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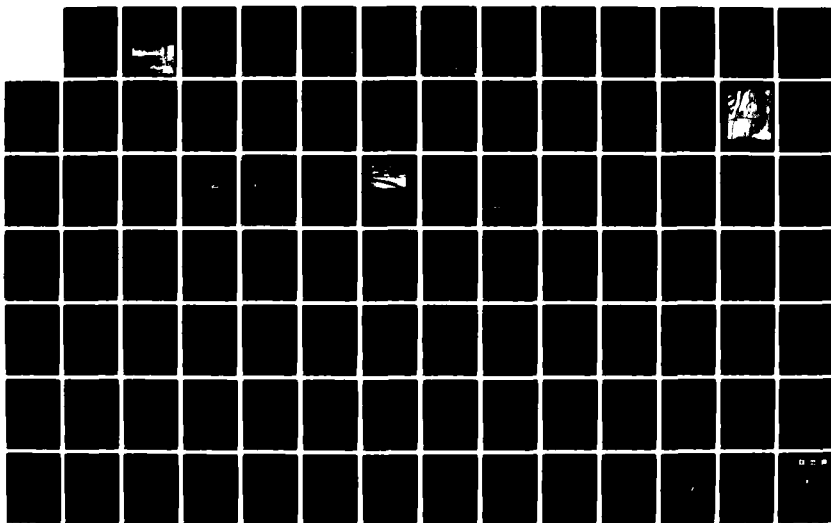
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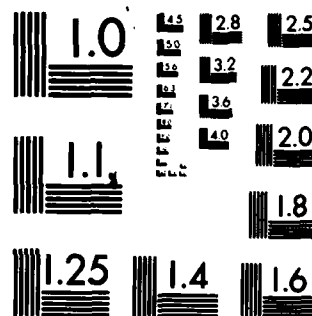
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**FINAL ENVIRONMENTAL
IMPACT STATEMENT
WINONA, MINNESOTA**

AD A139526



FILE

**FLOOD CONTROL PROJECT
AND WATERFRONT
DEVELOPMENT**

JANUARY 1976

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WINONA, MINNESOTA

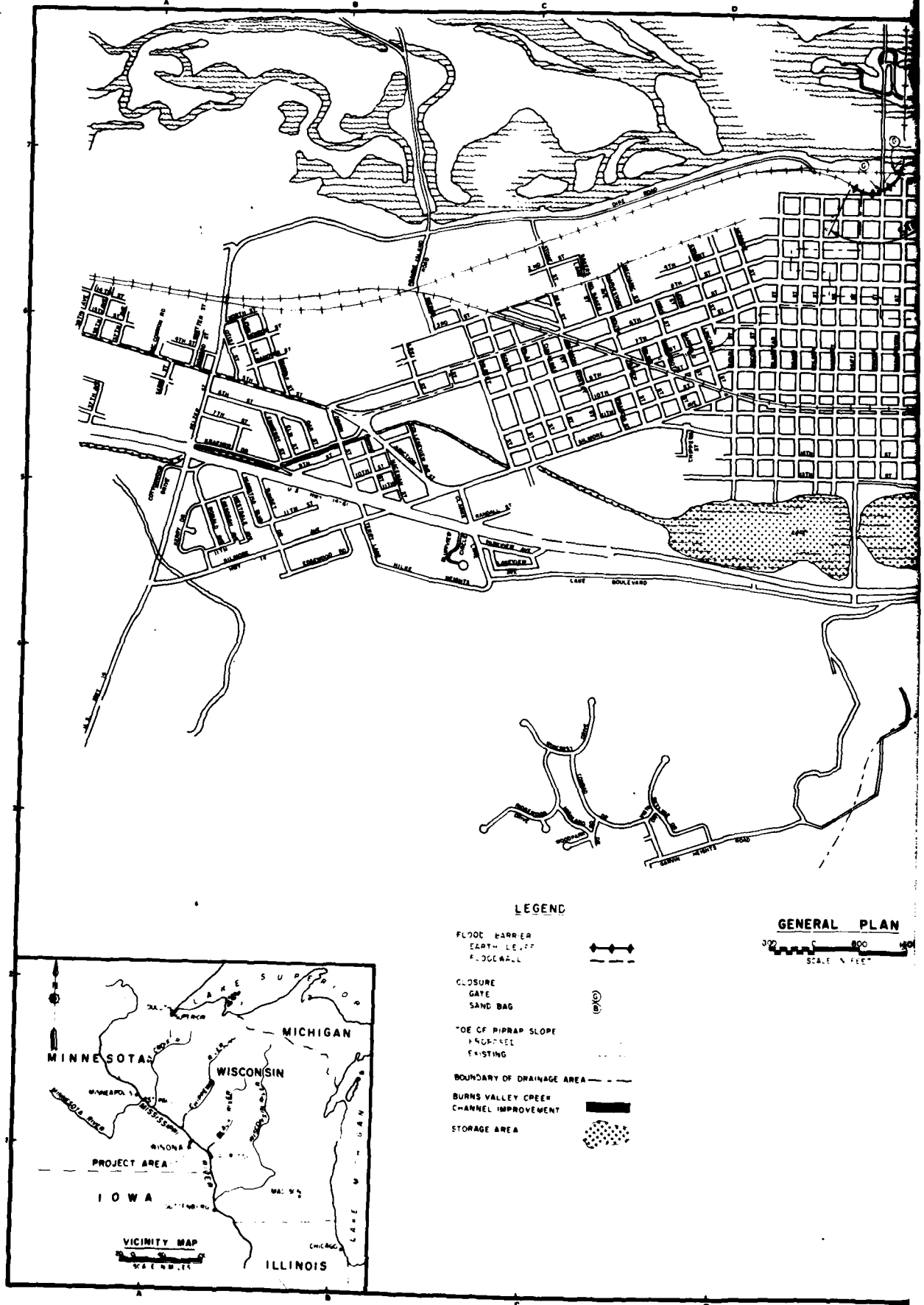
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FORWARD

Much of the city of Winona lies within the floodplain of the Mississippi River. By 1967 all but a small part of a flood control project authorized by the Flood Control Act of 1958 was completed by the Corps of Engineers. Stage I protection extends from Minnesota City (732 miles from the mouth of the Ohio River) to the Minnesota Highway 43 interstate bridge. This project provides only partial protection to the city of Winona. Following the record flood of 1965, city representatives requested that the authorized levee be extended to provide flood protection for the entire Winona riverfront which was heavily damaged in 1965. The project for flood damage reduction on the Mississippi River at Winona, Minnesota, described in House Document No. 92-152, 92d Congress, 1st Session was authorized under Section 201 of the Flood Control Act of 1965. In addition to providing protection for existing development, the proposed project would remove the flood threat from a large area of undeveloped land east of Lake Winona and would provide growth opportunities for the city.

There are numerous on-going or proposed projects on the Mississippi River floodplain in the vicinity of Winona, Minnesota, in addition to the proposed stage II flood control project. In an effort to understand the synergistic impacts of all these projects and the proposed stage II flood protection project, it was determined to prepare an umbrella environmental impact statement. Therefore this final EIS considers the environmental impacts of recently constructed, ongoing and proposed projects at Winona, Minnesota. Even though some of the projects lie within Winona's present dike system or do not require Federal permits, they have been included in order to assess the cumulative effects upon the environment.

The following projects are included in this Environmental Impact Statement (EIS):

a. Corps of Engineers Project

(1) Stage II Flood Control Project

b. Proposed projects which require a Department of the Army Permit(s)

(1) Fronings, Inc. Grain Handling Facility, Crooked Slough Harbor

(2) Winona Port Authority: 24-Barge Fleeting Area near River Bend Industrial Park and River Bend Industrial Park - Phase II (Projects are interrelated as presently proposed).

c. Completed projects which still require a Department of the Army Permit

(1) Winona Fleeting Company: 15-Barge Fleeting Area at Crooked Slough Harbor.

d. Completed actions constructed under the Department of the Army permitting authority.

(1) Farmers Union Grain Terminal - at Crooked Slough Commercial Harbor

(2) Storm Sewer Diversion at Pelzer Street

e. Proposed Projects which will/may require Department of the Army permits (these permits have not been applied for to date).

(1) City of Winona: Beltline Truck Route

(2) City of Winona: Extension of City Docks at Crooked Slough Harbor

(3) Mississippi Development Consortium Industrial Park and Theurer Blvd.

f. Proposed project which does not require a Department of the Army Permit.

(1) Enclosing of County Ditch No. 3

This Environmental Impact Statement was prepared by the U.S. Army, Engineer District, St. Paul, Minnesota as the lead Federal agency to assure compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA). The statement was prepared in accordance with the requirements of the Department of the Army, Engineers regulation 1105-2-507 dated 15 April 1974 and Council for Environmental Quality (CEQ) guidelines dated 1 August 1973.

The NEPA states, in part, that it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plants, functions, programs and resources to the end that the Nation may:

Fulfill the responsibilities of each generation as trustees of the environment for succeeding generations.

Assure for all Americans safe, healthful, productive and aesthetically and culturally pleasing surroundings.

Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.

Preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice.

Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities.

Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Further, with respect to major Federal actions significantly affecting the quality of the human environment, Section 102(2) (C) of the NEPA calls for preparation of a detailed statement on:

- (i) The environmental impact of the proposed action,
- (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
- (iii) alternatives to the proposed action,
- (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
- (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Pursuant to regulation ER 1105-2-507, the Department of Army, Corps of Engineers, prepares a detailed statement on the foregoing considerations with respect to its assignment in determining whether Federal permits should be granted to allow construction of the previously mentioned projects (those projects subject to the Department of Army permits).

When an application is submitted for Department of Army permits, the applicant is required to submit an environmental impact assessment if in the opinion of the District Engineer the proposed activity may have significant environmental impact. The Corps evaluates this report and may seek further information from the applicant, as well as from other sources, in making an independent assessment of the considerations specified in Section 102(2)(C) of the NEPA and ER 1105-2-507. If the District Engineer determines that the proposed activity will have significant environmental impact, an environmental impact statement is prepared and circulated to Federal, State, and local governmental agencies for comment. Interested persons are also invited to comment on the draft statement.

A draft environmental impact statement for the flood control project and waterfront development at Winona, Minnesota, was prepared and furnished to the public in May, 1975. This statement examined the proposed stage II flood control project and the waterfront development as identified earlier and available alternatives to the proposed actions. The draft EIS is presented to the public in an effort to gain their comments on the various activities and alternatives. This final EIS includes all comments received regarding the draft statement to date. Some comments have resulted in a modification of the proposed flood control plan as indicated in section 1.

It is anticipated that construction of the proposed stage II flood control project will be initiated in Fiscal Year 1978, assuming adequate funding is appropriated through Congress. The proposed project is currently estimated to be completed by April 1981.

This final statement will be filed with the Council on Environmental Quality in approximately 3 to 6 months. At that time a notice of availability will be made in the Federal Register. No administrative action on either the stage II flood control project or any permit actions will be made for 30 days after the notice of availability. This is to allow the public time to review the findings and make further comments on the actions if they desire.

Single copies of this statement may be obtained by writing to the District Engineer, U.S. Army Engineer District, 1135 U.S Post Office & Customs House, St. Paul, Minnesota 55101.

SUMMARY
FINAL ENVIRONMENTAL IMPACT STATEMENT
FLOOD CONTROL PROJECT AND
WATERFRONT DEVELOPMENT
WINONA, MINNESOTA

() Draft Environmental Statement (X) Final Environmental Statement

Responsible Office: U.S. Army Engineer District, St. Paul, Minnesota

1. Name of Action: (X) Administrative () Legislative

2. Description of Action: The proposed project for flood control provides for extension and modification to the project authorized by the 1958 Flood Control Act to complete a flood barrier along the riverfront and the downstream portion of Winona. Nonstructural measures include continuing floodplain regulations in the unprotected area including the McNally subdivision and Siebrecht's Nursery. Also discussed are the various waterfront projects planned or worked on after 1 January 1972 to include the following: Fronings Incorporated - Grain Storage Bins and Shipping Facility; Farmers Union Grain Terminal Association - Grain Elevators and Shipping Facility; Winona Fleeting Company - 15-Barge Fleeting Area in Crooked Slough; City of Winona - Belt Line Truck Route; City of Winona - Extension of City Dock in Crooked Slough; City of Winona - Storm Sewer Diversion at Pelzer Street; Winona Port Authority - 24-Barge Fleeting Area and Barge Cleanout Facility; City of Winona, Winona County and State of Minnesota - Enclosing of County Ditch No. 3; Winona Port Authority - Riverbend Industrial Park - Phase II; and, Mississippi Development Consortium - Industrial Park.

3. a. Environmental Impacts: The proposed flood control project would provide protection for the city of Winona against a Mississippi River flood having an expected frequency of occurrence of about once every 300 years. Land values on the protected low-lying areas would probably increase. In addition a greater degree of protection to the city water supply would exist.

Fronings proposed grain storage bins and shipping facility would provide economic benefits to the Winona area, as well as increase market opportunities for the upper midwest farmers.

The Farmers Union Grain Terminal Association grain elevators and shipping facility is complete and is presently providing benefits similar to those discussed above for Fronings' proposed project.

The dredging required for the 15-barge fleeting area proposed by the Winona Port Authority has already been accomplished to provide fill for the Pelzer Street extension. The fleeting area is already used extensively and is convenient to shippers using the Crooked Slough area. It has probably increased the value of the city-owned commercial dock and surrounding land.

The proposed Belt Line Truck Route is partially complete and has diverted trucks away from an athletic field and school area. When completed it will divert truck traffic from most residential areas and away from the downtown business district. It has provided easy access to Prairie Island Park.

No action has taken place to date regarding the proposed extension of the city dock in Crooked Slough Harbor. If completed it would speed loading operations and reduce congestion in the harbor.

The storm sewer extension has been accomplished and prevents storm sewer water from directly entering land owned by the Fish and Wildlife Service.

The proposed 24-barge fleeting area would relieve some of the barge fleeting congestion bound to develop with the related industrial development. It would promote industrial growth in Winona and produce revenue for the Winona Port Authority. When completed the area could precipitate the development of additional commercial docks on the east end of the city.

Enclosing of county ditch No. 3 would aesthetically upgrade the area and could provide a park or parking space for the residents of Thurley Homes.

Completion of the Riverbend Industrial Park, Phase II would provide employment, increase the tax base of Winona and result in increased commercial volume throughout the city. It would provide an incentive for industry to move from the city to a planned regulated area which is not residential. The area considered would be protected by the proposed flood control project.

The industrial park proposed by the Mississippi Development Consortium would provide similar benefits as discussed for the Riverbend area.

b. Adverse Environmental Impacts: The proposed flood control project would result in some reduction of flood storage capacity of the floodplain, and the loss of some marshland. In addition some adverse aesthetic impacts would result due to the height of the flood barrier.

Fronings Inc. proposal would displace 8 acres of water and floodplain forest. The development would result in a substantial increase in truck traffic with related congestion, noise and air pollution. In addition, increased congestion of boat and barge traffic in Crooked Slough Harbor would occur. Depending on the degree of increased river traffic the project could provide justification for the development of additional barge fleeting areas.

Farmers Union Grain Terminal Association project would have similar adverse impacts as those for Fronings proposal although on a lesser scale. If the Fronings project is completed the adverse impacts would be compounded.

The increased activity generated in the 15-barge fleeting area would result in less use of the site as a resting and feeding area by waterfowl during spring migration.

Construction of the Belt Line Truck Route may necessitate widening of the permanent dike which would constrict the river about 24 feet in the area west of the interstate bridge. The currently proposed route may cause some traffic problems along one residential area on Pelzer Street and along Second Street.

No significant adverse impacts would occur with extension of the city dock nor did they occur within the storm sewer diversion at Pelzer Street.

Construction of the 24-barge fleeting area would have some adverse aesthetic impacts and attract commercial river traffic to the east end of Winona. The construction of the project would result in loss of wetlands which provide habitat for fisheries and wildlife.

The enclosing of County Ditch No. 3 would have no significant adverse impacts.

Partial construction of Riverbend Industrial Park, Phase II, has already resulted in the loss of floodplain forest and marshland. Some additional small acreages of wetland would be lost when the industrial park is completed. As a result of comments made by the Minnesota Department of Natural Resources and the U.S. Department of Interior the alignment of the levee around Riverbend Industrial Park has been modified and a valuable type IV wetland will be preserved.

The development of the industrial park by the Mississippi Development Consortium would result in the loss of some floodplain forest and marshland.

4. Alternatives. The following alternatives were considered during selection of a flood control project for Winona: (a) no action; (b) continued construction of emergency works when floods are anticipated; (c) floodplain regulations; (d) flood insurance; (e) flood proofing; (f) evacuation; (g) combinations of nonstructural alternatives; (h) upstream reservoir storage; (i) channel improvement; (j) bypass channels; (k) combinations of structural measures; and, (l) combinations of structural and nonstructural measures.

The alternatives for waterfront development ranged from no action to less extensive development to more extensive development, as well as alternative sites.

5. Coordination:

a. Those who were furnished copies of the draft statement are listed on page 128.

b. A list of those who furnished comments on the draft statement is on page 130.

6. a. Draft statement to CEQ 29 April 1975.

b. Final statement to CEQ _____.

FINAL
ENVIRONMENTAL IMPACT STATEMENT
FLOOD CONTROL PROJECT AND
WATERFRONT DEVELOPMENT
WINONA, MINNESOTA

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FINAL
ENVIRONMENTAL IMPACT STATEMENT
FLOOD CONTROL PROJECT AND
WATERFRONT DEVELOPMENT
WINONA, MINNESOTA

INTRODUCTION

The purpose of this statement is to assess the environmental impacts associated with all on-going or proposed projects on the Mississippi River floodplain in the vicinity of Winona, Minnesota (see figure 1, Location Map). The proposed Stage II Flood Control Project will be discussed in greatest detail because it is the largest and most complex of all of the proposed projects. Even though some of the other projects lie within Winona's present dike system, they may still pertain directly or indirectly to the flood problem at Winona. Several of the other projects would have obvious effects upon the river, the surrounding marshlands, and the city itself. Arbitrarily, the project list contains all projects which were being planned or worked on after 1 January 1972. The list of projects and their locations are shown on figure 2. Much of the information contained in this report has been drawn from an environmental assessment prepared by Winona State University, Winona, Minnesota, under contract with the Corps of Engineers. The principal investigator was Dr. Calvin R. Fremling (see also Bibliography). This report is on file at the St. Paul District Office.

1. PROJECT DESCRIPTION

PROJECT LOCATION

1.001 Winona, a city of 26,438, is located on the right bank of the Mississippi River, 725.5 miles above the mouth of the Ohio River, in the southeastern corner of Minnesota at 44° 03.2' N. latitude and 91° 38.5' W. longitude.

1.002 Because Winona developed as an early steamboat port and saw-mill center, much of the city lies within the floodplain of the river. Flooding has been a constant threat to the city.

PROJECT AUTHORIZATION

1.003 The project for flood damage reduction on the Mississippi River at Winona, Minnesota, described in House Document No. 92-152, 92d Congress, 1st Session, was authorized under Section 201 of the Flood Control Act of 1965. Resolutions were adopted by the Public Works Committees of the House of Representatives on 29 July 1971 and of the Senate on 18 November 1971. The project provides for extension of and modifications to the project authorized by the 1958 Flood Control Act, to complete a flood barrier along the riverfront and around the downstream portion of Winona.

1.004 The proposed riverfront development projects involve the removal of dredge material from the Mississippi River and floodplain, and, in accordance with Section 10 of the River and Harbor Act of 1899, permits must be secured from the Corps of Engineers. The proposed 24-Barge Fleeting Area Cleaning Facility and the Mississippi Development Consortium would require permits under Section 404 of the Federal Water Pollution Control Act Amendments.

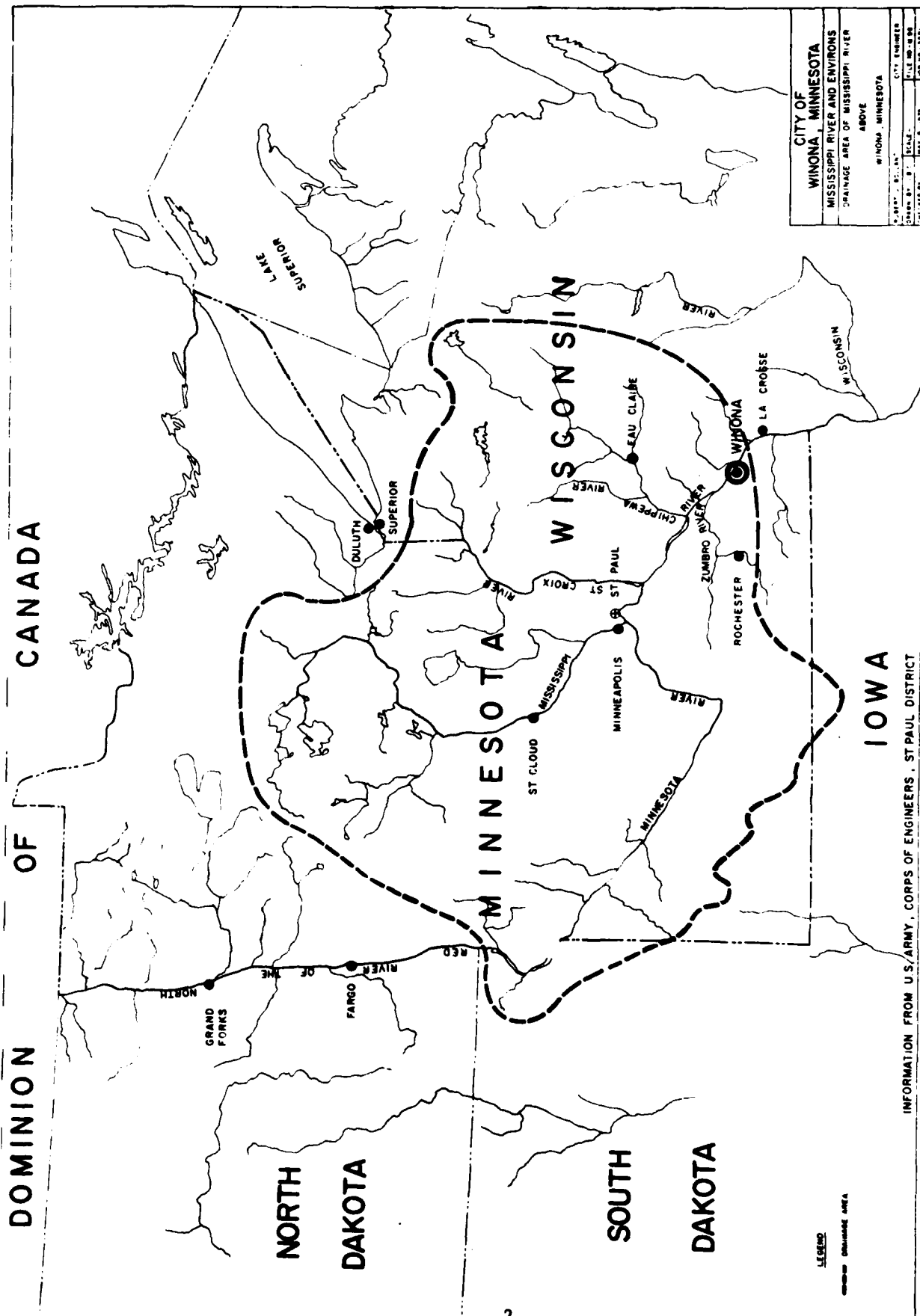
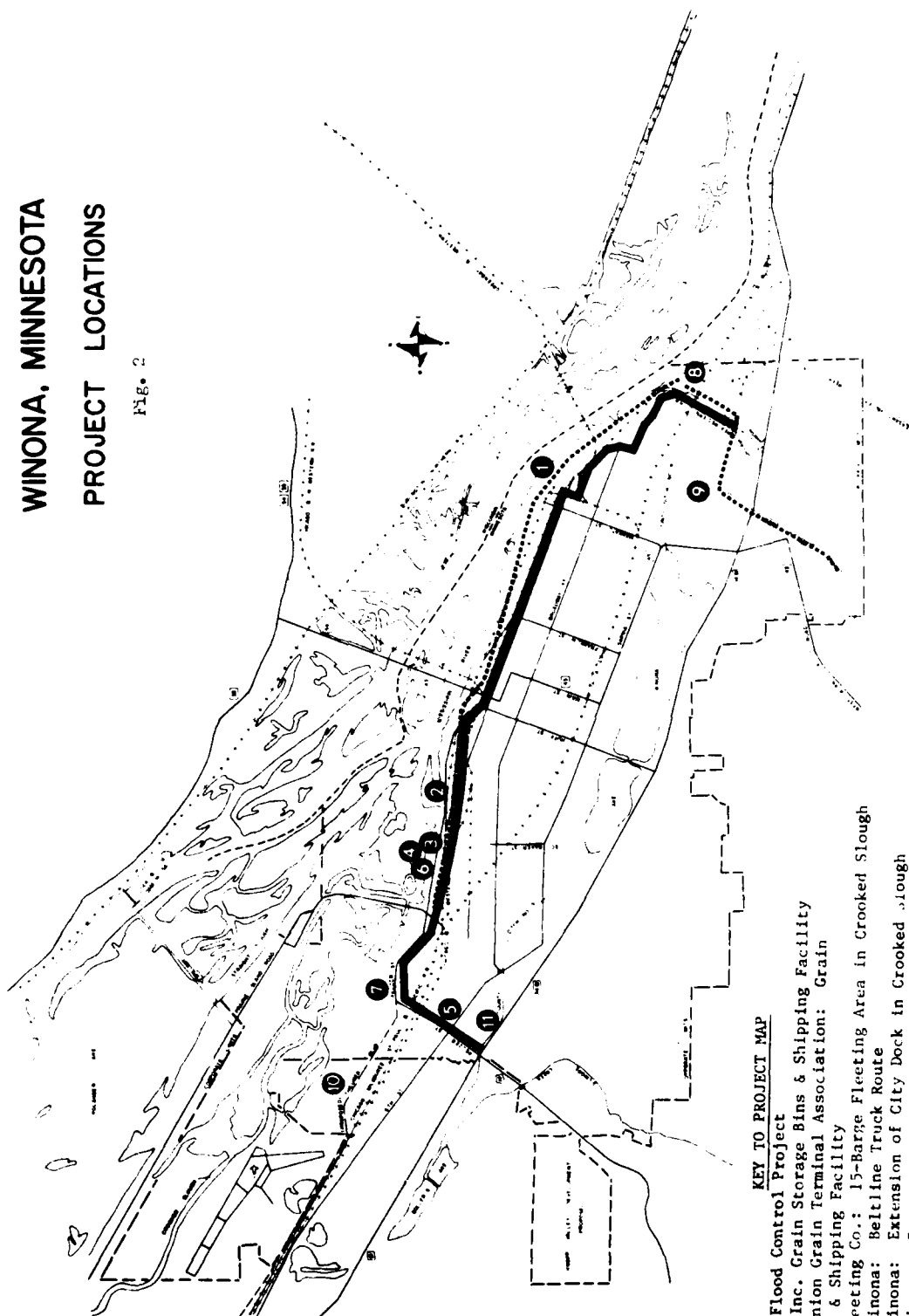


FIGURE 1

WINONA, MINNESOTA PROJECT LOCATIONS

Fig. 2



KEY TO PROJECT MAP

1. Stage II Flood Control Project
2. Fronings Inc. Grain Storage Bins & Shipping Facility
3. Farmers Union Grain Terminal Association: Grain Elevators & Shipping Facility
4. Winona Fleetring Co.: 15-Barge Fleetring Area in Crooked Slough
5. City of Winona: Beltline Truck Route
6. City of Winona: Extension of City Dock in Crooked Slough
7. City of Winona: Storm Sewer Diversion at Pelzer Street
8. Winona Port Authority: 24-Barge Fleetring Area near River Bend
9. Winona Port Authority: River Bend Industrial Park - Phase II
10. Mississippi Development Consortium: Industrial Park
11. City of Winona, Winona County & State of Minnesota: Enclosing of County Ditch No. 1

of 1972. Because the numbers and acreage of marshes and swamps within the United States are diminishing rapidly, all Federal agencies must exercise restraint to prevent unnecessary degradation of the wetland environment. The Winona flood control project and the proposed riverfront developments are all interrelated. In connection with these considerations and in order to properly assess the primary, secondary and cumulative impacts, the decision was to write a comprehensive statement including the Winona riverfront development.

EXISTING FLOOD CONTROL PROJECTS

1.005 All but a small portion of a flood control project authorized for the city of Winona in the Flood Control Act of 1958 was completed in 1967. This is the stage 1 protection and extends from Minnesota City (732 miles from the mouth of the Ohio River) to the Minnesota Highway 43 Interstate bridge (river mile 725.9) (figure 3). The uncompleted portion of this project consists of the control structure at the outlet at the lower end of Lake Winona. During recent Mississippi River floods, emergency measures were required to prevent extensive damages in the area partially protected by the completed portion of the authorized project as well as the unprotected industrial based riverfront reach downstream from the Minnesota Highway 43 bridge. Included within this unprotected reach is the city well field and water treatment plant, the main trunk line of the sanitary sewer system, and other vital public facilities. Since the city is located on alluvial deposits of pervious sand and gravel, high stages on the Mississippi River not only result in the inundation of business, residential and public properties in the city but also cause a general rise in the water table resulting in seepage into sewers and basements. Both the overland flow and seepage threaten to raise stages of the Lake Winona outlet during high water conditions. Test wells indicate that during low river stages the groundwater profile slopes from the lake to the river. However, with high river stages the slope of the groundwater profile is reversed so that seepage flow enters the lake.

1.006 The flood problem at Winona is further accentuated by the threat of flash flooding from the individual drainage basins of Gilmore, Burns Valley, and Pleasant Valley Creeks. Local improvements have reduced the threat of flooding from Gilmore Creek except for extremely rare occurrences; however, Burns Valley and Pleasant Valley Creeks remain uncontrolled and could cause considerable damage in the downstream reaches of Winona under present conditions.

1.007 Emergency levees, left in place after the floods of 1965, 1967, and 1969, together with the other limited flood control works undertaken by the city in the past, have fostered a feeling of security among many of the residents of the community. However, informed residents and city officials realize that the emergency works provided to date, because of the lack of freeboard and adequate pumping facilities, may have increased the potential flood losses which could result from a flood of greater magnitude than experienced to date. Although the recent emergency operations were successful, they were performed under relatively good working conditions and were not accompanied by large rainfalls which would have increased the interior pumping requirements. Furthermore, the emergency levees were constructed on poor quality foundations and on old sawdust deposits as evidenced by the many sand boils and bank sloughing problems experienced throughout the emergencies.

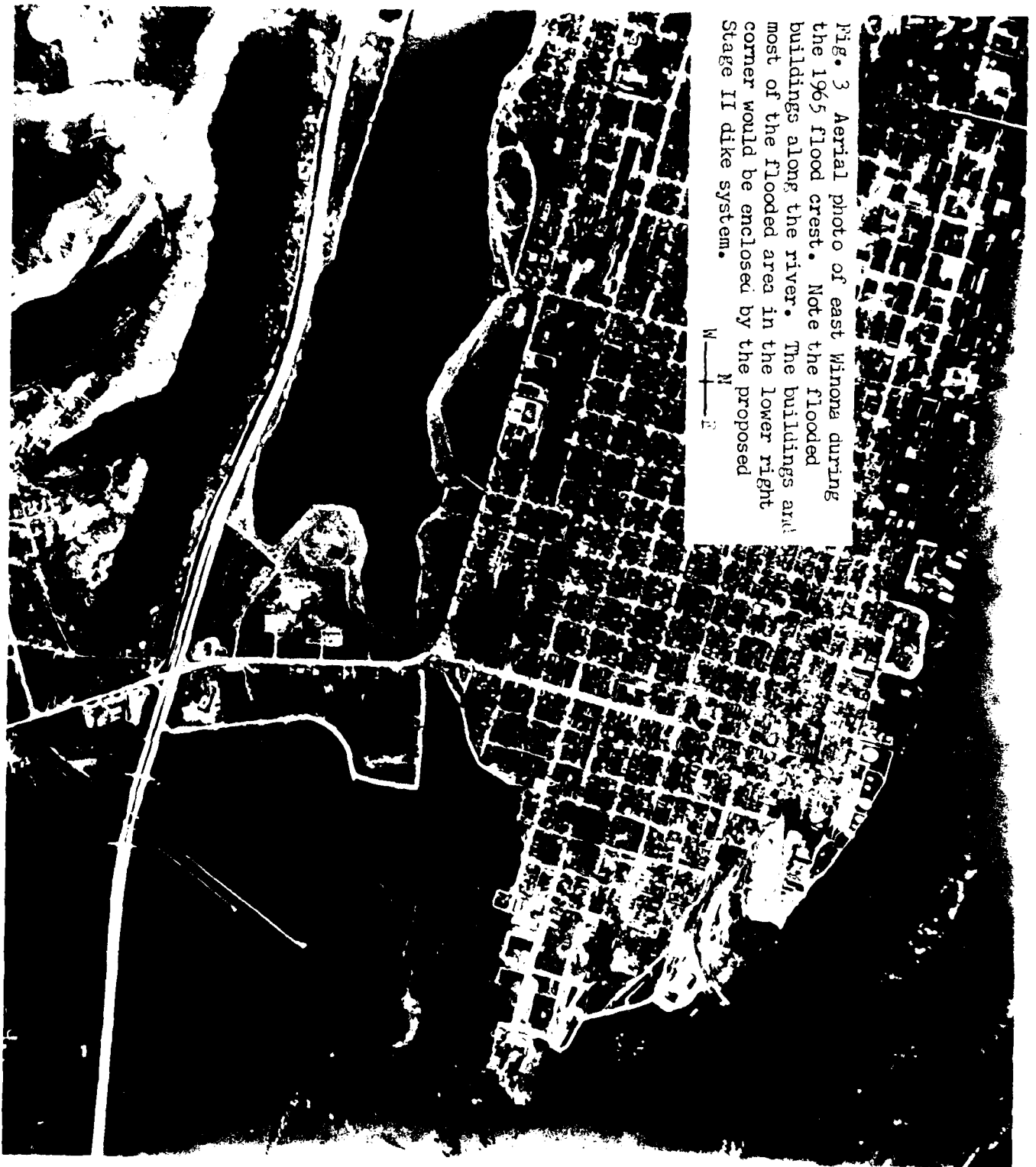


Fig. 3 Aerial photo of east Winona during the 1965 flood crest. Note the flooded buildings along the river. The buildings and most of the flooded area in the lower right corner would be enclosed by the proposed Stage II dike system.

1.008 In addition to the flood problems at Winona, a scarcity of land for industrial expansion has contributed to the slow economic growth of the city in recent years. For this reason, the city officials objected to the downstream closure alignment below Lake Winona provided by the initially authorized flood control project and requested that the levee alignment be moved eastward to provide flood protection for a large area of flood-prone land that could be used for growth opportunities. Thus, construction of the downstream closure of the authorized project was deferred for further economic study.

PROPOSED STAGE II FLOOD CONTROL PROJECT

1.009 The proposed plan of flood protection for Stage II, which includes both nonstructural and structural measures, would provide Winona with protection against a flood on the Mississippi River which has an expected frequency of recurrence of about once in 300 years. The proposed plan would include levee and floodwall protection with necessary interior drainage works for the riverfront and the Lake Winona closure reaches, as well as a sound floodplain management program to prevent unwise development of the area bordered by U.S. Highway 61 and Burns Valley and Pleasant Valley Creeks. The plan would also complete the initially authorized project by providing the downstream flood barrier needed to prevent Mississippi River backup flows from entering Lake Winona and inundating the area now only partially protected by the completed segment of the authorized plan. The selected plan would also provide control of Burns Valley Creek by means of channel modification, raising and extending the existing levee system, a drop structure, an erosion control structure, bridge modifications, and a sewer line modification (see figure 4 for general plan of improvement).

1.010 The recommended flood barrier consisting of levees and floodwalls would tie into the downstream extremity of the completed Stage I project, would extend downstream to protect the industrial based riverfront, and would provide the necessary closure below Lake Winona needed to complete the authorized project. Control of Burns Valley Creek would be afforded by extensive channel modification and raising of existing side levees. Included in the Burns Valley Creek modifications would be a drop structure and necessary erosion control facilities. The recommended alignment below Lake Winona provides protection for an area that would permit growth opportunities not originally included in the authorized plan.

1.011 Earth levees, averaging 10 feet in height and totaling approximately 3.8 miles in length, comprise about 85 percent of the proposed flood barrier. Concrete floodwalls, also averaging about 10 feet in height, total about 3,400 feet in length and have been designed integrally with a sheetpile cutoff wall to control underground seepage. To assure that the many abandoned sewer lines along the riverfront that once drained directly into the river are all accounted for and plugged, an inspection trench would be dug preceding levee or floodwall construction. Also, the trench would more accurately identify the sawdust deposits known to exist in the area from the many sawmills that once lined the Winona riverfront.

1.012 In all, four closure structures would be incorporated into the plan to provide openings in the flood barrier at railroad crossings, vital river access points, or to other properties affected by the flood barrier system. To minimize the height of the closure structure required downstream from Lake Winona where the flood barrier crosses the Chicago, Milwaukee, St. Paul and Pacific Railroad tracks, the tracks would be raised to the design flood elevation. Thus, only a low sandbag closure structure would be needed to provide freeboard protection above the design flood elevation. A permanent cutoff wall of sheet piling would be driven below the railroad closures to reduce seepage through the pervious ballast and underground foundations. In addition, two roadway ramps over the flood barrier would be included in the project plan; one at the boat-launching ramp at St. Charles Street and the other at the East End boat harbor. Widths would remain the same as the existing roadways serving these areas.

1.013 Originally, the proposed project called for six closures, but two will most likely be eliminated because of a recommendation by Robert Bollant (City Engineer), in behalf of the Citizen Advisory Committee on Flood Protection in Winona. The recommendation involved a change in alignment of the planned dike between Washington and Johnson streets. The temporary dike through the area was the Northwestern Railroad fill which abuts the depot and curves northwestward to the permanent dike. This alignment requires two railroad closures. By locating the levee along the edge of the river the two closures could be eliminated from the plan.

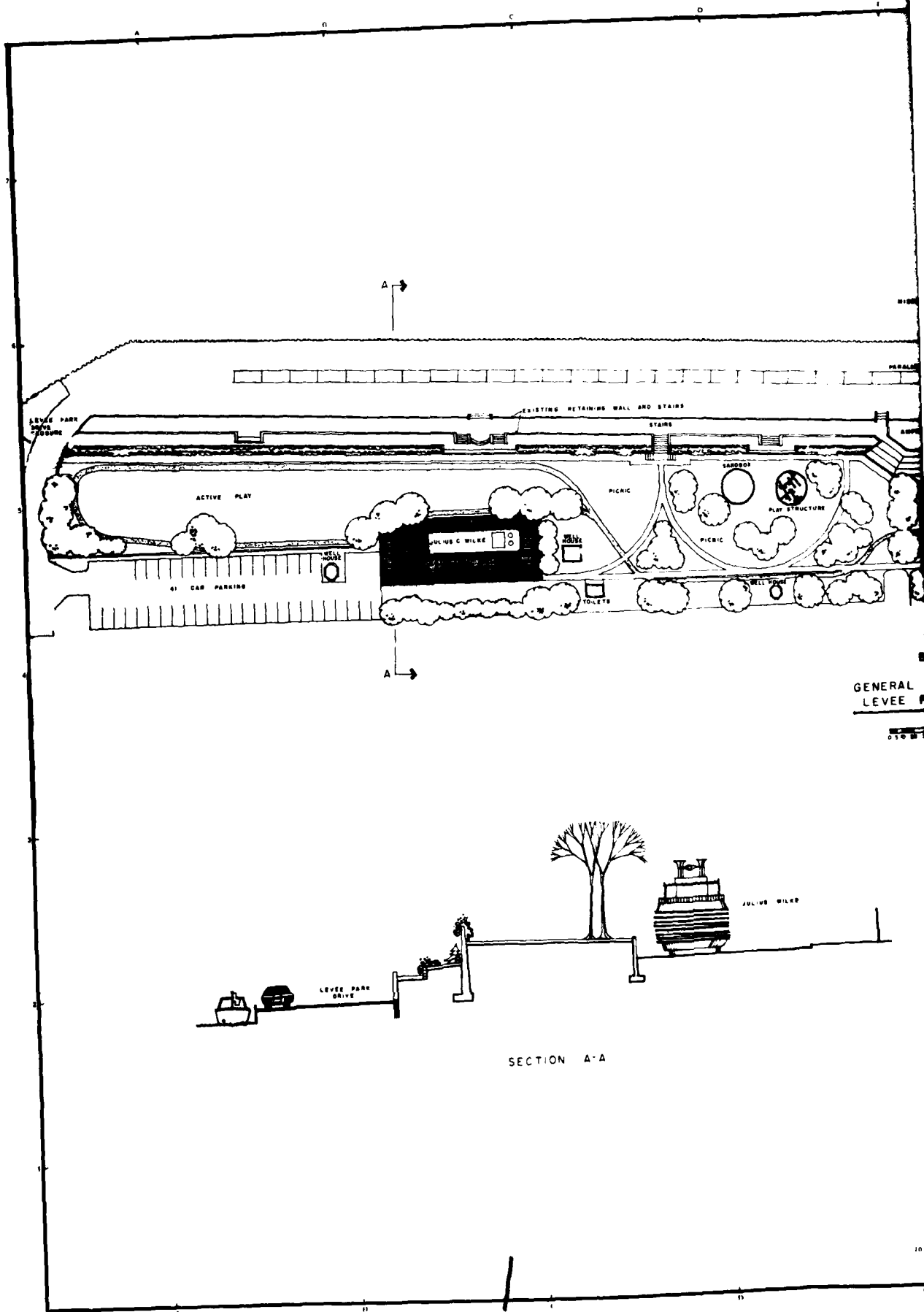
1.014 Drainage blocked by the project flood barrier includes surface runoff from approximately 15,000 acres of which approximately 15 percent is urban development. The general features of the proposed interior drainage plan consist of 23 gravity outlets which vary in size from 30 inches in diameter to 72 inches in diameter and interceptors consisting of ditches and pipes which drain to six collection points where pumping facilities would be provided. The interceptor pipe sizes would vary from 15 inches in diameter to a 68-inch arch. Ponding areas are proposed to reduce the capacities of two of the pumping stations; the Marina station and the Lake Winona outlet station. Alterations to existing sanitary facilities would be provided in four areas: (1) the installation of a manhole with a gate valve on the 18-inch sanitary interceptor sewer crossing the proposed flood barrier near the Badger foundry, (2) the relocation of a 42-inch reinforced-concrete pipe sanitary interceptor near Bob's Marina, (3) the addition of gate wells on the sewage treatment plant effluent lines, and (4) the addition of an inverted siphon where the existing sanitary line crossing Burns Valley Creek has to be lowered for necessary channel modifications.

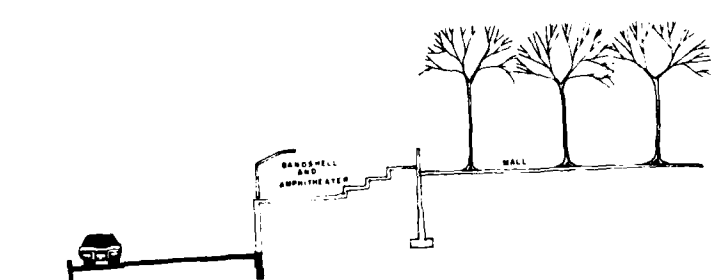
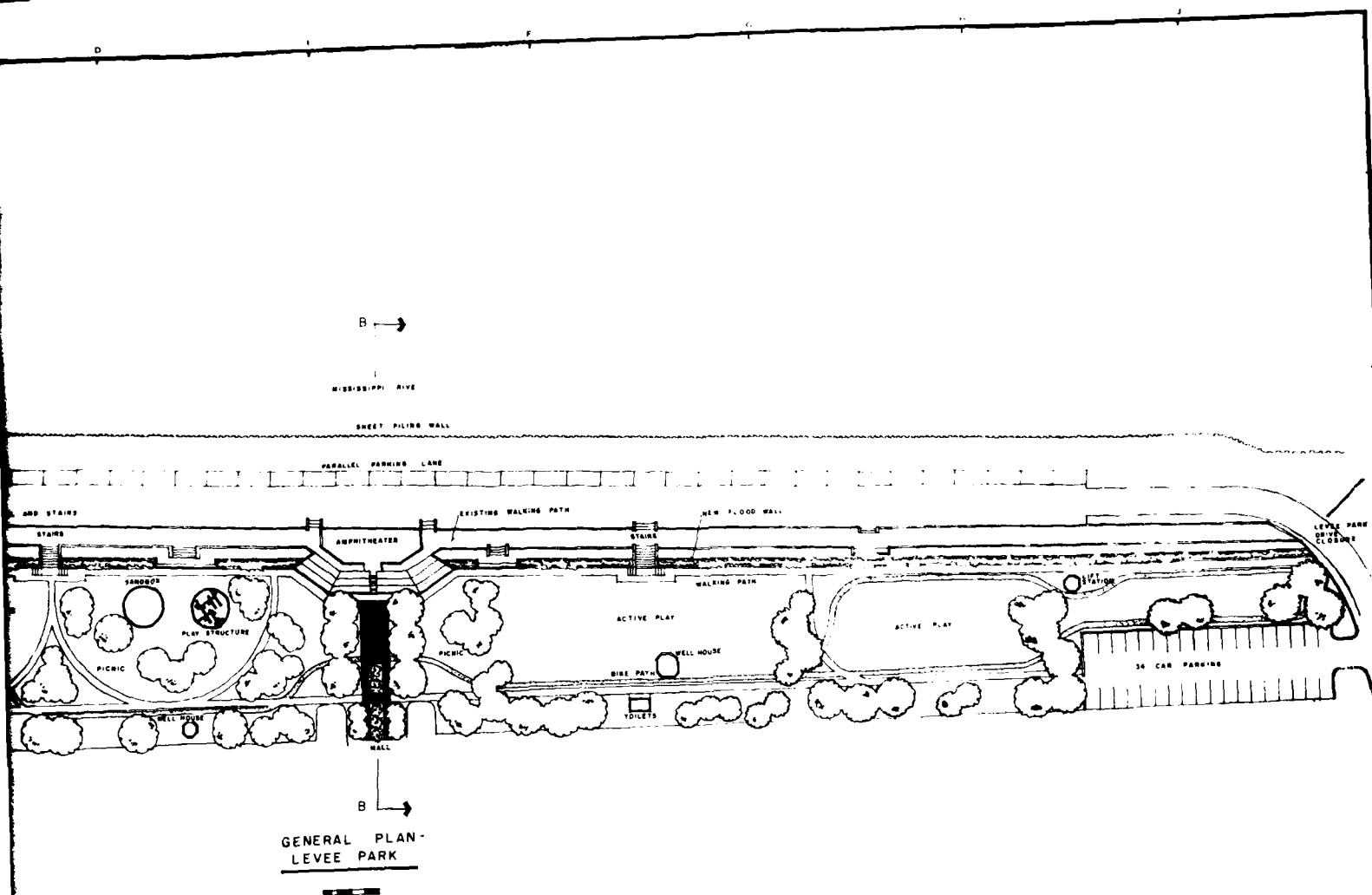
1.015 The only bridge modification required for the proposed plan for flood control occurs where old U.S. Highway 61 crosses Burns Valley Creek. Due to the extensive channel work required to accomodate the Burns Valley Creek design flow when the Mississippi River is at both high and low stages, the existing bridges would have to be raised and extended.

1.016 Plans for Levee Park have recently been modified so that the dike will be inconspicuous as it passes through the area. Slopes will be gradual and flood walls will only be about waist high so that they are not obtrusive. The final design for Levee Park will incorporate a combination levee and floodwall for the flood barrier. Provision will be made for vehicular access along the rivers edge, facilities to permit mooring of pleasure craft, and pedestrian visitors will be able to view the river from the landward side of the floodwall. The steamboat "Julius C. Wilkie" will be retained in its present location. Design of the floodwall is not finalized to date. (See figure 4A, page 10).

1.017 The estimated first cost of the project, based on October 1975 prices is \$16,100,000. Based on an interest rate of 6 1/8 percent the total annual charges for the project, including annual operation and maintenance costs, is \$986,400. At 6 1/8 percent interest, the average annual benefits are estimated to be \$3,935,000. The average annual costs of \$986,400 and average benefits of \$3,935,000 result in a benefit/cost ratio of 3.6 to 1.¹

¹Economic data, extracted from U.S. Army Corps of Engineers General Design Memorandum No. 2, General - Phase I - Plan Formulation, Winona, Minnesota, with values adjusted to October 1975 price levels. The complete document is available at U.S. Army Corps of Engineers District Office, St. Paul, Minnesota.





SECTION B-B



DATE		DATE
DEPARTMENT OF THE ARMY		DATE
11 PAIR DISTRICT, CAMP, OR HEADQUARTERS		DATE
11 PAIR DISTRICT, CAMP, OR HEADQUARTERS		DATE
SUBMITTED BY		DATE
APPROVED		DATE
DRAWING NUMBER		DATE
SHEET OF		DATE

FRONINGS INCORPORATED: GRAIN STORAGE BINS AND SHIPPING FACILITY (A633)

1.018 In July 1973, Kaiser Engineers completed a study for the Winona Port Authority to determine the feasibility of developing the Frog Island area which lies adjacent to Crooked Slough (figure 5). Although Kaiser Engineers felt that complete development of the Frog Island area could not be economically justified, they did recommend the construction of a 300,000 bushel capacity elevator on the Frog Island site. Concurrent with the Frog Island feasibility study was a plan by Fronings, Inc., of Clinton, Iowa, to build a grain elevator complex larger than the one recommended by Kaiser Engineers. On 29 August 1973, Fronings applied to the Corps of Engineers for a permit to dredge approximately 1,750,000 cu. yds. of material from the Mississippi River to fill a 60-acre site behind a bulkhead along the south shore of Crooked Slough Harbor.

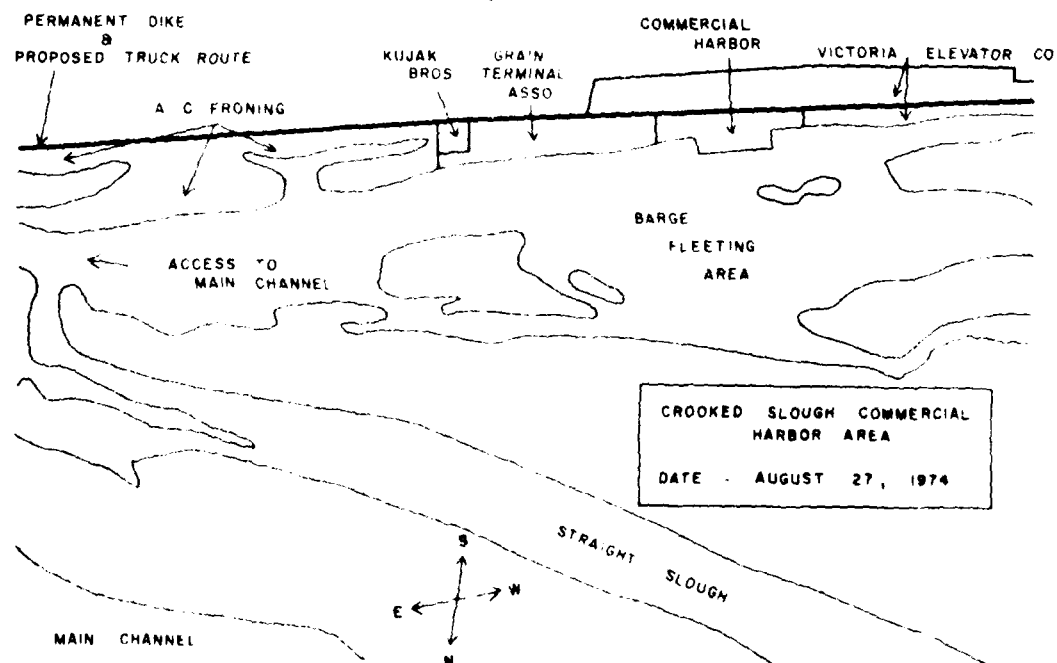
1.019 As a result of objections voiced by the Minnesota Department of Natural Resources (DNR) Fronings submitted a revised plan to the DNR on 28 August 1974. On 29 May 1975, Fronings submitted a revised permit application to the Corps of Engineers in accordance with Section 10 of the River and Harbor Act of 1899 and Section 404 of the Federal Water Pollution Control Act Amendments of 1972. The present proposal is to hydraulically dredge 214,000 cubic yards of sand and silt from a borrow area adjacent to the one created by the Pelzer Street project. The dredge material would be placed behind a wood and steel sheet piling retaining wall on the south side of Crooked Slough, Winona, Minnesota (See figures 6 and 7, pages 13 and 14).

1.020 The proposed 7.95-acre fill area is comprised of 6.83 acres of grass and bottomland hardwoods and 1.12 acres of water. A 5.6-acre secondary ponding area is presently comprised of 3.26 acres of grass and bottomland hardwoods and 2.34 acres of water. The fill area would be raised to an elevation of 665.0.

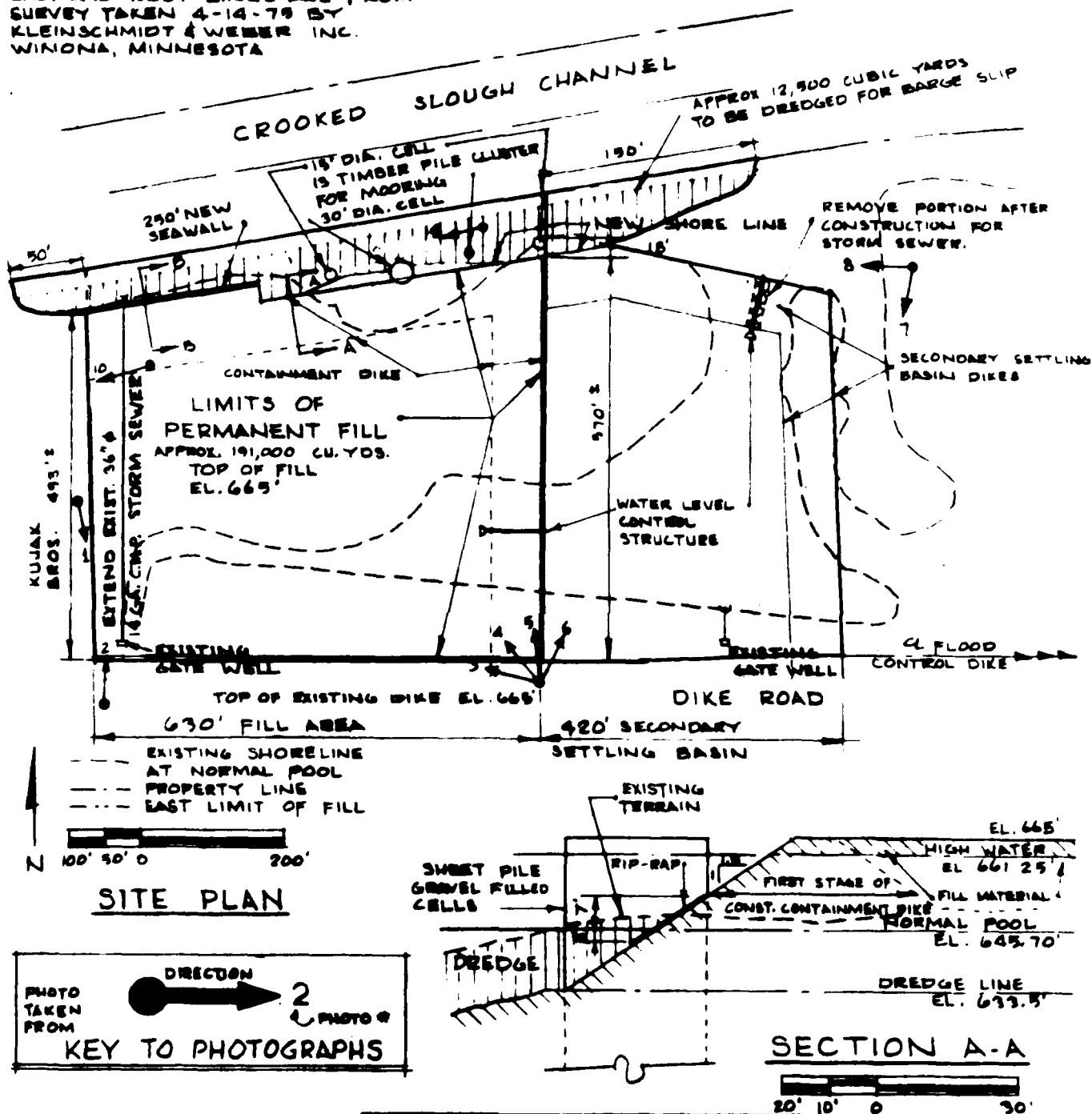
1.021 The proposed borrow area, which is indicated in figure 6, would be dredged to an average depth of 14-15 feet (630 elevation). The dredged material would be pumped to the project site and the runoff water would be allowed to settle in the secondary ponding area before being discharged into the Mississippi River. A permanent dike would surround the secondary ponding area. (See figure 7).



Fig. 5



NOTE:
493 FT. AND 588 FT. DIMENSIONS ALONG
EAST AND WEST LINES ARE FROM
SURVEY TAKEN 4-14-79 BY
KLEINSCHMIDT & WEBER INC.
WINONA, MINNESOTA



WHEELER & TILLITT
CONSULTING ENGINEERS
2101 HENNEPIN AVE.
MINNEAPOLIS MN 55405

SITE PLAN & SECTION
PROPOSED DREDGE FOR FILL
AT WINONA, MINNESOTA
OWNER: FRONINGS OF MINN. INC.
DATE: APRIL 23, 1975 SHEET NO. 3

1.022 The project would ultimately include 6 grain storage bins, each of which would be 160 feet in diameter and 60 feet high. Each bin would be constructed of steel and would hold 1 million bushels of grain. There would also be four 60,000-bushel working bins with hopper bottoms. The completed project would have facilities for receiving grain by truck and rail and shipping grain by barge and rail.

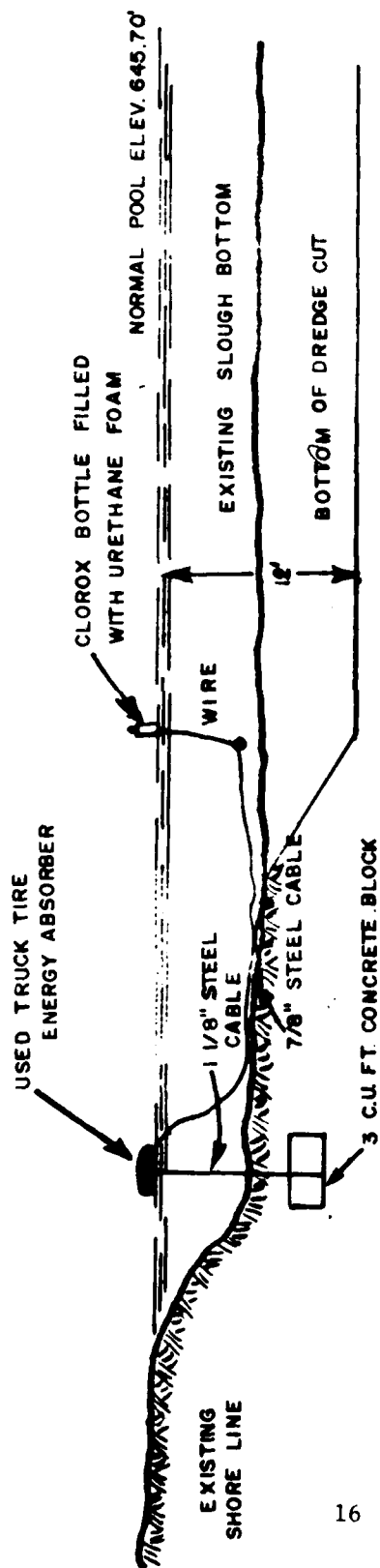
FARMERS UNION GRAIN TERMINAL ASSOCIATION: GRAIN ELEVATORS AND SHIPPING FACILITY

1.023 This project has been completed and is now in operation (see figure 5). The land for the project was purchased from Kujak Brothers, Incorporated, and the bulkheads and landfill were accomplished under a permit (Corps of Engineers number A545) which was originally issued to Kujak. Kujak has retained the southeast corner of the site and will maintain a scale and a warehouse. Kujak no longer has river access at the site.

1.024 The Farmers Union Grain Terminal Association plans involved the construction of a 100-foot wide sheet piling dock with an elevation of 660 feet. A grain storage surge unit with 140,000 bushel capacity was constructed on a pad which was raised to an elevation of 660 feet. An office building was constructed on the project site at an elevation of 662.5. A u-shaped road is used to conduct trucks from Pelzer Street to a scale and dump facility and back to Pelzer Street. The Farmers Union Grain Terminal went into operation on 1 June 1975.

WINONA FLEETING COMPANY: 15-BARGE FLEETING AREA IN CROOKED SLOUGH

1.025 The Winona Fleeting Company applied to the Corps of Engineers on 13 June 1973 for a permit (Number A610) to construct a barge fleeting area where dredge fill had been excavated for the construction of the Pelzer Street addition. The dredging for the project has already been accomplished (Number A557, issued 6 September 1972), as indicated previously (figure 6). The access channel for the 800-foot x 400-foot area was also dredged to provide fill for the Pelzer Street project. Originally the fleeting area was going to be 800-foot x 800-foot, but the size was reduced considerably when much of the dredge material necessary for the Pelzer Street project was removed from the access channel. "Dead men" have been placed in the fleeting area (figure 8 page 16). Each "dead man" consists of a used truck tire energy absorber anchored to 3 cubic feet of concrete block by a 1 1/8-inch steel cable, a 7/8-inch mooring cable would extend from each energy absorber to a buoy made of a urethane foam-filled polyethylene jug. The fleeting area has been heavily utilized during the entire 1974 shipping season.



16

TYPICAL
DEAD-MAN DETAIL
(MOORING ANCHOR)



PROPOSED
FLEETING AREA
in MISSISSIPPI RIVER
at MILE 727, county of
WINONA, state MINNESOTA
Applicant _____
Date _____ 1973

FIGURE 8

CITY OF WINONA: BELT LINE TRUCK ROUTE

1.026 The city plans to extend the Pelzer Street truck route from Prairie Island Road to the intersection of Second and Huff Streets (figure 2). This project would consist of widening the existing levee from a 20-foot width at the top to a 44-foot width. The 42-foot width would accommodate a 26-foot wide asphalt pavement surface and two gravel shoulders which would be 8 feet wide.

