CORRIDOR LOCATION STUDY

NORTH-SOUTH FREEWAY DUBUQUE, IOWA

Prepared for Iowa State Highway Commission by Henningson, Durham, & Richardson in association with Eckbo, Dean, Austin & Williams/Cullen, Schiltz & Associates.

HENNINGSON, DURHAM & RICHARDSON
ENGINEERING • ARCHITECTURE • PLANNING • SYSTEMS • ECONOMICS

8404 Indian Hills Drive
Omaha, Nebraska 68114
April 7, 1972

Mr. Joseph R. Coupal, Jr., Director
Iowa State Highway Commission
Ames, Iowa 50010

Dear Mr. Coupal:

In accordance with our contract with the Iowa State Highway Commission dated August 10, 1970, we submit the following report comprising the corridor study for the U.S. 151 Freeway in the Dubuque Corridor.

We, along with our associates, Eckbo, Dean, Austin & Williams and Cullen-Schiltz & Associates, have enjoyed working for you on this assignment.

Yours very truly,

HENNINGSON, DURHAM & RICHARDSON

Robert A. Rohling, P.E.
Vice President
Principal in Charge

Richard F. Ferguson, P.E.
Project Director

TABLE OF CONTENTS

LIST OF FIGURES

AUTHORITY FOR STUDY

This study has been conducted under the authority of a contract dated August 10, 1970, between the Iowa State Highway Commission and the consultants, consisting of Henningson, Durham & Richardson, in association with Eckbo, Dean, Austin & Williams, and Cullen-Schiltz & Associates. In order that any project resulting from this study might be eligible for Federal participation, Federal regulations, as represented by directives of the Department of Transportation, Federal Highway Administration, have been followed in both letter and spirit. It is universally recognized that there has been a growing emphasis on social, economic and environmental considerations, and the past few years have brought about a move to unify all such regulations of all branches of government. It has been the intent of the consultants to conform to these regulations as well as to those of the Iowa State Highway Commission and the State of Iowa. The consultants have further endeavored, in the spirit of environmental concern which is so strong today, to embody in the study proposals and potentialities for major environmental amenity improvements for the City of Dubuque, as an integral part of the proposed program.

ACKNOWLEDGEMENTS:

Many organizations and many people have made substantial contributions of time and thought, supplying facts and information, offering ideas, suggestions and criticisms, all contributing to the consummation of this report. It is impossible to name them all here, but special appreciation must be expressed to Mr. J. R. Coupal, Jr., Director of Highways, to the many members of his staff, and to the Commissioners of the Iowa State Highway Commission, without whose cooperation this report could not have been successfully completed.

Others, whose contributions are gratefully acknowledged, are:

City of Dubuque:
Gilbert D. Chavenelle, City Manager
John L. White, City Engineer
Donald D. Gilson, City Planner
Gent M. Wittenburg, Director, Urban Renewal

City Council:
Dr. Wayne A. Moldenhauer, Mayor
Walter A. Pregler
Joseph J. Bitter
C. Robert Justman
Allan T. Thoms
Donald R. Meyers (term expired)
Gaylord M. Couchman (term expired)

Members of the Iowa Legislature:
Senator John M. Walsh
Senator Gene V. Kennedy
Rep. Theodore R. Ellsworth
Rep. Raymond J. Taylor
Rep. Michael T. Blouin

Dubuque County Board of Supervisors:
Leo N. Schueller, Chairman
Louis C. Barret
Donald C. Meyers
Earl H. Welshons, Dubuque County Engineer

Dubuque Metropolitan Area Transportation Council

Dubuque County Historical Society

Dubuque Community School District

Archdiocese of Dubuque

Dubuque Council of Churches

Dubuque Chamber of Commerce

Dubuque Industrial Bureau

River Valley Community Action Program

Iowa Employment Security Commission

SUMMARY

The freeway route location study has produced the following recommended routes:

An elevated freeway through downtown about 12,000 feet long, from 24th and Elm to the foot of the Kerrigan Hill.

A Couler Valley expressway about 18,600 feet long, extending northward from 24th & Elm to John Deere Road (Iowa 386 North).

A south freeway approximately 17,300 feet long, generally following the present U.S. 61 Route from the foot of Kerrigan Hill southward to the proposed U.S. 520 Freeway.

An east leg of the freeway with the Mississippi River bridge crossing, about 10,000 feet long, extending from downtown eastward to Wisconsin Routes 35 and 11.

A Dodge Street Parkway about 7,200 feet long, extending from the freeway at Locust westward through Grandview to Fremont and Lombard Streets.

The first three portions of the above listed freeway have been estimated to cost $81,100,000, including all right-of-way costs, construction costs, engineering design costs, etc. The Mississippi River bridge leg, estimated separately because of the higher unit costs involved, is estimated at $15,300,000 construction, right-of-way and engineering. The Dodge Parkway segment, not including any of the costs of the interchange at Locust, is estimated at $8,700,000.

The above routes emerged to their preferred status through an exhaustive preliminary design and analysis procedure, taking into account all possible effects, both good and bad. Their primary advantage is that they provide the greatest amount of service, with access points close to all major traffic generators, thus relieving the existing surface street pattern of most, if not all, of the many intra-city movements.

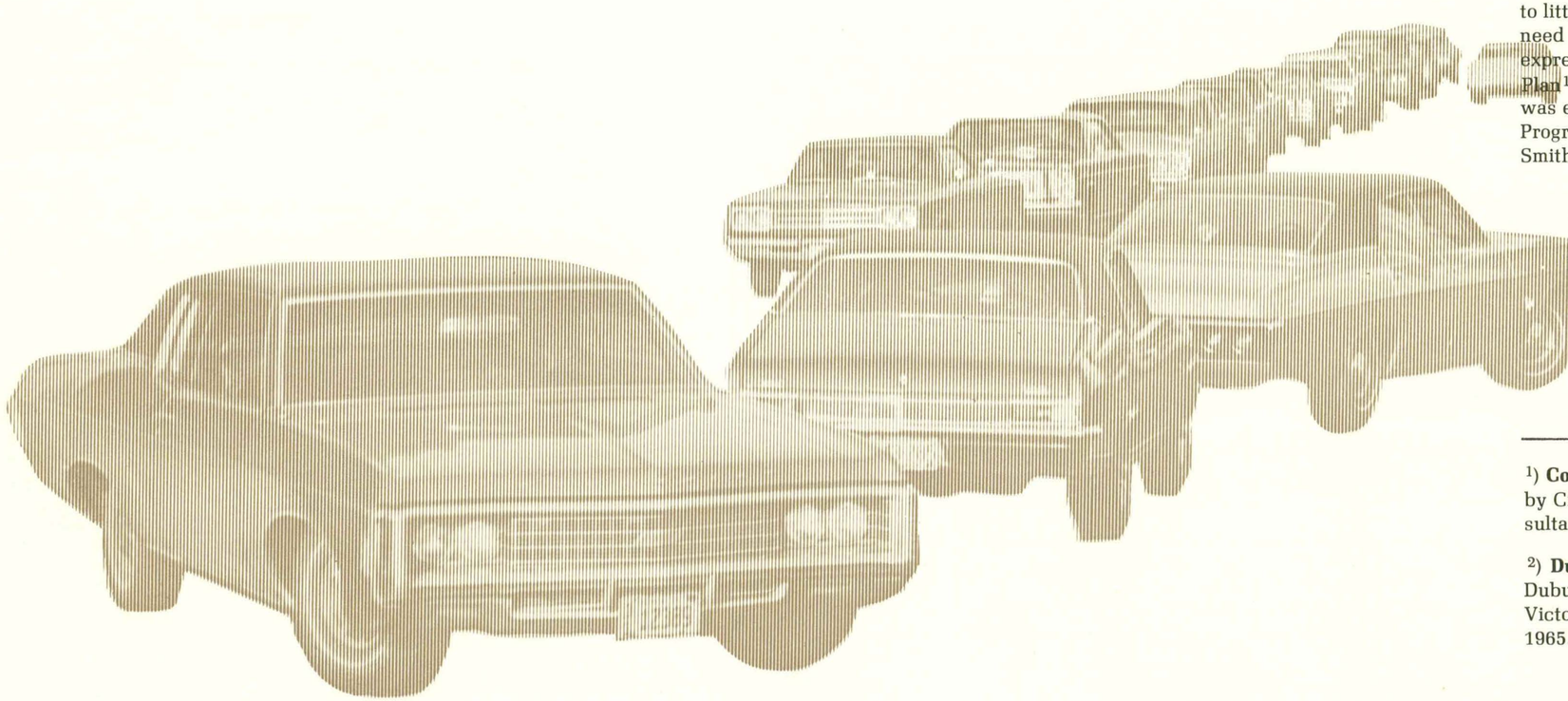
Our recommendations include the additional taking of certain peripheral property so the neighborhoods may be buffered from the adjacent freeway. In some instances, parts of these properties are recommended to be redeveloped with housing to replace part of the very old, substandard housing removed for the facility. Estmated cost of this additional property taking is $2,300,000. The project has been considered to be a part of the City, rather than simply a traffic facility passing through it. It is recognized that it is without a doubt the single largest and most important capital improvement program the City of Dubuque will see in our time. Its impact on the City and its potential for catalyizing and assisting other improvement programs must be examined very closely and coordination assured.

When the entire program is undertaken, it will have caused the relocation of 674 households and 223 businesses. This would probably occur over perhaps a 10 year period, so that normal turnover will accomplish at least a portion of the relocations. The workload of the remaining relocations and the construction of necessary new buildings is all well within the capability of the community, provided there is active leadership and coordination at the City level. Relocation costs for the recommended segments are estimated at $5,150,000.

The project is badly needed to revitalize the economy of the downtown heart of Dubuque.

KEY MAP RECOMMENDED ALIGNMENTS

Section I



BACKGROUND—POINT OF BEGINNING

There is a real unanimity among the studies of past years in the conclusion that the heart of Dubuque sorely needs upgraded traffic facilities. Terminology and details differ somewhat, but the theme is the same: Major highways traverse the outer portions of the City, but dwindle to little or nothing as they approach the city's center. This need for upgrading the means of central city access was expressed as far back as 1936 in the Comprehensive City Plan[1] culminating seven years' study. More recently, it was echoed in the report entitled "Dubuque Development Program", prepared by Victor Gruen Associates and Larry Smith and Company in 1965.

> "The vehicular circulation system of the city is a combination of east-west and north-south regional highways, radial arterial streets, and circumferential arterial streets, but lacks adequate interconnection of facilities adjacent to and serving the regional city center.....(thereby) causing increasing traffic congestion and decreasing the accessibility of the original city center and requiring solution by new north-south and east-west highway construction to expressway standards.[2]

---

[1]) **Comprehensive City Plan for Dubuque, Iowa,** prepared by City Planning & Zoning Commission, John Nolen, Consultant, 1936.

[2]) **Dubuque Development Program,** prepared for City of Dubuque, Iowa, and Dubuque Chamber of Commerce, by Victor Gruen Associates & Larry Smith and Company, 1965, p. 2.

In the recent past, the State has modified and upgraded the highway network leading toward and into the City, and recently has prepared a statewide plan (Figure I-1) of major freeways, similar to the interstate system, but primarily to provide safe, efficient and fast transportation on an intra-state basis. It will be noted that several of these freeways converge on Dubuque, in keeping with its importance as a major business, shopping, trade, manufacturing and distribution center. The usefulness of this system, and thus the prosperity of Dubuque, would be seriously affected without suitable continuity to the major points of origin or destination that lie within the City.

Recently, in compliance with Congressional action requiring coordination of all street and highway improvement projects as a prerequisite for any Federal Aid financing in metropolitan areas, a Dubuque County Metropolitan Area Planning Commission was inaugurated. With the cooperation of the three States of Iowa, Wisconsin and Illinois and the Counties of Dubuque, Iowa; Jo Daviess, Illinois; and Grant, Wisconsin, as well as the City, a study was inaugurated in 1967 leading to the final acceptance of a Comprehensive Transportation Plan in 1971. A map outlining the elements of that plan, prepared by the Green Engineering Company, is shown in Figure I-2.

Priorities and Needs.

The Dubuque Transportation plan underlines the needs of the entire metropolitan area and without minimizing the need for any part within the entire system, sets certain priorities for those parts most urgently needed. Some of the more important general conclusions which came out of the transportation study were:

> "A DOWNTOWN FREEWAY along the easterly edge of the Central Business District is a necessity for meeting 1990 traffic demands. This would be a link in the freeway-expressway systems of Highway 151 in Wisconsin and in Iowa. The Freeway must have convenient points of access to downtown and must have strong connections with other routes.
>
> "Planning for the future growth of Dubuque shows a need for a HIGH MOBILITY LOOP; which includes the Downtown Freeway, Dodge Street, a new high capacity route along the west and north sides of the city, and a new Couler Valley Expressway.
>
> "A new MISSISSIPPI RIVER BRIDGE is a necessity before 1978. Interstate discussion and agreement regarding the bridge must be started immediately so as to avoid crippling congestion on existing bridges".[3]

[3]) From the summary map of the **Transportation Plan for the Dubuque Metropolitan Area**, Dubuque County Metropolitan Area Planning Commission, 1970.

IOWA'S PROPOSED NETWORK OF FREEWAYS AND EXPRESSWAYS

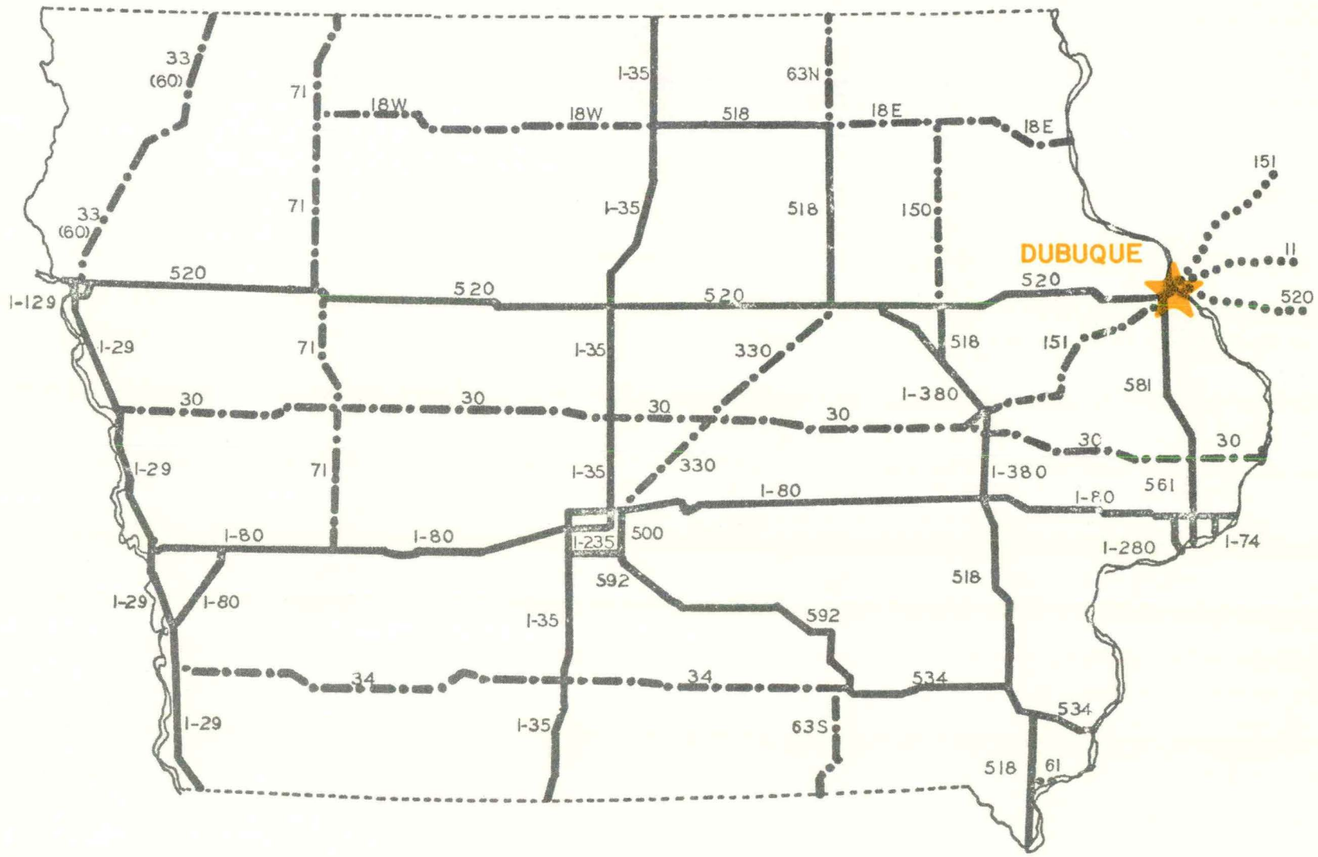


Figure I-1

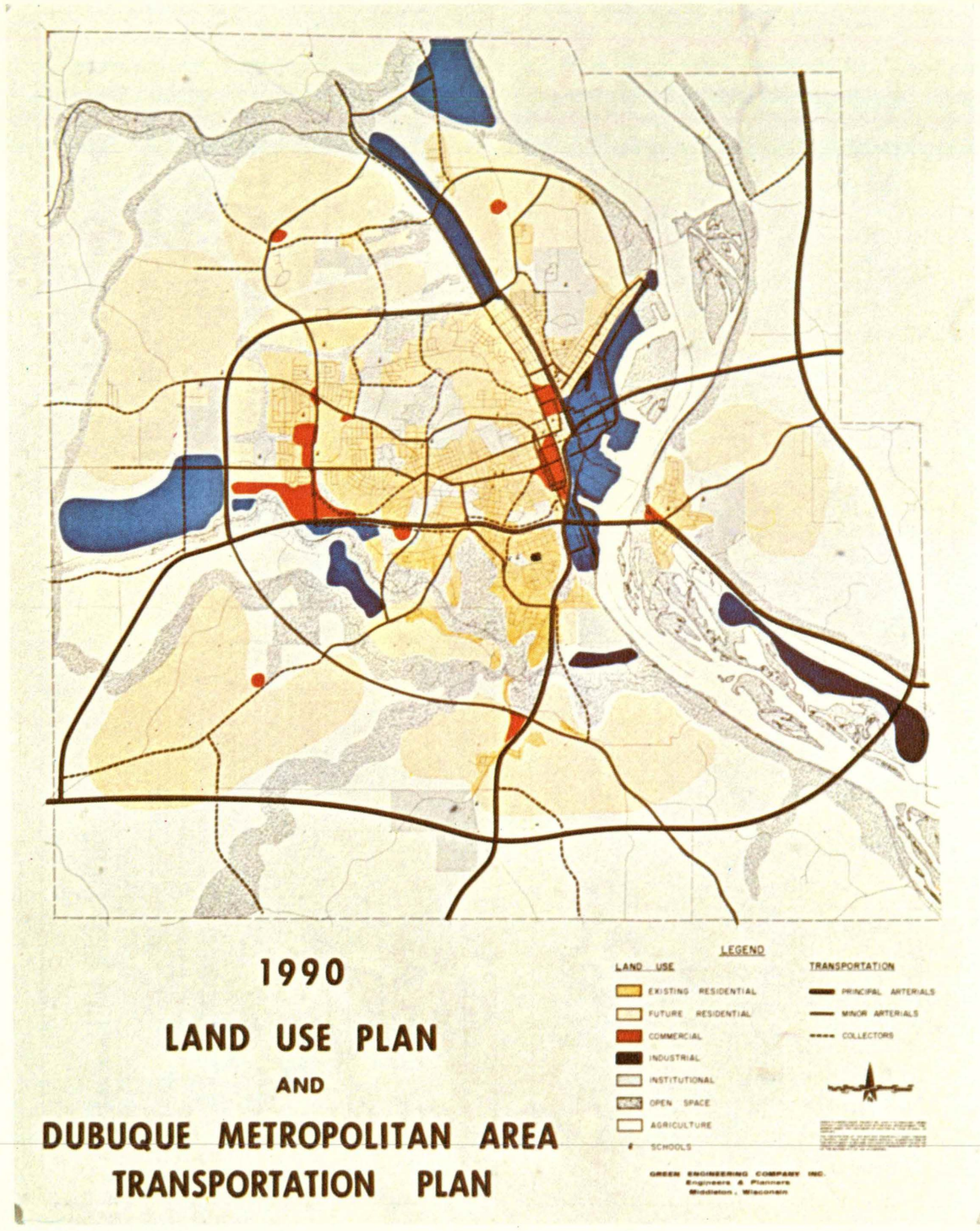


Figure I-2

These conclusions together with recommendations on arterial and collector streets reflect on the improvements needed to meet the travel demands in the Dubuque Area. Principal among these conclusions are the needs for major freeway facilities with their primary function to be the serving of the internal traffic flows.

The Transportation Study reports on the consequences of a street and highway system both with and without major freeway facilities. Forecasts were prepared of 1990 traffic for the existing street system and for alternative systems with freeway facilities.

As an illustration, the traffic volumes in the following table show for three street sections, a comparison of existing street traffic loads with and without a freeway in the system.

1990 ADT RANGES

Street	Sections in Vicinity of	With Existing Streets	With Freeway
1. Locust and Bluff	Downtown	20,900 to 27,500	7,600 to 16,000
2. Central and White (one-way pair)	20th Street	20,500 to 29,000	—
Central	20th Street		11,000 to 12,500
3. Central and Jackson (Two primary Streets)	32nd Street	19,000 to 23,600	—
3. Central	32nd Street	—	8,400 to 9,900

Without the freeway, higher volumes on the surface streets understandably reduce vehicular speeds and contribute to more congestion. With a freeway, longer urban trips are removed from the surface streets allowing local traffic on these streets to circulate more freely.

These differences, indicated above, are quite dramatic. They certainly highlight the need for additional traffic handling facilities of the freeway or expressway type and begin to suggest the consequences of no action. If a freeway system is not built, traffic loads will continue to build up on the existing streets until they become almost completely clogged. The results would be the following:

- Gradual, long-term attrition of economic vitality of those businesses and industries which depend on safe, efficient and dependable highway transportation, but which would be hampered by surface congestion.
- Similar deterioration of the livability and residential character of neighborhoods due to surface street congestion.
- Need to widen existing arterial streets.
- Unpredictable, but substantial, amount of displacement resulting from street widening.
- Imposition of additional prohibitions of curb parking in both residential and commercial areas to maximize street capacity.
- Depreciation of property values and acceleration of middle income migration to outlying portions of the City.
- Virtually no potential for constructing safe attractive housing.
- Higher percentage of total costs to be borne by local taxpayers due to lesser Federal financial participation.

The conclusion, therefore, is inescapable that the future welfare of the City of Dubuque is inextricably linked to major traffic improvements.

Study Location

With the Transportation Plan and other area plans serving as areawide guidelines, the foundation is provided for conducting the more detailed corridor studies. Such studies furnish more detailed and graphic descriptions of particular projects, permit stronger community understanding and backing for the plans, offer opportunities for protecting rights-of-way and in guiding community developments.[4]

On this accord, this corridor study was initiated to investigate and evaluate the route location of a downtown freeway, a northern freeway, a southern freeway, a Dodge Street facility and a river bridge connection, each of which are included in the priorities of the Transportation Plan. For this study, the areas indicated in Figure I-3 define the corridor limits for the analysis.

4) **Dubuque Metropolitan Area Transportation Study, The 1990 Plan,** Green Engineering Company, February 1970, P. 52.

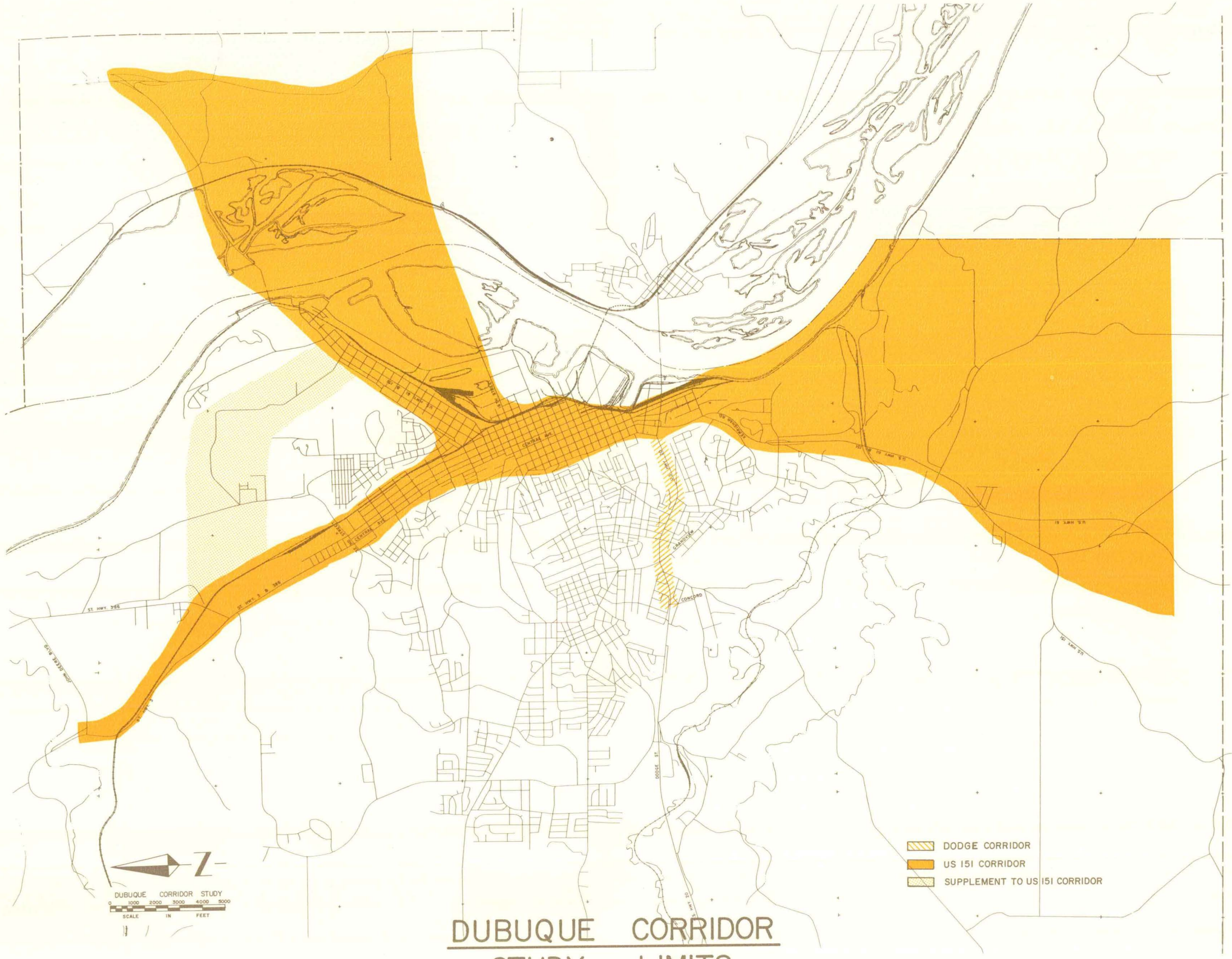

DODGE CORRIDOR
US 151 CORRIDOR
SUPPLEMENT TO US 151 CORRIDOR
DUBUQUE CORRIDOR STUDY
SCALE IN FEET
DUBUQUE CORRIDOR
STUDY LIMITS

Figure I-3

Scope of Study

In an attachment to the study contract, it was proposed that the study should generally follow eight clearly definable steps. They are:

1. Information gathering.
2. Preliminary selection of general alignments.
3. Pursuit of alternate alignments.
4. Real estate appraisal assistance.
5. Evaluation of final alternatives and preliminary report review.
6. Report and recommendations for corridor public hearing.
7. Corridor public hearing.
8. Submission of final revised report.

A ninth item, entitled "Conferences and Meetings", was separately shown. Its importance and significance was not fully realized at the time of contract negotiation. Federal and State Laws and recent subsequent court rulings have made it clear that social, economic and environmental considerations must receive at least equal weight with purely technical considerations in the instituting of highway facilities, as well as other public works. In order that every conceivable impact may be evaluated, it is necessary that every possible point of view of the affected population be discovered. In a metropolitan area, this means that there are many diverse and sometimes conflicting interests to be ascertained.

The only sure way to identify these various points of view is through interaction with the community itself. Citizen participation, as well as the participation of all governmental units in the jurisdiction, must be arranged for. The accompanying diagram (Figure I-4) suggests this third party participation.

STATE—CONSULTANT—LOCAL
FLOW DIAGRAM

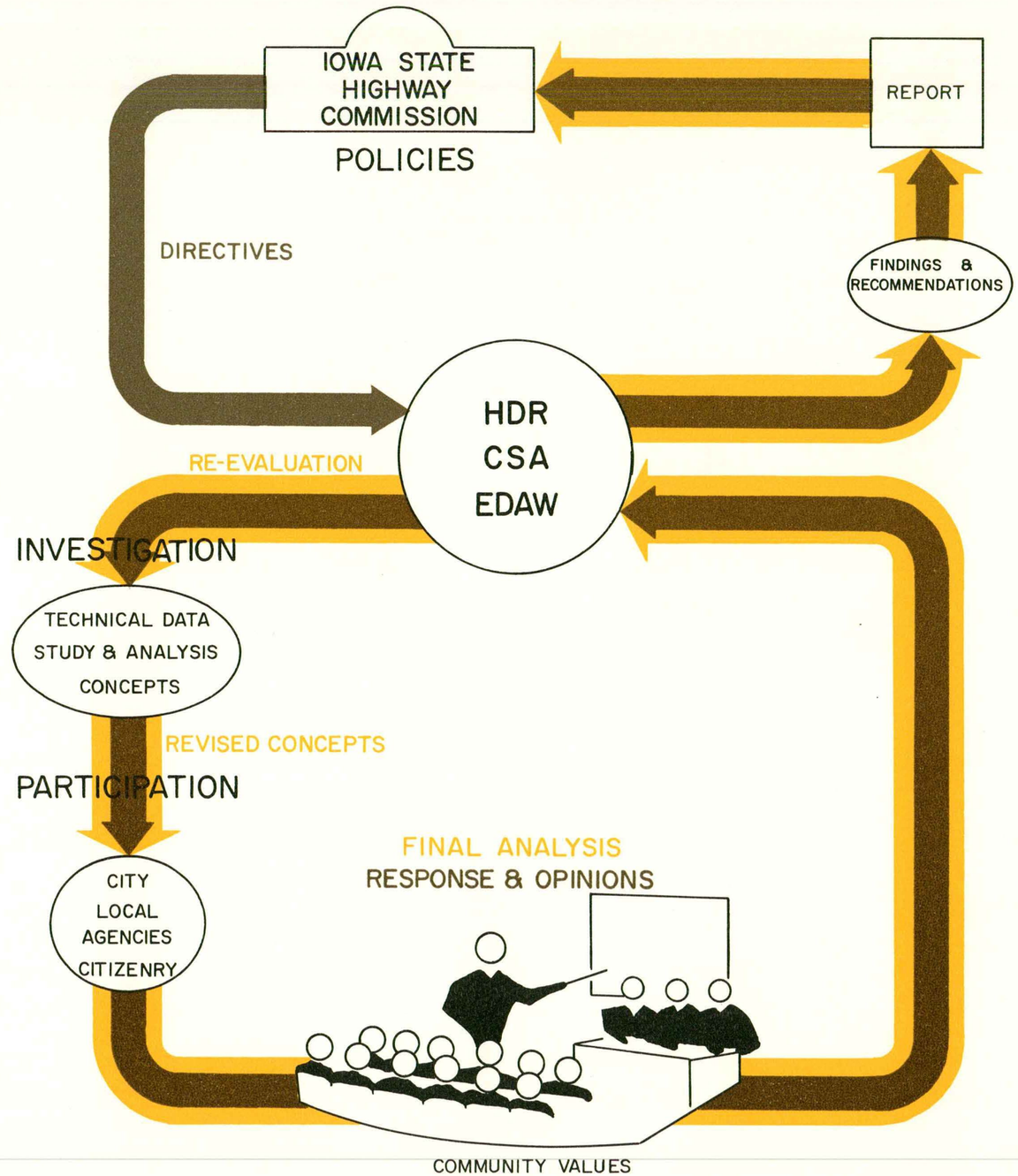
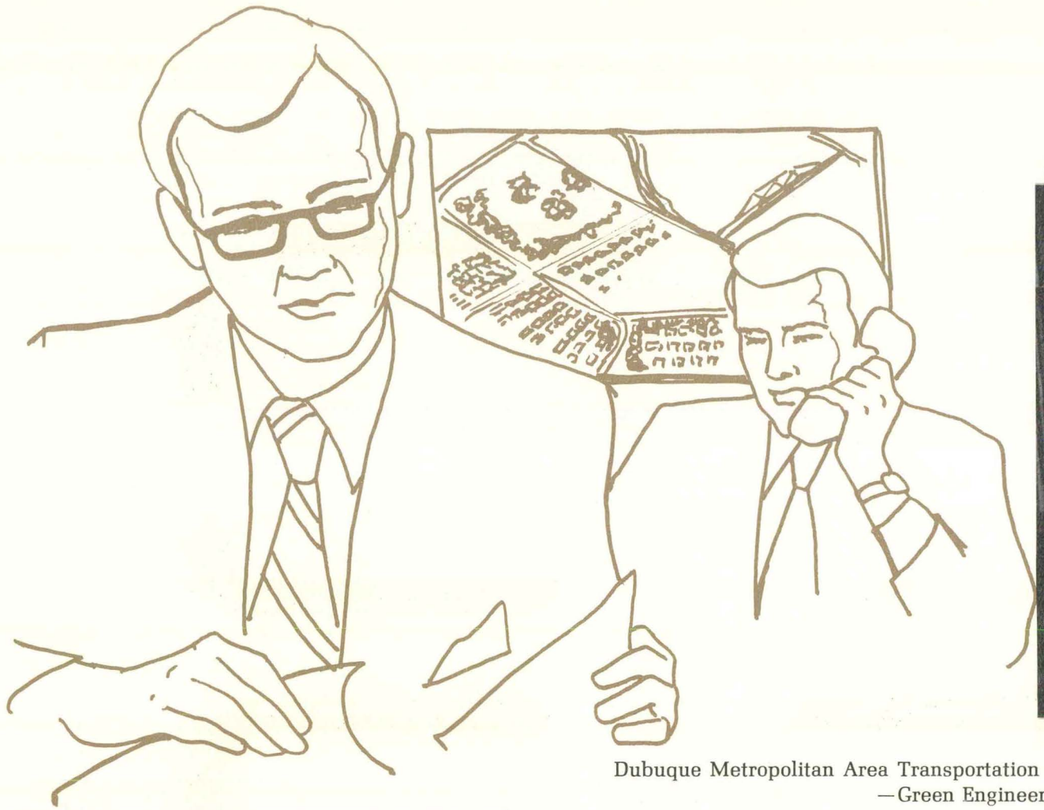
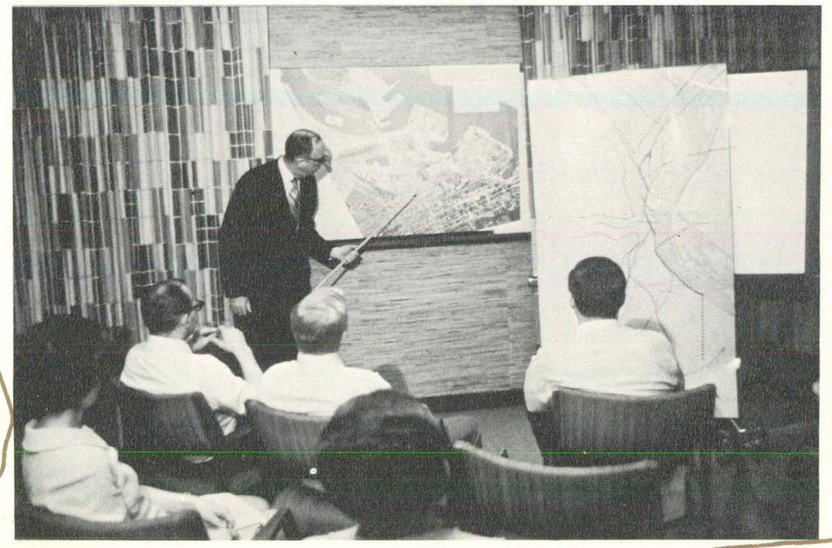


Figure I-4





Early in the study, while still in the information gathering stage, the first series of public informational meetings was held. The purpose was two-fold. The first, of course, was to inform the public of the study and the manner in which it was to be conducted. Second, it was to elicit the maximum possible participation by the public in providing opinions, needs, desires of all who had a legitimate interest. Maximum coverage was desired and attained.

A later series of similar meetings was held, and many informal meetings with small groups whose interests were clearly defined also were conducted.

Through such meetings, much valuable information was gained, permitting what is believed to be a much sounder and more responsive result than would have otherwise been possible.

Study Information Base

A thorough knowledge of the characterisitcs of the metropolitan area was necessary before any enlightened conclusions could be reached. Thus the information gathering stage of the work was of considerable importance. A number of existing reports were utilized, including the following:

Dubuque Development Program
—Victor Gruen & Associates

Dubuque Metropolitan Area Transportation Study
—Green Engineering Company

Mississippi River Bridge Study
—Howard, Needles, Tammen & Bergendoff

Dubuque Downtown Urban Renewal Project
—Barton-Aschman Associates

Dubuque Downtown Parking Ramps
—DeLeuw Cather & Associates

Information from the Federal Population Census of 1970 became available during the study. Unfortunately, only large scale information came out in time to be of use to this study, while the small scale information of the 1960 Census was too old to be of great use.

School census information, however, was both up-to-date and available, and it was found to be of considerable assistance.

The utilities, both private and public, were most cooperative in providing plans and other information regarding their installations.

Of equal importance to all of the above, however, was the information obtained from individuals. Residents, business men, people from all walks of life were interested in providing help in the form of big and little pieces of information, plans, opinions, suggestions and criticisms, all of which go together to provide the picture of a living community, fleshed out on a skeleton of bare facts.

Section II

PRELIMINARY SELECTION OF GENERAL ALIGNMENTS

The selection of the general alignments, whose suitability was to be later explored, was done by means of a graphic study technique. During the information gathering stages of the study, significant information on social, physical and environmental characteristics of the community and its countrsyide, was obtained and translated into graphic representation on multi-colored display maps. Many of these displays were used in our early series of public meetings to assist us with our explanations of the project and the types of information and input which we hoped to obtain from interested citizens. As additional information was obtained, it was added to one or more of these graphic displays.

The characterisics or criteria were divided into three groups: *social, physical and environmental.* These will be discussed individually in some detail later, but first let us examine the techniques which were applied to the route selection. Each of these individual displays was produced on a map background at an approximate scale of 1"= 600'. With these as a background, transparencies in varying shades of gray were prepared showing the gradations of the analytical criteria necessary for the preliminary choices.

Different parts of the community, and individual characteristics of these areas, might be thought of as presenting varying degrees of resistance to the passage of any new traffic facility. We might think of this trait in terms of "softness" or "resistance". This degree of resistance, in turn, was represented by varying gradations of gray or obscuration placed on the clear plastic overlay. At this point in the investigation process it was not necessary to draw the distinction too finely, so only three gradations or levels were recognized. High resistance areas were shown by the placement of a 20% density gray obscuration. Moderate resistance areas utilized a 10% density obscuration, while low resistance was left unobscured.

Several layers of the obscuration overlays were super-

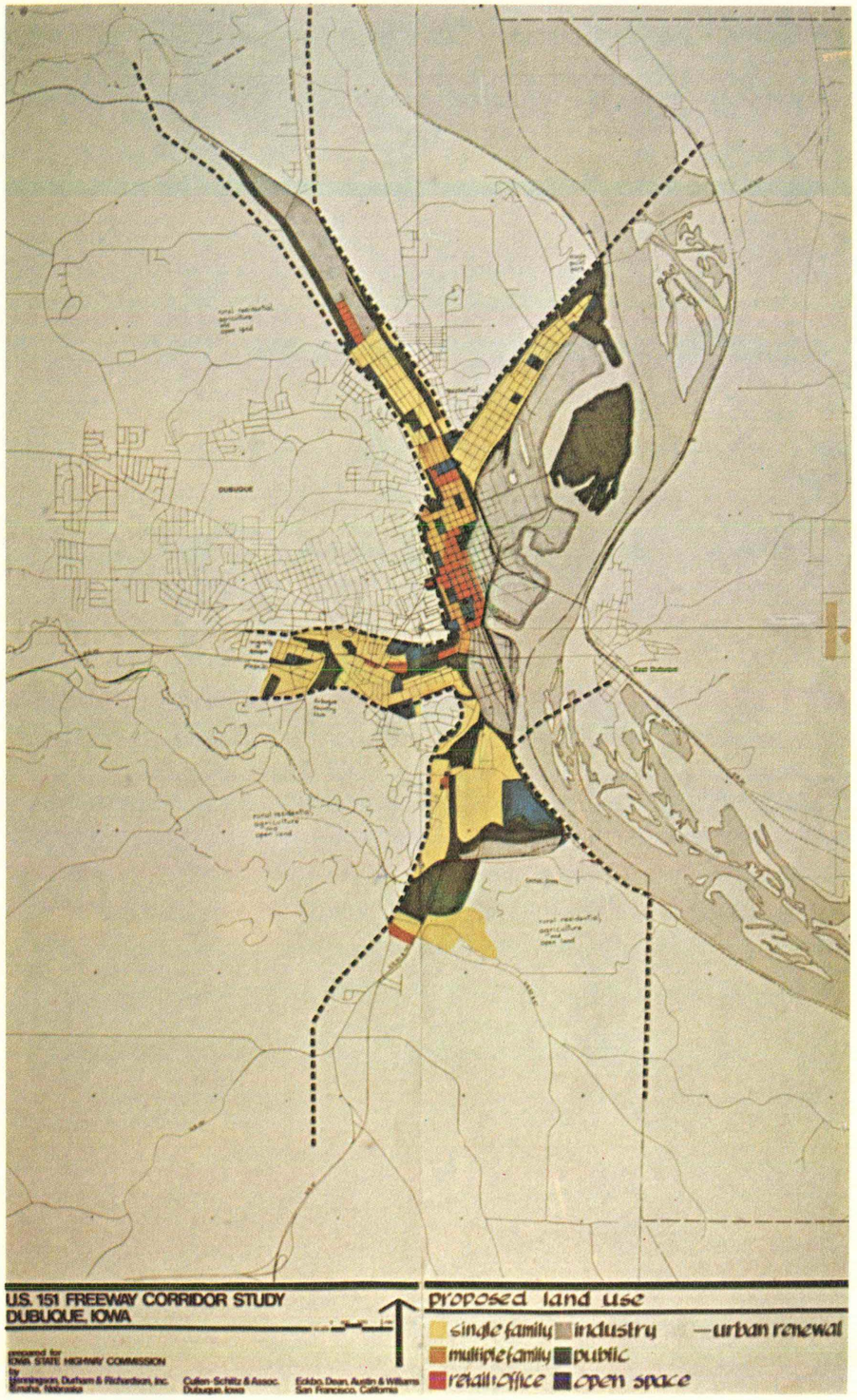


Figure II-1

Proposed Land Use

imposed on each other, graphically adding the resistances of various criteria within each of the major groups. The result was that if several criteria showed a high resistance at one particular location, the addition of several 20% density obscurations produced an area showing nearly solid black. Visually, then, the displays could be "read" to show routes of least resistance. Following a minimally obscured path or connecting lightly obscured islands showed potential routings of minimum resistance for a traffic facility. These choices must be made with discrimination, however, utilizing only those potential routes which serve the primary traffic desires.

The first group of characteristics was earlier defined as comprising **social** criteria. Graphic representations within this group were:

Existing land use
Planned land use
Neighborhood, parish and school boundaries
Population and employment densities

The display of the planned land use of the area involved in this study is reproduced in Figure II-1. The information was obtained from official maps, documents and study of the community. Displays of the other characteristics falling under the social heading were similarly prepared. Then, successively, the clear acetate sheet was laid over each of these and the obscuration patterns superimposed. The resulting diagram, laid over a simple map background of the area, is also reproduced here in Figure II-2. Note that potential routes, considering social criteria only, are shown in yellow.

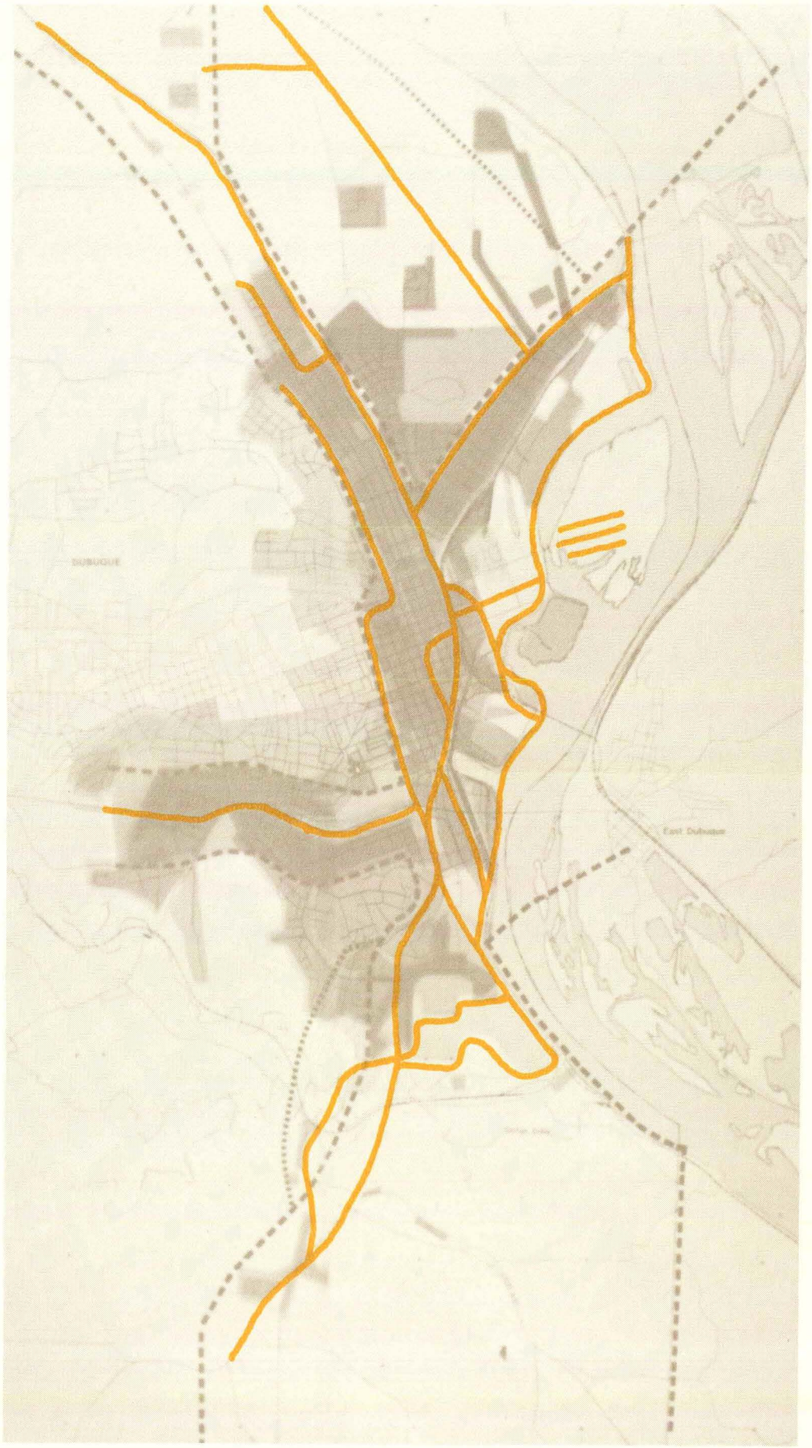


Figure II-2

Social Criteria Composite with Potential Routes

Figure II-3

Topographic Characteristics

The next step was to consider those criteria grouped under the **physical** heading.

Individual characteristics were:

Slopes
Soil conditions
Foundation conditions
Natural and manmade obstacles

Reproduced in Figure II-3 is a display that is essentially topographical. On it, varying degrees of slope have been depicted. Where the topography falls between 0 and 3% grade, no coloration is shown. Where slopes vary between 3% and 6%, the map shows a light coloration, and where slopes exceed 6%, a darker coloration. Translating these gradations into our obscuration pattern was a relatively straightforward process. Then, the other physical criteria were assessed and also translated into successive patterns of obscuring overlays. The resulting totalization of physical characteristics, again on a simple map background, is reproduced here, in Figure II-4. Again, potential routes based on physical characteristics only, were chosen, and these are superimposed in color on this display.

Figure II-4

Physical Criteria Composite with Potential Routes

Figure II-5

Natural Features

Environmental qualities provided the third group of criteria used as our guide. Included in this group were:

Historical qualities
Visual qualities
Ecological and aesthetic character

Figure II-5 shows the graphic representation displaying visual qualities of the area. This, along with the other environmental qualities, did not lend itself to precise measurement, and had to be used with discrimination and judgment.

Therefore, the potential routes of the first and second groups were superimposed upon each other and upon the environmental quality background and carefully examined for their correspondence or conflict.

The resulting choices from this elimination process are reproduced here, overlaid on the environmental composite, in Figure II-6. These then, became the general alignments which emerged as having the greatest potential for development in the more detailed study to follow.

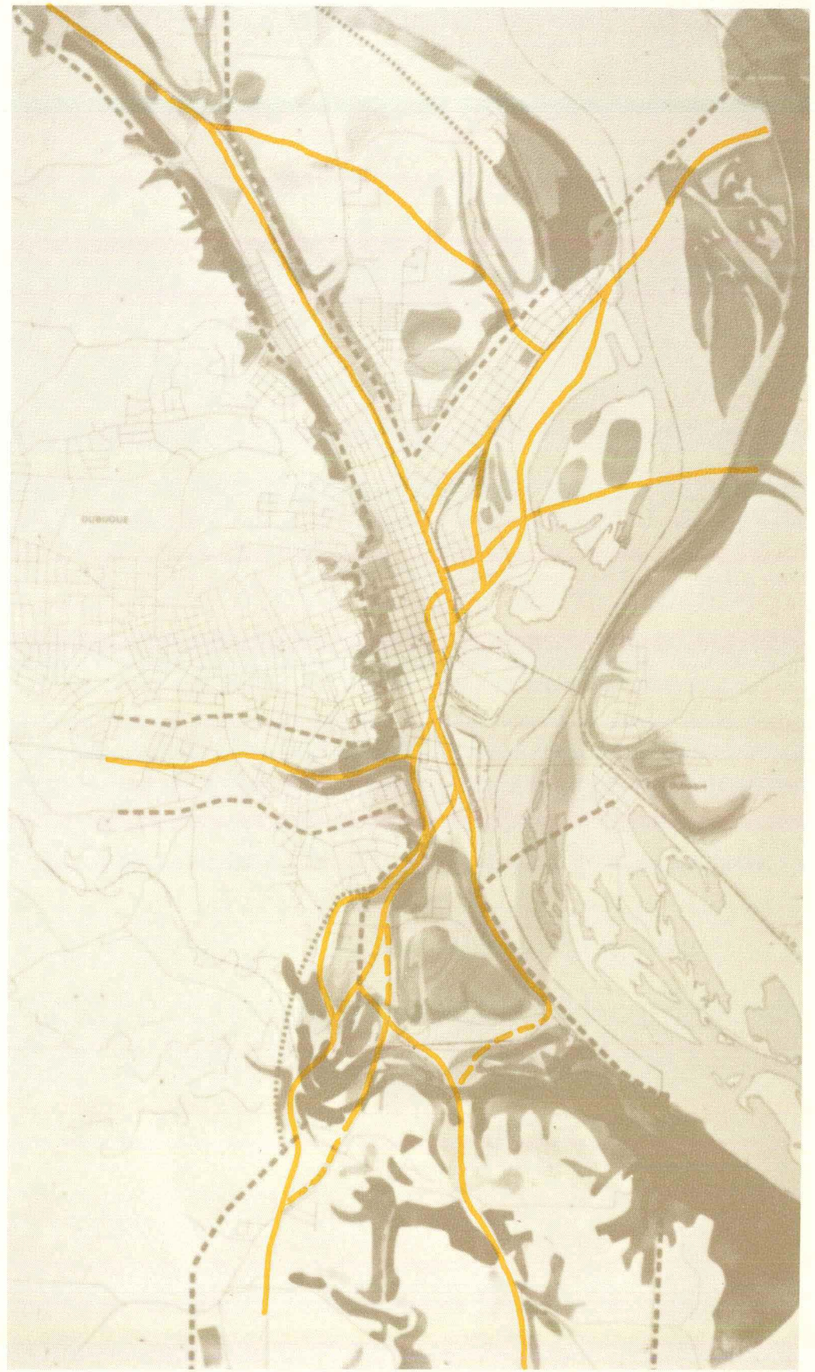


Figure II-6

Environmental Criteria Composite with All Potential Routes

PURSUIT OF ALTERNATE DESIGNS

The general alignments, selected by "broad brush" techniques, still needed to be translated into specific configurations so they could be evaluated regarding their services, effects and impacts on the citizens and on their community. We knew where to work; now we had to come to grips with the details that support, modify, limit or prohibit the placement of a real traffic facility on a real city.

The problem of relative scale of the city and the facility became one of the real critical situations of the study. For instance, an interchange can be rather easily roughed in on the rural scene where property lines are measured in terms of miles or fractions of miles, but the details become critical when superimposed on the inner city where ownerships, usages and property lines are measured in terms of feet. "How many", "how big", "how long" and "how wide" were all questions requiring answers.

Obviously, some generalizations were necessary. Traffic studies prepared by the Transportation Plan Consultant indicated very substantial loads on the trafficway, particularly in the congested central portion of the city. Depending on the speed for which the design is prepared, this translates into physical size or width of the facility which is necessary to accommodate all the vehicles. Naturally, this has considerable bearing on the amount of right-of-way which is to be needed. It also determines whether grade separation is needed at intersections with other streets and roadways.

It is physically possible to handle the heavy traffic such as generated here, at grade. Carrying the comparison to an absurd extreme, even a parking lot will handle many vehicles, but at a heavy sacrifice of speed and mobility. Check analyses were made indicating that at 4th Street, for instance, some 12 lanes would be required for an expressway, which, with the necessary median, shoulders, etc., would require a right-of-way of well over 200 feet, or most of a city block in width.[1]) Investigation showed that traffic could be expected to average perhaps 15 miles per hour, turning movements would operate very poorly, and cross-traffic of any volume would be accommodated poorly, if at all. Thus, a signalized expressway could be neither a practical nor an economical solution here.

Where lesser amounts of traffic are involved, and where crossings are widely spaced with relatively little cross-traffic, at-grade intersections do constitute a proper solution. The signalized expressway does lend itself to the Dodge Street ravine and to the northernmost reaches of the study area in the Couler Valley.

There remain three possible configurations. The first is a depressed trafficway bridged by the intersecting streets. Within the city this is not generally practical. The heart of the city is built on the Mississippi River flood plain where the water table lies relatively close to the surface. When ground water is high, a concrete tube or trench would have to be flooded or it would be floated out of the ground. To this disadvantage add the extreme disruption caused by the necessary relocation of sewers, water mains and other underground utilities and it is seen that this is not a practical solution.

Another potential solution is a traffic facility at grade with the intersecting streets raised on viaducts. Calculations based on current construction cost indicate that such viaducts, at four-block intervals, would cost as much as elevating the freeway.[2])

An additional disadvantage is the fact that the viaduct approaches would block the first street on each side of the freeway.

So by elimination, the conclusion was reached that an elevated freeway, with free access from one side to the other except where ramps block an occasional street, would provide the soundest solution. There would be less disruption of traffic on the surface streets and traffic would move much more expeditiously, efficiently and economically.

The accompanying drawings, Figures III-1 through III-5, show the typical sections and profile renderings which apply to each of the final alternates under consideration. These drawings are intended to illustrate general concepts of the roadway's characteristics, appearance and potentials, rather than specific details of specific segments within Dubuque. Such details will be determined at the time of final design.

The cross-sections are portrayed both structurally elevated and at-grade roadways for typical locations, and illustrate how the facility might be expected to appear. They were developed in compliance with the design policies of the American Association of State Highway Officials, Iowa State Highway Commission, and the U.S. Department of Transportation, Federal Highway Administration.

A solid concrete barrier is indicated for use in both the center and at the sides of the elevated section. This type of barrier has considerable merit in that it favors vehicular safety and lower maintenance while at the same time it tends to contain vehicle noise and direct it upwards rather than outwards.

---

[1]) Appendix B-1 shows the capacity analysis calculation at 4th Street for an expressway versus a freeway.

[2]) Appendix B-2 shows comparative cost estimates.

The several non-structural cross-sections presented mainly show variations in median widths for rural and urban freeway segments, while the Dodge corridor sections differ in the median and frontage road. Further variations will occur in lateral areas of the roadways dependent upon right-of-way width, cut and fill, adjacent land uses and landscaping. As an example, the perspective drawing of the non-structural roadway in FIGURE III-2 conceptually shows landscaped earth mounds on the left side of the roadway. Such mounds would also serve as noise deflectors and visual screening between the roadway and the adjacent residential neighborhood.

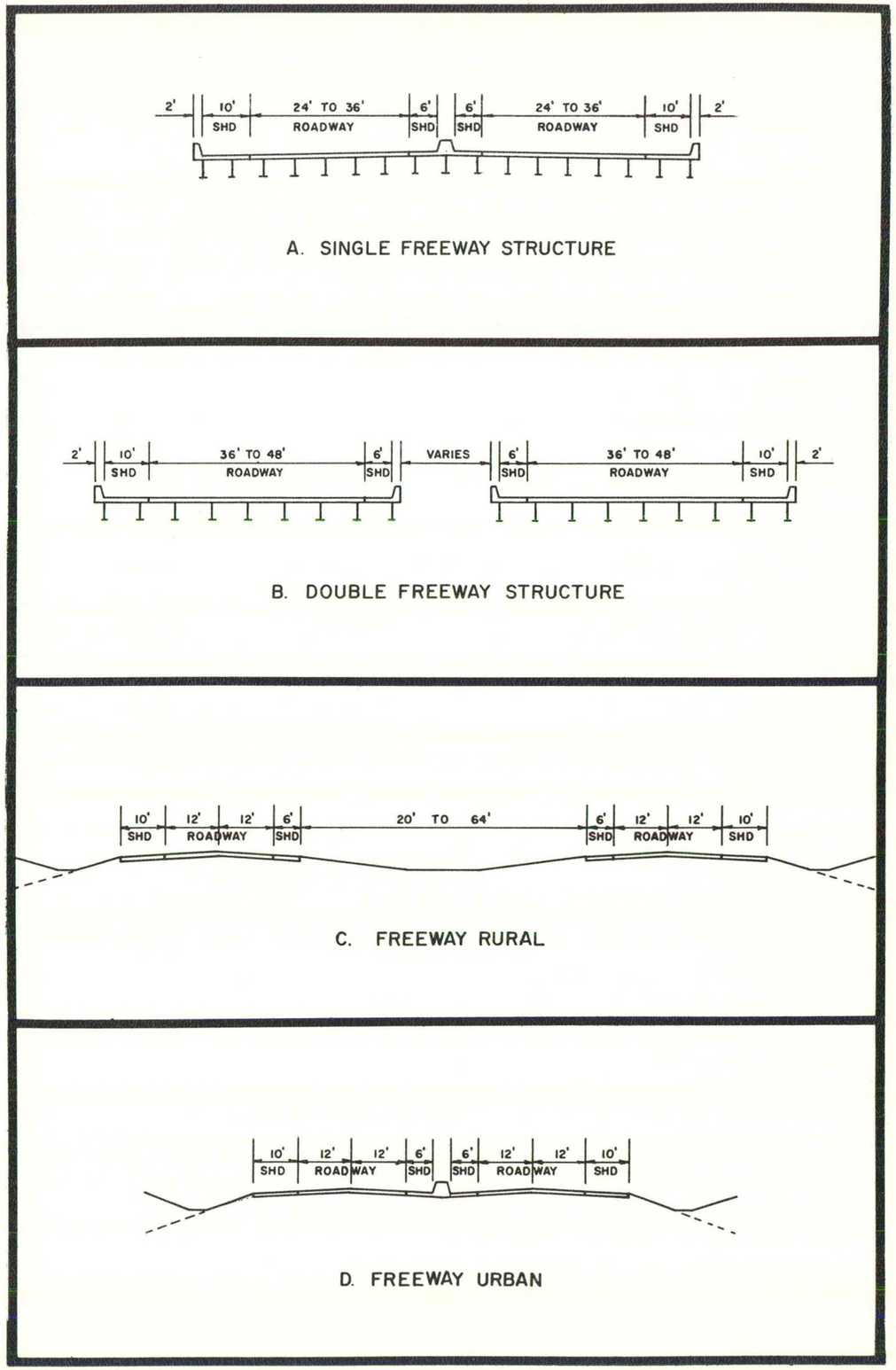


Figure III-1
Typical Cross-Sections

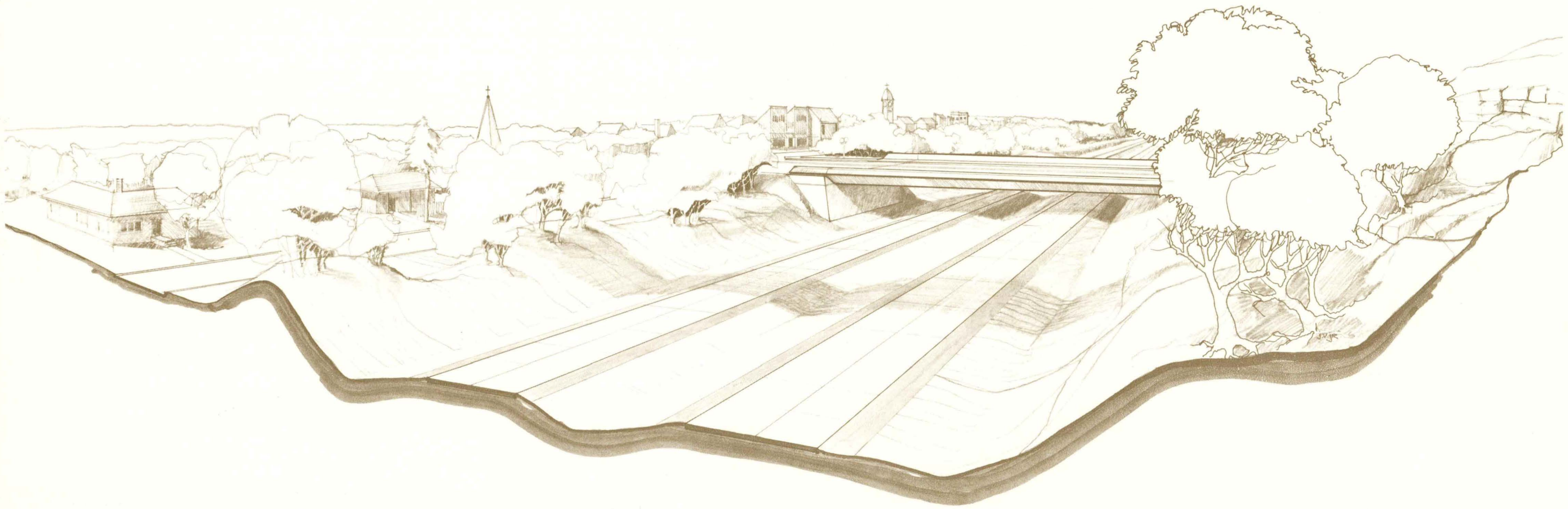


Figure III-2

The artist's rendering of the roadway in FIGURE III-5 illustrates in one drawing the variable character which the freeway could present in the Dubuque area. As shown in pure concept form, the roadway can blend with the natural and the manmade whether the facility is elevated, at grade or depressed.

Interchange geometry became of great importance too. It must be remembered that the purpose of this facility is not to serve the very small amount of through-city traffic, but to carry people to and from their destinations **within** the community. Unless they can enter and leave close to the point of their interest, the facility will not have fulfilled its prime function.

So the difficult study process continued. First, a roadway concept was laid out on the background of the city. Next it was reviewed in order to find its strengths and weaknesses, its successes or potential failures. Now, corrective measures were devised and the matter recycled.

In the course of this study procedure, many configurations were tried and discarded, primarily in the congested center of the city. Some changes resulted in minor modifications of this specific plan, but when major changes were necessary, a new designation was given to the newly devised layout. Through this process of recyling, several satisfactory configurations emerged. These were deemed worthy of serious consideration and were moved into the next stage of the study, the evaluation of alternatives.

For clarity and control, letter designations and numbers were assigned to the various segments under development and study. "N" prefixes identified northward leading legs; "E", eastward river crossings; "C" central city configurations; "R", connections paralleling the Rhomberg area. "D", showed a Dodge Street treatment; "S", a southward leading leg. "B" designated a sheet flanking the Julien-Dubuque Bridge, interconnecting "C", "D" and "S" plans.

The emergent, successful plans, pursued to the point where they could be studied with full confidence as feasible alternative combinations, are shown in FIGURE III-6. These are the routes which will be discussed in the remaining sections of this report. For those who wish to know more about the rejected alternates, they are reproduced in Appendix B-3 with a short discussion of each and the reasons for their discard or rejection.

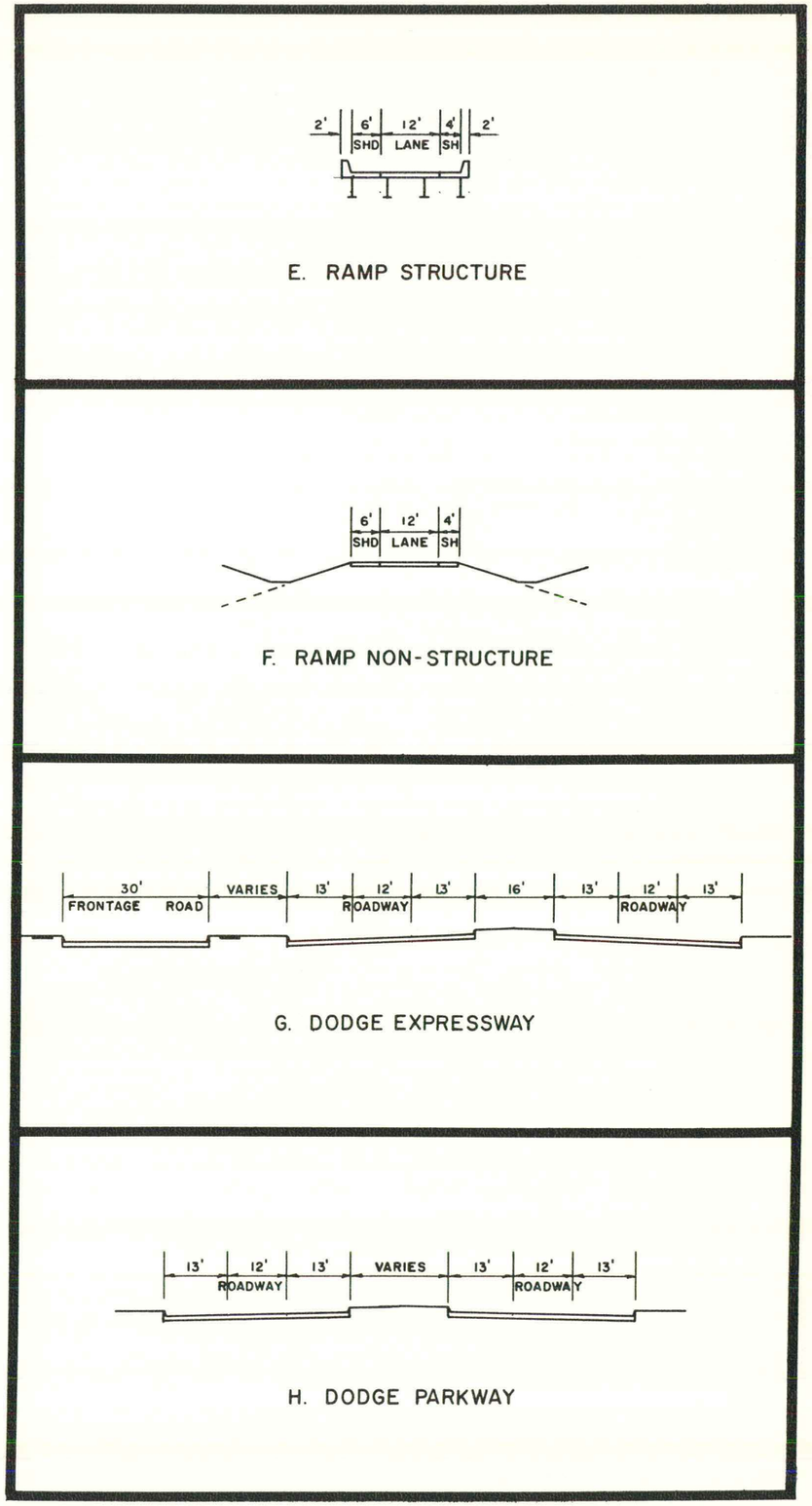


Figure III-3
Typical Cross-Sections (continued)

Figure III-4

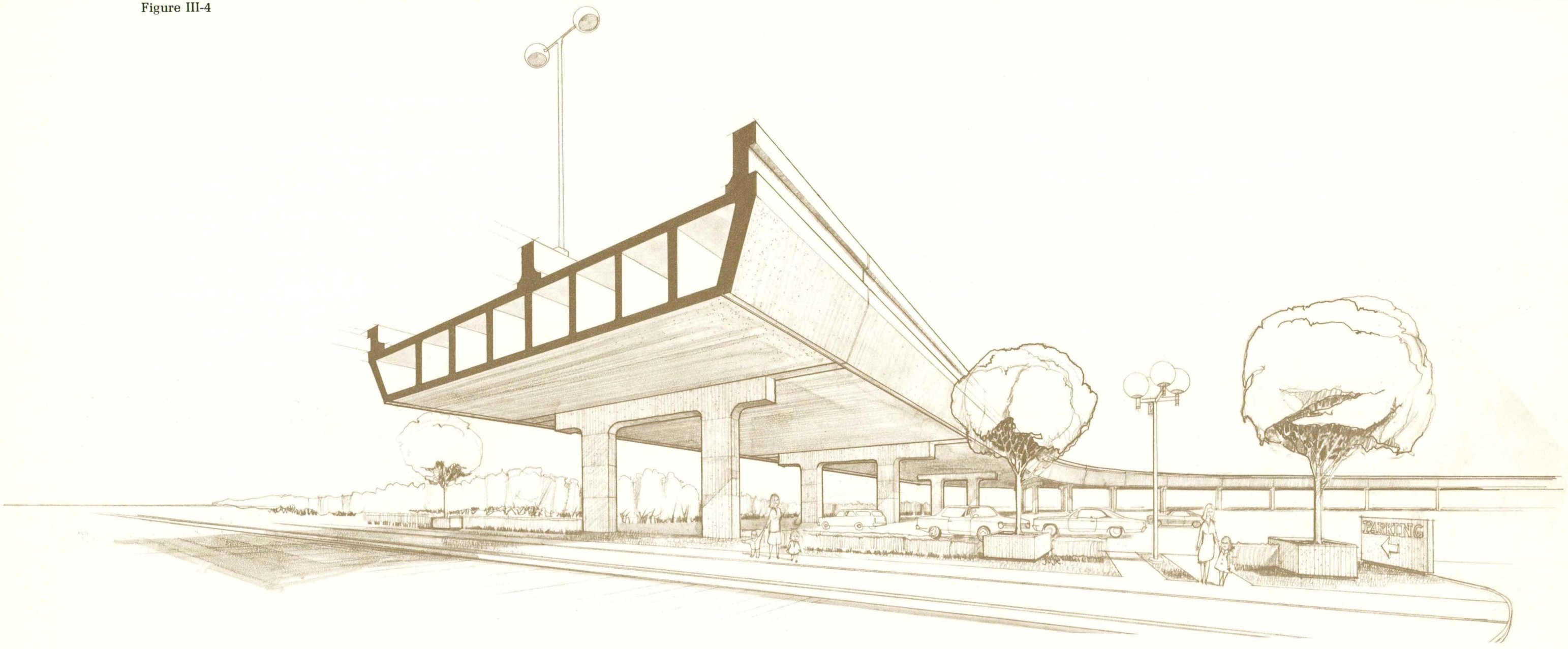
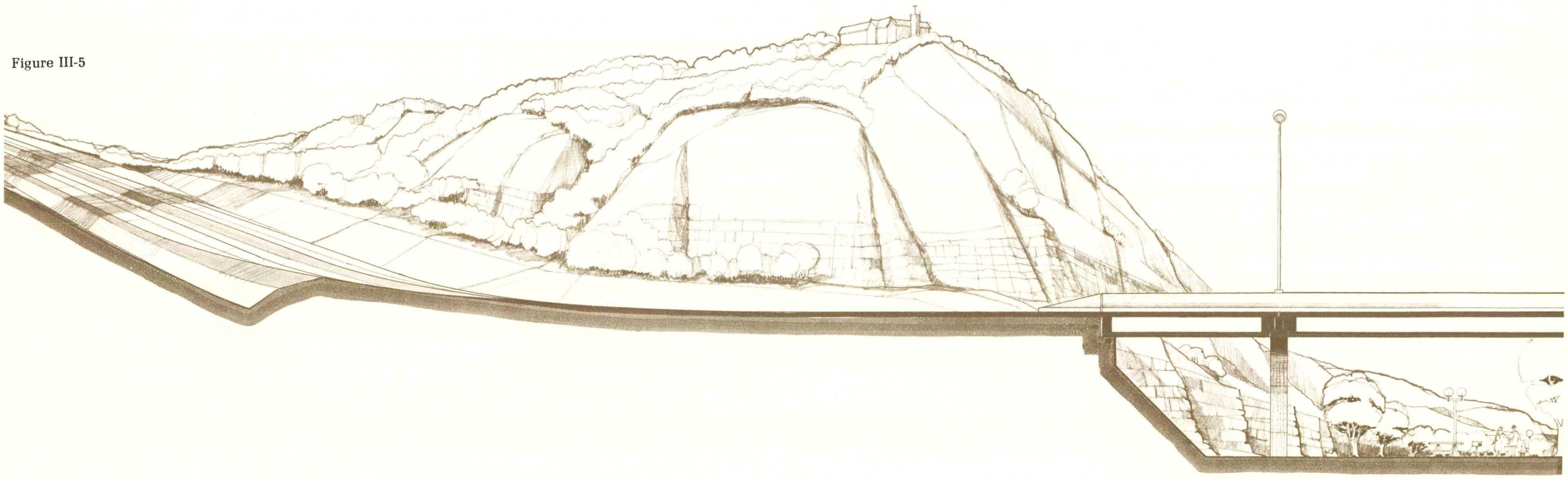


Figure III-5



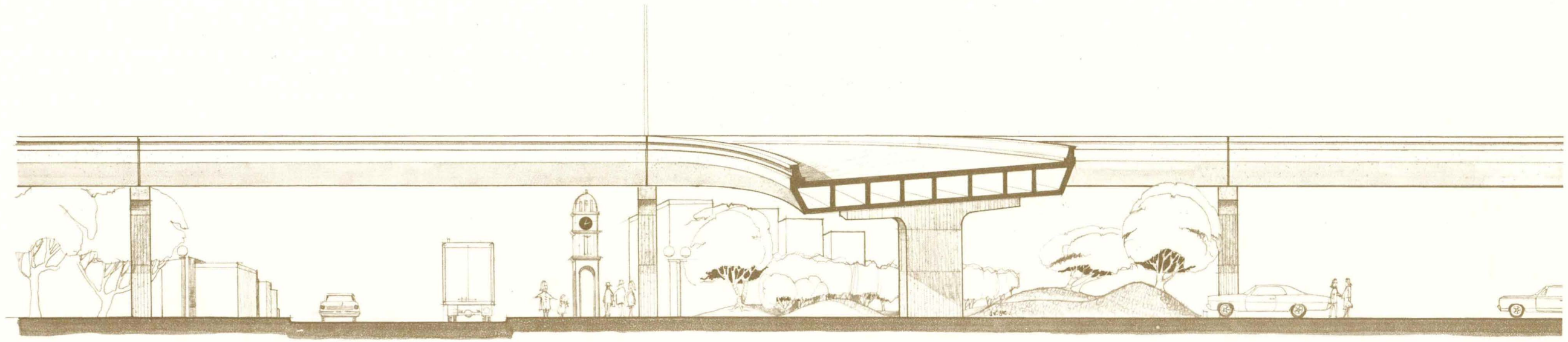


Figure III-6

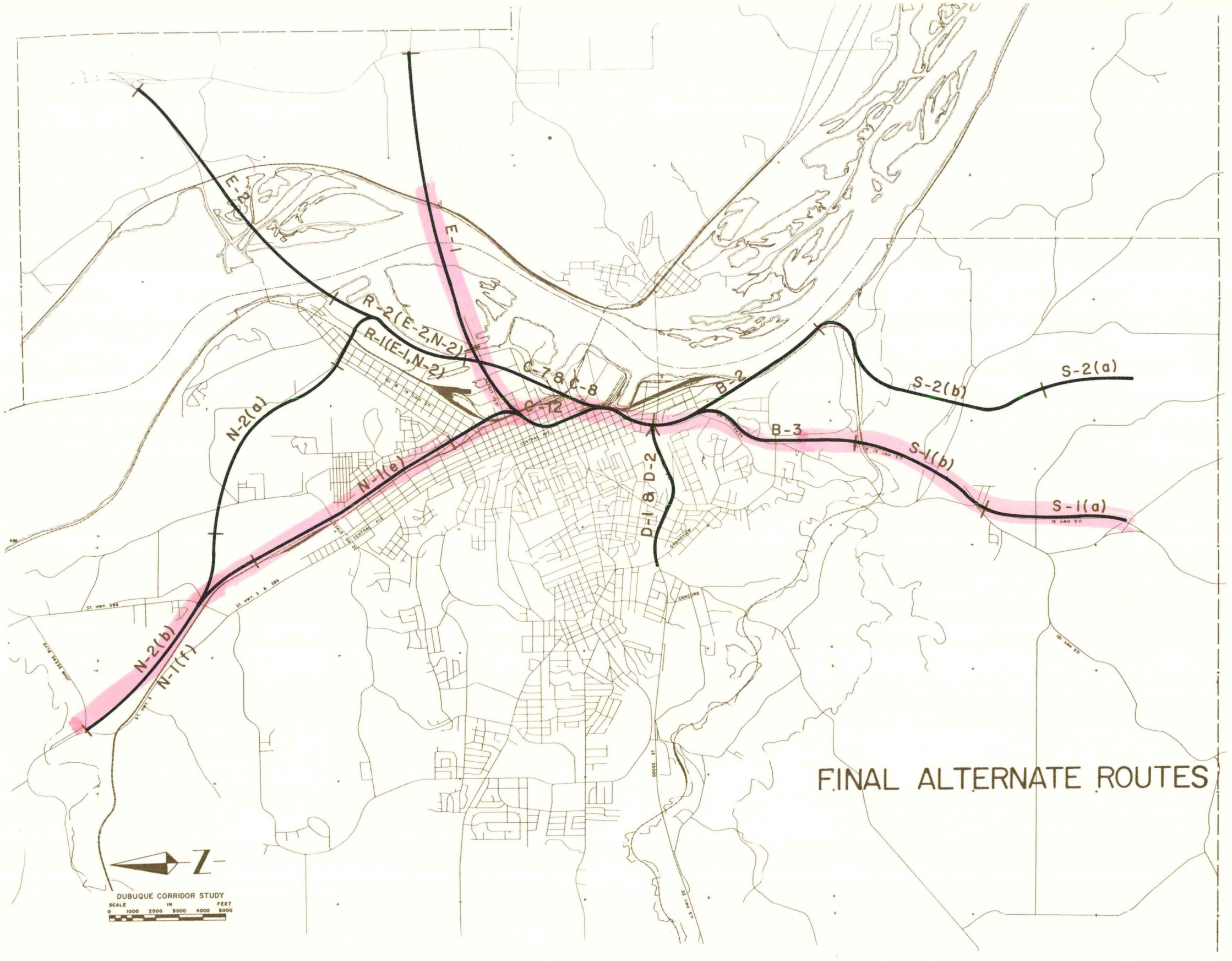

E-2
E-1
R-2(E-2,N-2)
R-1(E-1,N-2)
C-7 & C-8
C-12
B-2
S-2(b)
S-2(a)
B-3
S-1(b)
S-1(a)
N-2(a)
N-1(a)
D-1 & D-2
N-2(b)
N-1(f)
DUBUQUE CORRIDOR STUDY
SCALE IN FEET
0 1000 2000 3000 4000 5000
FINAL ALTERNATE ROUTES

Figure III-7

Section IV

DESCRIPTION OF FINAL ALTERNATIVES

General

Emerging from the prior study stages are several individual sections of alignments deemed to be satisfactory alternates for consideration in the final phases of this study. Having had alpha-numeric designations, these emergent sections are now combined into definitive alternate alignments and will be denoted in the remaining analyses with the specific names.

