

-REPORT ON PROPOSED BRIDGE LOCATIONS
OVER
THE MISSISSIPPI RIVER AT
KEOKUK, IOWA

IOWA DEPT. OF TRANSPORTATION
LIBRARY
800 LINCOLNWAY
AMES, IOWA 50010

Prepared by
MODJESKI AND MASTERS
November, 1976

PARTNERS

T. R. KEALEY
R. D. HUTTON
R. E. FELSBURG
W. B. CONWAY

MODJESKI AND MASTERS

CONSULTING ENGINEERS

Founded 1893

4713 CARLISLE PIKE
MECHANICSBURG, PA. 17055
TELEPHONE 717 - 761-1891

MAILING ADDRESS:
P. O. BOX 2345
HARRISBURG, PA. 17105

ASSOCIATES

J. H. LITTLE
J. R. BOWDEN
C. T. FORTRAN
H. E. ECKHOFF
J. J. SCHERRER
C. F. COMSTOCK
J. E. PRICKETT
T. Y. SOONG
H. E. WALDNER
R. E. TAUSCH
E. W. ROHRBAUGH

ASSOCIATE PARTNERS

T. SHINTAKU
H. H. SIEG
R. W. CHRISTIE
H. H. SNYDER

November 12, 1976

The Honorable Charles F. Eppers, Mayor
City of Keokuk
City Hall
415 Blondeau Street
Keokuk, Iowa 52632

RE: REPORT ON PROPOSED BRIDGE LOCATIONS OVER
THE MISSISSIPPI RIVER AT KEOKUK, IOWA

Dear Mayor Eppers:

We are pleased to submit, herewith, our letter report, along with appendices on the advantages and disadvantages of the Main Street Bridge location vs. the Timea-Bank Streets location, and including an analysis of the maintenance and operation of the existing Keokuk Municipal Bridge, all in accordance with our proposal dated September 3, 1976 and accepted by you on September 14, 1976.

STATEMENT OF PROBLEM

The existing Keokuk Municipal Bridge, although in excellent condition, proves inadequate from a standpoint of traffic operation because of the narrow width of the deck and the necessity for frequent openings and closings due to the passage of river traffic. A number of studies have been made over the past years on possible new bridge locations. The Iowa Department of Transportation is now proposing a new bridge at the Main Street location. Doubts have been expressed, by those concerned, about possible future congestion within the central business district due to a bridge at the Main Street location. Prior studies have considered various locations south of the Main Street location. Among these locations was one in the vicinity of Timea-Bank Streets. The purpose of this report is to compare the advantages and the disadvantages of the Main Street location vs. the Timea-Bank Streets location. The Department of Transportation is proposing that the new bridge be built with toll funding. They also propose that the existing bridge be maintained and operated for railroad traffic only. This report analyzes and estimates the cost of maintenance and operation of the existing bridge as a railroad structure.

MODJESKI AND MASTERS

The Honorable Charles F. Eppers, Mayor
City of Keokuk

-2-

November 12, 1976

PREVIOUS STUDIES AND INVESTIGATIONS

In December, 1967, the Iowa State Highway Commission authorized the preparation of a preliminary feasibility report for a proposed new toll bridge at Keokuk, Iowa. This report, published under date of September, 1968, was a bridge location, revenue, and traffic study report for a number of bridge locations. Two locations, which would connect to Main Street in Keokuk, were studied along with additional alternate location studies for a bridge connecting at Sixth Street, a bridge connecting at Timea Street, and a bridge connecting at U. S. 61. This report was updated in 1974, at which time an additional study, a location connecting to Bank Street, was made in addition to the Main Street crossing site.

In June, 1976, the Iowa Department of Transportation issued a report on estimated revenues, expenses, and proposed funding for the Iowa-Illinois Bridge over the Mississippi River at Keokuk, Iowa. This report recommends a bridge to be constructed at the Main Street location which was the Main Street Alternate A in the 1968 report. The report proposes funding for the new bridge through the collection of tolls by the State of Iowa. The report further recommends that the existing dual usage bridge be discontinued for vehicular traffic, but that it continue to operate as a railroad bridge. Operation under this condition would require the maintenance of the bridge for railroad traffic to be continued through the auspices of the Keokuk Bridge Commission.

INFORMATION AND DATA SOURCES

The City of Keokuk provided Modjeski and Masters with the following reports: Bridge Location, Revenue and Traffic Studies, Keokuk, Iowa dated September, 1968. Supplemental Report for Bridge Location, Revenue and Traffic Studies dated 1974. The Iowa Department of Transportation report on Estimated Revenues, Expenses and Proposed Funding of the Iowa-Illinois Bridge over the Mississippi River at Keokuk, Iowa, dated June, 1976. The Keokuk Origin and Destination Traffic Report of July, 1970. Additional traffic information was provided by the Iowa Department of Transportation and the City of Keokuk in October, 1976. The Keokuk, Iowa Comprehensive Plan dated 1975. Additional data was supplied by the City Engineers' office in the form of City Maps and Plans. Several on-the-spot field reconnaissances were made by members of our staff in company with officials of the City. Data pertaining to the operation and maintenance of the existing bridge was obtained from the Keokuk Bridge Commission.

MODJESKI AND MASTERS

The Honorable Charles F. Eppers, Mayor
City of Keokuk

-3-

November 12, 1976

DESCRIPTIONS OF ALTERNATE LOCATIONS

Main Street Location

This location is shown as Alternate A in the 1968 report. This location begins at a point approximately 2,000 feet from the Illinois bank of the Mississippi River on existing Route 136, and proceeds on alignment approximately 450 feet downstream and parallel to the existing Keokuk Municipal Bridge. The Iowa approach would connect directly to Main Street coming to grade approximately at Second Street. The Illinois approach is through a wooded area and crosses the right-of-way of the Toledo, Peoria and Western Railroad. The Iowa approach would cross a portion of Victory Park, located at the foot of Main Street, and from that point to its terminus in the vicinity of Second Street would occupy the existing right-of-way of Main Street. The toll plaza would be on the Iowa approach in the vicinity of First and Main Streets. Main Street, from Second to Seventh Streets, is concrete pavement in excellent condition, 69 feet wide back-to-back of curbs, with two through lanes in each direction and a provision for parallel parking on both sides of the street. At all street intersections, except for the Seventh Street intersection, the parking lanes are shadowed by the curb returns. All intersections, with the exception of Second Street, are controlled through the use of traffic signalization equipment. The Central Business District is centered on Main Street.

Timea-Bank Streets Location

This location begins at a grade intersection with the Hamilton-Warsaw Road approximately 4,700 feet south of Route 136, in Illinois, and proceeds through agriculture land and wooded areas to the Mississippi River, crossing same almost at right angle, approximately 2,000 feet south of the existing Keokuk Municipal Bridge, thence, proceeding across riverfront property, including a portion of the railroad yard, coming to the bluff midway between Timea and Bank Streets, thence, splitting to make use of existing Timea Street for eastbound traffic and existing Bank Street for westbound traffic. The foregoing streets would be used for traffic to and from a connection with Seventh Street. The toll plaza and facilities would be located in the vicinity of First Street. Both Timea and Bank Streets, at the present time, are in a residential area zoned as medium density residential from Fifth to Seventh Streets and high density residential from First to Fifth Streets according to the City of Keokuk's Comprehensive Plan. On Timea Street, there is an elementary school between Sixth and Seventh Streets. Large shade trees line this street between Fourth and Fifth Streets. A railroad grade crossing exists between Third and Fourth Streets, which is presently in poor condition. Bank Street is tree lined between Second and Third Streets and from Fifth to Seventh Streets. A railroad grade crossing, in poor condition, is located at Fourth and Bank Streets. There is another grade crossing on Bank Street between Third and Fourth Streets;

MODJESKI AND MASTERS

The Honorable Charles F. Eppers, Mayor
City of Keokuk

-4-

November 12, 1976

however, this crossing is not in use and could probably be abandoned. In the case of both of these streets, the low point for drainage is at the grade crossings. Both of these streets have rather steep grades between Fifth and Sixth Streets with the Timea Street grade being particularly steep. Timea Street is 35 feet wide with a gravel base course and a seal coat from Second to Fifth Streets and is 37 feet wide back-to-back of curb and is constructed of six inch plain cement concrete pavement between Fifth and Sixth Streets and is 35 feet wide back-to-back of curb with a brick base course and asphalt overlay from Sixth to Seventh Streets. Its condition is generally poor from Second to Fifth Streets. Bank Street construction from Second to Fifth Streets is 35 feet wide of asphalt construction and from Fifth to Seventh Streets is 35 feet wide with a brick base course and an asphalt overlay. Its condition is also poor from Second to Fifth Streets.

STRUCTURES

Main Street Location

The proposed Main Street bridge superstructure, as recommended in the prior reports, consists of ten spans of continuous girders approximately 188 feet each; three spans of continuous girders of 165 feet each; five spans of continuous girders of 100 feet each; a short approach span of about 55 feet; and a 450-foot tied arch span over the navigation channel. The substructure consists of two main piers of 100 feet height and nine river piers ranging from 45 to 80 feet in height, along with eight land piers ranging from 25 to 75 feet high. The overall length of structure at this location is 3,380 feet. The proposed width of bridge is 40 feet curb-to-curb.

Timea-Bank Streets Location

The superstructure of the proposed bridge at this location, as proposed in the 1974 report, consists of seven continuous girder spans of about 225 feet each, a three span continuous unit with spans of 225 feet, 250 feet, and 225 feet; and a tied arch span of 750 feet over the navigational channel. The substructure consists of two main piers approximately 100 feet high; six river piers ranging from 50 to 85 feet high; and two land piers ranging from 40 to 60 feet high. The overall length of structure is 3,025 feet. The proposed width of the bridge is 40 feet curb-to-curb.

Alternative types of navigation spans that might be considered are a simple truss or a near record length girder span at the Main Street location. At the Timea-Bank Streets location, a continuous truss or cable stayed girder might also be considered. Although alternative types of navigation channel spans might be under consideration for final design, it is fair to say that the type of structures that are recommended in the previous reports are entirely reasonable.

MODJESKI AND MASTERS

The Honorable Charles F. Eppers, Mayor
City of Keokuk

-5-

November 12, 1976

The structures are about equivalent aesthetically. The further questions of structural advantages and disadvantages of these two sites and their proposed bridges seems to rest strictly with the economy of the structures. Here, the Main Street site appears to have the advantage, although its overall length is 355 feet longer than the Timea-Bank Streets structure. This is more than offset by the 300 foot difference in the navigation channel spans. The question evolves around whether the cost of 655 feet of girder span is comparable to the cost of increasing the arch length 300 feet. It is assumed that the economical approach span lengths selected for both structures will result in essentially the same cost per foot of structure for that portion of the bridges. Using broad assumptions and approximate equations, resulting from long years of experience in bridge design, and further assuming continuous girders to be an economical form of construction and tied-arches to be only average, it would appear to result in a 20 percent greater cost for the Timea-Bank Streets site. Furthermore, about a 35 percent reduction in the cost of the navigation channel span would be required to equalize the estimated cost of both sites. This, of course, favors the Main Street location, and indicates that even small savings from slight variations in span length or structure type are not likely to alter these results.

The only significantly different feature between these structures is the relative cost, caused primarily by the difference in the lengths of the navigation channel spans. It appears that the Timea-Bank Streets structure would be in the neighborhood of 5 to 20 percent greater than at the Main Street location. Without making detailed studies and cost estimates, which are beyond the scope of this report, it is more probable that the 20 percent figure is more accurate; however, for cost comparison purposes, we have used 15 percent.

TRAFFIC

Assignment

The available traffic data was examined and a base year (1975) ADT volume assignment prepared for each alternative. The design year (2000) ADT volumes were projected by applying an appropriate growth factor to each base year assignment.

Iowa Department of Transportation reported a 1975 ADT of 6,650 vehicles and has projected an ADT of 13,574 vehicles for the year 2000, on the bridge. This yields an annual growth of 2.9 percent over 25 years for the river crossing. The dispersion of the traffic throughout the design period was assumed to remain in the same proportions as that reported in the 1970 Origin-Destination Traffic Report.

The uniform growth factor method assumes that the land use in each zone will not change over the period, that future trip generation will reflect the past, that sufficient undeveloped area remains to support

MODJESKI AND MASTERS

The Honorable Charles F. Eppers, Mayor
City of Keokuk

-6-

November 12, 1976

this growth, that all trips in all zones increase at the same rate. It is doubtful that the stated parameters will prevail in the City of Keokuk throughout the design period. However, since no information was readily available concerning future growth for various areas of Keokuk, the uniform growth factor method was deemed best for use in this study. We feel that the method is sufficiently accurate to predict the dispersion of future bridge traffic and may be used to evaluate the relative merits of the alternate bridge locations.

This assignment also assumes that congestion and delays will be so severe on Main Street north of Seventh Street that traffic will divert to the U. S. 136/61 bypass. This probably will not happen until 1990 to 1993, assuming a uniform 2.9 percent annual growth. It is doubtful that the Keokuk area can support such an extreme growth rate or that the traffic will divert to the bypass. It should also be noted that unless traffic engineering steps are taken to prohibit through traffic on Timea-Bank Streets, these streets will carry much of the traffic bound for the northwest areas of Keokuk instead of the U. S. 136/61 bypass.

See Exhibit IV in the Appendix for further details on traffic assignments. The traffic assignments are tabulated in Exhibits Numbered IV-A through IV-F in the Appendix.

Analysis

Main Street Location

Traffic patterns on Main Street from Second Street through Seventh Street were analyzed first with current, (1975) traffic volumes, and then with the design year (2000) traffic volumes under existing geometric conditions. While the quality of traffic service in the Keokuk CBD is currently acceptable, overloading of the Third Street, Fourth Street, Fifth Street and Seventh Street intersections will occur prior to the end of the design period (See Table I). This analysis assumes that the committed project to widen Seventh Street from Main Street to Route 61 is implemented.

TABLE I

<u>Intersection</u>	<u>Year Service Level C is Exceeded</u>	<u>Year Service Level E is Exceeded</u>
Second and Main	2000+	2000+
Third and Main	1986	1993
Fourth and Main	1996	2000+
Fifth and Main	1993	1999
Sixth and Main	2000	2000+
Seventh and Main	1986	1992

MODJESKI AND MASTERS

The Honorable Charles F. Eppers, Mayor
City of Keokuk

-7-

November 12, 1976

It was determined that Main Street intersections between Second Street and Seventh Street could be feasibly improved to provide an acceptable quality of traffic service in the Keokuk CBD with the river crossing at the Main Street location. Signalization of the Second and Main Streets intersection would be necessary. At the Third and Main Streets intersection, a right turn lane from Main Street into Keosippi Plaza and widening of the Keosippi Plaza entrance to provide three traffic lanes, would be required. Curb side parking would be banned within 150 feet of the intersection on Fourth Street east and on Fifth Street east and west. At the Seventh and Main Streets intersection, extensive widening of both Seventh Street and Main Street would be necessary. Parking would be banned within 250 feet of the intersection on Seventh and Main Streets. The parking loss would be approximately 10 spaces at Third and Main, 6 spaces at Fourth and Main, 12 spaces at Fifth and Main and 25 spaces at Seventh and Main Streets. Channelizing islands on Seventh Street west and on Main Street should be included to provide pedestrian refuge. The reconstruction at Seventh and Main Streets could be accomplished as part of the Iowa Department of Transportation's Seventh Street widening project.

Timea-Bank Streets Location

Timea-Bank Streets would be operated as a one way pair between Second Street and Seventh Street. Both streets would revert to two way operation beyond Seventh Street. Signalization would be required at Fourth and Bank Streets, Fourth and Timea Streets, Seventh and Bank Streets and Seventh and Timea Streets. Both Bank Street and Timea Street would be rebuilt to 40 foot width, providing two traffic lanes with parking on both sides.

