

TRAFFIC STUDY FOR NORTH LINCOLN STREET WITHIN THE CITY OF ELKHORN

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**MEMORANDUM REPORT
NUMBER 218**

**TRAFFIC STUDY FOR NORTH
LINCOLN STREET WITHIN
THE CITY OF ELKHORN**

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SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

Staff Memorandum

TRAFFIC STUDY FOR N. LINCOLN STREET WITHIN THE CITY OF ELKHORN

INTRODUCTION

Pursuant to a request from the City of Elkhorn, the Southeastern Wisconsin Regional Planning Commission staff has completed a traffic study for N. Lincoln Street in the City of Elkhorn. The N. Lincoln Street study segment is bounded by STH 67 (N. Wisconsin Street) on the north and STH 67 (E. Geneva Street) on the south (See Map 1).

A series of physical and operational inventories and studies were conducted to collect the data necessary to assess current traffic operations on the study segment of N. Lincoln Street and to evaluate the potential for planned new street extensions within the City to divert traffic from the study segment. Data collection was conducted during the month of May, 2013 and included an inventory of existing traffic control devices on STH 67 and N. Lincoln Street through the City. Average weekday traffic counts and vehicular speed data on N. Lincoln Street between N. Wisconsin Street and E. Geneva Street were also collected. Travel time data was collected on three routes: 1) IH 43/USH 12 through the City, 2) STH 67, and 3) a combination of STH 67 and N. Lincoln Street. Finally, an origin/destination study was conducted which involved the collection of license plate numbers observed over a 12 hour period at the six sites shown on Map 1.

In addition to the data collection, the traffic study also included analysis of the data collected, and the evaluation of the potential of proposed new street extensions and potential additional traffic engineering alternatives to divert traffic from the study street segment. The findings of the traffic inventories and analysis and the evaluation of the potential of proposed new facilities and potential traffic engineering alternatives to divert traffic from the study segment are set forth in the sections which follow.

**STUDY SEGMENT AND ORIGIN/DESTINATION SURVEY SITE LOCATIONS
FOR N. LINCOLN STREET TRAFFIC DIVERSION STUDY IN THE CITY OF ELKHORN**



— EXISTING STATE TRUNK HIGHWAY

○ SURVEY SITE



PHYSICAL AND OPERATIONAL INVENTORIES

N. Lincoln Street Traffic Control

N. Lincoln Street between the locations where it connects with STH 67 to the south at E. Geneva Street and STH 67 to the north at Wisconsin Street is a two traffic lane roadway with one traffic lane in each direction and also has two parking lanes. All N. Lincoln Street intersection approaches along this stretch with the exception of two intersections have a single shared lane for the through, left- and right-turn movements. At the intersection of N. Lincoln Street with STH 67 (E. Geneva Street), there are exclusive left-turn lanes and shared right-turn and through lanes on the N. Lincoln Street approaches. At the intersection of N. Lincoln Street with E. Walworth Street, there is an exclusive right turn lane and shared left- and through lane in the southbound N. Lincoln Street approach.

Traffic control devices located on the study segment of N. Lincoln Street include traffic signals, regulatory traffic control signing, warning signing, and pavement markings. Regulatory traffic control signing typically includes STOP signs, intersection lane control signs, speed limit signs, and parking control signs. The intersection of N. Lincoln Street and STH 67 (E. Geneva Street) is controlled by traffic signals. Intersection lane control signing is deployed at this intersection. Traffic on the N. Lincoln Street approach to its intersection with STH 67 (N. Wisconsin Street) is controlled by a STOP sign. Traffic at the N. Lincoln Street intersections of STH 11 (E. Court Street) and E. Walworth Street are both controlled by STOP signs on all four approaches, and there is a flashing red light suspended over the center of the STH 11 intersection. All other intersections on N. Lincoln Street from STH 67 to STH 11 are controlled by STOP signs on the intersecting street approaches only. Additional signing also includes 25 Mile per Hour speed limit and No Trucks regulatory signing, as well as Pedestrian Crossing and Playground warning signing. There are pavement markings indicating the location of pedestrian crossings at selected locations. On-street parking is permitted on both sides of the study segment of N. Lincoln Street between STH 67 (N. Wisconsin Street) and E. Walworth Street.

STH 67 (E. Geneva Street and N. Wisconsin Street) Traffic Control

With the exception of the intersections of STH 67 (N. Wisconsin Street) with E. Walworth Street and STH 67 with STH 11 (E. Court Street) where additional lanes are provided, and STH 67 (E. Geneva Street) between S. Wisconsin Street and S. Lincoln Street where two traffic lanes are provided and parking is provided only on the north side between S. Washington Street and S. Wisconsin Street, STH 67

is a two traffic lane roadway with one traffic lane and a bike lane in each direction. At the intersection of STH 67 with E. Walworth Street, there is a separate lane for each traffic movement on the southbound approach and an exclusive right-turn lane and shared left-turn and through lane on the northbound approach. At the intersection of STH 67 (E. Geneva Street) with S. Lincoln Street, there is an exclusive left-turn lane and a shared right-turn and through lane on the eastbound approach.

Traffic control devices located on STH 67 (N. Wisconsin Street and E. Geneva Street) include traffic signals, regulatory traffic control signing, warning signing, and pavement markings. The intersections of STH 67 with STH 11 (E. Court Street), STH 67 with E. Walworth Street, and STH 67 (E. Geneva Street) with S. Lincoln Street are controlled by traffic signals. Intersection lane control signing is deployed at these intersections. The intersection of STH 67 (S. Wisconsin Street) with STH 67 (E. Geneva Street) is controlled by STOP signs on all four approaches. All other intersections on STH 67 from N. Lincoln Street to STH 11 are controlled by STOP signs on the intersecting street approaches only. Additional signing includes 25 Mile per Hour speed limit regulatory signing, as well as, Pedestrian Crossing warning signing. There are pavement markings indicating pedestrian crossings at all intersections from N. Lincoln Street to S. Lincoln Street, and at mid-block locations between E. Geneva Street and E. Walworth Street and between E. Walworth Street and STH 11 (E. Court Street). On-street parking is prohibited between N. Lincoln Street and STH 11 (E. Court Street), between S. Lincoln Street and Washington Street, and on the south side of the roadway between S. Washington Street and S. Wisconsin Street.