- **a.** Couler Alignment with City Island Bridge
- **b.** Roosevelt Avenue Alignment with City Island Bridge
- **c.** Roosevelt Avenue Alignment with Eagle Point Bridge
- **d.** Kerrigan Alignment
- **e.** Granger Creek Alignment
- **f.** Dodge Expressway Alignment
- **g.** Dodge Parkway Alignment

These alignments, as described later in detail, are intended to serve the Dubuque Urbanized Area by linking northern and southern Dubuque with the commercial and industrial areas of the central city and by providing both a westerly extension along Dodge Street and an easterly connection across the Mississippi River.

Traffic Forecasts

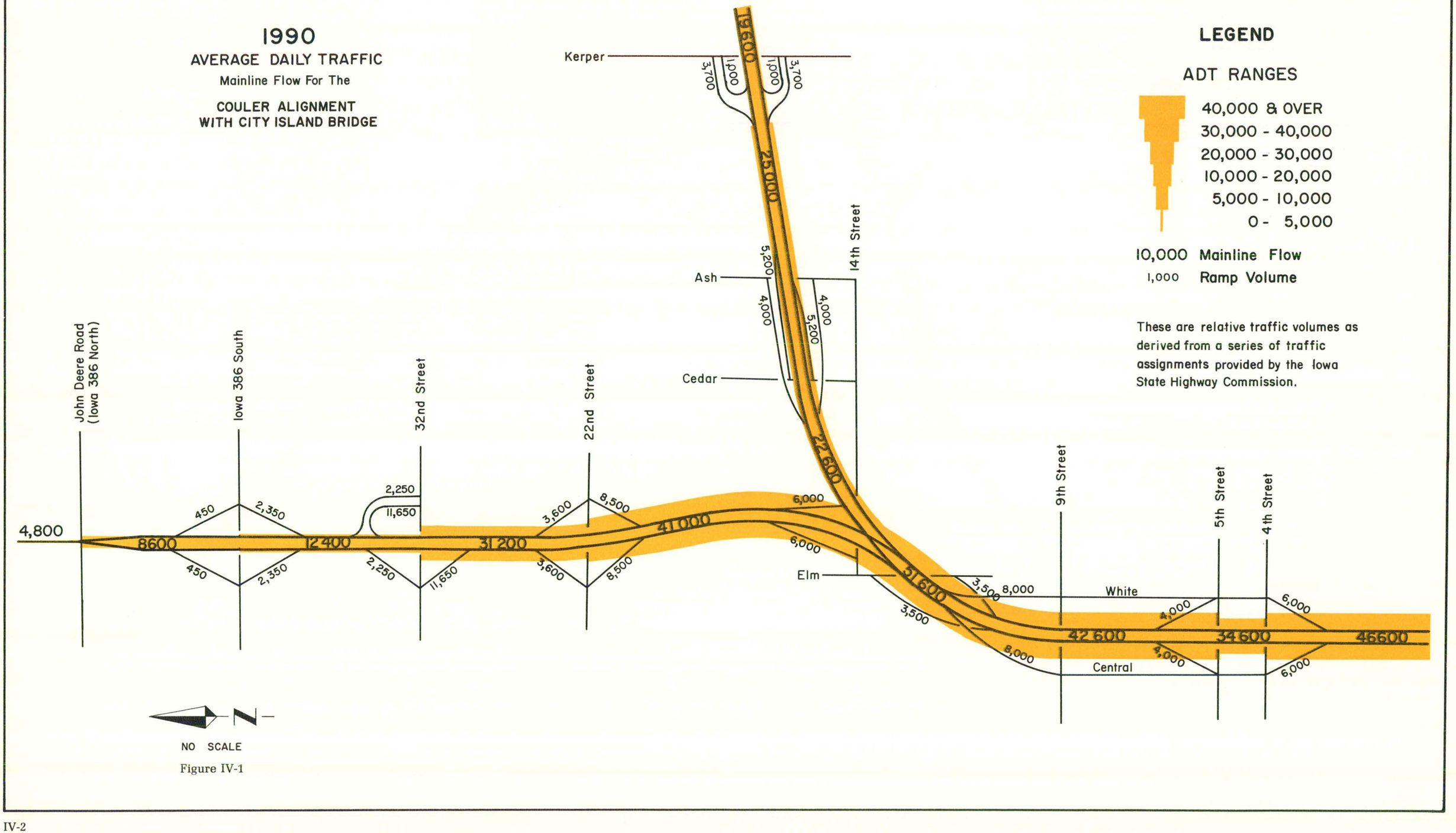
The Iowa State Highway Commission furnished a series of traffic assignments reflective of the 1990 traffic flows. The roadway systems to which the assignments were made were comprised of the primary streets and highways in the Dubuque Metropolitan Area as well as various freeway alternatives.

The results of the traffic assignments are graphically illustrated in the traffic flow maps of Figures IV-1 through IV-6 for each of the final alternates under consideration. The volumes shown are for average daily traffic (ADT) for the year 1990. The colored flow bands and larger type numbers represent the two directional mainline flow of the alternate while the smaller type values indicate the ramp volumes. It should be noted that these volumes are more relative than absolute and are representative of the various assignments made during the course of the study.

For the study, the 1990 assignments provided a basis for evaluating the relative effectiveness of an alternate for satisfying the 1990 travel desires. These volumes were utilized in the traffic service evaluations (as discussed in the next section and the appendix) and in the traffic operations analysis of the freeway mainlines and their connection points with surface streets.

1990
AVERAGE DAILY TRAFFIC
Mainline Flow For The

COULER ALIGNMENT
WITH CITY ISLAND BRIDGE



NO SCALE

Figure IV-1

LEGEND

ADT RANGES

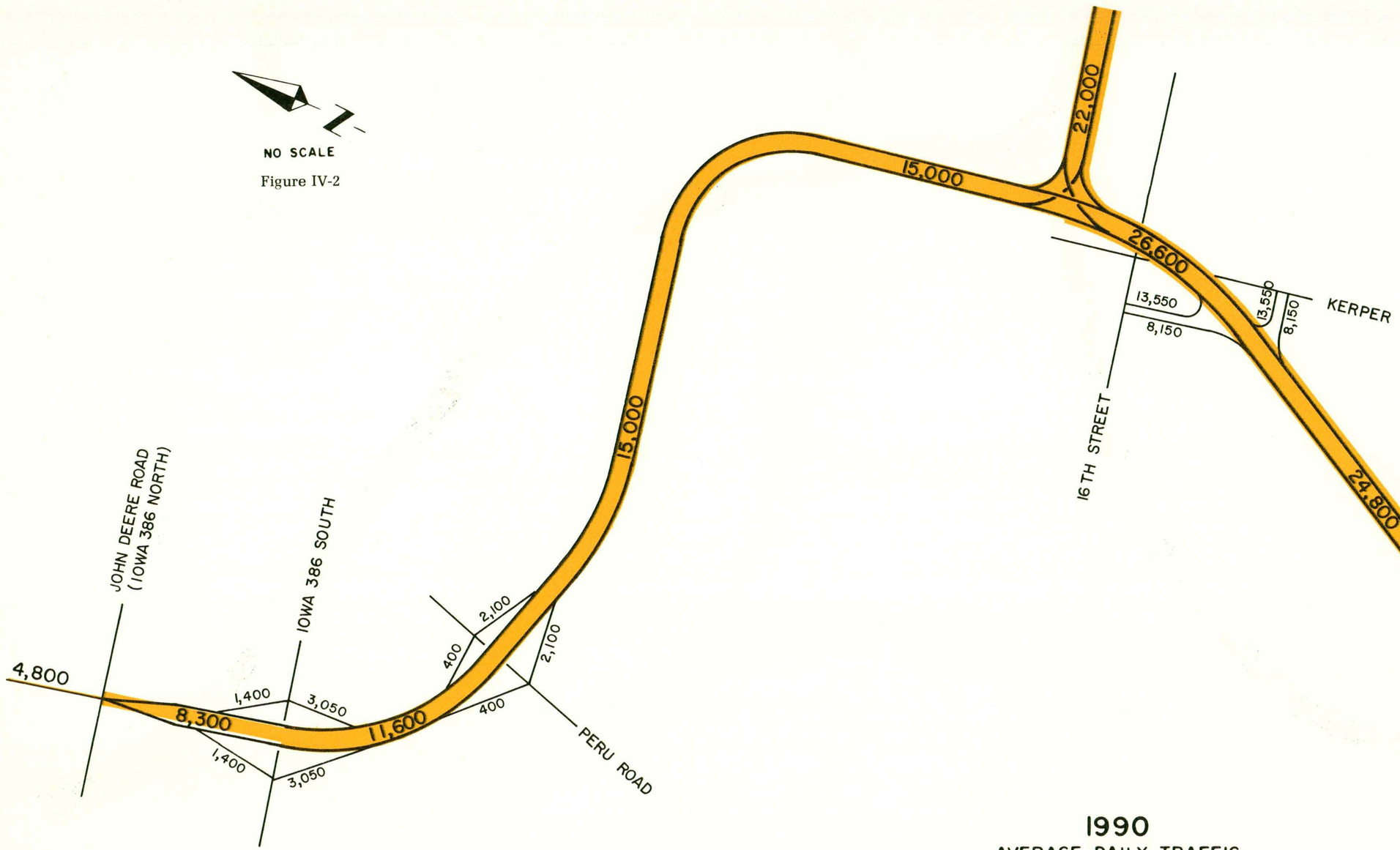
- 40,000 & OVER
- 30,000 - 40,000
- 20,000 - 30,000
- 10,000 - 20,000
- 5,000 - 10,000
- 0 - 5,000

10,000 Mainline Flow
1,000 Ramp Volume

These are relative traffic volumes as derived from a series of traffic assignments provided by the Iowa State Highway Commission.

NO SCALE

Figure IV-2



LEGEND

ADT RANGES

	40,000 & OVER
	30,000 - 40,000
	20,000 - 30,000
	10,000 - 20,000
	5,000 - 10,000
	0 - 5,000

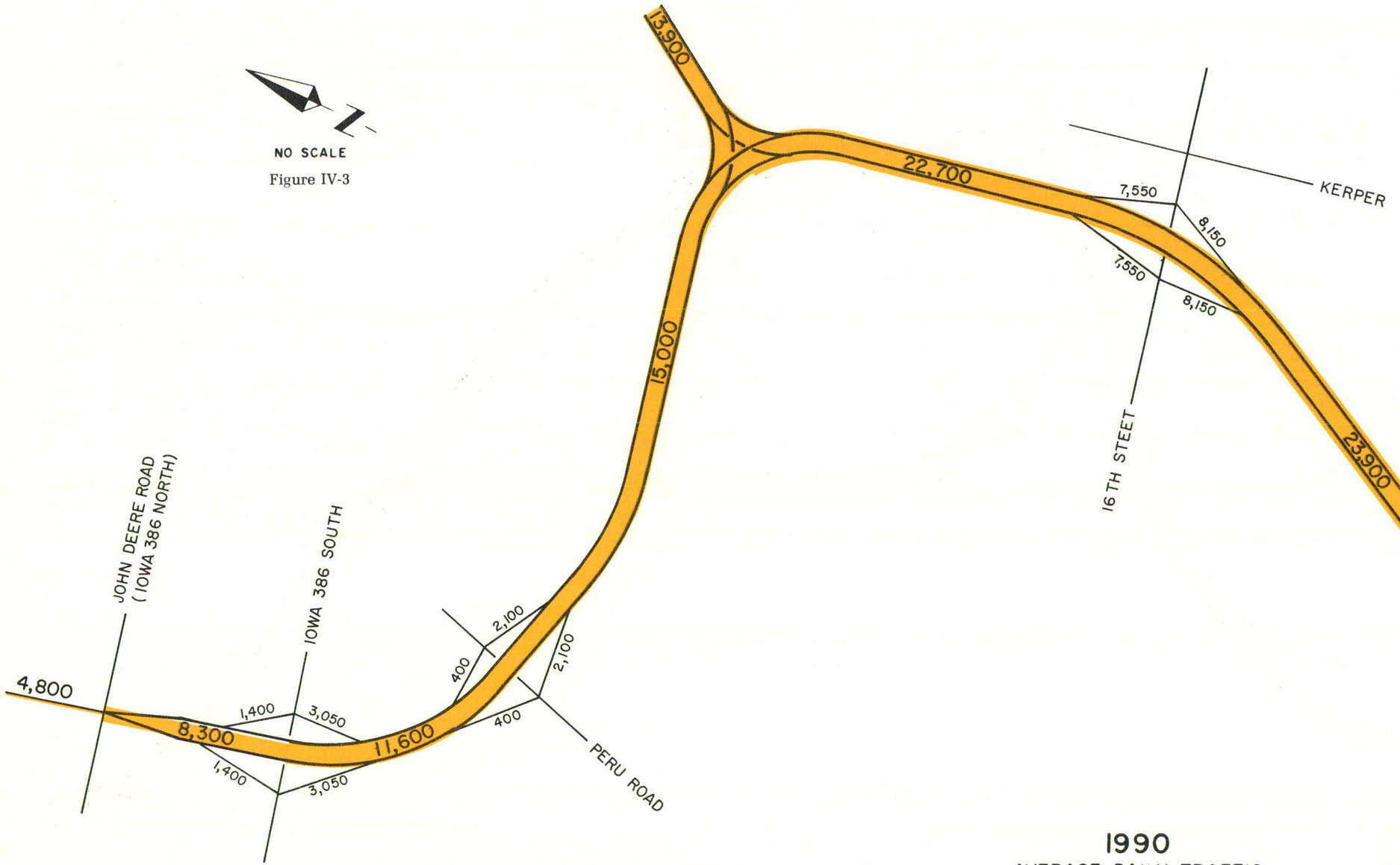
10,000 **Mainline Flow**
1,000 **Ramp Volume**

These are relative traffic volumes as derived from a series of traffic assignments provided by the Iowa State Highway Commission

1990
AVERAGE DAILY TRAFFIC
Mainline Flow For The
ROOSEVELT AVENUE ALIGNMENT
WITH CITY ISLAND BRIDGE

NO SCALE

Figure IV-3



LEGEND

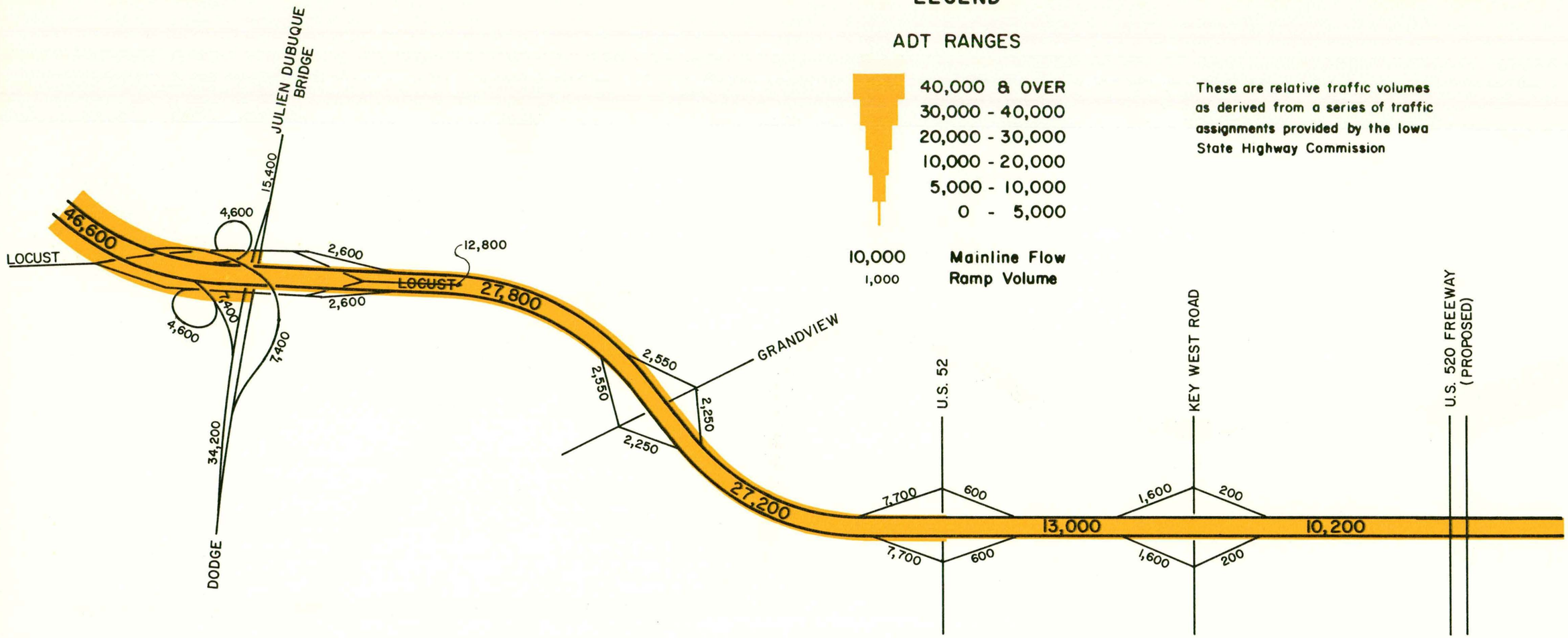
ADT RANGES

40,000 & OVER
30,000 - 40,000
20,000 - 30,000
10,000 - 20,000
5,000 - 10,000
0 - 5,000

10,000 **Mainline Flow**
1,000 **Ramp Volume**

These are relative traffic volumes as derived from a series of traffic assignments provided by the Iowa State Highway Commission

1990
AVERAGE DAILY TRAFFIC
Mainline Flow For The
ROOSEVELT AVENUE ALIGNMENT WITH EAGLE POINT BRIDGE



NO SCALE

Figure IV-4

1990
AVERAGE DAILY TRAFFIC
Mainline Flow For The
KERRIGAN ALIGNMENT

LEGEND

ADT RANGES

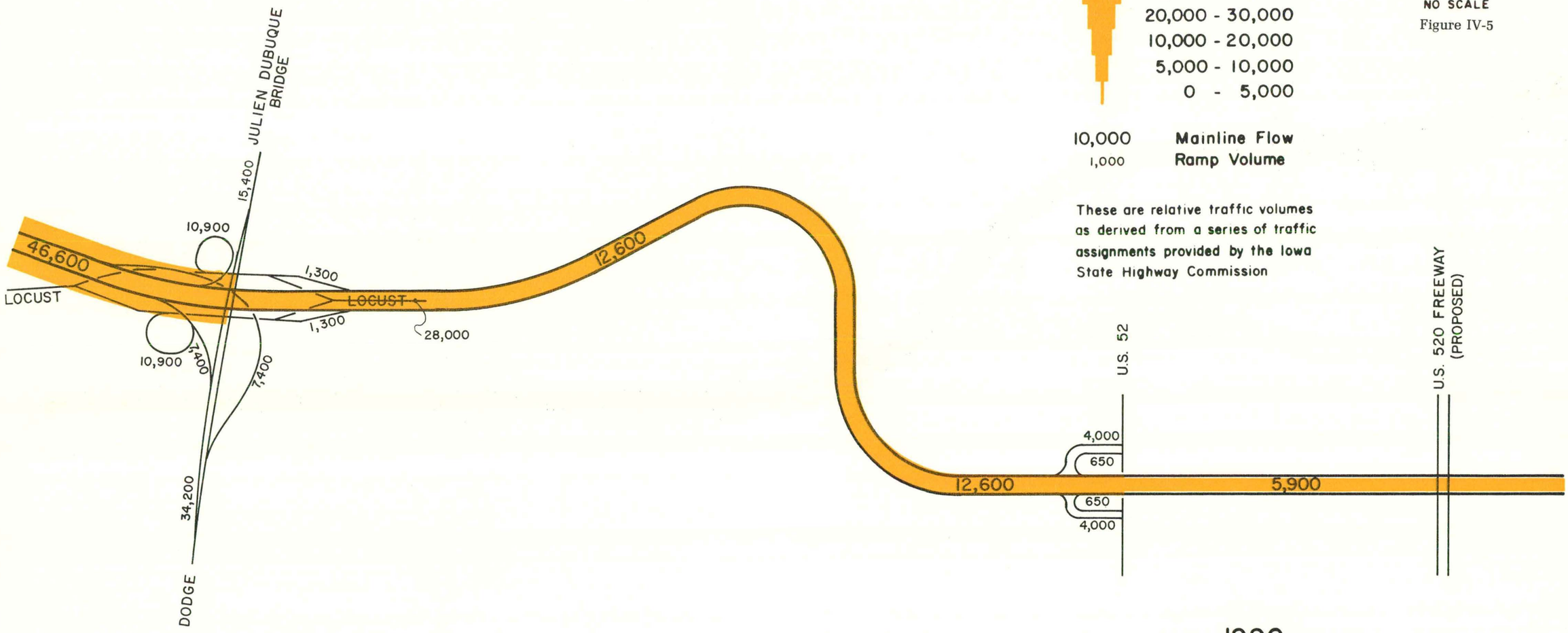
40,000 & OVER
30,000 - 40,000
20,000 - 30,000
10,000 - 20,000
5,000 - 10,000
0 - 5,000

10,000 Mainline Flow
1,000 Ramp Volume

These are relative traffic volumes as derived from a series of traffic assignments provided by the Iowa State Highway Commission

NO SCALE

Figure IV-5



1990
AVERAGE DAILY TRAFFIC
Mainline Flow For The
GRANGER CREEK ALIGNMENT

LEGEND

ADT RANGES

40,000 & OVER
30,000 - 40,000
20,000 - 30,000
10,000 - 20,000
5,000 - 10,000
0 - 5,000

10,000
1,000

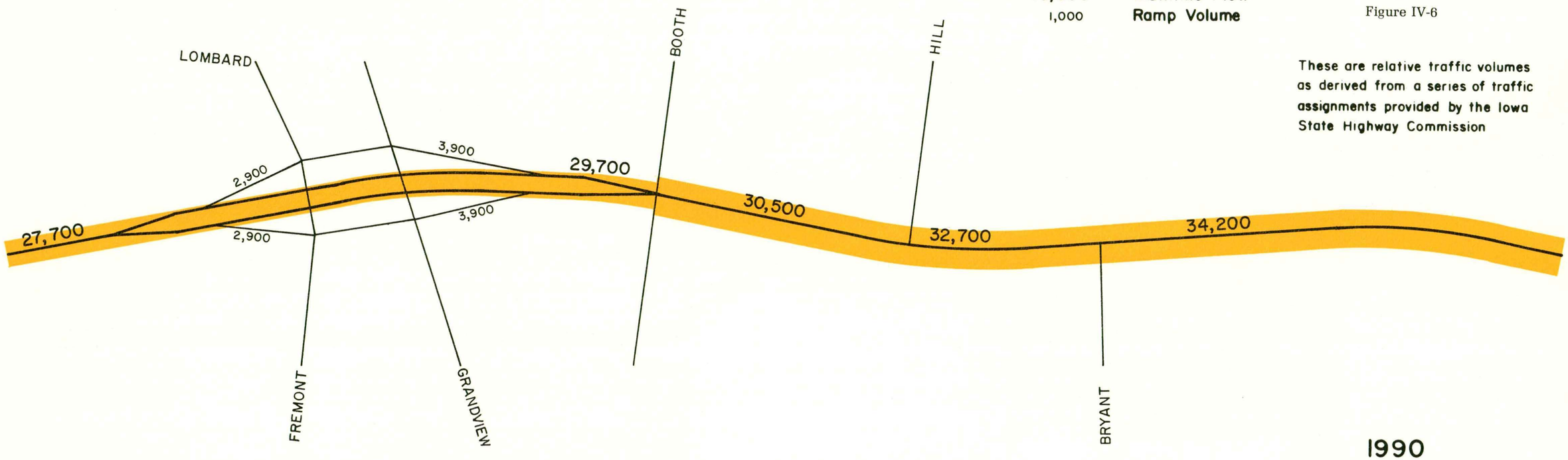
Mainline Flow
Ramp Volume

N

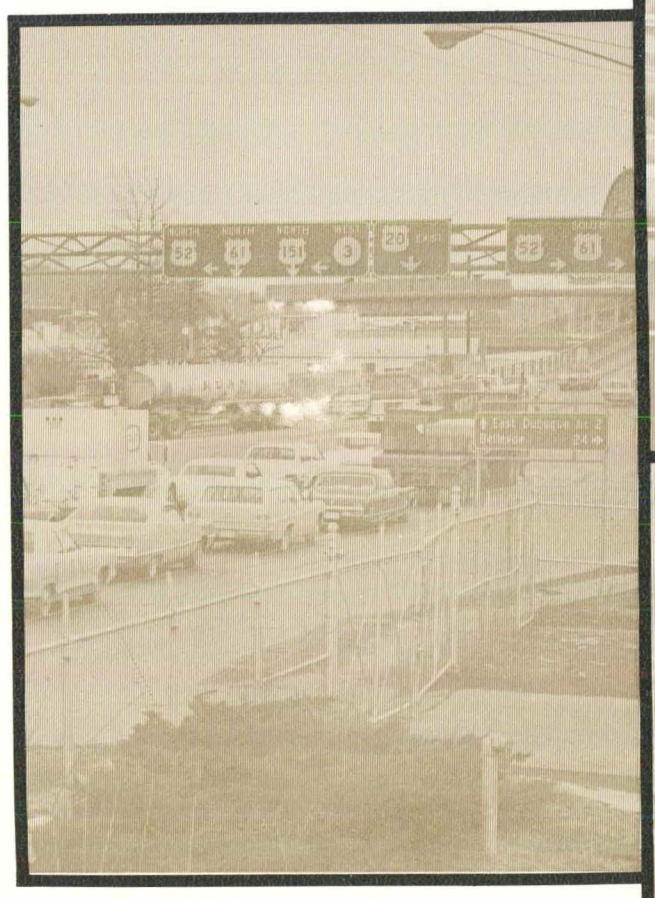
NO SCALE

Figure IV-6

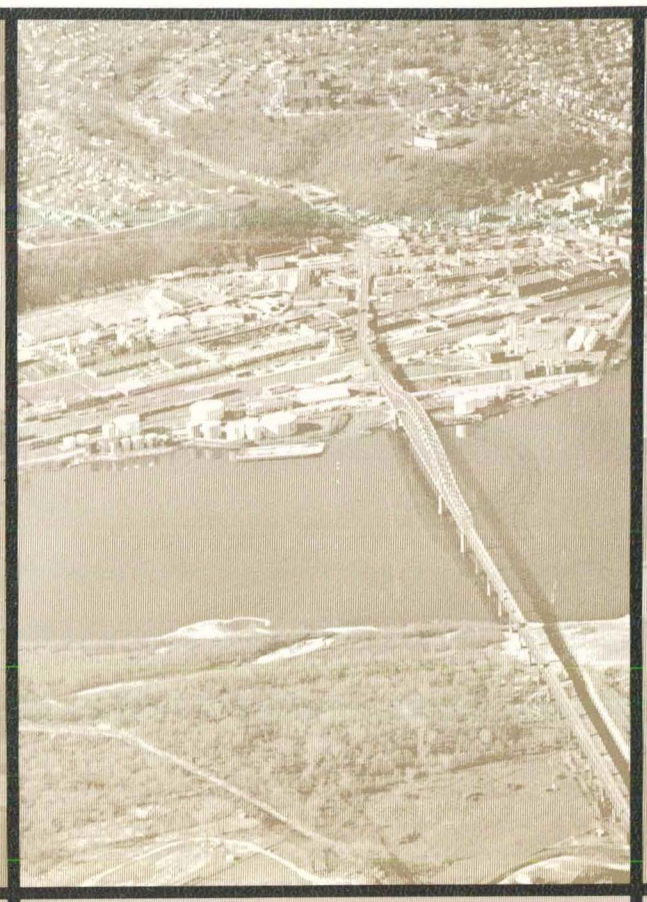
These are relative traffic volumes as derived from a series of traffic assignments provided by the Iowa State Highway Commission

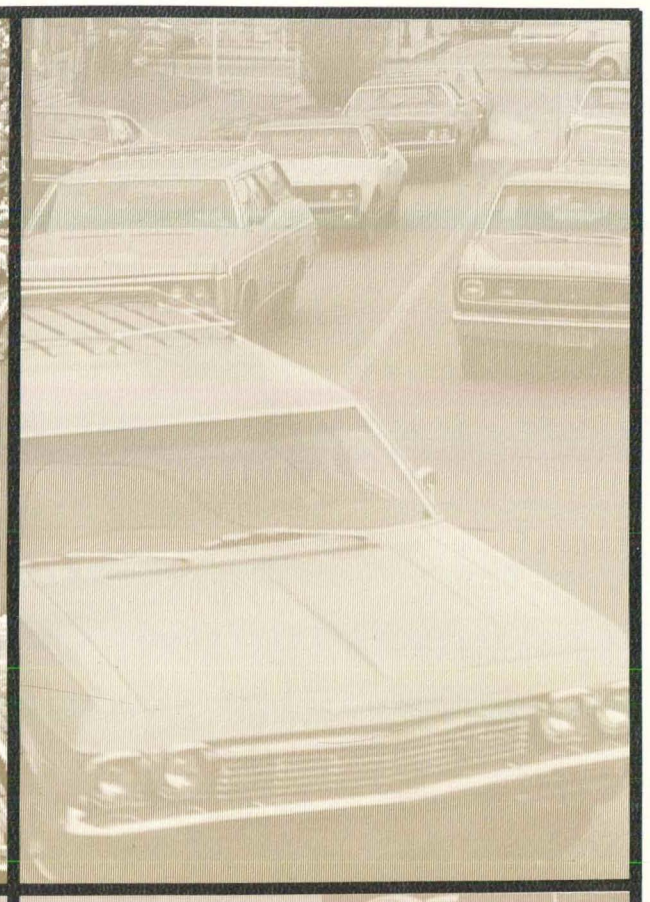


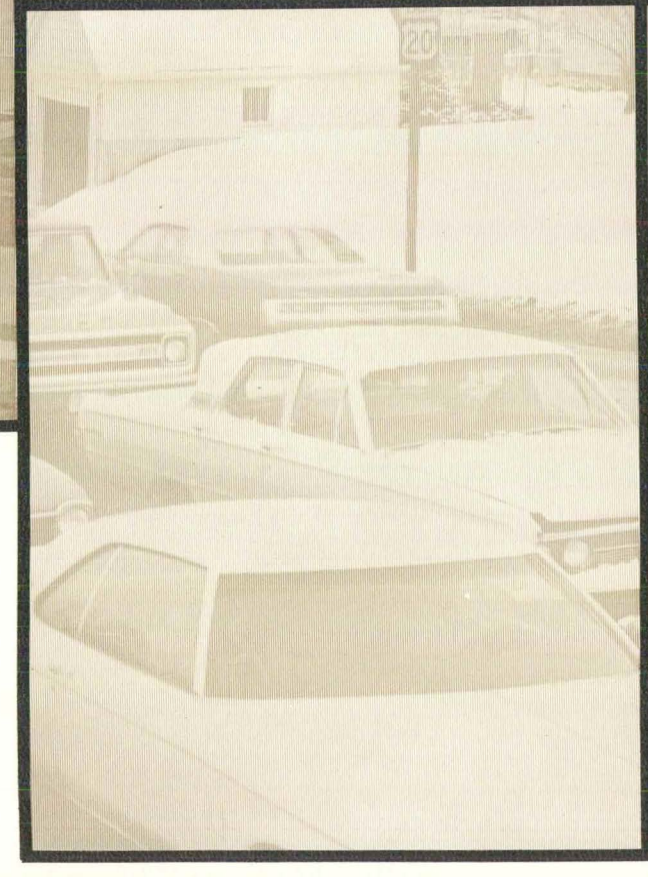
1990
AVERAGE DAILY TRAFFIC
Mainline Flow For The
DODGE ALIGNMENTS

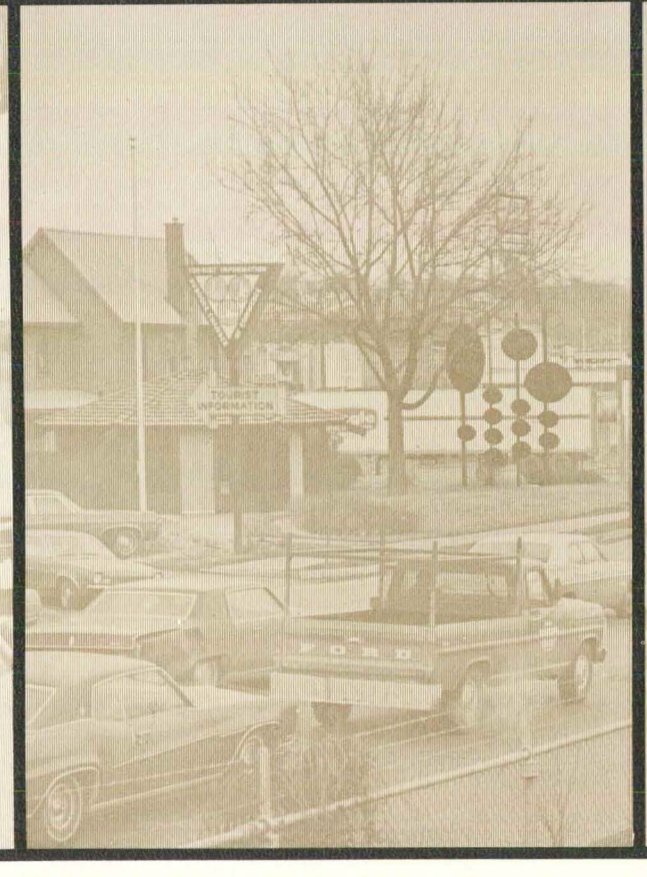

East Dubuque Rt. 2
Bellevue 24

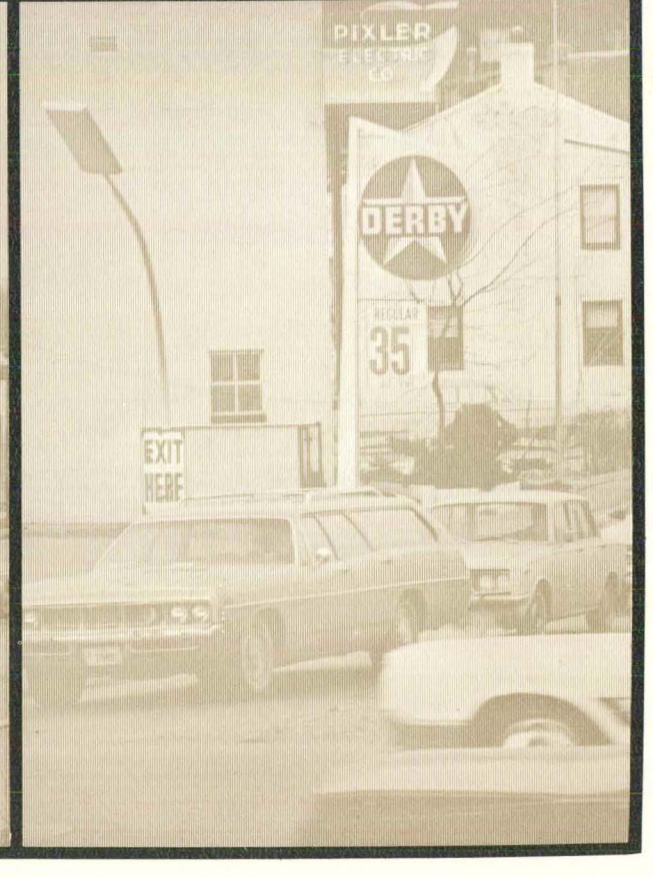

DODGE

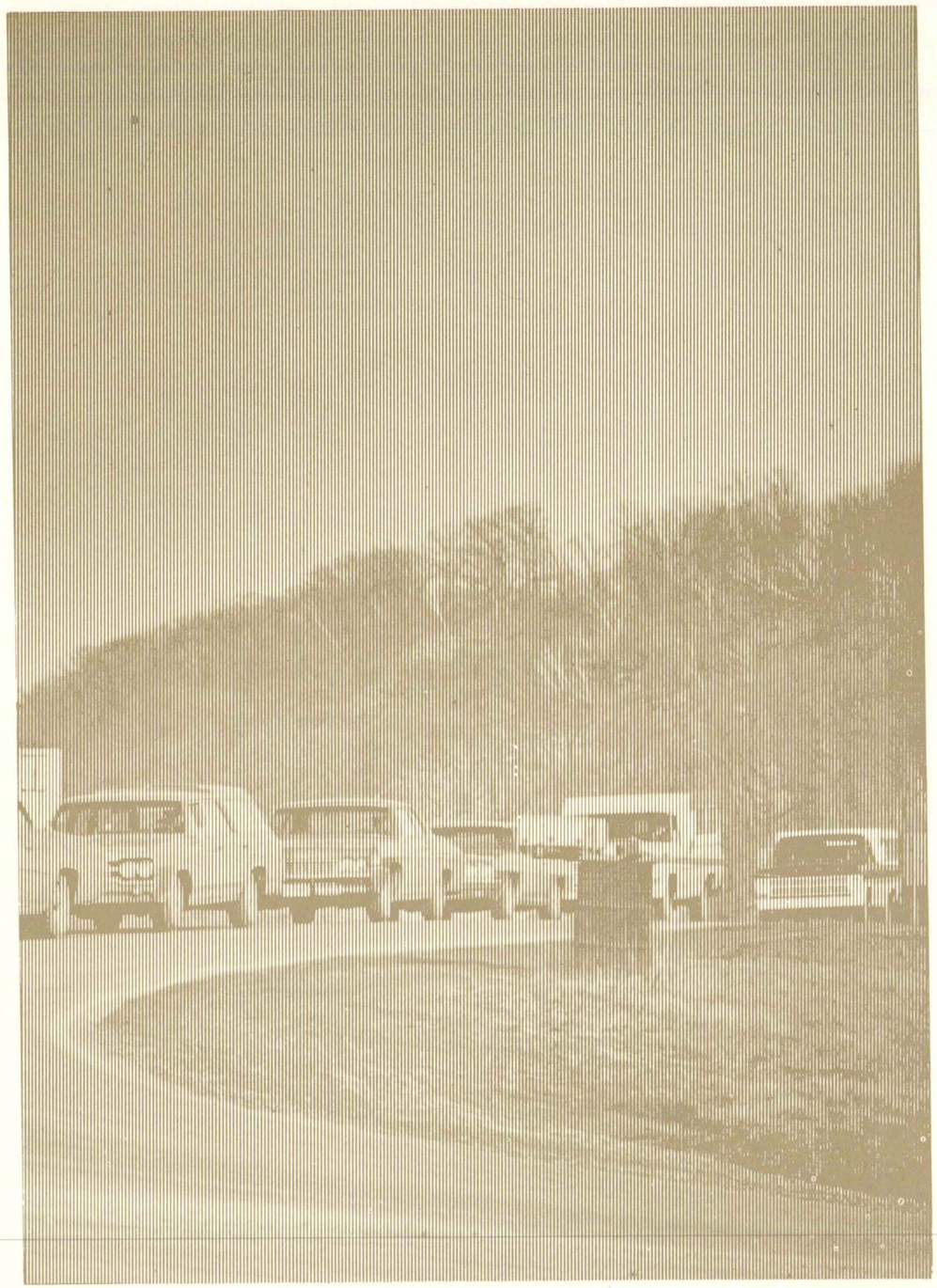





20


TOURIST
INFORMATION


PIXLER
ELECTRIC
CO
DERBY
REGULAR
35
EXIT
HERE



Couler Alignment with City Island Bridge

Freeway facilities from the northern urban limits and from the Wisconsin banks of the Mississippi River converge upon Downtown Dubuque to form a single freeway which continues southward toward Dodge Street. This confluence of roadways provides direct connections from the east, north, and south to the multitude of commercial and industrial activities in the heart and fringe of Downtown Dubuque.

The Couler Alignment commences at the northern end of the Couler Valley near the Little Maquoketa River at John Deere Road (Iowa 386 North) and existing U.S. 52/ Iowa 3 roadway. From that point, the alignment starts southward along the east bluff paralleling the Chicago Great Western (CGW) railroad line and continuing to an interchange with Iowa 386 South.

This configuration of the expressway in the north end of the Couler Valley is something of a compromise. The consultants would prefer to keep the roadway snug into the toe of the bluff for as long as possible, making the crossing of the valley only when absolutely necessary. This would preserve the valley's floor unbroken, with the minimum of intrusion. However, current planning for an improvement of line and grade of U.S. 52 and Iowa 3 makes such desire academic. The alignment shown on our recommended plan thus makes use of contruction which will be an accomplished fact by the time this project can get underway. All traffic desires, including an increasing amount of John Deere traffic from the Daytonville Road, are accommodated.

The intersection of 32nd Street with the Couler Alignment is one of major importance. This interchange connects into Peru Road (east on 32nd Street) to access the eastern bluff areas between the Couler Valley and the Mississippi River. More importantly, this interchange also connects with the proposed circumferential loop (west on 32nd Street) around the western part of the city. As such, the Couler Alignment not only serves as the north freeway but also as a part of the high-mobility loop linking northwestern Dubuque to the Center City.

At 32nd Street, the need for a grade separation is evidenced by the heavy traffic forecasts. Both topography and the concentration of industry limit possibilities of elements of the connections. It appears that the best solution is a modified diamond, in which the usual ramp in the southeast quadrant is replaced by a loop in the northeast quadrant. The result is the elimination of crossing traffic streams for the heavy left-turn desire, northbound to westbound.

Although the Chicago, Great Western (CGW) Railway line up the Couler Valley no longer carries the heavy traffic it once did, it still serves necessary functions. The business and industry within the valley have substantial need for rail service. North of the crossing of route 386 South, however, the need for service suggests that traffic might be terminated at some time in the future. It is important that the rail continue in existence adjacent to the industries of the Couler Valley. This means that the trafficway should lie east of the Railroad. Although this can be accomplished south of 32nd Street, north of that point it will require the realignment of the track to permit the expressway to stay on the Valley floor. This should provide a more economical and more suitable solution than the elevation of the roadway.

Continuing southward between the east bluff and the CGW, the Couler Alignment overpasses 29th and 24th Streets and proceeds to an interchange at 22nd Street. Having four lanes and being primarily on fill in the preceding sections, the Couler Route from 24th on south to its Dodge Street terminus becomes an elevated roadway on structures with lanes varying from a normal four to eight depending upon the ramp connections and weaving sections.

Although it was originally anticipated that there would be no need for any crossings between 32nd and 24th Streets, it was found that the 29th Street crossing fills a very important function for both school children and adults. Thus, it is desirable to provide a grade separation at this point, with the freeway rising on fill sufficiently to clear the existing street right-of-way at grade.

One of the City's built-in bottlenecks lies between 20th and 24th Streets in the vicinity of Elm. Three streets, 20th, 22nd and 24th Streets, with some minor help from 21st Street, provide the primary means of access between the old Rhomberg area and the newer Windsor Ave. area, and the remainder of the City. To the west, 22nd Street connects with Kaufmann Avenue and the western parts of the City. Thus it is important that these historic connections be modified the least possible by a freeway crossing. At the same time, it is equally important that access to the freeway be provided to serve this large area. An additional complication exists in the form of the Audubon School and the Sacred Heart Church and School.

In the face of these various and somewhat conflicting needs, it was concluded that 20th with its connectors Rhomberg and Garfield, and 24th Streets, be overpassed without change. 22nd Street (or Thomas Street) was chosen as the point where freeway access should be provided in the form of a diamond interchange. At the same time, it appeared desirable to close Thomas Street at its intersection with Johnson, reconnecting 22nd Street to Johnson at Lincoln Street. The exact configuration of the surface streets here is a problem for the City, and should

be subject to modification to best suit the needs of the community and the nearby schools.

South of 22nd, the alignment continues adjacent to the east side of the CGW, overpasses 20th Street, and crosses the Milwaukee Railroad at its junction with the CGW. The Couler Route follows the east edge of the Milwaukee Railroad past the Dubuque Packing Complex into a "Y" connection with the freeway section from the City Island Bridge.

Continuing southward, the alignment crosses the Milwaukee Railroad in the vicinity of 14th Street and diagonals to 12th St. at White. From there it proceeds to 1st Street between Central Avenue and White Avenue, the latter having been relocated about one-half block east. At 1st it diagonals to Dodge and Locust where it connects with the southern alternates.

The City Island crossing of the Mississippi River extends generally eastward from its interchange near 16th Street and Kerper Boulevard, rising as it crosses the island itself. The high point of the river crossing is reached over the center of the channel so the bridge may meet the legal requirements of clear height and channel width universally laid down for the river. Having been on an upgrade for a substantial distance, it is now necessary to reverse the grade for some distance in order that traffic, particularly heavy trucks, can regain speed lost on the long climb.

Following this reversed grade section, the roadway arrives at the east bank in the immediate vicinity of Boatyard Cove climbing again so that the close to 300 foot difference in elevation between river pool and the Wisconsin countryside may be accomplished. There are several erosion gullies which have formed in the bluffs, terminating in Boatyard Cove, and the roadway generally follows one of these on structure. This preserves the natural character and scenic beauty of the raw bluffs, avoiding the scarring which would result from alternate cuts and fills. As the roadway approaches the high ground, it becomes necessary to make some cuts with fills, as is necessary in any rolling country.

The exact terminus of this piece of roadway is still undefined. The long range plans of the Wisconsin Highway Department envision the upgrading of both Highway 11, leading east to Racine, and Highway 35, leading north. It is anticipated that there may be some minor relocations of both roadways in their upgrading, which could change the exact location of their intersection. It is anticipated that the U.S. 151 Freeway would connect at this same intersection. Thus, there may be some realignment of the east end of our roadway to accommodate.

The philosophy behind the major construction in the Flats area, east of the tracks, is worthy of discussion. It is apparent that this area holds two of the City's major traffic generators. The Dubuque Packing Company and the A. Y. McDonald Company are the community's second and third largest employers. They not only have large numbers of employee trips, but they also are major users of truck traffic. This in no way depreciates the needs of other segments of the community, but underlines the need for service here.

The conclusion is inescapable that the freeway must serve these major traffic generators, with full access in all directions, and with railroad overcrossings that are free from the interferences of mainline railroad traffic. The conclusion is also inescapable that similar service shall be provided for the industry, business and commercial interests lying to the west of the railroads. It is a sound principle that any neighborhood or district which is touched or penetrated by any public facility should receive the maximum benefits possible to balance its intrusion. Also, value of any traffic facility is its ability to serve, and the major facility users generally should be given preference over the minor users. These basic considerations led to the final configuration of the Couler-City Island Alignment as shown in PLATE 105.

Thus we have a major fork in the elevated freeway, with what appears to be a large number of ramps in close proximity. The location of the major fork is, to all intents and purposes, geometrically fixed within a few hundred feet, as are the locations of these major traffic generators. The result is that decision points, ramp gores where traffic must merge or diverge and other points of traffic friction come in somewhat quicker succession than is normally desired. We have attempted to alleviate this situation and have succeeded in minimizing the conflicts, but thus far have been unable to completely eliminate them. It is possible that more time and effort might further improve the configurations shown. However, the configuration indicated will work well and will provide the necessary service within the available geographic limitations. This will be accomplished at something less than the "ideal" freeway speeds, but this is a price that must be paid in compromising between access and service and higher speeds. We believe that a satisfactory compromise among the conflicting needs has been achieved.

It may be noted that traffic from across the river with a northbound desire and the reciprocal movement (W to N and S to E) have not been awarded their own elevated ramps, but have been required to come down to grade for a relatively short distance via the 14th and Ash ramps. This movement was indicated to be the lowest volume of any single movement in the interchange area, and thus its needs were given lowest priority.

It might be thought that we have two pair of ramps which are somewhat redundant since both provide for traffic access from the east to surface streets. One pair consists of the loops connecting to Kerper Boulevard adjacent to 16th, while the other comes to ground at Cedar Street. The outer pair is needed to serve industries along Kerper Boulevard while the inner pair was introduced to serve Dubuque Packing Company, A. Y. McDonald and the aforementioned City Island Bridge to Couler Valley desire. To delete the inner pair (Cedar Street) would slightly alleviate the crowded ramp pattern at the interchange, but at the cost of added surface loading of 16th Street and the addition of 10,400 vehicles per day to the Kerper loops. More study might modify this conclusion, but we believe it best to disperse this 10,400 vehicles per day (5,200 per ramp) within the rectangular surface street pattern provided by 14th, 16th, Sycamore and Maple.

There has been an attempt to avoid blocking the potential expansion of industry, while serving it. In the case of the Flats area, east of the railroads, this will require some reorientation of the use of space, with close cooperation between involved industry and the City and State. As a starter, 16th Street should be closed at the railroad crossing, and space under the elevated freeway returned to industry for truck parking and maneuvering. Remaining street patterns can be modified as appropriate and surface space assigned to employee parking and other uses. Existing well sites, lift stations, etc., can be left intact.

Although 16th Street is now one of the primary routes from the city west of the railroads to Dubuque Pack and other locations to the east, it is not a very good tie. For one thing, painstaking maneuvering of large trucks is necessary, which blocks the street for various lengths of time. Some of the area south of 16th Street is already used by Dubuque Pack with the probability of more in the future. The city's present plan includes the preservation of the Washington Street District just west of the track. Thus, it is desirable that heavy traffic arterials should not penetrate the neighborhood and assist in partitioning it.

It is therefore concluded that 14th Street should be preferred for a main east-west surface link across the tracks and a point of access to and from the new freeway.

In the Downtown Sections, the needs for entry to and exit from the freeway between 14th and Elm and 1st and Iowa Streets are extremely heavy from two different land use areas flanking the route. One is the industrial area lying generally between White Street and the railroad; the other, on the west side of the freeway, comprises the business and shopping parts of the City Center.

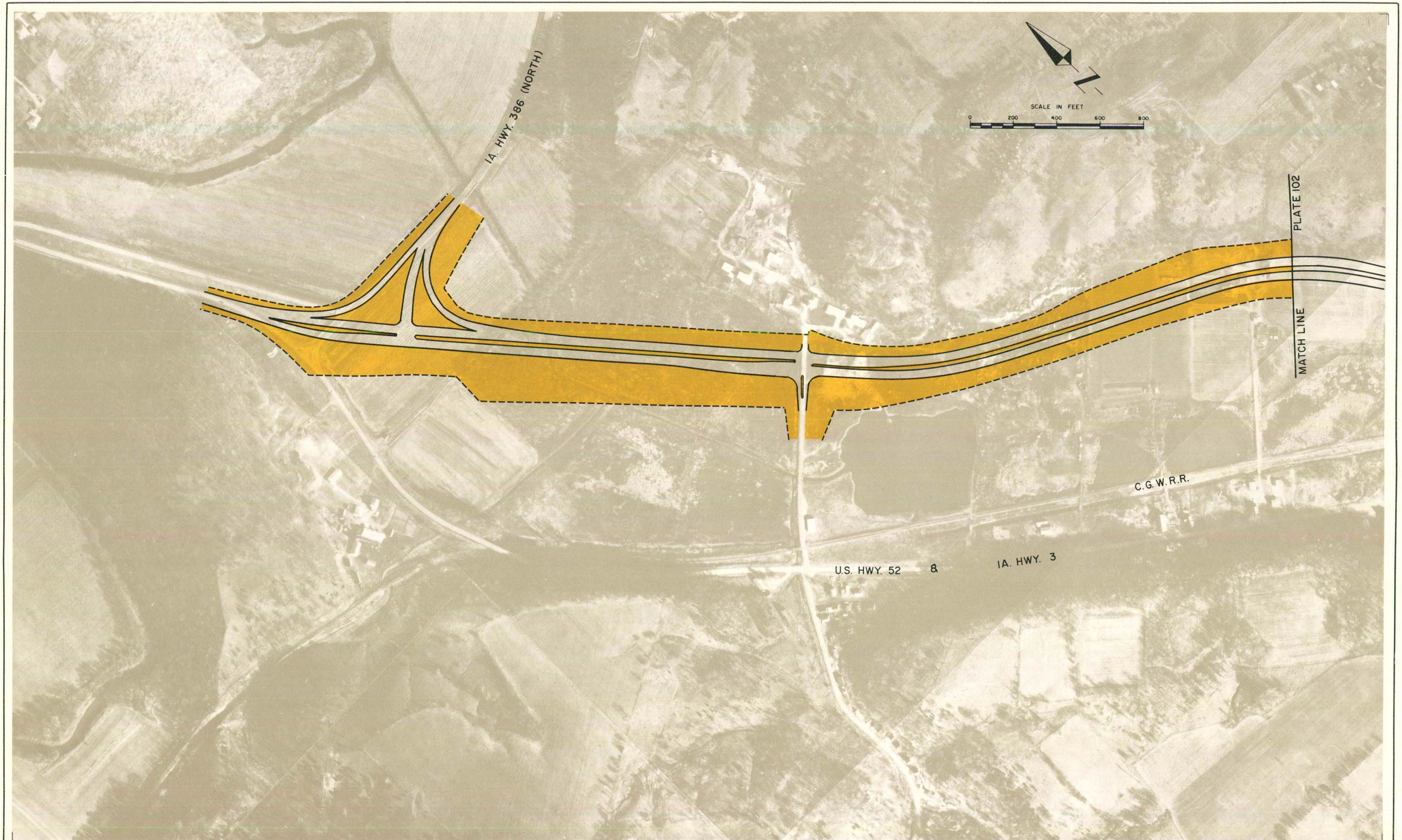
Because the forecast ramp volumes are so heavy, we have broken them into four ramp pairings. Even with this dispersal of access points, the loads are still sufficiently heavy to require the maximum possible use of tangential entry and exit on one-way streets. Exceptions are the pair of ramps terminating on Elm Street in the vicinity of 13th. The other three pairs terminate tangentially on Central Avenue, one-way southbound, and a relocated White Street, one-way northbound.

Because of the community's desire to preserve the County Courthouse and Jail, as evidenced by their listing as historical landmarks, an earlier suggestion that the freeway be routed through the city block lying between Central and White did not provide a solution. However, by placing the freeway within the two half-blocks facing the present location of White Street, the preservation of the two historical buildings is made possible. This does require the eastward relocation of White Street in order that it may flank the freeway and thus fulfill its responsibility as one of the pair of one-way frontage streets.

In this configuration, 4th, 7th, 8th and 9th Streets retain their traditional character of providing access from one side of the route to the other. The two one-way pairs around the ends of the mall, 4th and 5th Streets and 9th and 10th Streets, can still perform their designated tasks. In the presently shown plans, there is one slightly awkward point, the termination of the southbound off-ramp on Central, immediately south of 10th. For those who would wish to become westbound on 10th, this necessitates going around three sides of one block. It is not possible to move the ramp back one block without cutting off other streets, notably White Street. With the amount of traffic expected to use this off-ramp, it would be impossible to provide less than one city block for weaving into position to make any necessary turns at the next intersection. It is possible that some adjustments, possible only in detailed design, can improve this situation.

After a careful study of using only right-hand ramps indicated that they did not adquately satisfy the total needs for access, safety and circulation, left-hand ramps were then utilized at two locations (Cedar and Elm—13th) in an effort to provide greater flexibility in meeting these needs. However, caution was exercised in using these left-hand ramps so as to follow or cause (a) left-hand ramps to be used only where no logical weaving pattern would exist between it and a nearby right-hand ramp, and (b) left-hand on ramp must connect into a continuous lane.

KEY MAP COULER EXPRESSWAY CITY ISLAND BRIDGE ALTERNATE PLATE 100



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

COULER EXPRESSWAY

CITY ISLAND BRIDGE ALTERNATE

PLATE 101

FEBRUARY, 1972

LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

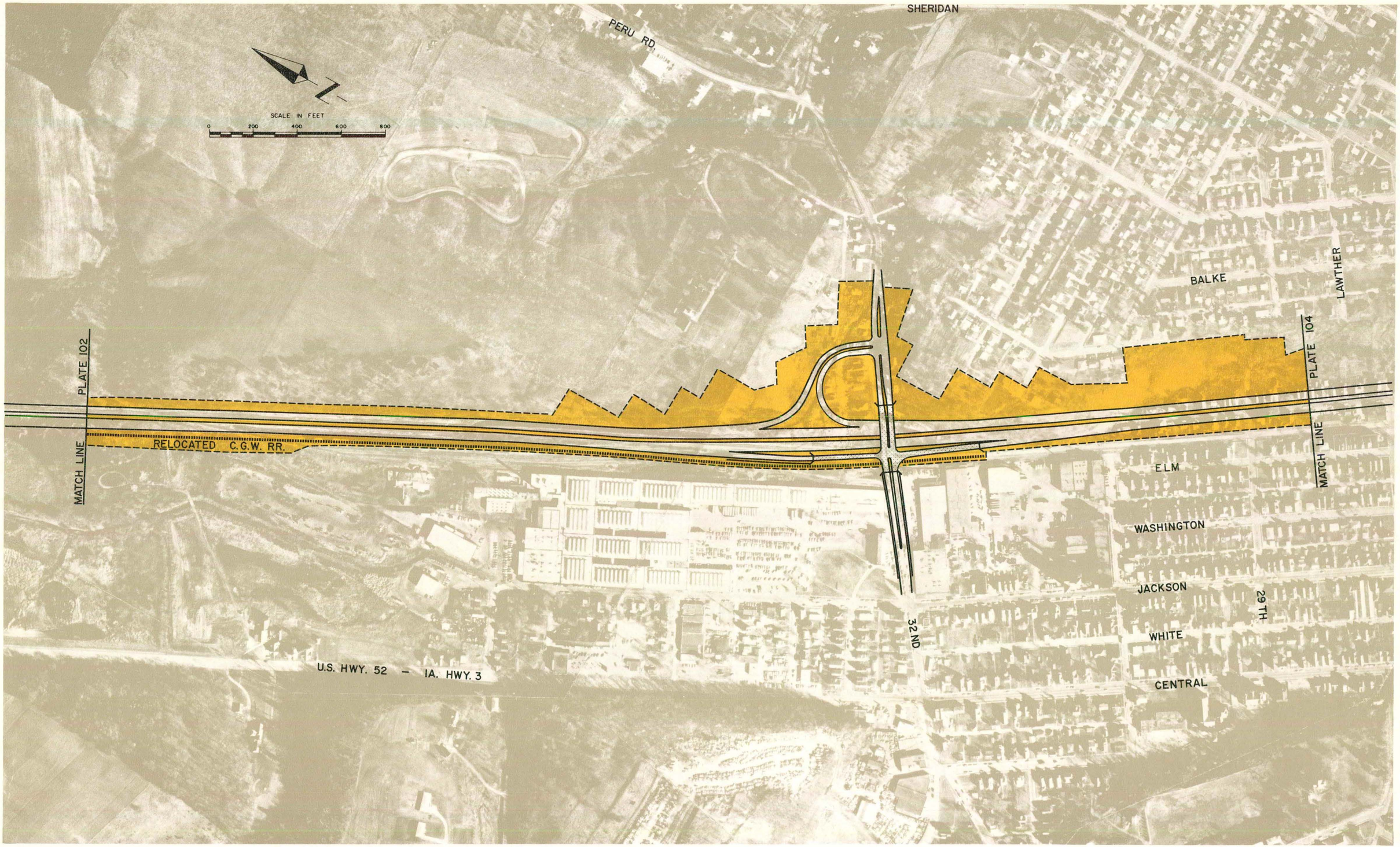
HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

COULER EXPRESSWAY

CITY ISLAND BRIDGE ALTERNATE

PLATE 102

FEBRUARY, 1972



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

COULER EXPRESSWAY
CITY ISLAND BRIDGE ALTERNATE

PLATE 103

FEBRUARY, 1972

LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

COULER EXPRESSWAY
CITY ISLAND BRIDGE ALTERNATE

PLATE 104

FEBRUARY, 1972

SCALE IN FEET
0 200 400 600 800

KERPER BLVD.

I.C.RR.

MATCH LINE PLATES 301, 311, 602, 612

MATCH LINE PLATE 106

MATCH LINE PLATE 104

C.M.ST.P.&P. RR.

2ND
3RD
4TH
5TH
6TH
8TH
10TH
12TH
16TH
ELM
WASHINGTON
JACKSON
14TH
WHITE
CENTRAL
IOWA
MAIN
LOCUST
BLUFF

LEGEND
REQUIRED AREA
ROADWAY ON EARTH
ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

COULER EXPRESSWAY
CITY ISLAND BRIDGE ALTERNATE

PLATE 105
FEBRUARY, 1972

LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

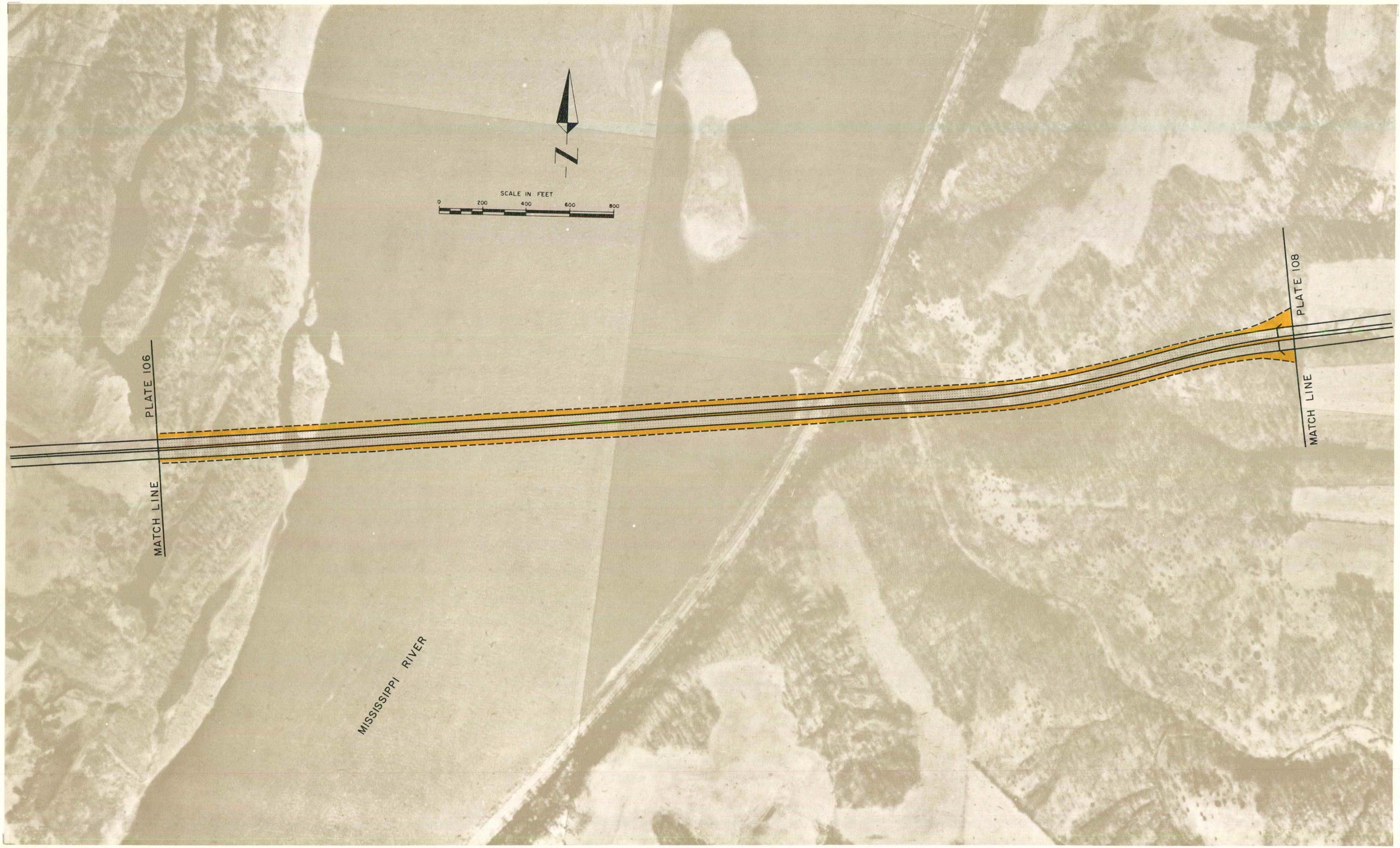
HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

COULER EXPRESSWAY

CITY ISLAND BRIDGE ALTERNATE

PLATE 106

FEBRUARY, 1972



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

COULER EXPRESSWAY

CITY ISLAND BRIDGE ALTERNATE

PLATE 107

FEBRUARY, 1972

LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

COULER EXPRESSWAY

CITY ISLAND BRIDGE ALTERNATE

PLATE 108

FEBRUARY, 1972

Roosevelt Avenue Alignment with City Island Bridge

As a four-lane roadway, the Roosevelt Alignment with the bridge crossing at City Island connects northern Dubuque and the Mississippi east bank with Downtown Dubuque. However, this route bypasses much of the Couler Valley for an alignment over the bluff to the river bank in the Rhomberg area.

The northern section is the same as the Couler Alignment from the John Deere Road (Iowa 386 North) to an interchange at Iowa 386 South. South of this interchange point, the Roosevelt Route turns southeasterly over high ground to the vicinity of Peru and Valley Roads. It traverses the rather sharply rolling terrain through cuts and fills, since it is physically impossible to follow the topography. It crosses Peru Road just north of its intersection with Valley, with a diamond interchange at this point. Although adverse distance is involved, this is the only location through which some connection can be made via Peru Road to the proposed 32nd Street loop which is planned around the western portion of the City.

The route continues southeasterly to an alignment which is south of an adjacent to Roosevelt Avenue. It follows the Roosevelt Avenue Valley down into the Rhomberg Area and directly to the waterfront of the Lake Peosta Channel just east of Kerper Boulevard.

Having been on cuts and fills, the Roosevelt Route initiates an elevated structure near Prescott Avenue and comes down on the levee before returning to the elevated type of roadway for the remaining sections through to Dodge Street downtown.

Interchange ramps are absent in this section of the Roosevelt Alignment, and no other local connection is feasible for a considerable distance until 16th Street and Kerper Boulevard. This is not the result of oversight, but rather of a combination of topography, cultural features and land use. For instance, if we were to look only at lines on a map, we would anticipate access ramps to Rhomberg Avenue and at the nearby crossing of Kerper Blvd. However, we have extreme grade differentials developing here as the roadways must climb rather steeply from the river bank to the bluffs. The railroad and the freeway curve at the waterfront also adversely influence the interchanging. Ramps here would, of necessity, be very long and property consuming, veritably obliterating many of the locations that they would be designed to serve which of course, is self-defeating.

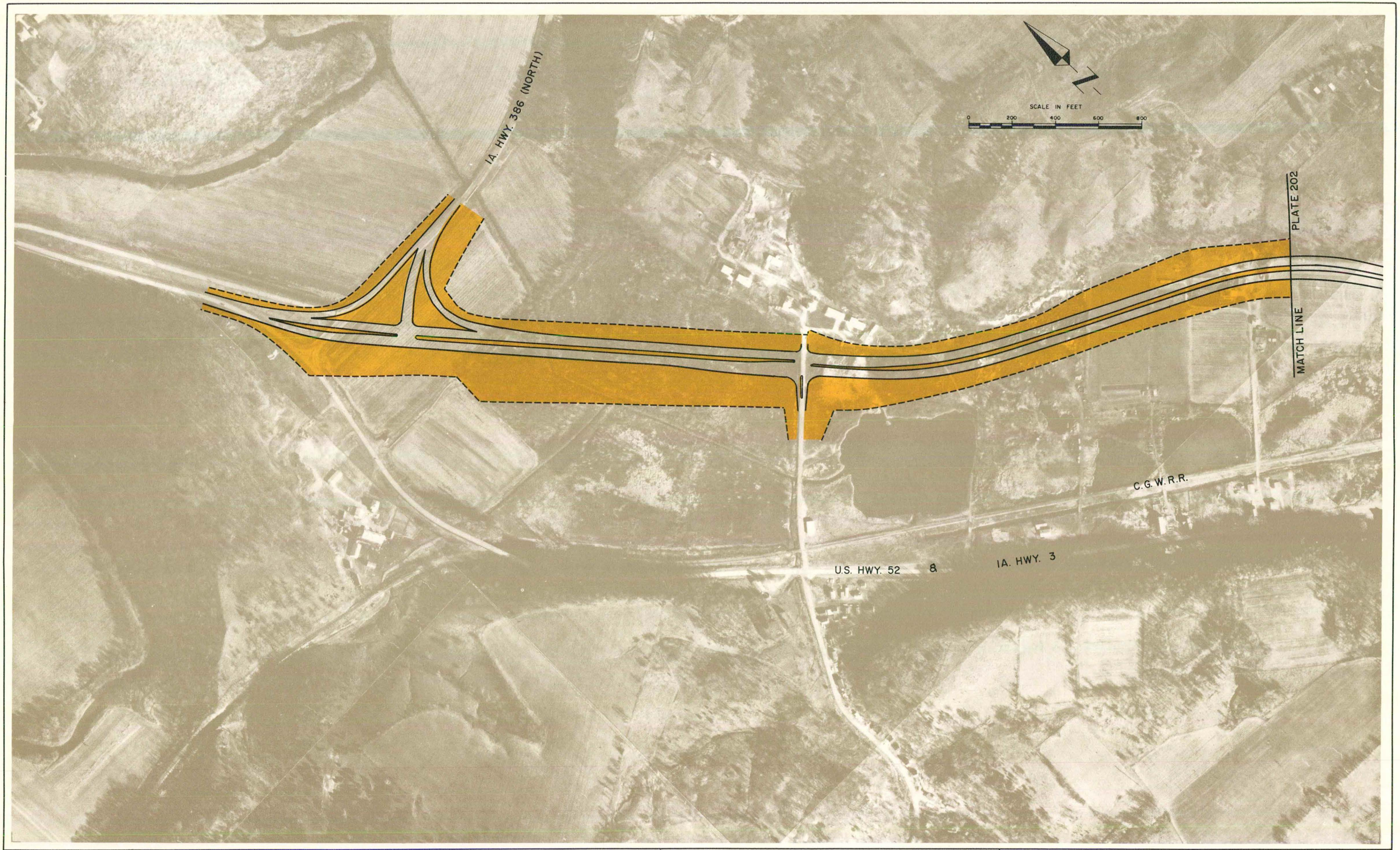
At the waterfront, the Roosevelt Alignment generally parallels Kerper southward to 16th Street. A freeway to surface street interchange is provided at 16th—Kerper while just to the north of this point a freeway to freeway interchange exists between the Roosevelt Alignment and the City Island Bridge Section. The 16th—Kerper Interchange would be very heavily loaded, since it would be expected to provide the entire access for everything east of the Railroad tracks, from Eagle Point to 9th Street, as well as part of that from west of the railroads.

From 16th, the Roosevelt Route follows a fairly direct path southwesterly to 1st Street through the Dubuque Industrial Area. The elevated alignment passes east of the A. Y. McDonald complex and crosses to the west side of the railroad tracks in the vicinity of 9th Street. It continues adjacent to the railroad to Dodge Street where it meets the southern alternates.

A half-diamond interchange at 4th Street forms the only ramp connections in this last section of the Roosevelt Route, before the Dodge—Locust Interchange. At 4th, the half-diamond serves to the southward. The companion half-diamond, serving to the northward and eastward is conspicuous by its absence. The many vital railroad sidetracks diverging from the main line tracks, as well as the alignment's diagonalling of the surface street network, make further ramp inclusions a virtual impossibility. Again, these ramps would either obliterate or block the usage of many facilities they would be designed to serve.

The City Island Bridge Section begins in Wisconsin with the present U.S. 61/151 Highway. Moving westerly, the freeway alignment crosses the Mississippi and interchanges with the main Roosevelt Alignment just north of 16th and Kerper area. This link across the river has the same alignment characteristics as previously denoted under the Couler Alignment discussion.

