)

                 2063        (   4,   6)           7520
                 2064        (   6,  85)           2400
                 2066        (  89,  36)           2400
                 2067        (  84,  83)           2328
                 2068        (  41,  40)           4140
                 2070        (  39,  40)            588
                 2071        (  40,  39)           2988
                 2072        (  39,  45)           2256
                 2073        (  38, 110)           1596
                 2074        ( 110, 104)           1596
                 2075        (  37,  35)           3096
                 2076        (  98, 107)           2256
                 2077        ( 111, 109)           2256
                 2078        ( 105, 107)            900
                 2079        (  99, 190)           3000
                 2080        (  70, 189)           3084
                 2081        ( 313,   2)           3456
                 2082        ( 315,   1)           3132
                 2083        (  88, 113)           1296
                 2084        ( 108,  86)           1296
                 2085        (  88,  96)           1296
                 2086        (  96,  94)           1296
                 2087        ( 113,  86)           1500
                 2088        (  96, 169)           1380
                 2089        (  78,  77)           3252
                 2090        (   8,   5)           5616
                 2091        ( 167, 101)           2700
                 2093        (   8,   5)           5615
                 2094        ( 317,   5)           5796
                 2095        ( 316,   3)           1440
                 2096        ( 317,   5)           5796
                 2097        (  93,  96)            936
                 2098        (  93,  45)           2628
                 2099        ( 112, 263)           1632
                 2100        ( 321, 186)           1476
                 2101        ( 112, 152)           1236
                 2104        ( 314,   1)           1140
                 2114        (  95, 101)           1512
                 2118        (  38,  44)           2184
                 2200        (   1, 100)           1248
                 2202        ( 101,  79)           1368
                 2203        (  77,  91)           1368
                 2204        ( 169, 167)           1368
                 2205        ( 112, 259)           1056
                 2206        ( 109, 191)           1548
                 2207        (  37,  39)           2004
                 2208        ( 104, 105)           2004
                 2209        (  87,  90)           1512
                 2210        (  87,  92)           1512
                 2211        (  82,  36)            804
                 2212        (  36,  83)           1620
```

```
                 SOURCE/SINK FLOW RATES

CENTROID NUMBER    LINK     SOURCE/SINK RATE (VEH/HR)

      2063        (   4,    6)           3168
      2064        (   6,   65)            960
      2066        (  89,   36)            960
      2067        (  84,   83)            924
      2068        (  41,   40)           1656
      2070        (  39,   40)            240
      2071        (  40,   39)           1200
      2072        (  39,   45)            900
      2073        (  38,  110)            636
      2074        ( 110,  104)            636
      2075        (  37,   35)           1236
      2076        (  98,  107)            900
      2077        ( 111,  109)            900
      2078        ( 105,  107)            360
      2079        (  99,  190)           1200
      2080        (  70,  189)           1236
      2081        ( 313,    2)           1380
      2082        ( 315,    1)           1248
      2083        (  88,  113)            516
      2084        ( 108,   86)            516
      2085        (  88,   96)            516
      2086        (  96,   94)            516
      2087        ( 113,   86)            600
      2088        (  96,  169)            552
      2089        (  78,   77)           1296
      2091        ( 167,  101)           1080
      2093        (   8,    5)           4488
      2094        ( 317,    5)           4644
      2095        ( 316,    3)            576
      2097        (  93,   96)            372
      2098        (  93,   45)           1044
      2099        ( 112,  263)            660
      2100        ( 321,  186)            588
      2101        ( 112,  152)            472
      2104        ( 314,    1)            456
      2114        (  95,  101)            600
      2118        (  38,   44)            876
      2200        (   1,  100)            504
      2202        ( 101,   79)   [illegible]32
      2203        (  77,   91)            552
      2204        ( 169,  167)            552
      2205        ( 112,  259)            620
      2206        ( 109,  191)            612
      2207        (  37,   39)            804
      2208        ( 104,  105)            804
      2209        (  87,   90)            600
      2210        (  87,   92)            600
      2211        (  82,   36)            324
      2212        (  36,   83)            648
```

```
       1         0     100

                                        NODE  315 IS UNDER SIGN CONTROL

  INTERVAL     DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
  NUMBER    (SEC)   (PCT)
     1         0     100

                                        NODE  316 IS UNDER SIGN CONTROL

  INTERVAL     DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
  NUMBER    (SEC)   (PCT)
     1         0     100

                                        NODE  317 IS UNDER SIGN CONTROL

  INTERVAL     DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
  NUMBER    (SEC)   (PCT)
     1         0     100

                                        NODE  321 IS UNDER SIGN CONTROL

  INTERVAL     DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
  NUMBER    (SEC)   (PCT)
     1         0     100



                                            INTERPRETATION OF SIGNAL CODES

                                    0          YIELD OR AMBER

                                    1          GREEN

                                    2          RED

                                    3          RED WITH GREEN RIGHT ARROW

                                    4          RED WITH GREEN LEFT ARROW

                                    5          STOP

                                    6          RED WITH GREEN DIAGONAL ARROW

                                    7          NO TURNS-GREEN THRU ARROW

                                    8          RED WITH LEFT AND RIGHT GREEN ARROW

                                    9          NO LEFT TURN-GREEN THRU AND RIGHT
```

```
                                 NODE  249 IS UNDER SIGN CONTROL

 INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
 NUMBER     (SEC)  (PCT)    ( 104, 249)
    1          0    100          1

                                 NODE  250 IS UNDER SIGN CONTROL

 INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
 NUMBER     (SEC)  (PCT)    ( 248, 250)     ( 249, 250)
    1          0    100          1               1

