

DRAFT
ENVIRONMENTAL STATEMENT

U.S. 71

DICKINSON COUNTY

PROJECT NO. F-71-9

Prepared By

**IOWA DEPARTMENT OF TRANSPORTATION
PLANNING AND RESEARCH DIVISION
OFFICE OF PROJECT PLANNING**

In Cooperation With

**U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION**

JANUARY, 1979

U.S. 71

**FROM MILFORD NORTH TO IOWA 9
IN SPIRIT LAKE**

DICKINSON COUNTY

ADMINISTRATIVE ACTION

DRAFT

ENVIRONMENTAL IMPACT STATEMENT

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

and

IOWA DEPARTMENT OF TRANSPORTATION

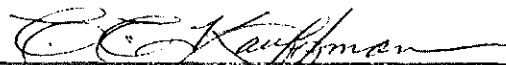
PLANNING AND RESEARCH DIVISION

SUBMITTED PURSUANT TO 42 U.S.C. 4332 (2) (C) 23 U.S.C. 128 (a)

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Jun. 19, 1979

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FOR THE DIVISION ADMINISTRATOR

FEDERAL HIGHWAY ADMINISTRATION

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INTRODUCTION

U.S. 71 DICKINSON COUNTY

Because of the time lapse experienced on this proposed highway improvement as regards early project concept, past public hearings, the circulation of previous Draft and Final Environmental Impact Statements, and legal action taken in regard to it, this introduction has been prepared to provide the reviewer with the necessary background to understand the present stage of project development, as well as to summarize the need for circulating a new Draft EIS, at this time.

Development of a concept for the improvement of U.S. 71 in Dickinson County, from Milford northerly to Iowa Highway 9 in Spirit Lake, began prior to 1968, the year the project first appeared in the Highway Commission's Five-Year Program. The original concept proposed a basic 65-foot improvement (two 24 1/2-foot roadways separated by a 16-foot median, for development of left-turn lanes) through Arnolds Park and Okoboji. That concept was presented at a public hearing held in Arnolds Park on September 5, 1968. As a result of the favorable response received from the five communities involved (Milford, West Okoboji, Arnolds Park, Okoboji, and Spirit Lake) the project design was commenced. Although the original intent of the Iowa State Highway Commission (ISHC), at the time of the initial public hearing, was to develop the project for federal aid, the option of doing so was subject to compliance with federal-aid development procedures. In late 1968, the Bureau of Public Roads (now the Federal Highway Administration) informed the ISHC that, although the September 5th public meeting met federal statutes concerning the conduction of public hearings, it had not met the requirements of the 1968 Highway Act regarding relocation assistance. Furthermore, in order for the project to be eligible for federal-aid, the Highway Commission would have to advertise for another public hearing.

Between 1969 and late 1971 there was a period of relative inactivity by the ISHC regarding the U.S. 71 project, and design progress was moderate. During this same period of time, however, all proposed highway improvements in the State were evaluated for the status of future development and for the availability of funds. In April, 1969, the Iowa State Highway Commission elected to further develop the U.S. 71 improvement with 100% State funding. The status remained as a federal non-participating project until November, 1978. Opponents of the project have attempted to capitalize on this funding status by suggesting that the project was being developed non-participating for the sole purpose of avoiding the requirements of the National Environmental Policy Act (NEPA) of 1969.

A review of the timing of events shows, however, that the funding change occurred before the effective date of NEPA (January 1, 1970). During that period of intense highway construction it was not uncommon for projects to lose or gain federal participation. The U.S. 71 project was just such an example - the federal monies were transferred to other projects to consume a greater share of the State's authorized federal funds.

At no time during the early years of project development were federal funds expended on this project. In addition, the FHWA never programmed nor gave any approvals or

authorizations for the development of this project for federal aid. The first approval of any kind granted by the Federal Highway Administration for an improvement to U.S. 71 in this area, was the October 6, 1972, approval to publish a U.S. 71 expressway location report from Freeway 520 northerly to the Minnesota State Line, bypassing the Great Lakes Area.

Due to concerns over the property damage resulting from a 65-foot wide highway facility in the corridor, a 49-foot back-of-curb to back-of-curb concept was developed and presented at a public information meeting held in Arnolds Park on November 11, 1971. The reaction from the public and the corridor communities was basically favorable, so on February 29, 1972, the State Highway Commissioners voted to scrap the 65-foot concept and to further develop the 49-foot improvement. That concept was formally presented at a design public hearing held in Arnolds Park on August 9, 1973. Four of the five communities involved (Milford, Arnolds Park, West Okoboji and Spirit Lake) concurred in the design. In December, 1973, the City of Okoboji, however, appeared before the Highway Commissioners, asking that the project be delayed. The Commission voted to delay further work on the project until after the 1974 program review. In June, 1974, the Commissioners voted to resume activity on the project.

Since the proposed improvement, at that time, was to be constructed with 100% State funding, the project, as previously stated, did not fall under the jurisdiction of the National Environmental Policy Act of 1969, and thus no formal Environmental Impact Statement was required, nor initially prepared. However, in September, 1974, the Commission specifically requested that a Draft Environmental Statement be prepared for the project, even though it would remain federal non-participating. That decision was based on the Commission's desire to assure the public that all ecological safeguards to protect the lakes environment would be undertaken.

The Draft EIS was prepared in late 1974 and early 1975. On April 1, 1975, circulation of the Statement was made to all appropriate federal, state and local agencies, as well as to several private organizations and the general public. The letter transmitting the Statement indicated that even though the project was not proposed for federal-aid, it was being circulated in the same manner, and it was asked that they review and comment on it as appropriate to their area of concern. Since the EIS was not a federal document, no federal approvals were required, nor would be obtained.

The basic concerns expressed in the comment letters received were with the design in the causeway area, specifically the decision to fill into West Lake Okoboji, and the economic impacts to businesses located adjacent to the route.

Following completion and circulation of the Draft EIS and the receipt of all comments regarding that document, the concept was revised numerous times to reduce impacts and in an attempt to satisfy the expressed environmental and economic concerns. In addition, numerous meetings were held with various groups, including the City of Okoboji, the Okoboji Protective Association, and the Iowa Conservation Commission, in an attempt to resolve these various issues.

The City of Okoboji, however, in August, 1976, filed suit in U.S. District Court to block further development and construction of the project. The suit contended the project would create economic hardships and ecological harm to the resort area. Although no injunction was issued at that time to bar construction, the Iowa D.O.T. agreed to voluntarily refrain from further work on the project until a ruling was issued. No settlement, however, had been reached by June of 1977; therefore, the Iowa D.O.T. contemplated an immediate resumption of work, in an attempt to get the legal action moving.

In July, 1977, the Iowa D.O.T. was temporarily enjoined from continuing with or doing any further work on the project. A hearing on the action was held in August, 1977, at which time the injunction was modified to allow the State to continue work on the plans and design of the highway improvement. The State was enjoined, however, from acquiring land or from actually constructing the highway, until such time as the court order was modified or terminated. The terms of the injunction allowed the Iowa D.O.T. to proceed with planning, design work, application for permits and approvals from other agencies, conduction of any necessary public hearings, and completion of all environmental studies.

The Final EIS was completed and in June of 1978 was circulated to those same reviewing agencies as commented on the Draft EIS. The Final EIS proposed a line shift into East Lake Okoboji, within the causeway area. According to the revised design no fill material would be placed into the lakes and the northerly 500 feet of the existing causeway embankment would be bridged. A public information meeting on the project was held in Spirit Lake on June 29, 1978.

On October 27, 1978, the Iowa D.O.T. filed a motion in U.S. District Court asking that the injunction be dissolved to allow for the negotiation and acquisition of right-of-way and project construction. The Court ruled, however, that further motions would have to be filed in the case creating still further legal delays in implementing the project. Therefore, Iowa D.O.T. staff, in consultation with the FHWA, recently (November, 1978) determined that it would be in the best public interest, and the most legally expedient, to redesignate the project as federal-aid and to comply with applicable federal-aid standards. That is the purpose of this new Draft Environmental Impact Statement. The redesignation of this project as federal-aid should clear up one of the remaining roadblocks to the timely completion of the project. This Draft EIS is being circulated once more to the appropriate federal, state and local review agencies. Following that, a public hearing will be held, the Final EIS will be prepared and Federal Highway Administration location-design approval will be requested.

A final point to be discussed in this introduction is the allegation brought by opponents of this project concerning segmentation between it and a proposed four-lane improvement to U.S. 71 south of the Lakes area. That project, between U.S. 18 in Spencer and an extension of Iowa 32, north and east of Milford (F-71-8 & F-71-9), is designated as part of Iowa's proposed State Arterial Highway System. Portions of it are contained in the Iowa D.O.T.'s current five-year Transportation Improvement Program for grade and pave, tentatively, in fiscal years 1983 and 1984. The Iowa D.O.T.-FHWA selection of termini for

that section of U.S. 71 was based on a 1972 Location Study report for the U.S. 71 Expressway, between Freeway 520 in Sac County and the Minnesota State Line. The Location Study, as did the 1970 Origin and Destination Traffic Study for the Great Lakes Area, pointed to a significant drop in traffic on the U.S. 71 expressway facility at a point near Milford, where the bypass would begin. Origin and destination traffic surveys indicate that 88% of the traffic utilizing U.S. 71 through the lakes area have either local origin and/or destination. Therefore, a bypass facility is not a viable alternative for serving local traffic needs in the study area and, as such, that portion of Arterial U.S. 71, from Iowa 32 northerly to the Minnesota State Line, bypassing the Lakes, has not as yet been programmed.

It must be strongly emphasized that the Arterial Highway project proposed south of Milford and the Lakes area, and the improvement proposed through the Lakes area, as contained in this Draft EIS, do not function as part of the same highway system. The Arterial U.S. 71 improvement is planned for expressway design with major consideration given to through traffic service. The Lakes Area bypass, when built, would complete the U.S. 71 Arterial System in Dickinson County, but would not alleviate traffic congestion along existing 71 through the Arnolds Park and Okoboji areas.

The U.S. 71 project proposed in this Environmental Impact Statement is an improvement to the urban highway network, only. It is not proposed as an expressway-type facility, but is designed to collect and distribute traffic to, through, and within the Lakes area. Its need arises independently from the high and growing traffic volumes on that highway, and its primary purpose is to serve local traffic. The proposed improvement also has logical termini and an independent utility of its own. The project begins in Milford (from the end of a 58-foot wide pavement section, just south of 14th Street), near the junction of Iowa Highway 32, and continues northerly through an urban resort area to the junction of Iowa Highway 9. The improvement pertains to increasing the level of service on Highway 71 through the resort area communities of West Okoboji, Arnolds Park and Okoboji by widening the existing roadway to accommodate four lanes. The independent utility of this project is providing for the congested traffic in this resort area. This improvement, therefore, has no particular impact upon areas beyond the termini of this project.

A large percentage of the study corridor traffic, as stated previously, has local origin or destination and could not be served by a bypass. The two projects are totally unrelated with respect to design, service and system relationship. Arterial U.S. 71 is an integral part of the State Arterial Highway System, but its construction would, in no way, preclude the need for the improvement of existing U.S. 71. The independency of these projects was set forth in the approved Final EIS (FHWA-IOWA-EIS-74-05-F), prepared for the Arterial U.S. 71 improvement, proposed south of the Lakes area (April, 1975).

DRAFT ENVIRONMENTAL IMPACT STATEMENT

SECTION 4 (f) STATEMENT

US 71

DICKINSON COUNTY

DRAFT ENVIRONMENTAL STATEMENT

U.S. 71 IN DICKINSON COUNTY, IOWA

SUMMARY OF STATEMENT

JANUARY, 1979

Project Description

The proposed project involves the development of a four-lane highway facility through the Iowa "Great Lakes Region," replacing an existing two-lane roadway. The project, which would follow the general alignment of existing U.S. 71, would begin just south of Fourteenth Street in Milford and extend northerly to the west junction of Iowa 9, in Spirit Lake. Within the incorporated areas of Milford, West Okoboji, Arnolds Park and Okoboji it is proposed to construct 49-foot back-of-curb to back-of-curb urban sections. In the rural area between Milford and West Okoboji, a 48-foot rural undivided section with 10-foot stabilized shoulders is proposed. The portion of highway from Okoboji northerly to Iowa 9 in Spirit Lake would be constructed as a four-lane divided facility. The rural cross section in that area would utilize certain portions of the existing highway, resurfaced with asphaltic concrete, as the two southbound lanes. The design would also provide for an approximate 20-foot median with 10-foot outside and six-foot inside stabilized shoulders. The urban cross section, within Spirit Lake, would utilize a 16 to 20-foot raised median and 10-foot outside stabilized shoulders. Sidewalks would be constructed within the project area to accommodate pedestrian traffic, where warranted, according to established Iowa D.O.T. policies and procedures. Total length of the proposed project is approximately 7.1 miles.

Probable Environmental Impacts

One of the major negative impacts of the proposed project would be the permanent displacement of approximately 35 individuals (11 dwellings), and 14 commercial properties. In addition, loss of roadside parking would negatively impact several other businesses. Seventeen mobile homes, housing approximately 51 individuals, would also be temporarily displaced during the construction process. There is, additionally, a possibility of secondary effects to the area, resulting from development, which may be stimulated by the highway improvement.

This project would divert approximately 35 acres of land to transportation use and would also remove numerous trees, shrubs, and other natural vegetation, which is suitable for wildlife habitat. Twenty-seven acres of the required right-of-way would be prime farmland.

The potential for soil erosion and sedimentation-type water pollution would be increased by the construction process, especially in the causeway area between Lakes East and West Okoboji. Noise and air pollution would also increase within the highway corridor.

Benefits to be derived from the project consist of a safer and more efficient transportation system for emergency, local and tourist traffic in the project corridor, reduced road-user costs, energy conservation, and long-term economic development.

Alternatives

Several alternatives were studied during various phases of project development. The original proposal was for a 65-foot wide facility with turning lanes. That concept, however, would have severely impacted adjacent properties. Another proposal was to construct two additional lanes along the abandoned C.M.St.P.&P. Railroad right-of-way, while maintaining the existing highway as one-half of a one-way pair. Prohibitive costs, due to cross street connection requirements; higher road-user costs, resulting from out-of-distance travel; and, operational problems were all instrumental in the rejection of this alternative.

A three-lane concept (two through lanes plus a continuous left-turn lane) and a concept for providing left-turn storage lanes, only, at a few selected intersection locations, were rejected because traffic studies showed they would not effectively or efficiently improve upon the carrying capacity capabilities of the existing route. This is due to the serious traffic conflicts encountered between through traffic and those vehicles along the route initiating numerous left and right turns.

Two alternates are currently being considered for this project. The construction alternate provides for a four-lane improvement of the existing two-lane facility from just south of Fourteenth Street in Milford northerly to the west junction of Iowa 9 in Spirit Lake. The other alternative being considered is the "Do-Nothing" Alternate, which provides for present conditions to remain unchanged.

Several alternatives for bridging the causeway area between Lakes East and West Okoboji have also been studied during project development. The original proposal was to fill into Lake West Okoboji by placing broken concrete in the water, thereby creating a barrier to retard wave action, and then placing fill into the lake to expand the width of the causeway. However, environmental concerns, primarily the degradation of water quality in Iowa's only "blue water lake", were responsible for a decision to shift the highway alignment into Lake East Okoboji. The proposal originally studied for expanding on the east side of the existing causeway was to fill into the Lake behind interlocking steel sheet piling walls, which would have been driven into the lake bed behind silt curtain barriers, to contain sediments and fine clay particles resulting from the construction activities. Because peat was discovered underlying the causeway area, however, the current proposal is to bridge, on the east side, the northerly 500 feet of the existing causeway. Only bridge piers would be placed into the lake bed, under this concept. The existing waterway opening between the two lakes would not be disturbed.

Reviewing Agencies

A Draft Environmental Statement was sent to the following agencies and individuals for comment in their respective areas of jurisdiction or expertise:

Federal Agencies:

Department of Health, Education and Welfare
Department of Housing and Urban Development
Department of Agriculture
Department of the Interior
Environmental Protection Agency
Army Corps of Engineers
Federal Energy Administration
U.S. Coast Guard

State Agencies:

Iowa Development Commission
Iowa Department of Soil Conservation
Iowa Conservation Commission
Iowa Natural Resources Council
Iowa Department of Environmental Quality
State Historic Preservation Officer
Office of the State Archaeologist
Iowa State Historical Society
Office of Planning and Programming
Iowa Department of Agriculture
Iowa Arts Council
State Rural Development Committee

Local Agencies:

Northwest Iowa Regional Council of Governments
Dickinson County Board of Supervisors
Dickinson County Conservation Board
Dickinson County Engineer
Mayor, City of Milford
Mayor, City of West Okoboji
Mayor, City of Arnolds Park
Mayor, City of Okoboji
Mayor, City of Spirit Lake
Iowa Lakeside Laboratory
Iowa State University

Private Organizations:

East Okoboji Lakes Improvement Corporation
Okoboji Protective Association
Dickinson County Farm Bureau
Iowa Confederation of Environmental Organizations
Community Action Research Group
Affiliated State Art Agencies of the Upper Midwest

This statement was made available to the Environmental Protection Agency on January 31, 1979.

Further information on this project may be obtained from:

Mr. R. L. Humphrey, Project Planning Engineer
Planning and Research Division
Iowa Department of Transportation
Ames, Iowa 50010
515-296-1225

H. A. Willard, Division Administrator
Federal Highway Administration
Ames, Iowa 50010
515-233-1664

SECTION I. PROJECT DESCRIPTION AND PURPOSE

The Iowa Department of Transportation proposes to improve U.S. 71 in Dickinson County from near 14th Street in Milford northerly to Iowa 9, in Spirit Lake, a distance of approximately 7.1 miles. The purpose of this project is to increase the highway's safety and level of service by replacing the existing two lanes with four. U.S. 71 is a major north-south route in Iowa. From I-80 north to the Minnesota border the route is designated a part of Iowa's proposed State Arterial Highway System. Future plans of that System include a bypass of the Iowa Great Lakes Region, leaving present U.S. 71 to serve as part of the functionally classified Arterial Connector System, to collect and distribute local traffic.

The proposed project would serve the incorporated communities of Milford, West Okoboji, Arnolds Park, Okoboji, and Spirit Lake. From Milford northerly to near the north corporate limits of Okoboji the existing pavement would be removed and a new four-lane non-divided highway section would be constructed, generally along the existing alignment. A channelized intersection, however, is proposed near the junction of Iowa Highway 32, just north of Milford. The roadway in the rural area would be 48 feet wide, while urban portions would have an additional six-inch curb on each side. Ten-foot stabilized shoulders are proposed in the rural area.

From Okoboji northerly to Iowa Highway 9 a four-lane divided pavement section is proposed, with two parallel 24-foot roadways. In the rural portion, between Okoboji and Spirit Lake, an approximate 20-foot median would separate the two traffic lanes. Ten-foot outside and six-foot inside stabilized shoulders are also proposed. Certain portions of the existing pavement in that area would be asphalt resurfaced only, to be utilized as the two southbound traffic lanes, while the remainder would be totally reconstructed. The four-lane divided section within the Spirit Lake corporate limits would be totally reconstructed and would be separated by a 16 to 20-foot variable width raised concrete median. Ten-foot outside stabilized shoulders are also proposed in that area. Median crossovers and left-turn storage lanes along this entire divided section would be provided at selected locations. The concept would also necessitate the construction of a limited number of access roads and/or drives. See Figure 1 for a project area map, which figuratively illustrates the proposed construction.

U.S. 71 in the project area is designated for access control as a Class III highway. This is a planned controlled access highway on which private access is permitted at predetermined locations, but primary consideration is given to the movement of through traffic. Present access control, however, does not meet Class III standards. Properties which presently have no curb and which have vehicles entering and leaving in random patterns would be provided with entrances to concentrate turning movements. However, only on the portion of the proposed improvement from Okoboji to Spirit Lake would access rights be acquired.

The bridge deck on the existing 64-foot by 24-foot concrete arch structure across the narrows between Lakes West and East Okoboji would be removed and a new 549.3-foot by 56-foot pretensioned, prestressed concrete and steel I-beam structure would be built on top

LOCATION OF PROJECT

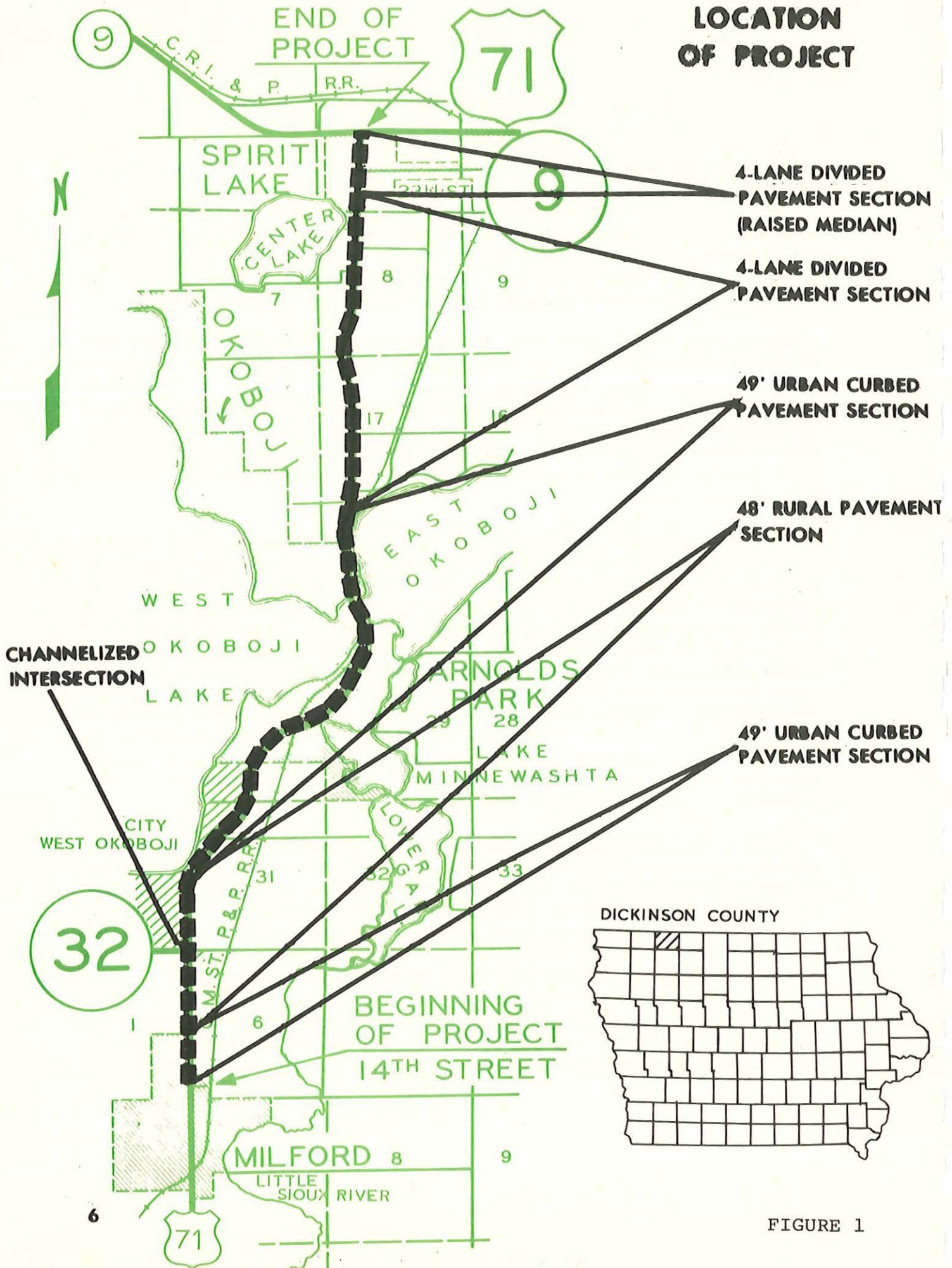


FIGURE 1

of the northerly 500 feet of the existing causeway, also spanning the boat channel. The existing 40-foot boat channel would not be altered, and the existing bridge abutments would be left in place to further minimize construction impacts upon the lakes.

The U.S. 71-Iowa 9 intersection in Spirit Lake would also be totally reconstructed by removing the existing radius curves and building a new "T" intersection. No interchanges would be built on this project. Right-of-way width varies from an average of 85 feet through the urban areas, to 175 feet through the four-lane divided section, north of Okoboji. The existing right-of-way width averages approximately 80 feet through the entire area, ranging from 66 feet to 120 feet.

History of U.S. 71

In the early 1900's this route was part of the Okoboji Trail, which extended from Des Moines to the Great Lakes. With the Primary Road Act of 1919, the highway was designated Route 4. It remained as such until 1927, when it became U.S. 71. The road was first paved in 1931 to a width of 18 feet. In 1956 U.S. 71 was widened to 24 feet, and in 1962 it was resurfaced.

Existing Highway Facilities and Deficiencies

U.S. 71 from Milford north to the Lakes region has relatively high traffic volumes with the greatest volumes occurring during the summer months. The present two-lane facility does not provide the level of service necessary to safely and efficiently handle this resort area traffic, particularly during the busy tourist season. A major factor contributing to the congested conditions, in addition to the large volumes of traffic, is the considerable number of traffic movements at private and public access points adjacent to the route and, in particular, the left-turn movements.

Sufficiency Study

The highway administrator looks at the long-range improvement of highways in order to get the maximum benefits from the expenditure of funds. The five-year Iowa Transportation Improvement Program is used to determine the priority of all projects. One of the tools used to develop that Program is the Sufficiency Study, which is a numerical system for evaluating the condition of the Primary Road System. Data on pavements, bridges, curves and other features of the highway are collected and analyzed.

Three factors enter into the sufficiency rating for each section of roadway. These are structural adequacy, safety, and service. Structural adequacy measures the ability of the road section to stand up under traffic and climatic conditions. Safety measures the ability of the road section to offer the motorist reasonable assurance of safe movement. Service measures the capability of the road to transport vehicular traffic with a minimum of conflict.

TABLE 1

1978 SUFFICIENCY RATINGS

<u>Location</u>	<u>Miles</u>	<u>Width</u>	<u>Rating</u>
Milford 14th Street - NCL Milford	.07	30'	54
Rural NCL Milford - Jct. Ia. 32	.68	24'	18
Jct. Ia. 32 - SCL W. Okoboji	1.01	24'	12
W. Okoboji SCL W. Okoboji - NCL W. Okoboji	.26	24'	44
Rural NCL W. Okoboji - SCL Arnolds Park	.31	24'	14
Arnolds Park SCL Arnolds Park - Broadway St.	.84	24'	34
Broadway St. - NCL Arnolds Park	.71	24'	16
Okoboji NCL Arnolds Park - NCL Okoboji	.35	24'	24
Rural NCL Okoboji - SCL Spirit Lake	2.35	24'	17
Spirit Lake SCL Spirit Lake - NCL Spirit Lake	.30	24'	77
Rural NCL Spirit Lake - W. Jct. Ia. 9	.14	42'	89

The basic rating is then adjusted for intolerability, if necessary, giving a tolerability adjusted rating. (A tolerable standard is defined as the minimum prudent condition, geometric or structural, which can exist without being in critical need of upgrading.)

Another adjustment is made based on the volume to capacity ratio. The volume to capacity ratio is the ratio of the volume of traffic that is using a road to the volume of traffic that it could be expected to carry at a given level of service.

A final adjustment is made for continuity of the route to reflect poor sections interspersed with longer and appreciably better road sections. This is the final sufficiency rating. A rating of 100 represents the maximum sufficiency rating obtainable on any road section. The numerical sufficiency rating classification is as follows:

Sufficiency Rating Scale

Points	Rating
100-90	Excellent
89-80	Good
79-65	Fair
64-50	Tolerable
49- 0	Critical

Table 1, on page 8, shows the 1978 sufficiency ratings on U.S. 71 from the beginning of the project in Milford to the end of the project at Iowa 9.

As can be seen by the table, all rural and urban pavement sections within the project area except for a short section immediately south of the Iowa 9 junction and within the corporate limits of Spirit Lake, fall within or very near the "critical" sufficiency range, with over 75% of the sections having a sufficiency rating of below 20.

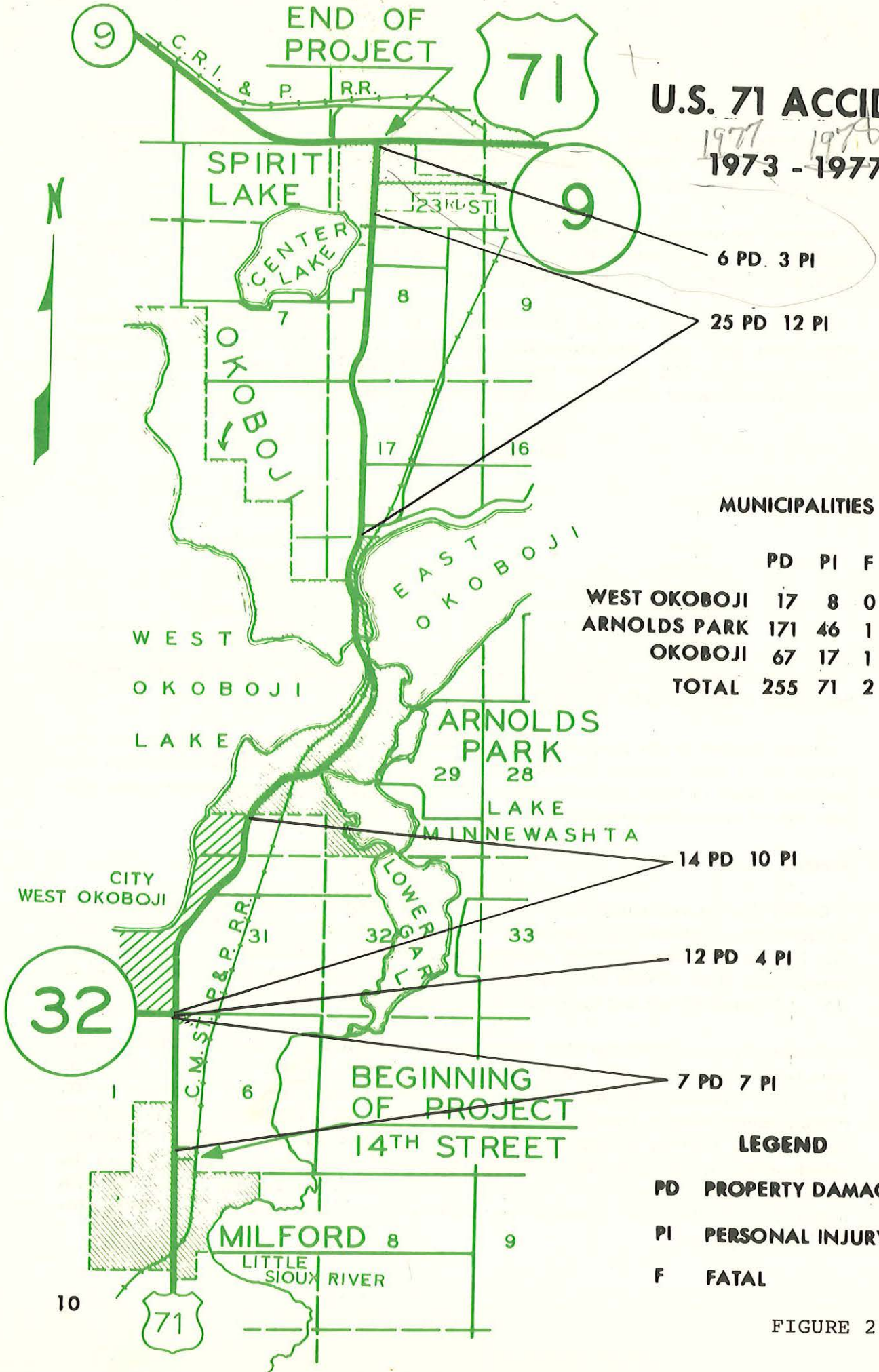
Accident Study

During the five year study period ¹⁹⁷⁷⁻¹⁹⁷⁴ 1973-1977, the latest years for which complete traffic accident data is available, 428 accidents were reported on U.S. 71 from Milford to Iowa 9. One hundred of these accidents occurred in rural areas while 328 occurred within the incorporated areas of West Okoboji, Arnolds Park and Okoboji. Accidents on portions of U.S. 71 through Milford and Spirit Lake are not included in the totals.

Seventy-five percent of the total accidents reported involved property damage and there were two fatal accidents. (See Table 2 for a distribution of accidents by year and type.) The 1973-1977 rural accident rate on U.S. 71 in the project area was 194 accidents per 100 million vehicle miles of travel. That figure was approximately 7% higher than the statewide rural primary highway average, for that same period, of 181 accidents per 100 million vehicle miles. In the three municipalities (West Okoboji, Arnolds Park and Okoboji) the computed accident rate of 1,071 accidents per 100 million vehicle miles of travel was 26% higher than the 1973-1977 statewide municipal highway accident rate average of 852. Table 2 is located on page 11.

U.S. 71 ACCIDENTS

1977 1978
1973 - 1977



6 PD 3 PI

25 PD 12 PI

MUNICIPALITIES

	PD	PI	F	TOTAL
WEST OKOBOJI	17	8	0	25
ARNOLDS PARK	171	46	1	218
OKOBOJI	67	17	1	85
TOTAL	255	71	2	328

14 PD 10 PI

12 PD 4 PI

7 PD 7 PI

LEGEND

- PD PROPERTY DAMAGE
- PI PERSONAL INJURY
- F FATAL

FIGURE 2

TABLE 2

ACCIDENTS ON U.S. 71 -- 1973-1977

Year	Property Damage	Personal Injury	Fatal	Total
1973	61	23	0	84
1974	89	27	0	116
1975	57	25	1	83
1976	39	9	1	49
1977	73	23	0	96
TOTAL	319	107	2	428

Figure 2 gives the location of accidents in the rural areas and lists the number of accidents within each city.

Traffic Data

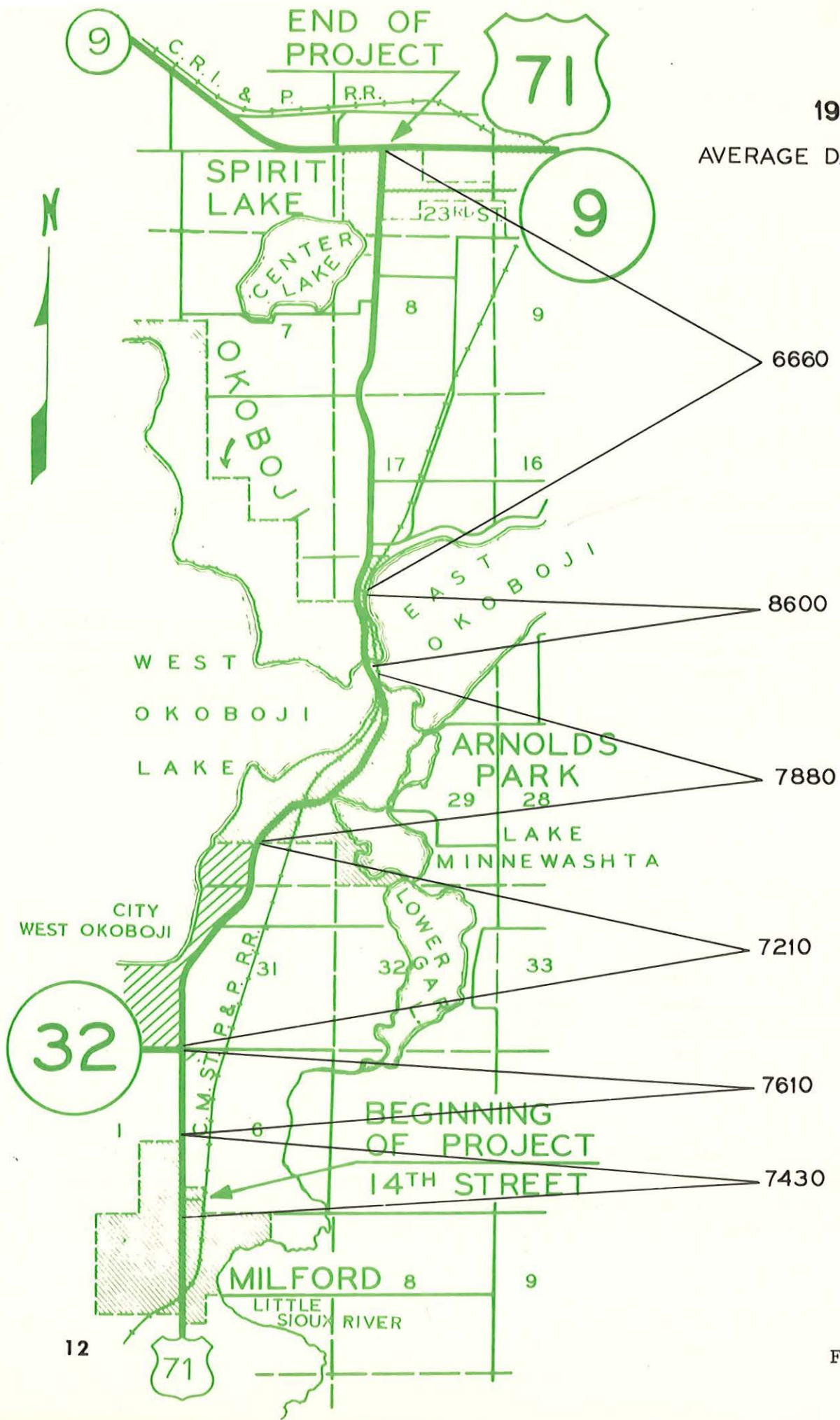
The 1978 annual average daily traffic volume on U.S. 71 through the project area is 7290 vehicles per day and includes 4% commercial vehicles. This information is based on summer traffic counts taken in the Great Lakes region and has been adjusted to reflect seasonal variations. The traffic volumes are illustrated in Figure 3. The seasonal variations in traffic for 1977 are illustrated in Table 3.

TABLE 3

1977 MONTHLY VARIATIONS IN TRAFFIC
AUTOMATIC TRAFFIC RECORDER
U.S. 71 NEAR FOSTORIA

<u>Month</u>	<u>Traffic</u>	<u>Month</u>	<u>Traffic</u>
January	3806	July	7610
February	4298	August	7237
March	4394	September	6442
April	5290	October	4793
May	6345	November	4360
June	7230	December	4255
		Average	5505

The data in Table 3 was obtained from an automatic traffic recorder located on U.S. 71 near Fostoria, six miles south of Milford. At this location, traffic is recorded 24 hours a day, 365 days a year. This data indicates that during 1977, traffic volumes on U.S. 71 during the months of June, July and August averaged 7359 vehicles per day. This figure was 25%



1978 TRAFFIC
AVERAGE DAILY TRAFFIC

FIGURE 3

higher than the annual average daily traffic at this location. Since the U.S. 71 project in the Great Lakes area is relatively close to this automatic traffic recorder location, it is assumed that a similar relationship also exists between the annual average daily traffic volumes and the summer traffic volumes in the project area.

The recreational traffic volume also varies by day of the week. Table 4 indicates the daily variation in traffic on U.S. 71, at the automatic traffic recorder station located near Fostoria. This data is for a typical week in August, 1977. The table illustrates the daily fluctuation in traffic, with the highest volumes occurring on the weekend. This reflects the trend in weekend recreational traffic, of people traveling to the Lakes area on Friday and Saturday, and returning to their place of residence on Sunday.

The daily variation in traffic, illustrated by the automatic traffic recorder data, would also be typical of the daily variation in traffic occurring on U.S. 71 through the Great Lakes area.

TABLE 4

DAILY VARIATIONS IN TRAFFIC
(AVERAGE WEEK - AUGUST, 1977)
AUTOMATIC TRAFFIC RECORDER
U.S. 71 NEAR FOSTORIA

<u>Day</u>	<u>Traffic</u>	<u>Day</u>	<u>Traffic</u>
Sunday	7810	Thursday	6850
Monday	7050	Friday	7720
Tuesday	6650	Saturday	7650
Wednesday	6880	Average	7230

Trip patterns and traffic distributions within the project area were determined from the Iowa Great Lakes (Dickinson County) Origin and Destination Study, conducted in 1970. This study indicated that of all traffic entering U.S. 71 from the south, only 12% of this total traffic had an origin or destination to the north, west, or east of the Great Lakes area. The remaining 88% had an origin or destination within the Great Lakes area. This study indicates the high percentage of motorists desiring access to the recreational activities in this area. It also illustrates the relatively low volume of through traffic in the Iowa Great Lakes region.

Forecast Traffic

By the year 2000, it is estimated that U.S. 71 through the project area will carry an estimated 11,700 vehicles per day, including approximately 4% trucks. This traffic growth was estimated based on a continuation of the average traffic growth pattern that has been experienced along U.S. 71 in the study area.

These increased traffic volumes reflect the increased use of recreational facilities in the Spirit Lake-Arnolds Park area. It is anticipated that this demand for recreational activities will continue in the future, placing an additional traffic burden on U.S. 71 in the study area. The present U.S. 71 facility is not adequately designed to handle the existing seasonal traffic volumes.

The estimated 1980 and year 2000 forecast traffic volumes on U.S. 71 through the study area are illustrated in Figure 4.

Construction Costs

The total cost of reconstructing U.S. 71 from Milford to Spirit Lake is estimated at over ten million dollars. The cost breakdown is shown in Table 5.

TABLE 5
ESTIMATED CONSTRUCTION COSTS

Right-of-Way	\$ 1,821,000
Grading	1,670,000
Paving	4,428,000
Structures	1,500,000
Miscellaneous and Contingency	915,000
 Total	 \$10,334,000*

*The Iowa Department of Transportation's share of the proposed hiking and biking trail would be, approximately, an additional \$280,000.

Maintenance Costs

Actual maintenance costs for U.S. 71 through the project area, for a three year period, are given in Table 6.