1.027 From Prairie Island Road to a point 1,600 feet east, the widening would take place on the south side of the dike. From a point 1,600 feet east of Prairie Island Road to a point 2,600 feet east of Prairie Island Road there would be a transition area in which the widening would shift from the south side of the dike to the north side of the dike. From a point 2,600 feet east to a point 5,000 feet east of Prairie Island Road, the widening would all be on the north or riverside of the dike. From a point 5,000 feet east of Prairie Island Road to Second and Huff Streets, the widening would take place on the south side of the permanent dike.

1.028 In that area where the widening would take place on the north side of the dike, it would run along the edge of property owned by Fronings, Inc. If Fronings is able to complete its fill prior to the road construction, the road would simply be constructed on top of existing fill. If, however, the road is constructed prior to the Fronings fill being made, the project would involve filling along the existing dike. This would involve slopes extending down into the water in some areas. A stretch of approximately 500 feet of riprap would be covered with this road construction, but the surface of the new road slope would be riprapped. Thus, there would be at least as much riprap area along the water's edge after the project is completed as now exists. If Pelzer Street is constructed before the Fronings project, the plan is to construct the widening by trucking in fill.

1.029 The street design will consist of a 7-inch thick crushed rock base and a 5-inch thick asphalt pavement. This surfacing would be constructed on top of the existing dike; thus, the finished elevation of the roadway would be 1 foot higher than the top of the existing dike. In essence, this would raise Winona's flood protection 1 foot in this reach of the dike.

CITY OF WINONA: EXTENSION OF CITY DOCK IN CROOKED SLOUGH

1.030 On 15 August 1974 Kujak Bros., Inc. suggested that the city of Winona extend the east end of its present crooked slough dock about 175 feet. Kujak felt that the extension would generate increased barge tonnage and that it would better serve future needs of barge traffic. They further suggested that the project be completed before April of 1975 because barge loading would not be possible during construction.

1.031 At this writing, no action has been taken on this project.

CITY OF WINONA: STORM SEWER DIVERSION AT PELZER STREET (A557)

1.032 This project consisted of extending a 42-inch diameter storm sewer at Pelzer Street 440 feet easterly along Pelzer Street so that the storm sewer effluent would discharge onto a city-owned portion of marsh rather than the portion of the marsh owned by the U.S. Fish and Wildlife Service.

1.033 The storm sewer was constructed at the request of the U.S. Fish and Wildlife Service and is located along the northerly edge of the Pelzer Street right-of-way. This Corps of Engineers permit was issued on 2 September 1972. The project was completed during August, 1974 (see figure 8A, page 19).

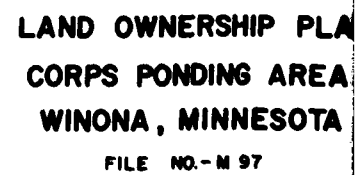
WINONA PORT AUTHORITY 24-BARGE FLEETING AREA AND BARGE CLEANOUT FACILITY NEAR RIVERBEND INDUSTRIAL PARK (A697)

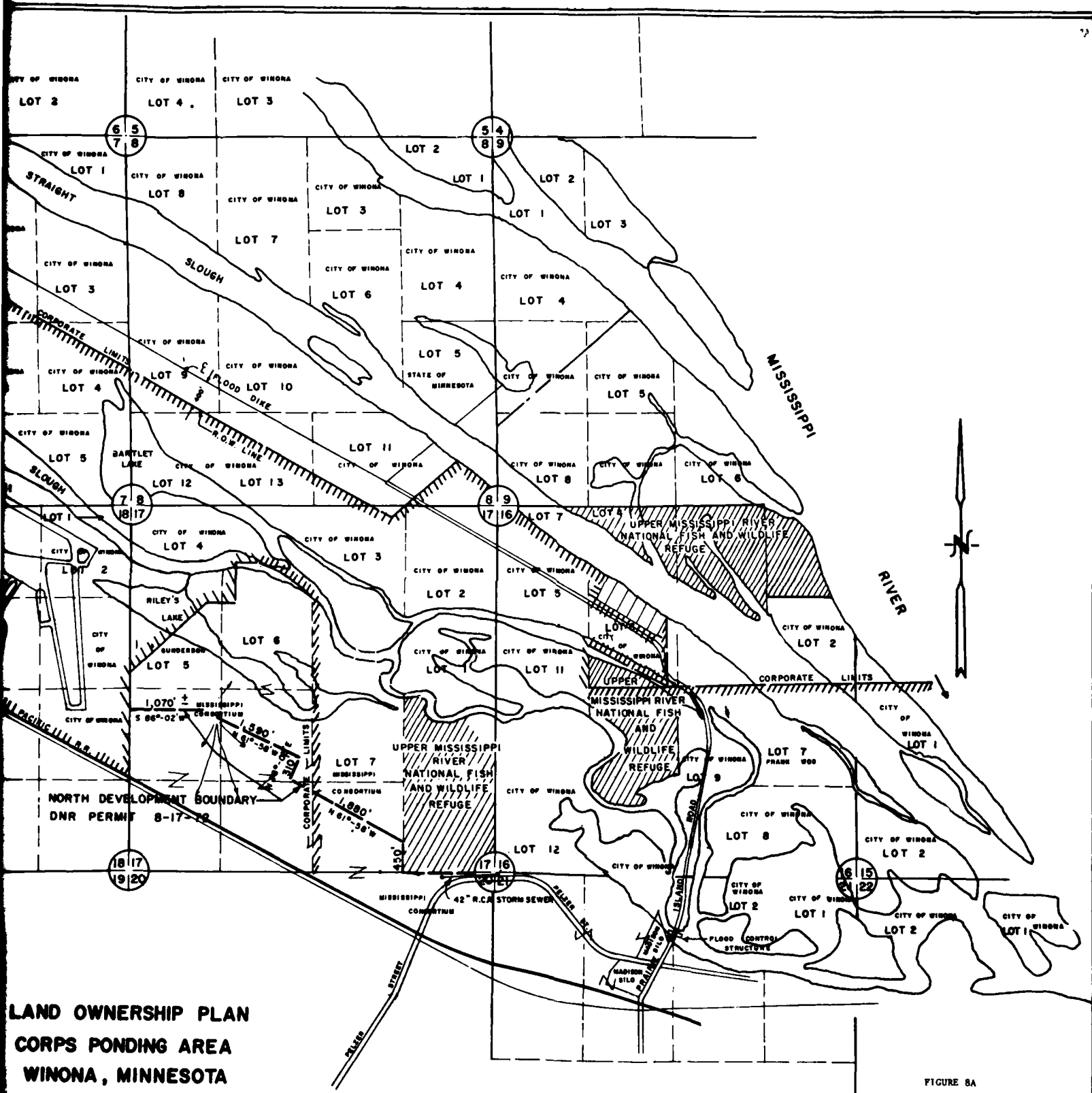
1.034 On 6 March 1975 the Port Authority of Winona applied for a Corps of Engineers permit to dredge 731,000 cubic yards of material (mostly sand) in order to construct a 36-barge fleeting area and cleanout facility on the right bank of the Mississippi River at river mile 722.5. The dredged material would be used as fill for Riverbend Industrial Park Phase II. On 24 October 1975 the permit applicant submitted a revised plan. The proposed project was reduced in size to handle 24 barges but the quantity of dredged material remains the same. The area to be dredged presently consists of floodplain forest and marsh.

1.035 The maximum depth of dredging would be 45.6 feet at normal pool elevation (645.6). At the lower or easterly end of the fleeting area, a 48-inch corrugated metal discharge pipe from the Winona Wastewater Treatment Plant, would be shortened to meet the new shore alignment.

1.036 The fleeting area would have an average length of 1400 feet and an average width of 300 feet. The banks would be stabilized with 24-inch diameter riprap for long-term bank stabilization. The existing trees along the river would be retained for aesthetic purposes (See figure 9, page 20).

1.037 Wastewater from the barge cleanout facility would be piped directly to the nearby wastewater treatment plant. The barge cleanout facility would be used to clean barges having contained dry cargo (not petroleum products).





FILE NO. - M 97

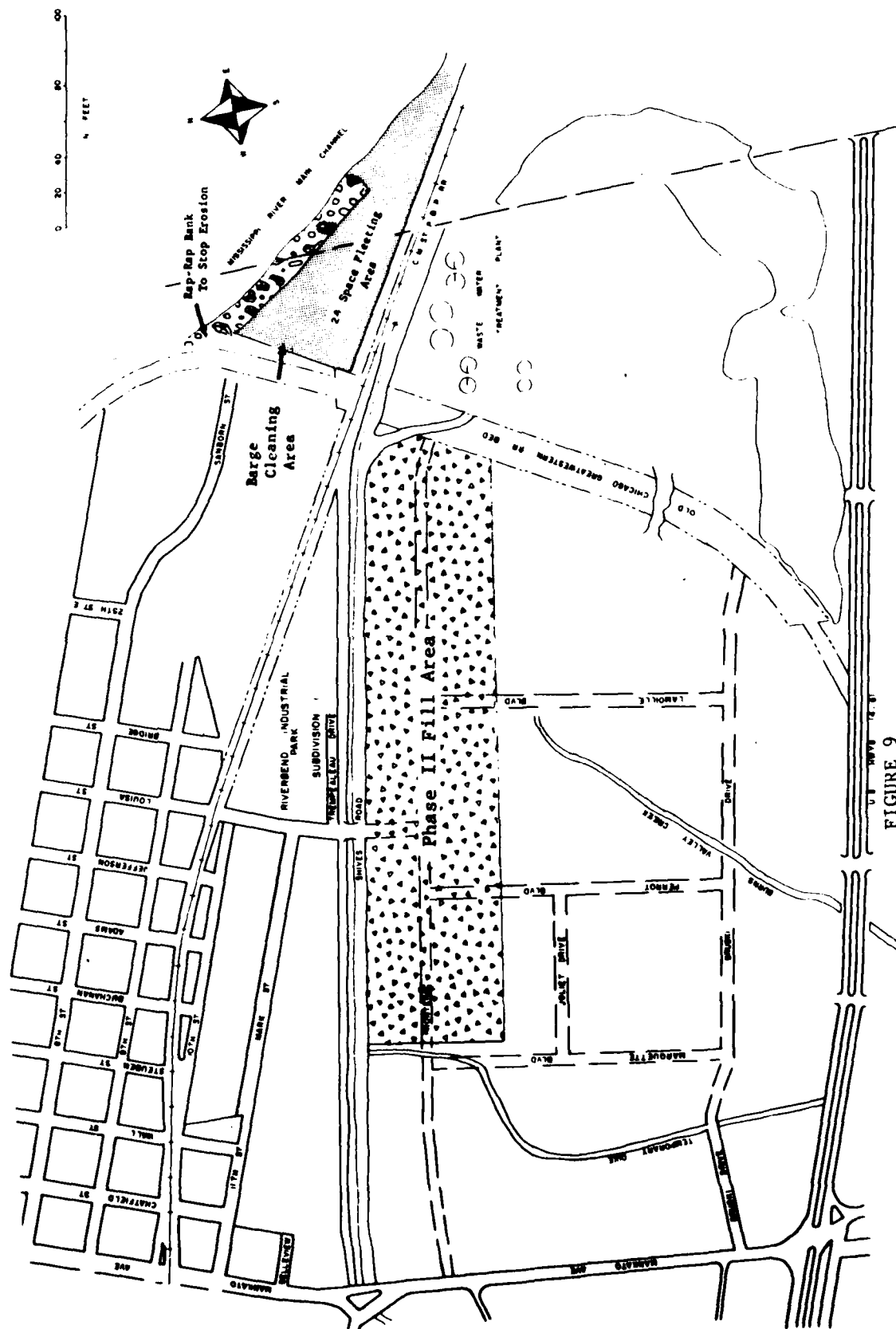


FIGURE 9

RIVERBEND INDUSTRIAL PARK

1.038 The dredged material would be discharged into a 208-acre dike contained ponding area. Of this area only 60 acres would be used for dredge material disposal, as part of Riverbend Industrial Park Phase II (see figure 9, page 20). The dredge sediments would be settled out before the water is discharged into the Mississippi River. This fleeting area has been proposed in lieu of a previously proposed 100-barge fleeting area on the Wisconsin side.

1.039 The Winona Port Authority fleeting plan is to use the Riverbend site as a staging area for large river tows and to move the barges back and forth to the commercial harbor at the western end of the city in smaller tows.

CITY OF WINONA, WINONA COUNTY AND STATE OF MINNESOTA: ENCLOSING OF COUNTY DITCH NO. 3

1.040 The proposed plan for County Ditch No. 3 Improvements within the city of Winona are as follows (figure 2):

1. From Gilmore Avenue through the College of St. Teresa, the ditch would remain essentially as it is, as an open ditch. Some slope improvement may be constructed over the next few years, with subsequent reseeding of slopes.

2. From the College of St. Teresa to Junction Street, a 6-foot wide by 2-foot high concrete channel would be constructed. The ditch would be filled with earth to the top of the channel walls and sloped upward to meet existing ground. The new slope would be seeded or sodded and then maintained by abutting property owners. By filling the floor of the ditch to the top of the channel wall, the ground would be raised above the water so that it would remain dry. Thus, maintenance would not be the problem that it presently is.

3. From Junction Street to Pelzer Street the present plan is to inclose the creek within a 122-inch arch concrete pipe culvert. The hydraulics department of the Minnesota Highway Department conducted a hydraulic evaluation and determined the culvert size. The culvert is designed for a flow of 420 cubic feet per second. The ditch would then be filled in and the area over the top of the culvert will be made into a linear park. Trees and shrubs would be planted along the right-of-way, and a bicycle path may also be constructed within the ditch rights-of-way. Offstreet parking would be constructed on part of the ditch right-of-way over the top of the culvert adjacent to Thurley Homes. Offstreet parking is needed adjacent to the Thurley Homes because Kraemer Drive is on the snow emergency route and when a snow emergency is declared the residents of Thurley Homes have no place to park their cars.

1.041 The 1975 Capital Improvements Program (5-year improvements plan for Winona) calls for improving the ditch from the west line of the College of St. Teresa to Orrin Street. The 1976 Capital Improvements Program calls for improving the ditch from Orrin Street to the Service Drive. The 1977 Capital Improvements Program calls for improving the ditch from the Service Drive to Pelzer Street. The costs of the project to both the city and county will be paid with revenue sharing funds.

1.042 The type of improvement has been nearly finalized, except for the section from Orrin Street to the Service Drive. There is still a possibility that this section may be improved with a concrete channel rather than the arch culvert. This decision will be dependent on funding, and also how well the channel works out in that section of the ditch from Junction Street to the St. Teresa Campus.

1.043 From Warren Street east, the project will be funded by the city and county. From Warren Street west, it probably will be funded by the city, county, and State.

1.044 It is hoped that permanent carp trap installation can be incorporated into the concrete channel at Junction Street. Such a trap is a necessary part of an ongoing program to rehabilitate Lake Winona as a fishing and swimming lake.

1.045 A water control structure may be placed at Boller Lake so that Gilmore Creek can be diverted around Boller Lake during periods of low flow. It is hoped that fresher water will thus be conducted via County Ditch No. 3 to Lake Winona. The diversion structure will also make it possible to cause Boller Lake to freeze to the bottom in the winter, thus controlling rough fish and enhancing the area as a northern pike spawning area. Money for the diversion has been approved by the Winona City Council.

WINONA PORT AUTHORITY: RIVERBEND INDUSTRIAL PARK - PHASE II

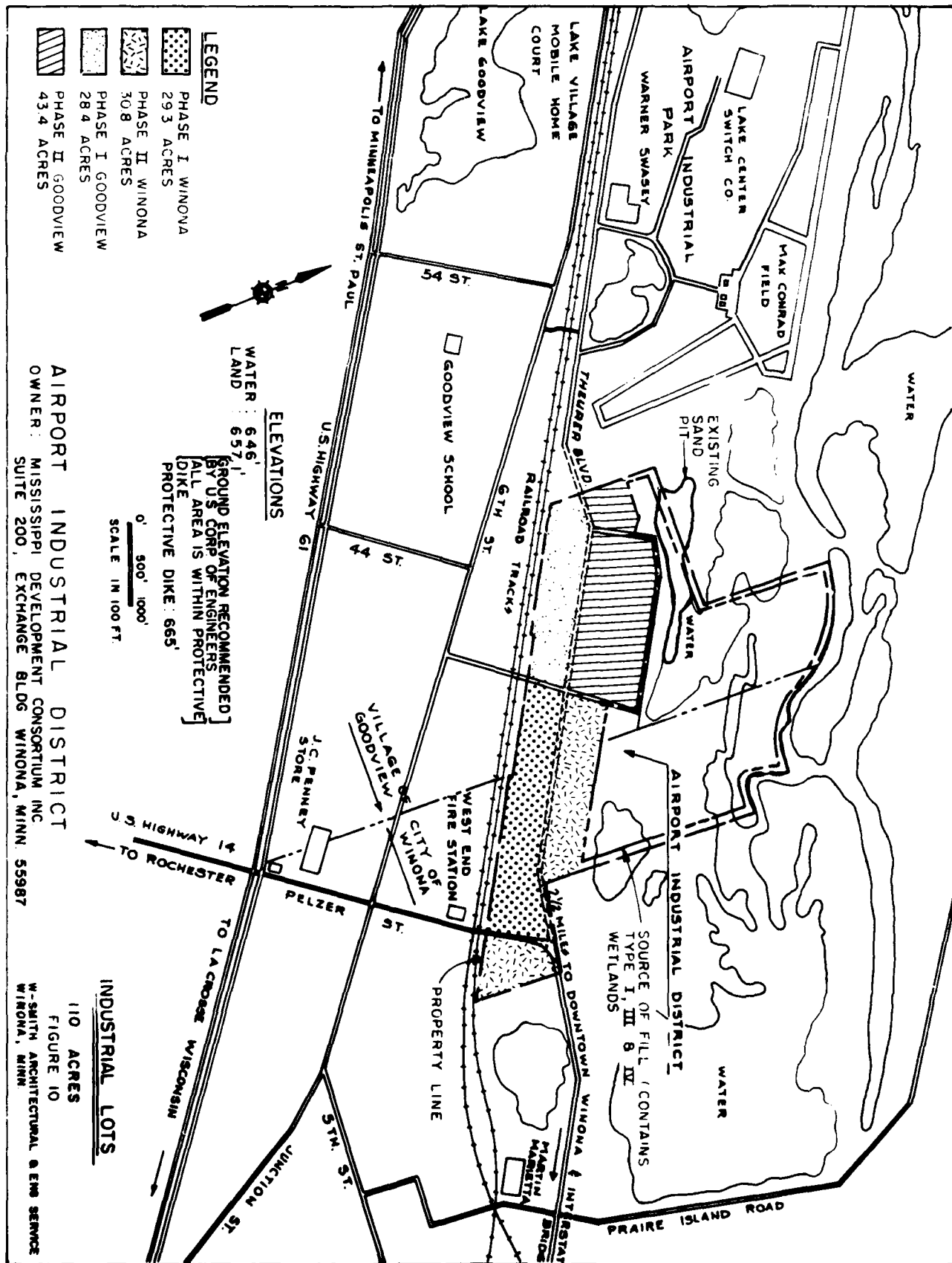
1.046 The project calls for the filling of an 800-foot x 3,400-foot area of Riverbend Industrial Park to an elevation of 656.5⁽¹⁾ with sand dredged from the Mississippi River (figure 9). The area to be filled is 760 feet wide and lies along Shive Road between Marquette Boulevard and the old Chicago Great Western Railroad bed. The previously mentioned 24-barge fleeting area would provide 730,000 cubic yards of fill for this project. Regulations governing the type of development in Riverbend Industrial Park have been set forth in "Protective Covenants Riverbend Industrial Park" by the Winona Port Authority⁽²⁾. A summary of the protective covenants is contained in exhibit 1, page A-1.

⁽¹⁾ Unless otherwise noted, all elevations in this statement refer to feet above msl (mean sea level) datum, 1912 adjustment.

⁽²⁾ A copy of the protective covenants is on file in the St. Paul District office.

MISSISSIPPI DEVELOPMENT CONSORTIUM: INDUSTRIAL PARK

1.047 The 160-acre area for this project is being filled to an elevation of 657 msl with dredge material. The eastern half of the area lies within the city of Winona, is bisected by Pelzer Street and abuts the Madison Silo sand pit. The west half of the development lies in the village of Goodview, but it abuts the municipal airport which is owned by the city of Winona. The north boundary limit is a line established in the Pelzer Street dredging permit. Dredging or development north of the line is prohibited to protect the public waters lying between the line and the Crooked Slough tract of land to the north which is controlled by the Latsch Memorial Board of the city of Winona. The project is being developed in four phases (see figure 10, page 24). Phase I, Goodview, has been filled to grade, Phase I, Winona, is only partially completed. The fill material for the project has been obtained by enlarging a gravel pit formerly operated by Peter Biesanz. The land comprising the fill source includes type I, III, and IV wetlands. The owners of the Consortium property have been informed that a Section 404 permit will be required from the Department of the Army if any additional fill is going to be placed in the remaining wetlands. The owners of the Consortium property have not applied for a Department of the Army permit as of this date. If the proposed project is completed as planned, the enlarged pit would ultimately form a small artificial lake. The proposed roadway, Theurer Boulevard, would link the airport industrial park with Pelzer Street.



2. ENVIRONMENTAL SETTING WITHOUT THE PROJECTS

INTRODUCTION

2.001 The area considered in this statement is located in southeastern Minnesota on the right bank of the Mississippi River and extends from Minnesota City, about mile 732⁽¹⁾, through Winona, mile 725.5, to the vicinity of Trempealeau, Wisconsin, mile 714.5 (as shown on figure 1). The drainage area of the Mississippi River at Winona is 59,200 square miles. Major tributaries of the Mississippi River upstream from Winona include the Minnesota, St. Croix, Chippewa, and Zumbro Rivers, with drainage areas of about 16,900, 7,600, 9,500 and 1,400 square miles, respectively. The high bluffs to the south of Winona are cut by the valleys of Gilmore, Burns Valley, and Pleasant Valley Creeks. These drain areas of about 9.0, 14.8, and 14.0 square miles, respectively. Flows from all these streams enter the Mississippi River at about mile 722.0.

2.002 At Winona the river flows through a valley from 3 to 5 miles wide bounded by steep bluffs which rise 500 to 600 feet above the valley floor. The main channel crosses the valley from near the Wisconsin bluffs opposite Minnesota City to the Minnesota bluffs in the vicinity of Homer, Minnesota, mile 720.7. Numerous secondary channels, sloughs, and elongated lakes lie between the main channel and the bluffs and divide the valley floor into islands. The main residential and business districts of Winona are located on one of these islands separated from the Minnesota bluffs by Lake Winona, an ancient riverbed of the Mississippi River. Elevations on this island range generally from 652 to 668 feet.

⁽¹⁾Unless otherwise noted, milages given throughout this statement refer to distances along the Mississippi River above the mouth of the Ohio River.

GEOLOGY⁽¹⁾

PHYSIOGRAPHY AND TOPOGRAPHY

2.003 Winona is located in what is commonly called the Driftless Section of the Central Lowland Province West of the Mississippi River. The Driftless Section includes most of southwestern Wisconsin and parts of southeastern Minnesota and northeastern Iowa. It has been called "driftless" because for years no evidence of glaciation, such as glacial drift, could be found in the section. Recent investigators, however, have found erratics and alluvium that are believed to be glacial in origin. Thus, it now appears that the section was glaciated at least very early during the ice age.

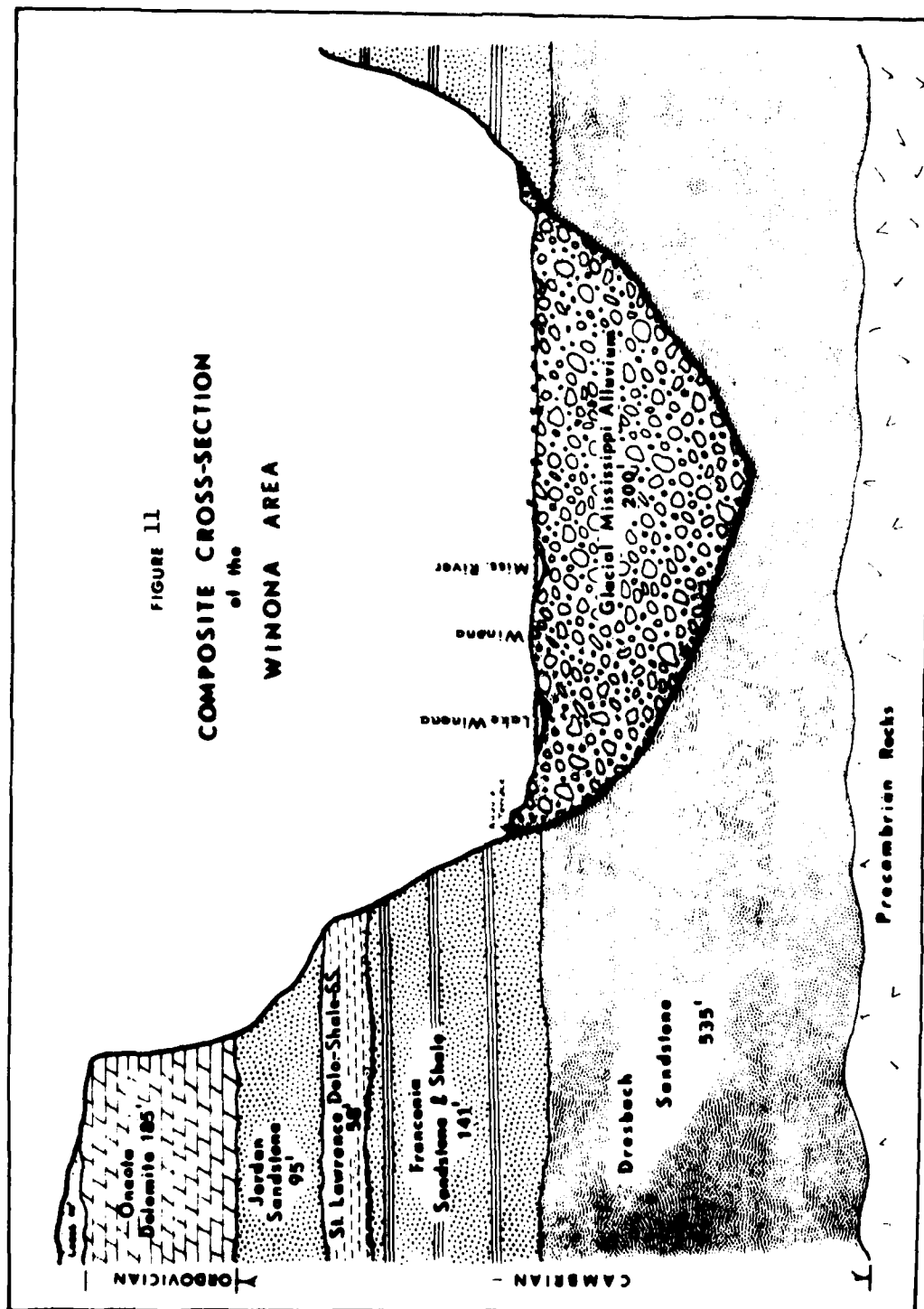
2.004 The scarcity of glacial drift in the Driftless Section results in a landscape that is quite different from the surrounding glaciated regions. The section is well-drained except for the floodplain of the Mississippi. Numerous tributaries of the Mississippi have cut large steep bluffed valleys into the local bedrock which rise 500 to 600 feet above the floor of the Mississippi floodplain (figure 11).

2.005 The floor of the valley at Winona lies as much as 600 feet below the flat agricultural upland surface. It is important to realize that Winona is not surrounded by hills. Rather, Winona lies at the bottom of a deep trench cut through typical, flat midwest topography. The low profile of the island is especially evident when compared with normal water levels in the Mississippi River 9-foot channel navigation pools (650 feet for Pool 5A and 645 feet for Pool 6).

BEDROCK GEOLOGY

2.006 Most bedrock in the Driftless Section is mantled by variable thicknesses of unconsolidated river, wind, swamp or lake sediment deposited within the recent geologic past. In the Winona vicinity, however, erosion by the Mississippi River and its many tributaries has exposed bedrock that is easily seen in the many river valleys and bluffs.

¹More detailed information on the geology of the Winona area may be seen in the environmental impact assessment report prepared by Fremling, 1974, on file at the St. Paul District Office.



2.007 Precambrian rocks are older than 600 million years and generally igneous and metamorphic in origin in Minnesota and adjacent areas. No Precambrian rocks can be seen in the Winona area because they are covered with at least 500 feet of newer, sedimentary Paleozoic rocks and alluvium.

2.008 Paleozoic rocks overlie Precambrian rocks throughout the Driftless Section. The Paleozoic rocks are relatively flat-lying sandstones, dolomites and shales that have a combined thickness in excess of 1000 feet in some parts of the area. These rocks were formed from sediment deposited by successive marine inundations occurring during the Cambrian, Ordovician and Devonian Periods (between 400,000,000 and 600,000,000 years ago). The sediments were later compacted and cemented forming hard sedimentary rocks. The various sedimentary rock formations in the Winona area are shown in figure 11.

2.009 The bluffs of Winona are capped by Oneota Dolomite which is gray in color. This rock formation is more resistant to erosion than the underlying sandstones and shales and thus has very steep slopes associated with it. The rock has been extensively quarried in the Winona area and has been used for building stone and road fill. The many wing dams in the Mississippi were constructed with Oneota Dolomite. Sugar Loaf, a common landmark in Winona, is a quarry remnant of Oneota Dolomite.

2.010 The Jordan, St. Lawrence, Franconia, and Dresbach Formations underlie the Oneota Dolomite, respectively. All four formations are dominantly composed of sandstone with thin beds of shale, siltstone and shale. The sandstones typically are poorly cemented and are thus quite easily eroded. They have a high porosity and permeability that make them important aquifers in the region. The Jordan sandstone is very conspicuous because of its yellow-orange color.

SURFACE SEDIMENT

2.011 The ancient bedrock of the Driftless Section is mostly covered by a discontinuous layer of loess, a wind-blown silt up to several tens of feet thick. Geologically, the loess is recent, having been eroded from glacial drift deposits during the later part of the Pleistocene Ice Age (about 19,000 years ago). The soils developed on the loess are some of the finest agricultural soils in the United States. Loess is easily eroded by running water and large amounts are carried into the Mississippi each year.

FORMATION OF THE MISSISSIPPI RIVER VALLEY

2.012 The course of the Mississippi above its junction with the Minnesota River probably does not follow its preglacial course but rather one developed at the close of the Pleistocene Era. A large glacial lake, Lake Agassiz, formed in front of the retreating

glacial ice, in the area that is now the Red River Valley. The lake expanded and eventually drained southward through the Minnesota River valley. This great volume of water, known as the Glacial River Warren, cut the outlet gorge as much as 300 feet deep through glacial alluvium for hundreds of miles to the Mississippi River at Minneapolis and beyond. The River Warren carried little sediment compared to its great discharge and thus had great stream power to erode and enlarge the valleys of the Minnesota and Mississippi Rivers. Because of its great discharge and relatively small load, River Warren was able to transport all of the sediment added to it from the Chippewa River and other tributaries in the region. The glacial river cut its bed in the Winona area to a gradient at least 100 to 200 feet below the modern floodplain. Additional water was added by Glacial River St. Croix, which served as the early outlet for Glacial Lake Duluth. Many tributaries were inundated by water backing up from the high stage of River Warren. Lake clays were deposited in the mouths of the tributaries and have been a source of pottery clay such as at Red Wing. As deglaciation continued, the outlets of Lake Agassiz and Lake Duluth shifted to the north and east, respectively. River Warren lost its great discharge and the modern Minnesota, Mississippi and St. Croix Rivers came into existence about 9,000 years ago. Lake Pepin also came into existence as the downstream grade of the Mississippi River adjusted to the coarser bedrock discharged by the Chippewa River.

2.013 During Holocene time (beginning about 10,000 years ago to present), the Mississippi slowly aggraded and built its gradient to its present position and elevation. The Chippewa River continued to overload the Mississippi with coarse sediment and thus forced the Mississippi to braid its channel in order to carry the coarse sediment. Instead of one main channel, many smaller channels formed each having the velocity necessary for transporting the coarse load. Many of the old channels and islands can still be seen on the floodplain today even though the Mississippi is now channelized and dammed along its course. Winona is situated on one of the alluvial islands.

2.014 Holocene erosion of the highlands has resulted in the deposition of alluvial fans of relatively impervious material over the sand and gravel valley fill at many points where tributary streams enter the Mississippi River Valley. Thus, at Minnesota City and near the mouths of Gilmore, Burns Valley, and Pleasant Valley Creeks, the sand and gravel is covered by impervious valley alluvium. Two alluvial fans, one deposited by Gilmore Creek and the other formed by Burns and Pleasant Valley Creeks, cut off the former channel of the Mississippi and form Lake Winona.

CLIMATE

2.015 The climate of the study area is typically continental because of the lack of proximity to oceans or other large water areas. Because the floodplain is only about 650 feet msl, however, and because it is flanked by bluffs which rise as high as

650 feet above the valley floor, the climate of the valley is moderated. Winters are less severe in the study area, for example, than they are in the Rochester, Minnesota, area which is only about 45 miles to the west (Fremling, et. al., 1973).

2.016 The annual average temperature has ranged from 41.9° F in 1917 to 51.6° F in 1931. The mean annual average temperature is 46.4° F (LaCrosse, Wisconsin, data). The average temperature ranges from a minimum of 6.9° F in January to a maximum of 83.1° F in July (Upper Mississippi River Comprehensive Basin Study Committee, 1970). The maximum summer temperature at Winona over a 36-year period was 108° F while the minimum temperature during the same period was -40° F (United States Department of Agriculture, 1941).

2.017 The date of the average last killing frost over a 16-year period at Winona was 3 May, while the date of the first average killing frost over the same period was on 8 October. The length of the growing season at Winona averages 158 days.

2.018 Most precipitation (LaCrosse, Wisconsin, data) occurs in June and the least precipitation occurs in December, January, and February. The minimum annual precipitation of 16.8 inches occurred in 1910 and the maximum annual precipitation of 42.4 inches occurred in 1938. The mean annual precipitation is 30.9 inches.

2.019 During January, winds blow most frequently from the northwest with an average speed of 11 mph. Winds blow most frequently from the northwest in April with an average speed of 14 mph. Southerly winds with an average speed of 8 mph prevail during July. October winds are generally southerly at a speed of about 10 mph.

SOILS

2.020 The soils of the floodplain are alluvial and they vary in texture from silty clay to sand. The composition of the soil depends upon the manner in which the soil was laid down. The strata are composed of clay, silt, sand and gravel and are very irregular. Stream banks plainly show the varying thickness of the different materials and in many places the lack of continuity of the sand and gravel layers above low water level (Fremling, et. al., 1973).

2.021 Sand and gravel strips border most sloughs, but some of the larger, more elevated areas between the sloughs are covered with heavy silty loam which is underlain with sand or gravel. Prior to impoundment, these silty tracts were usually managed for hay (Marsden and Shafer, 1924).

2.022 Subsequent to the implementation of the 9-foot channel project, many of the original soil profiles have been overlain with silt and sand.

GROUNDWATER

2.023 The following information has been extracted directly from Fremling, et al. (1973). The most important aquifers in the Upper Mississippi River Basin are sand, gravel, limestone, dolomite and sandstone. Massive deposits of clean gravel were deposited by swift glacial streams during the Pleistocene Epoch. Such deposits are commonly found in valleys now occupied by streams that provide rapid recharge during times of high streamflow.

2.024 The dolomite strata of the area are generally cavernous and they give rise to large springs. The sandstone strata which underlie the Oneota dolomite serve as excellent aquifers.

2.025 The valley of the Mississippi River is filled with as much as 200 feet of various sediments, some of which are preserved as terraces. Within the alluvium are sand and gravel aquifers which yield more than 1,000 gallons per minute to single wells.

2.026 Recharge to most aquifers is very rapid. Wells placed close to the river will, in most cases, induce water from the river to flow toward the wells. The alluvium along most reaches of the study area yields adequate water for most industrial and municipal uses.

2.027 Representative water samples from unconsolidated aquifers at Winona contain an average of 0.99 ppm iron, 44 ppm sulfate, 9.5 ppm chloride, and 280 ppm hardness expressed as calcium carbonate (Upper Mississippi River Comprehensive Basin Study Committee, 1970).

2.028 In 1972, Winona well water was tested by the U.S. Fish and Wildlife Service Fish Control Laboratory at LaCrosse, Wisconsin. The parameters of the water from this shallow sand point well were as follows: resistivity - 1277 ohms, pH - 7.42, total alkalinity as CaCO_3 - 331 ppm, total hardness as CaCO_3 - 384 ppm, calcium hardness as CaCO_3 - 260 ppm, ammonia nitrogen - 0.38 ppm, nitrite - less than 0.005 ppm, nitrate - 0.05 ppm, sulfate - 42.5 ppm, ortho phosphorous as PO_4 - less than 0.05 ppm, total iron - 0.28 ppm, manganese - less than 0.05 ppm, sodium - 32.5 ppm, calcium - 59.0 ppm, magnesium - 18.3 ppm, potassium - 3.7 ppm.

2.029 The water used domestically in the Winona Area is pumped from 11 wells located in the levee area, Westfield Golf Course, and Wincrest.

2.030 In 1973 the city of Winona used 2.9 million gallons of water daily as compared to 3.4 million gallons of water daily in 1963. The decrease in millions of gallons used daily in the city of Winona is due to increased cost resulting in lower demand and also due to a number of major industrial users establishing their own wells.

HYDROLOGY

2.031 The following account has been extracted directly from Fremling, et al. (1973). The study area receives an average of 32 inches of precipitation per year and the average annual potential evapotranspiration is 24 inches (Minnesota State Planning Agency, 1970).

2.032 About one-fourth of the average annual precipitation in the basin surrounding the study area appears in tributary streams as runoff. Tributaries of the Mississippi River in the study area have much steeper gradients than the Mississippi itself, thus the flow of the tributaries is more variable. Minimum flows of the Mississippi and its tributaries generally occur in August and September and in January and February (Upper Mississippi River Comprehensive Basin Study Committee, 1970).

2.033 The drainage area of the basin above Winona includes 59,200 square miles. During 39 years of record, the average discharge at Winona was 24,810 cfs, while the minimum flow was 2,250 cfs, on 29 December 1933 and the maximum flow was 268,000 cfs on 19 April 1965.

2.034 Floods of great magnitude have been known to occur throughout the study area for many years. Bunnell (1897) refers to severe floods in 1728, 1785, 1826, 1832, and 1844. During the flood of 1844, almost the entire site of Winona was reported to have been covered with water.

2.035 Floods appear to have increased in frequency and intensity in recent years, however. During the past 93 years, five floods at Winona have surpassed a discharge of 175,000 cfs. One of these floods occurred in 1880 (180,000 cfs), and the other four have taken place in the past 22 years (1951, 1952, 1965 and 1969). The 1965 flood exceeded the 1880 flood by 88,000 cfs. The 1965 flood caused an estimated \$225,000,000 damage to public and private property along the main stem of the river. A summary of flood data is presented in table 1 (Minnesota State Planning Agency, 1970).

Table 1 - Flood Data, Mississippi River at Winona

Date of Flood Crest	Stage (ft.)	Discharge (cfs.)
June 18, 1880	17.00	180,000
April 9, 1897	16.50	163,000
April 27, 1916	16.20	155,000
March 30 to April 1, 1970	15.90	149,000
April 15-16, 1922	15.20	137,000
April 18, 1951	17.40	178,000
April 20, 1952	17.90	190,000
May 7, 1954	16.25	156,000
April 19, 1965	20.77	268,000
April 19, 1969	19.44	219,000

2.036 The main stem of the Mississippi River has a large drainage area and a broad, flat floodplain with a considerable flood storage capacity. Floods have occurred in the study area during all seasons, but those of greatest magnitude have occurred during the spring. Approximately 75 percent of all floods at Winona have occurred in April, May and June. Severe spring floods are caused by a combination of meteorological conditions including deep frost penetration; an extensive moisture-laden snow cover in the Minnesota, Mississippi, St. Croix and Chippewa River drainage areas; and an extremely late spring with a sudden thaw in April accompanied by rain.

TERRESTRIAL VEGETATION

2.037 The river bottom in the Winona area, is comprised of the following tree species: silver maple (Acer saccharinum), American elm (Ulmus americana), slippery elm (Ulmus rubrea), green ash (Fraxinus pennsylvannica), white ash (Fraxinus americana), Eastern cottonwood (Populus deltoides), black willow (Salix nigra), river birch (Betula nigra), and swamp white oak (Quercus bicolor). Tree species of minor importance present in the floodplain are basswood, hickory, box elder, and black walnut.

2.038 The understory of a heavily stocked stand of the forest type is generally sparsely vegetated with shrubs and grapes, whose vines twine up into the forest canopy. In more open stands, heavy stands of shrubs including prickly ash, red and green dogwoods, poison ivy, button bush, and thick patches of silver maple and cottonwood reproduction are common.

2.039 Leafy vegetation on the floodplain meadows include grasses such as grama, and big and little bluestem. On the marsh borders, dikes and damp meadows, cord grass, several species of docks reed canary grass, rice cut grass, several species of sedges, wild millet, smartweed, Eragrostis and Paspalum can be found in numbers.

AQUATIC VEGETATION

2.040 The following account consists of excerpts from a paper written by William Green on ecological changes of the Upper Mississippi River since inception of the 9-foot channel. While this report covers the river for the entire length of the Upper Mississippi Wildlife Refuge, the statements are considered applicable for the Winona area.

2.041 River bulrush, which was the most common marsh species prior to impoundment, has continued to be an important marsh plant. Coming in dense, solid stands for several years following impoundment, this species deliquesced for a few years, but has since made a comeback and is at present an important marsh species, especially for muskrats. Although this species seldom sets seed to any extent on the river, there have been years when it seeded heavily, and then it was of considerable value to waterfowl also.

2.042 Round-stemmed bulrushes are common in the river bottomlands. Of these, hard-stemmed bulrush occurs rarely. Soft-stemmed bulrush is common, but is found almost exclusively scattered in small patches among other marsh plants.

2.043 Cattail is common, however, it is not dominant in any area. Reasonable amounts can be found in most places, but mostly in small stands intermixed with other vegetative types, particularly burreed and Phragmites. Large stands of cattail may be found but these are rare in occurrence.

2.044 Phragmites is found in most pools, probably all on the upper river, but is generally confined to the edges of marsh areas adjacent to willows and other woods. It is an important cover in pool 5.

2.045 Extensive marginal beds of smartweed and millet occur on most ridges for the entire length of the refuge. Seven species of smartweed occur, although Pennsylvania smartweed is the most common and important. In the lower pools (lower end of the Upper Mississippi Wildlife Refuge) this association makes up a very important part in the food supply for waterfowl.

2.046 Burreed was present and well distributed, but not too abundant prior to flooding. Since impoundment this species increased markedly. The Sagittaria-burreed association is very important for waterfowl cover and for muskrat housebuilding materials. Burreed is found behind the arrowhead closer to the water's edge.

2.047 Extensive stands of sagittarias (arrowhead) occur, with S. latifolia on the semi-dry margins and shallow water, followed by a zone of S. arifolia, and with S. heterophylla in beds in deeper water. Sagittaria is the major emergent on the Upper Mississippi River.

2.048 Rice cutgrass is well distributed on ridges and islands. Locally, extensive marginal stands of this species occur, and since it usually seeds well, it is an important food. In wooded areas another cutgrass (Leersia lenticularis) is often more common than is rice cutgrass. Both species are valuable as duck food.

2.049 Wild rice makes intermittent growth, depending on water conditions, and at the present time there are good stands of rice present in the upper pools. Its ripening habit, together with the presence of myriads of blackbirds, which eat the seed almost as fast as it ripens, reduces its food value for waterfowl, although it is important as cover.

2.050 The most common aquatics on the refuge are American pondweed, sago, leafy pondweed, small pondweed, flat-stemmed pondweed, bushy pondweed, curly muckweed, coontail, elodea, water stargrass, wild celery, and the pond lilies.

2.051 Coontail is the most abundant submerged aquatic plant on the upper river. Coontail is often found in association with elodea but the role is much reduced from the past. Coontail is found in pure stand and found virtually everywhere in backwater areas.

2.052 The second most abundant species of submergent aquatic is American pondweed, which is the most important single species of aquatic plant so far as waterfowl food is concerned. This species occurs in all pools in extensive beds in a great variety of conditions from very shallow water to deep flowing channels. In the upper pools this species grows in such dense beds over extensive areas that boat travel is rendered difficult. It makes its best growth in water 12-30 inches in depth. This species normally is a heavy seeder and is of outstanding importance as waterfowl food.

2.053 Sago pondweed is well distributed but is decreasing in abundance. Flat-stemmed pondweed is widespread but only moderately abundant. Both are found mixed with other aquatics or in pure stand.

2.054 The abundance of Najas has decreased from former years. Najas is important for blue-winged teal and baldpate, both of which feed heavily on the beds present.

2.055 Wild celery has spread until it can now be found almost the entire length of the refuge. It is most common in the upper pools, however.

2.056 So diversified are the aquatics on the refuge that it is not unusual to be able to find more than two dozen species in a matter of minutes anywhere in the better marshes and aquatic beds.

WILDLIFE

MAMMALS

2.057 The study area is rich in wildlife species because it provides a variety of habitats. The most common non-game species of mammals include shrews (3 species), moles (2 species), bats (6 species), woodchuck, ground squirrels (2 species), chipmunk, pocket gopher, mice (9 species), Norway rat, and skunks (2 species). Game species include cottontail rabbit, squirrels (4 species), beaver, muskrat, fox (2 species), raccoon, mink, and white-tailed deer.

2.058 The abundance of the various game species of mammals is relative to habitat. Squirrels are considered common but not abundant when compared to other areas with better habitat. Fox populations are generally high but in recent years populations have been reduced by an outbreak of mange. Populations of cottontail rabbit are generally high.

2.059 At the beginning of the twentieth century the beaver seemed doomed to extinction because of many years of exploitation by trappers, and in 1910 a closed season was declared (Joyce, 1933). Beaver were experimentally introduced at various points in the Upper Mississippi River Wildlife and Fish Refuge during the late 1920's. One small colony established in 1929 had increased to about 100 individuals 4 years later (Steele, 1933). Beaver are now abundant throughout the refuge.

2.060 Mink, muskrat, raccoon, and beaver are the primary furbearers that are trapped for their pelts. Populations of the different species of furbearers are reflected in the annual fur harvest (see exhibit 2, page A-3 for fur harvest data and fur values).

2.061 Flattum (1962) sampled mouse populations from six habitats in Winona County and concluded that upland meadows, upland marsh, and upland woods were much more productive for mice than equivalent areas in the floodplain. Four of the six species caught and 83 percent of the total mice were taken in the upland areas. The most abundant mouse in floodplain woods was Peromyscus maniculatus, the white-footed deer mouse.

2.062 White tailed deer are common in floodplain areas, particularly where the floodplain borders upland areas. Deer seem to be especially prevalent on island areas during spring, summer and fall. It is not unusual to find new-born fawns on islands during spring floods. Floodplain forests are heavily used by deer hunters.

REPTILES AND AMPHIBIANS

2.063 The floodplain affords habitat for turtles (7 species), snakes (12 species), lizard, salamander (2 species), toad, and frogs (5 species).

2.064 Dredge material deposits are heavily used by soft-shelled turtles (Trionyx sp.) as nesting sites (Vose, 1964). The turtles prefer sandy beach areas which are not heavily brushed, but which are not open for more than 15 feet along the shore. Gradually sloping beaches are preferred over steep beaches. Most turtles nest in a zone between 14 and 30 feet from the shore, but one nest was found 121 feet from the water.

BIRDS

2.065 Two hundred and fifty-five birds have been identified in the Upper Mississippi River Wildlife and Fish Refuge since its establishment in 1924 (U.S. Dept. Interior, 1970). Most of these species also occur in the study area. Duck hunting is a very important form of recreation in the Winona area. See exhibit 3, page A4 for estimator waterfowl harvest and waterfowl production.

FISH

2.066 The study area contains an extremely varied fish fauna because the river contains so many diversified habitats. Nord (1967) has compiled a comprehensive list of 122 species of fish known to inhabit the Upper Mississippi River.

2.067 The Winona area of the river supports a very productive fishery. Conservatively, the area probably has a carrying capacity of at least 300 pounds of fish per acre. Lake Winona, a floodplain lake, was recently poisoned as part of a lake reclamation project. The lake contained over 700 pounds of fish per acre. Table 2 indicates the commercial catch of fish in pools 5A and 6 on the Mississippi River near Winona.

Table 2 - Commercial catch of fish in pounds for 12-year period, 1953-1964 (Nord, 1967)

SPECIES	POOL	TOTAL	12-YEAR AVERAGE
Carp	5A	712,821	59,402
	6	570,528	47,544
Buffalo	5A	168,921	14,077
	6	178,936	14,911
Fresh-water Drum	5A	121,687	10,141
	6	73,621	6,135
Catfish	5A	106,942	8,912
	6	126,730	10,561
Other Species	5A	43,065	3,589
	6	71,878	5,990

THREATENED OR ENDANGERED SPECIES

2.068 The northern bald eagle is commonly seen in the Winona area. The northern bald eagle, though not in an endangered status, like the southern subspecies, is subject to the same forces that could further decimate its numbers.

2.069 The peregrine falcon was once plentiful along the river but is now seldom sighted. It was once common to see numbers of these birds both spring and fall when waterfowl were migrating.

2.070 The Winona flood control project and the other projects discussed in this EIS would not affect any threatened or endangered species.

AQUATIC INVERTEBRATES

2.071 The Mississippi River, in the Winona area, contains a large assemblage of invertebrate species. The varied invertebrate fauna is due to the wide variety of habitats in the area. Lake forms of invertebrates find suitable habitat in the lentic portions of the pools. Organisms which require running water find a wide range of water velocities in the tailwaters, main channel, along the wing dams, and in side channels. The rocks associated with wing dams and shoreline protection provide a suitable substrate for many species. Watkins (1969), for example, collected 38 species of aquatic invertebrates from artificial substrate samplers placed along the edges of the main channel in Pool 6 just below Winona. Floodplain pools provide additional habitat for specialized invertebrates.

2.072 As part of an environmental impact assessment concerning maintenance of the 9-foot channel, river transects were established in the Winona area for sampling invertebrate animals (Fremling, et al., 1973). The results of this sampling are shown in exhibit 4, page A5. These data indicate that sand is the least productive habitat and that rocks and silt are very rich in species provided that they lie in well-oxygenated water. Deep, stagnant sloughs are usually poor in species because their depths become anaerobic because of the high oxygen demand of bottom muds.

2.073 The relative abundance of many invertebrates has been changed by the activities of man in the study area. Changes in clam and mayfly abundance, for example, have been well documented. The basic biology of the most abundant caddisflies of the Upper Mississippi River has been reported by Fremling (1960).

2.074 Burrowing mayflies are abundant along much of the Mississippi River. Hoards of emergent insects often cause nuisance problems for river residents, motorists and towboat personnel (Fremling 1960), 1968, 1970). Nymphal forms of the three major species (Hexagenia bilineata, Hexagenia limbata and Pentagenia vittigera) are important food organisms for many species of river fish. The nymphs are efficient converters of detritus to high quality fish food. The abundance of H. bilineata and H. limbata has increased by the formation of the silted impoundments associated with the 9-foot channel project (Fremling, 1973). Both species are dependent upon a silted substrate for the construction of their burrows.

2.075 Hemming (1972) sampled Hexagenia mayfly populations above and below Lock and Dam 5A to determine the relative abundance and distribution of H. bilineata and H. limbata as related to environmental conditions. He determined that sand bottoms were always devoid of Hexagenia nymphs.

This was especially true in the main channel of the river but was true also in backwaters and side channels wherever considerable current kept the bottom free of fine silt. Areas which have a bottom composed of a mixture of sand and silt contained significant mayfly populations. The best habitat in the entire study area, however, was found at the foot of Pool 5A in a silted area known as Polander Lake.

2.076 Even within the lake the nymphs were numerous only in certain areas. Those areas which had been former slough areas prior to construction of the dam provided the best habitat. In those areas, deep deposits of silt provided excellent habitat. Old land surfaces, and former islands, now flooded by the dam, did not produce great quantities of nymphs because the substrate was too hard for burrowing. Areas of fine silt where vegetation was found provided no nymphs.

2.077 When Lock and Dam 5A was constructed, Straight Slough was bisected by the dam. The portion of the slough which lies above the dam provides excellent Hexagenia habitat, but the area below the dam consists of hard clay and sand and no nymphs were found there.

2.078 Erickson (1964) sampled Crooked Slough, near Winona, for Hexagenia mayfly nymphs. Even though the bottom of the slough was apparently of good texture for mayfly growth, no mayflies were present. He concluded that oxygen deficiencies occurred at the bottom because Crooked Slough has been isolated from the river by the earthen dike of Lock and Dam 5A. This isolation stopped water circulation within the slough, allowed the slough to thermally stratify and thus precluded the existence of burrowing mayflies.

2.079 Today, clam populations are generally sparse along most of the Upper Mississippi River. Navigation dams have slowed down the current, thus allowing silt to cover many of the formerly productive sand beds. Sludge deposits caused by upstream pollution have virtually eliminated the clam beds of previous years. Clam population in most of Crooked Slough, near Winona, were destroyed when the slough was stagnated by the earthen dike of Lock and Dam 5A.

WATER QUALITY

2.080 Except for Lake Pepin and upper reaches of Pool 4, the Mississippi River has generally good water quality throughout Pools 4, 5, 5A, and 6. Except in isolated sloughs and backwater lakes, the dissolved oxygen content of the water remains high year-round. Because of its turbulent nature, the river is well aerated and it can assimilate a considerable B.O.D. loading.

2.081 Water quality measurements were made at many locations within Pools 5A and 6 during the summer of 1973 (see exhibit 5, page A12). It is apparent from this data that the river throughout the study area is very fertile and well-oxygenated; and that it is capable of supporting large populations of algae, rooted aquatic plants, invertebrate animals and fish. Because it is so fertile, however, the river contributes large volumes of organic sediment to the backwaters. The organic sediment has a high biochemical oxygen demand which often causes conditions of oxygen depletion at the mud-water interface and in the hypolimnion of thermally stratified floodplain sloughs which have been stagnated by barrier islands of dredge material.

2.082 Earlier studies have shown that Lake Pepin acts as a settling basin for much of the pollutant load from the Twin Cities area (Rademacher, 1965; Watkins, 1969).

2.083 From 1935 until 1972, Winona's sewage treatment was accomplished by a primary treatment plant which consistently operated at less than 20 percent B.O.D. reduction. In June, 1972 the outmoded plant was replaced by a modern plant which provides primary and secondary treatment and chlorination of the final effluent. The sanitary and storm sewers of the city are completely separate. Influent and effluent quality measurements at the new treatment plant are listed in exhibit 7.

HISTORICAL BACKGROUND

2.084 Relatively little archaeological research has been carried out in southeastern Minnesota to establish a chronology. While there are no recorded Paleo Indian sites in the Winona area, there are reports of scattered finds of Paleo artifacts, indicating there were American Indians in the vicinity after the retreat of the glaciers. These nomadic peoples relied upon large mammals and vegetable materials as their source of food. This Archaic period, which in Minnesota was under way by 5000 B.C., is represented by two known sites along the Mississippi River in Winona County, 21 WN 1, a rock shelter, and 21 WN 15, a habitation and burial site. Neither site is in the project area.

2.085 The Woodland period followed the Archaic period about 1000 B.C. This period was characterized by two new dimensions in Indian lifestyle; the use of burial mounds, and the development of pottery. The rock shelter mentioned above was used during the Archaic period and continued to be used during the Woodland period. While there are only a few recorded Woodland habitation sites in the Winona area, there are thousands of distinctive burial mounds on the terraces and bluff tops around Winona. One such site, 21 WN 11, is located in the project area.

2.086 By 1000 A.D., a revolution in the Indian way of life was taking place in the Mississippi River area. The Indians began to settle in more permanent villages and were beginning to practice agriculture by raising maize and squash to supplement their hunting and fishing. The first people in the area to be identified by tribe were the Dakota (Sioux) who were present in their villages when the first Europeans arrived by way of the Mississippi River. Father Louis Hennepin is the first recorded white man to come into the area (1680) but there were many French trappers and explorers who followed when fur posts were established on the banks of the river to collect and trade pelts with the Native Americans.

2.087 Zebulon Pike, on a government expedition up the Mississippi River, visited and described the area in 1805. The first steamboat, the "Virginia", passed the site of Winona in May, 1823. Captain Orrin Smith, owner of the steamboat "Nominee", is acknowledged by most as the founder of the first settlement at Winona in 1851.

2.088 The site of Winona was settled rapidly because of its easy access by steamboat. The County of Winona was created by the Legislature of the Territory of Minnesota on 13 February 1854 and by November, 1855 there were 160 buildings and 800 residents in Winona. In 1856, an estimated 1,300 river craft tied up at the Winona levee. Winona became incorporated as a city on 6 March 1857 and Winona State Normal School opened in 1860 as the first normal school west of the Mississippi River. By 1870 the population of Winona was 7,000 and by 1890 it had swelled to 20,000 (Winona Daily News, Nov. 19, 1955, p-15).

2.089 Winona grew rapidly because of its location on the Mississippi River. In addition to being a shipping point for small grains and other commodities, Winona rapidly became the world's greatest sawmill center.

Rafts of white pine and Norway pine logs were sent from the pineries of northwestern Wisconsin to Winona via the Chippewa and Mississippi Rivers. The first sawmill opened in Winona in 1855 and by 1892 the nation's four largest mills were turning out 150 million board feet of lumber and 90 million shingles and were hiring 2,000 men. River traffic and the lumber industry both reached their peak in 1892 when 5,468 river boats passed through Winona. The pineries were soon exhausted, however, and the last raft of Wisconsin timber passed Winona in 1915.

2.090 Excellent railroad connections have been available to Winonans since the late 1800's when the city became known as the "meeting place for five railroads." The first train ran from Winona to Stockton in 1862 and during the ensuing 30 years, the great era of railroad building in the U.S., Winona gained an enviable position as far as rail transportation was concerned. The coming of the railroads, however, spelled the death knell for most of the big river boats.

2.091 By 1920, steamboats were scarce on the river. It was not until the development of the 9-foot navigation project in the 1930's that tow boats began to compete once more with railroads as haulers of bulk commodities. Because of its access by modern towboats, Winona is rapidly becoming a major terminal for grain, especially for corn and soy beans.

HISTORICAL SUMMARY OF RELATED ENGINEERING PROJECTS WITHIN THE AREA (1885-1975)

2.092 Most of the early engineering projects listed in this section were aimed at correcting flood problems associated with land management and the subsequent flooding of Burns Valley Creek, Gilmore Creek and Rollingstone Creek.

2.093 The topography of the Winona area is very rugged; and very little agricultural land in the area is level. Early settlers usually cultivated every part of their land which was not too steep for horsedrawn machinery. Conservation to the early farmers usually meant letting no portion of their land lie unproductive, thus land which was too steep to be plowed was grazed. Hillsides were burned frequently to discourage tree growth and to stimulate the production of additional grasses for grazing. Dairy cattle and horses were the principal grazers, but sheep and goats also helped denude the hillsides. Small grains, such as wheat, constituted the principal farm crops in the early days and soil conservation measures such as contour tillage, strip cropping and terracing were unheard of. As a result of flagrant mismanagement of the land, area watersheds lost their protective cover of vegetation and floods became regular events in most valleys.

2.094 The city of Winona encompasses the mouths of Burns Valley Creek and Gilmore Creek, both of which flooded frequently in the early days. Each time the creeks flooded, they carried tons of eroded soil and debris into Winona. Gilmore Creek, for example, frequently flooded the west end of the city. In 1902, such a flood inundated the flat land lying below Gilmore Valley; and the creek became swollen to a width of more than a mile. Traffic by road was impossible and those who wished to travel made their way about in boats. When the waters receded there were deposits of mud as deep as 4 feet on the flat lands and on the road (Winona Daily News, Nov. 19, 1955).

2.095 Gilmore Creek floods carried so much soil into Lake Winona that the lake had to be dredged in 1913 and again in 1951. A less intensive dredging was done in 1957. At its maximum flow on 21 July 1951, Gilmore Creek carried 5,360 cubic feet of water per second (Upper Mississippi River Comprehensive Basin Study Committee, 1970).

2.096 Because Burns Valley Creek and Gilmore Creek posed constant threats to the city, various channelization, diversion and diking projects were employed to prevent their flood waters and their sediment loads from damaging the city and Lake Winona.

DIVERSION OF GILMORE CREEK

2.097 Originally, Gilmore Creek flowed into the slough now known as Boller Lake and then flowed west to join Rollingstone Creek. The combined creeks then flowed into the upper end of Crooked Slough. In 1885, Gilmore Creek was diverted into Lake Winona (U.S. Army Corps of Engineers, 1970). The course of the creek at that time is clearly shown in Chart No. 176 of the Mississippi River Commission (1895). From Pelzer Street to Lake Winona, the creek then followed virtually the same path that it does today.

2.098 The marsh now known as Boller Lake continued to drain with Rollingstone Creek into Crooked Slough. The beds of the two creeks separated sometime during the 1880's, however, and for a time the two creeks ran distinct, but parallel, paths into Crooked Slough. Farmers were plagued by flooding and siltation from both streams, especially since Gilmore Creek still flowed through the Boller Lake marsh during flood time. A severe flood on 10 June 1899 caused Rollingstone Creek to radically change its path so that it left its meandering path and flowed directly into crooked Slough (Winona Republican Herald, 1899).

ESTABLISHMENT OF COUNTY DITCH NO. 3

2.099 In 1908 the creek which ran from Boller Lake marsh into Crooked Slough was channelized and was designated County Ditch No. 3 (Petition for Public Ditch, Winona Co., 1908). The purpose of the ditch was apparently to drain the surrounding marshland for agriculture, and to alleviate flooding and siltation caused by flood waters which often spilled into the area from Gilmore Creek. Thus, County Ditch No. 3 intermittently served as an outlet for Gilmore Creek.