KEY MAP ROOSEVELT EXPRESSWAY CITY ISLAND BRIDGE ALTERNATE PLATE 200



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

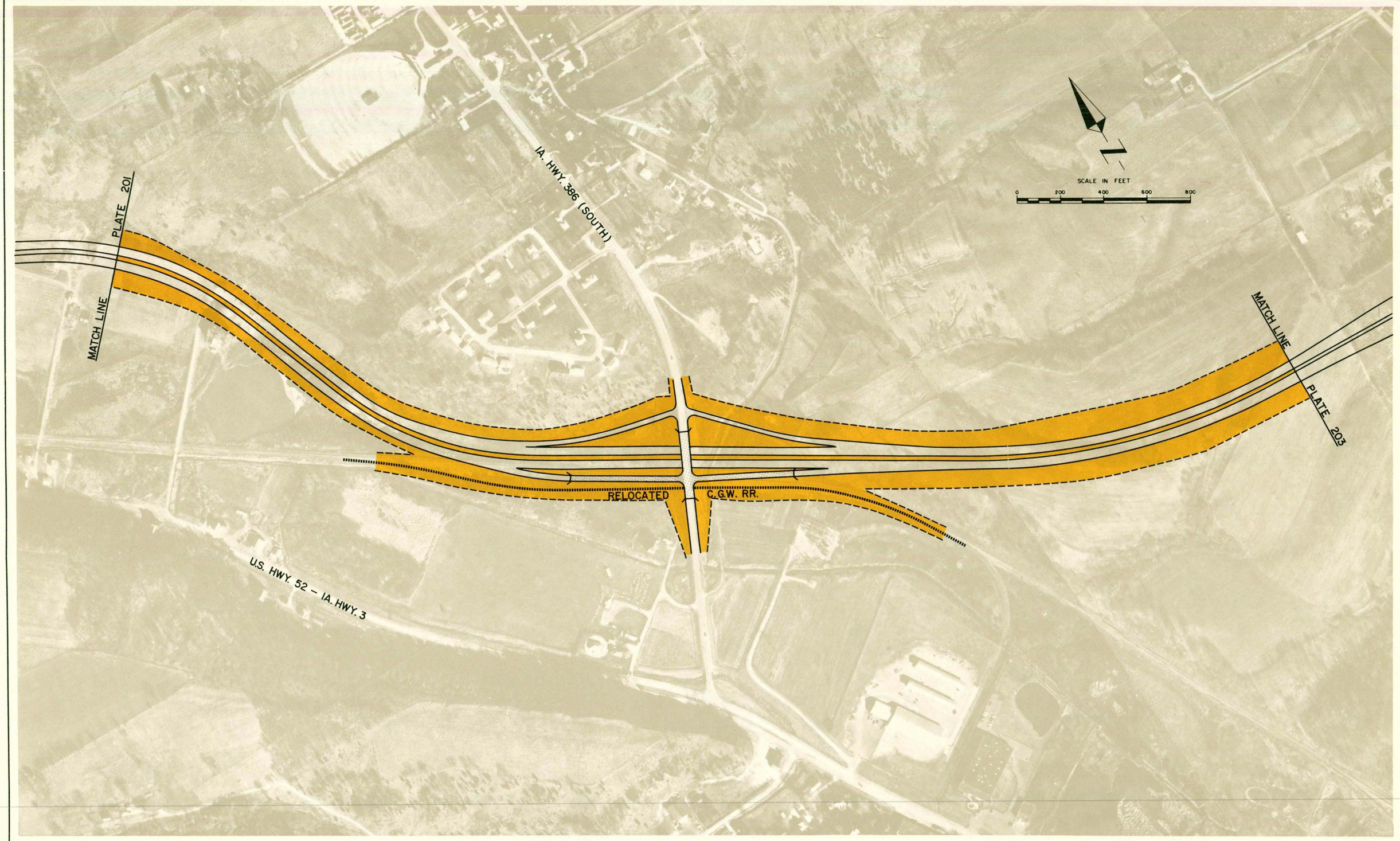
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT EXPRESSWAY
CITY ISLAND BRIDGE ALTERNATE

PLATE 201

FEBRUARY, 1972



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

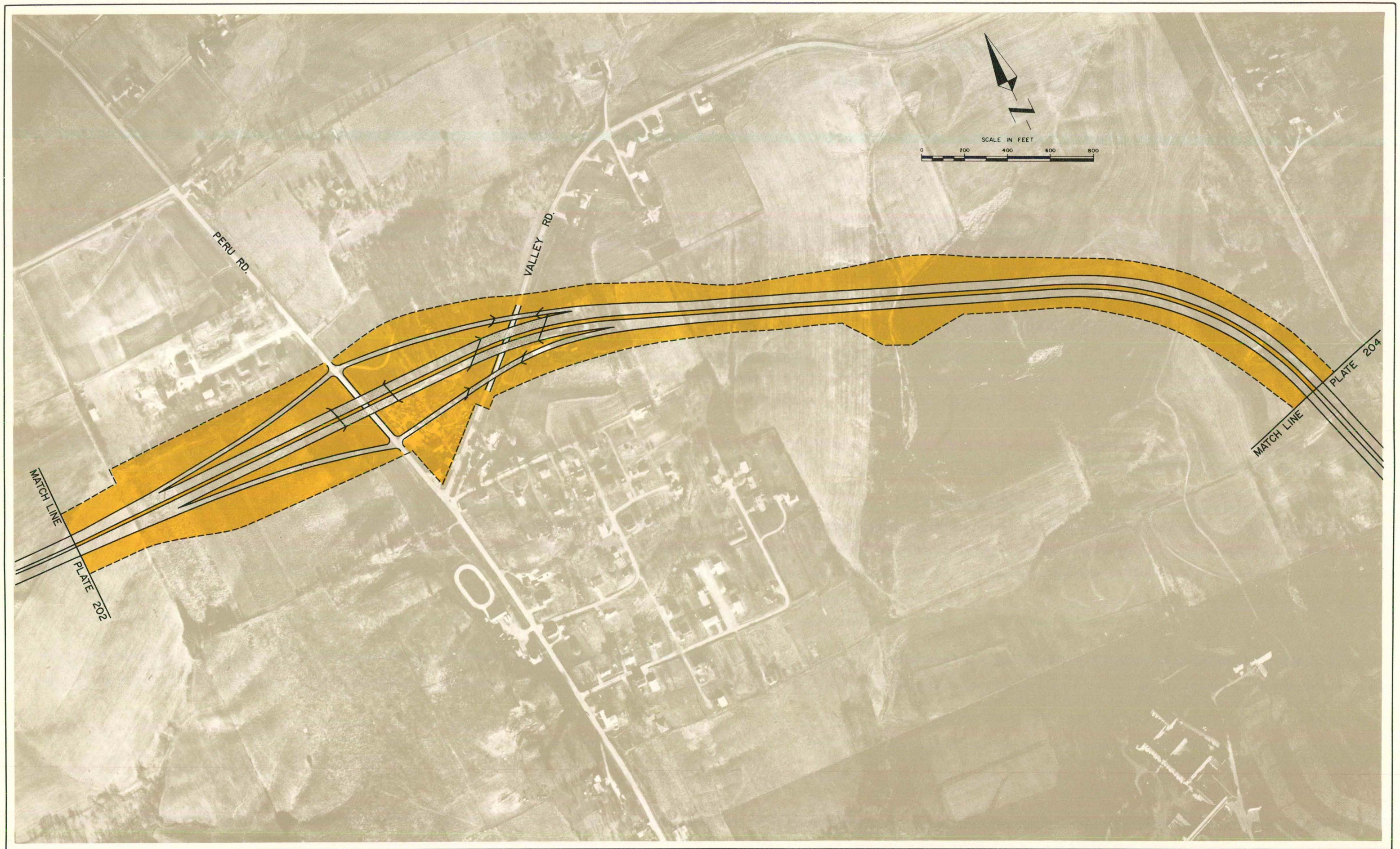
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT EXPRESSWAY
CITY ISLAND BRIDGE ALTERNATE

PLATE 202

FEBRUARY, 1972



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

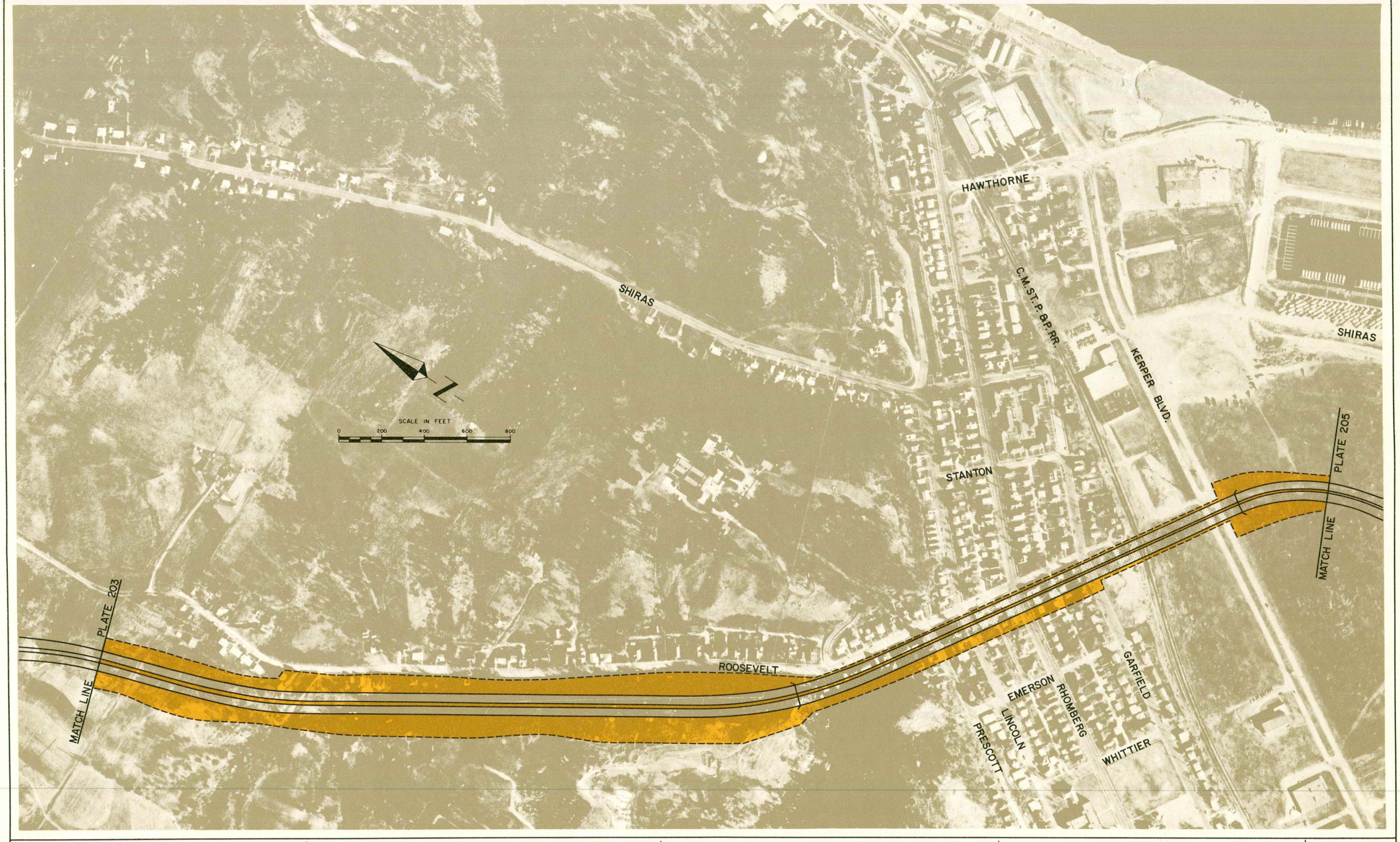
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT EXPRESSWAY
CITY ISLAND BRIDGE ALTERNATE

PLATE 203

FEBRUARY, 1972



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

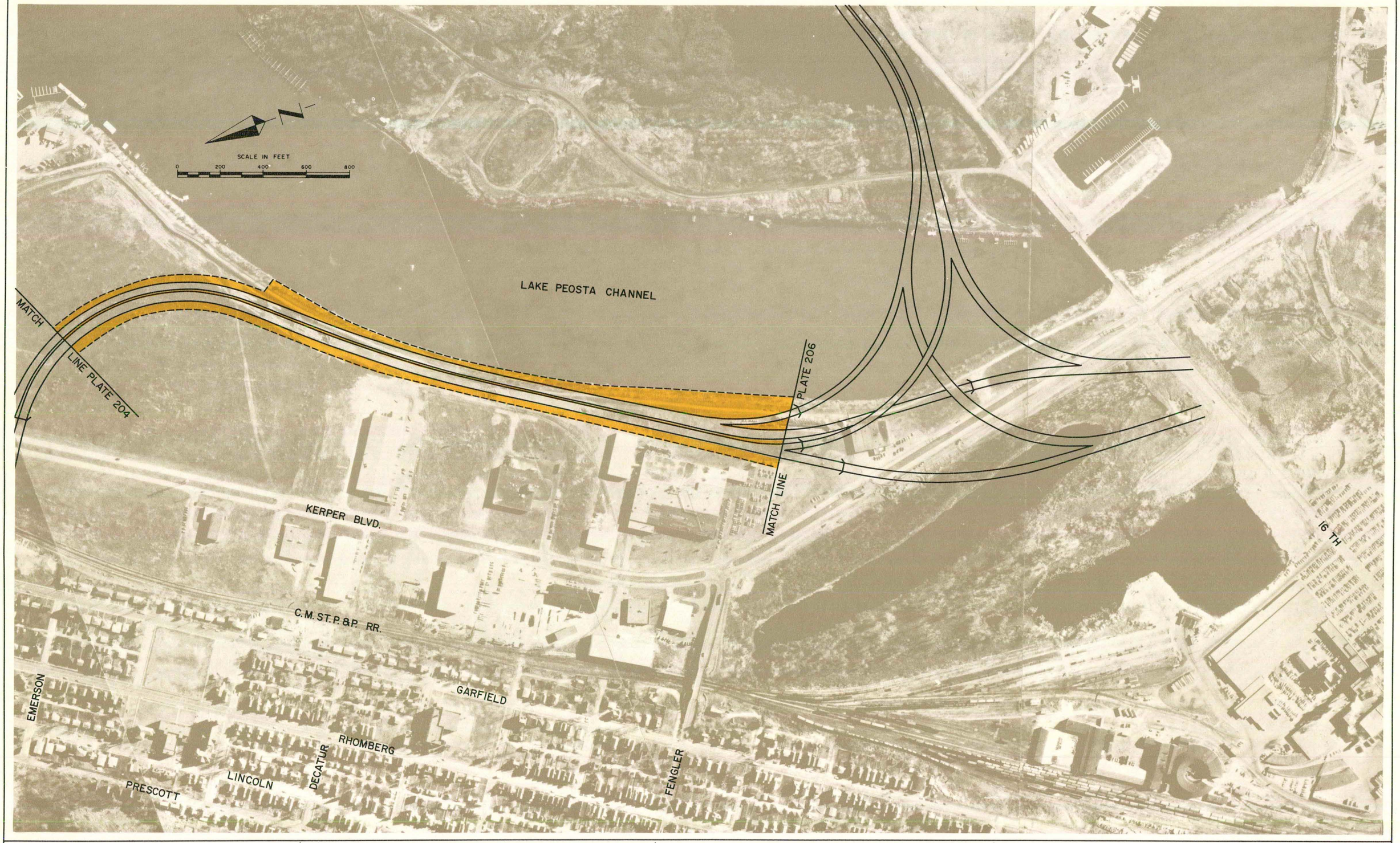
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT EXPRESSWAY
CITY ISLAND BRIDGE ALTERNATE

PLATE 204

FEBRUARY, 1972



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT ALIGNMENT
CITY ISLAND BRIDGE ALTERNATE

PLATE 205
FEBRUARY, 1972

MATCH LINE

KERPER BLVD

PLATE 205

LAKE PEOSTA CHANNEL

SCALE IN FEET

0 200 400 600 800

MATCH LINE

PLATE 208

GARFIELD

C.M.ST.P.&P.RR.

16 TH

14 TH

MATCH LINE

PLATE 207

MISSISSIPPI RIVER

LEGEND

REQUIRED AREA

ROADWAY ON EARTH

ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

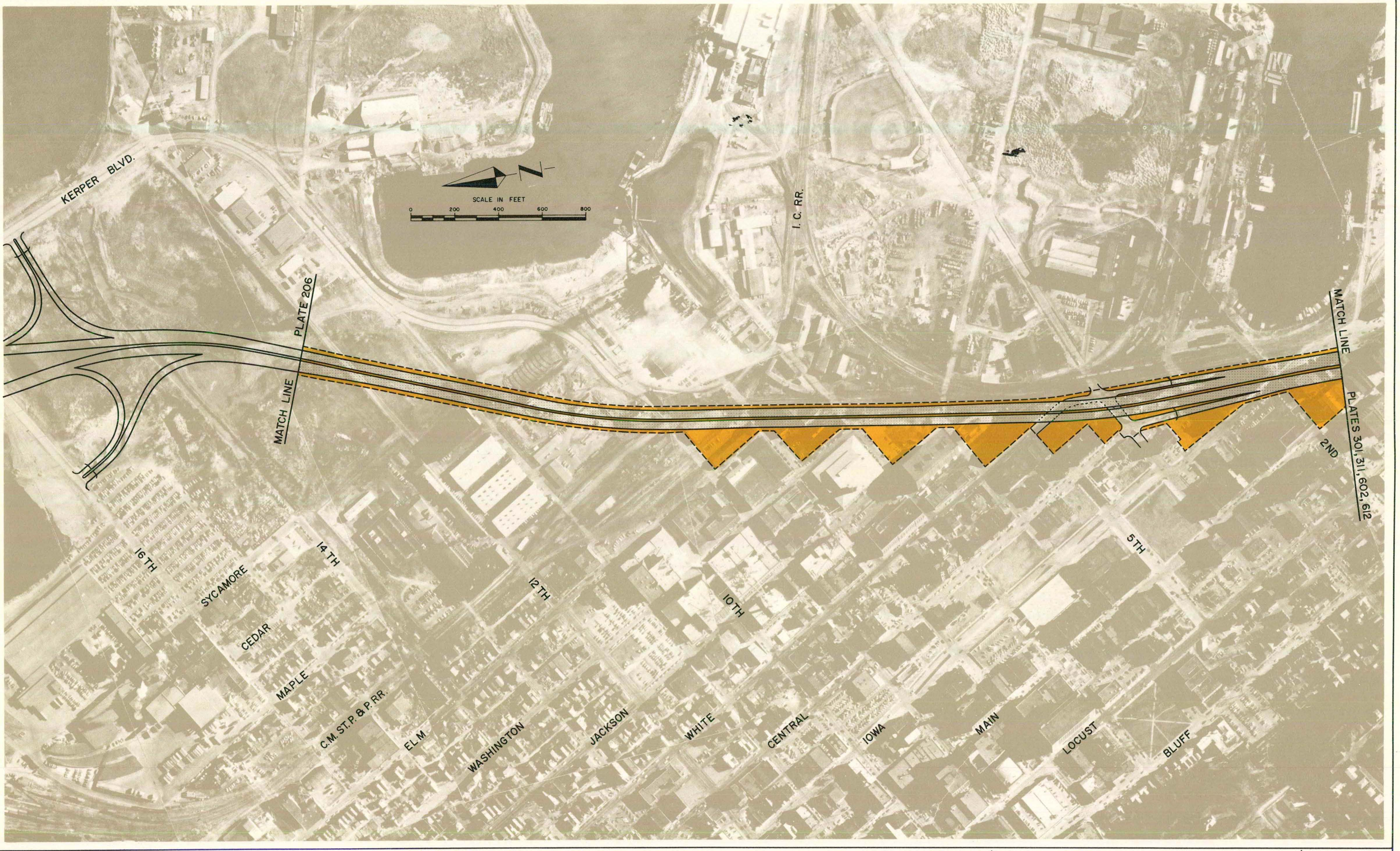
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT EXPRESSWAY
CITY ISLAND BRIDGE ALTERNATE

PLATE 206

FEBRUARY, 1972



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

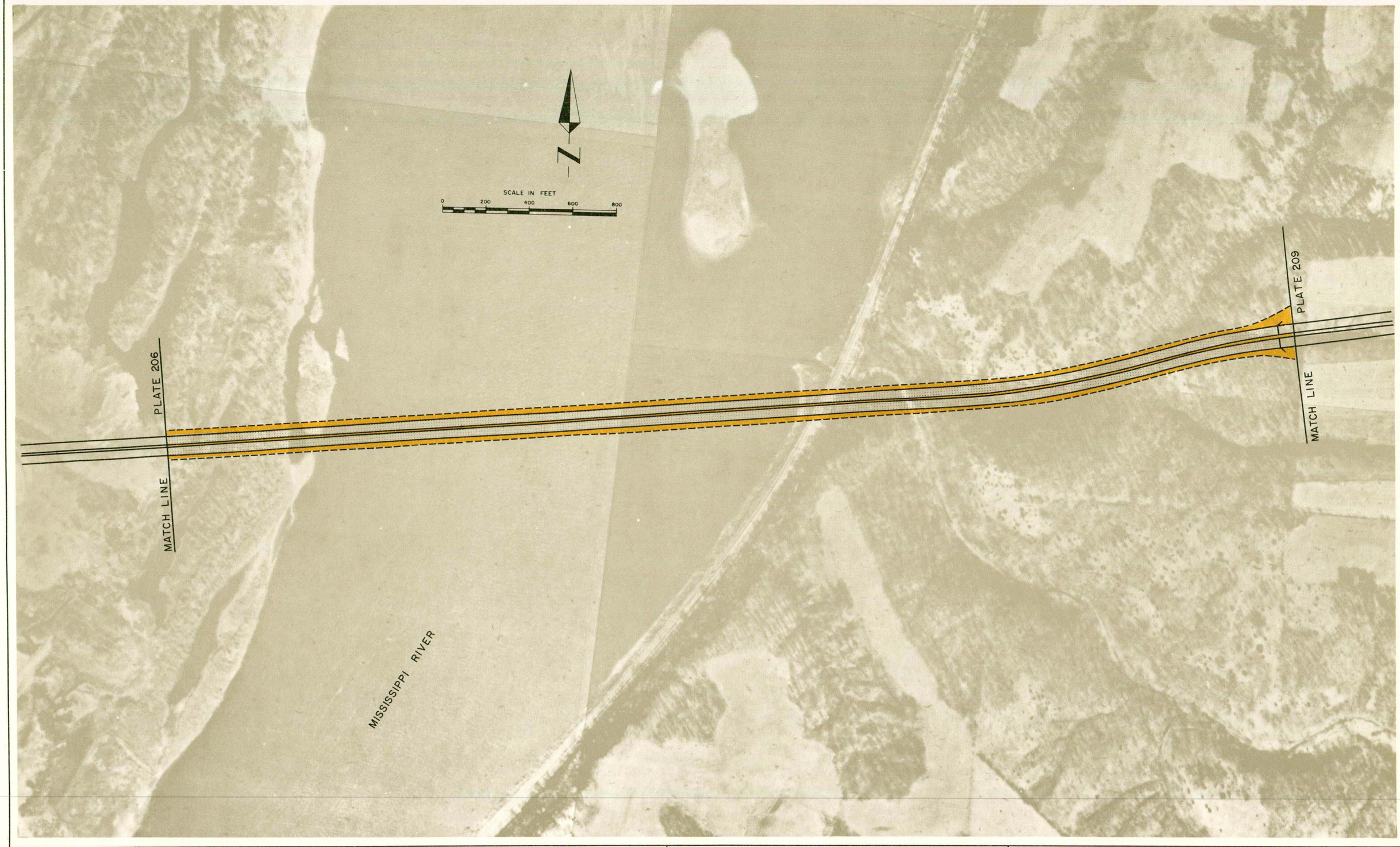
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT EXPRESSWAY
CITY ISLAND BRIDGE ALTERNATE

PLATE 207

FEBRUARY, 1972



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT EXPRESSWAY
CITY ISLAND BRIDGE ALTERNATE

PLATE 208

FEBRUARY, 1972

LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

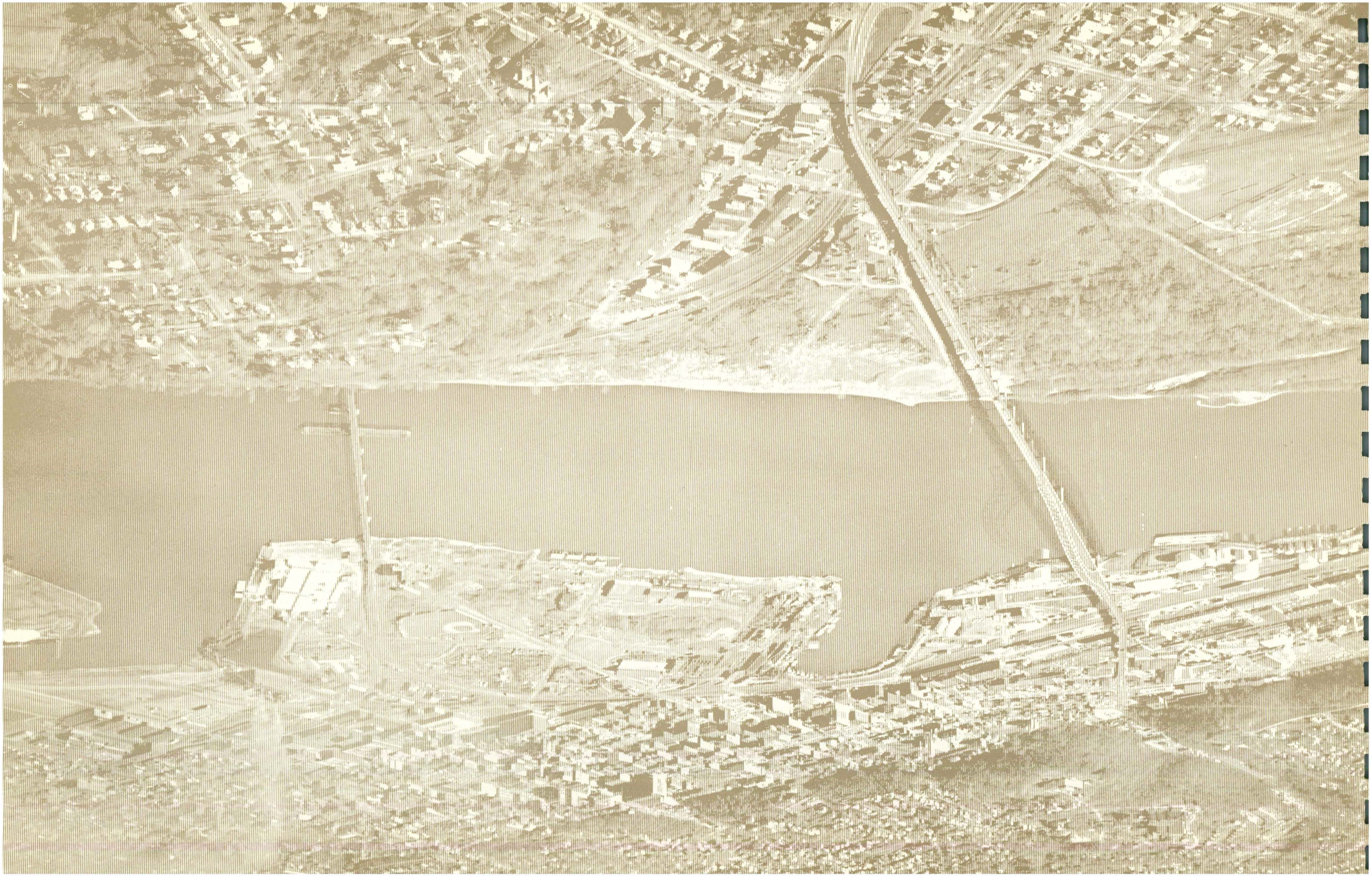
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT EXPRESSWAY
CITY ISLAND BRIDGE ALTERNATE

PLATE 209

FEBRUARY, 1972



Roosevelt Avenue Alignment with Eagle Point Bridge

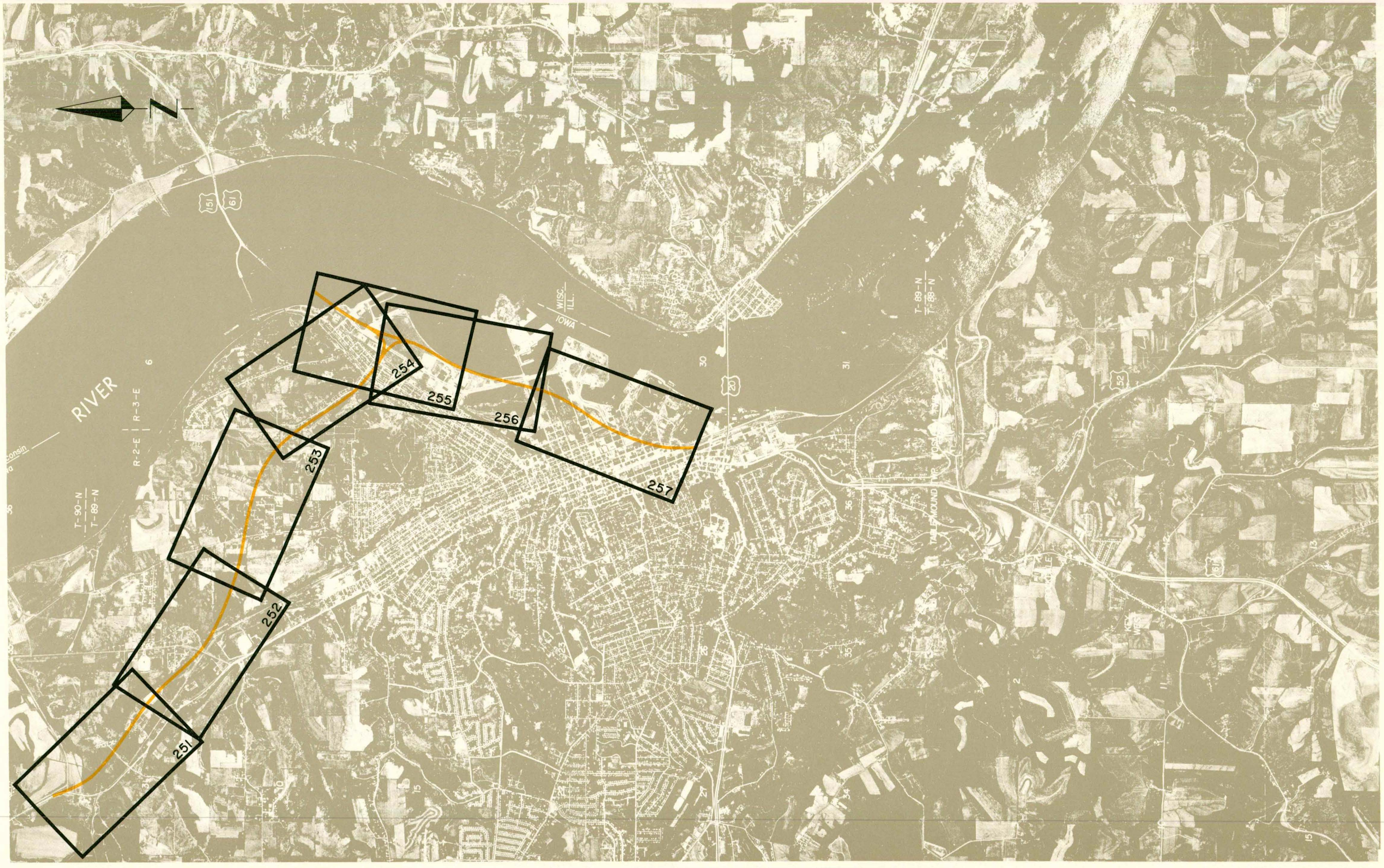
With the Roosevelt Alignment passing through the Rhomberg Area, an alternative river crossing to the City Island Bridge location was considered at the Eagle Point section of the Mississippi River.

The alternate Eagle Point River crossing would represent a far cry from the present structure. From the "Y" connection with the Roosevelt Avenue Alternative, it would extend generally northeastward, leaving the Iowa bank of the Mississippi slightly east of the end of Kerper Blvd. From this point it would continue diagonally across the river, crossing the islands on the east side and rejoining the present highway alignment at the point where it rounds the end of the bluffs and starts its climb to higher ground. Again, the exact terminus of this roadway will depend on the future relocation of Route 35, but it is expected that it would be in the general vicinity of the present interchange with the road to the present bridge.

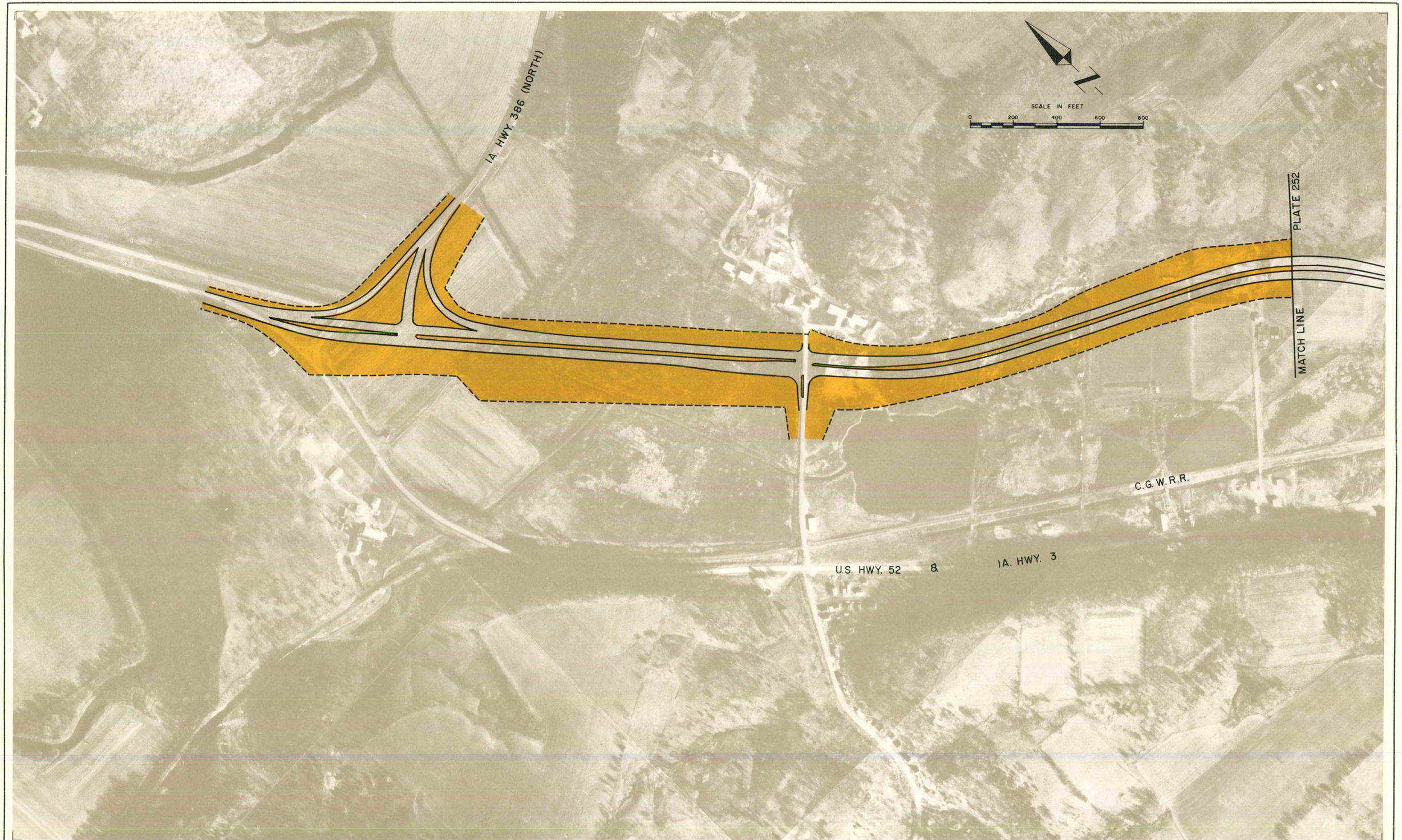
Aside from the bridge crossing relocation, the remaining sections of the Roosevelt Route are unchanged in alignment and in interchange locations from that previously described. That is, the alignment begins at the John Deere Road (Iowa 386 North) near the Little Maquoketa River. It continues to an interchange with Iowa 386 South where it turns southeast over high ground to an interchange at Peru Road.

Continuing over high ground, the Roosevelt Route passes east of the Sisters of Saint Francis Convent and the Mount Calvary Cemetery through cuts and fills and runs downhill adjacent to Roosevelt Avenue. Elevated across the Rhomberg Area, the freeway interchanges with the section from the Eagle Point Bridge and curves southwest along the Peosta Channel to a 16th Street Interchange.

Southwesterly, the Roosevelt Route passes through the Downtown Industrial District to Dodge Street where it joins the southern alternates. Bisected railroad spurs and the diagonally crossed street grid limit ramp connections to 4th Street.



KEY MAP ROOSEVELT EXPRESSWAY EAGLE POINT BRIDGE ALTERNATE PLATE 250



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT EXPRESSWAY
EAGLE POINT BRIDGE ALTERNATE

PLATE 251

FEBRUARY, 1972

LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT EXPRESSWAY
EAGLE POINT BRIDGE ALTERNATE

PLATE 252

FEBRUARY, 1972

LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT EXPRESSWAY
EAGLE POINT BRIDGE ALTERNATE

PLATE 253
FEBRUARY, 1972

LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT EXPRESSWAY
EAGLE POINT BRIDGE ALTERNATE

PLATE 254

FEBRUARY, 1972

MISSISSIPPI RIVER

HARBOR

SHIRAS

SCALE IN FEET
0 200 400 600 800

LAKE PEOSTA CHANNEL

HAWTHORNE

PLATE 256

MATCH LINE

KERPER BLVD.

STANTON

GARFIELD

EMERSON

C. M. ST. P. & P. RR.

MATCH LINE

PLATE 254

RHOMBERG

WHITTIER

HAMILTON

DECATUR

MARSHALL

SHIRAS

ROOSEVELT

LINCOLN

PRESCOTT

DOCK

ANN

LEGEND
REQUIRED AREA
ROADWAY ON EARTH
ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT EXPRESSWAY
EAGLE POINT BRIDGE ALTERNATE

PLATE 255
FEBRUARY, 1972

SCALE IN FEET

0 200 400 600 800

LAKE PEOSTA CHANNEL

PLATE 255

MATCH LINE

PLATE 257

MATCH LINE

KERPER BLVD.

16 TH

EMERSON

WHITTIER

GARFIELD

C.M.ST.P.&P. RR.

HAMILTON

RHOMBERG

LINCOLN

DECATUR

PRESCOTT

MARSHALL

DOCK

ANN

FEENGLER

LEGEND

REQUIRED AREA

ROADWAY ON EARTH

ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT EXPRESSWAY

EAGLE POINT BRIDGE ALTERNATE

PLATE 256

FEBRUARY, 1972

LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

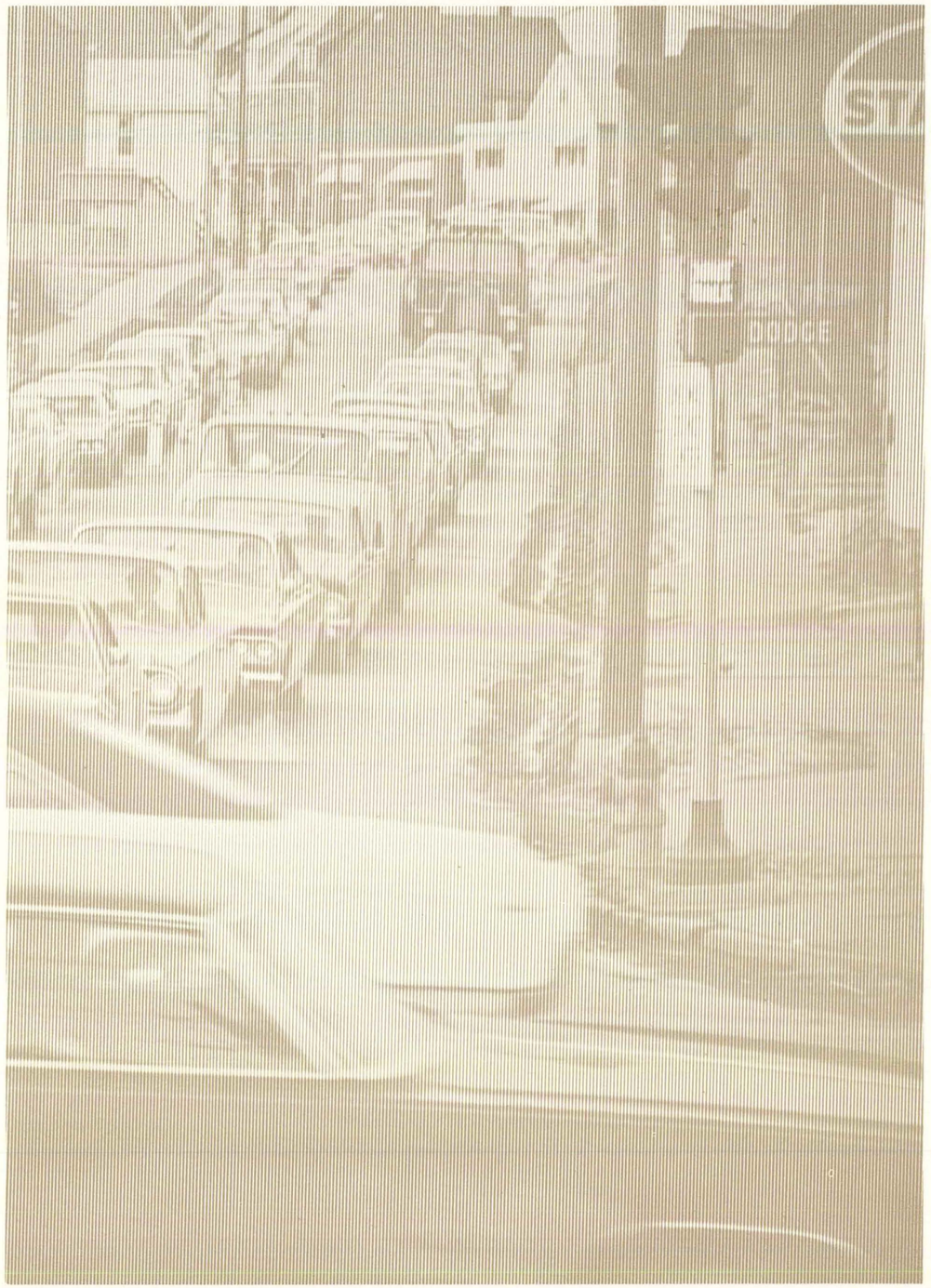
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

ROOSEVELT ALIGNMENT
EAGLE POINT BRIDGE ALTERNATE

PLATE 257

FEBRUARY, 1972



Dodge—Locust Interchange

The confluence of the northern, southern, and Dodge Street alignments is an interchange in the vicinity of Locust and Dodge just south of Downtown Dubuque. This focal point finds the intermixing of freeway and surface street facilities to meet the access and flow demands of several traffic streams.

Since the Dodge—Locust Interchange forms a common point of terminus, its discussion would be applicable under the descriptions of each alternative alignment. However, to avoid duplication of text, this important interchange is presented here in a separate summary graphic illustration.

The Dodge Street interchange is the result of considerable thought and effort. Our first configurations were based on the existing street patterns, but the City requested us to incorporate the revised Bluff Street pattern anticipated in the future development of "Cathedral Square" as suggested in the Gruen Report.[1] All subsequent planning was on this basis.

It was obvious that future traffic could not be accommodated by an at-grade intersection of the freeway and Dodge Street. (Today's volumes overload the combined intersection of Dodge, Locust and Bluff Streets.) Since ground water, river elevation, sewers and other utilities make depressed roadways impractical if not impossible, and since the approach to the Julien Dubuque Bridge is fixed, the elevated configuration of the freeway became imperative. It was also obvious that the freeway would be following the general alignment of South Locust Street, overhead. It thus appeared that we had a two-way Dodge Street intersecting a two-way Locust Street, with a two-way freeway overhead and parallel to Locust. The most logical and simplest solution for connecting the two systems was diamond ramps, generally parallel to the freeway, extending down to grade.

"T" intersections where these ramps might strike Dodge Street, however, were obviously no answer to the traffic congestion. So Locust Street, both south and north, was pulled apart into a parallel diamond, and the ramps permitted to blend tangentially into these legs of the surface diamond. This served the additional purpose of spreading friction points apart and providing storage space for potential left turn movements.

This pattern looked good until the detailed traffic desires within the interchange were separated. It then became clear that the traffic for the Dodge to Freeway north, and its reciprocal movement would take more of the total signal cycle timing and turn storage lanes than is feasible for good service. Clearly it was necessary to make completely separate movements out of these on their own ramps.

The two diamond ramps to the north of Dodge were still necessary, but to move their terminals so that they would not conflict with the new Dodge to Freeway ramps, they had to be curled into 360° loops. Thus the final form of the interchange evolved.

The introduction of the two additional ramps and their need to merge with the Dodge Street roadway, plus the recognition that 1990 volumes along Dodge required six lanes for reasonable flow, led to lateral space problems in the lower end of the Dodge Street canyon. In order to permit the installation of the frontage road and to leave the commercial establishments on the north side substantially untouched, it was necessary to cut into the bluffs on the south side (PLATE 301). Of course with the parkway configuration, these establishments were being eliminated, so little or no cutting into the actual toe of the bluff would be required (PLATE 311).

In the southeast quadrant of the Dodge—Locust—Freeway interchange, there is an area which, in its present layout, has very poor circulation capabilities. There is a street of sorts lying under and immediately south of the Julien Dubuque Bridge, which connects Main Street with Locust. It is narrow, clumsy, and connects with South Locust at a point so close to Dodge Street as to be a source of friction and dangerous conflict. The connection with South Locust should be closed, but a replacement for this function is highly desirable. For this reason we suggest that a street be cut through between the parking lots of the Eagle Supermarket and Sears store, from South Locust to Harrison Street and then after jogging northward slightly, connecting Harrison and Main Streets. Traffic circulation to, from and within this commercial and industrial area will definitely be improved, while a present danger point is eliminated.

---

[1]) **Dubuque Development Program,** prepared for City of Dubuque, Iowa, and Dubuque Chamber of Commerce, by Victor Gruen Associates & Larry Smith & Company, 1965.

LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

DODGE - LOCUST INTERCHANGE

PLATE 311

FEBRUARY, 1972

Kerrigan Alignment

At its northern terminus, natural topography and man-made land developments in the fringe area just south of Downtown Dubuque have combined to confine the Kerrigan Route to a rather limited corridor. As such, this alignment becomes a four-lane elevated route over existing arterial roadways. The result is a freeway which begins in an interchange with Dodge and Locust Streets (previously discussed) and continues south to the intersection of Railroad Street and Southern Avenue, elevated over the existing Locust Street.

Some study was applied to the possibility of a half-diamond interchange at Southern & Railroad, thereby connecting the surface streets to the freeway southward, but it was deemed inadvisable. Aside from further encroachment on neighboring businesses, the ramps would approximate steeper extensions of the relatively steep grade up the present Kerrigan Road hill. Grades on the proposed alignments have been eased somewhat from the existing condition, partly by additional cut at the top of the hill and partially by the fact that the foot of the new grade occurs some 25 feet higher than the present condition. Even so, it is not deemed desirable to descend a long and substantial grade at freeway speed and continue downward by ramp to the surface streets without substantial interruption for slowing and improved control. In the reverse direction, an on-ramp would provide no space for acceleration and blending into the freeway traffic before undertaking the freeway grades. Thus, it was concluded best to not place ramps at Southern—Railroad.

From Southern Avenue, the freeway alignment turns southwest, follows the existing Kerrigan Road and U.S. 61 roadway up along the hillside adjacent to Murphy Park. The roadway then interchanges with Grandview Avenue which provides access to the park, residential areas, and the Mount Carmel Convent.

The next interchange location is at the intersection of U.S. 52, known as the new Bellevue Road. Not only is this a U.S. Highway connecting to Clinton, but it is also expected to be the terminus of a circumferential route curving around the southwest quadrant of the City in the future development of the Metropolitan Area Transportation Plan.

The Keywest Community lies southward and has been developing on both sides of the present U.S. 151 Highway. In keeping with the limited access character of the upgraded freeway, a re-grading of the freeway permits it to underpass what is now a connection and continue southward to the next intersection with Carson Road. Here it is feasible to provide a grade separated interchange, with frontage road permitting Keywest citizens to get to or from the freeway.

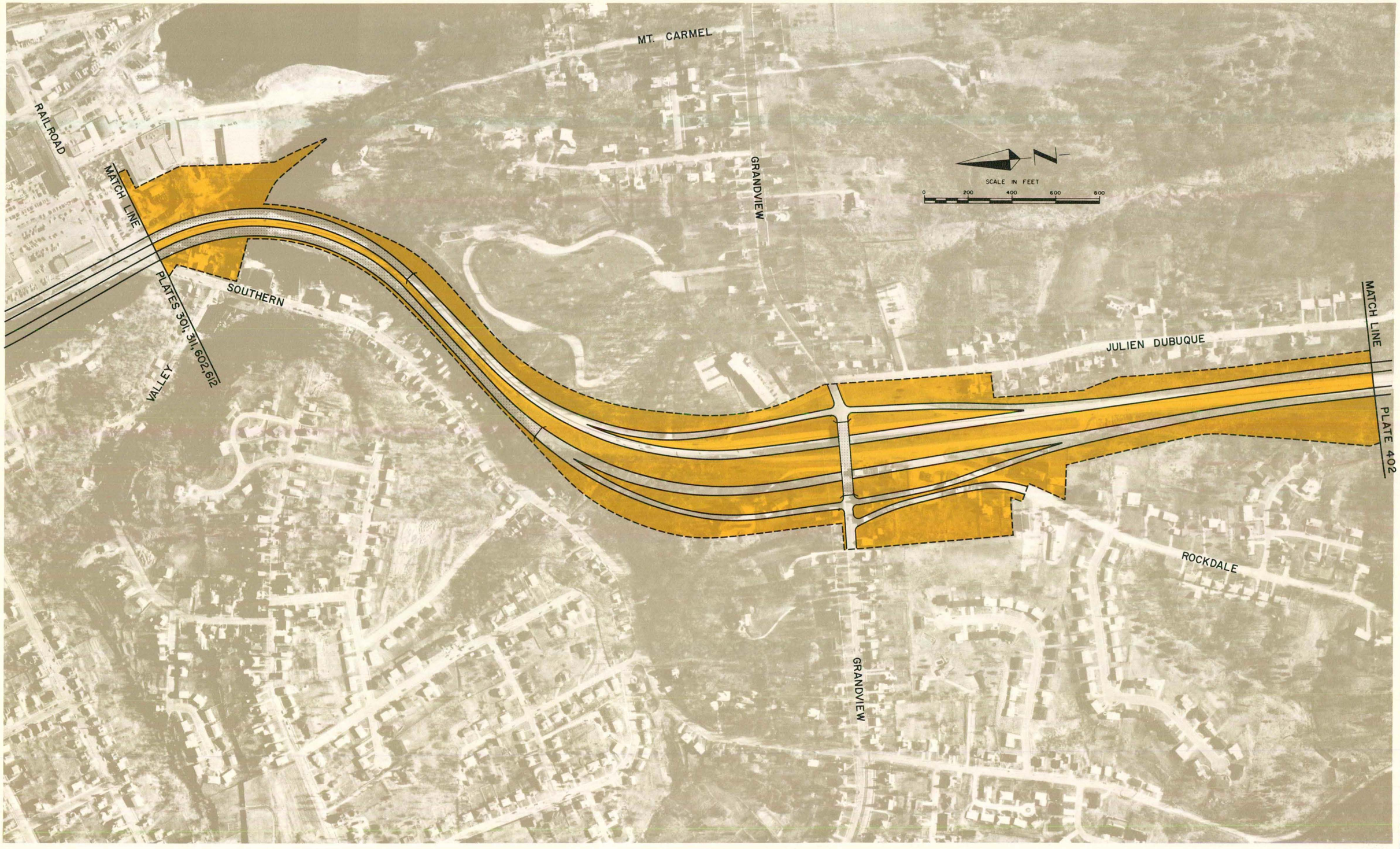
A short distance farther south the freeway makes its connection with the currently planned route 520 passing east and west. This is the southern terminus of this study. The potential location of the interchange lies at a point where the old Davenport Road (formerly U.S. 61) crosses from northwest to southeast. Obviously an interchange is no place to connect a local road, so it is suggested that the old Davenport Road be tied to Carson Road, thus leading to a freeway interchange. This could be accomplished via an east-west connection provided by either a frontage road along U.S. 520 or a new section-line road along the boundary between Sections 13 and 24 of the Table Mound Township.

The present route of U.S. 151 and U.S. 61, up from the south of the City, was designed and built under standards somewhat less restrictive than those of today. The location, over some of the most rugged terrain short of the mountains, was an extremely well chosen one. Our search for alternatives failed to find any feasible alignment that was nearly as direct as this.

In order to upgrade the roadway to meet best standards and 1990 volumes of traffic, however, some reduction in grades was needed. It has been found possible to obtain improvements by splitting the two roadways apart in some locations. Some slopes too steep for climbing, are acceptable for descending traffic. A reasonable combination has been achieved by providing a new bridge crossing the Catfish Creek connected to the old northbound roadway at Grandview, and connecting the old Catfish bridge with a new and lowered southbound lane under the Grandview crossing. This necessitates some added lateral space between the two roadways at Grandview, and thus the taking of some additional right-of-way. It is possible that the additional right-of-way needs might be reduced somewhat if it should be found that the excavation is in rock suitable for a near vertical side slope. Since this is a somewhat speculative conclusion, we have chosen to take the more liberal approach for this route location study in rights-of-way.

KEY MAP KERRIGAN EXPRESSWAY

PLATE 400



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

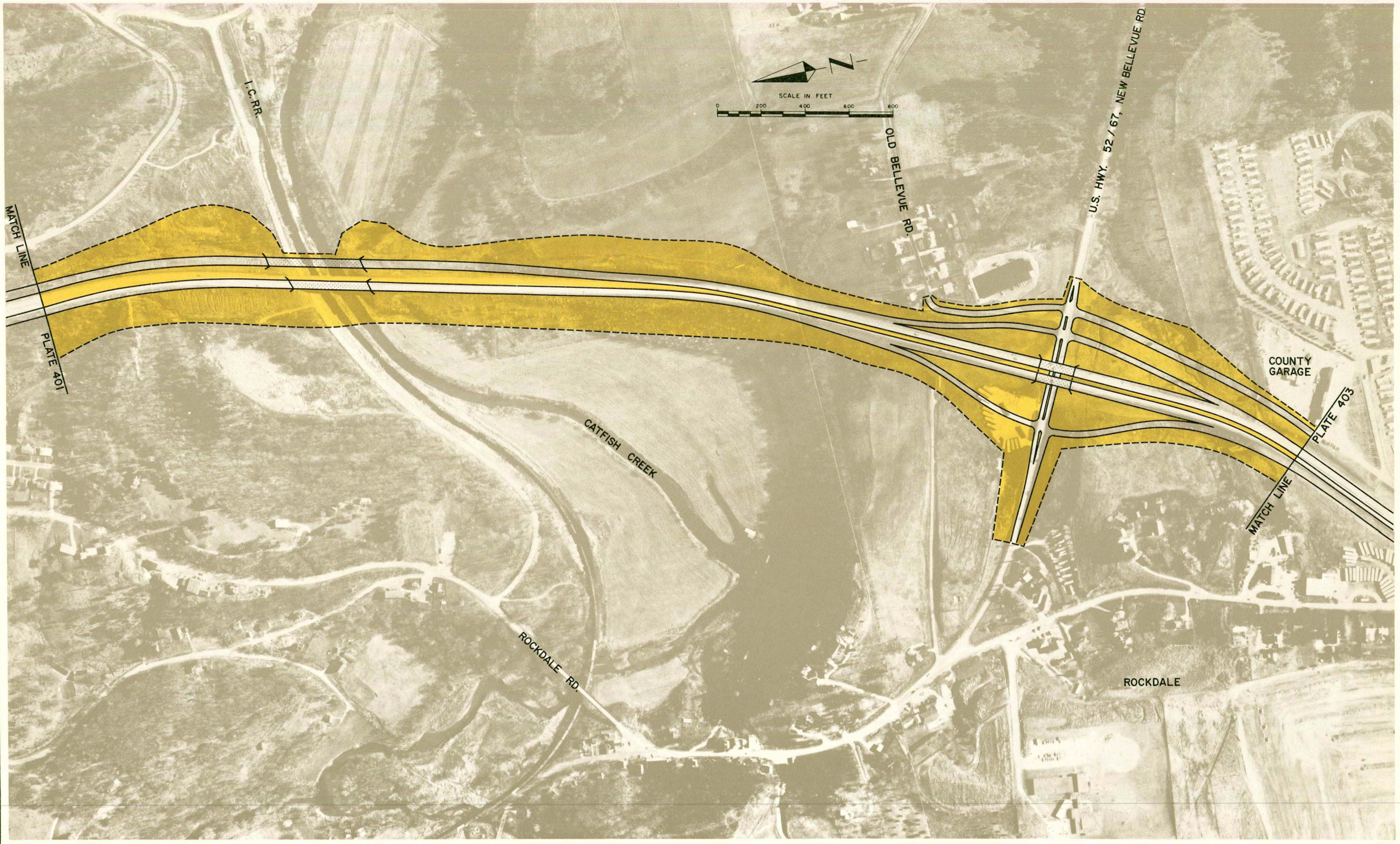
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

KERRIGAN EXPRESSWAY

PLATE 401

FEBRUARY, 1972



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

KERRIGAN EXPRESSWAY

PLATE 402

FEBRUARY, 1972

U.S. HWY. 52 / 67

COUNTY GARAGE

PLATE 402

MATCH LINE

MAQUOKETA

SCALE IN FEET

0 200 400 600 800

CARSON ROAD

PLATE 404

MATCH LINE

OLD U.S. HWY. 61 / 151

KEYWEST

LEGEND

REQUIRED AREA

ROADWAY ON EARTH

ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

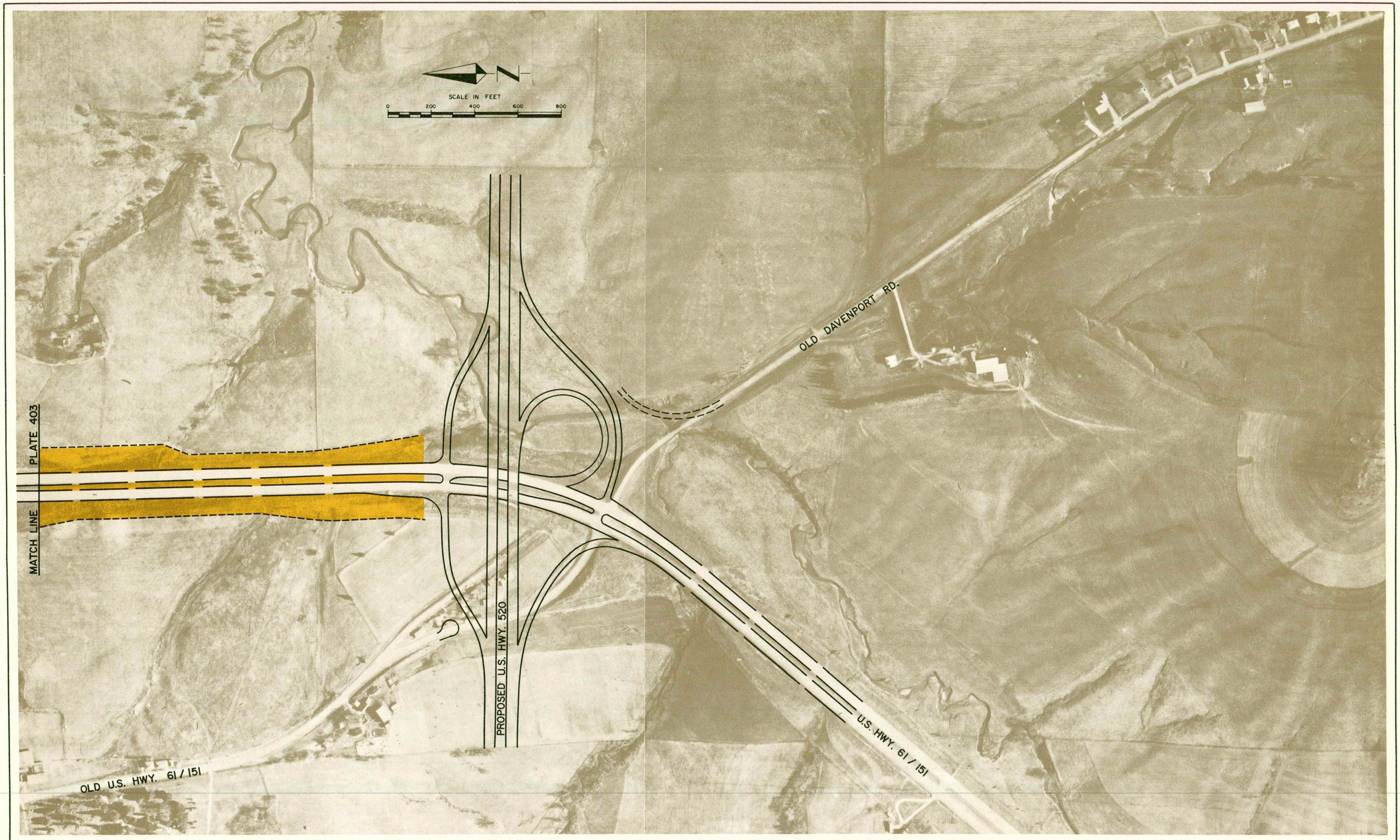
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

KERRIGAN ALIGNMENT

PLATE 403

FEBRUARY, 1972



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

KERRIGAN EXPRESSWAY

PLATE 404

FEBRUARY, 1972

Granger Creek Alignment

The Granger Creek alignment is an attempt to provide a corridor south of the City, while leaving the present means of access intact. At the same time it offers an opportunity to capitalize on some of the scenic character of this countryside.

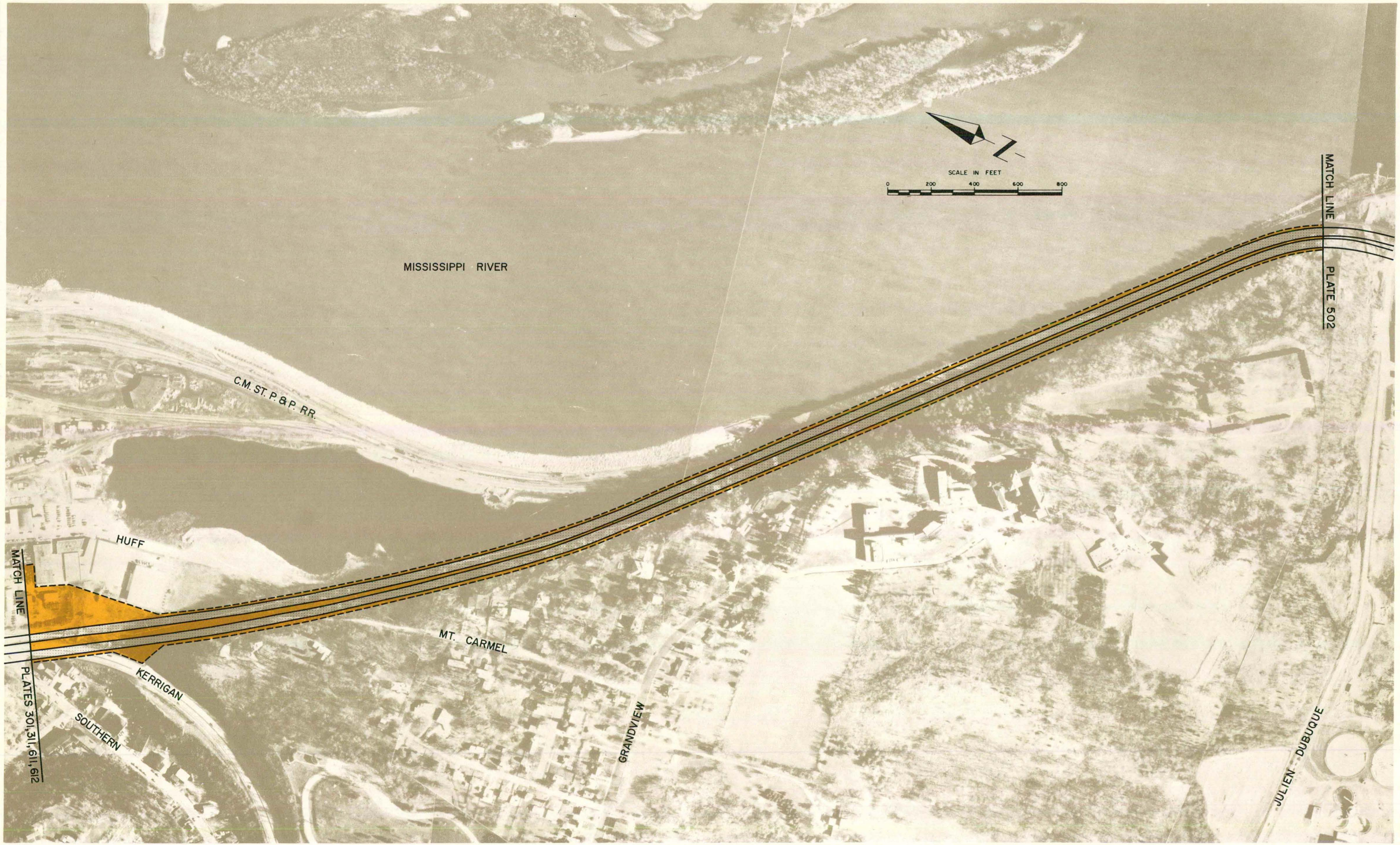
The segment begins in the Dodge interchange and runs southward overhead South Locust, as does the other alignment. As it reaches Railroad Street, however, it diverges southeastward, generally following the toe of the bluffs comprising the Mt. Carmel district. As it converges with the main line tracks of the Milwaukee and Illinois Central Railroads, it again must go elevated to clear the railroad traffic. It is anticipated that it would be placed on structure with long column legs on the outer edge, while the inner edge rests on the steep slope of the bluffs as nearly as possible.

As the old Catfish Creek draw is approached, the Illinois Central makes a severe turn to the westward. It is anticipated that the roadway would likewise turn westward, although diverging slightly southward along the bluff south of the sewage treatment plant. Then it turns southward, generally following the Granger Creek valley as it flows into the Catfish Creek. This is rather rugged and certainly beautiful terrain, although without a doubt the freeway would obliterate part of the beauty.

An interchange is provided where the freeway crosses U.S. 52, the new Bellevue Road. Because of the ruggedness of the terrain, it is necessary to use a half cloverleaf consisting of a half diamond and two half loops. As the ground rises, so does the freeway, winding somewhat in order to make best use of the land surface. No other interchanges are contemplated or possible until the full interchange with the proposed route 520 forming the southern terminus of our study.

KEY MAP GRANGER CREEK EXPRESSWAY

PLATE 500



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

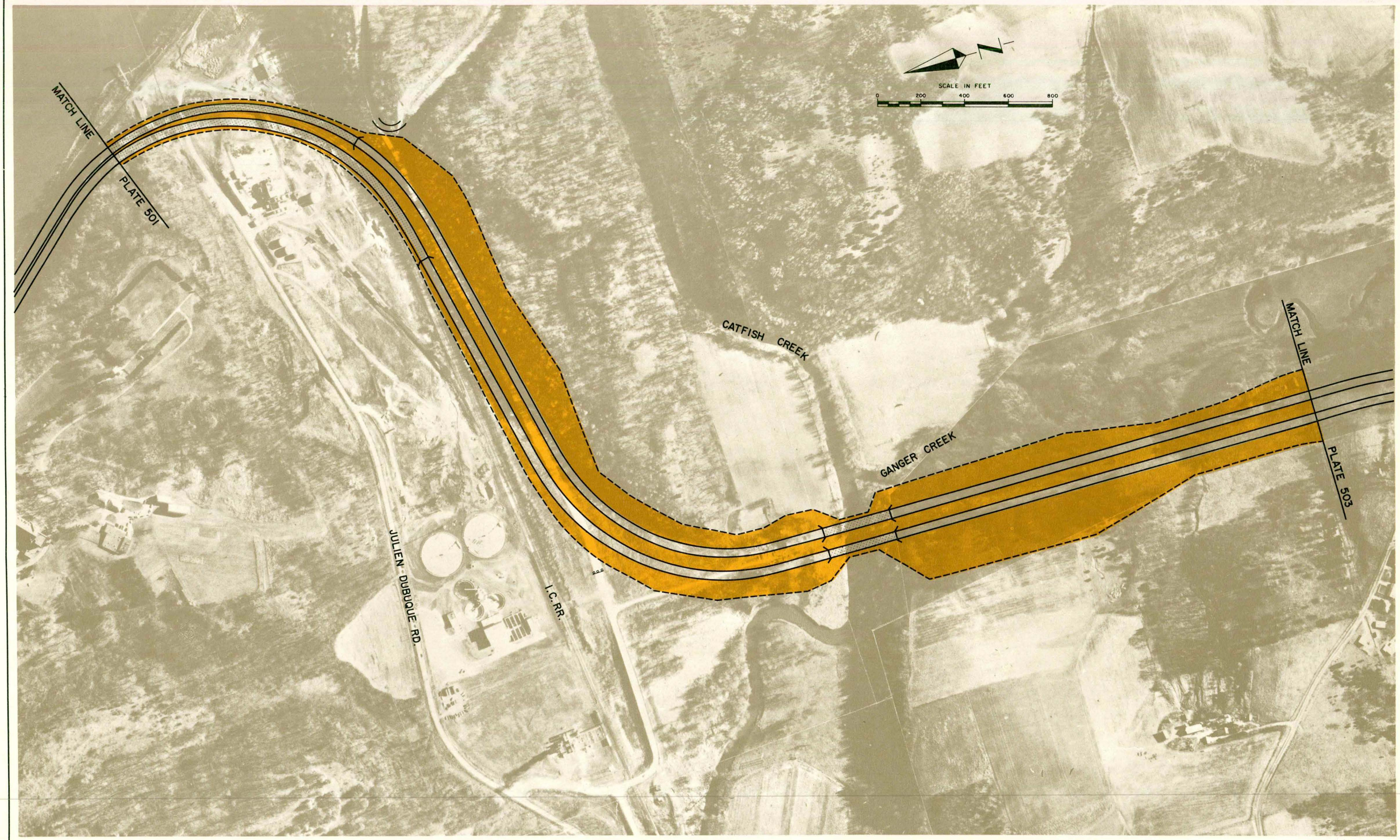
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

GRANGER CREEK EXPRESSWAY

PLATE 501

FEBRUARY, 1972



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

GRANGER CREEK EXPRESSWAY

PLATE 502

FEBRUARY, 1972

LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

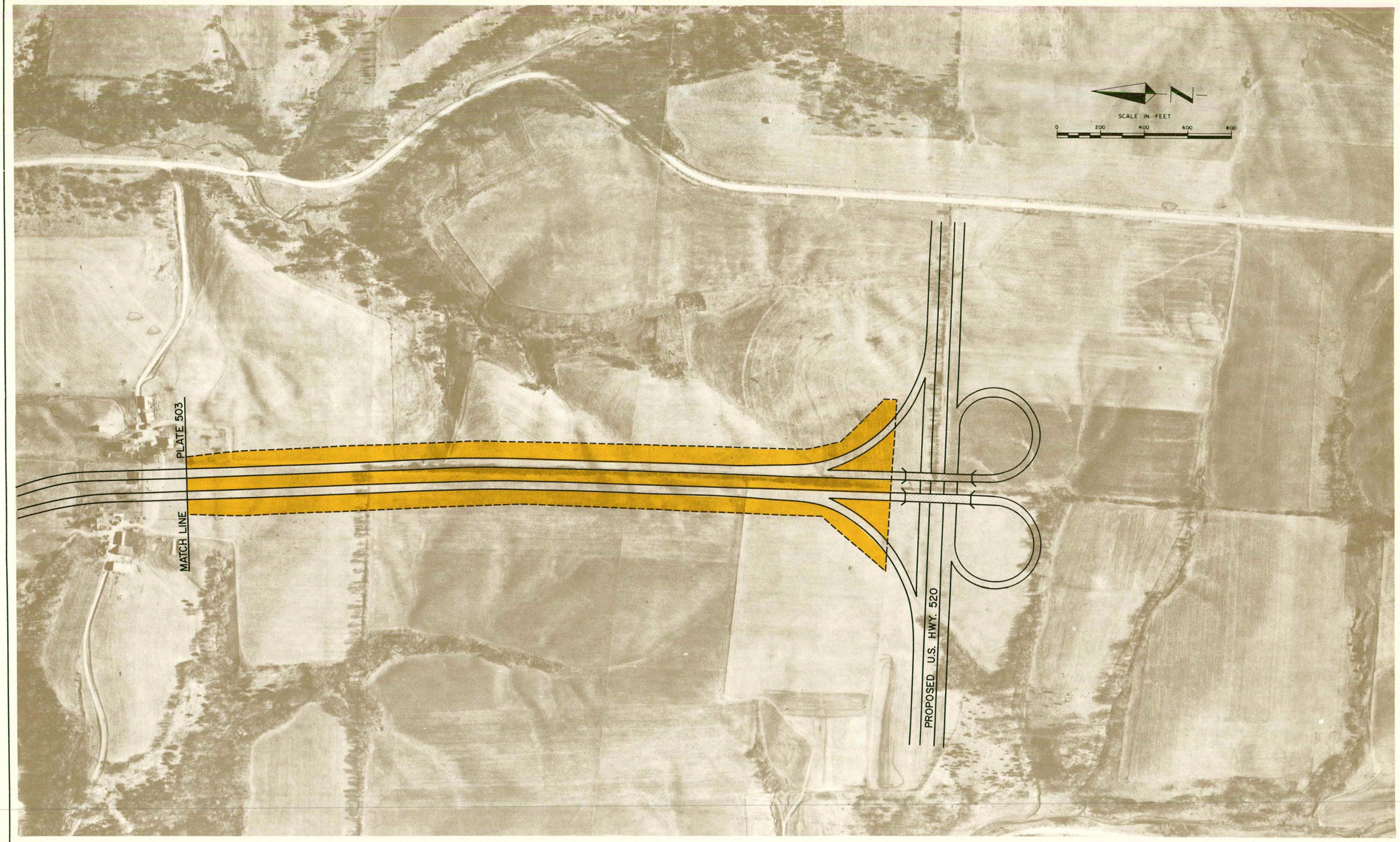
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

GRANGER CREEK ALIGNMENT

PLATE 503

FEBRUARY, 1972



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

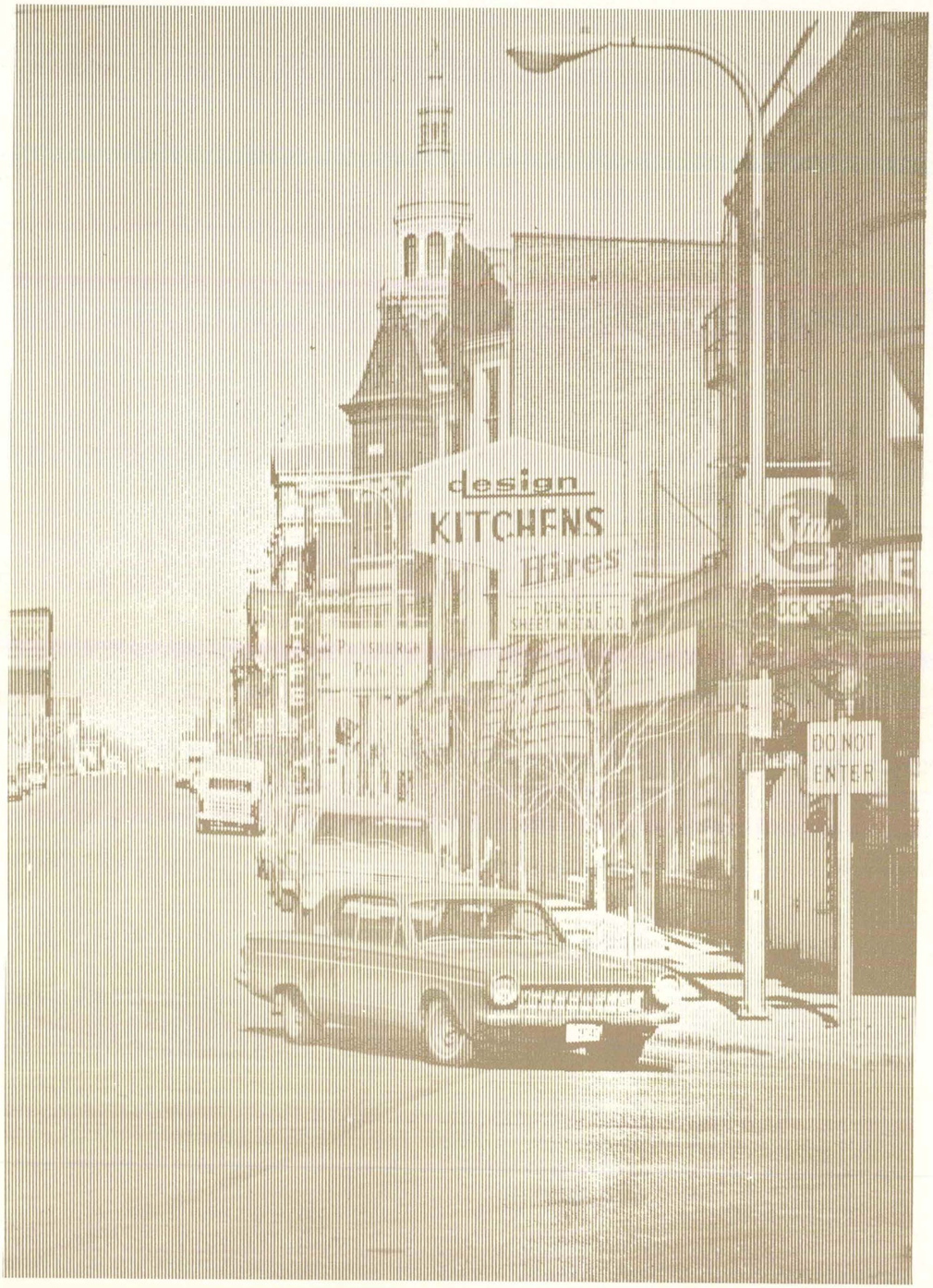
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

GRANGER CREEK EXPRESSWAY

PLATE 504

FEBRUARY, 1972



Dodge Expressway and Parkway Alignments

The Dodge Street routes are identical in location and from Booth Street west, but differ somewhat between Booth and Locust. What we have described as the Dodge expressway comes out of the Dodge-Freeway interchange as a six-lane divided expressway, with a frontage road on the north to serve the existing establishments on that side of Dodge Street. Generally speaking, it is contemplated that the present north curb line be the north curb line of this frontage road.

In order to provide the necessary space for the required roadway widths, it is necessary to take property on one side or both sides of the street. As a result, the expressway solution requires the taking of all properties fronting on the south side of Dodge Street within the length of this improvement.

The many intersections of the side streets along Dodge introduce unnecessary friction. This has been reduced by limiting these intersections to Bryant Street on the south, Hill Street on the north, and Booth Street from both north and south. These intersections are widely enough spaced so that they may be controlled with signals, and there are cuts through the median with left turn storage lanes provided. Thus, although the number of access points is fewer than before, access is substantially improved in safety and convenience.

One of the major disadvantages of the present Dodge Street is its steepness, particularly between Booth and Grandview. The intersection at Grandview, with heavy crossing and turning movements, is another point of serious friction and congestion. Rush hour traffic here involves long waits, largely because of inadquate left turn storage. The obvious solution to both of these problems is a grade separation wherein the grade of Dodge Street is flattened and the street passes under Grandview in a cut. To obtain the necessary grade reduction and maintain necessary site distance, etc., the cut must necessarily begin at Booth Street and run out finally somewhat east of Concord. The intersection with Fremont Street, and to a lesser degree Lombard, must not be left dangling, and thus an overpass is provided here, too. Access between the surface streets (Grandview, Fremont, Lombard) and Dodge will be maintained by short frontage roads and split diamond ramps. The ramps must begin at Booth and just east of Concord.

Washington Junior High School, on the northwest corner of Grandview and Dodge, does not have playground space to spare, so the necessary added width of the Dodge Street facility is recommended to be taken from the south side. South side properties will be damaged under any circumstances and thus they should be taken in total and utilized, with full compensation provided to the owners.

Properties along the north side of Dodge between Booth and Grandview will likewise be damaged by virtue of the diamond ramp which cuts off access from the street side. This problem is not as severe as first glance might suggest, however, since the YMCA has already purchased several of these, primarily for use of the back portions of the properties where they abut the main YMCA property. Termination of access to the Dodge Street side is no problem here.

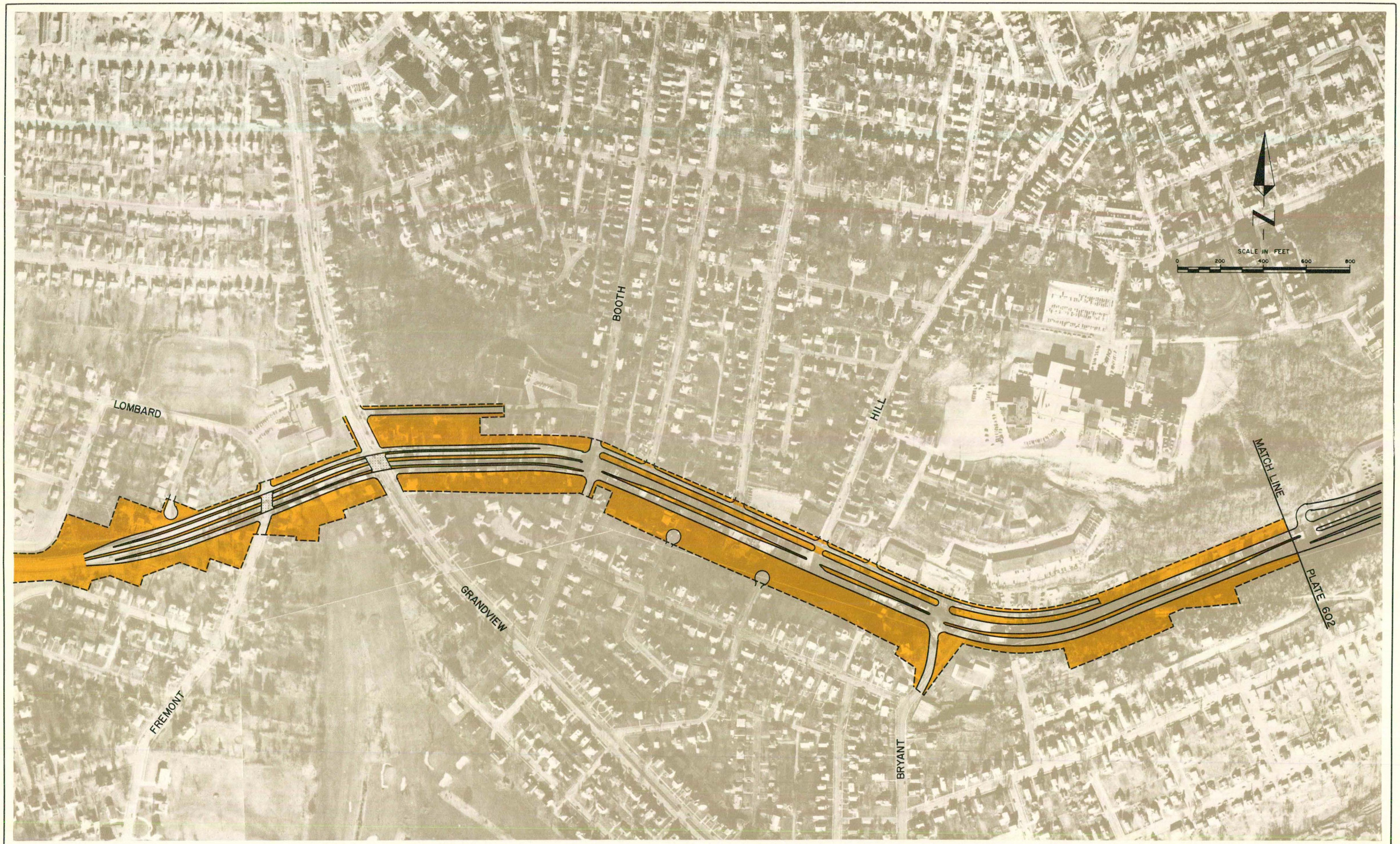
The Dodge Parkway alignment, as mentioned before, differs from the expressway treatment only between Booth and Locust Streets. One of the outstanding characteristics of Dubuque which makes it unique among its sister cities is the rugged beauty of its terrain. Its steep bluffs and deep ravines set it apart from most plains states cities, whose terrain can best be described as flat and featureless. The parkway treatment of the Dodge corridor is an attempt to capitalize upon this unique characteristic, at a point where it is both most spectacular and most viewable. Thus, Dodge Street is set into the bottom of the ravine with all adjacent structures removed, leaving only a very scenic drive.

With this alternative then, all buildings in the lower end of the ravine are removed, leaving only the gently curving twin 3-lane roadways. The same streets are providing access, Bryant to the south, Hill to the north and Booth to both north and south, again signalized with left-turn storage lanes where needed.

As the roadway rises, the ravine tends to flatten and on approaching Hill Street, the lateral requirements of the parkway are somewhat more limited, permitting the portions of the motel lying back away from the roadway to remain. The western end of the alignment, from Booth to Concord is the same as described for the expressway, with the Dodge roadway cut through to pass under Grandview and Fremont-Lombard.