With the bridge at the Timea-Bank Streets location, traffic operations on Main Street from Second Street through Seventh Street were analyzed with design year 2000 traffic volumes and existing geometric conditions. Construction of the Timea-Bank Streets alternative would provide acceptable quality of traffic service on Main Street throughout the design period at all locations, except at Seventh Street and Main Street intersections. Quality of service would deteriorate at Seventh and Main Streets by 1987 and overloading would occur by 1993. Extensive reconstruction of Seventh Street at the Seventh Street and Main Street intersections would be required and could be incorporated into the Seventh Street widening project proposed by the Iowa Department of Transportation. A loss of approximately 45 parking spaces (all at the Seventh Street and Main Street intersection area) would occur if this alternative were implemented.

MODJESKI AND MASTERS

The Honorable Charles F. Eppers, Mayor
City of Keokuk

-8-

November 12, 1976

Traffic Analysis Comparison

In terms of traffic operations, the Timea-Bank Streets bridge location has many advantages and few disadvantages when compared to the Main Street bridge location. These advantages/disadvantages are summarized below.

1. The Timea-Bank Streets bridge location will relieve congestion in the Keokuk CBD by removing non-CBD bound traffic (including trucks) from Main Street, while with the Main Street bridge location, the non-CBD traffic will remain on Main Street.

2. Average delay and total delay encountered by a driver on Main Street will be 40-45 percent less with the Timea-Bank Streets bridge.

3. Main Street will operate at a very high level of service (A) with the Timea-Bank Streets bridge location, while the quality of traffic service on Main Street with the Main Street bridge location will be barely acceptable (Service Level D).

4. Both alternatives will cause a loss in curb parking; however, the loss with the Timea-Bank Streets alternate will be approximately 15 percent less and will be concentrated at the Seventh and Main Streets intersection.

5. Both alternatives will require widening of Seventh Street beyond that proposed by the Iowa Department of Transportation. The Main Street bridge location alternate will also require widening of Main Street at Seventh and Main Streets intersection.

6. The chief disadvantage of the Timea-Bank Streets bridge location is that it will change the character of Timea and Bank Streets from residential streets to major routes.

See Exhibit V in the Appendix for a summary of traffic operation. The intersection capacity analyses are shown in Exhibit VI of the Appendix.

ALIGNMENT COMPARISONS

Main Street Location

Geometric Alignment

Advantages of this location are more direct routing, better overall horizontal and vertical alignment, and the absence of any grade crossings in Keokuk. The disadvantages of this location would be a possible grade crossing on the Illinois approach, and a possible introduction of more overall travel time, due to congestion of traffic on Main Street.

MODJESKI AND MASTERS

The Honorable Charles F. Eppers, Mayor
City of Keokuk

-9-

November 12, 1976

Timea-Bank Streets Location

Advantages of this location, alignmentwise, are possible better travel times at peak hours, and it will serve as a traffic relief measure for congestion on Main Street, while still being located physically close to the Central Business District. Disadvantages are more numerous and include less direct routing, the introduction of the grade intersection and curvature on same at the entrance to the Hamilton-Warsaw Road, a definite vertical grade problem on both Timea and Bank Streets in the vicinity of Fifth and Sixth Streets, grade crossings on both approaches, and the definite possibility of a drainage problem at the grade low points located at the railroad grade crossings on both Timea and Bank Streets.

OTHER LOCATION COMPARISONS

Main Street Location

The following statements are concerned with definite advantages of this location.

1. Less right-of-way and demolition costs.
2. No housing or business displacement.
3. Through traffic will not be routed through zoned residential areas.
4. The Mississippi River navigation channel is crossed at a point where navigation hazards are reduced to a minimum.
5. Less hindrance to river operations.
6. Less interference with existing railroad location and operation.
7. Less overall disruption of the environment.

Decided disadvantages of this location are as follows.

1. Disruption of a public park area.
2. Loss of the use of Main Street, east of Second Street as a local traffic artery.
3. Possible interruption to Main Street traffic during construction.

MODJESKI AND MASTERS

The Honorable Charles F. Eppers, Mayor
City of Keokuk

-10-

November 12, 1976

4. Disruption to the traffic pattern on the approach to the existing bridge during construction.
5. Possible serious contribution toward traffic congestion in the Central Business District.

Timea-Bank Streets Location

Advantages of this location are as follows.

1. Will provide definite traffic relief for the Central Business District.
2. Less interruption to local traffic during construction.

Disadvantages of this location are as follows.

1. This location will definitely be more expensive.
2. Through traffic is introduced in a residential area.
3. More right-of-way will be required, which will require loss of some residences.
4. Through traffic will be routed past a school, namely, the school on Timea Street between Sixth and Seventh Streets.
5. More tree cover will be removed.
6. May cause disruption to the railroad yard on the west bank of the Mississippi River.
7. Will involve railroad grade crossings on both Timea and Bank Streets.
8. Will involve a greater travel distance to the Central Business District shopping area from Illinois.
9. May introduce navigation hazards in the approach channel to Lock Number 19.
10. More disruptive to environmental conditions.

MODJESKI AND MASTERS

The Honorable Charles F. Eppers, Mayor
City of Keokuk

-11-

November 12, 1976

COST COMPARISONS

A cost comparison estimate sheet is included in the appendices. Since a detailed cost comparison estimate was beyond the scope of this study, it was decided to use basic cost estimates from the Iowa Department of Transportation Report, Table B, dated June 10, 1976. However, it was necessary to add costs for reconstruction on Timea and Bank Streets between Second and Seventh Streets, assuming a 40 foot width of street back-to-back of curbs. Costs were also added to the Timea-Bank Streets location for improvement of the Hamilton-Warsaw Road between the bridge approach intersection and its intersection with Route 136. On the basis of the preliminary structure analysis, the Timea-Bank Streets location structure costs were figured at 15 percent increase over the Main Street location.

While estimates are not provided in this report, there will be greater right-of-way and demolition costs on the Timea-Bank Streets location.

For the total of the items shown in the cost comparison estimates, indication is that the Timea-Bank Streets location costs will be approximately 25 percent greater than the Main Street location.

KEOKUK TRAFFIC ALTERNATE FOR MAIN STREET BRIDGE LOCATION

From the foregoing, it was determined that the Main Street location, although it has many advantages, has a decided disadvantage in that it will cause traffic congestion within the Central Business District, while the Timea-Bank Streets location will tend to remove that traffic congestion within the Central Business District. However, in order to benefit from all the other decided advantages for the Main Street location, a study was made to use Exchange Street between Second and Seventh Streets as a Central Business District bypass for through traffic. Exchange Street between Second and Fourth Streets has been recently reconstructed to improve alignment and grades and consists of six inch plain cement concrete pavement, 45 feet wide back-to-back of curb. Between Fourth and Seventh Streets, Exchange Street is in good condition with brick base and asphalt surfacing and is 35 feet back-to-back of curb. Except for the intersection with Seventh Street, Exchange Street does not need to be improved at the present time or within the near future in order to handle the expected traffic load for such a bypass. Parking should be banned on one side of Exchange Street between Fourth and Seventh Streets to provide sufficient width to handle the bypass traffic. With the concurrence of the Iowa Department of Transportation, this so-called bypass could be signed as traffic route 136 and 61. Our traffic studies indicate that an acceptable level of traffic service would be provided by this

MODJESKI AND MASTERS

The Honorable Charles F. Eppers, Mayor
City of Keokuk

-12-

November 12, 1976

bypass. It would be necessary to introduce signalization of the Second and Main Streets intersection and the Seventh and Exchange Streets intersection. Although the bypass is expected to relieve congestion on Main Street, it may still be necessary to introduce some partial parking bans with the inherent loss of parking spaces at the Main Street intersections between Second and Seventh Streets in order to maintain an acceptable level of service on Main Street and assure that the signalization at these intersections works efficiently.

Advantages attributable to use of a CBD bypass are as follows.

1. Traffic bound for the north and west will be diverted from Main Street, thereby providing definite relief on Main Street leading to a higher level of service (C).

2. Average and total delay to vehicles on Main Street will be 30 to 35 percent less with the use of a bypass.

3. The parking loss on Main Street will be approximately 10 percent less.

4. The bypass can be implemented without any intersection widening other than those already programed as part of the Iowa Department of Transportation's Seventh Street Widening Project. Traffic engineering measures alone will suffice.

The main disadvantage to the use of the proposed CBD bypass is that it does not provide as high a level of relief to the Keokuk Central Business District as does the Timea-Bank Streets location. However, the quality of traffic service that it will provide is acceptable at all locations throughout the projected usage.

EXISTING KEOKUK MUNICIPAL BRIDGE - MAINTENANCE AND OPERATION FOR RAILROAD TRAFFIC

Under the current plan of the Iowa Department of Transportation, it is their intention to construct a new bridge crossing the Mississippi River for highway usage. The State of Iowa will retain the highway tolls on this new highway bridge to pay for its construction. The existing bridge must continue to remain in service for rail traffic.

The existing bridge is a low level dual usage bridge with railroad traffic using the lower level and highway traffic the upper level. At the navigation lock on the Iowa shore, there is a swing span to permit the passage of river traffic. The existing bridge has been inspected yearly by Modjeski and Masters for a long period of time and is in excellent condition considering the age of the structure. Since the Bridge

MODJESKI AND MASTERS

The Honorable Charles F. Eppers, Mayor
City of Keokuk

-13-

November 12, 1976

Commission may be required to maintain the bridge in the future for rail operations, it is recommended that the roadway deck and both highway approach trestles be removed to minimize the maintenance expense.

The Toledo, Peoria and Western Railroad operates one freight train to Keokuk daily, with Keokuk the terminus of their operation. The train operates six days per week, arriving at the bridge during the early morning considerably after the schedule of 1:30 A.M., but normally 6:00 A.M. to 8:00 A.M. The return leaves more promptly to its 6:30 P.M. schedule.

The Norfolk and Western Railroad operates across the bridge under service it has requested to be abandoned. Service now operates from Quincy to Keokuk twice a week with 6 to 10 cars per train. The trains normally enter Keokuk during the early afternoon of Monday and Thursday and begin their return at noon Tuesday and Friday.

Since the rail traffic would normally be limited to the above traffic, it is recommended that the swing span of the bridge be in the open position as the normal condition. This will permit the uninterrupted flow of river traffic and reduce the expenses for bridge operators. The U. S. Army Corps of Engineers and the U. S. Coast Guard have offered no objection to this procedure. At the present time, when the swing span is in the open position the bridge is over the lock wall of the Keokuk lock and dam. This lock wall consists of two gravity walls, founded on rock, and filled with compacted material. It is recommended that two rest piers be constructed on this lock wall to secure the bridge when in the open position. The U. S. Army Corps of Engineers was contacted and has offered no objection to the construction of two rest piers on the lock wall.

It is reasonable to consider placing the swing span in the open position to allow unrestricted river navigation until notice of the need for closing, for the crossing of a freight train, necessitates dispatch of an operator to close the swing span.

The Bridge Section of the Second District of the U. S. Coast Guard could anticipate no difficulty with navigational requirements if the span were securely held in the open position, clear of the navigational channel. A railroad bridge at Keithsburg, Illinois, 64 miles upstream, is similarly operated, from the open position, on demand.

The Toledo, Peoria and Western Railroad operating to Keokuk passes a 24-hour operator's station at LaHarp about 30 miles from Keokuk and could provide notice of required crossing at 1-1/2 to 4 hours before the train reached the bridge, with a tolerance of one hour in arrival time. A "beeper" station 9 miles away would give more immediate notice. Departures from Keokuk could provide reliable advance notice. Norfolk and Western Railroad could give notice 30 to 40 minutes in advance of their train approach to the structure when the crew changes at Elvaston, Illinois, 8 miles away, if this service remains in operation.

MODJESKI AND MASTERS

The Honorable Charles F. Eppers, Mayor
City of Keokuk

-14-

November 12, 1976

It would appear that the Keokuk Department of Public Works could operate the bridge under a method where operators could be dispatched to close the span for train crossings 12 to 16 times per week. They could also inspect and maintain the operating machinery of the swing span along with a cursory inspection of the railroad deck daily.

Financial Considerations and Costs

In addition to the loss of the highway users' tolls to the Bridge Commission, the loss of \$44,000.00 in taxes to the City of Keokuk and \$38,000.00 to Illinois may be expected. Some consideration could be given by the State of Iowa to provide a like amount of funds to the taxing bodies in Iowa and Illinois.

Operation and maintenance of the railroad bridge at minimum cost to the City of Keokuk would be contingent upon the following:

1. Supervision of operation and maintenance by the Department of Public Works of Keokuk.
2. Operation of the swing span from a normal open position on call from the railroad by a single operator out of the Department of Public Works.
3. Removal of the highway portion of the structure to cut maintenance costs.
4. Minimum regular maintenance in the operation and maintenance budget and special maintenance by contract.

The estimated annual cost might be expected as follows:

a. A swing span operation 2,500 hours per year	\$24,000.00
b. Maintenance of swing span structure and machinery	12,000.00
c. Maintenance of railway deck only	6,000.00
d. Maintenance of piers and superstructure (minimum without repainting or structural repairs)	<u>18,000.00</u>
TOTAL	\$60,000.00

MODJESKI AND MASTERS

The Honorable Charles F. Eppers, Mayor
City of Keokuk

-15-

November 12, 1976

The present average annual revenue from railway and permit sources is \$60,000.00. Since the Norfolk and Western Railroad has made application for abandonment of its service, there may be a further reduction of revenue from the railroad sources. Alternative rail service is available in the Keokuk area by use of the Burlington Northern System or the Toledo, Peoria and Western Railroad. Any use of the Burlington Northern would provide no revenues to operate and maintain the bridge. It is estimated that the abandonment of service by the Norfolk and Western Railroad would amount to a reduction in bridge revenues of approximately \$3,000.00 per year.

It is recommended that the capital cost of removing the highway deck and highway approach spans and the construction of the required rest piers on the lock wall, estimated to be \$200,000.00 be included in the cost of the construction of the new highway bridge. Assuming the above can be accomplished, it is still apparent that the City of Keokuk will not realize sufficient revenues from the railroad traffic to maintain the railroad structure. The estimate for operation and maintenance presented above is only for routine maintenance and does not cover repainting or structural repairs. It is recommended that a reserve fund to cover special maintenance be funded at approximately \$25,000.00 per year, plus sufficient funds to cover the deficiency of operating revenues of approximately \$3,000.00 a year.

Consideration should be given by the City of Keokuk of transferring the operation and maintenance responsibilities to the State to avoid the expense continued operation with greatly reduced revenues.

SUMMARY OF FINDINGS

1. The advantages of the Main Street location would appear to greatly outweigh the advantages of the Timea-Bank Streets location with the exception of the item of traffic congestion within the Central Business District.

2. This traffic congestion disadvantage can be partially relieved by use of a bypass using Exchange Street between Second and Seventh Streets.

3. It would appear to be feasible to perform yearly maintenance and operation of the existing Keokuk Municipal Bridge for railroad traffic, through the use of personnel of the Keokuk Department of Public Works.

4. If continued operation and maintenance of the existing bridge is to be a function of the City of Keokuk, it is recommended that funding assistance be supplied through State funds in order to make up the expected deficit.