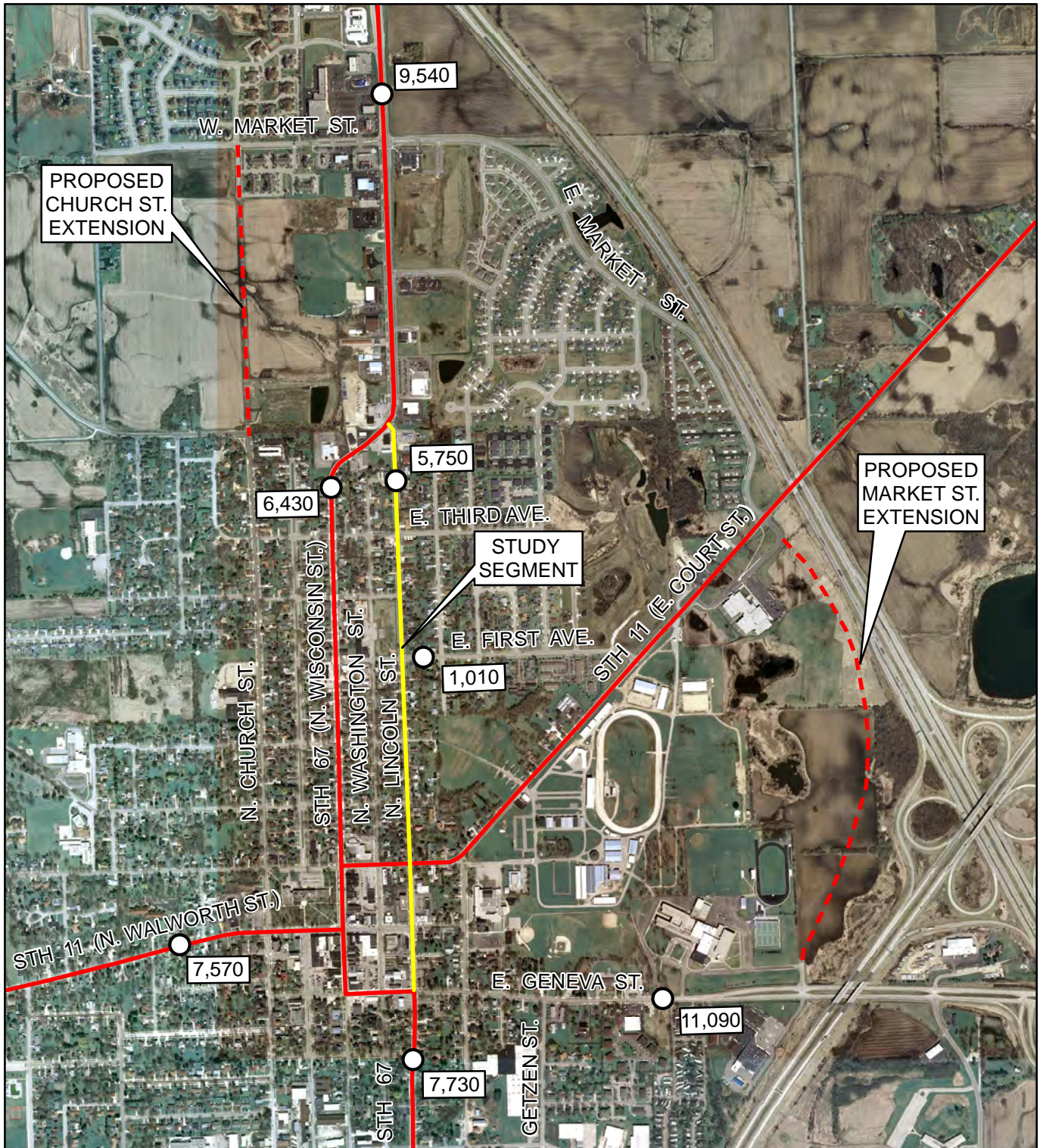
Traffic Counts and Vehicle Speeds

The Commission staff collected average weekday traffic counts and vehicular speed data on N. Lincoln Street between E. Fourth Avenue and E. Third Avenue using mechanical counters. These data were collected on Tuesday, May 21, 2013, Wednesday May 22, 2013, and Thursday, May 23, 2013. The average weekday traffic count was 5,750 vehicles per average weekday (See Map 2), and the average travel speed was 29 miles per hour. About 80 percent of vehicles were observed travelling at speeds exceeding the 25 mile per hour speed limit.¹ The 85th percentile travel speed, or that speed at which 85 percent of all vehicles were observed to be travelling at or below, was 32 miles per hour. The 10 mile per hour pace or the 10 mile per hour range of speeds containing the largest number of observations was

¹ City of Elkhorn Police Department conducted speed studies on the study segment of N. Lincoln Street in November/December, 2012 and April/May, 2013 about two blocks south of the Commission's speed study location. Average speeds observed were 29 miles per hour and 28 miles per hour, respectively. The 85th percentile travel speeds were 32 miles per hour and 31 miles per hour, and the pace range of speeds were 24 to 33 miles per hour and 23 to 32 miles per hour, respectively.

Map 2

AVERAGE WEEKDAY TRAFFIC COUNTS OBSERVED ON
SELECTED STREETS AND HIGHWAYS IN THE CITY OF ELKHORN: MAY, 2013



- EXISTING STATE TRUNK HIGHWAY
- TRAFFIC COUNT LOCATION
- 1,010 AVERAGE WEEKDAY TRAFFIC COUNT

Source: SEWRPC



from 23 miles per hour to 32 miles per hour. Approximately 71 percent of all vehicles were observed to be travelling at speeds within the 10 mile

In addition to the traffic count data collected on N. Lincoln Street, Commission staff also collected traffic count data on STH 11 (W. Walworth Street) between Adams Street and Elm Street, STH 67 (S. Lincoln Street) between E. Marshall Street and E. Rockwell Street, STH 67 (N. Wisconsin Street) north of E. Third Avenue and north of E. Market Street, E. Geneva Street east of Getzen Street, and E. First Avenue between N. Lincoln Street and N. Jackson Street. These counts were conducted mechanically on the same dates as the count on N. Lincoln Street. The average weekday traffic counts and traffic count locations are shown on Map 2.

Travel Time Runs

The Commission staff also conducted travel time runs to collect data on the time required to travel between USH 12 at STH 67 on the north side of the City of Elkhorn, and IH 43 at STH 67 on the south side of the City on three different routes (See Map 3). This entailed traversing the selected routes at the prevailing speeds of the traffic stream to determine the time to travel between the identified termini. Route 1 utilized USH 12 from STH 67 to its interchange with IH 43 and then utilized IH 43 to its interchange with STH 67. Route 2 utilized STH 67 through the City between the same two termini. Route 3 utilized a combination of STH 67 from USH 12 to N. Lincoln Street, N. Lincoln Street from STH 67 (N. Wisconsin Street) to STH 67 (E. Geneva Street), and STH 67 from E. Geneva Street to IH 43. Each route was traveled three times in the north- and southbound directions, and the three times were averaged.

The travel time required to traverse Route 1 (USH 12/IH 43) between USH 12 at STH 67 on the north side of the City, and IH 43 at STH 67 on the south side of the City expressed in minutes and seconds was 4:57 (four minutes: fifty-seven seconds) in the northbound direction. Traversing this route in the southbound direction took 5:05 (minutes:seconds). By comparison, the travel time required to traverse Route 2 (STH 67) between the same two termini was 7:22 (minutes:seconds) in the northbound direction and 7:35 (minutes:seconds) in the southbound direction. The travel time required to traverse Route 3 (Lincoln Street) between the same two termini was 7:15 (minutes:seconds) in the northbound direction and 6:50 (minutes:seconds) in the southbound direction. Thus, averaging the north- and southbound directions, Route 1 (USH 12/IH 43) between the two termini required the least time, about 5:02 (minutes:seconds) on average. This is about two and one quarter minutes faster than the average travel time of 7:29 (minutes:seconds) necessary to traverse Route 2 (STH 67) through the City and about two minutes faster than the average travel time of 7:03 (minutes:seconds) necessary to travel Route 3 (Lincoln

Map 3

TRAVEL TIME ROUTES IN THE CITY OF ELKHORN: MAY, 2013



Street) through the City. Also, it may be noted that Route 3 (Lincoln Street) is slightly faster—26 seconds or about 6 percent—than Route 2 (STH 67).

License Plate Survey

The objective of a license plate survey is to identify probable travel patterns based upon the vehicle's points of entry into, and egress out of, an area. Travel patterns—point of entry to point of egress—are established when a license plate is observed at two stations within certain time parameters. Generally, license plates observed entering at one station are compared to the plates observed at the other stations within a specific time interval of the observation time at the original station. That time interval is representative of the time required to travel between two stations without an intermediate stop. It is then possible to estimate that the two license plate observations within the specified time interval indicate that a single vehicle has traveled without an intermediate stop (other than for intersection traffic control) between two stations. It is also then possible to establish the likely travel route used by that vehicle between those two stations. If license plates are matched but the time interval between observations exceeds the specified time interval, it is generally assumed that the motorist had an intermediate destination. Not only is the location of the intermediate destination indeterminate, but there is no definitive method to establish the travel route of the vehicle.

The Commission staff conducted a 12 hour (7:00 a.m. to 7:00 p.m.) license plate survey at six sites over two days, May 22nd and 23rd, 2013. As previously noted, these sites are shown on Map 1. License plate numbers were collected in one direction at each station the first day and in the opposite direction the next day. Collection times were also periodically recorded which facilitated the assignment of a unique observation time to each license plate observed based upon the assumption of a uniform arrival rate between recorded times.

The observed license plates at a station were then examined to determine if they matched observed license plates at a second station within a travel time interval of ten minutes or less. For the purposes of this study, license plates were compared for matches at three stations in order to more clearly define specific travel routes. Observation of a single license plate at an intermediate station between two other stations indicated—with a high degree of confidence—that a particular route was used. In this survey, the STH 67 and the N. Lincoln Street stations north of E. Third Avenue were used as the intermediate stations. The number of license plates (or vehicles) observed during the 12 hour survey period is shown in Table 1 by station. The number of vehicles observed travelling between stations within a ten travel minute interval is shown in Table 2. Vehicles taking more than ten minutes to travel between stations were assumed to have

Table 1

**NUMBER OF LICENSE PLATES OBSERVED BY STATION
AT SELECTED LOCATIONS IN THE CITY OF ELKHORN IN MAY, 2013^a**

	Station					
	STH 67 (N. Wisconsin St.) at Market St.	STH 67 (N. Wisconsin St.) at Third Ave.	N. Lincoln St. At Third Ave.	STH 11 (W. Walworth St.)	STH 67 (S. Lincoln St.)	E. Geneva St.
Number of License Plates Observed	7,040	4,390	4,660	5,000	6,980	8,120

^a License plates were collected for a 12 hour period, from 7:00 a.m. to 7:00 p.m.

Source: SEWRPC

Table 2

**NUMBER OF VEHICLES OBSERVED TRAVELING BETWEEN STATIONS WITHIN
A TEN MINUTE TRAVEL TIME INTERVAL IN THE CITY OF ELKHORN IN MAY, 2013^a**

		To				
		STH 67 (N. Wisconsin St.) at Market St. through STH 67 (N. Wisconsin St.) at Third Ave.	STH 67 (N. Wisconsin St.) at Market St. through N. Lincoln St. at Third Ave.	STH 11 (W. Walworth St.)	STH 67 (S. Lincoln St.)	E. Geneva St.
From	STH 67 (N. Wisconsin St.) at Market St. through STH 67 (N. Wisconsin St.) at Third Ave.	--	--	21	12	7
	STH 67 (N. Wisconsin St.) at Market St. through N. Lincoln St. (at Third Ave.)	--	--	13	356	177
	STH 11 (W. Walworth St.)	24	27	--	44	93
	STH 67 (S. Lincoln St.)	10	319	36	--	95
	E. Geneva St.	6	192	72	108	--

^a At least four characters or numbers on each of two license plates matched, or in the event that license plates had fewer than four characters or numbers, all characters and numbers matched.