KEY MAP DODGE STREET ALIGNMENTS

PLATE 600



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

DODGE EXPRESSWAY ALIGNMENT
W/FRONTAGE RD. ON NORTH

PLATE 601

FEBRUARY, 1972

LEGEND

REQUIRED AREA

ROADWAY ON EARTH

ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

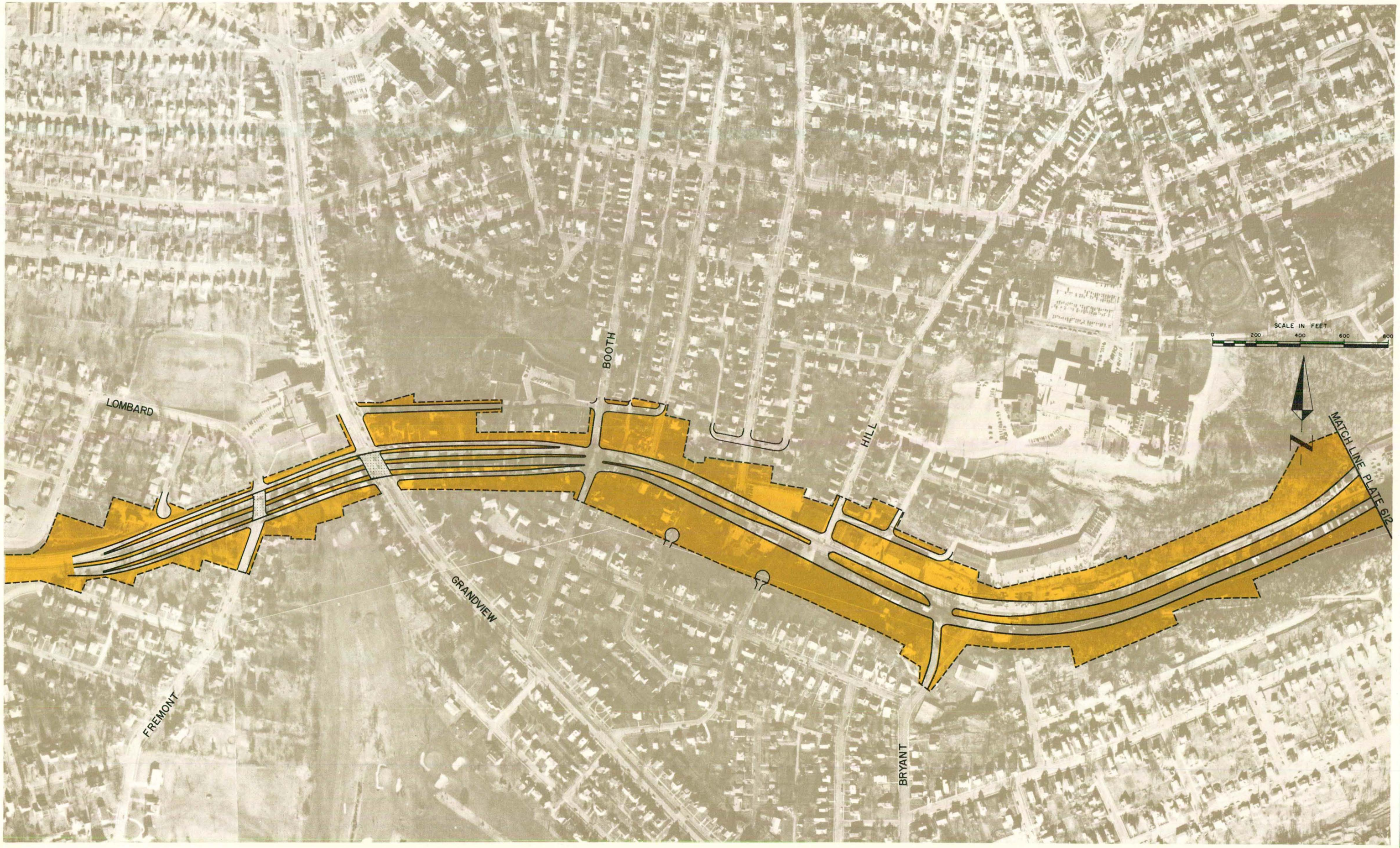
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

DODGE EXPRESSWAY ALIGNMENT
W/ FRONTAGE RD. ON NORTH

PLATE 602

FEBRUARY, 1972



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

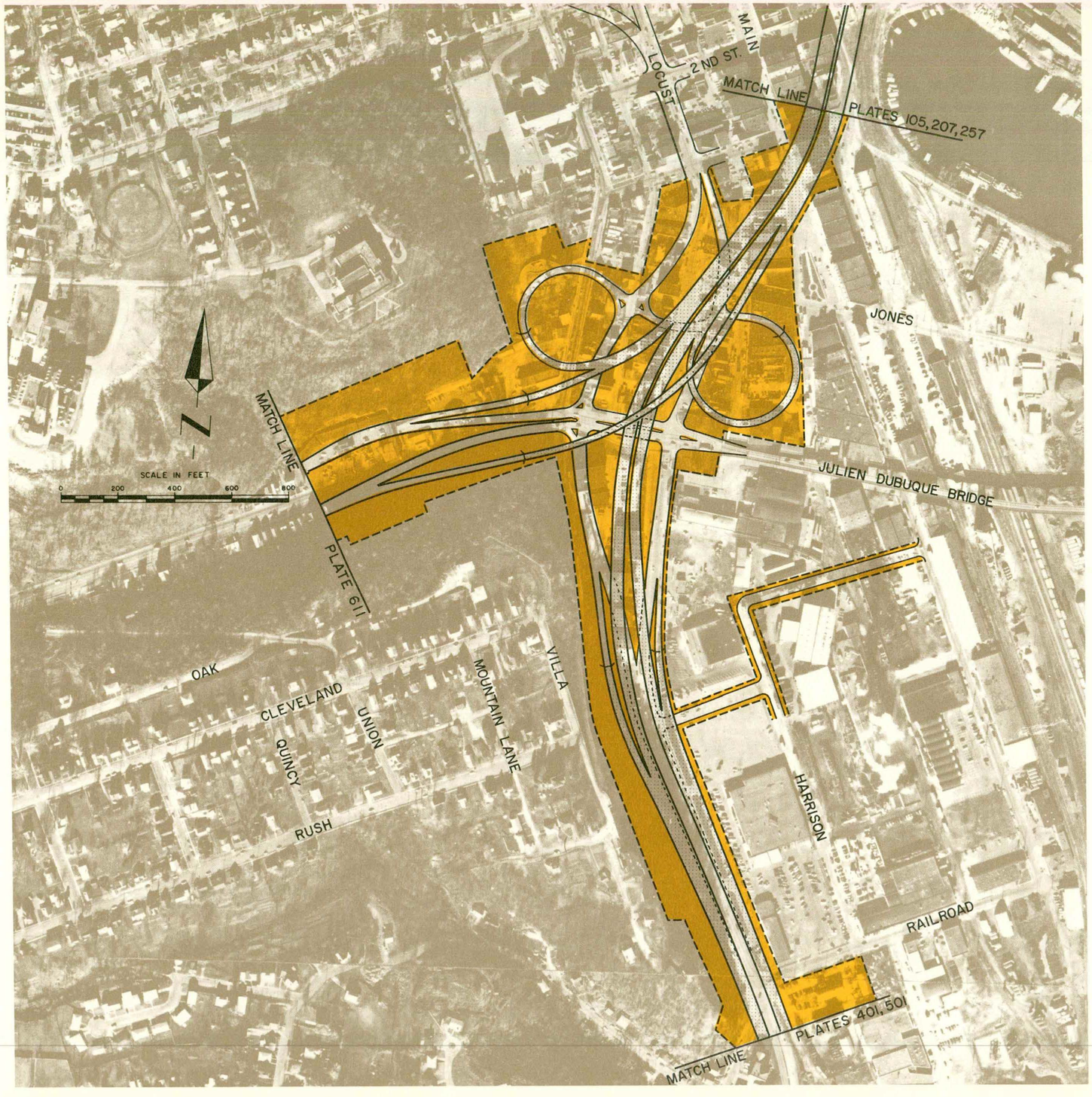
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

DODGE PARKWAY ALIGNMENT

PLATE 611

FEBRUARY, 1972



LEGEND

REQUIRED AREA — ROADWAY ON EARTH — ROADWAY ON STRUCTURE

U.S. 151 FREEWAY CORRIDOR STUDY ··· DUBUQUE, IOWA

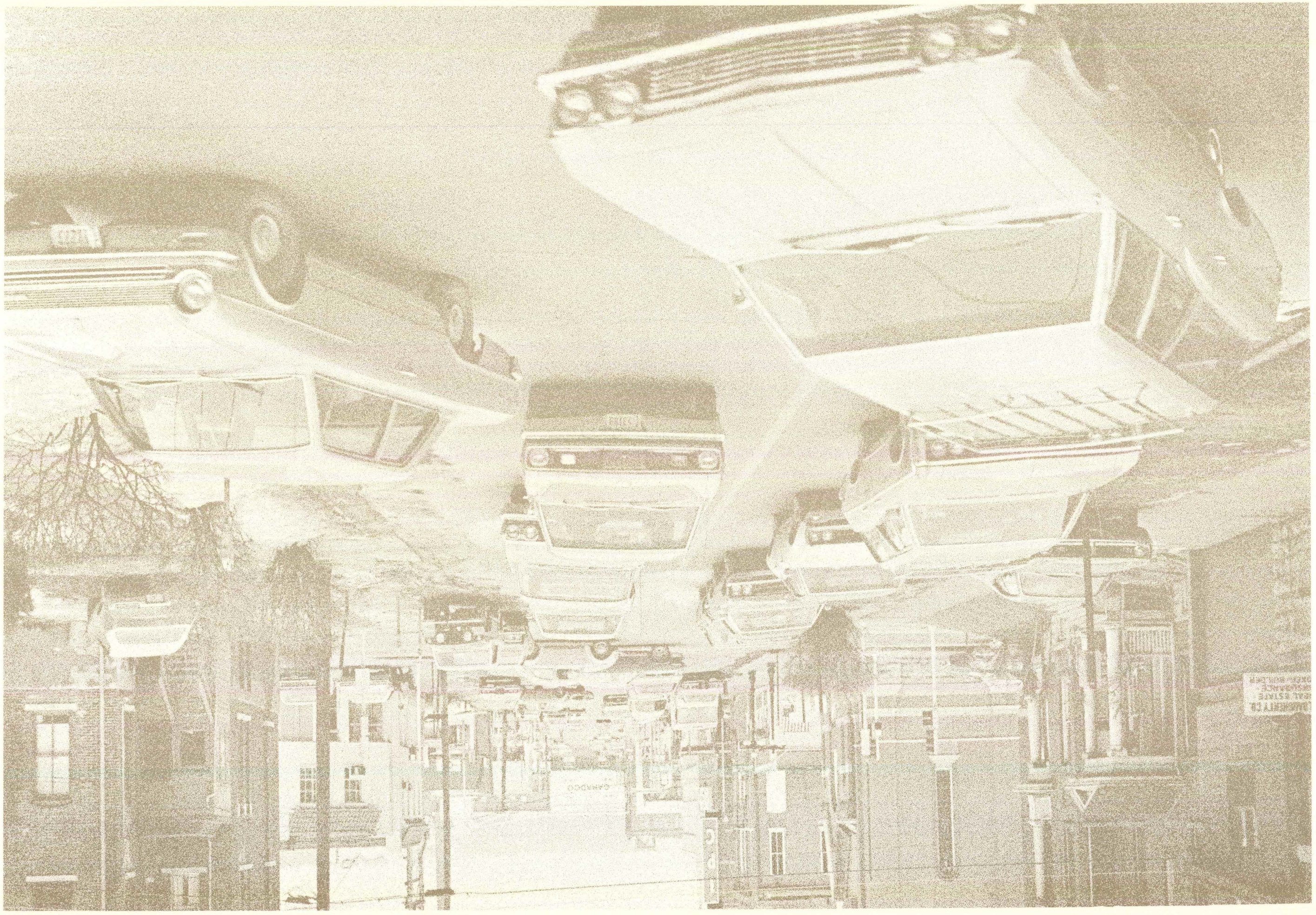
Prepared for the IOWA STATE HIGHWAY COMMISSION

HENNINGSON, DURHAM & RICHARDSON in association with ECKBO, DEAN, AUSTIN & WILLIAMS and CULLEN, SCHILTZ & ASSOCIATES

DODGE PARKWAY ALIGNMENT

PLATE 612

FEBRUARY, 1972



Section V

EVALUATION OF ALTERNATE ROUTES

Having devised the several alternatives and carried them to the point where they could be confidently offered as feasible systems, it now becomes possible to compare and evaluate them. Policy and Procedure Memorandum 20-8, of the Department of Transportation, Federal Highway Administration, reads in part as follows:

"Each request by a State Highway Department for approval of a route location or highway design must include a study report containing the following:

> (1) Descriptions of the alternatives considered and a discussion of the anticipated socioeconomic and environmental effects of the alternatives, pointing out the significant differences and the reasons supporting the proposed location or design. In addition, the report must include an analysis of the relative consistency of the alternatives with the goals and objectives of any urban plan that has been adopted by the community concerned."

The memorandum also lists 23 "effects" which must be considered. Thus, the following evaluation is built on a framework which insures compliance with the Federal policy.

Many evaluation techniques have been devised and used in corridor and route studies. Some are graphic, some are basically arithmetic and some are discoursive. Each has its partisans. Each has its strengths and weaknesses. In the final analysis, however, all require both objective and subjective judgments. When studied carefully, it is found that all of the techniques are based upon conclusions built up from judgments, and reliance on any system to resolve all conflicts and avoid all pitfalls is self-defeating.

There is no substitute for the judgment of well-trained, experienced, sensitive professionals. The only system that is needed is one that insures that all factors are fairly and openly studied with insight, with discrimination, and without bias.

With the foregoing rationale in mind, the simplest possible system has been chosen as the framework for our evaluation. Some 20 route evaluation factors, divided into five main groups, will be used. The factors themselves, their derivation and description, will be discussed in detail later. Route segments will be measured against these factors. A short narrative discussion will be prepared for each of the factors or groups of factors and each of the segments to be compared, followed by the assignment of a numerical grade. Grades will be assigned on a 10 to 0 scale—10 is best, 0 is worst. Where the factor is susceptible to specific measurement, the assignment of a specific grade is relatively simple. For the non-quantifiables, subjective judgment will permit the choice of grades describing such judgments as "excellent", "nearly as good as", "poor", or even "comparatively no good at all", for instance.

The various evaluation factors do not all have the same relative importance. In some instances, the relative importance of certain factors will differ between urban and rural areas, and even between zones. So the assignment of grades and of weights to be applied to the individual factors will be a matter of judgment.

After the grades have been assigned and weighted, they will be totaled within each of the groups and prorated to a 100 to 0 scale. The group grades will then be totaled and adjusted to a 100 to 0 scale. At every step, the results will be subject to rational justification. The system must not be allowed to obscure the thinking, the judgments or the overall results. Its sole purpose is to provide an orderly and logical method whereby the various specialists of the multi-disciplinary team may measure the relative degrees of overall service to and impacts on the community.

This step by step dissection of the problem and scrutiny of all possible effects should display all the strengths and weaknesses of the various alternatives and the summation should clearly indicate the optimum solution.

The **Route Evaluation Factors** are the specific characteristics or effects or consequences of a highway construction by which its total impact on the community may be measured. For purposes of this study, they have been grouped under five (5) sub-headings: Traffic Service, Cost, Social Factors, Economic Factors and Environmental Factors. Each group covers a category of related characteristics. The entire list follows, each factor with an explanation of its application to the project. For those who may be interested, the parenthetic numbers following each refer to the "effects" listed by the Department of Transportation in Policy and Procedure Memorandum 20-8, January 14, 1969.

TRAFFIC SERVICE

Fast, Safe and Efficient Transportation. This is the prime function of this entire group. The whole purpose of a traffic facility is to provide traffic service to the community—to take congestion from the existing street pattern and, by removing elements of friction, to make it flow smoother and expeditiously on the new facility, benefitting both user and neighbor. Unless it fulfills this aim, anything else it may or may not do is academic. This service is measured in terms of travel time, traffic interruptions, freedom to maneuver, driving comfort and convenience, freedom from traffic friction, operating costs—all road user benefits. An indicator is the amount of traffic attracted to the facility. Steep grades and sharp curvatures are detrimental. (1, 2)

Multiple Use of Space. The degree to which multiple use of space may be instituted and carried out is also a measure of usefulness and service. (17)

Operation and Use of Existing Highway Facilities and Other Transportation Facilities During Construction and After Completion. This is also a subjective comparison of the relative lack of conflict with traffic on present facilities during and after construction. It also covers the operations of public transportation, in this case, bus facilities. (23)

COSTS

Engineering, Right-of-Way and Construction Costs of Project and Related Facilities. Alternatives will be ranked inversely according to the summation of right-of-way costs, estimated construction costs, and estimated engineering costs. (21)

Maintenance and Operating Costs of the Project and Related Facilities. Again, we will produce an inverse ranking according to the maintenance and operating costs estimated for the facility. (22)

Public Utilities. No public utilities are to be removed from the picture, but some relocations are inevitable.

The cost of these relocations is not all charged directly to the project, but does become a cost to the economy. Inverse ranking of the extent of such relocations thus provides a means of measuring this effect. This should include electric distribution, telephone, TV cable, gas distribution, water distribution, sewer network, and public transport. (8)

Conduct and Financing of Government (including effect on local tax base and social service costs). The grades for this criterion result in part from an inverse relationship of the value of properties removed from the tax rolls by dedication to the freeway project. Experience shows, however, that many nearby properties are increased in valuation as a result of improved traffic handling. This tends to offset the tax roll reductions resulting from right-of-way acquisition. Further, will more or fewer public services such as fire and police protection be required? How do the costs of these services compare with those before installation of the facility? (12)

SOCIAL FACTORS

Accessibility. One characteristic to be assessed here involves the effect of the roadway on the mobility of fire apparatus, ambulances and other emergency vehicles. A related characteristic is the degree to whicp the accessibility of hospitals, schools, churches, public buildings and other facilities to the general public may be affected. (6, 9)

Neighborhood Integrity. The integrity of neighborhoods, public and parochial school districts, church parishes and the like, should be reinforced where possible. Penetrations and partitioning should be avoided, as degrading elements. The high grade here represents a minimal intrusion into such social units; a low grade indicates a disruptive intrusion. (10, 11, 19)

Family Disruption. The number of families displaced and their ability to take displacement in stride are the characteristics of importance here. There are those families who move easily and even frequently and who would wish to take care of their own relocation problems. To such a family, displacement does not represent disruption. On the other hand, there are those to whom relocation comes as a major shock, both psychologically and financially. Relocation of any substantial number of such families would be considered major disruption and would be the occasion for a low grade. (20)

ECONOMIC FACTORS

Economic Activity. The economic health of the community is the sum total of the state of the individual businesses. The degree to which economic activity of the affected businesses is facilitated or hindered provides the basis for comparison of alternate routes. Improved traffic service reduces the costs of doing business, which thus enhances opportunities for expanded or more profitable employment. It can also reduce employees' travel times to and from work. (3, 4)

Property Values. In general, business properties may be enhanced by proximity to a freeway, while residential properties may experience either upgrading or devaluation. The possibility of devaluation must be carefully examined, however, since reduction of traffic on surface streets is a counterbalancing advantage. Potential noise and air pollution must be considered here, as well as under environment. (16)

Replacement Housing. The degree of availability of replacement housing clearly has a direct effect on the economic life of a community. The filling of existing housing, now vacant, is clearly an economic plus. The construction of new housing is both an item of cost to the community and a stimulant to the economy. The ratio of availability to demand is probably the best overall means of measuring this factor. (18)

Displacement of Businesses. The displacement of businesses is considered to be a temporary loss to the economy. There is usually some disruption of the business during the process of moving. Many times a more effective business facility is the eventual result, although these are difficult to identify and document before the fact. (20)

ENVIRONMENTAL FACTORS

Recreation and Parks. Are recreational opportunities increased or decreased by the new facilities? Is park space more or less available? (5)

Aesthetics. Subjective judgment is required regarding the compatibility of the aesthetic quality of the facility to its surroundings. (7)

Conservation. What is the effect of the facility on wildlife, on the ecology of the vicinity? Does the construction initiate or increase the potential for erosion, for sedimentation? (13)

Natural and Historic Landmarks. Certainly the degree to which either natural or historic landmarks may be affected is susceptible to qualitative measurement. (14)

Pollution. The effects of both air and noise pollution are subject to general measurement. However, careful consideration must be given to whether these are newly impressed on the vicinity or whether they simply replace that that would otherwise occur on surface streets. In this respect, the differences resulting from speed, grades, etc., must be carefully studied. (15)

The very detailed, and sometimes lengthy, analyses of the alternate routes in the framework of the foregoing evaluation factors have been prepared by various members of the interdisciplinary team, followed by review by the other team members. These detailed analyses are reproduced in the Appendix for those who wish to make a similar, point by point review. A comprehensive digest of these route ratings follows with charts showing the comparative rankings of the overall routings. First to appear, will be the comparative ratings of the three northern alternatives (with their appropriate river crossings)followed by a comparison of the two southern routes, and finally, the two Dodge Street alternatives.

NORTHERN ALTERNATES

TRAFFIC SERVICE

In keeping with the prime importance of the general heading of service, the three northern alternatives differ substantially in the amount of **fast, safe, and efficient transportation** which they provide. The Couler Valley with City Island river crossing handles substantially more traffic than either of the others. This is primarily due to its superior location. It goes where the traffic wants to go. It has good connection with the business and shopping district, connects excellently to the major industries of the City and forms the downtown leg of a high mobility loop around the northwest quadrant of the City on the 32nd Street corridor. In keeping with the tremendous loads which it must pick up and deliver in the central City area, the traffic must move at moderate freeway speeds in the heart of the City, but satisfactory geometrics can be worked out to provide smooth, stable flow.

Its relatively simple and direct movements are logical so that no difficulties should be experienced from lost travelers. A new and additional crossing of the railroad tracks is added, free from interference by rail traffic.

By contrast, either Roosevelt Avenue alignment (with Eagle Point or City Island river crossing) is somewhat circuitous, with relatively poor connection to the primary traffic generators. This includes not only the downtown district but also the almost non-existent connection with the 32nd Street loop. Traffic estimates of vehicles attracted to the freeway or expressway are substantially lower than those of the first alternative. In view of these and the other details discussed at greater length in the appendix, the Couler alignment with the City Island bridge is given a rating of 10; the Roosevelt Avenue alignment with the City Island bridge is given a rating of 3; and the Roosevelt Avenue alignment with Eagle Point bridge is rated at 2.

Not a great deal need be said regarding **multiple use of space.** It becomes quite clear that the Couler Alignment offers a number of opportunities for mulitple use of space, while such use is much more limited in the case of both of the Roosevelt Avenue alignments. Thus the Couler

alignment receives a rating of 10; the Roosevelt Avenue with City Island alignment receives a rating of 5; and Roosevelt Avenue with Eagle Point crossing receives 3 on this criterion.

The third evaluation factor under the major heading of traffic service is that of **operation of existing facilities, both during and after the construction period.** All three of the alignments being discussed supplement rather than replace existing surface streets. However, because of the routing of the Couler alignment, it will attract a greater proportion of that surface traffic now congesting major arterials such as Central Avenue, and it thus should be favored. A few cross streets are necessarily cut by ramps, but all major streets remain open with no great differences. Both Roosevelt routes interfere with some surface streets and railroad spurs. On balance, the Couler alignment with City Island bridge is rated at 10, while each of the Roosevelt Avenue alignments receives the rating of 3 for this criterion.

COSTS

As is covered in detail in Appendix C-2, the cost comparison was carried out on the basis of carefully prepared estimates of site clearing, grading and drainage, surfacing, structures, lighting and signalization, engineering and contingency costs and right-of-way costs. Since the routes traversed different parts of the community, it was not possible to simplify these estimates, even though the final total costs do fall roughly in the order of length of segment. It is hardly necessary to go into more detail but rather to let the numbers speak for themselves. Thus, for **engineering, right-of-way and construction costs** the Couler alignment with City Island bridge received the highest rating of 5.2, while the two Roosevelt Avenue alignments, differing less than 1% in total cost, each received a rating of 4.9.

Maintenance and operating costs are likewise relatively simple to compare. The Couler Valley alignment is rated at 5.2, the Roosevelt Avenue alignment and City Island bridge is rated 4.9, and the Roosevelt Avenue Alignment at Eagle Point Bridge is rated at 4.8.

The comparative rating of **public utility** conflicts is also rather straight-forward. No public utility will be removed and deleted, but some relocations are inevitable. Therefore, the individual points of conflict between existing utilities and potential freeway construction were pinpointed by means of mutual study with key members of the various utility staffs involved. These points of conflict or interference are covered in considerable detail in the Appendix. They are summarized in a chart at the end of that section and the computed ratings are shown there.

As might be expected, the Couler alignment with City Island bridge, penetrating closer to the heart of the City, showed somewhat more potential conflicts than the other northern and central routes, and thus received a rating of 4.5. The Roosevelt Avenue alignment with City Island bridge receives a 5.5 rating, while the Roosevelt alignment with Eagle Point bridge is given a rating of 5.4.

The **financing of government** is based partly on real estate and property taxes. Thus the removal of any tax paying property from the tax rolls by dedicating it to public use represents an immediate loss in tax income. This is only temproary, since the accessibility to fast and efficient traffic facilities increases the valuation of nearby property, which in turn more than repays the loss in the long run. Since there is a temporary loss, however, it must be considered. Valuations have been totalled, as shown in Appendix C-4 and comparative ratings for the northern alternates are, Couler Valley with City Island Alternate 4.1, Roosevelt Avenue with City Island Alternate 5.7 and Roosevelt Avenue with Eagle Point Alternate 5.9.

SOCIAL FACTORS

In the several elements that go to make up the evaluative factor of **accessibility,** the Couler alignment with City Island Bridge stands head and shoulders above the two Roosevelt Avenue alignments. First, it goes to and provides interchanges for all of the many points of origin and destination, not only in the Central City area but in its tie to the high mobility loop of which the 32nd Street interchange is a necessary part. In so doing it simplifies the access of the driver to the system and takes him off of the local street pattern quickly so that he does not interfere with local access for those who have no interest in the freeway travel. Still another major point is the availability of points of access and discharge for emergency vehicles of all types, primarily fire and ambulance vehicles. On the other hand, the possibilities for access to either of the Roosevelt routes are limited because of their location and topography characteristics, thus making it harder to get on or off the freeway and keeping more traffic on the local street pattern. As a result, we must rate the Couler alignment with City Island Bridge 10, the Roosevelt alignment with City Island Bridge 4 and the Roosevelt alignment with Eagle Point Bridge 3 on this criteria.

Neighborhood integrity is one of the more important social or "people" factors or characteristics which is affected by a traffic facility such as a freeway. Hopefully, a facility should reinforce rather than break down or abridge neighborhood boundaries. Boundaries are often vague and ephemeral, but they were reasonably well defined in the preliminary stages of the study and attempts were made to follow rather than cross them.

The Couler Valley with City Island bridge route has been quite successful in achieving this goal. It skirts business and industrial districts and will form a positive boundary between the Washington Street residential district and industrial activity. As it proceeds north, it follows topographical boundaries, permitting the overlap of neighborhoods through relatively frequent crossings. It has been assigned a numerical rating of 8 under this category.

The two Roosevelt alignments achieve a reasonable degree of neighborhood skirting from First Street northward to the point area, at which juncture they must cut across the Rhomberg neighborhood and climb the high ground. Over what is now generally agricultural land, they cut directly through several planned and zoned developments which would be adversely affected by their intrusion. For these reasons, we have assigned both of the Roosevelt routes a rating of only 4.

The factor of **family disruption** is one of the most important and heavily weighted factors in considering the relative rankings of alternative routes. This is the characteristic that measures the travail of those who must be relocated in order to permit the passage of a traffic facility. As has been remarked before, to some families a move is merely an incident, while to others it is a major psychological hurdle. It is true that major concessions in the form of financial assistance are offered to the latter, but these are compensation only and in the ideal situation would be avoided entirely. Such an ideal situation is rarely encountered in fact.

The Couler Valley route requires the relocation of the greatest number of families, most of whom have limited means and thus are expected to have limited flexibility. The one ameliorating situation is that most of the housing which is to be taken is long past its prime and is in a deteriorated and run-down condition, needing rehabilitation. However, because of the number of families so involved, it is impossible to rate this route higher than 1.

The lesser number of necessary relocations caused by the two Roosevelt routes result in ratings of 6 for each of them.

ECONOMIC FACTORS

Economic activity of the community, as affected by the traffic facility, is one of the most important criteria which measure the impact of the freeway. If it is "money that makes the mare go" it is economic activity that makes the money, and thus benefits not only the employer but the employee. Impact can be positive, such as facilitating or reducing the costs of doing business, or negative, such as increasing the costs.

Of the three northern alternates, the Couler Valley with City Island bridge route has the greatest impact. Virtually all intermediate and long distance truck traffic would be diverted from the local street system, not only reducing costs of this trucking to the local businesses and industries, but removing their conflicts from the local traffic and parking requirements of these and other businesses. Employee travel to and from work is a parallel benefit, making it easier for employees to get to and from work, thereby increasing the attractiveness of employment at these location.

The two Roosevelt routes, on the other hand, with their fewer and more poorly located points of access, have relatively little positive impact.

Overall, we rate the Couler Valley route 9 for economic activity, and both Roosevelt routes at 2.

The factor of **property values** nearly directly parallels that of economic activity, since it is a reflection of the potential for economic health. Property which can be reached easily and quickly is certainly more attractive and, therefore, more valuable than its opposite. Thus, the conclusions reached in the detailed economic analysis of the Appendix C-5 provide a rating of 9 for the Couler Valley with City Island bridge route, while both of the Roosevelt routes (i.e. with City Island bridge or with Eagle Point bridge) are rated at 2.

Replacement housing can be a most important subject and comparative factor in determining the relative desirability of alternative routes. As a matter of fact, the absence of suitable replacements can, in today's climate, provide a real stumbling block for the initiation of the project. This is the reason for the rather lengthy discussion and thorough analysis of the entire subject, presented in full in Appendix C-6. The Couler Valley and City Island bridge alternative would require a substantially greater amount of appropriate housing than either of the two Roosevelt routes. If it can and will be provided, it would become an economic plus to the community, but its absence could be fatal. Fortunately, both private and public enterprise has been active in the recent past, and it is anticipated that over the period of time that the relocations would be accomplished would be able to provide the major amount of relocation housing without strain. There remains a core of difficult problems to be solved, but one which is capable of solution by an enlightened approach on the part of the City administration. Nonetheless, because of the magnitude of the problem, we are unable to grade the Couler route more than a value of 2, while the two Roosevelt routes each receive a ranking of 6.

Displacement of business and industry is likewise a problem. All routes would require a certain amount of relocation of business, although the Couler route would

undeniably provide the greater number. Fortunately, space for some commercial and industrial activities is available, either in the urban renewal areas or in the as yet unfilled industrial district. Others will prove to be more difficult. On the basis of the magnitude of problems, we rate the Couler route and City Island bridge 2, the two Roosevelt routes 4 each.

ENVIRONMENTAL FACTORS

The first of the environmental factors is that of **recreation and parks.** In assessing this factor, it was necessary to carefully evaluate the potentiality for the inclusion of park property and recreational facilities in the peripheral treatment of the freeway, as well as to study the effect on any such facilities already in existence. Of the northern alternatives, the Couler Valley route with City Island crossing stands far above the others in positive potentialities. Perhaps the main reason for this is that it goes where people are. This means that it must be buffered from its effect on non-industrial properties, and in so doing, the buffering can provide some positive amenities for the neighbors. The two Roosevelt routes just do not lend themselves to this type of treatment, except in that traversal of the high ground which is as yet not built up. For these reasons, the Couler with City Island alternative is rated 10, the Roosevelt route with City Island is rated 5, and the Roosevelt route with Eagle Point crossing is rated also at 5.

The **aesthetics** of any facility is bound to be a purely subjective evaluation. The Couler Valley with City Island route does little aesthetic damage and provides the opportunity for many aesthetic improvements for the neighborhoods through which it travels. The same cannot be said of the Roosevelt Avenue routes since in a large measure they would simply introduce hideous scars in the form of cuts and fills in the virgin, rugged hill country that they traverse. Aesthetically, the City Island crossing would be preferable to the Eagle Point crossing through its sheer sweep upwards in rising curves to meet the Wisconsin bluffs. From the top of the bluffs, the view of the City should be breath-taking. Aesthetically, the Couler Valley and City Island route is rated at 10, the Roosevelt route with City Island at 3, and the Roosevelt route with Eagle Point crossing at 2.

Conservation is hardly applicable as a factor within the built-up portion of the City. In the outlying areas, however, it does provide a potential problem. That part of the Couler Valley where it is a factor is free from adverse effect and is given a rating of 10. The Roosevelt Avenue routes, with their extensive cutting in earth, do leave slopes which are susceptible to erosion and thus are graded at a value of 2 in both cases, against this criterion.

Immediately on mention of **natural and historic landmarks,** the subject of the Court House and Jail spring to mind. This is and has been a highly emotional subject among the people of Dubuque, and both buildings are now on the National Register of Historic Landmarks. It is true that the Couler Valley route passes by to the east of the Court House, but at something more than half-block distance. At first glance, this might appear to be a somewhat adverse factor when evaluating this route. Such need not be and is not the case. The elevated freeway will act as a screen against the rather old and ugly back-drop of industrial buildings and will provide a vantage point from which the structure can be seen. On balance, however, we grade this route 9 for this factor, while the two Roosevelt routes, passing at a considerable distance, are rated 10.

The **pollution** potential of the alternatives is something that is easily determined. Means are available for computing the amount of air pollution resulting from vehicles operating at varying speeds. Generally speaking, less pollutant material is put into the air by vehicles traveling at freeway speeds than by those traveling at the lesser speeds of city streets. In any event, these are measurable and the results permit definite comparisons.

Sound levels are also capable of computation and differences determined between operating at grade vs. elevated as well as with and without shielding barriers. Noise levels which become objectionable, both indoors and out, are likewise known, permitting computations to be carried out in typical locations and the results compared.

For the Couler Valley route with City Island Crossing, the rating determined for the two items of pollution is 8. The Roosevelt route with City Island Crossing rates 6 overall, as does the Roosevelt route with Eagle Point Crossing.

SOUTHERN ALTERNATES

TRAFFIC SERVICE

Of the southern alternates, the Kerrigan Route will carry substantially more traffic than the Granger Creek Alternative. There are two reasons for this. The first is that the Kerrigan Route traverses a strip which is already partially built up, while the Granger Creek route travels through what is essentially rural usage. Concomitantly, the Kerrigan route has five interchanges in place of the three for the Granger Creek route. A second reason is that the Kerrigan route supplants an existing route, which would still be active as a parallel route to the Granger Creek alternative.

The Kerrigan Route, along existing U.S. 61 and 151, emerged as an almost inspired location effort of earlier years, through some extremely difficult and rough topography. Our study fails to produce another which could be called its equal. There are some grades and curves which are somewhat more difficult to execute than those of featureless countryside, but they are better than we were able to find, even on the Granger Creek routing, without tremendous amounts of earth moving, with its attendant scarring and destruction. It should also be noted that these curves and grades provide something of a transition between travel over the rolling terrain and the urban scene.

It is primarily for these reasons that the Kerrigan Route is graded 8 for **fast, safe and efficient transportation,** while the Granger Creek route achieved only a rating of 3.

With respect to the **multiple use of space,** both the Kerrigan and Granger Creek routes, starting at Dodge, travel overhead of South Locust Street, leaving it intact. For a short distance, the Granger Creek route would run at least partially overhead of the railroads (Illinois Central and Milwaukee) east of Mount Carmel. Otherwise, there is little difference between the two routes. Consequently, we have rated the Kerrigan Route at 4 and the Granger Creek Route at 5 for this factor.

There is not a great deal of difference between the Kerrigan and Granger Creek alternatives in the **operation and use of existing highway facilities and other transportation facilities during construction and after completion.** The Kerrigan Route will interfere somewhat with existing facility traffic during construction, but will make them more useful when construction is completed. Consequently, we have rated Kerrigan Route 7 and the Granger Creek Route 6 on the basis of this criterion.

COSTS

Construction costs on the Kerrigan and Granger Creek route differ substantially. The differences are accounted for in two ways. First, the somewhat sinuous route of the Granger Creek alternate naturally results in greater length, with that much more paving and facilities with the somewhat greater amount of new construction needed as a result. On the other hand, the necessary right-of-way needed by the Kerrigan Route comes from largely built-up, and therefore more expensive, property. This difference is more than outweighed by the construction cost differential, however. In the final analysis then, the Kerrigan Route receives a grade of 5.9, while the Granger Creek alignment is rated at 4.2 for the **engineering, construction, and right-of-way cost** criterion.

Little need be said regarding the **maintenance and operating costs** other than to recall that they vary directly with the length of the alternatives. Thus, the Kerrigan Road alignment is rated 5.5, the Granger Creek, 4.6.

Although the **utility** conflicts of the Granger Creek alignment are severe when they do occur, there are not nearly as many of them as there are along Kerrigan Road, where we are traversing considerable built-up property with its attendant need for utilities. As a consequence, the Kerrigan Road alignment is rated 4.1 and the Granger Creek alignment rates at a higher value of 5.9.

Financing of government, as represented by the temporary tax loss from dedication of properties to public use has resulted in a rating of the Kerrigan Alternate at 1.9 vs. its counterpart the Granger Creek Alternate at 8.1.

SOCIAL FACTORS

Accessibility of the Kerrigan alignment shows a positive superiority over that of the Granger Creek alignment. Again, the Kerrigan alignment goes where the people are and thus is much more convenient for them to get onto. Its several interchanges are relatively well spaced with frontage roads connecting in between where necessary. In addition to interchanges, there are other grade separations where needed which free local traffic desiring to cross the route from interference with heavy traffic. We thus find a rating of 10 suitable to the Kerrigan alignment, while the Granger Creek alignment must receive only 3.

The concept of **neighborhood integrity** would not appear to have much application to the southern routes, since they traverse largely rural countryside. The Kerrigan route does travel through two communities just as its predecessor does, but it does so in a manner which is less disruptive to the community activities than at present, due to grade separations.

The Granger Creek route travels through what is essentially undeveloped farm land, although it does partition one or more of the farmsteads. On balance, we must rate the Kerrigan route 8 for neighborhood integrity and the Granger Creek route 7.

The Kerrigan alternative causes the relocation of only a moderate number of families and thus occasions a relatively small amount of **family disruption.** For that reason, this route is assigned a rating of 9.

The Granger Creek route, on the other hand, requires the relocation of an almost insignificant number of families and is thus assigned the full rating of 10.

ECONOMIC FACTORS

The **economic activity** and **property value** impacts of the Kerrigan alignment would be generally positive. Improved and increased traffic flow along the already existing corridor, and the emplacement of new interchanges definitely improves the attractiveness of adjacent

alignment receives a rating of 10; the Roosevelt Avenue with City Island alignment receives a rating of 5; and Roosevelt Avenue with Eagle Point crossing receives 3 on this criterion.

The third evaluation factor under the major heading of traffic service is that of **operation of existing facilities, both during and after the construction period.** All three of the alignments being discussed supplement rather than replace existing surface streets. However, because of the routing of the Couler alignment, it will attract a greater proportion of that surface traffic now congesting major arterials such as Central Avenue, and it thus should be favored. A few cross streets are necessarily cut by ramps, but all major streets remain open with no great differences. Both Roosevelt routes interfere with some surface streets and railroad spurs. On balance, the Couler alignment with City Island bridge is rated at 10, while each of the Roosevelt Avenue alignments receives the rating of 3 for this criterion.

COSTS

As is covered in detail in Appendix C-2, the cost comparison was carried out on the basis of carefully prepared estimates of site clearing, grading and drainage, surfacing, structures, lighting and signalization, engineering and contingency costs and right-of-way costs. Since the routes traversed different parts of the community, it was not possible to simplify these estimates, even though the final total costs do fall roughly in the order of length of segment. It is hardly necessary to go into more detail but rather to let the numbers speak for themselves. Thus, for **engineering, right-of-way and construction costs** the Couler alignment with City Island bridge received the highest rating of 5.2, while the two Roosevelt Avenue alignments, differing less than 1% in total cost, each received a rating of 4.9.

Maintenance and operating costs are likewise relatively simple to compare. The Couler Valley alignment is rated at 5.2, the Roosevelt Avenue alignment and City Island bridge is rated 4.9, and the Roosevelt Avenue Alignment at Eagle Point Bridge is rated at 4.8.

The comparative rating of **public utility** conflicts is also rather straight-forward. No public utility will be removed and deleted, but some relocations are inevitable. Therefore, the individual points of conflict between existing utilities and potential freeway construction were pinpointed by means of mutual study with key members of the various utility staffs involved. These points of conflict or interference are covered in considerable detail in the Appendix. They are summarized in a chart at the end of that section and the computed ratings are shown there.

As might be expected, the Couler alignment with City Island bridge, penetrating closer to the heart of the City, showed somewhat more potential conflicts than the other northern and central routes, and thus received a rating of 4.5. The Roosevelt Avenue alignment with City Island bridge receives a 5.5 rating, while the Roosevelt alignment with Eagle Point bridge is given a rating of 5.4.

The **financing of government** is based partly on real estate and property taxes. Thus the removal of any tax paying property from the tax rolls by dedicating it to public use represents an immediate loss in tax income. This is only temproary, since the accessibility to fast and efficient traffic facilities increases the valuation of nearby property, which in turn more than repays the loss in the long run. Since there is a temporary loss, however, it must be considered. Valuations have been totalled, as shown in Appendix C-4 and comparative ratings for the northern alternates are, Couler Valley with City Island Alternate 4.1, Roosevelt Avenue with City Island Alternate 5.7 and Roosevelt Avenue with Eagle Point Alternate 5.9.

SOCIAL FACTORS

In the several elements that go to make up the evaluative factor of **accessibility,** the Couler alignment with City Island Bridge stands head and shoulders above the two Roosevelt Avenue alignments. First, it goes to and provides interchanges for all of the many points of origin and destination, not only in the Central City area but in its tie to the high mobility loop of which the 32nd Street interchange is a necessary part. In so doing it simplifies the access of the driver to the system and takes him off of the local street pattern quickly so that he does not interfere with local access for those who have no interest in the freeway travel. Still another major point is the availability of points of access and discharge for emergency vehicles of all types, primarily fire and ambulance vehicles. On the other hand, the possibilities for access to either of the Roosevelt routes are limited because of their location and topography characteristics, thus making it harder to get on or off the freeway and keeping more traffic on the local street pattern. As a result, we must rate the Couler alignment with City Island Bridge 10, the Roosevelt alignment with City Island Bridge 4 and the Roosevelt alignment with Eagle Point Bridge 3 on this criteria.

Neighborhood integrity is one of the more important social or "people" factors or characteristics which is affected by a traffic facility such as a freeway. Hopefully, a facility should reinforce rather than break down or abridge neighborhood boundaries. Boundaries are often vague and ephemeral, but they were reasonably well defined in the preliminary stages of the study and attempts were made to follow rather than cross them.

The Couler Valley with City Island bridge route has been quite successful in achieving this goal. It skirts business and industrial districts and will form a positive boundary between the Washington Street residential district and industrial activity. As it proceeds north, it follows topographical boundaries, permitting the overlap of neighborhoods through relatively frequent crossings. It has been assigned a numerical rating of 8 under this category.

The two Roosevelt alignments achieve a reasonable degree of neighborhood skirting from First Street northward to the point area, at which juncture they must cut across the Rhomberg neighborhood and climb the high ground. Over what is now generally agricultural land, they cut directly through several planned and zoned developments which would be adversely affected by their intrusion. For these reasons, we have assigned both of the Roosevelt routes a rating of only 4.

The factor of **family disruption** is one of the most important and heavily weighted factors in considering the relative rankings of alternative routes. This is the characteristic that measures the travail of those who must be relocated in order to permit the passage of a traffic facility. As has been remarked before, to some families a move is merely an incident, while to others it is a major psychological hurdle. It is true that major concessions in the form of financial assistance are offered to the latter, but these are compensation only and in the ideal situation would be avoided entirely. Such an ideal situation is rarely encountered in fact.

The Couler Valley route requires the relocation of the greatest number of families, most of whom have limited means and thus are expected to have limited flexibility. The one ameliorating situation is that most of the housing which is to be taken is long past its prime and is in a deteriorated and run-down condition, needing rehabilitation. However, because of the number of families so involved, it is impossible to rate this route higher than 1.

The lesser number of necessary relocations caused by the two Roosevelt routes result in ratings of 6 for each of them.

ECONOMIC FACTORS

Economic activity of the community, as affected by the traffic facility, is one of the most important criteria which measure the impact of the freeway. If it is "money that makes the mare go" it is economic activity that makes the money, and thus benefits not only the employer but the employee. Impact can be positive, such as facilitating or reducing the costs of doing business, or negative, such as increasing the costs.

Of the three northern alternates, the Couler Valley with City Island bridge route has the greatest impact. Virtually all intermediate and long distance truck traffic would be diverted from the local street system, not only reducing costs of this trucking to the local businesses and industries, but removing their conflicts from the local traffic and parking requirements of these and other businesses. Employee travel to and from work is a parallel benefit, making it easier for employees to get to and from work, thereby increasing the attractiveness of employment at these location.

The two Roosevelt routes, on the other hand, with their fewer and more poorly located points of access, have relatively little positive impact.

Overall, we rate the Couler Valley route 9 for economic activity, and both Roosevelt routes at 2.

The factor of **property values** nearly directly parallels that of economic activity, since it is a reflection of the potential for economic health. Property which can be reached easily and quickly is certainly more attractive and, therefore, more valuable than its opposite. Thus, the conclusions reached in the detailed economic analysis of the Appendix C-5 provide a rating of 9 for the Couler Valley with City Island bridge route, while both of the Roosevelt routes (i.e. with City Island bridge or with Eagle Point bridge) are rated at 2.

Replacement housing can be a most important subject and comparative factor in determining the relative desirability of alternative routes. As a matter of fact, the absence of suitable replacements can, in today's climate, provide a real stumbling block for the initiation of the project. This is the reason for the rather lengthy discussion and thorough analysis of the entire subject, presented in full in Appendix C-6. The Couler Valley and City Island bridge alternative would require a substantially greater amount of appropriate housing than either of the two Roosevelt routes. If it can and will be provided, it would become an economic plus to the community, but its absence could be fatal. Fortunately, both private and public enterprise has been active in the recent past, and it is anticipated that over the period of time that the relocations would be accomplished would be able to provide the major amount of relocation housing without strain. There remains a core of difficult problems to be solved, but one which is capable of solution by an enlightened approach on the part of the City administration. Nonetheless, because of the magnitude of the problem, we are unable to grade the Couler route more than a value of 2, while the two Roosevelt routes each receive a ranking of 6.

Displacement of business and industry is likewise a problem. All routes would require a certain amount of relocation of business, although the Couler route would

undeniably provide the greater number. Fortunately, space for some commercial and industrial activities is available, either in the urban renewal areas or in the as yet unfilled industrial district. Others will prove to be more difficult. On the basis of the magnitude of problems, we rate the Couler route and City Island bridge 2, the two Roosevelt routes 4 each.

ENVIRONMENTAL FACTORS

The first of the environmental factors is that of **recreation and parks.** In assessing this factor, it was necessary to carefully evaluate the potentiality for the inclusion of park property and recreational facilities in the peripheral treatment of the freeway, as well as to study the effect on any such facilities already in existence. Of the northern alternatives, the Couler Valley route with City Island crossing stands far above the others in positive potentialities. Perhaps the main reason for this is that it goes where people are. This means that it must be buffered from its effect on non-industrial properties, and in so doing, the buffering can provide some positive amenities for the neighbors. The two Roosevelt routes just do not lend themselves to this type of treatment, except in that traversal of the high ground which is as yet not built up. For these reasons, the Couler with City Island alternative is rated 10, the Roosevelt route with City Island is rated 5, and the Roosevelt route with Eagle Point crossing is rated also at 5.

The **aesthetics** of any facility is bound to be a purely subjective evaluation. The Couler Valley with City Island route does little aesthetic damage and provides the opportunity for many aesthetic improvements for the neighborhoods through which it travels. The same cannot be said of the Roosevelt Avenue routes since in a large measure they would simply introduce hideous scars in the form of cuts and fills in the virgin, rugged hill country that they traverse. Aesthetically, the City Island crossing would be preferable to the Eagle Point crossing through its sheer sweep upwards in rising curves to meet the Wisconsin bluffs. From the top of the bluffs, the view of the City should be breath-taking. Aesthetically, the Couler Valley and City Island route is rated at 10, the Roosevelt route with City Island at 3, and the Roosevelt route with Eagle Point crossing at 2.

Conservation is hardly applicable as a factor within the built-up portion of the City. In the outlying areas, however, it does provide a potential problem. That part of the Couler Valley where it is a factor is free from adverse effect and is given a rating of 10. The Roosevelt Avenue routes, with their extensive cutting in earth, do leave slopes which are susceptible to erosion and thus are graded at a value of 2 in both cases, against this criterion.

Immediately on mention of **natural and historic landmarks,** the subject of the Court House and Jail spring to mind. This is and has been a highly emotional subject among the people of Dubuque, and both buildings are now on the National Register of Historic Landmarks. It is true that the Couler Valley route passes by to the east of the Court House, but at something more than half-block distance. At first glance, this might appear to be a somewhat adverse factor when evaluating this route. Such need not be and is not the case. The elevated freeway will act as a screen against the rather old and ugly back-drop of industrial buildings and will provide a vantage point from which the structure can be seen. On balance, however, we grade this route 9 for this factor, while the two Roosevelt routes, passing at a considerable distance, are rated 10.

The **pollution** potential of the alternatives is something that is easily determined. Means are available for computing the amount of air pollution resulting from vehicles operating at varying speeds. Generally speaking, less pollutant material is put into the air by vehicles traveling at freeway speeds than by those traveling at the lesser speeds of city streets. In any event, these are measurable and the results permit definite comparisons.

Sound levels are also capable of computation and differences determined between operating at grade vs. elevated as well as with and without shielding barriers. Noise levels which become objectionable, both indoors and out, are likewise known, permitting computations to be carried out in typical locations and the results compared.

For the Couler Valley route with City Island Crossing, the rating determined for the two items of pollution is 8. The Roosevelt route with City Island Crossing rates 6 overall, as does the Roosevelt route with Eagle Point Crossing.

SOUTHERN ALTERNATES

TRAFFIC SERVICE

Of the southern alternates, the Kerrigan Route will carry substantially more traffic than the Granger Creek Alternative. There are two reasons for this. The first is that the Kerrigan Route traverses a strip which is already partially built up, while the Granger Creek route travels through what is essentially rural usage. Concomitantly, the Kerrigan route has five interchanges in place of the three for the Granger Creek route. A second reason is that the Kerrigan route supplants an existing route, which would still be active as a parallel route to the Granger Creek alternative.

The Kerrigan Route, along existing U.S. 61 and 151, emerged as an almost inspired location effort of earlier years, through some extremely difficult and rough topography. Our study fails to produce another which could be called its equal. There are some grades and curves which are somewhat more difficult to execute than those of featureless countryside, but they are better than we were able to find, even on the Granger Creek routing, without tremendous amounts of earth moving, with its attendant scarring and destruction. It should also be noted that these curves and grades provide something of a transition between travel over the rolling terrain and the urban scene.

It is primarily for these reasons that the Kerrigan Route is graded 8 for **fast, safe and efficient transportation,** while the Granger Creek route achieved only a rating of 3.

With respect to the **multiple use of space,** both the Kerrigan and Granger Creek routes, starting at Dodge, travel overhead of South Locust Street, leaving it intact. For a short distance, the Granger Creek route would run at least partially overhead of the railroads (Illinois Central and Milwaukee) east of Mount Carmel. Otherwise, there is little difference between the two routes. Consequently, we have rated the Kerrigan Route at 4 and the Granger Creek Route at 5 for this factor.

There is not a great deal of difference between the Kerrigan and Granger Creek alternatives in the **operation and use of existing highway facilities and other transportation facilities during construction and after completion.** The Kerrigan Route will interfere somewhat with existing facility traffic during construction, but will make them more useful when construction is completed. Consequently, we have rated Kerrigan Route 7 and the Granger Creek Route 6 on the basis of this criterion.

COSTS

Construction costs on the Kerrigan and Granger Creek route differ substantially. The differences are accounted for in two ways. First, the somewhat sinuous route of the Granger Creek alternate naturally results in greater length, with that much more paving and facilities with the somewhat greater amount of new construction needed as a result. On the other hand, the necessary right-of-way needed by the Kerrigan Route comes from largely built-up, and therefore more expensive, property. This difference is more than outweighed by the construction cost differential, however. In the final analysis then, the Kerrigan Route receives a grade of 5.9, while the Granger Creek alignment is rated at 4.2 for the **engineering, construction, and right-of-way cost** criterion.

Little need be said regarding the **maintenance and operating costs** other than to recall that they vary directly with the length of the alternatives. Thus, the Kerrigan Road alignment is rated 5.5, the Granger Creek, 4.6.

Although the **utility** conflicts of the Granger Creek alignment are severe when they do occur, there are not nearly as many of them as there are along Kerrigan Road, where we are traversing considerable built-up property with its attendant need for utilities. As a consequence, the Kerrigan Road alignment is rated 4.1 and the Granger Creek alignment rates at a higher value of 5.9.

Financing of government, as represented by the temporary tax loss from dedication of properties to public use has resulted in a rating of the Kerrigan Alternate at 1.9 vs. its counterpart the Granger Creek Alternate at 8.1.

SOCIAL FACTORS

Accessibility of the Kerrigan alignment shows a positive superiority over that of the Granger Creek alignment. Again, the Kerrigan alignment goes where the people are and thus is much more convenient for them to get onto. Its several interchanges are relatively well spaced with frontage roads connecting in between where necessary. In addition to interchanges, there are other grade separations where needed which free local traffic desiring to cross the route from interference with heavy traffic. We thus find a rating of 10 suitable to the Kerrigan alignment, while the Granger Creek alignment must receive only 3.

The concept of **neighborhood integrity** would not appear to have much application to the southern routes, since they traverse largely rural countryside. The Kerrigan route does travel through two communities just as its predecessor does, but it does so in a manner which is less disruptive to the community activities than at present, due to grade separations.

The Granger Creek route travels through what is essentially undeveloped farm land, although it does partition one or more of the farmsteads. On balance, we must rate the Kerrigan route 8 for neighborhood integrity and the Granger Creek route 7.

The Kerrigan alternative causes the relocation of only a moderate number of families and thus occasions a relatively small amount of **family disruption.** For that reason, this route is assigned a rating of 9.

The Granger Creek route, on the other hand, requires the relocation of an almost insignificant number of families and is thus assigned the full rating of 10.

ECONOMIC FACTORS

The **economic activity** and **property value** impacts of the Kerrigan alignment would be generally positive. Improved and increased traffic flow along the already existing corridor, and the emplacement of new interchanges definitely improves the attractiveness of adjacent

properties. The inclusion of frontage roads clearly improves the utility and thus the attractiveness of adjacent property as well.

The Granger Creek route, while scenic, would have little positive or negative direct economic impact. Access would be available only at U.S. Highway 52 and 67 where the topography is not conducive to adjacent development. The siphoning off of relatively long-range travelers from the existing Route 61 and 151 would do little to enhance the adjacent property. We thus must rate the Kerrigan Hill alignment 7 on economic activity vs. 2 for Granger Creek, with identical ratings, 7 and 2, for property values.

Relocation problems of the southern routes are not too great. On the Kerrigan route, most of the right-of-way is now used by the existing highway, and on the Granger Creek route, it generally traverses open country. The magnitude of the problems here is far less than in the central and northern parts of the City, with the result that for the subject of **replacement housing** the Kerrigan route receives a rating of 8 and the Granger Creek route a 9. For the factor of **displacement of business** and industry, Kerrigan rates a 9 and Granger Creek rates a 10.

ENVIRONMENTAL FACTORS

On environmental factors, the Kerrigan Road and the Granger Creek alignments are both relatively natural. There is some opportunity for the development of parklike atmosphere in both routes, but it is not deemed to be particularly or unusually strong for either. A rating of 5 is given to both routes for the **recreation and park** criterion.

The **aesthetic** compatibility of the two routes with their surroundings differs substantially. While the Kerrigan route will traverse largely built-up and occupied space, it will be landscaped with good buffer distance. It also is traversing a route already encompassing a major highway. With suitable treatment it can only improve the countryside, and thus is rated 10 for aesthetics. The Granger Creek route, on the other hand, traverses a long distance of what is now a beautiful and completely undefiled creek valley. The original choice of this routing was two-fold—first to use the rather good grade condition existing, and second to provide a beautiful view for the driver and passenger. Unfortunately, the scale of the roadway versus that of the creek valley is such as to be overpowering. It is thus concluded that this has an adverse effect on the aesthetics of the surroundings and is therefore rated 3.

What has just been said regarding aesthetics applies equally to **conservation.** The already existing Kerrigan Route will be changed very little and should have minimal effect on conservation. Thus it is rated 10. Numerous cuts and fills, although not deep, inevitably scar the countryside in the Granger Creek alignment giving that route factor a value of 2 only.

The Kerrigan route has no real effect on **natural or historic landmarks.** What effect there is results in the rugged landscape being more viewable. We rate this route 10 for this heading.

The Granger Creek route, skirting the old Catfish Creek Valley, cuts off the existing approach to the Julien Dubuque Monument and Grave. It makes necessary a rather circuitous and long substitute roadway. Because of its adverse effect, the route is rated only 4 under this criterion.

Pollution levels resulting from improved operating speeds and grades provide a rating of 8 for the Kerrigan Route, as against a rating of 7 for the Granger Creek Route. In part, this difference is the result of the longer roadway of the Granger Creek alternate.

DODGE ALTERNATES

TRAFFIC SERVICE

The Expressway and Parkway treatments of the Dodge Street corridor differ primarily in the inclusion of a frontage road in the expressway treatment, for the purpose of serving the various commercial establishments along the north side of Dodge. In the parkway treatment, these establishments are all taken, leaving little or no abutting property with need for access to Dodge between Grandview and South Locust. In both cases, the street provides three traffic lanes in each direction, providing stable flow, but the increased need for access in the expressway treatment provides somewhat more friction, with its attendant slowing action. Thus, the expressway is rated 6 for **fast, safe and efficient transportation,** while the parkway rates 9.

There is no real difference between the expressway and parkway insofar as use of other facilities is concerned. In both cases, detours and "shoofly" bypasses will be needed during construction and careful phasing of work will be necessary. When construction is complete, however, existing and supplementary facilities will work very well with the new construction. On this basis, both of the treatments are rated 8 for the criterion of **operation and use of existing highway facilities and other transportation facilities during construction and after completion.**

Within the strict definition of **multiple use of space** under which we are operating, there are no appreciable differences between expressway and parkway treatment of the Dodge corridor. It is true that one solution replaces the commercial establishments along the north side by green space, but it is felt that this is not within the context of our terminology. The advantages and disadvantages of each are dealt with elsewhere in our rating system. Therefore, we assigned both of these routes a relatively neutral grade of 5.

COSTS

The dollar cost picture of the two Dodge Street alternatives is an interesting contrast. While the expressway has less site clearing to contend with, it does have substantially more surface area of paving and subgrade preparation, as well as some rock excavation along the south face of the ravine. The result is that the construction cost of the expressway is about 25% greater than that of the parkway. On the other hand, the cost of the right-of-way obtained for environmental purposes increases right-of-way cost of the parkway to 2-1/2 times that of the expressway. The result is that the total cost of the parkway is approximately 20% more than that of the expressway treatment. As a consequence, the expressway treatment is rated 5.7, while the parkway treatment is rated 4.4 for the criterion of **engineering, construction, and right-of-way costs.**

Maintenance and operating cost of expressway and parkway are expected to vary according to the amount of paving surface. Obviously with the frontage road, the expressway presents a greater amount of surface to be maintained. On the basis of this comparison, the expressway treatment is rated at 4.7, while the parkway receives a higher rating of 5.3.

Reconstruction of the Dodge corridor will provide the same conflicts with **utilities** in both alternatives, thus both expressway and parkway are given identical public utility ratings of 5.

Financing of Government, as represented by the temporary tax loss resulting from dedication of properties to public use has resulted in a rating of the Dodge Expressway at 7.3 vs. its counterpart the Dodge Parkway 2.7.

SOCIAL FACTORS

The two Dodge Street treatments have no significant differences falling under the heading of **accessibility.** In both cases, interchanges are provided at Grandview and Locust, with several protected points of access intermediate. The only difference involves the inclusion of a frontage road alongside the expressway, to service establishments which do not exist in the parkway treatment. Thus no real differences can be ascribed, and because of the improved geometrics and handling of traffic, they must both be given a grade of 10.

Neighborhood integrity is hardly a factor in any decision involving choice between the two Dodge Street alternatives. The routes are identical and lie in a ravine which is a natural dividing line between neighborhoods. For this reason, we must consider both routes as reinforcing natural boundaries and apply the rating of 10 to both alternatives.

The two Dodge alternatives are to require the relocation of a relatively modest number of families with the parkway taking the slightly greater number. Neither is considered to be a great problem, but we have assigned the expressway treatment a rating of 8, and the parkway, a rating of 7, for the factor of **family disruption.**

ECONOMIC FACTORS

The expressway configuration of Dodge Street includes a frontage road to service the remaining commercial activities along the north curb line. The resultant removal of traffic friction from their margin can only be beneficial to them.

The removal of these commercial properties for the parkway configuration poses some immediate and serious questions regarding their relocation. There does not seem to be available property in the immediate vicinity for relocation, with the result that they would necessarily have to either go out of business, relocate farther west along the Dodge Street corridor, or even relocate along the south alternatives of the freeway. In any case, this would further weaken the historic downtown area.

As a consequence, we must rate the expressway 7 for **economic activity** and the parkway 3, with identical values for the factor of **property valuation.**

The problems of relocation involved in the two Dodge configurations are not unlike. Both configurations take all residences along the south curb, from Bluff through Fremont, with the parkway taking a few more on the north side. Discussion of these is elsewhere in the report and it suffices here to record ratings of 8 for the expressway and 7 for the parkway, under the heading of **replacement housing.**

The parkway affects businesses to a substantially greater extent, because of its encroachment on the north side of the Dodge corridor. The economics of these displacements have been discussed earlier, but the situations warrant an expressway rating of 7 and the parkway rating of 4 under the heading of **displacement of business.**

ENVIRONMENTAL FACTORS

Environmental factors are the main points of difference favoring the Dodge Parkway over the Expressway treatment. It is hardly necessary to discuss all of the factors separately, since several of them are related. The Dodge Expressway is essentially a businesslike approach to the need for increasing capacity of the roadway. By

contrast, the entire concept of the parkway is that of restful parklike beauty to be seen by the driver and his passengers. The expressway is rated 4 for **recreation and parks** and 4 for **aesthetics,** while the parkway receives 10 for each of these factors.

Because of the necessary added width for frontage road, ramps, etc., it is necessary to cut into the south wall of the ravine for the expressway treatment. Thus it is necessary to rate the expressway 4 for **conservation,** as against 6 for the parkway.

On the subject of **natural and historic landmarks,** the parkway treatment capitalizes on the natural beauty of the rugged ravine through which the Dodge avenue travels and thus we are able to rate the parkway with a 10, while the expressway receives only a rating of 3.

Pollution ratings for the two Dodge Street treatments result primarily from the removal of some of the adjacent occupancies in the parkway configuration. The resultants are a rating of 7 for the Dodge Expressway and a rating of 9 for the Dodge Parkway.

COMPARATIVE RATING SUMMARIES

The foregoing ratings arrived at independently and reviewed by the staff, have been consolidated into the following charts. Individual ratings have been multiplied by the relative weights involved and extended to a weighted rating. These weighted ratings have been summated within each group and the total adjusted to a 0 to 100 basis, with this adjusted number appearing in the column "Group Rating". Group totals have been added and divided by 5 to obtain the GRAND TOTAL RATING. Note that by this technique equal weight is given each of the five main factor groups of traffic service, cost, social factors, economic factors and environmental factors.

Now it is possible to compare grand total or overall ratings of comparable alternatives for the purpose of determining the preferred routes. It should not be inferred that this rating system is perfect or all powerful, for it is no better than the individual judgments. However, it should provide a good basis for comparison or contrast.

First, let us examine the northern alternates. Here we find the Couler Alignment with City Island Bridge receiving a rating of 71.2, while the Roosevelt Avenue Alignment with City Island Bridge receives 44.4, and the Roosevelt Avenue Alignment with Eagle Point Bridge a figure of 41.3. The Couler alternative rates far higher than the others. No amount of manipulation of individual ratings or weights can produce any other conclusion. We make this choice with the greatest of confidence.

Moving on to the southern alignments, we find the grand total of the Kerrigan Alignment to be 73.6, while the contrasting figure for the Granger Creek Alignment is 53.6. Here again, we have a very substantial margin for the higher rated alternative and find little ground for any conclusion other than that the Kerrigan alignment is demonstrably superior to the Granger Creek alignment and again we recommend its choice with confidence.

Of the two Dodge alternatives, we find the Parkway configuration leading the Expressway by a narrow margin of 68.4 to 66.7. We do not believe this to be a sufficiently significant difference to permit a clear-cut choice on the basis of the numbers alone. We are inclined to favor the Parkway treatment, but feel that in the final analysis the community itself must participate in the choice.

Let us look at the comparative group totals for the Dodge Corridor. It appears that the Parkway has some advantages in the traffic service group, as indicated by the comparsion of group totals 74.6 and 67.6. Dollar cost favors the expressway by the ratio of 56 to 44.5. Social factors also favor the expressway by a narrow margin 92.4 to 88.4. Economic factors, again favoring the expressway, show a wide margin of 72.6 to 43.1, while the environmental factors reverse that preference, favoring the Parkway by an even wider margin of 90.8 to 44.8.

Obviously, the environmental factors are those weighing most heavily for the Parkway. This is an opportunity almost unparalleled among Dubuque's sister cities, and one which should not be lightly cast aside.

On the other hand, this potential advantage has its costs, the greatest of which shows up under the heading of economic factors representing substantial dislocation of business and consequent devaluation through the inability to obtain locations of equivalent value. Social cost and dollar cost are likewise greater for the Parkway configuration.

So we feel it is not a choice for the consultants alone, but rather a choice to be made by those directly concerned with the welfare and image of the City, calmly, intelligently and in full possession of the facts.

COMPARATIVE RATING SUMMARIES

EVALUATIVE FACTORS	(Weight)	COULER ALIGNMENT with City Island Bridge			ROOSEVELT ALIGNMENT with City Island Bridge			ROOSEVELT ALIGNMENT with Eagle Point Bridge			KERRIGAN ALIGNMENT			GRANGER CK. ALIGNMENT			DODGE EXPRESSWAY			DODGE PARKWAY		
		Rating	Weighted Rating	Group Rating*	Rating	Weighted Rating	Group Rating*	Rating	Weighted Rating	Group Rating*	Rating	Weighted Rating	Group Rating*	Rating	Weighted Rating	Group Rating*	Rating	Weighted Rating	Group Rating*	Rating	Weighted Rating	Group Rating*
TRAFFIC SERVICE				100.0			35.6			26.0			65.6			45.2			67.6			74.6
Fast, Safe, Efficient Transportation	(10)	10	100		3	30		2	20		8	80		3	30		7	70		9	90	
Multiple Use of Space	(7)	10	70		5	35		3	21		4	28		5	35		5	35		5	35	
Operation of Existing & Future Facilities	(8)	10	80		3	24		3	24		7	56		6	48		8	64		8	64	
COST				49.5			51.0			50.9			49.8			51.0			56.0			44.5
Engineering, Construction, Right-of-way	(10)	5.2	52		4.9	49		4.9	49		5.9	59		4.2	42		5.7	57		4.4	44	
Maintenance & Operating	(5)	5.2	26		4.9	24.5		4.8	24		5.5	27.5		4.6	23		4.7	23.5		5.3	26.5	
Public Utilities	(3)	4.5	13.5		5.5	16.5		5.4	16.2		4.1	12.3		5.9	17.7		5	15		5	15	
Government Financing	(3)	4.1	12.3		5.7	17.1		5.9	17.7		1.9	5.7		8.1	24.3		7.3	21.9		2.7	8.1	
SOCIAL				59.1			47.7			44.6			90.0			69.2			92.4			88.4
Accessibility	(8)	10	80		4	32		3	24		10	80		3	24		10	80		10	80	
Neighborhood Integrity	(8)	8	64		4	32		4	32		8	64		7	56		10	80		10	80	
Family Disruption	(10)	1	10		6	60		6	60		9	90		10	100		8	80		7	70	
ECONOMIC				53.1			35.8			35.8			78.0			59.5			72.6			43.1
Economic Activity	(10)	9	90		2	20		2	20		7	70		2	20		7	70		3	30	
Property Values	(8)	9	72		2	16		2	16		7	56		2	16		7	56		3	24	
Replacement Housing	(10)	2	20		6	60		6	60		8	80		9	90		8	80		7	70	
Displacement of Business	(10)	2	20		4	40		4	40		9	90		10	100		7	70		4	40	
ENVIRONMENTAL				94.0			51.4			49.1			84.8			43.0			44.8			90.8
Recreation & Parks	(10)	10	100		5	50		5	50		5	50		5	50		4	40		10	100	
Aesthetics	(10)	10	100		3	30		2	20		10	100		3	30		4	40		10	100	
Conservation	(8)	10	80		2	16		2	16		10	80		2	16		4	32		6	48	
Natural & Historic Landmarks	(8)	9	72		10	80		10	80		10	80		4	32		3	24		10	80	
Pollution	(10)	8	80		6	60		6	60		8	80		7	70		7	70		9	90	
GRAND TOTAL RATING*				71.2			44.4			41.3			73.6			53.6			66.7			68.4

*Adjusted to a 100 base.

TYPICAL COMPUTATIONS:

COST

Wt	Rating	Wtd Rtg
10 x	5.2	= 52
5 x	5.2	= 26
3 x	4.5	= 13.5
3 x	4.1	= 12.3
21		103.8

Group Rating

$$\frac{103.8 \times 10}{21} = 49.5$$

adjustment to 100 base

properties. The inclusion of frontage roads clearly improves the utility and thus the attractiveness of adjacent property as well.

The Granger Creek route, while scenic, would have little positive or negative direct economic impact. Access would be available only at U.S. Highway 52 and 67 where the topography is not conducive to adjacent development. The siphoning off of relatively long-range travelers from the existing Route 61 and 151 would do little to enhance the adjacent property. We thus must rate the Kerrigan Hill alignment 7 on economic activity vs. 2 for Granger Creek, with identical ratings, 7 and 2, for property values.

Relocation problems of the southern routes are not too great. On the Kerrigan route, most of the right-of-way is now used by the existing highway, and on the Granger Creek route, it generally traverses open country. The magnitude of the problems here is far less than in the central and northern parts of the City, with the result that for the subject of **replacement housing** the Kerrigan route receives a rating of 8 and the Granger Creek route a 9. For the factor of **displacement of business** and industry, Kerrigan rates a 9 and Granger Creek rates a 10.

ENVIRONMENTAL FACTORS

On environmental factors, the Kerrigan Road and the Granger Creek alignments are both relatively natural. There is some opportunity for the development of parklike atmosphere in both routes, but it is not deemed to be particularly or unusually strong for either. A rating of 5 is given to both routes for the **recreation and park** criterion.

The **aesthetic** compatibility of the two routes with their surroundings differs substantially. While the Kerrigan route will traverse largely built-up and occupied space, it will be landscaped with good buffer distance. It also is traversing a route already encompassing a major highway. With suitable treatment it can only improve the countryside, and thus is rated 10 for aesthetics. The Granger Creek route, on the other hand, traverses a long distance of what is now a beautiful and completely undefiled creek valley. The original choice of this routing was two-fold—first to use the rather good grade condition existing, and second to provide a beautiful view for the driver and passenger. Unfortunately, the scale of the roadway versus that of the creek valley is such as to be overpowering. It is thus concluded that this has an adverse effect on the aesthetics of the surroundings and is therefore rated 3.

What has just been said regarding aesthetics applies equally to **conservation.** The already existing Kerrigan Route will be changed very little and should have minimal effect on conservation. Thus it is rated 10. Numerous cuts and fills, although not deep, inevitably scar the countryside in the Granger Creek alignment giving that route factor a value of 2 only.

The Kerrigan route has no real effect on **natural or historic landmarks.** What effect there is results in the rugged landscape being more viewable. We rate this route 10 for this heading.

The Granger Creek route, skirting the old Catfish Creek Valley, cuts off the existing approach to the Julien Dubuque Monument and Grave. It makes necessary a rather circuitous and long substitute roadway. Because of its adverse effect, the route is rated only 4 under this criterion.

Pollution levels resulting from improved operating speeds and grades provide a rating of 8 for the Kerrigan Route, as against a rating of 7 for the Granger Creek Route. In part, this difference is the result of the longer roadway of the Granger Creek alternate.

DODGE ALTERNATES

TRAFFIC SERVICE

The Expressway and Parkway treatments of the Dodge Street corridor differ primarily in the inclusion of a frontage road in the expressway treatment, for the purpose of serving the various commercial establishments along the north side of Dodge. In the parkway treatment, these establishments are all taken, leaving little or no abutting property with need for access to Dodge between Grandview and South Locust. In both cases, the street provides three traffic lanes in each direction, providing stable flow, but the increased need for access in the expressway treatment provides somewhat more friction, with its attendant slowing action. Thus, the expressway is rated 6 for **fast, safe and efficient transportation,** while the parkway rates 9.

There is no real difference between the expressway and parkway insofar as use of other facilities is concerned. In both cases, detours and "shoofly" bypasses will be needed during construction and careful phasing of work will be necessary. When construction is complete, however, existing and supplementary facilities will work very well with the new construction. On this basis, both of the treatments are rated 8 for the criterion of **operation and use of existing highway facilities and other transportation facilities during construction and after completion.**

Within the strict definition of **multiple use of space** under which we are operating, there are no appreciable differences between expressway and parkway treatment of the Dodge corridor. It is true that one solution replaces the commercial establishments along the north side by green space, but it is felt that this is not within the context of our terminology. The advantages and disadvantages of each are dealt with elsewhere in our rating system. Therefore, we assigned both of these routes a relatively neutral grade of 5.

COSTS

The dollar cost picture of the two Dodge Street alternatives is an interesting contrast. While the expressway has less site clearing to contend with, it does have substantially more surface area of paving and subgrade preparation, as well as some rock excavation along the south face of the ravine. The result is that the construction cost of the expressway is about 25% greater than that of the parkway. On the other hand, the cost of the right-of-way obtained for environmental purposes increases right-of-way cost of the parkway to 2-1/2 times that of the expressway. The result is that the total cost of the parkway is approximately 20% more than that of the expressway treatment. As a consequence, the expressway treatment is rated 5.7, while the parkway treatment is rated 4.4 for the criterion of **engineering, construction, and right-of-way costs.**

Maintenance and operating cost of expressway and parkway are expected to vary according to the amount of paving surface. Obviously with the frontage road, the expressway presents a greater amount of surface to be maintained. On the basis of this comparison, the expressway treatment is rated at 4.7, while the parkway receives a higher rating of 5.3.

Reconstruction of the Dodge corridor will provide the same conflicts with **utilities** in both alternatives, thus both expressway and parkway are given identical public utility ratings of 5.

Financing of Government, as represented by the temporary tax loss resulting from dedication of properties to public use has resulted in a rating of the Dodge Expressway at 7.3 vs. its counterpart the Dodge Parkway 2.7.

SOCIAL FACTORS

The two Dodge Street treatments have no significant differences falling under the heading of **accessibility.** In both cases, interchanges are provided at Grandview and Locust, with several protected points of access intermediate. The only difference involves the inclusion of a frontage road alongside the expressway, to service establishments which do not exist in the parkway treatment. Thus no real differences can be ascribed, and because of the improved geometrics and handling of traffic, they must both be given a grade of 10.

Neighborhood integrity is hardly a factor in any decision involving choice between the two Dodge Street alternatives. The routes are identical and lie in a ravine which is a natural dividing line between neighborhoods. For this reason, we must consider both routes as reinforcing natural boundaries and apply the rating of 10 to both alternatives.

The two Dodge alternatives are to require the relocation of a relatively modest number of families with the parkway taking the slightly greater number. Neither is considered to be a great problem, but we have assigned the expressway treatment a rating of 8, and the parkway, a rating of 7, for the factor of **family disruption.**

ECONOMIC FACTORS

The expressway configuration of Dodge Street includes a frontage road to service the remaining commercial activities along the north curb line. The resultant removal of traffic friction from their margin can only be beneficial to them.

The removal of these commercial properties for the parkway configuration poses some immediate and serious questions regarding their relocation. There does not seem to be available property in the immediate vicinity for relocation, with the result that they would necessarily have to either go out of business, relocate farther west along the Dodge Street corridor, or even relocate along the south alternatives of the freeway. In any case, this would further weaken the historic downtown area.

As a consequence, we must rate the expressway 7 for **economic activity** and the parkway 3, with identical values for the factor of **property valuation.**

The problems of relocation involved in the two Dodge configurations are not unlike. Both configurations take all residences along the south curb, from Bluff through Fremont, with the parkway taking a few more on the north side. Discussion of these is elsewhere in the report and it suffices here to record ratings of 8 for the expressway and 7 for the parkway, under the heading of **replacement housing.**

The parkway affects businesses to a substantially greater extent, because of its encroachment on the north side of the Dodge corridor. The economics of these displacements have been discussed earlier, but the situations warrant an expressway rating of 7 and the parkway rating of 4 under the heading of **displacement of business.**

ENVIRONMENTAL FACTORS

Environmental factors are the main points of difference favoring the Dodge Parkway over the Expressway treatment. It is hardly necessary to discuss all of the factors separately, since several of them are related. The Dodge Expressway is essentially a businesslike approach to the need for increasing capacity of the roadway. By

contrast, the entire concept of the parkway is that of restful parklike beauty to be seen by the driver and his passengers. The expressway is rated 4 for **recreation and parks** and 4 for **aesthetics,** while the parkway receives 10 for each of these factors.

Because of the necessary added width for frontage road, ramps, etc., it is necessary to cut into the south wall of the ravine for the expressway treatment. Thus it is necessary to rate the expressway 4 for **conservation,** as against 6 for the parkway.

On the subject of **natural and historic landmarks,** the parkway treatment capitalizes on the natural beauty of the rugged ravine through which the Dodge avenue travels and thus we are able to rate the parkway with a 10, while the expressway receives only a rating of 3.

Pollution ratings for the two Dodge Street treatments result primarily from the removal of some of the adjacent occupancies in the parkway configuration. The resultants are a rating of 7 for the Dodge Expressway and a rating of 9 for the Dodge Parkway.

COMPARATIVE RATING SUMMARIES

The foregoing ratings arrived at independently and reviewed by the staff, have been consolidated into the following charts. Individual ratings have been multiplied by the relative weights involved and extended to a weighted rating. These weighted ratings have been summated within each group and the total adjusted to a 0 to 100 basis, with this adjusted number appearing in the column "Group Rating". Group totals have been added and divided by 5 to obtain the GRAND TOTAL RATING. Note that by this technique equal weight is given each of the five main factor groups of traffic service, cost, social factors, economic factors and environmental factors.