                                 NODE  253 IS UNDER SIGN CONTROL

 INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
 NUMBER     (SEC)  (PCT)    (  45, 253)
    1          0    100          1

                                 NODE  255 IS UNDER SIGN CONTROL

 INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
 NUMBER     (SEC)  (PCT)    ( 227, 255)     ( 253, 255)     (  45, 255)
    1          0    100          1               1               1

                                 NODE  258 IS UNDER SIGN CONTROL

 INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
 NUMBER     (SEC)  (PCT)    ( 255, 258)     ( 259, 258)
    1          0    100          1               1

                                 NODE  259 IS UNDER SIGN CONTROL

 INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
 NUMBER     (SEC)  (PCT)    (  79, 259)     ( 112, 259)
    1          0    100          1               1

                                 NODE  262 IS UNDER SIGN CONTROL

 INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
 NUMBER     (SEC)  (PCT)    ( 258, 262)     ( 263, 262)
    1          0    100          1               1

                                 NODE  263 IS UNDER SIGN CONTROL

 INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
 NUMBER     (SEC)  (PCT)    ( 112, 263)     (  91, 263)
    1          0    100          1               1

                                 NODE  266 IS UNDER SIGN CONTROL

 INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
 NUMBER     (SEC)  (PCT)    ( 262, 266)     ( 267, 266)
    1          0    100          1               1

                                 NODE  267 IS UNDER SIGN CONTROL

 INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
 NUMBER     (SEC)  (PCT)    ( 186, 267)
    1          0    100          1

                                          NODE  268
               OFFSET   0 SEC                                            CYCLE LENGTH  75 SEC

 INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
 NUMBER     (SEC)  (PCT)    ( 106, 268)     ( 107, 268)
    1         20     26          1               2
    2         55     73          2               1

                                 NODE  269 IS UNDER SIGN CONTROL

 INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
 NUMBER     (SEC)  (PCT)    ( 250, 269)     ( 268, 269)
    1          0    100          1               1

                                 NODE  303 IS UNDER SIGN CONTROL

 INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
 NUMBER     (SEC)  (PCT)    ( 192, 303)     ( 269, 303)
    1          0    100          1               1

                                 NODE  313 IS UNDER SIGN CONTROL

 INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
 NUMBER     (SEC)  (PCT)
    1          0    100

                                 NODE  314 IS UNDER SIGN CONTROL

 INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
 NUMBER     (SEC)  (PCT)
```

```
INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  88, 113)
   1         0    100          1

                                    NODE  151 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 152, 151)
   1         0    100          1

                                    NODE  152 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 112, 152)
   1         0    100          1

                                                NODE  167
             OFFSET    0 SEC                                                CYCLE LENGTH  75 SEC

INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  94, 167)    ( 169, 167)
   1        50     66          1               2
   2        25     33          2               1

                                    NODE  169 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  96, 169)
   1         0    100          1

                                    NODE  186 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT     ( 321, 186)
   1         0    100          1

                                    NODE  188 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 266, 188)
   1         0    100          1

                                    NODE  189 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  70, 189)
   1         0    100          1

                                    NODE  190 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  99, 190)
   1         0    100          1

                                    NODE  191 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 109, 191)
   1         0    100          1

                                    NODE  192 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 191, 192)
   1         0    100          1

                                    NODE  220 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)
   1         0    100

                                    NODE  226 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  35, 226)    ( 220, 226)
   1         0    100          1               1

                                    NODE  227 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 226, 227)
   1         0    100          1

                                    NODE  248 IS UNDER SIGN CONTROL

INTERVAL     DURATION       +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 103, 248)    ( 227, 248)
   1         0    100          1               1
```

```
                                      NODE  100 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (   1, 100)     ( 113, 100)
   1         0    100          1               1

                                                    NODE  101
              OFFSET    0 SEC                                                        CYCLE LENGTH  75 SEC

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 167, 101)     (  95, 101)
   1        60     80          1               2
   2        15     20          2               1

                                      NODE  103 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  45, 103)     (  44, 103)
   1         0    100          1               1

                                                    NODE  104
              OFFSET    0 SEC                                                        CYCLE LENGTH  75 SEC

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  44, 104)     ( 110, 104)
   1        55     72          2               1

   2        20     26          1               2

                                      NODE  105 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 104, 105)
   1         0    100          1

                                      NODE  106 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 105, 106)
   1         0    100          1

                                                    NODE  107
              OFFSET    0 SEC                                                        CYCLE LENGTH  75 SEC

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  98, 107)     ( 105, 107)     ( 109, 107)
   1        25     33          1               2               2
   2        50     66          2               1               1

                                                    NODE  108
              OFFSET    0 SEC                                                        CYCLE LENGTH  75 SEC

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  86, 108)     (  88, 108)
   1        20     26          2               1
   2        55     73          1               2

                                                    NODE  109
              OFFSET    0 SEC                                                        CYCLE LENGTH  75 SEC

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 107, 109)     ( 111, 109)
   1        25     33          2               1
   2        50     66          1               2

                                                    NODE  110
              OFFSET    0 SEC                                                        CYCLE LENGTH  75 SEC

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  38, 110)
   1        55     73          1
   2        20     26          0

                                      NODE  111 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)
   1         0    100

                                      NODE  112 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 259, 112)
   1         0    100          1

                                      NODE  113 IS UNDER SIGN CONTROL
```

```
   1         0     100          1

                                                    NODE   86
             OFFSET    0 SEC                                                       CYCLE LENGTH  75 SEC

INTERVAL    DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 108,  86)     ( 113,  86)
   1        20     26           1               2
   2        55     73           2               1

                                                    NODE   87
             OFFSET    0 SEC                                                       CYCLE LENGTH  75 SEC

INTERVAL    DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  83,  87)     (  85,  87)
   1        60     80           2               1
   2        15     20           1               2