TABLE 6
MAINTENANCE COSTS

Fiscal Year	Cost	\$/Mile
1978	\$25,521	\$3,496
1977	19,938	2,731
1976	14,642	2,006

**ESTIMATED
1980 (2000) TRAFFIC
AVERAGE DAILY TRAFFIC**

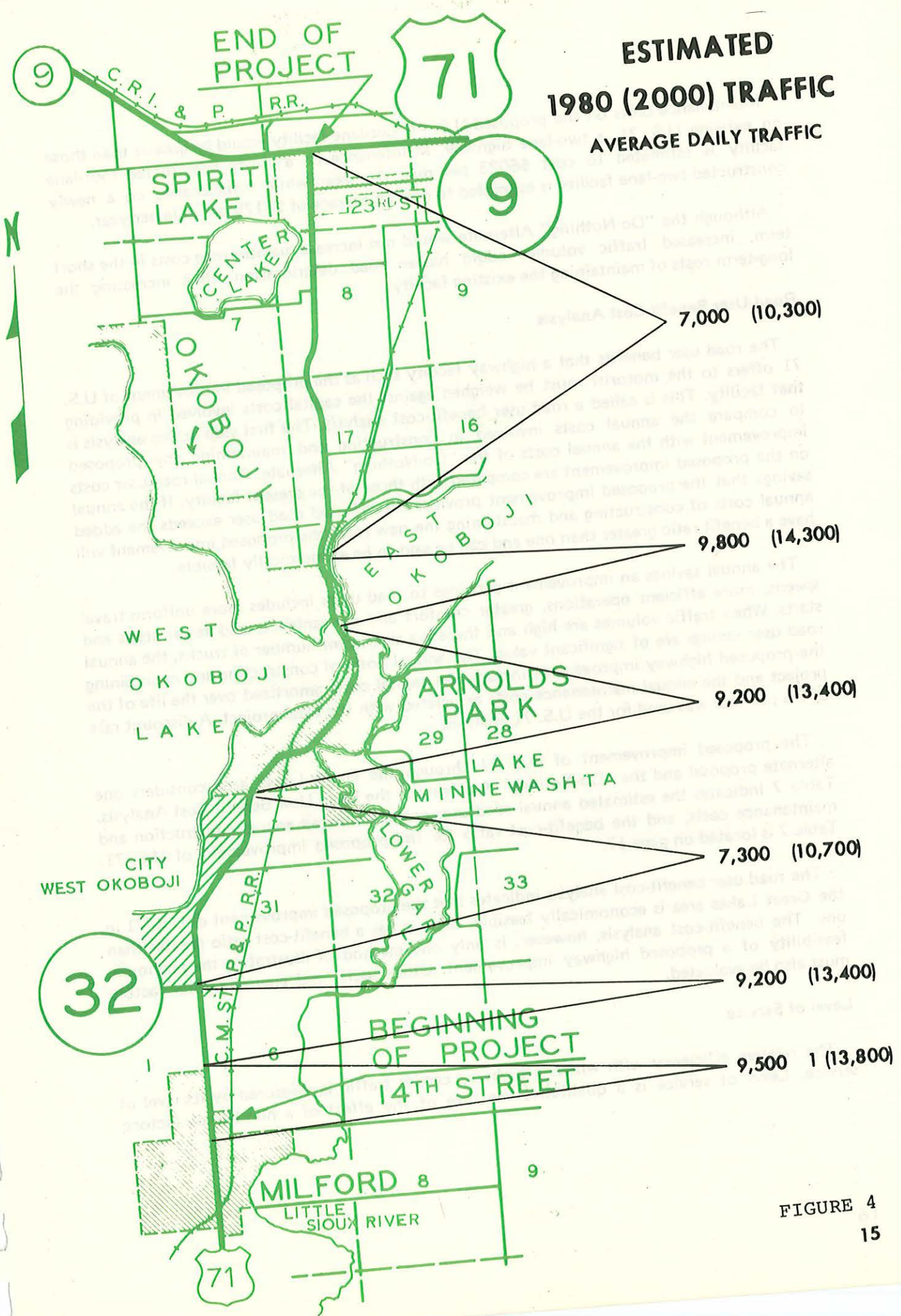


FIGURE 4
15

Maintenance costs on the proposed U.S. 71 four-lane facility would be greater than those on existing U.S. 71, a two-lane highway. Maintenance on a newly constructed four-lane facility is estimated to cost \$6023 per mile per year while maintenance on a newly constructed two-lane facility is estimated to cost an average of \$3175 per mile per year.

Although the "Do-Nothing" Alternate would not increase maintenance costs in the short term, increased traffic volumes could hasten road deterioration, thus increasing the long-term costs of maintaining the existing facility.

Road User Benefit-Cost Analysis

The road user benefits that a highway facility such as the proposed improvement of U.S. 71 offers to the motorist must be weighed against the capital costs involved in providing that facility. This is called a road user benefit-cost analysis. The first step in this analysis is to compare the annual costs involved in constructing and maintaining the proposed improvement with the annual costs of the "Do-Nothing" Alternate. Annual road user costs on the proposed improvement are compared with those of the present facility. If the annual savings that the proposed improvement provides the affected road user exceeds the added annual costs of constructing and maintaining the new road, the proposed improvement will have a benefit ratio greater than one and can be said to be economically feasible.

The annual savings an improvement provides to road users includes more uniform travel speeds, more efficient operations, greater comfort and convenience, and fewer stops and starts. When traffic volumes are high and there is a significant number of trucks, the annual road user savings are of significant value. The annual costs of constructing and maintaining the proposed highway improvement include the capital costs amortized over the life of the project and the annual maintenance costs associated with the total project. A discount rate of 6% per year was used for the U.S. 71 analysis.

The proposed improvement of U.S. 71 through the Great Lakes area considers one alternate proposal and the "Do-Nothing" Alternate in the Road User Benefit Cost Analysis. Table 7 indicates the estimated annual road user costs, estimated annual construction and maintenance costs, and the benefit-cost ratio for the proposed improvement of U.S. 71. Table 7 is located on page 17.

The road user benefit-cost analysis indicates that the proposed improvement of U.S. 71 in the Great Lakes area is economically feasible, since it has a benefit-cost ratio greater than one. The benefit-cost analysis, however, is only one method of illustrating the economic feasibility of a proposed highway improvement. Other social and environmental factors must also be evaluated.

Level of Service

The relative efficiency with which a highway carries traffic is measured by its level of service. Level of service is a qualitative measure of the effect of a number of factors,

TABLE 7

ROAD USER ANALYSIS

Alternate	Est. Annual Road User Costs	Est. Annual Const. & Maint. Costs	Benefit-Cost Ratio
"Do-Nothing"	\$6,962,000	\$ 26,300	--
Proposed Improvement	5,829,200	791,500	1.48

The benefit-cost ratio is calculated as follows:

$$\text{B.C. Prop. Imp.} = \frac{R_p - R_1}{C_1 - C_p} = \frac{\$6,962,000 - \$5,829,200}{\$791,500 - \$26,300} = 1.48$$

Where: R_p = Est. Annual Road User Costs (Do-Nothing)
 R_1 = Est. Annual Road User Costs (Proposed Improvement)
 C_1 = Est. Annual Const. & Maint. Costs (Proposed Improvement)
 C_p = Est. Annual Const. & Maint. Costs (Do-Nothing)

including speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs. Level of service determinations include these items as well as an analysis of the capacity of the highway and the demand traffic volume.

In Arnolds Park and Okoboji, during peak traffic hours, the flow of traffic can be expected to "breakdown", periodically. This is due to the nature of the project area. There are numerous small businesses with on-street parking, and heavy pedestrian traffic. Mid-block stops for loading, unloading and executing left turns are common. All of these factors reduce the capacity of the existing two-lane highway. During peak hours the demand volume exceeds the capacity, and traffic flow deteriorates.

A capacity analysis of the proposed four-lane improvement, made for 1993 traffic volumes, indicates that the highway would operate near a level of service where stable traffic flow would be maintained and where operating speeds would only begin to be restricted somewhat by traffic conditions. Reductions in operating speed are not unreasonable. The principal reason for this improved service is the addition of a second traffic lane in each direction; these lanes provide for a continuous flow of through traffic, even though cars may be stopped while waiting to make turns. The elimination of parking along the highway would also contribute towards improved traffic flow and safety.

Timing and Scheduling

The improvement of U.S. 71 from Milford to Spirit Lake first appeared in the Iowa State Highway Commission's Five Year Program in 1968. Since then the project has been delayed

several times, principally over financial, environmental and legal concerns. The current Five-Year Iowa Transportation Improvement Program, listing obligations for fiscal years 1979 through 1984, includes items for right-of-way acquisition and reconstruction tentatively programmed for fiscal year 1979.

The most current Production Schedule, prepared and distributed by the Highway Division of the Iowa Department of Transportation, has, however, modified and clarified that schedule, somewhat. Present plans, according to the Production Schedule, are to let the grade and pave portions of the project in April, 1980. To facilitate traffic control and project staging within the highway corridor during construction, the improvement has been divided into and would be let in three separate sections: Section I - 14th Street in Milford northerly to the NCL West Okoboji; Section II - NCL West Okoboji northerly to approximately 850 feet south of the NCL Okoboji; Section III - approximately 850 feet south of the NCL Okoboji northerly to the junction of Iowa Highway 9. The causeway bridge portion of the project, located within Section II, would be built in two stages, so that two-way traffic could be maintained across the causeway at all times. The eastern half of the new structure would be constructed first, with traffic to be maintained on the existing roadway. The western half of the structure would then be built while traffic would be maintained on the newly constructed eastern half. The remainder of the highway project, to be under construction at the same time, would be completed and open to traffic by late December of that same year. As previously indicated, the entire project would be built utilizing stage construction (building only half of the roadway at a time) so that traffic could be maintained through the study area at all times. It could be necessary, however, in localized areas of heavy fill, to temporarily detour traffic onto the local city street systems.

Since the tourist season is so crucial to the economic stability of the Lakes region, constructing the project in a manner such as this should limit disruption to one summer season. It should be noted, however, that weather and/or other adverse conditions could prolong this construction period. The fact that traffic would be maintained through the corridor at all times during construction would tend to lessen adverse impacts.

During the construction period, a marked detour around the lakes utilizing a local county road and Iowa Highway 32, would be provided for through traffic, while U.S. 71, as previously stated, would remain open, through stage construction, to serve local and tourist traffic.

Description of the Area

Climate

Iowa's Great Lakes region has a climate which is classified as humid-continental. The daily and seasonal characteristics vary widely. Seasonal temperatures range from 110°F(43°C) to -40°F(-40°C), and daily temperatures fluctuate as much as 50°F(27°C). Average annual precipitation is 27.62 inches, two-thirds of which falls between May and

September. High summer temperatures produce evaporation levels characteristic of prairies, but which discourage forest growth. Trees that do grow in the study area are generally found around the lakes and along streams. The area is, however, humid enough for corn and soybean crops. Consequently, the average 150-day frost free growing season has produced an intensive agricultural economy.

Topography and Drainage

The topography of the glaciated region is gently rolling. The landscape includes lakes, moraines, kames, potholes, eskers, seeps, and marshes. These glacial features comprise a terrain unique in Iowa. The landforms are poorly drained and, consequently, created the numerous and diverse habitats which existed in northwest and central Iowa before extensive drainage was undertaken. The numerous potholes and wet, marshy areas presented problems for the settlers who wished to farm the land. In the 1890's and again in the 1930's successful drainage made agriculture viable in this part of the state. At the same time, however, drainage extensively reduced aquatic habitat for flora and fauna in this region. (See General Vegetation and Wildlife, page 22.)

Geology

The geological events of the past have determined the natural features of this region. Surface contours, soil type formations, mineral locations, ground water locations, lake basins and stream channels are all products of the geology of this region. These natural features have, in turn, influenced the pattern of human settlement and cultural development.

The comparatively recent glaciation by the Wisconsin ice sheet, during the Pleistocene Epoch, makes the Iowa Great Lakes area the youngest landscape in Iowa. Under the glacially deposited drift are found Cretaceous shales and sandstones of varying thickness. In general, relief in the Lakes' region is low and the drainage pattern is poorly developed. The receding glaciers left large blocks of ice, which eventually melted, creating the lake basins.

Ground Water Hydrology

Several ground water flow systems exist in the Iowa Great Lakes area. The deep bedrock units underlying the glacial drift contain the deeper flow systems. The Dakota sandstone and the Ordovician and Cambrian Age sandstones are the most important. These systems are generally penetrated by wells 400 to 500 feet deep. These deeper units yield from 100 to 200 gallons of water per minute.(1)

The flow system having direct bearing on the lakes and streams of the area is the shallow system found in the glacial drift. The gradient of the ground water is generally to the south. However, local ground water highs are found throughout the area, generally following the land surface contours. Ground water highs are found below the hills east and west of Lake West Okoboji and east of Lake East Okoboji. In general, the topographic high areas are the recharge areas, and the low lying swamps and lakes are discharge areas.(1)

Depth of the water table varies throughout the Great Lakes watershed from flowing springs to 50 feet below ground surface. Studies on the watershed flow indicate that areas adjacent to the Little Sioux River are receiving ground water discharge. The lakes are also receiving flow from ground water.(1)

The quality of the ground water varies throughout the area. Highly mineralized waters are characteristic of some locations. Contamination by coliform bacteria was also found.(1)

Soils

The major soil associations of Dickinson County are the Clarion-Nicollet-Webster and the Galva-Primghar-Sac. All of Dickinson County, except for a relatively small area in the southwest, is included in the Clarion-Nicollet-Webster soil association.

The Clarion-Nicollet-Webster association has soils that vary from well to poorly drained, from medium to moderately fine textured, and from nearly level to strongly sloping. They may contain small pockets of sand or gravel in the subsoil or parent material, and are subject to erosion. The soils of this association developed under prairie or marsh vegetation on glacial till.

A typical profile of a soil in the Clarion series has a surface layer of very dark brown, friable loam with a subangular, blocky structure, extending to a depth of about 14 inches. The subsoils of the Clarion series extend to a depth of about 34 inches. They vary in color from dark brown to dark yellowish-brown. In texture, they are friable light clay loams with a subangular, blocky structure. The substratum consists of yellowish-brown, friable, calcareous loam. This series occurs in undulating topography, away from streams, or in rolling to steep terrain, adjacent to streams. Soils of this series can also be found in uplands.

The Nicollet series consists of imperfectly drained, dark colored upland soils. The surface layers are black, friable, heavy loams with a granular structure. This layer is approximately 14 inches deep. The subsoils of the Nicollet series extend to a depth of about 31 inches. They are dark grayish-brown, light clay loams with a subangular blocky structure. The substratum of this series consists of grayish-brown, friable massive loams that have yellowish brown mottles and a few pebbles. Members of this series are found on slopes from one-half to three percent and exhibit a high water holding capacity.

The Webster series consists of nearly level, poorly drained, dark colored soils. It is found mainly on the till plain, or in uplands or outwash areas. The surface layer of this series is a black, friable to firm, silty clay loam extending to a depth of about 21 inches. This layer has a granular texture and a subangular blocky structure.

Iowa Great Lakes

The Iowa Great Lakes (Big Spirit Lake, Lake West Okoboji, Lake East Okoboji, Upper Gar Lake, Lower Gar Lake, and Lake Minnewashta) are located in Dickinson County, Iowa.

Together they compose a unique aquatic resource in a prairie state with few natural lakes within its boundaries. They are an important recreational asset, not only to Iowans, but also to individuals in surrounding states who own recreational property on their shores. In addition, the waters of this lake system serve as a public water supply for many of the local residents.

Of the natural lakes in Iowa, Lake West Okoboji is the deepest, although Big Spirit Lake has the largest surface area. Lake West Okoboji is nearly six miles long and three miles wide with an average width of one mile. The banks are generally high, abrupt and wooded. The lake has a mean depth of 12.3 meters and measures 40.2 meters in the deepest part. The main slope of the lake bottom is fairly uniform and gradual to a depth of 30 meters, but beyond that it drops off sharply for about 10 meters, giving it a deep hole of comparatively small area. Lake West Okoboji is deep enough to form a thermocline and stratify.

Lake West Okoboji is one of the more than 600 inland bodies of water throughout the world receiving international recognition for the quality of the lake and for the research carried on there.* More recently the Iowa Water Quality Commission has determined that three lakes and one river in Iowa are of such recreational or ecological significance that they deserve the greatest possible protection from pollution. Lake West Okoboji is one of these three lakes.(2)

Lake East Okoboji is a chain of three narrow, connecting lakes, averaging 0.5 mile in width and extending for nearly seven miles. The lake has a maximum depth of 7.9 meters and averages 3.0 meters. This shallow lake has an irregular shoreline and generally high wooded banks. Lake East Okoboji is apparently too shallow to stratify.

Upper Gar Lake, Lake Minnewashta and Lower Gar Lake compose the "Gar Chain" Lakes. The first two lie within the watershed of Lake East Okoboji. Lower Gar Lake has a separate watershed. Through the Gar chain of lakes drain Lake East Okoboji, Lake West Okoboji and Spirit Lake.

The time required for the exchange of water within the lakes varies. Lake West Okoboji, with its small watershed and large volume, has a turnover rate of approximately once every 20 years. Lake East Okoboji, which flushes more rapidly, exchanges its water once each year. Lower Gar Lake and Spirit Lake have flushing rates of 3.5 times per year and once every 5.5 years, respectively.

All the Iowa Great Lakes are eutrophic, or biologically productive, but there are differences in the degree of eutrophication among them. Dr. Roger Bachmann, Department of Animal Ecology, Iowa State University, has ranked the lakes in the order of decreasing water quality: Lake West Okoboji, Big Spirit Lake, Lake East Okoboji (including Upper Gar Lake and Lake Minnewashta) and Lower Gar Lake.(3)

Each of these lakes has summer algal problems ranging from mild to serious nuisance conditions. The algal problems are most serious in Lower Gar Lake and Lake East Okoboji.

*Recognition is by the Societas Internationalis Limnologiae and the International Union for the Conservation of Nature and Natural Resources.

The problem is least serious in Lake West Okoboji and is usually localized because of downwind concentrations of blue-green algal cells. Because of the low algal densities, Lake West Okoboji probably has the clearest water of any major natural lake in Iowa.(3)

The most dramatic change noted in any of the Iowa Great Lakes has been the drastic decrease in the quantity and number of species of aquatic macrophytes (plants) in Lake East Okoboji, Lake Minnewashta, and the Gar Lakes, and their apparent replacement by blooms of blue-green algae, principally *Aphanizomenon*. A second change has been the decline in density and species numbers of the once rich molluscan fauna of Lake West Okoboji. Recent investigations indicate that from 25 to 40 fewer species are currently present in this lake than at the beginning of this century.(4)

Since the first human settlement about a century ago, there have been several changes in the watersheds that may have had some influence on the character of the lakes. Human action within the watersheds of the lakes has been responsible for the following: drainage and tiling of surrounding wetlands and potholes; row cropping of former grasslands; concentration of livestock feeding; grazing of cattle; urban development in the towns of Spirit Lake, Arnolds Park, and Okoboji; development of lakeside homes and condominium homes away from the lakes; riprap and shoreline filling; construction of water-control structures on outlets of Spirit Lake and Lower Gar Lake; use of copper sulfate in Lake East Okoboji to control algal blooms; and, an introduction of treated and untreated human wastes into the lakes. Although these activities have been cited as definite reasons for changes within the lakes, in the past, in all probability, human action has had some effect on the quality of water in Iowa's Great Lakes.

General Vegetation and Wildlife

Before the area was settled in the 1850's, Dickinson County was a land of lakes, edged by timber and surrounded by miles of undulating prairies. These prairies had numerous mounds, or kames, and many were interspersed with shallow depressions containing water. The prairies had a rich and varied flora; from pothole to upland prairie they provided a mosaic of diverse habitats.

Man's arrival changed the natural landscape. Drainage ditches were dug to make the land tillable, and soon the vast prairie gave way to the plow. A second great impact to the Lakes region resulted from the increasing numbers of people who settled around the lakes.

Today the vegetation in Dickinson County is primarily agricultural crops, with corn and soybeans the predominant commodities. Only a few tracts of Iowa's tall-grass prairies remain. One of the larger prairies located in Dickinson County is Cayler Prairie Preserve. This natural area lies west of the lakes and is not in the study area.

In general, there is an absence of trees in northwestern Iowa. Those trees which do exist grow around the lakes or along streams. This phenomenon is characteristic of the prairie states and is attributed to the hot drying winds of summer. Around the lakes and in

sheltered areas, however, the humidity and micro-climate are often sufficient to permit trees to grow. Because northwest Iowa receives the least amount of precipitation in the state, only drought tolerant trees which are planted or grow naturally survive the prairie conditions of Dickinson County. (See Appendix C for a list of native trees of the area.)

Most of the existing woodlands around the lakes have been developed for residential use. Consequently, little woodland understory remains. Throughout the project's length, bluegrass has replaced the native ground cover. In urban areas bluegrass is grown for residential lawns. In rural areas bluegrass is used for livestock pasture.

There was a great abundance of wildlife in the prairie country when the white man first arrived. A letter written by A. A. Mosher in 1882 and published in *Forest and Stream* tells of the abundance of game and the attractiveness of the region as a hunter's resort.(5) (See Appendix C for lists of amphibians, reptiles, mammals and birds found in the Cayler Prairie Preserve.)

At one time the prairie chicken (*Tympanuchus cupido pinnatus*) thrived in the grasslands of northern Iowa, and all across the mid-America prairie states. Their demise, however, came not from over-hunting but from diminished habitat. Ducks, geese, sandhill cranes, and shorebirds were also once quite abundant in Dickinson County.

It was once common for mallards, teal, widgeons, pintails, shovellers, wood ducks and other waterfowl to nest in the broad expanse of sloughs, where they were safe from predators. However, nesting has declined as wetlands have been drained. Some birds, such as sandhill cranes, pelicans, and swans no longer nest in Iowa. Quite a few birds, which are only migrants now, were at one time, breeding species.(5) Nesting has also declined because fringe areas around sloughs have frequently become so narrow that predators can easily find their prey. (See Appendix C for a list of the summer birds of the Okoboji region.)

In the past, changing land use brought about the disappearance of wildlife such as the prairie chicken and the sandhill crane. Today, changing land use continues to threaten wildlife. Loss of cover in northwest Iowa has reduced the numbers of pheasants, jackrabbits and other wildlife.(6) Decreased nesting cover and reduced food supplies have resulted from extensive fall plowing and conversion of pastures and hay fields to cash crops, primarily corn and soybeans. Without adequate cover, pheasants, quail and other wildlife suffer in blizzards and ice storms.

The Iowa Great Lakes have always provided good fishing. A. R. Larrabee conducted an ecological study of the fishes of the Lake Okoboji region during the 1920's. He found 45 species of fish in the lakes, 40 of which are thought to be native.(3) Most of these fish are still caught today. Game fishing has remained good because fish propagation and creel limits have been undertaken. Today the lakes attract fishermen throughout the year. West Okoboji is especially popular for ice fishing, and record catches have been produced in these lakes. (See Appendix C for a list of fish species.)

Even though most of the fish species have been retained, the flora of the lakes has not fared so well. In 1915, the Highway Commission surveyed Iowa's lakes and lakebeds. As part of the study they commissioned Dr. L. H. Pammel, a botanist from Iowa State College (now Iowa State University) to investigate the lake flora.(7) In 1961 researchers again studied the vegetation of Iowa's Great Lakes. They found that Lake East Okoboji, which originally supported 44 aquatic species, now had only 18 species. However, the flora in Lake West Okoboji had not undergone the same change.(4) Smith and Volker, authors of the 1961 study, attributed the decreased plant diversity in Lake East Okoboji to pollution by sewage, agricultural fertilizers, and siltation, as well as other factors.

The reduction in plant species indicates that over the 46-year period conditions in Lake East Okoboji have changed. The researchers found, however, that the vegetation of Little Miller's Bay on the west side of Lake West Okoboji was almost identical to the flora described in 1915. Volker and Smith concluded that pollution in Lake East Okoboji was evidently much more severe than in Lake West Okoboji.(4) A comparison of the vascular plants of East Lake Okoboji in 1915 and 1961 is presented in Appendix C.

Parks and Recreation Areas

Outdoor recreation is one of the fastest growing uses of Iowa's land and water resources. Increased affluence, mobility and leisure time have placed a growing demand on recreational facilities, as each year more people seek to use and enjoy the outdoors.

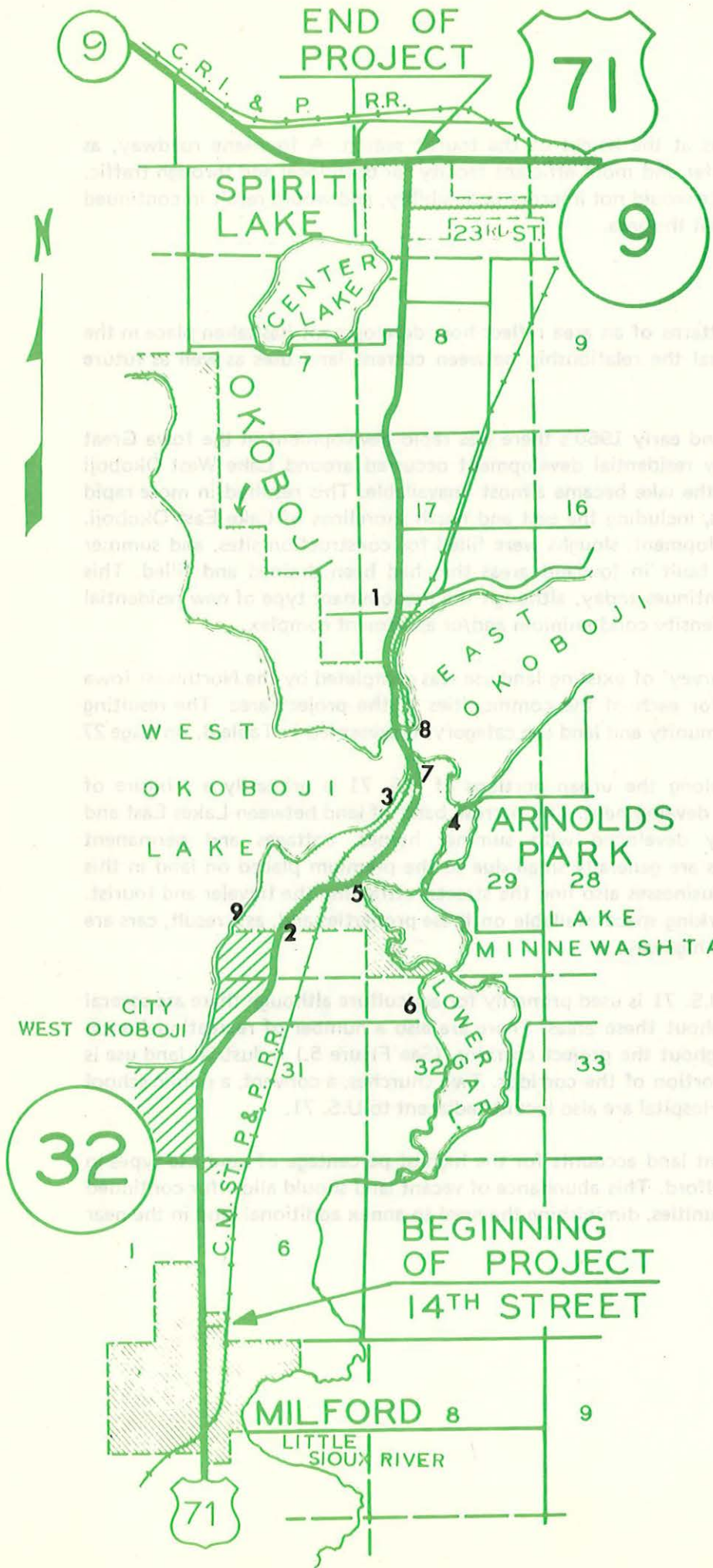
The project area, located in central Dickinson County, contains numerous parks and recreation areas (Figure 5). The area is known as Iowa's Great Lakes Region, and most of the area's recreational facilities are directly related to the many lakes in the region. The Iowa Great Lakes are of glacial origin, formed approximately 12,500 years ago. Four of Iowa's largest natural lakes are in Dickinson County and three of these are located within or adjacent to the project area: Spirit Lake (5,684 acres); West Okoboji (3,939 acres); and East Okoboji (1,875 acres). West Okoboji Lake is recognized as one of the world's three most beautiful blue water lakes. These three lakes provide some of the state's best walleye and northern pike fishing, and also contain bass, bluegill, crappie, yellow perch, bullheads and muskie.

The project area contains several state-owned recreation areas which provide general recreational facilities such as picnicking, fishing, swimming, camping, boating and hiking. Several sites of historic interest are also located here, most notably the Abbie Gardner Sharp Cabin, where the Spirit Lake Massacre occurred.

Other recreational facilities in the area include a hunting access, several golf courses, the Arnold's Park Amusement Park, ski areas, and numerous smaller lakes and city parks.

As the major north-south route through Dickinson County, U.S. 71 provides access to many of the area's recreational facilities. The proposed highway improvement will provide improved access to these parks, lakes and other recreational areas. This will be most evident

RECREATIONAL AREAS ALONG U.S. 71



1. BROOKS COUNTRY CLUB GOLF
2. EMERALD HILLS GOLF COURSE
3. PUBLIC FISHING ACCESS
4. UPPER GAR LAKE
5. MINNEWASHTA ACCESS
6. LOWER GAR ACCESS
7. ARNOLDS PARK STATION
8. CLAIRE WILSON PARK
9. PILLSBURY POINT

FIGURE 5
25

during the summer months at the height of the tourist season. A four-lane roadway, as proposed, will provide a safer and more efficient facility for both local and through traffic. The "Do-Nothing" Alternate would not improve accessibility, and would result in continued traffic congestion throughout the area.

Existing Land Use

The present land use patterns of an area reflect how development has taken place in the past and may help to reveal the relationship between current land uses as well as future trends.

During the late 1950's and early 1960's there was rapid development in the Iowa Great Lakes region. Initially, new residential development occurred around Lake West Okoboji and soon land adjacent to the lake became almost unavailable. This resulted in more rapid development of other areas, including the east and north shorelines of Lake East Okoboji. As a part of this new development, sloughs were filled for construction sites, and summer homes and cottages were built in lowland areas that had been drained and filled. This pattern of development continues today, although the predominant type of new residential development is the higher density condominium and/or apartment complex.

In 1976 a 'windshield survey' of existing land use was completed by the Northwest Iowa Council of Governments, for each of the communities in the project area. The resulting data, broken down by community and land use category, is presented in Table 8, on page 27.

The existing land use along the urban portions of U.S. 71 is primarily a mixture of residential and commercial development. The narrow band of land between Lakes East and West Okoboji is intensely developed with summer homes, cottages and permanent residences. These properties are generally small due to the premium placed on land in this region. Highway-oriented businesses also line the streets, attracting the traveler and tourist. Generally, there is little parking space available on these properties and, as a result, cars are parked along the side of the highway.

Rural land adjacent to U.S. 71 is used primarily for agriculture although there are several businesses scattered throughout these areas. There are also a number of recreational areas located near U.S. 71 throughout the project corridor. (See Figure 5.) Industrial land use is confined to the northern portion of the corridor. Two churches, a convent, a public school and the Dickinson County Hospital are also located adjacent to U.S. 71.

As seen in Table 8, vacant land accounts for the highest percentage of land use types in each community except Milford. This abundance of vacant land should allow for continued growth within these communities, diminishing the need to annex additional land in the near future.

TABLE 8
EXISTING LAND USE

Community	Total Acres in Corp. Limits	Total Residential	Total Commercial	Total Industrial	Total Public	Total Vacant	Streets & RR
Arnold's Park	Acres 563.3	88.1	64.8	3.8	170.7	170.6	65.3
	% of Total	15.6	11.5	.7	30.3	30.3	11.6
Milford	Acres 718.8	291.2	14.3	21.5	50.4	146.1	195.3
	% of Total	40.5	2.0	3.0	7.0	20.3	27.2
Okoboji	Acres 849.2	149.6	189.4	1.7	70.5	367.5	70.5
	% of Total	17.6	22.3	.2	8.3	43.3	8.3
Spirit Lake	Acres 1202.4	367.4	64.5	63.6	85.1	398.0	223.4
	% of Total	30.5	5.4	5.3	7.1	33.1	18.6
West Okoboji	Acres 842.2	63.8	24.2	0	231.6	461.9	60.6
	% of Total	7.6	2.9	0	27.5	54.8	7.2

Future Land Use

Future land uses will be determined by the future needs of the area. These future needs are, in turn, determined by factors such as population, economy, the availability of public utilities and streets, etc. Changes in land use are assumed to occur in those areas which experience a change in population, requiring changing land use patterns in response to an increase or decrease in population.

Dickinson County is expected to experience a population increase between 1975-2000, which will result in changes in the existing land use pattern. The 1977 *Regional Land Use Plan*, put together by the Northwest Iowa Regional Council of Governments, predicts that all communities in the county, except Superior, will experience population increases in the period 1975-2000. Most future development is expected to occur on currently vacant land.

New residential development will most likely continue the recent trend toward higher density residential areas, such as apartment and condominium complexes. Such development will occur primarily in and around the Lakes area, expanding similar areas already in existence. Some encroachment into agricultural areas seems inevitable, although the overall impact upon agricultural production is expected to be minimal.

Along with the expansion of residential land use, an increase in public and semi-public land use is anticipated, in order to accommodate the growing numbers of travelers and tourists who wish to enjoy the area's recreational facilities.

Industrial land use would continue to be concentrated in scattered areas throughout the region, with the largest concentration located in Milford. Very little new industrial development is anticipated. Land use along U.S. 71 is expected to continue as a mixture of residential and commercial development, perhaps more intensely developed in the future as developable land diminishes. Additional commercial development can be expected, especially that related to the recreational market and the seasonal population.

Some of the specific recommendations proposed in the *Dickinson County Comprehensive Plan, Phase 1, July, 1970*, for communities in the study area, are as follows:

<u>Community</u>	<u>Recommendation</u>
Arnolds Park	- expand commercial development along both sides of U.S. 71 to the edges of town on both the north and south sides.
Milford	- industrial development to occur east of U.S. 71; annex area adjacent to U.S. 71 north of 15th Street to maintain better control.
Okoboji	- maintain commercial uses along the length of U.S. 71, with expansion of commercial use to the west.
Spirit Lake	- general expansion of both commercial and industrial areas, with annexation south of town, along U.S. 71.

West Okoboji - annexation of a strip along U.S. 71 south from Milford Street to control development on both sides of the highway.

Social and Economic Profile

The Iowa Great Lakes watershed is an area of approximately 140 square miles in northern Iowa and southern Minnesota. Approximately 76% of the watershed is in Dickinson County. The recreational potential of these water resources has established the Great Lakes Region as the County's urban center and a popular Iowa resort area. U.S. 71 is the major primary highway serving the Lakes area communities of Milford, West Okoboji, Arnolds Park, Okoboji and Spirit Lake, and many of the businesses catering to tourists and the motoring public are located along this route. Motels, restaurants, taverns, novelty stores, fruit stands, ice cream and candy shops, gas stations and grocery stores are clustered along U.S. 71 throughout the project area.

Some of these businesses are open year-round while others are operated only during the summer. (Retail sales totals shown in Table 9 reflect this pattern.) In addition, some of these seasonal businesses are owned by individuals who live in the Lakes area only during the summer.

TABLE 9
1976 DICKINSON COUNTY RETAIL SALES

<u>Place</u>	<u>Quarter</u>	<u>Sales (\$)</u>
	1st (Jan.-March)	
Spirit Lake		4,236,785
Arnolds Park		722,183
Milford		1,374,232
County Total		8,486,324
	2nd (April-June)	
Spirit Lake		6,410,764
Arnolds Park		1,421,043
Milford		2,113,704
County Total		14,770,826
	3rd (July-Sept.)	
Spirit Lake		7,538,450
Arnolds Park		2,140,573
Milford		2,517,515
County Total		18,334,487
	4th (Oct.-Dec.)	
Spirit Lake		6,358,606
Arnolds Park		830,297
Milford		1,699,869
County Total		11,765,563

During the height of the summer tourist season, and especially on weekends, every motel and cabin is occupied, and restaurants and taverns are filled to capacity. U.S. 71 is no exception to the crowded conditions that exist during this time. The highway is sometimes packed bumper to bumper with cars and recreational vehicles. Traffic frequently comes to a halt for vehicles waiting to turn left and for those waiting for street-side parking.

Although the summer population is approximately 100,000, the number of permanent residents in the region was 6,684 in 1970. The 1975 population was estimated to be 7,742. (Table 10 shows population trends in the region.) Population projections for the area forecast a continuation of the gradual decline in population in the surrounding rural areas of Dickinson County and a stabilization of the population in the cities.

TABLE 10
STUDY AREA POPULATION

<u>Place</u>	<u>1960</u>	<u>1970</u>	<u>% Change</u>
Arnolds Park	953	970	1.8
Okoboji	326	361	10.7
Orleans	280	396	41.4
Spirit Lake	2685 ✓ 3331 ✓	3726 ✓ 3014 ✓	11.9 ✓ 12.3 ✓
Wahpeton	117	149	27.4
West Okoboji	171	210	17.0
Milford	1476	1668	11.6
Dickinson County	12,574	12,565	-0.1

Although Spirit Lake's population is also expected to basically stabilize, a four percent increase in population by the year 2000 is projected for that city. Most of the growth in the Lakes region will be concentrated in Spirit Lake, however, and the total population of the county should remain fairly constant.

Changes in seasonal population levels cannot be accurately predicted as part-time residents are not included in census counts. Seasonal population has only been roughly estimated. Although there is insufficient data for projecting the number of seasonal residents in the future, this population does seem to increase each year according to other indicators of growth, such as seasonal traffic and motel and restaurant volumes.

SECTION II. PROBABLE IMPACTS OF THE PROPOSED PROJECT

Right-of-Way Needs

A total of five houses, six mobile homes, 14 commercial properties, a state-owned lab building (fisheries stripping station), and several garages and other small sheds and signs would be permanently displaced by the proposed improvement of U.S. 71. Approximately 35 individuals would be relocated. In addition, seventeen mobile homes (approximately 51 individuals) in Smith's Trailer Court, located adjacent to U.S. 71 in the City of Okoboji, would be relocated temporarily while a retaining wall with chain link fence is constructed, from approximately Station 498 to Station 505. (See Aerial Plates 14 and 15 in Appendix B.) When construction is finished, these homes would be returned to their original pads, if desired. No minority group would be displaced by the project. (A discussion of the relocation assistance program is presented in Section VII).

The proposed four-lane replacement of the existing two-lane highway would also result in the diversion of approximately 35 acres of additional right-of-way to highway use. Approximately 27 acres or 76% of the right-of-way taking is prime farmland. In addition, three borrow areas have been proposed to provide fill material for the project construction. A total of approximately 15 acres of land would be used for these borrow areas, part of which is in agricultural use. (A discussion of the provisions for topsoil replacement is included in Section VII.)

Social Impacts

Various social impacts upon the communities and individual residents of the Lakes area are likely to be associated with the proposed improvement of U.S. 71. One of the more direct impacts upon the region would be the displacement of numerous area residents, as discussed above. A few of the residences that would be displaced by right-of-way acquisition are rural farm homes and mobile homes which could be relocated to other sites in the area. However, adequate replacement housing or relocation sites must be available for all who are displaced. A summary of relocation assistance provisions and the availability of replacement housing is presented in Section VII., under Relocation of Individuals and Businesses.

The Iowa Great Lakes Area communities are accustomed to integrating their activities with a highway in this corridor; therefore, the proposed reconstruction of U.S. 71 would not divide a neighborhood area or disrupt cohesiveness and social ties within a community. Commuting possibilities within the study area would be enhanced by this improvement.

Since there would be only a limited amount of access control on this proposed project, families would continue to retain previous community contacts and patterns of interaction. The proposed project does not pass through a neighborhood established with a cultural, racial or religious identity and, as such, no minority groups would be affected by the proposed improvement.

Although some side roads would be closed in the rural areas, only a small number of residents would be affected, as most of the closures are proposed for farm driveways. In those instances, other means of access to U.S. 71 are available nearby and out-of-distance travel would be minimal. In some cases new access roads and/or drives would be constructed to improve operations and safety. (Proposed road closures are shown on the Aerial Plates in Appendix B.)

The following discussion of public facilities and services includes a description of fire and police protection, health centers and ambulance services, educational facilities, religious institutions and public utilities in the project area.

Fire protection in the project area is provided by the Spirit Lake and Milford Fire Departments. Both of these consist of 25-person volunteer forces. The Spirit Lake Fire Department has two trucks and one emergency rescue unit while the Milford Fire Department has four vehicles.

Police protection and local law enforcement in the study area is mainly the responsibility of the County Sheriff's Department, located in Spirit Lake. The community of Spirit Lake has its own police force, consisting of four full-time and two part-time police persons. Milford and West Okoboji also have their own police forces, consisting of three and one persons, respectively.

Hospital and medical care in the study area is provided, predominantly, by the Spirit Lake community. Medical services in Spirit Lake are provided by the 100-bed Dickinson County Memorial Hospital, one clinic, eight doctors, one osteopath, four dentists, two optometrists, and one chiropractor. The Milford community has three physicians and one dentist to provide medical services. Ambulance service for the corridor area is provided by the Dickinson County Memorial Hospital. Spirit Lake also has one nursing home, with a 50 bed capacity.

The improvement of U.S. 71 should result in improved mobility for emergency vehicles in the study area communities and the surrounding rural areas. Where roads would be closed due to the U.S. 71 improvement, other means of access would be provided, such as the construction of new entrances and/or frontage roads. Therefore, emergency services should not be adversely affected by these closures.

There are three school districts traversed by the U.S. 71 project. They are the Milford Community, Arnolds Park Consolidated and Spirit Lake Community School Districts. Milford Community Schools consist of a public elementary school and a high school, with approximately 700 students, in addition to a parochial school. Arnolds Park has a high school and an elementary school with a total enrollment of approximately 345, and Spirit Lake's high school and elementary school have approximately 1350 students.

One of the school buildings in Arnolds Park is located adjacent to the U.S. 71 alignment, while the parochial school in Milford is also located very near the project corridor.

Therefore, both could experience some adverse effects from noise and air pollution. However, these levels are not intolerable and since the higher levels of noise and air pollution are projected to occur at the time of year when school is not normally in session, the schools should not suffer significant adverse impacts.

There are two facilities for higher education located near the study area. The Iowa Lakes Community College, located in Estherville, provides a two year vocational-technical curriculum. There are substantial numbers of students from the Iowa Great Lakes area who commute to this community college. The Iowa Lakeside Laboratory on Lake West Okoboji is a joint project of the State's three universities. It hosts nearly 100 students from all parts of Iowa during two summer sessions, and attracts a well-known faculty from various states. It has a research-oriented curriculum in botany, zoology, and Pleistocene geology, and is noted as one of the foremost prairie field research stations in the world. Neither of these institutions is located near enough to the corridor area to experience impacts of noise or air pollution.