Now it is possible to compare grand total or overall ratings of comparable alternatives for the purpose of determining the preferred routes. It should not be inferred that this rating system is perfect or all powerful, for it is no better than the individual judgments. However, it should provide a good basis for comparison or contrast.

First, let us examine the northern alternates. Here we find the Couler Alignment with City Island Bridge receiving a rating of 71.2, while the Roosevelt Avenue Alignment with City Island Bridge receives 44.4, and the Roosevelt Avenue Alignment with Eagle Point Bridge a figure of 41.3. The Couler alternative rates far higher than the others. No amount of manipulation of individual ratings or weights can produce any other conclusion. We make this choice with the greatest of confidence.

Moving on to the southern alignments, we find the grand total of the Kerrigan Alignment to be 73.6, while the contrasting figure for the Granger Creek Alignment is 53.6. Here again, we have a very substantial margin for the higher rated alternative and find little ground for any conclusion other than that the Kerrigan alignment is demonstrably superior to the Granger Creek alignment and again we recommend its choice with confidence.

Of the two Dodge alternatives, we find the Parkway configuration leading the Expressway by a narrow margin of 68.4 to 66.7. We do not believe this to be a sufficiently significant difference to permit a clear-cut choice on the basis of the numbers alone. We are inclined to favor the Parkway treatment, but feel that in the final analysis the community itself must participate in the choice.

Let us look at the comparative group totals for the Dodge Corridor. It appears that the Parkway has some advantages in the traffic service group, as indicated by the comparsion of group totals 74.6 and 67.6. Dollar cost favors the expressway by the ratio of 56 to 44.5. Social factors also favor the expressway by a narrow margin 92.4 to 88.4. Economic factors, again favoring the expressway, show a wide margin of 72.6 to 43.1, while the environmental factors reverse that preference, favoring the Parkway by an even wider margin of 90.8 to 44.8.

Obviously, the environmental factors are those weighing most heavily for the Parkway. This is an opportunity almost unparalleled among Dubuque's sister cities, and one which should not be lightly cast aside.

On the other hand, this potential advantage has its costs, the greatest of which shows up under the heading of economic factors representing substantial dislocation of business and consequent devaluation through the inability to obtain locations of equivalent value. Social cost and dollar cost are likewise greater for the Parkway configuration.

So we feel it is not a choice for the consultants alone, but rather a choice to be made by those directly concerned with the welfare and image of the City, calmly, intelligently and in full possession of the facts.

COMPARATIVE RATING SUMMARIES

EVALUATIVE FACTORS	(Weight)	COULER ALIGNMENT with City Island Bridge			ROOSEVELT ALIGNMENT with City Island Bridge			ROOSEVELT ALIGNMENT with Eagle Point Bridge			KERRIGAN ALIGNMENT			GRANGER CK. ALIGNMENT			DODGE EXPRESSWAY			DODGE PARKWAY		
		Rating	Weighted Rating	Group Rating*	Rating	Weighted Rating	Group Rating*	Rating	Weighted Rating	Group Rating*	Rating	Weighted Rating	Group Rating*	Rating	Weighted Rating	Group Rating*	Rating	Weighted Rating	Group Rating*	Rating	Weighted Rating	Group Rating*
TRAFFIC SERVICE				100.0			35.6			26.0			65.6			45.2			67.6			74.6
Fast, Safe, Efficient Transportation	(10)	10	100		3	30		2	20		8	80		3	30		7	70		9	90	
Multiple Use of Space	(7)	10	70		5	35		3	21		4	28		5	35		5	35		5	35	
Operation of Existing & Future Facilities	(8)	10	80		3	24		3	24		7	56		6	48		8	64		8	64	
COST				49.5			51.0			50.9			49.8			51.0			56.0			44.5
Engineering, Construction, Right-of-way	(10)	5.2	52		4.9	49		4.9	49		5.9	59		4.2	42		5.7	57		4.4	44	
Maintenance & Operating	(5)	5.2	26		4.9	24.5		4.8	24		5.5	27.5		4.6	23		4.7	23.5		5.3	26.5	
Public Utilities	(3)	4.5	13.5		5.5	16.5		5.4	16.2		4.1	12.3		5.9	17.7		5	15		5	15	
Government Financing	(3)	4.1	12.3		5.7	17.1		5.9	17.7		1.9	5.7		8.1	24.3		7.3	21.9		2.7	8.1	
SOCIAL				59.1			47.7			44.6			90.0			69.2			92.4			88.4
Accessibility	(8)	10	80		4	32		3	24		10	80		3	24		10	80		10	80	
Neighborhood Integrity	(8)	8	64		4	32		4	32		8	64		7	56		10	80		10	80	
Family Disruption	(10)	1	10		6	60		6	60		9	90		10	100		8	80		7	70	
ECONOMIC				53.1			35.8			35.8			78.0			59.5			72.6			43.1
Economic Activity	(10)	9	90		2	20		2	20		7	70		2	20		7	70		3	30	
Property Values	(8)	9	72		2	16		2	16		7	56		2	16		7	56		3	24	
Replacement Housing	(10)	2	20		6	60		6	60		8	80		9	90		8	80		7	70	
Displacement of Business	(10)	2	20		4	40		4	40		9	90		10	100		7	70		4	40	
ENVIRONMENTAL				94.0			51.4			49.1			84.8			43.0			44.8			90.8
Recreation & Parks	(10)	10	100		5	50		5	50		5	50		5	50		4	40		10	100	
Aesthetics	(10)	10	100		3	30		2	20		10	100		3	30		4	40		10	100	
Conservation	(8)	10	80		2	16		2	16		10	80		2	16		4	32		6	48	
Natural & Historic Landmarks	(8)	9	72		10	80		10	80		10	80		4	32		3	24		10	80	
Pollution	(10)	8	80		6	60		6	60		8	80		7	70		7	70		9	90	
GRAND TOTAL RATING*				71.2			44.4			41.3			73.6			53.6			66.7			68.4

*Adjusted to a 100 base.

TYPICAL COMPUTATIONS:

COST

Wt	Rating	Wtd Rtg
10 x	5.2	= 52
5 x	5.2	= 26
3 x	4.5	= 13.5
3 x	4.1	= 12.3
21		103.8

Group Rating

$\frac{103.8}{21} \times 10 = 49.5$

adjustment to 100 base

RECOMMENDATIONS

The evaluation system demonstrated the best routes of the various alternatives studied. In general, this confirms the more or less intuitive judgment of other, less exhaustive studies.

We recommend these best routes:
The Couler Valley Alignment
The City Island Bridge
The Kerrigan Alignment
Dodge Parkway or Expressway

The Couler Alignment with its central city and Dodge interchanges, is estimated to cost $62,000,000, including right-of-way, construction and engineering. The Mississippi bridge leg is estimated at $15,300,000. The Kerrigan Alignment is expected to cost $19,100,000, while the Dodge Parkway should cost $8,700,000. Relocations will be necessary for approximately 674 households and 223 businesses.

In making our recommendation, we do not wish to imply that there are no problems to be met in the installation and use of such facilities. There are both dollar costs and social costs. While dollars must be spent wisely, they really should take second position to the social costs involved. The freeway proper will be funded by State and Federal funds, while Dodge Street must come, at least partially, from local money. No tax funds are free, but Dubuque would participate in the use of funds which otherwise would be spent elsewhere in the state or country.

It is also important to emphasize that the loss of local tax base resulting from the removal of properties from the tax rolls is only temporary and will result in a gain in the long run.

The social costs result primarily from the disruptions caused by moving people and businesses from the right-of-way. Most people and businesses will gain financially through grants for purchase costs or rental assistance for replacement properties.

Our recommendations include certain perimeter takings and treatments for the purpose of eliminating or minimizing adverse effects on adjacent property. This is not without its costs. The estimated total acquisition cost of right-of-way needed for peripheral treatment is $2,257,388, and involves the removal of 174 households and 45 businesses. We have arrived at these peripheral takings only after reaching a thorough understanding of the entire, broad picture. Our investigations have indicated that efforts to minimize such takings in the past have often been recognized later to have been false economy, that many people who, at the time, preferred not to be taken, have later changed their opinions.

On the other hand, in the final analysis, the conclusions regarding these perimeters should be participated in by the community. A traffic facility does not exist in a vacuum, nor can it take its place in the community without cooperative planning and coordination. This study, although primarily a route location study, has had to assume certain conditions in order that the effects of the installation could be realistically analyzed. It does not mean that these conditions are totally fixed, but it does set certain levels and types of treatment and makes specific suggestions. We cannot provide a city plan, but we can provide a direction for city planning. If the levels of quality and general direction are not followed, quite obviously the results and the effects on the community will be something different.

A freeway program such as is contemplated here is without question the largest single program to be undertaken in the community, exceeding the downtown Urban Renewal Program. Its effects will reach every part of the city and through every fiber of the economic fabric of the community. It is imperative that the program be done correctly. The importance of the coordination of all of the various activities involved in the program is paramount. All of the functions of the city government, planning, engineering, urban renewal, housing, parks, and schools will be involved. Full cooperation between the city and state governments is vital. City planning must be updated and programmed as a part of a new Dubuque development plan, and the city must evidence the will to put it to work. Without such measures, opportunities for city betterment will be lost.

The replacement housing program is one of the more vital of the programs to be coordinated at the city level. As pointed out elsewhere in this report, it is probable that the private, profit-oriented segment of the building industry can and will produce most of the replacement properties needed. However, this is not the entire answer to the needs of the relocatees. Effort will positively be needed in the non-profit oriented sector as well.

Some suggestions have been shown on our recommended strip map for redevelopment of properties peripheral to the freeway itself. It is anticipated that these should result from the intelligent use of the public housing regulations already in existence. These are primarily for the less mobile segment of the relocatees and those whose means are limited. To avoid the necessity of all city owned and financed building, the cooperation of such organizations as Ecumenical Housing should be promoted. The profit oriented segment of the industry cannot be expected to step into an area where profit is not possible.

It is also likely that the best interests of the community will be served by the exchange of certain properties. Such possibilities should be carefully studied. It is suggested that the Dubuque Industrial Bureau might offer the best avenue for such transactions.

Construction staging is largely a matter of choice. There is no necessary starting point from the construction standpoint. However, it has been pointed out that the present river crossing will be overloaded by 1978, so an early start on the new crossing would be wise. It would thus appear that, along with the new bridge, the construction connecting it to Dodge and Locust streets should have first priority. The north leg should probably come next to ease the traffic loads on Central and its parallel streets.

The Kerrigan reconstruction, to the south, is not so vitally needed at this time, but probably should be planned to be completed by the time U.S. 520 is carrying traffic.

The Dodge Street work can be done at any time.

The physical embodiment of our recommendations is illustrated on the accompanying drawings. It includes the following elements:

An elevated downtown freeway structure about 12,000 feet long, from 24th Street to Kerrigan Hill.

A south freeway connection of about 17,300 feet, to the proposed U.S. 520 Freeway.

A west Dodge Street Parkway of about 7,200 feet, to Grandview, Fremont and Lombard.

A north Couler Valley expressway of about 18,600 feet, to John Deere Road, Iowa 386 North.

A freeway-bridge connection to the east shore of the Mississippi and Wisconsin Routes 35 and 11, about 10,000 feet.

In terms of its physical-social impact on the city, the most important of these elements is the 2-1/4 mile central elevated structure. From 24th Street to the Dodge Street Interchange it will create a bounding element some 25 feet high between the downtown commercial and residential sections, which lie between it and the western bluffs, and the industrial section and river to the east. No doubt, the separation from industry will be an asset, but further separation from the river should be avoided. A broad, yet intensive, examination of the overall urban design potential of Dubuque would certainly find that the river should be treated as an amenity which can improve the quality of urban living as well as being a utilitarian

waterway and a sewer and the source of flood hazards. An urban design plan for the entire central city would undoubtedly include construction for rich and meaningful waterfront living, cultural and recreational facilities, and perhaps a pleasure drive promenade complex, from the Rhomberg area to Kerrigan Hill, that could tie in with a City Island park. That major amenity should not be easily abandoned.

In this central section, our environmental analysis and plan specify possibilities for new housing, parks, and downtown renewal improvements associated with the freeway construction program. Suggestions for the implementation of such possibilities are included.

A further recommendation must involve the ultimate design character of the freeway structure itself. Basically, a massive open colonnade 25 or more feet high and 2-1/4 miles long, this will be by far the largest and most important structure in Dubuque. Combined with the existing and new bridges, the bluffs and the river, it will create the principal visual image of the city. This large complex will frame all of the other buildings, streets and open spaces which comprise the basic structure of the city.

The detailed design of this freeway structure, when it is built, will be of critical importance. It should not be treated as a simple utilitarian structure. Rather it should be considered a major piece of urban architecture. Line and form should be light and graceful, as befits a structure of such imposing size.

This is not to say that suggested details are unimportant. It may have been noted that we have indicated a solid concrete barrier at the margin of the freeway. This is not done capriciously. Besides its safety characteristic of redirecting a striking vehicle longitudinally along the roadway, it is one of the positive means of noise control in nearby property. Further study at the time of final design should determine its proper height, but it should be solid, without openings.

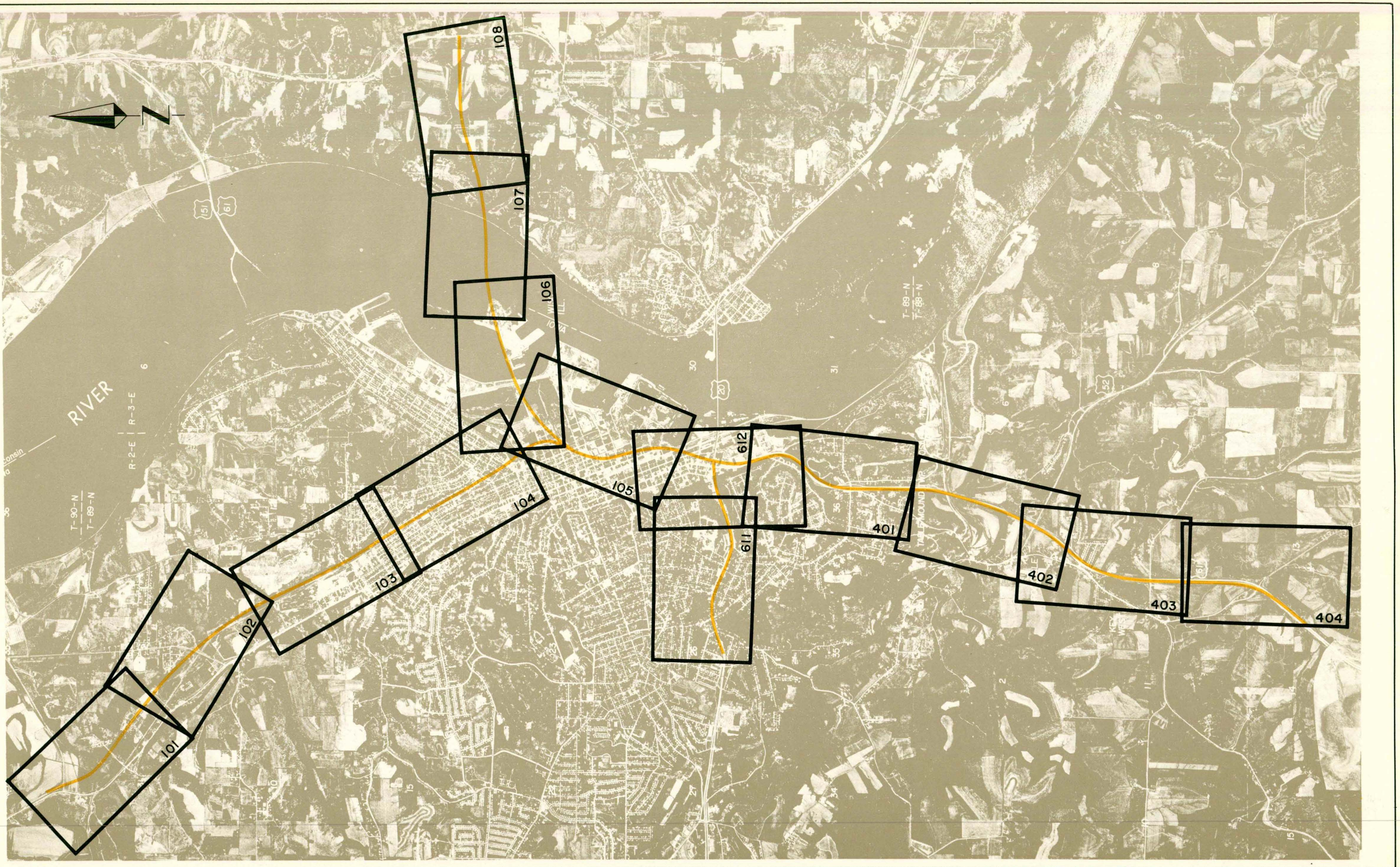
The south connection will present more typical freeway problems. Relations between traffic structures, land and vegetation forms, feeder connections, and land use control within the viewed corridor will all require intensive study.

The Dodge corridor presents opportunities for creating a handsome sculptured entrance structure at the Grandview underpass and the fine bluff to bluff green parkway for the mile and a half down to the Dodge Street interchange.

The Couler Valley expressway likewise presents opportunities for creating a true industrial park, combining structural development with green open space and bodies of water, as a handsome north entrance to the City.

The east connection over the Mississippi can be a very handsome extension of the central elevated structure, combined with a fine new bridge design. This will provide great vistas up and down the river, as well as an outstanding view of the City for the approaching driver.

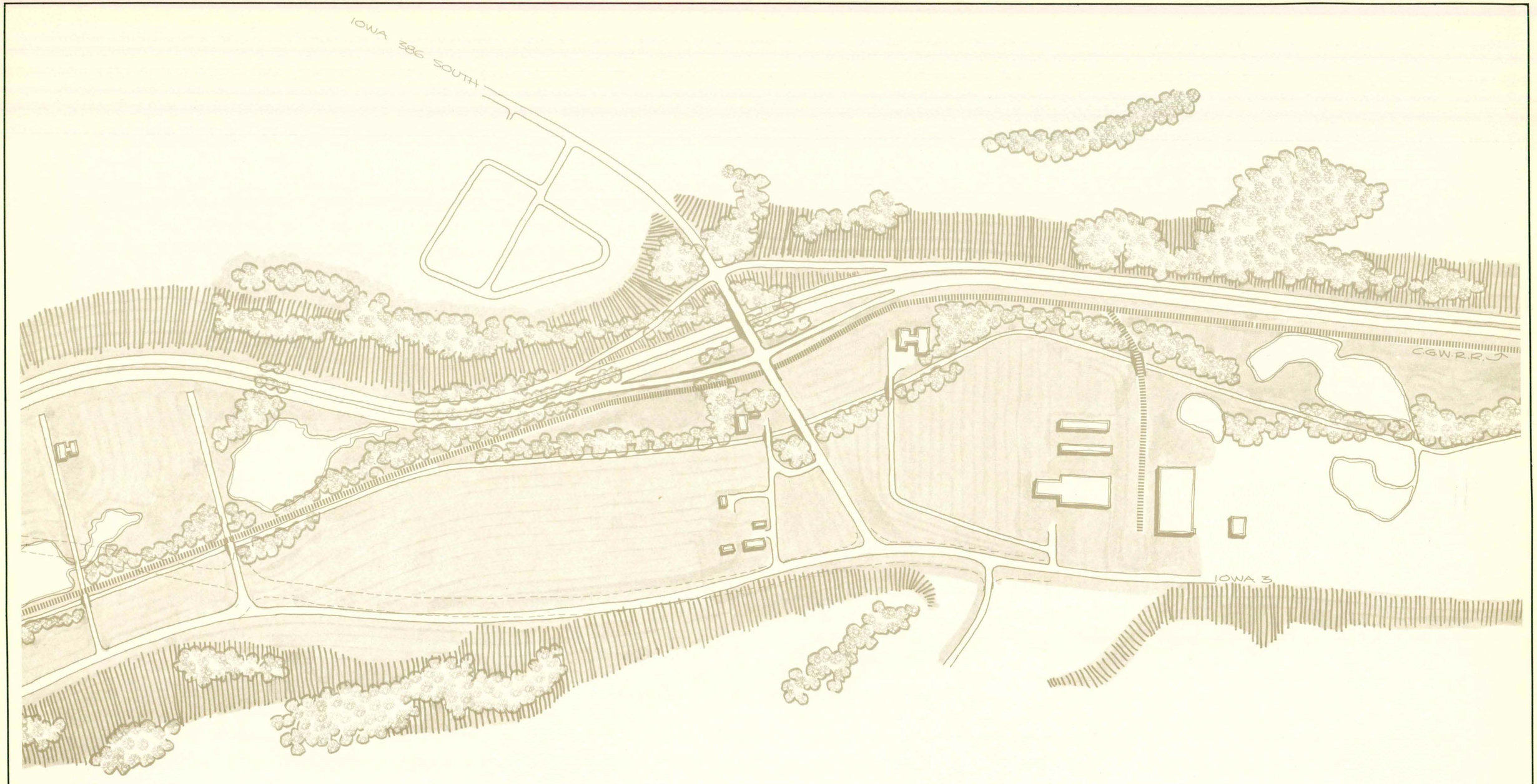
Finally, let us reemphasize that this should not be looked upon as a freeway **through** the City. It should be considered part and parcel of the total City structure. The facility's impact on the City and its potential for catalyzing and assisting other improvement programs must be examined very closely. Those who sponsor and direct this program take on major responsibility for the future quality of Dubuque's environment. The coordination of effort among the various teams designing individual portions of the City Improvement Program must be wholehearted and sincere.



KEY MAP RECOMMENDED ALIGNMENTS

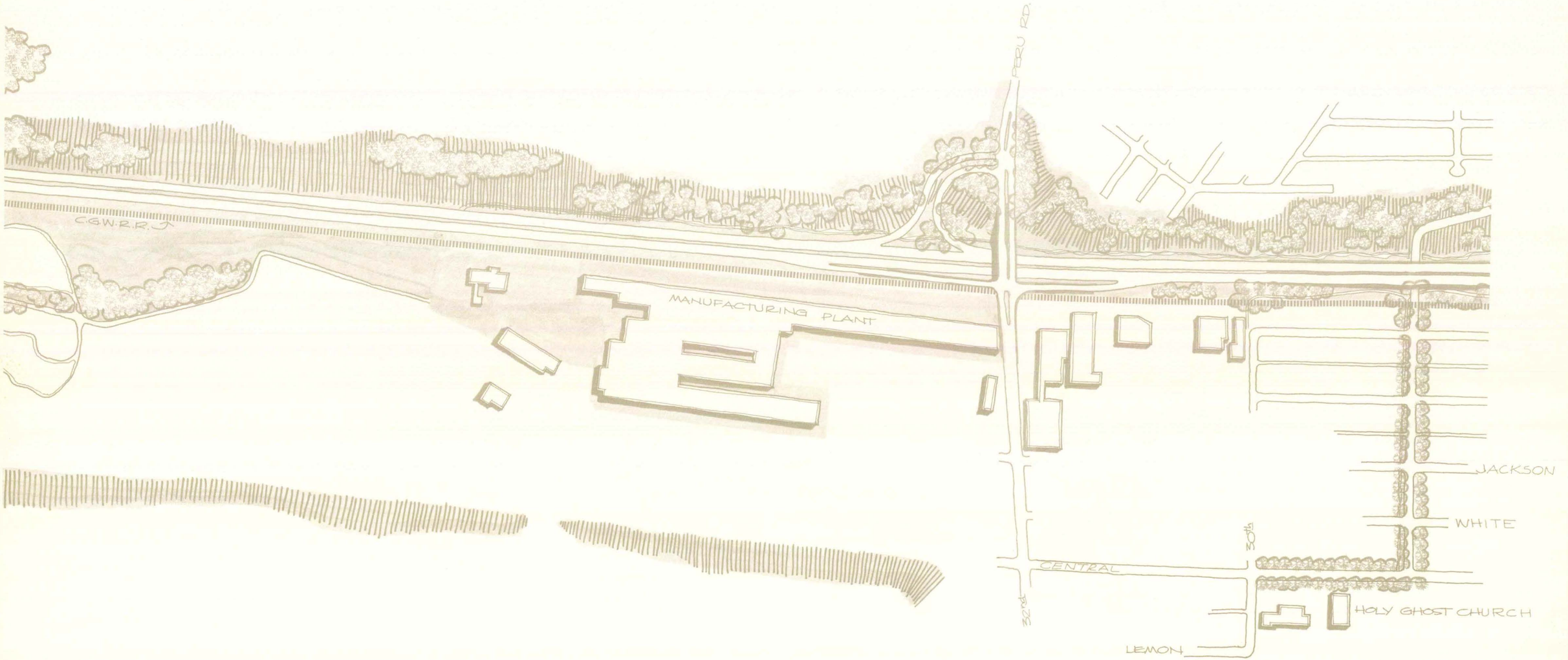
COULER ALIGNMENT CITY ISLAND BRIDGE ALTERNATE

PLATE S-101
FEBRUARY, 1972



COULER EXPRESSWAY CITY ISLAND BRIDGE ALTERNATE

PLATE S-102
FEBRUARY, 1972



COULER ALIGNMENT CITY ISLAND BRIDGE ALTERNATE

PLATE S-103
FEBRUARY, 1972

BIKE TRAIL
QUEEN
THOMAS
LINCOLN
RHOMBERG
C.M.ST.P.&P.R.R.
PARKING
WINDSOR
SACRED HEART CHURCH
NEW AUDUBON SCHOOL
JOHNSON
POSSIBLE NEW PLAYGROUND
GARFIELD
BIKE TRAILS
C.G.W.R.R.
TRUCK MARSHALLING UNDER
28th
WASHINGTON
27th
POSSIBLE FUTURE REPLACEMENT HOUSING
26th
POSSIBLE PARK
25th
COMISKEY FIELD
24th
22nd
JACKSON
21st
20th
SUPERMARKET
19th
18th
ELM
WASHINGTON
17th
16th
POSSIBLE REPLACEMENT HOUSING

COULER EXPRESSWAY CITY ISLAND BRIDGE ALTERNATE

PLATE S-104
FEBRUARY, 1972

OVERFLOW POND: LOWER AND LANDSCAPE

I.C. R.R.

PARKING

MARSHALLING YARD

GARFIELD

ELM

WASHINGTON

JACKSON

WHITE

REPLACEMENT HOUSING

'ENT HOUSING

CENTRAL

IOWA

JAIL-COURTHOUSE

COURTHOUSE PLAZA (COMMERCIAL FACILITIES)

MAIN STREET MALL

HOTEL

LOCUST

BLUFF

CATHEDRAL SQUARE HOUSING

COULER ALIGNMENT CITY ISLAND BRIDGE ALTERNATE

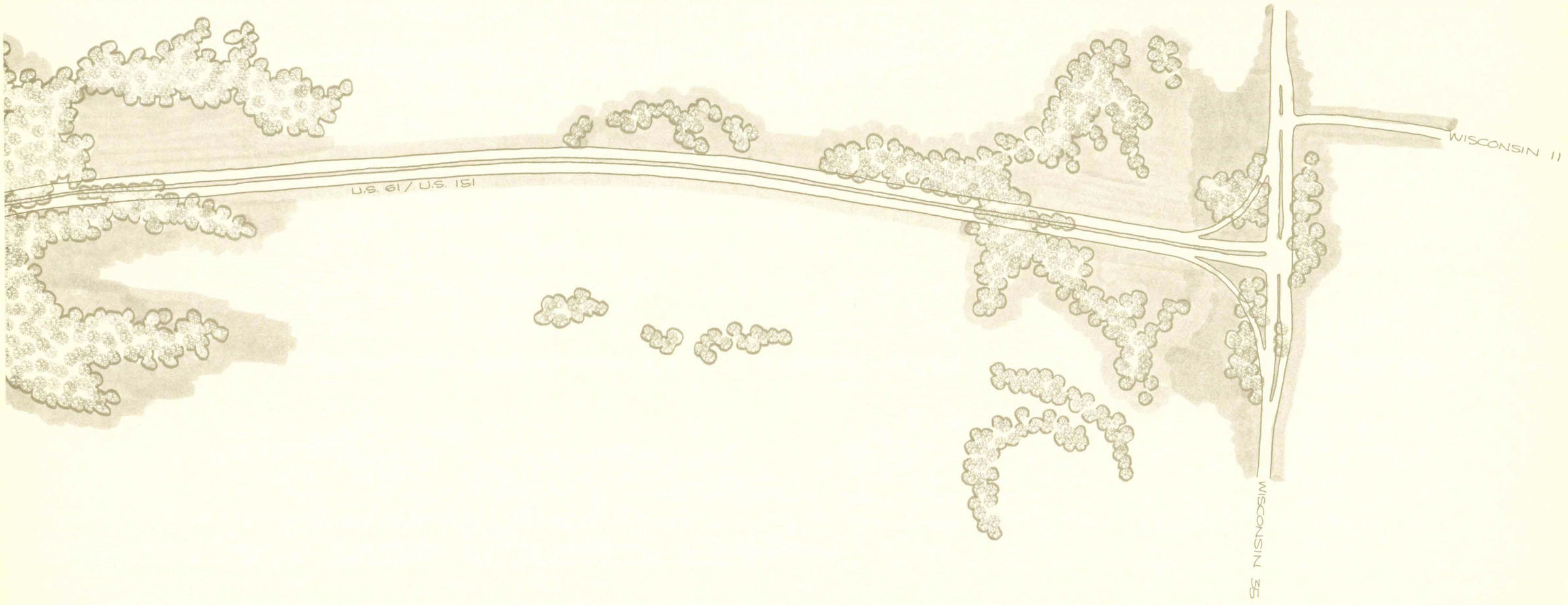
PLATE S-105
FEBRUARY, 1972

COULER EXPRESSWAY CITY ISLAND BRIDGE ALTERNATE

PLATE S-106
FEBRUARY, 1972

COULER ALIGNMENT CITY ISLAND BRIDGE ALTERNATE

PLATE S-107
FEBRUARY, 1972

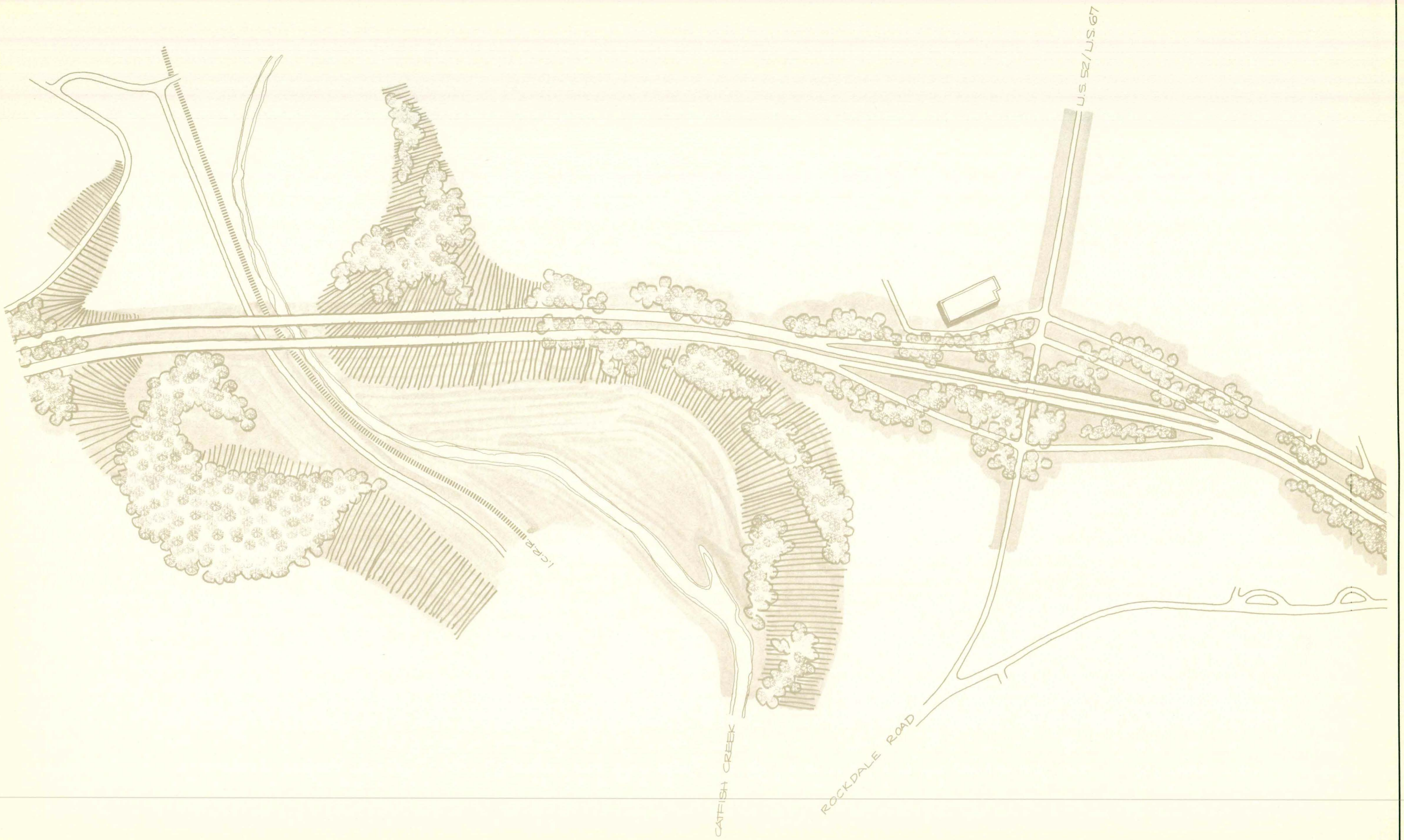


COULER ALIGNMENT CITY ISLAND BRIDGE ALTERNATE

PLATE S-108
FEBRUARY, 1972

KERRIGAN ALIGNMENT

PLATE S-401
FEBRUARY, 1972



KERRIGAN ALIGNMENT

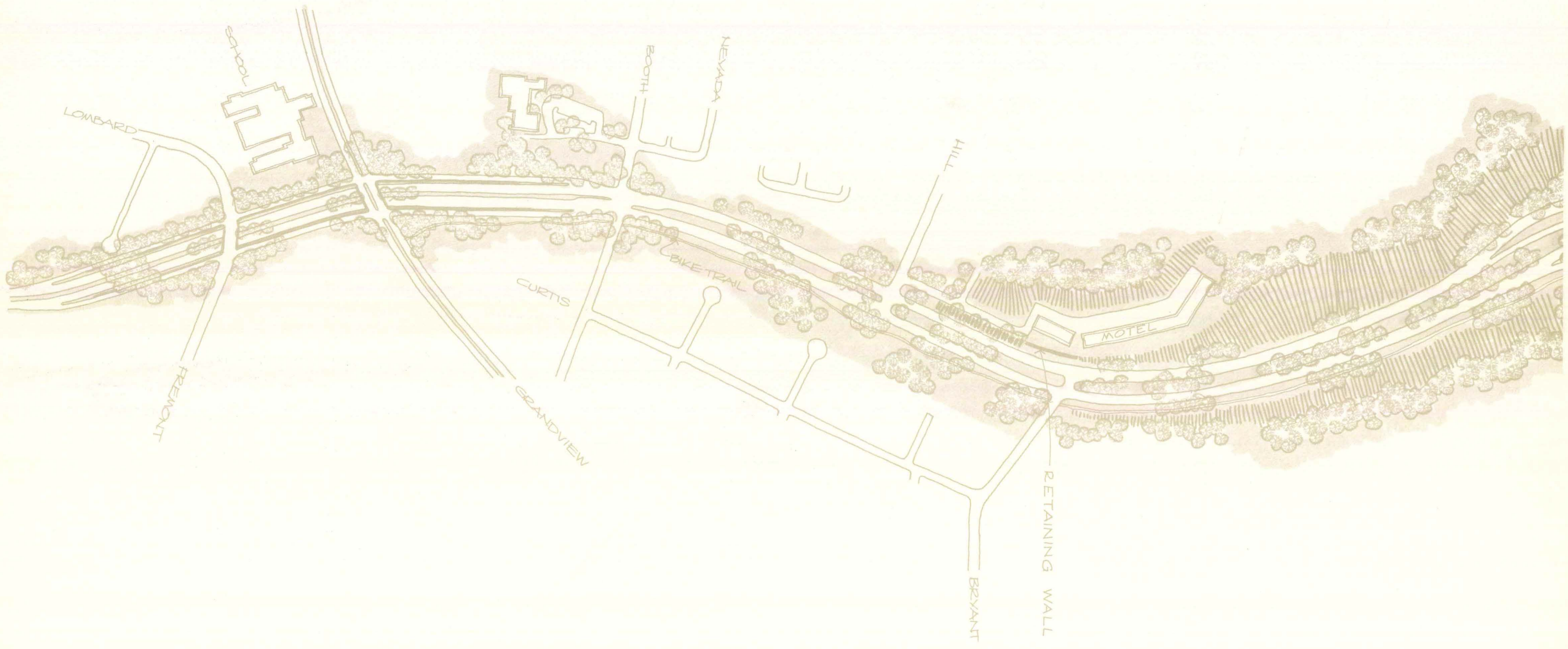
PLATE S-402
FEBRUARY, 1972

KERRIGAN ALIGNMENT

PLATE S-403
FEBRUARY, 1972

KERRIGAN ALIGNMENT

PLATE S-404
FEBRUARY, 1972



DODGE PARKWAY ALIGNMENT

PLATE S-611
FEBRUARY, 1972

DODGE PARKWAY ALIGNMENT

PLATE S-612

FEBRUARY, 1972

VIEWS AND NOTES FROM PUBLIC HEARING

More than 300 citzens attended the corridor hearing Sept. 14, 1972. The following is a summarization of the presentations and discussions of that evening, and written submittals received after the hearing.

A majority of those attending apparently recognized the need for improved traffic facilities although some questioned the extent or degree and the consequent intensity of construction necessary to meet that need. Some took issue with state traffic forecasts which will be updated and executed in greater detail for the design phase of the work.

Part of the reluctance of the public's difficulty in accepting increases in traffic projected 20 years into the future is based on wishful thinking with respect to the part to be played by public transportation, in spite of its current decline in all but the largest cities. Even there, changes are made possible only by the infusion of massive amounts of public money not available to cities of Dubuque's size.

There appeared to be a wide-spread lack of knowledge or understanding among the general public of the Metropolitan Area Transportation Plan which had earlier singled out the corridor as having the highest priority. A number of persons recommended the substitution of circumferential routes without realizing such routes were already part of the overall plan and their existence could not fulfill the needs of the traffic generators in the heart of the city. The final draft and dissemination of the Transportation Plan Report for Dubuque was delayed allowing little time for study. Consequently, during the study, it was necessary to reiterate and revalidate the previous drafts. That these attempts met with less than complete success is still apparent, and although there will be some latecomers, they should be in the minority.

The primary motive behind the objections and alternate suggestions was believed to be an attempt to minimize problems of relocation of both residents and businesses in an undeniably-congested portion of the metropolitan area. Coupled with this were the fears of those who felt air pollution and noise levels would inevitably increase and devalue neighboring properties. Conclusions reached by some residents appeared to be based on incomplete information or inaccurate use of forecasting techniques available and were quite speculative.

The size of the relocation problem may have presented the greatest shock to residents. Certainly it was a major argument presented against the Couler Valley part of the route and is worthy of some additional discussion.

Every Dubuque, city or metropolitan area plan stresses the need for greater capacity along this route, the only available location for a leg of the "high-mobility loop". It is logical, therefore, that a new facility should lie somewhere between the enclosing bluffs. From about 18th to 32nd Streets, the Valley is densely populated, mostly residential structures, although some commercial establishments, churches and schools line Central Avenue and several important industries lie along the west edge of the old C.G.W. Railroad line. Upgrading Central Avenue cannot provide the needed service without eliminating access and the consequent economic destruction of its bordering properties. On the other hand, the rail line offers an already-restricted alignment.

There are several choices of detail here. First, the railroad operations can be terminated and the actual right-of-way appropriated for freeway use. This does not seem desirable, or feasible, since all of the industries adjacent depend on it to a substantial degree. Terminating railroad service would add materially to truck traffic in the corridor.

A second alternative is to double-deck the railroad and carry the road traffic overhead. This is feasible, although the cost of use of right-of-way for freeway supports and restrictions on future modifications, along with the cost of elevated structure (where the recommended solution is at grade) might well be greater than the proposed plan. This seems to be more of a design problem than a location problem, however.

Finally, there is the presently-recommended location, adjacent to the railroad line. The residential takings are mostly older properties, and quite crowded. It is interesting to note a few facts: Between 20th and 32nd Streets, the recommended solution requires the taking of 110 residential buildings solely for the construction of the roadways. To provide the buffering to meet current environmental standards, an additional 74 must be purchased. The total in this reach then, is 184 residences, corresponding to 256 families. Whether this additional taking is reasonable, in an environment already dominated by a railroad, is debatable.

Appendix C-8 discusses the air and noise pollution characteristics in some depth. The general conclusion regarding air pollution is that vehicles on the freeway operating at more efficient and constant levels of speed, will produce significantly less pollution than if restricted to the City

streets. Thus, the overall condition of the City's air should be improved, although there will undeniably be some redistribution through rerouting. Dissipation of pollutants from elevated sections will also be accelerated.

The same Appendix section discusses noise levels, using what were then the best available techniques for estimation and criteria of acceptability. It is noted that certain areas, to be chosen during final design studies, will need corrective barrier treatment. It also addresses itself to a sensitive location — Audubon and Sacred Heart Schools. This location was re-examined later in response to the written inquiry of a Sacred Heart parishioner, and it was again found to be acceptable. In the interim, newer criteria were promulgated (PPM 90-2), making the margin of acceptability even greater. It must be emphasized, however, that we have assessed the results of a tentative location and perimeter condition, details of which must be re-examined during design.

A survey of existing noise levels was not required nor anticipated when this study was undertaken, although it has since been included in guidelines. Such information should make noise discussions more objective, and the Commission intends to follow through as the planning process continues. This will make realistic judgments possible.

Also foreseen were problems of pure aesthetics. The style or character of old Dubuque was lauded by many who felt an elevated freeway would clash with, or even destroy, its historic quality. Aesthetics is a most difficult subject for discussion, depending entirely on personal judgments, opinions, and preferences. There is much in Dubuque that has real aesthetic quality and historic value but great care must be taken to distinguish between these values and mere age because there is much that is just old, dilapidated and undistinguished.

The reasons for concern with, and objection to an elevated freeway in the downtown area have never come through clearly. If the proposed structures towered high above the neighborhood, the concern could be accepted as having a logical foundation. However, when passing through a neighborhood of two and three story buildings, with some even higher, the objection appears to lose credibility. In the Flats east of the railroads, it will stand up above its employee parking surroundings, but as this is an approach to a river bridge, through an industrial area, it is a valid expression of function and certainly no aesthetic blight. In the neighborhood of the Dodge interchange, the freeway does have a ramp which might be described as "soaring", but up against the 200-foot bluffs, it is dwarfed.

It would be well to summarize here the reasons for the choice of an elevated structure in the central city.

1. Even before the study began, various members of the official family of the City of Dubuque made very strongly-worded statements regarding the conflicts of railroad traffic with the present surface traffic of the existing street system, pointing out the existence of only one, very poorly placed viaduct into the Flats area. It was pointed out this was not only a serious inconvenience but had a very heavy bearing on access of emergency equipment and personnel, such as fire, police, ambulance, etc.

2. Two major main line railroads and one of lesser stature wind and twist their way through the Dubuque flood plain, with their numerous connecting yards, side tracks and feeder tracks. Any serious interruption would simply increase truck traffic in the vicinity, one of the problems which we are trying to alleviate.

3. No matter where the Freeway might be routed, at least one of its legs must cross this network once and perhaps several times, requiring its elevation at least at that point.

4. There is strong need for access between the riverfront and the remainder of the City, and concomitantly, there is need to avoid additional restriction of such access.

5. Studies of specific at-grade intersections between local streets and an expressway-type facility revealed most severe conflicts and competition for space and time with both crossing traffic and pedestrians should they meet at grade. The results were excessive roadway widths and numbers of lanes, and excessive right-of-way requirements with their attendant costs.

6. It is nearly impossible to provide the grade separation by depressing the roadway, because of the high water table in the flood plain and because of conflicts with major underground utilities. These conflicts are capable of solution only by heroic means, at heroic cost.

7. Cost studies were prepared showing that an elevated freeway is no more costly than an at-grade freeway with viaducts for crossing traffic at four block intervals. With viaducts at 3 block intervals, the elevated freeway is less expensive.

8. An elevated freeway permits much multiple use of right-of-way.

9. An elevated freeway, being more exposed to prevailing wind movements, provides a much quicker dissipation of any air pollution produced on the roadway.

10. If the objection is based on cost, then it is mistaken. We believe that no **valid** solution of the central City's traffic problem can be accomplished at a cost less than that of the elevated freeway.

11. It seems counter-productive to take extensive precautions against noise in a location adjacent to a railroad line, for instance.

On the positive side, many other persons, primarily business leaders, strongly endorsed the corridor and alignment as necessary for the continued economic welfare of the business community and its employees. According to one: "One of the most severe sociological impacts any town can have . . . would be unemployment." The proponents, quite numerous, presented their endorsements most clearly and forcefully.

There were some objections to specific details beyond the purview of this type of an investigation, but at least one alternate alignment or modification of the proposed alignment was brought forward by a group of business men.

Four basic conclusions stand out:

1. The need for improved traffic facilities has been unsatisfied for so long, that the solution, to be successful, appears to be rather heroic in stature. Thus, the changes are found to be a shock to the uninitiated.

2. The corridor alignment appears to be the most acceptable of those available.

3. Some changes in alignment and detail must be studied in detail in the design stages to follow.

4. More specific data on pollution levels needs to be developed in response to the disturbed occupants of specific localities.

In connection with Conclusion No. 3 above, two specific areas need, and will receive, additional study. The first is the crossing of the South Main Street industrial area from the foot of Kerrigan Hill, northward to the bridge interchange. This includes an interchange with the Dodge Street—Julien Dubuque Bridge access. The second involves the peculiarly-difficult traverse of the Couler Valley, discussed earlier. In such a location, the designer is clearly caught in a dilemma.

The planning program undertaken here has given positive evidence much can be done to minimize or eliminate adverse reactions when it is possible to identify a problem area and work with those people (neighborhood, business or other,) who are specifically involved. It take time to accomplish this and to develop the goodwill needed, but it is a necessary part of planning. Unfortunately, it appears that not all persons are able or willing to recognize or identify their problems until seeing the completed recommendation.

Post Hearing Deliberations

Some time subsequent to the actual hearing, the City Council of Dubuque unanimously voted to favor the concept of the freeway. This action was taken on December 5, 1972.

There have also been some informal discussions between citizens of Dubuque and the Highway Commission staff to more clearly state their specific need in connection with freeway location and design details so that future planning may deal with these individual problems as intelligently as possible. The Commission will continue to review the City's suggestions and needs during the design phase of the project.

APPENDICES

APPENDIX A
TERMINOLOGIES AND REFERENCES

APPENDIX A-1
LEVEL OF SERVICE[1]

Level of service denotes any one of six basic operating conditions that may occur on a given lane or roadway when it is accommodating various traffic volumes. Level of service is a qualitative measure of the effect of a number of factors, which include speed and travel time, traffic interuptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

A **Service Volume** is the maximum number of vehicles that can be accommodated during a specified time period while operating conditions are maintained that correspond to the selected or specified level of service.

Freeway Level of Service.

Level of service A is defined as **Free-flow operation** with low volumes and high speeds. Free-flow operation implies a flow condition in which a vehicle essentially is not affected by other vehicles in the traffic stream, and selection of speed is based on the individual driver's choice and on roadway design features. Operating speeds are greater than 60 mph and the service volume is 700 passenger cars per lane per hour.

Level of service B is in a **higher speed range of stable flow.** This level requires that operating speeds be at or greater than 55 mph and that the service volume on two lanes in one direction not exceed 50 percent of capacity. This gives an average service volume of 1000 passenger cars per lane per hour.

Further increases in demand volume are accompanied by a resultant decrease in operating speeds into **level of service C** which is still within the range of **stable flow.** In general, the requirements for level of service C are an operating speed of at least 50 mph and a service flow rate on two lanes in one direction not exceeding 75 percent of the capacity rate. Under ideal conditions for two lanes in one direction the rate cannot exceed an average of 1500 passenger cars per lane per hour.

Level of Service D is the **lower speed range of stable flow** with volumes higher than in Level C. Traffic operation under Level D approaches instability and becomes very susceptible to changing operating conditions. Operating speeds are near 40 mph, and service flow rates do not exceed 90 percent of capacity rates. Under ideal conditions for two lanes the flow rate cannot exceed an average of 1800 passenger cares per hour.

Level of Service E is the area of **unstable flow** involving volumes approaching or at **capacity.** Level E has overall operating speeds of about 30-35 mph and can handle about 2000 passenger cars per lane per hour under ideal conditions. Operating conditions may involve either fairly uniform speeds of about 50 percent of free-flow operating speed through the entire section, or a more intermittent type of operation. Design for this level is not recommended.

Level of service F describes a **forced-flow condition** in which the expressway acts as storage for vehicles backing up from a downstream bottleneck. Operating speeds range downward from those at capacity (near 30 mph) to those during stop-and-go type operation, and can drop to zero in the extreme case of a complete jam. Volumes vary widely, depending principally on downstream capacity. This service is unacceptable.

Urban and Suburban Arterial Level of Service

In addition to the previously stated general factors, levels of service for urban arterials are mainly a function of the intersection approaches, principally where major traffic streams cross. Such factors as street width, amount of "green" signal time, parking ,regulations, and turning traffic are important in measuring the levels of service.

Level of Service A is relative to free flow conditions characterized by negligible delay. Short term volume fluctuations may occur but will have little adverse effect. Overall travel speed should be 30 mph or more with service volumes up to 60% of capacity.

Level of Service B is the upper range of stable flow. As service volumes reach 70% of capacity, occasional signal loadings may develop. Average speeds remain at 25 mph or above; delay is not unreasonable.

Level of Service C is stable flow with acceptable delay. Service volumes are about 80% of capacity and overall travel speeds are at least 20 mph or more.

Level of Service D is approaching unstable flow. Volume increases have begun to tax the capabilities of the street. Service volumes approach 90% of capacity with average overall speeds down to 15 mph level. Delays at critical locations may become extensive with some vehicles occastionally waiting two or more signal cycles. Signals in effect store excess traffic demand.

Level of Service E is capacity and constitutes unstable flow causing the motorists intolerable delay and congestion. Continuous backup occurs on the approaches to most intersections with average speeds in the area of 15 mph.

Level of Service F is forced flow or jammed traffic movement with vehicular backups from one signal extending back through an upstream signalized intersection. Speeds vary from 0 to 15 mph.

(See examples on following page.)

---

[1]) **Highway Capacity Manual,** Special Report No. 87, Highway Research Board, 1965, Washington, D.C., pp. 245-279; 318-323.

APPENDIX A-2
LIST OF REFERENCES

1. **Comprehensive City Plan for Dubuque, Iowa, prepared**

1. **Comprehensive City Plan for Dubuque, Iowa,** prepared by City Planning & Zoning Commission, John Nolen, Consultant, 1936.

2. **Dubuque Development Program,** prepared for City of Dubuque, Iowa, and Dubuque Chamber of Commerce, by Victor Gruen Associates & Larry Smith and Company, 1965.

3. **Dubuque Metropolitan Area Transportation Plan, The 1990 Plan,** Green Engineering Company, February 1970.

4. **Mississippi River Toll Bridge**
Howard, Needles, Tammen & Bergendoff, and Wilbur Smith & Associates, October, 1968.

5. **Dubuque Downtown Urban Renewal Project**
Barton—Aschman Associates, June 1967.

6. **Proposed Iowa Street Parking Ramp,**
DeLeuw Cather & Associates, November, 1968.

7. **1965 Highway Capacity Manual,** Special Report 87, Highway Research Board, Washington, D.C.

8. **Capacity Analysis Techniques for Design of Signalized Intersections,** Reprints from **Public Roads, A Journal of Highway Research,** Vol. 34, Nos. 9 and 10, U.S. Dept. of Transportation.

9. **Highway Noise, A Design Guide for Highway Engineers,** NCHRP Report 117, Highway Research Board, 1971.

10. **Air Pollutant Emission Factors,** U.S. Environmental Protection Agency.

11. **Policy and Procedure Memorandum 20-8** Department of Transportation, Federal Highway Administration, January 14, 1969.

12. **Benefits of Interstate Highways,** U.S. Department of Transportation, Federal Highway Administration, June, 1970

13. **A Policy on Geometric Design of Rural Highway,** American Association of State Highway Officials, 1965.

14. William A. Luna, "An Analysis of Reports on Ground Vibrations Due to Pile Driving," **Foundation Facts,** Vol. III, No. 2, 1967.

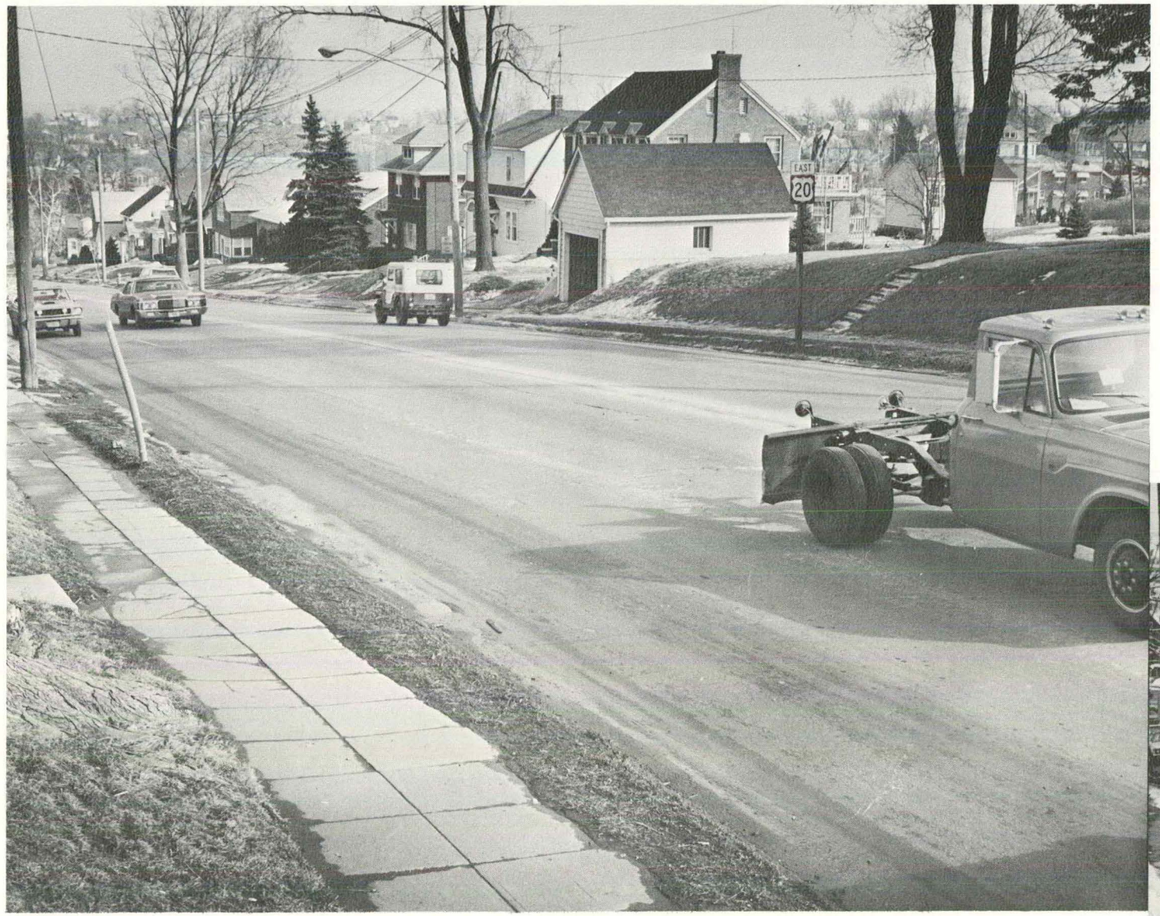
15. R. H. Ferahion & W. D. Hurst, "Construction Equipment 'Shakes' ", **American City Magazine,** September, 1969.

16. **Bridges and Foundations,** HRB Research Record No. 354, Highway Research Board.

17. **Dynamic Pavement Loads of Heavy Highway Vehicles,** NCHRP Report 105, Highway Research Board.

18. Karl Terzaghi and R. B. Peck, **Soil Mechanics in Engineering Practice,** 1948.

19 Melveille C. Branch, **Outdoor Noise and the Metropolitan Environment,** University of Southern California, 1970



Characteristic of Urban Street Level of Service "A"

Characteristic of Urban Street Level of Service "E"

APPENDIX B
PURSUIT OF ALTERNATE DESIGNS

APPENDIX B—1

EXPRESSWAY vs FREEWAY

REFERENCES:

A. **Highway Capacity Manual 1965,** Highway Research Board, Special Report 87

B. **Capacity Analysis Techniques for Design of Signalized Intersections** Reprints from **Public Roads, A Journal of Highway Research,** Vol. 34, Nos. 9 and 10, 1967.

COMMENTS:

1. Table A compares a Freeway with Expressway. For 1990 traffic, Freeway service is 45-50 mph average operating speed on a 6-lane facility, while Expressway service is 15 mph average operating speed on a 12-lane facility.

2. The calculation for the Expressway

   a. Do not consider pedestrian phases in the traffic signal timing. Added pedestrian signal timing would most likely require an extra lane in each direction to compensate for a corresponding reduction in vehicular signal timing; i.e. 14-lane Expressway.

   b. Indicate a single roadway would be over 200 feet wide to handle the traffic. If a one-way way street pair is used, each street's width would be around 100 feet.

   c. Do not consider the longer amber times which would be required for vehicles to clear the at-grade intersection.

   d. Do not consider the Central-White traffic which was not on the Freeway but on the surface streets. Under the Freeway Alternate, Central-White traffic was vertically separated from Freeway traffic. Under the Expressway, the two traffic flows are in the same horizontal plane.

TABLE A

Type of Roadway[1])	Mainline Traffic (vpd)	Lanes Both Directions	Avg Level of Service [4])	Avg. Operating Speed for the Level of Service
Freeway	46,600	6[2])	C	45-50 mph
Expressway	46,600	12[3])	D	15 mph

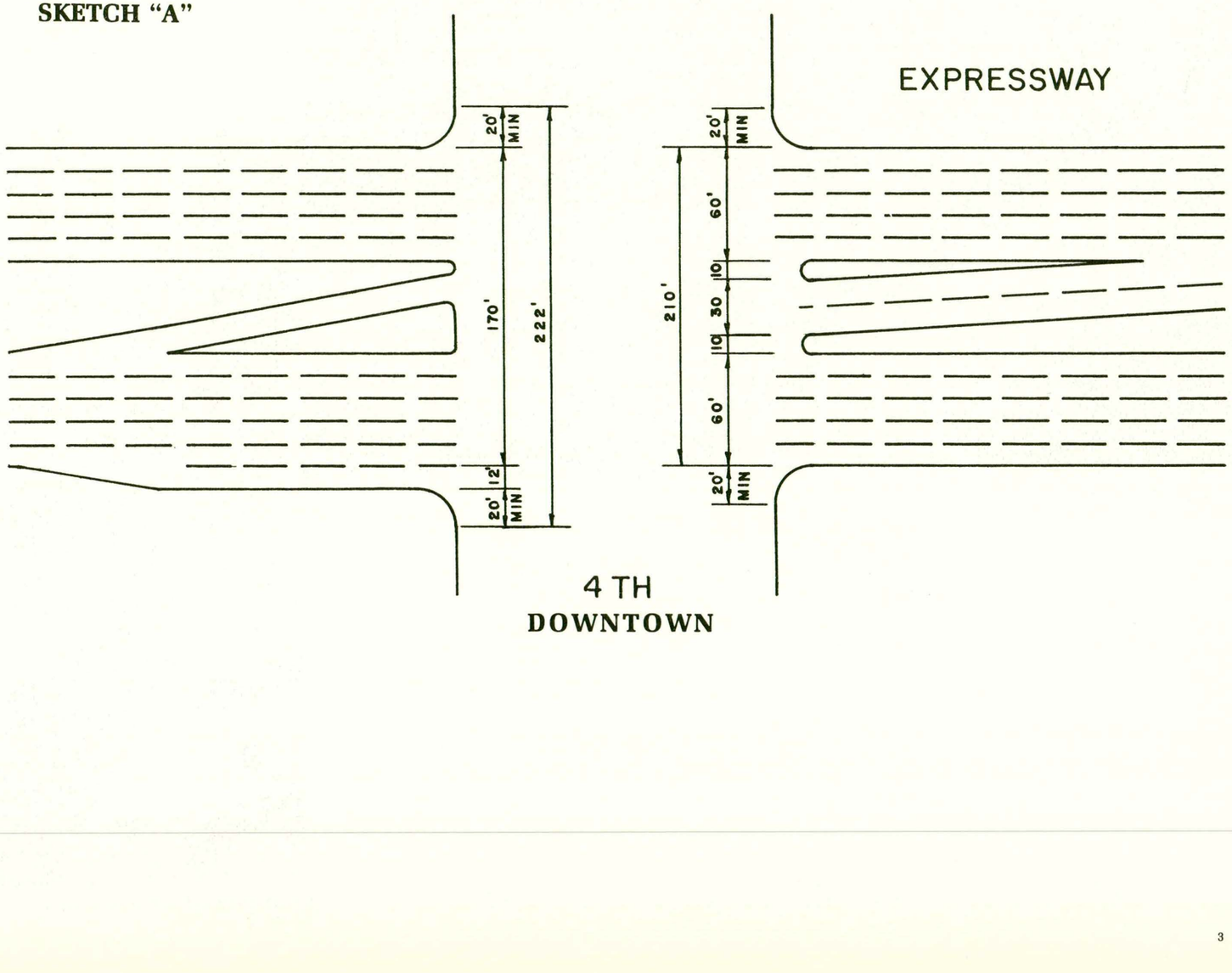
1) Freeway—controlled access roadway with interchanges
Expressway—controlled access roadway with at-grade intersections and some interchanges.

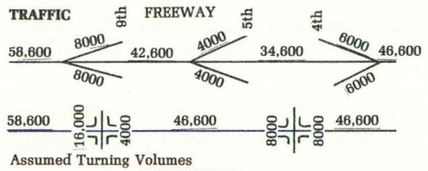
2) Includes auxiliary lanes connecting successive ramps

3) Includes thru and turning lanes from SKETCH A

4) Operating efficiency of roadway, ranging from "A" (free flow) to "E" (roadway's capcity) to "F" (total congestion). Level "C" is desirable for design with Level "D" being the minimum.

SKETCH "A"





Assumed Turning Volumes

EXPRESSWAY

EXPRESSWAY LEVEL OF SERVICE AT 4TH STREET

Assume 50-50% Traffic Split; 10% Peak Hour; 10% Trucks

%Turns at 4th 800 vph 18%
4660 vph

Assume 3/4 of turns are into CBD

For Approach Legs 2330 vph

∴ South Leg % RT 4% or 93 vph; % Lf 14% or 328
North Leg % RT 14% or 328 vph; % Lf 4% or 93

Traffic on 4th Street Approaches would require at least a G/C[5])=.30 if not more should separate left turn signal phase be used. Thus, without considering Amber or Pedestrian signal phases, total G/C=.70 for Expressway. Use .30 for lefts and .40 for thru & rights for first trial.

Trial		Exy Approach @ 4th	Approach Volume (vph)	Approach Width (ft)	G/C*	Level of Service Volume @ "C"	"E"	Concluded Level of Service
1.	So. Leg	(Lf)	328	12	.30	310	400	D+
		(Thru)	2002	48	.40	1150	1460	F
		& Rt)	2002	60	.40	1400	1820	F
2.	So. Leg	(Lf)	328	24	.20	350	—	C
		(Thru) & Rt	2002	60	.50	1750	2260	D
3.	No. Leg	(Lf)	93	12	.20[6])	310	—	A
		(Rt)	328	12	.50	525	—	A
		(Thru)	1909	60	.50	1750	2260	D

Overall intersection will operate a Level of Service "D" as controlled by Thru Traffic Movements.

---

[5])G/C = Signal Green Time / Signal Cycle Time

[6]) Controlled by So. Leg Left Turns

(Ref. B, Charts 3, 18, Fig. 11)

FREEWAY LEVEL OF SERVICE

Section between 9th & 5th Ramps (Ref A Table 9.1)

3 lanes 2130 vph

SVA = 2400 (.9 truck factor) = 2180 vph 2130 forecasted

∴ L of S "A"

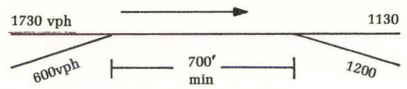
Section between 5th & 4th

2 lanes 1730 vph

SVB = 2000 (.91) = 1820 1730 forecasted

L of S "B—"

Section between 4th and Dodge-Locust



5% Trucks on Ramps

Use continuous auxiliary lane, check weaving

Vwei Vwez = 1 (600 1200) = 1900 eg vph within 700 ft.
.95
Truck factor

K 3; Q of F between III & IV (Ref A Fig 7.4)

and closer to IV

∴ L of S "D—" (Ref A Tab 7.3)

SVD = 3000 (.91) = 2730 for 2 lane approach lanes; 10% Trucks (Ref A Tab. 9.1)

SV = 2730 /2 lanes = 1365 lane

$$N = \frac{2330 + (3.0 - 1.0)\,600}{1365} = 2.59 \approx 3 \text{ lanes}$$

∴ Assumed 3 lanes okay for LofS "D—"

APPENDIX B-2

COST FOR ELEVATED FREEWAY VS. OVERPASSES

The following cost data was taken from actual construction bids of 1970.

Six Lane At-Grade with two half diamond interchanges

Total Paving and Related Items = $504,400
Total Length = 3280 Lin. Ft.
∴ Unit Cost $305/Lin. Ft.

Six Lane Elevated Structure

Two 3 lane structures
Each 180 ft. x 49 ft.
Surface Area 17650 sq. ft.

One 4 lane structure
210 ft. x 70 ft.
Surface Area 14700 sq. ft.

Total Surface Area = 32,350 sq. ft.
Total Cost of Structures and related items = $579,332

∴ Unit Costs

For 6-lane is: $579,332 x $\frac{17650}{32350}$ x $\frac{1}{180}$ = $1757/Lin. Ft.

For 4-lane is: $579,332 x $\frac{14700}{32350}$ x $\frac{1}{210}$ = $1252/Lin. Ft.

Comparison

One street overpass is approximately 1200 ft. long.

∴ 1200 x 1252 = $1,503,000
for an overpass.

6-lane elev. $1757/Lin. Ft.
6-lane grade $305
Diff. $1452/Lin. Ft.

∴ $\frac{\text{Overpass } \$1{,}503{,}000}{\text{Difference } \$1452}$ = 1034 Lin Ft.

OR, one overpass every 1034 feet plus an at-grade freeway would be equivalent to an elevated structural freeway.

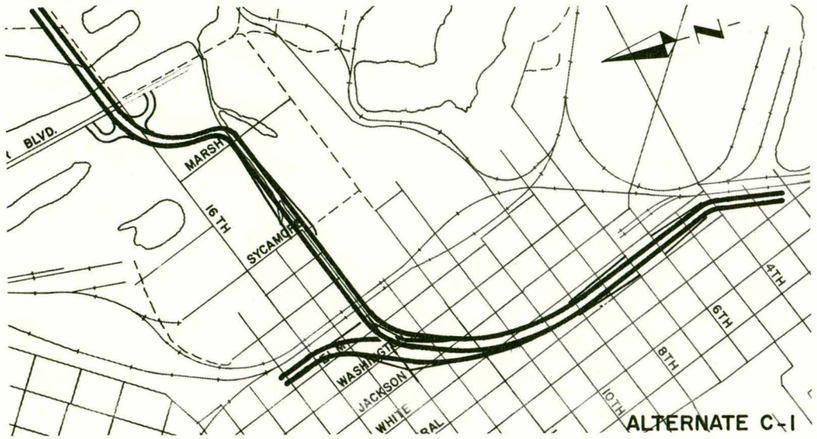
APPENDIX B—3
REJECTED ALTERNATE ALIGNMENTS

ALTERNATE C-1 was the first response to the preliminary lines of least resistance in the heart of the City. Its location lying in the block between Central and White Streets had been shown to fall between the business and commercial district to the west and the industrial district to the east. The major fork between north and east desire took place in the vicinity of 14th and Washington, with the northbound roadways curving into the block between Elm and the railroad tracks and continuing northward up the Couler Valley. The east leg paralleled 14th Street before swinging northward to the neighborhood of 16th for the City Island crossing. This alignment continued to receive serious consideration for quite some time in spite of violent opposition from some segments of the community. The fact that it lay adjacent to the Washington Street neighborhood for some distance caused very substantial opposition from the residents of that district, while the obvious obliteration of the court house and jail aroused the opposition of a different segment of the community. At that time, the preservation of the court house and jail was being hotly, although indecisively debated in public. The uncertainty insofar as the freeway was concerned came to an end with the acceptance and listing of the court house on the National List of Historic Monuments. C-1 was thereupon dropped from consideration because of its incompatibility with the principle of preservation of natural and historic landmarks.

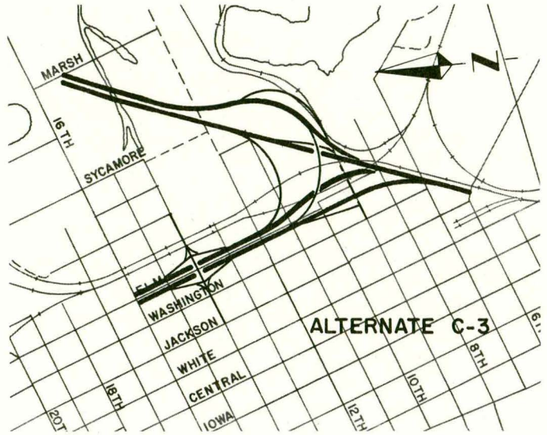
ALTERNATE C-2 was an attempt to overcome some of the drawbacks of C-1. Obivously, it touched neither the court house nor jail. It attempted to follow what appeared to be a line of least resistance along the railroad tracks. The major fork occurred in the vicinity of 9th and Elm Streets, thereby separating that point of traffic friction from the points of access and interchange with surface traffic. It was anticipated that business district access would be obtained through an upgrading of Iowa Street from about Second to Fourteenth at the least, and a similar upgrading of Fourteenth Street between Main and the railroads. This did not develop well, primarily because of clumsy geometrics near Ninth and Fourteenth Streets, and fell because of its inability to meet the criterion of safe and efficient transportation. It was more or less superseded by C-5.

ALTERNATE C-3 was a separate, but parallel, attempt to avoid some of the difficulties of C-1. Its primary point of difference from C-2 was based on the use of a freeway configuration south of Eighth Street in which the southbound roadway was "stacked" in a third level directly overhead the elevated northbound roadway. The reason for considering such a configuration is the simplicity with which opposing roadways may diverge at a fork in the route. Since they are already separated vertically, the divergent maneuver is handled very simply. It does have the additional disadvantage, however, of requiring longer ramps in connecting to the upper roadway. Other interconnecting ramps must go still higher to achieve separation. A still further disadvantage of this particular alternate was the additional encroachment into the Washington Street neighborhood. In spite of our best efforts, this produced some clumsy geometrics in the neighborhood of Ninth and Pine Streets, and was dropped because of inability to measure up to the criteria of fast, safe and efficient transportation and displacement of businesses.

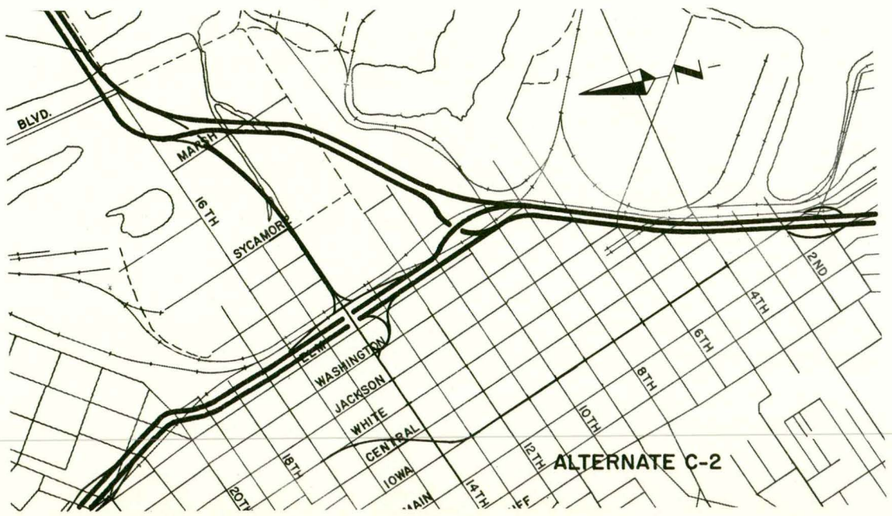
ALTERNATE C-4 following the same general route as C-3, extended further the concept of the "stacked" elevated roadways. The concept was carried into the eastbound leg and as far north as Sixteenth Street on the northbound leg. With the interconnecting ramps necessary between east and north, certain locations required a four-high stack. Insufficient access was permissible at 14th Street, certain locations had difficult vertical weaving problems and there was little service provided to the business and commercial district. This alternate was dropped because of its poor rating in fast, safe and efficient transportation service, its clumsy geometry and the aesthetic blight which would result from the towering of four levels of roadway over the essentially flat portion of the central city.



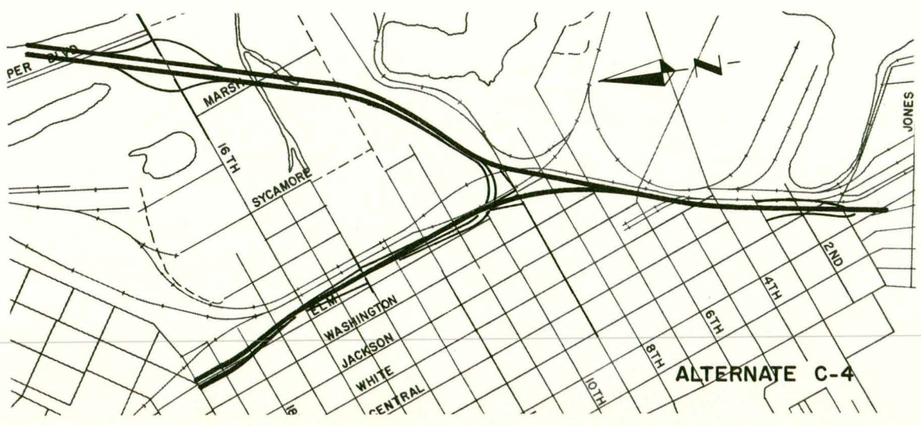
ALTERNATE C-1



ALTERNATE C-3



ALTERNATE C-2

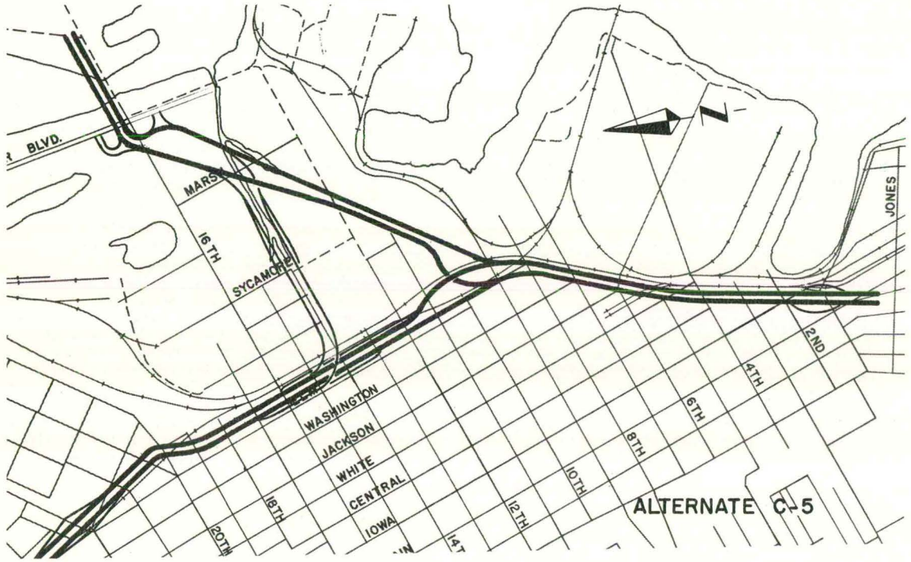


ALTERNATE C-4

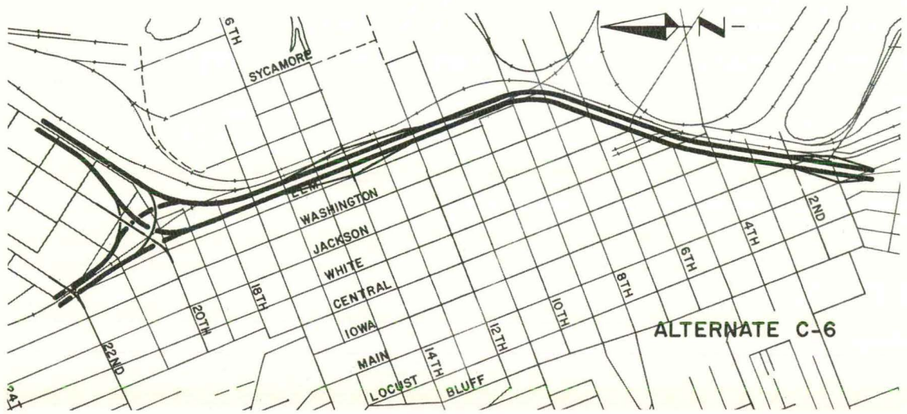
ALTERNATE C-5 was born of the other, previously numbered plans. It returned to the single elevated level of parallel roadways with the major fork falling in what has been an old and little used railway yard centered on 10th and Pine Streets. The east to north connection flanked 14th Street, with the north leg lying between Elm and the railroads. Although this shared the disadvantage of not directly serving the business and shopping district, it appeared to have substantial merit until it was learned that much of the interchange area had already been purchased and figured prominently in the expansion and updating of several manufacturing plants. Thus, it would have had a very substantial detrimental affect upon economic activity in the city, the displacement of business, as well as a very high right-of-way cost.

ALTERNATE C-6 was a plan which followed the railroad tracks as closely as possible from First Street up through 22nd, with an interchange in the vicinity of 20th and Rhomberg Avenue. From this point, the eastbound leg would have generally followed the alignment of Garfield Street northeastward, later crossing the Milwaukee main line and Kerper Boulevard before crossing the river on a new Eagle Point Bridge. Aside from the basic disadvantage of poor service to the business and commercial district, this added a new constriction of the access between the central city and the Rhomberg and Windsor Avenue districts. As large as this triangular interchange appears on the accompanying sketch, it is doubtful that it could have been held in as tightly as it is shown. The encroachment on homes, industry and street pattern were deemed to be intolerable. Specific criteria which it failed to meet are right-of-way cost, neighborhood integrity, family disruption, displacement of business, operation of streets, aesthetics.