MODJESKI AND MASTERS


The Honorable Charles F. Eppers, Mayor
City of Keokuk

-16-

November 12, 1976

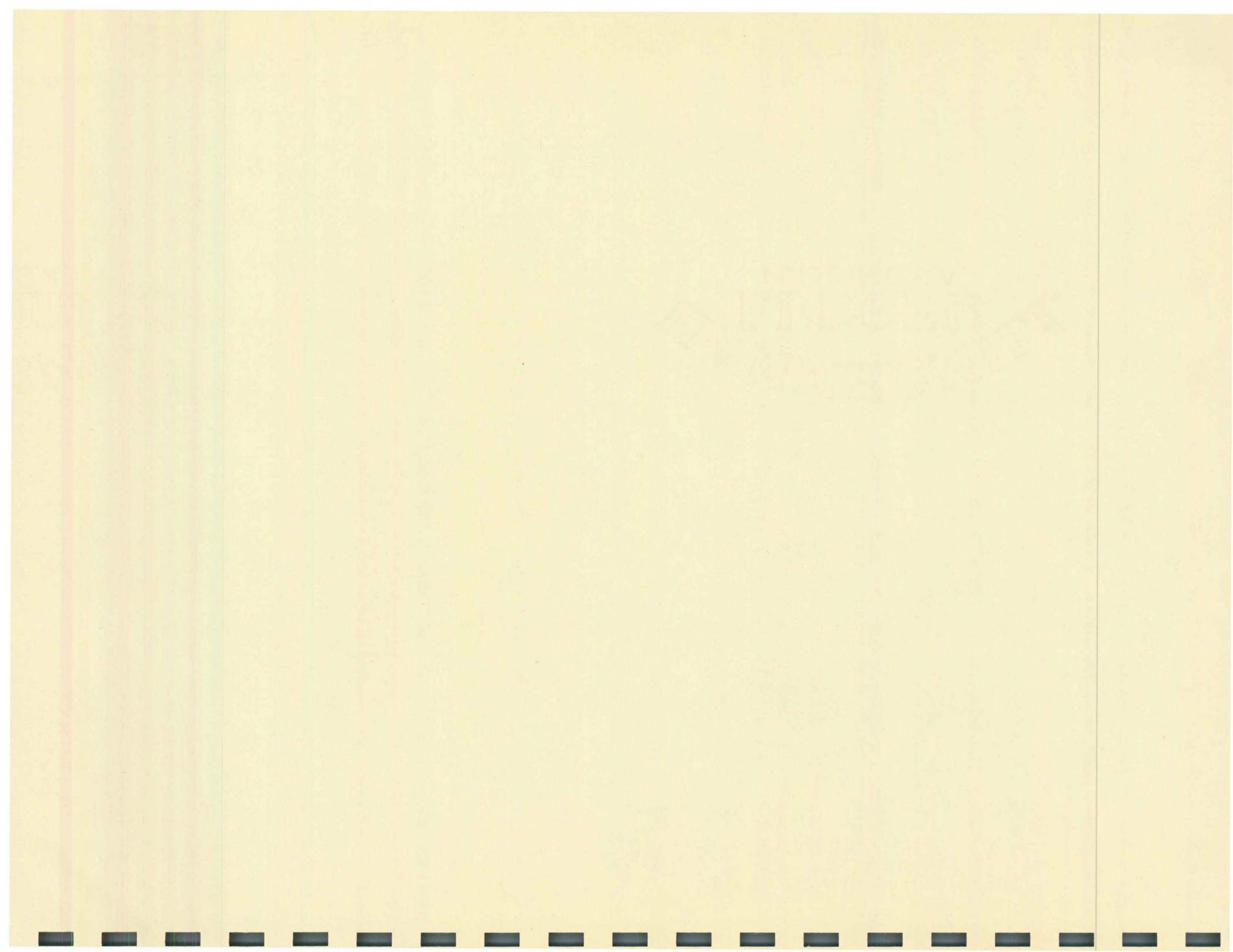
Grateful acknowledgement is extended to you, council members, your staff, members of the Bridge Commission, and personnel of the Iowa Department of Transportation for the excellent cooperation and helpful assistance given us in the development of this report.

Respectfully submitted,


ROBERT E. FELSBURG,
Partner

REF:rsh

encl.
as



APPENDIX

LIST OF EXHIBITS

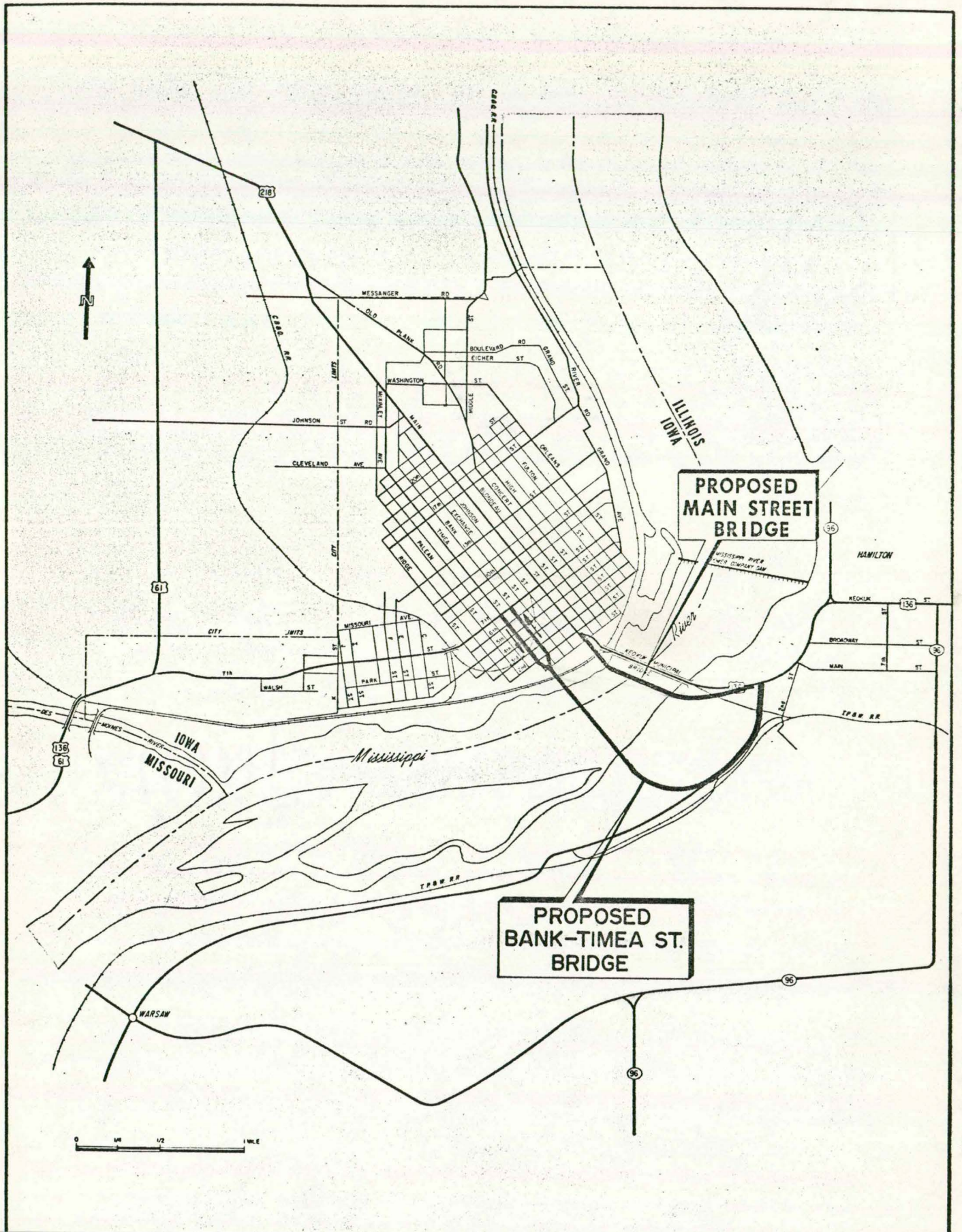
- I. Location Map
- II. Tract Map of the Keokuk Study Area
- III. Schematic Drawing Showing Existing Geometric Conditions, Keokuk CBD
- IV. Traffic Projections
 - A. ADT Volumes - Main Street Alternate
 - B. ADT Volumes - Main Street Alternate with CBD Bypass
 - C. ADT Volumes - Timea-Bank Street Alternate
 - D. DHV Volumes - Main Street Alternate
 - E. DHV Volumes - Main Street Alternate with CBD Bypass
 - F. DHV Volumes - Timea-Bank Street Alternate
- V. Traffic Operation Summary
 - A. Main Street Bridge Location - Existing Geometric Condition
 - B. Main Street Bridge Location - with Feasible Improvements
 - C. Main Street Bridge Location with CBD Bypass
 - D. Timea-Bank Street Bridge Location
- VI. Intersection Capacity Analysis
 - A. Main Street Bridge Location - Existing Geometric Condition
 - 1. 2nd and Main Streets Intersection
 - 2. 3rd and Main Streets Intersection
 - 3. 4th and Main Streets Intersection
 - 4. 5th and Main Streets Intersection
 - 5. 6th and Main Streets Intersection
 - 6. 7th and Main Streets Intersection
 - 7. 7th and Timea Streets Intersection
 - B. Main Street Bridge Location - with Suggested Improvements
 - 1. 3rd and Main Streets Intersection
 - 2. 4th and Main Streets Intersection
 - 3. 5th and Main Streets Intersection
 - 4. 7th and Main Streets Intersection
 - C. Main Street Bridge Location - with CBD Bypass
 - 1. 2nd and Main Streets Intersection
 - 2. 3rd and Main Streets Intersection
 - 3. 4th and Main Streets Intersection
 - 4. 5th and Main Streets Intersection
 - 5. 6th and Main Streets Intersection
 - 6. 7th and Main Streets Intersection
 - 7. 7th and Exchange Streets Intersection

List of Exhibits (cont'd)

D. Timea-Bank Street Bridge Location

1. 2nd and Main Streets Intersection
2. 3rd and Main Streets Intersection
3. 4th and Main Streets Intersection
4. 5th and Main Streets Intersection
5. 6th and Main Streets Intersection
6. 7th and Main Streets Intersection
7. 4th and Bank Streets Intersections
8. 4th and Timea Streets Intersection
9. 7th and Bank Streets Intersection
10. 7th and Timea Streets Intersection

VII. Cost Comparisons



LOCATION MAP

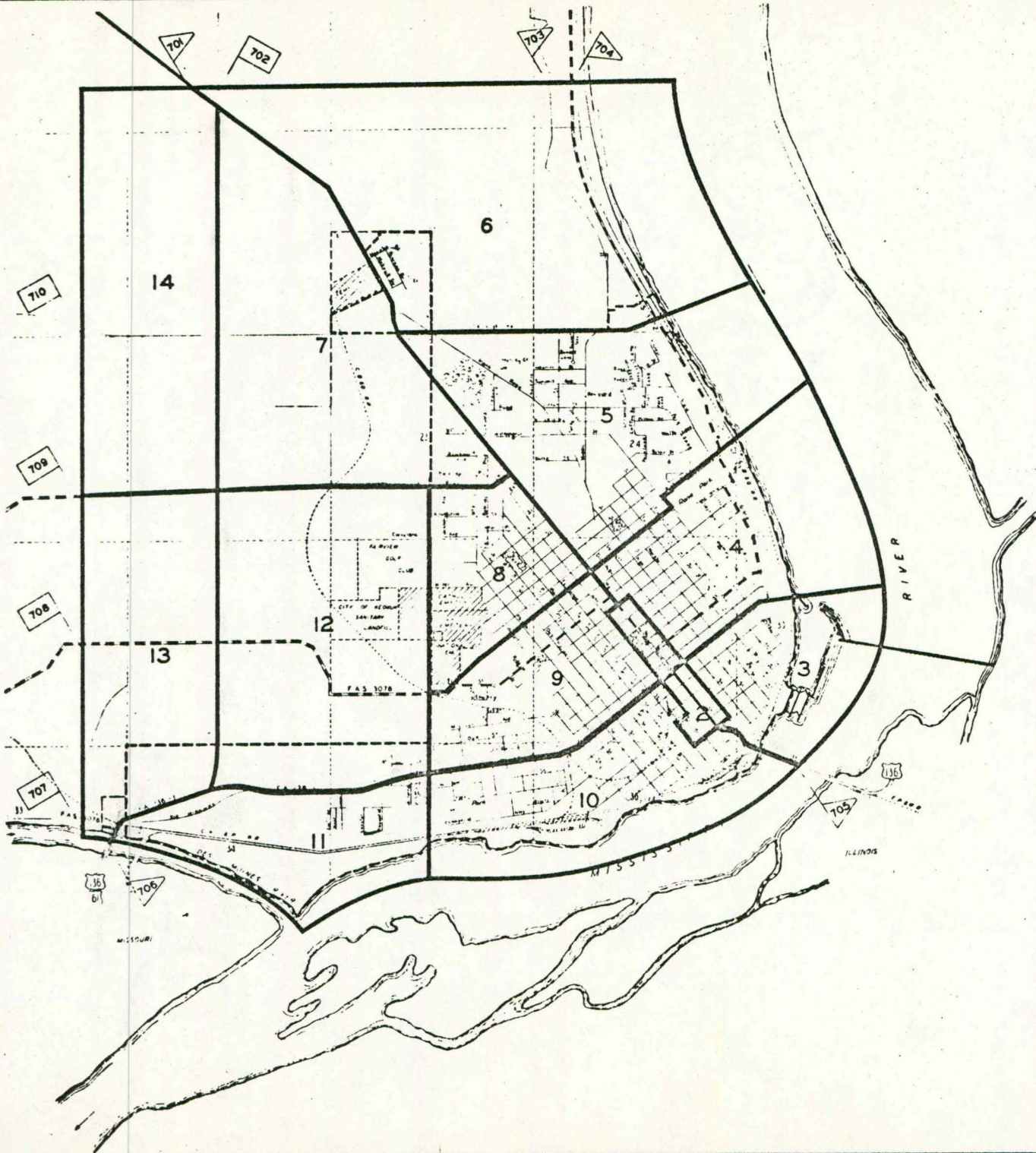


FIGURE
TRACT MAP OF THE
KEOKUK STUDY AREA
JULY 1970



LEGEND

- TRACT NUMBER
- TRACT BOUNDARY LINE
- CODE STATION LOCATION
- INTERVIEW STATION LOCATION

SOURCE KEOKUK, IOWA ORIGIN AND
DESTINATION TRAFFIC REPORT
IOWA DOT APRIL, 1971

EXHIBIT II

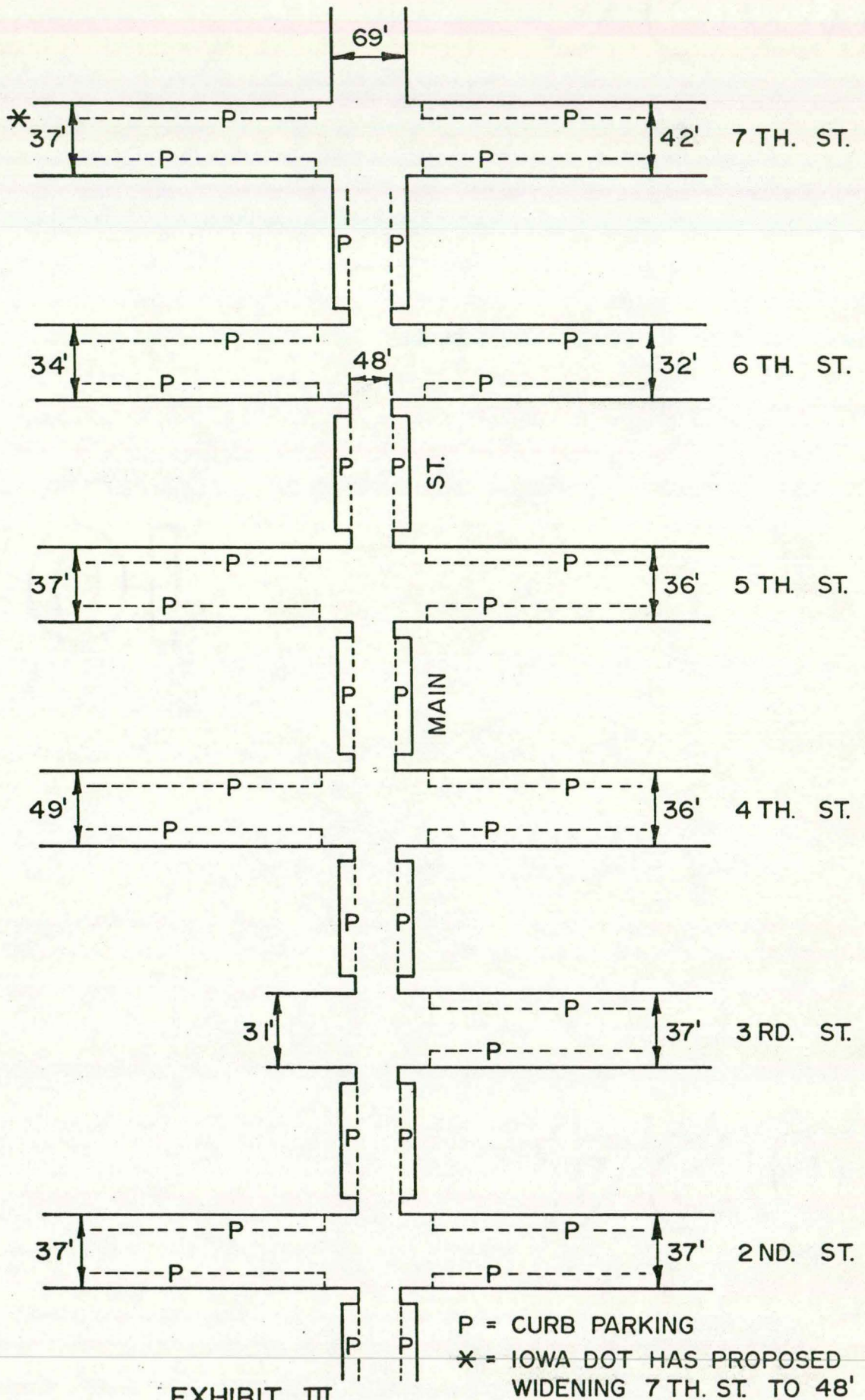


EXHIBIT III

KEOKUK BRIDGE
 LOCATION STUDY

MAIN STREET
 EXISTING GEOMETRIC CONDITIONS

MODJESKI & MASTERS
 HARRISBURG, PA. 17105

MODJESKI AND MASTERS

EXHIBIT IV - TRAFFIC PROJECTIONS

Basic information for the traffic assignment was obtained from the following sources:

1. Keokuk, Iowa - Origin and Destination Traffic Report of July, 1970.
2. 1976 Iowa Department of Transportation Bridge Study.
3. 1975 Comprehensive Plan, Keokuk, Iowa.
4. Howard, Needles, Tammenn and Bergendoff Bridge Study, 1968 and 1974.
5. Field Counts from Iowa Department of Transportation, Second and Main Streets and Seventh and Main Streets taken September, 1976.

I. ADT Traffic Assignment

No information was available indicating future growth for any of the origin and destination tracts or stations, except for Station 705, the bridge. Iowa Department of Transportation reported a 1975 ADT of 6,650 vehicles and has projected an ADT of 13,574 vehicles for the year 2000 on the bridge. This yields an annual growth of 2.9 percent over 25 years.

The 1970 ADT trips between stations and tracts of the O-D Study were factored to 1975 ADT volumes by multiplying by 1.07, the ratio of 1975 ADT bridge traffic to 1970 ADT bridge traffic. The 1975 ADT was obtained from the Iowa Department of Transportation 1976 bridge study. The 1970 ADT was given in the Iowa Department of Transportation O-D study. The year 2000 ADT volumes were obtained by applying the 2.9 percent annual growth factor (multiplier 2.045) to the 1975 ADT's uniformly.

The following assumptions were made in determining the traffic assignment for the alternatives evaluated. The tract and station numbers are the same as were used in the 1970 O-D study (See Exhibit II for tract and station numbers).

Alternate No. 1 - Main Street Bridge Location

A. Main Street traffic bound for the Water Street area will be routed via Second Street, Johnson Street, and/or Bank Street with the predominant trip interchange occurring between Main Street and Second Street southwest.

MODJESKI AND MASTERS

Exhibit IV (Continued)

-2-

B. At Seventh and Main Streets, the trip interchange between Bridge Station 705 and the study area tracts and stations, was assigned as follows:

1. Tracts 7, 11, 12, 13, 14 and Stations 701, 702, 706, 707, 708, 709, and 710 to U. S. 136 (Seventh Street eastbound).

2. Tracts 1, 5, 6, 8, 9 and Station 703 to U. S. 218 (Main Street).

3. Tract 4 and Station 704 to Seventh Street eastbound.

C. Dispersion of CBD bound traffic (Tract 2) was based on gross square feet of parking area in the CBD, as shown below:

1) Keosippi Plaza - 45 percent.

2) Commercial uses west of Main Street between Fourth and Seventh Streets - 20 percent.

3) Commercial uses east of Main Street between Fourth and Seventh Streets - 35 percent.

ADT volumes were available from the O-D study for the principal streets in the CBD; however, no volumes were available for Third or Sixth Streets. Third Street traffic was assumed to be greater than Seventh Street but less than Fourth or Fifth Streets, say 1900 ADT. Sixth Street was assumed to carry about 1,000 ADT.

D. Tract 10 traffic was assigned to Second Street westbound.

E. Tract 3 traffic was assigned to Fourth Street eastbound.

F. This assignment assumes that congestion and delays will be so restrictive on Main Street north of Seventh Street that traffic bound for Tracts 7, and 14 and Stations 701 and 702 will divert to U. S. 136/61 route.

Alternate No. 2 - Timea-Bank Streets Bridge Location

A. Timea and Bank Streets would be operated as a one way pair between Second Street and Seventh Street. North of Seventh Street, both streets would revert to two way operation.

B. The trip interchange between Bridge Station 705 and the study area tracts and stations, was assigned as follows:

1. Tracts 7, 11, 12, 13, 701, 702, 706, 707, 708, 709, and 710 to U. S. 136 (Seventh and Bank Streets Intersection or Seventh and Timea Streets Intersection).

MODJESKI AND MASTERS

Exhibit IV (Continued)

-3-

2. Tracts 1, 4, 5, 6 and Stations 703 and 704 to U. S. 136 east via Seventh Street and Main Street.

3. Tracts 8 and 9 to Timea and Bank Streets.

4. CBD bound traffic (Tract 3 and Tract 2) to Fourth Street.

5. Tract 10 to Second Street.

6. At Main and Seventh Streets, traffic bound for Tracts 4 and Station 704 would remain on Seventh Street. Traffic for Tracts 1, 5, 6, and Station 703 would turn left onto Main Street.

C. This assignment assumes that traffic engineering measures will have been instituted to prohibit traffic bound for Tract 7 and Stations 701 and 702 from using Timea and/or Bank Streets north of Seventh Street.

Alternate No. 3 - Main Street Bridge Location with a CBD Bypass

A. The CBD bypass would consist of Second Street between Main and Exchange Streets and Exchange Street from Second Street to Seventh Street with access to the bridge via Second Street.

B. The trip interchange between Bridge Station 705 and the study area tracts and stations was assigned as follows:

1. Tracts 7, 11, 12, 13, 14 and Stations 701, 702, 706, 707, 708, 709, and 710 to U. S. 136 at Seventh and Exchange Streets intersection.

2. Tracts 8 and 9 to remain on Exchange Street.

3. All other trip interchanges would remain as in Alternate 1, Main Street Bridge Location.

C. This assignment assumes that sufficient traffic, control measures will have been employed to discourage traffic bound for Tract 7 and Stations 701 and 702 from using Exchange Street north of Seventh Street.

See Exhibits IV-A, IV-B, and IV-C for the ADT traffic assignments for the alternatives studied.

II. DHV Traffic Assignment

Design hourly volumes (DHV) were calculated using the ADT traffic assignment as a base. KDT factors were obtained from Iowa Department of

MODJESKI AND MASTERS

Exhibit IV (Continued)

-4-

Transportation 1976 field count at Seventh and Main Streets intersection.
These factors (listed below) were applied at all intersections.

$$K = 10$$

$$D = 50$$

$$T = 4$$

The DHV traffic assignments for the alternatives studied are shown in Exhibits IV-D, IV-E and IV-F.