                                          NODE   88 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 113,  88)
   1         0    100           1

                                          NODE   89 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)
   1         0    100

                                          NODE   90 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  83,  90)     (  92,  90)     (  87,  90)
   1         0    100           1               1               1

                                                    NODE   91
             OFFSET    0 SEC                                                       CYCLE LENGTH  75 SEC

INTERVAL    DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  77,  91)     (  97,  91)
   1        40     53           1               2
   2        35     46           2               1

                                          NODE   92 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  87,  92)
   1         0    100           1

                                          NODE   93 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (   3,  93)     (  92,  93)
   1         0    100           1               1

                                          NODE   94 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  96,  94)     ( 108,  94)     ( 167,  94)

   1         0    100           1               1               1

                                          NODE   95 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( [illegible],  95)
   1         0    100           1

                                          NODE   96 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  88,  96)     (  93,  96)     ( 169,  96)
   1         0    100           1               1               1

                                          NODE   97 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  78,  97)     ( 108,  97)
   1         0    100           1               1

                                          NODE   98 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)
   1         0    100

                                                    NODE   99
             OFFSET    0 SEC                                                       CYCLE LENGTH  75 SEC

INTERVAL    DURATION      +- - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  86,  99)     ( 100,  99)
   1        15     20           1               2
   2        60     80           2               1
```

```
                                 NODE   41 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)   (PCT)
   1        0     100

                                              NODE   44
            OFFSET   0 SEC                                                     CYCLE LENGTH  75 SEC

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)   (PCT)    (  38,   44)    ( 103,   44)
   1        55     73           1               2
   2        20     26           2               1

                                              NODE   45
            OFFSET   0 SEC                                                     CYCLE LENGTH  75 SEC

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)   (PCT)    (  39,   45)    (  93,   45)
   1        65     86           1               1
   2        10     13           1               1

                                              NODE   68
            OFFSET   0 SEC                                                     CYCLE LENGTH  75 SEC

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)   (PCT)    (  99,   68)    (  86,   68)
   1        30     40           1               2
   2        45     60           2               1

                                 NODE   69 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)   (PCT)    (  97,   69)    (  68,   69)
   1        0     100           1               1

                                 NODE   70 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)   (PCT)    (  69,   70)
   1        0     100           1

                                 NODE   77 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)   (PCT)    (  78,   77)
   1        0     100           1

                                              NODE   78
            OFFSET   0 SEC                                                     CYCLE LENGTH  75 SEC

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)   (PCT)    (  94,   78)    ( 108,   78)
   1        15     20           2               1
   2        60     80           1               2

                                              NODE   79
            OFFSET   0 SEC                                                     CYCLE LENGTH  75 SEC

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)   (PCT)    (  77,   79)      101,   79)
   1        15     20           1               2
   2        60     80           2               1

                                 NODE   81 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)   (PCT)
   1        0     100

                                 NODE   82 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)   (PCT)    (  81,   82)
   1        0     100           1

                                 NODE   83 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)   (PCT)    (  36,   83)    (  84,   83)
   1        0     100           1               1

                                 NODE   84 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)   (PCT)
   1        0     100

                                 NODE   85 IS UNDER SIGN CONTROL

INTERVAL     DURATION        +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)   (PCT)    (   6,   85)
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                        SPECIFIED FIXED-TIME SIGNAL CONTROL AND SIGN CONTROL CODES
                                        NODE    1 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (   2,   1)    ( 314,   1)    ( 315,   1)
  1         0     100          1              1              1

                                        NODE    2 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    ( 313,   2)
  1         0     100          1

                                                 NODE    3
            OFFSET   0 SEC                                                        CYCLE LENGTH  75 SEC

INTERVAL    DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (   5,   3)    ( 316,   3)
  1        65     86           1              2
  2        10     13           2              1

                                        NODE    4 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)
  1         0     100

                                                 NODE    5
            OFFSET   0 SEC                                                        CYCLE LENGTH  75 SEC

INTERVAL    DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (   8,   5)    ( 317,   5)
  1        65     86           1              1
  2        10     13           1              1

                                        NODE    6 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (   4,   6)
  1         0     100          1

                                        NODE    8 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (   6,   8)
  1         0     100          1

                                        NODE   35 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  37,  35)    (  90,  35)
  1         0     100          1              1

                                        NODE   36 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  62,  36)    (  89,  36)
  1         0     100          1              1

                                        NODE   37 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)
  1         0     100

                                        NODE   38 IS UNDER SIGN CONTROL

INTERVAL    DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  40,  38)
  1         0     100          1

                                                 NODE   39
            OFFSET   0 SEC                                                        CYCLE LENGTH  75 SEC

INTERVAL    DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  37,  39)    (  40,  39)
  1        50     66           2              1
  2        25     33           1              2