ALTERNATE C-9 was a somewhat fresh approach, attempting to minimize the encroachment on industry which was inherent in those routes following the Milwaukee Railroad line. It continued north northeastward past 8th and Elm diagonalling toward 16th and Kerper Boulevard, as shown. The "Y" interchange took place at about 12th and Ash Streets, with the northbound leg extending nearly straight west to the railroad near 15th and Maple, then paralleling the Great Western, between the tracks and Dubuque Packing Company. This was the first real attempt to get east of the tracks and in some ways was a new approach. The vertical geometry near 14th and Sycamore appeared to be quite difficult, adverse distance for those people traveling north was involved, and minimal service was provided to the business and commercial district. It also encroached heavily on expansion space owned by the A. Y McDonald Company. It was rejected on the basis of a low rating on fast, safe and efficient transportation, and its adverse economic effect on the businesses involved.



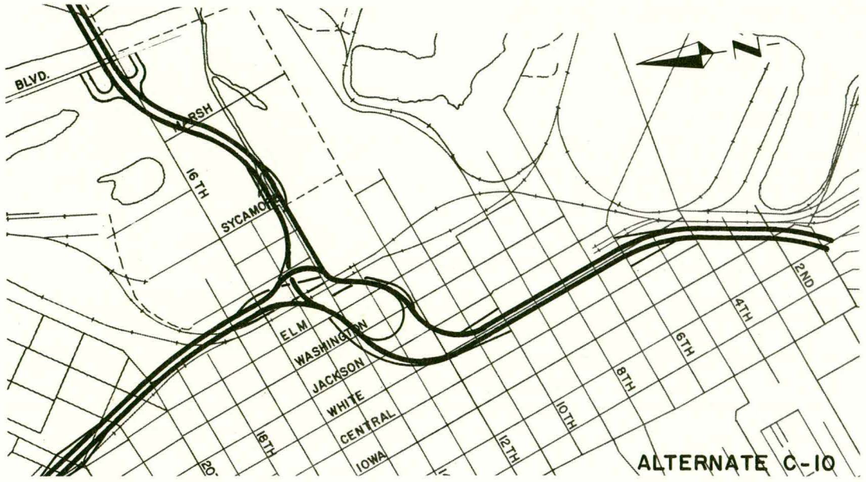
ALTERNATE C-5

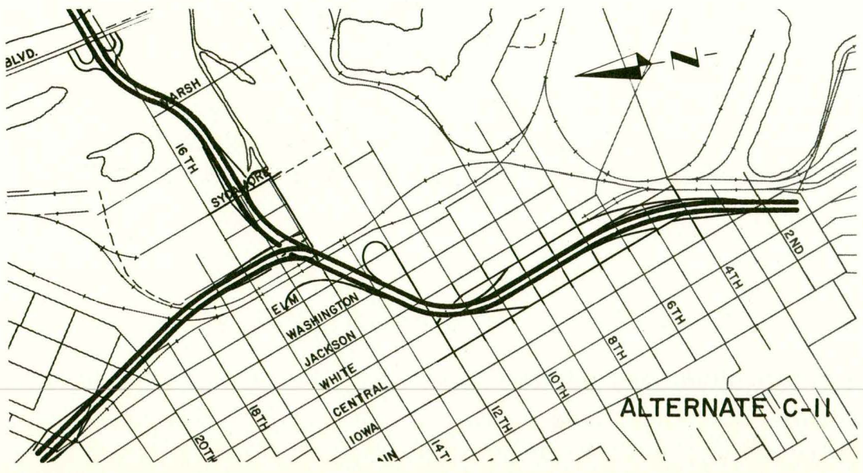


ALTERNATE C-6

ALTERNATE C-9

Both ALTERNATES C-10 AND C-11 might be considered natural descendents of all previous central routes, but necessitated a shift in certain basic design preferences. The need for nearly direct service to the business and commercial district was always recognized and the inability of any of the patterns other than C-1 to provide it was quite clear. Thus, it was decided to investigate the possibility of shifting the roadway to flank White Street, therby passing behind the court house and jail without immediately affecting them. The relative success of C-9 in passing between Maple Street and the railroads was repeated here. The primary difference between Alternates C-10 and C-11 is the introduction of ramps to serve the east to north and north to east movements in C-10. At the same time, with the receipt of up-to-date traffic information, it became clear that the desires for entry and exit on both east and west sides of the tracks warranted separate ramp systems. It would not be feasible to require traffic, from either side to cross the railroad tracks at grade. It might be said that the route for this general alternative was determined at this point, but there were still problems unsolved. The necessity of combining access facilities with the major route interchange had to be shown to be capable of solution before the route could be considered a valid alternative that could be confidently recommended. Conflicts inherent in the rather quick succession of points of friction and decision needed further development (under the heading of fast, safe, efficient transportation) and thus these two alternates were dropped in favor of C-12, described in the report as the Couler Valley Alignment with City Island Bridge.



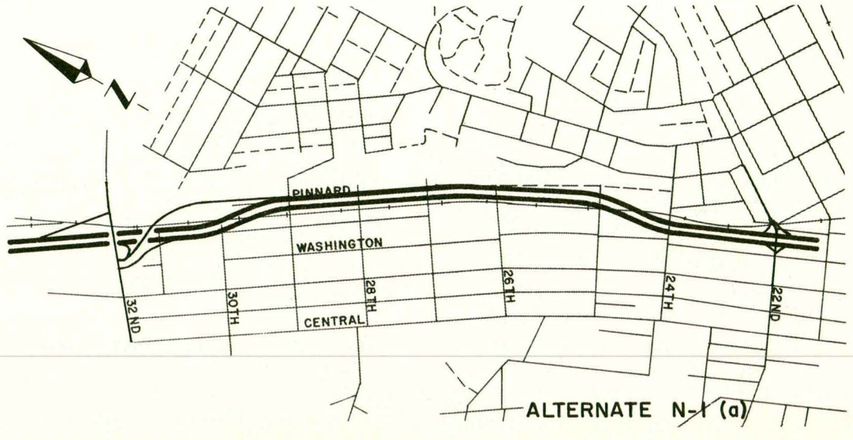


ALTERNATE N-1(a) was the first tracing of an alignment from 22nd Street northward. It was west of the railroad at 22nd Street, crossing over the tracks between 24th and 25th. It then stayed east of the tracks until approximately 30th, where it again crossed the west side of the tracks to avoid the bluff. It must be recalled that 32nd Street comprises the east end of the high mobility loop or circumferential route around the west and north parts of the city in the future City Plan. Thus, the interchange between the expressway and 32nd is of prime importance. In this alternate, the greater part of the interchange access is west of the tracks where it would encroach severely on heavy industry and crowd the Central Ave. intersection. Even so, the interchange was somewhat too constricted. Primarily on these points, the displacement of business and failure to provide fast, safe and efficient transportation, this alternate was dropped in favor of the later one in which both roadway and ramps lie east of the tracks.

A careful observer will perhaps note that certain of the "broad brush" general alignments shown at the end of the earlier stage of the program do not appear among the final alternatives. A word of explanation is due.

One such route segment runs roughly north and south immediately east of the Dubuque Packing Company. It was found that the use of this route would result in the cutting off of the Fengler Avenue bridge, presently the only "railroad free" crossing between the industrial area and the remainder of the city. Because of the necessity for this roadway to overpass the railroad, it would likewise be impossible to provide a substitute. Thus this leg proved impractical and was discarded.

It may also be noted that possible general alignments were shown south of the city proper, along Southern Avenue and Rockdale Road. While these appeared to be feasible from the overlay system, a careful plan and map-in-hand study of these two routes determined them to be unsuitable and without potential because of grade, alignment and existing cultural development. The topography is extremely rough and neither vertical nor horizontal standard criteria could be approached without tremendous amounts of construction. They were discarded in favor of a return to the present general alignment of U.S. 61 and 151.



APPENDIX B-4

ALTERNATE DODGE—LOCUST INTERCHANGES

The preliminary selection of general alignments, covered in Section 6, produced a crossing of the freeway and Dodge Street in the neighborhood of Locust and Bluff Streets. Thus the intersection, and its interchange, was expected to lie between the east abutment of the Julien Dubuque Bridge and the toe of the bluffs. During the pursuit of alternate designs, discussions with citizens and business men of the city prompted a re-examination of this conclusion. A somewhat more detailed investigation of the possible alternatives in the immediate vicinity was undertaken.

Two basic physical conditions tend to limit the available alternatives. The most immediately apparent is the existence of the Julien Dubuque Bridge, rising from its abutment immediately east of Locust Street, climbing so that it may provide the clearance over the river necessary for river traffic. Structure depth prevents a continuation of Harrison Street, one block east of Locust, and legal clearance for street traffic is obtained only at Shield Street, two blocks east of Locust, and further eastward.

The second limiting feature in the area is the existence of major underground utilities, sewers and such, which together with a high ground water table, make it impossible to install a depressed roadway below grade. It goes without saying that there must be a grade separation between the north-south freeway and the east-west Dodge Street and/or Julien Dubuque Bridge.

For the purposes of this sub-study, therefore, the alignment for investigation extended elevated north by east from the upgraded Kerrigan Road, diagonalling across the intersection of Railroad Avenue and Harrison Street, then curving into the block lying between Salina and Main Streets, descending to grade, passing under the bridge approach spans, rising again as it turns to more or less parallel Shield Street, across Main, rejoining the previously determined alignment between 1st and 2nd Streets at Iowa Street. The profile goes from elevated, where it leaves Kerrigan Drive, down to grade to pass under the bridge and returns to elevated beyond it. Interchange between the two main routes would be provided by diamond ramps, generally paralleling the Freeway, terminating in "T" intersections on the bridge.

Complete reconstruction of bridge approach spans from beyond Main Street to Locust would be required. At the time of this analysis, it was estimated that a full 6-lane width would be imperative for continuity between the interchange and Locust Street.

This reconstruction of the bridge would require its complete closure for a substantial period. Such closure would be possible if an alternate means of crossing the Mississippi were available. It would be possible, for instance, to construct the new bridge anticipated in this overall freeway system (for instance, at City Island) as one of the first items of construction. Certainly this would also require new construction, or at the very least a substantial upgrading, of the connecting highways in Wisconsin and Illinois. It is thought that the freeway construction would be necessary from the Iowa end of the bridge through the heart of town to a point providing a suitable connection with Dodge Street west and Locust Street south before traffic across the Julien Dubuque Bridge could be cut. Even under the most favorable of circumstances, it is difficult to imagine that service could be re-established in anything less than 6 months, and considering the usual interruptions of weather, unforeseen delays in material supply, and so on, a more realistic estimate would appear to be a year. During this time, traffic between Dubuque and East Dubuque would be seriously inconvenienced at best.

Demolition of the necessary approach spans of the Julien Dubuque Bridge is estimated at approximately $91,000 and reconstruction to meet the new requirements is estimated at $956,000.

Right-of-way requirements for the two possible routes between the foot of Kerrigan Drive and 1st and Main Streets have been reviewed and estimates of the acquisition costs prepared. Right-of-way cost via Locust is estimated at $1,533,567. Right-of-way cost via the more eastern, Main Street route, $2,278,431. The difference, in favor of the Locust Street route, is $744,864. It thus appears that there would be nearly $1,800,000 added cost in using the eastern route.

From the initiation of construction of the facilities involved in the alternate crossing, certainly 6 to 8 years would have elapsed before work could begin at Dodge Street.

A major disadvantage to the City as a whole would be the required closing of Main Street between 1st and Jones Streets. The impact of such a closing becomes clear when it is recognized that Main Street and South Locust Street are the two primary avenues of travel to and from the industrial and commercial districts lying south of Dodge and the bridge. Access to this area for emergency vehicles would be made much more difficult.

Other disadvantages include a "dogleg" connection between the freeway and the surface streets, increasing the traffic load on the newly constructed bridge approach spans, the introduction of a non-uniform grade on the main freeway and the encountering of two points of major friction and traffic control between Dodge Street and the bridge proper.

From the standpoint of the city as a whole, we are unable to see any advantages to overcome the very substantial disadvantages in time, money, and inconvenience. It was thus concluded that the original freeway alignment, overpassing Dodge between Locust and Bluff, should be recommended.

APPENDIX B—5

FREEWAY SOUND VIBRATION EFFECTS UPON THE COURT HOUSE COMPLEX

Late in the course of the study, Mr. Adrian Anderson, the State Liaison Officer, with the responsibility for historical and national monuments, expressed some misgivings with respect to the possibility that traffic vibrations might damage and disintegrate the Court House and Jail. His concern was more for the jail because of its type of construction. When this concern was transmitted to us by members of the Highway Commission, the consultants undertook a review of the situation. Our findings follow.

Perhaps the simplest concept to use in assessing the possibility of building damage is that of particle velocity. It is the instantaneous, peak value of velocity which is the determinant of damage or deterioration. Considered in terms of vibration, it can be noted that particles of a solid carrying vibration move back and forth in the transmission of this vibratory energy. A particle is at rest, accelerates to a peak velocity and then decelerates again to rest before moving back in the opposite direction to complete the cycle. The maximum particle velocity, reached midway between the two points of rest is the parameter at which we must look if we are to assess the possibility of damage. Authorities who have studied these phenomena recognize a particle velocity of 3 inches per second as representing the threshold of potential damage. [1,2]

It is a generally recognized principle of physics that the intensity of the energy received at any point is inversely proportional to square of the distance from the point of origin. Thus, in comparing the intensity of energy received at two points, the second of which is twice as far from the source as the first point, the intensity of energy received at the second point can be expected to be only one-quarter that at the first point. This same basic principle applies to the energy involved in a vibratory movement, and thus the particle velocities will vary similarly.

Of course, it is not quite as simple as that, particularly where vibrations are concerned. All resilient material and structures (and this includes all material) have a natural frequency. This is most easily recognized in thinking of a taut rope or wire, as in a jump rope or the string of a musical instrument. The same is true of a coiled spring. Any material has a "spring rate" and a natural period of vibration. If a vibratory movement or pulsation is impressed on such a body, and if the frequency of the impressed vibration is close to the natural frequency of the body, then this spring reacts harmonically, in a condition known as resonance. As resonance takes place, the amplitude of the vibration, and thus the maximum particle velocity, increases dramtically. So, before we can rule out the possibility of damage by sheer distance alone, we must examine the impressed frequencies and the natural frequencies of the structures or bodies involved.

In order that the natural frequency of the elevated structure in the vicinity of the Court House and Jail may be determined, certain characteristics have to be assumed. For this purpose, we assumed that the spans of the elevated structure would approximate 100 feet in length. This is believed to be a reasonable maximum and one which would yield a realistic set of results. Fortunately, there has been experimental work done on continuous structures which yield certain characteristics, ready for our use.[3]

Using the facts, figures and relationships from this report, it was computed that the natural frequency of a structure such as we anticipate would be approximately 3.66 cycles per second. Should the span be 90 feet, the natural frequency would be 4.05 cycles per second. Using conventional vibration analyses, the natural frequency of the columns is found to be so high as to be not significant to these analyses. According to the best information available, the foundation material in this vicinity is a fairly dense sand. The natural frequency of such sand is found to lie very close to 25 cycles per second.[4]

Now let us examine the impressed frequencies to see whether any resonance can be expected. One authority states that traffic vibration "generally falls between 10 and 20 cycles per second.[5] A very careful analysis of dynamic pavement loads of heavy highway vehicles traveling at various speeds, showed a wide spectrum of impressed frequencies, with energy peaks at 2.5 to 3 and again between 11 and 17 cycles per second.[6] Compari-parison of these impressed frequencies with the natural frequencies of the materials and structures anticipated indicates that the probability of resonance is very low on the structure itself and nil between the structure and subgrade. This latter is especially important in that it is the subgrade which would transmit vibrations to the buildings in question.

Information regarding the particle velocities impressed by traffic vibration is not quite as directly related to our particular case, but, when considered carefully, is equally impressive. Tests were actually made in which particle velocities on the inside face of foundation walls of dwelling type units were measured with various initiators at varying distances outside the building.[7]

Perhaps the most impressive was the result when a 28 ton concrete mixer truck was driven over a 3-inch plank in the street, at 15 miles per hour. It was actually 48 feet from the foundation wall and the maximum particle velocity measureable was 0.2 inches per second. In a second test a pavement breaker was moved in to within 3-1/2 feet of this basement wall and the full drop was performed on a concrete sidewalk. Even this produced a measured particle velocity in the foundation wall of only 0.6 inches per second. The highest particle velocity was experienced when a high loader with teeth on the bucket was employed to grub out the curb located 12 feet from the foundation wall. Even this produced a particle velocity of only 0.75 inches per second.

Recalling that a particle velocity of upwards of 3 inches per second is necessary to produce the very beginnings of damage to masonry or other structures, the conclusion is inescapable that the vehicular traffic, operating on a relatively smooth elevated freeway, cannot produce impacts or vibration with sufficient energy to damage the buildings in question, particularly when the distance could not possibly be less than 50 feet and most likely would be upwards of 100 feet. It is apparent that damage is far more likely from traffic on an adjacent street than from the freeway.

Neither do we have any real probability of resonance resulting from the coincidence of natural frequencies and imposed frequencies to magnify the small vibrations that do exist.

So we can only conclude that the probability that damage to either Court House or Jail resulting from travel on the proposed freeway at least a half block distance is nil.

---

[1] Luna, William A. "An Analysis of Reports on Ground Vibrations Due to Pile Driving" **Foundation Facts,** Vol. III, No. 2, 1967.

[2] Ferahion, R.H., and Hurst, W.D. "Construction Equipment 'Shakes' ", **American City Magazine, September, 1969.**

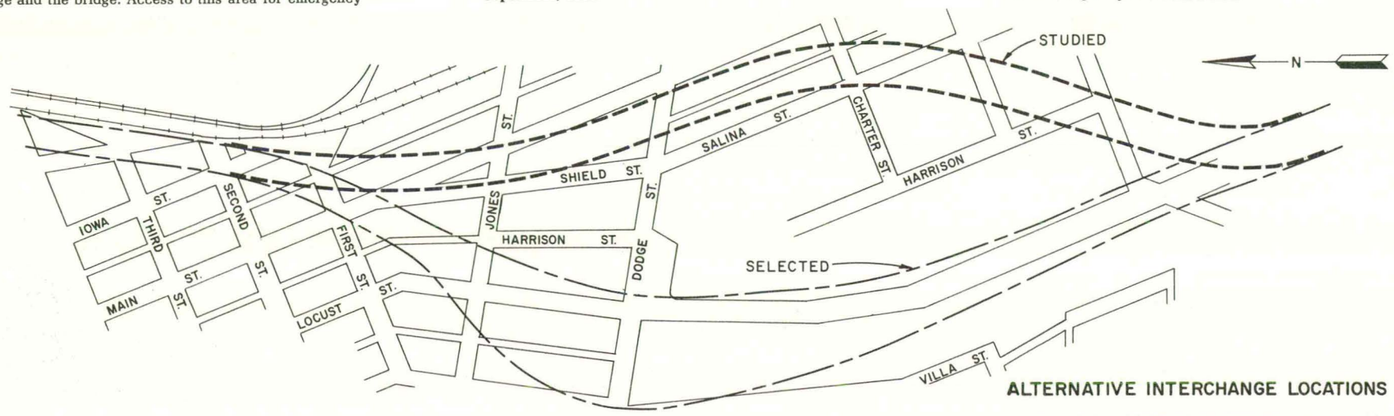
[3] **Bridges and Foundations,** HRB Research Record No. 354, Highway Research Board.

[4] Karl Terzaghi and R. B. Peck, **Soil Mechanics and Engineering Practice,** 1948.

[5] Ferhion and Hurst. op. cit.

[6] **Dynamic Pavement Loads of Heavy Highway Vehicles,** NCHRP Report No. 105, Highway Research

[7] Ferahion and Hurst. op. cit.



ALTERNATIVE INTERCHANGE LOCATIONS

U.S. 151 FREEWAY AT DODGE STREET

APPENDIX C
EVALUATION OF FINAL ALTERNATIVES

The basis for the comparative evaluations described in summary form in Section V of this report are contained in the ten sections of this appendix. Each of these sections comprise the written discussion of one or several evaluative criteria and represent in varying writing styles the written analyses and evaluations from the various study assignments made to those individuals who composed the technical staff for this comprehensive corridor study.

The ten sections and the related evaluative criteria are as listed below. The route segments which are referenced in these analyses are shown in the figure on page 10.

APPENDIX C—1: TRAFFIC SERVICE
- Fast, Safe, Efficient Transportation Factor
- Operation of Existing Facilities during and after Construction Factor

APPENDIX C—2: ENGINEERING, CONSTRUCTION, AND RIGHT-OF-WAY COST FACTOR

APPENDIX C—3: PUBLIC UTILITIES FACTOR

APPENDIX C—4: GOVERNMENT FINANCING FACTOR

APPENDIX C—5: ECONOMIC ANALYSIS
- Economic Activity Factor
- Property Values Factor

APPENDIX C—6: RELOCATION ANALYSIS
- Replacement Housing Factor
- Displacement of Business Factor
- Family Disruption Factor

APPENDIX C—7: ENVIRONMENTAL ANALYSIS
- Recreation and Park Factor
- Aesthetics Factor
- Conservation Factor
- Natural and Historical Landmarks Factor
- Multiple Use of Space Factor
- Neighborhood Integrity Factor

APPENDIX C—8: POLLUTION FACTOR

APPENDIX C—9: ACCESSIBILITY FACTOR

APPENDIX C—10: MAINTENANCE AND OPERATING COST FACTOR

APPENDIX C—1

TRAFFIC SERVICE

Fast, Safe, Efficient Transportation

Through both quantitative and qualitative means, each alternate was evaluated as to its abilities to move vehicular traffic in a manner which afforded expeditiousness, safety and efficiency to the motoring public. This involved analyses of traffic, geometrics, accessibility, and continuity as provided by each alternative.

Traffic assignments from the Iowa State Highway Commission and the procedures of the **Highway Capacity Manual**[1,2] determined the degree of vehicular usage and the levels of service[3] which would be provided. Interchange locations were used for evaluating convenience and access. Grades, curves (horizontal and vertical), and ramp spacing indicated the comfort and safety for moving vehicles while the interrelationships of these geometric elements were related to roadway continuity along the alignment.

[1]**1965 Highway Capacity Manual,** Special Report 87, Highway Research Board, Washington, D.C.

[2]**Capacity Analysis Techniques for Design of Signalized Intersections,** Reprints from **Public Roads, A Journal of Highway Research,** Vol. 34, Nos. 9 & 10, U.S. Dept. of Transportation.

[3]See APPENDIX A-1.

Operation and Use of Existing Highway Facilities and Other Transportation Facilities During Construction and After Completion.

Under this evaluative criterion, each alternate was reviewed as to its effects during and after construction upon vehicular access and circulation in the freeway corridor. Included in this review were the general needs for detouring and for stage construction during implementation as well as the effects upon railroad spurs and mainline tracks and upon water transportation. Continuity of the alternate with the Dubuque Street and Highway System also was an important consideration.

From discussions with the Public Transit Company, it was found that the bus system was flexible and any of the alternative alignments would not affect the operation of public transit. Consequently, transit routes were not considered further in this criterion's evaluation.

TRAFFIC SERVICE—Alternate C—12; N—1; E—1

Fast, Safe, and Efficient Transportation.

Of the alignments being studied, Alternate C—12; N—1; E—1 has overall the highest vehicular usage. This is reflected in the 1990 forecast traffic volumes which range from 40,000 to 52,000 ADT in the downtown section to 31,000 at 32nd Street to 8,600 in northern Dubuque.

Three primary reasons tend to explain this usage. First, the alignment is located withing the travel desire corridor extending from the downtown through the northern portion of the urbanized area. Second, excellent continuity is provided between this freeway alignment and the circumferential loop which begins at 32nd Street. Finally, ramp connections are located and spaced as to serve adequately the downtown and the industrial centers of Dubuque.

Because of the higher traffic volumes, the levels of service fluctuate along this alignments, but no section is below Level "D".[4] Alternate N—1 from 22nd Street northward & Alternate E—1. from Kerper eastward will both have primarily a Level "B" operation.

The downtown freeway sections (Alternate C—12) operate from Level "A" through "D". In order to promote continuous, more constant traffic flow through all of these downtown sections, a uniform speed limit consistent with the operating speed of the lowest calculated level of service will be necessary. By placing and enforcing such a speed limit on the downtown sections as well as on the approaching freeway sections to the downtown, an overall "stable flow" operation would be attainable.

Geometrically, the freeway is on a fairly direct alignment with few curves or grades. Five full interchanges serve all the major streets (Dodge-Locust, Kerper, 22nd, 32nd, Ia. 386) along these alternates with 7 half interchanges serving the heart of the downtown and industrial areas. Although the number of half interchanges seems large, their arrangement and spacing is suited for safe, smooth flow of traffic to and from the freeway.

The freeway to freeway interchange does not include ramp connections for S to E and W to N movements. Since a greater need for freeway-to-surface street existed, ramps for these two movements were not included. The S to E and W to N traffic, however, can make their connections via the surface street ramps in a fairly direct movement.

Alternate C—12 in the downtown area passes between the traffic generators rather than through them. The alignment is primarily between local streets which allow for better ramp connections and flow on surface streets. One-way street pairs are also promoted.

[4]See definition of terms under APPENDIX A.

This alternate also provides an overpass of the railroad. The overpass plus the ramps on either side of the railroad improve emergency vehicle access in the entire central area of Dubuque.

Alternate E—1, the river crossing, provides a direct connection from Wisconsin and Illinois into the employment and commercial centers of Dubuque. It is more centrally located with respect to the urbanization in this three-state area. With close proximity to the Julian Dubuque Bridge, Alternate E—1 can provide traffic relief to this existing river crossing.

Because of the traffic utilization, the continuity with the Dubuque street system, and the smooth, fluid alignment, Alternate C—12; N—1; E—1 is rated 10 for fast, safe and efficient transportation.

Operation and Use of Existing Highway Facilities and Other Transportation Facilities During Construction and After Completion.

Since Alternate C—12; N—1; E—1 will be on a new alignment, the existing major streets are available to carry the traffic during construction. Disruption will be limited to streets crossing the freeway alignment which will mostly affect traffic in the industrial area east of Downtown. However, staging some of the surface street improvements early in the construction period will aid in reducing traffic congestion in the Downtown while the elevated freeway is being built.

The alignment corridor provides both freeway and non-freeway service to Dubuque. From its geographic location and interchange connections, the freeway alignment serves the longer distance urban trips. Central Avenue and the downtown streets are available to provide local service and to access land development.

Although many at-grade railroad crossings will still exist, conflicts between vehicles and trains will be reduced by Alternate C—12. This alternate provides an overpass of the railroad in the downtown with good interchange ramps on either side of the railroad.

The closest this alternate comes to the water front is the section in the vicinity of 1st to 4th Streets. However, with the alignment being to the west side of the railroad, no disruption of shoreline water transporting activities in the Ice Harbor occurs.

Alternate C—12; N—1 E—1 is, therefore, rated 10.

TRAFFIC SERVICE—Alternates C—7; N—2 (incl. R—2, E—1, N—2); E—1

Fast, Safe and Efficient Transportation

In the downtown area, Alternate C—7 follows a fairly straight alignment primarily between the railroad and the river. Interchange connections are at Kerper—16th & Dodge-Locust with a half diamond at 4th Street. Other interchange ramps are somewhat prohibitive for several reasons thereby affecting safe and efficient of traffic flow.

First, the freeway alignment passes through the downtown industrial traffic generators which would bring the traffic from the downtown commercial activities into the industrial district for freeway access. Second, the alignment is a diagonal relative to the street grid system which disallows continuity of flow between ramps and local streets. Third, the area is penetrated by several railroad spurs resulting in railroad and motor vehicle conflicts within interchange areas.

With limits on additional downtown ramps, traffic will follow two courses for attaining access. First, freeway traffic will concentrate itself at the Kerper-16th Interchange and at the 4th and Dodge-Locust area which will saturate these interchange ramps and the adjacent surface streets. Second, congestion at these freeway interchanges will tend to force traffic back onto the arterial streets as drivers avoid the freeway entirely.

North of 16th Street, the Alternate N—2(R—2) section is located behind the Kerper Blvd. industries along the river bank before turning (over 90°) toward a northwesterly direction at Roosevelt Avenue. This turn is the only significant curve (50-60 mph design) in the alternate and is dictated both by the location of existing industrial buildings along Kerper and the interchange connections.

The absence of interchange ramps in this section to Rhomberg and Kerper prohibit Alternate N—2(R—2) from directly serving the land uses in the Rhomberg Area of Dubuque with a freeway route and a railroad overpass. Such interchanging has been negated due to grade differentials between the freeway, street, and railroad and to the greater infringement upon land uses to be served. Furthermore, should the ramps be provided, they would be within the influence of the freeway curve at Roosevelt and the river thereby having a negative bearing upon vehicular comfort and safety in operation.

Northwesterly along Roosevelt, Alternate N—2 continues with lengthy grades (3 to 4%) to a connection with U.S. 52/Iowa 3 north of Dubuque. Additional interchanges in this section are with Iowa 386 and Peru Road. The river crossing (Alternate E—1) is located near Kerper and 16th. As such, it provides a fairly centralized bridge location for connecting Wisconsin and Illinois into the employment and trade centers of the downtown Dubuque Area.

The given 1990 traffic forecasts vary from 39,000 in the downtown to 8,300 north of Dubuque. Levels of service are at "C" or above for the mainline freeway except for the weaving section between 4th and Dodge-Locust which is at Level "D".

Overall, this alternate provides reasonably good safety and continuity of flow with exception of the freeway curve section in the vicinity of Kerper and Roosevelt.

Convenience with this alternate has to be related to the availability of interchange connections to traffic generators. As such, this alignment passes the downtown and industrial generators; but, the lack of ramps to the freeway makes it more convenient to use the at-grade street system.

Based primarily on this absence of interchange connections to the Dubuque industries and downtown, the alignment composed of Alternates C—7, N—2, and E—1 is rated 3 for fast, safe, and efficient transportation.

Operation and Use of Existing Highway Facilities and Other Transportation Facilities During Construction and After Completion.

During construction, conflicts will exist with railroad spur traffic and motor traffic in the industrial area downtown. Elsewhere, disruption during construction will be limited to cross streets since this alternate is on a new alignment corridor.

The alignment of this alternate is located somewhat away from the northern Dubuque travel desire corridor which currently exists along North Central Avenue (U.S. 52; Iowa 3). Also, Alternate N—2 connects with the street network to the north of the proposed Dubuque circumferential loop roadway which initiates in the 32nd Street Corridor at Central. Consequently, after completion of this alternate, Central would continue to intercept and carry much of the northern traffic destined for the downtown and industrial areas due to its location in the urbanized area.

The Rhomberg Area would continue to be served by Rhomberg Avenue and Kerper Boulevard. Thus, rather than deriving improved accessibility, this section of Dubuque is only bisected.

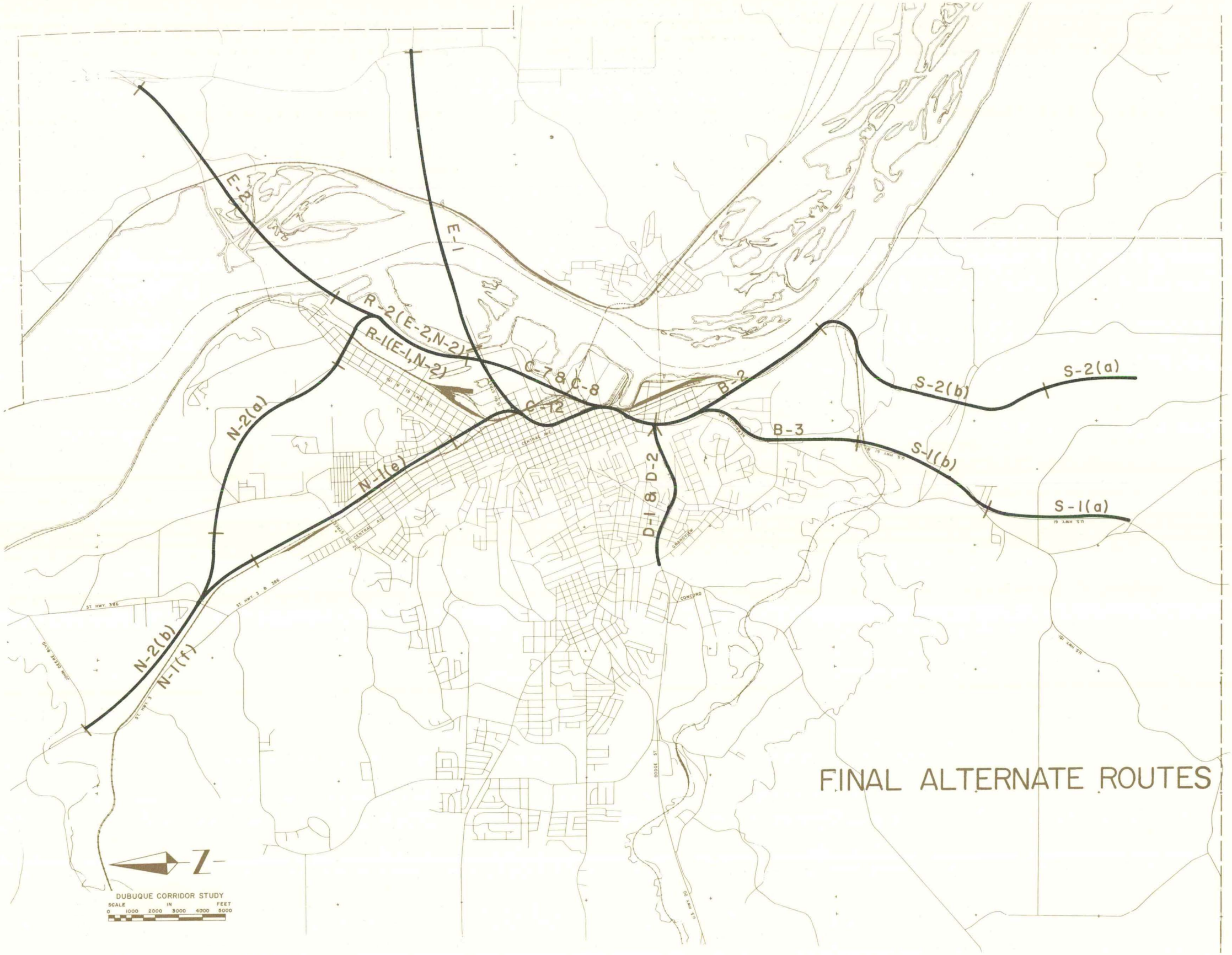

E-2
E-1
R-2(E-2,N-2)
R-1(E-1,N-2)
C-7 & C-8
C-12
B-2
B-3
D-1 & D-2
S-2(b)
S-2(a)
S-1(b)
S-1(a)
N-2(a)
N-1(e)
N-2(b)
N-1(f)
FINAL ALTERNATE ROUTES
DUBUQUE CORRIDOR STUDY
SCALE IN FEET
0 1000 2000 3000 4000 5000

Figure III-7

Although this alternate passes along or near portions of the water front, its alignment does not adversely affect the existing water transportation activities. However, it should be noted that the alternate would interfere with the potentials for shoreline water transport facilities along Kerper north of 16th Street. Also, the piers of the interchange ramps to the City Island Bridge will act as restrictions in the Peosta Channel.

Since it is located out of the travel desire corridor of Central Avenue, does not serve the Rhomberg Area, and does not have northern continuity with the circumferential loop, Alternate C—7; N—2; E—1 is rated 3.

TRAFFIC SERVICE—Alternate C—8; N—2 (incl. R2; E2; N—2); and E—2

Fast, Safe and Efficient Transportation

This alternate is, for all practical purposes, the same as Alternate C—7; N—2; E—1 with the major difference being the location of the river crossing (E—2) at a point further north. The result is a freeway-to-freeway interchange in the vicinity of Kerper and Roosevelt which is one further limitation, in addition to those discussed under Alternate C—7, N—2; E—1, for locating other ramps in this area to access the major streets of Rhomberg and Kerper.

Alternate E—2 is located further north than Alternate E—1. Therefore, E—2 by its location will provide less traffic relief to the Julien Dubuque Bridge.

For these reasons as well as the previously mentioned lack of safe and efficient interchange connections in the downtown section, Alternate C—8, N—2, E—2 is rated 2.

Operation and Use of Existing Highway Facilities and Other Transportation Facilities During Construction and After Completion.

For the same reason as discussed under Alternate C—7, N—2, E—1, this alternate is rated 3 because it likewise is located out of the travel desire corridor of Central Avenue, does not serve the Rhomberg Area, and does not have northern continuity with the circumferential loop at 32nd Street.

TRAFFIC SERVICE—ALT. S—1 (incl. ALT. B—3)

Fast, Safe, Efficient Transportation

Alternate S—1 follows the recommended alignment shown in the Dubuque Transportation Plan for the southern sections of the U.S. 151 Freeway. This alternate traverses a distance of approximately 3.8 miles and provides 5 interchange points—the proposed U.S. 520, Carson Road at Key West, U.S. 52, Grandview, and Dodge/Locust.

The forecast daily volumes range from about 28,000 south of Dodge to 10,000 at Highway 520. The southern third of Alternate S—1 operates well within Level of Service "A" with the remaining sections at Level "C".

Geometrically, this alternate has several lengthy grades (4 to 6 percent) which are a consideration for the mobility of the commercial trucks in the traffic stream. However, rather than occurring over isolated segments of Alternate S—1, the grades as well as the curvatures are joined to provide the motorist with a transition along the freeway from its southern rural sections into its urban sections just prior to Downtown Dubuque.

In closer reference to the curvatures, the verticals are long and broad and do not present a deterrent to adequate sight distances or comfortable vehicular travel at urban area freeway speeds. The horizontal curves of significance are two curves (55-65 mph design) that reverse the alignment just prior to the freeway's merge into the Locust Street Corridor at Southern Avenue.

Alternate S—1 follows the existing traffic corridor from the south into Dubuque. As such, its interchange points are well located for accessing areas of local traffic generation. Alternate S—1 also provides good continuity with existing U.S. 61 and close proximity to U.S. 151 radiating southward from the proposed U.S. 520 Freeway.

Based upon the transitioning provided from rural to urban and the magnitudes of traffic served, Alternate S—1 is rated 8 for fast, safe and efficient transportation.

Operation and Use of Existing Highway Facilities and Other Transportation Facilities During Construction and After Completion.

During construction, detours will be necessary as current traffic will be utilizing the same corridor as Alternate S-1 is to be constructed within. Since various local roads interconnect through this corridor, however, detouring should not be an insurmountable problem. With proper staging of the construction, disruption of access to land uses in the corridor will be minimized and a reasonable flow of traffic will be maintained through optimum usage of the local roadway for detouring.

Alternate S—1 replaces the existing principal arterial. However, the 1990 forecast traffic volume reflects the high anticipated usage for the alternate as a result of its geographic location and interchange points with all important cross streets in this corridor.

Alternate S—1 is rated 7 due to its accessibility provided to South Dubuque.

TRAFFIC SERVICE—ALT. S—2 (Incl. ALT. B—2)

Fast, Safe and Efficient Transportation

Having a length of approximately 4.5 miles, alternate S—2 meanders in virtually a new alignment corridor from Highway 520 to Dodge Street. This alternate has three interchanges—freeway to freeway connection with the proposed U.S. 520 and freeway to surface streets at U.S. 52 and at Dodge.

The forecast 1990 daily volumes range from about 13,000 south of Dodge to about 6,000 north of Highway 520. Based upon HCM procedures, Alternate S—2 would operate at Level of Service "A". However, several geometric features which place restrictions on traffic flow are not sufficiently reflected in the HCM calculations.

In fitting Alternate S—2 to the terrain of its corridor, varying grades and curvatures were introduced in the alignment which subjects the traffic stream to three differing sections of roadway within Alternate S—2.

The first section is a long, level tangent extending along the river. Because of its length and lack of lateral friction, motorists will be inclined to accelerate their vehicles in this section. This will result in fluctuating traffic flow and possible accident and congestion potentials since accelerating north-bound traffic will enter the reduced speed zones of Downtown Dubuque while southbound accelerating traffic enters the reduced speed curves of the second section.

This second section, forming the mid-link of Alternate S—2, consists of two curves (50 mph and 60 mph designs) that will reverse the alignment from the river to Catfish Creek. These curves combine to form an area of restrictive speeds with limited "comfort and convenience" to the motorist, particularly with commercial trucks in the traffic stream. Because of the lengths of these curves, inclement weather resulting in wet or snowy pavement is a contributor to increased accident potential.

The third section extending on southward to the interchange at the proposed U.S. 520, constitutes a series of vertical sag and crest curves. Foremost in this roadway section is the U.S. 52 interchange where ramps and mainline freeway are in both vertical and horizontal curves.

Alternate S—2 would not provide continuity with the existing U.S. routes which extend on southward from Highway 520. Thus, U.S. 151 and U.S. 61 traffic from the south must "jog" over Highway 520 to connect with Alternate S—2.

In summary, Alternate S—2 provides the traffic stream with a sporadic flow which varies suddenly from smooth to restrictive. The most critical features of this alignment are the switchback curves in its mid-section, especially the 50 mph curve. For these reasons, Alternate S—2 is given a rating of 3 in providing fast, safe and efficient transportation.

Operation and Use of Existing Highway Facilities and Other Transportation Facilities During Construction and After Completion

Since Alternate S—2 is in a new alignment corridor, traffic disruptions during construction are primarily limited to the few local roadways crossing the path of this alternate. Consequently, detours would be minimized.

The absence of major cross streets and the terrain have limited the interchanges and access. Of the three interchanges, the U.S. 52 connection must principally serve as the freeway access point for this area south of Dubuque. Alternate S—2 would, therefore, more logically serve through traffic rather than both through and south Dubuque traffic.

Major street access into Dubuque is maintained both during and after construction via the existing U.S. 61 and U.S. 151 roadways. With Alternate S—2, two north-south routes are provided—one a freeway and one a principal arterial.

Alternate S—2 does not disrupt any existing water transport facilities. The alignment utilizes the air space over the section railroad trackage along the Mississippi River and, consequently, could have some effect upon railroad operations during the roadway's construction.

In summary, this alternate is located away from the traffic generators in South Dubuque although it does provide two north-south roadways. For these reasons Alternate S—2 is rated 6.

TRAFFIC SERVICE—ALT. D—1

Fast, Safe, Efficient Transportation

Alternate D—1 is basically an at-grade expressway with a cross-section of 6-lane divided. Its length is nearly 1.2 miles on an approximate average grade of 4%.

Primary connections consist of at-grade intersections with Hill and Bryant, collector streets; an at-grade intersection at Booth, a local street; a diamond interchange with Grandview-Lombard; a combination of ramps and at-grade connections at Locust and the U.S. 151 Freeway; and a frontage road intersection between Bryant and the U.S. 151 ramps.

The forecast 1990 traffic ranges from 22,000 to 34,000 ADT. With this magnitude of traffic and the grade, six lanes between Booth and Locust will be needed in order for the at-grade intersections to function at Level of Service "C". With 4 lanes, the diamond interchange section will be satisfactory at a Level "B-" operation.

Alternate D—1 makes usage of a frontage road along much of its north side to allow access to the commercial activities which remain. However, the spacing along the cross-streets between their intersections with Alternate D—1 and with the frontage road is very short. This closeness of intersections and the traffic on the frontages generated by the commercial land uses will result in vehicular conflicts at the Alternate D—1 intersection areas. The existing commercial buildings somewhat prohibit the offsetting of the frontage roads to provide more freedom of movement for vehicles. The frontage road intersection west of the U.S. 151 ramps will influence safety and traffic flow due to its close proximity to these ramps.

The long grade will be an adverse factor to comfort. However, the Dodge Street corridor provides the most logical alignment for the terrain and for convenience and continuity with the Dubuque street system.

Alternate D—1 is rated 6 for fast, safe and efficient transportation because of the frontage road connections.

Operation and Use of Existing Highway Facilities and Other Transportation Facilities During Construction and After Completion.

Alternate D—1 follows the existing Dodge Street alignment. During construction, both detouring within the Dodge Corridor and diversion to alternative streets will occur. Since the nearby east-west major streets are 2 lanes, traffic congestion during construction is probable. Consequently, staging of construction and implementation prior to heavy traffic demands become important considerations.

Following construction, Dodge will be the primary east-west traffic carrier. Its geographic location allows for accessibility to and from Downtown Dubuque and an expeditious route via the Julien Dubuque Bridge into Wisconsin and Illinois.

Alternate D—1 has excellent continuity with the Dubuque Street System. Various north-south collectors and arteries feed into the Dodge corridor.

Based upon the above, Alternate D—1 is rated 8.

TRAFFIC SERVICE—ALT. D—2

Fast, Safe, Efficient Transportation

Differing from Alternate D—1 only in overall cross-section, Alternate D—2 provides a higher level of service with a 6-lane divided parkway with a wide median and no frontage roads. The 1990 forecast traffic will still range primarily from 22,000 to 34,000 ADT even with much of the new adjacent commercial development removed.

With the at-grade intersections, Alternate D—2 from Dodge to Booth will function at a Level of Service "C" with the 6 lanes. The section from Booth westward through the Grandview-Lombard Interchange with function at Level of Service "B-" with 4-lane divided.

As with Alternate D—1, the primary intersections and interchange ramps remain unchanged. The overall grade also remains at approximately 4% as do the other factors of comfort, convenience, and continuity discussed under Alternate D—1.

However, the frontage roads in Alternate D—2 are minimal. The few shown are to reduce the number of culde-sacs by interconnecting the local streets. Cross-Street intersection spacing with Alternate D—2 and its frontage roads is satisfactory for good vehicle flow and safety.

With good traffic service, better frontage road connections, and more open space, Alternate D—2 is rated 9.

Operation and Use of Existing Highway Facilities and Other Transportation Facilities During Construction and After Completion.

The discussion and rating of 8 under Alternate D—1 applies equally to Alternate D—2.

APPENDIX C—2

ENGINEERING, CONSTRUCTION, AND RIGHT-OF-WAY COST FACTOR

Cost comparisons for the various alignments are summarized in the following table. It should be pointed out that all costs shown here cover only the various freeway alternatives themselves, without any peripheral or buffer treatment. The development of such treatments entails the expenditure of considerable time and attention. Since it was anticipated that within the degree of accuracy possible at this time, these buffer developments would be similar for each alternative and thus represent a percentage addition to each alternative's cost, it was considered counter-productive to expend such detail effort on all alternatives. Consequently, such buffer developments and their cost implications are discussed for the recommended routes within Section VI and Appendices C—6 and C—7.

Construction costs were prepared from carefully made quantity take-offs of the plans, using cost figures which are current. Some escalation can be expected, however, the exact amounts depending on the number of years over which construction is spread.

Right-of-way costs were also very carefully determined. Early in the study, typical blocks of property falling within general corridor were closely analyzed and appraised as to their probable acquisition cost as of this year. These values were then compared with the valuations appearing on the assessors' records and the ratio determined. These ratios were then deemed to be applicable to similar properties in similar neighborhoods. This work was carefully done by well qualified appraisers with long experience in the Dubuque area. It was recognized that this technique would result in errors on individual properties but in the overall analysis should provide a good balance of high and low estimates which in turn should produce as accurate overall totals as could otherwise be prepared.

When specific right-of-way limits were determined, the individual properties were identified and their potential acquisition cost determined. The totals are shown in the appropriate column in the table.

The total costs, shown in the last column on the tabulation, are the total of construction costs, engineering and contingency costs and right-of-way costs. These were then numerically compared with their alternatives and the numerical ratings obtained. Among specific alternatives, the lowest cost was graded the highest rating and the highest cost was graded the lowest. These cost ratings are shown in the following summary table:

Alignment	Rating
Couler Valley with City Island Bridge	5.2
Roosevelt with City Island Bridge	4.9
Roosevelt with Eagle Point Bridge	4.9
Kerrigan	5.9
Granger Creek	4.2
Dodge Expressway	5.7
Dodge Parkway	4.4

ENGINEERING, CONSTRUCTION, RIGHT-OF-WAY COST ESTIMATES

Alternative Alignments	Descriptions (Report Plate Nos.)	Length (Miles)	Site Clearing	Grading & Drainage	Surfacing	Structures	Lighting & Signalization	Total Const. Cost	Engineering & Contingency Cost	Right-of-Way	Total Cost
Couler Valley with City Island Bridge	101-108	8.35	$922,600	$ 8,319,500	$2,239,100	$36,628,900	$834,000	$48,944,100	$8,565,217	$7,101,142	$64,610,459
Roosevelt with City Island Bridge	201-209	8.93	620,450	17,822,700	2,055,400	32,489,000	537,800	53,525,350	9,366,936	4,218,495	67,110,781
Roosevelt with Eagle Point Bridge	251-257	9.23	616,400	17,947,600	2,157,250	31,814,750	529,900	53,065,900	9,286,532	4,640,540	66,992,972
Dodge-Locust Interchange (Dodge Expressway Connection)	301 or 602	0.66	536,000	74,300	241,300	7,457,400	79,400	8,388,400	1,467,970	2,891,420	12,747,790
Dodge-Locust Interchange (Dodge Parkway Connection)	311 or 612	0.66	536,000	74,300	241,300	7,457,400	79,400	8,388,400	1,467,970	2,891,420	12,747,790
Kerrigan	401-404	3.59	57,950	10,258,100	1,205,700	3,769,500	195,000	15,486,250	2,710,094	939,741	19,136,085
Granger Creek	501-504	4.30	103,800	8,323,750	932,500	13,190,700	214,400	22,765,150	3,983,901	193,050	26,942,101
Dodge Expressway	601	1.35	218,000	1,657,500	759,800	950,000	142,400	3,727,700	652,347	2,289,285	6,669,332
Dodge Parkway	611	1.35	615,000	590,600	670,200	946,000	142,400	2,964,200	518,735	5,206,976	8,689,911

APPENDIX C—3
PUBLIC UTILITIES FACTOR

The analysis of public utilities for the freeway was accomplished for each segment relative to the section, township, and range through which the segment passes.

The analysis was made for the following utilities:

City of Dubuque Water Department (Water)
City of Dubuque Sewer Department (Sanitary Sewers)
City of Dubuque Sewer Department (Storm Drainage)
Interstate Power (Electric and Bus System)
People Natural Gas (Gas)
Northwestern Bell Telephone (Telephone)
Dubuque TV-FM Cable Co. (TV-Cable)
Northern Natural Gas (Gas Rural Area)
Mid America Oil Co. (Pipe Lines)
American Oil Co. (Pipe Lines)

From discussions with the Public Transit Company, it was found that the bus system was flexible and any location would not affect the operation of the public transit. Therefore, the location of the public transit routes in the area of the freeway will not be considered further.

METHODOLOGY

It is assumed that the utility, as it crossed the freeway, creates a spot location that is affected and must be evaluated as to the magnitude of the effect of the freeway on the utility at this location. The disruption of the utility relative to the total utility system was rated on a scale of 0 (no effect) to 5 (critical effect) depending on the magnitude of the problem and then summed for the utility and route segment.

Further summations and aggregrations were made, as shown in the table at the end of this appendix discussion, to produce total ratings for the alternative alignments under consideration. For comparison with the ratings of the other evaluative criteria, the final utility ratings for each alternative were converted to a scale from 0 (critical effects) to 10 (no utility effects).

NARRATIVE REVIEW OF UTILITIES BY SEGMENT—CITY OF DUBUQUE FACILITIES

Segment S-1(a), S-1(b), & B-3 Section 12-88-2

0 **Water System**
Service not extended this far south no problem

0 **Sanitary Sewerage System**
Service not extended this far south no problem

0 **Storm Drainage System**
Open channel flow culverts and bridges required no problem

Segment S-1(a), S-1(b), & B-3 Section 1-88-2

0 **Water System**
Service not extended this far south no problem

0 **Sanitary sewerage System**
New bridge piers will have to miss sewer line south of Catfish Creek.

0 **Storm Drainage System**
Open channel flow culverts and bridges required, no problem

Segment S-1(a), S-1(b) & B-3 Section 36-89-2

2 **Water System**
Grandview—carry 12" under freeway and connect to 10" on Grandview. Also connect 8" in North Cascade Road to 10" in Grandview (700'/12") (750'/8"). Mt. Carmel—leave 16" water main as is.

2 **Sanitary Sewer**
Eliminate 8" (may have to relocate for apartments) going down to Southern and connect Grandview, East to Julien Dubuque Drive and Grandview, West to Cascade Road. Construct 8" under Freeway 1800' South of Grandview (600'/8"), (750'/8").

0 **Storm Drainage System**
No problem in this section

Segment S-1(a), S-1(b) and B-3 Section 25-89-2

0 **Water System**
The proposed structure is elevated at this point of the segments and both segments B-2 and B-3 follow similar configurations. The existing water line in So. Locust may prove to be useless once the area being served is removed by the expressway. This would allow the line to be abandoned.

1 **Sanitary Sewer System**
The elevated structure would have to be built in such a manner to provide easy maintenance to the sewer line underneath the structure or reroute the sewer line to avoid the problem of maintenance after the expressway is complete in South Locust. Since many of the parcels being served by the sewer are being taken by the expressway and the need for the line at this location has been reduced, it could be relocated elsewhere.

2 **Storm Drainage System**
A large storm sewer drains the Kerrigan Road and Southern Avenue area to Dodge Street. The proposed freeway passes directly over the storm sewer; this may cause maintenance problems, and rerouting should be considered.

Segment S-2(a), S-2(b) and B-2 Section 18-88-3

0 **Water System**
Service not extended this far south, no problem

0 **Sanitary Sewerage System**
Service not extended this far south, no problem

0 **Storm Drainage System**
Open channel flow, culverts and bridges required, no problem

Segment S-2(a), S-2(b) and B-2 Section 7-88-3

0 **Water System**
Service not extended this far south, no problem

0 **Sanitary Sewerage System**
Service not extended this far south, no problem

0 **Storm Drainage System**
Open channel flow, culverts, and bridges required, no problem

Segment S-2(a), S-2(b) and B-2 Section 6-88-2

0 **Water System**
Elevated structure should have little problem in not affecting 8" water main.

1 **Sanitary Sewerage System**
Freeway route will miss the existing STP and a well engineered route would provide little problem to the 30" gravity truck sewer along the railroad, or the 30" pressure sewer along the river.

0 **Storm Drainage System**
Open channel flow, culverts and bridges required, main bridge over Catfish Creek, no problem.

Segment S-2(a), S-2(b) and B-2 Section 31-89-3

0 **Water System**
The segment leaves a 16" main in Mt. Carmel Road untouched as the freeway passes below the bluff.

3 **Sanitary Sewerage System**
The 30" force main serving the entire Dubuque system parallels the railroad and would parallel the freeway. A future force main is projected to be installed in the same approximate locations to provide full community service. At the time of construction neither line could be taken out of service. It would be unavoidable to miss the force main at this segment.

1 **Storm Drainage System**
The close proximity of the river and type of construction would provide no major problem to the storm sewer flow.

Segment S-2(a), S-2(b) and B-2 Section 25-89-2

0 **Water System**
The proposed structure is elevated at this point of the segments and both segments B-2 and B-3 follow similar configurations. The existing water line in So. Locust may prove to be useless once the area being served is removed by the expressway. This would allow the line to be abandoned.

1 **Sanitary Sewerage System**
The elevated structure would have to be built in such a manner as to provide easy maintenance after the expressway is completed. Since many of the parcels being served by the sewer are being taken by the expressway, and the need for the line at this location has been reduced, it could be relocated elsewhere.

2 **Storm Drainage System**
A large storm sewer drains the Kerrigan Road and Southern Avenue area to Dodge Street. The proposed freeway passes directly over the storm sewer; this may cause maintenance problems, and rerouting should be considered.

Segment D-1 Section 26-89-2

2 **Water System**
The proposed water main improvement alternate to 3rd Street feeder from Booth west on Dodge Street should be coordinated with the construction of the expressway. The most probable location would be under one of the ramps. Expressway construction on Dodge Street may improve considerations for Dodge Street feeder over 3rd Street. Alternates should be restudied in light of this study. 6" main in Grandview and Dodge Street must be relocated and upgraded as part of the looped system.

2 **Sanitary Sewer System**
The excavation of the expressway would necessitate the relocation of the sanitary sewer down Dodge Street from Grandview to Booth. This line could be eliminated if an alternate method of handling the sewage on Grandview could be found.

0 **Storm Drainage System**
Storm sewers would not be effected through this area of the segment. The only sewer drains from the north and enters the corridor at approximately Nevada Street. This is a 48" line and would serve the necessary drainage on the expressway. Another segment of storm sewer passes under present U.S. 20 at Stetmore where Rt. 20 has an existing fill section. All construction of the expressway would be completed east of this line therefore causing no problem.

Segment D-1 Section 25-89-2

1 **Water System**
The system will not be touched in this part of the segment. The only consideration should be upgrading of old pipes or undersized sections of water mains during the Expressway construction. All services will be cut off on the south side of the segment.

0 **Sanitary Sewerage System**
A 10" sanitary sewer extends down Dodge Street through this segment and will not be touched by the construction of the expressway, however, consideration should be made to upgrade old sewers or undersized piping at the time of construction.

2 **Storm Drainage System**
An existing storm sewer line would provide the drainage for the proposed improvement in Dodge Street for this segment. The pipe is sized from 48" to 96" at the point of discharge to the river. The sewer condition is not good. Any inadequate pipe size or slope should be corrected at the time of expressway construction.

Segment D-2 Section 26-89-2

2 **Water System**
The proposed water main improvement alternate to 3rd Street feeder from Booth, west on Dodge Street should be coordinated with the construction of the expressway. The most probable location would be under one of the ramps. Expressway construction on Dodge Street may improve considerations for Dodge Street feeder over 3rd Street. Alternates should be restudied in light of this study. 6" main in Grandview and Dodge Street must be relocated and upgraded as part of the looped system.

2 **Sanitary Sewerage System**
The excavation of the expressway would necessitate the relocation of the sanitary sewer down Dodge Street from Grandview to Booth. This line could be eliminated if an alternate method of handling the sewage on Grandview could be found.

0 **Storm Drainage System**
Storm sewers would not be effected through this area of the segment. The only sewer drains from the north and enters the corridor at approximately Nevada Street. This is a 48" line and would serve the necessary drainage on the expressway. Another segment of storm sewer passes under present U.S. 20 at Stetmore where Rt. 20 has an existing fill section. All construction of the expressway would be completed east of this line therefore causing no problem.

Segment D-2 Section 25-89-2

1 **Water System**
Similar discussion as to Segment D-1, except services to the north will be removed. Removing services on both sides in this concept may alleviate the need for the main unless it is a main part of the looped system or required for fire protection on the expressway.

0 **Sanitary Sewerage System**
Similar discussion to Segment D-1 except services from both sides would be removed. This scheme may eliminate the need for the sewer and it could be abandoned.

2 **Storm Drainage System**
Similar to D-1 Segment

Segment C-7 Section 25-89-2

1 **Water System**
This segment would be elevated through this area and the existing facilities would be untouched. Care in Engineering Design of the expressway must be taken to avoid bridge piers from disrupting the system mainly a 12" main in Main Street which is the major line feeding

the south part of the city.

1 **Sanitary Sewerage System**
Same concerns as expressed in the water system

1 **Storm Drainage System**
The 5th Street storm sewer will pass under the elevated structure at 5th and White Streets. Careful design must be taken to avoid disruption to the sewer during or after construction.

Segment C-7 Section 24-89-2

1 **Water System**
The water mains cross this segment at 6th, 7th and 8th Streets at approximately 45%. The main problem would be placement of bridge piers, mainly in the area of 7th Street because of the other utilities at this location. (See Sanitary Sewer)

1 **Sanitary Sewer System**
A 21" sanitary sewer line drains to the north and crosses the freeway at Washington Street at approximately 45% to 7th Street and follows parallel to the railroad line east of the freeway. The location of this line may cause engineering problems between 6th and 7th Streets.

0 **Storm Drainage System**
Two storm sewers pass under the freeway at 6th Street and at 8th Avenue. These lines are generally parallel to the streets and should cause little problems in construction.

Segment C-7 Section 19-89-3

0 **Water System**
The route will pass over large water mains, 20" in 11th Street; 12" in 16th Street; and 24" in Kerper Blvd. Because the route is elevated there would be only minor problems in avoiding the mains with bridge piers.

0 **Sanitary Sewerage System**
The elevated structure appears to ease the situation of having to relocate sanitary sewers at 11th Street and 16th Street.

3 **Storm Drainage System**
The Corps of Engineers has a storm water retention basin at the end of 14th Street on the west, Kerper on the east, and 12th and 16th Street south and north. This entire basin must be kept open for storm water retention, therefore the entire section of freeway must be on pillars elevated above any high water. Since the freeway is already elevated in this section there is little extra to increase the pillars height to elevate the freeway over the retention basin. Other storm sewers in the section include a 72" in 11th Street which crosses the freeway at a skew. This may cause some problems.

Segment C-8 Section 25-89-2

1 **Water System**
This segment would be elevated through this this area and the existing facilities would be untouched. Care in engineering design of the expressway must be taken to avoid bridge piers disrupting the system mainly a 12" main in Main Street which is the major line feeding the south part of the city.

1 **Sanitary Sewerage System**
Same concerns as expressed in the water systems.

1 **Storm Drainage System**
The 5th Street storm sewer will pass under the elevated structure at 5th and White Streets. Careful design must be taken to avoid disruption to the sewer during oryafter construction.

Segment C-8 Section 24-89-2

1 **Water System**
The water mains cross this segment at 6th, 7th, and 8th Streets at approximately 45° . The main problem would be placement of bridge piers, mainly in the area of 7th Street because of the other utilities at this location. (See San. Sewer)

1 **Sanitary Sewerage System**
A 21" sanitary sewer line drains to the north and crosses the freeway at Washington Street and Seventh Street at approximately 45° to 7th Street and follows parallel to the railroad line east of the freeway. The location of this line may cause engineering problems between 6th and 7th Streets.

0 **Storm Drainage System**
Two storm sewers pass under the freeway at 6th Street and at 8th Avenue. These lines are generally parallel to the streets and should cause little problems in construction.

Segment C-8 Section 19-89-3

0 **Water System**
The route will pass over large water mains, 20" in 11th Street; 12" in 16th Street; and 24" in Kerper Blvd. Because route is elevated there would be only minor problems in avoiding the mains with Bridge Piers.

0 **Sanitary Sewerage System**
The elevated structure appears to ease the situation of having to relocate sanitary sewers at 11th Street and 16th Street.

3 **Storm Drainage System**
The Corps of Engineers has a storm water retention basin at the end of 14th Street on the west, Kerper on the east, and 12th and 16th Street south and north. This entire basin must be kept open for storm water retention therefore the entire section of freeway must be in pillars elevated above any high water. Since the freeway is already elevated in this section, there is little extra to increase the pillars height to elevate the freeway over the retention basin. Other storm sewers in the section include a 72" in 11th Street which crosses the freeway at a skew. This may cause some problems.

Segment C-12 Section 25-89-2

1 **Water System**
This segment would be elevated through this area and the existing facilities would be untouched. Care in engineering design of the freeway must be taken to avoid bridge piers from disrupting the system.

1 **Sanitary Sewerage System**
Same concerns as expressed in the water system

1 **Storm Drainage System**
The 5th Street storm sewer will pass under the elevated structure at 5th and White Streets. Careful design must be taken to avoid disruption to the sewer during or after construction.

Segment C-12 Section 24-89-2

2 **Water System**
There appears to be little problem with the water system from 8th Street to 14th Street except for a 10" and 20" main in the vicinity of Elm Street. With the ramps interchanging with 15th Street there may be some problem in maintaining the existing lines, thereby, requiring relocation of a fairly larger water main from 11th to 14th Street. There appears little problem in the water main east of the tracks from 14th Street to 20th Street. The major problem with the water system is between 20th and 22nd where the lines are skew to the path of the freeway. These lines are generally small and local except for the 20" line in Rhomberg Avenue.

5 **Sanitary Sewerage System**
A 21" trunk down White Street would appear to be untouched considering that White Street would remain open. The 21" trunk down Washington Street may cause extra engineering to avoid it with bridge piers and provide future ease of maintenance and service considering the ramps that interchange with 14th Street. There appears to be no problem with sanitary sewers east of the tracks from 14th Street to 20th Street. A major 12" sewer may have to be relocated in the area between 20th Street and 22nd Street. This line parallels Kniest Street laying skew to the freeway and connecting to the Garfield Street trunk that drains westward to Elm Street.

4 **Storm Drainage System**
Storm sewers cross the freeway alignment normal to the Route at 8th Street and 11th Street Collector sewers may have to be relocated depending on pier location between 12th and 13th Street. The 14th Street interchange may cause some problem in handling storm sewers in that area. Bridge pier location would have some effect on the major sewers serving 15th and 16th Streets. A main problem would be to cross the Bee Branch north of 19th Street. The remainder of the way the major sewer is west of the railroad causing no problem. A sewer drain in the Point area at Lincoln and Kniest may need re-alignment.

Segment C-12 Section 19-89-3

0 **Water System**
There appears to be little problem with the water system from 8th Street to 14th Street except for a 10" and 20" main in the vicinity of Elm Street. With the ramps interchanging with 14th Street there may be some problem in maintaining the existing lines, thereby, requiring relocation of a fairly larger water main from 11th to 15th Stteet. There appears little problem in the water main east of the tracks from 14th Street to 20th Street. The major problem with the water system is between 20th and 22nd where the lines are skew to the path of the freeway. These lines are generally small and local except for the 20" line in Rhomberg Avenue.

0 **Sanitary Sewer System**
A 21" trunk down White Street would appear to be untouched considering that White Street would remain open. The 21" trunk down Washington Street may cause extra engineering to avoid it with bridge piers and provide future ease of maintenance and service, considering the ramps interchanging with 14th Street. There appears to be no problem with sanitary sewers east of the tracks from 14th Street to 20th Street. A major 12" sewer may have to be relocated in the area between 20th Street and 22nd Street. This line parallels Kniest Street laying skew to the freeway and connecting to the Garfield Street trunk that drains westward to Elm Street.

3 **Storm Drainage System**
Storm sewers cross the freeway alignment normal to the Route at 8th Street and 11th Street. Collector sewers may have to be relocated depending on pier location between 12th and 13th Street. The 14th Street interchange may cause some problem in handling storm sewers in that area. Bridge pier location would have some effect on the major sewers serving 15th and 16th Streets. A main problem would be to cross the Bee Branch north of 19th Street. The remainder of the way, the major sewer is west of the railroad causing no problem. A sewer drain in the Point area at Lincoln and Kniest may need re-alignment.

Segment R-2a, (E-1, N-2) Section 18-89-3

1 **Water System**
Freeway and Expressway is elevated where crossed by the water system therefore there is no major problem with the water system.

0 **Sanitary Sewerage System**
Freeway or expressway is elevated at Kerper Blvd., and along Emmerson so that little or no disruption will occur on existing sanitary sewers.

1 **Storm Drainage System**
Care must be taken to keep the continuity of the storm sewers on Dock Street Ext., Hamilton Street Ext., and Roosevelt Street Ext., where the expressway crosses the outlets, there seems to be no problem at this time.

Segment R-2b (E-2, N-2) Section 18-89-3

1 **Water System**
Care must be taken at the bridge approach to avoid the existing 24" water-mains and the water treatment facility. These mains are the major feeders from the well field to the treatment plant. Present alignment will make the bridge approach south of the water treatment facility and adjoining pool. The freeway is generally elevated at the point of watermain crossing but the pier spacing may be a problem.

0 **Sanitary Sewerage System**
The freeway is generally elevated at the points of sewer crossing causing little or no conflict.

1 **Storm Drainage Systems**
Care must be taken to keep the continuity of the storm sewer in Dock Street Ext., Hamilton Street Ext., and Roosevelt Street Ext., where the expressway crosses the outlets. There seems to be no problem at this time.

Segment N-1(f), and N-1(e) Section 13-89-2

1 **Water System**
A 12" main east of the tracks from 22nd to 25th Street would have to be relocated between 22nd and 24th Street. The 6" line in Pinard would have to be removed in like manner and the area it served is also being removed, therefore causing little problem. An 8" main in 24th Street crosses the alignment of the expressway. This main connects two service levels and should remain in service for emergencies. The Park Hill feeder main should be re-evaluated considering the alignment of the expressway. More right-of-way may be available for a direct routing from Rhomberg to 28th Street.

1 **Sanitary Sewerage System**
The main Couler Valley interceptor runs parallel to the tracks and adjacent to the east side. There should be little problem in avoiding the sewer during construction of the at grade portion of the route, and only minor problems with pier location in the elevated portion. Abandon 10" sanitary sewer in Pinard since local services will be taken by the expressway.

0 **Storm Drainage System**
The route passes over one storm sewer of any size, a 60" that serves Windsor area crossing at 24th Street. All other storm sewers are serving local areas that are removed by the expressway.

Segment N-(f) & N-1(e) Section 11-89-2

0 **Water System**
Water facilities have not been extended to this part of the city at the present time.

0 **Sanitary Sewerage System**
No existing sewers are within the area, but a proposed 30" trunk line is planned for extending north along the railroad and east of it. There should be no conflict with the expressway construction.

2 **Storm Drainage System**
No storm sewers are in the area, but a ditch that parallels the track, and on the east side before it crosses the track to the west, may give some engineering or construction problems.

Segment N-1(f) and N-1(e) Section 2-89-3

0 **Water System**
Service not extended this far north, no problem

0 **Sanitary Sewerage System**
Service not extended this far north, no problem

0 **Storm Drainage System**
Open channel flow culverts and bridges required, no problem

Segment N-(f) and N-1(e) Section 3-89-2

0 **Water System**
Service not extended this far north, no problem

0 **Sanitary Sewerage System**
Service not extended this far north, no problem

0 **Storm Drainage System**
Open channel flow culverts and bridges required, no problem

Segment N-(f) and N-(e) Section 34-90-2

0 **Water System**
Service not extended this far north, no problem

0 **Sanitary Sewerage System**
Service not extended this far north, no problem

0 **Storm Drainage System**
Open channel flow culverts and bridges required, no problem

Segment N-2(a), N-2(b) Section 7-89-3

0 **Water System**
No problem in this section

0 **Sanitary Sewerage System**
No problem in this section

0 **Storm Drainage System**
Open channel flow culverts and bridges required, no problem

Segment N-2(a), N-2(b) Section 12-89-2

2 **Water System**
All existing facilities have not reached into the virgin area as yet. This area is sparcely developed and utilities may be installed prior to Freeway/Expressway construction. Utility extension has seen increased activity in this section of land. Approximately 280 Ac. of ground are now under consideration for development. The total length of the expressway runs through the land proposed for development. For this route coordination between extension of facilities and the expressway would be required to avoid expensive crossing of the expressway by the public utility after installation. The water dept. is not concerned over expressway construction.

2 **Sanitary Sewerage System**
All existing facilities have not reached into the virgin area as yet. This area is sparcely developed and utilities may be installed prior to Freeway/Expressway construction. Utility extension has seen increased activity in this section of land. Approximately 280 Ac. of ground are now under consideration for development. The total length of the expressway runs through the land proposed for development. For this route coordination between extension of facilities and the expressway would be required to avoid expensive crossing of the expressway by the public utility after installation.

0 **Storm Drainage System**
Open channel flow culverts and bridges required, no problem.

Segment N-2(a) N-2(b) Section 11-89-2

0 **Water System**
Water facilities have not been extended to this part of the city at the present time.

0 **Sanitary Sewerage System**
No existing sewers are within the area, but a proposed 30" trunk line is planned for extending north along the railroad and east of it. There should be no conflict with the expressway construction.

2 **Storm Drainage System**
No storm sewers are in the area, but a ditch that parallels the track and on the east side before it crosses the track to the west may give some engineering or construction problems.

Segment N-2(a) and N-2(b) Section 2-89-2

0 **Water System**
Service not extended this far north, no problem

0 **Sanitary Sewerage System**
Service not extended this far north, no problem

0 **Storm Drainage System**
Open channel flow culverts and bridges required, no problem

Segment N-2(a), N-2(b) Section 3-89-2

0 **Water System**
Service not extended ,his far north, no problem

0 **Sanitary Sewerage System**
Service not extended this far north, no problem

0 **Storm Drainage Sys,em**
Open channel flow culverts and bridges required, no problem

Segment N-2(a), N-2(b) Section 34-90-2

0 **Water System**
Service not extended this far north, no problem

0 **Sanitary Sewerage System**
Service not extended this far north, no problem

0 **Storm Drainage System**
Open channel flow culverts and bridges required, no problem

NARRATIVE REVIEW OF UTILITIES BY SEGMENT UTILITY COMPANIES

Segment S-1(a), S-1(b), and B-3 Section 12-88-2

0 **Interstate Power**
Oakland Dairy Road—13.8 KV line will not cause problem since proposed roadway will meet existing grade at this point.

0 **Northwestern Bell Telephone**
No problem in this section

0 **Peoples Natural Gas**
No problem in this section

0 **Dubuque TV-FM Cable Company**
No problem in this section

Segment S-1(a) & S-1(b) & B-3 Section 1-88-2

5 **Interstate Power Company**
13.8 KV line east of U.S. 52 Jct. with U.S. 61 must be relocated. 69 KV line skew across proposed route through bottoms land, will have to relocate structure on east side. 13.8 KV line at Catfish Creek crossing is at maximum height now, must relocate to eliminate conflict with new bridge

0 **Northwestern Bell Telephone Co.**
No problem in this section

0 **Peoples Natural Gas**
No problem in this section

0 **Dubuque TV-FM Cable Co.**
No problem in this section

Segment S-1(a), S-1(b), and B-3 Section 36-89-2

3 **Interstate Power**
1 Grandview Interchange—local service system must be abandoned or relocated to serve adjacent areas.

2 Grandview to Southern—15 KV line must be relocated or raised; 69 KV line must be relocated or raised.

2 **Northwestern Bell Telephone**
2 Grandview Interchange—local service system must be abandoned or relocated to serve adjacent areas. South end feeder in Rockdale Road has to be relocated.

Grandview to Southern—no problem.

3 **Peoples Natural Gas Co.**
1 Grandview — east side — relocate DRS (District Regulator Station) from right-of-way

2 Grandview — west side — 4" intermediate pressure main must be relocated to continue service down Rockdale Road along with DRS.

0 Mt. Carmel and So. Locust — 4" high pressure main should cause no problems but must be watched during design.

1 **Dubuque TV-FM Cable Co.**
1/2 Grandview — relocate line in Grandview

1/2 Rockdale Road—Relocate line in Rockdale Road

Segment S-1(a) & S-1(b) & B-3 Section 25-89-2

3 **Interstate Power**
2 Railroad Avenue to Dodge—abandon or relocate local service system. Dodge Street, relocate 15 KV line at interchange.

1 Dodge Street to 1st Street—Abandon or relocate service system.

2 **Northwestern Bell Telephone**
2 Railroad Avenue to 1st Street. South end feeder in Locust St. must be considered during design. Jones Street—East Dubuque—feeder buried no problem.

1 **Peoples Natural Gas Co.**
1 Railroad Ave. — Freeway passes overhead but may cause some problem with DRS and would have to relocate.

0 So. Locust — 6" and 12" low pressure main should give no problem to freeway

0 Dodge to 1st Street - 6" low pressure in Locust and 2" high pressure in Iowa may cause problem if Iowa or Locust is closed to traffic because of piers.

0 **Dubuque TV-FM Cable Co.**
0 No cable until Iowa Street.

0 Iowa Street—Cable could go under elevated structure, no problem

Segment S-2(a), S-2(b) and B-2 Section 18-88-3

0 **Interstate Power Co.**
No problem in this section

0 **Northwestern Bell**
No problem in this section

0 **Peoples Natural Gas**
No problem in this section

0 **Dubuque TV-FM Cable Co.**
No problem in this section

Segment S-2(a), S-2(b) & B-2 Section 7-88-3

0 **Interstate Power Co.**
No problem in this section

0 **Northwestern Bell**
No problem in this section

0 **Peoples Natural Gas**
No problem in this section

0 **Dubuque TV-FM Cabel Co.**
No problem in this section

Segment S-2(a), S-2(b) and B-2 Section 6-88-3

3 **Interstate Power Co.**
2 Catfish Creek Bridge—69KV transmission line to Clinton must be relocated and/or raised.

1 13.8 KV at old STP must be relocated or rasied.

0 **Northwestern Bell**
0 Local lines in road north of 52 & 67, Metropolitan Heights and Julien Dubuque Drive, should cause no problem.

0 **Peoples Natrual Gas Co.**
No problem in this section

0 **Dubuque TV-FM Cable Co.**
No problem in this section

Segment S-2(a), S-2(b) and B-2 Section 31-89-3

1 **Interstate Power**
13.8 KV line along R.R. to flood pumps would need to be relocated

0 **Northwestern Bell Telephone**
No problem in this section

0 **Peoples Natural Gas Co.**
No problem in this section.

0 **Dubuque TV-FM Cable Co.**
No problem in this section

Segment S-2(a), S-2(b) and B-2 Section 25-89-2

3 **Interstate Power**
2 Railroad Avenue to Dodge—abandon or relocate local service system. Dodge Street, relocate 15 KV line at interchange.

1 Dodge Street to 1st Street—abandon or relocate local service system

2 **Northwestern Bell Telephone**
2 Railroad Avenue to 1st Street—South end feeder in Locust St. must be considered during design, Jones St. East Dubuque feeder, buried no problem.

1 **Peoples Natural Gas**
- 1 Railroad Ave.—Freeway passes overhead but may cause some problem with DRS and would have to be relocated.
- 0 So. Locust—6" and 12" low pressure in Locust and 2" high pressure in Iowa may cause problem if Iowa or Locust is closed to traffic because of piers.

0 **Dubuque TV-FM Cable Co.**
- 0 No cable until Iowa Street
- 0 Iowa Street—Cable could go under elevated structure, no problem.

Segment D-1 Section 26-89-3

3 **Interstate Power**
- 2 KV line running in Dodge Street will have to be relocated.
- 1 Local service in section must be abandoned or relocated to serve adjacent areas.

4 **Northwestern Bell Telephone**
- 3 Dodge Street buried conduit will have to be relocated due to deep cut on Dodge Street and Grandview, major problem.
- 1 Other local service should be buried or abandoned in this section.

6 **Peoples Natural Gas Co.**
- 5 Expressway, Concord to Booth—16" high pressure main feeder to Dubuque must be relocated. Construction estimate if required, will be made by PNG. This is a major problem and requires outside construction help.
- 1 Expressway, Freemont to Booth—8" low pressure main must be relocated.
- 0 Booth to York—3" low pressure line in Nevada and York can be abandoned.

1 **Dubuque TV-FM Cable Co.**
- 1 Dodge Street—Grandview to Fremont—relocate line and crossings of expressway.

Segment D-1 Section 25-89-2

3 **Interstate Power**
- 3 Relocate local system to serve north area. Relocate 15KV line.

1 **Northwestern Bell Telephone**
- 1 Relocate or bury local service system to serve north side.

3 **Peoples Natural Gas Co.**
Bluff to Nevada—16" high pressure main should cause little problem because the change in grade is slight. Feeders off the main at Burns, McClain and Hill may have to be relocated or lowered due to the width of the proposed expressway. 3" and 4" low pressure main has similar problem at Bryant, So. Hill, Alpine, York and Nevada.

1 **Dubuque TV-FM Cable Co.**
- 1 Hill Street—Cable crosses at this intersection and would have to be maintained furing construction; but, will cause only minor problems.

Segment D-1 Section 26-89-2

3 **Interstate Power Co.**
- 2 15 KV line running in Dodge Street will have to be relocated.
- 1 Local service in section must be abandoned or relocated to serve adjacent areas.