Source: SEWRPC

stopped at an intermediate destination, and, therefore, would not be likely to alter their travel route if new Church or Market Street extensions were constructed.

Traffic Counts

Experience indicates that a facility is likely carrying traffic through a neighborhood or even through a community when the average weekday traffic volume on that facility exceeds about 5,000 vehicles per average weekday. Such facilities are considered as arterials and their primary function is to carry traffic, although they may serve a secondary function to provide access to abutting land uses as well. Arterials carry the highest traffic volumes on the street network and one measure of operational performance is the ratio of average weekday traffic volume to the roadway capacity. Arterial facilities with one traffic lane in each direction are generally considered to have a design capacity of 14,000 vehicles per average weekday. Arterial facilities with two traffic lanes in each direction separated by a median are generally considered to have a design capacity of 27,000 vehicles per average weekday. As the average weekday traffic volumes approach or exceed the roadway capacity, the roadway becomes more and more congested resulting in significant travel time delays.

The observed average weekday traffic count on N. Lincoln Street in May 2013 was 5,750 vehicles per average weekday, thus indicating that N. Lincoln Street likely operates as an arterial street. Comparing the observed 5,750 average weekday traffic volume to the roadway design capacity of 14,000 vehicles per average weekday to the volume indicates that the volume is significantly less than the design capacity of N. Lincoln Street. Accordingly, it may be concluded that N. Lincoln Street has adequate traffic carrying capacity to accommodate the existing average weekday traffic volumes without experiencing any congestion.

Traffic count data were collected at six other locations in May 2013 at the same time as the traffic count data were collected on N. Lincoln Street. The average weekday traffic counts are shown on Map 2 by count location. The observed average weekday traffic counts at five of the locations including STH 11, STH 67 at all three locations—north of E. Market Street, north of E. Third Avenue, and north of E. Marshall Street—and E. Geneva Street all indicate that the respective facilities function as arterials. Each of these facilities has one traffic lane in each direction and would be considered to have a design capacity of 14,000 vehicles per average weekday at the locations where the traffic counts were conducted with the exception of STH 67 (N. Wisconsin Street) north of E. Market Street. The latter location has four traffic lanes separated by a median and would be considered to have a design capacity of about 27,000 vehicles per average weekday. The average weekday traffic counts observed on these facilities were compared to the appropriate roadway design capacity of either 14,000 or 27,000 vehicles per average weekday. At

each location, the average weekday traffic volumes are well below the appropriate design capacity of the roadway, and it may be concluded that either minimal or no congestion, or adverse operating conditions are experienced on these arterial facilities.

Finally, the 1,010 vehicles per average weekday traffic count observed on E. First Avenue indicates that its primary function is to provide access to abutting properties. Experience indicates that land access streets do not experience operational problems owing to traffic volume, and that when land access streets carry fewer than about 1,500 vehicles per average weekday, very few residents consider traffic to be a nuisance. When land access streets carry volumes approaching or exceeding about 2,500 vehicles per average weekday, most residents consider traffic to be a nuisance.

Vehicle Speeds

Experience indicates that it is generally those vehicles travelling at speeds greater than the 85th percentile speed which attract the notice of, and cause concern, among residents living along a facility. Thus, of the vehicular speeds observed on the N. Lincoln study segment, the 85th percentile speed is of interest.

The 85th percentile speed is also typically the travel speed that motorists using a facility consider to be safe and reasonable based on a number of factors including the pavement condition of the roadway, roadway width, and other factors, including adjacent land uses, the presence of parked vehicles, sidewalks, driveways and intersecting street spacing. As previously noted, the observed 85th percentile speed on the N. Lincoln Street study segment was 32 miles per hour, or about 7 miles per hour faster than the posted 25 Mile per Hour speed limit.

Lastly, municipal courts, absent some extenuating circumstances, typically refrain from prosecuting motorists cited for speeding until the observed travel speed exceeds the posted speed limit by at least five to seven miles per hour, which for this street segment would be 30 to 32 miles per hour. Thus, owing to the leeway typically afforded by the courts, motorists travelling at or below the 85th percentile speed on the study segment may be considered to be in compliance with the posted speed limit. About 15 percent, or about one in every seven vehicles, would be considered to be speeding based on the typical prosecution of speeding motorists by the courts.

Estimated Traffic Diversion

The extension of two facilities were evaluated for their potential to divert traffic from the study segment of N. Lincoln Street. The proposed facility extensions include Church Street from CTH H to W. Market Street, and E. Market Street from E. Geneva Street to STH 11 as shown on Map 1.

Traffic considered to have the greatest potential for diversion from the N. Lincoln Street study segment would have one end of its trip—the origin or the destination—on STH 67 north of E. Market Street, and the other end of the trip on STH 11 west of N. Church Street in the case of the proposed Church Street extension, or the other end of the trip on E. Geneva Street east of Getzen Street in the case of the proposed Market Street extension. The travel patterns identified for the purpose of establishing the potential level of traffic diversion from N. Lincoln Street by the extension of Market Street and from STH 67 by the proposed extension of Church Street are shown in Table 2. Further, in order to qualify as a potential candidate for diversion from N. Lincoln Street, each origin and destination pair would also have to be observed at the license plate study station on N. Lincoln Street north of E. Third Avenue.

Approximately 369 vehicles per average weekday traveled via N. Lincoln Street between the survey station on STH 67 just south of Market Street and the survey station on E. Geneva Street east of Getzen Street during the 12 hour period from 7:00 a.m. to 7:00 p.m. based upon the travel patterns identified by the license plate survey. This is approximately 7.9 percent of the 4,660 license plates (vehicles) observed on N. Lincoln Street in May 2013. Thus, it may be concluded that approximately 455 vehicles—7.9 percent of the total 5,750 vehicles observed on N. Lincoln Street on an average weekday—would approximate the total potential diversion from N. Lincoln Street on an average weekday owing to the proposed extension of Market Street.

Similarly, approximately 40 vehicles per average weekday traveled between the survey station on STH 67 just south of Market Street and the survey station on STH 11 west of N. Church Street via N. Lincoln Street during the 12 hour period from 7:00 a.m. to 7:00 p.m. based upon the travel patterns identified by the license plate survey. This is approximately 0.9 percent of the 4,660 license plates (vehicles) observed on N. Lincoln Street in May 2013. Thus, it may be concluded that approximately 50 vehicles—0.9 percent of the total 5,750 vehicles observed on N. Lincoln Street on an average weekday—would approximate the total potential diversion from N. Lincoln Street on an average weekday owing to the proposed extension of Church Street. When combined, the two proposed facility extensions would have the potential to divert an estimated 505 vehicles per average weekday from N. Lincoln Street. The diversion of 505 vehicles from N. Lincoln Street would represent about 8.8 percent of the 5,750 average weekday traffic volume.

Potential Traffic Engineering Alternatives to Divert Traffic from the Study Segment of N. Lincoln Street

City of Elkhorn officials also asked the Commission staff to identify and evaluate traffic engineering measures having the potential to divert a portion of or all of the vehicles observed traveling the length of the N. Lincoln Street study segment. Any diversion of traffic currently observed traversing the entire study segment of N. Lincoln Street would ideally be diverted to a parallel, surface arterial route through the City or to a freeway route around City.

One “parallel” surface arterial route through the City is the current route of STH 67. It is comprised of three facilities, N. and S. Wisconsin Street, E. Geneva Street, and S. Lincoln Street south of E. Geneva Street (See Route 2 on Map 3). As shown on Map 3, N. and S. Lincoln Street provides the most direct north-south route between the intersections of N. Wisconsin Street and N. Lincoln Street, and S. Lincoln Street and E. Geneva Street. By comparison, from the intersection of N. Wisconsin Street and N. Lincoln Street, STH 67 diverges two city blocks to the southwest. From that point it assumes a north-south orientation to the intersection of S. Wisconsin Street and E. Geneva Street, where it assumes an east-west orientation for two blocks along E. Geneva Street to the intersection of S. Lincoln Street with E. Geneva Street. Thus, the later route is approximately 0.15 miles longer than the N. and S. Lincoln Street route. While it does not directly intersect STH 67 (N. Wisconsin Street), N. and S. Washington Street is located midway between STH 67 (N. and S. Wisconsin Street) and N. and S. Lincoln Street, and is another potential route paralleling N. and S. Lincoln Street. Although N. Washington Street is not continuous between E. First and E. Second Avenues, the segments from STH 11 (E. Court Street) to E. First Avenue, and from E. Second Avenue to E. Fourth Avenue may be used by motorists to avoid potential traffic engineering alternatives intended to discourage the use of N. Lincoln Street as a shortcut through the City of Elkhorn. The potential diversion of traffic from N. Lincoln Street to N. Washington Street, a non-arterial, land access street, is not desirable.