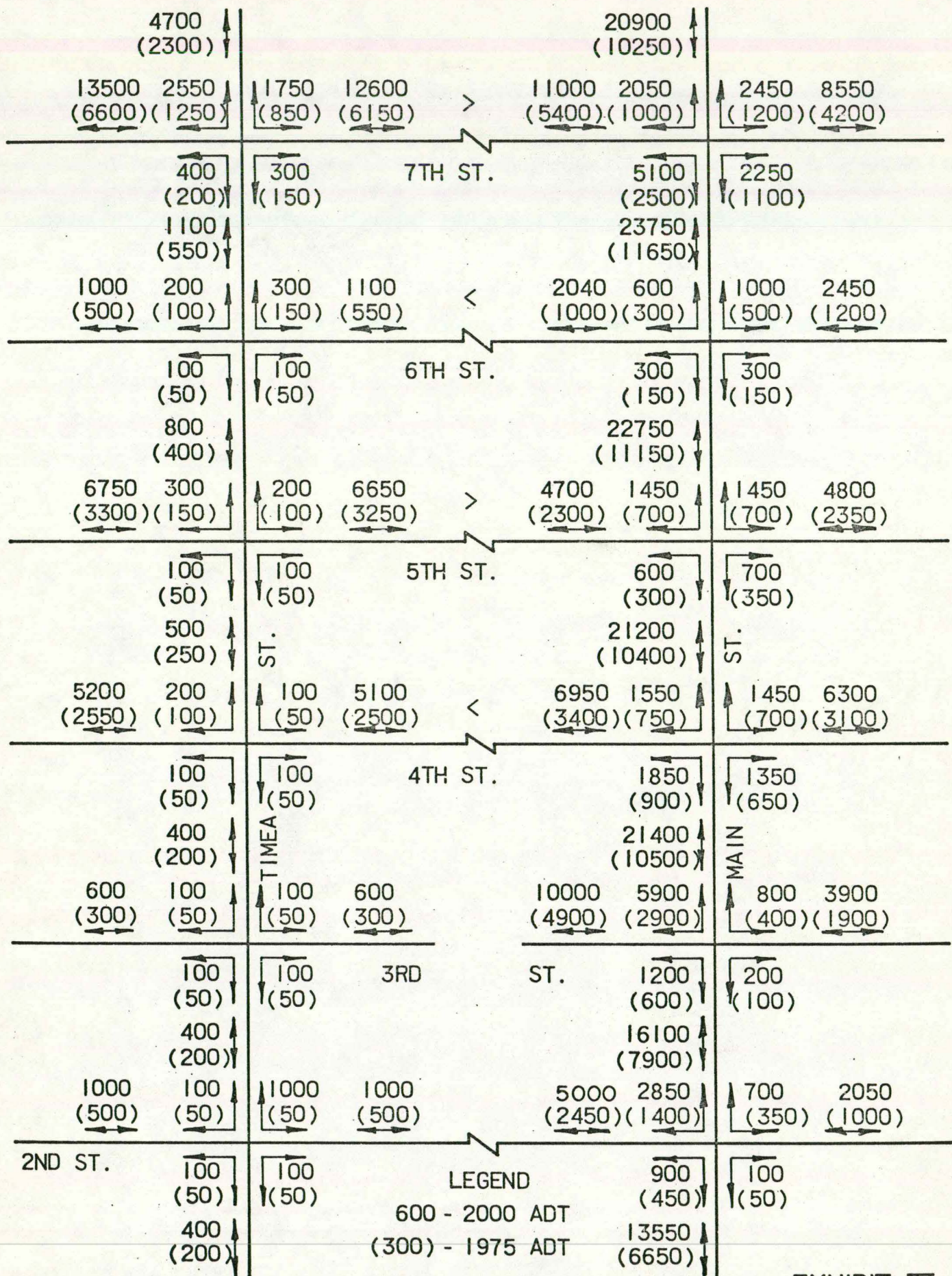


EXHIBIT IV A

KEOKUK BRIDGE
LOCATION STUDY

ADT TRAFFIC VOLUMES
ALTERNATE
MAIN STREET

MODJESKI & MASTERS
HARRISBURG, PA. 17105

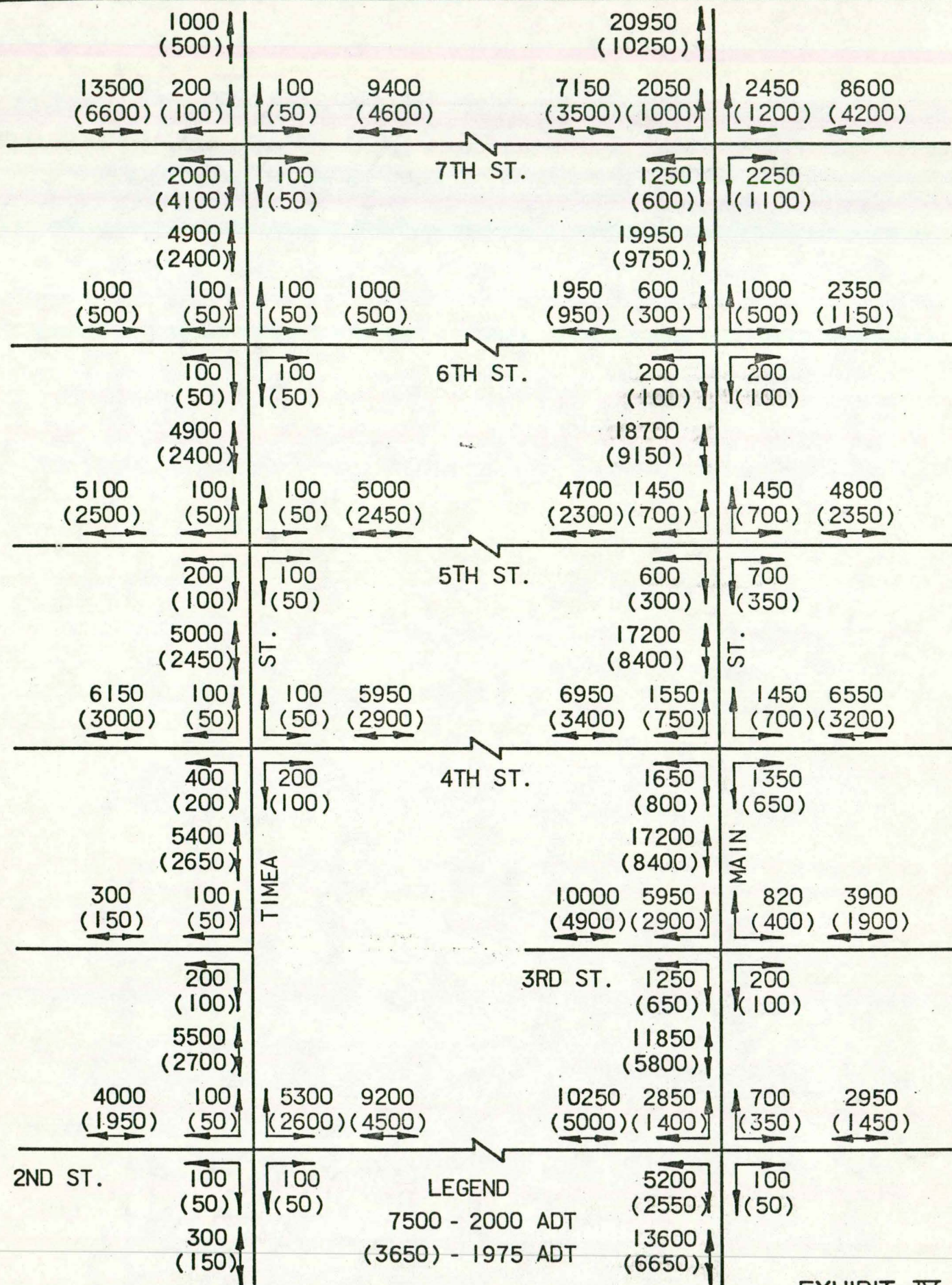


EXHIBIT IV B

KEOKUK BRIDGE
 LOCATION STUDY

ADT TRAFFIC VOLUMES
 ALTERNATE
 MAIN ST. - CBD BYPASS

MODJESKI & MASTERS
 HARRISBURG, PA. 17105

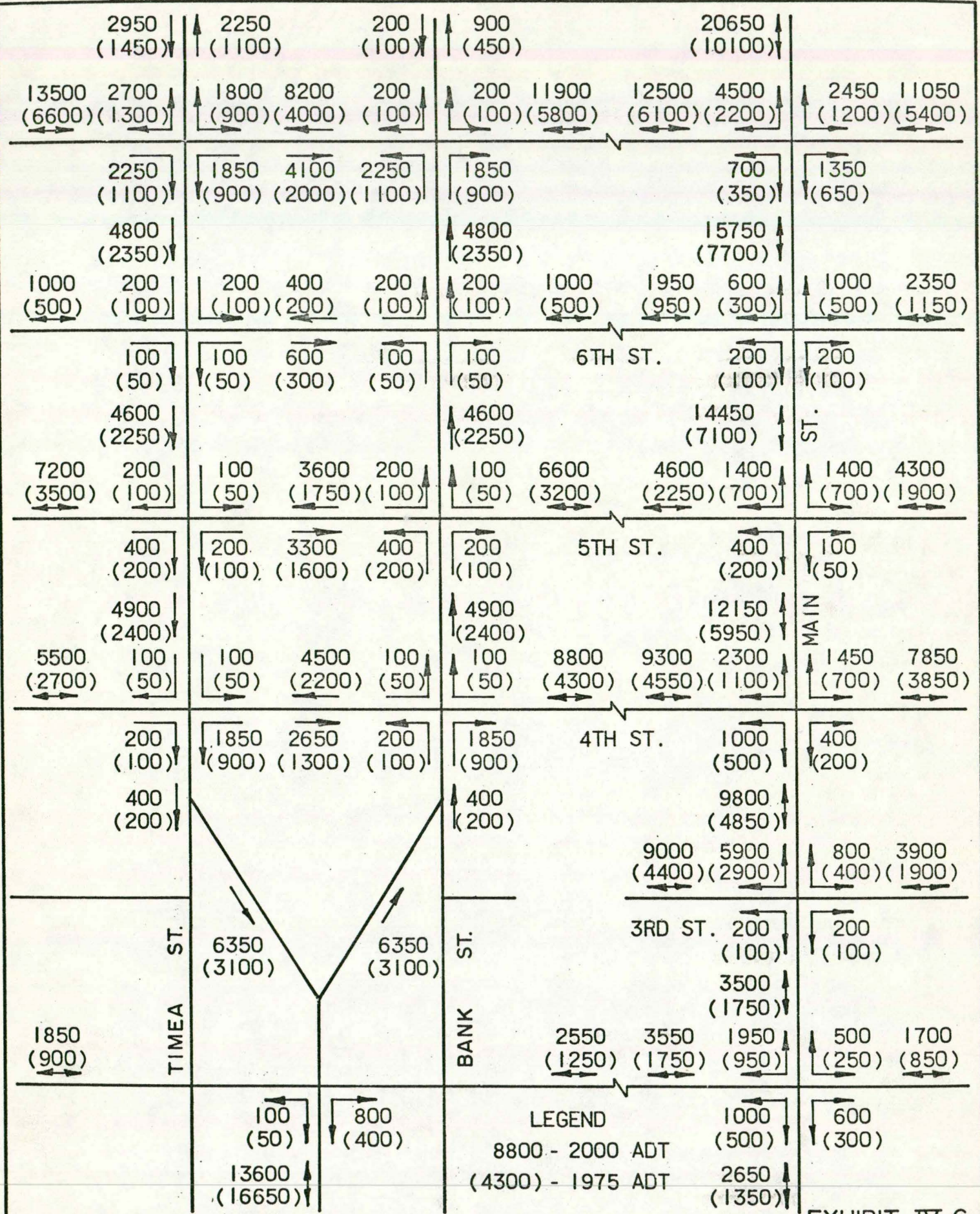


EXHIBIT IV C

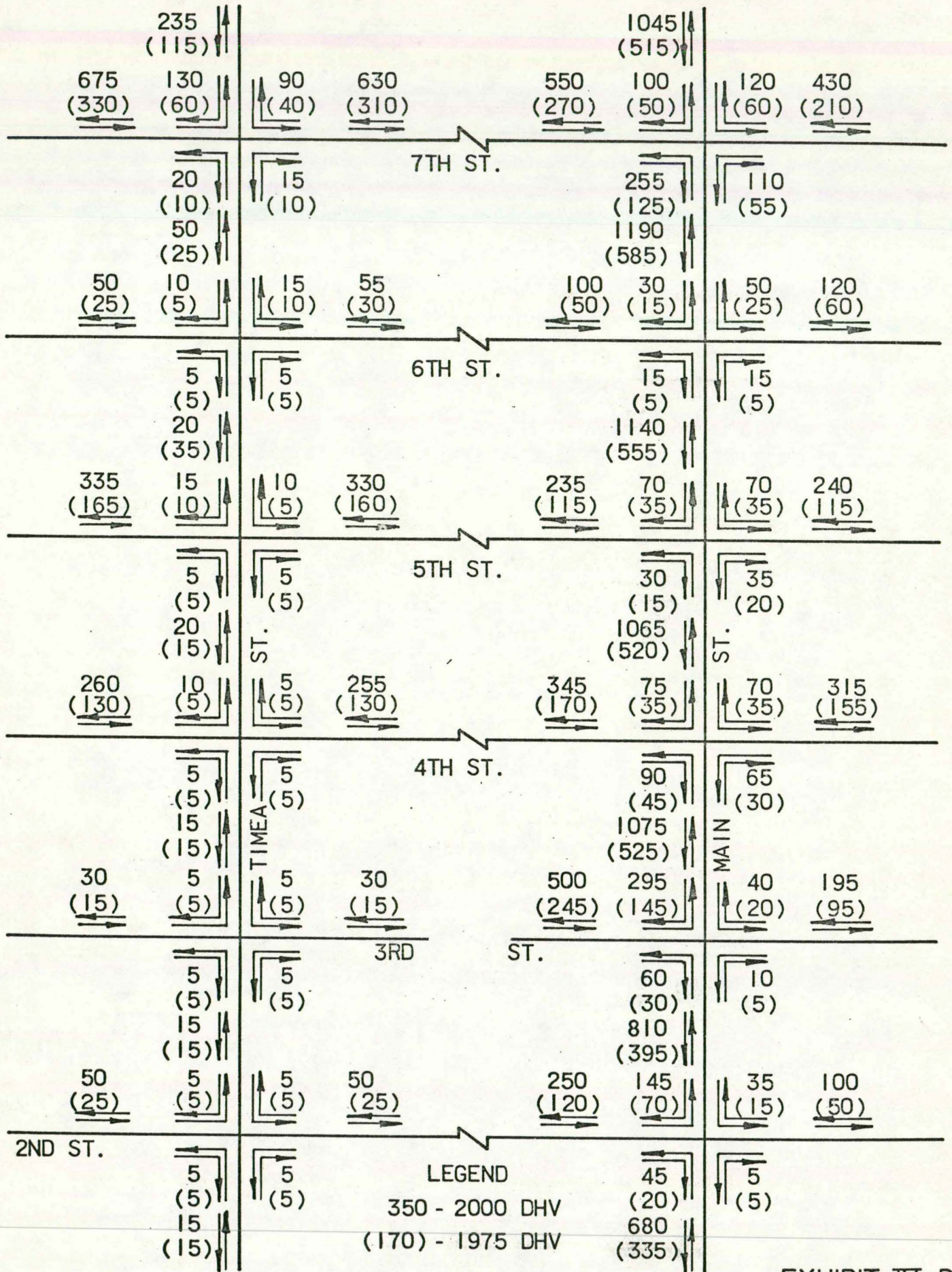


EXHIBIT IV D

KEOKUK BRIDGE
 LOCATION STUDY

DHV TRAFFIC VOLUMES
 ALTERNATE
 MAIN STREET

MODJESKI & MASTERS
 HARRISBURG, PA. 17105

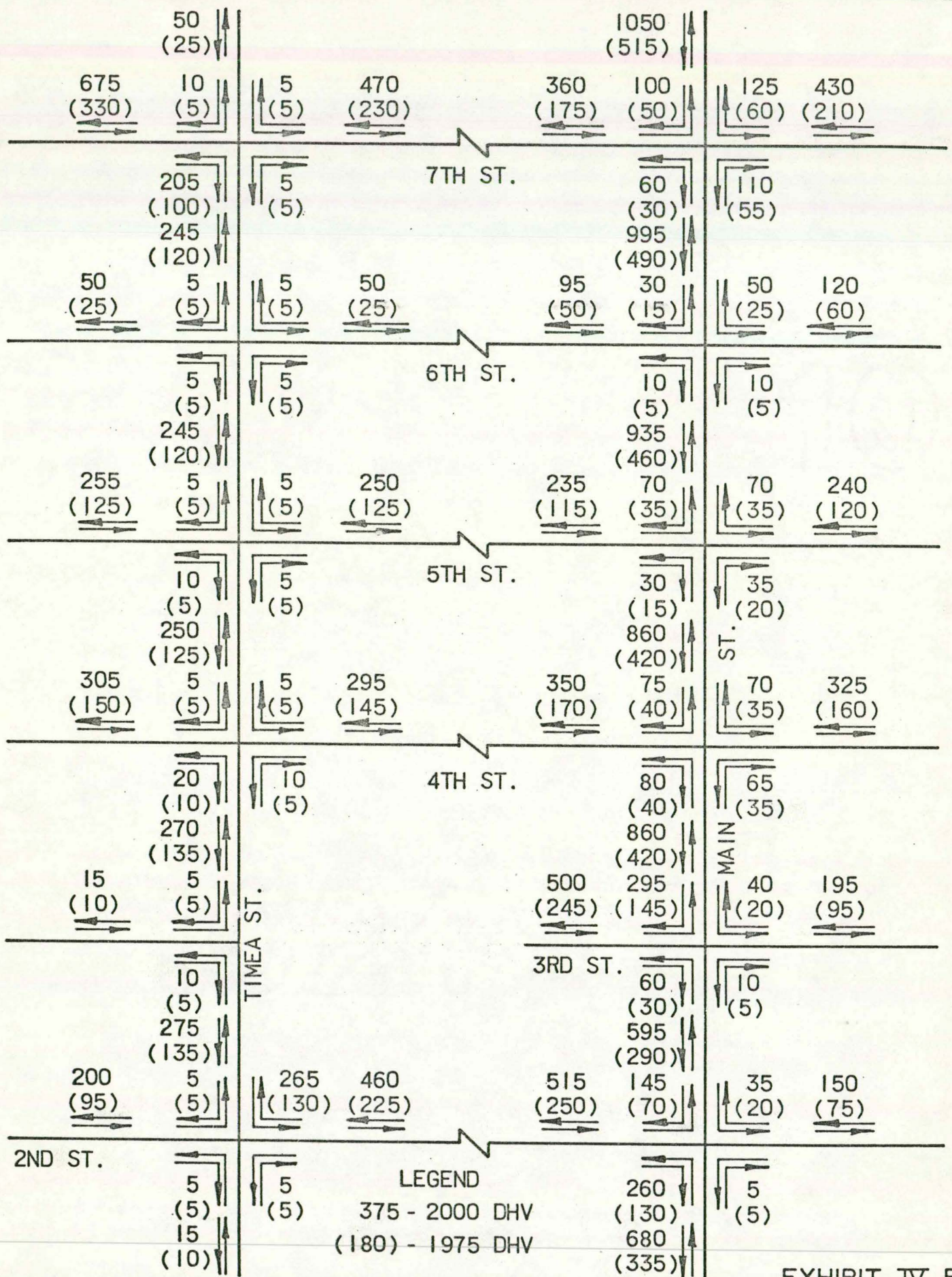
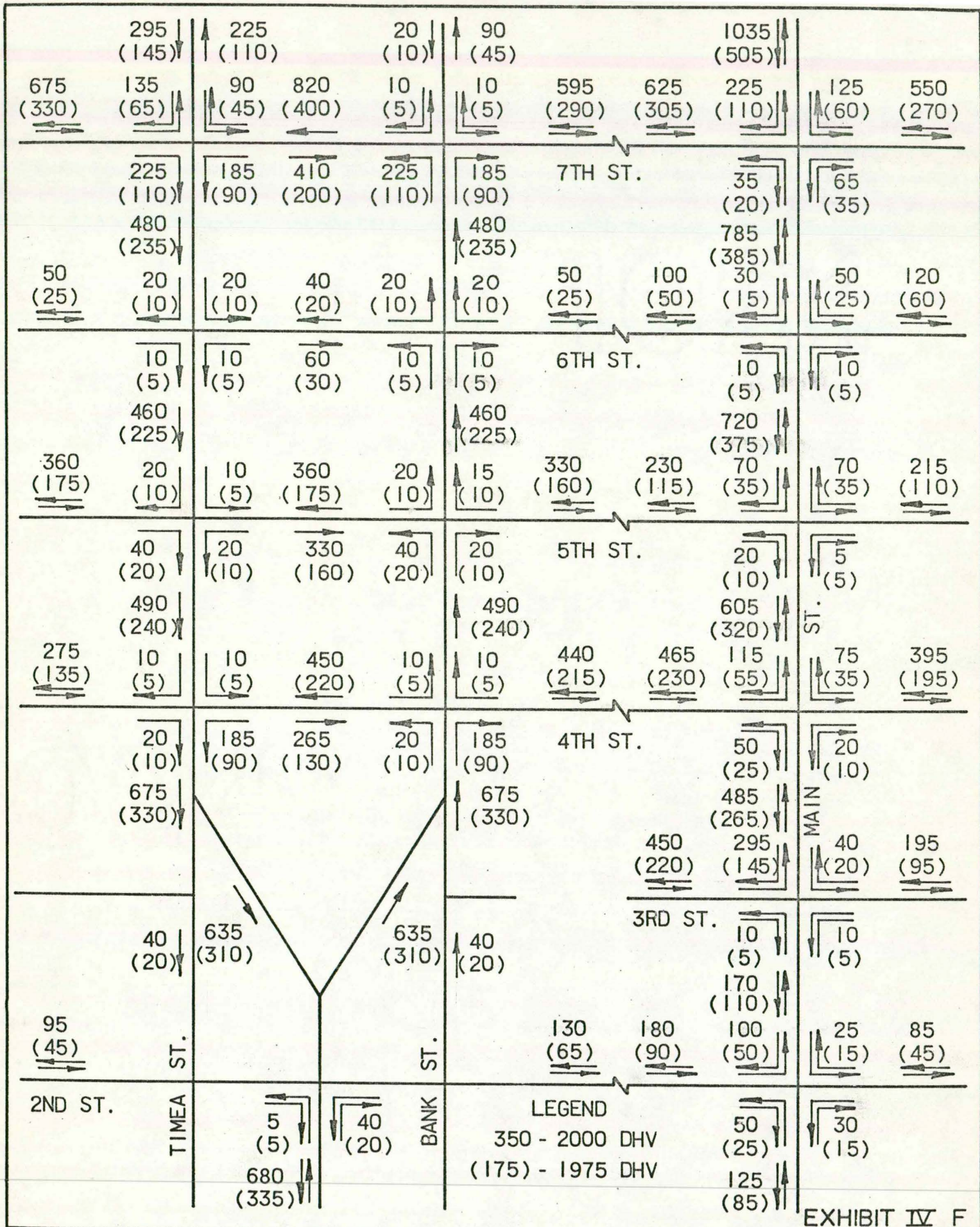


EXHIBIT IV E

KEOKUK BRIDGE
 LOCATION STUDY

DHV TRAFFIC VOLUMES
 ALTERNATE
 MAIN ST. - CBD BYPASS

MODJESKI & MASTERS
 HARRISBURG, PA. 17105



KEOKUK BRIDGE
 LOCATION STUDY

DHV TRAFFIC VOLUMES
 ALTERNATE
 TIMEA - BANK ST.