There are 19 churches located in the U.S. 71 study area. Eleven churches, representing eleven denominations, are found in Spirit Lake, while six churches are located in Milford, and two are located in Arnolds Park. Although some churches are located near the U.S. 71 alignment, they should not be significantly impacted by noise and air pollution during periods of normal use. Due to the fact that traffic noise and activity is an inherent characteristic of the U.S. 71 study corridor, the predicted increases would not be significant.

Construction of this project would involve utility relocations. Plans for the relocation of these public utilities would be coordinated with the respective companies to assure that essential services to the public would be maintained at all times.

In addition, the project would not cause greater travel hardships for those with special transportation needs or preferences (such as handicapped, low income or elderly persons). However, it would not alleviate the transportation problems of these groups, either.

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The travel needs and safety of bicyclists and pedestrians in the corridor must also be considered, since during the summer months numerous people walk and cycle along U.S. 71. This situation does not offer a great degree of safety. To help alleviate the inconvenience and unsafe conditions which exist with the interface of motorized and non-motorized traffic, sidewalks, crosswalks, and push-button crossing signals would be constructed or installed to accommodate pedestrian traffic, where warranted, and in accordance with currently established Iowa D.O.T. policies and procedures.

Another measure which should help alleviate some of the conflicts relative to non-motorized traffic is the proposed multi-purpose trail, to be located between Milford and Spirit Lake. This coordinated planning effort between the Iowa Department of Transportation and the Iowa Conservation Commission is discussed in detail later in this section of the report. Pedestrian crossing signals and painted crosswalks would be incorporated into the trail design at points where it must cross U.S. 71 traffic.

The aesthetic quality of the U.S. 71 corridor would be somewhat affected by the proposed project. A wider highway through the study area would create a different visual impact and would alter the aesthetic qualities of the area either favorably or unfavorably, depending upon personal point of view.

Throughout the project area some trees would be removed. This space would be converted to a paved surface. In Arnolds Park, several ash, elm, maple and oak trees would be removed near Lake Minnewashta. Most of the trees which front the residential properties in this area would be displaced by the wider pavement. Additional trees would be removed along the west side of U.S. 71, just north of the causeway area in Okoboji. The shelter and cooling effects which these trees provide would be lost when the trees are removed.

Numerous trees would also be removed by the proposed construction process in the rural portion of the project corridor north of Okoboji. Selective clearing, however, would be utilized in the area, whereby only those trees within the construction limits or the recovery area would be removed. Trees to be removed include bur oaks, cottonwoods, dead elms and red cedars. In addition, some prickly ash and other fence row shrubs would also be removed.

A further negative social impact of the proposed project would involve the possible temporary restriction of boat traffic through the passageway between Lakes East and West Okoboji during certain stages of bridge construction. Any such temporary restriction would be required for safety reasons and would be limited only to such times as overhead work is being performed, either on the old or the new structure. Every attempt would be made to minimize those restrictions, which would occur on a day-to-day basis. The passageway would be open for boat traffic at all other times. The silt curtain, which would enclose all construction activities within the lake (primarily the bridge pier placements), would be erected so as not to restrict the width of the water opening.

Economic Impacts

In general, the proposed reconstruction of U.S. 71 would increase accessibility to the Iowa Great Lakes Region. Through traffic and those traveling to the Lakes area for recreational purposes would benefit from the convenience of improved traffic flow and the resulting time and cost savings.

It is not anticipated that the project would significantly alter existing population or land use patterns. However, the acquisition of businesses and property for highway right-of-way would decrease the tax base of the area, and local governments could experience reduced revenues for a short period of time. The region could also experience decreased retail sales due to the proposed relocation, or the possible closing of some businesses impacted by the project. This decline in sales and the reduced tax revenues should be temporary, however, ending when the majority of the businesses are re-established in other locations. (Relocation assistance services are summarized in Section VII.) It is also probable that other businesses could receive increased sales as a result of the adverse effects of highway development upon their competitors. Also, favorable economic impacts usually result from public works projects, because of the local employment and materials used.

Of particular concern to commercial establishments in the corridor area are the short-term adverse impacts of construction on the economy of the area. It is recognized that there would be adverse impacts due to inconveniences and difficulties encountered in gaining access to businesses; however, the U.S. 71 project would be stage constructed so as to keep disruptions and inconveniences to a minimum. Access through the corridor area would be maintained at all times. In addition, construction would be planned so that the majority of the project area would be disrupted for only one summer. This would be accomplished by beginning construction in early spring and completing it by late December of that same year, weather permitting.

Another significant impact of the project would be the loss of on-street parking due to the development of additional traffic lanes. Those businesses without parking lots could lose some customers when this street-side parking is removed. However, businesses with a relatively stable demand for their goods or a well-established reputation would probably continue to attract their present customers, despite the inconvenience in parking. Customer parking could also be reestablished in other areas.

By providing improved access to the area, the proposed U.S. 71 reconstruction could increase the attractiveness of this recreational area and contribute to increasing the development potential, therein. The uncontrolled access characteristics of U.S. 71 would likely result in pressures for commercial strip development along the right-of-way. In those areas, local ordinances or policies could structure future land use. Increased development potential, induced by the improved access provided by the project, would be influenced by the existing socio-economic characteristics and trends of the region. The existing socio-economic trend in the Iowa Great Lakes region is characterized by increasing residential and recreationally-oriented commercial development. It would appear likely, however, that this trend would continue with, or without, the proposed reconstruction of U.S. 71.

The long-term impacts of the proposed reconstruction in the corridor vicinity would also be structured by the policies of local governments. Though certain development potentials are associated with improved highways, the actual growth patterns of the future would be influenced by additional factors, not controlled by this highway development. These factors would include such things as zoning and the extension of utilities and other such services. New and improved highways can furnish only the external stimulus for change. How a community responds to this stimulus depends on the capacity for change which exists in that area. In areas where highway projects have brought changes, studies show that community efforts are significant in determining the economic outcome.

Impact on Community Values

Various points of view have been expressed regarding the proposed four-lane reconstruction of U.S. 71 through this resort area. These perspectives represent differences in values held by various sectors of the community. Those individuals who support the project point to the traffic congestion and the need for improved transportation facilities

for recreational, agricultural, industrial and commercial purposes. Others who approve of the project state that any new growth associated with highway development would be beneficial to the area.

Those who object to the widening of U.S. 71 cite various reasons such as a desire to preserve the natural aesthetics and charm of the area and to avoid the possible deterioration of the lakes, due to construction activities. Other undesirable impacts that have been mentioned include the damage to properties and businesses through displacements and reductions in parking spaces. The possibility that the economic loss to the communities could offset the benefits of the project has also been noted. Some also believe that the project will increase traffic volumes and speeds, while others believe a bypass of the area would divert a significant amount of traffic, so that existing U.S. 71 would be sufficient to handle the remaining traffic.

Some of these beliefs are misconceptions, such as the statement that a bypass would significantly reduce traffic on U.S. 71 through West Okoboji, Arnolds Park and Okoboji. According to the 1970 Iowa Great Lakes Origin and Destination Traffic Study, most of those traveling U.S. 71 through this congested area begin and/or end their trips within the corridor communities and a bypass would not serve their travel needs, nor would it reduce the accident rate on the existing facility. Other concerns, such as the impacts upon Lakes East and West Okoboji in the causeway area, have been studied and the steps that will be taken to eliminate and/or mitigate harmful effects are discussed in Section VII. Other comments and objections are responded to in Section IX.

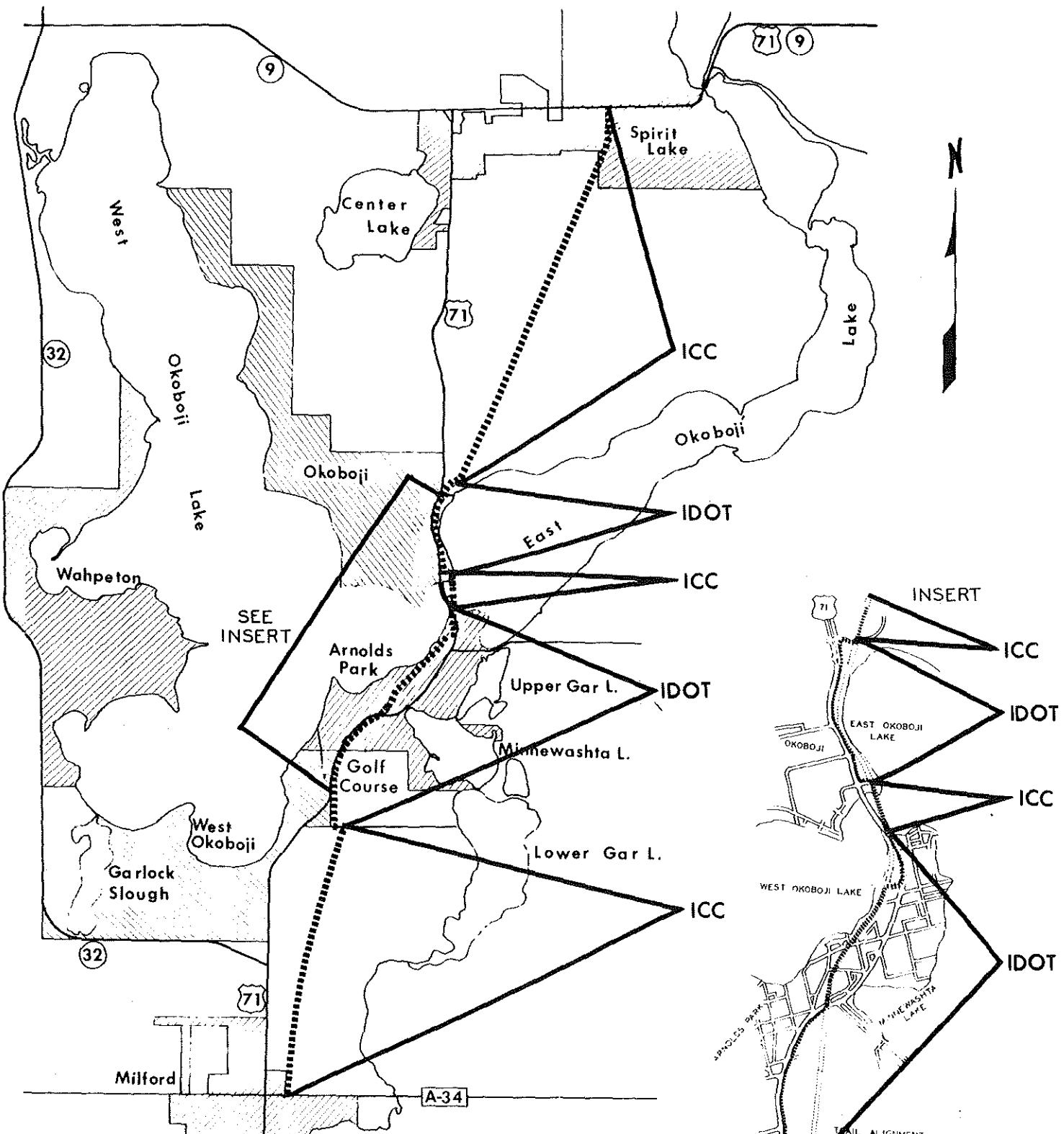
Proposed Dickinson County Trail

The Iowa Great Lakes Region in Dickinson County has long been one of the State's leading recreation areas. The arrangement of the lakes and the other recreational facilities makes U.S. 71 a major recreation corridor from Milford to Spirit Lake. This corridor is used by pedestrians and bicyclists, as well as motorized traffic.

Several recent developments favor the construction of a cycling and walking trail in the Lakes area and present a unique opportunity to incorporate the planning for this trail into a major change in the area's transportation system. In 1974, the Chicago, Milwaukee, St. Paul, and Pacific Railroad abandoned its track from Milford to Spirit Lake. The Iowa Conservation Commission, recognizing the recreational potential of the railroad corridor, acquired several portions of the right-of-way and the City of Arnolds Park, responding to a long-standing need to improve traffic circulation, purchased a portion of the abandoned right-of-way for a proposed new city street. In addition, the Iowa Department of Transportation has, for some time, planned to reconstruct U.S. 71 through the Lakes area.

The location of the proposed multi-use trail is generally along abandoned railroad right-of-way from Milford north to Spirit Lake. In several places, however, the location of the right-of-way in relation to surrounding land use made it desirable to consider alternative trail alignments, such as adjacent to U.S. 71. The general alignment of the trail is shown in Figure 6.

PROPOSED DICKINSON COUNTY TRAIL



LEGEND



-  Trail Alignment
-  Construction Responsibility
- IDOT - Iowa Department of Transportation
- ICC - Iowa Conservation Commission

FIGURE 6
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The report, *Proposed Dickinson County Trail - Milford to Spirit Lake*, prepared by the Iowa Department of Transportation, documents the efforts of the staff of the Iowa D.O.T. and the Iowa Conservation Commission to coordinate the planning for the proposed trail between Milford and Spirit Lake. The following summary of the report is presented in order to describe the interaction between the proposed trail project and the proposed improvement of U.S. 71. The plates referred to are presented in Appendix B, although the trail alignment is not shown on them.

Plate 8: After departing from the abandoned rail line, out of Milford, the trail would continue northerly along a county road that is to be closed as part of the proposed improvement of U.S. 71. The trail would be developed along this roadway for approximately 1100 feet. At the north end of this county road, near Station 398, the trail would join U.S. 71. Here, approximately 3700 feet of the trail would be located on the highway shoulder and separated from the highway by a curb and, where possible, a six-foot buffer strip. In certain areas, however, the trail would be located immediately adjacent to the roadway, to minimize right-of-way impacts. The width of the trail, itself, would be eight feet.

Plate 9: The bike trail would continue northeasterly along the right shoulder of the highway, again separated from U.S. 71 traffic by a curb and a maximum six-foot buffer strip. Originally it was proposed to route the trail easterly at a point near Station 418, along a short, dead-end city street. The street was to be extended by the City of Arnolds Park to the former railroad right-of-way, where the trail would have rejoined the abandoned rail line, again along a proposed city street. The Department of Transportation was later informed by the City, however, that street construction along the railroad right-of-way south of the point where the abandoned railroad viaduct had intersected U.S. 71 (Station 435; See Plate 10), was unlikely since they had not acquired that necessary right-of-way. Therefore, it was determined that the trail should be routed adjacent to the highway through that entire area.

Plate 10: The trail would continue northeasterly and then easterly adjacent to U.S. 71 to near Station 435. At that point, where the railroad formerly crossed the highway, the trestle has been removed. The bike trail would rejoin the abandoned rail line at that point and would continue northeasterly along that former railroad right-of-way. The proposed trail would intersect U.S. 71 at grade. A pedestrian actuated push-button crossing signal and painted crosswalk, to aid bicyclists and pedestrians crossing the highway at that point, would be installed. Actual installation and maintenance expenses would be in accordance with current Iowa D.O.T. policies and procedures.

Plates 11 and 12: The trail would continue northerly through the City of Arnolds Park to Carita Street, just south of the causeway area which separates Lakes East and West Okoboji following the abandoned rail line and, north of Broadway Street, a proposed future city street (also along the former rail line alignment).

Plate 13: Two alternate alignments were initially studied through the area just south of the causeway and documented in the Iowa D.O.T.'s earlier report on the proposed trail. One alternate continued northerly along the abandoned rail line through a parcel of land that had been acquired by an adjacent property owner (a resort-motel). The other alignment was proposed to carry the trail eastward to U.S. 71 at a point just south of the motel property. This alignment, however, would have required the acquisition of a small cottage. In recent discussions with the City of Arnolds Park and the property owners involved, an alternate trail alignment which is felt to be more feasible and economically prudent, has been proposed. This alignment would follow Carita Street eastward from the proposed new city street, joining U.S. 71 near Station 472. The trail would then be located along the sidewalk adjacent to U.S. 71 to near the former railroad grade crossing (near Station 485), where the trail would cross the highway at-grade. Originally, it was proposed to separate the trail at that location by constructing an eight-foot high, twelve-foot wide box culvert to serve as an underpass. The underpass, however, was included in a previously considered design concept whereby the causeway was to be expanded into Lake East Okoboji by filling into the lake behind a steel sheet piling retaining wall. Under that concept, the grade in the area of the proposed trail crossing was to have been raised approximately three and one-half feet, to accommodate the trail separation. Due to the design decision not to raise the causeway grade through that area, however, a separation is not possible. Although the proposed trail would intersect U.S. 71 approximately 600 feet south of the actual bridge structure, the limited fill height would not allow for construction of an eight-foot high box culvert, the floor of which must be above the elevation of projected storm wave run-up.

A tunnel could be constructed several hundred feet south of the proposed trail crossing site, but this would be of little or no benefit to snowmobile users. Presently, because of physical topographic restraints within the publicly owned right-of-way, a well-defined snowmobile crossing site between the two lakes has been established through use, at a point near where it is now proposed to cross the highway at-grade. Snowmobiles can not presently utilize the bridge opening between the lakes, since the water in that area does not freeze over hard enough to support them.

Therefore, an at-grade crossing is proposed and a pedestrian actuated crossing signal and painted cross-walk would be installed, near Station 485, to serve hikers, as well as bike and snowmobile traffic. The signal would also provide safe access between Claire Wilson Park and a City-owned beach on Lake West Okoboji. Actual installation and maintenance expenses for the traffic signal would be in accordance with current Iowa D.O.T. policies and procedures.

Plates 14-15: The trail would continue northerly through Claire Wilson Park and would cross a portion of Lake East Okoboji on the abandoned railroad trestle.

North of the Lake, it is proposed to construct the trail, for a short distance, on the abandoned rail line right-of-way, along a portion of which, at one time, the City of Okoboji proposed to build a city street.

While it was originally proposed to route the trail northerly to Depot Street and then westerly along that street to U.S. 71, it is now proposed to route the trail westerly to Highway 71 via Union Street. This is necessitated by the fact that the railroad right-of-way north of the Lake, in many areas, has been acquired by a number of different landowners and has become either lawns for adjacent homes or potential lakefront building sites. Therefore, due to the anticipated high cost of acquiring that land and the possibility of incompatible land uses, the Union Street alignment is being recommended. After being routed to the highway, the trail would follow U.S. 71 northerly. To minimize right-of-way takings, the trail would be located directly adjacent to the curb in some areas. In other areas a maximum 6-foot offset is proposed.

Plate 16: The trail would continue northerly adjacent to U.S. 71, to the county road near Station 535; at that point the trail would continue easterly along the county road to rejoin the abandoned rail line. The trail is then proposed to follow the railroad right-of-way northerly to Iowa 9 in Spirit Lake. In Spirit Lake, bicycle traffic would be dispersed on the local City street system.

Construction responsibility for the multi-purpose trail is to be shared by the Iowa Department of Transportation and the Iowa Conservation Commission. Basically, the Conservation Commission would assume responsibility for the trail along the abandoned railroad line in three areas: (1) from Milford northerly to the county road just south of the Emerald Hills Golf Course, near Arnolds Park; (2) through Claire Wilson Park, across the railroad trestle in the causeway area, to Union Street in Okoboji; and (3) from the local county road just east of Brooks Country Club, in Okoboji, northerly to Spirit Lake. The Iowa D.O.T. would assume responsibility for the remainder of the trail, through Arnolds Park and Okoboji. See Figure 6, on page 37.

In that portion of the trail corridor for which the Iowa D.O.T. is responsible the alignment will be incorporated into the highway design plans. Since the trail is adjacent to the highway along much of the project length through Arnolds Park and Okoboji it is proposed that the two projects be let and constructed at the same time.

The trail project meets federal objectives and bikeway criteria and will be eligible for participatory funding, in the same manner as for the highway project.

Air Quality During Construction

Air pollution during the construction period arises from two primary sources. One source is emissions from heavy construction equipment. Although often unsightly, such emissions seldom exist in concentrations which threaten human health or welfare. Prevailing winds within the project corridor act to disperse and rapidly reduce these emissions to innocuous levels.

The second source is fugitive dust arising from haul roads and normal grading operations. In accordance with Iowa Department of Environmental Quality rules and regulations

relating to air pollution control, construction contractors are not allowed to undertake such operations without taking reasonable precautions to prevent particulate matter in quantities sufficient to create a nuisance from becoming airborne. These adverse impacts of the construction period would be short-lived and would not be expected to constitute permanent threats to the environment.

Air Quality After Project Completion

Ambient air quality in the Iowa Great Lakes area has not been significantly affected by industrial or other technological pollution sources. The greatest contributor of air contaminants in the U.S. 71 study area is the internal combustion engine of motor vehicle traffic. Most of this traffic is concentrated along U.S. 71, and it is within this corridor that air pollution potential is highest. During the summer months traffic volumes increase, due to the vacationers in the area, and the potential for highway-related air pollution is at its highest.

Motor vehicle exhaust emissions are composed of carbon monoxide, oxides of nitrogen, hydrocarbons and particulate material. The oxides of nitrogen and hydrocarbons react in the presence of sunlight to form secondary pollutants which are identified as "smog" when present in sufficiently high concentrations. The high traffic volumes of large cities and sunny climates of areas such as Southern California greatly magnify the highway-related air pollution problems. The moderate peak-hour traffic volumes and suitable weather conditions in the Iowa Great Lakes area result in a low potential for such photochemical production of secondary pollutants.

The Clean Air Act Amendments of 1977 required the Iowa Department of Environmental Quality to designate those areas of the state in which the National Ambient Air Quality Standards are being exceeded. Although several areas throughout the state have been designated as non-attainment for one or more of the major pollutants, Dickinson County and the U.S. 71 project corridor are not included. Thus the general air quality of the area conforms with the national standards.

In its *Guidelines for Review of Federally-Funded Highway Projects*, DEQ has established cutoff traffic volumes for certain highway designs and operating speeds to aid in the determination of consistency with the State Implementation Plan (SIP) for maintenance of national ambient air quality standards. If predicted traffic volumes do not exceed the established cutoff, the highway traffic is expected to result in a very minor air pollution impact. In the following table the predicted year of completion (1981) traffic for the most heavily traveled section of U.S. 71 is compared to the cutoff volumes for a four-lane highway at an average operating speed of 15 miles per hour, the anticipated lowest average operating speed for this section. Table 11 is located on page 42.

TABLE 11

APPLICATION OF DEQ GUIDELINES

Predicted 1981 Peak Traffic on U.S. 71		Cutoff Volumes *	
1 hour	8 hour	1 hour	8 hour
1505	6516	1730	10050

*Table II, Guidelines of the Department of Environmental Quality for Review of Federally-Funded Highway Projects, 1974.

From the above comparison it could be concluded that the predicted critical year traffic volumes are below the DEQ cutoffs and the proposed project is consistent with the SIP due to its minor air quality impact.

Inasmuch as the critical year volumes approach the DEQ one-hour cutoff, a mathematical prediction model was applied in an effort to further quantify air quality impacts and also to identify trends in highway related air pollution as they relate to the U.S. 71 project. CALINE 2 is a line source dispersion model developed by the California Department of Transportation for estimating carbon monoxide concentrations near roadways. Carbon monoxide (CO) has come to be regarded as an indicator of highway related air pollution since its major technological source is the internal combustion engine and, as it does not participate in the photochemical process, it more readily lends itself to the prediction model. CALINE 2 estimates CO concentrations at specified locations downwind from the source based on traffic volumes, meteorological factors (wind speed and direction, and atmospheric stability), highway geometrics, and vehicle emission factors. Traffic volumes used were the estimated peak one- and eight-hour volumes for the most heavily travelled section of U.S. 71, which may be considered to include the sections which pass through Arnolds Park and Okoboji. Meteorological inputs were those which result in highest CO concentrations, i.e. wind speed = 2 mph, wind parallel to roadway, most stable atmospheric condition. Vehicle emission rates used were derived from the U.S. Environmental Protection Agency's most recent computation of mobile source emission factors. Again an average operating speed of 15 mph was used to describe the worst case condition which would probably occur near a signalized intersection during peak traffic conditions. Table 12 provides hourly average CO concentrations, for the years indicated, at a height of five feet and at a distance of 30 feet from the roadway (40 feet for existing conditions to account for widening) for both the peak hour and also for an hourly average during the peak eight hours. Table 12 is located on page 43.

TABLE 12

APPLICATION OF CALINE 2

Year	Average Daily Traffic	Distance from roadway	CO Concentration (ppm)	
			1 hour	8 hour
1979	8900	40'	18	10
1981	10025	30'	17	9
1986	11150	30'	10	5
1991	12275	30'	7	4

The data in the above table allows a comparison between the highest predicted CO levels after project completion (1981) and 1) existing conditions (1979), 2) future conditions (1981-1991) and 3) the national standards for CO (35 ppm for one hour; 9 ppm for eight hour).

Year of completion CO levels are expected to be slightly less than existing levels even though traffic may be moved closer to adjacent human activity as a result of the roadway widening. This is due to the federal motor vehicle emission control program and the increasing percentage of the vehicle population equipped with emission control devices. This trend is expected to continue in future years as lower per vehicle emissions counteract the effect of increasing traffic volumes.

The predicted CO concentrations must be added to the existing background levels for comparison to the national standards. Although no background CO data is available, it would be reasonable to assume that, in the absence of significant technological sources other than U.S. 71 traffic, the background levels may be regarded as negligible. Thus neither the 35 ppm one-hour standard nor the 9 ppm eight-hour standard are expected to be exceeded where normal human activity would be expected to occur. From the data in the table it remains a possibility that the eight-hour standard may be jeopardized when peak traffic volumes coincide with worst case meteorological conditions shortly after project completion. This however, is a lesser impact than what would be expected during a similar situation under existing roadway and traffic conditions. It should also be remembered that elsewhere in the project corridor and/or under the normal meteorological conditions of northwest Iowa the pollutant levels would be expected to be significantly lower than the worst case conditions used in this analysis.

Based on the above information the U.S. 71 project is considered consistent with Iowa's State Implementation Plan for maintenance of the National Ambient Air Quality Standards.

Noise Impacts

The proposed improvement would have some effect on noise levels in the project corridor. The construction of the project would impose short-term disturbances on some

land uses adjacent to the highway. In addition, the long-term impacts of traffic noise have been analyzed in detail. Existing and predicted future noise levels at representative sites in the corridor are shown in Table A-1, Appendix A. The estimated design year 70 dBA L10 noise contours are presented on the Aerial Plates, in Appendix B.

It is predicted that increased summer traffic volumes would result in higher than desirable noise levels at some sites adjacent to the highway. In urban residential areas of the corridor, the design year noise level is predicted to exceed FHWA noise standards for that type of land use. However, existing summertime noise levels in those same areas also exceed the standards, and are predicted to continue to increase, even if U.S. 71 is not reconstructed. Generally, however, noise levels along the highway would be higher in the year 2000 than they are now. Comparison of the predicted noise levels for the proposed construction and for the "Do-Nothing" Alternate in the year 2000 reveals that in some locations noise levels would be slightly higher, with the improvement, and in other locations, slightly lower. See Table A-1.

Because residential and commercial areas in the corridor communities are presently experiencing high noise levels, and since the predicted maximum increase in the noise level is estimated to be approximately 8 dBA (for the year 2000), it is anticipated that adjacent land use and activities in the corridor would not be severely impacted by the increased noise levels associated with the improved highway. There are few extremely noise sensitive land uses located along the highway. At the Dickinson County Hospital, the change in noise level (+1 dBA) should be insignificant. In addition, churches and schools in the vicinity should be subject to little noise intrusion during their periods of use. An improved U.S. 71 should also attract traffic from other residential streets, which are presently utilized to avoid the congestion that occurs along the present highway. That will, in turn, improve the noise environment in those residential areas.

Water Quality

Siltation during the construction period would cause some temporary water pollution. Once the vegetation is removed, rain and wind would erode the bare soil. This permits soil particles to be displaced in rivers, streams, or lakes, resulting in water turbidity.* Erosion such as this usually occurs for a relatively short period of time, since the contractor is required to take certain steps to minimize erosion and revegetate the slopes as quickly as possible. If, however, bare soil is exposed for a long period of time, erosion and siltation would continue to occur until erosion prevention measures are implemented. Continued siltation would result in loss of aquatic organisms and can contribute toward decreased water quality.

Impacts from erosion due to construction activities can be minimized and sometimes nearly eliminated. Specifications written into the final design plans for this project would

*Turbidity = muddy, cloudy; having the sediments stirred up.

specify to the contractors who construct the bridge or do the grading and paving work, what procedures must be followed to prevent erosion and avoid siltation of the lakes.

One of the principal concerns expressed by the public and by some scientists regarding this proposed project is the potential for water pollution to Lake West Okoboji resulting from construction in the area of the causeway. (See Aerial Plates 13-14.) This concern includes the fear that tiny particles of fine silt and clay, which will become suspended in the water due to construction activities, will stay suspended in the water indefinitely and will eventually be transported throughout the lake. The spread of these suspended silt and clay particles would give a muddied appearance to the water. The risk that this potential problem could occur in Lake West Okoboji has been greatly minimized, however, with the decision to bridge the northerly 500 feet on the east side of the existing causeway. Thus, by limiting the construction activity (bridge pier placement) to the Lake East Okoboji side, the "blue water lake"* of Okoboji would remain relatively undisturbed.

Pollution of the Lakes from the proposed construction should not occur on this project since all construction activities in the causeway area would take place behind floating silt curtain barriers, which are designed to contain eroded soil particles and possible disturbed lakebed sediments. In addition, silt fences are proposed along the remainder of the highway corridor to contain runoff sediment created by the highway construction process.

Silt curtain barriers, similar to the one proposed for use on this project, have been utilized by the Florida Department of Transportation to abate the movement of turbid waters into the main body of a Florida lake.(8) The silt curtain would act to trap the silt fines and clay particles which do not readily settle out and would prevent them from floating out into Lake West Okoboji. For additional information on mitigation of water quality impacts, see Section VII, MEASURES TO MINIMIZE HARM.

Another possible threat to the Lakes is from deicing chemicals which are used to create safe winter driving conditions. Roadway deicers are the principal means of providing near-normal highway conditions during the wintertime. Calcium chloride and sodium chloride salts are used as deicers; an application technique utilizing liquid calcium chloride sprayed onto sodium chloride has been developed to reduce the amount of salt necessary for deicing purposes. This technique reduces the incidence of salt scattering along the roadway. This new method of application melts ice at lower temperatures and is more efficient. Various salt additives are used as anti-caking agents; the Iowa Department of Transportation uses sodium ferrocyanide. Rust inhibitors are another group of salt additives; however, Iowa does not use these.

One of the concerns of using deicers and salt additives is the effect on the biotic community. Biological communities are highly integrated and interrelated. They are also susceptible to chemicals and other factors which change their environment; these organisms

*West Lake Okoboji is widely known throughout the State as Iowa's "blue-water" lake.

also vary in their tolerance to salt. When large concentrations of salt are introduced into small bodies of water, density stratification can occur. If this happens, the normal seasonal mixing of the lake will not take place and oxygen will be depleted from the bottom layer of the lake, which supports bottom-dwelling flora and fauna. The effects of sodium and calcium chloride salts are cumulative and sometimes irreversible. Through time, increased salinity could change the entire biological community of a lake. The water in Lake West Okoboji, which is deep enough to stratify, mixes twice a year.

In the study area, sodium chloride salt is used almost exclusively for wintertime deicing. It is applied by calibrated machines with the amount determined by the temperature, the wind, and the type of precipitation. In fiscal 1974 the average application for the six county area in which the study area is located was three tons of salt per mile for each two lanes of primary roadway. This amount was considerably less than the statewide average for that year of 7.8 tons of salt per mile of two-lane roadway. The deicing salt is spread on U.S. 71 by the District Maintenance Section of the Highway Division and not by the cities located in the project area. The salt is stored in a building on the maintenance grounds in Spirit Lake.

Since fiscal 1976, Iowa's roadway deicing program has been reduced. The bare pavement policy of the 60's and 70's has been replaced by a Priority I and Priority II highway snow removal program. In effect this has reduced the number of miles of highways which are salted, from 8200 to 6200. Only Priority I roads receive deicing salts. The salt is combined with sand in a 50%-50% mixture and applied at a rate of 300 lb. sand to 300 lb. salt per two lane mile of roadway. In Dickinson County, U.S. 71 and Iowa 9 are the only Priority I highways. Salt application for the past three years on these Priority I routes has averaged 2.3 tons per two lane mile.

Excess salinity can also decrease soil fertility by reducing the number and kinds of soil nutrients available to plants. It can also affect the absorption of moisture from the soil. Toxicity to vegetation is probably the most dramatic result of increased soil salinity. Symptoms include discoloration of plant foliage, leaf scorch, defoliation, stunting, and sometimes death. In rural areas, highway drainage is carried in roadside ditches to natural watercourses. The use of salt-tolerant varieties in roadside plantings keeps damage to a minimum. The principal crops in the area, corn, soybeans and oats, are relatively salt tolerant,(9) and little or no damage to agriculture is expected.

The problem of highway deicers is multi-faceted. Present substitutes are expensive, or impractical, or lack comparable effectiveness. Some are more toxic than chlorides of sodium and calcium. Measures taken to reduce the impact of deicing chemicals are outlined in Section VII.

Wildlife Habitat

Wildlife habitat which is removed by highway projects generally results in decreased wildlife populations. It can also result in replacement by other species of wildlife, if the habitat type is changed. Generally, animals and birds do not "relocate", since suitable sites

are usually already occupied. The net effect is that the wildlife species does not reproduce. Therefore, decreased habitat results in decreased wildlife populations.

The principal tree species which would be lost with this project is the bur oak (*Quercus macrocarpa*). This impact would affect wildlife more than the loss of certain other trees in the area since the oak mast* would no longer be available to wildlife for food. Acorns rate near the top of the wildlife food list because they are a good staple. Their greatest value is in the critical winter season when other foods are scarce.(10)

Approximately 30 bur oaks in Smith's Trailer Park, located adjacent to U.S. 71 just north of Lake West Okoboji, between Stations 498 and 507, would be lost with this project.

In the rural portion of the project corridor, north of Okoboji, numerous additional trees would also be removed by the proposed construction process. Selective clearing, however, would be utilized in the area, whereby only those trees within the construction limits or the recovery area would be removed. Native undergrowth has disappeared in these woodlands, due to livestock grazing; consequently, the remaining understory is prickly-ash and gooseberry, with bluegrass as ground cover.

Other species of trees that would be removed by this project include ash (*Fraxinus sp.*), elm (*Ulmus sp.*), oak (*Quercus macrocarpa*), red cedar (*Juniperus virginiana*), and spruce (*Picea pungens*). These trees do provide wildlife habitat; however, due to the nature of the existing urban and agricultural land uses (residential and livestock pasture), wildlife utilization is limited to those species which have adapted to the influence of man.

Agricultural land in row crops which would be required for right-of-way would not, generally, displace wildlife. Corn and soybeans which remain after harvest do provide some food; however, this land has limited use for wildlife, since cover is absent. Consequently, the use of agricultural land for additional right-of-way should not affect wildlife populations significantly.

Finally, since this project proposes not to fill into or dredge material out of any of the lakes in the project area (Minnewashta, East Okoboji or West Okoboji) existing fish habitat should not be affected.

The "Do-Nothing" Alternate would have no effect on existing conservation practices nor on wildlife habitat.

*Mast = nuts, especially as accumulated on the forest floor; utilized as food.

SECTION III. PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

Economic Effects

Impact on Businesses - Fourteen commercial properties would be displaced by right-of-way acquisition for the reconstruction of U.S. 71. These businesses include two restaurants, two gas stations, a drive-in theater, a car wash, a motel office and pizza parlor, four specialty shops and a combination beach resort, marina and snowmobile sales and service establishment. (Proposed displacements are shown on the Aerial Plates in Appendix B.) These displacements and the loss of parking spaces adjacent to other businesses along the existing highway represent the greatest adverse economic effect of this project. Further discussion of both beneficial and adverse economic impacts is presented in Section II.

Impact of Construction - During the construction period, businesses along U.S. 71 would be inconvenienced somewhat by the disruption of access to their establishments. As construction proceeds and access becomes more difficult, it is possible that the retail sales of those businesses would decrease for a period of time. However, the U.S. 71 project would be stage constructed so as to keep disruption to a minimum, and traffic would be maintained through the construction zone at all times, weather and construction activities permitting. During construction, motorists utilizing the route would also be inconvenienced. The employment generated by, and the local materials purchased for, the highway construction, would also be a stimulus to the areawide economy.

Removal of Cropland From Productivity - Approximately 35 acres of additional right-of-way, of which 27 acres is considered prime farmland, would be removed by this project. This is considered to be a permanent change in land use.

Impact on Utilities - Utilities located along U.S. 71 would be relocated as a part of this project. This may cause temporary disruption of services; however, coordination with the affected utility companies should keep this disruption to a minimum.

Social Effects

Impact on Residents - An undesirable impact of the proposed highway improvement would be the permanent displacement of approximately 35 individuals and the temporary displacement of an additional 51 people. Although relocation assistance payments would be made available, the relocatees would probably experience the general problems associated with relocating and readjusting to a new environment, even if just temporarily.

Ecological Effects

Changes in Development Patterns - By improving access to the Lakes area, the proposed U.S. 71 reconstruction could increase the attractiveness of the area, contributing to an increase in the development potential, therein. This would be characterized by increasing

residential and recreationally-oriented commercial development, in addition to possible strip commercial development along the highway.

Water Quality - Although no dredging or filling activities are proposed within any of the lakes located adjacent to the proposed U.S. 71 improvement, the potential for soil erosion and sedimentation-type water pollution would exist during the construction process; the problem would increase if rain and winds occur during the grading stage of construction, before temporary erosion control measures are implemented. In the causeway area separating Lakes East and West Okoboji, the construction activity with the greatest potential for adverse water quality impacts to the Lakes would be the placement of several bridge pilings into Lake East Okoboji.

The water pollution potential, however, should be minimal, as all construction activities within the lake are proposed to take place behind a floating silt curtain barrier. In addition, a silt fence will be used along the remainder of the project corridor to control sediment runoff from exposed slopes.

Removal of Terrestrial Habitat - Trees, shrubs and grasses that would be removed by this project will result in decreased wildlife habitat. Nesting songbirds would be displaced by the removal of trees in both urban and rural areas of the project. Spring and fall bird migrants, such as warblers, would have less habitat for foraging and roosting than is presently available. Removal of dead trees would affect habitat for woodpeckers, nuthatches, and those birds seeking wood-boring insects.

The loss of bur oaks would affect small animals as well as birds. Squirrels, raccoons and opossums that den in these trees would be displaced. Oaks, which are an important wildlife food source, are scarce on the northern prairies. Mammals and many birds feed on the acorns. Some birds found in the study area that feed on acorns are pintail ducks, clapper rail, bobwhite, crow, yellow-shafted flicker, grackle, red-breasted grosbeak, bluejay, meadow-lark, white-breasted nuthatch, yellow-bellied sapsucker, starling, tufted titmouse, and woodpeckers. Native fur and game animals which utilize acorns include red fox, muskrat, opossum, cottontail rabbit, raccoon, fox squirrel, eastern chipmunk, ground squirrel, meadow mouse, and white-footed mouse.(10)

Loss of these trees would also result in less available woodland-pasture edge. Such "edges" are highly productive areas for biological activity. The significance of these areas is relatively greater in this part of the state than in central or eastern Iowa, where trees are more abundant.

Air Quality - Automobiles are the major contributors of carbon monoxide and hydrocarbons. They also produce 40% of the nitrogen oxides in our environment.(11) For these reasons, the potential for air pollution is highest along the U.S. 71 corridor. This is especially true during the summer months when traffic flow is heaviest. Iowa has favorable weather conditions, however, and winds readily disperse vehicle emissions. Some deterioration of air quality is expected locally during the construction period. Emissions

from construction equipment and airborne dust are also expected during the construction period. Based on an air quality analysis of the proposed project, however, no long-term adverse air quality impacts are forecast.

Noise - Ambient noise levels along the U.S. 71 corridor fluctuate according to seasonal use. During the summer months, some locations currently exceed the noise level standards. Predicted noise levels for this project approach or exceed the acceptable levels for certain land use categories. (See the detailed explanation for noise analysis in Appendix A of this report.) Noise abatement barriers are considered too expensive and too ineffective to implement for this project.

SECTION IV. ALTERNATIVES

In considering alternatives it is necessary to keep in mind the input and stage of development of this project. The introduction to this Statement indicates why this project is being redesignated for federal aid and the need for circulating this EIS as a federal document. Several alternative concepts have been considered in the development of this project. The emphasis, however, will be on the proposed concept, which is the minimum improvement necessary to provide efficient and safe operating conditions within the highway corridor. The other alternates are either not practicable or would have greater adverse impacts and are described to provide background information only on the process by which the proposed concept was developed. Some of the alternatives were considered in the earliest stages of the project and others were suggested at public hearings or information meetings and then studied further.

Throughout the development of this project, the alternative of doing nothing to the existing highway has been considered several times. Although this approach would avoid the adverse effects of the highway improvement, the existing traffic problems on the route would remain. Traffic volumes are expected to increase and an improvement to increase capacity and safety must be provided.

The proposed improvement of U.S. 71 from Milford to Spirit Lake was first programmed in 1968. Plans were developed, and a location public hearing was held on September 5, 1968, to present the proposed concept. The proposal at that time differed from the present proposal in that the section from one mile south of Arnolds Park to 4500 feet north of Okoboji would have been 65 feet wide from back-of-curb to back-of-curb. This section included four lanes for through traffic, a four-foot median and left-turn storage lanes.

After considering input gathered at the public hearing and after further detailed study as to the damages that would result from the 65-foot wide highway, it was determined that the benefits of the left-turn storage lane were outweighed by the costs of the extra right-of-way required and the adverse impacts on businesses that would result. The project was modified to a 49-foot section in Arnolds Park and Okoboji and this concept was presented to the public at a design public hearing held on August 9, 1973.

When it became known that the C.M.St.P. and P. Railroad line through the area was to be abandoned, it was suggested that the feasibility of using the railroad right-of-way for a two-lane roadway be studied. These two lanes would have served as one-half of a one-way pair, with existing U.S. 71. It quickly became apparent that this proposal was not feasible and would be very disruptive. In order to serve the traffic desires in the area, a number of cross street connections would have been required. This additional construction made the cost prohibitive. The additional costs to road users resulting from out-of-distance travel also indicated the unfeasibility of this concept.