2.100 The original County Ditch No. 3 which drained Boller Lake marsh apparently became obsolete because of continued siltation. The consequent elevation of the floodplain at the east end of Boller Lake marsh probably increased the severity of Gilmore Creek floods because the flood waters could not flow readily into Crooked Slough.

2.101 In 1928, the channel of Gilmore Creek was improved, and levees were built from the old Highway 14 bridge to Lake Winona. Three small fixed-crest overflow dams were constructed as erosion control measures. These improvements proved inadequate for large flood flows which later damaged the dams and destroyed sections of the levees. Subsequently, the dams were removed, the levees repaired, and additional dredging of the channel accomplished (U.S. Army Corps of Engineers, 1970). For reasons not apparent at this writing, the latter channel was also named County Ditch No. 3.

ESTABLISHMENT OF COUNTY DITCH NO. 4

2.102 In 1929, construction of County Ditch No. 4 between Lake Winona and the Mississippi River was approved. The outlet channel from Lake Winona was enlarged and a double box culvert control was constructed at the down-stream end of the Mankato Avenue Bridge. The upstream end of the culvert floor was at elevation 646.0 and vertical lift gates were provided at the downstream end so that during high stages the water from the Mississippi River could be prevented from backing into the lake. The box culverts extend about 32 feet downstream from the bridge to a concrete end wall on which manual gate controls are located (U.S. Army Corps of Engineers, 1970).

GILMORE CREEK DRAINAGE PROJECT

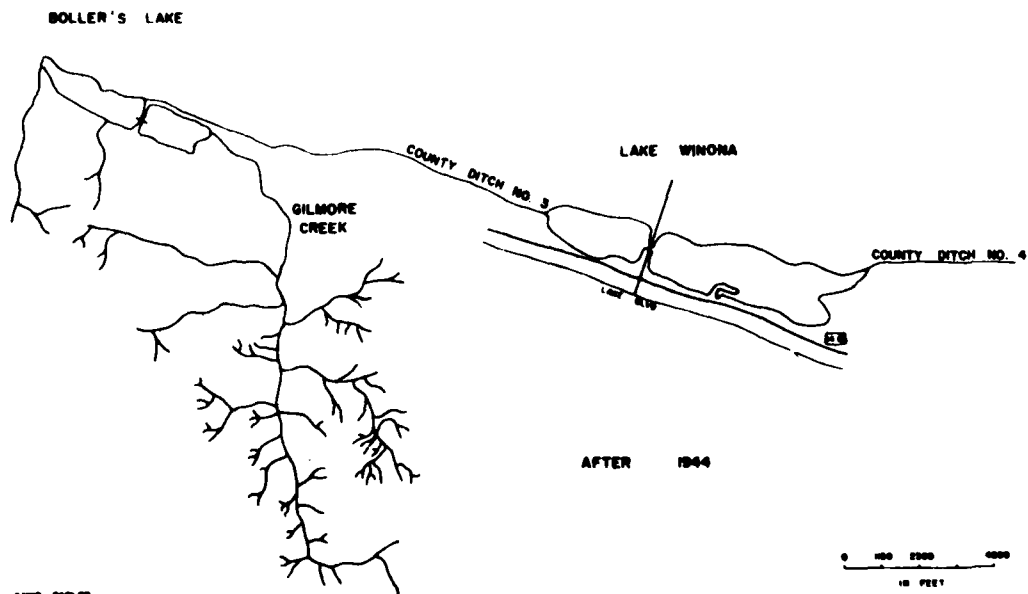
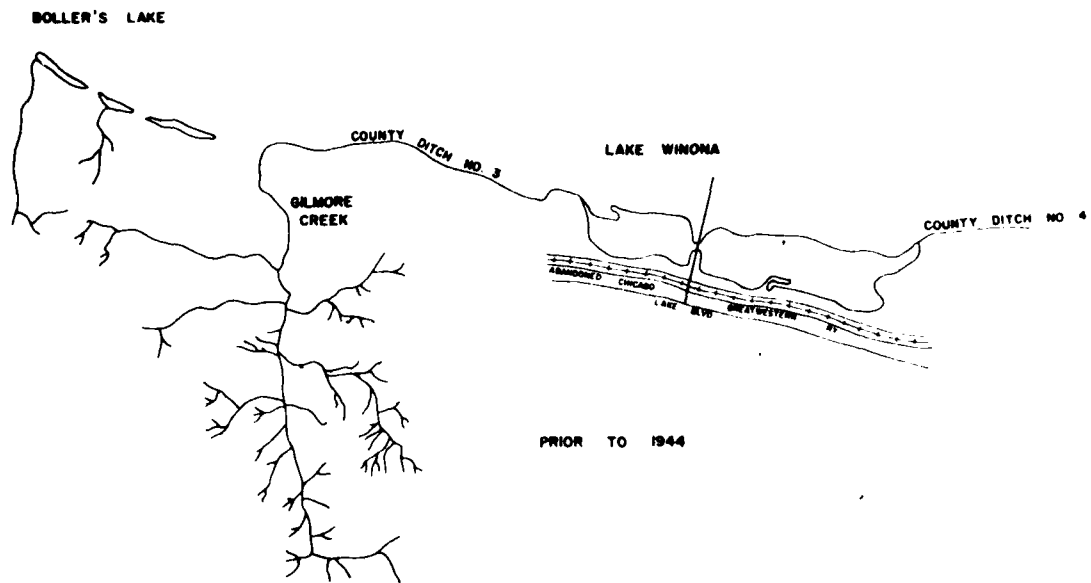
2.103 In spite of the previously listed improvements, Gilmore Creek still posed a threat to the city and Lake Winona. Thus, on 11 August 1944, the Minnesota State Department of Highways and the city of Winona agreed to share equally the costs of a Gilmore Creek Diversion Project. The purpose of the project was to divert Gilmore Creek, once again, into the oxbow marsh which has subsequently become known as Boller Lake. The Creek, after flowing through Boller Lake, was directed through County Ditch No. 3 to Lake Winona (figure 12). Since 1944, Boller Lake has served effectively as a sediment trap and flood storage reservoir with a capacity of about 1,700 acre feet. Sedimentation of Lake Winona has thus been reduced and flash floods on Gilmore Creek have been contained.

PRAIRIE ISLAND DIKE AND CONTROL STRUCTURE

2.104, In 1947 the city of Winona, in conjunction with the development of the city airport and in cooperation with the Civil Aeronautics Administration, raised the Prairie Island Road to act as a dike from the dike of Lock and Dam No. 5A to the mainland and constructed a bridge and control structure where the Prairie Island Road crosses Crooked Slough. The control structure was operated by the city of Winona in accordance with

GILMORE CREEK DRAINAGE SYSTEM

Fig. 12



a schedule designed to require regulated flooding of the protected area so that the head on the dike and levees would not exceed predetermined safe standards. The project was designed to protect the airport and other properties in the area from Mississippi River floods but failure of the dike at the control structure occurred in both the 1951 and 1952 floods. Emergency repairs to the control structure were made by the Corps of Engineers following both floods and low sections of the dike were raised in 1953 to provide a uniform degree of flood protection (U.S. Army Corps of Engineers, 1970).

PROJECTS RESULTING FROM FLOODS OF 1951 AND 1952

2.105 Other flood control works undertaken by the city during and following the 1951 and 1952 floods included raising a section of the Minnesota City Road to prevent overland flows from entering Lake Winona from the northwest through Gilmore Creek, construction of the Crooked Slough levee from the Prairie Island Road and dike to high ground just upstream from the interstate highway bridge, construction of a pumping station at the foot of Olmstead street, and installation of several storm sewer gates. However, realizing that these emergency measures would not provide protection from the higher flood flows, the city requested Federal assistance in further alleviating the flood potential at Winona. Subsequently, this resulted in the Corps of Engineers project, completed in 1967, which strengthened and extended the above discussed local improvements for Minnesota City Road, Prairie Island Road, and Crooked Slough. Additional data on flood control and related projects undertaken by other agencies at and in the vicinity of Winona, through 1952, are given in table 3 (U.S. Army Corps of Engineers, 1970).

DIVERSION OF BURNS VALLEY CREEK

2.106 In 1921, the channel of Burns Valley Creek was enlarged and straightened between the bluff and the outlet channel of Lake Winona so that the creek merged with the waters of Gilmore Creek to flow into the Mississippi. On 20 April 1956, the city of Winona and the Minnesota State Highway Department entered into a cost sharing agreement in connection with modifying Burns Valley Creek to prevent flood damage to the Trunk Highway 61 right-of-way and adjacent city areas. State Project No. 8504-16 specified the following:

(a) Construction of a new channel for Burns Valley Creek extending from the present Trunk Highway No. 61 northeasterly approximately 3,900 feet to a point where the new channel intersected the old channel.

(b) Obliteration of the old channel and the easterly dike between present Trunk Highway No. 61 and the point where the new channel intersected the old channel.

(c) Repairing of dikes and cleaning the channel of Burns Valley Creek between the present Trunk Highway No. 61 westerly to Pleasant Valley Road.

Table 3. Data on flood control and related projects constructed by other agencies at and near Winona, Minnesota.

Project	Constructed by	Date	Approximate cost
Gilmore Creek diversion	City of Winona	1885	Unknown
Burns Valley Creek improvement	City of Winona	1921	\$ 9,700
County ditch No. 3	City of Winona	1928	22,500
County ditch No. 4	City of Winona	1929	13,100
Gilmore Creek flood control basin	Minnesota Dept. of Highways and City of Winona	1944	98,500
Prairie Island dike and control structure (1)	Civil Aeronautics Administration and City of Winona	1947	147,000
Minnesota City Road and dike (1)	City of Winona	1951-52	10,000
Crooked Slough dike (1)	City of Winona	1952	179,300
Olmstead Street pumping station (1)	City of Winona	1952	15,900
Miscellaneous storm sewer gates	City of Winona	1952	<u>6,300</u>
Total			502,300

(1) Modified by Corps of Engineers projects.

(d) Enlarging and cleaning out the Burns Valley Creek channel and constructing riprap and dikes along said channel westerly from Pleasant Valley Road for a distance of approximately 878 feet.

2.107 The State at its own cost acquired the right-of-way required in the performance of items (a), (c) and (d). The city paid to the State 50 percent of the cost of performing the work provided for items (c) and (d). In addition to the payment of 50 percent of construction work, the city also agreed to pay the State a sum equal to 5 percent of the amount computed as the city's share of the construction costs, it being understood that the additional payment by the city was the city's proportionate share of engineering costs incurred by the State in connection with the work performed.

9-FOOT NAVIGATION CHANNEL

2.108 Winona is situated on the right bank of pool 6 of the existing Mississippi River 9-foot channel project which provides for a channel of 9-foot depth at low water with widths suitable for long-haul, common carrier service from the mouth of the Missouri River to Minneapolis, Minnesota. The project was adopted by the River and Harbor Act approved 3 July 1930, modified by a House joint resolution approved 24 February 1932 and further modified by the River and Harbor Acts of 30 August 1935, 26 August 1937, 2 March 1945, and subsequent acts. The navigation project is described in House Document No. 290, 71st Congress, 2d session, and in House Document No. 137, 72d Congress, 1st session. The St. Paul District portion of the project (mile 853.0 to 615.0) is substantially completed. The total cost of the existing project within the St. Paul District to 30 June 1969 was \$90,164,227. Maintenance and operation costs through 30 June 1969 for the St. Paul District portion of the project was \$62,824,611.

CROOKED SLOUGH HARBOR AND NAVIGATION CHANNEL

2.109 On 23 May 1956 a plan was approved by the St. Paul District Engineer of the U.S. Army Corps of Engineers for the City of Winona to construct a commercial harbor at the upper end of Crooked Slough. The purpose of the project was to provide suitable barge loading and unloading facilities at the existing fertilizer plant and grain elevator (see figure 2, page 3). The plan called for the city to construct, at its own expense, a sheet piling dock, 100 feet long, along the Crooked Slough flood levee. The dock was located about 1600 feet downstream from the junction of the Prairie Island road and the Crooked Slough levee. Two 13-pile dolphins were constructed upstream and two downstream from the proposed dock. The Corps of Engineers dredged a channel 200 feet wide from the mouth of Crooked Slough past the dock to within 200 feet of the Prairie Island road.

A portion of the dredged material was used to fill the dock to a level of 660 feet. The city paid the Corps \$3,400, the amount equal to the additional cost to the United States for placing dredge material to an elevation of 660 feet for the terminal rather than placing it in the most convenient manner. The project was completed in 1956.

EMERGENCY FLOOD OPERATIONS, 1965

2.110 In an effort to save the city from severe flooding, the city of Winona has waged several successful but costly flood fights (1951, 1952, 1965, 1969). During the record 1965 flood, the city of Winona, assisted by the Corps of Engineers, National Guard, Coast Guard, Red Cross, Civil Defense, and hundreds of volunteer workers, waged a massive flood fight. This involved raising the existing Minnesota City Road, Prairie Island Road, and Crooked Slough dikes and constructing new dikes to better control the outlet from Lake Winona. The emergency work consisted of some 9 miles of flood barrier into which 350,000 cubic yards of fill were placed; and 1.3 million sandbags and 100,000 square yards of polyethylene sheeting were used. As the flood crest approached, high water pressures and heavy seepage severely weakened and nearly destroyed critical reaches of the dikes. However, as the result of emergency sandbagging efforts and the accelerated placement of earth fill, these dikes were saved. The emergency measures, which cost about \$2 million, successfully protected a 510-block residential and business area and prevented damages estimated at \$19.8 million. Because of the scope of work required to accomplish the above emergency protection and the limited time available, the Winona riverfront downstream from the interstate highway bridge remained unprotected, resulting in \$10 million in damages to the industrial-based area. When the floodwaters receded, a major portion of the emergency levee below Lake Winona was left in place to serve as a temporary protection measure for preventing future damages. The upstream emergency work was removed in conjunction with the following authorized Corps of Engineers project which was completed in 1967 (U.S. Army Corps of Engineers, 1970).

CORPS OF ENGINEERS: PRAIRIE ISLAND AND CROOKED SLOUGH LEVEES

2.111 The only existing Corps of Engineers flood control project in the immediate Winona area is a continuous flood barrier about 6.1 miles long from the interstate highway to Minnesota City. House Document No. 324, 84th Congress, 2d session, contains the interim survey report recommending a local protection project at Winona and the 1958 Flood Control Act authorized construction of the project. A contract was initially awarded for the existing segment of the authorized project (Stage I) in October 1964, and was about 5 percent complete when work was suspended for the winter season. The record flood on the Mississippi River in April 1965 prevented resumption of work in the spring and made it advisable to redesign the project, increasing levee heights to protect for higher flows. A contract was reawarded in September 1965 and

was completed early in the spring of 1967 with a Federal cost of \$2,035,631 and \$17,316 contributed by local interests. Included as part of the authorized project was a plan which would strengthen and extend an existing levee downstream from the Lake Winona outlet. The estimated cost of this portion was \$1,020,000 Federal with \$17,000 to be contributed by local interests based on 1965 prices. At the request of local interests, this portion of the authorized project was not constructed in order that the scope of the project could be reconsidered to allow for the protection of additional lands needed by the city for industrial expansion. The uncompleted portion of the project was placed in a "Deferred for Restudy" category (U.S. Army Corps of Engineers, 1970).

VICTORIA ELEVATOR: MOORING CLUSTERS

2.112 On 8 March 1971 the Victoria Elevator Company applied for a permit to place two 13-pile mooring clusters at their existing barge terminal in Crooked Slough Harbor. The two clusters, completed during 1971, were placed 75 feet and 150 feet apart, upstream and in line with four similar dolphins. Each dolphin was composed of 13 poles, each 45 feet in length and not less than 12 inches on the butt or less than 8 inches on the point. The dolphins rise to an elevation of 660.5 msl.

FARMERS UNION GRAIN TERMINAL ASSOCIATION

2.113 The original application for this project was made by Kujak Bros. Transfer, Inc. (figure 2, page 3). The project, which was approved on 6 September 1972, consisted of a 100 foot-wide sheet pile bulkhead and backfill extending outward about 60 feet from the existing Kujak Bros. dock on the right bank of Crooked Slough at River Mile 726.2.

CITY OF WINONA: PELZER STREET EXTENSION AND CONSTRUCTION OF STORM SEWER OUTFALLS

2.114 This project, financed by the city of Winona, with State Aid reimbursement, was completed in November, 1973, at a total cost of \$550,000. The purpose of the project was to extend Pelzer Street to enable trucks to proceed directly from Highway 14 to the Crooked Slough Commercial Harbor without passing through congested residential or business areas (see figure 2). The extended street enters the marshy area surrounded by the Prairie Island dike, sweeps around an abandoned gravel pit behind Madison Silo Company, and then unites with the Crooked Slough dike. The 250,000 cubic yards of fill required for the project were obtained by hydraulic dredging, at a cost of \$.44 per yard, from the Crystal Lake area which lies adjacent to the Crooked Slough navigation channel. The borrow area which was dredged to a depth of elevation 590, provided an entrance into the Crooked Slough fleeting area. Pelzer Street was raised to the level of the existing flood levee. One 42-inch storm sewer was installed at the junction of Pelzer Street and Theurer Boulevard. At the request of the U.S. Fish and Wildlife Service, the outlet of the sewer was later moved 440 feet east so that it would not enter Federal land.

VICTORIA ELEVATOR CO.: TUG BOAT TIE-UP, SERVICING RAMP AND GRAIN STORAGE ELEVATOR

2.115 This project, which was approved on 7 June 1973, included the construction of a tug boat tie-up and service ramp in the Commercial Boat Harbor at Crooked Slough. The ramp was made by extending the existing dike embankment outward 30 feet with earth fill. A dry-lay retaining wall was constructed of 300-500 pound rocks to protect the river edge of the ramp. Two pilings, spaced 50 feet apart, allowed two 10-foot wide floats to bridge the space between the retaining wall and the moored tug boat. The project serves as a loading facility for the four grain storage elevators which Victoria completed in 1973. The total capacity of the elevators is 257,000 bushels.

SHELL OIL COMPANY: MOORING CELLS

2.116 In 1974, two mooring cells were constructed about 200 feet downstream from the foot of Chatfield Street on the right bank of the navigable channel. The cells replaced two pile clusters. Each cell is 15 feet-3 inches in diameter, is made of steel sheet piling, and is filled with sand. Each cell rises 8 feet above normal pool level and each contains an upright 8-foot mast on the channel side.

FROG ISLAND INDUSTRIAL DEVELOPMENT

2.117 In July 1972, the city of Winona solicited proposals for conducting feasibility studies concerning an extensive port development project within the Winona city limits. The Frog Island project was to include development of a 400-acre area lying along Crooked Slough, from the Prairie Island dike road to a point 5,000 feet east. It was to include the land now occupied by Victoria Elevator Co., the city's municipal dock, the Kujak Bros. property and others. Its north boundary was to be the south edge of Straight Slough. Kaiser Engineers, a division of Kaiser Industries Corporation, was awarded the contract for the feasibility study on 4 October 1972. The purpose of the feasibility study was to determine whether the Winona Port Authority should develop the area for barge dockage and industrial development. The feasibility study also included the gathering of enough environmental information to make an environmental impact assessment, if one proved necessary.

2.118 A market analysis concerning the feasibility of the project was submitted to the city of Winona by Kaiser Engineers in July, 1973. The report stated that large-scale development by the city of Winona was not justified and that the development of only a small portion of the Frog Island site was justified at that time. The firm felt that such development could be done by private companies and recommended the construction of a 300,000 bushel grain terminal and a marine-boatel-restaurant complex, both of which would require no more than 30 acres. In the future, however, the firm believed that added facilities would be needed for storing and loading western coal and that this use offered the potential for completing the development of Frog Island.

FRONINGS, INCORPORATED: GRAIN STORAGE BINS AND SHIPPING FACILITY

2.119 The proposed project site is in the upper reaches of pool 6 and the vegetative species found on the site are typical of species found on the floodplain. The dominant tree species is silver maple. Several other tree species found on the site include the following: American elm, slippery elm, green ash, white ash, Eastern cottonwood, black willow and river birch. The understory on the site is sparsely vegetated with shrubs, grape vines, nettles and scattered saplings of silver maple and cottonwood.

2.120 Leafy vegetation along the floodplain dike border includes cord grass, reed canary grass, rice cut grass, several species of sedges, wild millet and smartweed.

2.121 The forested bottomland provides habitat for the following species of mammals: mice, shrews, voles, bats, rabbits, squirrels, muskrat, beaver, mink, fox, skunk, raccoon, and deer. The carrying capacity for wildlife on the proposed project site appears to be low.

2.122 Various species of reptiles and amphibians could be expected to be found on the proposed project site. The water areas that are part of the proposed project provide only marginal habitat for fish, mammals, and waterfowl.

WINONA PORT AUTHORITY: 24-BARGE FLEETING AREA AND BARGE CLEANOUT FACILITY

2.123 The 16-acre triangular shaped area in its present state consists of type III marsh (4-6 acres) and riverbottom hardwoods. The marsh is isolated from the Mississippi River except during high water periods. The area supports an abundance of emergent and submerged aquatic vegetation. The average water depth appears to be 1 1/2 to 2 feet. The upland is typical river bottom hardwoods primarily consisting of soft maple, willow and cottonwood. The area has been degraded by the deposition of dredged material, primarily in the northwest corner of the project area.

2.124 The area provides nesting and feeding habitat for resident wood-ducks. It is also used as a resting and feeding area by migrating waterfowl (primarily puddle ducks). The project site provides habitat for muskrat, deer, raccoon, cottontail rabbits and several species of shorebirds. Numerous species of songbirds inhabit the project site.

2.125 The submerged portion of the area may provide a spawning and nursery area for several species of fish. This area is connected with the Mississippi River during high water periods, therefore it probably contributes to the fishery productivity of the Mississippi River.

SOCIOECONOMIC ENVIRONMENT

2.126 Winona is the county seat of Winona County. The county has a population of 26,438 (Nelson, 1954, and the U.S. Census Bureau, 1970). The population of the city of Winona and Winona County have shown a steady increase since 1900. The number of married people and the number of family groups have decreased in the past two decades. Within the city of Winona this trend can partially be explained by the increased numbers of college-aged, non-family groups seeking housing. The county, on the other hand, has increased the number of family households. This "suburban trend" is noticeable throughout the United States (U.S. Census, 1970).

2.127 There are three colleges in Winona: Saint Mary's, Saint Teresa, and Winona State College. The combined enrollment of full time students at the three colleges is approximately 5,563 (Registrars' Offices, Saint Mary's, Saint Teresa, and Winona State College, 1974).

2.128 Employment in the city of Winona and Winona County have increased steadily since 1960. Presently, 41.5 percent of the employment base in Winona is manufacturing and 34.5 percent of the labor force is employed in trade and service.

2.129 Industrial development in the Winona area has been concentrated in basically three areas: Riverbend Industrial Park, Airport Industrial Park, and the Riverfront Area. The Winona City Code and the Protective Covenants of the Port Authority of Winona⁽¹⁾ set forth regulations relative to the types of industrial development, building structures, noise levels, and other prohibited operations and land uses.

2.130 The industrial area referred to as the Riverfront Area encompasses the industrial sites near the river from the Prairie Island road stretching east past East 25th Street. The western section of this area includes the present commercial harbor area. The entire riverfront area extends approximately 3 1/2 miles paralleling the city of Winona. Table 4 indicates the firms located in this area, the acres they occupy, and the present employment of the firms.

(1) Exhibit 1, page A1.

Table 4
RIVERFRONT INDUSTRIAL AREA

<u>FIRM</u>	<u>SIZE (Acres)</u>	<u>EMPLOYMENT</u>
Archer Daniels *	13.2	69
Froedtert Malting	7.1	43
Shell Oil Company	8.5	5
Northern States Power **	7.9	0
Victoria Elevator	20	18
Genex Fertilizer	15	7
Madison Silo	11.6	220
Bay State Milling	4.56	148
Northwestern RR		10
Winona Industries		
Plant 1	4	225
Plant 3	3	75
Grain Terminal Assoc.	2	6
Peerless Chain	<u>25</u>	<u>250</u>
	151.9	1,076

*Closed in September 1974.

**The Winona Generating Plant, which occupied 6.6 acres was retired from service in September of 1974. The remaining 1.3 acres is occupied by NSP's Winona's substation.

2.131 A second area of industrial development in the Winona area is the Airport Industrial Park. The Airport Industrial Park occupies an 87-acre area adjacent to Max Conrad Field in the Village of Goodview. The Airport Industrial Park is bounded by the Max Conrad Field on the north and east, the corporate limits of Goodview on the west, and highway 14-61 on the south.

2.132 Table 5 indicates the firms located in this park, the acres occupied and the present employment of these firms. Figure 13 provides location information.

AIRPORT INDUSTRIAL PARK

Fig. 13

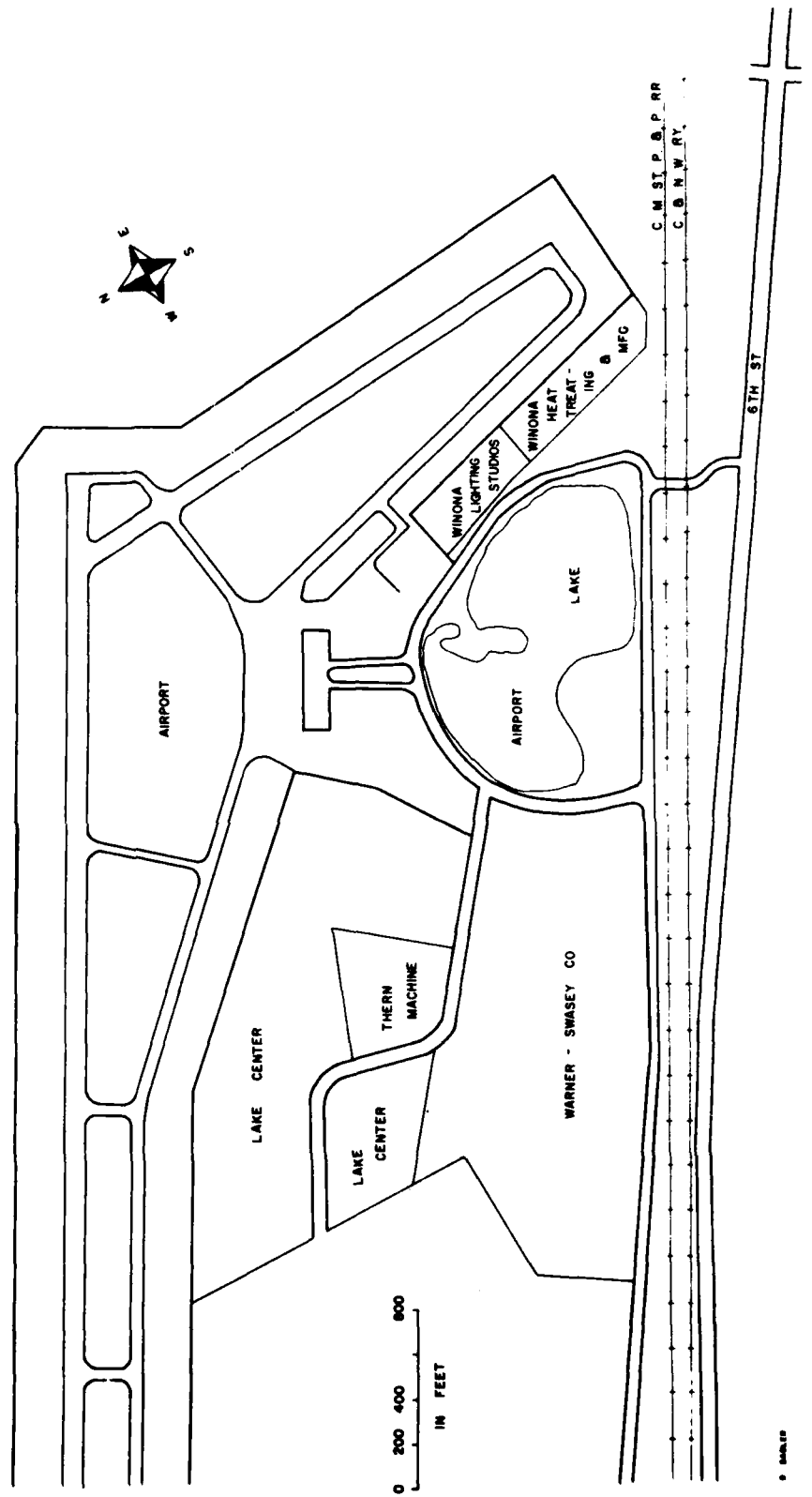


Table 5

AIRPORT INDUSTRIAL PARK

<u>FIRM</u>	<u>SIZE (Acres)</u>	<u>EMPLOYMENT</u>
Lake Center Switch	36.47	230
Thern Machine	5.2	45
Warner-Swasey	41.56	442
Winona Heat Treating		26
Boelter Industries	5.5	45
Winona Lighting	4	40

Source: Gathered from each firm, 1974.

2.133 Warner & Swasey, the firm owning the largest portion of the park, has stated that its future employment may reach a level of 1200 persons.

2.134 A third area is the Riverbend Industrial Park, which occupies approximately 300 acres in the eastern part of the city. It is bounded by the Chicago, Milwaukee, St. Paul, and Pacific Railroad on the north, Mankato Avenue on the west, and Highway 14-61 on the south. The proposed Hennepin Blvd. that will lie atop the Phase II dike will provide the park's eastern boundary.

2.135 The Riverbend Industrial Park Area is being developed on what was previously river bottom and swamp areas. The fill from the proposed barge fleeting area will be utilized for the Riverbend Industrial Park Area. The proposed Phase II dike provides protection to, not only the surrounding residential neighborhoods, but also for the Riverbend Industrial Park. This increase in land base provides Winona with expanding industrial sites.

2.136 Special legislation was enacted by the 1967 session of the Minnesota Legislature permitting the establishment of the Winona Port Authority with limited powers. The Winona Port Authority is composed of seven members appointed by the mayor with the approval of the City Council. Riverbend Industrial Park is the first industrial park developed by the Winona Port Authority which is also its legal owner. The Airport Industrial Park, however, was developed by the city of Winona before legislation enabled the city to create the Port Authority. Planning and engineering services for Riverbend were provided by the Planning and Engineering Departments of the city of Winona. Enforcement of the protective covenant provisions as well as supervision of the park is the responsibility of the Port Authority of Winona. Operations may be undertaken outside the corporate limits of Winona on the Minnesota side of the Mississippi River.

2.137 Another local organization, the Winona Area Industrial Development Association (WAIDA) an independent, non-profit corporation, has been involved in the planning and developing of both the Riverbend Industrial Park and the Airport Industrial Park. WAIDA is comprised of a cross-section of the business and industrial community in Winona. It has provided much of the manpower and money to support industrial developmental projects.

2.138 The Riverbend Industrial Park is being developed in a series of stages. The entire project encompasses 300 acres, with 235 acres available for sale or lease to industry. Emphasis is being placed on the development of light industry and warehouse properties. Funds for Riverbend development have and will come from Revenue and General Obligation Bonds. The tax-exempt nature of Port Authority bonds allows them to be sold at lower rates than private bonds.

2.139 The Riverbend Industrial Park has the following transportation facilities. It is served by the Chicago, Milwaukee, St. Paul, and Pacific Railroad, and by one State and two Federal trunk highways. Trucks can utilize U.S. Highway 61 or 14, or they can follow State Highway 43 to its junction with I-90 just 6 miles away. Streets have been designed by the city of Winona for heavy industrial traffic and intersections will accommodate heavy trucks.

2.140 To enhance the landscape, all utilities will be underground at Riverbend Park. Municipal mains will provide the project with the water supply necessary. Sanitary sewers are present to meet the industrial needs. Northern States Power Plant in Winona closed in September 1974. At the present, electric power is being transferred to Winona through direct lines from La Crosse and Alma, Wisconsin, and Red Wing, Minnesota.

2.141 Table 6 indicates the firms located in this park, the acres that they occupy, and the present employment figures of each firm (also see figure 14).

Table 6
RIVERBEND INDUSTRIAL PARK

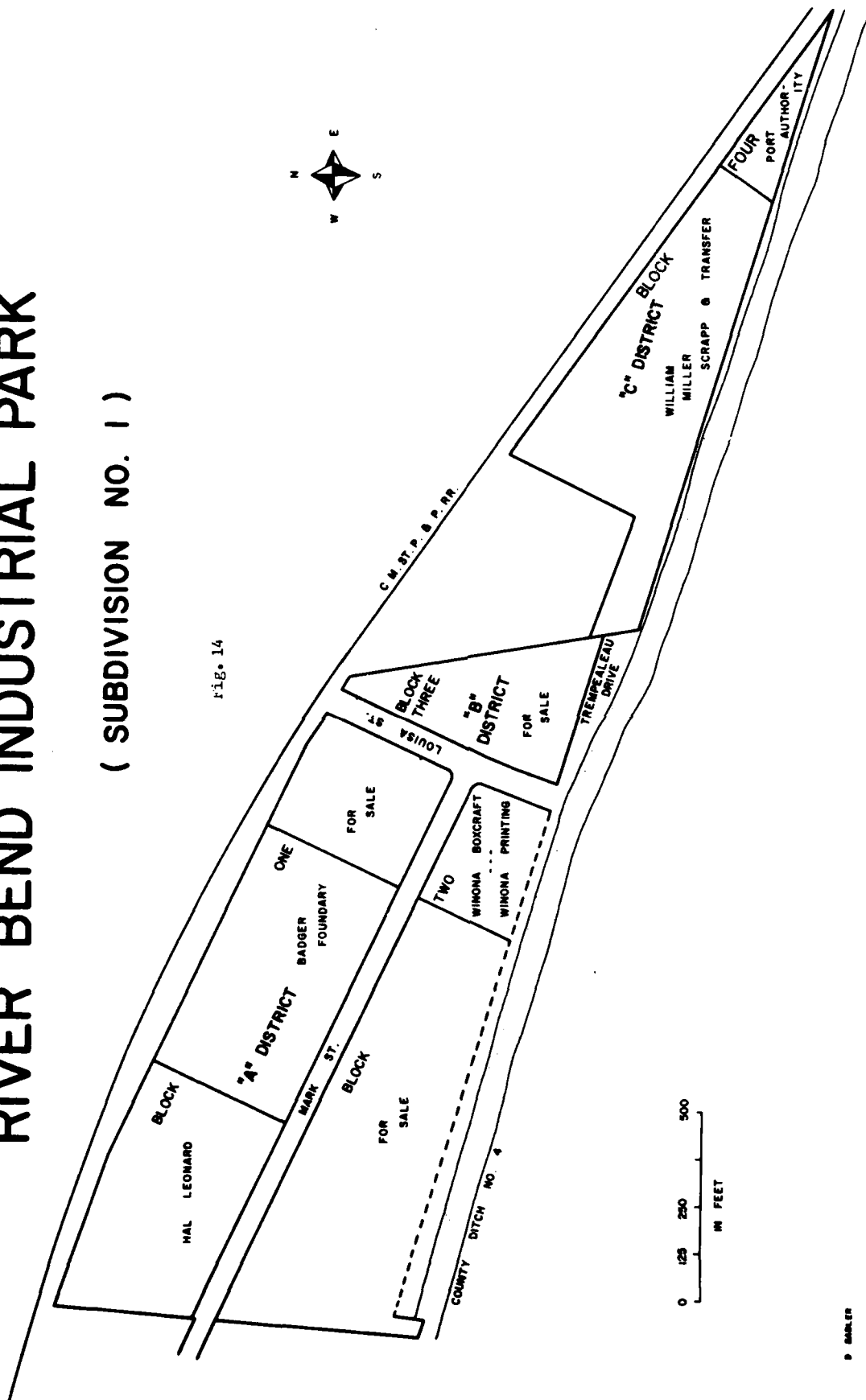
<u>FIRM</u>	<u>SIZE (Acres)</u>	<u>EMPLOYMENT</u>
Hal Leonard Music	5	140
Badger Foundry	6	107
Gorman Foundry	5	50
Winona Boxcraft	1	4
Winona Printing	2.5	23
Wm. Miller Scrap	7.5	11
	<u>27</u>	<u>335</u>

Source: Gathered from each firm (1974).

RIVER BEND INDUSTRIAL PARK

(SUBDIVISION NO. 1)

Fig. 14



D. MARKER

PARKS AND RESERVED OPEN SPACES

2.142 The largest single category of land use in the Winona area is for parks and reserved open spaces. The 2,325 acres in that category appear to be quite excessive for a city the size of Winona. However, over half that amount, or 1,241 acres, are set aside as sumps or ponding areas for rising water during floods. Of particular importance in this category are the vacant marsh of Crooked Slough, and Boller's Lake, a ponding area from Gilmore Creek (figure 2).

2.143 In addition to neighborhood parks, a large city park can be found adjacent to Lake Winona, which provides public recreational facilities including swimming in summer and ice skating in winter. Other large city parks are on Prairie Island and Latsch Island.

TYPES OF PARKS AND OTHER RECREATIONAL FACILITIES

2.144 For organizational purposes the parks and recreational facilities have been established and classified according to categories as indicated in table 7.

2.145 Winona's parks are often multi-functional. For that reason, the categories indicated on figure 15 differ slightly from those in the table 7. Table 8 is the key to the map of Parks and Recreation in Winona, figure 15.

2.146 In addition to the parks, the city operates two indoor facilities, the East and West Recreation Centers. A variety of equipment is available for checkout at each center. The West Recreation Center is located adjacent to Athletic Park where there are baseball, softball, football, ice skating and ice hockey rinks depending on the season.

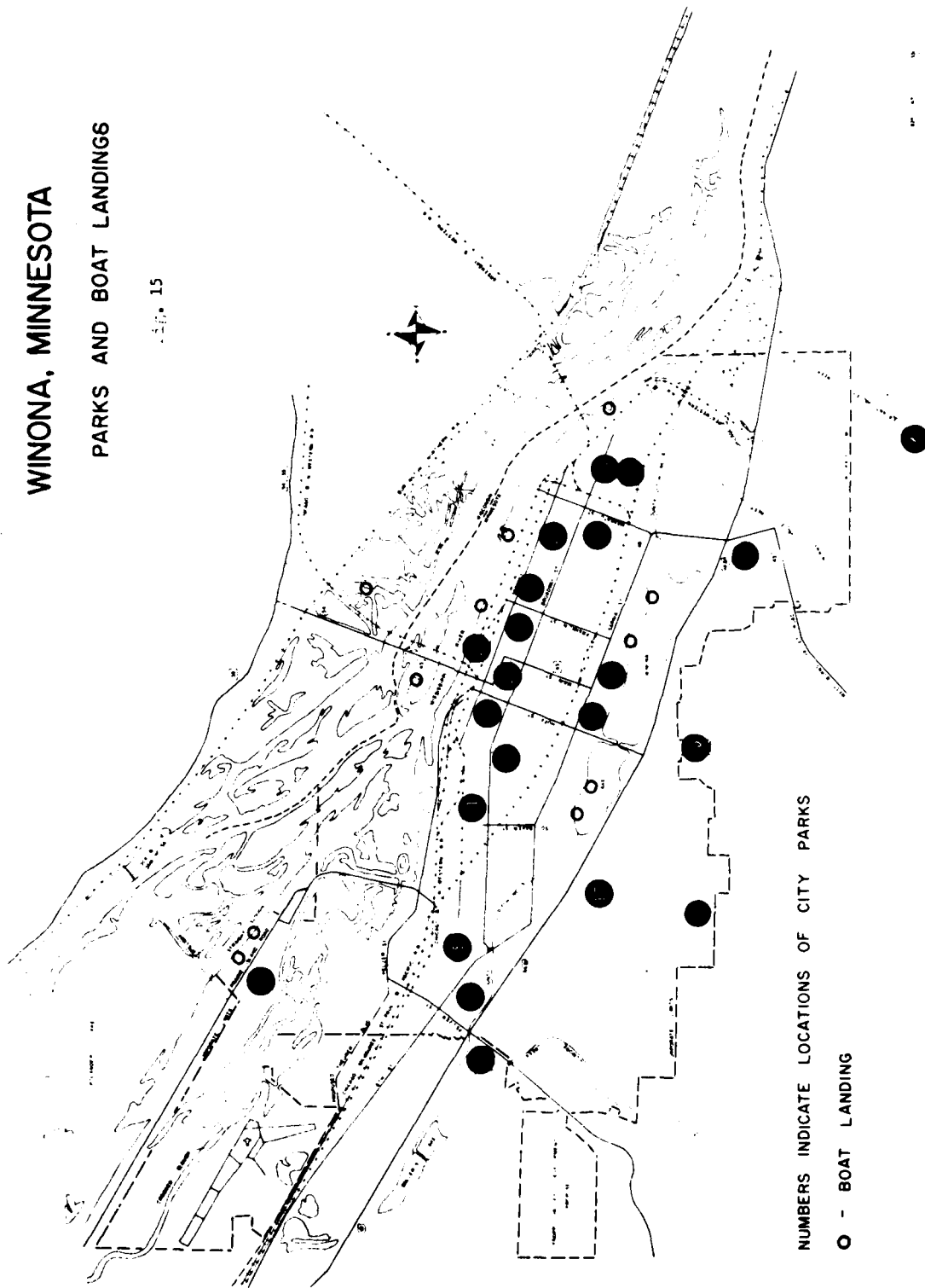
2.147 Agaghaming Park is unique among parks in Winona, and deserves special mention. First of all, it is located in Wisconsin, not Minnesota, as it lies north of the main channel of the Mississippi River. It was donated to the city of Winona in 1915 by Mr. John Latsch, as indeed were most of Winona's parklands (city of Winona, 1972). The park contains about 1,039.64 acres of land, which according to the original intent of the stipulations governing the donation, was to be used for public parks and animal, bird, fish, game and hunting reserves (city of Winona, 1972). In terms of city park, this land is virtually undeveloped. The park is used extensively, however, by fishermen and boaters.

2.148 Although parks and recreational areas are not specifically mentioned in Winona planning policy resolution, there is evidence of the need of additional land for that purpose. This evidence appears to be inconsistent with the fact that Winona already has hundreds of acres of parkland and reserved open spaces. The problem lies in the fact that parklands are not evenly distributed, and several areas of the city are not adequately provided with playgrounds and parks. This is particularly true of the Wincrest area, located on the bluffs above the city; the Glen Echo-Pleasant Valley-Glenview area located south of the hospital across Highway 14-61; and the areas on both sides of the highway where Highway 14-61 and Gilmore Avenue meet.

WINONA, MINNESOTA

PARKS AND BOAT LANDINGS

Fig. 15



NUMBERS INDICATE LOCATIONS OF CITY PARKS

O - BOAT LANDING

TABLE 7

ORGANIZATION OF PARKLAND BY SIZE AND LOCATION STANDARDS

	<u>Playlot</u>	<u>Playground</u>	<u>Play field</u>	<u>Area Park</u>
Population of Service Area	30-60 families	1.5 acres per 1000 population	1 acre per 1000 population	3.5 acres per 1000 population
Intended Age Group	Pre-sch. children	Elementary sch. children	15 yrs. and over	All ages
Radius of service area	1 block	1/2 mile	1 mile	2 miles
Site size	1500-2500 sq. ft.	2-4 acres	10-15 acres	option
Facilities	Swings slides sand box, etc.	Informal active recreation facilities for soccer, softball, handball, volleyball, etc.	Some area for children of families, baseball, softball, football, tennis, swimming, etc.	All facilities of other parks. Some special purpose or single activity i.e., golf, botanical garden, swimming, ice hockey in winter, etc.

Source: City of Winona, 1972

TABLE 8

KEY TO MAP, FIGURE 15 PARKS AND RECREATION IN WINONA

<u>Map No.</u>	<u>Name of Facility</u>	<u>Type</u>	<u>Developed area in acres</u>	<u>Comments</u>
1	Sobieski Square	Playground	2.06	East end of town
2	Sinclair Square	Playground	2.06	Central location
3	Thurly Housing	Playground	2.00	West end of town
4	Glenview Park	Neighborhood Park	27.16	Undeveloped
5	Windom Square	Neighborhood Park	2.06	Used by Jr. High School
6	Tillman Park	Neighborhood Park	2.90	Has indoor facilities
7	Wincrest Park	Neighborhood Park	9.50	Undeveloped
8	Jefferson Athletic Field	School Playground	8.26	Football, baseball, tennis,
9	Madison	School Playground	1.00	basketball, track, regular playground
10	Lincoln	School Playground	1.00	"
11	Central	School Playground	1.00	"
12	Washington-Kosciusko	School Playground	1.00	"
13	Sugarloaf	Citywide Facilities	20.5	Scenic lookout
14	Gabrych Park	"	2.0	Baseball, softball
15	Lake Park	"	120.00	All activities
16	Prairie Island	"	35.00	Multi-use, camping
17	Bluffside Park	"	12.00	Includes Holzinger Lodge
18	Garvin Heights Lookout	"	5.00	View city & valley
19	Levee Park	"	4.00	Steamboat museum
20	Central Square	"	0.7	
21	West Rec. Center & Athletic Park	"		Softball, ice hockey
22	East Rec. Center	"	2.00	Indoor-outdoor programs

PARK-RECREATION PROGRAMS

2.149 The Park and Recreation Department organizes and coordinates a comprehensive program of activities in the city. In summer there are youth programs in golf, tennis, swimming, track and archery; 11 supervised playgrounds; municipal day camp; and leagues of boys' baseball, girls' softball, and flag football. Adult programs include men's and women's softball and flag football leagues, swimming, tennis, square dancing, archery, and a senior citizen's program. In addition, there are family-type facilities and activities involving band concerts, rental of picnic game kits, bicycle and hiking trails, a rose garden, picnic areas, and boat loading docks. In winter, most of the summer activities are moved indoors into local school facilities. In addition, outdoor ice skating and hockey rinks are operated and maintained, and classes are conducted in figure skating.

2.150 In terms of per capita expenditures for parks and recreation, Winona ranks favorably with other southern Minnesota cities as can be seen in table 9, particularly when differences in total park acreages are considered.

TABLE 9

PARKS, RECREATION AND COSTS, SELECTED CITIES

<u>City</u>	<u>Acreage</u>	<u>Total Cost</u>	<u>Population</u>	<u>Per Capita Expense</u>
Albert Lea	205	\$288,720	19,500	\$14.80
Austin	250	247,000	25,700	9.61
Faribault	147	149,456	16,459	9.08
North Mankato	66	57,800	7,347	7.85
Mankato	340	346,900	30,800	11.06
Mankato Rec. Council **	- -	66,280	45,000	1.47
New Ulm	120	127,108	13,500	9.41
Owatonna	340	161,450	15,400	10.48
Pipestone	27	24,000	5,500	4.36
Rochester	1,231	424,000	55,000	7.71
Winona	3,000 (1,371)*	307,794	26,438	11.64

* Excludes Agaghting Park in Wisconsin and school land

** Provides all recreation programming for Mankato and North Mankato.

+ Not all cities report costs in the same manner. Total Cost may include one or more of four categories: park, recreation, administration and forestry

RIVER ORIENTED RECREATION AND AESTHETICS

2.151 About 13 percent of Winona's land area is used for park-recreational and open space uses⁽¹⁾. Large expanses of land are located around Lake Winona and on Prairie Island. Nationally accepted park-recreation standards indicate that Winona has enough park-recreation land for a population of 72,400. Many camping, hiking, picnicking, swimming and sightseeing areas are located in or near Winona. The lakes, marshes, rivers, islands, forests and bluffs afford many active and passive recreational uses as well as make the area aesthetically attractive.

2.152 The section of the Mississippi River near Winona also provides many hours of recreational activity in the form of pleasure boating, swimming, fishing, sightseeing, sunbathing, nature observation, water skiing, trapping and hunting. The locks and dams annually draw many visitors to view the operations and tugboat-barge activities are of interest to many people. The system of locks and dams has improved navigation opportunities for large pleasure craft. The potential for increased recreational activities is not always realized because of river pollution and turbidity from increased industrial activity along the river and barge activity on the river.

2.153 There has been a marked increase in pleasure boating on the river from 1960 to 1972. The best available measures of pleasure boating activity are records of annual lockages through locks 5A and 6, the locks at each end of pool 6. Lockages through lock 6 increased from about 3,700 in 1960 to 5,475 in 1974. Lockages through lock 5A have held consistently around 7,000⁽²⁾.

2.154 A variety of facilities have developed on the river, mainly to serve the pleasure boaters. These include numerous small boat harbors, marinas, and boat clubs. Boat launching sites, both public and private, are available at several locations in the city as is illustrated in figure 15. As important as boats and boating are to the total local summertime recreational activity, and in light of the fact there is an attempt to attract summer tourists to the area, there is not one place in Winona offering boat rental.

2.155 Precise measures of the numbers of sport fishermen using a specific pool are not available. Probably the best data available are the number⁽³⁾ of sport fishermen observed annually by attendants at lock and dam sites. The annual totals for 1974 run about 4,750 sport fishermen for lock 5A⁽²⁾ and 7,800 for lock 6. These data are only an index of activity, however.

2.156 Sport hunting of waterfowl and trapping of furbearers in this area is very popular. See exhibits 2 and 3, for waterfowl and fur harvest data.

(1) Park Recreation Plan - Comprehensive Plan Update - Report No. 1, City of Winona, Minnesota. 1959 to present.

(2) U.S. Corps of Engineers. Annual Lockage Data., St. Paul District.

(3) Proceedings of the Annual Meetings of the Upper Mississippi River Conservation Committee, 1960-1971.

TRANSPORTATION

ROADS

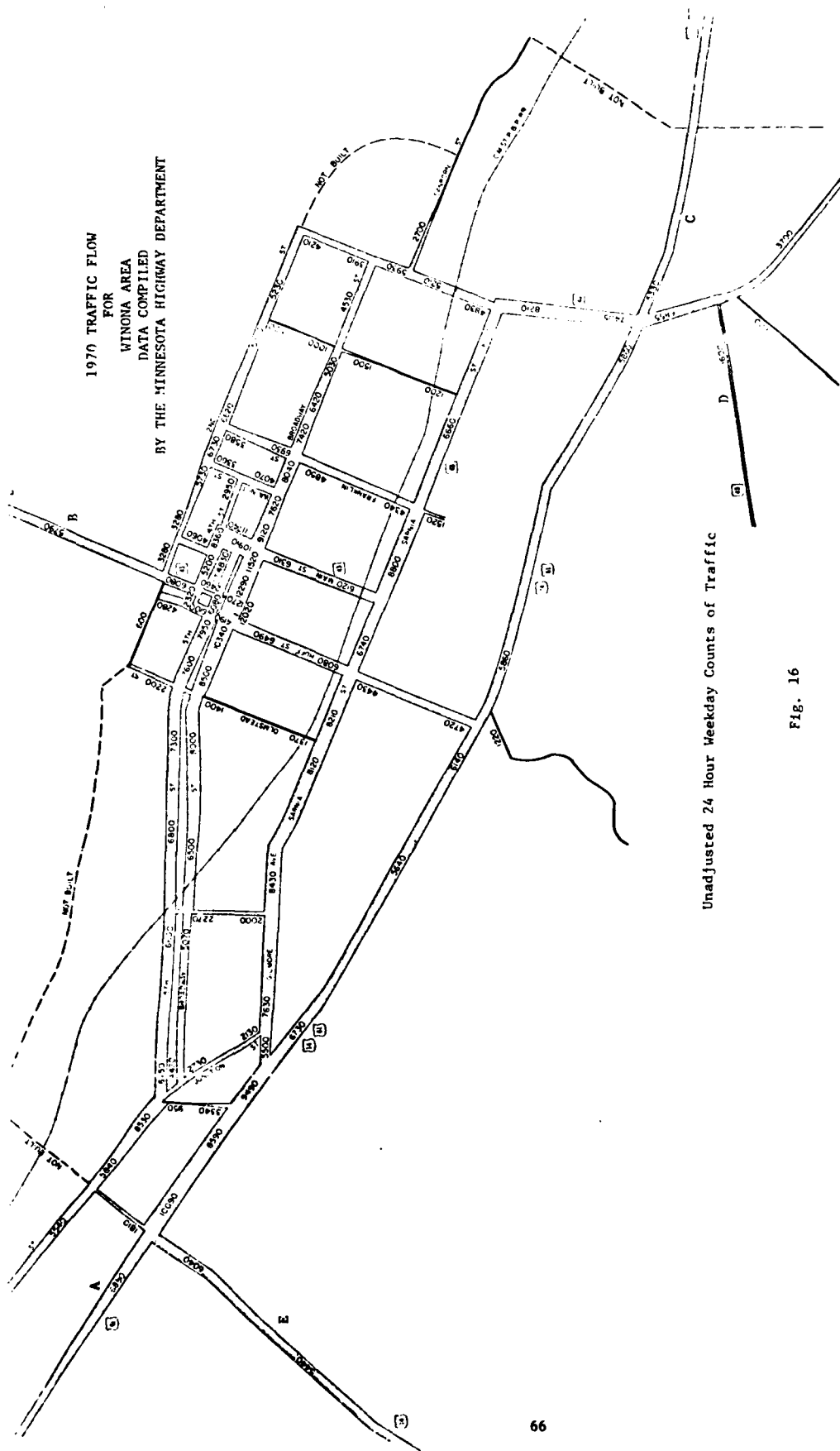
2.157 As a city, Winona has a number of alternative transportation resources. U.S. Highway 61 and Minnesota 43 both serve as connections between the city of Winona and the new Interstate 90. Winona is connected to Rochester, about 45 miles west of Winona, by U.S. Highway 14. A bridge and causeway cross to Wisconsin State Highways 35 and 54 at river mile 725.9. Major incoming and outgoing traffic to the Winona area is facilitated by State and Federal highways (figure 16). Average daily traffic on routes leading to and from the city has increased significantly. In 1948, average daily traffic on Highway 43 South was 11,543 as compared to 21,635 for 1970, which indicates that the traffic flow has nearly doubled at the external stations.

2.158 The two major utilized traffic routes, are Highway 61 and Highway 43 North. The outbound truck loading in pounds has remained relatively stable. The 1960 average was 5,261,167 pounds as compared to 5,820,906 in 1973. It may be noted that before September 1973, heavy commercial traffic to the grain elevator and other industries along Crooked Slough passed through a residential area using minor and local streets. With the construction of the Pelzer Street addition, an extension of Commercial Harbor Road to the west end beltline, truck traffic has been able to bypass residential areas. The Pelzer Street project provides new and present industries along the river with an easily accessible truck route. An estimated 3,000 vehicles per day will use Pelzer Street, 300 to 600 of which will be heavy commercial vehicles (U.S. Army Corps of Engineers, 1974).

BARGE TRAFFIC

2.159 The need to transport high volumes and/or heavy materials within the Winona area has encouraged commercial navigation on the Mississippi River. Such commercial navigation has been made possible by a series of locks and dams constructed and operated by the Corps of Engineers. The 9-foot navigation channel south of the Winona area is controlled by the operation of lock and dam No. 6 at mile 714.3 near Trempealeau, Wisconsin. North of the city of Winona, lock and dam 5A at mile 728.5 controls the water level in pool 5A.

2.160 A number of public and private river terminals at Winona load such commodities as grain, fertilizer, flour, and unload such commodities as coal, petroleum and other bulk products. It may be noted that shipping in terms of tons has increased significantly since 1960. The annual lockage data from the Corps of Engineers indicated that from 1960 to



1972 commercial lockages recorded by lock 6 increased 56 percent, while lockages at lock 5A increased 28 percent (U.S. Army Corps of Engineers, 1974). Presently the Crooked Slough and Crystal Lake area serves as a barge fleeting site. It may be concluded that the Mississippi River is utilized intensively to meet the transportation needs of the Winona area (see exhibit 8, page A-27, grain shipped from Winona).

RAIL SERVICE

2.161 Three major railroads utilize the rail facilities in Winona. They are: the Amtrak which provides passenger travel to Chicago and Minneapolis, the Chicago-Northwestern, and the Burlington Northern which handle freight traffic. In 1960, the average monthly rate of loading and unloading of railcars was 2,656, as compared to 3,162 per month in 1973. Amtrak (1974) provide four trains a day through Winona; two to Minneapolis and two to Chicago. Presently, a detailed study and plan of railroad relocation has been initiated by the Winona Planning Commission. Under consideration is the relocation of the Milwaukee Road line which intersects the city (City of Winona Land Use Plan, June 1972).

AIR SERVICE

2.162 Air transportation is also available at the Winona Airport. Mississippi Valley Airlines (1974) provides 6 to 8 regularly scheduled flights connecting Winona with Minneapolis, Chicago, Davenport, and Dubuque. It also provides charter service within the Tri-State Area.

AIR QUALITY

2.163 The Minnesota Pollution Control Agency (MPCA) has determined that Winona's airborne particulate matter ranked high as compared to the rest of the State of Minnesota. Air quality standards are set in accordance with those set by the Environmental Protection Agency (EPA) under the authority of the Clean Air Act of 1970. The air quality in Winona is monitored by the MPCA.

2.164 Two types of standards, primary and secondary, have been set. Primary standards are set for the protection of health. Secondary standards are set to protect welfare, vegetation, and aesthetics (paint damage to buildings, protection for wildlife). Table 10 below indicates air quality standards.

Table 10 - Air Quality Standards for Airborne Particulate Matter⁽¹⁾

Primary Annual Geometric Mean ⁽¹⁾	75 ug/m ³
Secondary Annual Geometric Mean	60 ug/m ³
Primary 24-Hour Standard	260 ug/m ³
Secondary 24-Hour Standard	150 ug/m ³

(1) Given in micrograms per cubic meter

2.165 The MPCA maintains a monitoring station at 2nd and Olmsted Street. The annual geometric mean for 1973 was 67.8 ug/m^3 . In 1973 there were three recorded violations of the secondary 24-hour standard. In 1974 the annual geometric mean was 93.2 ug/m^3 . In 1974 there were seven recorded violations of the secondary 24-hour standard. As of 2 November 1975 the geometric mean was 95.0 ug/m^3 . Using the available data for 1975 there were four recorded violations of the primary 24-hour standard and seven violations of the secondary 24-hour standard (greater than 150 ug/m^3 but less than 260 ug/m^3). Sulfur dioxide levels were also monitored but have been within the established standards. Levels of carbon monoxide and hydrocarbons have not been monitored. (1)

2.166 In a study by Galvin and Tans (1972), air quality was monitored for airborne particulate matter at three locations in Winona. Their readings exceeded the MPCA standards 31 percent of the time. In a study by Schwer and Russel (1972), airborne particulates exceeded MPCA standards on four occasions during a 3-month study.

2.167 The MPCA monitoring station is located near the Froedtert malting plant. This could be contributing to the high readings at this location. A new barley cleaning head is presently under construction at the Froedtert malting plant. After completion this could significantly improve the air quality in this area.

2.168 Thermal inversions occur frequently in September and October. These inversions are usually of short duration, however, and the area is not yet heavily populated nor industrialized. In a valley, such as the Mississippi River Valley, in which the city of Winona is located, the surrounding "hills" prevent the mixing of air and act as a holding corridor for pollutants. Inversions effectively suppress vertical air movement so that smoke and other atmospheric contaminants cannot rise out of the lower layer of air (McGraw Hill, Encyclopedia of Science and Technology Vol. 13, 1960).

ARCHAEOLOGICAL, HISTORICAL AND SCIENTIFIC SITES

2.169 Archaeological and historical sites of importance include such diverse elements as prehistoric village sites, petroglyphs (pictures on rocks), burial mounds, battle grounds, cemeteries, parks and buildings.

2.170 In order to determine if any of the proposed projects would affect archaeological, historical or scientific sites, the following people were asked for information: Mr. Russell W. Fridley (Director, Minnesota Historical Society), Dr. Elden Johnson (Minnesota State Archaeologist), Mr. William D. Gernes (Executive Director, Winona County Historical Society)

(1) Data source: Air Quality in Minnesota 1973 and 1974 (MPCA publication) and conversations with MPCA personnel.

and Dr. Lewis I. Younger (Board of Directors, Winona County Historical Society and long-time Winona historian). See exhibit 13, page A-44 (letters from Director, Minnesota Historical Society and Minnesota State Archaeologist). The following National Register Sites as of 1 January 1976, are listed in the National Register of Historic Places: Willard Bunnell House; James P. Pearson Steamboat (Steamboat Wilkie); Kirch/Latch Building; Merchants National Bank; Second Street Commercial Block; Winona County Courthouse.

2.171 None of these properties would be affected by the proposed project. In 1975, the Science Museum of Minnesota conducted a cultural resources survey of the project area (Archaeological Survey of the Proposed Winona Levee Flood Control Project-Stage II, Contract number DACW-37-75-C-0153) for the Corps of Engineers. The purpose was to locate new and recheck previously recorded archaeological sites along the proposed flood control route. The survey revealed that only two areas were of concern: 1) Burns Valley Creek, which includes the John Burns House, historic Indian burials, a possible prehistoric habitation site and a grist mill and 2) the levee park area, where two burial mounds are known to be under the present levee which were covered when the original levee was constructed in 1890 and again when, in 1965, an emergency levee was added.

2.172 The Science Museum recommended and the Corps of Engineers will, that because the exact location of the Burns House and Indian habitation and burials could not be determined under the limited survey program, an archaeologist be present when construction begins on the Burns Valley portion of the project. The grist mill, the pond of which has been filled and is now part of a housing development, was examined by the architectural historian from the Minnesota Historical Society who determined that because it had been significantly altered and/or destroyed, it was not eligible for the National Register of Historic Places.

2.173 The levee park area poses a special problem. The two known mounds (21 WN 11) under the levee were recorded by N.H. Winchell in 1884. Some digging was done in the tops of them; then they were covered by the first levee in 1890. The local inhabitants then reconstructed the mounds on top of the levee. The levee and "mounds" were covered with additional levees in 1965 and again in 1969 during emergency flood operations. With the current policy in Minnesota restricting the excavation of burial mounds, it will be necessary for the State Archaeologist and the Indian Affairs Commissioner to determine if the mounds will be excavated before the new levee is built or whether the mounds will be buried deeper by the new levee.

2.174 A cultural resources survey was conducted at the site of the proposed fill area for Fronings, Inc. (A633) grain terminal. The results of this survey were negative. A copy of the results of this survey is on file in the St. Paul District Office.

2.175 A cultural resources survey was conducted at the site of the proposed 24-barge fleeting area (A697) and the proposed fill area (Riverbend Industrial Park Phase II). The results of this survey were negative.

3. RELATIONSHIP OF THE PROPOSED ACTIONS TO LAND USE PLANS

INTRODUCTION

3.001 Current land use is illustrated in figure 17. Table 11 summarizes the results of a Corps of Engineers land use study conducted in 1969.