                                                 NODE   40
            OFFSET   0 SEC                                                        CYCLE LENGTH  75 SEC

INTERVAL    DURATION      +- - - - - - - - - - - - - - - - APPROACHES - - - - - - - - - - - - - - - - +
NUMBER    (SEC)  (PCT)    (  39,  40)    (  41,  40)
  1        37     49           1              2
  2        38     50           2              1
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( 167,  101)       0      100        0        0      NO       YES      NO       NO           0
( 167,   94)       0        0      100        0      NO       NO       YES      NO           0
( 169,   96)       0        0      100        0      NO       NO       YES      NO           0
( 169,  167)       0        0      100        0      YES      NO       YES      NO           0
( 169,   95)       0        0        0      100      NO       NO       NO       YES          0
( 186,  267)       0        0        0      100      NO       NO       NO       YES          0
( 191,  192)       0        0        0      100      NO       NO       NO       YES          0
( 192,  303)       0        0        0      100      NO       NO       NO       YES          0
( 220,  226)       0      100        0        0      NO       YES      NO       NO           0
( 226,  227)       0       24        0       76      NO       YES      NO       YES          0
( 227,  248)       0      100        0        0      NO       YES      NO       NO           0
( 227,  255)       0      100        0        0      NO       YES      NO       NO           0
( 248,  250)       0      100        0        0      NO       YES      NO       NO           0
( 249,  250)       0        0        0      100      NO       NO       NO       YES          0
( 250,  269)       0      100        0        0      NO       YES      NO       NO           0
( 253,  255)       0        0        0      100      NO       NO       NO       YES          0
( 255,  258)       0      100        0        0      NO       YES      NO       NO           0
( 258,  262)       0      100        0        0      NO       YES      NO       NO           0
( 259,  112)     100        0        0        0      YES      YES      NO       NO           0
( 259,  258)       0        0        0      100      NO       NO       NO       YES          0
( 262,  266)       0      100        0        0      NO       YES      NO       NO           0
( 263,  262)       0        0        0      100      NO       NO       NO       YES          0
( 266,  188)       0      100        0        0      NO       YES      NO       NO           0
( 267,  266)       0        0        0      100      NO       NO       NO       YES          0
( 268,  269)       0        0        0      100      NO       NO       NO       YES          0
( 267,  303)       0      100        0        0      NO       YES      NO       NO           0
( 313,    2)       0        0      100        0      NO       NO       YES      NO           0
( 314,    1)     100        0        0        0      YES      NO       NO       NO           0
( 315,    1)       0        0      100        0      NO       NO       YES      NO           0
( 316,    3)       0        0        0      100      NO       NO       NO       YES          0
( 317,    5)     100        0        0        0      YES      NO       NO       NO           0