Two additional alternative plans for the improvement of U.S. 71 through the Iowa Great Lakes area have been promoted by numerous residents of the study area. These include a

three-lane concept and a concept for providing left-turn lanes, only, at selected intersection locations. Their argument for promoting these concepts is that they would alleviate the periodic traffic congestion while minimizing disruptions and the negative impacts associated with a four-lane highway improvement. These alternatives have been extensively evaluated.

The existing two-lane highway facility does not provide the level of service necessary to safely and efficiently handle the present day traffic volumes within the study area, which average approximately 7290 vehicles per day. A major factor contributing to the congested conditions along the route, in addition to the large volume of traffic, is the considerable number of traffic movements at private and public access points adjacent to the route and, in particular, the left-turn movements. Many of these movements are at mid-block points. A three-lane proposal has been rejected because of the reduced traffic carrying capacity of such a facility and the conflicting traffic movements that would or could be created. A potential safety problem exists in that vehicles might, at certain times, utilize the third lane as a passing lane from both directions. Another consideration is that with a four-lane facility, gaps in traffic occasionally occur, allowing for left-turn movements. With a three-lane facility, however, only two lanes are being utilized for through traffic movements and, in heavy traffic, a continuous stream of vehicles allows little opportunity for left turns, even if the turning vehicle is situated in the middle, left-turn lane. Therefore, due to the traffic service capabilities such a facility could provide, the safety factors involved, and the costs of constructing such a facility compared to the benefits to be derived, the three-lane alternative has been dismissed as unfeasible.

As for the feasibility of the second alternative concept, left-turn lanes at selected intersection locations, many of the same arguments hold true. There are continuous left-turn movements throughout the project corridor and left-turn lanes at a few intersection locations would not greatly improve traffic operations. While such an improvement offers a partial solution to the existing traffic problems, it would, however, not safely and adequately accommodate existing and projected future traffic volumes, which range upwards of 14,000 in some sections of the highway corridor by the year 2000.

Although there will be a time savings for those traversing the route following a four-lane improvement, several other factors must also be considered. These include a more uniform travel speed, more efficient vehicle operations, comfort, convenience, and fewer starts and stops. These factors contribute to a safer highway facility and provide for greater fuel economy.

A number of people have also suggested that it would not be necessary to improve U.S. 71 through Arnolds Park and Okoboji if a highway were constructed bypassing the lakes, to carry through traffic. It has been suggested that enough trips would be diverted to significantly reduce the traffic congestion in the busy urban areas adjacent to present U.S. 71.

Such a bypass facility is a part of the Iowa D.O.T.'s State Arterial Highway System, but is a totally independent project. Preliminary studies have indicated that such an improvement

is a low priority with statewide needs, and it is, therefore, not presently programmed. A separate Environmental Impact Statement will be circulated at some future date, based on statewide priorities and the availability of funds.

The project proposed through the lakes area is an improvement to the urban highway network only and is designed to funnel local traffic to, through, and within the Great Lakes Region. Its need arises independently from the high and growing traffic volumes within that corridor. Origin and destination traffic surveys indicate that 88% of the traffic utilizing U.S. 71 through the lakes area have either local origin and/or destination. Therefore, a bypass facility is not a viable alternative for serving these local needs. A further discussion of the independency of the two projects is contained in the introduction to this EIS.

The construction alternate provides for a four-lane replacement for the existing two-lane highway. (Refer to the aerial photographs in Appendix B for details of the proposed project.) In Milford, from the end of the 58-foot wide pavement, just south of Fourteenth Street, northerly to the north corporate limits, the existing highway would be removed and replaced by a 49-foot wide section. It does not appear, at this time, that any additional right-of-way would be required in Milford. The widening would be accomplished symmetrically along the present centerline and the principal effect would be to shorten the distance between the curb and the sidewalk. While some trees would be displaced by the improvement, it is proposed to save the majority of them, although damage to their root systems, in many instances, would be unavoidable. Temporary easements would be acquired for the purpose of constructing entrances and shaping slopes.

Although access would not be restricted along this portion, the design of residential and commercial entrances would be more orderly than at present. Properties that presently have no curb and have vehicles entering and leaving in random patterns would be provided with entrances to concentrate turning movements. Parking is not presently permitted on the highway in Milford and would not be permitted when the project is complete. Portions of the highway right-of-way are now used for parking, in some places. Widening the pavement and limiting access to controlled entrances would eliminate some of these parking spaces. Many of the affected businesses have other off-street or side-street parking available and the impact is not expected to be severe. The primary impact of this project on Milford would be the temporary disruption and inconvenience during construction. The four traffic lanes would improve the traffic flow through Milford during the peak travel period, the summer months.

From the north corporate limits of Milford northerly approximately 0.9 mile, a four-lane rural section would be constructed. The design includes four 12-foot traffic lanes with 10-foot outside shoulders. In the vicinity of Iowa 32 a 16-foot wide raised concrete median would divide the traffic. Northbound traffic turning west on Iowa 32 would be provided with a 175-foot long left-turn storage lane. Some reconstruction would be done on Iowa 32, also, in order to channelize that intersection. Additional right-of-way would be acquired on both sides of U.S. 71. A steak house and a drive-in theater building, both on the right side of

the highway (directions from the road are given as though the reader were passing from Milford toward Spirit Lake), near the former intersection with Iowa 32 (Station 340), would be purchased and removed. A house near Station 341, on the east side, would also be purchased and removed.

At Station 360, approximately 230 feet south of Okoboji Boulevard in West Okoboji, a 49-foot back-of-curb to back-of-curb urban section begins. Surface water from this curbed section would be carried in storm sewers that would replace open ditches which presently parallel the highway. Also in this same area, south of Okoboji Boulevard, a 1.8 acre borrow area, on the right side, would provide fill material for the improvement. The Lake Street intersection would be reconstructed at right angles to U.S. 71. Some right-of-way would be required at this location. An oil station, presently unused, would be purchased and removed, near Station 366.

From Okoboji Boulevard northerly past the Maywood residential area the proposed highway centerline would be shifted to the right. This would allow for the use of the existing right-of-way line along the left side of the highway. From 15 to 20 feet of additional right-of-way would be acquired on the right side. No homes or businesses would be removed in this area but roadside parking areas for several businesses would be diminished. Some trees and a strip of lawn in front of adjacent cabins and houses would also be lost. The grades would be adjusted for residential and commercial entrances where necessary, with most of the changes being accomplished through temporary easements.

Near Station 385, just north of Milford Street, the proposed centerline returns to the existing centerline. The local road which presently intersects U.S. 71 near Station 384 would be relocated to meet the highway at right angles, near Station 389. The old road would be closed, as would the road intersecting U.S. 71 near Station 400.

The local road intersecting U.S. 71 at Station 406 would be closed and the road at the south corporate limits of Arnolds Park would be extended to intersect the highway near Station 414. Very little additional right-of-way would be acquired in this area. Temporary easements would be acquired for shaping slopes and modifying driveways and entrances.

The Zephyr Drive intersection would be reconstructed at a right angle to U.S. 71. The proposed centerline departs from the existing centerline near Station 427, just north of Zephyr Drive, as the highway is shifted to the right. A specialty shop and a pizza parlor and motel office, all near Station 431, would be purchased and removed. A modernized traffic signal is proposed to replace an existing signal at the Lake Drive intersection, adjacent to the Arnolds Park Amusement Center. The house on the right side near Station 434 would also be acquired. At this point the highway centerline would lie approximately 50 feet to the right of its present location. Parking for several businesses in this area would be reduced.

The overpass of the abandoned C.M.St.P. and P. Railroad, near Station 435, has been removed, and the highway grade raised about five feet in that area. The new grade, sloping downward to the east and north would promote efficient surface water drainage. The

installation and maintenance of a traffic control signal at that point, in conjunction with the planned crossing of the Dickinson County multi-purpose trail, would be accomplished in accordance with current Iowa D.O.T. policies and procedures. Two houses on the right near Stations 437 and 438 would be purchased and removed, as would a specialty shop near Station 443.



Figure 7
Former Railroad Overpass

As U.S. 71 passes Lake Minnewashta, the proposed highway centerline would be very near the existing centerline; however, some additional right-of-way would be required on both sides. No construction activities are proposed in Lake Minnewashta, itself, although a secondary settling basin would be constructed near the lake. This feature would allow some of the suspended sediment to settle out and would reduce the tendency of the drainage water to stir up the lake bottom. On the left side of the highway an attempt would be made to retain the decorative stone retaining walls in front of several homes. However, several elm, ash, maple and oak trees in front of these homes would be removed.

(See Figure 8, located on page 58.)



Figure 8
Homes Opposite Lake Minnewashta

Near Stations 448 and 449 a house and a garage, respectively, would be removed, both on the left side. A combination retaining wall and sidewalk would be constructed in that area. The proposed centerline would be shifted to the left throughout the area in order to utilize the existing right-of-way line along the edge of the cemetery. The oil station on the corner of Sidney Avenue would be purchased, as would the car wash on the corner of Ida Street.

From Bascomb Street north to just south of the causeway, one business near Station 471, on the left, would be displaced. Several small right-of-way parcels would also be acquired and temporary easements would be necessary for shaping slopes and adjusting driveways. Businesses in this area would be affected by the removal of on-street parking spaces. Establishments not having parking lots or other convenient parking could lose patronage. (See Figure 9, located on page 59.)

Businesses which have long-standing reputations would, however, attract their old customers, even with some inconvenience, but in order for them to increase their patronage, they would need to re-establish customer parking.

A traffic signal installation is presently located at the Broadway Street intersection, adjacent to the school. The signal would remain in operation and would include pedestrian pushbuttons. See Figure 9.

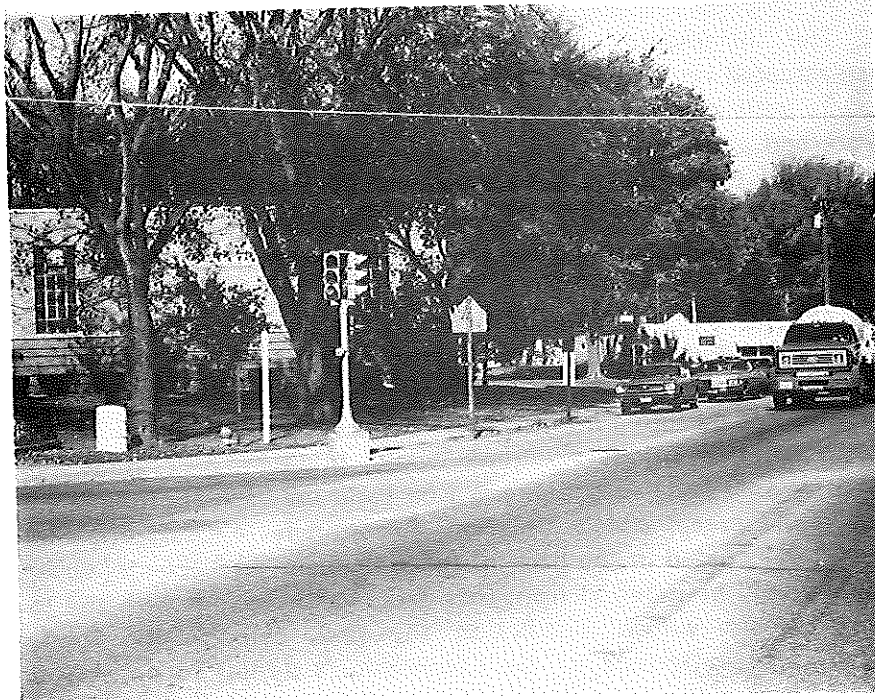


Figure 9
Intersection of Broadway St. & U.S. 71

Just south of the causeway area and on the right side of the highway, between approximate Stations 482 and 485, two separate parcels of land would be purchased, requiring the displacement of several building structures. These acquisitions are necessitated by a line shift, whereby the two new additional lanes would be constructed on the right side of the present causeway, in order to limit construction activity to the Lake East Okoboji side. The current concept in the area south of the causeway proposes shifting the alignment easterly approximately 20-25 feet. The toe of the foreslope on the east side would encroach up to 45 feet onto adjacent property, requiring the displacement of two motel units under the ownership of Reif's Grand Vue Beach Resort and Marina. A state-owned biology building (formerly utilized as a fisheries stripping station), located just north of the motel units, would also be displaced.

A secondary settling basin, into which the highway's storm sewer system in the area would drain, would also be constructed in that general vicinity. The storm sewer currently drains into Lake West Okoboji. The basin would be designed so as to remove, to the maximum extent practicable, any settleable solids present in the highway run-off, before entering the lakes. The secondary settling basins within the project corridor would provide the final treatment for storm sewer runoff before being discharged into the lakes. Surface water would initially collect in modified storm sewer intake wells (primary settling basins) throughout the corridor. The design of these intakes would be such that settleable solids would be allowed to settle out before the water is outletted into the secondary basins and finally, into the lake.

Near Station 485, where the abandoned C.M.St.P. & P. Railroad line formerly crossed U.S. 71, an at-grade crossing of the proposed Dickinson County multi-purpose trail is planned. The installation and maintenance of a designated painted cross-walk and pedestrian-actuated crossing signal at that point would be done in accordance with current Iowa D.O.T. policies and procedures. The signal would provide safe access between Claire Wilson Park and a City-owned beach on Lake West Okoboji. Since no parking is available on the west side of the highway, autos park in Claire Wilson and bathers cross from the east side of U.S. 71 to the beach. Access to Claire Wilson Park would be maintained to automobiles, and public parking would be available after completion of the project.

Shifting the highway alignment to the east through the causeway area would allow use of the existing right-of-way line along the Lake West Okoboji side. The widening into Lake East Okoboji would be accomplished by bridging the northerly 500 feet of the existing causeway, and not by filling into the lake. The new roadway alignment, including the south approach to the new bridge structure, would, however, necessitate some encroachment (from 22.5 to 33.5 feet) into Claire Wilson Park, between approximate Stations 487 and 491. This would create a 4(f) situation. Accordingly, a Draft 4(f) Statement has been prepared and is included in the back of this document, in Appendix D. Approximately 0.4 acre of land would be required from that park. In discussions with the Iowa Conservation Commission, under whose jurisdiction the park belongs, the Iowa Department of Transportation was informed of the Commission's desires to possibly develop a visitors center in that area at some time in the future. The reduction in size of that park, through the acquisition of highway right-of-way, would affect the number of available parking spaces, as well as future development plans for that site.

The Iowa D.O.T., in negotiations with the Iowa Conservation Commission regarding replacement land for that right-of-way taking, has investigated a parcel of land immediately south of Claire Wilson Park. The entire parcel includes a combination snowmobile sales and service and marina establishment, seven rental cottage units and five additional building structures, all under the ownership of Reif's Grand Vue Beach Resort and Marina.

As a mitigative measure to the use of park land, the Iowa D.O.T. proposes to provide replacement land through the purchase of that resort property. The replacement land provided would be of sufficient size so that it would be useable for the same purposes as intended on the affected property. A further discussion of park history, impacts to the park, and mitigation measures to be implemented, including replacement land, etc., is included in the Draft 4(f) Statement, in Appendix D.

North of Claire Wilson Park the causeway would be bridged by a 549.3-foot by 56-foot pretensioned, prestressed concrete and steel I-beam structure, between approximate Stations 491 and 496+50. Two 28-foot roadways are proposed with 5-foot sidewalks on either side. The total width of the bridge structure, including bridge and sidewalk railings, would be 71 feet. Piles up to 100 feet long and more, would be driven into the lake bed of Lake East Okoboji and through the existing causeway embankment to support the pier cap and roadway. The great length of the piles is required to penetrate peat material which underlies

the area and which averages from 36 to 69 feet in depth. Underlying the peat, into which the piles would be driven, are glacial clays. A set of approximately ten piles upon which the pier cap will rest, would be driven every 56.5 feet along the length of the causeway. Most of the piles would be driven through the existing causeway fill since the majority of the bridge would be constructed on that land mass. Only one to three piles would be in the water at each pile bent location (every 56.5 feet). See Figure 10 for a cross section of the proposed structure.

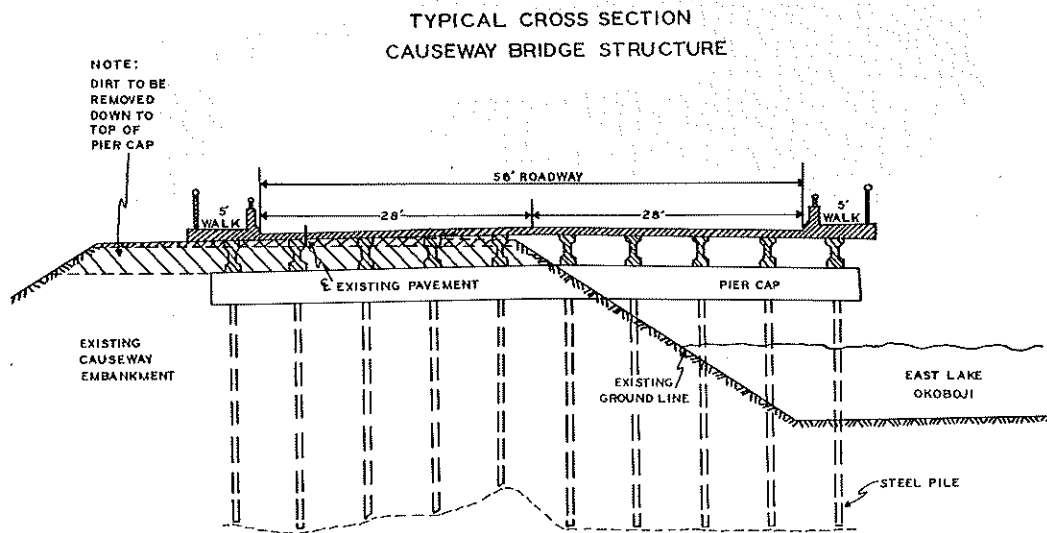


Figure 10

The existing 64-foot by 24-foot bridge over the inlet between Lakes East and West Okoboji (See Figure 11) would be removed. Both the existing north and south bridge abutments, however, would remain, to serve as partial retaining walls, and the existing water opening width would be retained. Surface run-off water on the bridge structure would be carried south in a storm sewer located beneath the pavement, and not allowed to drain directly into the lakes. The storm sewer would empty into the secondary settling basin located just south of the causeway area. A 12-inch sanitary sewer line, a three-inch gas main, and possibly other utility lines would also be located beneath the bridge deck. Figure 11 is located on page 62.

A total of five secondary settling basins are proposed to be incorporated into this highway project. In addition to the two previously discussed, near Stations 443 (Lake Minnewashta) and 484 (East Lake Okoboji, just south of the causeway bridge structure), three additional basins would be constructed within the corridor, in the City of Okoboji.

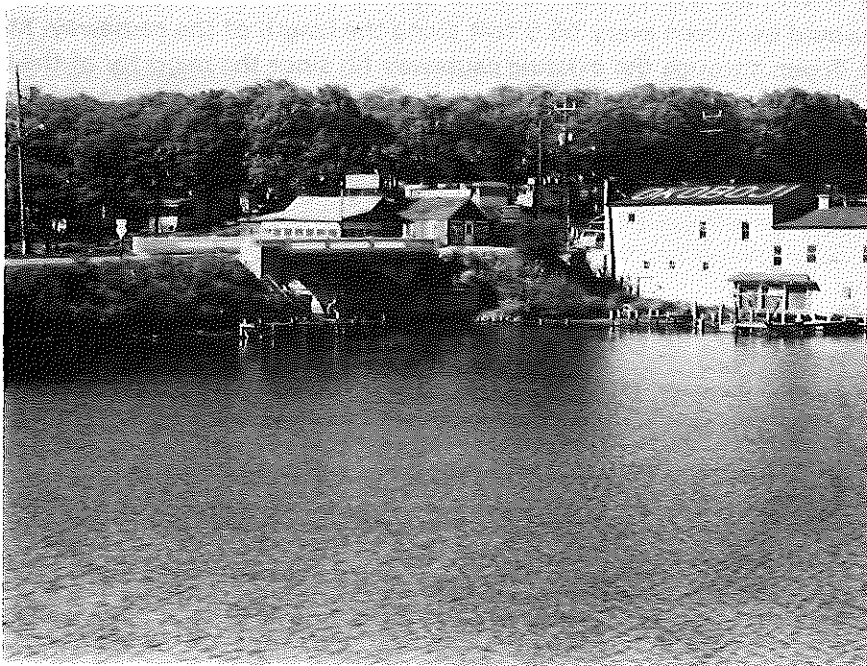


Figure 11
Existing Causeway Bridge

The third basin would be located near Station 497, just north of the new bridge structure on the Lake East Okoboji side. Storm sewer drainage which presently empties into Lake West Okoboji at that point would be diverted to the East Lake through this basin. The fourth basin would be in the vicinity of Station 512, also on the east side of the highway. The fifth settling basin would be constructed on the east side of U.S. 71, near Station 517. These basins would principally treat highway drainage picked up in the storm sewer system, before discharging the water into Lake East Okoboji.

As previously noted, no fill material would be placed in the Lakes to accomplish any of the proposed bridge construction or settling basin work. The Army Corps of Engineers, in March of 1978, thus concurred in our determination that a 404 permit is not required for this project. Their letter of concurrence is included as Figure 12.

Many people have expressed concern regarding the ecological effects of this project on the Lakes environment. Of major concern is the preservation of water quality in Lake West Okoboji. Besides the alignment shift to the Lake East Okoboji side and the decision to bridge the entire area, several features have been incorporated into the design of this project and would be implemented during construction to insure that the present water quality of the Lakes would be maintained after completion of the project. These measures include the construction of settling basins; the rerouting of all storm sewer outlets into Lake East Okoboji, through those basins; and the use of silt curtains and silt fences to minimize construction sediment entering the lakes.



DEPARTMENT OF THE ARMY
OMAHA DISTRICT, CORPS OF ENGINEERS
6014 U.S. POST OFFICE AND COURTHOUSE
OMAHA, NEBRASKA 68102

MROOP-N

16 March 1978

Iowa Dept. of Transportation
Highway Division
ATTN: Mr. Mark Looschen
800 Lincoln Way
Ames, IA 50010

RE: Proj. FN-71-9(5)--21-30

Dear Mr. Looschen:

Reference is made to your letter dated 31 January 1978, requesting our concurrence that a Department of the Army permit under Section 404 of the Federal Water Pollution Control Act Amendments of 1972 would not be required for the proposed causeway removal and bridge construction located between West and East Okoboji Lake in Section 20, Range 36 West, Township 99 North, Dickinson County, Iowa.

Based on the information submitted in your letter and the telephone conversation with Mr. Sage of my staff on 15 March 1978 stating:

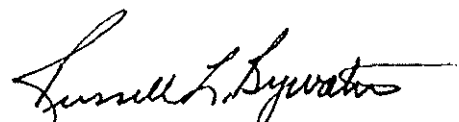
- a. That all bridge construction would be accomplished by using the existing causeway for the work platform and no fill material would be placed for causeways, cofferdams or any other purpose.
- b. That the removal of approximately 30 feet of the existing causeway to provide for two-way boat traffic would involve excavation only. (The existing causeway being made up of mostly boulders, the excavation would leave a riprap looking effect as no fill material will be placed for cover.)
- c. The fine mesh silt curtain around the excavation activity would not be considered fill.

Accordingly, a Department of the Army permit would not be required for the construction as proposed.

This letter does not obviate the requirement to obtain State and local assent as required by law.

If you have any further questions, contact this office or call Mr. Robert Sage at (402) 221-4172.

Sincerely yours,


RUSSELL L. BYWATER
Chief, Operations Division

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FIGURE 12

Silt curtain barriers would be provided at specific construction locations in the causeway area, encompassing all areas where bridge pier placements are proposed within the waters of Lake East Okoboji. By the specific and controlled placement of these silt barriers, siltation due to construction activities can be minimized. See Section VII, MEASURES TO MINIMIZE HARM, for a more thorough discussion of this and other mitigation measures.

In the City of Okoboji, between the bridge and Union Street, right-of-way would be acquired on the right side of the existing highway, requiring the acquisition and removal of a Kentucky Fried Chicken establishment and a specialty shop, located at Stations 498 and 499, respectively.

Right-of-way acquisitions through the remainder of Okoboji, north of Union Street, would average between 10 and 15 feet and would be acquired on the left side of the roadway.

Although no mobile homes would be permanently displaced by the improvement in the area immediately north of the causeway, it would be necessary to temporarily relocate 17 trailers due to their close proximity to the construction activity. This activity would include the construction of a retaining wall and chain link fence, from approximately Station 498 to Station 505. Approximately 30 bur oak trees adjacent to U.S. 71 in the area of the trailer park would also be removed by the construction.

No parking is presently permitted on the highway through Okoboji. Several businesses, however, presently use parking spaces that are within the existing right-of-way. Some of these spaces would be eliminated by the construction. Curb construction would concentrate access at driveways. Thus, even though no additional right-of-way is required on the right side, available parking areas would be reduced for several businesses.

A small parcel of right-of-way less than five feet wide and a temporary easement to shape slopes would be required at Brook's Country Club, on the left side. The acquisition and construction would not interfere with the way in which the golf course is played, however, since the land required is along the extreme edge of one hole.

Near Station 527 the highway would taper out to provide a variable-width painted median, to approximate Station 536. The local road that presently intersects U.S. 71 near Station 534 would be relocated to the north so that the intersection is opposite the motel and Country Club entrance, near Station 535.

From this point northerly the highway, within the rural area, would consist of four lanes divided by an approximate 20-foot median. The existing highway would be resurfaced in some areas while reconstructed in others to serve as the two southbound lanes. See the aerial plates in Appendix B for specifics. Two new 12-foot lanes would be constructed on the right, parallel to the existing roadway, for northbound traffic. Six-foot inside and ten-foot outside shoulders would be provided. Median crossovers would be provided for access as shown in the aerial photographs. Where heavy traffic is anticipated, left-turn storage lanes would also be constructed.

Right-of-way would be acquired on both sides of the highway, although most of it would be required along the right or east side. A borrow area of approximately 8.6 acres would be acquired across from the miniature golf course, between approximate Stations 542 and 550, to provide fill for the northbound lanes. In some places access drives would be built to serve several properties at a common entrance. It would thus be possible to locate entrances to conform to the standards for Class III access control, giving primary consideration to the through traveler.

From Okoboji to Spirit Lake, most of the additional right-of-way to be acquired is cropland. A few timbered areas, however, would also be traversed, requiring the removal of several mature trees. Selective clearing, however, would be utilized, whereby only those trees within the construction limits or the recovery area would be removed. Allowing trees to remain where possible would improve aesthetics as well as preserve a portion of the existing habitat for wildlife.

As the highway approaches the south corporate limits of Spirit Lake (approximate Station 640), a raised median, varying from 16-20 feet in width, is proposed, to be utilized within the corporate limits of that community. Ten-foot outside shoulders would remain. The U.S. 71-Iowa 9 intersection would be reconstructed by removing the existing radius curves and building a new "T" intersection. A 4.4-acre borrow area on the right, just south of the corporate limits, would provide fill for the project.

Six mobile homes would be displaced on the left side, between approximately Stations 649 and 652. Additional right-of-way would be acquired on both sides through this area.

A total of five houses, six mobile homes, 14 businesses, a state-owned lab building and several garages and other small sheds and signs would be permanently displaced by the proposed project. Approximately 35 people would have to be relocated and about 35 acres of land would be diverted to highway use under the provisions of the construction alternate. In addition, 17 mobile homes and approximately 51 individuals would also be temporarily relocated during the highway construction process.

Three borrow areas have been located to provide fill material for the construction of this project. These areas are shown on Aerial Plates 5, 17, 23 and 24 in Appendix B. Area A has approximately 1.8 acres; area B has approximately 8.6 acres; and area C has approximately 4.4 acres. All three borrow areas include cultivated land usually planted in row crops, and all are proposed to be dry type borrows, as opposed to lake or pond types.

All borrow areas would be planned for restoration by means of removing and replacing the topsoil, except in those areas which obviously would not require topsoil replacement. Such areas include lake or pond type borrows; borrows in urban areas and sites having potential for development; borrow areas where no topsoil exists in its original condition; and, borrows where restoration by fertilizing, mulching, reseeding or other appropriate measures to provide vegetative cover or prevent erosion is specifically documented and agreed to by the property owner involved prior to plan completion. Borrows which are incorporated into the project as an integral part of the roadway design by means of widening ditches and/or flattening backslopes in areas of normal excavation shall be treated in the same manner as the remainder of the project. No borrow areas would be located on federally-owned land.

The "Do-Nothing" Alternate provides for present conditions to remain unchanged. While such an alternate eliminates construction and relocation costs, and adverse impacts on the environment, it does nothing to improve existing conditions. The benefits of doing nothing must be carefully weighed against the predicted increases in traffic volumes and subsequent congestion and reduced travel efficiency. As presented in Section I, the need for improving U.S. 71 in the project area has been demonstrated.

SECTION V. THE RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

It is important to discuss the extent to which the proposed improvement involves trade-offs between short-term and long-term social, economic and environmental effects. These effects can be beneficial to the area while also restricting future options for resource use.

Improved traffic service would be the main benefit of the project. Driving on U.S. 71 in the project area would become safer and more convenient. The traffic congestion and long delays that are now common in the summer months would be reduced.

These benefits would be accompanied by some environmental losses and some risks of long-term environmental costs. Improving travel conditions within the region could increase the Lakes' popularity. As a result the project could generate additional traffic which would contribute to higher air and noise pollution levels.

Improved accessibility may also increase pressures for additional development of the region's resources. Demand for both seasonal and permanent housing may increase. Service demands for public utilities may also increase. The extent upon which this new development could adversely affect the region's long-term productivity will depend, in part, on the way in which it is regulated by local planning and zoning authorities and by other local groups and governmental agencies. Short and long-term environmental costs could be associated with this project. These losses include the displacement of people and businesses, the removal of trees, the diversion of cropland, etc. There could also be some effects on the water quality of the lakes during and after construction. However, steps would be taken to avoid this possibility.

The proposed project would also limit the options for future use of the corridor. Land utilized for the project would be exclusively committed to highway use. Land use adjacent to the divided portion of the highway could be influenced somewhat by access control in the area. Again, these impacts would depend on local land use planning and zoning regulations.

Some of these changes in the local environment will occur whether or not U.S. 71 is reconstructed. New development will probably be attracted to the area. Noise, air and water pollution are also likely to increase. The highway project would be associated with similar changes and would contribute to these trends.

SECTION VI. COMMITMENTS OF RESOURCES

In the construction of public works projects there are irreversible and irretrievable commitments of resources. Resources may be committed either directly or indirectly. These commitments must be weighed, along with other project costs, against the benefits derived from the new highway.

One of the principal resources that would be committed to this project is the land acquired for right-of-way. The corridor communities are a significant recreational and economic resource for northwest Iowa. The unique quality of Lake West Okoboji has established the importance of this natural resource. Much of the land use along U.S. 71 is related to the area's recreational character. Some of this land would be acquired for highway right-of-way.

A second commitment involves the lakes themselves. As stated in Section V., the project could create a demand for more intensive land use, which could then contribute adversely to the water quality of the lakes. The significance of these indirect impacts on the lakes would depend on the extent to which new development is regulated.

Other resources to be committed in this project are discussed in the following paragraphs:

Space - This includes the surface, sub-surface, and air space. In some cases there are multiple use possibilities for space over, under, and around a highway project. The most common example of this multiple use of space is the accommodation of utility lines in the highway right-of-way. In this project there are few possibilities for multiple use of space. One, however, is the development of the Dickinson County Trail within the U.S. 71 right-of-way.

Land and Vegetation - Land that is presently used for crops, wildlife habitat and pastureland would be diverted to transportation use. Parking spaces and front yards would also be diverted in the urban areas. Land diversion includes the removal of trees, grasses and forbs, all of which support a variety of animal and insect species. The significance of these trade-offs would depend on whether the anticipated benefits derived from the facility exceed the adverse impacts.

The rural portions of the project would convert agricultural land to transportation use. A total of approximately 35 acres of land would be so diverted. These are areas of cropland, pasture, and timber. Twenty-seven of these acres are considered prime farmland. Although it would be technically possible to someday restore this land to agricultural use, it could not be made as productive as it is today. Thus, the commitment is, to that extent, irreversible.

Construction materials - These include cement, sand, gravel, asphalt, steel, aluminum and other products typical of large-scale construction. In all probability, these elements would be permanently committed. In the event of future highway removal, however, some of the metals could be recycled and the aggregate used for other purposes. Any re-use of construction materials would depend on needs and economics at the time.

Construction equipment and motor fuels - Wear and tear on heavy equipment is an irreversible commitment. The recent realization that sources of energy are becoming more scarce has forced construction equipment manufacturers to expand their efforts to make safe, long-lasting, heavy-duty machines that will operate efficiently.

The use of diesel fuels, gasoline, and lubricants in construction means that they would be less available for other uses such as heat or power generation. In view of this and the current energy situation responsible utilization of these resources must be emphasized. These petroleum products are to be irreversibly committed to a long-term investment.

Future commitments - By constructing a section of road a commitment of future public expenditures is made. These expenditures are chiefly for maintenance and law enforcement.

SECTION VII. MEASURES TO MINIMIZE HARM

Water Quality

Perhaps the major concern of this project is the effect it would have on the water quality of the lakes. The watershed areas of Lake West Okoboji, Lake East Okoboji, and Milford Creek are affected by the project. The most sensitive segment of the project includes the causeway area and bridge connecting the Cities of Arnolds Park and Okoboji. This segment traverses the water connection between Lakes West and East Okoboji. Objections were originally raised over the placing of granular fill into Smith's Bay of Lake West Okoboji in order to widen the causeway to accommodate a four-lane roadway. Some of the residents and resort owners feared that the fill operation would cause pollution to the Lake and would jeopardize its aesthetic and recreational qualities.

Since early project development the concept has been revised whereby construction would be limited to the Lake East Okoboji side, only. A further decision, to bridge the northerly 500 feet of the causeway area, would permit construction without the placement of fill material into that lake. Only bridge piers would be placed into its waters. These decisions, in themselves, would reduce the threat of pollution to Lake West Okoboji.

Because of the various expressed concerns, however, additional precautions would be taken during grading and paving operations to control erosion and siltation from exposed, bare slopes from entering the lakes. These measures would be incorporated into the construction contract, and would include temporary stilling basins (to be constructed and maintained by the contractor), a silt curtain within the lake, silt fences throughout the remainder of the corridor, contouring, mulching and the immediate seeding of stabilized crops on exposed earth. Detailed specifications outlining these safety precautions within the project area would be included in the final design plans. These specifications would ensure that the water quality of both Lakes East and West Okoboji would not be degraded by this improvement.

To alleviate the potential siltation hazard to the lakes in the causeway area a floating silt curtain would be utilized as a barrier to contain sediments and fine clay particles resulting from construction activities. The silt curtain would be secured to the lake bottom by weights attached to the sides and bottom of the curtain. Occasional posts or pilings would be driven into the shoreline, the causeway embankment and/or the lake bottom to stabilize the barrier and counter the movement by wave action. The barrier would be placed around all construction activities in the causeway area which could potentially result in contamination of the lakes, specifically encompassing all areas where bridge pier placements are proposed within the waters of Lake East Okoboji. The curtain would not be strung across the waterway opening between the two lakes. After the construction work is completed and the silt and sediments have settled out, the silt curtain would be removed from the lake.

Silt fences, made of filter fabric attached to a woven wire fence, would be erected throughout the construction limits on the remainder of the highway project, wherever

runoff sediment posed a potential problem. In fill sections, the silt fence would be constructed longitudinally to the highway centerline, at the toe of the slope. In cut sections the fence would be installed transverse to the centerline, at frequent intervals, in order to intercept sediment-laden runoff from the project area. The construction contract would specify that the contractor erect these fences at the end of every work day and whenever wet weather threatened to interrupt construction activities. The sections of transverse silt fence would be staggered throughout the cut sections to allow maintenance of traffic at all times. Silt fences would also be erected around all intake wells within the project limits. Once construction is complete and the silt and sediments have settled out, these silt fences would be removed.

Other measures which have been developed for this project to protect the water quality include primary and secondary settling basins and the relocation of storm sewers and highway drainage outlets from Lake West Okoboji into Lake East Okoboji. All storm sewer intakes throughout the project corridor would be modified to allow settleable solids to settle out before being outletted. These primary settling basins would be located at selected locations as specified on the design plans. Water from these intakes would be carried into one of the five secondary stilling basins as identified on the aerial plates. One of these would empty into Lake Minnewashta while the remaining four would drain into Lake East Okoboji. These basins would be designed to remove, to the maximum extent practicable, any settleable solids present in the highway runoff, before being discharged into the lakes. No storm sewer water would be discharged directly into any of the lakes. The State would maintain all settling basins.

According to Bachmann(3), water from storm sewers contain high concentrations of nutrients which stimulate the growth of nuisance algae. Inquiry into this problem has indicated that it would be desirable to relocate the highway drainage outlets into the East Lake, since it has a comparatively lower water quality. Thus, all water collected within the roadways storm sewer system in Section II of the project corridor (the Arnolds Park and Okoboji urban areas) would be diverted into either Lake Minnewashta or East Lake Okoboji. The outlets in this Section which now empty into West Lake Okoboji would be relocated to empty into the East Lake. Two of these existing outlets, near the causeway area, are presently located at approximate Stations 485 and 496.

Plans for the highway improvement do not include any change in the causeway embankment extending into Lake West Okoboji or to the waterway opening between the two lakes. The existing bridge abutments would also be left in place. No material would be dredged from nor will any fill material be placed into any of the lakes within the project area.

Mowing and Spraying Practices

The Iowa Department of Transportation's policy to limit mowing was instituted to cut maintenance costs and improve wildlife habitat. Before July 1, only the shoulders and a single swath along the foreslopes are mowed. Backslopes and ditches are left in their natural

state. After July 1, medians and weed patches are mowed. Bridge berms and similar areas are planted with ground cover plantings such as crown vetch, thus eliminating the need for mowing.

Blanket spraying of the right-of-way is no longer practiced. The use of herbicides, mainly 2-4D is limited to the control of noxious weeds. When spraying is necessary, the herbicide is applied in an emulsion form to minimize drift. The growth of weeds is discouraged by a dominating cover of grasses. Reduced spraying and mowing also helps keep weeds from becoming established in the rights-of-way.

Management of Right-of-Way for Wildlife Habitat

A total of 3.07% of Iowa's land area is utilized for all existing highways, streets, and county roads; of this, only one-third is roadway and two-thirds are rights-of-way. This land in right-of-way represents potential wildlife habitat. A statewide policy of limited mowing and selective spraying provides vegetation year-round on the highway backslopes and ditches. This policy of delayed mowing was instituted to insure that nesting habitat within the right-of-way was not disturbed during the peak nesting periods. Today, the roadside cover of ditches and slopes is especially valuable to wildlife since wooded areas and fence row cover in Iowa are being removed, as more land is being placed under cultivation.

Salting Practices

Current maintenance policies of the Highway Division incorporate practices to guard against the adverse effects of deicing salts. Improved salt spreaders and calibration methods insure that only the amount needed to do the job will be applied to the pavement. Maintenance foremen are charged with the responsibility of exercising good judgment in determining where to salt and how much to salt.

Results of studies reprinted by the Salt Institute indicate that salt can cause contamination of some water sources near roadways. However, pollution of wells, ponds and streams is small, and contamination usually requires heavy salting very near the well or water source.(12)

Salt can also injure roadside vegetation, but it does not appear to cause widespread damage to grasses. Trees most sensitive to increased saline concentrations are white pine, hemlock, sugar maple, red maple, balsam fir, basswood, and elm. Most of these species are not found in the U.S. 71 study area. Certain plant families and plant species are also more tolerant to salt. Selective planting of these in the right-of-way can reduce salt damage.

In 1975, the Highway Division of the Iowa Department of Transportation modified its "bare pavement" policy. Widespread use of roadway deicers had been the primary means for implementing this policy to create wintertime roadway safety. The new policy outlines different procedures for Priority 1 and Priority 2 highways.

Priority 1 highways include freeways, expressways, major commuter routes and arterial highways. Maintenance for these highways provides storm snow removal and a near normal road condition within 10 hours after a storm ends. A 50-50 sand-salt mixture is utilized for snow and ice control.

Priority 2 highways include arterial connectors, trunk routes and stub routes. On Priority 2 highways, the inside wheel track surface is made bare enough to provide traction within 24 hours after a storm ends. During the course of a normal storm, sand only, is utilized for hazardous locations, including hills, curves, bridges, stop signs, and railroad crossings.

U.S. 71 in the project area is a Priority 1 highway.

Conservation of Top Soil

Top soil is removed and stockpiled from construction areas to preserve one of Iowa's natural resources. It is also salvaged from borrow areas at the discretion of the land owner. Later the soil is replaced in order that the productivity of the land will be maintained.

Section 404 Consideration

Section 404 of the Federal Water Pollution Control Act (PL 92-500, 86 Stat. 816) authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits, after notice and opportunity for public hearings, for the discharge of dredged or fill materials into the navigable waters at specified disposal sites.

The Army Corps of Engineers has determined that since no fill material will be placed into any of the lakes within this study corridor, a 404 permit will not be necessary for this project. See Figure 12, page 63.

Controlled Burning of Solid Wastes

Landscape wastes will be created as a result of clearing, grubbing, and construction operations. These wastes may be used in the project fill, hauled to a suitable landfill or burned on the premises. As stipulated by the Iowa Department of Environmental Quality administrative guidelines, open burning for the disposal of landscape wastes originating on the premises and produced in clearing, grubbing or construction operations is allowable only if such burnings are limited to sites at least one-quarter of a mile from any human habitation.

Open burnings do create infrequent, short durational air pollution situations which do not permanently alter the local air quality but will contribute additional particulates and hydrocarbons to the atmosphere.

Control of Fugitive Dust

Iowa's air quality standards require that certain measures be taken to control fugitive dust. As stipulated by the Iowa Department of Environmental Quality, the contractor will

take reasonable precautions to prevent particulate matter in quantities sufficient to create a nuisance, as defined in Section 657.1 of the Iowa Code, from becoming airborne. Fugitive dust precautions include application of suitable materials, such as asphalt, oil, water or chemicals to areas giving rise to airborne dust. Installation and use of containment or control equipment to enclose or limit the emissions resulting from the handling and transfer of dusty materials, such as aggregates, are required. Open-bodied vehicles transporting materials likely to give rise to airborne dust must be covered at all times when in motion.