Based upon the travel patterns identified in the license plate survey, approximately 1,340 vehicles per average weekday travelled through the N. Lincoln Street survey station between the survey station on STH 67 (N. Wisconsin Street) and the survey stations on STH 11 (W. Walworth Street), STH 67 (S. Wisconsin Street), and E. Geneva Street within ten minutes. Only the vehicles observed between survey stations within ten minutes were considered to be utilizing the N. Lincoln Street study segment on a routine, repetitive basis and, thus, susceptible to diversion. The ten minute constraint on these vehicle trips indicates that there were no intermediate stops which may have influenced the choice of travel routes. Vehicles having the greatest potential to be diverted from N. Lincoln Street include 455 vehicles per average weekday between N. Lincoln Street and E. Geneva Street, 835 vehicles per average weekday

between N. Lincoln Street and STH 67 (S. Lincoln Street), and 50 vehicles per average weekday between N. Lincoln Street and STH 11 (W. Walworth Street). Of the estimated 1,340 vehicles per average weekday, approximately 665 vehicles per average weekday were traveling northbound and approximately 675 vehicles per average weekday were traveling southbound.

The evaluation of the existing travel patterns through the City of Elkhorn indicated that only a modest amount of traffic, estimated to be about 505 vehicles per average weekday, would be expected to divert from the N. Lincoln Street between STH 67 (N. Wisconsin Street) and STH 67 (E. Geneva Street) on an average weekday following the proposed extensions of E. Market Street and Church Street. Neither extension would be expected to divert traffic that is traveling through the City between the IH 43 interchange with STH 67 on the south side of the City and the USH 12 Interchange with STH 67 on the north side of the City. Given the relatively modest traffic diversion anticipated owing to facility extensions, City officials asked Commission staff to identify and evaluate additional measures to discourage the continued use of N. Lincoln Street by motorists traveling through the neighborhood and redirect that traffic to other routes, in particular, STH 67 (N. Wisconsin Street).

It may be noted, however, that if no time constraint is considered, the data indicate that 2,115 vehicles per average weekday were observed traveling through the survey station on N. Lincoln Street between the STH 67 (N. Wisconsin Street) survey station and the STH 11 (W. Walworth Street), STH 67 (S. Wisconsin Street) and E. Geneva Street survey stations. That represents an increase of 775 vehicles per average weekday, or about 58 percent, more than the 1,340 vehicles per average weekday previously identified as traveling directly between survey stations via the study segment. The data also indicate that more than one hour transpired between the initial observation and the final observation of 600 vehicles, or 77 percent, of the 775 additional vehicles, clearly indicating an intermediate stop was made which may or may not have influenced the travel route and which may or may not be repeated on any given day.

A number of alternative traffic engineering measures were considered, primarily to divert traffic from the study segment of N. Lincoln Street, but each would also be expected to have an impact on vehicle speeds. The alternatives considered included: 1) guide signing south of the IH 43 interchange with STH 67 and north of the USH 12 interchange with STH 67 and encouraging the use of IH 43 and USH12 to bypass the City of Elkhorn (See Figure 1); 2) raise speed limit on STH 67 (N. Wisconsin Street) from 25 to 30 miles per hour (See Figure 2); 3) conversion of N. Lincoln Street between STH 11 (E. Court Street) and N. Wisconsin Street from two-way to one-way northbound traffic operation (See Figure 3); 4) reduce the roadway width of N. Lincoln Street between STH 11 (E. Court Street) and N. Wisconsin Street to 27 feet

(See Figure 4); 5) construct pavement chokers on N. Lincoln Street at three locations to narrow the pavement width to 20 feet permitting two-way travel (See Figure 5); 6) construct semi diverters on N. Lincoln Street at two locations to narrow the pavement width to 14 feet permitting travel in one direction only (See Figure 6); 7) construct a diagonal diverter at the intersection of N. Lincoln Street and E. First Avenue (See Figure 7); and 8) construct a cul de sac on N. Lincoln Street about 100 feet north of E. Fourth Street and terminating N. Lincoln Street at E. Fourth Street (See Figure 8). A complete description of each of the eight traffic engineering alternatives considered is set forth in Figures 1 through 8 at the end of this memorandum along with a summary of the potential advantages and disadvantages of each alternative and the estimated costs attendant to its implementation.

The evaluation of the alternative traffic engineering measures should include an assessment of their potential to divert the traffic traveling the entire length of the N. Lincoln Street study segment, as well as, an assessment of the likely impacts on travel by residents of N. Lincoln Street and adjacent neighborhoods. Those most likely to be impacted are residents along Washington Street north of STH 11 (E. Court Street) and residents of the Jackson Street neighborhood—an area generally bounded by N. Lincoln Street, Fair Meadow Lane, E. First Avenue, and Emily Avenue. The evaluation should also include the potential impact of the traffic engineering measures on emergency response times and routes. The locations from which emergency responses are initiated and the location of the emergency are essential to determining the potential impact on response times and routes. Fire protection and emergency medical services vehicles are housed at 13 S. Broad Street, and there are two emergency medical centers to which persons may be transported -- the Aurora Lakeland Medical Center located east of the City on County Road NN, or Mercy Walworth Hospital and Medical Center located south of the City on STH 67.

The Police Department is located at 100 W. Walworth Street (STH 11). However, because law enforcement personnel might respond from virtually any location in the City, the potential impact on law enforcement activities will depend on the combination of the location of the responding officer when a call for assistance or enforcement is received, the location where assistance or enforcement is required, and the location of a potential physical barrier attendant to a particular traffic engineering alternative. A description and analysis of each traffic engineering alternative is provided in Figures 1 through 8.

It may be noted that other traffic engineering measures, such as chicanes and traffic circles could have been analyzed, as well. Although chicanes and traffic circles do require modest changes in a vehicle's path, their impact on motorists is very similar to that of pavement chokers with similar advantages and disadvantages. Speed humps could also have been analyzed. Speed humps are wedge-shaped, raised areas about 15 feet in length across the width of the roadway, except at the curb and gutter thereby

minimizing the impact on drainage. Speed humps are recommended for use on roadways where the speed limit is 30 miles per hour or less and where the 85th percentile speed does not exceed 45 miles per hour. To affect speed, speed humps need to be installed at least every 500 feet. Speed humps would have the potential to reduce the 85th percentile speed of a roadway to about 25 to 30 miles per hour. As the 85th percentile speed on the N. Lincoln Street study segment is about 32 miles per hour, the installation of speed humps would not be expected to reduce vehicular speeds on this roadway enough to significantly reduce traffic volumes on N. Lincoln Street.

SUMMARY

This memorandum documents the results of a study requested by the City of Elkhorn to evaluate current traffic operations and make recommendations regarding planned facility extensions and traffic calming measures on the traffic operation of N. Lincoln Street between STH 67 (N. Wisconsin Street) and E. Geneva Street. Commission staff conducted a number of inventories of physical and operating characteristics on STH 67 (N. Wisconsin Street) and N. Lincoln Street. Traffic control on N. Lincoln Street and STH 67 (N. Wisconsin Street) was inventoried, average weekday traffic counts were conducted at selected locations, vehicular speed data was collected on N. Lincoln Street between E. Third and E. Fourth Streets, a license plate survey to identify travel patterns was conducted, and travel time data for two routes through the City and one route over USH 12 and IH 43 around the City was collected.

The analysis and evaluation of the inventory data indicated that based upon traffic volume carried, N. Lincoln Street functions as an arterial. Also, the data analysis indicated that N. Lincoln Street, and as well the other City of Elkhorn arterial streets are carrying traffic volumes less than their roadway design capacity, and do not experience congestion. The vehicular speed data indicated that the 85th percentile speed on N. Lincoln Street is about 32 miles per hour, or about seven miles over the posted speed limit.

Based upon the travel patterns identified by the license plate survey, potential diversion from N. Lincoln Street to a proposed E. Market Street extension was estimated to be about 455 vehicles per average weekday, and potential diversion from N. Lincoln Street to a proposed Church Street extension was estimated to be about 50 vehicles per average weekday. Together, the estimated 505 vehicles on an average weekday would represent about 8.8 percent of the total 5,750 vehicles per average weekday observed on N. Lincoln Street, representing a modest diversion of traffic from N. Lincoln Street.

In addition, analysis of the travel patterns identified by the license plate survey indicate approximately 1,340 vehicles per average weekday travel the study segment of N. Lincoln Street between the survey

station on STH 67 (N. Wisconsin Street) and the survey stations on STH 11 (W. Walworth Street), STH 67 (S. Wisconsin Street) and E. Geneva Street in ten minutes or less. The ten minute constraint on these vehicle trips indicates that they are direct between stations and may be assumed with a high degree of confidence to occur on a routine, repetitive basis. Vehicles that routinely and repetitively travel the study segment have the greatest potential to be diverted from N. Lincoln Street.

Eight alternative traffic engineering measures were considered and evaluated, primarily to divert traffic from the study segment of N. Lincoln Street, but each would also be expected to have an impact on vehicle speeds. A complete description of each of the eight traffic engineering alternatives considered is set forth in Figures 1 through 8 at the end of this memorandum along with a summary of the potential advantages and disadvantages of each alternative and the estimated costs attendant to its implementation. Three other alternative traffic engineering measures were identified, but rejected, because the probable impacts, advantages, and disadvantages of two of the alternatives are very similar to those of the pavement chokers. The third alternative traffic engineering measure was deemed inappropriate because of the prevailing operating speeds on N. Lincoln Street.