MODJESKI & MASTERS
 HARRISBURG, PA. 17105

MODJESKI AND MASTERS

EXHIBIT V - TRAFFIC OPERATION SUMMARY

A summary of traffic operations on Main Street in the Keokuk CBD was prepared for each of the alternatives evaluated (See Exhibits V-A, V-B, V-C, and V-D). Existing geometric conditions are shown on Exhibit III. This summary refers to conditions that would be encountered during the peak hour in the design year 2000.

Average delay is a measure of the delay an individual driver may encounter during the peak hours. Total delay is the sum of individual delays to all drivers. It serves as a measure of the relative effectiveness of an alternate.

AVERAGE DELAY (MINS/VEHICLE)				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	.70	.14	.34	.75
3RD. ST.	10.22	.18	.75	10.87
4TH. ST.	.66	.75	.75	.71
5TH. ST.	.75	.75	.70	.39
6TH. ST.	.29	.75	.21	.44
7TH. ST.	1.00	18.80	9.40	1.00
TOTAL	13.62		12.15	

AVERAGE QUEUE LENGTH				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	160	20	85	80
3RD. ST.	1900	35	125	1860
4TH. ST.	190	100	170	75
5TH. ST.	175	75	200	65
6TH. ST.	115	40	90	35
7TH. ST.	210	2575	1965	110

TOTAL DELAY (MIN.)					INTER-SECT. TOTAL
INTER-SECTION	APPROACH				
	12	22	32	42	
2ND ST	7.13	.18	2.95	2.34	12.60
3RD ST	137.59	.45	7.59	67.97	213.60
4TH. ST.	8.89	2.95	10.07	3.08	25.0
5TH. ST.	10.68	2.25	9.36	1.15	23.44
6TH. ST.	4.36	1.12	3.10	.56	9.14
7TH. ST.	17.41	134.63	186.96	9.16	348.16
TOTAL FOR ALL INTERSECTIONS					631.94

% CYCLE FAILURE				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	14.0	0	6.7	20.6
3RD. ST.	50.8	.4	24.7	43.4
4TH. ST.	22.7	20.5	23.5	6.8
5TH. ST.	28.7	18.5	22.7	7.8
6TH. ST.	13.2	6.6	10.8	3.8
7TH. ST.	37.4	57.5	53.2	31.1

V/C RATIO					INTER-SECT. AVG.
INTER-SECTION	APPROACH				
	12	22	32	42	
2ND. ST.	.89	.19	.73	.90	.79
3RD. ST.	1.23	.42	.93	1.24	1.08
4TH. ST.	.91	1.00	.94	.78	.91
5TH. ST.	1.01	1.02	.91	.67	.95
6TH. ST.	.83	.84	.77	.53	.66
7TH. ST.	1.04	1.33	1.22	1.03	1.14
AVERAGE FOR ALL INTERSECTIONS					.94

LEVEL OF SERVICE				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	D	A	A	D
3RD. ST.	F	A	D	F
4TH. ST.	D	F	D	C
5TH. ST.	F	F	D	A
6TH. ST.	D	D	A	A
7TH. ST.	F	F	F	F

EXHIBIT V A

KEOKUK BRIDGE
LOCATION STUDY

TRAFFIC OPERATION SUMMARY
MAIN ST. BRIDGE LOCATION
EXIST. GEOMETRIC CONDITIONS

MODJESKI & MASTERS
HARRISBURG, PA. 17105

AVERAGE DELAY (MINS/VEHICLE)				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	.70	.14	.34	.75
3RD. ST.	1.00	1.00	1.00	1.00
4TH. ST.	.40	.75	.48	.75
5TH. ST.	.27	.75	.19	.75
6TH. ST.	.29	.75	.21	.75
7TH. ST.	.78	1.08	.95	.48
TOTAL	3.44		3.17	

AVERAGE QUEUE LENGTH				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	160	20	85	80
3RD. ST.	165	100	170	100
4TH. ST.	130	50	150	55
5TH. ST.	105	40	80	40
6TH. ST.	115	40	95	40
7TH. ST.	210	75	240	40

TOTAL DELAY (MIN.)					INTER-SECT. TOTAL
INTER-SECTION	APPROACH				
	12	22	32	42	
2ND. ST.	7.13	.18	2.95	2.34	12.60
3RD. ST.	13.00	3.25	13.50	3.41	33.16
4TH. ST.	5.31	2.95	6.53	3.28	18.07
5TH. ST.	3.92	2.25	2.52	2.25	10.94
6TH. ST.	4.36	1.12	3.10	.93	9.51
7TH. ST.	13.07	6.25	16.07	1.72	37.11
TOTAL FOR ALL INTERSECTIONS					121.39

% CYCLE FAILURE				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	14.0	0	6.7	20.6
3RD. ST.	20.8	11.1	23.9	13.2
4TH. ST.	13.1	5.0	13.9	17.8
5TH. ST.	10.5	6.6	7.2	6.6
6TH. ST.	13.2	6.6	10.8	3.8
7TH. ST.	22.0	16.6	23.1	0.9

V/C RATIO					INTER-SECT. AVG.
INTER-SECTION	APPROACH				
	12	22	32	42	
2ND. ST.	.89	.19	.73	.90	.79
3RD. ST.	.95	.87	.95	.96	.93
4TH. ST.	.85	.77	.88	.89	.86
5TH. ST.	.81	.82	.73	.78	.78
6TH. ST.	.83	.84	.77	.74	.80
7TH. ST.	.90	.86	.92	.45	.86
AVERAGE FOR ALL INTERSECTIONS					.84

LEVEL OF SERVICE				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	D	A	A	D
3RD. ST.	E	D	E	D
4TH. ST.	D	C	D	D
5TH. ST.	C	C	A	C
6TH. ST.	D	D	A	A
7TH. ST.	D	D	D	A

EXHIBIT V B

KEOKUK BRIDGE
LOCATION STUDY

TRAFFIC OPERATION SUMMARY
MAIN ST. BRIDGE LOCATION
WITH FEASIBLE IMPROVEMENTS

MODJESKI & MASTERS
HARRISBURG, PA. 17105

AVERAGE DELAY (MINS./VEHICLE)				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	.86	.43	.35	.75
3RD. ST.	.33	.36	.18	.41
4TH. ST.	.56	.30	.58	.75
5TH. ST.	.20	.72	.15	.58
6TH. ST.	.19	.73	.15	.63
7TH. ST.	.37	1.00	.51	.51
TOTAL	2.51		1.92	

AVERAGE QUEUE LENGTH				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	115	55	65	125
3RD. ST.	100	55	55	60
4TH. ST.	140	40	145	80
5TH. ST.	75	50	65	45
6TH. ST.	75	55	65	40
7TH. ST.	110	90	155	70

TOTAL DELAY (MIN.)					INTER-SECT. TOTAL
INTER-SECTION	APPROACH				
	12	22	32	42	
2ND. ST.	10.75	1.11	1.46	3.99	17.31
3RD. ST.	3.60	.90	1.40	1.06	6.96
4TH. ST.	6.04	1.25	6.33	4.78	18.40
5TH. ST.	2.39	2.16	1.68	1.71	7.94
6TH. ST.	2.40	1.10	1.78	0.75	6.03
7TH. ST.	5.13	7.16	8.05	3.10	23.44
TOTAL FOR ALL INTERSECTIONS					80.08

% CYCLE FAILURES				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	12.5	0.5	.3	9.0
3RD. ST.	9.5	3.8	1.4	4.6
4TH. ST.	17.5	1.8	17.5	10.4
5TH. ST.	7.4	6.6	2.2	6.2
6TH. ST.	5.2	6.6	3.6	3.3
7TH. ST.	9.0	15.4	16.4	8.4

V/C RATIO					INTER-SECT. AVG.
INTER-SECTION	APPROACH				
	12	22	32	42	
2ND. ST.	.79	.43	.44	.81	.72
3RD. ST.	.78	.63	.56	.68	.71
4TH. ST.	.87	.56	.87	.88	.83
5TH. ST.	.71	.72	.63	.66	.68
6TH. ST.	.72	.72	.65	.65	.68
7TH. ST.	.78	.86	.86	.68	.75
AVERAGE FOR ALL INTERSECTIONS					.73

LEVEL OF SERVICE				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	C	A	A	C
3RD. ST.	C	A	A	A
4TH. ST.	D	A	D	D
5TH. ST.	A	A	A	A
6TH. ST.	A	A	A	A
7TH. ST.	C	D	D	A

EXHIBIT V C

KEOKUK BRIDGE LOCATION STUDY	TRAFFIC OPERATION SUMMARY MAIN STREET BRIDGE LOCATION WITH CBD BYPASS	MODJESKI & MASTERS HARRISBURG, PA. 17105
---------------------------------	---	---

AVERAGE DELAY (MINS/VEHICLE)				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	.21	.13	.20	.10
3RD. ST.	.51	.10	.21	.28
4TH. ST.	.31	.19	.23	.37
5TH. ST.	.39	.31	.26	.55
6TH. ST.	.17	.49	.14	.43
7TH. ST.	.84	1.00	.29	.73
TOTAL	2.43		1.33	

AVERAGE QUEUE LENGTH				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	25	25	25	25
3RD. ST.	80	30	20	95
4TH. ST.	70	80	50	60
5TH. ST.	105	60	75	85
6TH. ST.	65	45	55	35
7TH. ST.	145	100	155	95

TOTAL DELAY (MIN.)					INTER-SECTION TOTAL
INTER-SECTION	APPROACH				
	12	22	32	42	
2ND. ST.	.44	.14	.32	.10	1.00
3RD. ST.	3.11	.25	.46	1.62	5.44
4TH. ST.	2.36	.97	1.41	2.15	6.89
5TH. ST.	4.79	1.11	2.66	2.12	10.68
6TH. ST.	1.74	.77	1.32	.57	4.40
7TH. ST.	14.47	8.53	12.65	7.67	43.32
TOTAL FOR ALL INTERSECTIONS					71.73

% CYCLE FAILURES				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	0	0	0	0
3RD. ST.	8.7	0	0	11.7
4TH. ST.	3.9	.5	1.3	7.5
5TH. ST.	8.4	1.1	1.4	9.4
6TH. ST.	2.8	7.4	1.7	4.4
7TH. ST.	21.7	22.1	18.0	5.3

V/C RATIO					INTER-SECTION AVG.
INTER-SECTION	APPROACH				
	12	22	32	42	
2ND. ST.	.26	.26	.22	.15	.21
3RD. ST.	.75	.27	.25	.76	.62
4TH. ST.	.68	.51	.54	.69	.61
5TH. ST.	.75	.55	.58	.76	.67
6TH. ST.	.63	.63	.55	.56	.59
7TH. ST.	.80	.95	.95	.77	.80
AVERAGE FOR ALL INTERSECTIONS					.65

LEVEL OF SERVICE				
INTER-SECTION	APPROACH			
	12	22	32	42
2ND. ST.	A	A	A	A
3RD. ST.	A	A	A	C
4TH. ST.	A	A	A	A
5TH. ST.	A	A	A	C
6TH. ST.	A	A	A	A
7TH. ST.	C	D	D	C

EXHIBIT V D

KEOKUK BRIDGE
LOCATION STUDY

TRAFFIC OPERATION SUMMARY
TIMEA-BANK STREET
BRIDGE LOCATION

MODJESKI & MASTERS
HARRISBURG, PA. 17105

MODJESKI AND MASTERS

EXHIBIT VI - INTERSECTION CAPACITY ANALYSIS

Intersection capacity analysis was performed for all intersections on Main Street from Second Street through Seventh Street and for those intersections for which signalization would be required prior to the end of the design period. Since short time volume counts were not available to enable calculation of a peak hour factor (PHF), a PHF = 0.85 was selected as typical of a small urban area such as Keokuk. Main Street intersections were analyzed under "CBD" area conditions while all other intersections were assumed to operate under "Fringe" area conditions. Service Level C was chosen as design service level for all intersections.

The results of the intersection capacity analysis for the alternatives studied follow. See Table I below for explanation of the "Chart Code" used for analysis.

TABLE I

BASE CONDITION SELECTION CHART

<u>Chart Code</u>	<u>Street Type</u>	<u>Parking</u>	<u>Area</u>
1	Two Way	No	Central Business District
2	"	No	Fringe
3	"	No	Outlying Business District
4	"	No	Residential
5	"	Yes	Central Business District
6	"	Yes	Fringe
7	"	Yes	Outlying Business District
8	"	Yes	Residential
9	One Way	No	Central Business District
10	"	No	Fringe
11	"	No	Outlying Business District
12	"	No	Residential
13	"	One Side	Central Business District
14	"	"	Fringe
15	"	"	Outlying Business District
16	"	"	Residential
17	"	Both Sides	Central Business District
18	"	"	Fringe
19	"	"	Outlying Business District
20	"	"	Fringe
21	Two Way	No	Rural
22	Separate Turning Lanes - No Separate Signal		
23	Separate Turning Lanes - With Separate Signal		

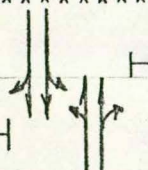
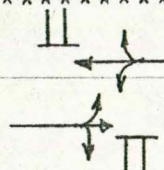
EOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND SECOND ST INTERSECTION
 MAIN ST ALTERNATE MADE BY GAM 10-19-76

BASIC CONDITIONS	CODE	TRAFFIC MOVEMENT	2000 DHV TRAFFIC
CYCLE LENGTH = 45 SECS	12	MAIN ST SB	*****
METRO POPULATION = 75000.22	22	SECOND ST WB	* N 35 *
PEAK HOUR FACTOR = 0.85	32	MAIN ST NB	* 60 *
BASE YEAR = 1975	42	SECOND ST EB	* 5 *
DESIGN YEAR = 2000	43	SECOND ST EB LT	* W ***** E *
AREA = CBD			* 145 630 35 *
			* 145 60 45 630 5 *
			* 60 45 S *

INPUT DATA	DESIGN FACTORS	TURNS	WIDTH	N TURN CHART	INTERSECTION SKETCH
MOVE CODE	K D T LB DSL DHV	R L	APPR EXIT	L ANG CODE	*****
12	10. 50. 4. 0. C 810.	19. 4.	35. 35.	2 0. 5	* P P P 24' P *
22	18. 50. 3. 0. C 100.	35. 5.	25. 25.	1 0. 5	* 2nd st. *
32	10. 50. 4. 0. C 680.	1. 7.	35. 35.	2 0. 5	* P P P 24' P *
42	12. 50. 3. 0. C 250.	18. 38.	12. 12.	1 0. 1	* 37' 12' 12' 37' *

OUTPUT DATA	A/C	G/C RATIO	SERVICE CAPACITY	V/C	SERVICE YEAR	DSL	ANNUAL
PHASE MOVE CODE	RATIO	REQD USED EXIT	VOLUME	RATIO	LEVEL	EXCEEDED	GROWTH
A 12	0.07	0.48 0.44 0.34	754. 912.	0.89	D	1998	2.914
A 32	0.07	0.39 0.44 0.34	766. 927.	0.73	A	2004	2.872
B 22	0.07	0.09 0.42 0.04	469. 534.	0.19	A	2056	2.811
B 42	0.07	0.46 0.42 0.09	233. 279.	0.90	D	1998	2.979

V/C RATIO = 0.793 (OVERALL INTERSECTION)