Relocation of Individuals and Businesses

To reduce displacement hardships caused by highway land acquisition, eligible individuals and businesses would receive compensation through acquisition payments supplemented by relocation assistance. The acquisition payment is the payment made to the owner for land and buildings. This amount is based on fair market value as determined by current sales and current prices. In addition, the Iowa Department of Transportation, under the provisions of the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and Chapter 316, Code of Iowa, 1975, would provide relocation assistance to all eligible relocatees of a highway project. The relocation assistance program assists owners and tenants displaced by a highway project by acquiring decent, safe, and sanitary housing for them. Both tenants and owners qualify for relocation assistance by meeting minimum residency requirements. Any individual or family who has owned and occupied or rented a dwelling for at least 90 days before the start of negotiations may be eligible to receive payments for residential moving expenses, closing costs incurred in purchasing another dwelling and, possibly, a replacement housing payment. Any individual or family that has owned and occupied their own home for at least 180 days before the start of negotiations may be eligible for additional compensation to offset increased interest payments on a replacement dwelling.

Programmed replacement housing as a "last resort" is provided for under Section 206 of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. This Act stipulates that if the local agency determines it is in the public interest to proceed with the construction of the Federal-Aid project and it cannot do so because of an inadequate supply of comparable replacement housing, then it may, as a last resort, provide the necessary housing by use of funds authorized for the highway project.

In the case of mobile homes, payment can be made to mobile home owners for the cost of disconnecting the unit at its present location and reconnecting it at a new location. This payment will cover all moving costs for distances up to fifty miles. Instead of actual relocation costs, however, the owner may accept a fixed payment based on the width of the unit and the distance it will be moved.

Twenty-three of the 28 residences that will be either permanently or temporarily displaced by the proposed project are mobile homes, which could be relocated to other mobile home sites. A housing survey taken in December, 1978, which included the four mobile home parks in the area, found monthly pad rentals ranging from \$45 to \$70. At that

time, three of the parks had no vacancies, while the fourth had only two vacant pads. One park is currently adding four pads, and the owner indicated that vacant pads are usually rented the same day. As a result, finding available, desirable replacement locations for the mobile homes may be a problem.

The housing survey previously cited also indicated that the area normally has an abundance of single family residences for sale at any given time, with average prices currently at \$45,000-\$55,000 for a three bedroom house. At the time of the survey, Milford had approximately 22 homes for sale, while the Arnolds Park, Okoboji and Spirit Lake area had roughly 200 homes for sale. Residential construction costs currently run about \$35-\$40 per square foot. This would indicate that there are sufficient replacement homes for sale in the area to accommodate the relocatees.

A short waiting list exists for low income units in Milford. Forty-four new low income units are under construction in Spirit Lake. Housing costs for these units are approximately \$130 per month.

Commercial property is available and per foot frontage costs range from \$300-\$600. Although highway frontage along U.S. 71 in the immediate area is often difficult to find, replacement buildings and lots not immediately fronting the highway can be readily found.

Salvage and Removal of Buildings

Special provisions for salvage operations and removal of buildings are written into the contract specifications for all highway projects. Before commencing, the contractor is required to exterminate all rodents and other pests at the site in a manner approved by the appropriate health authorities. The contractor shall seal all storm and sanitary sewers leading from the structure and shall top off all service lines and water mains in accordance with local regulations governing such work. The contractor shall be subject to all state and local regulations governing the removal and disposal of buildings and shall take all precautions to insure the safety of workmen on the site, and of the public. He is required to provide barriers adjacent to the structures being removed, warning signs and adequate night-time lighting. Masonry is to be thoroughly dampened during salvage operations to prevent spread of dust; excavations are to be backfilled within two weeks of building removal.

Regulation of Outdoor Advertising

Iowa legislation defines what kinds of outdoor advertising are permitted within visibility of primary and Interstate highways. The law restricts location and spacing of signs, sets standards for size and lighting, and provides for the removal of those signs which fail to comply with regulations.

Applications for sign permits are made through the Iowa Department of Transportation and require a fee. These permits help the Department in monitoring and controlling the outdoor advertising devices. By law these devices shall not be erected, maintained or

illuminated in a manner which interferes with official traffic signs or with the motorist's view of approaching, merging or intersecting traffic. Signs advertising the sale or lease of property on which they are located, are exempt from these regulations. So are signs advertising activities conducted on the property on which they are located, official traffic control devices, and public service information signs.

Compensation payment is provided by the Iowa Department of Transportation when new highway construction requires temporary removal of lawful signs. Monies collected from the advertising permit system are deposited in the Highway Beautification Fund. This fund is for the administration, control, acquisition and removal of advertising devices. The purpose and effect of this program is to promote safety, provide convenience, and make the highway corridor more aesthetic for the motoring public.

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SECTION VIII. IMPACTS ON PROPERTIES AND SITES OF HISTORIC AND CULTURAL SIGNIFICANCE

"Cultural resources are sites, structures, objects, and districts significant in history, architecture, archaeology, or culture." (Wright, 1974, p.xi.)

In order to protect those features of our environment which remind us of our cultural heritage, the Iowa Department of Transportation has developed a program for the systematic identification of cultural resources which may be affected by proposed highway improvement projects. The program is designed to provide for early identification and evaluation of these effects in order to insure that project location and design decisions are made in an informed manner. Steps in the program, in their normal order of occurrence, include: (1) early contact and coordination with the Office of the State Archaeologist (OSA) and the State Historic Preservation Officer (SHPO) at the time of project A-95 Review; (2) survey and report preparation activity by the Iowa DOT staff Cultural Resources Specialist for historic and architectural resources; (3) archaeological survey and report preparation by OSA's Highway Surveys Archaeologist; (4) submission of a combined Cultural Resources Survey Report to the SHPO for review and comment; and (5) written response by the SHPO based upon his review of the report. Every effort is made to complete this sequence and obtain a written response from the SHPO for inclusion in the Draft Environmental Impact Statement.

At this time, the archaeological survey has been completed (July, 1975) and a further assessment of the projects impacts on historic and architectural resources is in progress. The combined Cultural Resources Survey Report will be submitted to the SHPO for review, and a letter of comment will be requested. Highlights of the cultural report and the SHPO's response will be included in the Final EIS. The previous archaeological survey resulted in the finding that the project would not impact any prehistoric resources. Refer to page 88 for the letter from the State Archaeologist.

National Register Sites

At the present time three properties located in Dickinson County are listed in the National Register of Historic Places. Only one of these properties, however, is located within the project area, a brief description of which is provided below:

SPIRIT LAKE MASSACRE LOG CABIN, Arnold's Park; Settlement, Architecture. This was the site of a major incident between Sioux Indians and white settlers, one of several encounters during a two-day period in early March, 1857, that have collectively been referred to as the Spirit Lake Massacre.

The Cabin is located several blocks north of U.S. 71, in Arnolds Park; therefore, this proposed highway improvement would have no effect upon that site.

SECTION IX. COMMENTS AND OBJECTIONS

As previously documented in the introduction to this report, this project was originally developed as a federally non-participating project. However, due to the environmentally sensitive nature of the study area, Draft and Final Environmental Impact Statements were prepared and distributed in a similar manner as for federal-aid projects.

This section of the report contains letters received from reviewing agencies and the general public commenting on that initial Draft EIS (FN-71-9), circulated in April, 1975. Also included are our responses to their comments.

Following is a list of those agencies to whom that statement was circulated. An asterisk denotes those agencies and organizations whose comments were received within the prescribed period of reviewing time.

Federal Agencies:

- Department of Health, Education and Welfare
- Department of Housing and Urban Development
- * Department of Agriculture
- * Department of the Interior
- * Environmental Protection Agency
- * Army Corps of Engineers
- Federal Highway Administration

State Agencies:

- Iowa Development Commission
- Department of Soil Conservation
- * Iowa Conservation Commission
- * Iowa Natural Resources Council
- Department of Environmental Quality
- * State Historic Preservation Officer
- Office of the State Archaeologist
- State Historical Society of Iowa
- * Office for Planning and Programming

Local Agencies:

- Northwest Iowa Regional Council of Governments
- * Dickinson County Board of Supervisors
- Dickinson County Conservation Board
- Mayor, City of Milford
- Mayor, City of West Okoboji
- Mayor, City of Arnolds Park

*Mayor, City of Okoboji
*Mayor, City of Spirit Lake
*Iowa Lakeside Laboratory
Iowa State University

Private Organizations:

East Okoboji Lakes Improvement Corporation
*Okoboji Protective Association
Dickinson County Farm Bureau
Iowa Confederation of Environmental Organizations

This new Draft EIS (FHWA-IOWA-EIS-79-01-D) will again be circulated to the proper governmental agencies for review. Copies will also be made available to the public. After sufficient time has been allowed for review, a public hearing will be held, giving interested persons and agencies an opportunity to express their views on the proposed project.

Following the hearing, the Iowa Department of Transportation and the Federal Highway Administration will examine all data, statements and pertinent information, and prepare a Final EIS, before proceeding into the final design stage of project development.

retention of some of the ties to and colorful features of past decades are involved in the emotional appeal of scenic drives. The loss of such places as the Fisherman's Wharf and the large oak trees in the area are examples of our objections.

No mention of a left-hand turn provision is included in the statement for west-bound traffic at station 500, nor is any included in the aerial. In our opinion this is now one of the most hazardous areas. Trying to cross one lane on heavy traffic periods is risky now, but what about two or three lanes and higher speed traffic? (Again we mention the Fitzgibbons plan.)

Page 44. The O. P. A. does not concur that this highway should be another freeway with its high-speed traffic. Your statement concedes that 88 per cent of the traffic on this stretch is of local origin. These local people know that traffic flows at a moderate pace and don't expect to speed through it. Many consider it a scenic drive and want it retained as such, not a speedway.

Page 45. Measures to Minimize Harm. The planned contouring of the construction area to retard run-off might reduce erosion provided there were no heavy rains. The stilling basin provision might also be effective. But rainfall measuring up to 8 inches in a 24 hour period has been experienced, (July, 1965), and three inch rains are not uncommon. It is doubtful that any contouring, stilling basins or silt trap devices would be effective in averting catastrophic siltation during construction. The diversion of storm sewers to East Okoboji would of course help the West Lake, but East Okoboji residents would resent it.

CONCLUSION

In addition to the deep apprehension concerning the adverse environmental aspects of the proposed new 4 lane highway, the Okoboji Protective Association is concerned that it would stimulate additional business and "progress." This would increase the population by the lakes. The consensus of the O. P. A. can be summed up by paraphrasing a term used by the Department of Environmental Quality. The Iowa Great Lakes region has reached its "absorbitive capacity" in terms of people, congestion, traffic, promoters, and developers. So called "planned progress" still means more people and further taxing of the limited resources of the lakes to accommodate increasing demands for water oriented recreation.

The Environmental Impact Statement mentions, but understandably glosses over the long term environmental losses. It poses threats of long-term economic losses due to the projected increased

Grades have been modified in the area mentioned, to provide improved sight distance.

The speed limit on the highway will remain 35 mph. Vehicles, however, will have an additional travel lane in which to avoid turning traffic, ahead of them.

See Section VII, under Water Quality, for provisions that will be implemented to mitigate adverse water quality impacts.

See Section II, under Social Impacts, Economic Impacts, and Impact on Community Values, which addresses some of these concerns. In addition, see Section V.

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traffic and air pollution. The last paragraph on page 41 is wholly unacceptable---"Failure to build the proposed improvement would represent an acceptance of long-term economic and environmental losses." Our position is in diametric opposition ---Failure to build ---Would represent insurance of environmental stability, no increased erosion hazard, no additional salinity hazard, no loss of valuable trees or valuable farm lands, no loss of scenic drive, no threat of further economic "progress."

The O. P. A. is in favor of improving the traffic safety factors in this stretch of highway, and has advocated the Fitzgibbons plan for adequate left-hand turn provisions at critical intersections. We respectfully urge the Department of Transportation to seriously consider this proposal which in our judgment would be much safer than the planned 4 lane and certainly far less expensive.

Respectfully,

Earl T. Rose, President
Okoboji Protective Association
R. R. 3
Spirit Lake, Iowa

That statement has been removed from this Environmental Statement.

810 West Benton - 106
Iow City, Iowa
Apr 11, 1975

The Honorable Robert Ray
Governor
State House
Des Moines, Iowa
50319

Dear Governor Ray:

My concern focuses on the negative ecological effects the proposed widening of highway 71 from Milford to Spirit Lake would have on the great lake area of Iowa. Aside from losing many valuable mature trees by this project, the widening of the isthmus between East Okoboji and West Okoboji would cause irreparable damage to the west lake and its plant and animal life.

The erosion of the land and siltation from this construction needs to be considered seriously in the study of Project FN-71-9. The Iowa Highway Commission has suggested the use of a plastic screen-type system placed in the water to control the amount of siltation during construction, but this system has serious drawbacks when viewed in regard to the climate of the area. The chances of the plastic screen (untested in Iowa) withstanding severe summer storms, thick ice cover, and large amounts of drainage in the spring during the years of construction, are slight, thus allowing increased filling of the lake with soil particles that will spread quickly, muddying the esthetically pleasing blue water.

So far, there has been no recorded effect on the plant and animal life of the lakes from pollution or siltation. The widening of the isthmus, however, would permit more flow of algae and silt from the east lake to the west, filling the shallow spawning grounds of several species of fish. The increased flow of already muddied water would add to the eutrophication of West Okoboji - the filling of the lake by abundant algae growth, the death of many fish from lack of oxygen - the result being a virtually unproductive body of water for recreational purposes.

One other consideration cannot be overlooked; the necessity of purifying this water that serves four area towns. Okoboji, Arnolds Park, Milford, and Whapeton depend upon water drawn from West Okoboji for all of their pure water needs. With increased siltation and eventual eutrophication, the cost and upkeep of chlorination and overall purification would be substantial.

I can see no ecological or economic advantage to this project, and feel that the widening of the isthmus is too great a risk when dealing with Iowa's main recreational area. My concern is to keep the ecological balance of this area unaltered and the only blue water lake in America as clean and unpolluted as long as possible. I feel that intense evaluation of these potential problems cannot be ignored or overlooked.

Sincerely,

Sara J. Ingram
Sara J. Ingram

Stringent precautionary measures would be taken to avoid causing irreparable damage to Lake West Okoboji. See Section IV, ALTERNATIVES, and Section VII, MEASURES TO MINIMIZE HARM.

The silt curtain would only be used for one construction season and would not need to stay in place for several years. This would be possible due to the construction scheduling as proposed in Section I of this report. The curtain would be removed after the silt has settled out, following construction.

The silt curtain to be utilized is designed to withstand adverse climatic conditions. The material is extremely strong, yet porous enough to allow for the passage of water through it. The curtain would be weighted down and would possibly have to be attached, by pilings, to the shoreline, the causeway embankment and/or the lakebed.

See Sections IV and VII of this report, where these concerns are addressed. In addition, Appendix C in this Environmental Statement contains information on the historical changes in plant life which have occurred in Lakes East and West Okoboji. For additional information see the following references:

Water Quality in the Iowa Great Lakes, Project No. 1779 of the Iowa Agriculture and Home Economics Experiment Station, 1974, by R. W. Bachmann and J. R. Jones.

Iowa Lakes and Lake Beds, 1917, Iowa State Highway Commission, Des Moines, Iowa.

See Sections II, IV, and VII of this Environmental Impact Statement for comments regarding the concepts proposed and the mitigation measures to be implemented to protect the water quality of Lake West Okoboji.

APPENDIX A
DESIGN PHASE NOISE STUDY

For U.S. 71
in Dickinson County

Introduction

The Iowa Department of Transportation is studying a proposed four-lane improvement of U.S. 71 in Dickinson County from the north terminus of the existing four-lane section in Milford northerly through Arnolds Park and Okoboji, to its junction with Iowa 9, in Spirit Lake. The concept under study consists of reconstructing the existing 24-foot roadway to a 48-foot pavement section in the rural area just north of Milford and to a 49-foot back-of-curb to back-of-curb section in the municipal areas of Milford, West Okoboji, Arnolds Park and Okoboji. A four-lane divided section is proposed from Okoboji north to Iowa 9. The approximate length of the project is 7.1 miles. This report will set out the anticipated impact of the project upon the noise environment of the study corridor.

Highway Noise Fundamentals

Before assessing the noise impact of this project upon the environment an overview of noise, its measurement, composition, effect, prediction and control is needed. The discussion will be brief, however, and if further elaboration is required reference to the manual, *Fundamentals and Abatement of Highway Traffic Noise*, (U.S. Department of Transportation, 1973), should provide a more detailed explanation of the noise problem.

Measurement: Just as "feet" are used to measure distance, and "degrees" are used to measure temperature, "decibels" are used to measure sound intensity. Decibels (dB) are logarithmic units which serve as a reference to sound pressure. The reference point, (0dB), is the level upon which noise is measured.

Frequency: The normal frequency range of hearing for most people extends from a low frequency of 20 Hertz to a high frequency of 10,000 to 15,000 Hertz. A given sound can be divided into frequency components. That is, it can be determined how much of the noise is low frequency, how much is high frequency and how much is in the middle frequency range.

Weighting Networks: Sound level meters have the capability of filtering out certain frequency ranges. The A-scale weighting circuit is normally used because it approximates the frequency response of the average young ear. Studies have revealed that when people make relative judgments of the "loudness" or "annoyance" of a noise, their evaluations most closely correspond to the A-scale sound levels of those noises.

Traffic Noise: Vehicles make sounds during their operations over roadways, from engine and exhaust, tire-roadway interaction, brakes, air disturbance and chassis and/or load vibration. The total sound varies dependent upon the number of vehicles, the operating speed, the physical design of the road and vehicle type complexion or mix.

Effect of Noise: The degree of disturbance or annoyance of unwanted noise depends essentially upon three things:

1. The amount and nature of the intruding noise.
2. The amount of background noise present before the intruding noise.
3. The nature of the working or living activity (land use) of the people occupying the area where the noise is heard.

Figure A-1 indicates the decibel level of common indoor and outdoor noise sources. Also included in this figure are the design noise levels by land use category. The latter table was prepared by the Federal Highway Administration (FHWA) to serve as a guide for the maximum desirable noise levels for specific land uses.

Prediction: Research conducted by the National Cooperative Highway Research Program has established a method by which highway noise may be predicted. The parameters incorporated into the analysis are: design hour traffic volumes, percent of trucks, speed, distance from the highway to the noise receiver, and the unique design features of the roadway. Comparison of the predicted value to the existing ambient noise level indicates the probable noise impact of the project upon the location selected for analysis.

Noise Abatement: There are two methods by which highway noise may be reduced: (1) better muffler systems and other vehicle noise controls and, (2) highway noise control design features. The first technique is an area that must be treated by industrial modifications or legislative restrictions or guidelines. However, noise abatement design techniques can be employed, where needed and practical, by the state highway departments. If the proposed highway project has a severe noise impact upon the environment, and alignment changes are neither feasible nor prudent, noise abatement procedures should be investigated.

An effective means for attenuating highway noise is the construction of a barrier between the noise source and the receiver. The height, length and physical composition requirements of the barrier depend upon the physical arrangement and density of the area affected. Other possible abatement techniques include depressed or elevated roadway design and planting of vegetation. Tree and hedge plantings, while not an effective attenuator unless in concentrated form are of aesthetic and psychological value.

Existing Noise Environment

Ambient noise in and around the project corridor reflects the seasonal nature of activity in this vacation area. Autumn, winter and springtime noise levels are not significantly

Common Outdoor Noise Levels	Noise Level dBA	Common Indoor Noise Levels
	--110--	Rock Band
Jet Fly-over at 1000 ft.	--105--	
	--100--	Inside Subway Train (New York)
Gas Lawn Mower at 3 ft.	-- 95--	
	-- 90--	Food Blender at 3 ft.
Combine at 50 ft. Diesel Tractor or Truck at 30 ft. Snowmobile at 50 ft. Noisy Urban Daytime	-- 85-- -- 80--	Garbage Disposal at 3 ft. Shouting at 3 ft.
	-- 75--	
Gas Lawn Mower at 100 ft.	-- 70--	Vacuum Cleaner at 10 ft.
Commercial Area	-- 65--	Normal Speech at 3 ft.
	-- 60--	
	-- 55--	Large Business Office
Quiet Urban Daytime	-- 50--	Dishwasher next room
	-- 45--	
Quiet Urban Nighttime	-- 40--	Small Theatre, Large Conference Room (Background)
Quiet Suburban Nighttime	-- 35--	Library
	-- 30--	
Quiet Rural Nighttime	-- 25--	Bedroom at Night Concert Hall (Background)
	-- 20--	
	-- 15--	Broadcast and Recording Studio
	-- 10--	
	-- 5--	Threshold of Hearing
	-- 0--	

COMMON INDOOR AND OUTDOOR NOISE LEVELS
Adapted from: Bolt Beranek and Newman Inc.,
Fundamentals and Abatement of Highway Traffic Noise, 1973

DESIGN NOISE LEVEL/ACTIVITY RELATIONSHIPS

Activity Category	Design Noise Levels-dBA		Description of Activity Category
	Leq	L10	
A	57 (Exterior)	60 (Exterior)	Tracts of lands in which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, or open spaces which are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B	67 (Exterior)	70 (Exterior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, recreation areas, playgrounds, active sports areas, and parks.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties or activities not included in categories A and B above.
D	--	--	For requirements on undeveloped lands see paragraphs 11a and c, FHPM 7-7-3.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

different from other Iowa municipalities of similar size, which are transected by a primary highway. Noise levels near the highway corridor due to motor vehicle operations decrease with distance from the highway. Such noise levels are reflections of normal through traffic on U.S. 71 and normal local traffic activity. Summertime noise levels throughout the area are higher as a result of increased outdoor activity. This is true in areas around the Iowa Great Lakes, including campgrounds, picnic areas, the Arnolds Park Amusement Park, and summer cottages and motels throughout the area. However, summer peak noise levels are concentrated along U.S. 71.

The attraction of vacationers to the main thoroughfare in the Great Lakes region and the associated concentration of commercial activity greatly increases highway-related noise during the summer season. Peak summer traffic volumes represent an approximate three-fold increase over normal "off-season" traffic activity. Noise from heavy duty truck traffic, which often dominates the noise environment near highways, has a more pronounced effect when automobile traffic is lower. During the vacation season the heavy duty truck volume remains essentially the same, but it is joined by a much higher volume of automobiles and the contribution of the trucks to the total noise environment is not so noticeable.

Another important consideration in contrasting off-season to peak summer noise levels is the contribution of motorcycle noise to the latter. Testimony from local residents during this study indicated this to be the most significant difference between summer and non-summer highway-related noise levels. Snowmobile activity in the winter would be expected to be noticeable on occasion but is not considered to be of major significance.

The existing noise environment reflects the seasonal nature of outdoor activity in this vacation area. Noise levels in the study area are considered to be typical of many other Iowa communities during the vacation off-season. The summer months find the Iowa Great Lakes area, and more specifically the U.S. 71 corridor, experiencing greatly increased activity. This includes higher automobile volumes and motorcycle traffic, along with other activities typical of a summer resort area, which result in higher ambient noise levels.

Impact of the Project Upon Existing Noise Levels

The existing noise environment was measured in 1974 using the method described by Bolt, Beranek and Newman ("Fundamentals and Abatement of Highway Traffic Noise, 1973"). The off-peak (autumn weekday) noise levels were measured at 27 sites representing noise sensitive land uses throughout the length of the proposed project. These study sites are identified on the aerial photographs which accompany this report. Because considerable time has passed since these measurements were taken, they are not thought to properly represent present ambient noise conditions. Although time and weather conditions have not allowed the repetition of these measurements for this report, 1978 traffic estimates were incorporated into a noise prediction model and estimates of existing noise conditions were then generated. The model used was derived from National Cooperative Highway Research Program (NCHRP) Reports 117 and 144. Experience has shown this model to be highly

TABLE A-1
U.S. 71 - MILFORD TO SPIRIT LAKE
SUMMARY OF NOISE DATA

Study Site No.	Approx. Dist. to existing highway	Land Use Represented						Estimated 1978 L10-Off Peak	Estimated 1978 L10-Summer Peak	Predicted Summer L10-Year 2000	Year 2000 Design Hour Traf. Vol. (Build Alt.)	Do Nothing L10-Year 2000	Year 2000 Design Hour Traf. Vol. (Do-Nothing Alt.)
		Residence	School	Church	Commercial	Motel	Cottage						
1	66	12	1	(Convent)	1	1	72dBA	74dBA	78dBA	1880	77dBA	1880	
2	71	8			3	1	71	74	77	"	77	"	
3	66	2			1		72	74	74	1480	75	1480	
4	126	5					67	69	73	"	71	"	
5	62	5			1		71	73	74	"	75	"	
6	42	6			2		73	75	76	"	77	"	
7	106	1			4		65	67	73	1830	72	1830	
8	78	1			3		67	69	74	"	74	"	
9	78	11			1		67	69	74	"	74	"	
10	47	13			2		69	71	79	"	80	"	
11	42	3	1	1	4		70	72	78	"	80	"	
12	32	7			5		71	73	79	"	"	"	
13	29	2		1			72	74	77	"	77	"	
14	32	2			1		72	74	76	"	79	"	
15	42					2	70	72	79	"	80	"	
16	90	1			3		67	69	73	1946	72	1946	
17	72	6		(City Hall Bldg.)			68	70	73	"	73	"	
18	72				8		68	70	73	"	73	"	
19	66	6			2	2	69	71	72	"	73	"	
20	176					1	65	67	67	"	68	"	
21	326			(Summer Theater)			61	63	63	1430	63	1430	
22	156	3			1		65	67	67	"	67	"	
23	119				1		66	68	68	"	70	"	
24	156			1			64	66	70	"	68	"	
25	506			(Hospital)	3		58	60	61	"	60	"	
26	148	1			3		65	67	72	"	69	"	
27	36	8					72	74	76	"	76	"	

reliable in determining highway traffic noise levels. This is evidenced by a comparison of the unweighted average of predicted 1978 L10's (the noise level exceeded 10% of the time) with the unweighted average of 1974 measured values. Only a 1dBA difference exists and this would be expected from the different traffic conditions.

The NCHRP model was also used to determine summer peak noise levels for 1978 and for the design year (2000) at each of the 27 representative sites. Summer peak traffic volumes were determined by adjusting off-peak volumes by a factor shown from automatic traffic counts to represent the increase in traffic during the summer season. 1978 summer peak L10 values are 2dBA higher than off-peak. Predicted summer peak design year L10's are from 0-8 dBA higher than the 1978 values. Little or no increase in noise levels would be experienced only at those receiver sites which, under the new highway design, would be located at a greater distance from the traveled roadway.

It is evident from Table A-1, on page 125, that some sites along U.S. 71 are currently experiencing noise levels in excess of FHWA guidelines and that most sites would experience summer peak levels in the design year exceeding that criterion. Only those sites located a considerable distance from the highway would remain below that level. For example, site 15 was located 30 feet from the pavement edge while Site 21 was almost 320 feet from U.S. 71 traffic.

Table A-2 quantifies the degree of interference with speech communication resulting from various noise levels. This is the most widely accepted parameter for use in determining the acceptability of a noise environment. Conditions which permit a minimum of effort to maintain effective speech communication are important indicators of acceptable environmental quality. This factor more easily lends itself to numerical measurement than the more subjective parameters of annoyance and disturbance, even though the latter effects of noise are acknowledged as important considerations.

TABLE A-2
NOISE LEVELS ACCEPTABLE FOR SPEECH COMMUNICATION

Maximum L10 A-Scale Noise Levels That Will Permit
Barely Acceptable Speech Communication For Voice
Levels and Listener Distances Shown

Distance (ft)	Voice Level*			
	Low	Normal	Raised	Very Loud
1	66 dBA	72 dBA	78 dBA	84 dBA
2	60 dBA	66 dBA	72 dBA	78 dBA
3	56 dBA	62 dBA	68 dBA	74 dBA
4	54 dBA	60 dBA	66 dBA	72 dBA
5	52 dBA	58 dBA	64 dBA	70 dBA
6	50 dBA	56 dBA	62 dBA	68 dBA
12	44 dBA	50 dBA	56 dBA	62 dBA

*Based on men's voices, standing face-to-face outdoors.

As for the actual impact of the predicted increase in noise, one may make some generalizations regarding public response to changes in ambient noise. There are no official policies regarding the amount of noise which would constitute a noise impact, simply because individual human attitudes vary considerably. It has, however, been suggested by some informed experts that an increase of 0 to 5 decibels is a negligible change, 5 to 10 decibels is minor, 10 to 15 is moderate and 15 or more constitutes a significant or severe impact. Accordingly, the 27 representative study sites may be broken down as to the degree of anticipated impact:

TABLE A-3

EXPECTED DEGREE OF NOISE IMPACT

<u>Degree of impact (1974 off-peak vs. 2000 design hour)</u>	<u>Number of repre- sentative sites</u>	<u>Commercial</u>	<u>Residential</u>	<u>Church</u>	<u>School</u>	<u>Motel or Cottage Courts</u>
negligible (0-5 dBA)	8	10	6	0	0	6
minor (6-10 dBA)	15	23	63	2	0	2
moderate (11-15 dBA)	5	12	29	1	2	2
severe (over 15 dBA)	0	0	0	0	0	0

Several items should be mentioned at this point regarding interpretation of Table A-1.

(1) The proposed design of the U.S. 71 improvement influences the predicted noise levels. In some instances the two-lane widening will occur between the study site and the existing roadway, placing traffic nearer, and increasing the traffic noise. In other cases the two new lanes are placed farther from the study site, effecting a lesser increase in noise due to highway traffic. Likewise, a lesser (probably negligible) increase results in placing one new traffic lane on each side of the existing roadway. Consequently, when a study site is shown to represent two receivers located on opposite sides of the existing U.S. 71 roadway and is predicted to experience an increase in noise, partially as a result of design specifications, the opposite site would be expected to enjoy a reduction in future levels, even though this is not indicated in Table A-1 (e.g. Site 15).

(2) As was mentioned previously, the amount of motorcycle activity was regarded by local citizens as the biggest factor in the increase in ambient noise during the summer months. Unfortunately, the prediction model does not consider the contribution of motorcycles to future noise levels. If this vehicle's present popularity continues and more effective muffling devices are not developed, substantial highway noise may be predicted to result. The appropriate adjustment to be made to predicted L10's to account for motorcycle noise would be conjectural at this point, due to a lack of supportive data. The possible effect of motorcycles on future noise levels within the U.S. 71 corridor, however, should be kept in mind in an assessment of the impact of the proposed improvement.

(3) As shown in Table A-1, both schools adjacent to U.S. 71 within the project corridor are predicted to experience design hour noise levels which represent a moderate impact upon the existing noise environment. It should be pointed out that the design hourly volumes used for noise prediction would not coincide with the normal school year and associated classroom activity. As a result, a lesser impact should be expected during the school year months of the year 2000.

(4) Since future traffic volumes on U.S. 71 are not expected to change significantly as a result of the improvement, predicted noise levels under the "Do-Nothing" Alternative would not differ greatly from those predicted for the improved facility. The differences indicated in Table A-1 for future noise levels under these two concepts are due to (1) changes in distance from roadway to study site, and (2) improved traffic flow (lack of congestion) under conditions of the improvement, as proposed. Noise conditions in general are expected to improve along the U.S. 71 corridor because of the latter factor.

Summary and Recommendations

Summer and off-peak noise levels at 27 representative sites were calculated for 1978 conditions utilizing a noise prediction model derived from NCHRP Reports 117 and 144. The summer noise levels were shown to consistently approach or exceed the land use category B design noise levels of FHPM 7-7-3. The predicted noise levels for the year 2000 represented changes ranging from 0dBA to +8dBA, with an average of +3 for the 27 sites. At 20 of the representative sites the category B design noise levels are predicted to be exceeded, by the year 2000.

It must now be determined whether or not noise abatement measures, as described earlier, may be successfully incorporated into the design of improved U.S. 71. Throughout most of the project, receiver sites are grouped together. This makes them more amenable to the noise reduction capabilities of noise barriers. In rural portions of the alignment, scattered receivers make noise barriers very expensive in relation to the benefits achieved. In addition, the frequency of points of access required by the residential/commercial land uses, and the proximity of these land uses to U.S. 71, would pose limitations on the barrier concept, where the receivers are grouped. Breaks in the barriers to allow access would significantly reduce their effectiveness. The nearness of the buildings to the highway would require the barriers to be located very near the traveled roadway, or very near the protected building. Safety considerations and aesthetic factors, then, would further limit the noise barrier approach to alleviate traffic noise.

Both residential and commercial interests have persisted adjacent to U.S. 71 as the Arnolds Park - Okoboji area has developed, and traffic volumes and attendant noise has become an accepted component of the area's summertime environment. Because of space limitations and safety factors, in addition to further aesthetic intrusion created by noise barriers, no recommendations in support of such design features are being made.

The significance of the predicted noise increases over the 20-year design life of the U.S. 71 improvement are highly subjective. Summer residents located adjacent to the highway

would be expected to voice the loudest disapproval, while commercial interests should be somewhat less concerned. Motel owners should not be severely affected, as traffic volumes fall off during nighttime hours. Churches and schools should likewise be subject to little noise intrusion during periods of normal use. Because of the fact that traffic activity and noise is an inherent characteristic of the U.S. 71 corridor through this resort area, it is felt that land use, as it has persisted in the past, would not be severely affected by the predicted noise increases accompanying the improved highway.

APPENDIX B

AERIAL PHOTOGRAPHIC PLATES

The proposed improvement of U.S. 71 through the Lakes region begins in Milford, approximately 50 feet south of 14th Street, and extends northerly to the west junction of Iowa 9 near Spirit Lake, a distance of 7.1 miles. It is proposed that 49-foot back-of-curb to back-of-curb urban sections be built through the urbanized areas of Milford, West Okoboji, Arnolds Park and Okoboji. A 48-foot rural section would be constructed between Milford and West Okoboji. From near the north corporate limits of Okoboji to the end of the project, a four-lane divided highway would be constructed. Portions of the existing two-lane highway would be resurfaced and utilized through that area as the new southbound lanes. A new bridge would be constructed in the causeway area between Lakes East and West Okoboji. The intersection of U.S. 71 and Iowa 9 in Spirit Lake would also be reconstructed by removing the existing radius curves and building a new "T" intersection.

The following aerial photographs show the construction proposed for the U.S. 71 improvement through the Lakes region. All intersecting city streets, secondary roads and primary highways, as well as some relocated private access roads and/or drives would be reconstructed to match the proposed grade and alignment of the new highway. Although most private drives and other entrances have not been shown on the plates, every effort would be made, during final design, to locate drives and entrances in compliance with both current design standards and the safety and convenience of the individuals involved.

Right-of-way acquisition would require the permanent displacement of five single family dwellings, 14 commercial properties, six mobile homes and one non-profit organization (State-owned). In addition, 17 mobile homes would be temporarily relocated during the construction process. The location of these displacements is noted on the aerial photographs by the letters A through V. A description of the displacement will appear on the page opposite the plate.

LEGEND:



Proposed 4-Lane Reconstruction



Proposed 24-Foot Reconstruction



Proposed 24-Foot A.C. Resurfacing



Proposed Side Street And/Or Side Road Reconstruction



Proposed Median Crossovers



Proposed Service Roads



Proposed Turning Lanes



Corporation Lines



Proposed Raised Or Painted Medians



Section Lines



Closures (Streets, Roads & Entrances)



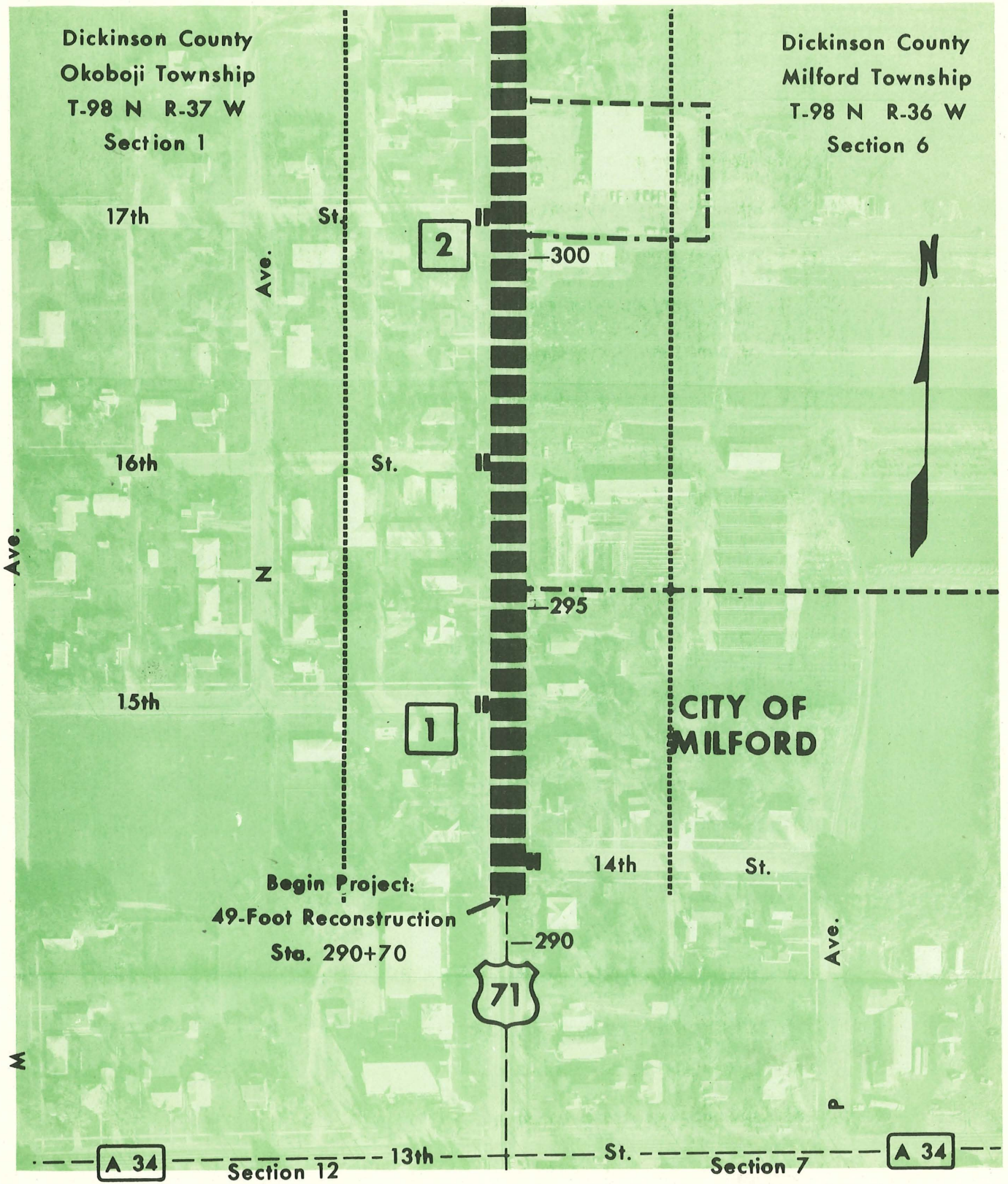
Noise Site



Acquired Homes And Businesses



70dBA Contour



SCALE: 1 in. = 250 ft. PLATE 1

Dickinson County
Okoboji Township
T-98 N R-37 W
Section 1

Dickinson County
Milford Township
T-98 N R-36 W
Section 6



315

Sta. 313+35

End 49-Foot Reconstruction

Begin 48-Foot Reconstruction

Milford
Municipal
Airport

19th

St.

Ave.

310

CITY OF
MILFORD



18th

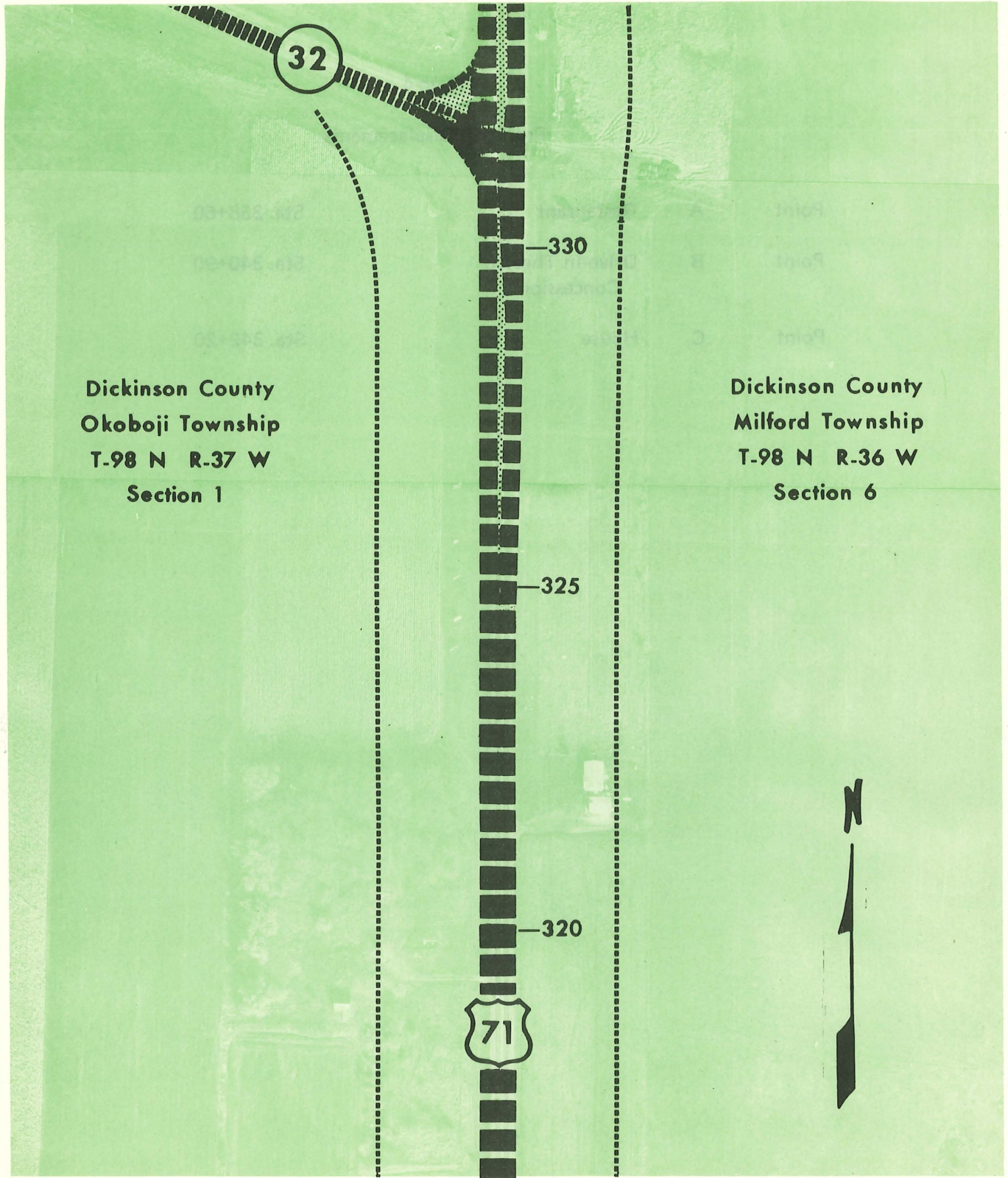
St.