Of the eight traffic engineering alternatives considered, four alternatives (Alternatives 1, 2, 4 and 5) rely on modification of motorist perception and behavior to divert traffic. Alternative 3 relies on the conversion of N. Lincoln Street to one-way operation to divert traffic and three alternatives (Alternative 6 through 8) rely on physical barriers to divert traffic. The four alternatives which rely on modification of motorist perception and behavior to divert traffic were not recommended for further consideration owing to concern that desired behavior modification would not occur. Alternative 3 (Figure 3), which relies on the conversion to northbound one-way operation of the N. Lincoln Street study segment, was also not recommended for further consideration owing to the absence of a suitable parallel facility to be converted to southbound one-way traffic operations, a probable increase in vehicular speeds on N. Lincoln Street, and the fact that the northbound portion of the traffic traveling the study segment of N. Lincoln Street between STH 11 (E. Court Street) and STH 67 (N. Wisconsin Street) would not be diverted.

The three remaining traffic engineering alternatives (Alternatives 6 through 8) rely on the construction of physical barriers. Of these three alternatives, two were recommended for further consideration and one was not. Under Alternative 8 (Figure 8) which was not recommended for further consideration, a cul de sac would be constructed on N. Lincoln Street just north of E. Fourth Avenue and N. Lincoln Street would be terminated at E. Fourth Street. This alternative was not recommended because, in addition to changing the travel patterns of the routine, repetitive trips using N. Lincoln Street between STH 11 (E.

Court Street) and STH 67 (N. Wisconsin Street) as desired, it would change the travel patterns of all residents of N. Lincoln Street and the adjacent neighborhoods.

One of the alternatives recommended for further consideration was the construction of two semi diverters on N. Lincoln Street (Alternative 6 described on Figure 6). The first semi diverter would be located on the east side of N. Lincoln Street at its intersection with STH 11 (E. Court Street) and the second on the west side of N. Lincoln Street at its intersection with STH 67 (N. Wisconsin Street) as shown in Figure 6. Two-way traffic would be maintained on N. Lincoln Street between the semi diverters which would limit travel to one direction only, southbound at STH 11 (E. Court Street) and northbound at STH 67 (N. Wisconsin Street). The southbound STH 67 (N. Wisconsin Street) exclusive left-turn lane would also be eliminated under this alternative. This alternative has the potential to divert the 1,340 vehicles per average weekday traveling through the N. Lincoln Street study segment, although diversion of northbound traffic may be to N. Washington Street rather than STH 67 (N. Wisconsin Street). This alternative may be expected to have a relatively minimal impact on response times of emergency service providers. It will impose modest travel indirection and travel time impacts on residents of N. Lincoln Street and adjacent neighborhoods, particularly residents southbound on STH 67 (N. Wisconsin Avenue) north of its intersection with N. Lincoln Street.

The other alternative (Alternative 7 shown on Figure 7) recommended for further consideration was the construction of a diagonal diverter oriented from the southeast corner to the northwest corners at the intersection of N. Lincoln Street and E. First Avenue, as shown in Figure 7. Orienting the diverter between the southeast and northwest corners directs northbound N. Lincoln Street traffic to the west on E. First Avenue takes advantage of the discontinuity of N. Washington Street between E. First and E. Second Avenues, ultimately directing northbound traffic to STH 67 (N. Wisconsin Street) and directing southbound traffic to STH 11. This alternative also has the potential to divert the 1,340 vehicles per average weekday traveling through the N. Lincoln Street study segment to STH 67 (N. Wisconsin Street). Of the two alternatives recommended for further consideration, this alternative may be expected to have the greater potential for diversion of the 1,340 vehicles per average weekday from N. Lincoln Street to STH 67 (N. Wisconsin Street), but it would also be expected to have the more significant impact on resident travel indirection and travel time, particularly those residing north of E. First Avenue. It would impact the provision of fire and emergency medical services to that same area imposing increased travel distance and time on responders. Response times by law enforcement officers may also be impacted dependent on the location from which the response is initiated and the location where assistance is desired relative to the diagonal diverter. This alternative has the potential to have a more significant impact on police response times than the other alternative recommended for consideration by the Commission staff.

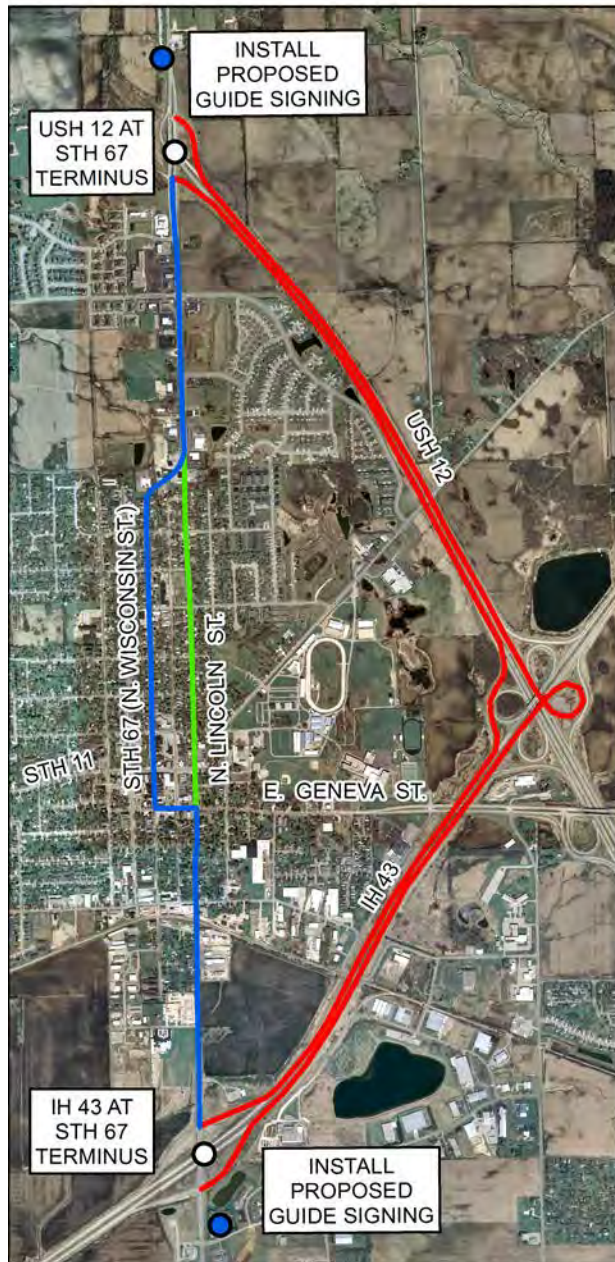
Should City officials determine to implement one of the traffic engineering alternatives recommended by Commission staff, it is recommended that implementation occur on a trial basis and the impacts of implementation evaluated. Any such trial should be of sufficient duration to experience the full range of impacts, and in particular, should include a period of time when schools are in session. It is further recommended that travel speeds on the study segment of N. Lincoln Street continue to be monitored, and that periodic vehicular travel speed enforcement activities be undertaken at irregular intervals as may be necessary.

* * *

Figure 1

ALTERNATIVE 1: INSTALLATION OF GUIDE SIGNING

LOCATIONS OF PROPOSED GUIDE SIGNING



DESCRIPTION

This alternative would require the installation of guide signing to direct motorists to a freeway route, using USH 12 and IH 43, to connect STH 67 north and south of the City of Elkhorn. The guide signings would be installed facing southbound STH 67 traffic north of the STH 67 interchange with USH 12, and facing northbound STH 67 traffic south of the STH 67 interchange with IH 43. The signs would bear the message “BYPASS ELKHORN VIA FREEWAY” and include an arrow directing motorists.

COST ESTIMATE

The estimated cost to implement this alternative is about \$2,500.

ADVANTAGES

- It is cost effective
- The freeway route provides for faster travel through the City than the current route
- It could potentially divert up to 835 vehicles entering and exiting the City via STH 67 and 455 vehicles traveling between STH 67 (N. Wisconsin St.) and E. Geneva St.

DISADVANTAGES

- It relies on people to voluntarily modify their travel patterns due to the advisory nature of the signing
- It would have a marginal impact on existing travel patterns and speeds on N. Lincoln St.
- Vehicles traveling between STH 67 (N. Wisconsin St.) and STH 11 (Walworth St.) would not be expected to divert to the freeway route
- Existing guide signing advises southbound STH 67 motorists of a freeway route to Delevan and Lake Geneva thereby potentially diverting motorists who might otherwise be encouraged to divert by the proposed signing
- Additional advisory signing would be required at the IH 43 and USH 12 interchange
- Merchants in the City of Elkhorn may oppose any potential traffic diversion around the City of Elkhorn

POTENTIAL NEGATIVE IMPACT ON EMERGENCY SERVICES

Since there would be no physical change to any of the roadways in the study segment, this alternative would have no negative impact on the provision of emergency services within the City of Elkhorn.