( 321,  186)       0      100        0        0      NO       YES      NO       NO           0
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	TURN MOVEMENT PERCENTAGES				TURN MOVEMENT POSSIBLE				CAPACITY REDUCTION (PERCENT)
LINK	LEFT	THROUGH	RIGHT	DIAGONAL	LEFT	THROUGH	RIGHT	DIAGONAL	
(100, 99)	50	50	0	0	YES	YES	NO	NO	0
(99, 68)	0	100	0	0	NO	YES	NO	NO	0
(68, 69)	0	0	0	100	NO	NO	NO	YES	0
(4, 6)	0	0	100	0	NO	YES	YES	NO	0
(5, 3)	0	100	0	0	NO	YES	NO	NO	0
(6, 85)	0	100	0	0	NO	YES	NO	NO	0
(6, 8)	0	100	0	0	NO	YES	NO	NO	0
(8, 5)	0	0	100	0	NO	NO	YES	NO	0
(35, 226)	0	0	0	100	NO	NO	NO	YES	0
(36, 83)	0	0	0	100	NO	YES	NO	YES	0
(37, 35)	100	0	0	0	YES	NO	NO	NO	0
(37, 39)	0	0	100	0	YES	NO	YES	NO	0
(38, 44)	0	0	100	0	NO	NO	YES	NO	0
(38, 110)	0	100	0	0	NO	YES	NO	NO	0
(39, 45)	0	0	100	0	NO	NO	YES	NO	0
(39, 40)	0	0	0	100	NO	NO	NO	YES	0
(40, 39)	0	100	0	0	NO	YES	NO	NO	0
(40, 38)	0	100	0	0	NO	YES	NO	NO	0
(41, 40)	0	100	0	0	NO	YES	NO	NO	0
(44, 103)	100	0	0	0	YES	NO	NO	NO	0
(44, 104)	64	36	0	0	YES	YES	NO	NO	0
(45, 103)	0	0	0	100	NO	NO	NO	YES	0
(45, 253)	0	0	0	100	NO	NO	NO	YES	0
(45, 255)	0	0	0	100	NO	NO	NO	YES	0
(3, 93)	0	100	0	0	NO	YES	NO	NO	0
(69, 70)	0	100	0	0	NO	YES	NO	NO	0
(70, 189)	0	100	0	0	NO	YES	NO	NO	0
(77, 79)	100	0	0	0	YES	NO	NO	NO	0
(77, 91)	0	100	0	0	NO	YES	NO	NO	0
(78, 97)	0	100	0	0	NO	YES	NO	NO	0
(78, 77)	100	0	0	0	YES	NO	NO	NO	0
(79, 259)	0	0	0	100	NO	NO	NO	YES	0
(82, 36)	0	100	0	0	NO	YES	NO	NO	0
(81, 82)	100	0	0	0	YES	NO	NO	NO	0
(83, 87)	0	0	100	0	NO	NO	YES	NO	0
(83, 90)	0	0	0	100	NO	NO	NO	YES	0
(84, 83)	0	100	0	0	NO	YES	NO	NO	0
(85, 87)	0	100	0	0	YES	YES	NO	NO	0
(86, 99)	0	76	24	0	NO	YES	YES	NO	0
(86, 108)	100	0	0	0	YES	YES	NO	YES	0
(86, 68)	0	0	0	100	NO	NO	NO	YES	0
(87, 90)	0	100	0	0	NO	YES	NO	NO	0
(87, 92)	0	100	0	0	NO	YES	NO	NO	0
(88, 96)	100	0	0	0	YES	YES	NO	NO	0
(89, 108)	0	100	0	0	NO	YES	YES	NO	0
(88, 113)	0	0	100	0	NO	YES	YES	NO	0
(89, 36)	100	0	0	0	YES	NO	NO	NO	0
(90, 35)	0	0	0	100	NO	NO	NO	YES	0
(91, 263)	0	0	0	100	NO	NO	NO	YES	0
(92, 90)	100	0	0	0	YES	NO	NO	NO	0
(92, 93)	0	0	100	0	NO	NO	YES	NO	0
(93, 96)	0	100	0	0	NO	YES	NO	NO	0
(93, 45)	0	51	0	49	NO	YES	NO	YES	0
(94, 167)	0	100	0	0	NO	YES	NO	NO	0
(94, 76)	0	100	0	0	NO	YES	NO	NO	0
(95, 101)	0	0	100	0	NO	NO	YES	NO	0
(96, 94)	0	100	0	0	NO	YES	NO	NO	0
(96, 169)	100	0	0	0	YES	YES	NO	NO	0
(97, 69)	0	100	0	0	NO	YES	NO	NO	0
(98, 107)	85	0	15	0	YES	NO	YES	NO	0
(97, 91)	100	0	0	0	YES	NO	NO	NO	0
(2, 1)	0	100	0	0	NO	YES	NO	NO	0
(99, 190)	0	100	0	0	NO	YES	NO	NO	0
(1, 100)	100	0	0	0	YES	NO	NO	NO	0
(101, 79)	0	100	0	0	NO	YES	NO	NO	0
(103, 44)	0	100	0	0	NO	YES	NO	NO	0
(103, 248)	0	0	0	100	NO	NO	NO	YES	0
(104, 105)	0	0	0	100	NO	NO	NO	YES	0
(104, 249)	0	0	0	100	NO	NO	NO	YES	0
(105, 106)	0	0	100	0	NO	NO	YES	NO	0
(105, 107)	71	29	0	0	YES	YES	NO	NO	0
(106, 268)	0	0	0	100	NO	NO	NO	YES	0
(107, 109)	0	100	0	0	NO	YES	NO	NO	0
(107, 268)	0	0	0	100	NO	NO	NO	YES	0
(108, 78)	0	100	0	0	NO	YES	NO	NO	0
(108, 97)	0	0	0	100	NO	NO	NO	YES	0
(108, 86)	0	50	0	50	NO	YES	NO	YES	0
(108, 94)	100	0	0	0	YES	YES	NO	NO	0
(109, 107)	0	0	100	0	NO	NO	YES	NO	0
(109, 191)	0	100	0	0	NO	YES	NO	NO	0
(110, 104)	0	64	36	0	NO	YES	YES	NO	0
(111, 109)	71	0	29	0	YES	NO	YES	NO	0
(112, 152)	0	100	0	0	NO	YES	NO	NO	0
(112, 259)	0	0	0	100	NO	NO	NO	YES	0
(112, 263)	100	0	0	0	YES	NO	NO	NO	0
(113, 86)	0	24	26	50	NO	YES	YES	YES	0
(113, 88)	100	0	0	0	YES	YES	NO	NO	0
(113, 100)	0	0	100	0	NO	NO	YES	NO	0
(152, 151)	0	100	0	0	NO	YES	NO	NO	0