305

Z

SCALE: 1 in. = 250 ft.

PLATE 2



Dickinson County
Okoboji Township
T-98 N R-37 W
Section 1

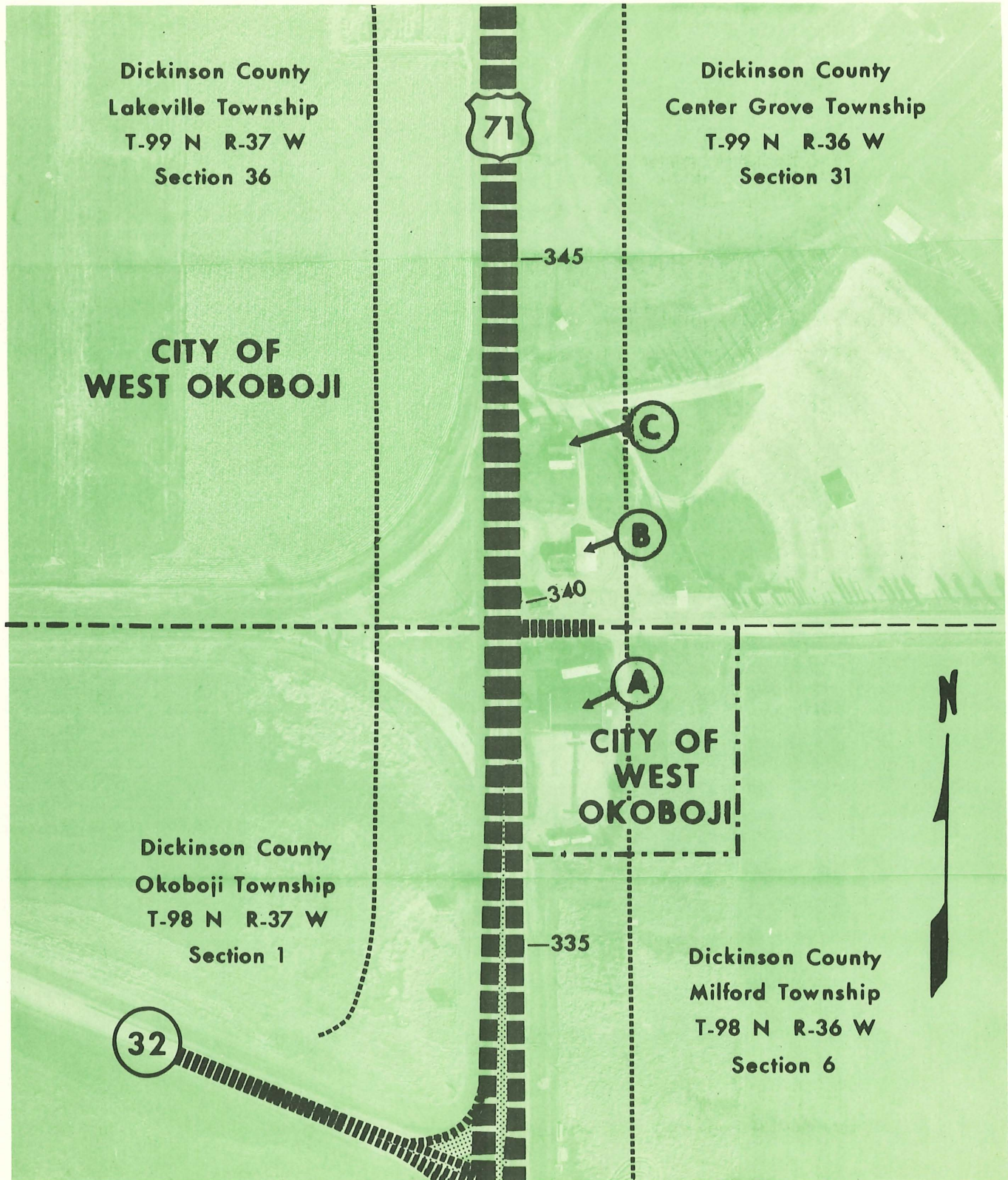
Dickinson County
Milford Township
T-98 N R-36 W
Section 6

SCALE: 1 in. = 250 ft. PLATE 3

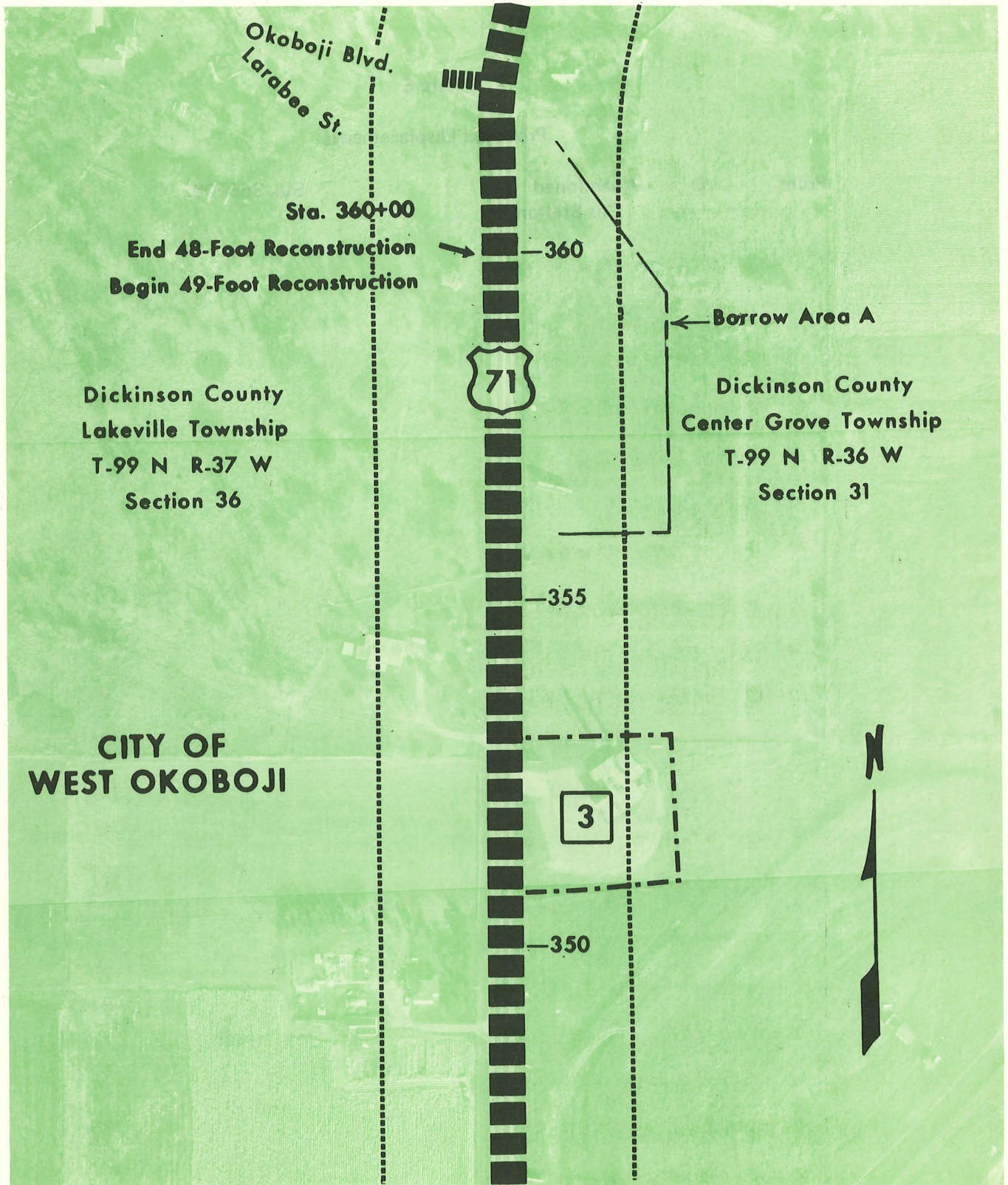
Plate 4

Proposed Displacements

Point	A	Restaurant	Sta. 338+60
Point	B	Drive-In Theatre Concession	Sta. 340+90
Point	C	House	Sta. 342+20



SCALE: 1 in. = 250 ft. PLATE 4

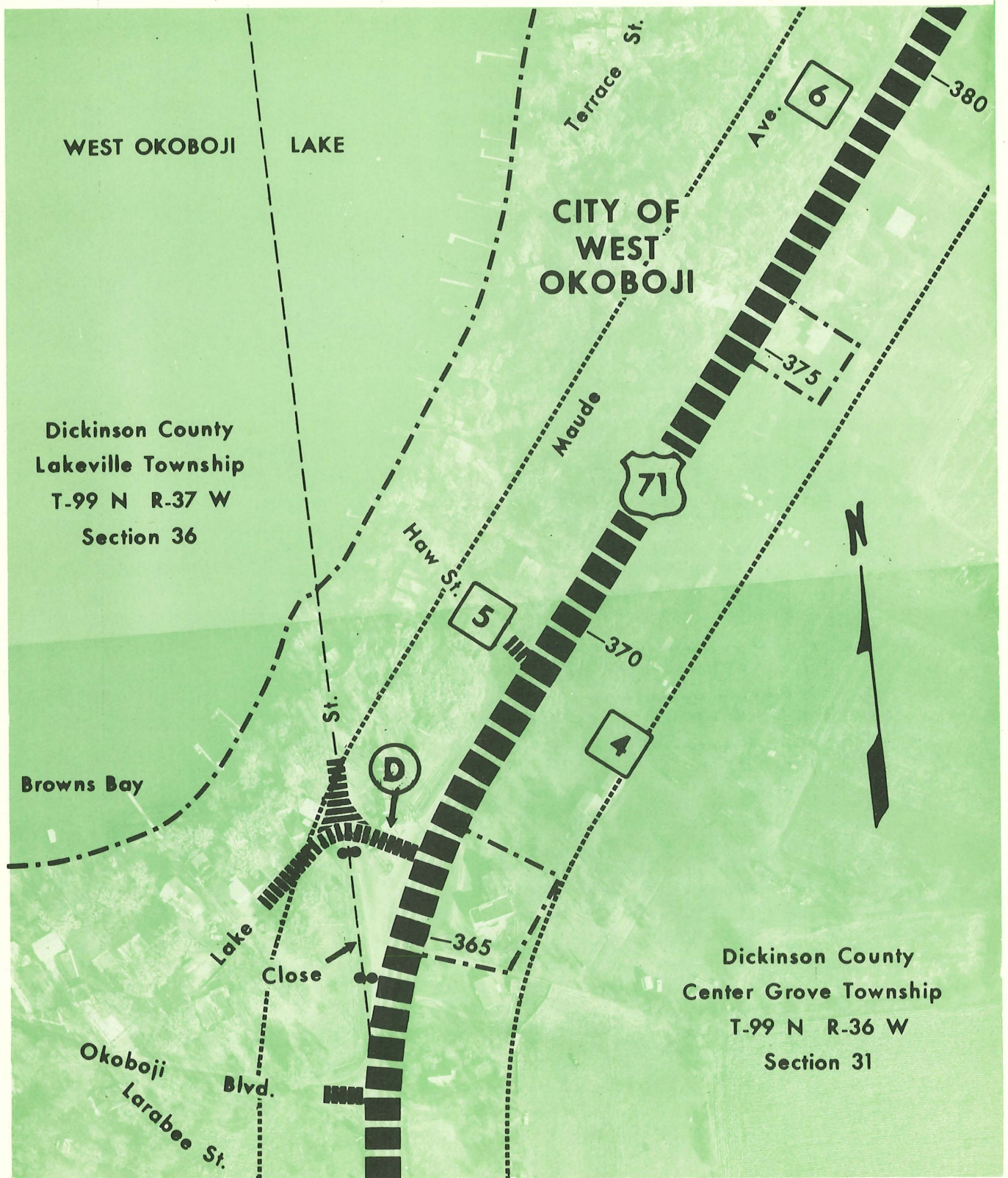


SCALE: 1 in. = 250 ft. PLATE 5

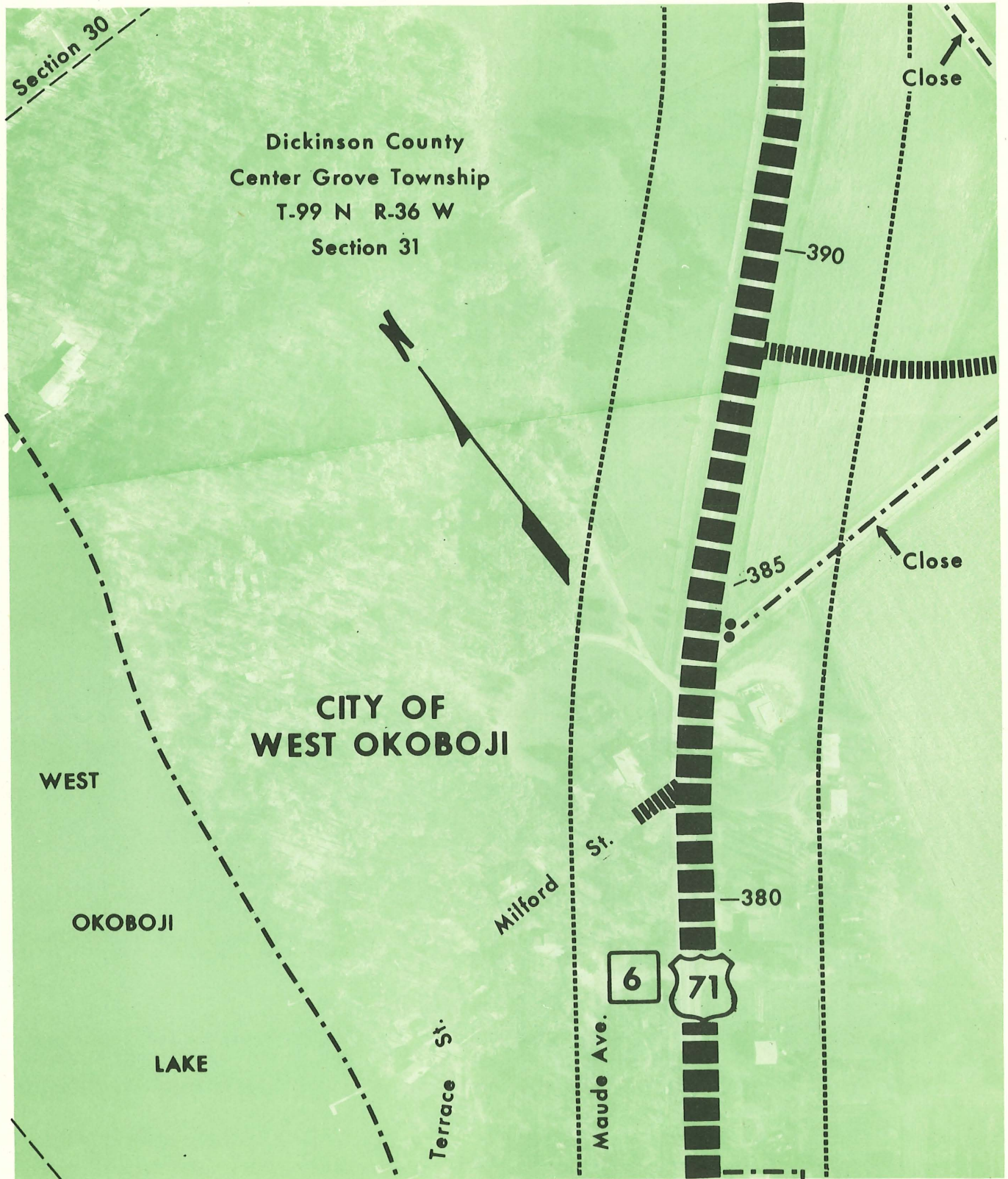
Plate 6

Proposed Displacements

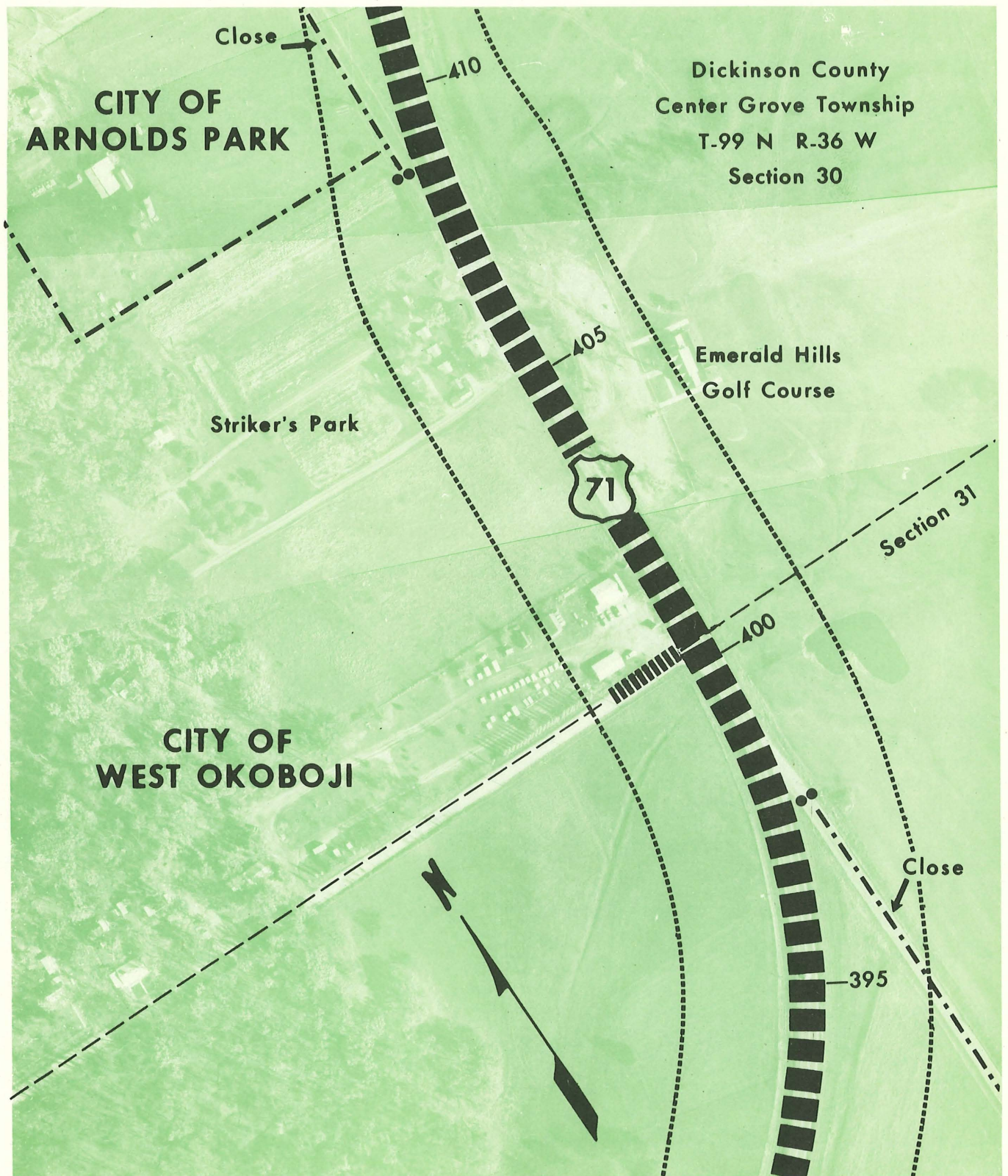
Point	D	Abandoned Gas Station	Sta. 366+00
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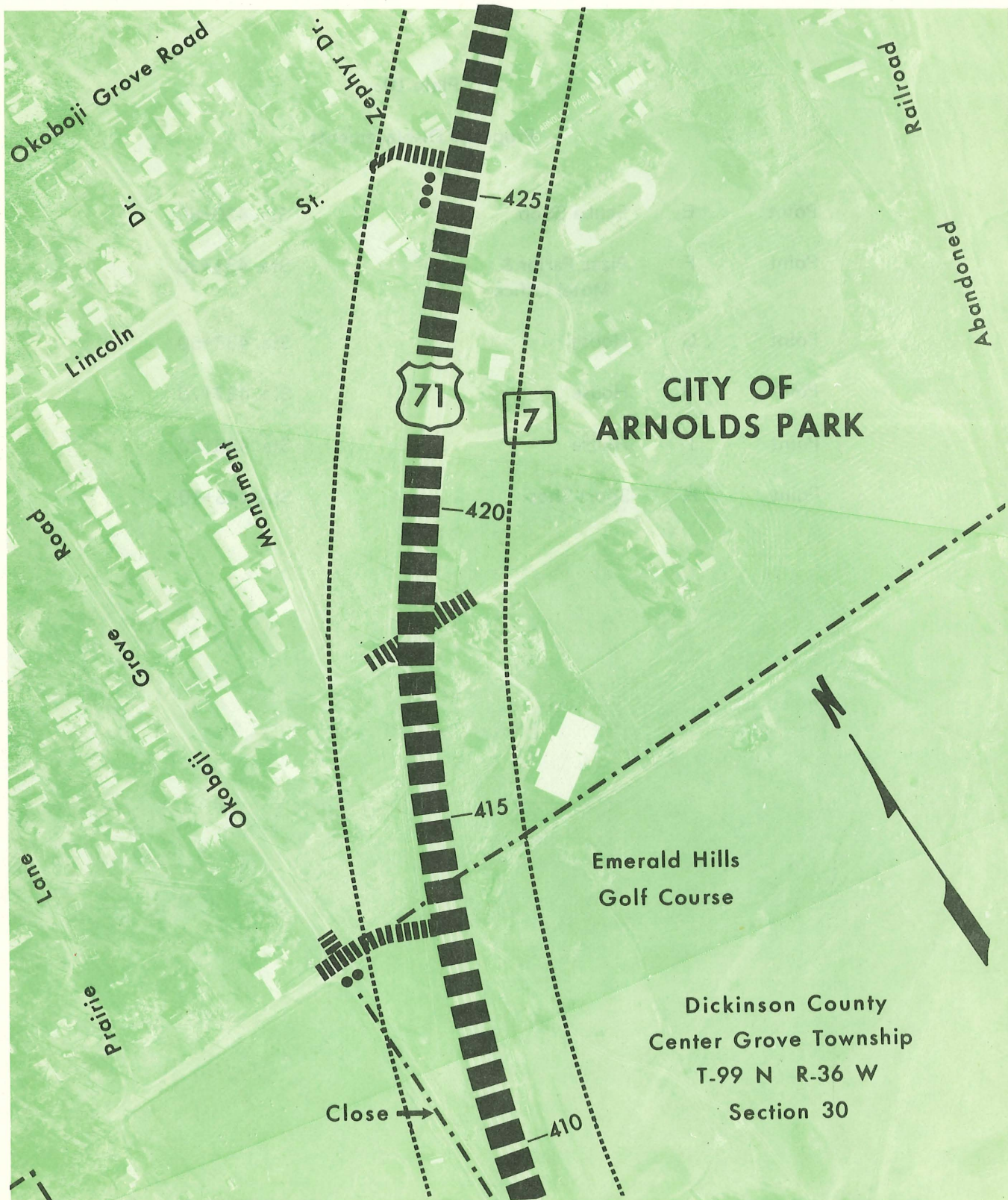
SCALE: 1 in. = 250 ft. PLATE 6



SCALE: 1 in. = 250 ft. PLATE 7



SCALE: 1 in. = 250 ft. PLATE 8

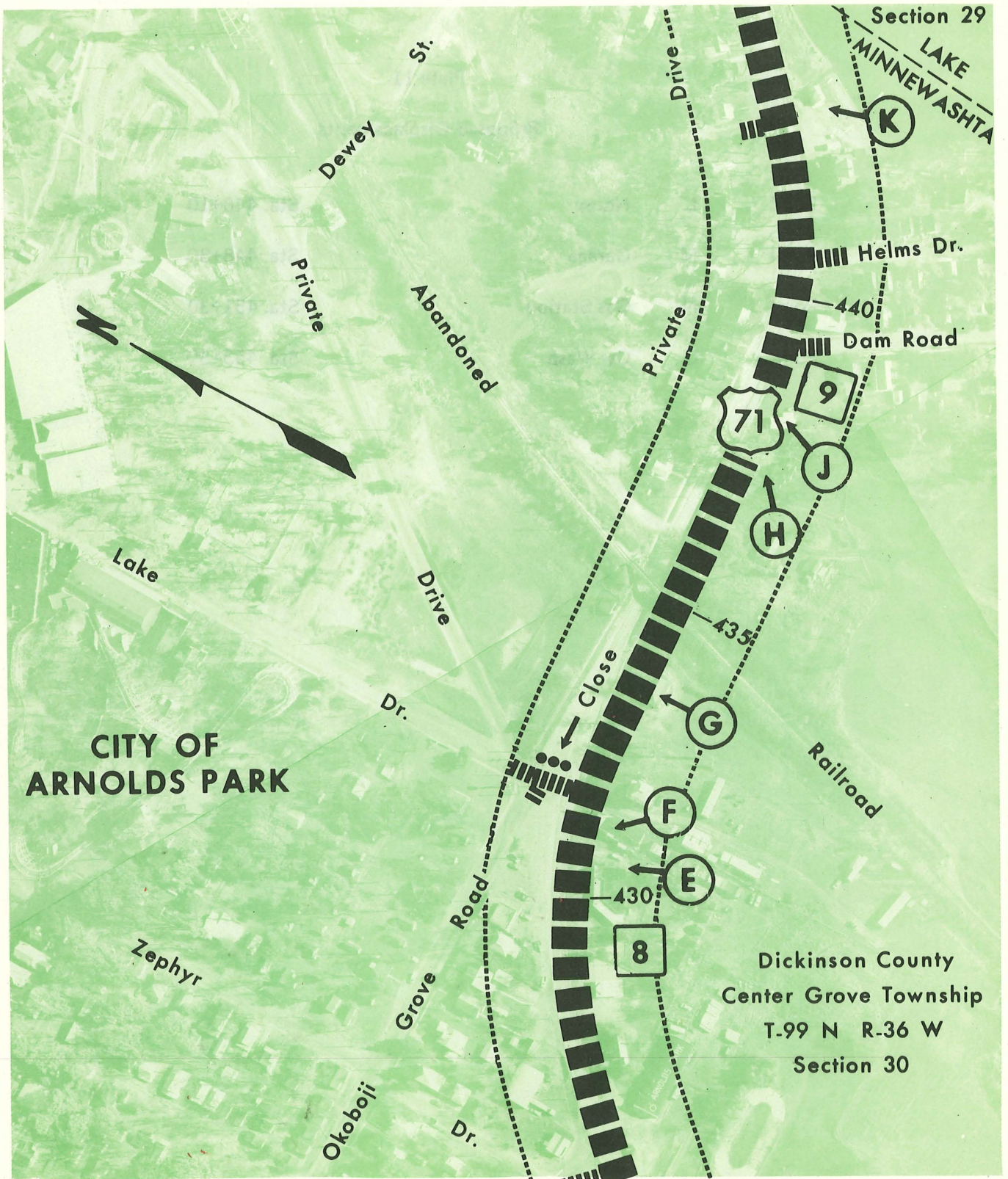


SCALE: 1 in. = 250 ft. PLATE 9

Plate 10

Proposed Displacements

Point	(E)	Scuba Shop	Sta. 430+80
Point	F	Pizza Parlor & Motel Office	Sta. 431+30
Point	G	House	Sta. 433+50
Point	(H)	House	Sta. 437+70
Point	J	House	Sta. 438+20
Point	(K)	Sport Shop	Sta. 443+10

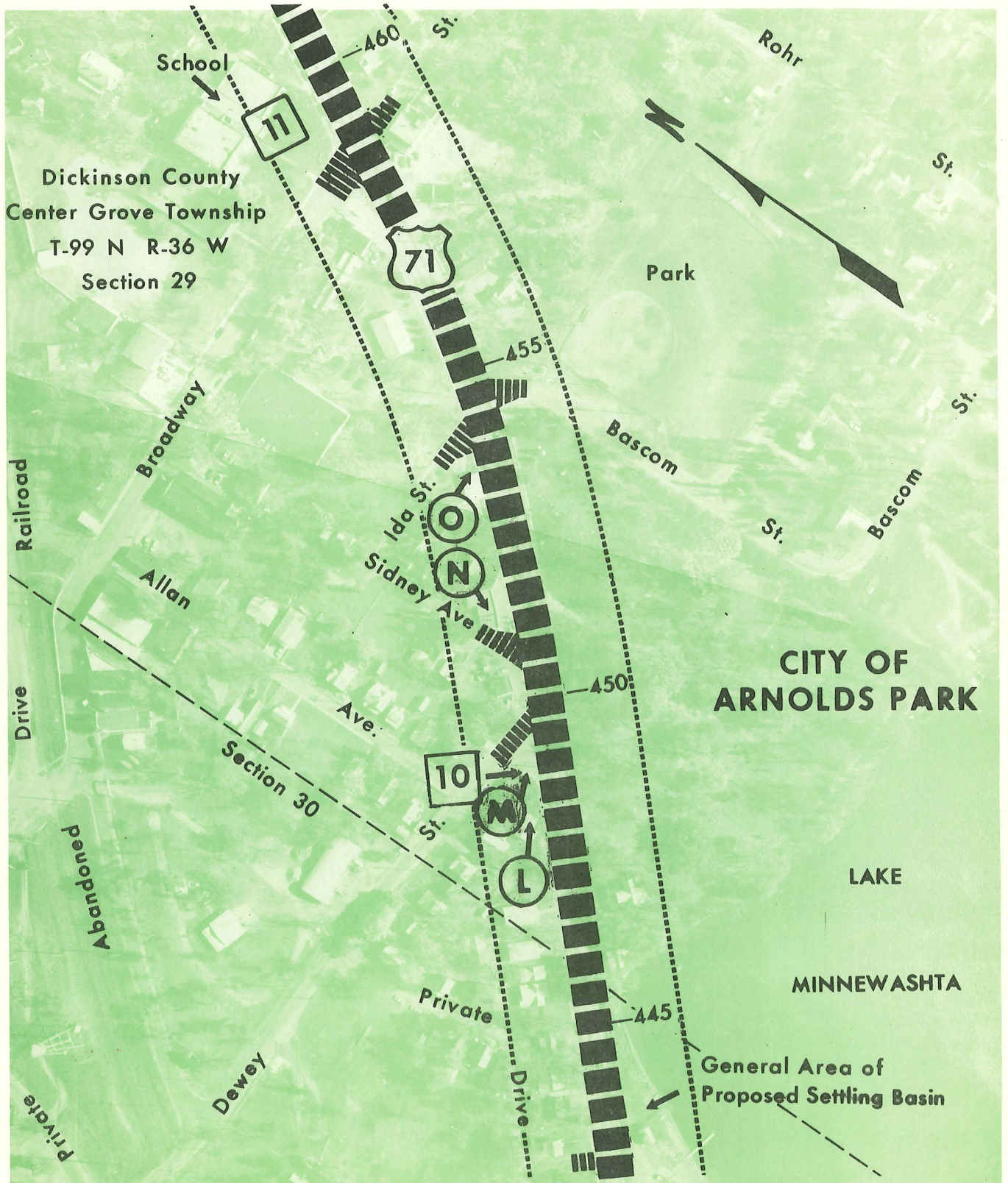


SCALE: 1 in. = 250 ft. PLATE 10

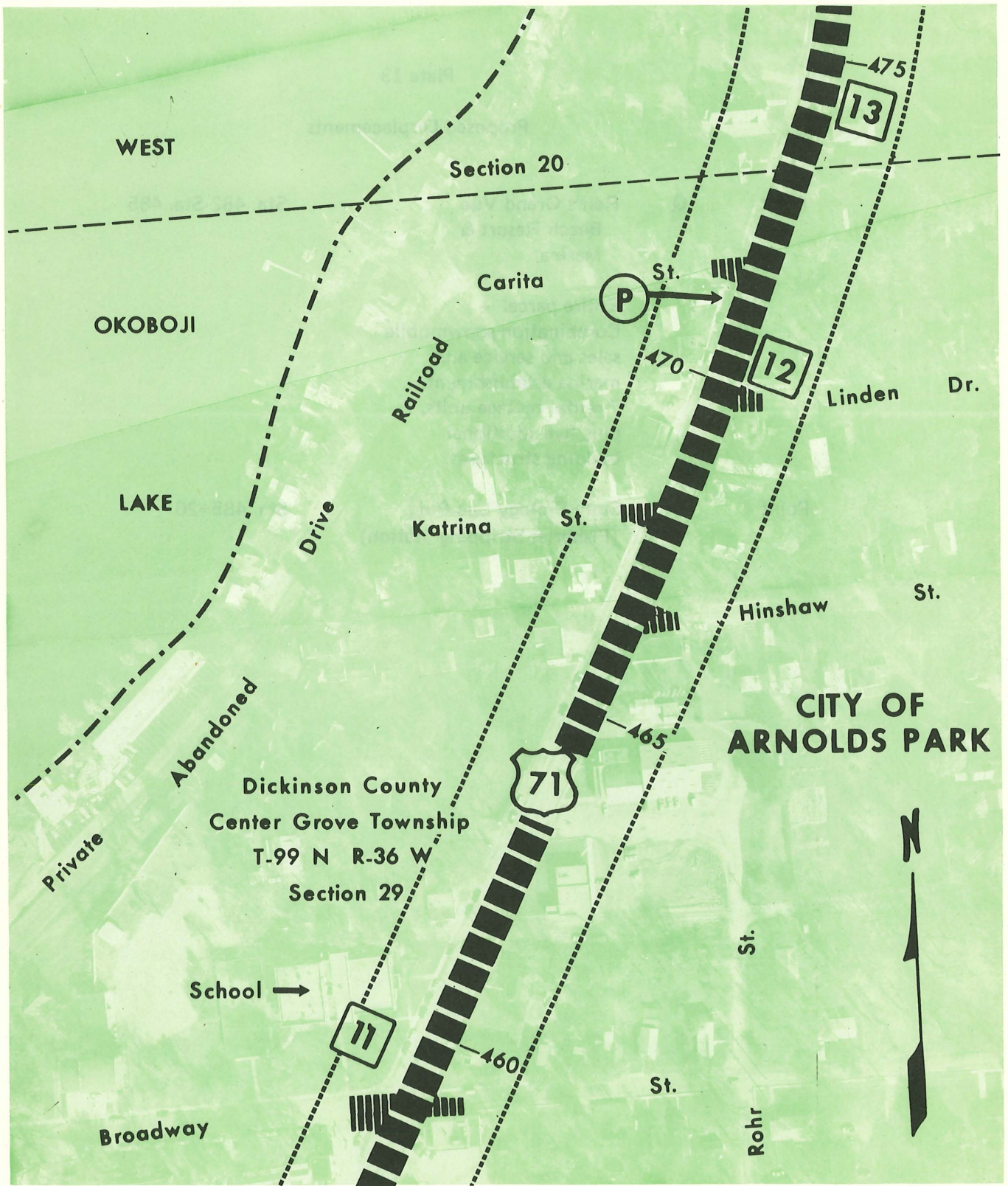
Plate 11

Proposed Displacements

Point	L	House	Sta. 448+10
Point	M	Garage	Sta. 448+80
Point	N	Gas Station	Sta. 451+30
Point	O	Car Wash	Sta. 453+30



SCALE: 1 in. = 250 ft. PLATE 11

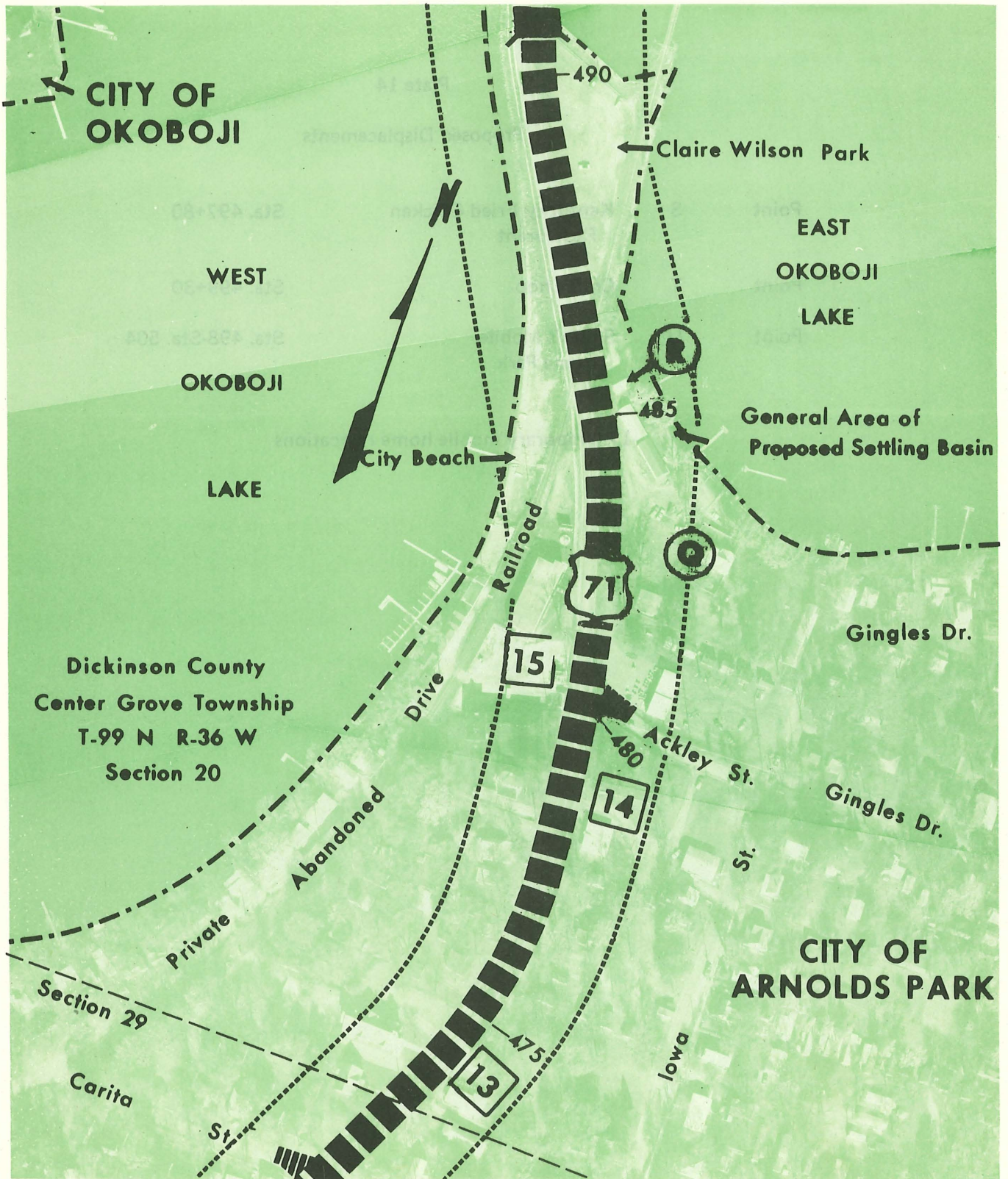


SCALE: 1 in. = 250 ft. PLATE 12

Plate 13

Proposed Displacements

Point	Q	Reif's Grand Vue Beach Resort & Marina	Sta. 482-Sta. 485
		Entire parcel -- Combination snowmobile sales and service and marina establishment, 7 rental cottage units, plus five additional building structures.	
Point	R	State Biology Lab Bldg. (Fisheries Stripping Station)	Sta. 485+20