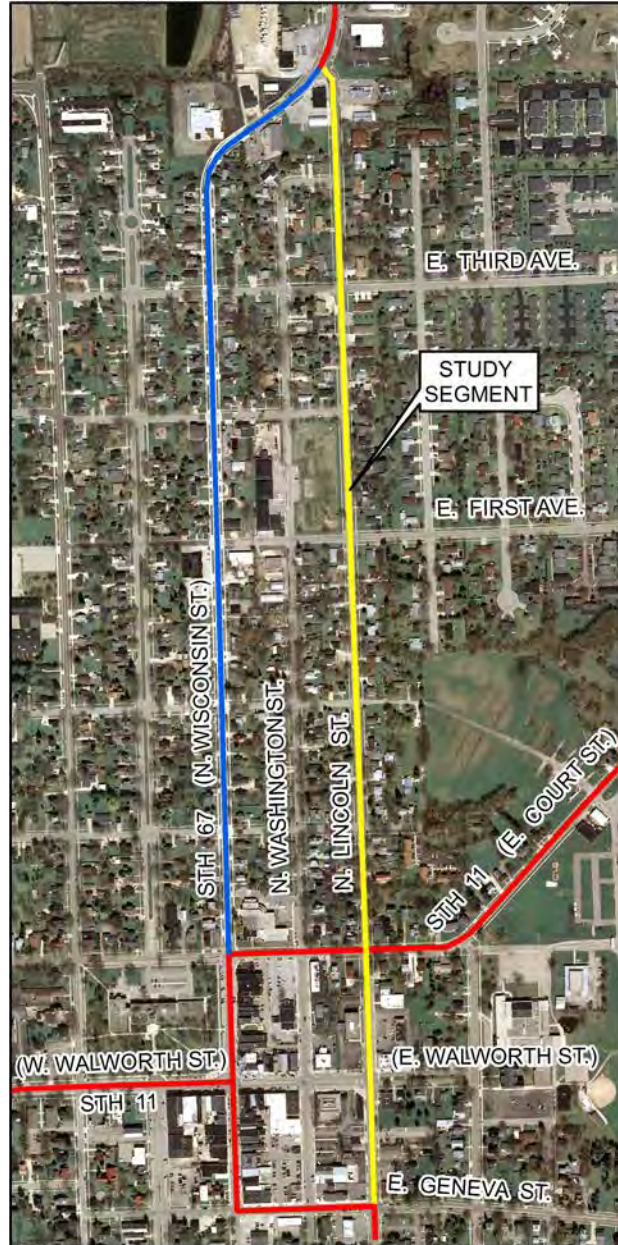
RECOMMENDATION

As existing signing already advises southbound STH 67 motorists of a freeway route to Delevan and Lake Geneva, the additional signage would be expected to have a marginal impact on the existing travel patterns on the study segment. This traffic engineering alternative is not recommended for further consideration.

Figure 2

ALTERNATIVE 2: RAISE SPEED LIMIT ON STH 67 (N. WISCONSIN ST.)

**REVISE POSTED SPEED
LIMIT TO 30 MILES PER HOUR**



— EXISTING STATE TRUNK HIGHWAY
— STATE TRUNK HIGHWAY PROPOSED
FOR REVISED 30 MPH SPEED LIMIT



DESCRIPTION

This alternative would raise the posted speed limit on STH 67 (N. Wisconsin St.) between STH 11 (E. Court St.) and N. Lincoln St. from 25 miles per hour to 30 miles per hour, thereby reducing the travel time on this segment by approximately 19 seconds between N. Lincoln St. and STH 11 (E. Court St.).

COST ESTIMATE

The estimated cost to implement this alternative is about \$2,500.

ADVANTAGES

- It is cost effective
- It has a modest impact in reducing the travel time on STH 67 (N. Wisconsin St.)
- It could potentially divert up to 55 vehicles per average weekday from N. Lincoln St. between STH 67 (N. Wisconsin St.) and STH 11 (W. Walworth St.) to STH 67 (N. Wisconsin St.)

DISADVANTAGES

- Delay incurred at the traffic signals at the STH 67 (N. Wisconsin St.) intersections with STH 11 (E. Court St.) and STH 11 (W. Walworth St.) may negate the modest reduction in travel time attendant to the increased speed limit
- The travel time reduction would not be sufficient to divert traffic to and from the south via STH 67 (S. Lincoln St.) or to and from the east via E. Geneva St.
- It may result in an 85th percentile speed approaching 40 miles per hour, which may be objectionable to abutting property owners along STH 67

**POTENTIAL NEGATIVE IMPACT ON
EMERGENCY SERVICES**

Since there would be no physical change to any of the roadways in the study segment, this alternative would have no negative impact on the provision of emergency services within the City of Elkhorn.

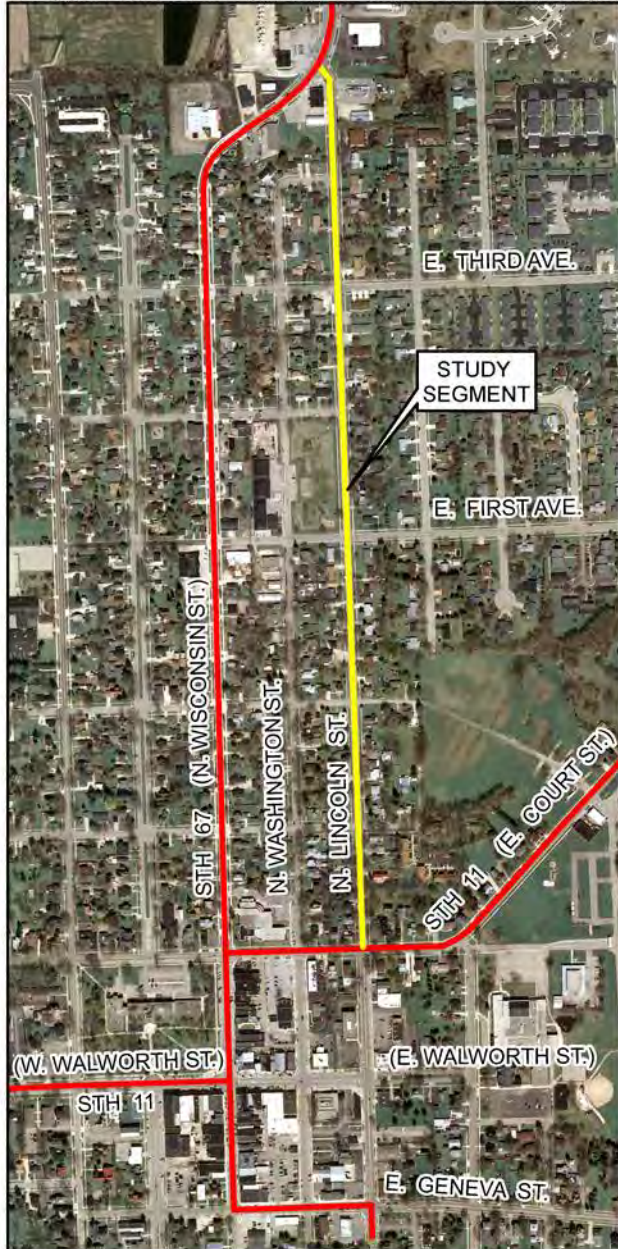
RECOMMENDATION

This traffic engineering alternative is not recommended for further consideration as it is expected to divert only a modest amount of traffic from the study segment attendant to the modest reduction in travel time along STH 67 (19 seconds).

Figure 3

ALTERNATIVE 3: CONVERSION FROM TWO-WAY TO ONE-WAY TRAFFIC OPERATION

SEGMENT OF N. LINCOLN STREET PROPOSED TO BE CONVERTED TO ONE-WAY TRAFFIC OPERATION



— EXISTING STATE TRUNK HIGHWAY
— CONVERT TO ONE-WAY OPERATION



DESCRIPTION

This alternative would require the conversion of N. Lincoln St from its existing two-way traffic operation to a one-way northbound traffic operation between STH 11 (E. Court St.) and STH 67 (N. Wisconsin St.).

COST ESTIMATE

The estimated cost to implement this alternative is about \$72,000. The elimination of the exclusive southbound left-turn lane on STH 67 at the intersection of N. Lincoln St. and STH 67 (N. Wisconsin St.) is included in the estimated cost.

ADVANTAGES

- It would potentially divert an estimated 675 non-resident southbound vehicles per average weekday from the study segment to STH 67 (N. Wisconsin St.)
- It would potentially divert an additional estimated 1,800 southbound vehicles per average weekday generated by residents of the study segment and adjacent street segments

DISADVANTAGES

- It imposes modest travel indirection and increased travel times on the study segment residents and southbound customers and employees of businesses located within the study segment
- An estimated 1,800 southbound vehicles per average weekday generated by residents of the study segment and adjacent streets would be diverted to cross-streets and parallel facilities for southbound travel
- It would not be expected to divert any of the existing 665 non-resident northbound vehicles per average weekday on the study segment
- Experience indicates that vehicular speeds typically increase following the conversion from two-way to one-way operation
- Standard practice would include the one-way conversion of a parallel facility such as STH 67 or N. Washington St.

POTENTIAL NEGATIVE IMPACT ON EMERGENCY SERVICES

This alternative may be expected to have a relatively negligible negative impact on emergency response times as responders are able to, under certain conditions, disregard select rules of the road including regulations governing direction of movement when en route to an emergency (§346.03 of the Wisconsin Statutes).