4 **Northwestern Bell Telephone**
- 3 Dodge Street buried conduit will have to be relocated due to deep cut on Dodge Street at Grandview. Major problem.
- 1 Other local service should be buried or abandoned in this section.

6 **Peoples Natural Gas**
- 5 Expressway, Concord to Booth—16" high pressure main feeder to Dubuque must be relocated. Construction estimate if required will be made by PNG. This is a major problem and requires outside construction help.
- 1 Expressway Fremont to Booth—8" low pressure main must be relocated.
- 0 Booth to York—3" low pressure line in Nevada and York can be abandoned.

1 **Dubuque TV-FM Cable Co.**
- 1 Dodge Street—Grandview to Freemont relocate line and crossings of expressway.

Segment D-2 Section 25-89-2

3 **Interstate Power**
- 3 Abandon or relocate local system to serve adjacent areas. Relocate 15 KV line.

1 **Northwestern Bell Telephone**
- 1 Abandon or relocate local service system to serve adjacent areas.

3 **Peoples Natural Gas**
- 2 Bluff to Nevada—16" high pressure main should cause little problem because the change in grade is slight. Feeders off the main at Burns, McClain and Hill may have to be relocated or lowered due to the width of the proposed expressway. 3" and 4" low pressure main has similar problem at Bryant, So. Hill, Alpine, York, and Nevada.

1 **Dubuque TV-FM Cable Co.**
- 1 Hill Street—cable crosses at this intersection and would have to be maintained furing construction; but will cause only minor problems.

Segment C-7 Section 25-89-2

1 **Interstate Power**
- 1 1st Street to 6th Street—Abandon or relocate local service for serving adjacent areas.

1 **Northwestern Bell Telephone**
- 1 1st Street to 6th Street—Abandon or bury local service for serving adjacent areas.

1 **Peoples Natural Gas Co.**
- 1/2 1st Street at Main—8" low pressure main should be missed with proper design
- 0 2nd Street at Iowa 3" intermediate pressure main should give not problem.
- 1/2 5th Street and White—12" high pressure main should be avoided with proper design causing no problem.

0 **Dubuque TV-FM Cable Co.**
No problem in this section.

Segment C-7 Section 24-89-2

0 **Interstate Power**
These segments pass through approximately 1000' of the section and power lines cause little problem.

0 **Northwestern Bell Telephone**
These segments pass through approximately 1000' of the section and telephone lines cause little problem.

0 **Peoples Natural Gas Co.**
These segments pass through approximately 1000' of the section and cause no problem with gas mains.

0 **Dubuque TV-FM Cable Co.**
These segments pass through approximately 1000' of the section and causes no problem with the Cable Co.

Segment C-7 Section 19-89-3

11 **Interstate Power**
- 3 9th Street to 11th Street at Pine-69 KV and 13.8 KV line must be relocated.
- 0 9th Street to 14th Street along the flats expressway misses 13.8 KV line—no problem.
- 2 14th Street, Pine to retension basin 15 KV line must be relocated.
- 2 16th Street, 13.8 KV line must be relocated, or underground.
- 4 Kerper Blvd., relocate or raise 2-69 KV line down easment in Kerper— 13.8 KV underground—2-69 KV on new towers, major problem.

4 **Northwestern Bell Telephone**
- 1 8th Street overhead line must be buried or relocated.
- 1 Cedar Street overhead line must be buried or relocated.
- 1 14th Street overhead line must be buried or relocated.
- 1 Retention basin overhead line must be buried relocated cutting diagonally across freeway.
- 0 All other local service is presently buried and cause no problem.

4 **Peoples Natural Gas Co.**
- 2 Pine Street, 8th to 9th Street—12" high pressure main will cause problem with pier location and must be relocated.
- 0 9th Street—12" high pressure main in right-of-way will cause no problem.
- 2 11th Street at Cedar—12" high pressure main from south will cause problem and will have to be relocated. 3" high pressure m in to east will cause no problem.
- 0 16th Street—6" high pressure main should cause no problem.
- 0 Kerper Blvd. north of 16th St.—6" high pressure main should cause no problem.

0 **Dubuque TV-FM Cable Co.**
- 0 No problem this section.

Segment C-8 Section 25-89-2

1 **Interstate Power Co.**
- 1 1st Street to 6th Street—Abandon or relocate local service for serving adjacent areas.

1 **Northwestern Bell Telephone**
- 1 1st Street to 6th Street—Abandon or bury local service for serving adjacent areas.

1 **Peoples Natural Gas Co.**
- 1/2 1st Street at Main—8" low pressure main should be missed with proper design.
- 0 2nd Street at Iowa—3" intermediate pressure should give no problem
- 1/2 5th Street and White—12" high pressure main should be avoided with proper design causing no problem.

0 **Dubuque TV-FM Cable Co.**
- 0 No problem with this section.

Segment C-8 Section 24-89-2

0 **Interstate Power**
These segments pass through approximately 1000' of the section and power lines cause little problem.

0 **Northwestern Bell Telephone**
These segments pass through approximately 1000' of the section and telephone lines cause little problem.

0 **Peoples Natural Gas Co.**
These segments pass through approximately 1000' of the section and cause no problem with gas mains.

0 **Dubuque TV-FM Cable Co.**
These segments pass through approximately 1000' of the section and cause no problem with the Cable Co.

Segment C-8 Section 19-89-3

11 **Interstate Power**
- 3 9th Street to 11th Street at Pine, 69 KV and 13.8 KV line must be relocated.
- 0 9th Street to 14th Street along flats, miss 13.8 KV line, no problem.
- 2 14th Street, Pine to retension basin, 15 KV line must be relocated
- 2 16th Street, 13.8 KV line must be relocated or underground.
- 4 Kerper Blvd. relocate or raise 2-69 KV line down easement in Kerper. 13.8 KV underground 2-69 KV on new towers. Major problem.

2 **Northwestern Bell Telephone**
- 1 12th Street overhead line must be buried or relocated.
- 1 16th Street arial line will be buried in future
- 0 All other local service is presently buried and will cause no problems.

4 **Peoples Natural Gas Co.**
- 2 Pine Street, 8th to 9th Street—12" high pressure main will cause problem with pier location and must be relocated.
- 0 9th Street—12" high pressure main in right-of-way will cause no problem.
- 2 11th Street at Cedar—12" high pressure main from south will cause problem and will have to be relocated. 3" high pressure main to east will cause no problem.
- 0 16th Street—6" high pressure main should cause no problem.
- 0 Kerper Blvd. North of 16th Street—6" high main should cause no problem.

0 **Dubuque TV-FM Cable Co.**
- 0 No problem in this section

Segment C-12 Section 25-89-2

1 **Interstate Power**
- 1 1st Street to 6th Street—abandon or relocate local service for serving adjacent areas.

1 **Northwestern Bell Telephone**
- 1 1st Street to 6th Street—Abandon or bury local service for serving adjacent areas.

1 **Peoples Natural Gas Co.**
- 1/2 1st Street at Main—8" low pressure main should be missed with proper design.
- 0 2nd Street at Iowa 3" intermediate pressure main should give no problem.
- 1/2 5th Street and White—12" high pressure main should be avoided with proper design causing no problem.

0 **Dubuque TV-FM Cable Co.**
- 0 No problem in this section

Segment C-12 Section 24-89-2

12 **Interstate Power**

0 8th Street—2-15 KV lines on 8th Street would have to be relocated. May abandon by line of freeway construction.

0 9th Street—underground 15 KV line would not present any problem.

4 Alley east of Jackson from 11th to 14th Street—69 KV line as main feeder to 17th Street sub station must be relocated or placed underground. Major problem.

3 Elm Street—11th to 15th Street—2-15 KV lines would have to be relocated or placed underground.

1 Alley's east and west of Elm Street—11th to 14th Streets—minor lines to be relocated to serve areas not taken by Expressway and abandoned in areas where lots served will be taken as part of freeway.

2 16th Street—15 KV line overhead must be relocated or placed underground.

2 17th and 18th Street—Packing Co.—feeders from 17th Street sub station must be relocated causing major problem.

0 No problem with electrical between 16th and 22nd Street in this section.

4 **Northwestern Bell Telephoned**

0 6th to 8th Street—underground telephone presents no problem in this section.

0 8th Street to 12th Street—underground telephone presents no problem in this section.

2 16th Street—service to Dubuque Packing Co., major problem if disturbed.

1 Alleys between Jackson, Washington, Elm and Railroad—overhead lines will have to be relocated or buried to serve areas not being taken by the freeway or abandoned in areas being taken.

0 16th Street to Garfield Avenue—underground telephone presents no problem in this section.

1 Garfield Avenue to 22nd Street—overhead lines in Garfield Lincoln, and 22nd Street will have to be relocated or buried.

0 Rhomberg Ave.—East feeder buried causing no problem.

4 **Peoples Natural Gas Co.**

1 White Street—6th to 9th St.—12" high pressure main in right-of-way should cause little problem until it turns east in 9th Street; may cause minor difficulty.

0 White Street—9th to 10th St.—16" low pressure main in right-of-way should cause no problem.

0 White Street—10th to 11th Street. 8" low pressure main in right-of-way should cause no problem.

0 Jackson Street—11th to 14th Street. 4" low pressure main in right-of-way should cause no problem if Jackson is kept open.

0 Washington St.—12th to 14th Street—4" low pressure main should be abandoned because the area served is being taken, causing no problem.

1 Elm St.—12th to 14th Street—12" low pressure main must be relocated to serve adjoining area.

1 13th St.—at Railroad—4" low pressure main must be relocated to serve adjoining area; 3" main could be abandoned.

1 Maple—14th to 16th Streets—4" low pressure main must be relocated to serve adjoining area.

0 16th St.—10" high pressure main in 16th Street in right-of-way causing no problem if 16th is kept open.

0 19th, Garfield, and Rhomberg—4" low pressure main within street right-of-way causing no problem.

0 Lincoln—10" low pressure main in right-of-way causing no problem.

0 22nd Street—6" and 3" low pressure mains in right-of-way causing no problem.

1 **Dubuque TV-FM Cable Co.**

0 6th Street to 11th Street no problem.

1/2 11th Street to 14th Street—overhead line must be relocated to serve areas adjacent to freeway.

1/2 22nd Street—line must be relocated.

Segment C-12 Section 19-89-3

8 **Interstate Power**

2 14th Street, Pine to retension basin, 15 KV line must be relocated.

2 16th Street—13.8 KV line must be relocated or underground.

4 Kerper Blvd., relocate or raise 13.8 KV 2-69 KV, lines down easement in Kerper Blvd. 13.8 KV underground, 2-69-KV on new towers. This is major problem.

2 **Northwestern Bell Telephone**

1 14th Street overhead line must be buried or relocated.

1 Retension basin overhead line must be buried or relocated cutting diagonally across freeway.

0 All other local service is presently buried and and will cause no problem.

0 **Peoples Natural Gas Co.**

0 14th Street at Sycamore—12" high pressure main in Sycamore should cause no problem with Sycamore remaining open.

0 16th Street—6" high pressure main should cause no problem.

0 Kerper Blvd., North of 16th St.—6" high pressure main should cause no problem.

0 **Dubuque TV-FM Cable Co.**

0 No problem in this section

Segment R-2a (N-2, E-1) Section 18-89-3

6 **Interstate Power**

0 No problem with power lines after crossing Kerper and passing behind industries.

2 Kerper Blvd. at extension of Emerson and Roosevelt. I-69 KV and I-161 KV line in Kerper must be relocated or raised. Major problem.

1 Kerper to Prescott, local power system must be relocated or passed under expressway to continue service. Expressway is elevated through this area.

3 Sub station west of Roosevelt and South of Garfield near railroad serves Point area, major problem.

2 **Northwestern Bell Telephone**

0 Kerper Blvd.—No problem with buried cable in Kerper.

1 Flood dike adjacent to Peosta channel—overhead telephone must be relocated or buried.

1 Kerper Blvd. to Prescott—local telephone lines must be relocated or buried.

0 **Peoples Natural Gas Co.**

0 Kerper Blvd.—North at 16th St.6" high pressure main in medium strip of Kerper Blvd. at Roosevelt Ext.—2" high pressure main in Kerper Blvd. No problems.

0 Garfield, to Prescott—3" and 6" low pressure mains, in right-of-way causing no problem.

0 **Dubuque TV-FM Cable Co.**

0 Alley South of Lincoln—no problem—line can pass under freeway

Segment R-2b, (N-2, E-2,) Section 18-89-3

8 **Interstate Power**

6 North of 16th to extension of Roosevelt same comments as Segment R-2a.

2 Extension of Shiras—I-69 and I-161 KV line must be relocated or raised over freeway.

0 Shiras to River—No problem with local service lines.

2 **Northwestern Bell Telephone**

2 North of 16th to extension of Roosevelt same as Segment R-2a.

0 Roosevelt to River—No problem with local service lines.

0 **Peoples Natural Gas Co.**

0 Kerper Blvd.—North of 16th St.—6" high pressure main in medium strip of Kerper Blvd, causing no problem.

0 Kerper Blvd.—Roosevelt Ext.—2" high pressure main in Kerper Blvd., causing no problem.

0 Garfield to Prescott—3" and 6" low pressure mains in right-of-way causing no problem.

0 Shiras Extension—2" high pressure main in right-of-way causing no problem.

0 **Dubuque TV-FM Cable Co.**

0 Alley South of Lincoln—No problem line can pass under freeway

Segment N-1(f) and N-1(e) Section 13-89-2

4 **Interstate Power Co.**

1 Disrupted local service will take area served. Lines need to be abandoned or relocated to continue service to adjacent areas.

2 26th to 27th Street — 13.8 KV feeder uses Pinard to by-pass Klauer Industries. Must be relocated.

1 32nd Street—relocate 13.8 KV line crossing proposed expressway.

4 **Northwestern Bell Telephone**

1 Disrupted local service will take area served. Lines need to be abandoned or relocated to continue service to adjacent areas.

2 26th to 28th Streets—main feeder in Pinard Street serving Windsor Avenue, major problem.

1 29th Street—Xavier Hospital major feeder crossing proposed expressway.

3 **Peoples Natural Gas Co.**

0 Elm regent to 22nd Street—3" low pressure main could be abandoned.

1 24th St.—8" intermediate pressure main in right-of-way will cause problem due to increased cover up main.

0 Pinard—24th Street to 30th Street—3" low and intermediate pressure main could be abandoned.

2 29th St.—4" high pressure main in right-of-way must be relocated.

1 **Dubuque TV-FM Cable Co.**

1/2 22nd Street to 25th Street—relocate line.

1/2 32nd Street—relocate line.

Segment N-1(f), and N-1(e), Section 11-89-2

12 **Interstate Power**

4 Center of section N-S at expressway crosses I-69 KV lines. This line must be relocated or raised over expressway.

4 West of Chicago, Great Northern Railroad are 4 circuits on 3 poles that run parallel with the railroad. Would be costly to relocate.

4 Main sub station must be avoided as well as rural sub station west of it. 161 and 69 KV lines run west and east from substation across valley. Eastward lines serve John Deere Co. 13.8 KV line runs north adjacent to drainage ditch.

1 **Northwestern Bell Telephone**

1 North of section center and expressway, telephone lines need to be relocated and raised over or buired under expressway.

0 **Peoples Natural Gas**

0 No problem in this section

0 **Dubuque TV-FM Cable Co.**

0 No problem in this section

Segment N-1(f) and N-1(e) Section 2-89-2

2 **Interstate Power Co.**

2 13.8 KV line runs along drainage ditch northwest through section.

2 **Northwestern Bell Telephone**

2 Major buried cable under tracks at south leg of 386. Only major feeder to John Deere.

2 **Peoples Natural Gas Co.**

2 386 South Interchange—8" high pressure main would have to be relocated due to new bridge.

0 **Dubuque TV-FM Cable Co.**

0 No problem with this section.

Segment N-1(f) and N-1(e) Section 3-89-2

1 **Interstate Power Co.**

1 13.8 KV line runs normal to expressway at Daytonville Road-extension must be relocated or raised.

1 **Northwestern Bell Telephone Co.**

1 Proposed relocated conduit of major significance planned for new 52 alignment. Expressway would have bearing on this design.

0 **Peoples Natural Gas Co.**

0 No problem in this section.

0 **Dubuque TV-FM Cable Co.**

0 No problem in this section.

Segment N-1(f) and N-1(e) Section 34-90-2

0 **Interstate Power Co.**

0 No problem in this section.

0 **Northwestern Bell Telephone Co.**

0 No problem in this section.

0 **Peoples Natural Gas**

0 No problem in this section.

0 **Dubuque TV-FM Cable Co.**

0 No problem in this section.

0 **Other**

0 Northern Natural Gas Co.—Near No. 386. 8" #750 Natural Gas line crosses proposed expressway. Expressway will maintain existing grade causing no problem. Platteville office has jurisdiction.

Segment N-2(a) and N-2(b) Section 7-89-3

4 **Interstate Power**
- 4 Transmission line diagonally crosses expressway with 69 and 161 KV lines that must be raised or relocated. Major problem.

1 **Northwestern Bell Telephone**
- 1 Telephone line crosses expressway diagonally and will have to be buried or relocated.

0 **Peoples Natural Gas Co.**
- 0 No problem in this section

0 **Dubuque TV-FM Cable Co.**
- 0 No problem in this section

Segment N-2(a), and N-2(b) Section 12-89-2

2 **Interstate Power Co.**
- 2 Transmission line at center of section 69 KV must be raised or relocated.
- 0 13.8 KV line in Peru Road and Valley Road may pass under expressway overpass

1 **Northwestern Bell Telephone**
- 1 Overhead line intersecting expressway north of section center must be buried or relocated.
- 0 Peru Road and Valley Road lines may pass under expressway overpass.

0 **Peoples Natural Gas Co.**
- 0 Peru Rd.—Overpass of expressway on Peru Road should have no problem with new intermediate pressure gas main.

0 **Dubuque TV-FM Cable Co.**
- 0 Peru Rd.—Overpass of expressway on Peru Road should allow line to pass under expressway causing no problem.

Segment N-2(a) & N-2(b) Section 11-89-2

12 **Interstate Power Co.**
- 4 Center of section N-S at expressway crosses I-69 KV lines. This line must be relocated or raised over expressway.
- 4 West of Chicago Great Northern Railroad are 4 circuits on 3 poles that run parallel with the railroad. Would be costly to relocate.
- 4 Main sub station must be avoided as well as rural sub station west of it. 161 and 69 KV lines run west and east from sub station across valley. Eastward lines serve John Deere Co. 13.8 KV line runs north adjacent to drainage ditch.

1 **Northwestern Bell Telephone**
- 1 North of section center and expressway, telephone lines need to be relocated and raised over or buried under expressway.

0 **Peoples Natural Gas**
- 0 No problem in this section.

0 **Dubuque TV-FM Cable**
- 0 No problem in this section.

Segment N-2(a) and N-2(b) Section 2-89-2

2 **Interstate Power Co.**
- 2 13.8 KV line runs along drainage ditch northwest through section.

2 **Northwestern Bell Telephone**
- 2 Major buried cable under tracks at south leg of 386. Only major feeder to John Deere.

2 **Peoples Natural Gas Co.**
- 2 386 South of Interchange—8" high pressure main would have to be relocated due to new bridge.

0 **Dubuque TV-FM Cable Co.**
- 0 No problem in this section.

Segment N-2(a), N-2(b) Section 3-89-2

1 **Interstate Power Co.**
13.8 KV line runs normal to expressway at Daytonville Road extension. Must be relocated or raised.

1 **Northwestern bell Telephone Co.**
Proposed relocated conduit of major significance planned for new 52 alignment. Expressway location would have bearing on this design.

0 **Peoples Natural Gas Co.**
- 0 No problem in this section.

0 **Dubuque TV-FM Cable Co.**
- 0 No problem in this section.

Segment N-2(a), N-2(b) Section 34-90-2

0 **Interstate Power Co.**
- 0 No problem in this section.

0 **Northwestern Bell Telephone**
- 0 No problem in this section.

0 **Peoples Natural Gas Co.**
- 0 No problem in this section.

0 **Dubuque TV-FM Cable Co.**
No problem in this section.

0 **Other**
Northern Natural Gas Co.—Near No. 386 8" #750 natural gas line crosses proposed expressway. Expressway will maintain existing grade causing no problem. Platteville office has jurisdiction.

Segment E-1 Section 17-89-3 to Wisconsin

1 **Interstate Power Co.**
City Island—I-161 KV and I-69 line crosses City Island on wood poles. Is part of Mississippi River crossing. Line will have to be raised. This line is in temporary easement until final determination of Island development by city.

0 **Northwestern Bell Telephone Co.**
- 0 No problem in this section.

0 **Peoples Natural Gas**
- 0 No problem in this section.

Segment E-2 Section 8-89-3 to Wisconsin

0 **Interstate Power Co.**
- 0 No problem in this section.

0 **Northwestern Bell Telephone Co.**
- 0 No problem in this section.

0 **Peoples Natural Gas Co.**
- 0 No problem in this section

0 **Dubuque FM-TV Cable Co.**
- 0 No problem in this section.

SUMMARY OF UTILITY RATINGS

SEGMENTS	C-12			N-1(e) & N-1(f)					E-1	C-7			R-2a	N-2a & N-2b						C-8			R-2b	E-2	S-B-2, 2(b) & S-2(a)					S-S-B-3, 1(b) & 1(a)				D-1		D-2	
SECTION	24	25	19	11	13	2	3	34	17	24	25	19	18	12	7	2	3	11	34	24	25	19	18	8	25	31	6	7	18	25	36	1	12	25	26	25	26
WATER	2	1	0	0	1	0	0	0	0	1	1	0	1	2	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	2	0	0	1	2	1	2
SANITARY SEWER	5	1	0	0	1	0	0	0	0	1	1	0	0	2	0	0	0	0	0	1	1	0	0	0	1	3	1	0	0	1	2	0	0	0	2	0	2
STORM SEWER	4	1	3	2	0	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0	1	3	1	0	2	1	0	0	0	2	0	0	0	2	0	2	0
INTERSTATE	12	1	8	12	4	2	1	0	1	0	1	11	6	2	4	2	1	12	0	0	1	11	8	0	3	1	3	0	0	3	3	5	0	3	3	3	3
NORTHWESTERN BELL	4	1	2	1	4	2	1	0	0	0	1	2	2	1	1	2	1	1	0	0	1	2	2	0	2	0	0	0	0	2	2	0	0	1	4	1	4
PEOPLES NATURAL	4	1	0	0	3	2	0	0	0	0	1	4	0	0	0	2	0	0	0	0	1	4	0	0	1	0	0	0	0	1	3	0	0	3	6	3	6
CABLE FM-TV	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
SECTION TOTALS	32	6	13	15	14	4	2	0	1	2	6	20	10	7	5	6	2	13	0	2	6	20	12	0	9	5	5	0	0	9	13	5	0	11	18	11	18
SEGMENT TOTALS	51			35					1	28			10	33						28			12	0	19					27				29		29	
ALTERNATIVE ALIGNMENT TOTALS	(C-12,N-1,E-1 87									(C-7,N-2,R-2,E-1) 73										(C-8,N-2,R-2,E-2) 73					(S-2) 19					(S-1) 27				(D-1) 29		(D-2) 29	
RATINGS (0-10)	4.5									5.5										5.4					5.9					4.1				5		5	

APPENDIX C—4
GOVERNMENT FINANCING FACTOR

The factor of Conduct and Financing of Government can be measured in this case on the basis of the amount of taxable property removed from the tax rolls by being devoted to freeway or related use. It has been pointed out earlier that this represents only a temporary tax loss, in that the existence of the freeway and of access to it invariably raises the value of nearby property. It seems inevitable that there would be some lag in this revaluation for tax purposes, however, so it does appear that there may be a temporary loss here.

The following table shows the valuations for tax purposes of properties within the various segments.

Couler Alignment with City Island	$2,448,692
Roosevelt Alignment with City Island	1,777,292
Roosevelt Alignment with Eagle Point	1,674,996
Kerrigan Alignment	$ 224,811
Granger Creek Alignment	52,110
Dodge Expressway	$ 494,355
Dodge Parkway	1,372,188

On the basis of the above figures, the comparative ratings have been computed as follows:

Couler Valley with City Island Alternate	4.1
Roosevelt Avenue with City Island Alternate	5.7
Roosevelt Avenue with Eagle Point Alternate	5.9
Kerrigan Alternate	1.9
Granger Creek Alternate	8.1
Dodge Expressway	7.3
Dodge Parkway	2.7

APPENDIX C-5
ECONOMIC ANALYSIS

Dodge Street Expressway vs. Dodge Street Parkway

The expressway treatment takes virtually all development on the south side of Dodge Street but provides a service road so that most development can remain on the north side.

The parkway treatment requires the elimination of most development on the north side in addition to the south side takings. Only the Holiday Inn would remain in functioning condition.

The parkway alternate changes the visual character of the improvement only on the north side and then only along about a quarter of the route. Near Hill Street housing will be the abutting use instead of business. Near the bottom of the grade, the motel-restaurant complex would be eliminated and only the cliffs would remain at the roadside.

The positive economic impact of the parkway would be only indirect—it's difficult to say how much the road users would value a fleeting view of cliffs without businesses at their foot.

The negative impacts would be the loss of the businesses. Would they have to go west thus further weakening the historic downtown? They most likely would.

The positive economic impact of the expressway would be the counter of the negative impact of the parkway configuration.

The businesses would probably do better operating off of the service road, with the protected left turn channels on Dodge Street, than they are now with the dangerous turning movements. This would be particularly true for those businesses from Holiday Inn west to Hill Street.

The negative economic impact of the expressway would be minimal.

The comparative rating of the two routes:

	Parkway	Expressway
Economic Activity	3	7
Property Values	3	7

South Connections: Kerrigan Hill vs. Granger Creek

The two alternates are the same north of Railroad Street and the Dodge Street interchange. South of Railroad Street the Granger Creek route heads for the riverfront where it skirts Mt. Carmel Hill to the Catfish Creek valley where it turns first west and then south up Granger Creek to the south where it ends at a connection with the proposed Freeway U.S. 520.

The Kerrigan alignment follows the present Highway U.S. 61 up Kerrigan Hill and south, using much of the present roadway.

The Granger Creek route would indeed be scenic, but it would have little positive or negative direct economic impact. Access would be available only at U.S. Highway 52-67 where the topography is not conducive to adjacent development. It would provide a slight impetus to residential development.

The indirect effect would be that the present U.S. 61 would handle most of the intermediate distance traffic and would be only slightly impacted by traffic diversion.

The Kerrigan Hill alignment would offer some reinforcement to commercial development around its interchanges thus raising property values.

The negative impacts of the Kerrigan Hill route would be minimal because it takes very little developed property south of Railroad Street/Southern Avenue.

The comparative rating of the two routes:

	Granger Creek	Kerrigan
Economic Activity	2	7
Property Values	2	7

Three Alternative Central Alignments Connecting With:

- Roosevelt Avenue with City Island Bridge
- Roosevelt Avenue with Eagle Point Bridge
- Couler Valley with City Island Bridge

All alternates are elevated.

The two alternates to be used with the Roosevelt Alignment stay close to the railroad through the industrial district. They give negligible service to the Central Business District. The Eagle Point Bridge Alternate gives very little service to the industries, but the City Island Bridge Variation serves the Dubuque Packing Company and the Kerper Boulevard industries.

The Couler Valley, City Island Bridge Alternate passes between the Central Business District and the industry-warehousing district from about First to Eleventh Street before turning east between Dubuque Packing Co. and Caradco to City Island. It serves the Central Business District from two ends, the Dubuque Packing Co. area and the Kerper Blvd. area.

The two Roosevelt Avenue alternates have little positive economic impact. They could be very injurious to the CBD by taking potential customers from Wisconsin well past the center. Trucks for a few of the industries would be served.

The negative economic impact is limited to some small industry and warehousing relocation.

The positive economic impacts of the Couler Valley alternate are great. It gives maximum access to the central business district, and all of the industries. Virtually all intermediate and long distance trucking would be diverted from local streets. Industrial employee traffic would also be diverted to a great extent.

The negative economic impact of the Couler Valley route would be the additional wholesale and warehouse type buildings taken. On the whole, this negative impact would be dwarfed by the positive impacts.

The comparative rating of the three routes:

	Central to Roosevelt-City Island	Central to Roosevelt-Eagle Point	Central to Couler Valley
Economic Activity	2	1	9
Property Values	2	1	9

Couler Valley vs. Roosevelt Avenue with City Island or Eagle Point Bridges

Both of the Roosevelt Avenue alignments proceed from near the center of the city through Dubuque Industrial Park at the edge of the Peosta Channel then turn sharply to the northwest up Roosevelt Avenue. The approaches to an Eagle Point bridge site begin at this bend. The alignment continues up the west side of the Roosevelt Avenue valley to near the Peru Road-Valley Road intersection then back to Couler Valley alignment at State Highway 386, South. The only accesses are at Peru Road and SH 386, South.

The Couler Valley Route begins where Pine Street crosses the Milwaukee Railroad and continues north against the bluff between the bluff and the Great Western Railroad tracks. There are interchanges at 22nd Street, 32nd Street, and SH 386, South.

The positive economic impact of the Roosevelt alternates is minimal. It will give good access to the Peru Road area thus aiding development there.

The negative economic impacts are likewise minimal with a few moderately priced houses taken, but few businesses or industries would be disturbed.

The positive impacts of the Couler Valley route are many. It will give good access to the existing industries in Couler Valley and promote the use of vacant or ill used land for commerce and industry. The opportunity will be provided to improve routes to the west from 32nd Street, Ia 386 South and Ia 386 North thus helping to create a workable circumferential traffic system. Virtually all intermediate and long distance truck traffic would be diverted from the local street system.

The negative impact involves the removal of a considerable number of houses along Kneist and Pinard Sts.

The comparative rating of the two routes:

	Roosevelt (both)	Couler Valley
Economic Activity	2	9
Property Value	2	9

CONSOLIDATED RATINGS

	Economic Activity	Property Values
Dodge Expressway	7	7
Dodge Parkway	3	3
Kerrigan	7	7
Granger Creek	2	2
Couler Valley with City Island Bridge	9	9
Roosevelt with City Island Bridge	2	2
Roosevelt with Eagle Point Bridge	2	2

ISSUES

Highway and major street improvements are generally fought and lobbied for with great vigor and persistence. This is because of the universally demonstrated principle that good access fosters good economic rewards. Otherwise good land—which cannot be easily reached—will remain in low demand and have a lower value, while useable land with good access will be in demand and thus have a higher price.

Historically, the very existence of cities and towns was determined by transportation routes, particularly junctions. If a city is to retain its economic health and to prosper, its access network—streets and highways—must be up to date and competitive.

Access, to a great extent, determines property values, but its influence works differently under different circumstances.

Access to the wilderness must be adequate for the user to get to it, but not so good that access routes are evident from the wilderness. The farmer does not need the mass customer access of retail trade, but he needs fast access to the city to maintain his standard of living through service and culture availability. His products must get to market with a minimum of difficulty.

For residential land, optimum access may mean being convenient to a high traffic capacity facility, yet far enough away so as not to be annoyed by the facility.

For commerce and industry, immediate access to a high volume facility is usually a decided advantage. Trucks can get on the facility easily and large volumes of customers can get to retail facilities easily. The advertising value of being next to a highway usually is considered a decided advantage.

The precise economic and social effects of a highway, new or old, are difficult to assess, because it is an integral part of the regional mix of essential facilities and even has an inter-regional or national aspect. Because land is needed for right-of-way, the construction of a new facility causes some land to be converted from its previous use. However, the new highway usually creates conditions which cause nearby land to develop at a higher value. The supply of land being fixed, changes in the supply are expected to raise the price of that remaining. New access relationships shift and concentrate values, usually upward.

The above issues have been a continual cause for concern and it would be most desirable to be able to assess, precisely, the true impacts. These can only be approximated, but research conducted around the country has supported several universal tendencies. For example:

Highways can serve as economic stimulants only where conditions are favorable for economic expansion.
Highways & Economic & Social Changes, BPR 1964

New highways often hasten economic changes that were previously underway. This appears to be more characteristic of potential gains than losses.
The Connecticut Turnpike—A Ribbon of Hope
Walter C. McKain, Univ. of Conn. 1965

Local tax roll losses due to right-of-way acquisition have typically been offset by new development or intensified existing development.
Economic Issues in the Route Study Process, An Evaluation of Community Response to Alternative Route Proposals. California Division of Highways, 1965

Induced new industrial growth or service to a larger trade territory are doubly important due to their multiplier effect.
Economic and Social Effects of Highways
FHWA, February 1971

All direct and indirect economic influences as well as those related to environment and access convenience are eventually reflected in land and building values. In only a few cases will the changes be dramatic. Land value influences stabilize slowly because of a number of tangible and intangible factors. Among these are zoning, existing structures, prejudice, inertia, habit, ignorance, general economic conditions and excessive speculative expectations. Actual land development reflects the highway influence slowly and imperfectly, whereas speculative prices

react quickly. Assessed valuations tend to react slowly, and they go down more slowly than they increase.

Limited Access vs. Conventional Streets. In making a fair assessment of the impacts of a freeway, the possibility that future traffic loads may have to be accommodated on existing or modified existing streets should be considered as the basic alternative.

High volumes of traffic on non-limited access streets tend to foster ribbon business development. This creates high values for the abutting property but is usually costly for the community as a whole. It creates serious problems —it is unsightly and noisy (probably noisier in most places than a freeway); interferes with the orderly development of all of the land; is more costly to maintain because of its linear nature; reduces drastically the traffic carrying capacity of the street, and creates a high accident rate. When traffic volumes reach serious congestion, the abutting businesses are actually hurt because of the difficulty and danger of getting in and out of the location.

Controlled access highways are more compatible with the growth of nucleated industrial parks, shopping centers and other urban development which is more pleasing to the citizens and less costly to the taxpayers. They carry more traffic at a higher speed and suffer fewer accidents per unit of travel. They tend to increase values citywide by making overall travel more convenient. In most cases they create less noise per unit of travel and reduce the total amount of air pollution. An automobile emits about .42 pounds of carbon monoxide per mile in central business district type driving but only about .11 pounds per mile on expressways.[1])

There have been many examples of business, industrial and residential development being generated by a new high capacity traffic facility. This is primarily due to improved access. The nature of the access connection is more important than being next to a freeway (except where an advertising impact is the primary consideration). Easy access to the facility is the important thing. Travel time and convenience are becoming ever more important. Limited access locations have a greater number of potential customers because of travel time reduction and, therefore, their location is more valuable.

Other benefits are not so evident, but are none-the-less real. Redevelopment of worn-out or inappropriate land uses can be benefitted by the construction of a new facility. Not only is the market for the reuse of land enhanced through influences mentioned earlier, but there is also a psychological acceptance of change generated by the upheaval inevitable in constructing the traffic facility. Such public attitudes should work toward making the execution of the nearby urban renewal objectives easier. This, of course, assumes that the highway project was well conceived and handled well in execution.

The construction payroll and the relocation payments provide an extra measure of free cash with which to finance the private portion of desirable change. The city must recognize this type of opportunity and organize well to be able to take advantage of it.

Negative influences. Not everyone or every property can be expected to benefit from the construction of a new traffic facility. However, a prime objective of the corridor planning is to recognize and to minimize any potential adverse effects. Not only is attention given to minimizing adverse influences, but great effort is expended toward maximizing positive influences for both the non-users as well as the users of the facility.

Detrimental effects can be classified as to economic, social, and the environmental aspect of each of these. Detrimental effects can be newly generated by the facility or can be a transfer of the impact away from one set of properties and people to another set of properties and people.

[1]**Benefits of Interstate Highway,** U.S. Department of Transportation, Federal Highway Administration, June 1970, p.6.

The first negative effect which commonly comes to mind is the loss of a considerable amount of land and buildings from the tax rolls. Studies referred to earlier in this section indicate that eventually new value will likely be created to more than make up for the taxable values lost. It will likewise be expected that the new facility will make it easier to preserve the existing values in the central business district. The recommended route, where feasible, is designed to take low value properties as opposed to higher value properties. Some loss in building values would occur in this type of area even if there were no new highway construction.

The taking of the lower value properties poses its own set of problems. Whereas the occupants of the higher value properties could relocate upon their own initiative, for the most part, the typical occupants of lower value properties do not have the financial capacity to move easily. This subject will be treated more thoroughly under a separate section on the relocation workload, resources and plan.

Business relocation has both good and bad economic aspects. A firm on its upward cycle can often be helped by receiving a cash award which allows it to move to more suitable facilities. In other cases, weaknesses are magnified and changes are accelerated. This acceleration can be interpreted as good or bad.

Some types of secondary economic impact situations are generally as follows:

1. Some businesses will lose a non-replaceable location. This is not so likely to affect a large company as it is a very small one. The home owned gasoline service station site may not be replaceable because of the scarcity of new sites and their high cost. Zoning enforcement may make it very difficult for a person to have his business and residence on the same lot, such as an auto repair garage behind the house. Taverns with a neighborhood clientele may not be replaceable, particularly if they are now in a very low rent structure.

2. Older businessmen may not want to go through the moving experience and then hard work of doing enough business to warrant higher rents. They are likely to retire and often will discontinue the enterprise.

3. Very weak businesses may take their relocation payments and discontinue operations. This may well be classed as a benefit.

4. The elimination of very old buildings with cheap rent places a hardship on certain classes of business which have traditionally operated in the frame[2] of the central business district in lower rent quarters. A typical example is the office furniture store which requires large areas for inventory and display but has a low average turnover of stock. The lower rent, older structure is often the incubation site of new businesses. Dubuque may have had an excess of this type of building before urban renewal, but much of this excess was eliminated and the occupants moved into similar structures a few blocks away. There is some local expression that the move was beneficial to most businesses involved. Will a second move be equally beneficial? Will there be any suitable locations available to move into as even more of this type of buildings are eliminated? Will new commercial building be generated? Will these businesses be able to pay the higher rent for better facilities? Are the logical locations for "frame" type businesses being master planned for other uses?

Cash Flow Aspects of Relocation. As recently as ten years ago, only an occasional local group was interested in using improvements paid for to a great extent by higher levels of government, to trigger desirable secondary local changes. Property owners and tenants were paid only for their interest in the realty at fair market value. In a high percentage of cases this payment was far below the true cost to the relocatee. Many owners were quite happy to find a ready market for their land at a low selling cost, but the owner-occupier of a completely depreciated building was seldom able to even come near replacing the serviceability once enjoyed, with his award of fair market value. The tenant seldom received any compensation for his considerable relocation costs.

Relocation payments for all classes of relocatees have continually improved. By 1971 all direct and subsidiary costs of relocation by all classes were fully compensated. Additional assistance is available so that persons not ordinarily able to participate in the new construction market, now can do so. Because of these new policies, there is a real possibility that local real estate, on the average, can be upgraded at minimal cost to the local economy.

On balance, if a large highway project through an urban area is handled in all its aspects with imagination and competence, it can be made into a positive contribution to the community in ways additional to its traffic service function.

[2]"Frame" refers to the supportive land and buildings surrounding a higher valve "core" which together make up a central business district.

GENERAL ECONOMIC BENEFITS TO THE DUBUQUE AREA

A prime objective of the Dubuque Freeway Corridor Studies has been to minimize any recognizable economic detriments and to maximize any recognizable economic benefits. Therefore, the emphasis in this statement will be upon the relative or net economic benefit.

General Economic Changes. The completion of a freeway-expressway system as contemplated will materially augment the economy of Dubuque. The completion of Freeway U.S. 520 across the state and into Chicago along with connections with the south to Interstate 80 and northwest to Madison will make Dubuque a minor (as compared with Chicago) crossroads. This communications improvement will aid the competitive position in attracting and holding business and industry. It will make Dubuque an acceptable alternative or satellite for a Chicago location The retail trade territory will be stretched to the point where Dubuque is in direct competition with its neighbors of equal or larger size.

There is a multiplier effect involved in holding or gaining new business. Where the new money is generated by employment based on sales or investment from outside the urban area, it can be expected that new local economic activity will be generated to the extent of an additional 70% of the new business financed from these outside investment or trade purchases. New business from expanded trade opportunities thus amounts to considerably more than the first impulses through the economy.

Induced Activity at Interchanges. When the main through traffic routes are limited access, there is not only more traffic to service, but the location of service points are localized at or near interchanges. Thus many interchange areas become potential candidates for higher value development with traffic service businesses. If these same interchanges also happen to serve a local trade area of consequence, they may develop into full fledged shopping centers and community focal points for new outlying development. This influence will also work for currently developed areas.

Tax Loss Replacement. Limited access highways require considerable amounts of right-of-way. In the rural areas the tax loss is minimal as a percentage of the whole, but in urban areas, many millions of dollars of assessed value can be taken away at one fell swoop. Numerous studies have pointed out that where there is a demand for land, new land will be brought into higher type use which will more than replace the value of the taxable values lost. The highway planners, when possible, take the improvements of least taxable value for right-of-way while the replacement improvements are usually new (directly or indirectly), thus giving a higher assessed value in the intermediate run. The only catch in this is that development and assessment practices are such that there is a lag in getting the replacement values on the rolls.

Reduction of Redundant Structures. The routes have been planned so they traverse, where possible, areas occupied by lesser valued improvements. These universally tend to be at the edge of residential neighborhoods, industrial districts and business districts. The most likely occurence of these low values is where two unlike areas join. In carrying out the objective of not cutting up viable districts and in minimizing costs, the transition areas are more often than not selected for the recommended route.

The elimination of fully depreciated buildings has a beneficial effect in that they disappear under conditions of considerable compensation to the owners and adequate compensation to the occupants. In the normal real estate market these buildings would eventually be eliminated without compensation. For highway improvements they go quickly and thus reduce their deadening effect upon other properties.

However, these same fully depreciated buildings traditionally house the most economically and socially weak portion of the population. The typical business is one that normally requires inexpensive floor space, or is just getting started. In short, an economic advantage is traded for a considerable relocation problem. Still, on balance, the recommended solutions are far superior overall to any solution which would significally reduce relocation problems.

Economic Use of Land Under Structures. The primary objective met in elevating the roadway around the Central Business District was to facilitate the multitude of communications links needed across the facility. An important secondary benefit of this elevation is the possibility of using the space underneath for important activities.

Probably the most prominent use will be for automobile parking to serve the abutting businesses and industry. Where the elevated structure is adjacent to residential occupancies, the sheltered space can be used for paved play space. In some instances this can be highly specialized, such as a skating rink. Where appropriate, it is possible to design enclosed structures which continue under the roadways.

Mobility of Labor Force. The completed freeway-expressway system, or even major parts of it, will provide a direct benefit to the labor force. The journey to work will be greatly facilitated in both time cost and operating cost.

Transportation Costs for Goods Shipment. The freeway system serves most of the industrial establishments in the Dubuque area. Most plants are only a few blocks from an interchange with the free flowing, high speed system connecting the industry with the rest of the world.

Strengthening of the CBD & Industrial Park, Improved transportation facilities widen the trade territory accessible to the Central Business District. The improved accessibility of the industrial park to markets strengthens its value as a plant site.

Advertising Benefits. The new traffic facilities, particularly the elevated portion, will provide a new view of the city from the road. The motorist will be much more able to grasp the organization of the city. Business centers, particularly the core of the CBD will be more readily identifiable as will many industrial locations. New developments next to the freeway will be able to establish an identity almost immediately.

Businesses at the old arterial street locations will not suffer appreciably under conditions of a growing market. The increase of traffic on such streets is approaching a point of diminishing returns at some locations, due to congestion. Further congestion, due to no major highway improvement, would be very detrimental.

Reduction of Traffic on Other Streets. The rerouting of through truck traffic off of major streets serving commerce will greatly improve the business climate on these streets. Reduction of general congestion will allow customers to conveniently maneuver into and out of business locations. Some residential neighborhoods will be greatly benefitted by the rerouting of worker and truck traffic away from them.

Individual Residential Property Benefits. Residential properties are commonly thought to be harmed by freeways. Under poor design conditions this is very possible, but with good design there are often benefits which are not generally recognized. Improved access to work, shopping and other activities is commonly recognized as being beneficial. Freeways have wider right-of-way and, therefore, houses are usually farther removed from the traffic stream than is true of conventional major streets.

The freeway right-of-way will assure uninterrupted vistas for many properties, thus assuring long lasting values. It will be a desirable barrier in some places from the encroachment of incompatible uses of land. In other cases properties will be immediately benefitted by the removal of dense adjacent development. Some people consider it a value for their house to be seen from the freeway, if the view is from far enough away to reduce the noise to an acceptable level.

Lastly, the traffic stream will be diverted away from thousands of properties situated far from the freeway thus increasing the enjoyment of these properties. Even where traffic volumes are not materially decreased in such areas, the properties are spared the acute distress of increased congestion likely in the event improvements are not made.

DISCUSSION OF NON-USER ECONOMIC IMPACTS

The route sections passing through the more urbanized portions of the Dubuque Metropolitan Area are discussed below in more detailed.

Alternate S-1. Segment 1 follows the existing U.S. 61 and extends from the junction with the proposed Freeway U.S. 520 on the south to Bellvue Road on the north. There are three interchanges on this segment: the freeway to freeway interchange at the south; a diamond at what is known as Carson Road at Key West, and the diamond interchange of Bellvue Road (U.S. 52-67).

The nature of a freeway to freeway interchange is such that there is little opportunity for convenient access to land close to it. Economic impacts on this farmland will therefore be slight for a long period.

Commercial site possibilities will be enhanced at the Carson Road interchange, and there are no features that would tend to depreciate existing development. This would be the southern terminus of a segment of frontage road, about a mile long serving the existing development to the east of the highway. The Airline Motel would be served by this frontage road from both the Carson Road and the Bellvue interchanges. The access to the motel would not be ideal, but the site never was a prime one form the standpoint of commercial development. Increased traffic due to the improved road will at least balance the loss of direct access to the motel and additionally, all highway service business will be similarly situated, that is without direct access.

Three quadrants of the Bellvue Road interchange should double or more in value due to their advantageous position for highway commercial development. The fourth quadrant has difficult topographic problems, but with careful planning could be made into a superior motel site. There are no identifiable detrimental effects upon properties not taken for the improvement.

Segment 2 extends from Bellvue Road to just north of Grandview Blvd. Access relationships on this segment will not change and therefore economic impacts from this factor will remain the same. The new construction to reduce the grade to the Grandview Blvd. summit and to separate the roadways will bring the roadways slightly nearer to existing housing along Julien Dubuque Drive and Fox Drive. The Fox Drive properties, being below the grade, are more subject to noise impacts but their situation will be little different from a situation of no new construction.

The rear yards of two or more houses on Julien Dubuque Drive are likely to be shortened, thus changing the character of the potential occupancies. The noise should be little different because of the elevation. All losses of enjoyment to these properties should be amply compensated in the taking for right-of-way. There should be little if any uncompensated detriment in this vicinity.

At the Grandview Interchange the land on the east side will not be materially affected. On the west side a considerable number of properties are proposed for taking. There is one house not proposed for taking on Kerrigan Road, south of the interchange which will lose some of its back yard and will be so close to the through lanes as to be significantly depreciated by the noise factor. This house should be taken.

Segment 3 extends from just north of Grandview to Railroad Street at the base of the Kerrigan Hill grade. Most of the east side of the right-of-way is occupied by Grandview Park. It is far above the road grade and will remain so after any new construction. Its utility will not be affected.

On the west side the properties along Southern Avenue have a potential impact. They are considerably below the grade so as to be somewhat less effected by the noise. The grade will be somewhat reduced, thus reducing the noise. On balance, they should be no better or worse off than if no construction were undertaken. At the junction of Southern Avenue and South Locust Street, the dairy is proposed to be taken. Its present site and buildings are somewhat less than modern. If its market position is good, it could very well benefit from new buildings on a more manageable site.

Segment 4 is from Railroad Street on the south to First Street on the north and includes the Dodge Street interchange. The roadway will be elevated.

The project is bounded on the west from Railroad to Dodge by high bluffs. All development at the foot of the bluff will be taken. The properties on top of the bluff will be unaffected.

The land to the east of South Locust from Railroad to Dodge is an intensively developed mixture ranging from retailing to heavy manufacturing. It is connected with the remainder of the city by but two access streets—South Locust and South Main. Its enterprises depend on access for trucks, employees and customers. The two largest customer access generators are the Sears department store and the Eagle food store, both of which prosper on customers from a wide trade territory. Right-of-way requirements will not appreciably hinder the operation of these two stores. Even if the viaduct encroaches on some of the parking of Sears, spaces will likely be available under the structure. Ingress and egress from South Locust will be improved because the through traffic will be elevated.

The overall freeway and expressway system will improve the time-convenience aspect of access to this quadrant and will tend to extend the trade territory. Access into the quadrant from the south will be less than ideal, however, with the traffic having to go to Dodge Street and double back. Another east-west street is needed in this area, but this is independent of any changes the highway project might require.

Industry in the removal area of the southwest quadrant is a publishing company which is now in the process of building on another more suitable site and a merchant wholesaler facility of A. Y. McDonald Company. This location is obsolete for the latter use. Industrial park land is ideal for the construction of modern replacement facilities, and there need be no loss of employment in these industries because of the relocation.

Most of the Dodge Street interchange movements are concentrated to the north of Dodge and the most businesses must be removed in that area. There does not appear to be any appreciable disability impacted upon any of the properties not taken. There does appear to be a considerable issue as to where the businesses displaced can relocate.

Some of the businesses can no doubt develop new quarters in the new industrial districts, but others are those which normally locate on the edge of the central business district in what is called the "frame". Some are the type of businesses which locate in older, lower rent buildings. Still others have only recently moved from the urban renewal area. There is a definite overall economic aspect to the relocation problem of these businesses. The businesses to be displaced by number and type are discussed in more detail in Appendix C-6 .

Based upon the above, the economic ratings for Alternate S-1 are 7 for the Economic Activity Criterion and 7 for the Property Value Criterion.

Alternates C-12; N-1; E-1. This route in the part of the system which skirts the central business district. Segment 1 is from First Street to Fourth Street.

The buildings taken for right-of-way in this segment are all very old and are occupied by heavy commercial type uses. To the east are rail facilities and the port, neither of which will be affected by the elevated structure with most cross streets left intact. On the west are mostly old commercial structures which should not feel any adverse effects, but could find an advantage in the advertising value of being next to a high traffic volume street.

The exception to the general statement above are two hotels, the Julien Motor Inn and the Canfield Hotel. The Julien appears to be far enough removed from the main traffic stream so as not to suffer from noise or air pollution, particularly in that it is air conditioned throughout. The nearness of the traffic stream should, on balance, be beneficial because of the hotel's visibility from the freeway in contrast to its present situation several blocks away from prime activity centers.

The Canfield should be impacted somewhat more due to its proximity to the main traffic stream and an upramp. Air conditioning will be necessary for the east and south exposures. It is difficult to say whether there will be further loss of desirability. One is reminded of the high price of motel rooms in close proximity to the noisy Dodge Street grade. Again the Canfield will be rescued from an out of the way location and be given a prominent spot. Its age and potential for providing high grade service may make it difficult to capitalize on its potential new visibility. It should not lose value because of the freeway.

Finding a new location for the businesses displaced will be critical if an adverse economic impact due to their problems is to be avoided.

Segment 2 runs east of and parallel to the core of the central business district from Fourth Street on the south to 12th Street on the north.

East of the segment, the development is almost entirely manufacturing and warehousing. The principal employer is Caradco. Most of the streets will remain open beneath the elevated structure (except at ramp locations) thus leaving access relatively undiminished. On and off ramps for travel in either direction on the freeway are available to this segment, thus overall access is substantially increased. The advertising value in the sites between Jackson Street and the alley to the west (edge of the right-of-way) will be considerable, but the buildings will need renovation to capitalize on this. Some parcels near the ramps may be converted to automotive services at a higher rent. Truck access to the industries will be greatly enhanced.

West of the segment is the core of the central business district. There will be no detrimental effects of consequence on this area. Local surface street access will not be downgraded, although the location of the ramps may alter the major flows. Semi-local and long distance traffic will be taken off of the streets serving the business district directly, making maneuvering for the actual users of the district, much easier. The diversion of trucks will be particularly beneficial.

The overall time savings which will be experienced by people from Wisconsin and Iowa places to the south and north will materially extend the potential trade territory. This influence will extend into Illinois when Freeway U.S. 520 is completed.

Additional business potential for the central business district should be generated by the advertising value of the nearness of the freeway, although it is too far away to be of much direct advertising value to individual businesses.

There will be a considerable number of businesses displaced by the right-of-way. These are listed and discussed in more detail under business relocation in APPENDIX C-6.

There is a proposal to convert the blocks between Iowa and Central Streets (between the CBD core and the freeway) to park and similar development. This will provide a decided aesthetic resource and bolster the advertising aspect of the central business district core's economic benefit. This will not be without considerable cost. There is not only the direct cost of the land and buildings but there is the overall economic cost of losing much of the central business district frame. There is little experience as to the secondary impacts of a CBD losing a large portion of its "frame". These businesses are essential. They provide employment and add considerable value to the local economy. Where will they go? Will they move in on and force the demise of the Washington Street neighborhood? Will they move west and will this diminish the strength of the CBD and tend to establish a bi-nucleated city?

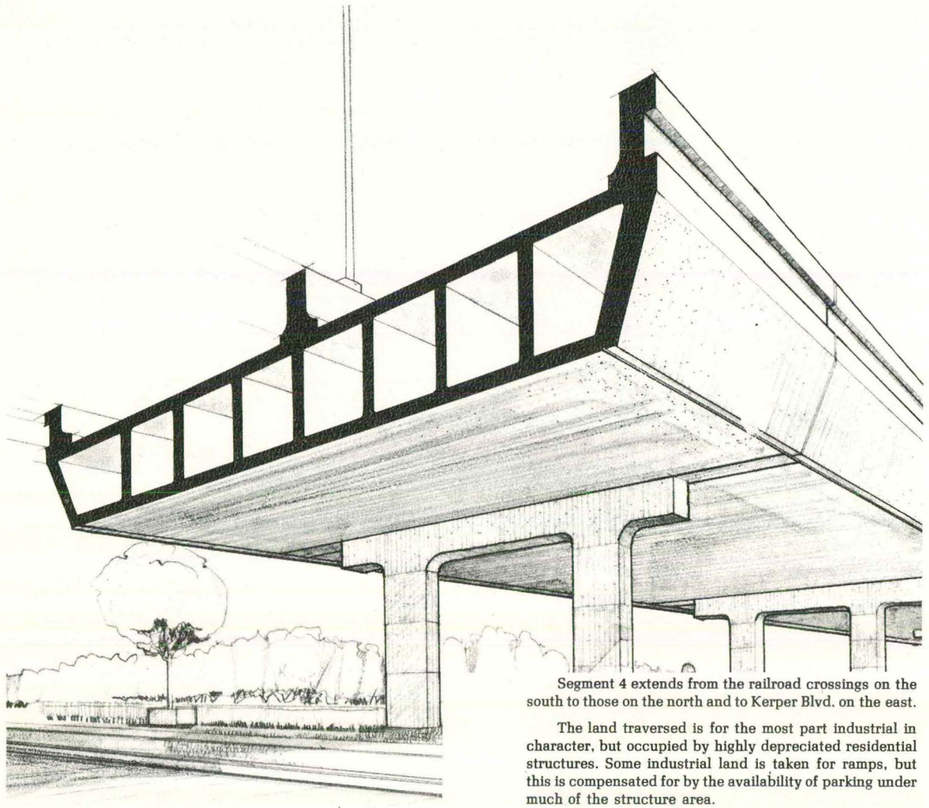
The relocation of the "frame" type businesses must be satisfactorily solved if serious adverse economic impacts are to be avoided.

Segment 3 extends from 12th Street on the south to the railroad tracks on the east.

This short section is included separately because it involves cutting across the corner of the Washington Street neighborhood. The road will form a beneficial barrier separating the residential neighborhood from the industrial district to the east.

The economic impacts for industry are beneficial through improvements in access for trucking and for the employees. The advertising value of the sites would be a minor plus.

A few businesses and a considerable number of housing units will be lost. The residential neighborhood will be only slightly influenced by the concentration of vehicles on the freeway which will be a noise source. This will be balanced by the taking of most of the trucks and automobiles associated with industry off of the local streets. This latter advantage should exceed by several times the influence of any of the adverse factors.



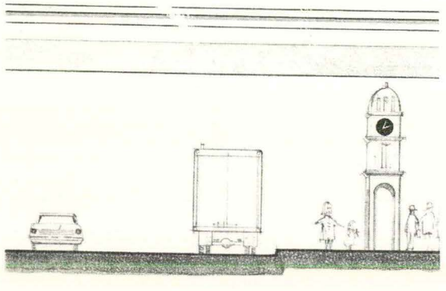
Segment 4 extends from the railroad crossings on the south to those on the north and to Kerper Blvd. on the east.

The land traversed is for the most part industrial in character, but occupied by highly depreciated residential structures. Some industrial land is taken for ramps, but this is compensated for by the availability of parking under much of the structure area.

There is no economic impact upon residential properties after the facility is built because there will be little or none left. The problem then is one of relocation of lower income residents.

The industries will gain greatly through much improved access. Stock trucks destined for Dubuque Packing Company come especially to mind. They will be able to use the new facility practically to the gates of the stock pens and loading ramps. This will reduce transportation problems for the industries while benefiting the entire central business district and its nearby neighborhoods by eliminating the truck hazards now being experienced. Access improvement will vastly improve the competitive position of land in the riverside industrial park, particularly along Kerper Blvd.

The facility will limit the possibility of Dubuque Packing expanding into the residential area to its west, but limited multiple use of the land under the structures is possible. At the very least, this land should should be available for parking.



Segment 5 is a short segment extending from the railroad on the south to 21st Street on the north. It connects the Couler Valley alternate with the industrial area interchange.

The alignment of the segment forms a divider between the Washington Street neighborhood and the Lower Rhomberg neighborhood. Most of the impact will be upon commerical properties which will be somewhat benefited because of advertising values. Those residential properties nearby should notice little difference in the noise levels because of the existing intrusion of the railroad.

Segment 6 parallels, to the east the railroad line up Couler Valley. The segment under discussion begins at 21st Street on the south and extends to 24th Street on the north.

The railroad is the west boundary and tends to insulate the residences from the influence of the freeway on that side. It should be noted that this alignment follows an undisputed neighborhood boundary and avoids bisecting natural residential areas. Both the Catholic and Public schools, however, are located at the edge of the Lower Rhomberg neighborhood and serve two neighborhoods. Access to these facilities is unimpeded due to the elevated structure. Audubon School is being rebuilt further away from the freeway and will not be impacted by it. The Catholic school should likewise not be impacted because of the distance separation. The public school land adjacent to the freeway will be used for playground and should not be significantly adversely impacted. Land under the structure could be used for foul weather play space.

Segment 7 is to the east of the railroad in Couler Valley, from 24th Street on the south to 29th Street on the north. The alignment is fitted between the railroad and the bluff and removes all residential properties which would otherwise be impacted. The residential land to the east is at a much higher elevation and the land to the west is used or planned for industrial use. The industrial land will be benefited from its advertising position.

Segment 8 continues the Couler Valley Route from 29th to 32nd Streets. This portion requires some cutting of the bluff and, therefore, disturbance of the properties on the top. The plans show the taking of all properties impacted.

The land to the west is at least half industrial which will benefit from advertising and from the vastly improved access afforded by the freeway and an interchange at 32nd Street.

Segment 9 continues north between the railroad and the bluff from 32nd Street on the south to the southern portion of State Highway 386.

The land to the east on the bluff is undeveloped and will not be harmed for future development by the freeway. In fact, the improved access from the interchanges at 32nd Street and at Highway 386, should make this land more attractive. The land to the west is industrial in use and in plan. The freeway access should improve its chances of more rapid development. Its uses are somewhat limited because of poor soil conditions. However, the pressure from relocations of business further south should provide an incentive to overcome the soil problems. Values in the valley should increase considerably. Flexsteel should be materially benefited by improved truck access.

Segment 10 extends north from State Route 386 South to 386 North which is the end of the project.

At the south end of segment, the interchange requires cutting into the bluff. It will still be low enough and leave enough land so as not to materially impact the residential development on the top. This residential land on the top of the bluff to the east will have improved marketability because of the improved access afforded by the freeway and its interchange at Highway 386.

The land to the west will not be hurt as it is mostly undeveloped and not of the best soil conditions. With the improved regional access its value should increase and it should eventually find use as industrial locations.

The farms further to the north are skirted and have access. The small residential development near the north end of the valley likewise has access across and onto an expressway type section. The residences should be only minimally impacted by proximity to the highway. The other side of the coin—access improvement—should well compensate for any disadvantage of proximity.

The remainder of the land at the north end of Couler Valley is swamp and floodable and should remain in this type of use for a long time to come.

The Highway 386, North intersection takes some agricultural land, but this is of minimal value in that it is floodable.

Segment 11 extends across the Mississippi River over the City Island. Better access for all of the people in the city should more than balance the loss of amenity caused by the intrusion of the bridge structure. The bridge structure itself will afford a scenic spectable.

Based upon the above, Alternate C-12; N-1; E-1 is rated 9 for the Economic Activity Criterion and 9 for the Property Value Criterion.

Alternate D-1. Segment 1 is the Dodge Street improvement and this segment, the lower end, extends from Bluff Street on the east at the bottom of the grade to Booth Street on the west near the top of the grade.

The alignment is to use the south side of the valley and to take virtually all development at the base of the bluff on that side. Virtually all development on the north side would be undisturbed and served by service roads.

The remaining land on the south side will find little impact. Most of it is far above the elevation of the roadway. Accesses are undisturbed and probably better due to the design of safer left turn protection slots in the divided roadway.

No abutting properties on the north should be worse off, because they will be served by a service road which will be much safer. The commercial enterprises will be better off on the service roads than they would be on the existing type of development. It is getting increasingly difficult to make a left turn into these businesses. The divided feature of the through roadways offers an opportunity for protected left turn storage lanes which will make such turns feasible even under conditions of high traffic volume. The freer flow of the street and its additional safety due to the divided feature, will enhance the advertising factor of the adjacent businesses, because drivers will be more likely to be able to look away from the roadway occasionally.

Accesses to the land to the north and away from Dodge Street are preserved and no negative impact should be observed.

The Segment 2 portion of Dodge Street is from Booth Street on the east to Concord Street on the west. It involves the Grandview interchange. The grade of Dodge Street will be drastically reduced at Grandview Boulevard. Thus the through lanes will be far below the abutting land. The plan proposes the taking of those properties which would lose excessive land for the accommodation of the on and off ramps. No abutting land along this segment will be any worse off than if nothing was done. The lowering of grade will decrease the noise exposure as compared to the present.

Therefore, Alternate D-1 is rated 7 for both Economic Activity and Property Value.

APPENDIX C-6
RELOCATION ANALYSIS

Kerrigan Hill (S-1; B-3) vs. Granger Creek S-2; B-2). The relocation implications of the Kerrigan Hill route have been described in detail elsewhere in this appendix. Both routes have a common connection through the Dodge Street interchange. They diverge at Railroad Street. This brief discussion will deal only with the portions of the routes south of Railroad Street.

Neither route requires an appreciable relocation effort: Kerrigan because much of the existing highway is being used, and Granger because it goes through open country. Kerrigan Hill requires the removal of 29 housing units and six businesses while Granger Creek requires the

removal of six housing units and no businesses. These firgures do not include any extra takings for enviromental purposes, although any properties which would be materially damaged were considered to be taken in their entirity.

The common portion of the two routes—the Dodge Street interchange area would require the removal of 68 housing units and 41 businesses or industries. This does not include partial takes from the latter.

The relative evaluation of the routes is as follows.

Route	Displacement of Business	Replacement Housing	Family Disruption
Kerrigan	9	8	9
Granger	10	9	10

Couler Valley/City Island Bridge (C-12; N-1; E-1) vs Roosevelt (C-7; N-2; E-1 and C-8; N-2; E-2) The Couler Valley Route is coupled with the White Street alternate past the Central business District, whereas the Roosevelt Route goes with a central alternate somewhat to the east along the railroad and considerably farther from the core of the CBD. On the Roosevelt Alignment there are alternate bridge locations—(Eagle Point and City Island), whereas on the Couler Route only a City Island Bridge location is contemplated. The relocation implications of the actual bridge approach right-of-way are not significantly different for the two locations.

The Couler Valley/White Street combination has a higher relocation impact. It cuts between neighborhoods and functional economic areas, but these borders are not unoccupied. In contrast, the Roosevelt Route although it cuts through a neighborhood and the industrial area, finds much more open land.

The Couler Route would require the removal of 489 housing units and 129 businesses and industries. In contrast the Roosevelt Alternate with the Eagle Point bridge would dislocate 125 housing units and 65 businesses and industries, and the similar alternate with a City Island bridge crossing would take 121 housing units and 64 businesses and industries.

The Couler Route's disruption is ameliorated by the hope that in the relocation process there will be a dramatic improvement in the overall quality of housing. Much of the housing to be eliminated is of very poor quality. These benefits only somewhat balance the relocation problem—it will be a difficult undertaking in any event.

The relative ratings of the alternates is as follows:

Route	Displacement of Business	Replacement Housing	Family Disruption
Couler/City Island Bridge	2	2	1
Roosevelt/City Island Bridge	4	6	6
Roosevelt/Eagle Point Bridge	4	6	6

This discussion pertains only to the construction right-of-way and not to the considerable additional environmental right-of-way proposed for the Couler Route in the downtown area. The family and business disruption implications of this additional taking is great and serious. Other than the actual taking, this environmental land will be using land which should logically be the relocation resource for many of the businesses to be displaced.

Dodge Expressway vs Dodge Parkway The residential component of the two alternatives offers little difference with the expressway taking 88 housing units and the parkway taking eleven more or 99. The biggest difference is in the magnitude of the commercial takings. The parkway takes 47 businesses while the expressway takes only 26. The additional business takings involve eliminating the 21 businesses on the north side of the street.

The relative rating of the two alternatives are as follows:

Route	Displacement of Business	Replacement Housing	Family Disruption
Dodge Expressway	7	8	8
Dodge Parkway	4	7	7

ESTIMATION OF RELOCATION COSTS

During 1971, uniform procedures were instituted for relocation payments to all businesses industries and households displaced by projects involving Federal funds. The Department of Housing and Urban Development was designated to assure compliance under the basic law, the Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970.

To date there is only a modest amount of experience with the costs of the new policies. The options open to the relocatee are numerous and could be frivolously exercised. It is, therefore, not productive to attempt costing by building on a case by case basis. As an alternative, the Consultant has interviewed the HUD officials responsible for assessing current relocation operations and plans. These interviews yielded the following generalized planing factors calibrated to the probable Dubuque experience three years hence. Because of this modification and because of the greatly increased benefits, the results are considerably higher than experienced in recent urban renewal relocations.

Type of Household	Average Relocation Award
Owner/Occupant to repurchase	$7,000
Renter to rent	3,000
Renter to buy	3,000

Straight moving costs would in themselves average about $450 per household broken down to $225 for moving allowance and $200 for resettlement allowance.

The average commercial and industrial relocation is estimated to cost $8,000, including the actual moving cost plus the loss of income during the moving process. Many relocatees can be expected to cease operations or undertake a new line of business if they are now marginal. In this case the award includes a year's income based on an average of the income for the preceding three years.

Awards will vary widely and the selected average is based on the large number of businesses which are physically easy to move. In estimating the cost of relocation on some of the route segments where one or more very costly cases dominate, the average has been exceeded.

On this accord, the relocation costs for residences and businesses have been estimated as follows:

Couler Valley with City Island Bridge	$4,091,000
Roosevelt with City Island Bridge	1,807,000
Roosevelt with Eagle Point Bridge	1,863,000
Kerrigan	182,000
Granger Creek	38,000
Dodge Expressway	692,000
Dodge Parkway	877,000

AFFECTED BUSINESSES AND HOUSING UNITS

Alternate	Structures	Housing Units	Business
S-1 (B-3)	125	97	47
S-2 (B-2)	110	74	41
C-12	214	233	109
N-1	215	256	20
C-7/C-8	86	76	58
N-2	46	45	6
E-1	0	0	0
E-2	5	4	1
D-1	92	88	26
D-2	120	99	47

RELOCATION WORKLOAD SUMMARIES

The magnitude of the relocation effort which must be expended for the execution of construction of the complete freeway-expressway system is considerable. The impact of relocation, however, will be broadly dispersed over time. As even an unlikely maximum, no more than a quarter of the relocations would be likely to occur in any one year. Even though the total relocation load is to be spread over a number of years, the continual pressure on certain types of properties may cause them to be in chronic short supply. Examples include reasonably priced housing units for the elderly, locations for gasoline stations and auto repair shops, some of them on the same lot as a residence suitable for the proprieter. These longer term shortages will require reexamination of zoning policies for the businesses and forward planning for housing for the elderly at below market rents.

Another form of shortage which is likely to become chronic, is low rent retail and wholesaling structures to accommodate those businesses which historically cannot operate in high rent premises under conditions of competition.

Residential Relocations The primary concern in preparing for relocation services is to be able to provide for those types of households which will not be served by the private housing market. The two most likely candidates in Dubuque are the retired and those with larger families and moderate or low incomes. The retired person living in a home he owns which is valued at less than $15,000 is particularly disadvantage. An equitable payment for his present property will not buy anything currently being produced on the market. He may be able to reinvest in a similar property, but this type of housing is rapidly being eliminated. Considerable numbers of relocatees in this situation will not be able to find suitable housing for the value of their award upon the taking of the property for the highway. Regulations specifying that relocations must be made into housing meeting minimum standards further reduces the options available. The spector of supplying housing subsidized to below market rents is very real in the face of any substantial residential relocation effort.

Minority Housing The survey team has been unable to identify any households within the proposed right-of-way which could be classed as a minority. There is a small black population in Dubuque, but all appear to be housed in the higher rent parts of town and are not involved in this highway project.

Characteristics of Relocatees The proposed right-of-way for all the more urbanized route segments (S-1; C-12; N-1; E-1; D-1) requires the removal of 674 housing units. The distribution of housing by types and by route segments is as follows:

HOUSING UNITS BY STRUCTURE TYPE

Alternate	Total	Single Family	Two Family	3 or 4 Family	Over 4 Family	In Business Structure
S-1	97	67	20	0	0	10
C-12	233	84	93	22	13	21
N-1	256	159	74	14	0	9
D-1	88	75	10	3	0	0
Totals	674	385	197	39	13	40

Note: Alt. E-1 does not involve relocation.

Whether a household is headed by a female and the age of the relocatees are important indicators of the pressures to be expected on specialized housing markets.

SEX AND AGE OF HOUSEHOLD HEADS

	Female		Male	
Alternate	Total	Retired	Total	Retired
S-1	29	9	57	54
C-12	67	41	134	34
N-1	54	29	194	24
D-1	18	9	59	16
Totals	168	88	444	84

The 172 retired household heads, about equally divided among male and female, indicates a considerable market for a special class of housing. Further, retired people are more likely to insist strongly on being relocated nearby. With proposals for creating large additional open spaces in the vicinity of the highway project, it will be most difficult to find the necessary housing in the same neighborhood. In fact, if all proposals are executed, there will scarcely be a neighborhood left in the vicinity of the Cathedral.

The size of a household is an indicator of the type of housing market it will be entering on relocation. Generally speaking, households containing over six people will tend to create special problems because they will require more bedrooms than typical market new housing. The household size tables from the computer tabulations are as follows:

CHARACTERISTICS BY HOUSEHOLD SIZE

1 PERSON HOUSEHOLD

Alternate	Total Number	Female Head	Owners	Renters	Head Over 65
S-1	24	22	18	6	8
C-12	79	53	32	47	47
N-1	43	33	25	18	31
D-1	22	11	16	6	12
Total	168	119	91	77	98

2 PERSON HOUSEHOLD

Alternate	Total Number	Female Head	Owners	Renters	Head Over 65
S-1	21	5	13	8	10
C-12	31	6	17	14	22
N-1	66	11	50	16	17
D-1	21	4	15	6	9
Total	139	26	95	44	58

3 PERSON HOUSEHOLD

Alternate	Total Number	Female Head	Owners	Renters	Head Over 65
S-1	23	1	15	8	1
C-12	44	4	14	30	4
N-1	57	5	32	25	3
D-1	13	1	10	3	4
Total	137	11	71	66	12

4 PERSON HOUSEHOLD

Alternate	Total Number	Female Head	Owners	Renters	Head Over 65
S-1	7	0	3	4	0
C-12	19	2	9	10	1
N-1	28	1	20	8	1
D-1	12	1	7	5	0
Total	66	4	39	27	2

5 PERSON HOUSEHOLD

Alternate	Total Number	Female Head	Owners	Renters	Head Over 65
S-1	2	1	0	2	0
C-12	15	0	9	6	1
N-1	19	1	15	4	1
D-1	3	0	3	0	0
Total	39	2	27	12	2

6 PERSON HOUSEHOLD

Alternate	Total Number	Female Head	Owners	Renters	Head Over 65
S-1	3	0	2	1	0
C-12	4	0	1	3	0
N-1	19	2	16	3	0
D-1	2	1	2	0	0
Total	28	3	21	7	0

7 PERSON HOUSEHOLD

Alternate	Total Number	Female Head	Owners	Renters	Head Over 65
S-1	2	0	1	1	0
C-12	2	1	0	2	0
N-1	7	1	6	1	0
D-1	1	0	1	0	0
Total	12	2	8	4	0

8 PERSON HOUSEHOLD

Alternate	Total Number	Female Head	Owners	Renters	Head Over 65
S-1	3	0	1	2	0
C-12	1	0	0	1	0
N-1	6	0	4	2	0
D-1	2	0	1	1	0
Total	12	0	6	6	0

9 PERSON HOUSEHOLD

Alternate	Total Number	Female Head	Owners	Renters	Head Over 65
S-1	1	0	1	0	0
C-12	5	1	1	4	0
N-1	4	0	4	0	0
D-1	1	0	1	0	0
Total	11	1	7	4	0

10 PERSON HOUSEHOLD

Alternate	Total Number	Female Head	Owners	Renters	Head Over 65
S-1	0	0	0	0	0
C-12	1	0	1	0	0
N-1	0	0	0	0	0
D-1	0	0	0	0	0
Total	1	0	1	0	0

The amount of income a relocatee has compared with the value of the property he occupies as an owner is another good indicator of the magnitude of relocation problems. The following tables give this information.

ALTERNATE S-1
KERRIGAN HILL

Owners Property Values

Income Group	No. of H'holds	Female Head	Retired Head	No. of Owners	Under $10,000	10,001-15,000	15,001 20,000	Over 20,001
Less Than $3,000	21	13	14	18	7	6	1	4
$3,001-6,000	18	10	1	7	6	-	-	1
$6,001-9,000	26	3	3	18	7	2	6	3
$9,001-12,000	11	3	1	4	4	-	-	-
$12,001-15,000	6	-	-	4	-	-	-	4
Over $15,001	4	-	-	3	1	-	-	2

ALTERNATE C-12
CENTRAL

Owners Property Values

Income Group	No. of H'holds	Female Head	Retired Head	No. of Owners	Under $10,000	10,001-15,000	15,001 20,000	Over 20,001
Under $3,000	72	42	65	38	32	4	2	-
$3,001-6,000	60	19	7	14	12	2	-	-
$6,001-9,000	43	3	2	21	18	3	-	-
$9,001-12,000	20	1	-	9	5	3	-	1
$12,001-15,000	5	1	1	1	1	-	-	-
Over $15,000	1	1	-	1	1	-	-	-

ALTERNATE N-1
COULER VALLEY

Owners Property Values

Income Group	No. of H'holds	Female Head	Retired Head	No. of Owners	Under $10,000	10,001-15,000	15,001 20,000	Over 20,001
Under $3,000	50	28	43	31	23	7	1	-
$3,001-6,000	73	19	6	49	29	18	2	-
$6,001-9,000	69	4	3	51	23	16	9	3
$9,001-12,000	46	3	1	33	12	14	6	1
$12,001-15,000	7	-	-	4	2	2	-	-
Over 15,001	4	-	-	4	-	4	-	-

ALTERNATE D-1
DODGE STREET PARKWAY

Owners Property Values

Income Group	No. of H'holds	Female Head	Retired Head	No. of Owners	Under $10,000	10,001-15,000	15,001 20,000	Over 20,001
Under $3,000	24	9	21	21	2	10	6	3
$3,001-6,000	19	7	2	9	3	2	3	1
$6,001-9,000	20	1	-	14	2	6	1	5
$9,001-12,000	7	-	-	6	2	1	1	2
$12,001-15,000	5	1	2	4	-	2	2	-
Over 15,000	2	-	-	2	-	-	-	2

SEGMENTS
(S-1, C-12, N-1, D-1)

Owners Property Values

Income Group	No. of H'holds	Female Head	Retired Head	No. of Owners	Under $10,000	10,001-15,000	15,001 20,000	Over 20,001
Under $3,000	167	92	143	108	64	27	10	7
$3,001-6,000	170	55	16	79	50	22	5	2
$6,001-9,000	158	11	8	104	50	27	16	11
$9,001-12,000	84	7	2	52	23	18	7	4
$12,001-15,000	23	2	3	13	3	4	2	4
Over 15,001	11	1	-	10	2	4	-	4
TOTAL	613	168	172	366	192	102	40	32

The summary tables indicate the character of the relocation task. The total number of households to be removed from the construction right-of-way over the several years of project execution is 613. The investigations of current occupancy indicated that 168 of these had a female head. A slightly larger number were listed as retired—172. Over half of the households—366— were owner-occupied. Most of the properties so occupied were of low or very low value: 192 less than $10,000, and 102 at between $10,000 and $15,000.

Over half of the households had estimated incomes of less than $6,000 (337). One hundred eighty seven of these lower income householders were owner-occupants and most of these had properties valued at less than $15,000 (163).

The crux of the relocation problem is that there are likely to be many older people and many owner-occupants who not only have modest incomes, but, even if they have full equity in their properties, the payments they will receive for the realty will be too small to buy a standard structure in the open housing market.

RELOCATION RESOURCES

The assessment of relocation resources cannot even approach an exact accounting, only general tendencies and disabilities can be pointed out. The lead time before relocation can take place causes the local real estate market to presently be in a different cycle from that in which relocation will be carried out. The Federal Housing Administration (FHA) puts a maximum limit of two years on the useful life of a market analysis and often will require an update at much shorter periods. In a market the size of Dubuque's, a demand can be satisfied in one construction season and the prime demand can shift to a new group of customers. General financing and governmental guarantee and subsidy programs can vastly alter what is feasible in just a few short months.

This discussion will be broken down into two general groups; the normal private market and the subsidized market.

The Normal Private Market. Owners are currently publicly complaining about an overbuilding of medium to higher priced apartments. There is little doubt that more similar type units will be built as soon as the present supply of vacancies tends toward filling up. Any relocatee with sufficient income who desires a new apartment can confidently expect that one will be available.

Medium priced houses are readily available. In the median wage earners price range, there are several builders meeting the market as it develops. One can easily build 200 houses a year and another can build from 80 to 120 a year. Other smaller builders can handle 50 to 100 units a year among them.

A continually substantial, but fluctuating, number of new housing units have been built in Dubuque since 1965. According to FHA, the following volume and types of units have been completed:

TOTAL NUMBER OF LIVING UNITS PER YEAR[1]
CITY OF DUBUQUE

YEAR	APART-MENTS	SINGLE FAMILY	TOTAL
1965	159	330	489
1966	112	261	373
1967	34	193	227
1968	44	170	214
1969	115	167	282
1970	182	105	287

[1]Unpublished file records of the Federal Housing Administration, Des Moines Insuring Office, Des Moines, Iowa.

The City has been cooperative in providing for the orderly expansion of utilities to make the development of new subdivisions a routine matter.