DYNEV LINKS (CONT.)

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                     PKT LENGTH          PKT
             LENGTH     FEET     FULL   LANES          LANE CHAN         DESTINATION NODES   OPP.   LOST   Q DIS   FREE
    LINK     MI*100   L      R   LANES   L R   GRD    1 2 3 4 5 6    LEFT THRU RGHT  DIAG NODE   TIME   HDWY    SPD    RTOR   PED
                                                                                                  SEC     SEC    MPH    CODE   CODE
( 111, 109)    55     0      0     1     0 0    0     0 0 0 0 0 0     107    0  191     0    0   2.5*   2.4     30      0      0
( 112, 152)   125     0      0     1     0 0    0     0 0 0 0 0 0       0  151    0     0    0   2.5*   2.7     40      0      0
( 112, 259)   160     0      0     1     0 0    0     0 0 0 0 0 0       0    0    0   258    0   2.5*   2.4     35      0      0
( 112, 263)   280     0      0     1     0 0    0     0 0 0 0 0 0     262    0    0     0    0   2.5*   3.1     35      0      0
( 113,  86)    50     0      0     1     0 0    0     0 0 0 0 0 0       0   68  108   -99    0   2.5*   2.4     30      0      0
( 113,  88)    55     0      0     1     0 0    0     0 0 0 0 0 0     108   96    0     0    0   2.5*   3.1     35      0      0
( 113, 100)    85     0      0     1     0 0    0     0 0 0 0 0 0       0    0   99     0    0   2.5*   3.1     35      0      0
( 152, 151)   230     0      0     1     0 0    0     0 0 0 0 0 0       0 8013    0     0    0   2.5*   2.7     40      0      0
( 167, 101)    60     0      0     1     0 0    0     0 0 0 0 0 0       0   79    0     0    0   2.5*   2.4     35      0      0
( 167,  94)    80     0      0     1     0 0    0     0 0 0 0 0 0       0    0   78     0    0   2.5*   3.1     35      0      0
( 169,  96)    70     0      0     1     0 0    0     0 0 0 0 0 0       0    0   94     0    0   2.5*   3.1     35      0      0
( 169, 167)    35     0      0     1     0 0    0     0 0 0 0 0 0      94    0  101     0    0   2.5*   2.4     30      0      0
( 169,  95)   140     0      0     1     0 0    0     0 0 0 0 0 0       0    0    0  -101    0   2.5*   3.1     35      0      0
( 186, 267)    95     0      0     1     0 0    0     0 0 0 0 0 0       0    0    0   266    0   2.5*   3.1     40      0      0
( 191, 192)   150     0      0     1     0 0    0     0 0 0 0 0 0       0    0    0   303    0   2.5*   2.7     40      0      0
( 192, 303)    20     0      0     1     0 0    0     0 0 0 0 0 0       0    0    0  8007    0   2.5*   3.1     35      0      0
  220, 226)   110     0      0     4     0 0    0     0 0 0 0 0 0       0  227    0     0    0   2.5*   2.1     60      0      0
( 226, 227)    25     0      0     4     0 0    0     0 0 0 0 0 0       0  255    0   248    0   2.5*   2.1     60      0      0
( 227, 248)   160     0      0     2     0 0    0     0 0 0 0 0 0       0  250    0     0    0   2.5*   2.1     60      0      0
( 227, 255)   115     0      0     3     0 0    0     0 0 0 0 0 0       0  258    0     0    0   2.5*   2.1     60      0      0
( 248, 250)   110     0      0     2     0 0    0     0 0 0 0 0 0       0  269    0     0    0   2.5*   2.1     60      0      0
( 249, 250)    20     0      0     1     0 0    0     0 0 0 0 0 0       0    0    0   269    0   2.5*   3.1     35      0      0
( 250, 269)   310     0      0     3     0 0    0     0 0 0 0 0 0       0  303    0     0    0   2.5*   2.1     60      0      0
( 253, 255)    25     0      0     1     0 0    0     0 0 0 0 0 0       0    0    0   258    0   2.5*   3.1     35      0      0
( 255, 258)   225     0      0     3     0 0    0     0 0 0 0 0 0       0  262    0     0    0   2.5*   2.1     60      0      0
( 258, 262)   260     0      0     4     0 0    0     0 0 0 0 0 0       0  266    0     0    0   2.5*   2.1     60      0      0
( 259, 112)   160     0      0     1     0 0    0     0 0 0 0 0 0     263  152    0     0    0   2.5*   3.1     40      0      0
( 259, 250)    40     0      0     1     0 0    0     0 0 0 0 0 0       0    0    0   262    0   2.5*   3.1     35      0      0
( 262, 266)   190     0      0     4     0 0    0     0 0 0 0 0 0       0  188    0     0    0   2.5*   2.1     60      0      0
( 263, 262)    50     0      0     1     0 0    0     0 0 0 0 0 0       0    0    0   266    0   2.5*   3.1     35      0      0
( 266, 188)    50     0      0     4     0 0    0     0 0 0 0 0 0       0 8016    0     0    0   2.5*   2.1     60      0      0
( 267, 266)    30     0      0     1     0 0    0     0 0 0 0 0 0       0    0    0   188    0   2.5*   3.1     35      0      0
( 268, 269)    20     0      0     1     0 0    0     0 0 0 0 0 0       0    0    0   303    0   2.5*   3.1     35      0      0
( 269, 303)   345     0      0     3     0 0    0     0 0 0 0 0 0       0 8007    0     0    0   2.5*   2.1     60      0      0
( 313,   2)   132     0      0     1     0 0    0     0 0 0 0 0 0       0    0    1     0    0   2.5*   3.1     25      0      0
( 314,   1)    75     0      0     1     0 0    0     0 0 0 0 0 0     100    0    0     0    0   2.5*   2.4     25      0      0
( 315,   1)    90     0      0     1     0 0    0     0 0 0 0 0 0       0    0  100     0    0   2.5*   2.4     30      0      0
( 316,   3)   142     0      0     1     0 0    0     0 0 0 0 0 0       0    0    0   -93    0   2.5*   2.7     35      0      0
( 317,   5)    57     0      0     1     0 0    0     0 0 0 0 0 0       3    0    0     0    0   2.5*   2.7     30      0      0
( 321, 186)   225     0      0     1     0 0    0     0 0 0 0 0 0       0  267    0     0    0   2.5*   3.1     40      0      0

                                          * INDICATES DEFAULT VALUES WERE SPECIFIED


                 LANE CHANNELIZATION                      RTOR                        PEDESTRIAN
                       CODES                              CODES                          CODES

                 0  UNRESTRICTED                  0  RTOR PERMITTED               0  NO PEDESTRIANS
                 1  LEFT TURNS ONLY               1  RTOR PROHIBITED              1  LIGHT
                 2  BUSES ONLY                                                    2  MODERATE
                 3  CLOSED                                                        3  HEAVY
                 4  RIGHT TURNS ONLY
                 5  CAR - POOLS
                 6  CAR - POOLS + BUSES
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                                                     DYNEV LINKS