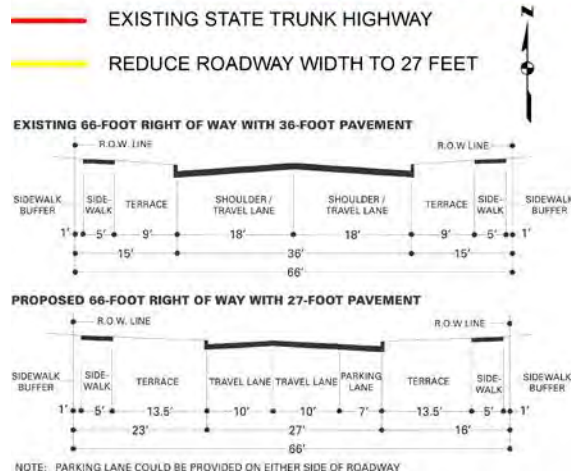
RECOMMENDATION

This traffic engineering alternative is not recommended for further consideration as it will require (standard practice) the conversion of a parallel street to one-way southbound traffic operation such as STH 67 or N. Washington St. If STH 67 is converted to the complementary southbound one-way road, more northbound traffic would divert to N. Lincoln St. than the southbound traffic diverted from N. Lincoln St.

Figure 4

ALTERNATIVE 4: N. LINCOLN ST. ROADWAY WIDTH REDUCTION

**SEGMENT OF N. LINCOLN STREET
PROPOSED TO BE REDUCED TO 27 FEET IN WIDTH**



DESCRIPTION

This alternative would require the reconstruction of the existing N. Lincoln St. pavement between STH 11 (E. Court St.) and STH 67 (N. Wisconsin St.), narrowing it from 36 feet wide to 27 feet wide providing two 10-foot wide traffic lanes and a seven-foot wide parking lane.

COST ESTIMATE

The estimated cost to implement this alternative is about \$2,560,000.

ADVANTAGES

- The ten-foot wide traffic lanes and seven-foot wide parking lanes would act as traffic calming devices, hence encouraging reduction in vehicular speeds on N. Lincoln St.
- It could potentially divert some or all of the 1,340 non-resident vehicles per average weekday traveling through the N. Lincoln St. study segment to STH 67 (N. Wisconsin St.)
- Reduces pedestrian crossing width
- It increases green space in the curb lawn
- Changes the character of the roadway from arterial facility to local land access

DISADVANTAGES

- It is dependent on motorist reaction to narrower travel lanes, the implied change in roadway character from arterial to land access, and the extent of on-street parking
- Plowed snow may make on-street parking difficult
- High cost

POTENTIAL NEGATIVE IMPACT ON EMERGENCY SERVICES

This alternative would have a negligible negative impact on emergency response times as emergency responders would likely only have to drive more cautiously due to the narrowed roadways. When designed properly, narrower streets easily accommodate fire trucks, ambulances, and other emergency vehicles.

RECOMMENDATION

This traffic engineering alternative is not recommended for further consideration given its high cost and dependence on motorist perception of the street characteristic change from an arterial facility to a local land access facility and narrower travel lanes to divert some vehicles to parallel streets with arterial facility characteristics.

Figure 5

ALTERNATIVE 5: TWO-WAY TRAVEL PAVEMENT CHOKERS ON N. LINCOLN STREET

LOCATIONS OF PAVEMENT CHOKERS

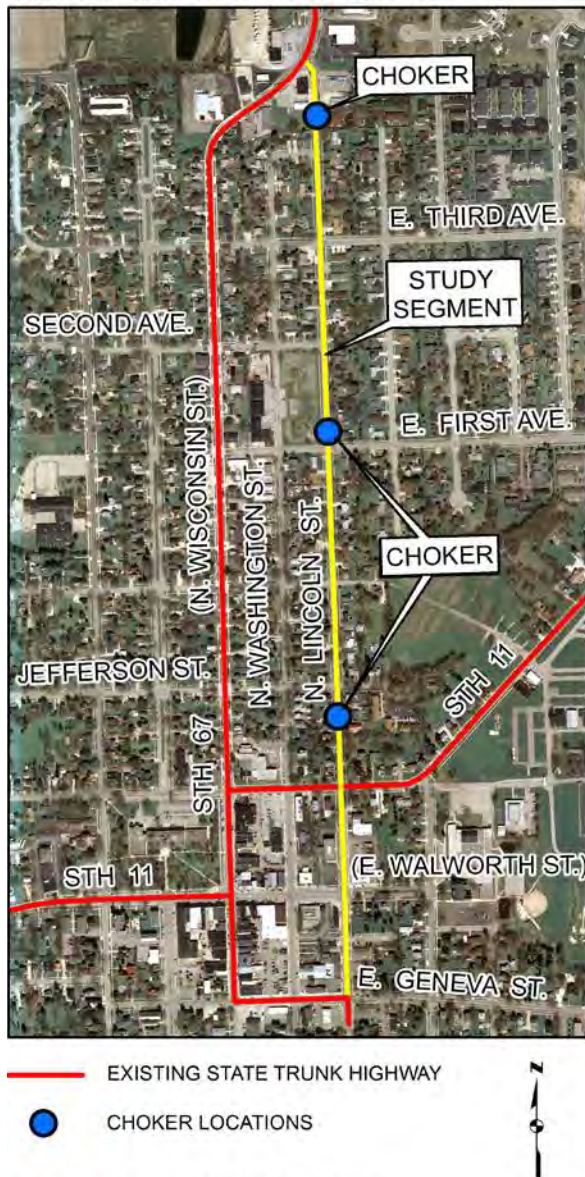
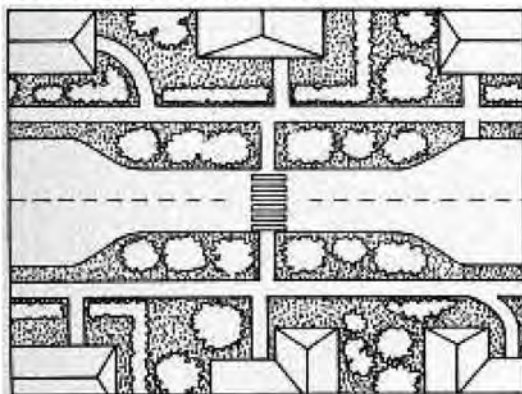


FIGURE OF PAVEMENT CHOKERS



Source: U.S. Department of Transportation, Federal Highway Administration and SEWRPC

DESCRIPTION

This alternative would require the construction of 50 foot long, eight-foot wide pavement chokers on each side of the existing roadway at three locations on the N. Lincoln St. study segment to narrow the pavement width from the existing 36 feet to 20 feet, maintaining two-way travel via two ten-foot wide traffic lanes. Locate one choker just north of E. Fourth Ave.; a second choker just north of E. First Ave.; and a third choker just south of E. Jefferson St.

COST ESTIMATE

The estimated cost to implement this alternative is about \$35,000.

ADVANTAGES

- The chokers would act as traffic calming devices, hence encouraging reduction in vehicular speeds on N. Lincoln St.
- It could potentially divert some or all of the 1,340 non-resident vehicles per average weekday traveling through the N. Lincoln St. study segment to STH 67 (N. Wisconsin St.)
- Reduces pedestrian crossing width
- It may be implemented on a trial basis by erecting traffic control barricades to serve as chokers, during which its effectiveness may be assessed.

DISADVANTAGES

- It may impact parking and driveway access
- It is expected to divert only a minimal amount of traffic, owing to the fact that the chokers create no impediment to two-way traffic other than a marginal reduction in speeds over short distances
- Vehicular speeds may increase between chokers to compensate for reduced speeds at the chokers

POTENTIAL NEGATIVE IMPACT ON EMERGENCY SERVICES

This alternative would have a negligible negative impact on emergency response times. Emergency responders would have to drive more cautiously through the narrowed streets.

RECOMMENDATION

This traffic engineering alternative is not recommended for further consideration as vehicles may increase speeds between the chokers resulting in little or no net change in overall vehicles speeds, hence it may be expected that traffic diversion would be relatively minimal.

Figure 6

ALTERNATIVE 6: ONE-WAY TRAVEL SEMI DIVERTERS ON N. LINCOLN STREET

CHOKER LOCATIONS TO NARROW N. LINCOLN STREET TO 14 FEET AND ONE TRAFFIC LANE

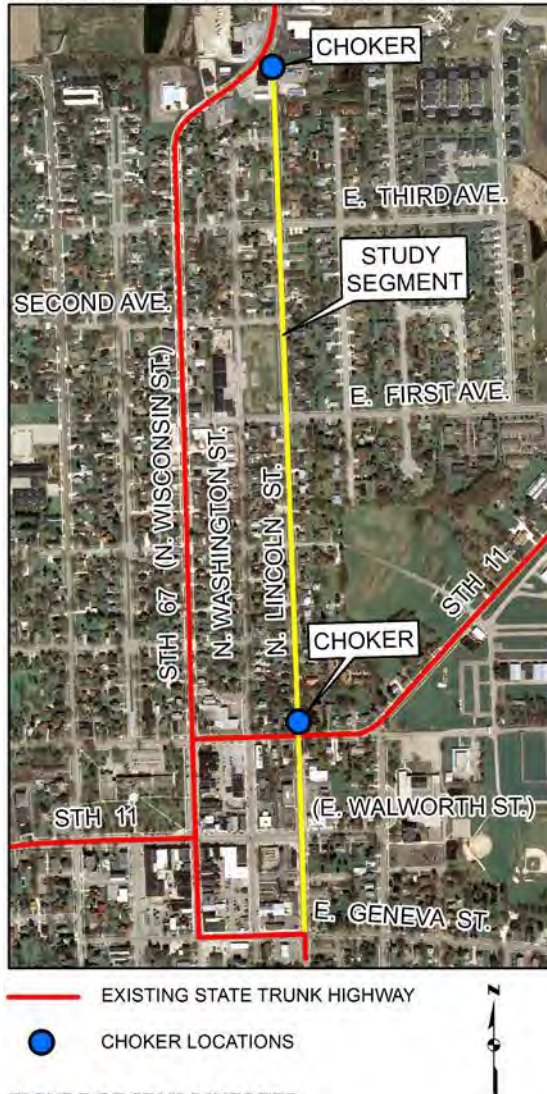
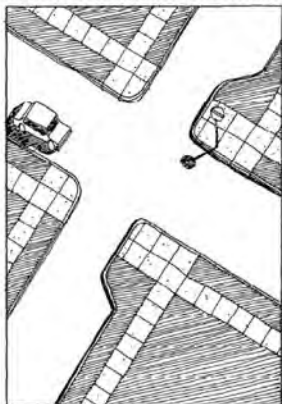