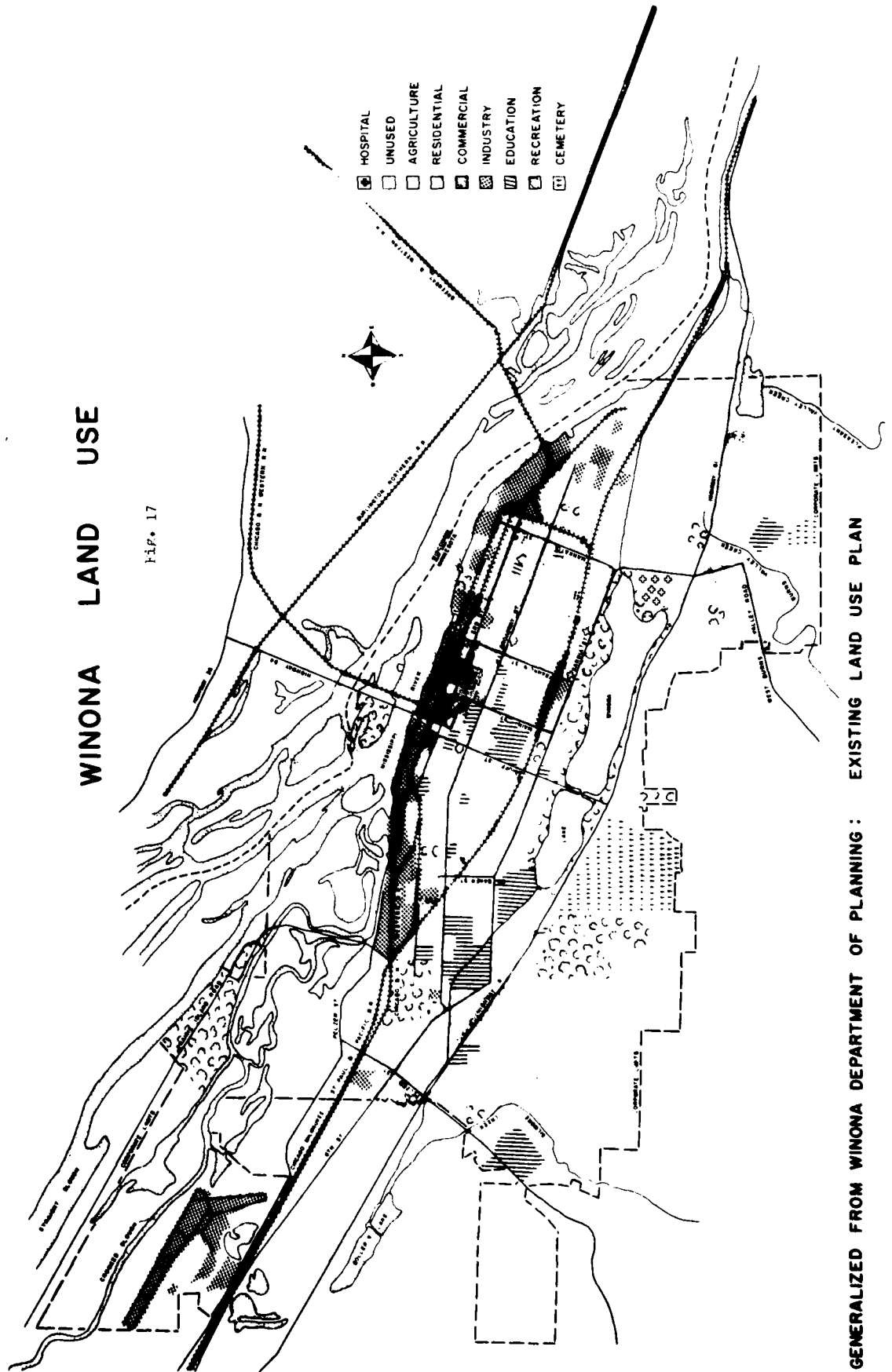
Table 11

LAND USE IN SELECTED CATEGORIES IN THE WINONA AREA, JANUARY 1969 (1)

<u>Land Use</u>	<u>Acres</u>	<u>Percent</u>
Parks and reserved open space	2325	37.2
Residential	1295	20.7
Streets and roads.	1097	17.5
Public and semi-public	562	9.0
Industrial	470	7.5
Railroads	270	4.3
Commercial	<u>239</u>	<u>3.8</u>
(1) Source: Corps of Engineers, 1970	6258	100.00

WINONA LAND USE

Fig. 17



GENERALIZED FROM WINONA DEPARTMENT OF PLANNING: EXISTING LAND USE PLAN

PLANNING POLICY RESOLUTION

3.002 The city of Winona has adopted a planning policy resolution. The policy resolution is a broad statement or framework within which a planning policy takes shape. It is a flexible document which binds no one to a specific plan or program. The policy resolution is used, however, as a guide to support or reject specific land use change proposals such as a zoning variance request. Essentially the resolution calls for a goal of development of the city to a maximum population of 35,000 by 1990. According to studies conducted during the preparation of the Environmental Impact Assessment Report (1974) a more realistic figure would probably be 29,500. Figure 18 is the Generalized Land Use Plan, Winona, Minnesota and Environs.

3.003 Commercial and industrial areas are being consolidated as much as possible and an efficient transportation system should connect them with the Winona "suburban" areas. An intra-city transportation system could be developed which would encourage the use of mass public transportation and generally discourage vehicular traffic.

3.004 Residential population densities should be increased particularly in the downtown area to increase pedestrian traffic and eliminate some of the need for vehicular traffic in the central business district. No increase in low density housing is anticipated.

3.005 The three colleges and area technical school in Winona are not expected to require additional land in the foreseeable future.

3.006 Demand does exist for park and recreational facilities in some neighborhoods in the city. Some land is available for use as public facilities should a time and specific use be agreed upon.

CORPS OF ENGINEERS: LAND USE PLAN AND STAGE II FLOOD CONTROL PROJECT

3.007 Future land use plans in Winona require flood protection. If no permanent flood control project is constructed, contingency plans must be made for evacuating the city in time of flood.

3.008 A comparison of the 1965 Winona Flood Map (figure 19) with the 1990 Generalized Land Use Plan (figure 18) graphically illustrates the significance of having a permanent dike around the city. The 1965 flood map shows that extensive areas of commercial, industrial and residential lands were inundated during that flood. Of particular significance is the large industrial area located east of Mankato Avenue - the location of the proposed Riverbend Industrial Park. During the flood of 1965, virtually all of that land was under water.

3.009 The city's existing floodplain regulations (adopted in 1974) require that the minimum elevation of the lowest structure within Riverbend must be at least 659.0 elevation or at least 1 foot above the 100-year frequency flood. Because of the high cost involved in filling Riverbend to this elevation the city opted to pay their required share of the additional cost for protecting Riverbend Industrial Park with the levee system. After the levee around Riverbend is constructed the floodplain regulations will probably be modified to permit construction at a lower elevation.

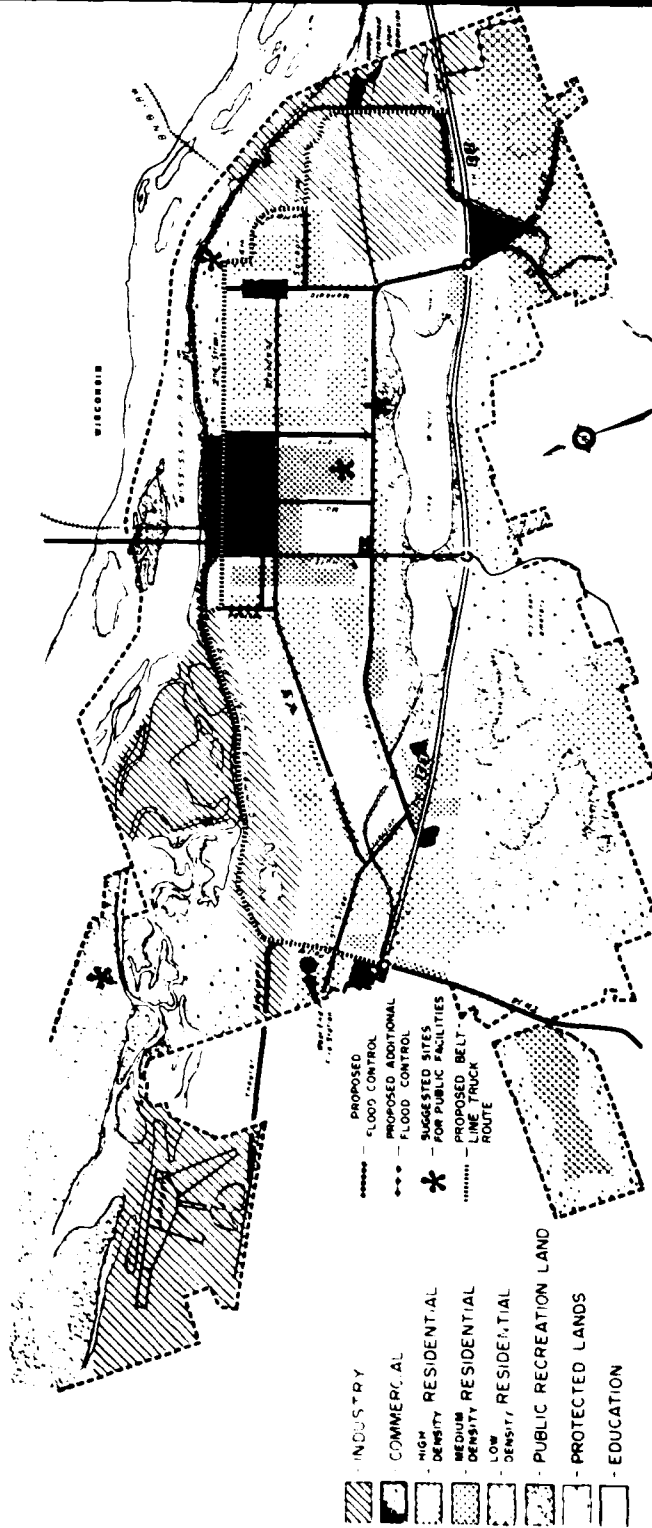
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PLANNING
DEPARTMENT
WINONA
MINNESOTA

director
C.E. Dillman
graphics
coordinator
D. Dennis

date: 8/20/73
scale: 1" = 2000'

PLATE



1980 GENERALIZED LAND USE PLAN WINONA, MINNESOTA AND ENVIRONS

1. 13

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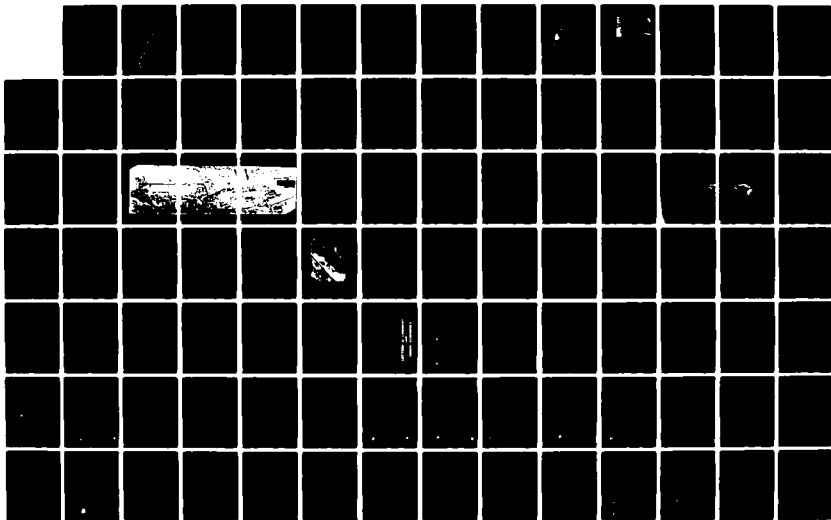
WINONA MINNESOTA FLOOD CONTROL PROJECT AND WATERFRONT
DEVELOPMENT(U) CORPS OF ENGINEERS ST PAUL MN ST PAUL
DISTRICT JAN 76

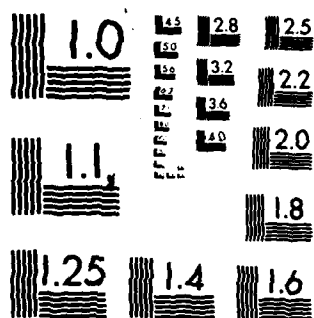
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MICROCOPY RESOLUTION TEST CHART
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WINONA FLOOD 1965

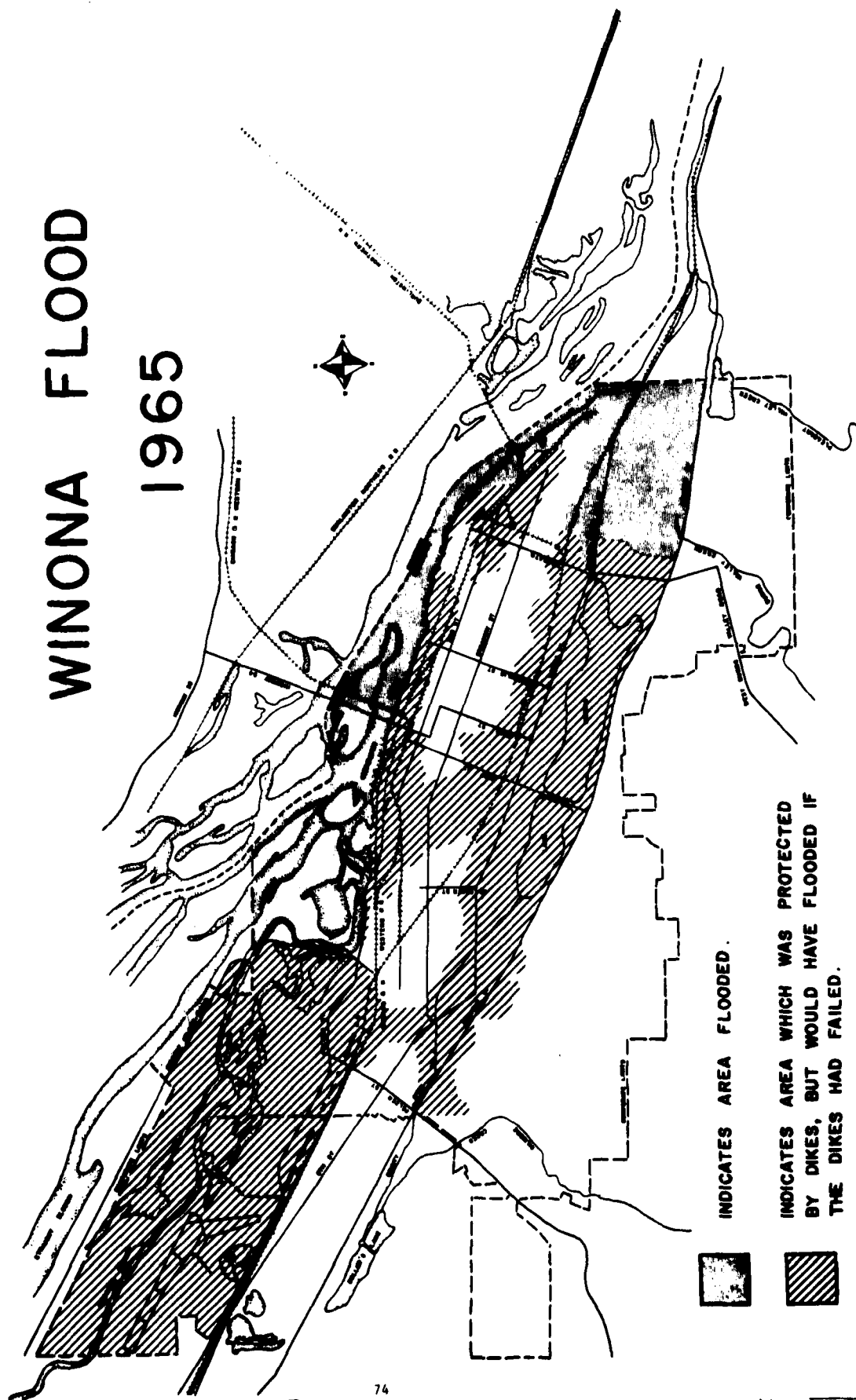


FIGURE 19

3.010 Much of the proposed development of industry in Winona is predicated upon the construction and development of Riverbend Industrial Park. Presently, that area consists of marginal river lands. Its development will increase the tax base in Winona and increase land values in the area.

FRONINGS INC.: GRAIN STORAGE BINS AND SHIPPING FACILITY

3.011 The proposed Fronings grain storage bins are to occupy 8.98 acres of land along Commercial Harbor Road. The actual site for the facility is zoned for industrial use but presently consists of marsh and wooded lowlands. The plans, which have not yet been finalized, call for the area to be filled with dredge material from adjacent river waters. Ultimately, a 6,240,000-bushel grain elevator complex is to be constructed on the site. Grain will be received in trucks, and loaded on to river barges in much the same manner as is employed by the adjacent Victoria Elevator Company.

3.012 The Fronings elevator operation will require a wide, hard surfaced road capable of accommodating large grain trucks. In 1973, the Pelzer Street addition was constructed to provide such a roadway to the commercial harbor. The proposed 1990 land use plan calls for a beltline road which includes the continuation and hard surfacing of the Commercial Harbor Road thereby making the Fronings operation consistent with future city land use plans.

FARMERS UNION GRAIN TERMINAL ASSOCIATION: GRAIN ELEVATORS AND SHIPPING FACILITY

3.013 The Farmers Union Grain Terminal Association grain elevators shipping facility is now in operation. It is constructed adjacent to the proposed Froning, Inc. facility on Commercial Harbor Road (figure 2). The Farmers Union facility occupies 3 acres and has a capacity of 140,000 bushels. Its mode of operation is similar to those presently employed by the Victoria Elevator Company. Grain will be brought to the elevators by truck, then loaded on river barges for export. This operation will also make use of the expanded Pelzer Street Addition and Commercial Harbor Road thereby keeping it consistent with the Winona 1990 land use plans.

WINONA FLEETING CO.: 15-BARGE FLEETING AREA IN CROOKED SLOUGH

3.014 The barge fleeting area in Crooked Slough and Crystal Lake is located immediately adjacent to the commercial harbor area. The fleeting area which is presently in use, was created as the borrow area from which material was taken for the construction of the Pelzer Street Addition. Because of its location, the barge fleeting area provides space for the mooring of barges being used by the Victoria Grain Elevator. The value of this facility as a fleeting area has increased with the completion of the Farmers Union GTA elevator and is expected to increase further with the completion of the proposed Froning Inc. facility. For that reason, the 15-barge fleeting area appears to add credibility and viability to the plan for increasing water transportation facilities in Winona by 1990.

CITY OF WINONA: BELT LINE TRUCK ROUTE

3.015 The belt line truck route, when completed, will provide an essential element to the Winona 1990 inter-city and intra-city transportation plans. As shown in figure 18, the route will facilitate the movement of heavy trucks to and from industrial and commercial areas while keeping them out of residential neighborhoods as much as possible. The results should greatly increase the efficiency of truck traffic and eliminate many nuisance factors and traffic hazards in residential areas. The eastern portion of the Belt Line Truck Route is dependent upon the completion of the Phase II dike because the land use plan indicates that portion of the beltline route is to be constructed on the dike itself.

CITY OF WINONA: EXTENSION OF CITY DOCK IN CROOKED SLOUGH

3.016 The extension of the city dock in Crooked Slough has been made practical by the creation of the 15-barge fleeting area in the adjacent waters. Although the proposed expansion is relatively minor-increasing the barge handling capacity to two barges rather than one-the proposal is in keeping with the long range city plan of improving water transportation.

CITY OF WINONA: STORM SEWER DIVERSION AT PELZER STREET

3.017 The storm sewer diversion at Pelzer Street does not significantly affect the proposed future land use plans for the city of Winona.

WINONA PORT AUTHORITY: 24-BARGE FLEETING AREA

3.018 The Winona Port Authority is planning the construction of a 24-barge fleeting area just north of the sewage treatment plant. Such a fleeting facility would provide a safe and efficient docking area for the increasing demand for barges in the developing industrial areas of Winona.

3.019 The plan calls for a major dredging effort to be accomplished to create the fleeting area, with dredged material being deposited on land to produce Phase II of Riverbend Industrial Park. The construction of a barge fleeting area at the eastern end of the city would appear to conflict with the notion of concentrating river orientated industries in the vicinity of the commercial harbor.

3.020 The 1990 transportation plan for Winona calls for the improvement of water transport facilities.

CITY OF WINONA, WINONA COUNTY AND STATE OF MINNESOTA: ENCLOSING OF COUNTY DITCH NO. 3

3.021 County Ditch No. 3 is the subject of a 3-year plan of improvement, including the enclosing of that portion of the ditch from Junction Street to Pelzer Street. The ditch is to be enclosed within a 122-inch arch concrete culvert. The sides of the ditch will be filled in and the top of the culvert covered in order to create a linear park and recreation area. The proposed plan calls for the establishment of a bicycle path and off-street parking on the ditch right-of-way adjacent to Thurley Homes. This plan should help alleviate the parking problem for residents of the Thurley Homes, particularly in winter. Local residents presently use Kraemer Drive for parking; however, Kraemer Drive has been declared a snow emergency route and at times during the winter the people are without parking space.

WINONA PORT AUTHORITY: RIVERBEND INDUSTRIAL PARK. PHASE II

3.022 Much of 1990 future land use plans for Winona are based on attracting industry to the city. One of the cornerstones of those plans involves the creation of Riverbend Industrial Park (figure 18). The two-fold purpose of the park is to not only attract new industry but to concentrate existing industry within a controlled area.

3.023 Presently, 235 acres of Riverbend Industrial Park, Phase II, are classified by the city as marginal river lands. In order for industrial development to take place, the area will require land fill. Present plans by the Winona Port Authority call for using material dredged during the construction of the 24-barge fleeting area.

3.024 If Winona is to attain a population by 1990 such as that proposed in the Land Use Plan, then Riverbend Industrial Park, or some equivalent area will be needed for industrial development in order to provide the necessary jobs to attract new residents.

MISSISSIPPI DEVELOPMENT CONSORTIUM: INDUSTRIAL PARK

3.025 The Mississippi Development Consortium is a private Minnesota corporation owned and operated by four Winona business concerns. Together, they own 260 acres of land which lie mostly in the village of Goodview and extend eastward, parallel to the Milwaukee Road tracks, across Pelzer Street and into the city of Winona (Figure 10). Of the 260 acres owned by the corporation, 110 acres are presently planned for development as an industrial park. The corporation is interested in promoting light and medium industry in the area.

3.026 The plans for the development of an industrial park here coincide with the 1990 land use plan, in that the general vicinity is already zoned for industry. Excellent transportation facilities will be available since the area is located less than a mile from both the airport and the commercial harbor. Excellent surface transportation will be available via the belt line truck route, and by the proposed Theurer Boulevard.

3.027 This industrial park should be a considerable asset to the city of Winona and to the 1990 plan to increase population and attract industry.

4. PROBABLE IMPACTS OF THE PROPOSED PROJECTS

CORPS OF ENGINEERS: STAGE II FLOOD CONTROL PROJECT

4.001 Winona's present total dike system is 10.4 miles long and consists of a permanent dike and a temporary dike (see figure 4). The temporary dike which was hastily constructed during the 1965 flood and repaired in the 1969 floods, is 4.3 miles long and extends from the interstate highway bridge around the east half of the city and abuts highway 61. The temporary dike is presently an eyesore, as it has not been landscaped, and is costly to maintain under emergency flood conditions. The proposed Stage II dike would incorporate landscaping in the Levee Park area and would not require costly emergency repairs.

4.002 This proposed project would provide protection and security for the city of Winona. Floodproofing of buildings within the diked system would no longer be necessary. With a permanent dike building costs in all enclosed low-lying areas would be reduced. However, floodplain regulations (includes floodproofing) would continue in the area including the McNally subdivision and Siebrechts Nursery which would remain unprotected (McNally subdivision and Siebrechts Nursery are within the area designated reach No. 4, figure 23 and the shaded area designated plan 5, figure 24) (pages 102 and 109).

4.003 An integral part of this permanent dike would include a pumping station which would lower the level of Lake Winona during flood time. Since Lake Winona acts as a sump for the city, lowering the lake also lowers the water table beneath the city so that basements are not flooded by the seepage of groundwater. This pumping station would be placed in County Ditch No. 4 at a point .8 mile east of the temporary pumping station at Mankato Avenue. As a result, the water level in County Ditch No. 4 would always be kept lower than the level of Lake Winona. This would facilitate the fish management program for the lake because it would make it more difficult for unwanted river fish to pass into Lake Winona through the electric weir.

4.004 Land values would increase on low-lying protected areas of the city with the proposed flood control project. A greater degree of protection to the city water supply would occur. Short-term employment during construction would occur.

4.005 The permanent and temporary dike system of Winona has constricted the floodplain of the Mississippi River. The Phase II permanent dike system would cause no further significant restriction.

4.006 The portion of the proposed Stage II Dike that runs from the Peerless Chain Company to Highway 61 would be constructed upon or next to the old Chicago and Great Western Railroad bed. The dike would destroy a strip of marsh and upland vegetation somewhat wider than the dike.

4.007 At the present time no one is living in the area in question. Boaters and fishermen, however, occasionally use the narrow shore of the Mississippi River which flanks the tracks. The only structures that exist in the area are the Peerless Chain Company, which stands at the northwest end of the old railroad bed, and the new sewage treatment plant located where Shives Road crosses the old railroad bed.

4.008 The section of the railroad bed that extends from the Peerless Chain Company to the sewage treatment plant has been covered in some areas by dredge material from previous Corps of Engineers activities. Mature stands of box elder, silver maple, cottonwood and sandbar willow dominate that section (figure 20). The section also includes a marsh which lies between the Mississippi River and the old railroad bed. Arrowhead and cattails constitute the main vegetation in the marsh.

4.009 The railroad bed itself, because of its elevation, contains upland vegetation. Trees and shrubs that cannot be found anywhere else in the immediate area can be observed growing on the bed. Some examples of these are wild plum, woodbine, raspberry and wild rose. The actual tracks no longer exist on the bed and the trestle which once spanned Burns Valley Creek has disappeared.

4.010 The marsh just north of Highway 61 contains grasses, sedges, arrowhead and cattail which are bordered by bottomland hardwoods (figure 20). Burns Valley Creek is the primary water source for the marsh. As a result of comments on the DEIS made by the U.S. Department of Interior and the Minnesota Department of Natural Resources, the alignment of the proposed levee has been modified to exclude this marsh from the protected area (figure 21). This marsh is presently a spawning area for northern pike, largemouth bass, sunfish and several species of rough fish. In addition, the marsh and the surrounding type I wetlands provide habitat for muskrat, raccoon, cottontail rabbit, and waterfowl.

4.011 Burns Valley Creek will be channelized from the sharp bend which is located 986 yards upstream of the Highway 61 Bridge down to a point located 176 yards downstream from the bridge. The channelization will be initiated with a drop structure and terminated with a sheet pile weir for erosion control. There will be a loss of small game and songbird habitat as a result of the channelization. The existing fishery habitat at this location on Burns Valley Creek is limited to minnow species. The channelization will remove the existing habitat diversity and reductions in fish populations can be expected to occur.

RIVERBEND PARK VEGETATION

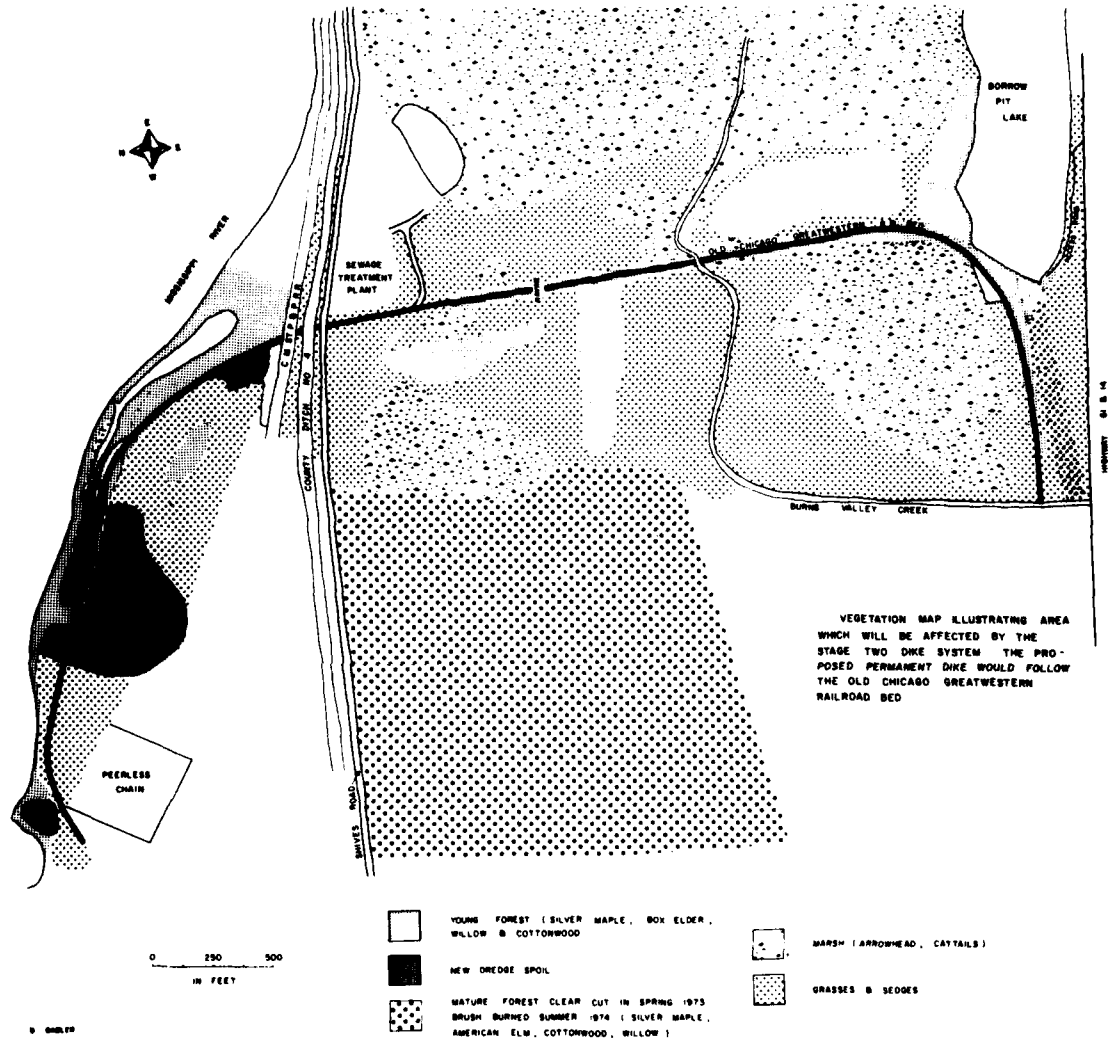


FIGURE 20

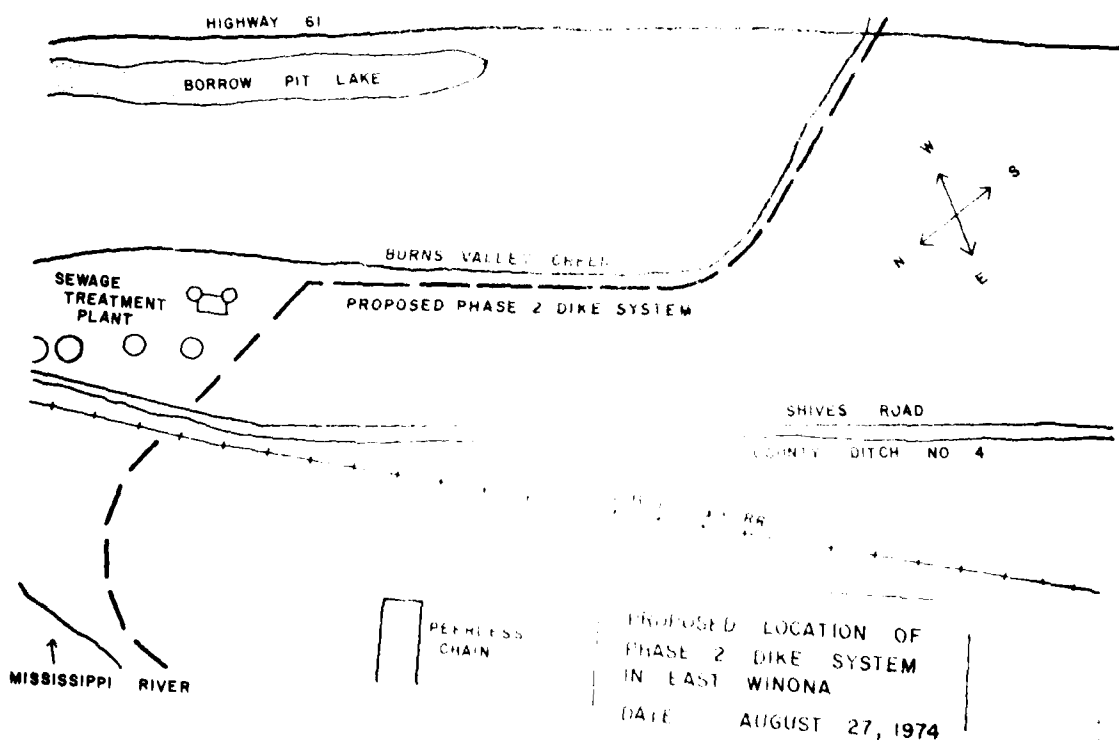


FIGURE 21

FRONINGS, INC.: GRAIN STORAGE BINS AND SHIPPING FACILITY

4.012 Fronings proposed project as described in paragraph 1.018, would have economic benefits to the Winona trade area. The actual construction of the project would provide short-term employment and it would result in the sale of locally-sold construction materials. The completed project would provide increased market opportunities for upper midwest farmers. The Fronings project would also increase business volume in the trade area, particularly to truck-oriented businesses such as service stations and truck repair shops. The completed project would provide employment and it would increase the tax base for the city. It should be recognized, however, that grain elevators do not employ many people. The Victoria Grain Terminal (see figure 5); for example, only hires 18 people during the shipping season.

4.013 The project would utilize river barges rather than train or trucks for the export of stored grain. It is generally accepted that barge shipping as a means of bulk transportation is more conservative of energy than alternative methods. Shipment by barge as opposed to truck would also lessen the congestion on truck routes from Winona to points as far south as New Orleans.

4.014 If wet fill for the project were to be obtained from the mouth of Straight Slough, many people would benefit. Presently, the mouth of Straight Slough is almost closed by accumulations of sand. The channel is impassable to large houseboats and it is barely navigable to runabouts. If the channel were reopened, it would provide easy access to Prairie Island Park from the main channel of the river. Those who reside along Straight Slough would also benefit because they would regain easy access to the river.

4.015 The fill required for the project would destroy about 8 acres of floodplain forest and water. However, the forest is of little value aesthetically, commercially, or for wildlife. The water areas in question provide marginal habitat for fish, invertebrates and waterfowl..

4.016 The project would result in increased barge traffic into the Crooked Slough harbor. This, in turn, would increase the congestion which already exists in the area. Increased numbers of grain barges would cause more congestion at locks and in the main channel. The same amount of increased traffic would occur, however, if the grain terminal were built upstream from Winona.

4.017 The Crooked Slough fleeting area is presently not large enough to accommodate increased numbers of barges. The Froning project would necessitate construction of additional fleeting areas in Crooked Slough or elsewhere.

4.018 This project, and other projects, will necessitate the extension of the belt line truck route (see paragraph 3.015). Increased traffic of grain trucks will cause air pollution, noise pollution, accidents and highway maintenance.

4.019 The heaviest truck traffic would occur during the navigation season, but trucks would bring grain to the elevators during all seasons of the year. Peak traffic would not necessarily occur during the harvest season as might be supposed. Because trucks would be delivering grain which has previously been stored in distant elevators, peak traffic may occur in July as it did at Victoria's elevator in 1973.

4.020 The number of trucks necessary to supply grain to Victoria, GTA and Froning is virtually incomprehensible. In 1973, for example, 19 million bushels of grain were passed through the Victoria elevators. This required 25,000 trucks. If GTA, whose elevators are about one-half as large as Victoria's, does a commensurate volume of trade, this would mean approximately 12,500 more trucks.

4.021 The proposed Fronings project, whose ultimate storage capacity would be 6,240,000 bushels, dwarfs the Victoria and GTA projects. If Fronings' bins are not used as surge elevators, for example, and are filled to capacity only once each year, it would require only 6,240 semi-trailer trucks per year to haul the grain. If, on the other hand, the bins were used as surge elevators, and if Fronings did traffic commensurate with Victoria's (whose total grain flow was 63 times its storage capacity in 1973), it is conceivable that Fronings could handle about 393,120,000 bushels of grain in one year. This has the potential requirement of 393,120 semi-trailer trucks of 1000-bu capacity. The number of trucks could actually be greater because many grain trucks have less than 1,000-bu. capacity. If the above figures are an actual approximation of expected volume, and if Fronings should operate 12 hours per day, 310 days per year, an average of 1268 trucks could arrive at the Fronings elevators every day. Actually, the daily number would be much less on some days but it would be much greater on other days. It is conceivable that the completed Fronings project could process 1500 trucks in one day, or over 100 per hour.

4.022 The above projections are theoretical. Fronings, Inc. has indicated that their method of operation will be a combination surge and storage facility. A larger amount of grain will be stored when the river is not open to navigation. The average navigation season runs from 10 March to 10 December. Fronings, Inc. expects to be handling 24 million bushels of grain/year. This would require an average of approximately 77 trucks/day to handle this amount of grain (310 days/year). The daily number of trucks would be much less during the winter months and higher during the navigation season. By 1980 Fronings expect to be shipping 39 million bushels of grain/year. This would require an average of 126 trucks/day.

4.023 Most Winona residents are still unfamiliar with long lines of grain trucks and it may be difficult for them to imagine lines over a mile long. They should recognize, however, that in the Twin Cities grain trucks often wait in line for 6 or 8 hours, and lines are frequently 2 miles long.

4.024 The railroad crossing at Pelzer Street creates a traffic hazard because it is frequently blocked by freight trains. Because there is no overpass, traffic is frequently stopped for 10 minutes or more. During the

peak trucking season, such a tie-up could back up the combined truck traffic of Fronings, GTA and Victoria elevators as far as Highway 61. Train derailments could cause even longer lines.

4.025 St. Mary's hill on Highway 14 is a relatively dangerous area because of the high volume of vehicular and pedestrian traffic in the area. It will become increasingly dangerous unless trucks use the I-90, Highway 43 route.

4.026 In 1973, Galvin and Taus investigated airborne particulate levels in the city of Winona and reported that their readings exceeded the State of Minnesota's unsatisfactory rating 31 percent of the time. See exhibit 10, page A-33. As part of the present study, air particulates were monitored with a high volume vacuum sampling unit utilizing a weighed cellulose filter with a 3.4 to 5.0 micron pore size. The sampler was placed at the residential intersection of Stone and 2nd Streets, about one block from the Municipal Dock and Victoria Elevator. Readings were taken during July and August 1974 (see exhibit 9, page A-32) and all readings exceeded the Minnesota Pollution Control Agency standard of unsatisfactory (75 ug/m^3).

4.027 The source of the particulates was not determined but it is evident that air quality in the area is already marginal. There is mounting evidence that construction activity in the vicinity of the air quality monitor may have caused the high number of violations that occurred in the past. The MPCA has placed an additional monitor in the Winona area and will continue to monitor air quality at both sites.

FARMERS UNION GRAIN TERMINAL ASSOCIATION: GRAIN ELEVATORS AND SHIPPING FACILITY

4.028 This project is described in paragraph 1.023 and is now in operation. Although the project is outside of Winona's flood protection system, the existing elevation provides for protection from the 100-year flood. The project is consistent with floodplain regulations for this location on the Mississippi River.

4.029 Statements made concerning the impacts of the Fronings project are also true of the GTA project, although to a lesser degree.

WINONA FLEETING CO.: 15-BARGE FLEETING AREA IN CROOKED SLOUGH

4.030 As indicated previously (paragraph 1.025), the 15-barge fleeting area already exists, the dredging having been done to provide the fill for the Pelzer Street extension.

4.031 The fleeting area is used extensively at the present time and it is very convenient for shippers of all commodities to and from the Crooked Slough harbor. The project has increased the worth of the city-owned commercial dock and it has probably also increased the value of the surrounding land.

4.032 The fleeting area relieves congestion along the main channel of the river and it also reduces the number of trees that are girdled or uprooted by barges which are often tied to them.

4.033 Fears have been expressed that it is dangerous to have a fleeting area upstream from a bridge. The fears seem to be groundless in this case because there is little likelihood of barges drifting out of the slack water fleeting area.

4.034 Construction of the fleeting area has resulted in deeper water (figure 22) and more space for aquatic life. Deepening of the area has not resulted in marked thermal stratification and the subsequent creation of an anaerobic hypolimnion. At depths of over 40 feet, however, dissolved oxygen levels drop below 4 ppm during late summer.

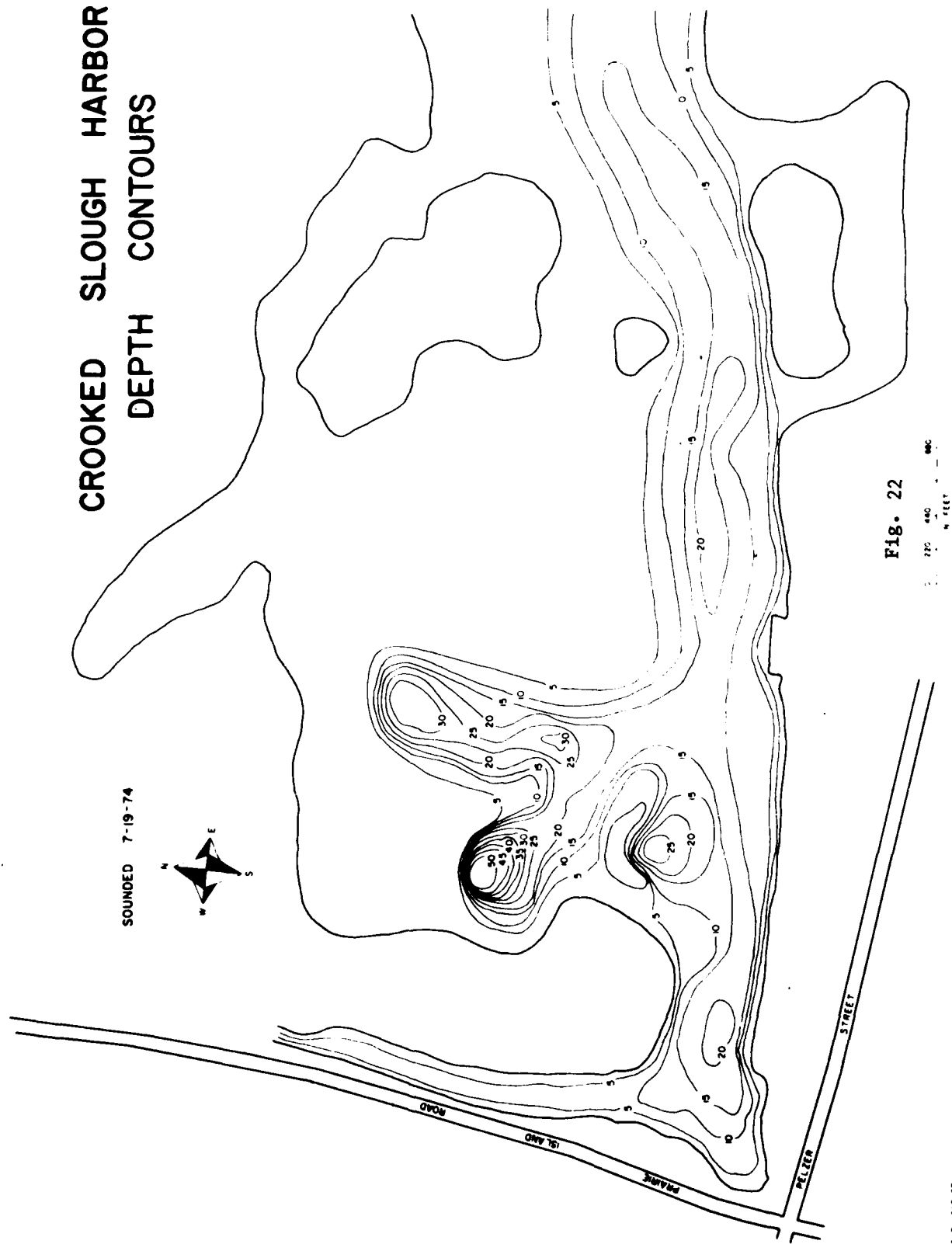
4.035 The fleeting area is not large enough to accommodate the increased barge traffic which will result from the Fronings and GTA projects. Furthermore, if the area is expanded by dredging, there will be no place to deposit the dredged material. The entrance to the fleeting area is presently too narrow to accommodate a large tow. It will probably be necessary to widen the entrance if additional fleeting is done. Under present conditions, it is doubtful that a large tow of grain barges could be assembled in Crooked Slough and then negotiate the sharp turn necessary to pass through the interstate bridge.

CITY OF WINONA: BELT LINE TRUCK ROUTE

4.036 In former years, grain trucks had to pass Paul Giel Athletic Field and Jefferson Grade School to reach the grain elevator area on Crooked Slough. The streets which bounded the athletic field and school were hazardous areas because of the large number of children playing there. During peak periods of truck traffic, tie-ups occurred frequently when grain trucks tried to thread their way through cars and pedestrians during athletic events. Trucks from Madison Silo Company and Cenex also used this route. Fortunately, no serious accidents have occurred in the areas mentioned. The Pelzer Street extension has effectively routed trucks around this problem area. The completed project promises to divert truck traffic from most residential areas and out of most of the business district. It should relieve much of the present truck traffic on Gilmore, Sarnia and Main Streets.

4.037 The Pelzer Street extension has provided easy access to Prairie Island Park for campers, tourists, fishermen and duck hunters. The road is very scenic as it sweeps along the edge of the Crooked Slough marsh.

CROOKED SLOUGH HARBOR DEPTH CONTOURS



4.038 When the Belt Line Truck Route is completed, drivers may find it more convenient to reach downtown shopping areas from Highway 14 by driving down the Belt Line Route than to use Kraemer Drive and Broadway. The completed project would provide a direct route to Wisconsin for trucks owned by the Winona Aggregate Co. The aggregate trucks presently pass through much of residential Goodview and Winona to reach the interstate bridge. Employees of Warner and Swasey and other firms at the Airport Industrial Park would be able to use the beltline route, thus bypassing residential Goodview. The project would make it possible for Winona to become a major grain terminal; and it would facilitate the movement of grain from Wisconsin where Farmers Union Grain Terminal Association apparently plans to buy much of its grain.

4.039 Truck traffic would necessarily be increased along the residential segment of Pelzer Street. Residents may find the combined Victoria, GTA, Fronings traffic to be unbearable. As stated previously, the Pelzer Street railroad crossing promises to be a constant source of aggravation because there is no overpass.

4.040 Truck traffic may also be a problem along Second Street. This street, which has been designated as part of the belt-line route, lies between Levee Park and Levee Plaza, both of which bear heavy pedestrian traffic. Furthermore, pedestrian traffic would probably increase markedly in the area when Levee Park is beautified as part of the Stage II Permanent Dike project.

CITY OF WINONA: EXTENSION OF CITY DOCK IN CROOKED SLOUGH

4.041 The present city dock will accomodate only one barge at a time. Extension of the dock would make it possible to tie up two barges, one waiting and one loading. This would speed loading operations and it would reduce congestion in the harbor.

4.042 The project should not produce any significant adverse impacts. As indicated in paragraph 1.030, no action on this project has been taken to date.

CITY OF WINONA: STORM SEWER DIVERSION AT PELZER STREET

4.043 The diversion, which has already been accomplished (see paragraph 1.032 and figure No. 8A), prevents storm sewer water from draining directly onto land owned by the U.S. Fish and Wildlife Service (FWS). Stormwater runoff can carry quantities of deicing salts, oil, and other street refuse. Therefore, the potential for degradation of the marsh still exists. Although the stormwater outlet was diverted from FWS land, it still drains into a contiguous wetland.

WINONA PORT AUTHORITY: 24-BARGE FLEETING AREA AND BARGE CLEANOUT FACILITY
NEAR RIVERBEND

4.044 Two grain terminals are presently in operation at the Crooked Slough Harbor and it is possible that the much larger Fronings project will be started within the next year.

4.045 In January of 1975, the Winona City Engineer completed a feasibility study for the Port Authority, to assess the need for fleeting spaces at the port of Winona. It was determined that Winona will need fleeting space for a total of 60 barges in the next 5 years.

4.046 The Crooked Slough Harbor, in its present state, is not adequate for staging large tows. The channel is too narrow for large tows to negotiate the sharp turn necessary to get through the interstate bridge and the Chicago and Northwestern Railroad Bridge. Presently, tows are often assembled along the Minnesota bank of the main channel between the two railroad bridges. Barges are also presently tied to trees along the river bank downstream from the Peerless Chain Company. This has killed and uprooted trees and caused severe bank erosion along that section. If Winona is to become a major grain terminal, it is obvious that additional fleeting area must be provided.

4.047 The proposed 24-barge fleeting area (see paragraph 1.034 and figure 9) would relieve some of the congestion which is sure to develop. The area would promote industrial growth in the city and it would produce revenue for the Winona Port Authority. It could also precipitate the development of additional commercial docks on the east end of the city.

4.048 The creation of the fleeting area would require the dredging of 730,000 cubic yards of sand from the floodway of the river. The sand, in this case, would be pumped into the Riverbend Industrial Park where it would be used to create additional industrial building sites.

4.049 The removal of sand would have some beneficial effects on the river, because sand accumulation in the river is a major environmental problem.

4.050 Even though the project site has been degraded by the deposition of dredged material, it still provides good habitat for wildlife. The construction of the project would result in a permanent loss of 16 acres of bottomland hardwoods and marsh. If the project is constructed, the value of the area as a habitat for waterfowl, furbearers, deer, cottontail rabbits, and songbirds would be eliminated. There would be a loss in existing populations of reptiles and amphibians inhabiting the project site. The area is probably a spawning site for northern pike and other species of fish during periods of high water. All value as fish spawning habitat would be lost if the project is constructed.

4.051 The proposed project site would easily be accessible to barges because it is located along the edge of the main channel. It should be easy to move barges and pull tows in and out of the area.

4.052 The fill which would be pumped from the fleeting area into River-bend would reduce the cost of building sites because the cost of the sites could be written off on two projects.

4.053 The project would provide an area where boaters could observe the fleeting activities of tow boats and barges. Many people enjoy this type of activity. The fleeting area would be located downstream from bridges. There would be less chance, therefore, of runaway barges drifting into bridges and causing damage. Fleeting activities could cause occasional congestion in the main channel as barges are moved in and out of the area. It is unlikely that the dredged area would require maintenance dredging because the entrance is on the downstream end of the fleeting area. The need for electrical power would easily be met due to the close proximity of lines reaching the sewage treatment plant. The location is ideally suited for a barge clean-out facility. The access to sewer lines has been a problem at other locations.

4.054 The principal disadvantage of this site for a fleeting area is its remoteness from the grain terminal area. The 7-mile round trip distance from the terminal to the fleeting area would be wasteful of time, energy and money.

CITY OF WINONA, WINONA COUNTY AND STATE OF MINNESOTA: ENCLOSING OF COUNTY DITCH NO. 3

4.055 County Ditch No. 3 has been an eyesore and a source of public complaint for many years. Enclosing the ditch and channelizing it would make the area much more attractive and easier to clean. The area to be enclosed would provide park area or parking space for the residents of Thurley Homes.

4.056 The diversion structure to be placed at Boller Lake would enable Gilmore Creek to be diverted around Boller Lake so that the water level of Boller Lake could be controlled. This would allow Boller Lake to be lowered during the winter to freeze the lake out, thus killing carp if they again become a problem in the lake. Because water levels could be raised in the spring, Boller Lake would be improved as a spawning ground for northern pike.

4.057 The concrete channel which would run from Junction Street to the St. Teresa campus would provide an excellent site for the installation of an efficient carp trap. A trap is presently being designed for the site as part of the Lake Winona reclamation project.

WINONA PORT AUTHORITY: RIVERBEND INDUSTRIAL PARK - PHASE II

4.058 The area which has been designated to receive fill from the 24-barge, fleeting area was cleared of trees in the spring of 1974 (see figure 9). Saleable logs were removed, and all slash was burned during the summer of 1974. A contract was let for stump removal during the fall of 1974.

4.059 Analysis of stumps and suckers shows that, prior to clearing, the area contained mature American elm, silver maple, sandbar willow and cottonwood. At ankle height, many of the trees average 12 to 24 inches in diameter. There appeared to have been very little ground vegetation. The area was not a prime habitat for wildlife. Mature stands of floodplain trees usually have a low carrying capacity for wildlife.

4.060 A very small isolated acreage of wetland exists in the phase II portion of the industrial park. This area has been subjected to periodic flooding during the spring runoff.

4.061 The area would provide a beneficial use for dredge material removed from the proposed fleeting area. Industry located there would be protected by the proposed Stage II dike system. The industry would provide employment and it would increase the tax base of Winona. It would result in increased commercial volume throughout the city. The project would also provide an incentive for industry to move from the city core to a planned, regulated area which is not residential. Concentration of industry in Riverbend would help reduce all types of pollution within the business and residential sections of the city (e.g. truck traffic, noise, odor, etc.).

4.062 It is unlikely that there will be a significant amount of shuttling of trucks from Riverbend to the Airport Industrial Park because the industries have little in common.

4.063 The proposed alignment of the Corps levee around Riverbend has been modified (figure 4, page 7). The new proposed alignment would result in the preservation of 40.6 acres of type I and III wetlands. On the other hand, this means a reduction of 40.6 acres of potential industrial development within Riverbend Industrial Park. The original proposal was to have a roadway (Bundy Boulevard) utilizing the top of the dike as a connecting link between Highway 61 and Riverbend. Because the proposed alignment was modified the city may have to pursue other alternatives for connecting Highway 61 with Riverbend.

MISSISSIPPI DEVELOPMENT CONSORTIUM: INDUSTRIAL PARK

4.064 This project would provide an area for industrial expansion within Goodview and to a lesser extent within Winona. Industry attracted to the area would provide employment and it would broaden the tax base of both municipalities, especially Goodview. The project is very close to the municipal airport, rail lines and to Pelzer Street. A portion of the filling necessary for the project has already been completed.

4.065 The proposed project would facilitate the completion of Theurer Boulevard by providing fill. This, in turn, would relieve the traffic congestion which presently occurs at the railroad crossing during every shift change at Airport Industrial Park. With the completion of Theurer Drive, east-bound workers would be able to avoid the railroad crossing and drive along Theurer Boulevard to Pelzer Street and along the belt line route to downtown Winona or to the east end. This may also relieve congestion on 5th and 6th streets during rush hours.

4.066 Part of the fill for the project has been dredged from an existing sandpit. (See figure 10, page 24). An unquantified amount of fill would be dredged from an adjacent marsh. This would result in the loss of a marsh that is a composite of type I, III and IV wetlands. Phase II, Goodview, and phase III, Winona, include wetlands. The marsh provides food and habitat for waterfowl and supports a large number of aquatic furbearers, primarily muskrats. This marsh and the surrounding area has in the past received moderate to heavy recreational use by hunters and trappers. This type of recreation would be reduced when the project is completed.

4.067 As a result of dredging, an artificial lake is being created. This lake could provide improved fishery habitat. If the lake were open to the public, there would be increased recreational benefits.

IMPACTS OF THE PROPOSED PROJECTS ON THREATENED OR ENDANGERED SPECIES

4.068 The Winona flood control project and the other projects discussed in this EIS would not affect any threatened or endangered species.

SYNERGISTIC EFFECTS OF ALL PROJECTS

4.069 One combined effect of all projects would obviously be an increased commercial volume throughout the trade area. The projects would increase employment and the tax base of the city. Most of the projects are designed to facilitate the movement of industry out of downtown and residential areas and to reduce congestion. The projects have been well planned and considerable foresight has been used by planners to insure an orderly, regulated growth of the city. However, the increased industry would inevitably cause increased population and the resultant loss of Winona's small town image. Increased crowding of recreational facilities, beaches, fishing areas and hunting areas would result. The quality of the recreational experience would be substantially diminished. Increased population would require more police and fire protection and all other city services. Traffic problems, which are already severe at several critical railroad crossings would be intensified.

4.070 Increased industrial expansion, particularly in riparian locations would result in increased demands upon fishery and wildlife habitat. These bottomlands and open spaces are not intensively used for recreational purposes so many people would be apathetic concerning this loss. The cumulative effect would be a net loss of wetlands and open spaces which are a finite resource.

4.071 The increases in river oriented industry, primarily grain terminals would add to the amount of barge traffic on the Mississippi River. The increase in barge traffic on the river could create some conflicts with recreational uses of the river. A major increase in barge traffic could cause accelerated shoreline erosion necessitating more channel maintenance.

4.072 The floodway of the Mississippi River at Winona is constricted at several points. The first major constriction occurs at the spillway and water control structures of Lock and Dam 5A (see figure 2). Here the entire flow of the river must pass through the Prairie Island concrete spillway or through the water control structures of the dam proper. The total width of these two openings is less than .4 mile. The remainder of the dike that runs from Prairie Island to Lock 5A is sandbagged in time of flood so that flood waters cannot overtop the earthen dike and wash it out.

4.073 A second major constriction occurs at the interstate highway bridges for Minnesota Highway 43 and Wisconsin Highway 54 where the entire river must flow through two channels whose total width is less than 0.5 mile. The third, and most serious constriction occurs at mile 724 where the Burlington Northern Railroad and the Winona Dike system form a funnel, the apex of which is less than 0.6 mile wide. The river is further constricted in that area by the Green Bay and Western Railroad bridges which constrict the river to a total width of less than 0.5 mile. The Prairie Island dike was extended outward into the floodplain after the 1965 flood to inclose the homes on Prairie Island which had been flooded, further constricting the floodway.

4.074 While none of the projects promises to significantly constrict the already severely constricted floodway at Winona, even a small encroachment could be critical at some points. Widening the permanent dike for belt line route would constrict the river about 24 feet in the area just west of the interstate bridge. It is worth noting that the city of Winona is working with the railroad to determine if Pelzer Street can be widened on the land side of the dike rather than the river. If Pelzer Street can be constructed by widening on the land side, the river would not be further constricted by this project.

SYNERGISTIC IMPACTS ON AIR QUALITY

4.075 The construction of the projects discussed in this impact statement would all add varying amounts of particulate matter to the air during the time required for construction. This impact upon ambient air quality is common to constructions projects where soil has to be moved. This impact is considered to be short-term and its effects should be limited to the period of time required for construction.

4.076 The normal operation of a grain terminal adds particulate matter to the air. Because grain elevators are in operation throughout the year their emissions of particulate matter will be considered long-term.

4.077 At the present time there are two grain elevators in operation at Crooked Slough Harbor and a third is proposed. Victoria Elevator (now GARNAC), GTA, and the proposed Fronings elevator will be considered in assessing the impact of grain elevators on the air quality of Winona. GTA is in compliance with Federal regulations for emission controls with the exception of the barge load-out (the state of the art for controlling barge loading emissions has not been perfected). GARNAC is not in compliance with Federal regulations for emission controls. The MPCA has informed them of this and will probably be taking measures to insure that the emission standards are met, using the best available technology. For the purposes of estimating the particulate emissions, it will be assumed that the best available technology is being used.

4.078 The shipping or receiving of grain (truck receiving and barge load-out) without emission controls will each add 1 pound of particulate matter to the air for every ton of grain handled. The transferring and conveying of grain will add 2 pounds of particulates for every ton of grain handled.⁽¹⁾ Varying quantities of grain will be screened, cleaned, and dried at these elevators. Since there are no reliable data to estimate the amount of grain processed in this manner, the particulate emissions from these processes will not be estimated. The truck receiving, barge loadout, and conveying will add a combined total of 4 pounds of particulates for every ton of grain handled. If the best available technology for emission control is used, we will assume a 99 percent effective reduction in the level of particulate emissions.

4.079 The average bushel of grain (corn) weighs approximately 56 pounds. At 56 pounds per bushel there are 35.7 bushels per ton.

4.080 In 1975, the GTA elevator at Winona, shipped 4,425,000 bushels of grain (123,949 tons). This amount of grain at 4 pounds per ton will add 495,798 pounds of particulates (247.9 tons) to the air. Assuming 99 percent effective emission controls there were 2.5 tons of particulate matter added to the air by the GTA elevator in 1975.

4.081 GTA has projected a grain shipment of 5 million bushels from their Winona elevator in 1980. This amount of grain will weigh 140,056 tons. This amount of grain would add 560,224 pounds of particulates (280 tons) to the air in 1980. With 99 percent effective emission controls this amount of grain would add 2.8 tons of particulate matter to the air in 1980.

4.082 In their first year of operation, Fronings expects to be shipping 24 million bushels of grain per year (672,268.9 tons of grain). This amount of grain would add 2,689,075 pounds (1,344.5 tons) of particulates per year to the air. With 99 percent effective emission controls there will be 13.4 tons of particulates added per year. By 1980, Fronings expects to be shipping 39 million bushels of grain per year. This amount of grain would weigh 1,092,436.9 tons. This amount of grain would add 4,369,747.8 pounds of particulates to the air (2,184.8 tons). With 99 percent effective emission controls this will add 21.8 tons of particulates to the air in 1980.

(1) Compilation of Air Pollutant Emission Factors, U.S. Environmental Protection Agency, AP-42.

4.083 Victoria elevator (now GARNAC) shipped approximately 19 million bushels of grain from their Winona elevator in 1973. This amount of grain weighed 532,212.8 tons. This tonnage of grain would add approximately 2,128,851 pounds of particulates to the air (1,064 tons). With 99 percent effective emission controls this amount of grain would have added 10.64 tons of particulate matter to the air in 1973. In 1974, 19 million bushels of grain were shipped from their Winona terminal. The level of particulate emissions was probably of similar magnitude of that in 1973. In 1975, GARNAC shipped 8 million bushels of grain (224,089.6 tons). This tonnage of grain added 896,358 pounds of particulates (448.1 tons). With 99 percent effective emission controls this amount of grain would add 4.48 tons of particulate matter to the air in 1975.