                    PKT LENGTH         PKT                                                                   LOST   Q DIS   FREE
           LENGTH      FEET     FULL  LANES           LANE CHAN        DESTINATION NODES    OPP     TIME   HDWY    SPD     RTOR   PED
   LINK    MI*100    L     R    LANES  L R   GRD    1 2 3 4 5 6     LEFT THRU RGHT  DIAG   NODE     SEC     SEC    MPH     CODE   CODE
(   1, 100)  200     0     0      1    0 0    0     0 0 0 0 0 0       99    0    0     0      0    2.5*    3.1     35       0      0
(   2,   1)   20     0     0      1    0 0    0     0 0 0 0 0 0        0  100    0     0      0    2.5*    2.4     25       0      0
(   3,  93)  190     0     0      2    0 0    0     0 0 0 0 0 0        0   45    0     0      0    2.5*    2.4     40       0      0
(   4,   6)  130     0     0      2    0 0    0     0 0 0 0 0 0        0    8   85     0      0    2.5*    2.7     30       0      0
(   5,   3)   25     0     0      2    0 0    0     0 0 0 0 0 0        0   93    0     0      0    2.5*    2.4     40       0      0
(   6,  85)  195     0     0      1    0 0    0     0 0 0 0 0 0        0   87    0     0      0    2.5*    2.7     40       0      0
(   6,   8)   40     0     0      2    0 0    0     0 0 0 0 0 0        0    5    0     0      0    2.5*    2.7     30       0      0
(   8,   5)  165     0     0      2    0 0    0     0 0 0 0 0 0        0    0    3     0      0    2.5*    2.7     30       0      0
(  35, 226)   25     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0   227      0    2.5*    3.1     35       0      0
(  36,  83)   90     0     0      1    0 0    0     0 0 0 0 0 0        0   87    0    90      0    2.5*    2.5     40       0      0
(  37,  35)  100     0     0      1    0 0    0     0 0 0 0 0 0      226    0    0     0      0    2.5*    2.4     35       0      0
(  37,  39)  120     0     0      1    0 0    0     0 0 0 0 0 0       41    0   40     0      0    2.5*    2.4     35       0      0
(  38,  44)   60     0     0      1    0 0    0     0 0 0 0 0 0        0    0  104     0      0    2.5*    2.4     30       0      0
(  38, 110)   30     0     0      1    0 0    0     0 0 0 0 0 0        0  104    0     0      0    2.5*    2.4     30       0      0
(  39,  45)  125     0     0      1    0 0    0     0 0 0 0 0 0        0    0  103     0      0    2.5*    2.4     35       0      0
(  39,  40)   40     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0   -38      0    2.5*    3.1     30       0      0
(  40,  39)   40     0     0      1    0 0    0     0 0 0 0 0 0        0   45    0     0      0    2.5*    2.4     30       0      0
(  40,  38)   30     0     0      1    0 0    0     0 0 0 0 0 0        0  110    0     0      0    2.5*    2.4     30       0      0
(  41,  40)   40     0     0      1    0 0    0     0 0 0 0 0 0        0   38    0     0      0    2.5*    2.4     30       0      0
(  44, 103)   40     0     0      1    0 0    0     0 0 0 0 0 0      248    0    0     0      0    2.5*    2.7     40       0      0
(  44, 104)   40     0     0      1    0 0    0     0 0 0 0 0 0      247  105    0     0      0    2.5*    2.7     40       0      0
(  45, 103)   80     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0   248      0    2.5*    2.7     40       0      0
(  45, 253)   20     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0   255      0    2.5*    3.1     35       0      0
(  45, 255)   25     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0   258      0    2.5*    3.1     35       0      0
(  68,  69)   95     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0   -70      0    2.5*    2.7     40       0      0
(  69,  70)   25     0     0      2    0 0    0     0 0 0 0 0 0        0  189    0     0      0    2.5*    2.5     55       0      0
(  70, 189)  315     0     0      1    0 0    0     0 0 0 0 0 0        0 8015    0     0      0    2.5*    2.5     55       0      0
(  77,  79)  147     0     0      1    0 0    0     0 0 0 0 0 0      259    0    0     0      0    2.5*    2.4     40       0      0
(  77,  91)   35     0     0      1    0 0    0     0 0 0 0 0 0        0  263    0     0      0    2.5*    2.4     40       0      0
(  78,  97)   60     0     0      2    0 0    0     0 0 0 0 0 0        0   69    0     0      0    2.5*    2.4     55       0      0
(  78,  77)   40     0     0      1    0 0    0     0 0 0 0 0 0       91    0    0     0      0    2.5*    2.4     40       0      0
(  79, 259)   45     0     0      2    0 0    0     0 0 0 0 0 0        0    0    0  -258      0    2.5*    2.4     40       0      0
(  82,  36)   30     0     0      1    0 0    0     0 0 0 0 0 0        0   83    0     0      0    2.5*    2.5     40       0      0
(  81,  82)  100     0     0      1    0 0    0     0 0 0 0 0 0       36    0    0     0      0    2.5*    2.4     30       0      0
(  83,  87)   50     0     0      2    0 0    0     0 0 0 0 0 0        0    0   90     0      0    2.5*    2.4     40       0      0
(  83,  90)   85     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0    35      0    2.5*    2.4     45       0      0
(  84,  83)   65     0     0      1    0 0    0     0 0 0 0 0 0        0   90    0     0      0    2.5*    3.1     35       0      0
(  85,  87)   65     0     0      1    0 0    0     0 0 0 0 0 0       92   90    0     0      0    2.5*    2.4     40       0      0
(  86,  99)   50     0     0      1    0 0    0     0 0 0 0 0 0        0  190   68     0      0    2.5*    2.4     35       0      0
(  86, 108)   60     0     0      1    0 0    0     0 0 0 0 0 0       97   94    0   -78      0    2.5*    2.4     35       0      0
(  86,  68)   25     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0    69      0    2.5*    2.4     35       0      0
(  87,  90)   75     0     0      1    0 0    0     0 0 0 0 0 0        0   35    0     0      0    2.5*    2.7     40       0      0
(  87,  92)   60     0     0      1    0 0    0     0 0 0 0 0 0        0   93    0     0      0    2.5*    2.4     45       0      0
(  88,  96)   30     0     0      1    0      0     0 0 0 0 0 0       94  169    0     0      0    2.5*    3.1     35       0      0
(  88, 108)   35     0     0      1    0 0    0     0 0 0 0 0 0        0   97   94     0      0    2.5*    2.4     30       0      0