FIGURE OF SEMI DIVERTER



Source: Institute of Transportation Engineers and SEWRPC

DESCRIPTION

This alternative would require the construction of two semi diverters to narrow the pavement width to 14 feet, permitting travel in one direction only. One semi diverter would be constructed on the east side of N. Lincoln St. at STH 11 (E. Court St.) restricting traffic to the southbound direction only at that location. The other would be constructed on the west side of N. Lincoln St. at STH 67 (N. Wisconsin St.) restricting traffic to the northbound direction only at that location. Two-way operation of N. Lincoln St. would be maintained between the two-semi diverters.

COST ESTIMATE

The estimated cost to implement this alternative is about \$100,000 including elimination of the southbound left-turn lane on STH 67 (N. Wisconsin St.) at N. Lincoln St.

ADVANTAGES

- It would potentially divert all of the 675 southbound non-resident vehicles per average weekday and some or all of the 655 northbound non-resident vehicles per average weekday observed traveling the N. Lincoln St. study segment
- Reduces pedestrian crossing width
- It may be implemented on a trial basis by erecting traffic control barricades to serve as semi diverters, during which its impacts may be assessed

DISADVANTAGES

- Access to the businesses located just south of the intersection of N. Lincoln St. and STH 67 (N. Wisconsin St.) would be eliminated from the north. Access to these businesses would still be provided via Third St. and N. Lincoln St. from the south
- It imposes modest travel indirection and increased travel times on residents and businesses of the study segment and the adjacent streets
- It may impose additional traffic volumes on cross-streets between STH 11 (E. Court St.) and E. Fourth Ave.

POTENTIAL NEGATIVE IMPACT ON EMERGENCY SERVICES

This alternative would have a relatively negligible negative impact on emergency response times as responders are able to, under certain conditions, disregard select rules of the road including regulations governing direction of movement when en route to an emergency (§346.03 of the Wisconsin Statutes).

RECOMMENDATION

This traffic engineering alternative is recommended for further consideration as it has the potential to divert a substantial volume of average weekday traffic from N. Lincoln Street between STH 11 (E. Court St.) and STH 67 (N. Wisconsin St.). This alternative would impact local as well as through travel in the city. As such, this alternative could potentially significantly impact traffic volumes on N. Lincoln St.

Figure 7

ALTERNATIVE 7: CONSTRUCT A DIAGONAL TRAFFIC DIVERTER ON N. LINCOLN STREET

DIAGONAL DIVERTER LOCATION

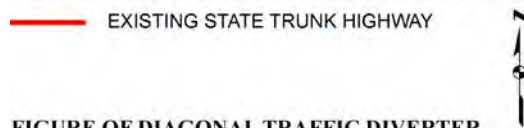
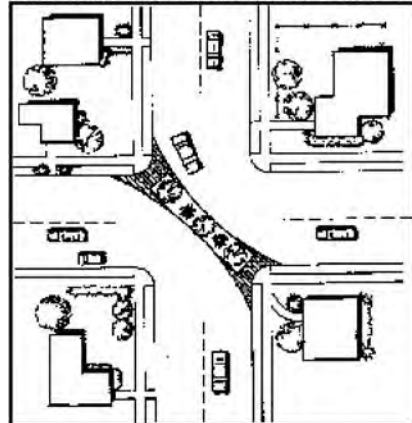


FIGURE OF DIAGONAL TRAFFIC DIVERTER



Source: Institute of Transportation Engineers and SEWRPC

DESCRIPTION

This alternative would require the construction of a diagonal traffic diverter oriented between the northwest and the southeast corners at the intersection of N. Lincoln St. and E. First Ave. The proposed location and orientation of the diagonal diverter takes advantage of the closure of N. Washington St. between E. First Ave and E. Second Ave. to divert through traffic to STH 67 (N. Wisconsin St.). In comparison, orienting a diagonal diverter from the southwest corner to the northeast corner at this intersection allows northbound traffic to use a route comprised of N. Lincoln St., E. First Ave., N. Jackson St., and E. Third Ave., and southbound traffic to use a route comprised of N. Lincoln St., E. First Ave., and N. Washington St. to bypass the diverter.

COST ESTIMATE

The estimated cost to implement this alternative is about \$12,500.

ADVANTAGES

- It would potentially divert an estimated 1,340 through vehicles per average weekday observed traveling the study segment of N. Lincoln St. to STH 67 (N. Wisconsin St.)
- It may be implemented by erecting traffic control barricades to serve as the diverter on a trial basis during which its effectiveness may be assessed

DISADVANTAGES

- Travel by residents in an area bounded by STH 67 (N. Wisconsin St.), STH 11 (E. Court St.), and N. Lincoln St and the area bounded by N. Lincoln St., Fair Meadow Ln., E. First Ave., and Emily Ave. would be more circuitous with increased travel times.
- Certain route based municipal services may be rendered less efficient and more time consuming

POTENTIAL NEGATIVE IMPACT ON EMERGENCY SERVICES

The diverter would negatively impact fire and emergency medical response times, particularly for residents north of E. First Ave. and east of N. Washington St. It may also negatively impact police emergency response times dependent on the location from which the police response is initiated.

RECOMMENDATION

This traffic engineering alternative is recommended for further consideration as it has the potential to divert the through traffic from N. Lincoln Street between STH 11 (E. Court St.) and STH 67 (N. Wisconsin St.).

Figure 8

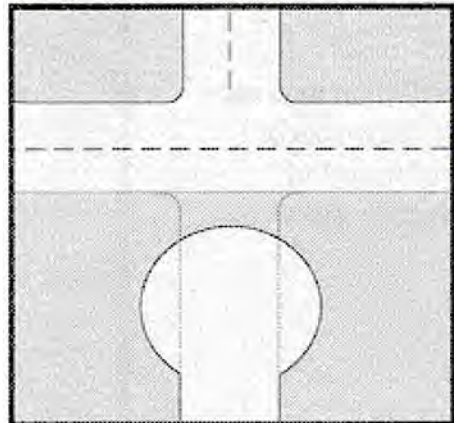
ALTERNATIVE 8: CUL DE SAC ON N. LINCOLN STREET

CUL DE SAC LOCATION



- EXISTING STATE TRUNK HIGHWAY
- CUL DE SAC LOCATION

FIGURE OF DIAGONAL TRAFFIC DIVERTER



Source: City of Portland, Oregon and SEWRPC

DESCRIPTION

This alternative would require the construction of a cul de sac on N. Lincoln St. about 100 feet north of E. Fourth Ave. The cul de sac would have its approach roadway from the north and N. Lincoln St. would be terminated at E. Fourth Ave.

COST ESTIMATE

The estimated cost to implement this alternative is about \$170,000.

ADVANTAGES

- It would potentially divert an estimated 1,340 vehicles per average weekday observed traveling the study segment of N. Lincoln St. In addition, some non-through trips would divert as well
- It may be implemented on a trial basis by erecting traffic control barricades, during which its impacts may be assessed

DISADVANTAGES

- It would require minor right-of-way takings from two properties as the existing 66-foot wide right-of-way is too narrow to accommodate the desirable cul de sac radius of 45 feet
- All travel between E. Fourth Ave. and STH 67 (N. Wisconsin St.) would be eliminated
- It would impose modest travel indirection and increased travel times on emergency responders, all residents of the study segment and the adjacent streets, and customers and employees of businesses located within the study segment
- It may impose additional traffic volumes on cross-streets around the study segment of N. Lincoln St.
- Certain route based municipal services may be rendered less efficient and more time consuming

POTENTIAL NEGATIVE IMPACT ON EMERGENCY SERVICES

Emergency response times will be negatively impacted by the construction of the cul de sac, particularly for police vehicles responding to emergencies south and east of the intersection of N. Lincoln St. and STH 67 (N. Wisconsin St.) from the north of the intersection.

RECOMMENDATION

This traffic engineering alternative is not recommended for further consideration as it would impact the travel patterns by all residents of N. Lincoln St. and adjacent neighborhood.