About 100 of the 613 households found in combined right-of-way of Alternates S-1, C-12, N-1, E-1, & D-12 would probably be served well by the unsubsidized new housing market.

There is also a market in older housing for sale and for rent. Some indication of the health of this market is revealed by the following FHA compilation in regard to rental advertising in the **Telegraph-Herald.**

YEAR	INCHES OF RENTAL ADVERTISING [2]
1967	7,902
1968	6,002
1969	4,545
1970	5,535

There is little solid information which would indicate the amount of older housing for sale or for rent at the time relocation is taking place. The fact that this relocation would be spread over quite a few years increases the chance that this type of housing would be available to those who desire it.

About 200 of the relocatees can be expected to find satisfactory new accommodations easily in older housing.

This leaves about 300 households with incomes of less than $6,000, a class which can be expected to yield a considerable number of cases where subsidized housing will be needed.

The Subsidized Market. Of the 300 or so households to be relocated which will probably have incomes of less than $6,000, it is prudent to expect that at least 200 will require subsidized housing. About 100 of these would be in the market for housing for the elderly (out of 159 listed as retired).

Dubuque has a "track record" on providing subsidized housing under several programs. This is a positive indication that these programs can be put into operation when the immediate need arises.

A series on housing carried during January 1972 in the **Telegraph-Herald** neatly capsulizes information given by the FHA Insuring Office in Des Moines.

> "Sixty-three completed single-family homes built under Section 235 of the National Housing and Urban Development Act. A person who buys a "235" house gets a FHA subsidy monthly to meet his mortgage payments.
>
> ". . . there are 97 more "235" homes planned or under construction.
>
> "Kennedy Manor on Owen Court, completed last year under Section 236 of the housing act, has 73 apartments, a fifth of which are eligible for rent supplements. In addition to the rent supplements, Section 236 projects provide for FHA subsidies to the project sponsor—in this case Ecumenical Housing, Inc.—to reduce mortgage interest payments."

There are additional projects using the 236 Program as well as a related program under Section 221 (d) (3) which allows for rent supplements in projects sponsored by non-profit groups.

Each Congress seems to provide an additional avenue for financing housing for low and moderate income families. The relocation agency must keep in constant touch with FHA in regard to these programs.

The preceding comments set the tone for relocation in Dubuque as being a straight forward and uninhibited activity. This is probably true, but in February of 1972 a minor storm cloud arose. The Council refused to make land in the central area urban renewal project available to Ecumenical Housing, Inc., a non-profit organization sponsored by the city's churches, to construct a high rise apartment building for the elderly. The opposition claimed that the city was overbuilt in housing and that other programs, including profit oriented initiative, could meet the demands. This latter objective is not impossible, but it is still unlikely that profit oriented organizations can furnish safe and sanitary housing for people who do not have the income to pay even the fixed charges on such construction, let alone any profit. Buildings can be built for the profit in short term depreciation, but it is difficult to see how they can be operated for long term profit and still serve the disadvantaged clientele unless the taxpayers in fact pay that profit.

The Ecumenical Housing proposal would be a valuable resource to the relocation effort for the freeway project. It would meet the type of need for a difficult segment of the relocatees to accommodate, and would satisfy another objective by being about the only hope of providing suitable housing in the same neighborhood the relocatees come from.

The City must wholeheartedly commit itself to an efficient and adequate relocation effort or there will be no freeway. Ecumenical Housing is not the type of organization to wait long for a real human need to be met. It can be expected that suitable housing for the elderly will be built in time for the freeway relocation effort.

The primary responsibility for relocation from right-of-way needed for the freeway portion of the project rests with the Iowa Highway Commission. For the Dodge Street Expressway project, the responsibility will probably be on the City of Dubuque. The Highway Commission can contract with the City to perform all relocation services. This appears to be a logical approach, because the City must maintain a relocation capability for other projects in any event. Policies which will assure ample relocation resources are definitely City policies and can be influenced by State intervention only as a last resort.

RELOCATION: DISCUSSION BY SUB-SEGMENT OF THE ALTERNATES

Alternate S-1 (Kerrigan Hill Alignment). Segment 1 from the proposed Freeway 520 to Bellevue Rd. (US 52-67) is mostly through open country. Only five single-family houses are to be taken; all of which are indicated as owner occupied and with a male household head. The household sizes are believed to be between three and four persons and the household incomes are probably in the $6,000 to $9,000 range. Four of the houses are in the $15,000 to $20,000 value range with one over $20,000. Relocation should not be unusually difficult in this sub-segment.

There were no businesses disturbed by the proposal in this sub-segment.

In Segment 2, from Bellevue Rd. to slightly north of Grandview Blvd., there would be 21 housing units removed. Sixteen would be single-family, four in two-family structures, and one in a business structure. Two of the housing units are probably occupied by households with retired female heads and five have retired male heads. Fifteen of the structures are owner-occupied. Two households had one person; six had two persons; ten had three persons and two had four persons.

Estimates of incomes indicate that six households had probable incomes of less than $3,000; one with from $3,000 to $6,000, and five with $6,000 to $9,000. Three of the households in the group listed as retired were owner-occupants of properties valued at from $10,000 to $15,000. It appears that there would be moderate to severe difficulty in relocation for seven households. Non-residential properties which would be removed include a motel which is owner occupied; a grocery store, and a church. The lack of suitably zoned property could present a serious relocation barrier for the two commercial enterprises if they are to continue to serve their local area.

In Segment 3, from north of Grandview Blvd. to Railroad Street, three single-family houses would be removed. One was vacant at the time of the survey. The two occupied units had a male household head, one of these was an owner-occupant. One was estimated to be a three person household and the other with five persons. Incomes were estimated to be in the $12,000 to $15,000 group or over. The property value for the owner-occupant is under $10,000. There should be no unusual relocation problem in this sub-segment.

The only non-residential property in the proposed right-of-way is a small dairy plant. Moving would probably be impractical except to a new plant with much new equipment; and therefore, this relocation must be classified as difficult. There is some possibility that this plant will not be operating in this location at construction time.

In Segment 4, Railroad Street to First Street (includes the Dodge Street Interchange), there are sixty-eight housing units in the proposed right-of-way. Forty-three of the housing units were in single-family structures; sixteen were in two-family structures and nine were in business structures.

Twenty-seven of the households were headed by females, seven of whom were listed as retired. There were thirty-two male household heads, five of whom were listed as retired. Thirty-three of the households were owner-occupants.

Twenty-two of the households were of the one-person type, with twenty-one of these being a female and seven listed as retired. Fifteen households had two persons; four were headed by females and four were listed as retired. Ten households had three persons, one with a female head and one listed as retired. Other household sizes were two at four persons, one at five persons, three at six persons, two at seven persons, three at eight persons and one at nine persons.

The four households of seven or more persons could provide an unusual relocation situation as could the twenty-seven with a female head.

There were twenty-one households with estimated incomes of less than $3,000 of which thirteen had female heads and fourteen were listed as retired. Eighteen of the twenty-one were owner-occupiers. Seven of these had properties valued at less than $10,000 and six had values of between $10,000 and $15,000.

Households with estimated incomes from $3,000 to $6,000 numbered eighteen with ten of these having female heads and one listed as retired. There were seven owner-occupiers in this income class, six of which had properties valued at less than $10,000.

The $6,000 to $9,000 income group was represented by twenty six households. Three of these were headed by females and three were listed as retired. Seven of the eighteen owner-occupiers in this income group had property valued at less than $10,000.

The workload of unusual residential relocation cases could be thirty-six.

There were a considerable number of businesses in the proposed right-of-way for this Segment 4. Some would be involved in only partial takes while others would have to move. Those to move include:

1. A small hotel
2. A meat processing plant
3. A millwork plant
4. A publishing plant (now in the process of moving)
5. A large cleaning supplies plant
6. A machinery fabricator, small
7. A small metal working shop
8. A small motor freight terminal
9. Two wholesale trade establishments
10. A small hardware and farm equipment establishment
11. A small grocery store
12. An automobile sales lot
13. Seven gasoline service stations
14. Two retail auto supply stores
15. Four eating places
16. Two drinking places
17. A drug store
18. A specialty store
19. A dry cleaning store
20. Three warehouses
21. Two auto repair garages
22. Two miscellaneous repair shops
23. A public elementary school (obsolete)

This is a total of forty nine establishments.

Some of these enterprises will no doubt not attempt to relocate. Candidate categories for this option are the small hotel, the grocery, the drug store, some of the gasoline service stations, some of the eating and drinking places and the public school.

As a generalization, there are suitable locations available for the manufacturing and other heavy types of businesses although inexpensive floor area may be in short supply.

The retailers who depend on local trade or street traffic will find it difficult to re-establish nearby. In some cases their customers will be gone. This class of business could well pose the most difficult relocation problem if they choose to retain a similar business style and location. For instance, there will be a great many gasoline service stations eliminated, and even one new location will be difficult to find.

It is estimated that the active caseload for intensive relocation assistance for business and industry for this segment will be fifteen establishments.

Alternate C-12 (Central area from First Street to north of 21st Street and east of Kerper Blvd.). Segment 1 from First to Fourth Streets has only four households, all located in a business building. Three of these were headed by a female, one of whom was listed as retired. One household had a male head listed as retired. Three were one-person households and one a two-person household. One household had an estimated income of less than $3,000, while the other three were in the $3,000 to $6,000 group. The workload of more difficult relocation cases for this subsegment is estimated to be only one.

Business and industry which would fall in the right-of-way include the following:

1. A hotel
2. A warehouse for a publisher
3. Two auto parts stores
4. Five wholesalers
5. A gasoline service station
6. A real estate office
7. A barber
8. Two general warehouses
9. A non-profit organization

There is ample land available to provide new locations for the wholesalers and warehouses. The hotel would most likely not be relocated, and the gasoline service station would have difficulty finding a new location. The caseload of difficult commercial and industrial relocations should not exceed five.

In Segment 2, Fourth Street to Twelfth Street, there were seventy-six housing units in the right-of-way. Thirteen of these were single-family; thirty were in two-family structures; ten were in 3 or 4-family structures; twelve in structures containing over four families, and eleven in business structures.

Twenty-two of the households had female heads, thirteen of whom were listed as retired. Forty-seven had a male head, thirteen of whom were listed as retired. There were sixteen owner-occupants.

There were twenty-six single person households, sixteen of which had female heads; seventeen two-person households, two of which had female heads; sixteen three-

[2] Ibid.

person households, two of which had female heads; five four-person households, one with a female head; three five-person households; one six-person household, and one nine-person household.

In the estimated income range of less than $3,000, there were twenty-five households. Fourteen of these had a female head, twenty-two were listed as retired and twelve were owner-occupants. Ten of the owner-occupied structures were valued at less than $10,000 and two at from $10,000 to $15,000.

There were twenty-four households in the $3,000 to $6,000 income group. Of these, five had a female head, two were listed as retired and four were owner-occupants. The value of the owner-occupied structures were in each case less than $10,000.

Nine households were in the $6,000 to $9,000 income group. One of these had a female head and one was headed by a person listed as retired. Three were owner-occupants of properties valued at less than $10,000.

There were thirty-four cases which appeared to have a potential for providing more than usual relocation workload.

There were a variety of industrial wholesale, retail and service establishments in the proposed right-of-way of Segment 2. These include:

1. A wood products plant
2. Three small metal working shops
3. Seven wholesalers
4. Two lumber and hardware dealers
5. Four retailers in the plumbing and heating, paint, electrical equipment and farm equipment fields
6. Two motor vehicle sales lots
7. A gasoline service station
8. Three retailers in marine supplies, furs and furniture lines
9. One eating place
10. Four drinking places
11. A real estate sales office
12. Three laundry & dry cleaning establishments
13. Three barber shops
14. A general warehouse
15. Three miscellaneous repair shops
16. The post office mail handling terminal

Many of the displacees could locate satisfactorily in the available industrial districts. Others may need or prefer lower rent locations which would be in short supply at the time of relocation. The drinking places could have trouble finding alternate locations.

The mail handling facility is not of the configuration preferred for this type of operation and a new facility could be in operation on another site before the land would be needed for the freeway.

The persistent caseload for business and industry in this sub-segment is likely to be ten.

In Segment 3, from Twelfth Street to the railroad near Fifteenth Street and Pine, there were sixty-six housing units. Thirty-one of these were single-family; twenty five in two-family structures; nine in 3 or 4-family structures and one in a business building.

There were twenty-one households with a female head, eleven of whom were listed as retired. Males headed thirty-seven households and of these were listed as retired. Owner-occupancy was twenty-four. Eight housing units were vacant.

Single-person households numbered twenty-six, of which seventeen had female heads and fourteen were listed as retired. Ten were owner-occupants. There were seven two-person households, one headed by a female, three by owner-occupants and six by those listed as retired. Three-person households numbered twelve, two of which were headed by females, seven by owner-occupants and one listed as retired. There were nine four-person households, one of which was headed by a female and six by owner-occupants. Five-person households numbered two, one of which was an owner-occupant and one listed as retired. There was one six-person household and one seven person household.

There were twenty-five households with estimated incomes of less than $3,000, fourteen of which had a female head, and twenty-two which had a head listed as retired. Eleven were listed as owner-occupants of which nine had properties valued at less than $10,000. One had a property listed at $10,000 to $15,000.

In the $3,000 to $6,000 income category there were fourteen households, six of which had a female head. Two were listed as owner-occupants, both of which had properties valued at less than $10,000.

There were twelve households in the $6,000 to $9,000 income group. Nine of these were owner-occupants of which eight had properties valued under $10,000, and one valued from $10,000 to $15,000.

There were two owner-occupants with properties valued at less than $10,000 who had incomes in the $9,000 to $12,000 group.

The probable persistent residential caseload from this sub-segment is thirty-five.

The area is predominantly residential with only a few commercial enterprises. These include:

1. A rooming house
2. A drinking place
3. A secondhand store
4. A general warehouse
5. Two auto repair shops

None of these relocations would cause any particular problem except as viewed from the standpoint of the pressures created by other relocations.

In Segment 4, from 16th Street to the railroad at about 18th St., there were sixty-five housing units in the right-of-way. Thirty-four were single-family; twenty-six in two-family structures; three in 3 or 4-family structures and two in business structures.

Seventeen of the households were headed by a female, thirteen of whom were listed as retired. Males headed thirty-four households, seven of whom were listed as retired. Owners occupied twenty-six of the structures. Fourteen housing units were listed as vacant.

There were twenty one-person households, fifteen of which had a female head and sixteen reported as retired. Twelve were owner-occupants. Four were two-person households; two listed as retired and one with a female head. Three were owner-occupants. There were thirteen three-person households; one of these was listed as retired and five as owner-occupants. Four-person households numbered three; five had five persons; one had six persons; one had seven persons; one had eight persons; two had nine persons and one had ten persons.

Very low income households, under $3000, numbered seventeen. Of these, twelve had female heads and sixteen had heads listed as retired. There were twelve owner-occupants, all of whom had properties valued at less than $10,000.

There were sixteen households with estimated incomes of from $3,000 to $6,000. Four of these had a female head and four were listed as retired. Of the six owner-occupants, five had properties valued at less than $10,000 and one had a property valued from $10,000 to $15,000.

There were fourteen households in the $6,000 to $9,000 income group, six of which were owner-occupants, all of whom had properties valued at less than $10,000.

There were twenty-seven households which appeared to have a likelihood of providing challenging relocation work.

Industries and businesses in the Segment 4 include:

1. Two motor freight lots
2. A wholesale establishment
3. A credit establishment
4. A building contractor
5. A general warehouse
6. Two automotive repair shops

Most of the businesses have minor investment in structures and should have only minor difficulty in relocating.

In Segment 5, from 18th Street to 21st Street, there were twenty-two housing units. Six were single-family; twelve in two-family structures and four in business structures. Three were vacant. Four of the household heads were female; three of these being listed as retired. Fifteen had male household heads; two listed as retired. Ten structures were owner-occupied.

Four households were one-person, three of these with a female head; three owner-occupants, and three listed as retired. Two-person households numbered two; both retired owner-occupants and one a female household head. There were three three-person households; two at four-persons and one at six-persons. Of the five five-person households, four were owner-occupants. There were two nine-person households, one of which was an owner-occupant.

In the less than $3,000 income category, there were four households all of which were listed as retired and two of which had a female head. Of the three owner-occupants in this group, one had a property valued less than $10,000 and one between $10,000 and $15,000.

There were three households in the $3,000 to $6,000 income group, one of which had a female head. Of the two owner-occupants, one had property valued at less than $10,000 and one between $10,000 and $15,000.

There is likely to be a caseload of eight households which will require special relocation services.

There were four businesses in the right-of-way of this segment:

1. A hide wholesaler
2. A motor vehicle dealer
3. A general warehouse
4. An auto repair shop

Three of these businesses could well add to the more than usual relocation effort caseload.

Alternate N-1 (Couler Valley). In Segment 1, 21st Street to 24th Street, there were 103 housing units: thirty-five single-family; fifty-two two-family; eleven 3 or 4-family, and five in commercial structures. Of all of the households, twenty-eight had female heads, fourteen of whom were listed as retired. Seventy-two had male heads of which seven were listed as retired.

Single-person families numbered twenty-two. Seventeen of these had female heads and fifteen were listed as retired. There were fourteen two-person families, four of which had a female head and six of whom were listed as retired. The three-person families numbered twenty-seven, of which two had a female head. There were twelve four-person families and six five-person with each having one female head. Six-person families numbered ten with two female heads, while there were three seven-person; four eight-person, and two nine-person families. Three housing units were vacant.

In the very low income group, under $3,000, there were twenty-three households; sixteen of these with a female head and seventeen listed as retired. Of the eleven owner-occupants in this group, eight had properties valued at less than $10,000 and three at between $10,000 and $15,000.

There were thirty-five households in the $3,000 to $6,000 income group. Ten of these had a female head and four were listed as retired. Of the eighteen owner-occupants, five had property valued at less than $10,000, and eleven had properties valued between $10,000 and $15,000.

Of the nineteen households in the $6,000 to $9,000 income group, six were owner-occupants of properties valued at less than $10,000.

The caseload of families requiring extraordinary attention is likely to be thirty-eight.

There are only a few business establishments in this segment. They include:

1. Two drinking places
2. A dry cleaning store
3. A barber

The drinking places may find trouble in relocating because of the large number displaced in other segments of the route. The dry cleaning station may find it difficult to relocate near its clientelle because of the lack of additional commercial zoning.

In Segment 2, 24th Street to 29th Street, there were 108 housing units. Of these, eighty-nine were single-family; fourteen two-family; three in 3 or 4-family structures, and two in commercial structures.

Twenty-two of the households had a female head of whom twelve were listed as retired. Eighty two had male heads of whom twelve were listed as retired. Eighty-five of the ninety-six residential structures were owner-occupied.

One-person households number seventeen, thirteen of these having a female head and twelve being listed as retired. There were thirty six two-person households, six with a female head and nine listed as retired. Four-person households number fourteen; three having a female head and one being listed as retired. There were thirteen four-person, twelve five-person, seven six-person, three seven-person, one eight-person and two nine-person households. Three housing units were listed as vacant.

The less than $3,000 income group had nineteen households of which nine were listed as having a female head and eighteen listed as being retired. Of the sixteen owner-occupants, thirteen had property values of less than $10,000 and three had values of from $10,000 to $15,000.

There were twenty-six households with estimated incomes of from $3,000 to $6,000, eight of which had a female head and two listed as retired. There were twenty-two owner-occupants of which sixteen had properties valued at less than $10,000 and six between $10,000 and $15,000.

In the $6,000 to $9,000 income range, there were thirty-five households, three being with female heads and three listed as retired. The twenty-seven owner-occupants had values of less than $10,000 in fourteen cases and values of between $10,000 and $15,000 in ten cases.

There were thirty-two cases which had a good potential for requiring more than minimal relocation assistance.

The following businesses were found in the right-of-way:

1. Three auto repair shops
2. A small warehouse
3. A small specialty store

The auto repair shops could be difficult to relocate because of the pressure on suitable locations caused by relocations from other segments.

Segment 3, 29th Street to 32nd Street, had twenty-three housing units of which thirteen were single-family; eight in two-family structures and two in business structures. Four of the households were headed by females of whom three were listed as retired. There were eighteen male household heads, three of whom were listed as retired. Fourteen were owner-occupants.

There were four one-person households, three of these with a female head and all listed as retired. Of the nine two-person households, one had a female head and two were listed as retired. There were two three-person households, two four-person households, one five-person household, two six-person households, one seven-person household and one eight-person household.

In the less than $3,000 income group there were six households, three with a female head and all listed as retired. Of the four owner-occupants, two had properties valued at less than $10,000 and one between $10,000 and $15,000.

There were two households in the $3,000 to $6,000 income group. One of these had a female head. Of the two owner-occupants, both had values of less than $10,000.

There were about eight cases which had a potential for requiring more than minimal need for relocation assistance.

The only business in this segment is an auto repair shop. Finding a suitably zoned location for this activity could present a difficulty.

In Segment 4, 32nd Street to Iowa 386 South, there were twenty households in this sub-segment. All were in single-family structures and all had a male household head. There were twelve owner-occupants. There were seven two-person; twelve three-person, and one four-person households.

The two households in the under $3,000 income group were listed as retired. In the $3,000 to $6,000 income group there were ten households, seven of which were owner-occupants. Six of these had properties valued at less than $10,000.

There were two households which had a potential for extra relocation assistance requirements.

The only business found in the right-of-way proposal was a concrete products plant. The investment is moderate and there should be little difficulty in relocating this plant.

In Segment 5, from Iowa 386 South to John Deere Road (Iowa 386, North), there were two households involved in the right-of-way. Both were single-family, three-person households, and owner-occupied. They were in the $6,000 to $9,000 income group and the properties were valued at over $15,000. There should be no unusual relocation problem here.

Farms are the only business disturbed and no viable working units are destroyed.

Alternate D-1 (Dodge Street Expressway). Segment 1, from Bluff Street to Booth Street, requires the removal of fifty three housing units. Forty-five were single-family and eight were in two-family structures. There were ten households which had a female head, four of whom were listed as retired. Of the thirty-three households headed by males, eight were listed as retired.

There were fourteen single-person households, four of which were headed by females and six of which were headed by persons listed as retired. The two-person households numbered thirteen, four being headed by a female and three listed as retired. There were eight three-person households, three of which had a head listed as retired. There were five four-person; one five-person; one six-person; one eight-person and one nine-person households. Ten housing units were listed as vacant.

Incomes of twelve of the households was estimated to be less than $3,000, with four of these having a female head and ten being listed as retired. Of the ten owners, two had properties valued at less than $10,000 and seven were valued at from $10,000 to $15,000.

In the $3,000 to $6,000 income group there were fourteen households, four with a female head and one listed as retired. Of the six owner-occupants, three had values less than $10,000 and one had a value of between $10,000 and $15,000.

The two properties valued under $10,000 were occupied by owners in the $6,000 to $9,000 income class.

There were seventeen households which had the potential for requiring more than the minimal relocation assistance.

There were a considerable number of businesses and professional offices within the proposed right-of-way for this segment.

1. A motel
2. Three gasoline service stations
3. Two eating places
4. A drug store
5. A real estate office
6. A small warehouse
7. Fourteen medical offices
8. A non-profit organization

The motel, gas stations and eating places may have difficulty finding suitable alternate sites.

In Segment 2, Booth Street to Concord Street, there were thirty-five housing units in the right-of-way. Thirty were single-family; two were in two-family structures, and three were in 3 or 4-family structures.

Eight of the households had a female head and five were listed as retired. Males headed twenty-six of the households and eight of these were listed as retired.

There were nine single-person households, seven of these headed by a female and six listed as retired. Two-person households numbered eight and six of these were headed by a male listed as retired. There were five three-person; seven four-person; two five-person; one six person; one seven-person and one eight-person households. One housing unit was vacant.

There were twelve households in the under $3,000 estimated income group. Five of these were female headed and eleven were listed as retired. Of the eleven owner-occupants, three had values of between $10,000 and $15,000.

Of the five households in the $3,000 to $6,000 income group, three were female headed and one was listed as retired. Of the three owner-occupants, one had property valued at between $10,000 and $15,000. There were nine households in the $6,000 to $9,000 income group and three of the eight owner-occupants had properties valued at between $10,000 and $15,000.

There were fifteen households which could need more than minimal relocation help.

One religious organization would be displaced.

STUDY TECHNIQUE

A measure of the magnitude of the relocation effort required to execute the project is an important consideration. For those responsible for project execution, it is essential to have a general idea of the cost of relocation for budgeting purposes and the physical difficulty of relocation so that planning can be done for proper organization of assistance.

In the route selection procedure, the monetary cost to the government and the social cost to the individuals and the community of the relocation form part of the cost-benefit equation for the alternate routes.

For the individual household or business, the event of relocation can range from a traumatic experience to a blessing. The difficult experience can be expected for an elderly person who may have lived all of her life in a house and has no interests beyond the immediate vicinity of her house. On the other extreme, a business which has an important portion of its capital sunk in an obsolete location, can find no more convenient method of reestablishing in a suitable location than through the highway relocation process. A seller's market is created from what would otherwise be a very depressed buyer's market.

Two serious problems face the researcher in assessing the relocation impact. First, the actual event of relocation will be from two years (at an absolute minimum) to many years in the future and the people and businesses now occupying the land will be different or if the same people remain, their circumstances will be different. Secondly, it is not advisable or even worthwhile to personally contact individuals residing within the proposed right-of-way at this early and possibly premature date.

To overcome these difficulties, a method was developed to indirectly study the characteristics of prospective relocatees using published records. It is assumed that in the intermediate run, the general character of the real estate and its occupants will remain the same. People will die and people will move, but on the average they will be replaced by people of similar characteristics.

Sanborn Atlas sheets were used as a base upon which additional information as to the use of land was added from field observations. The Sanborn Atlas already has recorded general information about the structures on each property. It also lists street addresses of the structures, which provide a link to the records subsequently used.

Using the street addresses from the Sanborn Atlas, the researchers found the name and owner-occupant status from the street address listing of the Polk City Directory. They then searched the name in another section of the directory and determined the occupation of the occupants of each household.

Female head was assumed from the order of listing. Retirement age was assumed when the occupation was listed as "retired".

Income was estimated from the skill and company of employment listed in the directory. Wage scale information was furnished by the State Employment Service.

The value of buildings was determined by matching the address with assessors records. True value was calibrated from assessed values by means of a multiplier factor furnished by a team of appraisers.

All data pertaining to each business and household was coded and punched on data processing cards from which a computer tabulated tables of characteristics of the occupants as deemed of interest by the analysts.

The original data bank has been preserved, and corrections can easily be made for updating. This record can also serve as a checklist for disposal of relocation cases as the project progresses into execution.

RELOCATION IMPLICATIONS OF ADDED RIGHT-OF-WAY FOR ENVIRONMENTAL CONSIDERATIONS

The calculations of costs and the relocation implications treated in the principal discussions of Appendix C deal with that land which is needed for construction of the facility and any additional land which would be immediately adversly affected by the presence of the freeway. For example, if the yard of a house was needed for the freeway, the house would also be taken.

The takings, the relocation implications of which are discussed here, are designed to improve the image of portions of the city and at the same time to give maximum protection from the presence of large volumes of traffic. The proposed parkway type additions are at strategic points and do not treat all portions of the freeway equally.

It will require a careful governmental decision to determine whether this additional land should be converted in its use, and if the answer is affirmative, whether to do so at the same time relocation is going on for the construction right-of-way.

In some parts, the additional takings will cause considerably increased relocation problems by increasing the competition for relocation sites and by eliminating logical relocation sites for businesses. Particularly, in the Washington Street neighborhood, this taking involves a disproportionate number of poor older people.

Kerrigan Alignment

On this alignment only a few housing units and no businesses or industries would be taken to provide for environmental protection right-of-way.

There would be a total of 15 housing units involved. Eleven of these were single-family and four units were in two duplexes.

Three of the households involved had female heads and two of these were listed as retired. Of the eleven male heads, three were listed as retired. Ten of the structures were owner-occupied.

There were four one-person families, three of which had a head listed as retired and one listed as female. Of the three two-person families, two had a female head and two were listed as retired. Four-person families numbered two and there was one six person family.

Four households had estimated incomes of less than $3,000. One of these had a female head and all four were listed as retired. Of the two owner-occupants, both had properties valued at less than $10,000. There were five households in the $3,000 to $6,000 income grouping. Three of these were owner-occupants and their properties were valued at less than $10,000.

The addition of this land to the right-of-way will likely increase the difficult relocation case workload by five.

Central Alignment

There were 133 housing units located in the right-of-way proposed for environmental protection use along this segment of the alignment.

Thirty-eight were in single-family units, 31 in two-family structures, 16 in 3 or 4-family structures, 26 in structures containing over four units, and 16 in business structures.

Females headed 51 of the households, of whom 23 were listed as retired. Of the 75 male household heads, 14 were listed as retired. Owners occupied 44 structures.

Single-person households numbered 62 of which 43 had female heads and 26 were listed as retired. There were eleven two-person households, five with female heads and eight listed as retired. Of the 30 three-person households two had female heads and two were listed as retired. There were nine four-person households, one of which had a female head; eight five-person households; one six-person household; two seven-person households; two eight-person households, and one ten person household.

Households with estimated incomes of less than $3,000 numbered 42. Thirty of these had a female head and 31 were listed as retired. Fourteen of this income group were owner-occupants, nine of whom had properties valued at less than $10,000 and five with properties valued at from $10,000 to $15,000.

There were 47 households in the $3,000 to $6,000 estimated income group of which 17 had a female head and two were listed as retired. Of the eleven owner-occupants, ten had properties valued at less than $10,000 and one had a value of between $10,000 and $15,000.

In the $6,000 to $9,000 income group there were two female household heads and there were nine owner occupants with properties valued at less than $10,000.

There were about 50 households located in this additional right-of-way which have a strong potential for providing a caseload of challenging relocation effort.

Thirty five establishments would have to move under this proposal. They include:

1. Five wholesalers
2. Four retail stores
3. Two auto sales establishments
4. Six drinking places
5. Four personal service establishments
6. Three general warehouse buildings
7. Five repair shops
8. Three construction trades establishments
9. Two religious institution establishments

The relocation of most of these businesses would not cause any particular problem except as they add to the pressure on alternate locations already presented by other relocations. Particularly difficult to relocate would be the six drinking places and the five repair shops. It appears that this project will cause the moving of a high percentage of all of these types of establishments in the metropolitan area.

Couler Valley Alignment

Twenty-six housing units are included in the proposed taking for environmental purposes along this route. Ten were single-family; ten were in two-family structures; three were in three or four-family structures, and three were in business structures.

Females headed eight of the households and five of these were listed as retired. There were 16 households headed by males of whom five were listed as retired. Thirteen of the structures were owner-occupied.

Single-person families numbered seven of which five were headed by females and all seven were listed as retired. Four of these were listed as owner-occupants. There were seven two-person families, three of which were owner-occupants. Of the six three-person households, three had a female head, one listed as retired and two owner-occupants. There were one four-person household, three six-person households, and one nine-person household.

There were eleven very low income (less than $3,000) households, eight of which had a female head and eight listed as retired. Three households were owner occupants of properties valued at less than $10,000. The $3,000 to $6,000 income group was represented by five households.

There were 14 households in this proposed right-of-way which could be expected to offer unusual relocation assistance requirements.

There is only one business in this proposed right-of-way, an auto repair shop. Standing alone as a relocation challenge, it is insignificant, but added to the great number of repair shops to be removed from the construction right-of-way, it presents a definite problem. Suitable sites for auto repair shops will be in very short supply if all of the others are moved in the same span of time.

APPENDIX C-7
ENVIRONMENTAL ANALYSIS

This analysis is a narrative evaluation of the alternates as primarily concerned with, though not limited to, multiple use of space, neighborhood integrity, recreation and parks, aesthetics, conservation, and natural and historical landmarks. Its overriding and comprehensive concern is with the total quality of the Dubuque environment, as it exists and as it may be after construction of new freeways and expressways.

Alternate N-1

The North Expressway begins at John Deere Road, well outside the city limits of Dubuque. It connects with Highways 3 and 386 North and becomes the effective entrance to the City, even though it is beyond the limits of present urban development. The Green[1]) and Gruen[2])

[1])**Dubuque Metropolitan Area Transportation Plan, The 1990 Plan,** Green Engineering Company, February 1970.
[2])**Dubuque Development Program,** Victor Gruen Associates and Larry Smith and Company, 1965.

plans agree in projecting light industry for the entire length of the Couler Valley, with rural or single-family residential flanking it east and west.

At present, north of the Flexsteel Plant, the Valley is relatively open and undeveloped. There are agricultural areas, marshy areas, a number of good-sized ponds. The west side of the Valley is well-wooded, the east side more open slopes. It is neither natural nor pastoral, but it is relatively pleasant, green open space. The marshes and ponds probably have substantial wild life populations.

The present industrial zoning will ultimately destroy this open, green entrance to the City. Design and development controls should be established which will insure a reasonably pleasant balance between expressway construction, industrial construction, and green open space. There should be a system of open space reservations stripped or checkerboarded throughout this portion of the Valley. Unless it is annexed to the City, this would have to be accomplished through county planning controls.

The expressway right-of-way could, and should, make a substantial contribution to the maintenance of a pleasant north entrance to the City, by widening in irregular patterns to establish a permanent open space corridor throughout this portion of the Valley. The actual form and area of the corridor will depend upon property lines and acquisition processes. But it should be substantial, perhaps averaging at least a quarter of the width of the Valley.

Establishment of an open space corridor does not necessarily imply developed and maintained park land. It can be left in approximately its existing natural condition, or perhaps receive additional plantings of natural self-maintaining species. Ponds and marsh areas could be preserved, although perhaps reshaped.

The form of the expressway itself will be very important in determining the character of this open space corridor. Special grading designs should be prepared to develop a system of contoured earth forms that will relate to the sides of the Valley and give the expressway the quality of riding over sculptured natural topography.

This first section of the expressway lies in the open valley for a little over 6000 feet. Then, about 600 feet north of the Iowa 386 South crossing, it runs into side hill excavation. This continues south for about 9000 feet. It runs out 600 feet south of the 32nd Street crossing.

This entire cut section should receive very careful detailed study. It should be determined immediately whether the excavation will be through rock or through earth (the former seems likely), and what kind of each. If the material is the local stratified sandstone, vertical cuts will take on a handsome sculptural quality. A cut this long will be a major landscape element. If the material is other stone or earth, intensive study of its behaviour when cut, angle of repose, color, and other properties, should be made. It will be necessary to determine how to treat the cuts and fills, in form and by planting, to blend the expressway into the side hill with forms that grow out of it naturally. The treatment of the down side will be equally important. Whether clean cut or fill, it will provide the visual base for the expressway as seen from the valley. The right-of-way for this section should be ample in width, to allow appropriate quantities of planting above and below the excavated section.

The Flexsteel Plant extends 2200 feet north of 32nd Street. The railroad yards extend another 800 feet north. These mark the transition from the green open space of the north valley to the intensive urbanization of its southern end.

After the expressway leaves the side hill cut, there will be a strip of open land on its up side about 3600 feet long and 200 feet wide. This should be made a part of the expressway right-of-way, and maintained as a parkway entrance to the dense part of the city. It runs out just

where the expressway makes the transition to the elevated freeway structure, which is the central urbanized section. This parkway strip should be developed in more refined park-like form than the open space corridor to the north.

The expressway will create a new eastern boundary for Holy Ghost Church neighborhood, and a slight realignment of the boundary between Comiskey and Windsor neighborhoods, while removing a good many houses.

Alternate C-12

The elevated downtown freeway structure begins at 24th Street and extends south about 12,000 feet until it comes to grade again on Kerrigan Hill. This is the most important section of the entire complex, in that it passes through the most heavily developed central housing, commercial, and industrial parts of the city. It presents a major problem and opportunity in urban design. Its final relations with buildings, streets, and open spaces, the ultimate formation and treatment of its cleared right-of-way, will determine whether it is a major, or only a limited, asset to the city. This elevated section requires close and detailed study. Here we outline the general form of that study.

From 24th to 20th is a short but important stretch over and through the Sacred Heart Church neighborhood. It follows closely the western boundary with East 22nd and Comiskey neighborhoods. It removes a substantial number of houses, and cuts across a corner of the Audubon School playground. This will create an opportunity for improvement of the school, either by reconstruction, or by relocation and new construction.

Holy Ghost Church, Comiskey, and Sacred Heart Church neighborhoods have 20-29 percent substandard housing units. East 22nd has 40-49 percent. Washington Street and The Flats, both also heavily affected by freeway structures, have respectively 60-69 and 80-89 percent. It would seem to be both possible and desirable to integrate redevelopment and freeway construction programs, in order to:

1) Rehouse displaced families in their own neighborhoods, or nearby.
2) Bring all housing in these neighborhoods up to standard.
3) House the same number of families in the same neighborhoods less freeway right-of-way takings, if necessary.
4) Re-adjust and improve community facility — open space proportions and relations.

The mechanics for such integrated programs should be studied in detail. Joint redevelopment and freeway construction in these six neighborhoods would create a maximum improvement program for the city, and a maximum prototype in advanced urban design processes.

From Rhomberg to 18th the freeway structure passes through three blocks of commercial-industrial buildings. These blocks are very strategic in the sequence of visual experience passing through the city. They should become sites for well-designed and important buildings, or perhaps for major tree planting.

At 18th the freeway structure crosses the railroad tracks and enters The Flats neighborhood. Between 18th and 14th the east half of the proposed full interchange replaces most of the neighborhood. When one considers the high rate of substandard housing there, it appears desirable to replace it—IF adequate and decent housing replacements can be provided, in the area, by the sort of integrated program we have urged.

Now is the time to begin to think about multiple use of the freeway structure itself. It will be high enough to shelter two or three floors of building construction. In the blocks from 18th to 24th, detailed architectural study could bring out the potentiality for integrating new housing with the freeway structure. This would mean no actual loss of neighborhood space. Prototypes have developed in other parts of the world.

If The Flats is cleared, six blocks should be incorporated with the east half of the interchange as a park with parking. The seventh block, between 15th, 16th, Sycamore, and Cedar, can remain largely in it current use.

Similarly the four blocks which are displaced by the west half of the interchange should be developed as replacement housing and a major downtown park. Provision of a pedestrian bridge over the tracks would create an exceptional green breathing pore and eye refresher in this strategic location between housing, industry, and downtown commercial.

Moving from the interchange southward between White Street and Central Avenue, from 11th to 4th, the proposed plan creates a major urban design opportunity, to create a very special complex. A number of options are opened:

1) Existing uses can be rehoused in new structures under the freeway. This makes possible unified architectural — urban design treatment on the east side of seven blocks of a major downtown urban space. Parking and pedestrian facilities can be skillfully blended in it. This is an unparalleled qualitative opportunity for an American city. Not only new building design, but new design of the entire space between the freeway structure and the Central Avenue urban renewal frontage, becomes possible. This can include planting, seating, street furniture, graphics, and lighting, a total urban design operation. This should all be made an integral part of the freeway construction program.

2) Continuity of design between the major downtown interchange park and this new urban corridor could create a very special downtown complex.

3) At certain points along the corridor, as behind the courthouse, it may be desirable to break the continuity of structure with small squares or plazas.

These thoughts must, of course, be carefully related to the recently completed downtown renewal project, which creates a new fifteen-block Main Street Mall complex. This will be the heart of downtown Dubuque. In this plan White Street is seen as part of a one way pair with Central, running north from 4th. The Expressway is shown in the block between White and Central. All of this is part of a "CBD access ring route" which encircles the mall complex with one-way pairs.

We see no incompatibility between these proposals and the possibilities cited above. Development of the new mall complex certainly does not mean that the rest of downtown is not eligible for qualitative upgrading. Rather, it should stimulate area-wide improvement.

The Barton-Aschman plan,[3] in 1967, was based on the Gruen plan of 1965. It also showed the expressway in a block-wide park between Central and White, and a Main Street Mall from 1st to 13th. However, that expressway alignment took out the courthouse, which should be preserved.

From 6th to 4th, and on past 1st to the Dodge Street interchange, the freeway structure bends and cuts diagonally across the street gridiron. White Street will dead-end at 4th, which will go through.

In these five blocks there will be a substantial opportunity, by combining freeway structure, land takings, and multiple use of the space below the structure, to continue the urban design concepts embodied in the White Street section. It will thus be possible to establish a controlled qualitative complex in which the entire elevated freeway structure, from 24th Street to Kerrigan grade, becomes a major element of civic design, pulling together, identifying and visually improving the entire central city.

Between 6th and 1st this can take the form of a closed structure, blocking off the industrial view east of the tracks from downtown view, combined with an open space element which creates a controlled vista into the boat basin between 3rd and 1st. This could be one of the more exciting sections of the complex. It requires careful detailed design study, before the final land taking boundaries are established.

Dodge Interchange (Alt. B-2 & B-3)

The Dodge Street Interchange, occupying about eight city blocks at the most strategic location for contact with the city from the south side, should be seen as much more than a utilitarian traffic facility. It will be the entrance structure which creates an image of the city in the minds of all who pass through it. Connecting, as it does, the Kerrigan grade approach, the Dodge Street corridor, the Julien Dubuque Bridge, and downtown, it will be one of the major nodes of the city. It should take on special architectural, sculptural, and/or open space character. Its form should result as much from its visual interchange function as from its traffic interchange function. The two triangular spaces under the structure, created by the diamond ramps, and the squares occupied by the circular ramps, should be developed as special green parks.

As one approaches Dubuque from the south on Kerrigan Road one has a visual experience which begins with dramatic surprise and ends with disappointment. The sudden view through the gap in the hills from the top of the grade is breathtaking. As one takes in the city in more and more detail enroute down the grade this sense of drama and surprise dissipates. The area between the bluffs and the bridge is a scene of industrial urban confusion.

The interchange, plus the 2400 feet of elevated structure which extends south to meet Kerrigan grade, may represent a major opportunity to revitalize and rehabilitate this area. Although the actual structure stays close to South Locust, its program and implementation could and should become a vehicle for area-wide redevelopment and/or beautification efforts. Addition of landscaping to the neighboring business properties would greatly assist.

The section from the interchange to Southern Avenue is shown as a split structure. The western side will be built close to the tree-covered bluff. No other structures should occur or remain on this side, from Southern to Dodge, and the natural vegetation should be encouraged to establish complete coverage down to Locust. The possible impact of the freeway structure shadow on this vegetation will need careful analysis, and possible remedial arrangements to avoid the creation of a dead strip.

On the east side under the structure, planting or additional structure can be developed to screen the views to the east from Locust. With a wider right-of-way taking at least thirty to fifty feet beyond the structure, similar screening could be developed for freeway riders. The total complex should be seen as an opportunity to improve the passage through Locust, as well as over the freeway.

The transition from the elevated structure to Kerrigan grade will be very important. The hill, with Grandview Park, is a major element both in approaching the city from the south, and leaving it that way. Structure, grade lanes, hill form and vegetation should be blended in extraordinary sculptural concepts.

Alternates C-7 and C-8

Alternates C-7 and C-8 are based on shifting the North Expressway from Couler Valley east through Roosevelt neighborhood, and the location of the new Mississippi River Bridge near the present one at Eagle Point. Roosevelt topographical problems are extraordinarily difficult, and would necessitate very bad scarring of the landscape. Bridge studies indicate that the City Island crossing is more desirable technically and functionally. Therefore, these alternates do not merit further consideration.

Alternate S-1

This connection from the end of the elevated structure to the new 520 bypass to the south totals roughly 17,300 feet. It passes through open country with scattered development. Its problems will be of two kinds. First, those of technical design, the handling of earth, structure, and vegetation forms so as to produce a completely sculptured and harmonious unity, rather than the normal hard-edged intrusion. Second, the control of development within the freeway corridor so that there will be a guaranteed balance of construction and open space throughout its length. Ideally, an open-space scenic corridor of maximum width will be created as a special zone, by joint city-county action. Within this corridor amounts and kinds of development will be carefully planned, with strong design controls. At least a third of the corridor should remain in permanent open space. Locations for development and open space should be established in a master plan for the corridor.

At the north end of this section for 4200 feet the west lanes will be new, cut into the hill below present Kerrigan Road, which is remodeled to become the new east lanes. Overlapping this by 600 feet another 4000 feet of east lanes will be cut into the hill above Kerrigan. All together this divided section, with substantial median space, totals 7600 feet. From there south for another 4900 feet the lanes are brought together in a single undivided structure, which passes under U.S. 52/67 and the Key West entry road. Another 4800 feet of divided lanes connects the still-tentative location of the 520 interchange.

It is apparent from this breakdown that, even with the use of the current Kerrigan and Rockdale rights-of-way, there will be very substantial grading for the new freeway. Relative amounts of rock and earth in the excavations must be determined, and new forms and techniques for handling them developed. From Key West south, excavation will be all earth. From there north, it will be rock. Kinds of earth and rock remain to be determined.

Alternate S-2

This alternate avoids the Kerrigan grade by following the river bank south, east of Mount Carmel, turns west at the Sewage Plant for some 2500 feet, then south again through untouched country. No matter how it was handled, this alternate would devastate the river bank and the countryside. There appears to be little justification for it as compared with S-1.

Dodge St. Corridor (Alt. D-1 & D-2)

Alternative D-1 proposes tight standard expressway cross section, with frontage road at north side, in order to preserve existing motels and restaurants. On the south side it removes a row of houses in order to hug the base of the tree-covered bluff.

Alternative D-2 displaces restaurants, one motel, and a portion of the other, as well as the houses, in order to make of the entire corridor, bluff to bluff, a green parkway. East and west-bound lanes curve gracefully, and are separated by a wider and more variable median. No frontage road is needed.

This corridor offers two major opportunities to create a west entrance to downtown of major visual quality. The first is in the grade change structure at Grandview Avenue. A 35-foot cut makes possible a truly dramatic entry, combining bold structural-sculptural and plant forms.

The other opportunity is to create, in the lower half of the corridor, a broad green parkway approach to downtown, such as is shown in D-2. The political difficulties and economic costs of this alternative are obvious, but they should be examined closely in relation to the potential for improvement in urban amenity and image-building potential which it embodies. There can be no question but that this would be a better approach to downtown than the present commercial strip atmosphere.

[3] **Dubuque Downtown Urban Renewal Project,** Barton-Aschman Associates, June, 1967.

There may be some possible compromises between D-1 and D-2. These would probably embody persuading the enterprises within the corridor to improve themselves. Such improvement would entail re-design of parking areas, development of more planting and pedestrian amenities, coordination and refinement of lights, graphics and street furniture, and possible some structural remodeling.

City Island Bridge (Alternate E-1)

Alternate C-12 extends east over 14th Street past the packing plant, then curves north and east again to meet the desired City Island bridge alignment. It passes largely over raw land, including the flood retaining basin. It should provide fine views up and down the river. These will be partially spoiled by the untidy mess of the lands below and around the freeway structure. This connection should use its influence to attain a maximum amount of tree planting, even of temporary soft-wooded kinds, in this scene of devastation.

It is unfortunate that the Dubuque Industrial Park makes so little of that most typical symbol of parks—trees. Front yard landscaping for industrial plants is an inadequate gesture toward living up to the term Park. What is needed are blocks of trees of a scale similar to the groves of willows in the recently filled ponds northeast of the packing plant. Space for such blocks could be created by 30 to 50 foot easements between lots, or by squares or odd segments cut out of them. Once properly selected and planted, such tree planting would self-maintaining. It would be in adequate scale with industrial plants, and provide adequate harmonizing contrast with them.

At the very least, the retaining basin could be ringed with a belt of trees.

Alternatives C-7, R-2, E-1, N-2.

Combinging the City Island crossing with the Roosevelt neighborhood route, the Roosevelt neighborhood route is bad because it crosses very irregular topography and would therefore require major ugly cutting and filling. Another undesirable characteristic is the denuding of the hillside above Roosevelt Avenue by cutting the trees that now beautify it. Its closeness to the cemetary is also detrimental, intruding into what should be a quiet peaceful setting. Noise waves that would be acceptable elsewhere, would be out of character here.

The route would start rising from the waterfront homes of the Point area. Visually it would be overpowering.

Alternatives C-8, R-2, N-2, E-2.

This alignment combines the Eagle Point crossing with the Roosevelt neighborhood route. Bridge studies show that the Eagle Point crossing is not as desirable as the city island crossing, because of better traffic connections on the Dubuque side, as well as engineering considerations. All of the other undesirable features of the C-7, R-2, N-2 combination apply have, adding the complexity of an interchange in the air.

Based upon the above discussion, the following ratings have been made under the environmental analysis:

	Multiple Use of Space	Neighborhood Integrity	Recreation and Parks	Aesthetics	Conservation	Natural and Historical Landmarks
S-1	4	8	5	10	10	10
S-2	5	7	5	3	2	4
C-12, N-1, E-1	10	8	10	10	10	9
C-7, N-2, E-1	5	4	5	3	2	10
C-8, N-2, E-2	3	4	5	2	2	10
D-1	5	10	4	4	4	3
D-2	5	10	10	10	6	10

APPENDIX C-8
POLLUTION FACTOR

Two pollution parameters—air and noise—were used under this criterion for rating the various alternative alignments.

Noise is defined as unwanted sound and the magnitude of noise is generally described in terms of its sound pressure. Because of the very great range of sound pressures usually encountered, a logarthmic scale is necessary to provide a convenient system of units. This logarithmic scale relates sound pressures to a common unit, the decibel (dB), for measuring the relative loudness of sound.

Sound pressure levels may also be defined in terms of a frequency weighting network, such as A-level, B-level, etc. The weighting network used in the sound level meter is the A-weighting scale and reflects the bias of the human ear in sensitivity to sound pressure levels. Measurements expressed in decibels are labeled dBA. The following are dBA examples[1]).

Power Lawn Mower	96 dBA
Rock-N-Roll Band	114
Motorcycle at 25 feet	90
Food Blender	88
Vacuum Cleaner	70
TV Set	70
Bird Calls	44

For noise pollution, a newly published design guide[2]) was used to determine the decibel sound levels generated by the forecast 1990 traffic for several selected locations along the freeway alternates. Since homes and schools are mostly the concern for noise levels, the selected sites studied included these land use types for providing an evaluative measure of noise along the alternates.

In the noise pollution analysis, dBA criteria are used for the various types of land use areas being studied. These criteria are expressed in technical terms as an L_{10} value. Examples of the tolerable L_{10} criteria for traffic noise are as follows.[3]

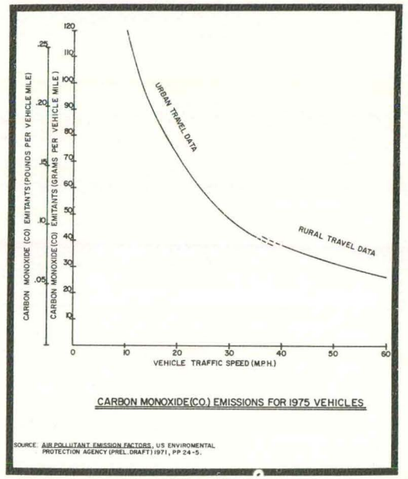
Residences	Inside	51dBA
	Outside	56
Schools	Inside	46
	Outside	61

From the design guide, estimates of the decibel levels were calculated for the test sites. These calculated sound levels were compared to the recommended decibel levels in the design guide to provide an indicator of (a) the noise effect on adjacent land uses and (b) the measures to be taken in final design for reducing noise impact.

Yard areas within 200 feet of the freeway were found to be primarily affected with the degree of the noise level determined by the shielding (barriers, vegetation, buildings). Therefore, noise ratings for the various alternates were based upon the housing and schools exposed to the alternates.

For air pollution, a recent government study[4] relates the post-1975 vehicle emittants as a function of the vehicle speed. Hydrocarbon and carbon monoxide emissions decrease with an increase in vehicle speed, whereas, nitrogen oxides are independent of average vehicle speed.[5]

The 1975 carbon monoxide rates from this study (FIGURE) were used to evaluate the general air pollution effects of each alternate. With the traffic held constant, the freeway's alternates with their higher travel speeds will produce less total CO emittant than would the surface street system. Estimates of the CO percent reduction in pounds and in 1000 pounds per mile were made for each alternate.



POLLUTION—Alternate S-1

The land developments directly adjacent to the existing Highway 151 would experience increased noise levels from forecast 1990 traffic along this corridor. However, since there is an established highway currently in this alignment, the intensity increases will not seem as pronounced to this corridor's environs as it would those in a new alignment.

Approximately 50 housing units are within 200 feet of the freeway pavement of Alternate S-1. Based upon the design guide procedures, the inside decibel levels would be below the L_{10}=51dBA criterion[6]. Therefore, noise will not adversely affect indoor sound levels for houses in close proximity to Alternate S-1.

Outdoor noise levels, on the other hand, would exceed the L_{10}=56dBA criterion for most of those housing units adjacent to Alternate S-1. Variations in the decibel levels from above this criterion (unacceptable) to below this criterion (acceptable) would be dependent upon the noise shielding provided by barriers, vegetation, buildings, and other noise screening means. Shielding both on and off the right-of-way would be required adjacent to residential areas to bring the outside noise levels in yards areas below the L_{10} criterion.

Holding constant the forecast 1990 traffic, vehicular usage of the existing southern roadway versus the replacement Alternate S-1 shows a reduction in carbon monoxide emittants. With Alternate S-1, total pounds of CO would be reduced by about 40% (1000 pounds per mile of CO by 46%) over the existing U.S. 151 roadway for this traffic. Improved vehicle operating efficiency from the higher travel speeds and reduced delays account for the fewer CO emittants.

For noise alone, Alternate S-1 would receive a 6-rating due to its effects upon the residential areas. A 10 rating would be assigned for air alone due to this alternate's emission reductions over the presently existing roadway.

Overall, Alternate S-1 is rated 8 for noise and air pollution.

POLLUTION—Alternate S-2

The absence of development along the alternate S-2 corridor results in minimal affects to area residents from highway noise. The lower traffic volumes using this alternate produce a lower intensity of noise levels.

However, since Alternate S-2 is located away from the traffic generators in the existing U.S. 151 corridor, U.S. 151 remains as a principal traffic carrier. Total emission of carbon monoxide from vehicles on U.S. 151 and Alternate S-2 is reduced over having no southern freeway, but not as extensively as with Alternate S-1. The CO in 1000 pounds per miles was estimated to reduced 58%; however the total pounds of emittants was reduced only 7% over having no freeway.

Ratings would be 10 for noise alone; 4 for air pollution alone. Overall, Alternate S-2 is rated 7 for pollution for noise and air.

POLLUTION—Alternate D-1

As with Alternate S-1, Alternate D-1 is a redevelopment of an existing corridor to a higher standard roadway. In this corridor most residential properties are screened from this alternate by commercial buildings or vegetation. Consequently, outdoor noise level will exceed the L_{10}=56dBA outside criterion for only relatively a few residences. Indoor sound (L_{10}=51dBA criterion) will be acceptable for all housing areas.

The 1990 traffic volumes show Alternate D-1 will operate near its roadway capacity. As a result, the low travel speeds of this alignment will affect vehicle operating efficiencies which in turn affects the carbon monoxide emissions. Consequently, compared with the existing roadway, Alternate D-1 will reduce CO emittants by about 28%.

The overall rating for Alternate D-1 is 7 based upon individual ratings of 9 and 5 respectively, for noise and air.

POLLUTION—Alternate D-2

Alternate D-2 removes much of the commercial development which was shielding the residential housing from the vehicular noise. As a result, outdoor sound levels in several residential areas along the northern side of the alternate will increase. The number of houses in addition to those affected in Alternate D-1 will total about ten more.

The six lanes of Alternate D-2 promotes more efficient vehicle operation and a corresponding decrease (60%) in carbon monoxide in comparison with the existing roadway.

For noise alone, the rating would be 8; for air, it would be 10. Overall, Alternate D-2 is rated 9.

POLLUTION—Alternate C-12; N-1; E-1

Approximately 30 housing units are within 100 feet of these alternates and 70 units are within 200 feet. For these residences, the outside decibel level is the critical factor for consideration while the indoor level would be satisfactory.

Median and shoulder barriers along the freeway will aid in shielding these houses (10% reduction in the L_{10} dBA for 3.5 ft. barriers). Vegetation on both on and off the ROW in non-elevated (structure) freeway sections would further shield yard areas of these houses.

In the area of 22nd Street and Alternate N-1 are located Audubon and Sacred Heart Schools. Sound levels at the old Audubon would exceed the indoor and outdoor criteria from the noise design guide. This is due largely to the open areas between the freeway and the school.

At Sacred Heart, noise levels are below both indoor and outdoor criteria. Adequate shielding of the school is provided by several buildings between the school and freeway. Since the New Audubon School would be about the same distance as Sacred Heart from the freeway, noise levels should be within the criteria.

Because these alternates attract traffic away from Central Avenue and other local streets, carbon monoxide emissions are reduced due to the better vehicle operating efficiencies of the freeway. The calculations for Alternate N-1 show total pounds of CO to reduce by 51% and 1000 pounds per mile by 50% over having no freeway.

[1]) Branch, Melville C., **Outdoor Noise and the Metropolitan Environment,** University of Southern California, 1970, p. 2.

[2])**Highway Noise, A Design Guide for Highway Engineers,** NCHRP Report 117, Highway Research Board, 1971.

[3]) Ibid., p. 70.

[4])**Air Pollutant Emission Factors,** U.S. Environmental

[5])**Ibid,** p. 27.

[6])L_{10} is the sound level that is exceeded 10% of the

Overall, Alternate C-12, N-1; E1 is rated 8 with noise alone being rated 5 and air alone being rated 10.

POLLUTION—Alternate C-7; N-2; E-1

Since Alternate C-7 is easterly of the downtown railroad lines, its noise effects upon neighborhoods is minimal due to its distance from the residential areas.

Along Roosevelt Avenue, however, Alternate N-2 is within 100 feet of about 30 housing units and within 200 feet of about 35 other units. Outside noise levels are above the L_{10}=56dBA criterion with inside sound levels being acceptable. Barriers and screening will be necessary to reduce the decibels levels below the criterion.

The lower 1990 traffic volumes on these alternates reflect that many vehicles will continue to use Central and other non-freeway streets. Consequently, reductions in carbon monoxide will not be as high as with an alternate which would intercept more of the Dubuque traffic.

With Alternate N-2, total CO pounds would be reduced 8% over having no freeway, although based upon the route mileage the 1000 pounds of CO per mile would be reduced 54%.

Overall, Alternate C-7; N-2; E-1 is rated 6 with noise and air each individually rated as 6.

POLLUTION—Alternate C-8, N-2; E-2

The finding and conclusions regarding noise and air pollution for this alignment are the same as for Alternate C-7; N-2; E-l. Therefore, this alternate is also rated 6 for overall pollution.

APPENDIX C-9
ACCESSIBILITY FACTOR

GENERAL

What is the meaning of accessibility? What are we interested in when evaluating the accessibility of a freeway? We are interested in whether the freeway has access to a neighborhood to provide the general public capability of traveling from their neighborhood to any other neighborhood within the city. Has the freeway caused disruption to the neighborhood that would restrict the general public from using local shops, schools, and churches by both vehicular and pedestrian traffic? Are emergency vehicles able to use the freeway facility to better serve the general public for fire and ambulance service?

The evaluation criteria for accessibility will be divided into three areas of concern: ,(1) Freeway to local and local to freeway system; (2) Local to local system; and (3) Emergency vehicle accessibility for fire equipment and ambulance service traveling from base to the neighborhood and the neighborhood to the hospital.

Some accessibility evaluating criteria has been or will be discussed under other sections of this report and will not be considered at this time to avoid a duplication of effort. It is felt that sufficient evaluation of the traffic service has covered the accessibility of the freeway to freeway system.

In like manner, the accessibility of the freeway for work trips, shopping trips and the transportation of products and materials has been covered under the economic analysis section of this report. These items will not be considered under this section.

For a better understanding of the emergency facilities in Dubuque, a list of the fire station, ambulance services, and the hospital locations, also indicating their location with respect to the freeway, can be found in Table A.

Following the evaluation of the criteria, each alternative will be graded numerically as done in previous sections. The grading system will be based upon the improvements that the alternatives have made to the existing system. The alternatives can then be compared by using the existing system as the common denominator. The general grading of the systems will be good, fair, and poor. Numerical values will be given to make the total range from 0-10. The following table indicates the relationship between the general terms and the numbers for the three points of criteria:

CRITERIA	GOOD	FAIR	POOR
1. Freeway to Local and Local to freeway system	4	2	0
2. Local to local system	4	2	0
3. Emergency Vehicles	2	1	0

COULER ALIGNMENT WITH CITY ISLAND BRIDGE

FREEWAY TO LOCAL AND LOCAL TO FREEWAY SYSTEM

Couler Valley

The south one half of this segment of the alternative forms part of the "High Mobility Loop"! In conjunction with the accessability of traffic on the "High Mobility Loop", the segment serves industries to the north of the Central City. Access is provided to the freeway at points of major traffic generation, John Deere Boulevard, Iowa 386 North; Iowa 386 South; the North leg of the "High Mobility Loop" at 32nd Street; 22nd Street; and the main interchange with the City Island Bridge and the Central City segments. Access at these points will provide excellent accessibility to and from the freeway.

TABLE A
EMERGENCY FACILITY LOCATIONS TABLE

EMERGENCY FACILITY		LOCATION	RELATIONSHIP TO FREEWAY
Fire Station	#3	9th and Central	Adjacent to 10th Street ramp north bound
	#1	18th and Central	9 blocks north west from 14th and Elm St. interchange
	#6	Rhomberg and Marshall	3/4 mile north of Kerper Blvd. interchange
	#5	Grandview at Bryant	5 blocks south of Bryant intersection with Dodge Street
	#4	University at Grandview	6 blocks north of the Grandview-Dodge interchange
	#2	J.F.K. and Keyway	West end of Dubuque not affected.
Rural		Key West	1000 feet west of Key West interchange at Kerrigan Road
Ambulance Reserve Unit		9th and Central	Adjacent to 10th Street ramp north bound
No. 1		18th St. and Central	9 blocks northwest of 14th and Elm St. interchange
Hospitals			
Finley		Delhi at Grandview	5 blocks north of Grandview-Dodge interchange
Mercy		Hill at Third	3 blocks north of Hill intersection at Dodge
Xavier		Sheridan Road at Davis	One half mile east of 32nd Street interchange with Couler Alignment

City Island Bridge

The City Island segment provides access to Wisconsin and the accessibility to a major area of Wisconsin that generates traffic bound for the Central City and other areas around Dubuque. From the major interchange with the other segments, north and south, interchanges are provided at Ash Street and Kerper Blvd., prior to crossing the Mississippi River, and interchange with a re-aligned U.S. 61 in Wisconsin. The east extension of the City Island Bridge alignment connects to Wisconsin Highway No. 11, a proposed expressway in the Wisconsin Highway plans. This connection will provide improved accessibility to southern Wisconsin and northern Illinois. Kerper and Ash interchanges provide for excellent accessibility to industrial island and the industries in the area of the flats.

Central City

This segment of the alternative is part of the "High Mobility Loop". The major portion of traffic generators are located in the Central City. Access points for this alternative have been provided to improve accessibility to all major generators. Grade separated interchange is located at Dodge Street and Locust Street, where both streets are provided local access and expressway access for traffic traveling the southern leg of the "High Mobility Loop" from or to the west. Other interchanges are at 4th Street, 5th Street and 6th Street, 10th Street and Elm Street near 14th Street. Excellent accessibility is provided by these interchanges in all directions, north, east, south, and west, as well as both to and from the freeway.

LOCAL TO LOCAL SYSTEM

Couler Valley

Elevated from the Central City segment to 24th Street, the structure allows free movement beneath it for local traffic, except where ramps block the local street system at Lincoln and Kniest Streets. The 22nd Street interchange is in the vicinity of a parochial and public school. Pedestrian accessibility across the freeway in the local area is hampered. School children crossing from the west must cross both the on and off ramp. Special pedestrian treatment of the intersection would be required. The cut and fill section from 24th to the north overpasses 29th Street leaving access beneath for pedestrian and vehicular traffic. North of 32nd Street all major local cross traffic intersects with the expressway.

City Island Bridge

The segment is elevated in the industrial area allowing for free movement beneath the structure. Across City Island, the freeway will have to be constructed to allow movement beneath as part of the re-development of City Island. In Wisconsin the freeway travels virgin ground and does not affect the local system.

Central City

The elevated structure from Railroad Avenue through the Central City allows the existing local system to operate in much the same manner as it does today, with minor exception near on and off ramps to the freeway. The existing street pattern can pass beneath the freeway providing excellent accessibility to local system.

EMERGENCY VEHICLES

Fire—The central fire headquarters is located adjacent to on and off ramp leading northward and only a few blocks from southbound ramps. Once on the freeway, the vehicles can travel in any direction with minimal traffic conflicts. One good point is the elevated access over the railroad allowing free access to the industrial area from 9th Street to Industrial Island. The only present free access over the railroad is at Fengler Street in the Point Area. This access will relieve the problem of using the local systems where emergency routes could be blocked by rail traffic.

Ambulance—Since the city ambulance is located at the 18th Street and Central fire station, access would be provided at 14th Street and Elm to travel in all directions. Hospital access is provided at the 32nd Street interchange for Xaiver and the Dodge Street corridor for Finley and Mercy.

Based on the above evaluation, the Couler Alignment with the City Island Bridge alternative would receive a grading of 10 for accessibility.

ROOSEVELT AVENUE ALIGNMENT WITH CITY ISLAND BRIDGE

FREEWAY TO LOCAL AND LOCAL TO FREEWAY SYSTEM

Roosevelt Avenue

The Roosevelt segment connects with the Central City through Industrial Island where it cuts across the Point Area into the high bluffs to link with the northern part of the city. Because of the terrain and the railroads, no local access is provided from 16th Street north to Peru Road at Valley Road. This lack of local access leaves very poor accessibility to and from the freeway.

City Island Bridge

The City Island segment provides access to Wisconsin and the accessibility to a major area of Wisconsin that generates traffic bound for the Central City and other areas around Dubuque. From the interchange at Kerper Blvd., the segment crosses City Island and the Mississippi River to an interchange with a re-aligned U.S. 61 in Wisconsin. The east extension of the City Island Bridge Alignment connects to Wisconsin Highway No. 11, a proposed expressway in the Wisconsin Highway plans. This connection will provide improved accessibility to southern Wisconsin and northern Illinois.

Central City

The Central City segment of this alternative passes from Dodge Street diagonally towards the railroad and passes over the railroad to Kerper Blvd. at 16th Street. The freeway is elevated with interchanges at Dodge Street and Locust, 4th Street, and 16th Street at Kerper Blvd. Because the route follows the railroad, the number of possible interchanges are limited to the three mentioned. This alternative does not provide good access to the Central City with one interchange nor does the industrial area have good access with this alternative. The alignment of this Central City Segment does not form part of the "High Mobility Loop" discussed earlier.

LOCAL TO LOCAL SYSTEM

Roosevelt Avenue

The segment is elevated or passes through the undeveloped bluff lands leaving the local system to function much as it does today. An increase to the local system because of the lack of access to the freeway causes an overload to the local system decreasing the local accessibility in the local area.

City Island Bridge

The segment is elevated over Kerper Blvd. allowing free movement beneath the structure. Across City Island, the freeway will have to be constructed to allow movement beneath as part of the redevelopment of City Island. In Wisconsin, the freeway travels virgin ground and does not affect the local system.

Central City

The segment of the alternative is elevated over the local system, but will not alleviate the traffic congestion because of its inaccessability to the major traffic generators. The lack of good access to the freeway will cause the local system to function in the same manner as today. The increase in traffic load will prevent good accessibility between the local to local system.

EMERGENCY VEHICLES

Fire—Interchanges with this alternative are not located in the immediate vicinity of the fire headquarters leaving the local system as the more active emergency routings. Even though the alternative provides for free access across the railroad, the adverse distance to be traveled is a detriment against its frequent use.

Ambulance—In addition to similar comments made with respect to the fire emergency equipment, the accessibility to Xavier Hospital is limited because of the adverse distance that must be traveled should the freeway be used. This provides for the major use of the local system for access to the hospital, unless access is provided by an interchange within closer proximity of the hospital.

Based on the above evaluation, the Roosevelt Avenue alignment with the City Island Bridge alternative would receive a grading of 4 for accessibility.

ROOSEVELT AVENUE ALIGNMENT WITH EAGLE POINT BRIDGE

FREEWAY TO LOCAL AND LOCAL TO FREEWAY SYSTEM

Roosevelt Avenue

The Roosevelt segment connects with the Central City through Industrial Island from where it interchanges with the Eagle Point Bridge segment then cuts across the Point Area into the high bluffs to link with the northern part of the city. Because of the terrain and railroads, no local access is provided from 16th Street north to Peru Road at Roosevelt Road. This lack of local access leaves very poor accessibility to and from the freeway.

Eagle Point Bridge

This alternative will traverse across the remainder of the Industrial Island parallel to Peosta Channel and crosses the Mississippi River south of the present Eagle Point Bridge and connects to an interchange with U.S. 61 at its present location in Wisconsin. This alternative provides good accessibility to the north along U.S. 61, but is limited in providing good accessibility east and south in Wisconsin and Illinois. Poor access is provided for the local system on the Dubuque side of the Mississippi River with the only interchange to the local system located at 16th Street.

Central City

The Central City segment of this alternative passes from Dodge Street diagonally towards the railroad and passes over the railroad to Kerper Blvd. at 16th Street. The freeway is elevated with interchanges at Dodge at Locust, 4th Street, and 16th Street at Kerper Blvd.

Because the route follows the railroad, the number of possible interchanges are limited to the three mentioned. This alternative does not provide good access to the Central City with one interchange nor does the industrial area have good access with this alternative. The alignment of this Central City Segment does not form part of the "High Mobility Loop" discussed earlier.

LOCAL TO LOCAL SYSTEM

Roosevelt Avenue

The segment is elevated or passes through the underdeveloped bluff lands leaving the local system to function much as it does today. An increase to the local system because of the lack of access to the freeway causes an overload to the local system, decreasing the local accessibility in the local area.

Eagle Point Bridge

The alternative is elevated or placed away from the local system causing little problem in disrupting the local to local traffic; however, because the freeway lacks access to the local area, it will do little to improve the local system.

Central City

The segment of the alternative is elevated over the local system, but will not alleviate the traffic congestion because of its inaccessibility to the major traffic generators. The lack of good access to the freeway will cause the local system to function in the same manner as today. The increase in traffic load will prevent good accessibility between the local to local system.

EMERGENCY VEHICLES

Fire—Interchanges with this alternative are not located in the immediate vicinity of the fire stations leaving the local system as the more active emergency routings. Even though the alternative provides for free access across the railroad, the adverse distance to be traveled is a detriment against its frequent use.

Ambulance—In addition to similar comments made with respect to the fire emergency equipment, the accessibility to Xavier Hospital is limited because of the adverse distance that must be traveled should the freeway be used. This provides for the major use of the local system for access to the hospital.

Based on the above evaluation, the Roosevelt Avenue Alignment with the Eagle Point Bridge alternative would receive a grading of 3 for accessibility.

DODGE EXPRESSWAY ALIGNMENT

FREEWAY TO LOCAL AND LOCAL TO FREEWAY SYSTEM

The Dodge Expressway alignment follows the existing Dodge Street Corridor from Grandview interchange to Bluff Street. A grade separated interchange is provided at Grandview with at grade intersections at Booth, Hill, and Bryant prior to entering the major interchange at Locust. Access at these major points provide accessibility to the local system by either direct access or use of frontage roads. The Booth intersection is the only intersection where turning movements may have to be restricted due to closeness of the Grandview Ramps. Fremont Avenue access will be improved by the Grandview interchange which encompasses the Fremont-Lombard intersection. Existing access on the south side will be eliminated at York, Hill, and Rising Streets, and all local traffic will have to enter and exit at Booth or Bryant Streets.

LOCAL TO LOCAL SYSTEM

The Grandview interchange improves local vehicle and pedestrian traffic by removing the high volume of through traffic for the local system and carry it under Grandview Avenue. The Booth intersection requires restrictive turning movements which limits the accessibility to the YM-YWCA north of Dodge Street. An additional access road onto Grandview will help alleviate that problem. Alpine, Nevada, and McClain Street on the north have been cut off from direct access to Dodge Street, but access is handled quite well with a frontage road connecting to Hill Street. All businesses on the north side are provided with a frontage road to allow free movement among the businesses without affecting through traffic. The closing of Rising Street reduces the accessibility to the bluff area it is serving. Rising is only one of two streets providing access to the bluff. It is a sub-standard access presently, and the closing may be a benefit if additional access can be found elsewhere.

EMERGENCY VEHICLES

Fire—The fire station on Grandview near Bryant and the station at Grandview and University will be able to continue service to the area adjacent to Dodge Street without making use of Dodge Street except for the businesses on Dodge, which will be served by use of the frontage road. The improved Grandview interchange will provide easier accessibility across the Dodge Expressway Alignment.

Ambulance—Ambulance service will have easy access to Mercy Hospital through the use of the Hill Street intersection and better control of turning movements at this interesection. Services using the Dodge Expressway from the west exit the expressway at the Fremont ramp to reach Finley Hospital.

Based on the above evaluation, the Dodge Expressway Alignment would receive a grading of 10 for accessibility.

DODGE PARKWAY ALIGNMENT

Basically the evaluation of the Dodge Expressway Alignment would follow with this alignment, except the points concerning the businesses along Dodge Street would not apply leaving fewer access points in the lower section of the Dodge Parkway Alignment.

Based on the above evaluation, the Dodge Parkway Alignment would also receive a grading of 10 for accessibility.

KERRIGAN ALIGNMENT

FREEWAY TO LOCAL AND LOCAL TO FREEWAY SYSTEM

The present local access points to Kerrigan Road will not change drastically for the Kerrigan Alignment. Access to the local system will remain as grade separated interchanges at three locations; the county road at Key West, U.S. Route 52-67, and the Grandview Interchange. Accessibility will be reduced at the old Davenport Road South of Key West with no local access provided at the interchange of Kerrigan Alignment with the proposed 520 Interstate. The old U.S. Route 151 intersection at Table Mound will not be accessible from the freeway except by frontage roads from U.S. 52-67 to Key West.

LOCAL TO LOCAL SYSTEM

The main volume of traffic has been removed from the local system allowing free movement across the freeway at the grade separations, interchanges, or overpasses.

EMERGENCY VEHICLES

Fire—The close proximity of the interchange to the Key West Fire Department allows for ease of using the new freeway accessibility to the far side of the freeway. Fire station No. 5 at Grandview and Bryant has a good accessibility to the freeway as well as crossing the freeway at the Grandview interchange.

Ambulance—The high speed traffic facility provides increased accessibility for the egress and ingress of ambulance service to the Central City traffic system.

Based on the above evaluation, the Kerrigan Alignment alternative would receive a grading of 10 for accessibility.

GRANGER CREEK ALIGNMENT

FREEWAY TO LOCAL AND LOCAL TO FREEWAY SYSTEM

The alignment of this alternative is through developed country providing little improvement to non-existant local traffic facilities. Access would only be provided at one location, U.S. Route 52-67.

Access to the freeway in the vicinity of Catfish Creek is prohibitive because of the rough terrain and elevated roadways. Local access to the Central City will still use the existing U.S. 61 Corridor because of the adverse distance that must be traveled to gain access to this alignment.

LOCAL TO LOCAL SYSTEM

The freeway will disrupt the local traffic patterns by closing the county road north of Metropolitan Heights east of the development. Service to the area can only be provided through the connection of this road with the frontage road at the present U.S. 52 and U.S. 61 intersection. Local access to the Julien Dubuque Memorial Park has been disrupted and a new lengthy access will have to be provided from U.S. 52 to continue accessibility to the park.

EMERGENCY VEHICLES

Fire—The Granger Creek alignment provides little in the way of improving the accessibility of fire protection equipment. The minor roads and urbanization in the vicinity lack the need for improved access to the area.

Ambulance—U.S. 61 corridor would remain the primary access for this type of emergency vehicles to the south. The Granger Creek alignment does little or nothing towards improving the accessibility to the Central City for this service.

Based on the above evaluation, the Granger Creek alignment alternative would receive a grading of 3 for accessibility.

SUMMARY TABLE OF GRADING

Description of Alternative Alignment	Freeway to Local Local to Freeway System		Local to Local System		Emergency Vehicles		Total
	Seg.	Alter.	Seg.	Alter.	Seg.	Alter.	
Couler Alignment with City Island Bridge:		4		4		2	10
Couler Valley	4		4		2		
Central Island	4		4		2		
Central City	4		4		2		
Roosevelt Avenue Alignment with City Island Bridge:		1		2		1	4
Roosevelt	0		2		0		
City Island	4		4		2		
Central City	0		0		0		
Roosevelt Avenue Alignment with Eagle Point Bridge:		1		1		1	3
Roosevelt	0		2		0		
Eagle Point	2		2		1		
Central City	0		0		0		
Dodge Expressway Alignment:		4		4		2	10
Dodge Parkway Alignment		4		4		2	10
Kerrigan Alignment:		4		4		2	10
Granger Creek Alignment:		0		2		1	3

APPENDIX C-10
MAINTENANCE AND OPERATING COST FACTOR

Among the various items of cost which must be considered in our comparative ratings are those costs involved in maintenance and operation of the facility. Unfortunately, in the past, the cost accounting systems of the various highway departments have not been geared to provide complete and factual information on costs of this type. The Iowa Highway Commission, however, has been able to segregate the costs of maintaining nearly 14 miles of Interstate I-235 in Des Moines. This cost approximated $21,340 per mile during fiscal 1971. This basic piece of information will have to suffice.

We have carefully reviewed the various tasks which go together to make up the total of the maintenance operations. This has been done for a freeway at grade and also for an elevated street freeway on structure. A number of these items are considered to apply equally to both types of facility. They are: litter pickup, sign maintenance, lighting and pavement marking. The task of snow plowing applies equally, however, in the case of the freeway on structure there is an added cost for removal of heavy snow accumulations. The task of maintaining drainage facilities is also applicable to both, but is expected to be slightly more expensive in the case of the elevated structure.

The element of pavement repair is also applicable to both types of facility, but with some differences. The at-grade facility requires joint sealing, a task which is absent from the maintenance of elevated structure. The repair of the bituminous shoulder strips is probably more time consuming and more often necessary for the at-grade facility than for the elevated structure, although an actual structural repair of the elevated facility would perhaps be more costly than its counterpart. Guard rail maintenance is an item of at-grade freeway maintenance which is completely lacking in a structure where we have anticipated the concrete "New Jersey" type barrier should be used. Likewise the item of landscape maintenance, grass cutting, etc. on that part of the right-of-way not paved is another item with no counterpart in the structurally elevated facility. It may be suggested that similar maintenance might be needed below an elevated structure, but when one considers that nearly all such space will be put to some use, it must be concluded that any maintenance will be assumed by the user.

So it must be concluded that the differences between maintenance costs of at-grade and elevated facilities probably differ less than individual differences due to construction quality variations, climatic exposure, etc. For this reason we have concluded that we should use a basic estimate of $25,000 per mile per year for average 4-lane divided roadways with the suitable number of ramps and interchanges. Since we find no appreciable difference between elements of cost, the only differences result from that of length.

On this basis, we have rated the alternatives against each other as shown in the following table:

Alignment	Rating
Couler Valley with City Island Bridge	5.2
Roosevelt with City Island Bridge	4.9
Roosevelt with Eagle Point Bridge	4.8
Kerrigan	5.5
Granger Creek	4.6
Dodge Expressway	4.7
Dodge Parkway	5.3