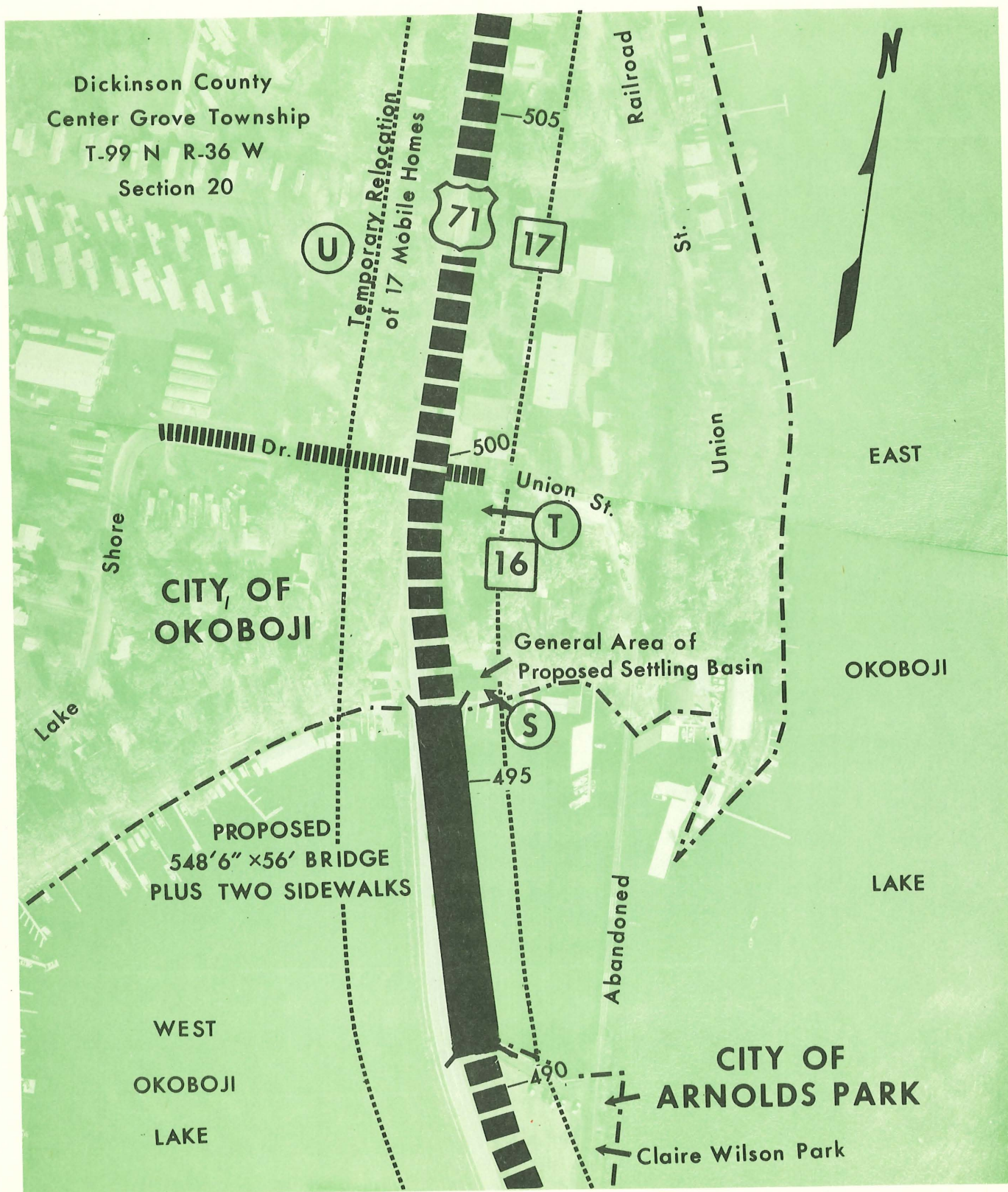
SCALE: 1 in. = 250 ft. PLATE 13

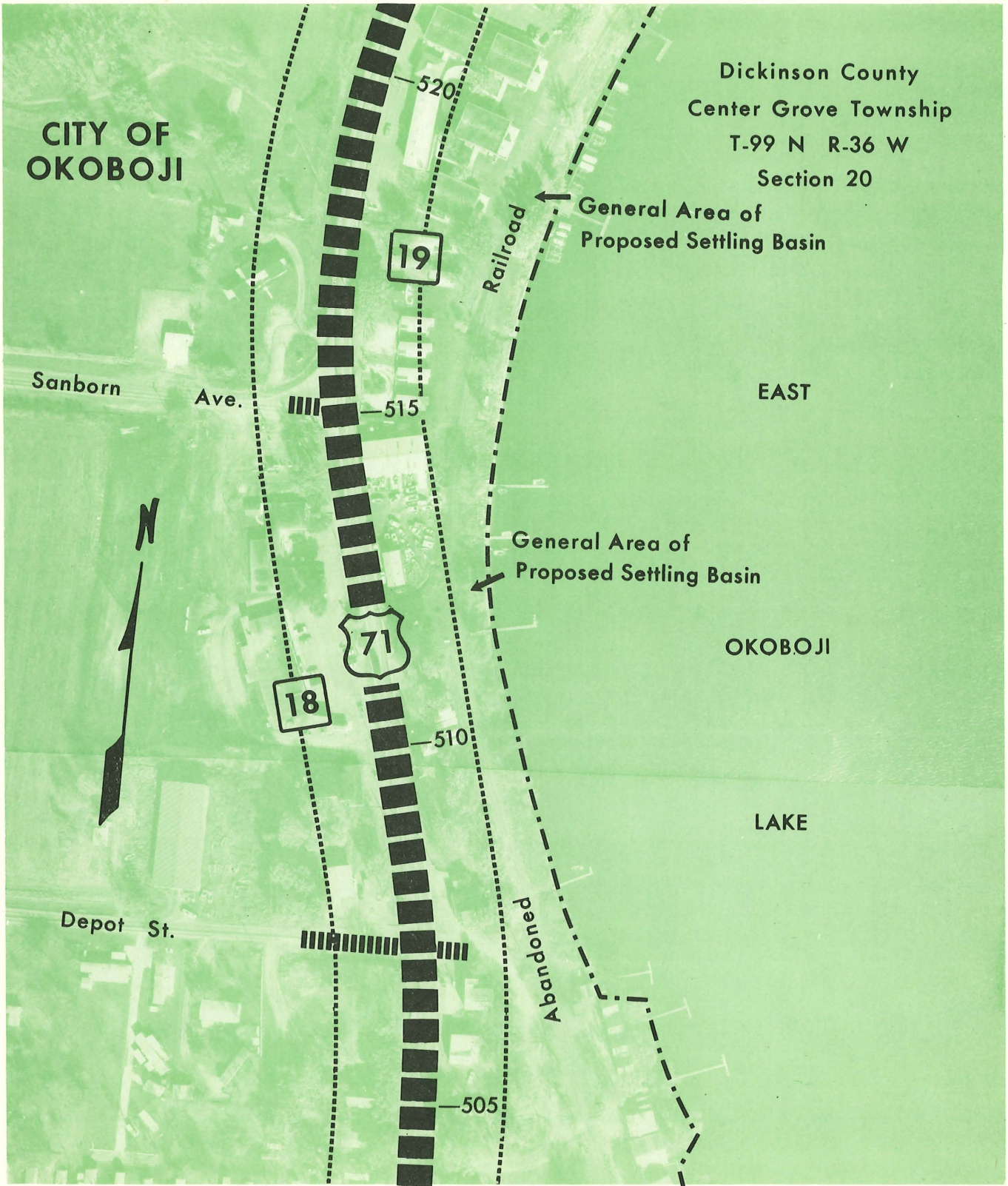
Plate 14

Proposed Displacements

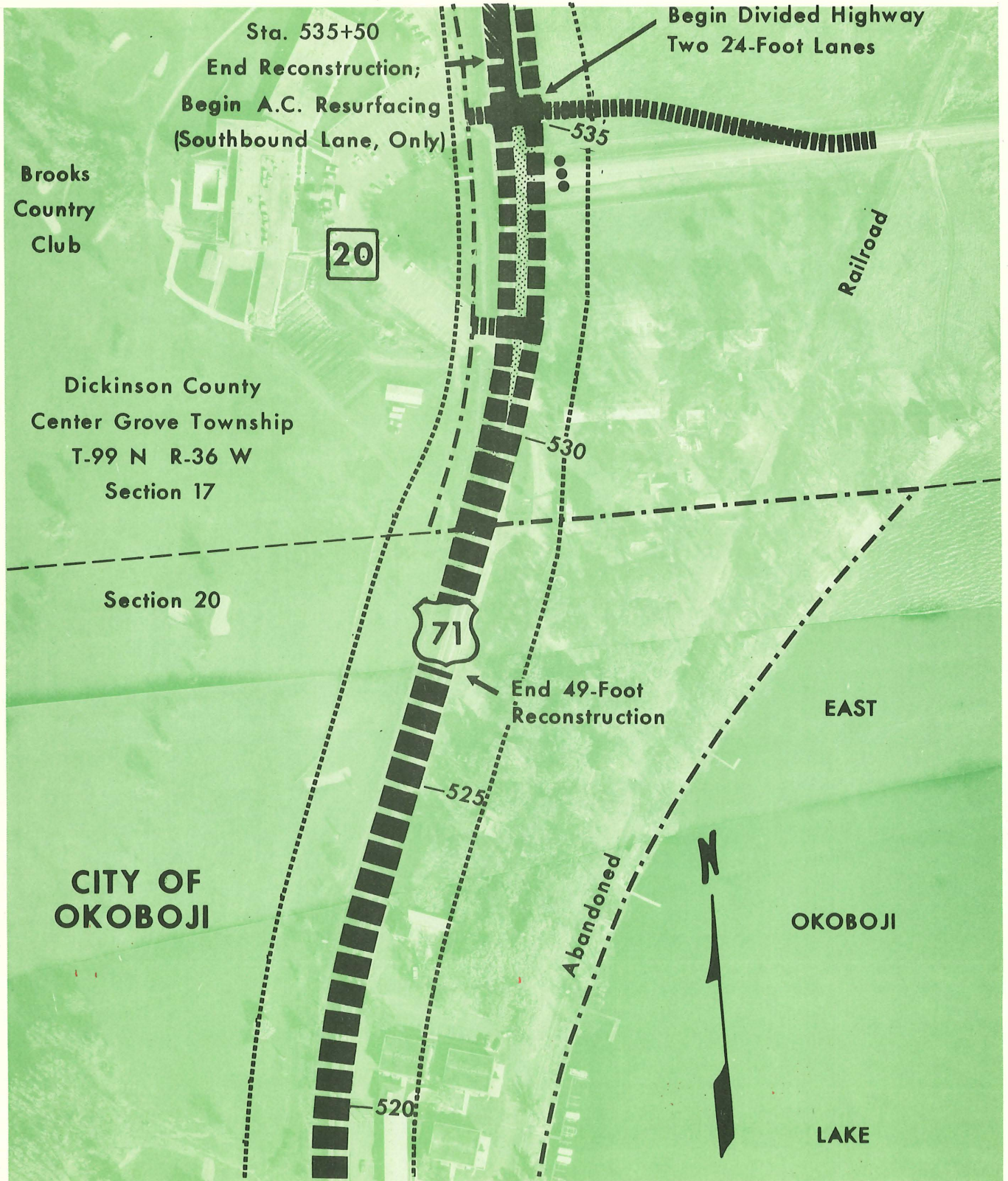
Point	S	Kentucky Fried Chicken Restaurant	Sta. 497+80
Point	T	Craft Shop	Sta. 499+30
Point	U	Smith's Mobile Home Park	Sta. 498-Sta. 504

-17 temporary mobile home relocations

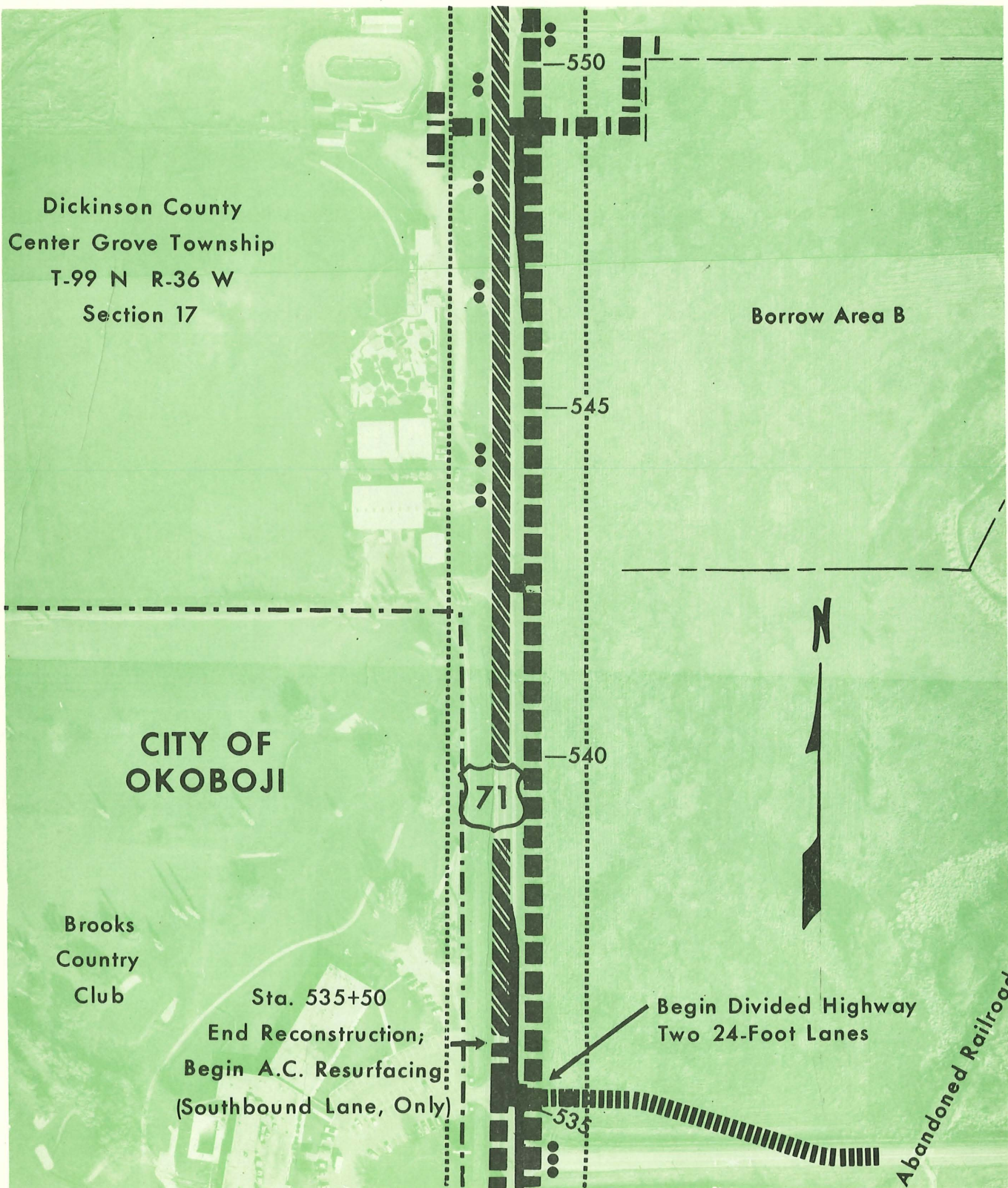




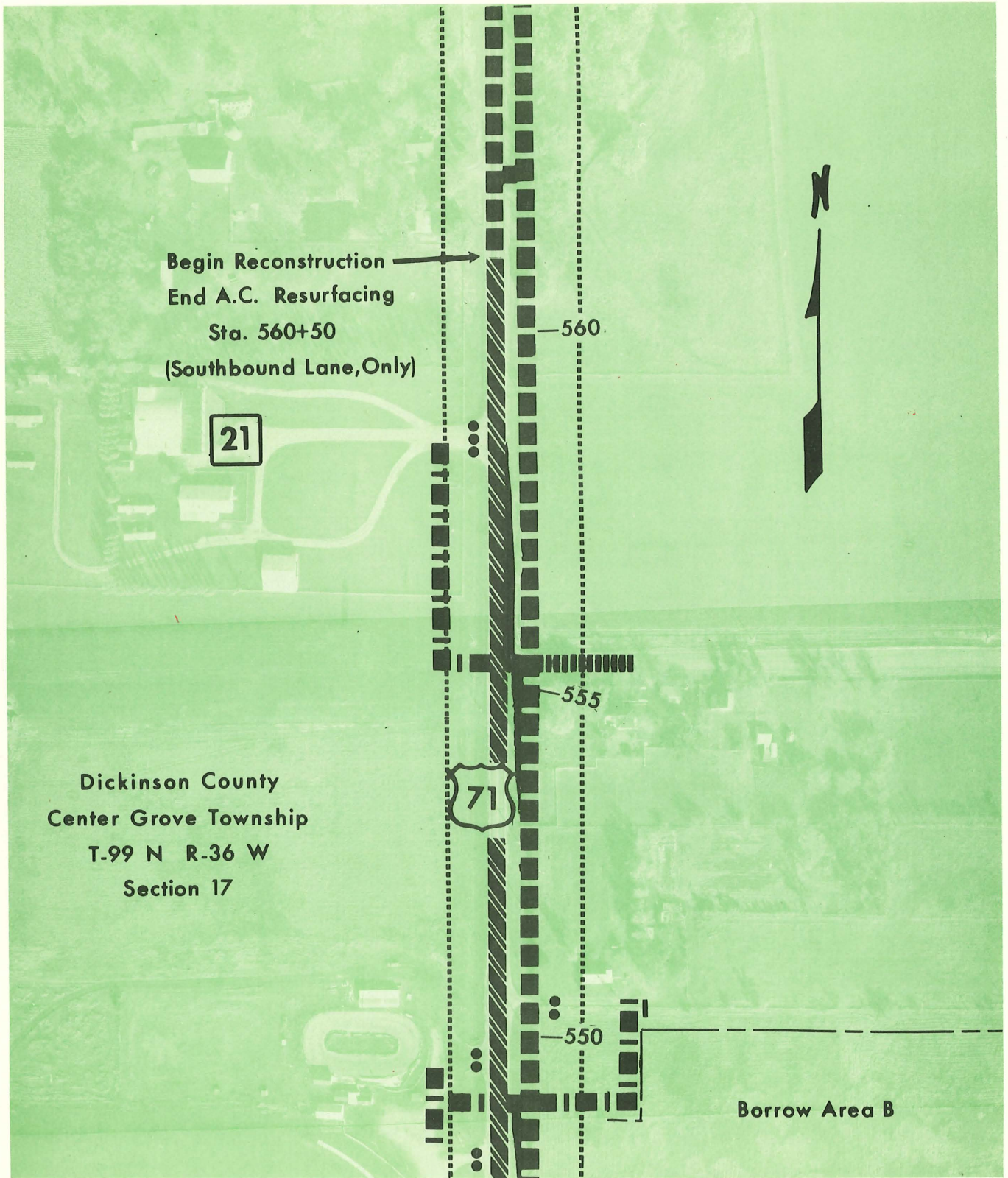
SCALE: 1 in. = 250 ft. PLATE 15



SCALE: 1 in. = 250 ft. PLATE 16

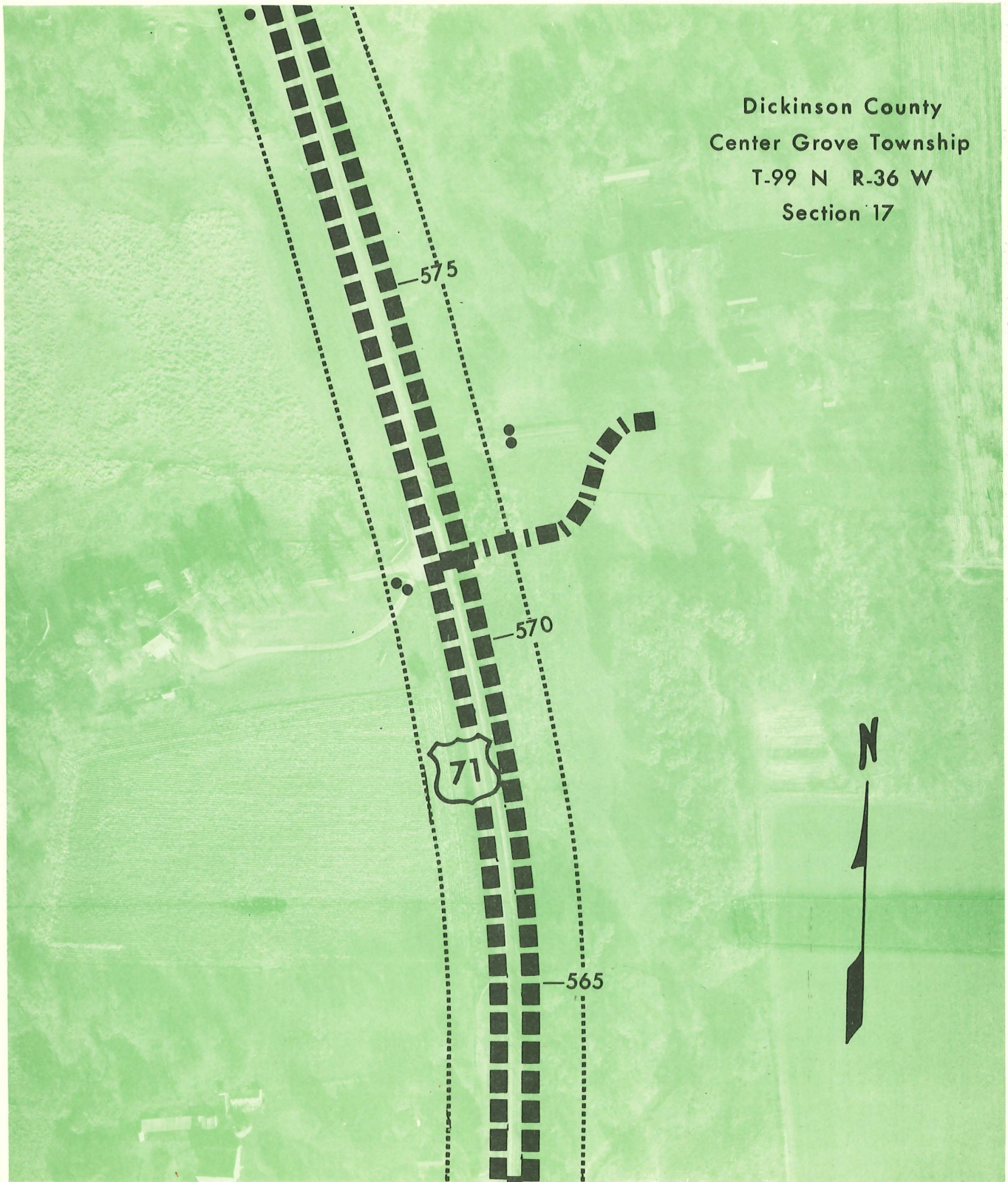


SCALE: 1 in. = 250 ft. PLATE 17



SCALE: 1 in. = 250 ft. PLATE 18

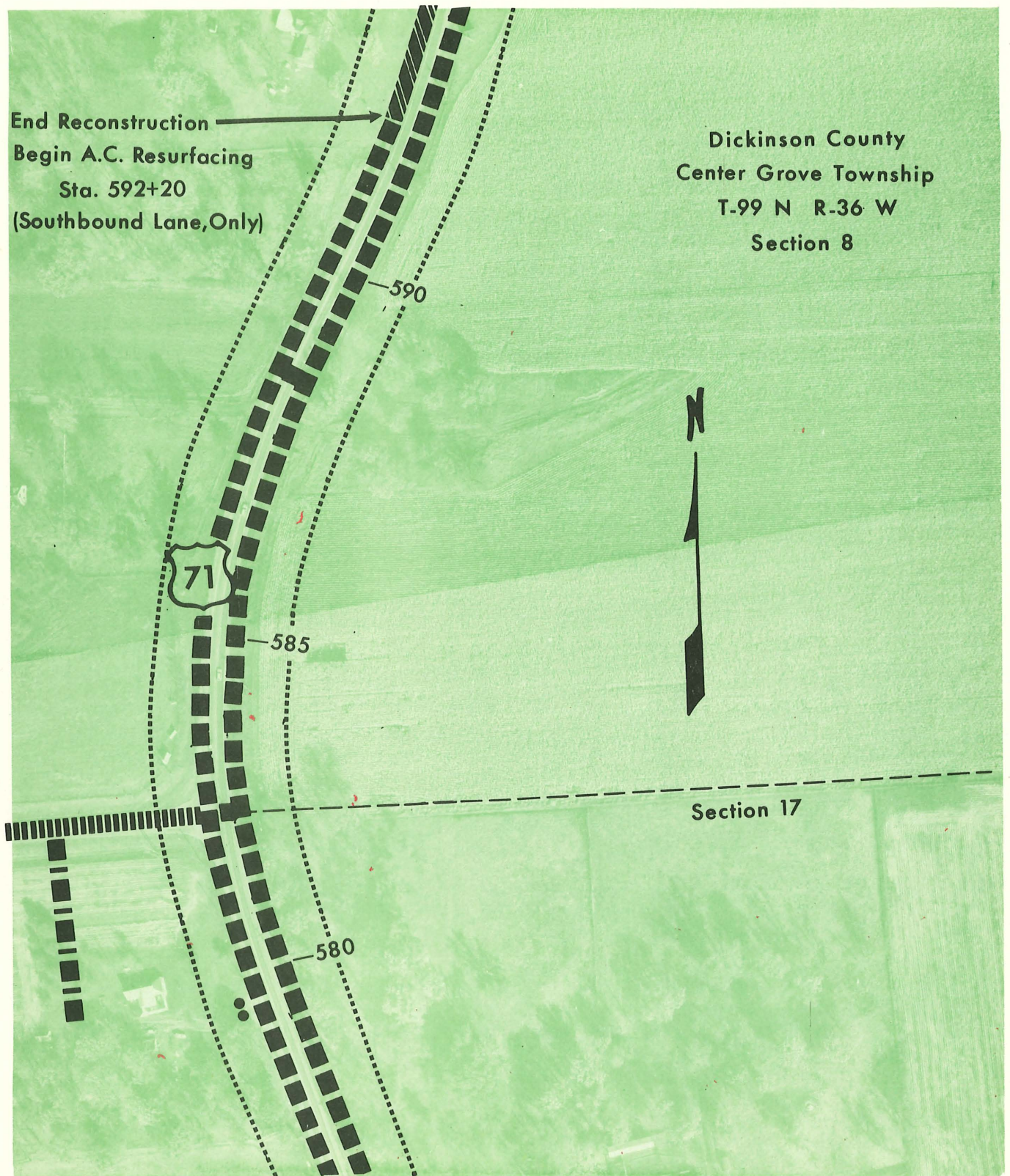
Dickinson County
Center Grove Township
T-99 N R-36 W
Section 17



SCALE: 1 in. = 250 ft. PLATE 19

End Reconstruction →
Begin A.C. Resurfacing
Sta. 592+20
(Southbound Lane, Only)

Dickinson County
Center Grove Township
T.99 N R.36 W
Section 8



SCALE: 1 in. = 250 ft. PLATE 20

Dickinson County
Center Grove Township
T-99 N R-36 W
Section 8



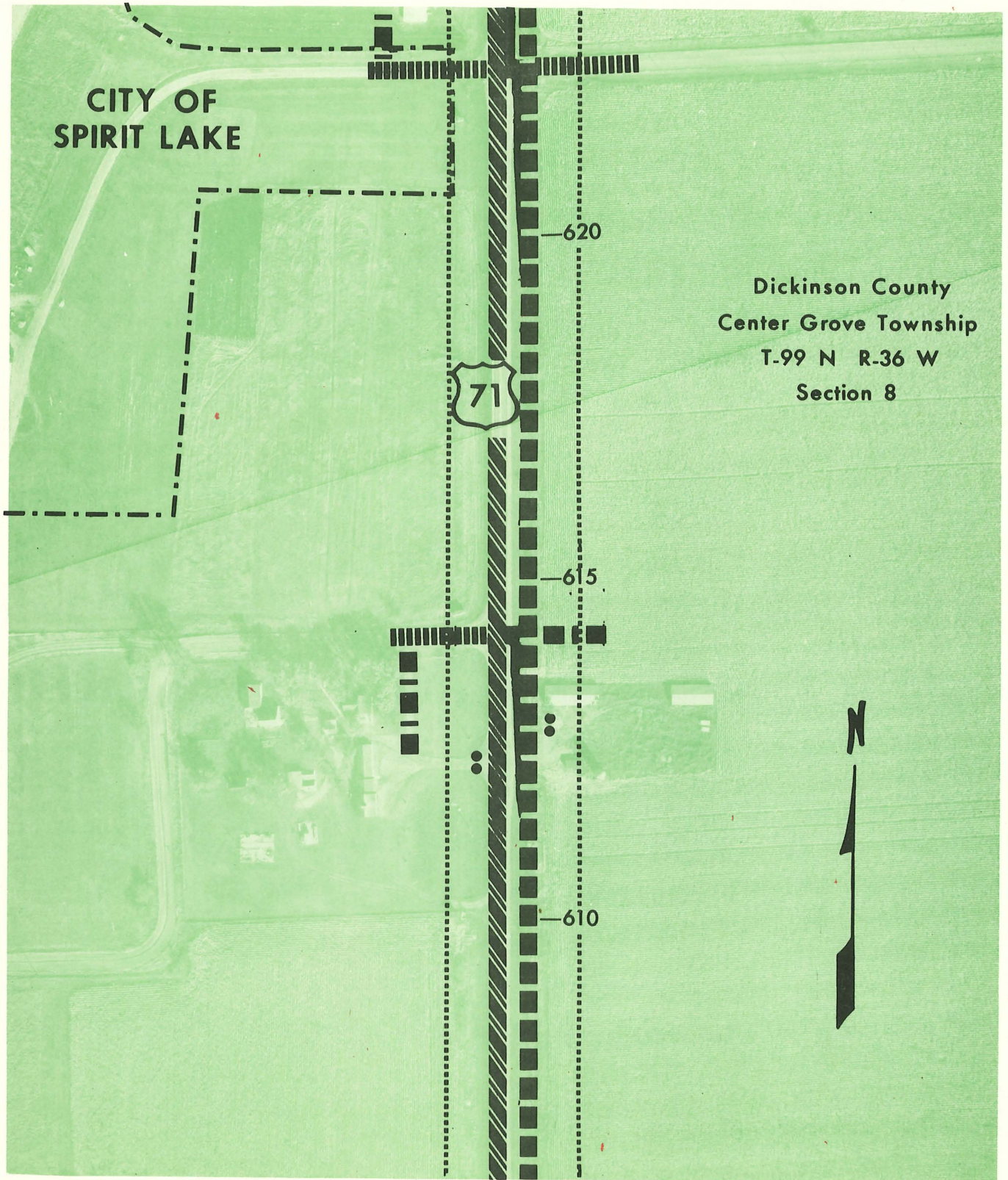
605

600

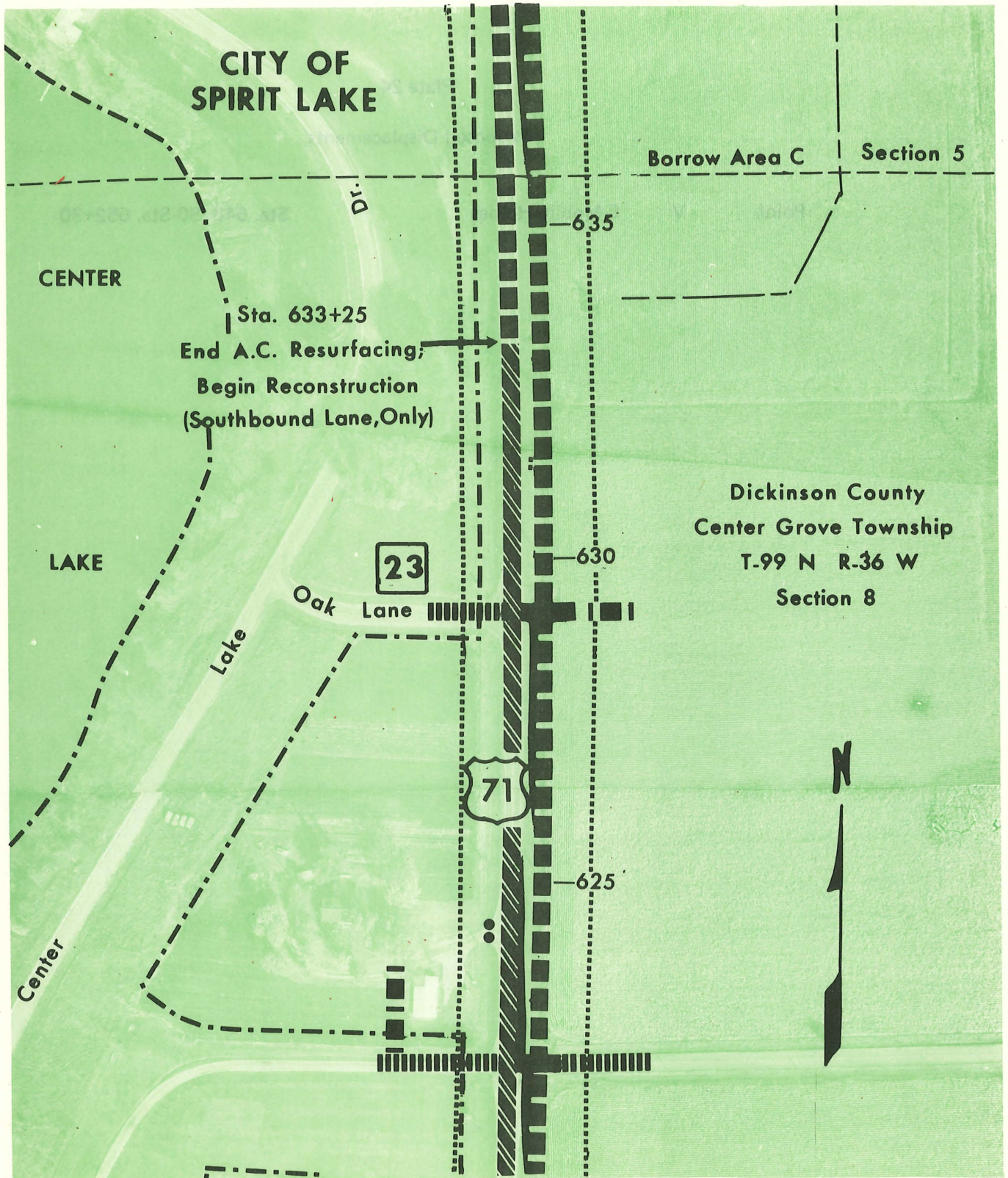
595



SCALE: 1 in. = 250 ft. PLATE 21



SCALE: 1 in. = 250 ft. PLATE 22

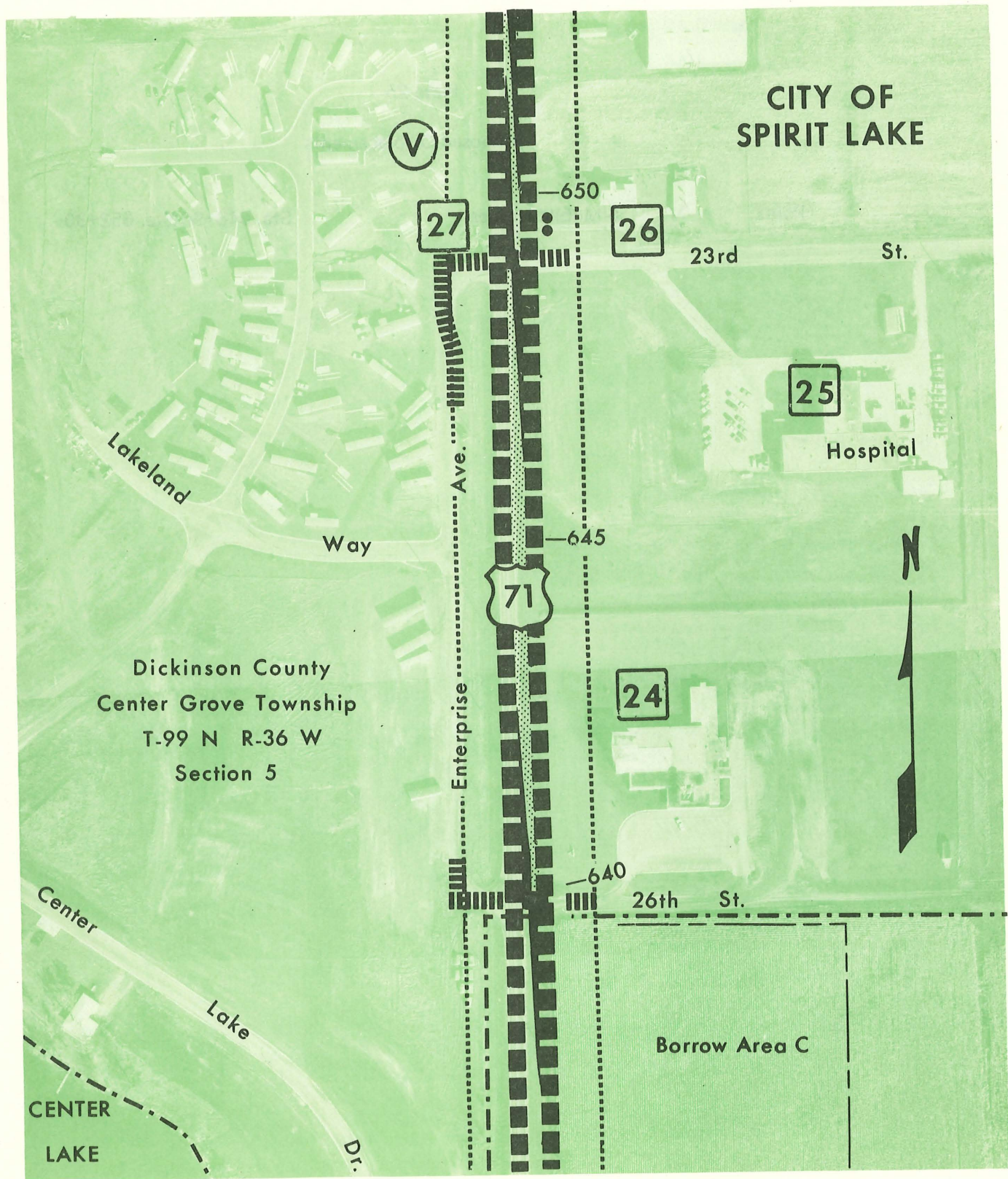


SCALE: 1 in. = 250 ft. PLATE 23

Plate 24

Proposed Displacements

Point	V	6 Mobile Homes	Sta. 648+90-Sta. 652+30
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SCALE: 1 in. = 250 ft. PLATE 24

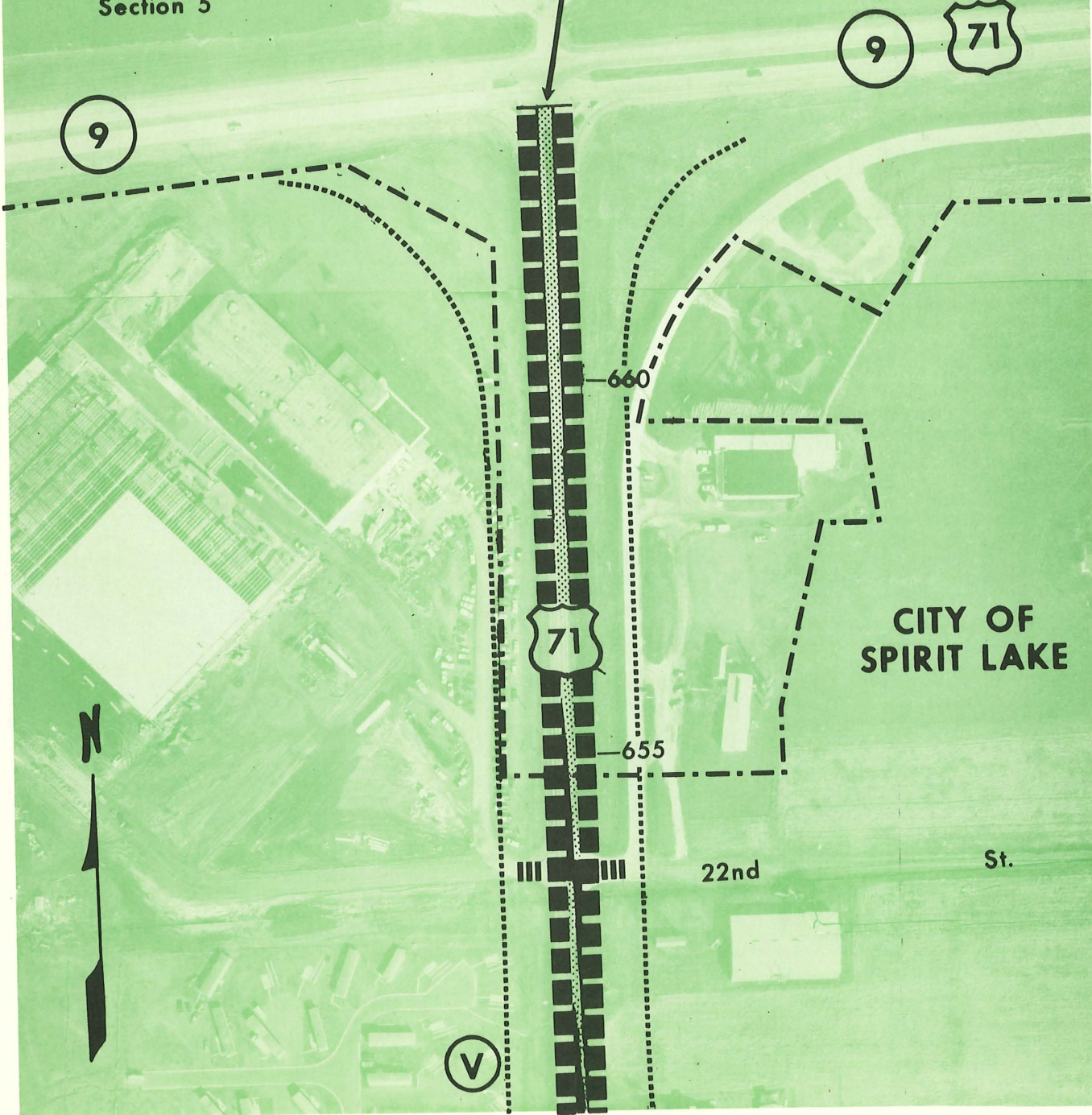
Plate 25

Proposed Displacements

Point	V	6 Mobile Homes	Sta. 648+90-Sta. 652+30
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Dickinson County
Center Grove Township
T.99 N R.36 W
Section 5

End Project: Sta. 663+50±



SCALE: 1 in. = 250 ft. PLATE 25

APPENDIX C

CATALOG OF LOCAL PLANTS AND ANIMALS

The lists of plants and animals given in this Appendix are species which have been reported from Dickinson or adjacent counties. Some of the studies from which these lists came were carried out in the early 1900's. More recent records have frequently shown a decline or elimination of some of the species. Consequently, a comparison of the lists indicates an historical change in the flora and fauna of this region.