(  88, 113)   55     0     0      1    0 0    0     0 0 0 0 0 0        0  100   86     0      0    2.5*    3.1     35       0      0
(  89,  36)   60     0     0      1    0 0    0     0 0 0 0 0 0       83    0    0     0      0    2.5*    3.1     35       0      0
(  90,  35)   45     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0   226      0    2.5*    2.4     40       0      0
(  91, 263)  230     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0  -262      0    2.5*    2.4     50       0      0
(  92,  90)   60     0     0      1    0 0    0     0 0 0 0 0 0       35    0    0     0      0    2.5*    2.7     40       0      0
(  92,  93)  150     0     0      1    0 0    0     0 0 0 0 0 0        0    0   45     0      0    2.5*    2.7     40       0      0
(  93,  96)  220     0     0      1    0 0    0     0 0 0 0 0 0        0   94    0     0      0    2.5*    2.5     40       0      0
(  93,  45)  240     0     0      2    0 0    0     0 0 0 0 0 0        0  253    0  -255      0    2.5*    2.7     40       0      0
(  94, 167)   90     0     0      1    0 0    0     0 0 0 0 0 0        0  101    0     0      0    2.5*    2.4     35       0      0
(  94,  78)   30     0     0      2    0 0    0     0 0 0 0 0 0        0   97    0     0      0    2.5*    2.4     55       0      0
(  95, 101)   75     0     0      1    0 0    0     0 0 0 0 0 0        0    0   79     0      0    2.5*    2.4     35       0      0
(  96,  94)   20     0     0      2    0 0    0     0 0 0 0 0 0        0   73    0     0      0    2.5*    2.5     55       0      0
(  96, 169)   70     0     0      1    0 0    0     0 0 0 0 0 0      167   95    0     0      0    2.5*    3.1     35       0      0
(  97,  69)   70     0     0      1    0 0    0     0 0 0 0 0 0        0   70    0     0      0    2.5*    2.5     55       0      0
(  98, 107)   55     0     0      1    0 0    0     0 0 0 0 0 0      268    0  109     0      0    2.5*    2.4     30       0      0
(  97,  91)   40     0     0      1    0 0    0     0 0 0 0 0 0      263    0    0     0      0    2.5*    2.4     35       0      0
(  99,  60)   20     0     0      1    0 0    0     0 0 0 0 0 0        0   69    0     0      0    2.5*    2.4     35       0      0
(  99, 190)  387     0     0      1    0 0    0     0 0 0 0 0 0        0 8014    0     0      0    2.5*    2.7     45       0      0
( 100,  99)   60     0     0      1    0 0    0     0 0 0 0 0 0      190   68    0     0      0    2.5*    2.4     35       0      0
( 101,  79)   55     0     0      2    0 0    0     0 0 0 0 0 0        0  259    0     0      0    2.5*    2.4     35       0      0
( 103,  44)   40     0     0      1    0 0    0     0 0 0 0 0 0        0  104    0     0      0    2.5*    2.4     40       0      0
( 103, 248)   25     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0   250      0    2.5*    3.1     35       0      0
( 104, 105)   60     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0   107      0    2.5*    2.7     40       0      0
( 104, 249)   25     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0   250      0    2.5*    2.7     40       0      0
( 105, 106)  220     0     0      1    0 0    0     0 0 0 0 0 0        0    0  268     0      0    2.5*    3.1     35       0      0
( 105, 107)  280     0     0      1    0 0    0     0 0 0 0 0 0      268  109    0     0      0    2.5*    2.4     40       0      0
( 106, 268)   70     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0  -269      0    2.5*    2.4     35       0      0
( 107, 109)   35     0     0      1    0 0    0     0 0 0 0 0 0        0  191    0     0      0    2.5*    2.4     35       0      0
( 107, 268)   40     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0   269      0    2.5*    2.4     30       0      0
( 108,  78)   35     0     0      1    0 0    0     0 0 0 0 0 0        0   77    0     0      0    2.5*    2.4     30       0      0
( 108,  97)   65     0     0      1    0 0    0     0 0 0 0 0 0        0    0    0    69      0    2.5*    2.4     35       0      0
( 108,  86)   60     0     0      1    0 0    0     0 0 0 0 0 0        0   99    0    68      0    2.5*    2.4     35       0      0
( 108,  94)   35     0     0      1    0 0    0     0 0 0 0 0 0       78  167    0     0      0    2.5*    3.1     35       0      0
( 109, 107)   35     0     0      1    0 0    0     0 0 0 0 0 0        0    0  268     0      0    2.5*    2.4     30       0      0
( 109, 191)  165     0     0      1    0 0    0     0 0 0 0 0 0        0  192    0     0      0    2.5*    2.7     40       0      0
( 110, 104)   50     0     0      1    0 0    0     0 0 0 0 0 0        0  249  105     0      0    2.5*    2.4     35       0      0
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12 SUPPLEMENTARY NOTES

13 ABSTRACT (200 words or less)

A study performed by the Pacific Northwest Laboratory (PNL) with the assistance of the Texas Transportation Institute for the U.S. Nuclear Regulatory Commission (NRC) identifies the key input parameters to I-DYNEV affecting evacuation time estimates (ETEs). In addition, this study attempts to determine the sensitivity of ETEs to changes in those parameters when applied to two different evacuation networks. This information could then be used to determine parameters requiring additional research and to assist in the evaluation of ETEs submitted by licensees and applicants.

The parameters analyzed for the study included vehicle population, network capacity, loading time, the capacity reduction factor, the time interval of processing, and free-flow velocity. These parameters were applied to two evacuation networks simulating a rural and an urban area.

Changes in each of the six input parameters evaluated for this study affected to some degree the estimates of evacuation times. In addition, an algorithm within the I-DYNEV model was determined to route traffic in a potentially unreasonable manner in order to balance the system demand. In general, however, the results obtained revealed that the sensitivity of the evacuation time estimates to changes in the input parameters is consistent with traffic modeling theory and documented algorithms included in the model.

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THE SENSITIVITY OF EVACUATION TIME ESTIMATES TO CHANGES IN INPUT PARAMETERS FOR THE I-DYNEV COMPUTER CODE