4.084 The combined emissions in 1975 from the GTA and GARNAC elevators were approximately 6.98 tons of particulate matter (with 99 percent emission controls). It should be noted that GARNAC (formerly Victoria) shipped less than half of the volume of grain that was shipped from the same elevator in the two previous years.

4.085 Future projections for grain handling are not available for the GARNAC elevator and shipping facility at Winona. It will be assumed that their maximum handling capacity is of similar volume as handled in 1973 and 1974. As stated above, this volume of grain (19 million bushel) would contribute approximately 10.64 tons of particulate matter. This volume of particulates combined with the 1980 projected emissions for GTA (2.8 tons) and the proposed Fronings Project (21.8 tons) will contribute 35.2 tons of particulate matter to the ambient air in 1980 (assuming 99 percent effective emission controls).

4.086 The Farmers Union Grain Terminal (GTA) is located approximately 3,700 feet (straight line distance) from the MPCA air sampler at 2nd and Olmsted Street. Whether or not the particulate emissions from the grain elevators are reflected in the recorded data is largely dependent on wind direction.

4.087 In a study by Schwer and Russell (1972), airborne particulate matter exceeded the MPCA standards on four occasions during the 3-month study. During the sampling 44 percent of the airborne particulates originated in the study area (city of Winona).

4.088 In general, the Winona area is not heavily populated nor industrialized; however, road construction activity and modifications of a malting plant, both in the vicinity of the MPCA monitor, probably contributed to the number of air quality violations recorded during 1973 through 1975. (1) The operation of grain terminals with proper emission controls should not impair Winona's ambient air quality.

4.089 Although the truck traffic generated by the operation of the grain terminals will contribute some particulates, an estimate of the added particulates was not made. The beltline truck route will be blacktopped so the amount of dust raised by the trucks will be controlled to a large degree and truck emissions would not be considered significant when contrasted to point sources such as the grain terminals.

(1) Mr. Robert Bollant, City Engineer, Winona, Minnesota

4.090 Additional coordination has been accomplished with the Environmental Protection Agency (EPA) concerning the potential impact of Fronings grain terminal on Winona's air quality. Copies of the letters of coordination are contained in exhibits 14-18.

SYNERGISTIC IMPACTS ON WATER QUALITY

4.091 The proposed flood control project, the 24-barge fleeting area and associated filling of Riverbend Phase II, and Fronings, Inc., grain elevator would all require dredging from the Mississippi River. The dredging would cause temporary increases in turbidity. Each project that requires dredging would be subject to State regulations for increases in turbidity. Turbidity caused by dredging is considered a short-term impact and should have no lasting effects (see exhibit 6, page A-13, excerpts from applicable State regulations, and exhibit 5, page A-12, existing water quality).

5. ADVERSE ENVIRONMENTAL IMPACTS WHICH CANNOT BE AVOIDED

CORPS OF ENGINEERS: STAGE II FLOOD CONTROL PROJECT

5.001 The permanent dike of Stage II of the flood control project is planned for construction through an area which is partially wetland. The portion of the marsh which is scheduled to be enclosed by the dike would be filled in and used for the planned industrial park.

5.002 The completion of the permanent dike would produce adverse aesthetic impacts which cannot be avoided. Because of the height of the dike, the view of the river from most parts of the city would be restricted. Conversely, the view of the city from the river would be marred by the presence of the dike. Also of concern is the appearance of riprap which is to be placed along much of the main channel section of the river front.

FRONINGS INC.: GRAIN STORAGE BINS AND SHIPPING FACILITY

5.003 The construction of the proposed Fronings, Inc., grain bins and shipping facility would contribute to four kinds of adverse environmental impacts involving floodplain encroachment, increased truck traffic in Winona, barge traffic, and increased particulate emissions.

5.004 The proposed project would displace about 8 acres of water and floodplain forest.

5.005 Grain is to be transported to the storage bins by truck, normally via the recently completed Pelzer Street addition. The construction of the Fronings project is expected to result in a substantial increase in truck traffic on Pelzer Street. While investigating this project, estimates have been made of the possible increase in the volume of grain truck traffic. Presently, with only one elevator operating, trucks are waiting in lines 1/2 mile or so long. Theoretically, with three elevators in operation, the line lengths could at least double. Traffic problems could be further compounded each time a train on the Milwaukee Railroad blocks traffic as it crosses Pelzer Street. With no viaduct over the railroad, traffic might easily back up as far as Highway 14-61.

5.006 Increased road use also increases the potential for accidents. Saint Mary's hill and the area of Pelzer Street between Hwy. 14-61 to 5th Street are two areas in which an increase in the number of traffic accidents may be expected. The intersection at Kraemer Drive could become particularly dangerous as cars attempt to cross Pelzer Street to enter the J.C. Penney parking lot. High density housing in the area (Thurley Homes) also increases the probability of accidents involving pedestrians. Street and road maintenance costs would increase with an increase in truck traffic.

5.007 The increased volume of truck traffic and grain handling could contribute to increased noise and the amount of grain dust in the air. As indicated previously air quality tests (exhibits 9 and 10) indicate that the present levels of particulate matter in the air already exceed the State standards for clean air. However, the present requirements for emission control measures should minimize the impact on Winona's air quality.

5.008 Construction of Fronings project would result in increased congestion of boats and barges in the Crooked Slough harbor area. This factor would probably prove most objectionable to users of the area for recreational purposes, i.e., boating and fishing. The addition of barges plying their way to and from Fronings dock would contribute to an overall increase in barge traffic on the river, cause additional congestion at locks and dams, and contribute to the accident potential on the river.

5.009 Depending on the degree of increase in barge traffic, congestion may provide sufficient justification for the construction of additional barge fleeting areas. At the present time, Crooked Slough is not large enough to accommodate a substantial increase in barge traffic.

FARMERS UNION GRAIN TERMINAL ASSOCIATION: GRAIN ELEVATORS AND SHIPPING FACILITY

5.010 Inasmuch as the purpose and general operation of this facility is similar to that of the proposed Fronings elevator, (described above) it can be assumed that essentially the same adverse environmental impacts can be associated with both the GTA and Fronings project but on a smaller scale.

WINONA FLEETING CO.: 15-BARGE FLEETING AREA IN CROOKED SLOUGH

5.011 There are few adverse environmental impacts associated with the 15-barge fleeting area except for possible inconvenience to an occasional recreational boater or fisherman.

5.012 This site is used as a feeding and resting area by waterfowl (primarily diving ducks) during the spring migration. Undoubtedly the presence and increased activity of a large number of barges would reduce this use considerably.

CITY OF WINONA: BELT LINE TRUCK ROUTE

5.013 The widening of the permanent dike for the Belt Line Truck Route, as currently proposed, would constrict the river about 24 feet in the area just west of the interstate bridge. Truck traffic may prove to be a problem along Second Street as indicated in section 4. The increase in truck traffic along the residential segment of Pelzer Street (also discussed in section 4) may increase to the degree that present land uses may change in the future. The present residents may find the increase in traffic intolerable and choose to live elsewhere.

CITY OF WINONA: EXTENSION OF CITY DOCK INTO CROOKED SLOUGH

5.014 There are no significant unavoidable adverse environmental impacts associated with this project.

WINONA PORT AUTHORITY: 24-BARGE FLEETING AREA NEAR RIVERBEND

5.015 Utilization of the river in this manner may be considered aesthetically displeasing to some. The presence of a barge fleeting area would attract commercial river traffic and also contribute to congestion on the river. The development would also increase the risk of accidental spills and discharges from barge cleaning operations. The construction of this project would result in the loss of 16 acres of fishery and wildlife habitat.

CITY OF WINONA, WINONA COUNTY AND STATE OF MINNESOTA: ENCLOSING OF COUNTY DITCH NO. 3

5.016 There are no significant adverse environmental impacts associated with this project.

WINONA PORT AUTHORITY: RIVERBEND INDUSTRIAL PARK - PHASE II

5.017 The area designated to receive fill has already been cleared with the loss of mature American elm, silver maple, sandbar willow and cottonwood trees. Although the area was not considered prime habitat for wildlife it nonetheless represents some loss of habitat.

MISSISSIPPI DEVELOPMENT CONSORTIUM: INDUSTRIAL PARK

5.018 The preparation for the development of this project has led to the clearing of the floodplain forest which formerly covered the land. Dredging has begun to fill low areas of former marshland. If the project is completed, presumably most of the original forest and marsh on the property will have been destroyed.

SYNERGISTIC ADVERSE IMPACTS OF ALL PROJECTS

5.019 The combined adverse impacts of all the projects would lean primarily to problems related to increased population and associated congestion.

5.020 Of great concern to many Winonans is the possibility of losing the small town image. When discussing the future development of Winona, many residents state quite frankly that they are opposed to any large scale industrial development in the city. Such development would attract many people and may eventually alter the relatively quiet and peaceful life of the small city. The present high quality recreational advantages may be decreased. Traffic volume, noise and exhaust fumes would increase throughout the city.

5.021 The projects dealing with the waterfront, including the dike itself, would encroach upon the floodplain, thereby constricting the floodway and slightly reducing its flood carrying capacity.

6. ALTERNATIVES TO THE PROPOSED ACTIONS

INTRODUCTION

6.001 The purpose of this chapter is to discuss alternatives to the actions described in previous chapters. It should be noted that a number of the projects discussed have been completed, are presently under construction, or are locked into a planned commitment so as to preclude a probability of change. (This does not include the Corps flood control project or projects requiring a Department of the Army permit). The Corps of Engineers can not alter an applicants proposal but can affect it by ruling on the application which is subject to public comment.

CORPS OF ENGINEERS: PHASE II FLOOD CONTROL PROJECT

GENERAL

6.002 Various alternatives to the proposed plan have been studied prior to final formulation of the selected plan. The basic objective of the studies was to formulate a plan which would best meet the identifiable present and foreseeable future needs of the people of Winona while still being consistent with the best use or combination of uses of the water and related land resources of the area. An equally basic objective is to consider all project effects, favorable and unfavorable, as well as tangible and intangible. The plan formulated will generally conform to the guidelines determined by national economic efficiency while giving full consideration to the localized needs of the Winona area and the environment. To meet these objectives, the following principles guided the project formulation analyses:

- a. The goods and services produced by a water resource project have value only to the extent of the need and demand for a product.
- b. The overall plan should consider the expanding needs of the people and provide for a sound management and development program to meet these needs with the least investment cost in resources and funds.
- c. The scale of project development will provide, where practicable, a maximum excess of benefits over costs.
- d. The program of development should be devised as an integral element of an overall plan of water and related land resource management and development for the Upper Mississippi River basin.

6.003 The following paragraphs briefly summarize the project formulation procedure including comparison of available alternatives, selection of a plan of improvement, and determination of the scale of development(1) The economic data in this section is based on 1970 figures.

FLOOD DAMAGE REDUCTION ALTERNATIVES

6.004 All of the various means of reducing or preventing flood damages can be grouped into two broad categories, nonstructural and structural. The nonstructural measures considered include flood warning systems, floodplain evacuation, flood proofing of existing buildings and future construction, and regulation of floodplain land use and development. The discussion of nonstructural alternatives in the following paragraphs is limited to that portion of the remaining floodplain at Winona outside of the authorized project limits. The area considered is shown as reaches 1, 3 and 4 on figure 23. Reach 2, which encompasses the area affected by the authorized project, is densely developed and includes over 2,500 residences, 34 businesses, a State college, and the many utilities and improvements existing in a well-developed community. Clearly such measures as flood proofing and evacuation are both economically impractical and socially unacceptable for reach 2 as these measures would affect over 50 percent of the developed land area of the city. Flood proofing would involve costly structural changes to some of the newer, high-value homes and businesses in the community, and evacuation would involve relocating the affected homes to an area several miles from the city limits of Winona. Also, reach 2 is already partially protected by the completed upstream portion of the authorized project, which constitutes a major portion of the structural work needed to protect this area.

NONSTRUCTURAL ALTERNATIVES CONSIDERED

6.005 A no action alternative would utilize the Phase I of the completed dike system and the temporary dike as it is presently. Such an alternative would leave the city open to flood threat from approximately half of the total dike system. If part of the eastern temporary dike failed, the entire city of Winona would be threatened and the effort and monies expended for Phase I of the dike system would be of little value relative to protecting the city of Winona during high level spring floods. Also, it is costly to depend upon the temporary dike during threat of high flood due to the manpower and mobilization of resources necessary to ensure the protection of the city of Winona.

(1) Further information may be found in the Interim Survey Report for Flood Control, Mississippi River at Winona, Minnesota, 6 February 1970, U.S. Army Corps of Engineers, on file in the St. Paul District office.





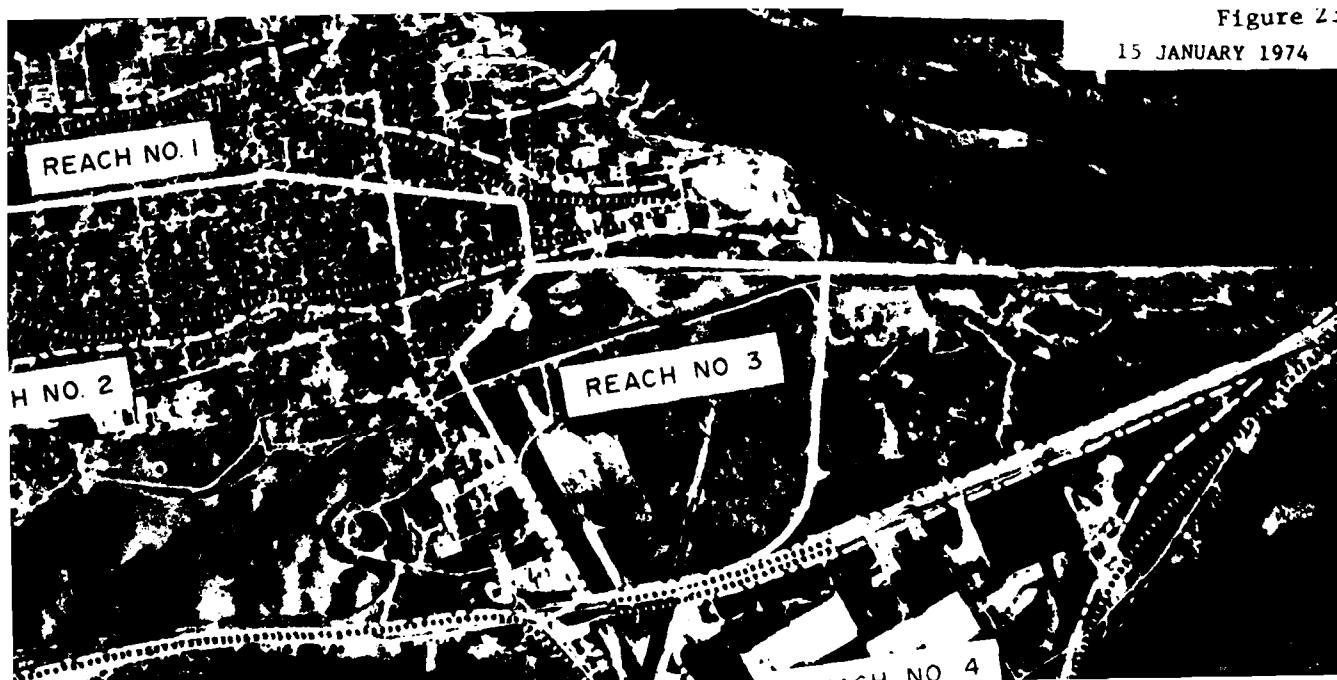
1

2

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Figure 23

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6.006 The flood forecasting and flood warning system available for the Upper Mississippi River basin through the U.S. Weather Bureau and the St. Paul District, Corps of Engineers, proved to be very effective at Winona in reducing the hazard to life and property from the recent flood of 1965, 1967, and 1969. These accurate and timely flood forecasts and warnings could be expected to continue to reduce the flood hazard to life and to provide time for protection of valuable property and relocation of movable goods and equipment. However, these measures alone would not provide sufficient flood protection at Winona since numerous fixed improvements including homes, businesses, schools, and transportation facilities would remain subject to damage.

6.007 Rather than precluding floodplain development, sound floodplain regulation shapes floodplain land use and development so as to lessen the damaging effects of floods. Floodplain regulation involves the adoption and use of legal tools by local governmental units, to control the extent and type of future development which will be permitted in the floodplains. This requires public understanding of the general flood problem, degree of risk, and the various means of controlling land use which include:

- a. Providing flood hazard information.
- b. Establishment of open or green spaces.
- c. Urban redevelopment.
- d. Designation of floodways and encroachment lines.
- e. Zoning.
- f. Subdivision regulations.
- g. Building codes.
- h. Bridge construction regulations.
- i. Building financing.
- j. Tax adjustment.
- k. Development policies.

Considering these floodplain regulations alone, expected residual flood damages within the Winona city limits would be very high because of the dense existing urban developments and the likelihood that urban land use would not appreciably change in the foreseeable future. This leads to the conclusion that floodplain regulation alone could not be expected to minimize total flood hazard costs representing the costs of any corrective measures plus residual damages. Furthermore, economic

base studies indicate that zoning to discourage future development and redevelopment in the floodplain at Winona would suppress the economic climate of the city, as contiguous high-ground areas are not available for expansion of the industrial base which the city needs to maintain its economy and assure economic growth. Accordingly, floodplain regulation is considered further in this report as a necessary supplement to, rather than a substitute for, appropriate structural and nonstructural flood protective measures.

6.008 Flood Insurance is currently available to the residents of Winona. Community qualification for flood insurance involves developing technical information involving river flood stage water depths and minimum first floor building elevations. If the proposed permanent dike is completed around the city, flood insurance would no longer be mandatory but would be optional for most areas within the dike. (See exhibit 11, page A-34 for detailed explanation of Winona's participation in the flood insurance program.)

6.009 Permanent evacuation of developed floodplain areas and conversion of land use involves the acquisition of lands by purchase, the removal and relocation of improvements, the evacuation and resettlement of population, and the permanent conversion of lands to less flood damage susceptible land use. Flood proofing, as considered in this report, is a combination of structural changes and adjustments to flood-prone properties for flood damage reduction. The fact that the floodplain in reach 1 at Winona is primarily developed industrially precludes evacuation from being a viable alternative by itself. Most of the industrial complexes in this area cannot, because of their bulk size, be moved practically or economically. Therefore, a combination evacuation-flood proofing plan was evaluated for this reach. Evacuation and flood-proofing costs were based on estimates received from experienced home mover contractors in the area, available costs for fill and utility modifications and estimated costs for flood proofing typical structures in the floodplain. Flood proofing examples range from temporary wooden barricades enforced with sandbags to sophisticated arrangements in which panels would be bolted to preinstalled brackets in door and window openings during emergency situations. A flood proofing cost of \$1 per square foot of ground floor was assumed after analyzing the actual costs of several businesses where this alternative had already been employed. The average ground flood area for an existing industrial development at Winona was estimated to be approximately 10,000 to 15,000 square feet. The long duration of flooding at Winona would preclude effective flood proofing for approximately 50 percent of the existing structures as the flood-softened foundation soils might allow damaging settlement as experienced during the recent floods. Also, the long flood periods and appreciable flood depths would cause seepage through the walls of most structures even with effective sealing of doorways and window openings. This plan would also force the city to relocate its water supply well field at a cost of approximately \$1.5 million.

These costs plus the costs for flood proofing the existing sanitary sewer system are included in table 12. In reach 3, estimated flood proofing costs include costs for fill to raise the existing undeveloped area to a desirable elevation less prone to flooding. For preliminary formulation purposes, a degree of protection which would protect against a flood comparable to the record 1965 flood was assumed.

6.010 Also considered, but not priced, were certain social, institutional and physical limitations inherent with this non-structural alternative. As an example, public opposition is anticipated against a large-scale evacuation plan recommending removal from the city tax base of a large section of residential development in a community where land for further residential development is already at a premium. Institutional problems would also arise since the only vacant flood-free land available for resettlement purposes is located several miles from the city limits, offering no readily available community services such as schools, sewer and water, and police and fire protection. Also, about 50 percent of the homes are either valued less than the cost estimated to move them or are structurally unsound for moving.

STRUCTURAL ALTERNATIVES CONSIDERED

6.011 Based upon the above discussions, the implementation of non-structural measures in reach 1 is not economically feasible. The city requested that the area designated reach 3 be included within the protected area to provide additional area for growth. Because the protection of this area involves land enhancement, the city was required to pay 50 percent of the additional cost for protecting reach 3. On the other hand, nonstructural measures appear to offer a more favorable flood control alternative for reach 4.

6.012 The structural flood damage reduction measures studied included the evaluation of local protection works, channel modifications, existing and potential reservoir storage, and various combinations of these measures. Inasmuch as the existing Corps of Engineers reservoirs located in the headwaters region of the Mississippi River control less than 8 percent of the total drainage area above Winona and are located more than 300 river miles upstream, their operation has little effect on flood peaks at Winona. The possibility of constructing additional reservoirs to store and regulate flood runoff from the Mississippi River basin above Winona was investigated and found not to be a practical solution to the flood problem at Winona. Although numerous upstream reservoir sites have been identified in the Upper Mississippi River Com-

Table 12 - Summary of nonstructural costs and benefits (1969 data)

Reach	Number of houses businesses	Evacuation costs(1)	Purchase costs(2)	Flood proofing costs(3)	Total first costs(4)	Average annual costs(5)	Average annual damages benefits(6)	Benefit-cost ratio
1	508	\$2,500,000	\$2,300,000	\$2,100,000	\$6,900,000	\$339,000	\$548,100	\$290,000 0.9
3	0	0	0	6,000,000	6,000,000	295,000	0	76,800 0.3
4	22	6	0	1,130,000	1,130,000	55,000	18,000	57,000 1.04

(1) Includes real estate resettlement and land improvement costs.

(2) Assuming 50 percent of the houses to be purchased outright in reach 1.

(3) Costs include relocation of well field and flood proofing of sanitary sewer system in reach 1 and fill costs in reaches 3 and 4.

(4) Estimated cost of protecting against the record 1965 flood levels.

(5) 100-year life, 4 7/8-percent interest rate.

(6) Assuming 50 percent of the business damages would be residual due to structural limitations, necessary shutdowns, and debris cleanup costs in reach 1. Land enhancement benefits included for reaches 3 and 4.

prehensive Basin Study as having potential for future development, reservoir control offers no practical or feasible solution to the immediate needs at Winona. Development of a complete system of reservoirs would be required before flood stages at Winona could be reduced to tolerable levels and large reservoir sites are lacking in the basin. Such a long-range solution is not acceptable or practicable when considering the urgency of the problem at Winona.

6.013 The presence of the Chicago, Burlington and Quincy Railroad embankment, which parallels the main channel on the Wisconsin side of the river throughout the reach from above lock and dam No. 5A to below Trempealeau, and the several railroad and highway grades which cross the lowlands between the main channel and the Wisconsin bluffs opposite Winona suggest that appreciable reductions in flood stages at Winona might be obtained by permitting high flows to utilize the overbank flow area now not available. The advantages obtainable through such a diversion of flood flows are limited by the restrictive effect of the high bluffs just above Trempealeau. Preliminary studies have indicated that the peak stages of major floods might be reduced about 0.5 foot at Winona through use of the overbank area but that the costs of effecting the diversion, primarily costs of necessary bridges and rights-of-way, would considerably exceed foreseeable benefits.

6.014 Enlargement of the existing main channel is impracticable as a solution to even small floods, since such an improvement would have to be carried several miles downstream to produce any substantial reduction in flood stages at Winona and would involve the excavation and disposal of several million cubic yards of material. Since the major flood profiles indicate an average slope of 0.7 foot per mile in the Winona area, the slope could be flattened but slightly by channel enlargement and the stage reduction at Winona would not be sufficient to justify the work.

6.015 In view of the above discussion, and based on early estimates, the only practical solution to the flood problem at Winona is local protection works including flood barriers with necessary interior drainage facilities. Consideration of the hydrologic aspects and residual damages which could result from a flood of high magnitude, such as the 1965 flood of record, dictates that a high degree of protection should be sought within economic limits and recognizing intangible benefits. Therefore, as an early guide to screening available structural alternatives, a degree of protection was assumed consistent with that provided by the existing Federal project. The upstream segment of the authorized project was constructed to withstand a design flood of 290,000 cfs which represents a river stage approximately 1 foot higher than experienced during the 1965 flood. A discharge of 290,000 cfs has about an 0.35-percent chance of occurring within any 1 year.

6.016 As part of the project formulation analysis, five alternative flood barrier alignments were evaluated to determine if a feasible and economical structural plan could be developed to reduce the remaining flood hazard at Winona and to provide additional lands for growth. Table 13 provides a summary of the economic data for each plan. The alignments studied and basic assumptions made are presented in the discussions which follow. The alignments considered are shown on figure 24.

a. Plan 1. - This plan consists of upgrading the project originally authorized for the area below Lake Winona, to offer the same degree of protection provided by the existing upstream levee project (stage I). The alignment for this plan would remain essentially as authorized and would afford no protection to the riverfront area designated as reach 1 on figure 23, nor make available additional lands for future growth. Further study has revealed that the authorized stage II alignment would have to be extended to control against high flows from Burns Valley Creek. Consequently, this has resulted in a higher cost estimate than shown in the authorizing document. The benefits obtained in reach 2 have been upgraded to allow for present day conditions.

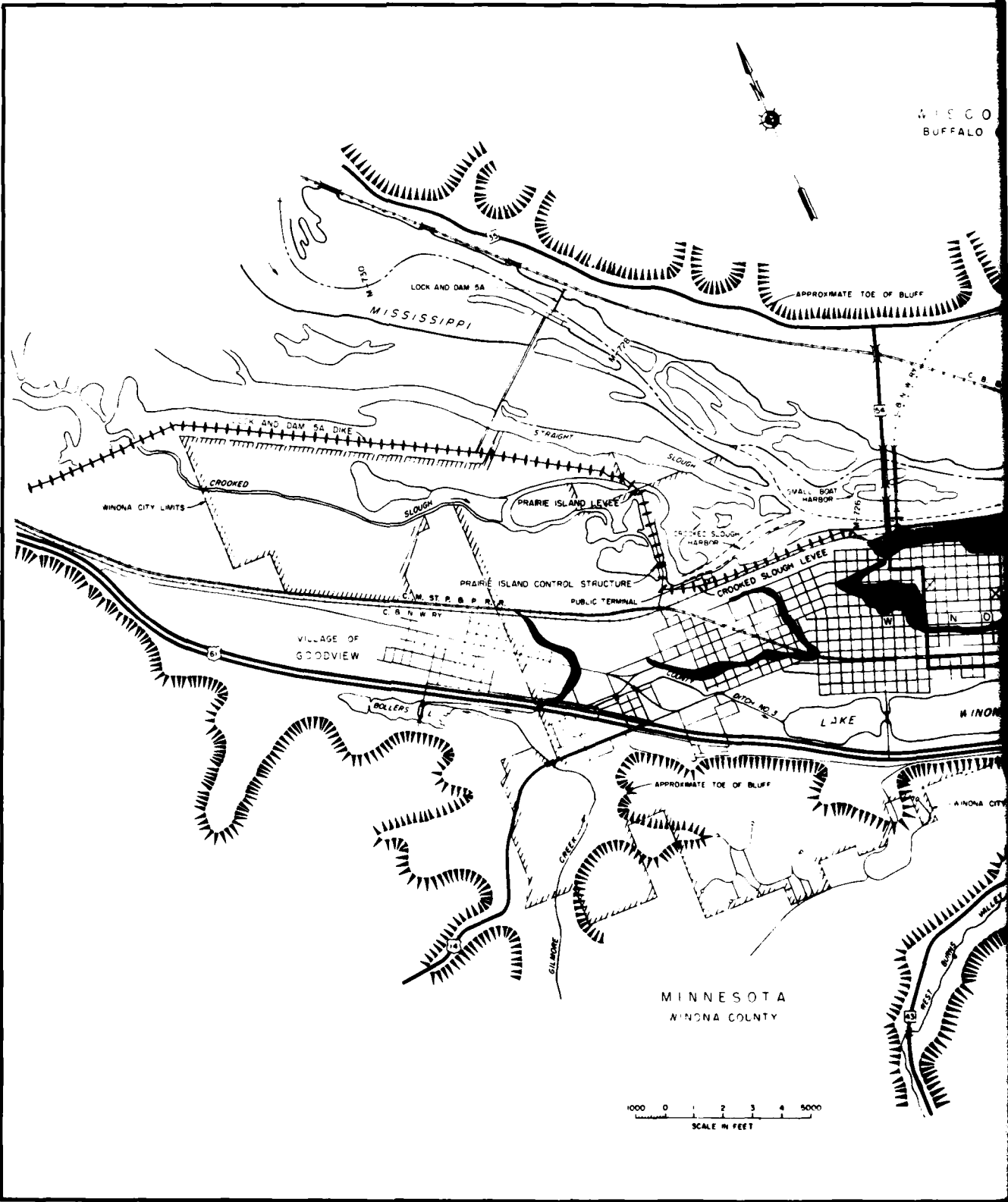
b. Plan 2. - This plan would extend the levee considered in plan 1 upstream along the unprotected Winona riverfront to the stage I levee project limits. As in plan 1, this alternative does not consider additional lands for future growth.

c. Plan 3. - Plan 3 is similar to plan 2 except that the levee alignment below Lake Winona has been moved eastward approximately 4,000 feet to provide protection for a large area of vacant lowland desired by the city for growth opportunities.

d. Plan 4. - The alignment considered in plan 4 extends along the entire riverfront downstream to Homer, providing flood protection for all land south of the Chicago, Milwaukee, St. Paul and Pacific Railroad and extensive temporary ponding areas to control flows from Burns Valley and Pleasant Valley Creeks. Levees to contain both creeks would also be required, greatly increasing project costs.

e. Plan 5. - Plan 5 considers only those structural measures required to protect an additional area of land south of U.S. Highway 61 subject to flooding from high stages of the Mississippi River as well as Burns Valley and Pleasant Valley Creeks. This area, designated as reach 4, would be protected by plan 4 but is considered separable when studied with plans 1, 2, or 3. This area, together with the additional land included within the plan 3 alignment encompasses most of the remaining undeveloped land available for expansion at Winona. Benefits realized are primarily the result of change in land use and have been evaluated accordingly.

WISCONSIN
BUFFALO



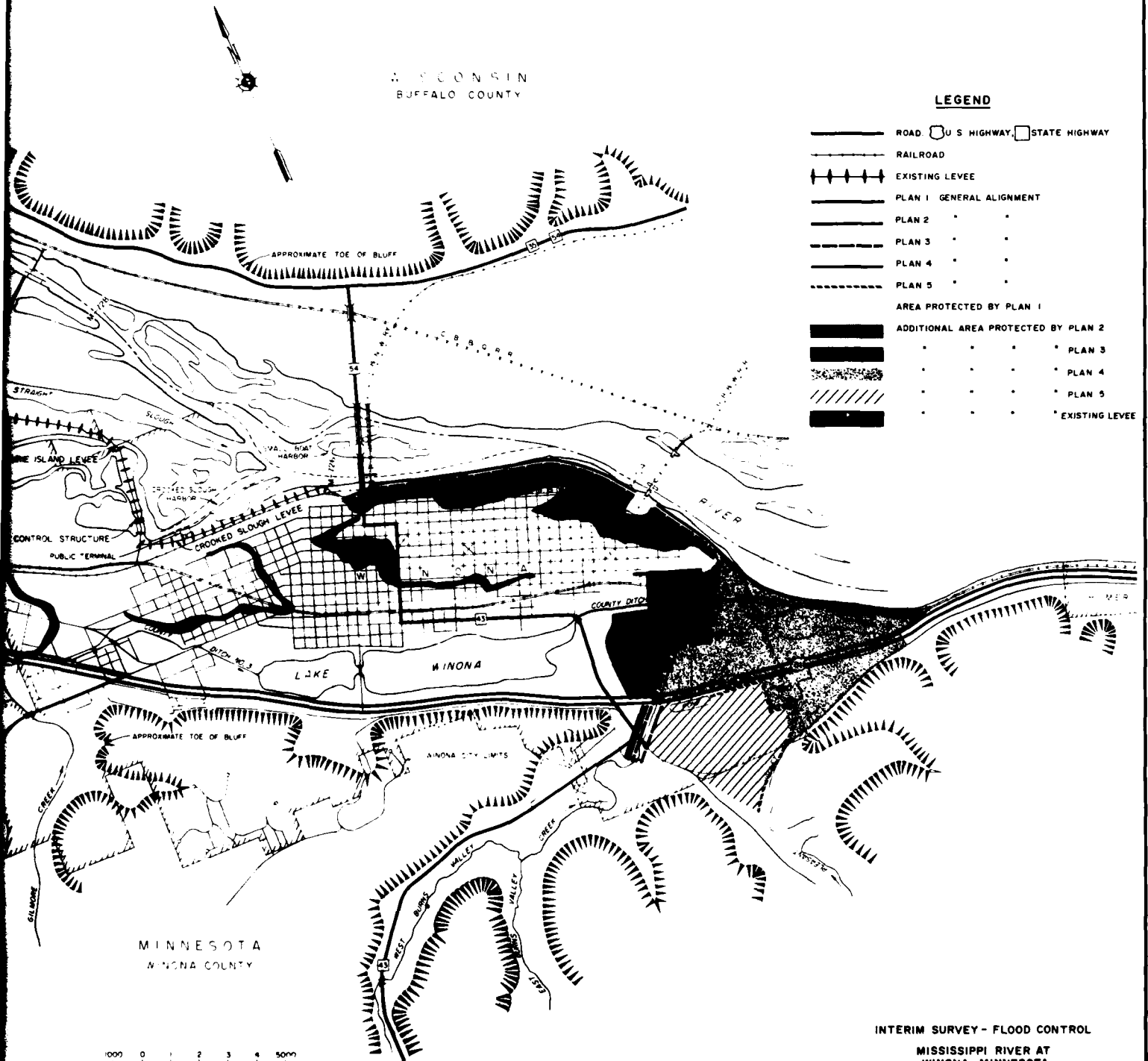
MINNESOTA
WINONA COUNTY

1000 0 1 2 3 4 5000
SCALE IN FEET

MISSISSIPPI
BUFFALO COUNTY

LEGEND

- ROAD: ☐ U S HIGHWAY, ☐ STATE HIGHWAY
RAILROAD
EXISTING LEVEE
PLAN 1 GENERAL ALIGNMENT
PLAN 2 " " "
PLAN 3 " " "
PLAN 4 " " "
PLAN 5 " " "
AREA PROTECTED BY PLAN 1
ADDITIONAL AREA PROTECTED BY PLAN 2
" " " " " PLAN 3
" " " " " PLAN 4
" " " " " PLAN 5
" " " " " EXISTING LEVEE



MINNESOTA
WINONA COUNTY

1000 0 1 2 3 4 5000
SCALE IN FEET

INTERIM SURVEY - FLOOD CONTROL

MISSISSIPPI RIVER AT
WINONA, MINNESOTA

ALTERNATIVE ALIGNMENTS CONSIDERED

ST. PAUL, MINN. DISTRICT

FILE NO. M-R6-7/60

6 FEB. 1970

FIGURE 24

Table 13- Summary of structural alternatives considered⁽¹⁾
(July 1969 prices)

Plan	Total cost	Average annual cost	Average annual benefits	Net Average annual benefits	Residual Average annual damages	Benefit-cost ratio
1	\$4,287,400	\$219,500	\$1,476,000	\$1,256,500	\$701,000	6.7
2	11,407,400	584,200	1,977,000	1,392,800	199,000	3.4
3	11,747,400	601,000	2,053,900	1,453,000	212,000	3.4
4	16,644,000	850,900	2,115,000	1,264,100	210,000	2.5
5	1,740,000	89,000	57,000	-32,000	18,000	0.6

(1) Design flood of 290,000 cfs assumed for screening process.

(2) Plans 1-4 include \$2,207,400 cost of completed segment of authorized project plus beautification costs.

(3) Based on 100-year life and 4 7/8-percent interest rate and includes operation and maintenance costs.

(4) Includes future growth and land enhancement.

(5) Includes benefits from completed authorized project segment, with the exception of plan 5.

(6) Includes induced residual damage (plans 3, 4, and 5).

(7) Plan 5 analyzed separately to investigate incremental justification.

6.017 A review of the alternatives available indicates that structural measures offer the only feasible flood control alternative for the economic planning areas designated as reaches 1, 2, and 3 and the non-structural measures offer the most feasible alternative for the area designated as reach 4. Of the structural alternatives available, plan 3 proves to be the most engineeringly feasible and economically justified plan to best meet the water and related land resource needs of the study area. Plan 3 is found to provide the greatest net benefits while at the same time providing feasible protection for the vacant, flood-prone land in reach 3. Incremental justification for protecting the added vacant land in reach 3 is further illustrated by comparing the added annual cost over plan 2 (\$16,800) with the added annual benefits (\$77,000), resulting in an incremental ratio between benefits and costs of 4.6. (Note - the updated benefit cost ratio is presented in paragraph 1.017 and is now 3.6 to 1.)

6.018 Plan 4, consisting of a levee along the entire riverfront to Homer, is economically justified. However, the additional average annual costs over plan 3 (\$249,900) far exceed the additional average annual benefits obtained (\$61,000). Furthermore, although not economically justified, plan 5 would provide the same structural flood protection for reach 4 at a much lower average annual cost (\$89,000 versus the \$249,900 increment between plans 3 and 4). The analysis for nonstructural measures indicates that as the relatively undeveloped reach 4 floodplain is needed for growth opportunities, sound floodplain management measures such as filling and flood proofing are economically feasible and could offer a viable alternative that would allow for expanded economic use with minimum flood rise.

6.019 Comparing plans 2 and 3 with plan 1(the authorized project plan) illustrates the economic feasibility of expanding the authorized project to include protection for the riverfront industrial area and the additional lands below Lake Winona (reach 3) requested by the city for growth opportunities. Accordingly, expansion of the authorized levee alignment below Lake Winona as presented for plan 3 and supplemental nonstructural floodplain management measures for reach 4 were selected as the best of the alternatives available.

6.020 In order to select the optimum economic level of flood protection for the Winona area, costs and benefits were computed for varying degrees of flood protection that would be provided by varying the design flood discharges for plan 3. Included in this analysis are the economics of raising the stage I levee to provide standard project flood protection. The plan optimization data are summarized in table 14.

Table 14 - Plan optimization summary

Item	Flood discharge (cfs)			
	215,000	246,000	290,000	360,000(1)
Annual cost	\$443,200	\$520,000	\$601,000	\$827,000
Annual benefits	1,333,000	1,733,000	2,053,900	2,174,000
Net benefits	889,800	1,213,000	1,453,000	1,347,000
Benefit-cost ratio	3.0	3.3	3.4	2.6

(1) Standard project flood.

6.021 An optimum relationship between costs and benefits exists when flood protection is provided against a discharge of 290,000 cfs on the Mississippi River, the same design to which the stage I project was constructed. From the discharge-frequency relationships developed, this flow represents a flood having an average frequency of occurrence in the order of once in 286 years. Included in the analysis are the costs and benefits associated with providing protection from Burns Valley Creek for the floodplain subject to flooding from both the Mississippi River and Burns Valley Creek.

6.022 Plan optimization data indicate that protection against the standard project flood would be economically justified. However, provision of this degree of protection would require that the entire stage I project be raised accordingly. A further raise of the stage I project would be both costly and objectionable since this would involve raising and resurfacing the existing road on top of the levee, modifications to several railroad closures, and extensive modifications to the existing levee system to withstand the added hydraulic pressures and to regulate the additional amounts of seepage anticipated in the Prairie Island levee area. Raising the existing levee would also be objectionable because of the need to acquire additional lands in an already densely developed riverfront industrial area and additional relocations. Furthermore, the increased height would cause adverse environmental effects in the Levee Park area. In view of this rationale and since the proposed top of levee provides about 2 feet of freeboard over the standard project flood profile, adoption of the standard project flood scale of development appears unwarranted.

FRONINGS, INC.: GRAIN STORAGE BINS AND SHIPPING FACILITY

NO ACTION

6.023 One alternative to the Fronings proposal (Fronings Assessment, 1974) would be no action. Fronings would compete directly with similar companies in the Twin Cities and Red Wing for grain. There will be about the same amount of grain from year to year, but Fronings' competitors would vie for it. If the Fronings project is not completed, firms in the Twin Cities and Red Wing could handle the grain. Truckers, however, do not like to go to the Twin Cities because of congestion and resultant time losses. If this course of action were followed, floodplain forest and open water habitat would be maintained at the proposed Fronings site, at least for the present. Further industrial development would be discouraged and future barge traffic would probably not increase at such a fast rate. Such an alternative would influence the tonnage of grain shipped in and out of Winona.

ALTERNATIVE SITE

6.024 Land for the Fronings project could be acquired in another area. Alternative sites, however, may not offer the proximity to the present truck-to-river and rail-to-river means of transportation. According to the Fronings assessment (1974), "Grain shipments by truck to St. Louis, Missouri, or to New Orleans, Louisiana, are not feasible...However, the cost difference between shipping of corn and soybeans by barge versus rail is too large to warrant consideration at this time. Shipping of corn and beans to New Orleans by barge costs 14.25 cents/bushel compared to unit-train costs of 28.56 cents/bushel for corn and 30.60 cents/bushel for soybeans (25-car unit) and 26.88 cents/bushel for corn and 28.80 cents/bushel for beans (50-car unit)."

MODERATE DEVELOPMENT OF THE SITE

6.025 The Fronings site could be filled to an extent greater than currently proposed in association with the moderate expansion of the fleet-ing area in Crystal Lake (to a 60-barge capacity). More wetland area (approximately 30 acres) would be consumed by this alternative, with the adverse biological impacts being proportionately greater. This could, however, preclude the need for the barge fleet-ing area in the vicinity of the Riverbend II development.

DEVELOPMENT OF THE ENTIRE 60-ACRE SITE

6.026 The development of the entire 60-acre Froning site as an alternative to the proposed action would allow for the expansion of the facility (storage bins, drying operations, salt and fertilizer). This alternative would provide ample space for the dredge material that may be dredged from the Crooked Slough Commercial Harbor for the purpose of expanding the barge fleet-ing capacity at Winona. The expansion of the commercial harbor would complement the 60-acre site by allowing for the utilization of the dredged material. The 60-acre site alternative would result in the direct loss of 60 acres of floodplain habitat and the loss of some aesthetic values related to limited recreational use.

FARMERS GRAIN TERMINAL ASSOCIATION: GRAIN ELEVATORS AND SHIPPING FACILITY

6.027 The alternatives to the GTA project are very limited due to the fact that the grain elevator complex has already been constructed and is presently in operation. Because the elevator has already been built, the consideration of alternate sites would not be feasible.

WINONA FLEETING COMPANY - 15-BARGE FLEETING AREA

NO EXPANSION

6.028 Under this alternative the present 15-barge fleetinging area would remain as is. Further capacity for barge fleetinging would be designated for another site such as the proposed 24-barge fleetinging area. Under this alternative the environmental setting would remain the same and the need for dredging and the resultant disposal area would be eliminated. This action would require the selection of an alternative site. It may be noted that a very high percentage of barge loading and unloading occurs in this area, therefore, the movement of barges from any alternative site to the Crooked Slough Harbor area would result in greater river congestion and greater amounts of energy expended for the movement of barges.

MODERATE EXPANSION

6.029 A second alternative may be the development and expansion of the 15-barge fleetinging area to a capacity of 60 barges. This would require additional dredging of the Crystal Lake area. The dredged material could possibly be utilized in the proposed Fronings project or other industrial development along Crooked Slough. This alternative would have the distinct advantage of fleetinging the barges in the proximity of the actual loading and unloading operations. It would not, however, maintain the environmental "status quo" of the area.

MAJOR EXPANSION

6.030 A third alternative could be a major increase in the 15-barge fleetinging area to a capacity of 100 barges. Such a major expansion may reduce the need for any other proposed barge fleetinging area. It would require extensive dredging and a considerable area for the resultant dredge material. There may be temporary unavoidable environmental impacts on the water quality due to increased turbidity. It may also be destructive for habitat areas utilized by some species of vertebrate and invertebrate wildlife. As explained previously, however, the area is not prime wildlife habitat. It would have the advantage of placing the barge fleetinging area in the close proximity of the loading and unloading operations concentrated in the Crooked Slough Harbor area.

BELT LINE TRUCK ROUTE

NO EXPANSION

6.031 Presently, the Belt Line Truck Route extends from the junction of Highway 61 and Pelzer Street to the city dock located within the Crooked Slough area. The present truck route allows for heavy truck flow within residential areas such as the housing project and other neighborhood areas located near the western corporate limits of the city of Winona. If additional industrial expansion occurs in the Crooked Slough Harbor area, the congestion and utilization of the completed portion of the Belt Line Truck Route would increase. This alternative may have negative consequences relative to traffic hazards and traffic congestion within the before mentioned neighborhood and residential area.

MODERATE REROUTING

6.032 This second alternative would reroute the present truck flow away from residential areas. Congestion at the junction of Highway 61 and Pelzer Street could be avoided by routing trucks west on Highway 61, north on 54th Avenue (between the State Highway Garage and the County Highway Department Garages on Highway 61), past the outdoor theatre to the Airport Industrial Park, then to Theurer Boulevard, and then to the belt line (figure 2). This route would avoid populated areas. This alternative would also allow for a greater back up of trucks away from the railroad intersection on Pelzer Street and other heavily utilized intersections.

MODERATE EXPANSION

6.033 This alternative would allow for the construction of truck routes primarily along the dike system without the utilization of Second Street which would, in fact, reduce the unavoidable impacts on the downtown area. Second Street presently has a high flow of pedestrian and automobile traffic and the burden of additional trucks would compound the traffic hazards and congestion. This alternative would also reduce the additional noise and air pollution created by the trucks. With this alternative adequate turn-about and parking areas would be required along the proposed Hennepin Boulevard and along Commercial Harbor Road so that trucks may return to the highway junctures. Such an alternative would fail to interconnect the industrial areas of Winona.

MAJOR EXPANSION

6.034 The land use plan of 1990 for the city of Winona proposes the expansion and completion of the Belt Line Truck Route. The Belt Line Truck Route would extend from its present completed point east to Olmstead Street, continue east along Second Street, and eventually connect to the proposed Hennepin Boulevard and Highway 61.

For its specific location see figure 2. The proposed truck route would not only have the distinct advantage of interconnecting the major industrial areas of Winona, but also facilitating traffic flow from the Airport Industrial Park, Crooked Slough Harbor Area and the Riverbend Industrial Park to the major highway junctures. The utilization of Second Street as a part of the Belt Line Truck Route may have unavoidable impacts on the downtown district of Winona. Presently, Second Street has considerable pedestrian and automobile traffic and its use as a portion of the Belt Line Truck Route would increase traffic congestion and hazards and also increase noise and air pollution within the downtown area.

CITY OF WINONA: EXTENSION OF THE CITY DOCK

NO EXPANSION

6.035 This alternative would provide for no action. Presently, the city dock has a capacity for unloading one barge at a time. With this alternative, the environmental "status quo" would be maintained.

MODERATE EXPANSION

6.036 The proposed expansion would allow for the extension of the city dock to a capacity of two barges instead of one. The environmental impacts would be limited and nominal.

CITY OF WINONA: STORM SEWER DIVERSION

6.037 The storm sewer diversion at Pelzer Street has been completed. Therefore, there are no alternatives that may be suggested for this project.

WINONA PORT AUTHORITY: 24-BARGE FLEETING AREA

NO ACTION

6.038 This alternative would leave the present environment as is. This 16-acre area does have value as wildlife habitat. The north end marsh area has been somewhat degraded due to deposition of dredged material resulting from channel maintenance. The fill for Riverbend II could be obtained by dredging in the navigation channel area with relatively minimal adverse effects.

ALTERNATIVE SITES

6.039 Two alternate sites for barge fleeting areas may be cited; first, a barge fleeting area could be constructed just across the river from River Bend Industrial Park. This site would be located mid-channel and would accommodate 100 barges. This site has been studied extensively because it was the original proposed action prior to the permit application for the 24-Barge Fleeting Area (see figure 25). The site could be dredged to a maximum depth of 18 feet and a width of 500 feet. When completed the area could accommodate as many as 100 barges.



FIGURE 25

Proposed 100-barge fleetin area located downstream from Winona at River Mile 725. The white line delineates the boundaries of the proposed area. The Burlington Northern Railroad bridge can be seen at the top of the photo.

6.040 Extensive benthological sampling was done in the area during the summer of 1974. Transects were established across the area and sampling stations were designated along the transects (see exhibit 12). (1) Measurements of water depth were taken at each station, bottom samples were taken with a Ponar dredge, bottom type was noted, and organisms were extracted from the bottom sample by sieving through No. 40-mesh soil screens. All organisms were identified to the species level whenever possible and biomass standing crop determinations were made.

6.041 The data reveal that the river bottom of the area is composed essentially of sand and coarse silt. Along the shores, the bottom contains small amounts of detritus. The bottom is not very productive in terms of species or total biomass and chironomid midge larvae are the most abundant animals found there. The rocky tops of wing dams afford the most productive habitat, being rich in caddisfly larvae, planaria and other species. Dredging in the area would temporarily denude the area of most of its benthic fauna, but that fauna would be rapidly replaced by downstream drift and by oviposition. Indeed, the area may become more productive after dredging because it could act as a silt trap; and a silty organic bottom is generally more productive than a sand bottom. Studies conducted before dredging and after dredging in the Crooked Slough fleeting area show that the area has not stratified thermally and that there are at least 4 ppm dissolved oxygen at all depths less than 40 feet. Recolonization of the bottom of that fleeting area has been very rapid. The total standing crop of benthos was not altered appreciably because the silt bottom was quickly reformed by natural processes.

6.042 The proposed area would be easily accessible to barges because it is located along the edge of the main channel. It would be easy to move barges and full tows in and out of the area. The islands which flank the proposed area would serve to isolate much of the activity within the fleeting area from traffic along the main channel.

6.043 The southernmost island is approximately 3,200 feet long and is covered by mature elm, cottonwood and boxelder on its upstream end. This vegetation gradually is replaced by young willows and other saplings farther downstream and finally by sparse grasses and bare sand at the downstream end.

6.044 The northernmost island, which is actually composed of two smaller islands, is about 3,900 feet long and is entirely covered with mature elm, cottonwood, boxelder and river birch trees. The soil of this island is heavier and contains more silt than does the highly sandy soil of the southernmost island.

(1) Detailed information on sampling data is contained in the Environmental Impact Assessment Report, on file in the St. Paul District Office.

6.045 The channel between the islands is 500 to 700 feet wide and the water velocity is equal to that of the main channel. During June, 1974, the average depth in the upstream portion of the area was about 7 feet. Depth increased gradually, becoming 14 feet deep on the extreme downstream end.

6.046 Five wing dams extend across the proposed fleeting area. The tops of the dams lie from 3 to 5 feet beneath the surface and all are nearly completely covered by sand and silt deposits.

6.047 The area may afford marginal spawning habitat for walleyes and saugers and sheepshead. Carp utilized the flooded, grassy, downstream end of the southernmost island for spawning during the summer of 1974. False map turtles and soft shelled turtles utilized the sandy embankments of the southern island for basking and possibly for egg laying.

6.048 The entire location seems to have little recreational value. Boaters occasionally pass through, but no fishing has been observed. Picnickers sometimes use the sandy banks of the southern island, but no camping has been observed. No waterfowl concentrations have been seen in the area, primarily because it is not productive of either plant or animal foods.

6.049 The fill which would be pumped from the fleeting area into Riverbend would reduce the cost of building sites because the cost of the sites could be written off on two projects. The project would provide an area where boaters could observe the fleeting activities of tow boats and barges. Many people enjoy this type of activity. The fleeting area would be located downstream from bridges. There will be less chance, therefore, of runaway barges drifting into the bridges and causing damage. Fleeting activities could cause occasional congestion in the main channel as barges are moved in and out of the area. Some people could object to the project because it would interrupt the natural scenery of the river. Residents who overlook the area would be affected most because they may feel that the project would spoil their view of the river.

6.050 It is likely that the dredged area would require additional dredging in the future due to sand accumulation. This would be especially true after major floods when large volumes of sand are moved by the river. The resultant dredge material could be pumped into Riverbend. Because the proposed fleeting area is off the main channel of the river, there would probably be little need for an elaborate lighting system. It would be very difficult, of course, to provide the area with electricity. Because of its mid-river location supervision of the area may be difficult. Supervision of the area would presumably be under the direct control of the Winona Port Authority or under the control of a lessee. Because the area is not sewered it would be unsuited for barge cleaning, unless the debris and wash water were stored in an empty barge in preparation for hauling the wash water to an on-shore pumping station.

6.051 This alternate site is in the State of Wisconsin. Primary reasons for not selecting this site involved acquisition problems since the Winona Port Authority does not own the property, and the increased cost of piping dredge material from this location (versus the selected site) to the Riverbend industrial area.

6.052 The principal disadvantage of this site for a fleeting area is its distance from the grain terminal area in Crooked Slough. This site, like the proposed 24-barge fleeting area, is a 7-mile round trip to Crooked Slough. The end result would be wasted time and energy.

6.053 An alternative 60 or 100-barge fleeting and staging area could be located in the Crooked Slough-Crystal Lake area as cited and previously discussed under the heading of WINONA FLEETING COMPANY: 15-BARGE FLEETING AREA.

CITY OF WINONA, COUNTY OF WINONA AND STATE OF MINNESOTA: ENCLOSING
OF COUNTY DITCH NO. 3

NO ACTION

6.054 This alternative would allow for the county ditch to remain in its present state. Presently the ditch is an eyesore and it does present a minor safety hazard to children playing in the area.

ENCLOSING THE DITCH

6.055 This alternative would improve the appearance of the ditch and it would improve the hydraulic efficiency of the ditch.

WINONA PORT AUTHORITY: RIVERBEND INDUSTRIAL PARK

6.056 It should be noted the first subdivision of the Riverbend Industrial Park is completed and is occupied. The proposed Riverbend Project is also an integral part of the 1990 land use plan as developed by the city of Winona.

NO FURTHER ACTION

6.057 This alternative would discourage the further development of the Riverbend Industrial Park. It would discourage the relocation of present industry located within or near residential and downtown areas of the city. It may be noted that all the land within the Airport Industrial Park has been purchased. Furthermore, it may be noted that flat land for industrial development is scarce within the city limits of Winona. Industrial development in the surrounding valleys in the Winona area would aesthetically degrade the scenic value of Winona. Industries located outside the city limits would find the services such as fire and police protection, water supply and sewage disposal extremely costly. Beyond this, the proposed

Riverbend Industrial Park lends itself to the utilization of rail, water and truck transportation due to its strategic location. This alternative, of "no further action", would allow the maintenance of some forested and marsh habitat for plants and animals.

CONSTRUCTING AS PROPOSED USING AN ALTERNATE SOURCE OF FILL

6.058 Riverbend Industrial Park Phase II, as currently proposed, is directly tied to the dredging and constructing of the 24-barge fleeting area. An alternate source of fill would be the channel of the Mississippi River. The biological impacts would be temporary due to the heavy bed load of the river. There would be increased dredging costs because of the greater distance required to move the material and the costs could not be applied to two separate projects. The need for a barge cleaning area could be met by constructing this type of facility at Crooked Slough Harbor. The need for additional barge fleeting spaces would have to be met at another location. This could be accomplished by enlarging the Crooked Slough Harbor.

MISSISSIPPI DEVELOPMENT CONSORTIUM AS AN ALTERNATE SITE

6.059 If the first alternative were selected, industrial development could be encouraged in the Mississippi Development Consortium Park. Of the total 260 acres owned by the Minnesota Corporation only 150 acres are planned for development. Presently, only 20 acres are available for industrial development. If industrial development were to be channeled into the consortium, industrial expansion would be inhibited by the number of acres available. The proposed Riverbend Industrial Park Phase II would make available over 110 acres for industrial development.

MISSISSIPPI DEVELOPMENT CONSORTIUM: INDUSTRIAL PARK

NO FURTHER EXPANSION

6.060 This alternative would limit the development of the Mississippi Development Consortium. At the present time only 20 out of the 260 acres owned by the Minnesota Corporation are developed. The area provides habitat for wildlife which would be retained with no further development.

MAJOR EXPANSION

6.061 Since land for industrial development is scarce and limited in the Winona area, it may seem feasible to encourage the development of the entire 260 acres. The Mississippi Development Consortium land is presently classified as an industrial zone and is adjacent to the Airport Industrial Park. It would provide easy access to rail and truck routes, allowing for ample and efficient transport. Such an alternative would destroy the forested and swamp areas and also destroy the potential for the area to support wildlife.

7. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT
AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

7.001 Short-term benefits would consist of avoidance of adverse economic and social impacts of floods in Winona. Extended and expanded occupation of the floodplain impairs the productivity of the floodplain areas involved.

7.002 Many may agree that the city of Winona should not have been built within the floodplain of the Mississippi River. Nevertheless, for reasons presented in earlier sections of this report, circumstances dictated that the city be built in its present location. Despite its susceptibility to flood damages, it is extremely unlikely that the city will ever be relocated to higher ground.

7.003 The upstream half of the city is presently flanked by a permanent dike system, but the lower one-half is protected by a make-shift temporary system which has hastily erected in 1965 and reinforced in 1967. Winona's temporary dike system is very costly to maintain, not only in terms of money, but in terms of time and energy. Most of the work done during floodtime is redundant. Sandbags are filled, only to be emptied. Chimneys are erected around boils and manholes and are subsequently torn down. Construction work is done hurriedly, and without proper quality control. Virtually the entire city must be mobilized with each major crisis.

7.004 It should also be apparent that a temporary system which relies on dunnage bag closures for storm sewers and sandbag chimneys to protect manholes cannot be depended upon. This will be especially true if flood problems become more severe in the future.

7.005 Flood proofing would constitute a costly, short-sighted alternative to a permanent dike system. In spite of its obvious, adverse effect of constricting the floodplain, it would appear to be in the best long-term interest of the city and the nation to replace the present temporary dike with a permanent dike system.

7.006 The creation of additional industrial sites within the proposed dike system at Riverbend are consistent with the long range land use plans of the city. If it is desirable for the city to continue to grow industrially, it is better to have industries move into pre-planned parks which will not aesthetically degrade the scenic Winona environment than it is for them to move into the surrounding valleys or for them to continue the unnecessary monopolization of the waterfront. It also seems more sensible to construct a permanent dike and to locate industries within it than it does to build the industries and then construct protective dikes as an afterthought.

7.007 The Crooked Slough harbor area presents a complex situation with regard to short-term benefits versus maintenance and enhancement of long-term productivity. Because of reluctance of the Minnesota Department of Natural Resources to allow Fronings to fill and develop their entire holdings, Fronings present permit is for only 8.98 acres. In the long run, if industrial development in Winona is indeed desirable, such a piecemeal approach is costly and wasteful of resources. It seems inevitable that the entire holding will ultimately be filled and developed. It would appear to be more expedient and conservative of resources to do it all in one operation than to do it piece by piece. If Fronings is limited to 8.98 acres, it will be necessary for the city of Winona to provide all of the fill for its Belt Line Truck Route through the Fronings area. If Fronings were allowed to do all of their filling now, the city could build part of their road on Fronings fill. Also, if the Belt Line is constructed prior to Fronings complete filling, the city will have to riprap the river side of their road embankment. Subsequent filling by Froning would bury the riprap and Fronings would have to put in new riprap or sheet piling on the face of their fill. One-step filling of the Fronings area would allow for adequate primary and secondary settling ponds so that dredging for the project would not cause turbidity problems in Crooked Slough.

7.008 If Fronings were allowed to fill their entire holding, much of the needed fill could be taken from the Crystal Lake area, thus constructing more fleeting area. Fleeting in the Crystal Lake area would be much more efficient than fleeting in the downstream area proposed by the Winona Port Authority. The entrance to the latter area is 4.5 miles downstream from the most distant Crooked Slough grain terminal and locating there would necessitate unnecessary expenditures of time and energy. The shuttling of barges back and forth between the two areas would result in a financial burden to the towing company which would ultimately result in higher prices for the consumer and lower prices for the producer. As indicated in section 6, the most efficient place for a fleeting area would appear to be Crystal Lake area of the Crooked Slough Harbor because it is nearest the terminals which need the fleeting area.

7.009 The entire Crystal Lake area could be dredged to provide fill for the Fronings project but this would have some adverse effects on wildlife. Additional depth would reduce the value of the area for diving ducks. It is likely that increased depth would increase the carrying capacity of the area for game fish - especially during the winter.

7.010 The portion of Crystal Lake which was dredged to provide fill for the Pelzer Street extension illustrates what would happen to Crystal Lake if it were deepened by dredging. The dredged area, which varies from 20 to 50 feet in depth, was sampled for benthos during the summer of 1974. In general, the deeper zones produced as rich and varied a fauna as the shallower zones.

Water chemistry data also indicate that dredging did not degrade the area. Only at the 50-foot depth did dissolved oxygen levels become critically low. Water temperature measurements indicate that the area does not thermally stratify during the summer. The lack of stratification may be the result of natural water flow, wind action, barge movement or a combination of all factors. If the area is dredged, the maximum depth should not exceed 30 ft to make certain that no portion of the depths becomes anaerobic.

7.011 The Crystal Lake area has little recreational value and it is seldom even seen by most Winona residents. If it is inevitable that there be more grain elevators along Crooked Slough, it seems only reasonable that they be located adjacent to a fleeting area of sufficient size to handle the volume of river traffic.

7.012 If Winona is destined to become a major grain terminal there are many obvious short-term gains to be expected. The Winona economy would certainly benefit during the construction phases of the various projects. The projects would also provide tax revenue and an inflow of money into the community for many years. Unfortunately, modern grain elevators are highly automated and they require relatively few people for their operation; thus their contribution of salaries to the community would be relatively small. Truckers coming to Winona would eat, buy fuel and have repair work done; but it is unlikely that many would buy or rent homes within the city, or pay taxes.

7.013 If the city becomes a major grain terminal, it will be at a considerable price to the environment. As mentioned previously, Winona is now a relatively quiet river city. Its residents enjoy a clean environment, unlimited outdoor recreation, magnificent scenery and comparative solitude.

8. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

8.001 Quantifiable amounts of resources to be consumed in the proposed projects would include labor, materials and energy. The labor expenditure for most of the projects would be greatest during construction. For example, very little labor would be involved in the operation and maintenance of the permanent dike system, fleeting areas or County Ditch No. 3. Because they are highly automated, the elevators would use relatively few personnel. Even the large Fronings elevators would probably only employ about 25 full-time people during the peak season. In addition there would be a loss of a wetland area for the construction of the 24-barge fleeting area.