The trees listed in Table C-1 are those which grow naturally around lakes, along streams or under other suitable conditions in northwestern Iowa. They represent the more drought tolerant species which will survive in that section of the State. This list was taken from a 1915 survey of the lakes in Emmet County.(7)

TABLE C-1

Trees Grown In Northwest Iowa
Which Are More Tolerable Of
Prairie Conditions

<i>Quercus macrocarpa</i>	bur oak
<i>Ulmus fulva</i>	slippery elm
<i>Ulmus americana</i>	American elm
<i>Fraxinus sp.</i>	ash
<i>Tilia americana</i>	basswood
<i>Prunus virginiana</i>	choke cherry
<i>Prunus serotina</i>	black cherry
<i>Prunus americana</i>	American plum
<i>Acer saccharinum</i>	soft maple
<i>Acer negundo</i>	boxelder
<i>Salix sp.</i>	willow
<i>Populus deltoides</i>	cottonwood
<i>Juglans nigra</i>	black walnut
<i>Celtis occidentalis</i>	hackberry
<i>Carya glabra</i>	pignut
<i>Ostrya virginiana</i>	ironwood
<i>Crataegus mollis</i>	red haw
<i>Juniperus virginiana</i>	red cedar

Dr. W. J. Platt studied the vertebrate fauna of the Cayler Prairie Preserve in Dickinson County between 1971 and 1974. He reported 72 species including four amphibians, seven reptiles, 35 birds and 26 mammals. The diverse fauna of the prairie results from the variety of habitats available. The species listed in Table C-2, however, represent only a part of the original indigenous fauna. The larger birds and mammals which were formerly present no longer exist on the prairie remnant. (13) Conversion of the land to agricultural use has reduced the species and the numbers of individuals which now occupy it.

TABLE C-2

VERTEBRATE FAUNA OF THE CAYLER PRAIRIE PRESERVE

Species abundance designated as
common (C), uncommon (U), or rare (R)

Amphibia

<i>Ambystoma tigrinum</i>	tiger salamander	C
<i>Bufo americanus</i>	American toad	C
<i>Pseudacris triseriata</i>	northern chorus frog	C
<i>Rana pipens</i>	leopard frog	C

Reptilia

<i>Chelydra serpentina</i>	snapping turtle	U
<i>Emydoidea blandingi</i>	Blanding's turtle	U
<i>Chrysemys picta</i>	painted turtle	U
<i>Eumeces septentrionalis</i>	prairie skink	C
<i>Thamnophis radix</i>	plains garter snake	C
<i>Thamnophis sirtalis</i>	common garter snake	C
<i>Elaphe vulpina</i>	fox snake	U

Mammalia

<i>Sorex cinereus</i>	masked shrew	C
<i>Blarina brevicauda</i>	short-tailed shrew	C
<i>Scalopus aquaticus</i>	eastern mole	U
<i>Myotis lucifugus</i>	little brown bat	U
<i>Spermophilus tridecemlineatus</i>	13-lined ground squirrel	C
<i>Spermophilus franklini</i>	Franklin's ground squirrel	R
<i>Geomys bursarius</i>	plains pocket gopher	C
<i>Castor canadensis</i>	beaver	R
<i>Reithrodontomys megalotis</i>	western harvest mouse	C
<i>Peromyscus maniculatus</i>	deer mouse	C
<i>Onychomys leucogaster</i>	northern grasshopper mouse	U
<i>Microtus pennsylvanicus</i>	meadow vole	C
<i>Ondatra zibethicus</i>	muskrat	U
<i>Zapus hudsonius</i>	meadow jumping mouse	C
<i>Lepus townsendii</i>	white-tailed jackrabbit	C
<i>Sylvilagus Floridanus</i>	eastern cottontail	U
<i>Vulpes fulva</i>	red fox	U
<i>Procyon lotor</i>	raccoon	C
<i>Mustela nivalis</i>	least weasel	C

Mammalia (Cont'd)

<i>Mustela erminea</i>	short-tailed weasel	C
<i>Mustela vison</i>	mink	R
<i>Mustela frenata</i>	long-tailed weasel	U
<i>Mephitis mephitis</i>	striped skunk	U
<i>Spilogale putorius</i>	eastern spotted skunk	U
<i>Taxidea taxus</i>	badger	C
<i>Odocoileus virginiana</i>	white-tailed deer	C

Aves

<i>Anas platyrhynchos</i>	mallard	C
<i>Anas discors</i>	blue-winged teal	C
<i>Anas crecca</i>	green-winged teal	C
<i>Cathartes aura</i>	turkey vulture	U
<i>Buteo jamaicensis</i>	red-tailed hawk	C
<i>Falco sparverius</i>	American kestrel	C
<i>Circus cyaneus</i>	marsh hawk	U
<i>Phasianus colchicus</i>	ring-necked pheasant	C
<i>Perdix perdix</i>	Hungarian partridge	C
<i>Charadrius vociferus</i>	killdeer	C
<i>Bartramia longicauda</i>	upland plover	C
<i>Zenaidura macroura</i>	mourning dove	C
<i>Bubo virginianus</i>	great-horned owl	U
<i>Chordeiles minor</i>	common nighthawk	U
<i>Archilochus colubris</i>	ruby-throated hummingbird	U
<i>Tyrannus tyrannus</i>	eastern kingbird	C
<i>Eremophila alpestris</i>	horned lark	U
<i>Riparia riparia</i>	bank swallow	C
<i>Hirundo rustica</i>	barn swallow	C
<i>Corvus brachyrhynchos</i>	common crow	C
<i>Cistothorus platensis</i>	short-billed marsh wren	C
<i>Cistothorus palustris</i>	long-billed marsh wren	U
<i>Turdus migratorius</i>	American robin	U
<i>Lanius ludovicianus</i>	loggerhead shrike	U
<i>Molothrus ater</i>	brown-headed cowbird	C
<i>Xanthocephalus xanthocephalus</i>	yellow-headed blackbird	U
<i>Agelaius phoeniceus</i>	red-winged blackbird	C
<i>Sturnella magna</i>	eastern meadowlark	C
<i>Sturnella neglecta</i>	western meadowlark	C
<i>Dolichonyx oryzivorus</i>	bobolink	C
<i>Spiza americana</i>	dickcissel	C
<i>Carduelis tristis</i>	American goldfinch	C
<i>Passerculus sandwichensis</i>	savannah sparrow	C
<i>Ammodramus savannarum</i>	grasshopper sparrow	C
<i>Melospiza melodia</i>	song sparrow	C

T. C. Stephens prepared the following lists of the summer birds of the region, according to their relative abundance. The studies were carried out during the summers of 1911 through 1919 and in 1921, in the Lake Okoboji region.

TABLE C-3

The Summer Birds of the
Lake Okoboji
Region of Iowa

Birds Listed as Rare

Ring-billed Gull	<i>Larus delawarensis</i>
Double-crested Cormorant	<i>Phalacrocorax auritus</i>
Shoveller	<i>Spatula clypeata</i>
Wilson's Phalarope	<i>Steganopus tricolor</i>
Dowitcher	<i>Limnodromus griseus</i>
Stilt Sandpiper	<i>Micropalama himantopus</i>
Marbled Godwit	<i>Limosa fedoa</i>
Willet	<i>Catoptrophorus semipalmatus inornatus</i>
Prairie Chicken	<i>Tympanuchus cupido pinnatus</i>
Osprey	<i>Pandion halioetus carolinensis</i>
Short-eared Owl	<i>Asio flammeus flammeus</i>
Burrowing Owl	<i>Speotyto cunicularia</i>
Alder Flycatcher	<i>Empidonax traillii traillii</i>
Towhee	<i>Pipilo erythrophthalmus</i>
Cedar Waxwing	<i>Bombycilla cedrorum</i>
Prothonotary Warbler	<i>Protonotaria citrea</i>
Wilson's Warbler	<i>Wilsonia pusilla pusilla</i>
Redstart	<i>Setophaga ruticilla</i>
Tufted Titmouse	<i>Parus bicolor</i>

Birds Listed as Uncommon

Loon	<i>Gavia immer</i>
Franklin's Gull	<i>Larus pipixcan</i>
Hooded Merganser	<i>Lophodytes cucullatus</i>
Mallard	<i>Anas platyrhynchos</i>
Lesser Scaup	<i>Aythya affinis</i>
Bob-white	<i>Colinus virginianus</i>
Cooper's Hawk	<i>Accipiter cooperii</i>

Birds Listed as Uncommon (Cont'd)

Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>
Ruby-throated Hummingbird	<i>Archilochus colubris</i>
Crested Flycatcher	<i>Myiarchus crinitus</i>
Least Flycatcher	<i>Empidonax minimus</i>
Lark Sparrow	<i>Chondestes grammacus grammacus</i>
Chipping Sparrow	<i>Spizella passerina passerina</i>
Field Sparrow	<i>Spizella pusilla pusilla</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota albifrons</i>
Black and White Warbler	<i>Mniotilta varia</i>
Wood Thrush	<i>Hylocichla mustelina</i>

Birds Listed as Fairly Common

Forester's Tern	<i>Sterna forsteri</i>
Blue-winged Teal	<i>Querquedula discors</i>
Least Bittern	<i>Ixobrychus exilis</i>
Black-crowned Night Heron	<i>Nycticorax nycticorax naevius</i>
Green Heron	<i>Butorides virescens</i>
King Rail	<i>Rallus elegans</i>
Virginia Rail	<i>Rallus limicola</i>
Carolina Rail	<i>Porzana carolina</i>
Florida Gallinule	<i>Gallinula chloropus cachinnans</i>
Upland Plover	<i>Bartramia longicauda</i>
Semipalmated Plover	<i>Charadrius semipalmatus</i>
Marsh Hawk	<i>Circus cyaneus hudsonius</i>
Hairy Woodpecker	<i>Dendrocopus villosus</i>
Night Hawk	<i>Chordeiles minor minor</i>
Chimney Swift	<i>Choetura pelagica</i>
Phoebe	<i>Sayornis phoebe</i>
Prairie Horned Lark	<i>Eremophila alpestris praticola</i>
Orchard Oriole	<i>Icterus spurius</i>
Vesper Sparrow	<i>Pooecetes gramineus gramineus</i>
Grasshopper Sparrow	<i>Ammodramus savannarum</i>
Indigo Bunting	<i>Passerina cyanea</i>
Scarlet Tanager	<i>Piranga olivacea</i>
Purple Martin	<i>Progne subis subis</i>
Rough-winged Swallow	<i>Stelgidopteryx ruficollis serripennis</i>
Tree Swallow	<i>Iridoprocne bicolor</i>
Migrant Shrike	<i>Lanius ludovicianus migrans</i>
Yellow-throated Vireo	<i>Vireo flavifrons</i>
Short-billed Marsh Wren	<i>Cistothorus platensis stellaris</i>
White-breasted Nuthatch	<i>Sitta carolinensis</i>

Birds Listed as Common

Pied-billed Grebe	<i>Podilymbus podiceps podiceps</i>
Black Tern	<i>Chlidonias nigra surinamensis</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Cowbird	<i>Molothrus ater ater</i>
Great Blue Heron	<i>Ardea herodias</i>
Coot	<i>Fulica americana</i>
Pectoral Sandpiper	<i>Erolia melanotos</i>
Least Sandpiper	<i>Erolia minutilla</i>
Lesser Yellow-legs	<i>Totanus flavipes</i>
Solitary Sandpiper	<i>Tringa solitaria</i>
Spotted Sandpiper	<i>Actitis macularia</i>
Killdeer	<i>Oxyechus vociferus</i>
Mourning Dove	<i>Zenaidura macroura</i>
Screech Owl	<i>Otus asio</i>
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>
Belted Kingfisher	<i>Megaceryle alcyon</i>
Downy Woodpecker	<i>Dryobates pubescens</i>
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>
Northern Flicker	<i>Colaptes auratus luteus</i>
Arkansas Kingbird	<i>Tyrannus verticalis</i>
Wood Pewee	<i>Myiochanes virens</i>
Blue Jay	<i>Cyanocitta cristata</i>
Crow	<i>Corvus brachyrhynchos</i>
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>
Western Meadowlark	<i>Sturnella neglecta</i>
Baltimore Oriole	<i>Icterus galbula</i>
Bronzed Grackle	<i>Quiscalus quiscula aeneus</i>
Goldfinch	<i>Astragalinus tristis tristis</i>
Song Sparrow	<i>Melospiza melodia</i>
Swamp Sparrow	<i>Melospiza georgiana</i>
Rose-breasted Grosbeak	<i>Hedymeles ludovicianus</i>
Dickcissel	<i>Spiza americana</i>
Red-eyed Vireo	<i>Vireo olivaceus</i>
Warbling Vireo	<i>Vireo gilvus</i>
Yellow Warbler	<i>Dendroica aestiva</i>
Maryland Yellow-throat	<i>Geothlypis trichas</i>
Catbird	<i>Dumetella carolinensis</i>
Brown Thrasher	<i>Toxostoma rufum</i>
Prairie Marsh Wren	<i>Telma todytes palustris dissaepus</i>
Black-capped Chickadee	<i>Penthestes atricapillus</i>
Robin	<i>Turdus migratorius</i>
Bluebird	<i>Sialia sialis</i>

Birds Listed as Abundant

Kingbird	<i>Tyrannus tyrannus</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Barn Swallow	<i>Hirundo erythrogaster</i>
Bank Swallow	<i>Riparia riparia</i>
Western House Wren	<i>Troglodytes aedon parkmani</i>

A. R. Larrabee conducted an ecological study of the fishes of the Lakes region during the summers of 1921, 1922, 1924, and 1925. He found 45 species of fish in the Okoboji region, 40 of which are thought to be native. Table C-4 lists those taxa which he reported in Lake West Okoboji and in Lake East Okoboji.

TABLE C-4

Fishes Of The Okoboji Lakes

<u>Scientific Name</u>	<u>Common Name</u>	<u>West</u>	<u>East</u>
<i>Polyodon spathula</i>	Spoonbill	X	X
<i>Lepisosteus osseus</i>	Long-nosed Gar	X	X
<i>Lepisosteus platostomus</i>	Short-nosed Gar	X	X
<i>Cristivomer namaycush</i>	Great Lake Trout	X	
<i>Ictiobus cyprinella</i>	Big-mouth Buffalo	X	X
<i>Ictiobus bubalus</i>	Small-mouth Buffalo	X	X
<i>Catostomus commersonii</i>	Common Sucker	X	X
<i>Moxostoma aureolum</i>	Red-horse	X	X
<i>Cyprinus carpio</i>	Carp	X	X
<i>Pimephales notatus</i>	Chub		X
<i>Pimephales vigilax perspicuus</i>	Bullhead Minnow	X	X
<i>Notropis cayuga</i>	Cayuga Minnow	X	
<i>Notropis heterodon</i>	Variable-tooth Minnow	X	
<i>Notropis blennius</i>	River Shiner	X	X
<i>Notropis hudsonius</i>	Spotted Shiner	X	X
<i>Notropis lutrensis</i>	Red Shiner	X	X
<i>Notropis jejunos</i>	Shiner	X	
<i>Pylodictis olivaris</i>	Flathead Catfish		X
<i>Ictalurus punctatus</i>	Channel Catfish	X	X
<i>Ictalurus natalis</i>	Yellow Bullhead	X	X
<i>Ictalurus nebulosus</i>	Common Bullhead	X	X
<i>Ictalurus melas</i>	Black Bullhead	X	X
<i>Esox lucius</i>	Northern Pike	X	X
<i>Fundulus diaphanus menona</i>	Banded Killfish	X	?

Fishes Of The Okoboji Lakes (Cont'd)

<u>Scientific Name</u>	<u>Common Name</u>	<u>West</u>	<u>East</u>
<i>Percopsis omiscomaycus</i>	Trout Perch	X	X
<i>Pomoxis annularis</i>	White Crappie	X	X
<i>Pomoxis nigro-maculatus</i>	Black Crappie	X	X
<i>Amblophites rupestris</i>	Rock Bass	X	X
<i>Hiodon alosoides</i>	Goldeye		X
<i>Abramis crysoleucas</i>	Golden Shiner		X
<i>Hybopsis storeriana</i>	River Chub		X
<i>Lepomis cyanellus</i>	Green Sunfish	X	X
<i>Lepomis macrochirus</i>	Bluegill	X	X
<i>Lepomis megalotis peltastes</i>	Long-eared Sunfish		X
<i>Lepomis gibbosus</i>	Pumpkinseed	X	X
<i>Micropterus salmoides</i>	Large-mouthed Bass	X	X
<i>Stizostedion vitreum</i>	Walleye	X	X
<i>Perca flavescens</i>	Yellow Perch	X	X
<i>Percina caprodes</i>	Northern Logperch	X	X
<i>Roccus chrysops</i>	White Bass	X	X
<i>Aplodinotus grunniens</i>	Freshwater Drum	X	X
<i>Boleosoma Nigrum</i>	Johne Darter		X
<i>Etheostoma exile</i>	Iowa Darter		X
<i>Stizostedion canadense</i>	Sauger	X	X

Aquatic Vegetation

The following tables give an indication of changing lake conditions in Lake East Okoboji, over a number of years. The aquatic plants which were surveyed in the lake in 1915 declined from 44 species to 18 species by 1961. Table C-5 shows the frequency of submerged or floating vascular plants found in the East Lake in 1915 and in 1961. Table C-6 shows the frequency of emergent aquatic plants reported in that lake, for those same years.

TABLE C-5

Comparison of submerged or floating vascular plants reported from Lake East Okoboji in 1915 and 1961

<u>Species</u>	<u>*Frequency</u>	
	<u>1915</u>	<u>1961</u>
<i>Heteranthera dubia</i>	4	
<i>Potamogeton americanus (P. nodosus)</i>	4	
<i>Potamogeton amplifolius</i>	4	
<i>Potamogeton dimorphus (P. diversifolius)</i>	4	
<i>Potamogeton epihydrus</i>	4-5	
<i>Potamogeton friesii</i>	5	
<i>Potamogeton foliosus</i>	4	5
<i>Potamogeton heterophyllus</i>	5	
<i>Potamogeton natans</i>	3-4	
<i>Potamogeton pectinatus</i>	3	2
<i>Potamogeton praelongus</i>	5	
<i>Potamogeton pusillus</i>	4	
<i>Potamogeton richardsonii</i>	5	5
<i>Vallisneria spiralis</i>	3-5	
<i>Ceratophyllum demersum</i>	1	5
<i>Ranunculus aquatilis</i>	5	
<i>Myriophyllum spicatum</i>	1-3	
<i>Bidens beckii</i>	3	
<i>Lemna minor</i>	4	5
<i>Lemna trisulca</i>	4	
<i>Spirodela polyrhiza</i>	4	5
<i>Wolffia punctata</i>	5	
<i>Potamogeton zosteriformis</i>	5	
<i>Zannichellia palustris</i>	5	5
<i>Najas flexilis</i>	4	
<i>Elodea canadensis</i>	4-5	
<i>Elodea ioensis (E. nuttallii)</i>	2-3	
Totals	26	7

*EXPLANATION OF FREQUENCY NUMBERS:

	1915	Freq. No.	1961
"Very abundant to dominant"		1	13 or more stations
"Abundant"		2	10-12 stations
"Common"		3	7-9 stations
"Frequent"		4	4-6 stations
"Less frequent"		5	1-3 stations

TABLE C-6

Comparison of emergent aquatic vascular plants reported from Lake East Okoboji in 1915 and 1961

<u>Species</u>	<u>*Frequency</u>	
	<u>1915</u>	<u>1961</u>
<i>Typha latifolia</i>	4	4
<i>Typha angustifolia</i>		4
<i>Typha X glauca</i>		4
<i>Sparganium americanum</i>	4	
<i>Sparganium eurycarpum</i>	3	5
<i>Sparganium simplex</i>	4	
<i>Sagittaria latifolia</i>	3-4	5
<i>Echinodorus cordifolius</i>	5	
<i>Alisma plantago-aquatica</i>	4-5	
<i>Phragmites communis</i>	4-5	
<i>Glyceria nervata</i>	4-5	
<i>Glyceria grandis</i>	4-5	
<i>Phalaris arundinacea</i>		5
<i>Eleocharis acicularis</i>	3-4	
<i>Eleocharis ovata</i>	5	
<i>Eleocharis palustris</i>	4	
<i>Scirpus fluviatilis</i>	4-5	4
<i>Scirpus validus</i>	3-4	1
<i>Scirpus acutus</i>		3
<i>Scirpus heterochaetus</i>		5
<i>Iris versicolor</i>	4	
<i>Radicula palustris</i>	4	
<i>Bidens cernua</i>	4-5	
Totals	18	11

*See footnote in Table C-5 for explanation.

Source: "Aquatic Vascular Flora of East Okoboji",
Proceedings of the Iowa Academy of Science,
 Volume 72, 1965.

APPENDIX D
SECTION 4(f) STATEMENT
FOR
CLAIRE WILSON PARK
IN ARNOLDS PARK
DICKINSON COUNTY, IOWA
PROJECT NO. F-71-9

Prepared By
Iowa Department of Transportation
Planning & Research Division
Office of Project Planning

In Cooperation With
U.S. Department of Transportation
Federal Highway Administration

January, 1979

General Location and Need for Project

The proposed U.S. 71 improvement involves the development of a four-lane highway facility through the Iowa Great Lakes Region, in Northwest Iowa. This facility would serve the incorporated communities of Milford, West Okoboji, Arnolds Park, Okoboji and Spirit Lake. The project, which would follow the general alignment of existing U.S. 71, would begin just south of Fourteenth Street in Milford and extend northerly to the west junction of Iowa 9, in Spirit Lake, a distance of approximately 7.1 miles. See Figure D-1 for the location of the proposed project within the Lakes area.

A public hearing on the proposed U.S. 71 project was initially held on September 5, 1968. Although original intent was to develop the project for federal aid, the subsequent design was advanced for non federal-aid participation, due to established statewide funding priorities. A design public hearing was held for the improvement on August 9, 1973. In March, 1975, and June, 1978, respectively, draft and final environmental impact statements (EIS's) were distributed for the proposed improvement, even though such documents were not required by law, due to the lack of federal funds involvement. They were prepared at the specific direction of the State Highway Commission, the purpose being to acknowledge the environmentally sensitive nature of the study area. Due to continuing legal delays in implementing this proposed improvement, however, the project has recently been redesignated for federal-aid participation in an attempt to dismiss certain allegations and expedite its further development. This decision required that a new Draft Environmental Impact Statement, of which this 4(f) Statement is a part, be prepared. For further details on the history of project development, refer to the introduction section contained in the front of this Draft EIS.

The need for this project is established by factors such as traffic volumes, sufficiency studies, accident analyses and level of service. The present two-lane facility does not provide the level of service necessary to safely and efficiently handle the seasonal resort area traffic demands. A major factor contributing to the congested operating conditions, in addition to the large volumes of traffic, is the considerable number of traffic movements at private and public access points adjacent to the route, and in particular, the left-turn movements.

Sufficiency ratings for nearly all rural and urban pavement sections within the project area fall within or very near the "critical" sufficiency range, with almost 75% of the sections having a sufficiency rating of below 20. According to the 1973-1977 accident analysis, the rural accident rate on U.S. 71 was approximately 7% higher than the statewide rural primary highway average. The municipal accident rate was approximately 26% higher than the statewide municipal highway accident rate. Current traffic volumes within the corridor average approximately 7300 vehicles per day, increasing to a projected average of 11,700 vehicles per day by the year 2000.

The proposed project would provide a safer and more efficient transportation facility for emergency, local and tourist traffic in the project corridor, and would result in reduced road user costs and energy conservation. Improved access to the area could also increase the attractiveness of this recreational area and contribute to increasing the development potential therein.

Project Description

The proposed project provides for a four-lane highway section to be constructed, generally along the existing U.S. 71 alignment, from Milford northerly to Iowa 9 in Spirit Lake.

Within the incorporated areas of Milford, West Okoboji, Arnolds Park and Okoboji it is proposed to construct 49-foot back-of-curb to back-of-curb urban sections. In the rural area between Milford and West Okoboji, a 48-foot rural undivided section with 10-foot stabilized shoulders is proposed. The portion of highway from Okoboji northerly to Iowa 9 in Spirit Lake would be constructed as a four-lane divided facility. The rural cross section in that area would utilize certain portions of the existing highway, resurfaced with asphaltic concrete, as the two southbound lanes. The design would also provide for an approximate 20-foot median with 10-foot outside and six-foot inside stabilized shoulders. The urban cross section, within Spirit Lake, would utilize a 16 to 20-foot raised median and 10-foot outside stabilized shoulders. Sidewalks would be constructed within the project area to accommodate pedestrian traffic, where warranted, according to established Iowa D.O.T. policies and procedures.

The bridge deck on the existing 64-foot by 24-foot concrete arch structure across the narrows between Lakes West and East Okoboji would be removed and a new 549.3-foot by 56-foot pretensioned, prestressed concrete and steel I-beam structure would be built on top of the northerly 500 feet of the existing causeway, also spanning the boat channel. The existing 40-foot boat channel would not be altered, and the existing bridge abutments would be left in place to further minimize construction impacts upon the lakes.

U.S. 71 in the project area is designated for access control as a Class III highway. This is a planned controlled access highway on which private access is permitted at predetermined locations, but primary consideration is given to the movement of through traffic. Present access control, however, does not meet Class III standards. Properties which presently have no curb and which have vehicles entering and leaving in random patterns would be provided with entrances to concentrate turning movements. However, only on the portion of the proposed improvement from Okoboji to Spirit Lake would access rights be acquired.

Alternatives

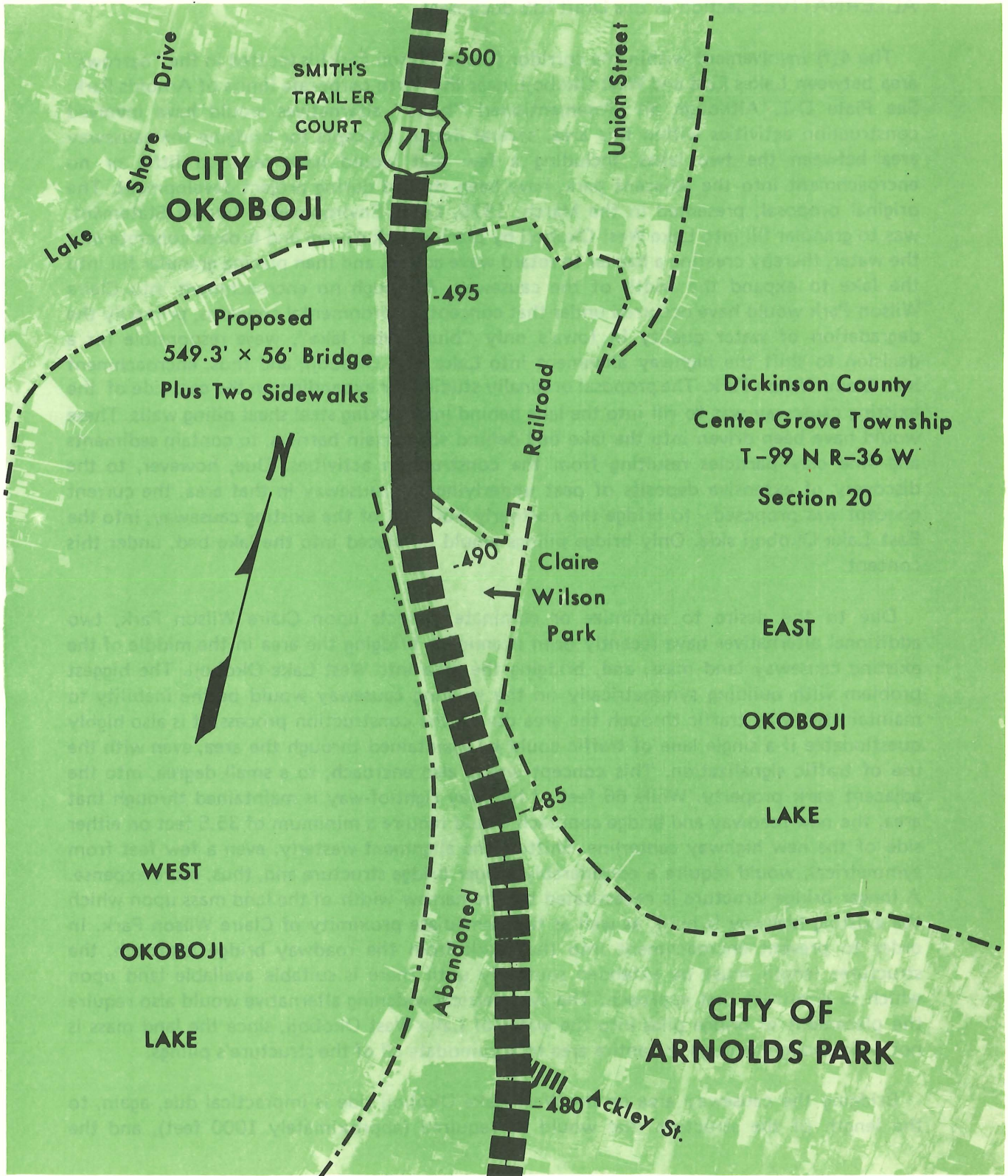
Several alternative concepts for the improvement of U.S. 71 have been studied during various phases of project development. The other alternatives have included a 65-foot wide facility with turning lanes; the construction of two additional lanes along the abandoned C. M. St. P. & P. Railroad right-of-way, while maintaining the existing highway as one-half of a one-way pair; a three-lane concept; a concept for providing left-turn storage lanes, only, at a few selected intersection locations; and, a "Do-Nothing" concept. These alternatives were, however, eliminated from further consideration since they were either poorly suited to satisfying the need for the project, were disruptive to existing community facilities and future development, or were not geometrically practicable. A further discussion of those

alternatives plus a description of the proposed "build" alternate is included in the previous ALTERNATIVES section of this Draft EIS document.

The 4(f) involvement within the corridor (Claire Wilson Park) is located in the "narrows" area between Lakes East and West Okoboji, near the north corporate limits of Arnolds Park. See Plate D-1. Although all aforementioned "build" alternatives would have involved construction activities within this area, several design concepts for bridging the causeway area between the two lakes, including a few that would have required little or no encroachment into the adjacent park, have been studied during project development. The original proposal, presented in the March, 1975, Draft Environmental Impact Statement, was to granular fill into Lake West Okoboji by placing rock rip-rap and broken concrete into the water, thereby creating a barrier to retard wave action, and then placing granular fill into the lake to expand the width of the causeway. Although no encroachment into Claire Wilson Park would have occurred under that concept, environmental concerns, primarily the degradation of water quality in Iowa's only "blue water lake", were responsible for a decision to shift the highway alignment into Lake East Okoboji; and thus, encroachment into Claire Wilson Park. The proposal originally studied for expanding on the east side of the existing causeway was to fill into the lake behind interlocking steel sheet piling walls. These would have been driven into the lake bed behind silt curtain barriers, to contain sediments and fine clay particles resulting from the construction activities. Due, however, to the discovery of extensive deposits of peat underlying the causeway in that area, the current concept was proposed - to bridge the northerly 500 feet of the existing causeway, into the East Lake Okoboji side. Only bridge pilings would be placed into the lake bed, under this concept.

Due to the desire to minimize or eliminate impacts upon Claire Wilson Park, two additional alternatives have recently been examined: bridging the area in the middle of the existing causeway land mass; and, bridging the area into West Lake Okoboji. The biggest problem with building symmetrically on the existing causeway would be the inability to maintain two-way traffic through the area during the construction process. It is also highly questionable if a single lane of traffic could be maintained through the area, even with the use of traffic signalization. This concept would also encroach, to a small degree, into the adjacent park property. While 66 feet of highway right-of-way is maintained through that area, the new roadway and bridge approach would require a minimum of 35.5 feet on either side of the new highway centerline. Shifting the alignment westerly, even a few feet from symmetrical, would require a considerably longer bridge structure and, thus, more expense. A longer bridge structure is necessitated by the narrow width of the land mass upon which the existing highway is built, as well as the immediate proximity of Claire Wilson Park. In order to prevent encroachment into that park from the roadway bridge approach, the structures length must be extended southerly until there is suitable available land upon which to construct that approach. The symmetrical widening alternative would also require the placement of bridge piles into the water of Lake West Okoboji, since the land mass is not wide enough through the entire area to accomodate all of the structure's pilings.

Bridging the causeway area on the West Lake Okoboji side is impractical due, again, to the length of the structure that would be required (approximately 1000 feet), and the



associated social, economic and environmental impacts. In addition to minimal construction activities (pile placements) within the West Lake, the structure would also impact a City-owned beach, located west of U.S. 71, opposite Claire Wilson Park, as well as several business establishments, located west of the north bridge approach, in the City of Okoboji. This concept would also require the permanent displacement of approximately 17 mobile homes in Smith's Trailer Court, identified in Plate D-1. Under the recommended alternate, a 10-foot retaining wall is being built in that vicinity, to facilitate construction into East Lake Okoboji. The 17 mobile homes, under that concept, would be only temporarily displaced during the construction process. It should also be noted that it is highly unlikely this area would be bridged, since there appears to be sufficiently stable foundation material overlying the unstable deposits of peat in West Lake Okoboji, to support a filled causeway embankment. It would be much more practical, considerably cheaper, and much less disruptive socially and economically to widen the structure on fill material. However, as previously noted, this alternative is unacceptable, due to the possible environmental consequences of filling into that lake.

Description of 4(f) Involvement

The proposed construction alternate would involve encroachment into Claire Wilson Park, located in the "narrows" area, near the north corporate limits of Arnolds Park. The park, itself, is sovereign land and was created, over a number of years, by the placement of fill material into the lake, behind a plank retaining wall. Neither a property plat nor an acreage figure exists for the area since a survey of that property has never been completed.

Facilities within the park area include a gravel parking lot; a shoreline retaining wall; a railroad trestle (recently converted to a public fishing pier and trail crossing); a brick building structure (originally used as a fisheries stripping station, and currently used for storage); and, numerous benches, trash receptacles, etc., along the shoreline. See Plate D-2 for the location of these facilities within the park.

Plate D-2 also shows the approximate limits of the Claire Wilson Park area, including the former railroad grade right-of-way and the former fisheries stripping station. The abandoned rail line, in that area, is intended for use as a portion of the proposed Dickinson County multi-purpose trail. The entire area is under the jurisdiction of the Iowa Conservation Commission. Available records indicate that no direct federal funds have been used to acquire or develop any portion of the park. A January 5, 1979, letter from the Iowa Conservation Commission in regard to this park and its relation to the proposed highway improvement is included in the back of this statement.

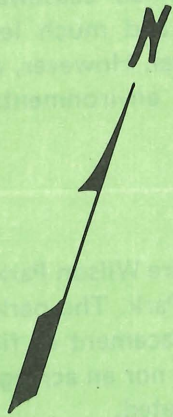
As previously stated, a 66-foot strip of highway right-of-way is maintained through the causeway area. Plans for the new highway improvement, however, propose moving the centerline easterly, through the area of the park, anywhere from 20 to 31 feet. Approximately 35.5 feet of right-of-way will be necessitated on either side of that new centerline (24.5-foot roadway, 10-foot shoulder and one-foot right-of-way offset); therefore, encroachment into Claire Wilson Park would range between 22.5 feet and 33.5

Proposed
549.3' x 56' Bridge
Plus Two Sidewalks

Abandoned Railroad Trestle

LEGEND

- Existing Centerline
- - - - Proposed Centerline
- ==== Proposed 8-Foot Sidewalk & Snowmobile Path
- Trail Crossing Site



490

Claire
Wilson
Park



Proposed Dickinson County Trail

EAST

OKOBOJI

LAKE

WEST

OKOBOJI

LAKE

Property Under Jurisdiction of
Iowa Conservation Commission

City
Beach

Fisheries Stripping Station

Property Line

485

Reif's Grand Vue
Beach Resort & Marina

Dickinson County
Center Grove Township
T-99 N R-36 W
Section 20

Abandoned
Railroad
Line

CITY OF
ARNOLDS PARK

feet, and would encompass approximately 0.4 acre. Plate D-2 shows the existing and proposed future highway centerlines. The former fisheries stripping station would also be displaced by the proposed highway improvement. The park land to be displaced is composed entirely of a gravel parking area; no facilities to accommodate fishermen, such as benches, tables, trash receptacles, etc., are located within the effective taking.

The actual causeway bridge structure would begin near station 491+00. Currently, access to the park is provided through a poorly defined entrance from U.S. 71, due to the lack of a highway curb through that area. Following project completion, an entrance to the park (curb cut) would be provided to concentrate turning movements. This would promote safe, orderly traffic operations at that point.

An important feature of this park, as indicated in the Conservation Commission letter, is its location within the narrows area separating Lakes East and West Okoboji. It allows for an open and uncluttered view of the lakes, the shoreline, boat traffic and other recreational activities or features. The shallow pool located between the existing highway bridge and the railroad trestle is also a highly productive and popular sport fishing site. The park area is used considerably during the winter months as a parking area for the loading and unloading of snowmobiles.

Recreational activities and uses accommodated by the park, in addition to fishing, viewing of the area, and snowmobiling, include walking, as well as parking for a small City-owned beach, located west of U.S. 71 in that area. The following park usage figures, supplied by the Conservation Commission, are based on field staff estimates, only. No precise usage data has been compiled, making the data subject to revision.

Fishing

Open Water - 15-20 vehicles/day (weekday)
30-40 vehicles/day (weekend)

Ice - 10-15 vehicles/day (weekday)
15-20 vehicles/day (weekend)

Sightseeing

Summer - 50-70 vehicles/day (weekday)
75-100 vehicles/day (weekend)

Winter - 10-15 vehicles/day (weekday)
25-30 vehicles/day (weekend)

Winter Snowmobiling

2-3 vehicles/day (weekday)
5-10 vehicles/day (weekend)

The area is also used for snowmobiles crossing between Lakes East and West Okoboji:

20 snowmobiles/day (weekday)
125-175 snowmobiles/day (weekend)

The Iowa Conservation Commission has plans for the future development of a visitors center facility on the Claire Wilson Park site. In addition, the area is also planned as a "trail head" for the proposed Dickinson County multi-purpose trail. (See pages 36-40 in the Draft Environmental Statement.) An improved parking area is planned to accommodate the anticipated increase in visitors to the area.

While no unique facilities exist in the park, itself, its location, both in regard to the trail and the two lakes, makes it a significant recreational resource.

The proposed construction alternate would require the taking of approximately 0.4 acre of park land (in addition to the former fisheries stripping station), in a strip ranging in width from 22.5 feet to 33.5 feet along the entire length of the park, adjacent to the highway. However, due to the demonstrated need for an improvement, and the detrimental social, economic and environmental impacts identified and associated with the other alternates studied, the alternate of constructing into East Lake Okoboji is deemed to be the most feasible and prudent alternative.

Mitigation Measures

The reduction in size of Claire Wilson Park, through the acquisition of highway right-of-way, would affect the number of available parking spaces as well as future plans for the erection of a visitors center on that site. The visitors center concept within the present park boundaries, however, poses numerous additional problems, besides the shortage of available land on which to build. The unstable foundation material underlying the area would make construction difficult and the problems associated with providing utility services to the site, primarily a sanitary sewer line, would have to be overcome.

As a mitigative measure to the use of park land, the Iowa Department of Transportation proposes to provide replacement land immediately south of, and adjoining that property currently under the jurisdiction of the Iowa Conservation Commission. The replacement land would be of sufficient size so that it would be useable for the same purposes as intended on the affected property. The property to serve as replacement land is known as Reif's Grand Vue Beach Resort and Marina. The entire parcel contains a combination snowmobile sales and service and marina establishment, seven rental cottage units, and five additional building structures. The possibility of utilizing one of the existing building structures on the property to serve as the visitors center has been discussed with the Conservation Commission, and they have agreed to give consideration to that possibility.

Although details of the land exchange have not been totally worked out and agreed upon at this time, efforts in that direction will continue; the Final Section 4(f) Statement will

contain that definitive plan. At this stage of project development it appears that a mutually acceptable solution to the problem of replacement land can be worked out; such an agreement will be contained in the Final 4(f) Statement. It should also be noted that under the existing court injunction, the Iowa D.O.T. is prevented from pursuing land negotiations with affected property owners in the project area. Any federal requirements for the purchase of 4(f) park land will be followed.

Another impact upon Claire Wilson Park would be increased noise levels. L10 noise levels (the level exceeded 10% of the time) at the park would increase by about 5 dBA over present levels by the year 2000. The 70 dBA contour distance would then encompass nearly the entire park. These increases, however, are only slightly higher than would be expected if the project were not completed. Currently, the park is used basically for shore-side fishing and parking. The expected increases in noise levels are not deemed sufficient to detract from the quality of this existing land use. Noise abatement techniques, in the form of a wall or berm, are not practical for this area since the uninterrupted barrier design that would be required would eliminate access, thereby limiting the areas availability to the public. In addition, a noise abatement structure would be aesthetically displeasing, would obstruct the view of the lakes, would require the taking of additional park land and would be inordinately expensive.

Mitigation or enhancement measures proposed include the incorporation of sidewalks into the design of the bridge structure through the causeway area; inclusion of a crosswalk and pedestrian actuated traffic signal at the proposed trail crossing site; construction of a sidewalk and snowmobile path between Claire Wilson Park and the adjoining property to the south, to facilitate pedestrian and snowmobile access in that area; and, provisions for supplying embankment material to the Iowa Conservation Commission so that existing Claire Wilson Park could be graded to improve surface drainage.

Sidewalks adjacent to the roadway surface along the proposed 550-foot bridge structure would not only improve pedestrian access through the Arnolds Park-Okoboji area, but would also provide an excellent place from which to fish. The proposed trail crossing site, with inclusion of the pedestrian actuated signalization, would significantly increase safety for bathers, pedestrians, fisherman, bikers and snowmobilers crossing U.S. 71 in the causeway area. The sidewalk and snowmobile path from Claire Wilson Park southerly would provide improved access to East Lake Okoboji for snowmobilers, as well as provide improved pedestrian access between the two area.

Temporary erosion control measures will be instituted to minimize the effects of soil erosion during construction of this project. These procedures, in general, normally include the construction of berms, dikes, slope drains and/or sediment basins; and, the use of fiber mats, netting, mulches and grasses. Permanent erosion control measures, such as sodding, mulching and seeding, are usually instituted as soon as possible during and following construction. Due, however, to the environmentally sensitive nature of the study area, several additional measures are being implemented to control potential water pollution resulting from the U.S. 71 construction process. Although these measures are discussed in

detail in Section VII, MEASURES TO MINIMIZE HARM, of the Draft Environmental Statement, briefly, they consist of the following: the diversion of storm sewers within the Arnolds Park and Okoboji urban areas from West Lake Okoboji into the East Lake or into Lake Minnewashta; the construction of numerous primary and secondary settling basins within the study area, to collect highway run-off and allow foreign material to settle out before entering the lakes; the use of silt curtain barriers in the lakes during the construction process, to trap any fine silt and clay particles suspended in the water; and, the erection of silt fences along the remainder of the corridor to collect sediment-laden runoff yielded by the construction process.

Summary

There are no other parks and/or recreational lands involved with this proposed highway improvement. The project has been coordinated with other agencies and has the support of many local officials and area residents.

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