8.002 Large amounts of gravel, sand, cement and steel would be used in all projects. Expenditures of fossil fuels would be great during construction because all projects would require the movement of massive amounts of bulk commodities. This would be especially true of projects such as the permanent dike, fleeting area, Riverbend and Fronings project where large amounts of dredged material would be used as fill.

8.003 The operation of grain terminals requires the expenditure of vast amounts of fossil fuels. Because rail rates are unfavorable for the shipment of grain to Winona, and because grain sources are usually not situated along railroads, trucks are the primary conveyors of grain into the city. As shown in table 15, trucks are very inefficient in terms of energy utilization, being much less efficient than rail transportation. Fortunately, grain would be shipped downstream from Winona elevators by barge. Barge transportation is probably the most efficient means of shipping bulk commodities such as grain.

Table 15 Energy intensiveness of various modes of freight transportation (Mooz, 1973).

<u>Freight Mode</u>	<u>Energy Intensiveness</u> (BTU's/ton-mile)	<u>Ratios of E.I.</u>
Waterways	500	1
Rail	750	1.5
Pipeline	1,850	3.7
Truck	2,400	4.8
Air Cargo	63,000	126

8.004 The permanent dike system and the Riverbend project would cause the eventual loss of a marsh and its associated wildlife. The heavy truck traffic associated with the proposed grain shipping projects could increase air pollution levels and destroy much of the charm, tranquility and natural beauty of the Winona environment.

8.005 The proposed projects may just be the beginning. Victoria and GTA could easily squeeze additional elevators onto their land. A building permit from the city may be the only requirement for such construction. The riverfront property being vacated by Northern States Power Company (NSP) would be a natural site for another large cluster of elevators. The developer would probably not need to do much alteration of the riverfront because NSP already has mooring and unloading facilities at the site. If consummated, these projects would magnify everything that has already been said in this section.

9. COORDINATION

PROPOSED PHASE II FLOOD CONTROL PROJECT

9.001 The authorized plan for flood control has been discussed with representatives of Federal and State agencies and no serious concerns have been expressed to date without being later resolved. A citizens advisory committee, established specifically for the study on the flood control project, is in accord with the basic plan contained in the project document. The city of Winona has urged on several occasions that advance planning for the authorized project be expedited. The Minnesota Department of Natural Resources is in accord with the project since it is coordinated with a plan for floodplain regulations.

9.002 Minor modifications in alignment and location of the protective flood barrier have been suggested by local interests. These suggestions will be considered in detail during the phase II, general design memorandum. The modifications, if adopted, would not result in significant changes in project costs.

9.003 The U.S. Department of Interior and the Minnesota Department of Natural Resources in reviewing the DEIS suggested a modification in the levee alignment near Highway 61. Several meetings were held with these agencies concerning the new alignment. On 17 November 1975, the Winona City Council passed a resolution approving the alignment modification. As a result of the alignment change, 40 acres of types I & IV wetland will be preserved and the developable land within River Bend Industrial Park will be reduced by a like amount.

9.004 Recreational potential associated with the project has been considered in coordination with local interests. From the studies made to date, recreational facilities such as a pedestrian walkway, a docking area, and picnic areas are applicable only to the Levee Park area and have been incorporated into the landscaping plan for this city park.

FRONINGS INCORPORATED: GRAIN STORAGE BINS AND SHIPPING FACILITY

9.005 Application for a permit (No. A633) was made to the Corps of Engineers on 7 August 1973. A public notice was issued on 29 August 1973. On 2 April 1974 an interagency meeting was held with representatives of the Corps, the Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, U.S. Fish and Wildlife Service and the U.S. Bureau of Outdoor Recreation. Subsequently a determination was made to hold the permit in abeyance until completion and review of this Environmental Impact Statement (EIS).

9.006 On 29 May 1975, Fronings submitted a revised permit application to the Corps of Engineers in accordance with Section 10 of the River and Harbor Act of 1899 and Section 404 of the Federal Water Pollution Control Act Amendments of 1972. A revised public notice was issued on 27 August 1975.

FARMERS UNION GRAIN TERMINAL ASSOCIATION: GRAIN ELEVATORS
AND SHIPPING FACILITY

9.007 The Farmers Union Grain Terminal elevator is presently in operation. The land for the project was purchased from Kujak Brothers Inc. The bulkheads and landfill were constructed under a permit (No. A545) which was originally issued to Kujak Brothers. On 27 August 1971, Kujak Brothers applied to the Corps for a permit. A public notice was issued on 15 September 1971. No substantial objections were voiced and the permit was issued on 11 July 1972.

WINONA FLEETING COMPANY: 15-BARGE FLEETING AREA IN CROOKED SLOUGH

9.008 A permit application was made to the Corps on 15 May 1973 (No. A610). A public notice was issued on 14 June 1973. The permit is being held in abeyance pending the completion and review of this EIS.

CITY OF WINONA: BELT-LINE TRUCK ROUTE

9.009 No permit is required by the Corps on this project except in relation to the Pelzer Street Storm Sewer Diversion as previously discussed and indicated below.

CITY OF WINONA: EXTENSION OF CITY DOCK IN CROOKED SLOUGH

9.010 No permit request has been received to date on this project.

CITY OF WINONA: STORM SEWER DIVERSION AT PELZER STREET

9.011 Application for a permit was made to the Corps (No. A557) on 18 January 1972. On 24 March 1972 a public notice was issued. No substantial objections were voiced and the permit was issued on 6 September 1972.

WINONA PORT AUTHORITY: 24-BARGE FLEETING AREA AND BARGE CLEANOUT FACILITY

9.012 A permit application was submitted to the Corps on 6 March 1975, in accordance with Section 10 of the River and Harbor Act of 1899 and Section 404 of the Federal Water Pollution Control Act Amendments of 1972. A revised public notice was issued on 9 December 1975. On 4 December 1975, a meeting was held at the St. Paul District Office with the permit applicant to discuss alternatives to the proposed project. No further action has occurred to date. Action will be delayed pending completion and review of this EIS.

CITY OF WINONA, WINONA COUNTY AND STATE OF MINNESOTA: ENCLOSING OF COUNTY DITCH NO. 3

9.013 No permit is required on this project by the Corps.

WINONA PORT AUTHORITY: RIVERBEND INDUSTRIAL PARK - PHASE II

9.014 This project, as proposed, is directly tied to the previously mentioned 24-barge fleeting area. Dredge material from the 24-barge fleeting area is planned to be used for the phase II portion of Riverbend Industrial Park. If this project is to be constructed, a permit in accordance with Section 404 of the Federal Water Pollution Control Act Amendments of 1972 would be required.

MISSISSIPPI DEVELOPMENT CONSORTIUM: INDUSTRIAL PARK

9.015 The owners of the Mississippi Development Consortium have been informed that a Section 404 permit will be required from the Department of the Army if any additional fill is to be placed in wetland areas. As of this date, the owners of the Mississippi Development Consortium have not applied for a permit.

GENERAL

9.016 Since the synergistic effect of all the projects is significant it was determined to prepare this EIS to deal with the area as a whole rather than in a piecemeal manner. Coordination with all interests has taken place wherever feasible and will continue. Copies of the draft statement were furnished to the following for review and comment.

U.S. Environmental Protection Agency
U.S. Department of Agriculture
U.S. Department of Commerce
U.S. Department of Health, Education and Welfare
U.S. Department of Housing and Urban Development
U.S. Department of the Interior

U.S. Department of Transportation
Upper Mississippi River Basin Commission

Minnesota State Clearinghouse
Minnesota Department of Agriculture
Minnesota Department of Economic Development
Minnesota Department of Health
Minnesota Department of Natural Resources
Minnesota Environmental Quality Council
Minnesota Highway Department
Minnesota Pollution Control Agency
Minnesota Resource Commission
Minnesota State Archaeologist
Minnesota State Historical Society
Minnesota State Park Commission
Minnesota State Planning Agency
Minnesota Water Resources Board
Southern Minnesota Rivers Basin Commission
Upper Mississippi River Basin Commission
Minnesota-Wisconsin Boundary Area Commission
Citizens Advisory Committee, Environmental Quality Control
Friends of the Earth, Minnesota Branch
Izaak Walton League of America, Minnesota Division
Minnesota Conservation Federation
Minnesota Environmental Control Citizens Association
Minnesota Public Interest Research Group
National Audubon Society, North Midwest Regional Office
The Nature Conservancy, Minnesota Chapter
Sierra Club, North Star Chapter
Soil Conservation Society of America, Minnesota Chapter
Minnesota Educational Association, Environmental Task Force
Minnesota Environmental Steering Committee, Minnesota
Department of Education
Minnesota Environmental Education and Research Association,
St. Paul
Minnesota Environmental Education Council
Mayor, City of Winona
Winona City Council
Citizens' Advisory Committee, Winona
Port Authority, City of Winona
City Engineer, Winona
Mr. R. T. Doherty, Victoria Elevator Co.
Dr. Calvin Fremling, Winona State College
Mr. Robert G. Hull, Hull and Hull
Mr. Larry Musel, Fronings Elevator and Shipping Facility
Mr. E. H. Schentzel, Northern States Power Co.
Mr. Glen Tamke, Owen Ayers and Associates
Pearless Chain Company
Mr. Clifford R. Johnson
Mr. Mel Sundquist
Mississippi Development Consortium

9.017 In addition copies of this statement are being furnished to the following libraries where they will be available for review:

St. Mary's College Library

Winona State College Library

St. Teresa's Library

Public Library, Minneapolis

Public Library, Winona

9.018 Comments on the draft statement were received from the following:

U.S. Environmental Protection Agency

U.S. Department of Agriculture - Forest Service

U.S. Department of the Interior

U.S. Department of Transportation

Federal Highway Administration

U.S. Coast Guard

Minnesota Department of Natural Resources

City of Winona

Farmers Union Grain Terminal Association

Northern States Power Company

9.019 The ensuing pages contain copies of the letters of comment juxtaposed with the Corps responses.

**LETTERS of COMMENT
and
CORPS RESPONSES**



UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460
TELEPHONE (202) 343-7000
FEDERAL GOVERNMENT PRINTING OFFICE: 1975

AUG 13 1975

Mr. Robert E. Hall
Director, Federal Highway Administration
1200 New York Avenue, N.W.
Washington, D.C. 20591

Dear Mr. Hall:

We have prepared for review of the Draft Environmental Impact Statement (EIS) for the proposed Federal Highway Project and Waterfront Development, Virginia Beach, Virginia. As you know, we commented on the Public Notice on application for Permit No. EISD-8-74(610) and for Permit No. EISD-8-79(610) concerning the proposed area in Crooked Slough on July 20, 1973 and July 2, 1974 respectively, and had no objections to the issuance of the permit. The applicant (Marine Planning Company) complied with our mitigation requirements. On October 3, 1973, we also commented on the Public Notice on application for Permit No. EISD-8-81(610) by Friends to the Earth, Inc., and other youth from Crooked Slough and deposit the spoil from the proposed waterfront along the westerly bank of the slough. Since the comments submitted on the public notice were insufficient to assess the proposed project's potential effects, we requested the submission of an environmental impact statement. In response, we applied in our June 5, 1975 letter on application for Permit No. EISD-8-1004(697) by the Port of Virginia to construct a large floating area at mile point 7225 and a 200-acre dike contained ponding area, and we received this application for permit will be submitted after our review of the draft EIS is completed. The preparation of this comprehensive environmental impact statement is an attempt to consider collectively the potential effects of these permit actions and the authorized Federal flood control project. We agree with this approach and commend you and your staff for your efforts in this effort.

The EIS will describe the effects of the flood control project and waterway improvements. The project has been adequately described and may be mitigated by the project. We have no serious concerns regarding the project's second-order effects on the environment, such as the potential noise impacts to residences of the project area and the potential impacts of the filling of more than 100 acres of wetlands and the potential impacts of the potential impacts of the project on the project area.

We are confident that the EIS will provide the information needed to make a decision on the project. We will submit our comments on the EIS to the State's Department of Transportation and the Federal Highway Administration, the subject of the project.

AUG 13 1975

The project is located in an area which is subject to the application of the Minnesota Pollution Control Act. The project is located in an area which is subject to the application of the Minnesota Pollution Control Act. The project is located in an area which is subject to the application of the Minnesota Pollution Control Act.

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Very truly yours,
Valdes V. Adams
Valdes V. Adams
Acting Regional Administrator

EPA's ATTACHED COMMENTS ON THE DRAFT EIS FOR FLOOD CONTROL
PROJECT AND WATERSHED DEVELOPMENT, WINONA, MINNESOTA

Section 404 Permits

Several projects include the addition of fill material for the purpose of converting backwater wetland areas of the Mississippi River into commercially developable land. These wetland areas consist of aquatic plants dependent on periodic inundation by the river for growth and have wildlife and fishery value. Therefore, in accordance with procedures established by the July 25, 1975 Federal Register, these projects will be subject to Section 404 of the Federal Water Pollution Control Act Amendments of 1972. From our review of this EIS, review of aerial photographs, discussion with your office staff and our site inspection, we believe the following projects will require a Section 404 permit: Froning Inc. Grain Terminal; Winona Port Authority 36-Barge Cleaning Area; and the Mississippi Development Consortium.

Air Quality

It is indicated in the EIS that air quality standards in the Winona area are continually being violated for total suspended particulates. The EIS also states that construction of many of these proposed projects will increase the frequency of these standard violations due to the increased grain dust and particulates from grain truck traffic, the unloading of these trucks and the loading of barges. Therefore, attainment of national ambient air quality standards for particulates will be jeopardized by these projects in the Winona area. A quantitative estimate of the source and their potential impact upon air quality should be included in the Final EIS. We request the inclusion of the following information in the EIS:

2. 1. Existing ambient air quality for particulates.
2. Projected particulate emissions from the proposed projects (emission factors for grain handling may be obtained from EPA, AP-42, "Compilation of Air Quality Emission Factors").
3. Incremental impact of these emissions (proposed projects) upon ambient air quality assuming worst case annual and 24-hour conditions.
4. Comparison of projected ambient air quality with the national ambient air quality standards for particulates.
5. Effects upon the State's Air Implementation Plans.

We recommend coordination with the Minnesota Pollution Control Agency (MPCA) relative to their proposed standards of performance for grain handling facilities and the acquisition of applicable State permits.

Corps Responses to the U.S. Environmental Protection Agency

1. Fronings, Inc., Winona Port Authority 36-barge Fleeting Area (now 24-Barge Fleeting area, see paragraph 1.034) cleaning facility and the Mississippi Development Consortium have been informed that Section 404 permits will be required for their proposed projects. Also see paragraph 1.004.
2. See paragraphs 2.162 - 2.165 for existing ambient air quality for particulates.
3. See paragraphs 4.075 - 4.089, pages 93-95, for projected particulate emissions. Worst-case 24-hour projections could not be accurately projected as the amount of grain shipped into and out of Winona, varies from month to month. There are also other possible point sources of particulate emissions in Winona whose single and cumulative effect upon the ambient air quality is not known. Also, available data only allow estimates of particulate loadings and are not readily translated to particulate concentrations.
4. See paragraph 4.088.
- 4a. We have met with the permit applicant and representatives of the Minnesota Pollution Control Agency (MPCA) Division of Air Quality. See also paragraph 4.077 of the final EIS. The grain handling facility proposed by Fronings, Inc., will require an installation (construction) and an operation permit from the MPCA. Before an installation permit is granted, the plans for emission controls at the proposed facility will be reviewed by the MPCA.

Notes

As stated in the EIS, the Fanning project alone could produce 1,500 trucks in one 12-hour day for 310 days per year. We recommend coordinating with the State Department of Transportation regarding impacts resulting from this increased traffic. Specifically, noise sensitive areas along roadways which would provide access to the grain terminal should be identified and worst case noise levels for sensitive receptors resulting from increased truck traffic should be predicted. We also suggest that you contact Mr. Perez of MPCA concerning the State's proposed noise standards.

5.

State II Flood Control Project

We note that as a part of this project a new floodwall will be constructed along the river from mile point 726 near Highway 54 to about mile point 723.4 and then southeast on top of the old Chicago Great Western Railroad bed to a point near Highway 43 and Burns Valley Creek. The source of fill for the project levees should be indicated. The EIS should indicate the level of flood protection provided at the sewage treatment plant (STP). While the STP is currently elevated above the old railroad bed, the EIS should explain why it was not incorporated into the flood control project's floodwall construction. The EIS should provide a more detailed exhibit of the proposed floodwall and its siting effects relative to the City's protected lands.

6.

5. The cited projections are theoretical as stated in the EIS (paragraph 4.021). The projections in paragraph 4.022 are based on grain shipping projections made by the permit applicant, Fronings, Inc. In any case there would be increased truck traffic along the residential segment of Pelzer Street which is acknowledged in the EIS (4.039). In order to predict worst-case noise levels for sensitive receptors, such as the residential property along Pelzer Street the following information is necessary: (1) Vehicle volume during the hour of heaviest traffic or assuming 10 percent of total traffic volume; (2) Distance to the closest residence from the centerline of the road; (3) Actual speeds at which the vehicles are traveling; (4) Percent of truck traffic comprising the total vehicle volume. With this information and the aid of nomograph, the worst-case noise levels can be estimated. Unfortunately this type of data is not available and worst-case noise levels cannot be predicted at this time. The following information was obtained from the Minnesota Pollution Control Agency (Mr. Alfredo Perez): Some of the residences along Pelzer Street are approximately 50 feet from the centerline of the road. In the residential segment of Pelzer Street, peak noise levels are expected to be in the 80-86 decibel range. Noise levels in excess of 86 decibels, at this distance from residential property and speeds less than 35 mph, would be in violation of Federal and State noise regulations (motor vehicle noise limits). It has been the experience of the Minnesota Pollution Control Agency that 10 percent or less of the grain trucks would exceed this limit.

6. The alignment of the proposed levee has been changed (see figure 4, page 7). The source of fill for the project levee would be sand dredged from the bottom of the Mississippi River. The exact location where the dredging would take place has not been determined at this time.

The elevation of the Winona Sewage Treatment Plant is 664 which is 5 feet above the elevation of the 100-year flood. The city constructed the sewage plant outside of the proposed alignment in order to provide more land for industrial development within the protected area.

The city's designation of protected lands for the area along the river was somewhat misleading and has been deleted from the final EIS. The "protected area" along the river and Front Street is presently industrial. The protected designation has been assigned in an attempt to relocate industries presently at the end of their economic life. The protected land designation has also been assigned so that future activity in this area may be closely watched and so that new uses may be most economically initiated with minimum disruption.

Fronings

According to the EIS, the size of the construction area from Fronings proposed grain storage bins and shipping facility has been reduced from 60 acres to 14.75 acres. The bulkhead line would not extend out beyond the existing shoreline and would be in line with Forest's Union Grain Terminal Association bulkhead. While this proposal will still destroy the forested bottomland and increase the industrial development of this backwater slough, the magnitude of these impacts is considerably reduced. With regard to dredging near the mouth of Straight Slough and in the sand borrow areas as shown in the August 29, 1973 permit application, we would have no objections to this action provided the applicant (1) abide by specific mitigative recommendations and conditions that will be developed when we receive the revised public notice on Fronings application for a permit and (2) secures wetlands, bottomland forest and riparian rights of Mississippi River bottomland of like quality and amount being adversely affected by the proposed project and place these lands under the protection of a public agency for preservation purposes.

15-Barge Floating Area in Crooked Slough

We note that the material has been removed for Pelican Street from both the 400' x 800' slough borrow area and the access channel and that the original size of the floating area has been reduced by one-half - yet more than 15 barges use the floating area; it appears that this facility may have the capacity with expansion to handle additional barges rather than construct a new barge floating area. It is stated on page 76 of the EIS that the reason the floating area is not being expanded is because there is no place to deposit the dredge material and the entrance channel would have to widen. However, there is no indication that alternatives for dredge material deposition have been thoroughly explored.

Corps Responses to the U.S. Environmental Protection Agency (cont.)

7. The proposed borrow area for the revised project is indicated in figure 6, page 13. Fronings, Inc., have not secured any replacement wetlands, bottomland forest or riparian rights to Mississippi bottomland at this time.
8. We have met with representatives of the Winona Port Authority and Fronings, Inc. The Port Authority presently has plans to pursue this alternative and will be submitting permit applications to the Corps of Engineers in the near future. The Port Authority plans to work out an agreement with Fronings, Inc., whereby they can use the Fronings property as a disposal site.

Belt Line Truck Route

The EIS indicates that if this road is constructed prior to the Frontings fill proposal, the project would have to truck in fill. The source of this fill should be noted. The possibility of using fill from the 15-barge floating area for the beltline extension should also be considered regardless of the status of Frontings proposal.

Winona Port Authority

According to the EIS and Public Notice MCSDD-8-1004(A697), Winona Port Authority plans to dredge 16 acres of flood plain forest and 4.6 acres of marsh. The EIS and public notice indicates that the 36-barge floating area will be dredged to elevation 618.1 which would allow for an 11-foot draft. Since the low water pool elevation is 645.5, this dredging would provide 27.4 feet below low water elevation, 15.4 feet more than that permitted under permit number M10 for the Winona Floating Company's 15-barge floating area in the same general area. The reason for the additional dredging depth should be explained. The anticipated life of this floating area should be further discussed. This discussion should include the secondary impacts of this development upon the adjacent protected lands.

Winona Port Authority - Riverbend Industrial Park - Phase II

As shown on Figure 17 of the EIS and as observed on our July 23, 1975 field inspection, wetlands will be enclosed within the proposed floodwall. However, a statement on page 81 indicates that no marsh exists in the Phase II portion of the industrial park; clarification of this statement is necessary with regard to map exhibit 4 and the discussion on pages 70 and 71. The proposed dredging for the 36-barge floating area, filling in the Riverbend Industrial Park and the secondary effects of the proposed floodwall would destroy about 36 acres of wetland including bottomland forest, wet meadows and marsh. Our agency would have no objection to the filling of the area designated for spoil provided lands of similar quality and amount (prior to the 1973 clearing) are secured, and placed in the control of an appropriate public agency for preservation. Consideration should be given to using this site for disposal of Mississippi River dredging.

Mississippi Development Consortium: Industrial Park

While the EIS indicates that this proposed project does not require a Federal permit, a 404 permit may be required under the interim 404 guidelines. During our field inspection of the project area, we note that a substantial portion of this proposed spoil deposit area (page 10) has already been filled - specifically the west half of the area - except for the bottomland forested area between the fill area and the public park. On the east half, about 75 acres of wetlands and bottomland forest still remain to be filled. This filling is contrary to our Wetland Policy. Additional information on the structural integrity of the Prairie Island levees in protecting this area should be given with a description of its flood protection capability. We note the last work was completed in 1967.

Corps Responses to the U.S. Environmental Protection Agency (cont.)

9. The fill for the Belt Line Truck Route would probably be obtained by dredging bottom material from the Mississippi River. The exact location of the borrow area is not known at this time. If the decision is made to obtain fill from the Mississippi River a Department of Army permit would be required to obtain the necessary fill. The dredging for the 15-barge floating area was already accomplished when Pelzer Street was extended (permit A557 issued on 6 September 1972).

10. As noted earlier the permit application has been revised and is now for a 24-barge floating area (see paragraph 1.034). The primary reason for the depth required is to provide the needed fill for River Bend Industrial Park, Phase II. The Winona City Engineer has indicated the floating area (24-barge) is constructed as a permanent fixture and that the anticipated life of the project has not been figured as in Corps projects.

See also our response number 6, page 134, regarding protected lands.

11. These paragraphs have been revised (paragraph 4.060 and 4.063 in the final EIS). There is a small acreage of isolated wetland within the Phase II area of River Bend Industrial Park. The proposed alignment of the proposed base around River Bend Industrial Park has been altered to preclude the filling of 40.6 acres of Types I and IV wetlands (see figure 4, page 7 and response number 8 to U.S. Department of Interior, page 141). In a letter dated 31 March 1976 from the U.S. EPA to the District Engineer, we were advised that the filling of River Bend Phase II would not require mitigative measures in view of the modification of the proposed levee alignment around the industrial parks. This letter also states that the EPA remains opposed to the construction of the 24-barge floating area because of the existence of other viable alternatives. River Bend Phase II is one of the sites that is currently being considered for disposal of dredge materials resulting from Mississippi River channel maintenance.

12. The owners of the Mississippi Development have been informed that a Section 404 permit will be required if any wetlands are to be filled. If the Mississippi Development Consortium does apply for a permit, the impacts of the project will be dealt with in a supplement to this impact statement.

The stage 1 portion of the flood control project at Winona presently provides protection from a flood which has a frequency of approximately 100-years. This is the same level of protection that would be afforded by the proposed project.

Corps Responses to the U.S. Environmental Protection Agency
(cont.)

Alternatives

13. The EIS should discuss in detail alternative sites that could avoid some or all of the adverse environmental effects of the proposed Fronings Inc. Grain Terminal and the Mississippi Development Consortium.

14. As stated in the EIS, an alternative to the Winona Port Authority 36-Barge Channel Area would be to expand the present 15-barge floating area in Crooked Slough; the EIS should discuss this alternative in more detail. This discussion should include but not be limited to the effects on wetlands, Section 404 permits and impacts due to future expansion on protected lands and wetlands.

General Comments

1. The EIS should discuss in detail how the Froning project and the Farmers Union Grain Terminal compound the adverse environmental effects on air quality and noise pollution in all quantitative estimates.

2. The EIS should state to what extent these projects will affect the 100-year flood elevation. The effect that these flood elevation changes will have on cities upstream of Winona should also be noted.

In conclusion, we have serious concerns regarding the destruction of wetlands. Because of the relationship of these wetlands to the Mississippi River, many of these projects will require a Section 404 permit. Secondly, the proposed projects will further degrade ambient particulate levels in the Winona area and will cause an increase in the frequency of air quality standard violations. Lastly, the construction of these projects will produce possible severe noise impacts on noise sensitive areas along some of the roadways in the Winona area. We strongly recommend coordination with the MPCA on both the air and noise aspects of these proposed projects and their relationship to applicable State and Federal standards.

13. All of the available alternatives for constructing the Fronings Grain Terminal have been discussed in the final EIS, see paragraphs 6.023 - 6.025.

14. The present proposal by the Winona Port Authority is to construct a 24-barge area at the same location in lieu of the previously proposed 36-barge floating area. The alternative of expanding the floating area at Crooked Slough rather than constructing the downstream floating area (24-barge floating area) is discussed in paragraphs 6.037 to 6.052 of the final EIS. A discussion of the city's "protected lands" designation is discussed in response 6, page 134.

15. The cumulative adverse effect on air quality of the Farmers Union Grain Terminal and the proposed Fronings project is now discussed under synergistic impacts on air quality in paragraph 4.075 to 4.089 of the final EIS. The resultant increased noise levels from truck traffic is acknowledged in the FEIS. Also see response to U.S. EPA number 5, page 134.

16. Each project that involves the deposition of fill within the floodplain requires a Department of the Army permit. The projects included in this EIS that require permits have been reviewed by the St. Paul District Hydraulics Branch and no problems were noted. The cumulative effect of filling within the floodplain is acknowledged in this EIS. (See paragraphs 4.072 - 4.074.) One exception to this is the extension of Pelzer Street to the east towards the interstate bridge. This is part of the belt line truck route. The city of Winona has not applied for a Corps permit as of this date. The city is actively working with the Railroad to determine if this road can be widened on the landward side rather than further constricting the Mississippi River.

17. The impacts upon wetlands have been discussed for each project. The EPA recommendation for the requirement of section 404 permits for the Fronings, Inc. Grain Terminal, Winona 36-Barge Floating Area, and the Mississippi Development Consortium have been discussed in our response number 1, page 133.

See section 4, paragraphs 4.075 to 4.089 of the FEIS for a discussion of synergistic impacts on air quality in Winona.

See response number 5 to EPA on noise, page 134.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
WISCONSIN AREA, STATE AND PRIVATE FORESTRY
1200 L. I. Post Office & Custom House
MILWAUKEE, WISCONSIN 53103
TELEPHONE: 214-557-3772

8400
June 27, 1975



Mr. W. L. Smith, District Engineer
Department of the Army
1200 L. I. Post Office & Custom House
Milwaukee, Wisconsin 53103

Refer to: NCSED-ER, Draft Environmental
Statement, Flood Control,
Milwaukee, Wisconsin

Dear Sir: Re: Re:

The approach of the above statement, covering flood control
development and related projects at one time, is
unusually good. The effects of the levees, industrial
development and roadway improvement are interrelated.

It is concerned about the cumulative depletion of marshland
in this and other areas. At some time, now or in the near
future, it may be necessary to replace any wetlands that are
removed for any reason. Although not all alternatives
affect wetlands directly, associated development will certainly
affect them at their expense.

The role of flood plain zoning is not clear. The final state-
ment should show how this measure of flood protection fits into
the planning.

Thank you for the opportunity to review and comment on the
draft.

Very truly,
W. L. Smith
W. L. Smith
District Engineer

Corps Responses to the U. S. Department of Agriculture - Forest Service

1. Concur. The effects on wetlands are discussed for each individual
project in section 4 of the EIS. The cumulative effects are dis-
cussed under synergistic impacts, paragraphs 4.069 - 4.074.

2. Floodplain regulations are presently in effect in the Winona area.
If the proposed flood control project is constructed the fill
requirements within most of the protected area would probably be
reduced. Reach 4, as depicted in figure 23, page 102 would remain
unprotected. A discussion of floodplain zoning is presented on
pages 103-106.

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2. The Senator has reviewed the Draft Environmental Impact Statement for the proposed Project and the National Environmental Policy Act of 1969, as requested in your transmittal letter of 11/1/78. The Senator has also reviewed the comments of the Assistant Secretary, Program Development and Policy, U.S. Department of the Interior, and has been impressed with the thoroughness and expertise and have been particularly impressed with the National Environmental Policy Act of 1969.

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the extent of defining the cumulative impacts of a combination of related projects; however, this statement, even though it disallows a number of projects which are associated with development of the new flood plain at Winona, does not assess adequately their potential impacts, either individually or collectively. The cumulative impacts to be established Winona as a major grain terminal in the region, yet the "synergistic adverse impacts" of additional projects are avoided in a single sentence (5.019) stating, "The cumulative impacts of all the projects will then primarily be in increased population and associated congestion." The statement is self-evident: problems . . . should be avoided and otherwise other basic problems should be addressed:

[illegible]

Corps Responses to the U.S. Department of the Interior

1. The section discussing the synergistic impacts of the proposed projects has been expanded in the final FIS, see paragraphs 4.069 - to 4.090.
2. The cited statement has been revised (see paragraph 6.007). The wording "economically disastrous" was too strong in referring to the potential impact on Wisconsin's economic stability. We recognize the fact that the proposed flood control project would foster more development within the protected area. The consequent increased demands on fish and wildlife habitat are acknowledged in paragraph 4.070, FIS. It is recognized that the project would only put off the day that the city's growth would be curtailed.

The existence of a major grain shipping center at New Orleans may well affect the Mississippi river by increasing increased barge traffic. Accelerated shoreline erosion, increased potential for chemical spills, increased navigation-related impacts should be discussed in the planning. Further, the impacts of increased barge traffic on biota in areas near Vicksas should be considered, not only in terms of direct impacts generated by the moving activities themselves, but also in terms of adverse effects on habitat as pressure for more floating transport increases as a result of expanded industrial development in the area.

The obvious nature of the statement makes it difficult to comprehend. We believe that readability would be improved substantially if each of the project impacts was treated separately in "mini-impact statements" with a comprehensive effort of all the projects treated similarly at the end of each volume. The addition of better graphics including detailed photographs would be much to aid comprehension. The natural environmental impacts of each project also should be described in detail with particular attention to those impacts as individual and open space. At present, the impacts are lumped in together from the general description of the flood plain project. We cannot draw any conclusions regarding impacts generated by individual projects. Any interactions between projects should be noted in the same way as the other impacts.

3. **Concur.** Damages due to a flood of such magnitude would be increased. However, the intent of the proposed project's high degree of protection is to make the event very improbable.

4. The impacts of increased barge traffic on the Mississippi River are discussed in paragraph 4.071 of the FEIS. In January 1977, the City Engineer completed a feasibility study on the barge floating needs of Winona. It was determined that a total of 60 spaces would be required to meet the barge floating demands of Winona in the next 5 years. The demands that may be placed upon habitat beyond this point are impossible to predict with any accuracy.

5. The Winans flood control project and the proposed development are all interrelated. In order to properly assess the primary, secondary and cumulative impacts of the proposed projects the decision was made to write a comprehensive EIS. We have attempted to clarify the statement and improve the graphics. The descriptions of the interrelationships and interactions of the proposed projects have been expanded.

ENVIRONMENTAL SETTING WITHOUT THE PROJECT HISTORICAL, NATURAL, AND SCIENTIFIC SITES

The proposed project would be consistent with the National Register of Historic Places and does not appear to have any property included in or eligible for inclusion in the Register (such as the Second Street Commercial Historic District). The project would not be a project of the National Register of Historic Places. Further, the statement should be revised to be consistent with the project development.

4. POSSIBLE EFFECTS OF THE PROPOSED PROJECTS

The results of the proposed archaeological survey indicate possible impacts on cultural resources, such impacts should be described in the project description. The project would not be a project of the National Register of Historic Places. Further, the statement should be revised to be consistent with the project development.

5. ENVIRONMENTAL SETTING WITH THE PROJECT

The project would not be a project of the National Register of Historic Places. Further, the statement should be revised to be consistent with the project development.

6. ENVIRONMENTAL SETTING WITH THE PROJECT

The project would not be a project of the National Register of Historic Places. Further, the statement should be revised to be consistent with the project development.

6. The FHS reflected this information (see paragraphs 2.170 - 2.173).

7. See paragraphs 2.170 - 2.173

8. This alternative has been adopted and incorporated into the proposed project. See figure 4, page 7.

9. The Winona Port Authority has submitted a revised permit application for the previously proposed 36-barge floating area. The present proposal is to construct a 24-barge floating area. The environmental impacts would be essentially the same.

It would be possible to expand the Crooked Slough floating area in lieu of constructing a floating area near Riverhead Industrial Park. By allowing the entire 60 acres of the Fremings property to be filled with fill taken from Crooked Slough two objectives can be achieved. A floating area can be created that would meet the needs of Winona and the proposed downstream floating area could be eliminated.

The Winona City Engineer completed a feasibility study for the Port Authority in January 1975 to determine the basic floating needs for the city. It was determined that a total of 60 barge floating spaces would be required to meet the needs of Winona in the next 5 years.

We recognize the environmental tradeoffs incurred if the Crooked Slough floating area were expanded on a large scale. It must also be recognized, however, that by concentrating the floating in the Crooked Slough area, there would be less need for the construction of floating areas at other locations near Winona.

STATION AT PELZER STREET

3. SOURCE FLEETING AREA NEAR RIVER BEND

INDUSTRIAL PARK

STATION THE OBJECTS OF ALL PROJECTS

HOW CAN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT
BE MANAGED TO AVOID THE DEPLETION AND ENLIGHTENMENT OF LONG-TERM PRODUCTIVITY

11. Field investigations subsequent to the publication of the draft EIS revealed that the area does have value for wildlife (see paragraph 4.050 of the final EIS). The statement referring to the eventual filling of the marsh has been deleted.

12. See Figure 10, page 24 of the final ETS.

13. The section covering synergistic impacts of the proposed projects has been expanded, see paragraphs 4.069 to 4.090.

Corps Responses to the U.S. Department of the Interior
(cont.)

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14. In order to meet the barge floating needs of Vietnam over the next 5 years, there will be 60 barge floating spaces required (see response 9, page 141). The wisdom of providing additional floating areas at locations other than the commercial harbor is questionable. If barge floating areas were allowed to fill the entire 60-acre site, the need for additional floating spaces would be met and a disposal site for the material would be available.

Sincerely yours,

William F. McCreath

William F. McCreath
Acting Special Assistant
to the Secretary

United States Department of the Interior

OFFICE OF THE SECRETARY

1015 CENTRAL AVENUE
SOUTH DULUTH, MINN. 55812
TELEPHONE 222-2222

July 1, 1973

Mr. J. Edgar Hoover

Director, Federal Bureau of Investigation

U.S. Department of Justice

Washington, D.C. 20535

Dear Mr. Hoover:

Enclosed for your review are two copies of a letterhead memorandum (LHM) dated June 11, 1973, concerning the Draft Environmental Impact Statement (EIS) for the Flood Control Project and Waterfront Development in the City of Wisconsin, Wisconsin. If these comments reach you, please be considered in preparation of the final EIS, you may be able to assist in other aspects of project planning.

In addition to the written comments, we wish to highlight impacts on the recreational resources of the Wisconsin area. If the subject proposals are approved, the City's present recreational environment will be severely impacted. In our view, these impacts were not adequately evaluated in the EIS.

Very truly yours,

Enclosure

The enclosed letterhead memorandum indicates that the City of Wisconsin currently has no recreational lands for a population of 72,400, there is no dis-

tribution of the subject proposals in a wide range of recreation facilities. In view of the present lack of the proposals on the quality of the existing recreational lands, the future availability of these lands for meeting the needs of the population of the City of Wisconsin may be substantially diminished. The enclosed letterhead memorandum and evaluation is the statement.

Sincerely yours,

William J. McDermott

William J. McDermott
Acting Special Assistant
to the Secretary

Copy Responses to the U.S. Department of the Interior
(cont.)

15. The section on recreation and aesthetics in the Wisconsin area has been expanded (see paragraphs 2.139 to 2.153). The potential impact of increased industrial expansion upon the quality of the recreational experience has been recognized in the final EIS (see paragraphs 4.069 to 4.070).

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pollock Building, Fort Snelling
P.O. Box 55111
St. Paul, Minnesota 55111

Colonel Ray M. Bush
Military Engineer
U.S. Army Engineer District
St. Paul
1275 U.S. Post Office & Custom House
St. Paul, Minnesota 55101

OCT 14 1975

Dear Colonel Bush:

This letter provides further comments regarding the proposed flood control project at Winona, Minnesota.

The April 1974 draft Environmental Impact Statement for the proposed Flood Control Project and Interfront Development in Winona identified a wetland area within the proposed levee alignment. Deposition of fill and movement of equipment for construction of the levee would result in destruction of part of this wetland. Relocating of Burns Valley Creek for inclusion in project plans would eliminate the primary water supply for the creek and would result in further elimination of wetland habitat of significant value to fish and wildlife. In addition, destruction of existing wetland and wooded areas would occur with future development of the River Bend Industrial Park within the constructed levee.

The area with which we are primarily concerned involves approximately 40 acres of Type 4 wetland bordered by willows and lined hardwood bottom land forest. It provides food and cover for northern pike, bullheads, muskrats, mallards, wood ducks, herons and waterfowl. Our preliminary review indicates that if the project is constructed as proposed, it would be necessary to purchase lands for public ownership to offset habitat loss.

The Department of the Interior review of June 11, 1975, of the draft Environmental Impact Statement suggested that this wetland could be saved by rerouting the levee to include it thus the area protected from flooding. The new proposed levee alignment recommended by your office will accomplish this objective and in so doing that it be implemented.

In making further coordination with your office to develop a mutually agreeable flood control alternative for the Winona area.

Sincerely,

John B. Bataineh

Regional Director

St. Paul, Minnesota 55101, St. Paul

Corps Responses to the U.S. Department of the Interior
(cont.)

16. As noted in response number 8, page 141 this suggested alternative has been incorporated in the proposed flood control plan.

DEPARTMENT OF TRANSPORTATION
BUREAU OF AIRCRAFT ADMINISTRATION

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Figure 1

We have reviewed the draft environmental statement for the proposed mining, reclamation and reforestation project and recommend Development, Viroqua, Minnesota, to prepare the necessary permits to offer.

1. Statement of the problem and comment on the draft environmental

Sincerely yours,

E. L. Anderson
Regional Administrator

Keywords: *addition, subtraction, mathematics, problem solving, mathematics education*

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W. G. Birch, Director
Office of Environment and Design

Office of Environment and Design

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THE UNIVERSITY OF CHICAGO

2. The proposed 3rd-barge floating area (now 2nd-barge floating area, see paragraph 1.034) cleasout facility is intended for cleaning of barges containing dry cargo only (see paragraphs 1.037, page 18).
3. The impacts of the barge floating area adjacent to River Road Industrial Park are discussed in paragraphs 4.047 to 4.148. We concur that the proposed location of the floating area could directly affect the development of the industrial park and the quality of the local environment.
4. Exhibit 8 shows existing tonnages and barge traffic levels to and from Wisconsin. Also indicated are barge traffic (green only) to the Minneapolis - St. Paul area.

expanding upon the water-front facilities planned in this area, and to increase heavy traffic in the Winona port area. The plan calls for a new wharf, both to and from Winona, and a new pier for heavy traffic. The plan also calls for a new pier for heavy traffic, and a new pier for heavy traffic.

the same time, the same equipment for the waterfront facilities should be directed to the Aids Center, and the same staff should be directed to the Aids Center.

...community in review your draft environmental impact statement. We intend to review the final version.

1

Commander, U. S. Coast Guard
Chief, Marine Safety Division
Under direction of the District Commander

Corps Response to the Minnesota Department
of Natural Resources

1. The section describing vegetation of the area has been expanded, see paragraphs 2.037 to 2.056, final EIS.
2. This information has been included, see paragraphs 2.067 to 2.062.
3. See paragraph 2.065, final EIS.

STATEMENT OF NATURAL RESOURCES

STATE OF MINNESOTA, DEPARTMENT OF NATURAL RESOURCES, ST. PAUL, MINNESOTA - 55155

Minnesota Department of Natural Resources
Division of Wildlife Management
100 North Wacker Drive
St. Paul, Minnesota 55101

Re: Wisconsin, Draft E.I.S., Wisconsin Flood Control
Project and subsequent development.

Dear Sirs:

The Minnesota Department of Natural Resources has reviewed the above
document and offers the following comments.

Minnesota Department of Natural Resources has previously indicated
that it would like additional flood control measures
to be considered, and therefore these comments will deal
with the question of the State II Flood Control Project
and subsequent development.

Information regarding the natural resources of
the area is incomplete, often deals in generalities, and
does not contain any data, and considerable changes are
needed in the report. The report does not adequately recognize
the importance of the natural attributes of the area.

The information on the vegetation of the area
is very incomplete. It is a source (papers by H.E. Green)
which is old, and considerable changes are
needed in the information presented in the distribution
of species (plants) i.e., Sago is believed to
be a commoner species rather than increasing.

Information on the area is very sketchy. No information on
the distribution of species such as muskrat,
beaver, mink, otter, and rabbit is provided. Data on
the distribution of species should also be provided.

The information on the area is very sketchy. No information on
the distribution of species such as muskrat,
beaver, mink, otter, and rabbit is provided. Data on
the distribution of species should also be provided.

The information on the area is very sketchy. No information on
the distribution of species such as muskrat,
beaver, mink, otter, and rabbit is provided. Data on
the distribution of species should also be provided.

Corps Responses to the Minnesota Department
of Natural Resources (cont.)

4. This was not the intended implication of Table 3 and paragraph 2.130 of the draft environmental impact statement. The discussion of parks and recreation has been expanded in the final EIS. (see paragraphs 2.139 to 2.153 and paragraphs 4.066 and 4.067.)

5. This has been revised, see page 1, final EIS.

6. This information has been included in paragraph 3.009, final EIS, page 72.

7. The wording "economically disastrous" was probably a bit strong for describing floodplain zoning's (by itself) potential effect on the economic situation in Winona. This paragraph has been revised in the final environmental impact statement (see paragraph 6.007, page 103). The two cited sentences, when read in context are not inconsistent. Floodplain regulation (by itself) would discourage future development in the floodplains at Winona. Outstanding high-ground areas for development are not available because of Winona's geographic location.

8. This paragraph has been revised, see paragraph 6.009, page 6.010 of the final EIS.

...and more generally, for the ... National Fish and Wildlife Refuge, ... data should be generated.

... in Table 3 (p. 59) and in paragraph 2.130 showing ... and reserved open space" are ... that there is plenty of this ... heart to lose some. Actually, ... wildlife habitat and other types of ... for intensive recreation. This type ... it naturally occurs (in ... and therefore its abundance ... and statewide basis. Any measure ... such as the Winona ...

Page 11 (Revised Content)

... (p. 4) states that the project will "provide ... and security for the City of Winona." It should ... security will be provided only ... level, and will not be absolute protection.

... deficiency of the Draft E.I.S. is its inadequate ... of the floodplain regulations adopted by the ... in 1974, which have definite flood protection ... in line of permanent structural protection. There ... in the report where this could have been ... as an alternative action. An example ... which mentions the benefits the dike will ... the proposed River Bend Industrial Park, while ... of the city's existing floodplain regula- ... that the minimum elevation of the lowest ... is to be at least 659.0' elevation, ... the 100 year-frequency flood.

... Section 6.007 states that floodplain zoning ... economically disastrous to the city" ... with an earlier statement in this ... states that "rather than precluding ... floodplain regulation shapes ... and development."

... states that implementation of non-structural ... is not economically feasible. This is ... and appears inconsistent with the city's ... regulations which require individual ... for new development in this area.

Page 4
Colonel Max N. Noah
July 3, 1975

In regard to the comments in paragraph 7.009 relating to the dredging of Crystal Lake to provide fill for the Fronting project, it should be noted that additional water depth would eliminate plant and animal life utilized by waterfowl, and in addition, increased use by barges will increase harassment and disturbance of ducks, and will increase the chances of spills.

b. Farmers Union Grain Terminal Association, Elevators and Shipping Facility.

This facility is also outside the flood protection system, yet its protection is not discussed.

c. Winona Fleeting Company, 15-Barge Fleeting Area in Crooked Slough.

Paragraph 4.033 gives the impression that the prior dredging was good for the area, contrary to the facts. Major expansion of this facility (paragraph 6.028) would have the effect of giving further economic justification for the Frog Island Industrial Park.

d. Winona Port Authority, 36-Barge Fleeting Area and Barge Cleanout Facility.

The fact that the marsh may fill in anyway is not justification for destroying it by dredging. The marsh wouldn't be "doomed" (paragraphs 6.036, 4.047) if the Corps wasn't dumping spoil upstream which washes into the marsh during periods of high water. It should be added (paragraph 5.015) that the development will also increase the risk of accidental spills and discharges from barge-cleaning operations.

e. Enclosing of County Ditch No. 3.

In the discussion on p. 16, no mention is made of the capacity which the enclosed ditch is designed to carry. Was a hydraulic evaluation made in sizing the culvert?

f. Mississippi Development Consortium, Industrial Park.

This project involves 160 acres which was formerly Mississippi backwater channels, marshes, and islands. The existing Prairie Island flood protection levee cut this portion of the flood plain off from the river. Much of this area back of the levee, which is planned for development, consists of Type III and IV wetlands including U. S. Fish and Wildlife Service refuge

Corps Responses to the Minnesota Department
of Natural Resources (cont.)

13. It is recognized that there are adverse environmental tradeoffs involved with most projects connected with riparian development.

14. The area occupied by Farmers Union Grain Terminal was filled to an elevation of 660-662.5 feet. (1 foot above the 100-year flood level). This is consistent with the floodplain zoning regulations for this area on the Mississippi River. (See paragraph 1.024 of the FEIS.)

15. Anaerobic conditions only exist in depths over 40 feet in Crooked Slough Harbor. The deeper areas only comprise a small portion of the dredged area.

We agree that a major expansion of this harbor would provide additional justification for the Frog Island Industrial Development. Any development of Frog Island would be subject to State and Federal air and water quality regulations.

16. We do not consider this "fact" to be justification for allowing the destruction of the existing wildlife habitat. All aspects of the project, i.e. social, environmental, and economic will be considered before a permit is granted or denied.

The reference to the marsh being "doomed" has been deleted in the final EIS. It is acknowledged in the final EIS that the marsh has been degraded by the earlier deposition of dredged material. Comments on the draft EIS and subsequent field investigations revealed that the project site does have value as fisheries and wildlife habitat (see paragraphs 2.124 and 2.125 of the final EIS). The Great River Environmental Action Team (GREAT) is studying the Corps' dredged material disposal program on the Mississippi River. They are exploring ways of reducing the amount of maintenance dredging done on the river and finding ways in which dredged material can be disposed of in an environmentally sound manner.

This has been added to paragraph 5.015 of the FEIS.

17. See paragraph 1.040, final EIS.

18. The destruction of wildlife habitat is recognized in paragraph 4.066 of the final EIS. The elimination of littoral areas will be dependent upon the areas dredged and the resulting depths.

Page 5
Colonel Max W. Noah
July 3, 1975

lands and lands bequeathed to the City of Winona by John Latsch for wildlife purposes. Dredge and fill proposals by the Consortium would destroy these shallow marsh habitats in addition to creating a deep steep-sided lake. The lake would have little or no shallow littoral area, thus eliminating the wildlife attributes and creating undesirable conditions for game fish.

Thank you for your cooperation in this matter.

Sincerely,


Robert L. Herbst
Commissioner

rd

CITY OF WINONA

CLARENCE E. LARSEN, JR. - WINONA, MINNESOTA 55901

November 17, 1975

Colonel Neil W. Bush
District Engineer
U.S. Army Corps of Engineers
1000 S. 1st Street
St. Paul, Minnesota 55101

Re: Response to Draft E.I.S. dated
April 1975

Dear Colonel Bush:

Enclosed is a copy of the City's response to the Draft Environmental Impact Statement on the Winona Flood Control Project and Waterfront Development. We are submitting this response as a result of our meeting with you and your staff on November 10, 1975.

The reason we did not respond to the Draft E.I.S. was that we, the City, thought that the Corps would give the City a chance to respond to issues raised by various agencies on a point-by-point basis. The basis for this thinking is as follows:

1. On June 4, 1975, the Winona Port Authority submitted a request for a permit to the Corps to construct a bridge crossing the Mississippi River in Phase II Riverbank Industrial

On July 7, 1975, the Corps requested the Winona Port Authority to submit an archaeological investigation of the bridge crossing site and the fill site. The request for this archaeological investigation was made in a statement: "Processing of your application for this permit has not been completed until the archaeological investigation requested above has been provided."

On July 2, 1975, the Winona Port Authority received a letter from the Corps requesting the Port Authority to answer the objections to the proposed bridge crossing by the Perless Chain Company. This

November 17, 1975

The processing of the Winona Port
application will be held in abeyance until
the processing of the Rice Lake County have
been completed.

On July 1, 1975, objections had been received from U.S.
Fish and Wildlife Service for the Minnesota Department of Natural Re-

sources. On July 28, 1975, Bob Pennington of the Corps staff gave
a copy of the letter addressed to Colonel Max Moak from
Colonel Pennington, Commissioner for the Minnesota Department
of Natural Resources, which letter objected to the April 1975
application for a permit to construct a dam. To date the Port Authority
has not received an official communication from the Corps in regard
to the processing of the application. A statement concerning the
application is being made in Phase II of Riverbend.

On October 30, 1975, the Winona Port Authority received
a letter from the Corps, including a copy of the letter from
Colonel Pennington, Commissioner for the Minnesota Department
of Natural Resources, which letter objected to the April 1975
application for a permit to construct a dam. The processing of your application is held in
abeyance until the resolution of the objections is received.
The objections are being reviewed and the Corps is being advised of the
progress of the review.

The above described actions led the City of Winona to be-
lieve that the City could be requested to respond to the Draft
Application for a permit to construct a dam. We sincerely appreciate
the opportunity to have responded to the Draft E.I.S. and are
looking forward to your response.

Thank you for your cooperation.

Respectfully submitted,

David E. Sorenborger
David E. Sorenborger
City Manager

David E. Sorenborger, City Engineer

November 17, 1975

CITY OF WINONA, MINNESOTA
RESPONSE TO DRAFT ENVIRONMENTAL IMPACT STATEMENT
FLOOD CONTROL, PORTLAND AND WATERFRONT DEVELOPMENT

1. GENERAL COMMENTS

The purpose of this response is to clarify and set out the long range goals and needs of the city and also to express dissenting points of view to the Draft EIS.

The City of Winona is in dire need of the completion of Stage II of the Permanent Dike Project. The frequency of flooding on the Mississippi River has rapidly increased with flood stage at Winona being exceeded six times in the last eleven years. The City maintains 4.3 miles of temporary dikes along with the existing 6.1 miles of permanent dikes to protect the city from flooding. Maintaining temporary dikes is very costly and time consuming for the City of Winona. Temporary dikes also present a false sense of security. Failure of a temporary dike (which is quite possible) would catch the City by surprise and cause tremendous damage. Completion of the permanent dike is paramount to the long range planning of the city.

The United States policy on grain exporting has had a very real impact on the City of Winona. Two elevators, Victoria (now Winona) and Farmers Grain Terminal, have located at Winona, and a third elevator company, Fanning of Clinton, Iowa, has been granted permits to also construct a grain terminal. Winona's location on the Mississippi River below Lake Pepin and in the center of the grain belt makes Winona a prime location for the efficient transfer of grain between rail, truck, and barge. To facilitate planning of the Winona riverfront, in particular

...referred to water-transportation, the Winona Port Authority employed a consulting engineering firm, Kaiser Engineers, to perform a market analysis and feasibility study in 1973. This study stated that grain exporting from Winona could amount from 8,000,000 bushels in 1972 to 39,000,000-bushel commercial, the 1974 total was 22,000,000 bushels. The city policy is to concentrate the grain elevators in the commercial export area and to construct a belt line truck route to serve grain elevators.

Due to the boom in the exporting of grain from Winona by barge, barge floating has become a very real problem for Winona. A feasibility study completed for the Port Authority by the City Engineer in January, 1975, shows the Winona barge floating needs of 78 spaces. At a Mayor's Conference held on September 23, 1975, the Port Authority spent the whole day studying with the authorities and companies involved, where the barge floating sites should be located. The decision made at this conference was that as much floating as possible be done in the Commercial Harbor area (where the greatest need is), but a floating site was located in the Riverbend area to provide floating for the non-commercial industries located in the East End of Winona and to provide a staging area to assemble tows and drop off barges from the tows. Barges could be moved back and forth and transferred to the Commercial Harbor in smaller tows.

The study report plan of the City calls for the concentration of industry in industrial parks at the West End and East End of Winona. The purpose of this is to minimize truck traffic and the pollution of the city and improve the environment in

posed to noise, air pollution, and traffic safety. This plan is working with Gorman, Fearless Chain, Hal Leonard, Haskins, Roger Pender, Wilma Boncraft, and Miller Scrap Iron, all coming from the center of the city to Riverbend Industrial Park in recent years. The City must be allowed to continue to develop Riverbend Industrial Park to complete the plan of concentrating the industry on each end of the city.

The City has planned a belt line truck route consisting of Theater Boulevard, Pelzer Street, Second Street, Main Street, Eighth Street, and Rudy Boulevard to serve the industrial parks, the commercial harbor areas (grain terminals), and to minimize truck traffic through residential areas.

Pelzer Street connecting Trunk Highway 61-14 directly with the Commercial Harbor was constructed in 1972 and 1973 by dredging to a fill through a marsh. This link of Pelzer Street eliminated the trucks following a narrow winding route through residential areas past a grade school. With the present laws, rules and regulations, this link of Pelzer Street probably could not be constructed. The City contends that an Environmental Impact Statement must look at the total development of the area including noise, air and safety hazards to residents, and that the environment of the people should be taken into account. An Environmental Impact Statement should be prepared on the impact of wetland owned and protected by the City and on the impact of the project on the wetland. The City contends that before denying a project permit simply because the project adversely affects some wetland.

Corps Responses to the City of Winona

1. The geographical area only partially dictates the quantity of grain that will be exported from the Winona Port. Increases in production and improved highway systems will be a large factor in contributing to the amount of grain shipped out of Winona. Three elevators will increase competition because a greater total quantity of grain would be shipped.

2. Concur.

3. The impacts of all available alternatives for filling Riverbend Industrial Park, Phase II, are discussed in the final Environmental Impact Statement. The Corps of Engineers is not opposed to the development of Riverbend Industrial Park, although there are alternatives for the source of fill that should be considered by the Winona Port Authority.

4. The correction has been made in the final Environmental Impact Statement.

5. The theoretical figures were based upon the fact that Victoria elevator (now GAREAC) exported a volume of grain equal to 63 times their storage capacity. See response to your comment number 1. The grain is already sold under contract before it reaches Winona so individual truck drivers do not have the option of selling their grain to the elevator with the shortest waiting line. Additional off-street parking will no doubt alleviate some of the congestion and traffic problems that may occur. See responses to comment 1.

2. The geographical area will dictate the quantity of grain that will be exported from the Winona Port. Increases in production and improved highway systems will be a large factor in contributing to the amount of grain shipped out of Winona. Three elevators will increase competition because a greater total quantity of grain would be shipped.

3. The impacts of all projects covered in the Draft E.I.S. will be discussed in the final Environmental Impact Statement. The Corps of Engineers is not opposed to the development of Riverbend Industrial Park, although there are alternatives for the source of fill that should be considered by the Winona Port Authority. The projects planned by the City of Winona will reduce the adverse effect of truck traffic and the moving and storage of grain on the overall environment of the citizens of Winona.

4. Riverbend cannot be developed, the industry cannot be moved from the center of the city.

5. P. 16 - Fillings fill area will be raised to an elevation of 665, not 645.

6. The probable impacts of the proposed project are discussed in the final Environmental Impact Statement. The theoretical figures about Fringing would be accurate from the E.I.S. as the amount of grain shipped out of the Winona geographical area will increase the amount of grain exporting from Winona. The Kaiser study

show the Winona potential at 35,000,000 bushels. Road traffic should be calculated on the 35,000,000-bushel figure. Three grain elevators handling 30,000,000 bushels per year will not back the grain trucks up along Pelzer Street to the Milwaukee Railroad tracks, much less, T.H. 61. The elevator companies during 1975 have provided considerable more off-street parking for the semis.

4. P. 73 - Archer Daniels Midland Company was one of the major sources of air pollution in Winona. This company has sold out its Winona property and moved out of the city. Air pollution should no longer be a problem.

5. P. 80 - The Port fleet plan is to use the Winona side as a staging area for large river boats and to move the barges back and forth to the Commercial Harbor in smaller tows.

6. P. 83 - The City of Winona is working with the railroad to determine if Pelzer Street can be widened on the land side of the dike rather than the river. If Pelzer can be constructed by widening at the land side, the river would not be further constricted by this project.

7. P. 85 - The view of the dike from the river will be an improvement over the existing view which includes dilapidated boat houses, debris, and

Corps Responses to the City of Winona (Continued)

6. It is very possible that Archer Daniels Midland Company was a major contributor to the air pollution problem in Winona. The closing down of Archer Daniels is noted in table 4, page 54 of the final EIS. Recent data indicates that there are high levels of particulate matter present in the air (see paragraph 2.162, page 66).

7. This has been noted in the project description, see paragraph 1.038 of the final Environmental Impact Statement.

8. This information has been included in paragraph 4.074 of the final Environmental Impact Statement.

9. The dike will restrict the view of the city from the river. Aesthetics is obviously a matter of personal preference. We feel that dike will restrict the view of most parts of the city from the river. This has to be considered an aesthetic impact.

and railroad concrete walls.

10. 25 - The amount of grain to be exported from Winona by barge will be the same whether it is shipped down Winona, Red Wing, or the Twin Cities; thus, the Fronings project will not contribute to an increase in barge traffic on the river. Mentioned previously was the fact that Archer Daniels, a major source of air pollution, had moved out of the city; thus, Winona may now be well within state standards for clean air.

The projected truck traffic of 1.7 trucks per minute, 12 hours a day is inaccurate. Our calculations show approximately 200 trucks per day (average) to move 39,000,000 bushels of grain per year.

11. P. 25 - As mentioned previously, the City is trying to change the design of Pelzer Street to widen on the land side rather than the river side.

12. P. 25 - The long range goals of the City show a maximum population by 1990 of 35,000, and a probable 1990 population of 29,500 will not cause Winona to lose its small town image.

Corps Responses to the City of Winona (Continued)

10. See responses to specific comments numbers 1 and 4, page 156.

11. The figures used were based upon the theoretical projection that Fronings could ship a volume of grain equal to 63 times their storage capacity as did Victoria Elevator (now CAMWAC) in 1973. The figures you are using are based upon a smaller volume.

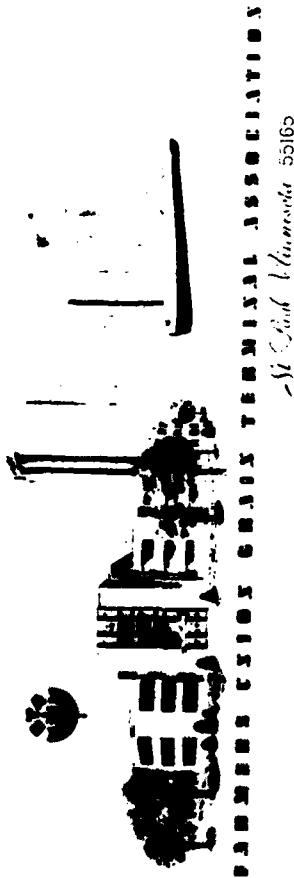
12. This has been noted in the final EIS, paragraph 4.074.

13. Whether or not the city loses its small town image is a subjective judgment. Large increases in truck traffic, increased noise and increases in population all accompany large scale industrial development. The District feels that this impact must be recognized.

11. P. 101 - One of the purposes of the belt line truck route is to connect the interstate bridge to Pelzer Street. This connection will also allow grain trucks from Wisconsin to travel through only three blocks of residential and commercial area enroute to the grain terminals in place of traveling through 46 blocks of residential and commercial area on the present route of Fourth Street, Main Street, Sarnia Street, Gilmore Avenue, Junction Street, Fifth Street, and Pelzer Street.

14. The advantages of the connection between Pelzer Street and the Interstate Bridge are recognized in paragraph 4.038.

Robert J. Ballant
Robert J. Ballant
City Engineer



June 18, 1975

Colonel Max W. Koch
U. S. District Engineer
St. Paul Post Office Building
St. Paul, Minnesota 55101

Dear Sir:

Acknowledging your courtesy and kind assistance (and your staff's) on several occasions, may we submit these comments, as required by law, on your April, 1975, draft environmental impact statement regarding flood control at Winona, Minnesota.

Ray State Milling Company, the Victoria elevator, and the Farmers Union Grain Terminal Association (GTA) elevator load grain in barges at Winona.

The statement suggests "limitation of future expansion" only by ourselves, Farmers Union Grain Terminal Association.

No criteria are offered to define this "limitation of future expansion."

2. The question why the draft singled out our elevator among the Winona competitors or others loading grain in barges at Red Wing, the Twin Cities and La Crosse.

This GTA elevator was completed, and shipping grain in barges from Winona, before we had knowledge from any source of an impact statement referring to it.

3. We ask that you please have a copy of the draft and subsequent changes to it forwarded to Congressman Quie.

Yours very truly,

FARMERS UNION GRAIN TERMINAL ASSOCIATION

Robert J. Wilson
Robert J. Wilson
Manager - Transportation Research

cc: Mr. M. J. Warner, Vice President
Farmers Union Grain Terminal Association

7-17-75

Corps Responses to the Farmers Union Grain Terminal

1. This statement has been deleted from the FEIS. The EIS was written in order to assess the new and proposed riverfront developments as well as the proposed stage II flood control project at Winona. Ray State Milling and Victoria are well established industries in Winona and were not included. Since the GTA elevator is already in operation, other alternatives were not considered as they are with proposed projects.
2. Winona has the potential for becoming a major grain shipping center. Because Farmers Union Grain Terminal is a new project and is related to existing and proposed waterfront development in Winona, it was included in the EIS.
3. A copy of the DEIS has been forwarded to Congressman Quie and he will receive a copy of the final after it is filed with CEQ.

NORTHERN STATES POWER COMPANY

Corps of Engineers Responses to Northern States Power Company

June 14, 1975

Col. Max W. Smith, District Engineer
St. Paul District, Corps of Engineers
1330 U.S. Post Office & Custom House
St. Paul, MN 55101

St. Paul District Impact Statement
Winona Flood Control Project
2000-20

We wish to offer the following brief comments on the
St. Paul District Impact Statement concerning the Winona
Flood Control Project and Waterfront Development, circulated
by the St. Paul District Corps of Engineers on April 30, 1975.

Table 4, on page 48, indicates that Northern States Power
Company would lease a 7.9 acre riverfront site in 1974. This
is only partially correct. MSP owns 7.9 acres of riverfront
land in the City of Winona, which was the site of the former
winery connecting plant and associated facilities. In
November, 1974, the Winona plant, which occupied 6.6 acres,
was sold to a private firm. This valuable riverfront property
is now available for sale. The remaining 1.3 acres is
owned by MSP's Winona substation and will continue to be
used for this purpose.

The impact statement contains much discussion about increased
traffic generated by proposed transshipment of grain
through this area. It would appear that the maximum

1. Table 4, on page 54 in the EIS has been changed to reflect the new information. We do recognize the importance of the Winona substation to the supply of electricity.
2. The Minnesota State Planning Agency published a study on Grain Transportation in Minnesota in January 1975. Their projections for the year 1980 were that the greatest cash crop that could be available for sale would be 775 million bushels of grain. A comparison with other projections made by the U.S. Department of Agriculture and OMA's (national and state) show this projection to be realistic. By 1980 Fronings, Inc., expects to be shipping 39 million bushels of grain/year. This amount would constitute only 5 percent of the projected figure. The Belt Line Truck Route was conceived in order to route heavy truck traffic around residential areas and out of most of the business district. The extension of Palmer Street has enabled trucks to bypass the Jefferson Grade School and Paul Gial Athletic Field area. This has made these two areas much safer for pedestrians. The Palmer Street railroad crossing still promises to be a constant cause of traffic tieups because there is no overpass. In the future, measures may have to be taken to correct this.

INDUSTRIAL STATES POWER COMPANY

-3-

of grain transshipment capability is used to handle grain traffic in the area. It is not likely that 25 percent of the total grain produced in the four-state area would be shipped through one elevator, as implied by the statement made in the draft RRS. In addition, the City of [redacted] would consistently control excessive truck traffic through existing regulations.

It is not the opportunity for a chance to comment on [redacted]

[Signature]
J. M. [redacted] Assistant Manager
Regulatory Activities

BIBLIOGRAPHY

American Air Conservation Commission

1965. Air conservation. Horn Shafer Company, Baltimore, Maryland.

Amtrak, The Milwaukee Road

1974. Personal Communique. Winona, MN.

Brown, Gary E.

1974. Director of Utilities, City of Winona, Winona, MN. Personal Communique.

Bunnel, Lafayette H.

1897. Winona and its Environs on the Mississippi in Ancient and Modern Days. Jones and Kroeger, Winona, MN.

Carlander, Harriet E.

1954. A history of fish and fishing in the Upper Mississippi River. Upper Mississippi River Cons. Com.

Carman, Richard

1970. Fluorometric determination of current patterns within a slough in Pool 6 of the Mississippi River. Unpublished M.S. Thesis, St. Mary's College Library, Winona, MN.

City of Winona

1969. Department of Planning, Land Use Analysis.

City of Winona

1972. Department of Planning. Winona Land Use Plan.

City of Winona

1971. Demographic Analysis and Projection, Report No. 2, pp. 28-42. Department of Planning.

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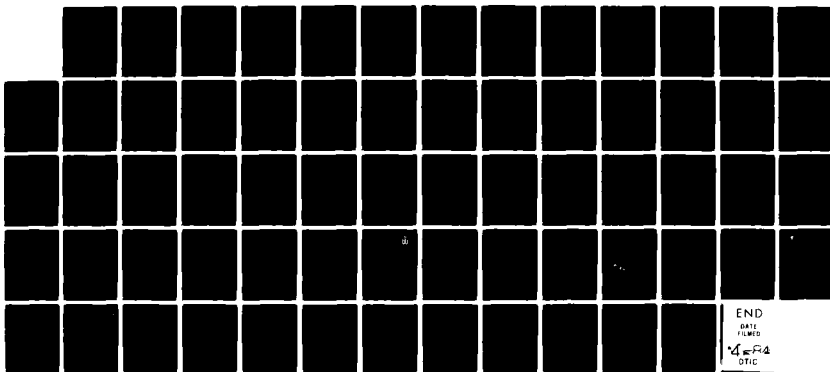
WINONA MINNESOTA FLOOD CONTROL PROJECT AND WATERFRONT
DEVELOPMENT(U) CORPS OF ENGINEERS ST PAUL MN ST PAUL
DISTRICT JAN 76

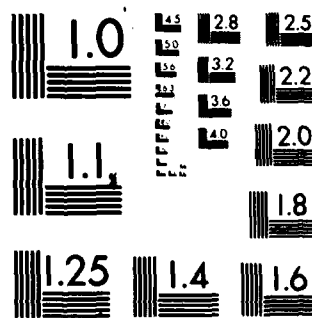
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Curtiss-Wedge, Franklin and W.J. Whipple

1913. History of Winona County, Minnesota. H.C. Cooper Jr. and Co., Chicago.

Erickson, James R.

1964. Three southeastern Minnesota lakes as possible habitat for Hexagenia mayflies. Proc. Minn. Acad. Sci. 32(1): 24-25.

Flattum, Roger

1962. Distribution of mice population in the Winona Area. Proc. Minn. Acad. Sci. 30(1): 14-17.

Fremling, Calvin R.

1960. Biology of a large mayfly, Hexagenia bilineata (Say), of the Upper Mississippi River. Ia. State Res. Bul. 482.

-
1960. Biology and possible control of nuisance caddisflies of the Upper Mississippi River. Ia. State Res. Bul. 483.

-
1964. Rhythmic Hexagenia mayfly emergences and the environmental factors which influence them. Verh. Internat. Verein. Limnol. 15: 912-196.

-
1970. Factors influencing the distribution of burrowing mayflies along the Mississippi River. Proc. Internat. Soc. Ephemeroptera: 12-25.

,D. V. Gray and D. N. Nielsen

1973. Phase III Report. Environmental Impact Study of Pool 5A of the Northern Section of the Upper Mississippi River Valley. North Star Research and Development Inst. St. Paul, MN.

Fremling, Calvin R., D. V. Gray and D. N. Nielsen

1973. Phase III Report. Environmental Impact Study of Pool 6 of the Northern Section of the Upper Mississippi River Valley. North Star Research and Development Inst. St. Paul, MN.

Frye, J.C., H. B. Wilman and R. F. Black

1965. Outline of glacial geology of Illinois and Wisconsin, in Wright, H.E., Jr., and D.G. Frye, The Quaternary of the United States: Princeton, Princeton Univ. Press: 43-61.

Galvin, Dennis G. and Taus, David A.

1972. A comparison of quantitative particulates from three sites in Winona, MN. St. Mary's College, Winona, MN.

Green, William E.

1947. Distribution of Marsh and Aquatic Plants on the Upper Mississippi River Wild Life Refuge. U.S. Dept. Inter., Bur. Sport Fish. Wildl., Winona, MN.

-
1960. Ecological Changes on the Upper Mississippi Wild Life and Fish Refuge. mimeo publication, 15 pp. U. S. Dept. Inter., Bur. Sport Fish. Wildl., Winona, MN.

Hemming, Donald L.

1972. A distribution study of the mayflies, Hexagenia bilineata (Say) and Hexagenia limbata (Serville), in the area of Lock and Dam 5A, Winona, Minnesota. Unpublished M.S. in Ed. Thesis. Winona State College Library, Winona, MN.

Joyce, F. L.

1933. Minnesota beaver. They still need protection. Minnesota Waltonian 4(9): 2, 14.

Kaiser Engineers

1973. A market analysis, Frog Island Industrial District, Feasibility Study for Port Authority, Winona, Minnesota.

Marsden, Roger D. and Fred F. Shafer

1924. The overflowed lands on the Mississippi River between St. Paul and Rock Island, and the practicability of reclaiming them for agriculture. U. S. Department of Agriculture. Bureau of Public Roads. 36pp. mimeo.

Matsch, C. L.

1962. Pleistocene geology of the St. Paul and Prescott quadrangles: Univ. of Minnesota, unpublished M.S. thesis.

Mattison, Willis M. and Jerry F. Leinecke

1972. A radiotelemetric study of the behavior ecology of whitetailed deer in an Upper Mississippi River floodplain environment. Unpublished M.S. Thesis, St. Mary's College Library, Winona, MN.

Minnesota Department of Employment Services

1973. Winona, MN. Personal Communique.

-
1973. Minnesota County Work Force Data.

Minnesota Highway Department and the Department of Planning

1972. City of Winona Transportation Plan.

Minnesota Pollution Control Agency

1971. Air Pollution Summary. Division of Air Monitoring and Data Evaluation. State of Minnesota Printout. St. Paul, Minnesota.

Minnesota Pollution Control Agency

1972. Data Analysis Printout. Division of Air Monitoring and Data Evaluation. State of Minnesota Printout. St. Paul, Minnesota.

Minnesota State Planning Agency

1970. Minnesota Water and Related Land Resources. First Assessment.

Mississippi Valley Airlines

1974. Personal Communique.

Moody's Investor Service

1973. Moody's Transportation Manual. New York.

Nelson, Lowery

1954. A century of Population Growth in Minnesota, University of Minnesota, pp. 34-35.

Nord, Robert C.

1967. A compendium of fishery information on the Upper Mississippi River Cons. Com.

Pike, Zebulon M.

1811. Exploratory travels through the western territories of North America: voyage from St. Louis, on the Mississippi to the source of that river, and a journey through the interior of Louisiana, and the north-eastern provinces of New Spain. . . . 1805, 1806, 1807, by order of the Gov't of the United States. Paternoster-Row. London.

Rademaker, John M.

1966. A report on pollution of the Upper Mississippi River and major tributaries. Federal Water Pollution Control Administration.

St. Mary's College

1974. Registrars Office. Personal Communique. Winona, MN.

St. Teresa College

1974. Registrars Office. Personal Communique. Winona, MN.

Schwer, Rosemary and Nancy Jo Russel

1972. Quantitative determination of particulate matter generated by the City of Winona and/or introduced by wind currents. Unpublished M.S. Thesis, St. Mary's College Library, Winona, MN.

Steele, Ray C.

1933. The Upper Mississippi River Wild Life and Fish Refuge. Minnesota Waltonian. 4(9): 4, 14.

U. S. Army Corps of Engineers

1970. Interim Survey Report for Flood Control Mississippi River at Winona, Minnesota. St. Paul: Corps of Engineers.

-
1974. Preliminary Environmental Assessment-Fronings Elevator and Shipping Facility in Winona, MN. St. Paul: Corps of Engineers.

U. S. Census Bureau

1970. Characteristics of the Population, Volume I, Table 32, pp. 171-179.

U. S. Department of the Interior

1968. Mammals of the Upper Mississippi River Wildlife and Fish Refuge. Bureau of Sport Fisheries and Wildlife Refuge Leaflet 326.

-
1970. Amphibians and reptiles of the Upper Mississippi River Wildlife and Fish Refuge. Bureau of Sport Fisheries and Wildlife Refuge Leaflet 420.

-
1970. Birds of the Upper Mississippi River Wildlife and Fish Refuge. Bureau of Sport Fisheries and Wildlife Refuge Leaflet 442-R4.

U. S. Geological Survey

1969. Water Resources Data of Minnesota. Parts 1 and 2. U. S. Dept. Interior.

Upper Mississippi River Comprehensive Basin Study Committee

1970. Upper Mississippi River Comprehensive Basin Study. Vol. 3.

Victoria Mills

1974. Personal Communique. Winona, MN.

Vose, Rory N.

1964. Nesting habits of the soft-shelled turtles(Trionyx sp.)
Proc. Minn. Acad. Sci. 31(2): 122-124.

Watkins, Paul R.

1969. Yearly macroinvertebrate productivity as related to
organic pollution on the Upper Mississippi River.
Unpublished M.S. Thesis, St. Mary's College Library,
Winona, MN.

Winona Daily News

1960, 1965, 1970, 1973. Economic Indices. Winona, MN.

Winona State College

1974. Office of Informational Research Personal Communique.
Winona, MN.

Wright, H.E., Jr., and R. V. Ruhe

1965. Glaciation of Minnesota and Iowa, in Wright, H.E., Jr.,
D. G. Grey, The Quaternary of the United States:
Princeton, Univ. Press: 29-41.

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**ST. PAUL DISTRICT, CORPS OF ENGINEERS
DEPARTMENT OF THE ARMY**

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FINAL
ENVIRONMENTAL IMPACT STATEMENT
FLOOD CONTROL PROJECT AND
WATERFRONT DEVELOPMENT
WINONA, MINNESOTA

EXHIBIT SECTION

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SUMMARY OF PROTECTIVE COVENANTS

The Port Authority of Winona has placed a number of Protective Covenants on the River Bend Industrial Park. Such regulations have implications for the environmental impact relative to the stages of industrial development within the Park. The following is a statement of the regulations.

Article 1

Definitions

1. "A" District, a district specifically designed to be occupied by industries often characterized as "light," together with wholesale and warehouse activities.
2. "B" District, a district specifically designed to be occupied by industries often characterized as "medium to heavy."
3. "C" District, a district specifically designed to be occupied by solid waste transfer stations and general scrap storage, reduction, recycling, and reclamation operations or any use permitted in an "A" or "B" district.
4. Site, "site" shall mean all contiguous land under one ownership or one lease.

Article V

Regulations of operations and uses

2. Specific District Prohibitions

- A. In an "A" District, the following are prohibited: any noise, other than vehicular, discernable outside the enclosed confines of a structure and/or the emission of any smoke, dust, or other particles, odor, noxious gas, fumes, radioactivity, matter of radioactivity, ground vibrations, and heat or glare discernable outside the enclosed confines of a structure.
- B. In a "B" District the following are prohibited: any noise, other than vehicular, discernable outside the district boundry and/or emissions of any smoke exceeding the intensity of Ringle Mann #1, the emission of any dust or other particles, odor, noxious gas, fumes, radioactive matter, or radioactivity, ground vibrations, heat and light or glare discernable outside the district boundaries.

SUMMARY OF PROTECTIVE COVENANTS (Continued)

3. Prohibited operations and uses. The following operations and uses shall not be permitted on any property in either an "A" or "B" District:
 - A. Commercial excavation of buildings or construction materials.
 - B. Dumping, disposal, incineration, or reduction of garbage, offal, dead animals, or refuse.
 - C. Any use that offers goods or services for sale to the general public.
 - D. Residential.
 - E. Trailer courts.
 - F. Junk yards.
 - G. Labor camps.
 - H. Distillation of bones.
 - I. Fat rendering.
 - J. Stockyards or slaughter of animals.
4. Prohibited operations and uses in a "C" District. The following operations and uses shall not be permitted on any property in a "C" District:
 - A. Residential.
 - B. Trailer Courts.
 - C. Labor camps.
 - D. Distillation of bones.
 - E. Fat rendering.
 - F. Commercial excavation of building or construction materials.
 - G. Stockyards or slaughter of animals.
 - H. Any use that offers goods for sale to the general public at retail.
5. Approval of operations and uses.
 - A. Operational plans and specifications for any site improvement shall be submitted to the declarant prior to the construction thereof over the signature of a person deemed to be responsible by the declarant, together with certification from a design architect or engineer that said operational plans and specifications comply with paragraphs two and three of this article. If declarant fails either to approve or disapprove such operational plans or specifications within sixty (60) days after the same have been submitted to it, it shall be conclusively presumed that the declarant has disapproved said plans unless declarant has taken action to continue consideration of the matter to a date certain. The declarant, from time to time, reserves the right to order recertification of such compliance by a qualified professional at the total expense of the property owner, lessee, or occupant.

FUR HARVEST DATA

	Pool	Species	# Trappers	#Animals	Price	Remarks
75-75	6	Muskrat	27	1855	4712.33	110 not sold
	6	Mink	3	3	16.00	
	6	Beaver	1	10	150.00	Season closed in Minnesota
	6	Raccoon	2	9	94.00	
	5A	Muskrat	57	5231	13023.89	9 not sold
	5A	Mink	7	12	83.50	
	5A	Beaver	3	9	122.00	Season closed in Minnesota
	5A	Raccoon	4	17	147.00	
73-74	6	Muskrat	23	2162	5578.00	
	6	Beaver	3	29	224.00	Season closed in Wisconsin
	6	Mink	3	5	72.00	One not sold
	6	Raccoon	4	15	167.00	
	6	Opossum	1	1	-	
	5A	Muskrat	56	6794	17530.00	
	5A	Beaver	11	65	942.00	Season closed in Wisconsin
	5A	Mink	4	7	112.00	
	5A	Raccoon	1	1	8.00	
	5A	Opossum	1	1	1.00	

Data for the 72-73 season was not compiled by pool and would take considerable effort to retrieve. However, total District take of muskrats was approximately 31,000 in 72-73, 30,884 in 73-74, and 29,074 in 74-75. There were 254 trappers in 72-73, 270 in 74-75. In 72-73 the Beaver season was closed in Minnesota. It was closed again in the 74-75 season. The Winona District includes pools 4,5,5A, and 6.

Source: U.S. Fish and Wildlife Service, Winona District.

WINONA DISTRICT

WATERFOWL PRODUCTION AND HARVEST DATA

Estimated number of hunter visits to the district:

1974	16200	
1973	17900	
1972	15900	Hunters spend an average 4 hours per visit (estimated).

Estimated harvest -

1974:	1973:	1972:
coot 2600	coot 3600	coot 3400
snow geese 35	snow geese 30	snow geese 14
Canada geese 30	Canada geese 30	Canada geese 30
ducks:	ducks:	ducks:
Mallard 6300	Mallard 6660	Mallard 7097
Black 200	Wood duck 1500	Black 440
Gadwall 160	BWT 5090	Gadwall 685
Pintail 160	Wigeon 1250	Pintail 600
BWT 2750		GWT 820
GWT 770	no breakdown for	BWT 2800
Wood duck 1900	other species	Wood duck 3750
Ringneck 140		Bufflehead 300
Scaup 150	Total ducks 16,650	Goldeneye 30
Bufflehead 10		Mergansers 20
Goldeneye 25		Total ducks 17,967
Mergansers 25		
Wigeon 1185		
14,440 total		
13,775 ducks		

Figures are not broken down by pool: We estimate that about 25 percent of the hunting occurs in pool 5A and 2 percent in pool 6.

Waterfowl production estimates for the Winona District:

	1975	1974	1973
coot	200	200	128
mallard	1500	1770	2325
black	20	20	32
GWT	10	210	32
BWT	10	336	242
wood duck	2500	2890	1909
hooded merganser	50	150	32

Estimated breakdown by pool is as follows: pool 4 - 35 percent, pool 5A - 30 percent, pool 5A - 30 percent and pool 6 - 5 percent.

Source: U.S. Fish and Wildlife Service, Winona District.

BENTHIC FAUNA AND BOTTOM TYPE DATA, POOLS 5A AND 6.

Key to symbols used for recording taxonomic status of benthos and type of bottom at sample sites along transects within Pools 5A and 6 (Fremling, et al., 1973)

Phylum

- I - Annelida
- II - Arthropoda
- III - Mollusca
- IV - Pisces

Class

- A - Hirudinea
- B - Oligochaeta
- C - Arachnoidea
- D - Eucrustacea
- E - Insecta
- F - Gastropoda
- G - Pelecypoda

Order

- 1 - Rhyncobdella
- 2 - Opisthopora
- 3 - Plesiopora
- 4 - Amphipoda
- 5 - Cladocera
- 6 - Isopoda
- 7 - Coleoptera
- 8 - Diptera
- 9 - Ephemeroptera
- 10 - Hemiptera
- 11 - Odonata

- 12 - Plecoptera
- 13 - Trichoptera
- 14 - Hydracarina
- 15 - Ctenobranchiata
- 16 - Pulmonata

Family

- a - Sphaeriidae
- b - Glossiphonidae
- c - Haplotaxidae
- d - Tubificidae
- e - Talitridae
- f - Daphnidae
- g - Leptodoridae
- h - Asellidae
- i - Dytiscidae
- j - Elmidae
- k - Ceratopogonidae
- l - Chironomidae
- m - Culicidae
- n - Baetiscidae
- o - Caenidae
- p - Ephemerellidae
- q - Ephemeridae
- r - Heptageniidae

- s - Corixidae
- t - Hydropsychidae
- u - Psychomyiidae
- v - Perlidae
- w - Gomphidae
- x - Gomphidae
- y - Hydracarinidae
- z - Pleuroceridae
- a' - Valvatidae
- b' - Physidae
- c' - Planorbidae
- d' - Piscicolidae
- e' - Limnaeidae
- f' - Leptoceridae

Substrate

- c - clay
- d - detritus
- gr - gravel
- m - mud
- oo - organic ooze
- r - rocks
- s - sand
- shf - shell fragments

Misc.

- Tr. - trace, less than 0.001 gms/m².

BENTHIC FAUNA AND BOTTOM TYPE DATA, POOLS 5A AND 6. (Cont)

Benthic fauna and bottom type found at sampling stations along transects in Pools 5A and 6 (Fremling, et al., 1973).

Date	Transect	Station	Taxa Code	Species	NO. g/m ² (wet wt.)	Bottom
6/22/73	5AAA (RM 736.9)	1	I,B,3,d	<u>Limnodrilus</u> sp.	3	0.076
			I,B,3,d	<u>Branchiura sowerbyi</u>	2	1.04
			II,E,8	Chironomidae sp.	3	0.076
			II,E,8,k	<u>Palpomyia</u> sp.	1	Tr.
			II,E,9,q	<u>Hexagenia</u> sp.	9	1.229
			II,E,8,k	<u>Palpomyia</u> sp.	1	0.076
		2	II,E,9,o	<u>Caenis</u> sp.	2	0.057
		3	II,E,9,q	<u>Hexagenia</u> sp.	2	0.151
		4	II,E,9,o	<u>Brachycercus</u> sp.	1	Tr.
		5	II,E,8	Chironomidae sp.	1	Tr.
		6	II,D,5,g	<u>Leptodora kindtii</u>	1	Tr.
			II,E,9,q	<u>Hexagenia</u> sp.	4	4.631
			I,B,3,d	<u>Branchiura sowerbyi</u>	6	2.647
			II,E,8,k	<u>Palpomyia</u> sp.	2	Tr.
			III,G,g	<u>Sphaerium</u> sp.	5	Tr.
			III,G,g	<u>Musculium</u> sp.	2	3.46
			II,E,8	Chironomidae sp.	3	0.057
		7	I,B,3,d	<u>Branchiura sowerbyi</u>	4	2.647
			II,E,9,q	<u>Hexagenia</u> sp.	22	5.577
			II,E,9,o	<u>Caenis</u> sp.	2	Tr.
			III,G,a	<u>Sphaerium</u> sp.	1	0.057

BENTHIC FAUNA AND BOTTOM TYPE DATA, POOLS 5A AND 6 (Cont)

Benthic fauna and bottom type found at sampling stations along transects in Pools 5A and 6 (Fremling, et al., 1973). (Continued)

Date	Transect	Station	Taxa code	Species	NO. g/m ² (wet wt.)	Bottom
6/22/73	5AAA (RM 736.9)	7	III,G,a	<u>Misculium</u> sp.	14 4.915	
		8	III,G,a	<u>Sphaerium</u> sp.	2 0.227	
			II,E,8	Chironomidae sp.	4 1.796	
			I,B,3,d	<u>Branchiura sowerbyi</u>	5 0.189	
		1	II,E,9,q	<u>Hexagenia</u> sp.	4 8.885	s,r
6/21/73	5ABB (RM 733)	2	II,E,8	Chironomidae sp.	1 0.075	s
			II,E,9,o	<u>Brachycercus</u> sp.	1 0.038	
		3		No sample taken		s
		4	II,E,8	Chironomidae sp.	3 0.113	gr.
			III,G,a	<u>Misculium</u> sp.	3 0.794	
			II,E,8,k	<u>Palpomyia</u> sp.	3 0.019	
			II,E,13,t	<u>Cheumatopsyche campyla</u>	12 0.227	
		5	II,E,9,o	<u>Brachycercus</u> sp.	3 0.132	s
			II,D,5,f	<u>Daphnia</u> sp.	1 0.019	s
			II,E,13,t	<u>Cheumatopsyche campyla</u>	1 0.057	
			II,E,8	Chironomidae sp.	2 0.019	
			II,E,9,q	<u>Hexagenia</u> sp.	11 20.964	
		6	II,D,5,g	<u>Leptodora Kindtii</u>	1 0.076	
			II,E,13,u	<u>Genus A</u> sp.	1 0.151	s,oo
			II,E,8	Chironomidae sp.	34 2.473	
			III,G,a	<u>Sphaerium</u> sp.	5 1.323	

BENTHIC FAUNA AND BOTTOM TYPE DATA, POOLS 5A AND 6 (Cont)

Benthic fauna and bottom type found at sampling stations along transects in Pools 5A and 6 (Fremling, et al., 1973). (Continued)

Date	Transect	Station	Taxa code	Species	NO.	g/m ² (wet wt.)	Bottom
6/21/73	5ABB (RM 733)	6	III,G,a	<u>Miscellium</u> sp.	7	4.612	
			II,E,9,q	<u>Hexagenia</u> sp.	7	0.567	
			II,D,4,h	<u>Asellus</u> sp.	1	0.038	
			II,E,9,o	<u>Brachycercus</u> sp.	7	0.265	
			II,E,7,j	<u>Dubiraphia</u> sp.	1	0.076	
			II,E,7	<u>Corixidae</u> sp.	4	0.265	
			II,E,13,t	<u>Cheumatopsyche</u> sp.	7	0.284	
			III,F,15,z	<u>Pleurocera acuta</u>	1	6.616	
		7	I,B,3,d	<u>Limnodrilus</u> sp.	23	2.799	s,d
		8	I,B,3,d	<u>Branchiura sowerbyi</u>	1	Tr.	s
			II,E,8	<u>Chironomidae</u> sp.	4	0.076	
			II,E,8,k	<u>Palpomyia</u> sp.	1	0.038	
			I,B,3,d	<u>Limnodrilus</u> sp.	1	0.076	
		9	II,E,9,q	<u>Ephemera neehami</u>	1	0.076	r
			II,E,8	<u>Chironomidae</u>	198	2.703	
			II,E,9,r	<u>Stenonema</u> sp.	3	0.057	
			II,E,9,o	<u>Brachycercus</u> sp.	8	0.076	
			II,E,u	<u>Genus A</u> sp.	1	0.132	
			II,E,12,v	<u>Perlesta placida</u>	3	0.586	
			II,E,9,p	<u>Ephemerella deficiens</u>	5	0.347	
			II,E,7,j	<u>Cylloepus</u> sp.	5	0.208	

BENTHIC FAUNA AND BOTTOM TYPE DATA, POOLS 5A AND 6 (Cont)

Benthic fauna and bottom type found at sampling stations along transects in Pools 5A and 6 (Fremling, et al., 1973) (Continued)

Date	Transect	Station	Taxa Code	Species	NO. g/m ² (wet.wt.)	Bottom
6/21/73	5ABB (RM 733)	9	II,E,9,o	<u>Tricorythodes</u> sp.	14	0.567
			II,E,9,o	<u>Caenis</u> sp.	2	0.095
			II,D,5,f'	<u>Athripsodes</u> sp.	1	0.17
			II,E,8,k	<u>Palpomyia</u> sp.	1	Tr.
			III,G,a	<u>Sphaerium</u> sp.	4	0.435
			II,E,13,t	<u>Cheumatopsyche campyla</u>	202	21.115
			II,E,13,t	<u>Hydropsyche orris</u>	495	55.746
			II,E,13,t	<u>Hydropsyche</u> (pupae)	7	2.476
			II,E,9,p	<u>Ephemerella</u>	2	0.132
				no fauna		s
6/15/73	5ACC (RM 728.8)	1		no fauna		s
		2		no fauna		s
		3		no fauna		s
		4		no fauna		s,r
		5		no fauna		s,r
2/2/72	6AA (RM 628.3)	33 + 90	II,E,9,q	<u>Hexagenia</u> sp.	21	1.191
			II,E,7,j	<u>Dubiraphia</u> sp.	1	0.019
			II,E,9	<u>Heptageniidae</u> sp.	1	Tr.
		35 + 00	II,E,7,j	<u>Dubiraphia</u> sp.	4	0.095
			II,E,9,q	<u>Hexagenia</u> sp.	8	0.057

BENTHIC FAUNA AND BOTTOM TYPE DATA, POOLS 5A AND 6 (Cont)

Benthic fauna and bottom type found at sampling stations along transects in Pools 5A and 6 (Fremling, et al., 1973). (Continued)

Date	Transect	Station	Taxa Code	Species	NO. E/m ² (wet wt.)	Bottom
2/2/72	6AA (RM 628.3)	35 + 00	II,E,13,t	<u>Hydropsyche orris</u>	1	0.113
			II,E,8	Chironomidae sp.	2	0.095
			II,E,11	Gomphidae sp.	1	7.391
			II,E,8,k	<u>Palpomyia</u> sp.	1	Tr.
			II,E,13,t	<u>Cheumatopsyche campyla</u>	3	0.265
			II,D,4,e	<u>Hyalella azteca</u>	1	0.076
			II,E,11,w	<u>Ischnura</u> sp.	1	0.010
			II,E	<u>Plecoptera</u> sp.	1	0.002
			II,E,8	Chironomidae sp.	3	0.17
			II,E,9,q	<u>Hexagenia</u> sp.	17	0.51
6/13/73	6BB (RM 721)	1	II,E,9,q	<u>Hexagenia</u> sp.	2	0.076
			II,E,9,o	<u>Branchycercus</u> sp.	1	Tr.
			II,E,9,o	<u>Caenis</u> sp.	1	0.057
			II,E,8	Chironomidae sp.	2	Tr.
				no fauna		s
				no fauna		s
				no fauna		c,m
			III,G,a	<u>Musculium</u> sp.	2	3.611
			III,G,a	<u>Musculium</u> sp.	1	3.629
			II,E,8	Chironomidae sp.	2	0.321
			III,G,15,z	<u>Pleurocerca acuta</u>	3	2.609
			II,E,8	Chironomidae sp.	2	0.076
						c,m

BENTHIC FAUNA AND BOTTOM TYPE DATA, POOLS 5A AND 6 (Cont)

Benthic fauna and bottom type found at sampling stations along transects in Pools 5A and 6 (Fremling, et al., 1973). (Continued)

Date	Transect	Station	Taxa Code	Species	NO.	g/m ² (wet wt.)	Bottom
6/13/73	6CC (RM 714.5)	1	II,E,8	Chironomidae sp.	2	0.246	m,d
			III,G,a	Sphaerium sp.	1	2.306	
			II,D,4,e	Hyaella sp.	1	0.019	
			II,E,9,o	Leptohyphes sp.	1	0.057	
			I,B,3,d	Limnodrilus sp.	4	0.246	
			II,E,9,q	Hexagenia sp.	20	13.516	
			III,G,a	Sphaerium sp.	2	0.359	s,r
			II,E,9,q	Hexagenia sp.	6	1.947	s,r
		3	I,B,3,d	Limnodrilus sp.	1	Tr.	
				no fauna			s
		4	II,E,9,o	Leptohyphes sp.	1	0.151	s
			II,E,8	Chironomidae sp.	1	0.038	
			II,D,4,e	Hyaella sp.	1	0.076	

Water quality characteristics of the Mississippi River within Pools 5A and 6. Unless otherwise indicated, all measurements are given in ppm. Samples and temperatures were taken 6 in. below water surface. Where station is not listed, measurements were made in center of main channel (Fremling, et al., 1973, 1973a).

Date	Transect or Mile No.	Station	Temp. (°C)	pH	Secchi disk (in.)	D.O.	Total Hardness	Calcium Hardness	Alkalinity	Nitrate	Ammonium nitrate	Organic	Inorganic	Ortho-	Total
6/22/73	5AAA	4	18.8	8.0	23	10	238	108	136	0.7	-	-	-	-	-
6/21/73	5ABB	10	20	8.0	23	10	238	109	153	1.0	-	-	-	-	-
6/15/73	5ACC	1	22.2	8.5	25	10	221	102	170	0	-	-	-	-	-
6/15/73	6AA	1	22.2	8.5	19	11	208	119	136	0	-	-	-	-	-
6/13/73	6BB	5	-	8.5	23	13.5	316	136	136	0.9	-	-	-	-	-
6/13/73	6CC	6	-	8	23	10	238	136	170	0.9	-	-	-	-	-
8/10/73	733	-	23.3	8.5	22	11	238	85	170	0.1	0.35	0.5	0.5	0.5	1.0
8/10/73	726	-	23.3	9.0	20	11	187	85	140	0.2	0.4	1.4	0.6	0.5	2.0
8/10/73	715	-	26.7	9.0	22	11	238	102	153	0.2	0.4	0.7	0.6	0.4	1.3

Applicable Water Pollution Control Regulations

STATE OF MINNESOTA
POLLUTION CONTROL AGENCY

CHAPTER TWENTY-FIVE: WPC 25

CLASSIFICATIONS OF INTERSTATE WATERS OF MINNESOTA

WPC 25: The following regulation establishing classifications applies to all interstate surface waters of the state except as otherwise indicated herein.

(a) All interstate waters except those previously classified are included, although some minor watercourses such as unnamed streams or interconnecting waters and/or intermittently flowing creeks, ditches, or draws, etc., are not listed individually herein. Previously classified interstate waters are listed in Regulations WPC 1, 2, 3, 5, 6, 10, 11, 12, 13, 16, 17, which may be purchased from the Documents Section, Minnesota Department of Administration, St. Paul; and all such classifications shall remain in force unless changed herein.

(b) The regulation includes known present uses and/or uses which may be made of the waters in the future. In addition to the classification(s) given below, the interstate waters are also included in Classes 3C, 4A and B, 5 and 6 for all reaches or areas where such uses are possible. Where specific criteria are common to two or more listed classes the more restrictive value shall apply. For additional information refer to Regulation WPC 15, Criteria for Classification and Establishment of Standards for Interstate Waters, April 8, 1969.

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WATERS	REACH OR AREA INVOLVED OR LOCATION	CLASSIFICATION
Streams	Lower Mississippi River Basin	
Bear Creek	Source to Iowa border	2C, 3B
Beaver Creek	Source to Iowa border	2C, 3B
Crooked Creek	Source to mouth	1B, 2A, 3B
Upper Iowa River	Source to Iowa border and Iowa border to Iowa border	2C, 3B
Mississippi River	Lock and Dam No. 2 at Hastings to Iowa border	2B, 3B
Pine Creek	Source to Iowa border	2C, 3B
Riceford Creek	Source to mouth	2C, 3B
Root River	South Fork mouth to mouth	2B, 3B
South Fork of the Root River	Riceford Creek mouth to mouth	2B, 3B
Wapsipinicon River	Source to Iowa border	2C, 3B
Waterloo Creek	Source to Iowa border	1B, 2A, 3B

CHAPTER FIFTEEN: WPC 15

CRITERIA FOR THE CLASSIFICATION OF THE INTERSTATE WATERS
OF THE STATE AND THE ESTABLISHMENT OF STANDARDS OF
QUALITY AND PURITY

WPC 15 The official policy and purpose of the State of Minnesota in regard to these matters is set forth in the Minnesota Water Pollution Control Statutes:

Sec. 115.42. It is the policy of the state to provide for the prevention, control and abatement of pollution of all waters of the state, so far as feasible and practical, in furtherance of conservation of such waters and protection of the public health and in furtherance of the development of the economic welfare of the state It is the purpose of Laws 1963, Chapter 874, to safeguard the waters of the state from pollution by: (a) preventing any new pollution; and (b) abating pollution existing when Laws 1963, Chapter 874, become effective, under a program consistent with the declaration of policy above stated.

Sec. 115.44 Subd. 2. In order to attain the objectives of Laws 1963, Chapter 874, the commission* after proper study, and after conducting public hearing upon due notice, shall, as soon as practicable, group the designated waters of the state into classes and adopt classifications and standards of purity and quality therefor. Such classification shall be made in accordance with considerations of best usage in the interest of the public and with regard to the considerations mentioned in subdivision 3 hereof.

Sec. 115.44 Subd. 8. The commission* may classify waters and adopt criteria and standards in such form and based on such evidence as it may deem necessary and sufficient for the purposes of meeting requirements of such federal laws, notwithstanding any provisions in Chapter 115 or any other state law to the contrary Notwithstanding the provisions of subdivision 4, wherever advisable and practicable the commission* may establish standards for effluent of disposal systems entering waters regardless of whether such waters are or are not classified.

In accordance with this declaration of policy and legislative intent, and under the powers delegated to the Agency, the following interstate water use classifications and corresponding standards of quality and purity are hereby adopted by the Pollution Control Agency as provided by law.

John P. Badalich, PE
Executive Secretary and
Chief Executive Officer

Robert C. Tuveson, Chairman
Attorney at Law

Homer C. Luick, Vice-Chairman

Dated: April 8, 1969

*Laws of 1967, Chapter 882, abolished the Water Pollution Control Commission and transferred its powers and duties to the Minnesota Pollution Control Agency.

(a) Introduction

(1) Definitions. The terms "waters of the state" for the purposes of this regulation shall be construed to mean interstate waters as herein below defined, and the terms "sewage," "industrial wastes," and "other wastes," as well as any other terms for which definitions are given in the Water Pollution Control Statutes, as used herein have the meanings ascribed to them in Minnesota Statutes, Sections 115.01 and 115.41, with the exception that disposal systems or treatment works operated under permit of the Agency shall not be construed to be "waters of the state" as the term is used herein. The current requirements of applicable federal laws which must be met are set forth in the Federal Water Pollution Control Act, as amended (33 U.S.C. 466 et seq.). Interstate waters are defined in Section 13 (e) thereof as including all rivers, lakes, and other waters that flow across or form a part of state boundaries. Other terms and abbreviations used herein which are not specifically defined in the law shall be construed in conformance with the context, and in relation to the applicable section of the statutes pertaining to the matter at hand, and current professional usage.

(2) Uses of the Interstate Waters. The classifications are listed separately in accordance with the need for interstate water quality protection, considerations of best use in the interest of the public and other considerations, as indicated in Minnesota Statutes, Section 115.44. The classifications should not be construed to be an order of priority, nor considered to be exclusive or prohibitory of other beneficial uses unless so stated in regard to discharge or disposal of sewage, industrial wastes or other wastes commonly associated with such other uses, where such discharges may adversely affect the specified uses. Only the uses of the interstate waters of the state as a medium for disposal of sewage, industrial wastes or other wastes is subject to regulation by the Agency, not their appropriation or other use such as for navigation or recreation. Where more than one of the listed uses may occur without reasonable separation in distance on the same interstate waters, appropriate adjustments will be made in the classifications and standards to take into account such intermingling of uses.

(3) Determination of Compliance. In making tests or analyses of the interstate waters of the state, sewage, industrial wastes or other wastes to determine compliance with the standards, samples shall be collected in such manner and place, and of such type, number and frequency as may be considered satisfactory by the Agency from the viewpoint of adequately reflecting the condition of the interstate waters, the composition of the effluents, and the effects of the pollutants upon the specified uses. Reasonable allowance will be made for dilution of the effluents in relation to the uses of the interstate waters into which they are discharged or other interstate waters which may be affected. The samples shall be preserved and analyzed in accordance with procedures given in the 1965 edition of Standard Methods for the Examination of Water and Waste-Water, by the American Public Health Association, American Water Works Association, and the Water Pollution Control Federation, and any revisions or amendments thereto, or other methods acceptable to the Agency.

(4) Natural Interstate Water Quality. The interstate waters, in a state of nature, have some characteristics or properties approaching or exceeding the limits specified in the standards. The standards shall be construed as limiting the addition of pollutants of human origin to those of natural origin, where such be present, so that in total the specified pollutant concentrations will not be exceeded in the interstate waters by reason of such

controllable additions; except that where the background level of the natural origin is reasonably definable and normally is higher than the specified standard the natural level may be used as the standard for controlling the addition of pollutants of human origin which are comparable in nature and significance with those of natural origin, but where the natural background level is lower than the specified standard and where reasonable justification exists for preserving the quality of the interstate waters as nearly as possible to that found in a state of nature, the natural level may be used instead of the specified standard as the maximum limit on the addition of pollutants. In the adoption of standards for individual interstate waters, the Agency will be guided by the standards set forth herein but may make reasonable modifications of the same on the basis of evidence brought forth at a public hearing if it is shown to be desirable and in the public interest to do so in order to encourage the best use of the interstate waters or the lands bordering such interstate waters.

Waters which are of quality better than the established standards will be maintained at high quality unless a determination is made by the State that a change is justifiable as a result of necessary economic or social development and will not preclude appropriate beneficial present and future uses of the waters. Any project or development which would constitute a source of pollution to high quality waters will be required to provide the highest and best practicable treatment to maintain high water quality and keep water pollution at a minimum. In implementing this policy, the Secretary of the Interior will be provided with such information as he requires to discharge his responsibilities under the Federal Water Quality Act, as amended.

(5) **Variance from Standards.** In any case where, upon application of the responsible person or persons, the Agency finds that by reason of exceptional circumstances the strict enforcement of any provision of these standards would cause undue hardship; that disposal of the sewage, industrial waste or other waste is necessary for the public health, safety or welfare; and that strict conformity with the standards would be unreasonable; impractical or not feasible under the circumstances; the Agency in its discretion may permit a variance therefrom upon such conditions as it may prescribe for prevention, control or abatement of pollution in harmony with the general purposes of these classifications and standards and the intent of the applicable state and national laws. The Federal Water Pollution Control Administration will be advised of any permits which may be issued under this clause together with information as to the need therefor.

(b) Water Use Classifications—All Interstate Waters of the State

Based on considerations of best usage in the interest of the public and in conformance with the requirements of the applicable statutes, the interstate waters of the state shall be grouped into one or more of the following classes:

- (1) **Domestic Consumption.** (to include all interstate waters which are or may be used as a source of supply for drinking, culinary, food processing use or other domestic purposes, and for which quality control is or may be necessary to protect the public health, safety or welfare.)
- (2) **Fisheries and Recreation.** (to include all interstate waters which are or may be used for fishing, fish culture, bathing or any other recreational purposes, and for which quality control is or may be necessary to protect aquatic or terrestrial life, or the public health, safety or welfare.)

(3) **Industrial Consumption.** (to include all interstate waters which are or may be used as a source of supply for industrial process or cooling water, or any other industrial or commercial purposes, and for which quality control is or may be necessary to protect the public health, safety or welfare.)

(4) **Agriculture and Wildlife.** (to include all interstate waters which are or may be used for any agriculture purposes, including stock watering and irrigation, or by waterfowl or other wildlife, and for which quality control is or may be necessary to protect terrestrial life or the public health, safety or welfare.)

(5) **Navigation and Waste Disposal.** (to include all interstate waters which are or may be used for any form of water transportation or navigation, disposal of sewage, industrial waste or other waste effluents, or fire prevention, and for which quality control is or may be necessary to protect the public health, safety or welfare.)

(6) **Other Uses.** (to include interstate waters which are or may be used for the above listed uses or any other beneficial uses not listed herein, including without limitation any such uses in this or any other state, province, or nation of any interstate waters flowing through or originating in this state, and for which quality control is or may be necessary for the above declared purposes, or to conform with the requirements of the legally constituted state or national agencies having jurisdiction over such interstate waters, or any other considerations the Agency may deem proper.)

(c) General Standards Applicable to All Interstate Waters of the State

(1) No untreated sewage shall be discharged into any interstate waters of the state. No treated sewage, or industrial waste or other wastes containing viable pathogenic organisms, shall be discharged into interstate waters of the state without effective disinfection. Effective disinfection of any discharges, including combined flows of sewage and storm water, will be required where necessary to protect the specified uses of the interstate waters.

(2) No raw or treated sewage, industrial waste or other wastes shall be discharged into any interstate waters of the state so as to cause any nuisance conditions, such as the presence of significant amounts of floating solids, scum, oil slicks, excessive suspended solids, material discoloration, noxious odors, gas ebullition, deleterious sludge deposits, undesirable slimes or fungus growths, or other offensive or harmful effects.

(3) Existing discharges of inadequately treated sewage, industrial waste or other wastes shall be abated, treated or controlled so as to comply with the applicable standards. Separation of sanitary sewage from natural run-off may be required where necessary to ensure continuous effective treatment of sewage.

(4) The highest possible levels of water quality, including dissolved oxygen, which are attainable in the interstate waters by continuous operation at their maximum capability of all units of treatment of the discharging effluents into the interstate waters shall be maintained in the interstate waters in order to enhance conditions for the specified uses.

(5) Means for expediting mixing and dispersion of sewage, industrial waste, or other waste effluents in the receiving interstate waters shall be provided so far as practicable when deemed necessary by the Agency to maintain the quality of the receiving interstate waters in accordance with applicable standards.

(6) It is herein established that the Agency will require secondary treatment or the equivalent as a minimum for all municipal sewage and biodegradable, industrial or other wastes to meet the adopted water quality standards and a comparable high degree of treatment or its equivalent also will be required of all non-biodegradable industrial or other wastes unless the discharger can demonstrate to the Agency that a lesser degree of treatment or control will provide for water quality enhancement commensurate with present and proposed future water uses and a variance is granted under the provisions of the variance clause. Secondary treatment facilities are defined as works which will provide effective sedimentation, biochemical oxidation, and disinfection, or the equivalent, including effluents conforming to the following:

Substance or Characteristic	Limiting Concentration or
5-Day biochemical oxygen demand	25 milligrams per liter
Total coliform group organisms	1,000 MPN/100 ml
Total suspended solids	30 milligrams per liter
Oil	Essentially free of visible oil
Turbidity	25
pH range	6.5 - 8.5

(7) Allowance shall not be made in the design of treatment works for low stream flow augmentation unless such flow augmentation of minimum flow is dependable under applicable laws or regulations.

(8) In any instance where it is evident that natural mixing or dispersion of an effluent is not effective in preventing pollution, or that it may not be feasible to provide by other means for effective mixing or dispersion of an effluent, or if at the applicable stream flows mentioned in the sections on specific standards of interstate water quality and purity it is evident that the specified stream flow may be less than the effluent flow, the specific standards may be interpreted as effluent standards for control purposes, where applicable. The period of record for determining the specific flow for the stated recurrence interval, where records are available, will include at least the most recent 10 years of record, including flow records obtained after establishment of flow regulation devices, if any. Such calculations will not be applied to lakes and their embayments which have no comparable flow recurrence interval. Where stream flow records are not available, the flows may be estimated on the basis of available information on the watershed characteristics, precipitation, run-off and other pertinent data. In addition, the following effluent standards may be applied without any allowance for dilution where stream flow or other factors are such as to prevent adequate dilution, or where it is otherwise necessary to protect the interstate waters for the stated uses:

Item	Limit
5-day biochemical oxygen demand	20 milligrams per liter
Total phosphorus	1 milligram per liter
Total suspended solids	20 milligrams per liter

It is the intention of the Agency to require control of nutrients from all sources to the fullest practicable extent wherever sources of nutrients are considered to be actually or potentially injurious to conservation or enhancement of the designated water uses.

(9) In any case where, after a public hearing, the Agency finds it necessary for conservation of the interstate waters of the state, or protection

of the public health, or in furtherance of the development of the economic welfare of the state, it may prohibit or further limit the discharge to any designated interstate waters of any sewage, industrial waste, or other waste effluents, or any component thereof, whether such effluents are treated or untreated, or existing or new, notwithstanding any other provisions of classifications or specific standards stated herein which may be applicable to such designated interstate waters.

(10) In any proceeding where specific standards have been adopted which are directly or indirectly applicable to named interstate waters of the state, it shall be incumbent upon all persons responsible for existing or new sources of sewage, industrial wastes or other wastes which are or will be discharged to such interstate waters, to treat or control their wastes so as to produce effluents having a common level or concentration of pollutants of comparable nature and effect as may be necessary to meet the specific standards or better, and in no case shall the concentration of polluting substances in any individual effluent be permitted to exceed the common concentration or level required of the other sources of comparable nature and effect discharging to the same classified and named interstate waters, regardless of differences in the amount of pollutorial substances discharged, or degree of treatment involved.

(11) Liquid substances which are not commonly considered to be sewage or industrial wastes but which could constitute a pollution hazard shall be stored in accordance with Regulation WPC 4, and any revisions or amendments thereto. Other wastes as defined by law or other substances which could constitute a pollution hazard shall not be deposited in any manner such that the same may be likely to gain entry into any interstate waters of the state in excess of or contrary to any of the standards herein adopted, or cause pollution as defined by law.

(12) No sewage, industrial waste or other wastes shall be discharged into the interstate waters of the state in such quantity or in such manner alone or in combination with other substances as to cause pollution thereof as defined by law. In any case where the interstate waters of the state into which sewage, industrial wastes or other waste effluents discharge are assigned different standards than the interstate waters into which such receiving interstate waters flow, the standards applicable to the interstate waters into which such sewage, industrial waste or other wastes discharged shall be supplemented by the following:

The quality of any waters of the state receiving sewage, industrial waste or other waste effluents shall be such that no violation of the standards of any interstate waters of the state in any other class shall occur by reason of the discharge of such sewage, industrial waste or other waste effluents.

(13) Questions concerning the permissible levels, or changes in the same, of a substance, or combination of substances, or the effect on fish or other biota shall be resolved in accordance with the standards specified by the National Technical Advisory Committee of the Federal Water Pollution Control Administration, U. S. Department of the Interior. The Committee's recommendations also will be used as official guidelines in other aspects where the recommendations may be applicable.

(14) All persons operating or responsible for sewage, industrial waste or other waste disposal systems which are adjacent to or which discharge effluents to these waters or to tributaries which affect the same, shall submit

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regularly every month a report to the Agency on the operation of the disposal system, the effluent flow, and the characteristics of the effluents and receiving waters. Sufficient data on measurements, observations, sampling and analyses, and other pertinent information shall be furnished as may be required by the Agency to in its judgment adequately reflect the condition of the disposal system, the effluent, and the waters receiving or affected by the effluent.

(d) **Specific Standards of Quality and Purity for Designated Classes of Interstate Waters of the State.** The following standards shall prescribe the qualities or properties of the interstate waters of the state which are necessary for the designated public use or benefit and which, if the limiting conditions given are exceeded, shall be considered indicative of a polluted condition which is actually or potentially deleterious, harmful, detrimental or injurious with respect to such designated uses or established classes of the interstate waters:

(2) Fisheries and Recreation

Class B The quality of this class of the interstate waters of the state shall be such as to permit the propagation and maintenance of sport or commercial fishes and be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable. Limiting concentrations or ranges of substances or characteristics which should not be exceeded in the interstate waters are given below:

Substance or Characteristic	Limit or Range
Dissolved oxygen	Not less than 6 milligrams per liter from April 1 through May 31, and Not less than 5 milligrams per liter at other times.
Temperature	5°F above natural, except in no case shall it exceed 90°F.
Ammonia (N)	1 milligram per liter
Chromium (Cr)	0.05 milligram per liter
Copper (Cu)	0.2 milligram per liter
Cyanides (CN)	0.02 milligram per liter
Oil	Not to exceed a trace
pH Value	6.5 - 9.0
Phenols	0.01 milligram per liter
Turbidity value	25
Total coliform organisms	1,000 most probable number per 100 milliliters
Radioactive materials	Not to exceed the lowest concentration permitted to be discharged to an uncontrolled environment as prescribed by the appropriate authority having control over their use.

Discharges of sewage, industrial waste or other waste effluents shall be controlled so that the standards will be maintained at all stream flows which are equal to or exceeded by 90 percent of the 7 consecutive daily average flows of record (the lowest weekly flow with a once in 10 year recurrence interval) for the critical month.

(3) Industrial Consumption

Class B The quality of this class of the interstate waters of the state shall be such as to permit their use for general industrial purposes, except food processing, with only a moderate degree of treatment. The quality shall be generally comparable to Class D interstate waters used for domestic consumption, except for the following:

Substance or Characteristic	Permissible Limit or Range
Chlorides (Cl)	100 milligrams per liter
Hardness	250 milligrams per liter (Surface) 350 milligrams per liter (Ground)
pH value	6.0 - 9.0
Temperature	65° F (ground) 86° F (surface)
Total coliform organisms	5,000 most probable number per 100 milliliters

Class C The quality of this class of the interstate waters of the state shall be such as to permit their use for industrial cooling and transportation's transport without a high degree of treatment being required to avoid severe fouling, corrosion, scaling, or other unsatisfactory conditions. The following shall not be exceeded in the interstate waters:

Substance or Characteristic	Limit or Range
Chlorides (Cl)	250 milligrams per liter
Hardness	500 milligrams per liter
pH value	6.0 - 9.5
Temperature	65° F (ground) 90° F (surface)
Total coliform organisms	5,000 most probable number per 100 milliliters

Additional selective limits may be imposed for any specific interstate waters as needed.

(4) Agriculture and Wildlife

Class A The quality of this class of the interstate waters of the state shall be such as to permit their use for irrigation without significant damage or adverse effects upon any crops or vegetation usually grown in the area, including truck garden crops. The following concentrations or limits shall be used as a guide in determining the suitability of the waters for such uses, together with the recommendations contained in Handbook 60 published by the Salinity Laboratory of the U. S. Department of Agriculture, and any revisions, amendments or supplements thereto:

Substance or Characteristic	Permissible Limit or Range
Bicarbonates (HCO_3)	5 milliequivalents per liter
Boron (B)	0.5 milligram per liter
pH value	5.0 - 8.5
Specific conductance	1,000 micromhos per centimeter
Total dissolved salts	700 milligrams per liter
Sodium (Na)	60% of total cations as milliequivalents per liter
Total coliform organisms	5,000 most probable number per 100 milliliters
Radioactive materials	Not to exceed the lowest concentrations permitted to be discharged to an uncontrolled environment as prescribed by the appropriate authority having control over their use.

Class B The quality of this class of the interstate waters of the state shall be such as to permit their use by livestock and wildlife without inhibition or injurious effects. The limits or concentrations of substances or characteristics given below shall not be exceeded in the interstate waters:

Substance or Characteristic	Limit or Range
pH value	6.0 - 9.5
Total salinity	1,000 milligrams per liter
Total coliform organisms	5,000 most probable number per 100 milliliters
Radioactive materials	Not to exceed the lowest concentrations permitted to be discharged to an uncontrolled environment as prescribed by the appropriate authority having control over their use.
Unspecified toxic substances	None at levels harmful either directly or indirectly.

Additional selective limits may be imposed for any specific interstate waters as needed.

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(5) Navigation and Waste Disposal. The quality of this class of the interstate waters of the state shall be such as to be suitable for esthetic enjoyment or scenery and to avoid any interference with navigation or damaging effects on property. The following limits or concentrations shall not be exceeded in the interstate waters:

Substance or Characteristics	Limit or Range
Total coliform organisms	5,000 most probable number per 100 milliliters
pH value	5.5 - 10.0
Hydrogen sulfide	Not to exceed a trace

Additional selective limits may be imposed for any specific interstate waters as needed.

(6) Other Uses. The uses to be protected in this class may be under other jurisdictions and in other areas to which the interstate waters of the state are tributary, and may include any or all of the uses listed in the foregoing categories, plus any other possible beneficial uses. The Agency therefore reserves the right to impose any standards necessary for the protection of this class, consistent with legal limitations.

[June 14, 1967; Amended July 1, 1969; Amended October 13, 1971]

STATE OF MINNESOTA

POLLUTION CONTROL AGENCY

CHAPTER TWENTY-NINE: WPC 29

EFFLUENT STANDARDS FOR DISPOSAL SYSTEMS DISCHARGING TO THAT PORTION OF THE MISSISSIPPI RIVER FROM THE BLANDIN DAM IN THE CITY OF GRAND RAPIDS TO THE MOUTH OF THE RUM RIVER AND FROM THE MOUTH OF THE CHIPPEWA RIVER TO THE IOWA BORDER, THE RED CEDAR RIVER FROM AUSTIN TO THE MINNESOTA-IOWA BORDER, THE MINNESOTA RIVER FROM THE MOUTH OF THE POMME DE TERRE RIVER AND INCLUDING MARSH LAKE TO MANKATO, AND THE BLUE EARTH RIVER FROM THE MOUTH OF ELM CREEK TO THE JUNCTION WITH THE MINNESOTA RIVER IN MANKATO

WPC 29: The following standards of effluent quality and purity are hereby adopted and established for that portion of the Mississippi River from the Blandin dam at the outlet of Paper Mill Reservoir in the City of Grand Rapids approximately 400 feet upstream from the U.S. Highway 169 bridge to the mouth of the Rum River in the City of Anoka, and from the mouth of the Chippewa River at the lower end of Lake Pepin near the Village of Wabasha to the Minnesota-Iowa border; and that portion of the Red Cedar River from the bridge on Interstate Highway 90 in the City of Austin to the Minnesota-Iowa border in Section 33, Township 101 North, Range 18 West; and for that portion of the Minnesota River from the mouth of the Pomme de Terre River (Township 120 North, Range 43 West) to the mouth of the Blue Earth River in Mankato, and that portion of the Blue Earth River from the mouth of Elm Creek in Section 4, Township 103 North, Range 28 West to the mouth in Mankato.

(a) **Definitions.** The terms "person," "sewage," "industrial wastes," "other wastes," "treatment works," "disposal systems," and "waters of the state," as well as any other pertinent terms for which definitions are given in the water pollution control statutes, as used herein have the meanings ascribed to them in Minnesota Statutes (1969), Chapters 115 and 116. Other terms and abbreviations used herein not specifically defined in the law shall be construed in conformance with the context and professional usage.

(b) **Severability.** The provisions of this regulation shall be severable and the invalidity of any lettered paragraph or any subparagraph or sentence thereof shall not make void any other lettered paragraph, subparagraph, division or any other part thereof.

(c) **Standards of Effluent Quality and Purity.** Except as otherwise provided herein and notwithstanding any prior regulation it is hereby established as a requirement applicable to all persons operating or causing to be operated or in any way responsible for the operation of a disposal system which discharges sewage, industrial waste or other wastes to the above named waters, or which may affect these waters, that all effluents shall be treated prior to discharge so as to meet any or all of the following limiting concentrations:

Substance or Characteristic	Limiting Concentration
5-day biochemical oxygen demand	25 milligrams per liter
Total suspended solids	30 milligrams per liter
Fecal coliform group organisms	200 most probable number per 100 milliliters
Total coliform group organisms*	1,000 most probable number per 100 milliliters
Pathogenic organisms	None
Oil	Essentially free of visible oil
Turbidity value	25
pH	6.5-8.5
Unspecified toxic or corrosive substances	None at levels acutely toxic to humans or other animals or plant life, or directly damaging to real property.

(d) **Monthly Reports.** All persons operating sewage, industrial waste or other waste disposal systems adjacent to or discharging to the waters covered by this regulation shall submit every month a report to the Minnesota Pollution Control Agency on the operation of such disposal system, the effluent flow, and the characteristics and concentration of the effluents and receiving waters. Sufficient data on measurements, observations, sampling and analyses and other pertinent information shall be furnished as may be required by the Agency to reflect adequately the condition of the disposal system, the effluent and the waters receiving the effluent.

(e) **Determination of Compliance.** In making tests or analyses of the sewage, industrial wastes or other wastes to determine compliance with the standards, samples shall be collected in such manner and place, and of such type, number and frequency as may be considered satisfactory by the Agency. No allowance will be made for dilution of the effluents in the waters of the state into which they are discharged. The samples shall be preserved and analyzed in accordance with procedures given in Standard Methods for the Examination of Water and Waste Water, by the American Public Health Association, American Water Works Association, and the Water Pollution Control Federation, which is in effect on the effective date of this regulation or other methods acceptable to the Agency.

(f) **Variance from Standards.** In any case where, upon application of the responsible person or persons, the Agency finds that by reason of exceptional circumstances the strict enforcement of any provision of these standards would cause undue hardship, that disposal of the sewage, industrial waste or other waste is necessary for the public health, safety or welfare, or that strict conformity with the standards would be unreasonable, impracticable or not feasible under the circumstances, the Agency in its discretion may permit a variance therefrom upon such conditions as it may prescribe for the prevention, control or abatement of pollution in harmony with the general purposes of these standards and the intent of the applicable state and national laws.

Filed with the Secretary of State and Commissioner of Administration February 4, 1971.

**May be used as the control parameter in lieu of fecal coliforms if desired.*

Quality of Sewage Inflow and Outflow from Winona Municipal Sewage Treatment Plant. Unless otherwise indicated, all values are expressed in ppm.

MONTHLY AVERAGE Inflow (millions of gallons)	June - Dec. 1972		Jan. - Dec. 1973		Jan. - May 1974	
	Average	Range	Average	Range	Average	Range
	98.8	63.6-126.3	124.8	93.7-185.2	112.4	101.1-121.6
DAILY AVERAGE						
B.O.D. Inflow	179	164-223	164	144-248	181.2	148-214
B.O.D. Outflow	45	29-55	44	31-59	33.8	23-48
B.O.D. % Remov.	75	71-83	75	70-83	81.8	78-84
Susp. Solids Inflow	164	132-200	157	137-183	184.2	171-212
Susp. Solids Outflow	26	18-41	30	16-58	43	32-56
Susp. Solids % Remov.	84	76-88	82	68-90	76.8	71-81
Total Solids Inflow	914	801-994	972	850-1093	1004.2	907-1060
Total Solids Outflow	768	746-815	803	721-880	847	770-878
Total Solids % Remov.	7	5-22	17	13-26	15.6	15-17
Dissolved Solids Inflow	761	730-816	804	712-865	821.4	739-883
Dissolved Solids Outflow	737	709-777	768	659-842	805	739-841
Dissolved Solids % Remov.	4	2-5	4	1-14	2	0-5
Tot. Nitrogen Inflow			21.9	9.5-30.7	25.2	23.9-26.5
Tot. Nitrogen Outflow			13.8	5.3-19.9	19.1	18.5-19.7
Tot. Nitrogen % Remov.			36	22-54	23.5	22-25
Ammonia-N Inflow			11.8	5.1-17.2	15.7	14.9-16.5
Ammonia-N Outflow			9.5	2.8-15.1	14.3	13.4-15.3
Ammonia-N % Remov.			19	-12-62	8.5	7-10
Nitrate-N Inflow			1.15	0.7-1.5	1.4	1.3-1.5
Nitrate-N Outflow			3.77	2.2-5.0	2.0	1.7-2.4
Nitrate-N % Remov.					-49.5	-85-14

Quality of Sewage Inflow and Outflow from Winona Municipal Sewage Treatment Plant. Unless otherwise indicated, all values are expressed in ppm. (Continued)

	June - Dec. 1972		Jan. - Dec. 1973		Jan. - May 1974	
	Average	Range	Average	Range	Average	Range
DAILY AVERAGE						
Tot. Phosphorus Inflow			12.3	8.0-15.5	15	13.7-16.2
Tot. Phosphorus Outfl.			7.7	6.2-9.8	8.4	7.5-9.3
Tot. Phosphorus Remov.			36	23-44	44.5	43-46
Soluble Phos. Inflow			7.4	3.8-10.5	8.9	8.3-9.4
Soluble Phos. Outflow			7.1	4.4-9.5	7.28	6.7-7.8
Soluble Phos. % Remov.			3	-29-+15	18	17-19
Resid. Chlorine Outflow	0.62	0.46-1.10	0.56	0.28-0.97	0.52	0.15-0.75
Total Coliform Outflow (MPN/100ml)	695	575-859	1772	244-4580	973.3	100-1800

NUMBER OF BARGES LOADED AND UNLOADED IN WINONA

	<u>1960</u>	<u>1965</u>	<u>1970</u>	<u>1973</u>
JAN	NA	NA	NA	NA
FEB	NA	NA	NA	NA
MAR	441	NA	250	147
APR	707	35	903	991
MAY	758	652	1367	-
JUN	622	1101	1354	1350
JUL	794	134	1246	1648
AUG	802	-	1397	1340
SEP	732	979	1024	1775
OCT	776	884	985	1433
NOV	4	844	1064	1197
DEC	NA	NA	96	NA

NA: Not applicable-no traffice during winter months

Source: Winona Daily News

BARGE FREIGHT (IN TONS) FOR WINONA

	1960		1965		1970	
	<u>Unloaded</u>	<u>Loaded</u>	<u>Unloaded</u>	<u>Loaded</u>	<u>Unloaded</u>	<u>Loaded</u>
JAN	NA	NA	NA	NA	NA	NA
FEB	NA	NA	NA	NA	NA	NA
MAR	—	—	NA	NA	637,952	130,600
APR	623,002	132,966	84,473	4,100	940,917	529,500
MAY	725,620	330,344	676,182	222,210	959,662	627,500
JUN	723,118	270,512	1,324,202	541,500	—	—
JUL	739,514	118,395	820,460	490,750	—	—
AUG	885,997	195,035	—	—	—	—
SEP	906,697	135,569	1,025,014	405,300	1,046,695	697,200
OCT	874,513	182,657	973,259	201,250	1,211,000	782,700
NOV	NA	NA	801,184	481,500	—	—
DEC	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>952,825</u>	<u>982,816</u>
	782,640	195,068	841,967	335,230	958,175	625,052

NA: Not applicable-no traffic on river during winter.

Source: Winona Daily News

March-December, 1973

BARGE SHIPMENTS FROM RIVER TERMINALS
Minneapolis, St. Paul, Red Wing and Winona

	WHEAT		DURUM		CORN		OATS		BARLEY		RYE		SOYBEANS		TOTAL	
	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.
ADM Elev. D	86	4074	19	944	93	4697	-	-	-	-	-	-	73	3575	271	13290
Port Bunge	183	8759	-	-	493	25578	-	-	-	-	-	-	25	1257	701	35594
Port Car-gill C	56	2643	2	92	427	22079	78	6313	-	-	10	491	112	5546	685	27164
Cent. Soya Red Wing	-	-	-	-	291	14932	-	-	-	-	-	-	45	2258	336	17190
Port Cont.	27	1250	-	-	555	27844	7	536	-	-	3	154	102	4901	694	34685
FUGTA St. Paul	163	7837	37	1752	128	6233	62	4771	-	-	1	47	2	95	393	20735
Gen. Mills Washburn	44	2003	1	60	63	3104	40	2939	-	-	4	199	2	101	154	8406
McMillan Shoreham	50	2272	10	450	10	393	1	65	-	-	-	-	-	-	71	3180
Peavey Riv. Term	19	945	-	-	229	11392	-	-	-	-	-	-	48	2362	296	14699
Pills Riv. Term	-	-	-	-	381	19541	-	-	-	-	-	-	20	987	401	20528
Searle Riv. Term	-	-	-	-	36	1658	-	-	-	-	-	-	-	-	36	1658
Victoria Mpls.	15	739	2	92	59	2857	-	-	-	-	6	293	11	559	93	4540
Victoria F Winona	-	-	-	-	311	15914	-	-	-	-	-	-	61	3043	372	18957
TOTAL	643	30522	71	3390	3076	156222	188	14624	-	-	24	1184	501	24684	4503	230626
Mar-Dec, 1972	878	41270	43	2175	1761	89536	526	41500	182	10401	30	1495	561	27249	3981	213706

March-December, 1974

BARGE SHIPMENTS FROM RIVER TERMINALS
Minneapolis, St. Paul, Red Wing and Winona

	WHEAT		DURUM		CORN		OATS		BARLEY		RYE		SOYBEANS		TOTAL	
	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.
ADM Elev. D	51	2392	20	946	112	5831	-	-	-	-	-	-	87	4287	270	13496
Port Bunge	188	9085	-	-	393	20554	5	413	-	-	-	-	15	778	601	30830
Port Car-gill C	172	7939	10	459	385	19712	83	6872	-	-	4	199	184	8696	838	43877
Cent. Soya Red Wing	1	50	-	-	257	12956	1	69	-	-	-	-	65	3235	324	16310
Port Cont.	164	7992	-	-	397	20030	6	462	-	-	-	-	167	8326	734	36910
FUGTA St. Paul	222	10377	46	2156	175	8778	54	4131	-	-	2	101	38	1768	537	27311
Gen. Mills Washburn	116	5524	-	-	33	1643	32	2567	-	-	1	50	8	391	190	10175
McMillan Shoreham	56	2530	1	51	1	56	1	85	-	-	-	-	-	-	59	2722
Peavey Riv. Term	142	6784	10	472	124	6389	-	-	-	-	-	-	8	369	284	14014
Pills Riv. Term	-	-	-	-	462	23498	-	-	-	-	-	-	48	2329	510	25827
Searle Riv. Term	11	544	-	-	85	4349	-	-	-	-	-	-	32	1493	128	6386
Victoria Mpls.	49	2005	11	559	24	1228	-	-	-	-	-	-	7	346	91	4138
Victoria F Winona	-	-	-	-	286	15427	-	-	-	-	-	-	87	4264	373	19691
TOTAL	1172	55222	98	4643	2734	140451	182	14599	-	-	7	350	740	36282	4939	251547
March-Dec., 1973	643	30522	71	3390	3076	156222	188	14624	-	-	24	1184	501	24684	4503	230626

January-July 1975

BARGE SHIPMENTS FROM RIVER TERMINALS
Minneapolis, St. Paul, Red Wing and Winona

	WHEAT		DURUM		CORN		OATS		BARLEY		RYE		SOYBEANS		TOTAL	
	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.
ADM.																
Elev. D.	13	645	1	53	18	939	1	85	-	-	-	-	30	1519	63	3241
Folander-																
Conlan	15	729	3	156	1	45	1	86	-	-	-	-	-	-	20	1016
Port																
Bunge	14	671	-	-	126	6666	-	-	-	-	-	-	-	-	140	3337
Port C. r-																
gill C	82	3941	3	138	199	9917	7	616	-	-	-	-	43	2117	334	16729
Cent. Soya																
Red Wing	-	-	-	-	118	5965	-	-	-	-	-	-	12	605	130	6570
Port																
Cont.	40	2007	1	49	220	11126	-	-	-	-	-	-	71	3503	332	16695
FUGTA																
St. Paul	116	5647	25	1222	96	4936	16	1159	-	-	-	-	7	361	260	13325
FUGTA																
Terra 22	3	155	-	-	16	836	-	-	-	-	-	-	6	275	25	1266
Gen. Mills																
Westburn	68	3282	6	293	14	717	16	1238	-	-	-	-	-	-	104	5530
Peavey																
Riv. Term.	59	3029	6	306	24	1227	-	-	-	-	-	-	-	-	89	4562
Pills Riv.																
Terr.	3	128	1	51	157	8199	-	-	-	-	-	-	23	1104	184	9482
Victoria																
Mpls.	21	1018	8	380	7	380	-	-	-	-	-	-	-	-	36	1778
Winona																
Riv. Term.	-	-	-	-	42	2301	-	-	-	-	-	-	19	962	61	3203
Bay State																
Winona	-	-	-	-	-	-	-	-	-	-	-	-	8	387	8	387
TOTAL	434	21252	54	2648	1038	53254	41	3184	-	-	-	-	219	10833	1786	91171
March-July 1974	310	14400	5	231	1816	94200	76	6128	-	-	3	154	436	21494	2646	136607

Grain Shipped by Barge from Winona in 1974

Victoria Elevator	20,000,000 bushel
Bay State Milling	2,000,000 bushel

Grain Shipped by Barge from Winona in 1975

GTA	4,424,000 bushel	87 barges
GARNAC	8,395,000 bushel	159 barges
Bay State Milling	638,000 bushel	13 barges

Total Coarse Grains Shipped by Barge from River Terminals in 1973

230,626,000 bushel*

Total Coarse Grains Shipped by Barge from River Terminals in 1974

251,547,000 bushel*

Total Coarse Grains Shipped by Barge from River Terminals in 1975

174,316,000 bushel*

* River Terminals include Minneapolis, St. Paul, Red Wing and Winona; 1973 and 1974 figures do not include Bay State Milling.

Source: Minneapolis Grain Exchange

January-December, 1974

VOLUME OF GRAIN HANDLED BY MINNEAPOLIS-ST. PAUL AREA ELEVATORS

Reported to the Minneapolis Grain Exchange
Commodities IN and OUT, by Kind
and by Mode of Transportation

(BUSHELS IN THOUSANDS)

COMMODITY	RAIL				TRUCK				BARGE		TOTAL	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	OUT	OUT	IN	OUT
	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	Bu.	Bu.
WHEAT(not including DURUM)	21642	51047	7351	18347	49659	39979	86	88	1153	54678	91024	73113
DURUM	8292	19508	1917	4990	1094	848	-	-	98	4643	20350	9133
CORN	13081	32488	4088	12499	100261	86603	351	291	2209	112562	119091	125352
OATS	9647	32276	8104	27459	9261	13623	1333	1631	181	14530	45899	43620
BARLEY	16601	42387	10947	35163	2614	2723	485	480	-	-	45110	35643
RYE	921	2070	726	1924	939	779	4	1	7	350	2849	2275
FLAX	947	2107	290	764	12266	9979	1130	966	-	-	12086	1730
SOYBEANS	3775	8696	420	1245	39768	32042	163	140	594	28783	40738	30168
TOTAL	74906	190579	33843	102391	215862	186576	3552	3597	4242	215546	377155	321534
Jan.-Dec., 1973	59334	147987	45578	124953	280200	242583	3729	3276	3790	194479	390570	322708

January-July 1975

VOLUME OF GRAIN HANDLED BY MINNEAPOLIS-ST. PAUL AREA ELEVATORS

Reported to the Minneapolis Grain Exchange
Commodities IN and OUT, by Kind
and by Mode of Transportation

(BUSHELS IN THOUSANDS)

COMMODITY	RAIL				TRUCK				BARGE		TOTAL	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	OUT	OUT	IN	OUT
	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	No.	Bu.	Bu.	Bu.
WHEAT(not including DURUM)	10153	24735	4261	12171	21813	17295	33	24	433	21206	42040	35401
DURUM	4423	10458	1649	4643	1197	926	8	6	54	2642	11365	1287
CORN	5648	15406	2411	7307	33884	29109	345	268	878	44983	44515	52563
OATS	4846	16818	5493	18844	903	1275	810	862	41	3184	18093	22690
BARLEY	5919	15732	7019	23647	1145	1179	268	239	-	-	16911	23286
RYE	366	895	240	675	380	328	8	8	-	-	1223	681
FLAX	114	243	4	11	3116	2542	-	-	-	-	2785	11
SOYBEANS	968	2391	261	747	14390	11622	659	524	180	8879	14013	10156
TOTAL	32437	86678	21338	68045	76828	64276	2131	1931	1586	80905	150954	150681
Jan.-July 1974	33436	84692	22379	66260	127971	110570	2466	2468	2287	117710	195262	186438

Air sampler particulate measurements collected
at the intersection of Stone and Second Street.

Date weighed	Wind (mph)	ug/m ³
19-20 Jul 1974	NNW-8	165.9
20-21 Jul 1974	E-7	95.3
22-23 Jul 1974	-	97
23-24 Jul 1974	S-12	116.4
24-25 Jul 1974	SSW-1	91.7
29-30 Jul 1974	NNW-15	88.2
30-31 Jul 1974	N-9	102.3
31 Jul-1 Aug 1974	Calm	124.7
5 Aug - 6 Aug 1974	E-6	90.0
6-7 Aug 1974	SE-10	129.4
Dated weighed	Wind (mph)	ug/m ³
7-8 Aug 1974	Calm	167.0
13-14 Aug 1974	SW-5	108.2
14-15 Aug 1974	S-10	114.1
15-17 Aug 1974	VAk-5	120.6

Air Sampler Particulate Measurements for the Three Sampling Sites

Date	City Hall (ug/m ³)	Sewage Plant (ug/m ³)	Lock and Dam 5A (ug/m ³)
January 19	42.32	33.57	2.68
January 27	62.85	59.36	21.57
February 1	16.16	-	12.26
February 9	90.97	58.43	60.01
February 16	73.25	57.57	52.19
February 21	109.10	114.02	50.88
March 7	142.79	130.05	88.25
March 15	51.98	33.94	13.62
March 23	129.08	48.52	50.25
March 28	131.14	94.28	63.52
April 5	56.65	52.84	32.27
April 12	95.33	80.62	39.63
April 20	83.10	104.59	53.41
September 7	66.85	2.43	-
September 14	93.38	95.66	95.45
September 21	146.03	106.14	127.67
September 28	57.97	25.27	21.13
October 5	36.90	29.53	35.87
October 16	80.75	77.41	69.38
October 26	29.89	27.54	27.54
November 2	31.63	24.76	18.86
December 5	69.21	15.17	27.75
December 14	66.85	68.26	49.02

Source: Calvin, Dennis G. and Taus, David A., 1972

FLOOD INSURANCE

An economic consideration important to all communities located on floodplains is the availability of flood insurance. Historically, it has been virtually impossible to obtain flood insurance because of the limited number of potential customers and the possible wide-spread effects of the potential disaster. Recent Federal legislation, however, created the Federal Insurance Administration within the Department of Housing and Urban Development. Flood insurance is now available at government subsidized premium rates for all types of buildings both publicly and privately owned, whether for profit or non-profit, religious, residential, commercial, or agricultural, including contents of the buildings, at a price it is believed the public can afford.

In order to qualify for flood insurance, however, the community must make application to the Flood Insurance Administration. Certain conditions must be met before the community will be eligible for the insurance.

Congress authorized the provision of subsidized insurance for those exposed to flood hazards only within communities where future development would be controlled through flood plain management to minimize losses. Such management may include community operation of a comprehensive program of corrective and preventative measures for reducing flood damage, including land use control measures on a uniform basis, emergency preparedness plans, and flood control works (National Flood Insurers Assn. 1974).

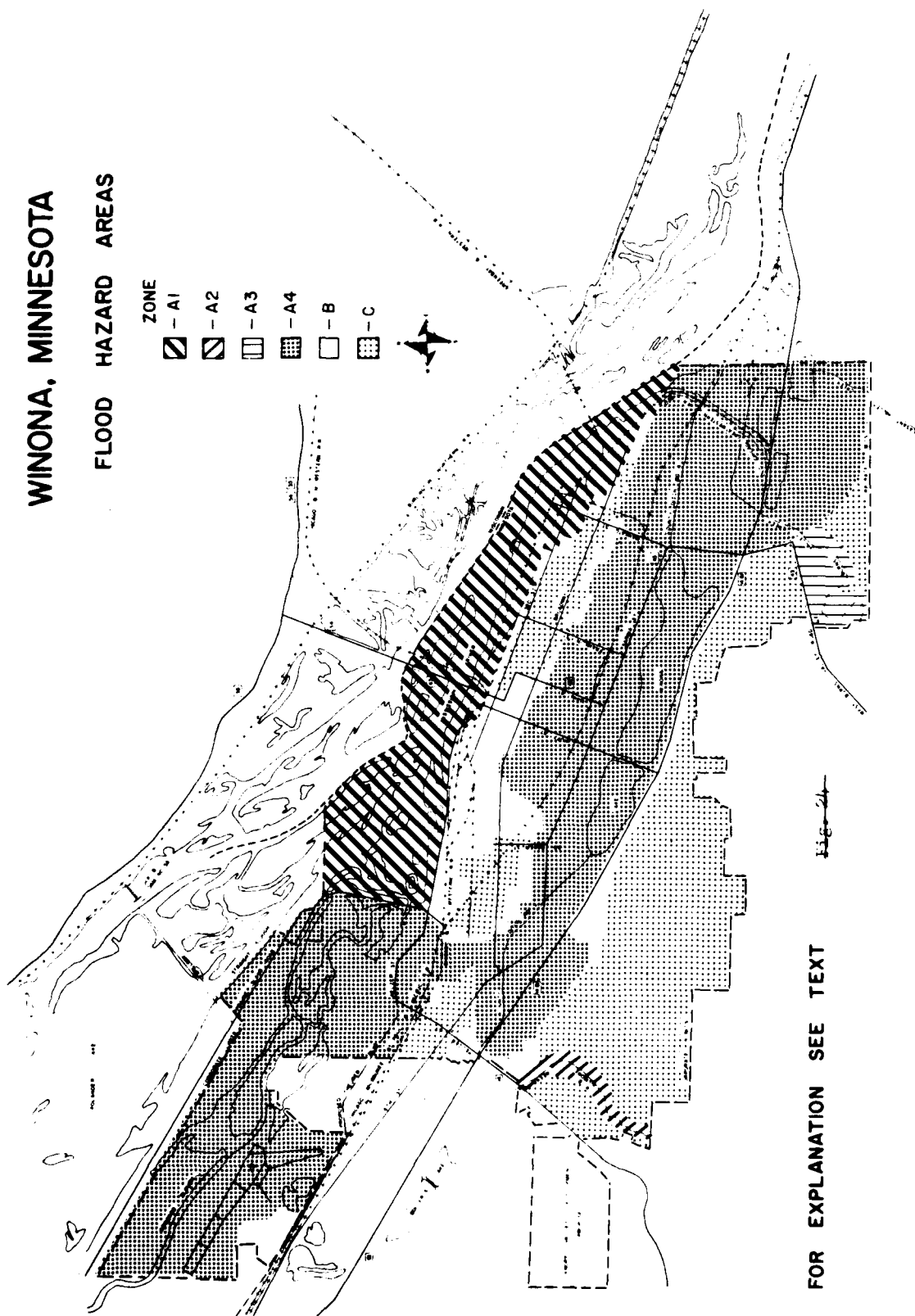
Community qualification for flood insurance involves developing technical information involving river flood stage water depth and minimum first floor building elevations. From this data a map is drawn of flood hazard. Lines separating flood hazard are drawn on a block basis rather than on a street basis. The city of Winona became eligible for flood insurance on April 20, 1972, and, at that time received a community identification number MN275250 (National Flood Insurers Assn., 1974). The following figure identifies the following six flood hazard classifications which exist in Winona:

WINONA, MINNESOTA

FLOOD HAZARD AREAS

ZONE

-  - A1
-  - A2
-  - A3
-  - A4
-  - B
-  - C



FOR EXPLANATION SEE TEXT

Fig. 24

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- Zone A-1 Area of special flood hazards with base flood elevations determined. These areas are subject to flood with flowing water.
- Zone A-2 Area of special flood hazard along a stream where hazard is variable - Gilmore Creek.
- Zone A-3 Area of special flood hazard along a stream where hazard is variable - Burns Valley Creek.
- Zone A-4 Area of special flood hazard. These areas are subject to flood by back water and standing water.
- Zone B Area of moderate flood hazards. Flood insurance optional, not required.
- Zone C Area of minimal flood hazard. Flood insurance optional, not required.

As a special incentive to enter the flood insurance program, individuals and businesses located in identified areas of special flood hazards (Zone A-1, A-2, A-3, A-4) of participating communities are required to purchase flood insurance as a prerequisite for receiving any type of federally insured or federally regulated financial assistance for acquisition or construction purposes. Moreover, effective July 1, 1975, federal mortgage guarantees and insurance, mortgage loans, grants, and other forms of federal assistance for financing capital costs of construction and equipment will not be available to individuals and businesses in identified flood prone areas unless the community has qualified for the program by adopting effective land use and land management controls (National Flood Insurer's Assn., 1974).

Flood insurance is presently required in Winona for anyone building or buying property in a special hazard zone. Furthermore, construction in a special flood hazard zone must conform to requirements concerning first floor building elevations. That floor which is to be considered the "first" floor in any home or other building, must be constructed one foot above the level of the 1% or 100-year flood. In Winona, that is taken to mean the level of the 1965 flood. Any basement or floor below the "first" floor must be of an approved flood proofing design.

In order to provide a program of flood insurance at a cost the public can afford, the Federal Government subsidizes a portion of the premium. The amount of the premium paid varies with the value of the property, the flood risk zone in which the property is located, and the elevation of the property above or below the 100-year flood level. The average cost of insurance on a single family dwelling is about 26¢ per 100 dollars worth of insurance to a maximum of \$35,000 for the first level of a building.

Table A-1 indicates some examples of premiums paid for flood insurance in Winona. Insurance has been mandatory for special flood hazard zones since the city was accepted into the program. No particular pattern is implied by the figures in the table, as they represent only a random sample of flood insurance premiums.

The cost of flood insurance, particularly mandatory insurance, could pose a financial hardship on many Winona residents in the future. The only way that hardship can be avoided is by the completion of Phase II of the permanent dike.

Should the permanent dike be completed around the city, flood insurance would no longer be mandatory for all areas, but would be optional for most areas within the dike (See letter to R.W. Krimm, page A-38 and reply from U.S. Department of Housing and Urban Development, page A-39). This fact should stress the importance of the proposed dike to every property owner in Winona.

Table A-1

Flood Insurance Costs and Subsidies in Winona, MN				
	ZONE	AMOUNT OF INS. for DWELLING and/or CONTENT	TOTAL ANNUAL COST U.S. GOVERNMENT SUBSIDY	CLIENT COST
Case A	A4	23,000 (Dwelling)	\$748	\$58
Case B	A4	7,000 (Dwelling)	350	18
		3,000 (Content)	276	11
Case C	A4	11,000 (Dwelling)	344	28

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EXHIBIT 11

APPENDIX VII

October 21, 1974

R. W. Krimm
Asst. Administrator of Flood Insurance
Federal Insurance Administration
451 7th Street S.W.
Washington, D. C. 20410

ATTENTION: F. M. Crompton

Dear Mr. Krimm:

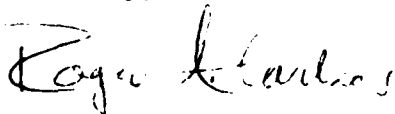
The U.S. Army Corps of Engineers is planning to complete a permanent dike around Winona, Minnesota, a city located on the Mississippi River. Presently, about 1/2 of the dike is permanent and the other 1/2 is temporary. I am involved in the preparation of an Environmental Impact Assessment for the Corps of Engineers concerning the completion of the permanent dike. As a part of the assessment, the question of flood insurance is being investigated.

The Winona flood hazard area was identified 72/04/20 and given the community identification number MN275250. Inasmuch as flood insurance is presently being issued within the city, the following questions have been posed during the course of this investigation:

1. Will any change in flood insurance premium rates result if the permanent dike is completed?
2. Is there any possibility that the city qualification for flood insurance may be cancelled if the permanent dike is not completed?

I would very much appreciate any information your office could supply concerning these questions.

Sincerely,



Roger A. Carlson
Head, Department of Geography

RAC:kd

EXHIBIT 11

A-38



Winona, Minnesota 55901

Telephone (507) 431-1111



DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION
WASHINGTON, D. C. 20410

APR 1 1975

IN REPLY REFER TO:

Mr. Roger A. Carlson
Head, Department of Geography
Winona State College
Winona, Minnesota 55987

Dear Mr. Carlson:

This is in response to your letter of October 21, 1974, questioning the effects of temporary and permanent dikes on flood insurance rates and continuing eligibility for flood insurance for Winona, Minnesota.

Winona, Minnesota, participates in the National Flood Insurance Program under the Regular Program. Its flood hazard zones are delineated on the Flood Insurance Rate Map for Winona. In spite of the fact that flood hazard delineations on Flood Insurance Rate Maps reflect only existing conditions, the flood insurance rates for flood-prone communities are indeed affected by the presence of on-going improvements in the flood protection system in a community. An amendment to the National Flood Insurance Act of 1968, Section 1307(e), a copy of which is enclosed for your reference, permits any community that has made adequate progress, to a degree acceptable to the Secretary of HUD, on the construction of a flood protection system, to become eligible for flood insurance at premium rates not exceeding those which would be applicable if the flood protection system had actually been completed. In order to establish the acceptability of the improvements now in progress in Winona, the City should submit all available technical data on the construction now completed to the Federal Insurance Administration for review (Attn: Engineering and Hydrology Division). We will review data from the community and from the U.S. Army Corps of Engineers who prepared the Flood Insurance Rate Map, to determine what premium rates shall be applied to Winona in conformity with Section 1307(e).

When the dike is actually completed, the city should submit all available technical data showing the effects of the dike on the flood hazard area in Winona. After a review of the data, we will revise our maps if necessary. The insurance rates applicable in Winona will also be revised to reflect any changes in zone elevations due to improvements in the flood protection system.

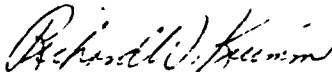
If, after a review of data submitted, zone elevations on the Flood Insurance Rate Map for Winona are revised, the Federal Insurance Administration (FIA) will publish the proposed flood elevations in the Federal Register and officially notify the chief executive of the community.

The current status of Winona in the National Flood Insurance Program will not be cancelled or changed if the permanent dike is not completed.

If we may be of further assistance, please let us know.

Sincerely,

J. Robert Hunter
Acting Federal Insurance Administrator



By Richard W. Krimm
Assistant Administrator for
Flood Insurance

Enclosure

Public Law 93-383
93rd Congress, S. 3066
August 22, 1974

FLOOD INSURANCE PROGRAM

42 USC 4101. Sec. 816. (a) Chapter III of title XIII of the Housing and Urban Development Act of 1968 is amended by adding at the end thereof the following new section:

"NOTICE OF FLOOD HAZARDS

42 USC 4104a. "SEC. 1364. Each Federal instrumentality responsible for the supervision, approval, regulation, or insuring of banks, savings and loan associations, or similar institutions shall by regulation require such institutions, as a condition of making, increasing, extending, or renewing (after the expiration of thirty days following the date of the enactment of this section) any loan secured by improved real estate or a mobile home located or to be located in an area that has been identified by the Secretary under this title or Public Law 93-234 as an area having special flood hazards, to notify the purchaser or lessee (or obtain satisfactory assurances that the seller or lessor has notified the purchaser or lessee) of such special flood hazards, in writing, a reasonable period in advance of the signing of the purchase agreement, lease, or other documents involved in the transaction."

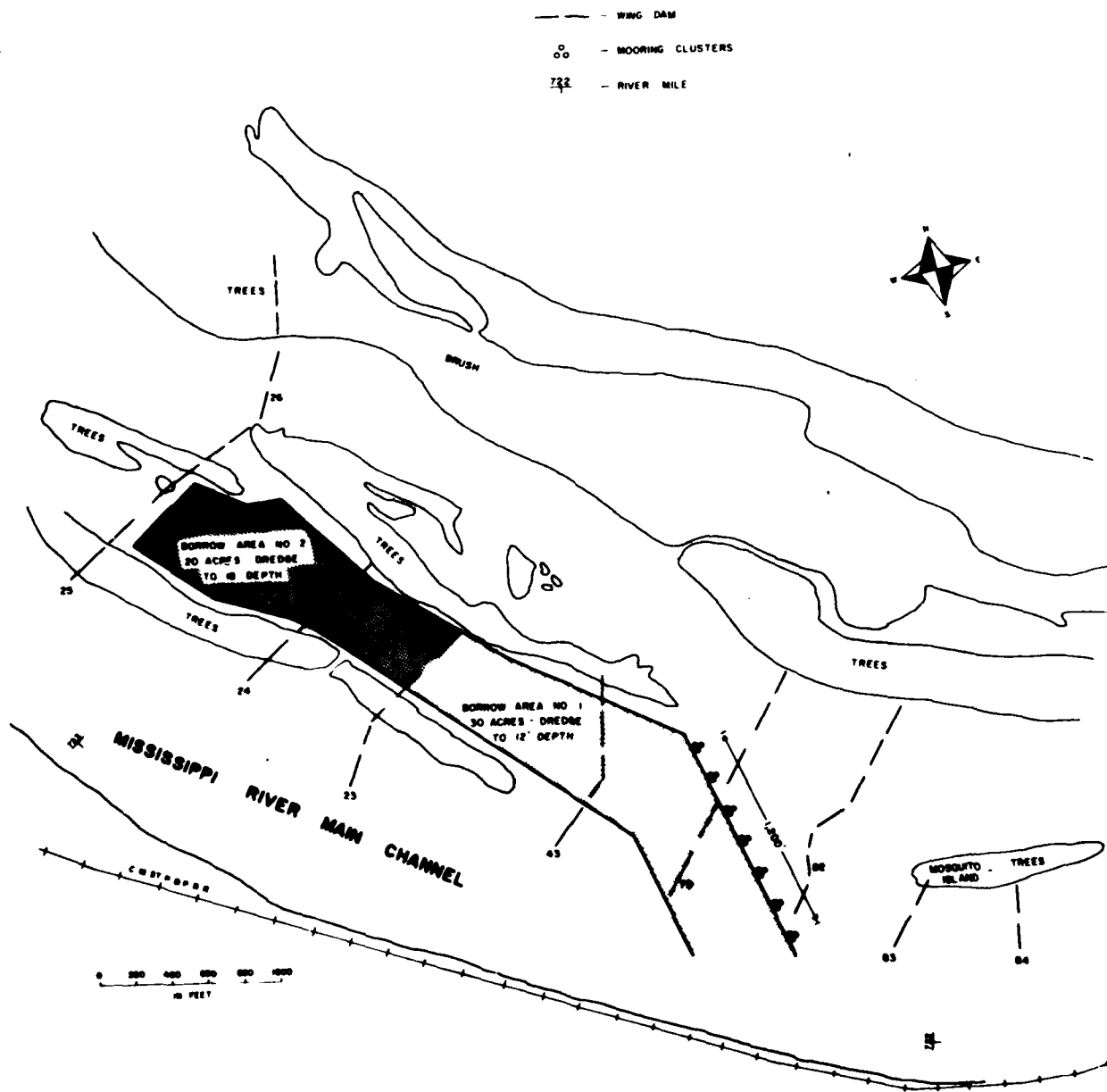
87 Stat. 975.

42 USC 4014. (b) Section 1307 of such Act is amended by adding at the end thereof the following new subsection:

Flood insurance, eligibility. "(e) Notwithstanding any other provision of law, any community that has made adequate progress, acceptable to the Secretary, on the construction of a flood protection system which will afford flood protection for the one-hundred year frequency flood as determined by the Secretary, shall be eligible for flood insurance under this title (if and to the extent it is eligible for such insurance under the other provisions of this title) at premium rates not exceeding those which would be applicable under this section if such flood protection system had been completed. The Secretary shall find that adequate progress on the construction of a flood protection system as required herein has been only if (1) 100 percent of the project cost of the system has been authorized, (2) at least 60 percent of the project cost of the system has been appropriated, (3) at least 50 percent of the project cost of the system has been expended, and (4) the system is at least 50 percent completed."

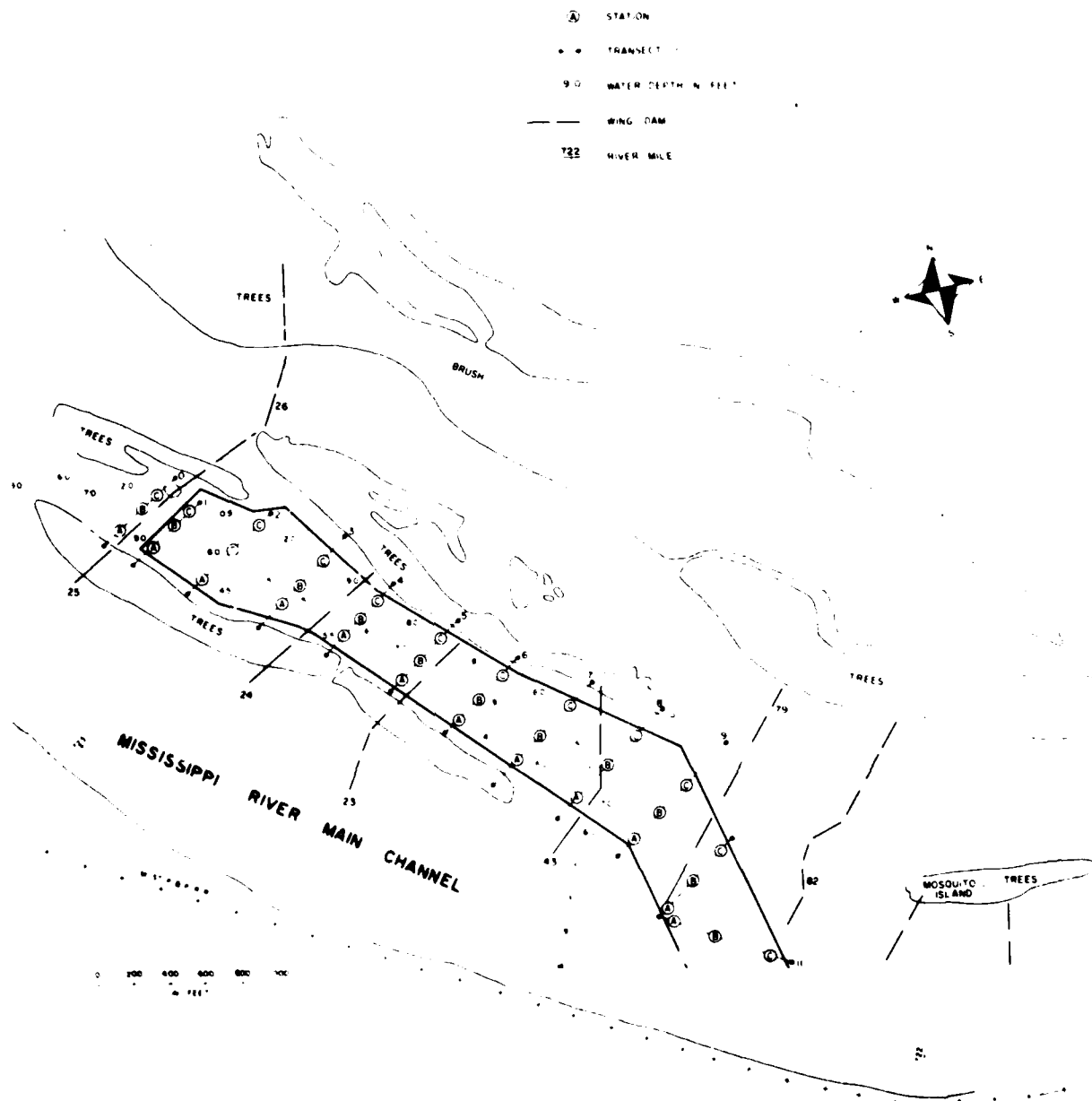
BARGE FLEETING AREA

ALTERNATE
(PROPOSED)



ALTERNATE BARGE FLEETING AREA (PROPOSED)

TRANSECTS & STATIONS FOR COLLECTION OF BOTTOM FAUNA





UNIVERSITY OF MINNESOTA
TWIN CITIES

Department of Anthropology
215 Ford Hall
Minneapolis, MN

December 10, 1974

Professor Calvin Fremling
Winona State College
Winona, Minnesota 55987

Dear Professor Fremling:

I have your letter concerning archaeological/historical features in the Winona area where the Corps of Engineers plan construction work. I'm afraid that I cannot pin-point those features using the map you submitted as I am not sure what your symbols mean nor am I sure where the present dikes are located. I would guess that this is the area where two prehistoric burial mounds were previously buried undisturbed under an earth dike and there are some significant historical features in the area.

Because the area has never been intensively surveyed, I am sure that the Corps will require a field survey in addition to a records check. The field check will require test excavation--a little difficult to do this time of the year.

At any rate, I would suggest that you contact either Gary J. Hudak, archaeologist, Science Museum of Minnesota, St. Paul; or Rain Vehik, archaeologist, La Crosse-University of Wisconsin, and ask if either would do the necessary work on a sub-contract. Either you or the archaeologist you employ will be welcome to use our archaeological site files.

Sincerely,

Elden Johnson
State Archaeologist

EJ:dl



MINNESOTA HISTORICAL SOCIETY

Fort Snelling Branch (Building 25) Fort Snelling, St. Paul, Minnesota 55111 • 612-726-1171

2 January 1975

Professor Calvin R. Fremling
Winona State College
Winona, Minnesota 55987

Dear Professor Fremling:

RE: Environmental Impact Assessment
Flood Control and Waterfront Development
U.S. Army Corps of Engineers Projects
Winona, Minnesota

The above listed projects have been reviewed by the Survey and Planning and Archaeology sections of the Minnesota Historical Society as per your request of 6 December 1974 to Russell W. Fridley. You mention in your letter that the assessment is to be done for ten projects, including a dike system, grain elevators, fleeting areas, etc., however, you do not indicate on your enclosed map what type of project is to occupy each coloured area. It is therefore impossible to adequately comment on the possible environmental impact as no description of construction, dredging, fill, and disposal is provided.

Sites of archaeological and historical potential are known to exist in the general area. One archaeological site (21-WN-11) is located in the project area and a second (21-WN-10) is located adjacent. It is therefore evident that a survey must be conducted by a qualified archaeologist prior to issuance of the requested environmental impact assessment statement.

Should you have further questions on this matter, please contact Mr. Alan R. Woolworth, Chief Archaeologist, Minnesota Historical Society.

Respectfully,

Charles W. Nelson
Supervisor - E.I.S.

CWN/fr

cc: Alan R. Woolworth, Chief Archaeologist and
Douglas George, Survey Archaeologist
Minnesota Historical Society
Building 27, Fort Snelling
St. Paul, Minnesota 55111

A-45

EXHIBIT 13

Founded 1849 • The oldest institution in the state

NOCLM:mr

3 March 1970

Mr. Marie Telleson
Chief, Technical Support Branch
United States Environmental Protection
Agency
Region V
230 South Dearborn Street
Chicago, Illinois 60604

Dear Mr. Telleson:

We have provided your office with air quality data and associated narrative that will be part of the Final Environmental Impact Statement for the Winona, Minnesota Flood Control Project and Waterfront Development.

It is our understanding from a recent conversation with Mr. Gary Williams, of your office, that additional data pertaining to the existing air quality of the Winona area will be necessary, particularly with regard to the analysis of the grain transshipment facility proposed by Fronings, Inc.

We would appreciate your written evaluation of the data that we supplied, so that we can inform the permit applicant what additional information will be required.

Sincerely yours,

RICHARD F. BERRY
Biologist
Acting Chief, Environmental
Resources Branch
Engineering Division

EXHIBIT 14



UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
200 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604



Mr. Richard F. Berry
Biologist
Acting Chief, Environmental
Resources Branch
Engineering Division
U. S. Army Engineer District, St. Paul
1135 U. S. Post Office & Customhouse
St. Paul, Minnesota 55101

Dear Mr. Berry:

We have evaluated the Corp's preliminary air quality comments that are intended to be part of the Final EIS for the Flood Control Project and Waterfront Development for Winona, Minnesota as requested in your March 3, 1976 letter. Reference is also made to a March 30, 1976 telephone conversation with Mr. Ted Ondler of your staff. He requested clarification of our position on Fronings' proposed landfill. We offer the following comments with respect to the preliminary air analysis and to what would be expected of the permit applicant.

The annual primary particulate standards in Winona have increased in each of the years 1973 through 1975. Minnesota Pollution Control Agency (MPCA) personnel are shortly going to investigate what sources are likely to have caused the increase in ambient concentration. The monitoring station in Winona may have been influenced by now completed long-term local road and building construction projects in addition to local industry emissions.

The GTA Elevator in Winona has control facilities except for problems being experienced with barge loading. The GRANAC Elevator (formerly Victoria Elevator) has virtually no controls but has now engaged an outside contractor to design a control program. Fabric filters will be required of these large terminal elevators. While such filters are not inexpensive, the costs are not prohibitive. Fabric filters have no secondary adverse effects. Thus emissions should be reduced from existing grain elevators in Winona. Calculations by MPCA personnel indicate that if the proposed Froning Grain Terminal shipped grain at the indicated 24 million bushels per year and had the 99% control efficiency as required by the Proposed State Regulation, annual emissions would be 13 tons per year of particulate matter and would not have a significant impact on the ambient air. These figures should be verified by MPCA.

Well-controlled grain elevators should not pose a local air pollution control problem. If "best available control technology" (BACT) is applied, present day grain handling emission controls may be adequate by themselves to prevent increases of air quality standards violations in Winona.

EXHIBIT 15

Our Research Triangle Park Laboratory (RTP) has prepared a draft New Source Performance Standard (NSPS) background document for grain handling facilities. The document is not yet available for distribution and is subject to revision. The tentative conclusions of the draft document are that economical grain elevator controls are capable of reducing emissions at point sources (other than barge loading) in the range of 90% (using cyclones) to 99% (using bag houses). Once the proposed Minnesota regulation concerning grain elevator emissions becomes law, elevators will be uniformly controlled throughout the State, dependent on total yearly grain throughput and population of the area in which the facility is located. Grain elevators with these required controls should not generally cause violations of ambient standards by themselves. Control of barge loading emissions is an area where the solution to these pollution problems is not satisfactory. Solutions now proposed are not feasible for all existing elevators, but progress is being made in this area. It would still be necessary, however, to meet the requirements of §51.18 of the Code of Federal Regulations (copy attached) concerning the review of new sources and modifications. In accordance with these Federal regulations, an air quality assessment plan with dispersion modeling of the area's present and proposed grain handling emissions would be required to ascertain if national standards are being violated, either directly because of emissions from the source, or indirectly, because of emissions resulting from mobile source activities associated with it.

Unfortunately, the state-of-the-art of dispersion modeling of grain elevator emissions is not highly developed. Some work has been done at our RTP and we have requested copies of this work. Consultants may have done additional studies, but we are not aware of them. Given this state-of-the-art, a logical approach would be to do a model validation study using the grain elevators already operating in the area. If such studies were to validate a model, it could then be used to predict the air quality impact of the proposed facilities.

Therefore, we request that the permit applicant be required to submit an air quality assessment detailing the probable air quality impacts of additional grain handling facilities upon the attainment of National Ambient Air Quality Standards in Winona. This assessment should be made prior to any construction activities. If this assessment concludes that air quality standard violations will significantly increase as result of the proposed project even though BACT is applied in controlling air pollution from the grain handling facilities, EPA may recommend denial of the permit(s). Ambient air levels may be such that even a small increase in particulates could cause a significant increase in air quality standard violations.

For your information, "Plume Rise" is not a significant factor to the dispersion of emissions from grain handling facilities; therefore, inversion situations are probably not critical in the assessment of the impact of the grain terminal's emissions. We recommend that the MPCA be consulted regarding the actual potential for inversions in the area.

With regards to our position on Fronings' proposed landfill, the May 29, 1975 public notice on application for Permit No. NCSCO-S-831a(A633) indicates a proposed fill of 214,000 cubic yards. According to the EIS, the size of the proposed construction area, 14.75 acres is an area sufficient to accommodate the grain elevator and related service building. Our 404(b) Guidelines for evaluating the discharge or dredged or fill material in navigable waters state that the discharge of fill materials in wetlands shall not be permitted unless the applicant clearly demonstrates the following:

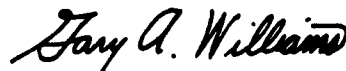
- (1) the activity associated with the fill must have direct access or proximity to, or be located in, the water resources in order to fulfill its basic purpose, or that other site or construction alternatives are not practicable; and
- (2) that the proposed fill and the activity associated with it will not cause a permanent unacceptable disruption to the beneficial water quality uses of the affected aquatic ecosystem.

It is our opinion that the applicant has satisfied the requirements of the guidelines in regard to the 14.75 acres needed for the construction of the grain elevator and service buildings.

In summary, the preliminary air comments to be incorporated into the Final EIS would be satisfactory provided there was a statement indicating that a detailed air quality impact assessment(s) as described above would be required from the permit applicant and sufficient time would have to be allowed to review these assessments before any construction could commence.

With regard to our other comments on air quality, no response is necessary. We also believe the permit applicant has satisfied the requirements of the guidelines in regard to the 14.75 acres needed for construction of the grain facilities. We appreciate the opportunity to review the preliminary air comments prior to their release in the Final EIS and to clarify our position with regard to what is expected of the permit applicant.

Sincerely yours,



Gary A. Williams
Chief,
Environmental Review Section

(2) At least one sampling site must be located in the area of estimated maximum pollutant concentrations.

(b) The plan shall include a description of the existing and proposed air quality surveillance system, which shall set forth:

(1) The basis for the design of the surveillance system, selection of samplers, and sampling sites.

(2) The locations of the samplers by Universal Transverse Mercator (UTM) grid coordinates or the equivalent. Any EPA monitoring station may be designated as a sampler location.

(3) The sampling schedules.

(4) The methods of sampling and analysis.

(5) The method of data handling and analysis procedures.

(6) The timetable for the installation of any additional equipment needed to complete the system.

(c) The plan shall provide for monitoring of air quality during any air pollution emergency episode stage. The stations selected for use during such periods must be in operation within 1 year after the date of the Administrator's approval of the plan and be capable of indicating when pollutant concentrations have reached, or are approaching, any episode criteria established pursuant to § 51.16.

[36 F.R. 22323, Nov. 25, 1971, as amended at 36 F.R. 25233, Dec. 30, 1971]

§ 51.18 Review of new sources and modifications.

(a) Each plan shall set forth legally enforceable procedures which shall be adequate to enable the State or a local agency to determine whether the construction or modification of a facility, building, structure, or installation, or combination thereof, will result in violations of applicable portions of the control strategy or will interfere with attainment or maintenance of a national standard either directly because of emissions from it, or indirectly, because of emissions resulting from mobile source activities associated with it.

(b) Such procedures shall include means by which the State or local agency responsible for final decisionmaking on an application for approval to construct or modify will prevent such construction or modification if it will result in a violation of applicable portions of the control strategy or will interfere with the attain-

ment or maintenance of a national standard.

(c) Such procedures shall provide for the submission, by the owner or operator of the building, facility, structure, or installation to be constructed or modified, of such information on:

(1) The nature and amounts of emissions to be emitted by it or emitted by associated mobile sources;

(2) The location, design, construction, and operation of such facility, building, structure, or installation as may be necessary to permit the State or local agency to make the determination referred to in paragraph (a) of this section.

(d) Such procedures shall provide that approval of any construction or modification shall not affect the responsibility of the owner or operator to comply with applicable portions of the control strategy.

(e) Each plan shall identify the State or local agency which will be responsible for meeting the requirements of this section in each area of the State. Where such responsibility rests with an agency other than an air pollution control agency, such agency shall consult with the appropriate State or local air pollution control agency in carrying out the provisions of this section.

(f) Such procedures shall identify types and sizes of facilities, buildings, structures, or installations which will be subject to review pursuant to this section. The plan shall discuss the basis for determining which facilities shall be subject to review.

(g) The plan shall include the administrative procedures, which will be followed in making the determination specified in paragraph (a) of this section.

(h) (1) Such procedures shall provide that prior to approving or disapproving the construction or modification of a facility, building, structure, or installation pursuant to this section, the State or local agency will provide opportunity for public comment on the information submitted by the owner or operator and on the agency's analysis of the effect of such construction or modification on ambient air quality, including the agency's proposed approval or disapproval.

(2) For purposes of paragraph (h) (1) of this section, opportunity for public comment shall include, as a minimum:

(i) Availability for public inspection in at least one location in the region af-

ected of the information submitted by the owner or operator and of the State or local agency's analysis of the effect on air quality.

(ii) A 30-day period for submittal of public comment, and

(iii) A notice by prominent advertisement in the region affected of the location of the source information and analysis specified in paragraph (h)(2) (i) of this section.

(3) Where the 30-day comment period required in paragraph (h) of this section would conflict with existing requirements for acting on requests for permission to construct or modify, the State may submit for approval a comment period which is consistent with such existing requirements.

(4) A copy of the notice required by paragraph (h)(2) of this section shall also be sent to the administrator through the appropriate regional office, and to all other State and local air pollution control agencies having jurisdiction in the region in which such new or modified installation will be located. The notice also shall be sent to any other agency in the region having responsibility for implementing the procedures required under this section.

(i) Suggestions for developing procedures to meet the requirements of this section are set forth in appendix O.

[38 FR 15936, June 18, 1973]

§ 51.19 Source surveillance.

Each plan shall provide for monitoring the status of compliance with any rules and regulations which set forth any portion of the control strategy. Specifically, each plan shall, as a minimum, provide for:

(a) Legally enforceable procedures for requiring owners or operators of stationary sources to maintain records of, and periodically report to the State information on, the nature and amount of emissions from such stationary sources and/or such other information as may be necessary to enable the State to determine whether such sources are in compliance with applicable portions of the control strategy.

(b) Periodic testing and inspection of stationary sources.

(c) Establishment of a system for detecting violations of any rules and regulations through the enforcement of appropriate visible emission limitations and for investigating complaints.

(d) Procedures for obtaining and maintaining data on actual emissions reductions achieved as a result of implementing transportation control measures. In the case of measures involving inspection, maintenance, or retrofit, these data shall include the results of an emission surveillance program designed to determine actual average per vehicle emissions reductions attributable to inspection, maintenance, and/or retrofit. In the case of measures based on traffic flow changes or reductions in vehicle use, the data shall include observed changes in vehicle miles traveled (VMT) and average speeds. The data shall be maintained in such a way as to facilitate comparison of the planned and actual efficacy of the transportation control measures.

[36 FR 22398, Nov. 25, 1971, as amended at 38 FR 15196, June 8, 1973]

§ 51.20 Resources.

Each plan shall include a description of the resources available to the State and local agencies at the date of submission of the plan and of any additional resources needed to carry out the plan during the 5-year period following its submission. Such description, which shall be provided in a form similar to that in Appendix K to this part, shall include projections of the extent to which resources will be acquired at 1-, 3-, and 5-year intervals.

§ 51.21 Intergovernmental cooperation.

(a) For the purpose of assisting in the development of a plan for any interstate region, the State agency responsible for implementing national standards in any portion of such an interstate region shall furnish any available data on emissions, air quality, and control strategy development, upon request, to any other State or local agency having such responsibility in any other portion of such interstate region.

(b) Each plan shall identify:

(1) The local agencies, by official title, which will participate in carrying out the plan.

(2) The responsibilities of such local agencies and the responsibilities of any State governmental agency involved in carrying out any portion of the plan.

(c) Each plan shall provide assurances that the State agency having primary responsibility for implementing national standards in any region, or portion thereof, will promptly transmit to other State agencies having similar or related

Department of the Army
St. Paul District Command
1135 U. S. House of Representatives Building
St. Paul, Mn. 55101

NCSed-ER

6 May 1976

Mr. Marie W. Tellekson
Chief, Technical Support Branch
U.S. Environmental Protection Agency
Region V
230 South Dearborn Street
Chicago, Illinois 60604

Dear Mr. Tellekson:

As a result of recent telephone conversations with members of your office we would like you to clarify the requirement for the permit applicant, Fronings, Inc. (Permit A633) to provide an air quality assessment. That air quality assessment was requested in your 1 April 1976 letter addressed to Mr. Richard F. Berry of this office and was discussed at a subsequent meeting on 26 April 1976 at your office.

We understand that you have been analyzing current air quality data from the Winona, Minnesota, area and will soon be able to define existing ambient air quality conditions in Winona. Once the ambient air quality conditions are defined, it is our feeling that the air quality impacts from the proposed Fronings, Inc. grain handling facility can be determined, assuming that Fronings and other existing area grain handling facilities must install the necessary emission controls to meet State and Federal air quality standards. Therefore, we feel an air quality assessment is not necessary at this time.

Based on our discussions with the Minnesota Pollution Control Agency, members of your office and Winona city officials, we understand that ambient air quality conditions in Winona have improved considerably from a year ago. In addition, the emissions from the Fronings facilities, assuming a high degree of required particulate control, are not expected to raise ambient airborne particulate levels above acceptable standards. If these understandings are true, we propose to indicate these findings in the final environmental impact statement (EIS).

A decision as to the disposition of the pending permit is not necessary at this time, but in order to clarify the air quality impacts in the final EIS we need your views on the issues discussed above.

6 May 1976

NCSEB-EK

Mr. Merle W. Tellekson

Resolution of the air quality issue for Fronings is necessary before many of the other issues on related Winona area permit applications can be resolved. Once the air quality impacts are defined, we can complete the final EIS and forward it for filing with the President's Council on Environmental Quality (CEQ). If we complete the final EIS this month it should be filed with CEQ by mid-September. Following a 30-day review of the final EIS a decision on the pending permits can be made.

The Fronings permit application has been under consideration for over 3 years, and recently local interests and Congressional Representatives have expressed a strong desire to expedite processing of the application. We feel this is a reasonable and justified desire. Therefore, we would appreciate your response by 14 May 1976, if possible.

Sincerely,

✓ WILLIAM L. GONTZ
Chief, Construction-Operations
Division

A-53

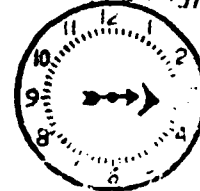


UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V

230 SOUTH DEARBORN ST
CHICAGO, ILLINOIS 60604

JAN 1 '76 PM

JAN 1 1976



RECEIVED
GENERAL REGULATORY
BRANCH



Mr. William L. Goetz
Chief, Construction - Operations Division
U.S. Corps of Engineers, St. Paul
1135 U.S. Post Office & Customhouse
St. Paul, Minnesota 55101

Dear Mr. Goetz:

Thank you for your letter of May 6, 1976 requesting clarification of the requirement for Fronings, Inc. in Winona, Minnesota to provide an air quality assessment. We have completed our analysis of past and current air quality data in Winona and have concluded that an assessment by the applicant will not be necessary. Additional data from MPCA's newly installed samples will be necessary to help establish air quality trends in the Winona area. Detailed comments on our air quality analysis have been attached to this letter.

While it was determined at the April 26, 1976 interagency meeting that an air quality assessment would be desirable, the nature of this assessment was still not defined. We further explained that the nature of the assessment would be dependent upon our analysis of past and current air quality and Fronings' design specifications for air quality control. As you know, our April 1, 1976 letter stated that we would have no objections to the Final EIS being released provided an assessment would be required from the permit applicant and that sufficient time would be allowed to review this assessment before any construction could commence. While a requirement for dispersion modeling in the assessment was mentioned in the same letter, we have now determined that because of the non-recurring nature of the particulate violations, effects from concurrent construction activities and the absence of a reliable data base for establishing air quality trends in Winona, dispersion modeling would not be practical nor conclusive in an air quality assessment. Since the applicant must provide Best Available Control Technology (BACT) for the plant under State and Federal regulations, the use of bag houses will result in a 99% removal efficiency for proposed grain elevators. Furthermore, New Source Performance Standards (NSPS) for grain elevators and barge loading emissions are currently being prepared and should be effective this fall. Depending upon the plant's design and construction status at the time the regulations come into effect, the applicant may also have to comply with these NSPS. For the reasons above and the fact that our attached analysis constitutes an appropriate assessment of the air quality situation at Winona, the requirement upon the permit applicant to provide a detailed air quality assessment is no longer necessary.

- 2 -

The applicant must still submit their design specifications for pollution control devices at the new plant. It should be realized that if ambient particulate levels (of which grain emissions are a significant contributing source) increase in Winona such that air quality standards would be violated, remedial measures will have to be implemented.

In conclusion, we have no objections to the release of the Final EIS and believe the air quality issues with the proposed Fronings elevator have been resolved as far as the Corps' permit is concerned. We would like to thank Messrs. Ondler and Berry of your office for their cooperation in this review. Please send us five copies of the Final EIS when it is filed with the Council on Environmental Quality.

Sincerely yours,

Merle W. Tellekson

Merle W. Tellekson
Chief,
Technical Support Branch

EXHIBIT 17

A-55

AIR QUALITY ANALYSIS FOR WINONA, MINNESOTA

BACKGROUND ON AIR QUALITY MONITORING

Sampling for airborne particulate matter by the high volume technique was first performed in Winona, Minnesota at 207 Lafayette Street. Data from this site submitted by Minnesota Pollution Control Agency (MPCA) to the National Aerometric Data Bank (NADB) was summarized as follows:

	<u>Annual Geometric Mean</u>	<u>Max 24-hr Obs.</u>	<u>2nd Max 24-hr. Obs.</u>	<u># Obs. > Primary Standard</u>	<u># Obs. > Secondary Standard</u>
1971	92	285	272	3	13
1972	33(18 obs)	95	75	0	0
1973	98(7 obs)	177	153	0	2

This site although showing violation of the primary standards (260 ug/M³ for 24-hour average and 75 ug/M³ for annual geometric average) was not maintained adequately as seen in the insufficient sampling during 1972 and 1973, and was discontinued in May of 1973. The record shows that this site was in accordance with recommended U.S.E.P.A. guidance at the time. The hi-vol was on a rooftop 40' feet above ground and was situated in a center-city commercial area. Sources in this vicinity are predominately commercial.

The second site at 2nd & 9 W. Olmsted began in May of 1973. The data collected was summarized as follows:

	<u>Annual Geometric Mean</u>	<u>Max 24-hr. Obs.</u>	<u>2nd Max 24-hr. Obs.</u>	<u># Obs. > Primary Standard</u>	<u># Obs. > Secondary Standard</u>
1973	68	172	169	0	3
1974	83	235	222	0	7
1975	85	374	358	4	10

This site situated 12' above ground, is in a center-City industrial location, with major sources, Froedtert malt, Second and Olmstead, and Fiberite, Third and Olmstead, in the vicinity.

ANALYSIS

A trend analysis of annual means and maximum was made of the data collected at both sites. However, since 1972, data did not meet sampling criteria (i.e., representing all four seasons), it was not used in the analysis. The annual composited arithmetic means were:

1971	114
1973	82
1974	98
1975	115

(2)

Maximum and second maximum 24-hour values were:

	<u>Maximum</u>	<u>2nd Maximum</u>
1971	285	272
1973	177	172
1974	235	222
1975	374	358

No significant trends, downward or upward, were detected in the analysis of the means or maximums. Using only data from 2nd St. and 9 West Olmstead, an upward trend can be detected. By comparison, the months of March through October 1975 were significantly higher in both monthly averages and maximum values than previous years. There were 4 observations exceeding the primary standard (260 ug/M^3) during this period in 1975 as compared with none in 1974. Further, 10 observations exceeded the secondary standard (150 ug/M^3) during this time in 1975 as compared with 6 in 1974.

CHARACTERIZATION OF THE HIGH CONCENTRATIONS

An analysis was performed to determine if either meteorological conditions or sample composition differed in the 1971-1975 concentrations exceeding the standards. Wind direction and speed, temperature and precipitation were reviewed for unusual differences by year. This analysis revealed low resultant wind speeds (6-9 mph) in most cases, precipitation in about 50% of the days, and above average temperatures. No significant differences were detected in the meteorological parameters by year. Trace metals analysis was run on selected filters; however, in most cases the days of values exceeding standards were not analyzed. Therefore, little information could be compared on the industrial source impact on particulate matter.

CONCLUSIONS

Data collected to date in 1976 shows levels below previous years. Documentation of the periods during 1974 - 1975 on the road construction in the vicinity of the 2nd and West Olmstead site reveals that the construction was concurrent with particulate violations (July 15, 1974 - September 11, 1975). It is likely that these particulate violations were in part due to this construction. In order to show conclusively that violations were due to construction, analysis would have to be made of the particulate samples to distinguish the contributing sources. Construction of the Foedtert Malt Plant addition (November 1973 - Present) and the Fiberite plant (Fall 1973 - December 1974) addition were also concurrent to particulate violations. This documentation reveals the past sporadic or non-recurring nature of the particulate problem in this industrial area of Winona. Trends based on new and old data at both the 2nd & 9 W. Olmstead Street site and the MPCA newly installed site should confirm the elimination of the non-recurring problem. Steps should be taken to assure the monitoring of pollution control devices at the old and new plants as well as reduction of fugitive dust from roadways in the area.