* PHASE A *	* PHASE B *
* ***** *	* ***** *
*  *	*  *
* ***** *	* ***** *

* G/C = 0.44 * * G/C = 0.42 *

* G = 20. * * A = 3. * * G = 19. * * A = 3. *

EOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND SECOND ST INTERSECTION
 MAIN ST ALTERNATE MADE BY GAM 10-19-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.70	7.13	0.00	0.00	0.8872
A	32	0.34	2.95	0.00	0.00	0.7327
B	22	0.14	0.18	0.00	0.00	0.1869
B	42	0.75	2.34	0.00	0.00	0.8934

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	3.4	87.2	2.8	70.5	6.3	157.8
A	32	1.0	25.1	2.3	59.2	3.3	84.3
B	22	0.0	0.5	0.7	17.9	0.7	18.5
B	42	1.3	33.1	1.7	44.9	3.1	78.1

CYCLE FAILURE ANALYSIS

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES
A	12	13.99
A	32	6.74
B	22	0.00
B	42	20.61

TURNING LANE CHECK

PHASE	MOVE CODE	QUEUE MAX LENGTH	TAPER LENGTH	TOTAL LENGTH
-------	-----------	------------------	--------------	--------------

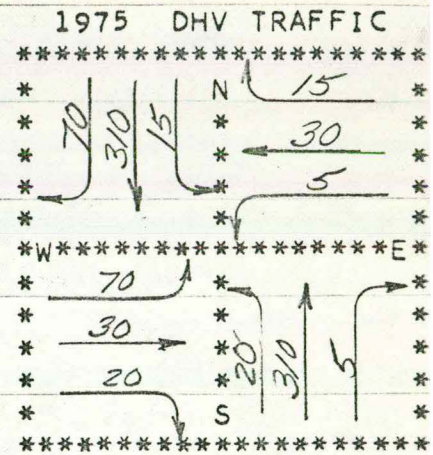
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	48.0	6.0	4.0	7.0	10.5	17.5	22.9	YES
A	4	48.0	6.0	4.0	7.0	10.5	17.5	22.9	YES
B	1	24.0	6.0	4.0	7.0	4.5	11.5	22.0	YES
B	3	40.0	6.0	4.0	7.0	8.5	15.5	22.0	YES

END OF PROGRAM

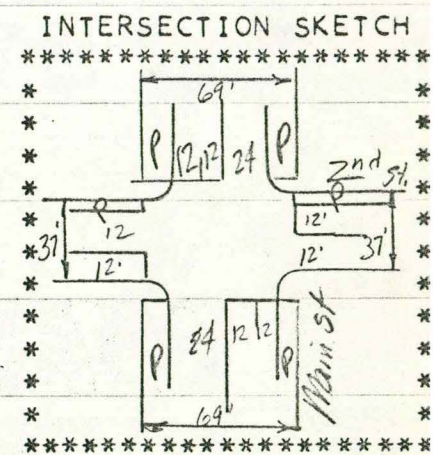
KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND SECOND ST INTERSECTION
 MAIN ST ALTERNATE MADE BY GAM 10-19-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 SECOND ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 SECOND ST EB
 DESIGN YEAR = 1975 43 SECOND ST EB LT
 AREA = CBD



INPUT DATA

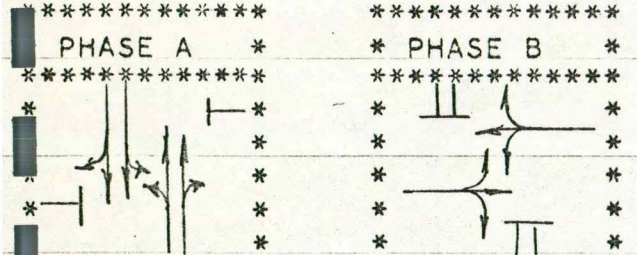
MOVE	DESIGN FACTORS	TURNS	WIDTH	N TURN	CHART	INTERSECTION SKETCH
CODE	K D T LB DSL DHV	R L	APPR EXIT	L ANG	CODE	
12	10. 50. 4. 0. C 395.	19. 4.	35. 35.	2 0.	5	
22	18. 50. 3. 0. C 50.	35. 5.	25. 25.	1 0.	5	
32	10. 50. 4. 0. C 335.	1. 7.	35. 35.	2 0.	5	
42	12. 50. 3. 0. C 120.	18. 33.	12. 12.	1 0.	1	



OUTPUT DATA

PHASE	MOVE	A/C	G/C RATIO	SERVICE CAPACITY	V/C	SERVICE YEAR	DSL	ANNUAL
	CODE	RATIO	REQD USED EXIT	VOLUME	RATIO	LEVEL	EXCEEDED	GROWTH
A	12	0.07	0.23 0.45 0.16	760. 920.	0.43	A	1975	0.000
A	32	0.07	0.19 0.45 0.17	772. 935.	0.36	A	1975	0.000
B	22	0.07	0.05 0.42 0.02	465. 530.	0.09	A	1975	0.000
B	42	0.07	0.22 0.42 0.05	231. 277.	0.43	A	1975	0.000

V/C RATIO = 0.384 (OVERALL INTERSECTION)



* G/C = 0.45 * * G/C = 0.42 *
 * G = 20. * A = 3. * G = 19. * A = 3. *

LEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND SECOND ST INTERSECTION
 MAIN ST ALTERNATE MADE BY GAM 10-19-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.19	0.94	0.00	0.00	0.4293
A	32	0.17	0.72	0.00	0.00	0.3582
B	22	0.13	0.08	0.00	0.00	0.0942
B	42	0.23	0.35	0.00	0.00	0.4323

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	0.1	4.0	1.3	34.2	1.5	38.2
A	32	0.0	2.5	1.1	29.0	1.2	31.5
B	22	0.0	0.1	0.3	9.0	0.3	9.1
B	42	0.1	4.1	0.8	21.7	1.0	25.8

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE STORAGE	TAPER	TOTAL
					MAX LENGTH	LENGTH	LENGTH
A	12	0.39					
A	32	0.14					
B	22	0.00					
B	42	1.85					

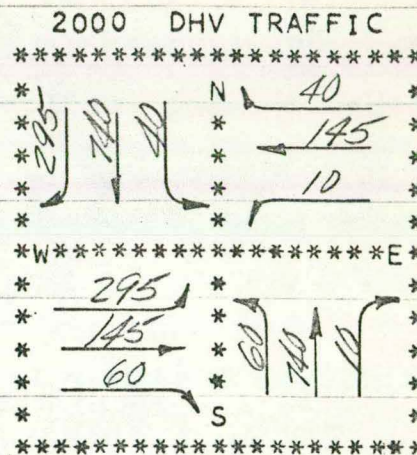
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	48.0	6.0	4.0	7.0	10.5	17.5	23.0	YES
A	4	48.0	6.0	4.0	7.0	10.5	17.5	23.0	YES
B	1	24.0	6.0	4.0	7.0	4.5	11.5	21.9	YES
B	3	40.0	6.0	4.0	7.0	8.5	15.5	21.9	YES

END OF PROGRAM

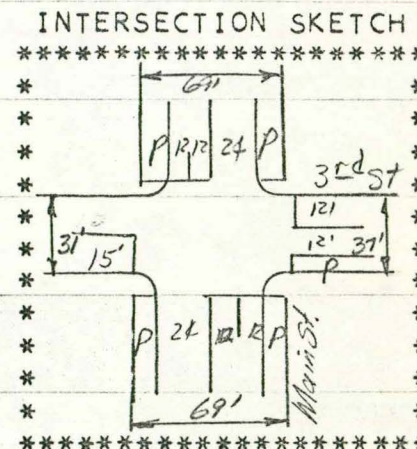
KOOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND THIRD ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 3RD ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 3RD ST EB (SHOPPING CENTER)
 DESIGN YEAR = 2000 43 3RD ST EB LT TURN
 AREA = CBD



INPUT DATA

MOVE CODE	K	D	T	LB	DSL	DHV	TURN R	TURN L	WIDTH APPR	WIDTH EXIT	N	TURN CHART L	TURN CHART ANG	TURN CHART CODE
12	10.	50.	4.	0.	C	1075.	28.	4.	35.	35.	2	0.	5	
22	10.	50.	4.	0.	C	195.	21.	0.	12.	15.	1	0.	1	
32	10.	50.	4.	0.	C	810.	7.	5.	35.	35.	2	0.	5	
42	10.	50.	4.	0.	C	500.	12.	59.	15.	12.	1	0.	1	



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C REQD	RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	12	0.07	0.62	0.42	0.39	721.	873.	1.23	F	1986		2.908
A	32	0.07	0.47	0.42	0.38	723.	875.	0.93	D	1996		2.914
B	22	0.07	0.23	0.45	0.10	387.	465.	0.42	A	2024		2.918
B	42	0.07	0.67	0.45	0.13	335.	403.	1.24	F	1986		2.894

V/C RATIO = 1.076 (OVERALL INTERSECTION)

PHASE A * PHASE B *

* G/C = 0.42 * * G/C = 0.45 * *

* G = 19. * A = 3. * G = 20. * A = 3. *

LEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND THIRD ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	10.22	137.39	155.29	110.19	1.2309
A	32	0.75	7.59	0.00	0.00	0.9247
B	22	0.18	0.45	0.00	0.00	0.4191
B	42	10.87	67.97	160.40	113.81	1.2404

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	72.8	1820.8	3.1	79.7	76.0	1900.5
A	32	2.1	52.6	2.9	73.9	5.0	126.5
B	22	0.1	3.7	1.3	33.4	1.4	37.2
B	42	71.6	1792.6	2.7	69.1	74.4	1861.7

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE STORAGE	TAPER	TOTAL
					MAX LENGTH	LENGTH	LENGTH
A	12	50.75					
A	32	24.70					
B	22	0.36					
B	42	43.37					

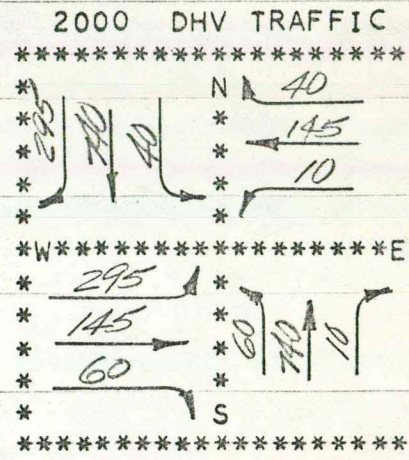
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	29.0	7.5	4.0	7.0	5.3	12.3	21.7	YES
A	4	30.0	7.5	4.0	7.0	5.6	12.6	21.7	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	23.2	YES
B	3	48.0	6.0	4.0	7.0	10.5	17.5	23.2	YES

END OF PROGRAM

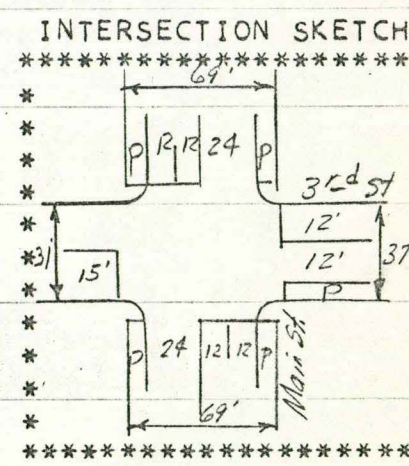
KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND THIRD ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 3RD ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 3RD ST EB (SHOPPING CENTER)
 DESIGN YEAR = 2000 43 3RD ST EB LT TURN
 AREA = CBD



INPUT DATA

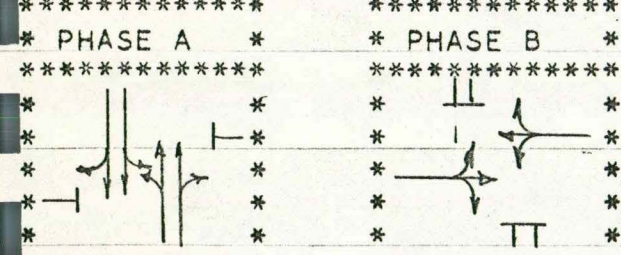
MOVE CODE	K	D	T	LB	DSL	DHV	R	L	WIDTH APPR	WIDTH EXIT	N TURN L	TURN CHART ANG	CODE
12	10	50	4	0	E	1075	28	4	35	35	2	0	5
22	10	50	4	0	E	195	21	0	12	15	1	0	1
32	10	50	4	0	E	810	7	5	35	35	2	0	5
42	10	50	4	0	E	500	12	59	15	12	1	0	1



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C RATIO REQD	G/C RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	12	0.07	0.51	0.41	0.33	869	869	1.24	F	1993		2.908
A	32	0.07	0.38	0.41	0.32	872	872	0.93	D	2003		2.914
B	22	0.07	0.19	0.45	0.09	467	467	0.42	A	2030		2.918
B	42	0.07	0.56	0.45	0.10	404	404	1.24	F	1993		2.894

V/C RATIO = 1.078 (OVERALL INTERSECTION)



* G/C = 0.41 * * G/C = 0.45 *
 * G = 19. * * A = 3. * * G = 20. * * A = 3. *

KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND THIRD ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	10.64	143.08	158.19	112.24	1.2363
A	32	0.75	7.59	0.00	0.00	0.9287
B	22	0.18	0.44	0.00	0.00	0.4175
B	42	10.48	65.53	157.75	111.93	1.2355

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	75.5	1889.4	3.1	79.6	78.7	1969.1
A	32	2.0	52.3	2.9	74.1	5.0	126.5
B	22	0.1	3.7	1.3	33.3	1.4	37.0
B	42	69.3	1733.8	2.7	69.2	72.1	1803.0

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE MAX LENGTH	STORAGE TAPER LENGTH	TOTAL LENGTH
A	12	50.75					
A	32	24.70					
B	22	0.36					
B	42	43.37					

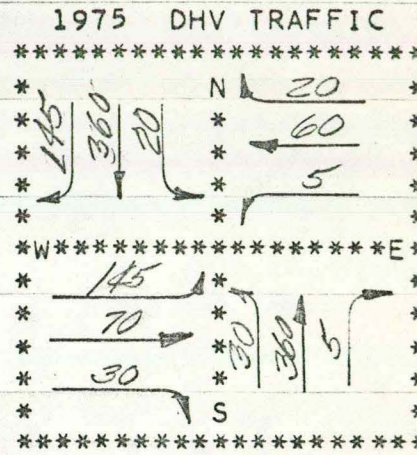
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	29.0	7.5	4.0	7.0	5.3	12.3	21.6	YES
A	4	30.0	7.5	4.0	7.0	5.6	12.6	21.6	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	23.3	YES
B	3	48.0	6.0	4.0	7.0	10.5	17.5	23.3	YES

END OF PROGRAM

KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND THIRD ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 32 3RD ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 3RD ST EB (SHOPPING CENTER)
 DESIGN YEAR = 1975 43 3RD ST EB LT TURN
 AREA = CBD



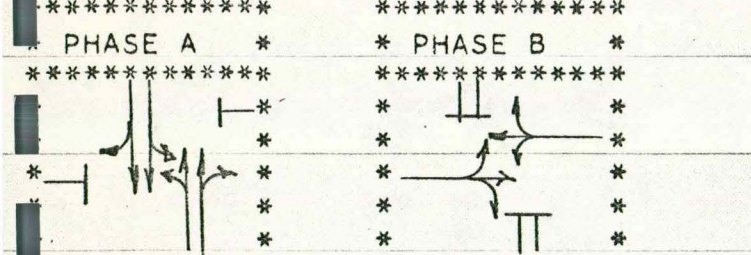
INPUT DATA

MOVE CODE	K	D	T	LB	DSL	DHV	TURN R	L	WIDTH APPR	EXIT	N TURN L	CHART ANG	INTERSECTION SKETCH
12	10	50	4	0	C	525	28	4	35	35	2	0	5
22	10	50	4	0	C	95	21	0	12	15	1	0	1
32	10	50	4	0	C	395	7	5	35	35	2	0	5
42	10	50	4	0	C	245	12	59	15	12	1	0	1

OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C RATIO REQD	G/C RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	12	0.07	0.30	0.41	0.19	720	871	0.60	A	1975	0.000	
A	32	0.07	0.23	0.41	0.19	722	874	0.45	A	1975	0.000	
B	22	0.07	0.11	0.45	0.05	388	465	0.20	A	1975	0.000	
B	42	0.07	0.33	0.45	0.06	336	403	0.61	A	1975	0.000	

V/C RATIO = 0.526 (OVERALL INTERSECTION)



* G/C = 0.41 * * G/C = 0.45 * *

* G = 19 * * A = 3 * * G = 20 * * A = 3 * *

LEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND THIRD ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.27	1.80	0.00	0.00	0.6022
A	32	0.21	1.05	0.00	0.00	0.4517
B	22	0.14	0.16	0.00	0.00	0.2038
B	42	0.26	0.82	0.00	0.00	0.6068

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	0.4	11.3	1.9	48.0	2.3	59.4
A	32	0.1	4.6	1.4	36.1	1.6	40.7
B	22	0.0	0.6	0.6	16.2	0.6	16.9
B	42	0.4	11.7	1.6	41.9	2.1	53.6

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE MAX LENGTH	STORAGE TAPER LENGTH	TOTAL LENGTH
A	12	4.97					
A	32	1.33					
B	22	0.00					
B	42	3.67					

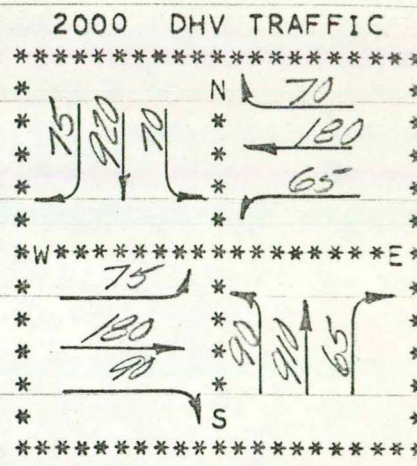
EDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	29.0	7.5	4.0	7.0	5.3	12.3	21.6	YES
A	4	30.0	7.5	4.0	7.0	5.6	12.6	21.6	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	23.3	YES
B	3	48.0	6.0	4.0	7.0	10.5	17.5	23.3	YES

END OF PROGRAM

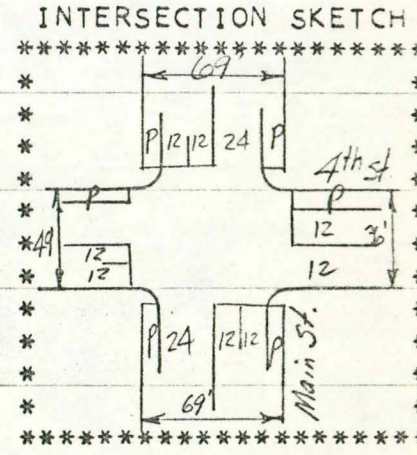
KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 4TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 4TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 4TH ST EB
 DESIGN YEAR = 2000
 AREA = CBD



INPUT DATA

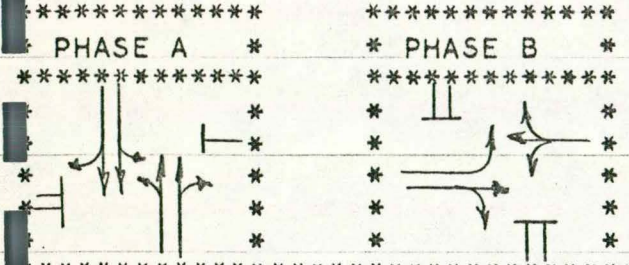
MOVE	DESIGN FACTORS	TURNS	WIDTH	N TURN	CHART
CODE	K D T LB DSL DHV	R L APPR EXIT L ANG CODE			
12	10. 50. 4. 0. C 1065.	8. 7.	35. 35.	2 0.	5
22	10. 50. 4. 0. C 315.	22. 22.	24. 24.	1 0.	5
32	10. 50. 4. 0. C 1075.	7. 9.	35. 35.	2 0.	5
42	10. 50. 4. 0. C 345.	27. 23.	24. 12.	2 0.	1



OUTPUT DATA

PHASE	MOVE	A/C	G/C RATIO	SERVICE CAPACITY	V/C	SERVICE YEAR	DSL	ANNUAL
	CODE	RATIO	REQD USED EXIT	VOLUME	RATIO	LEVEL	EXCEEDED	GROWTH
A	12	0.07	0.63 0.57 0.49	966. 1168.	0.91	D	1997	2.909
A	32	0.07	0.64 0.57 0.49	949. 1148.	0.94	D	1996	2.908
B	22	0.07	0.34 0.30 0.14	278. 315.	1.00	F	1996	2.877
B	42	0.07	0.28 0.30 0.20	368. 442.	0.78	C	2002	2.871

V/C RATIO = 0.914 (OVERALL INTERSECTION)



* G/C = 0.57 * * G/C = 0.30 *
 * G = 26. * A = 3. * G = 13. * A = 3. *

EOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 4TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.66	8.89	0.00	0.00	0.9112
A	32	0.75	10.07	0.00	0.00	0.9356
B	22	0.75	2.95	0.00	0.00	0.9989
B	42	0.71	3.09	0.00	0.00	0.7796

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	4.6	116.9	2.8	72.0	7.5	188.9
A	32	3.8	95.2	2.9	72.7	6.7	168.0
B	22	1.1	29.5	2.7	68.9	3.9	98.4
B	42	1.3	34.4	1.5	37.7	2.8	72.2

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE STORAGE	TAPER	TOTAL
					MAX LENGTH	LENGTH	LENGTH
A	12	22.73					
A	32	23.50					
B	22	20.51					
B	42	6.78					

PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	30.0	6.0	4.0	7.0	6.0	13.0	28.5	YES
A	4	36.0	6.0	4.0	7.0	7.5	14.5	28.5	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	16.4	NO
B	3	48.0	6.0	4.0	7.0	10.5	17.5	16.4	NO

END OF PROGRAM

KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 4TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

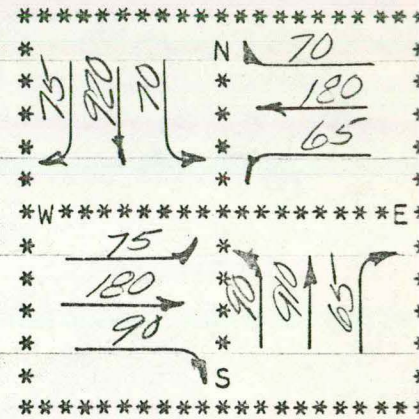
BASIC CONDITIONS

CYCLE LENGTH = 45 SECS
 METRO POPULATION = 75000
 PEAK HOUR FACTOR = 0.85
 BASE YEAR = 1975
 DESIGN YEAR = 2000
 AREA = CBD

CODE TRAFFIC MOVEMENT

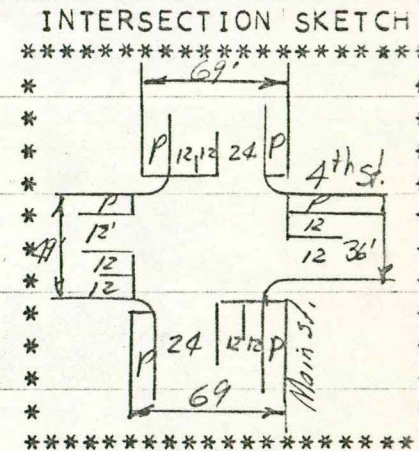
12 MAIN ST SB
 22 4TH ST WB
 32 MAIN ST NB
 42 4TH ST EB

2000 DHV TRAFFIC



INPUT DATA

MOVE CODE	K	D	T	LB	DSL	DHV	TURN R	TURN L	WIDTH APPR	WIDTH EXIT	N TURN L	TURN ANG	CHART CODE	INTERSECTION SKETCH
12	10	50	4	0	E	1065	8	7	35	35	2	0	5	*
22	10	50	4	0	E	315	22	22	24	24	1	0	5	*
32	10	50	4	0	E	1075	7	9	35	35	2	0	5	*
42	10	50	4	0	E	345	27	23	24	12	2	0	1	*



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C RATIO REQD	G/C RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	12	0.07	0.52	0.55	0.40	1141	1141	0.93	D	2002	2.909	
A	32	0.07	0.53	0.55	0.40	1122	1122	0.96	E	2001	2.908	
B	22	0.07	0.30	0.31	0.12	329	329	0.96	E	2001	2.877	
B	42	0.07	0.23	0.31	0.17	461	461	0.75	A	2010	2.871	

V/C RATIO = 0.922 (OVERALL INTERSECTION)

* PHASE A * * PHASE B *

* G/C = 0.55 * * G/C = 0.31 * *

* G = 25 * * A = 3 * * G = 14 * * A = 3 * *

KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 4TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.75	9.98	0.00	0.00	0.9329
A	32	0.75	10.07	0.00	0.00	0.9579
B	22	0.75	2.95	0.00	0.00	0.9569
B	42	0.61	2.63	0.00	0.00	0.7467

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	3.6	92.1	2.9	74.2	6.6	166.4
A	32	3.7	93.0	2.9	74.9	6.7	168.0
B	22	1.2	30.8	2.7	67.6	3.9	98.4
B	42	1.1	27.5	1.4	37.0	2.5	64.5

CYCLE FAILURE ANALYSIS

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES
A	12	22.73
A	32	23.50
B	22	20.51
B	42	6.78

TURNING LANE CHECK

PHASE	MOVE CODE	QUEUE MAX	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
A	12				
A	32				
B	22				
B	42				

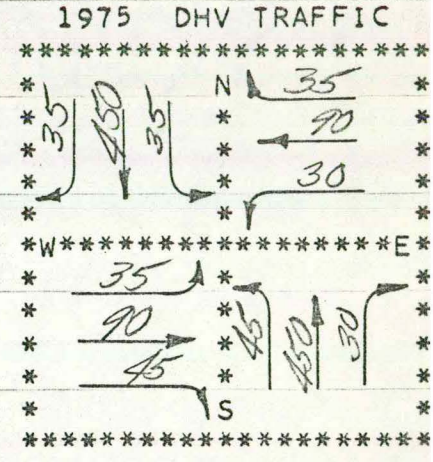
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	30.0	6.0	4.0	7.0	6.0	13.0	27.9	YES
A	4	36.0	6.0	4.0	7.0	7.5	14.5	27.9	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	17.0	NO
B	3	48.0	6.0	4.0	7.0	10.5	17.5	17.0	NO

END OF PROGRAM

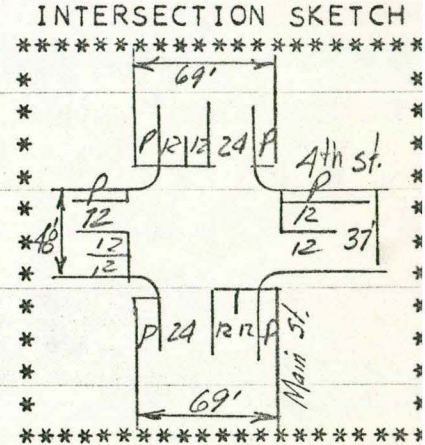
KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 4TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 4TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 4TH ST EB
 DESIGN YEAR = 1975
 AREA = CBD



INPUT DATA

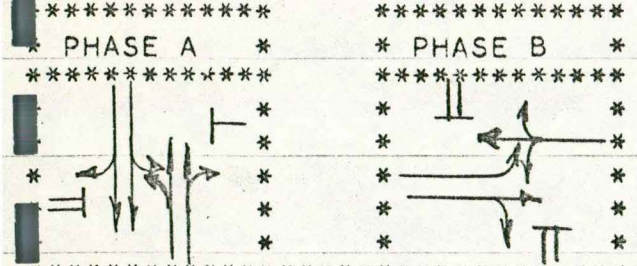
MOVE CODE	K	D	T	LB	DSL	DHV	URNS R	L	WIDTH APPR	EXIT	N TURN L	CHART ANG
12	10.	50.	4.	0.	C	520.	8.	7.	35.	35.	2	0.
22	10.	50.	4.	0.	C	155.	22.	22.	24.	24.	1	0.
32	10.	50.	4.	0.	C	525.	7.	9.	35.	35.	2	0.
42	10.	50.	4.	0.	C	170.	27.	23.	12.	12.	1	0.



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C RATIO REQD	G/C RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	12	0.07	0.31	0.43	0.24	732.	885.	0.59	A	1975		0.000
A	32	0.07	0.31	0.43	0.24	719.	870.	0.60	A	1975		0.000
B	22	0.07	0.17	0.44	0.07	405.	459.	0.34	A	1975		0.000
B	42	0.07	0.32	0.44	0.07	233.	280.	0.61	A	1975		0.000

V/C RATIO = 0.567 (OVERALL INTERSECTION)



* G/C = 0.43 * * G/C = 0.44 *
 * G = 19. * A = 3. * G = 20. * A = 3. *

EOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 4TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.25	1.68	0.00	0.00	0.5869
A	32	0.26	1.76	0.00	0.00	0.6028
B	22	0.17	0.33	0.00	0.00	0.3373
B	42	0.32	0.69	0.00	0.00	0.6071

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	0.4	10.4	1.8	46.3	2.2	56.7
A	32	0.4	11.4	1.8	46.7	2.3	58.2
B	22	0.0	2.1	1.0	27.2	1.1	29.4
B	42	0.4	11.7	1.1	29.9	1.6	41.6

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE STORAGE	TAPER	TOTAL
					MAX LENGTH	LENGTH	LENGTH
A	12	1.82					
A	32	4.97					
B	22	0.08					
B	42	2.15					

PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	30.0	6.0	4.0	7.0	6.0	13.0	22.3	YES
A	4	36.0	6.0	4.0	7.0	7.5	14.5	22.3	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	22.6	YES
B	3	48.0	6.0	4.0	7.0	10.5	17.5	22.6	YES

END OF PROGRAM

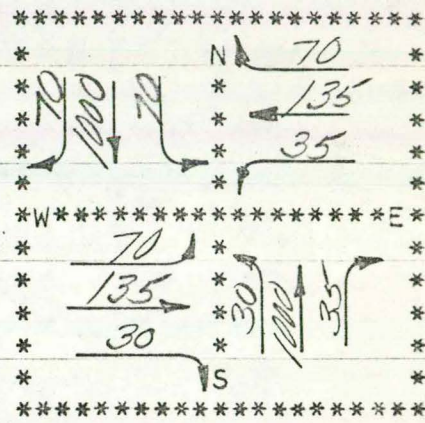
EOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 5TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

BASIC CONDITIONS

CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 5TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 5TH ST EB
 DESIGN YEAR = 2000
 AREA = CBD

CODE TRAFFIC MOVEMENT

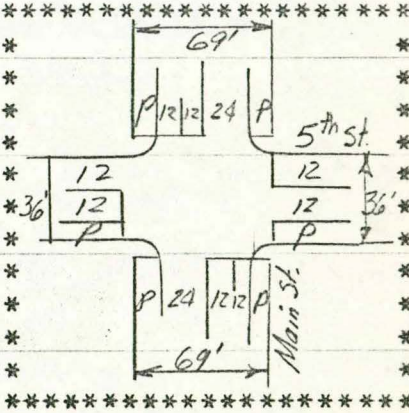
2000 DHV TRAFFIC



INPUT DATA

MOVE CODE	K	D	T	LB	DSL	DHV	URNS R	URNS L	WIDTH APPR	WIDTH EXIT	N TURN L	TURN ANG	CHART CODE
12	10	50	4	0	C	1140	6	6	35	35	2	0	5
22	10	50	4	0	C	240	29	13	12	12	1	0	1
32	10	50	4	0	C	1065	3	3	35	35	2	0	5
42	10	50	4	0	C	235	13	29	24	24	1	0	5

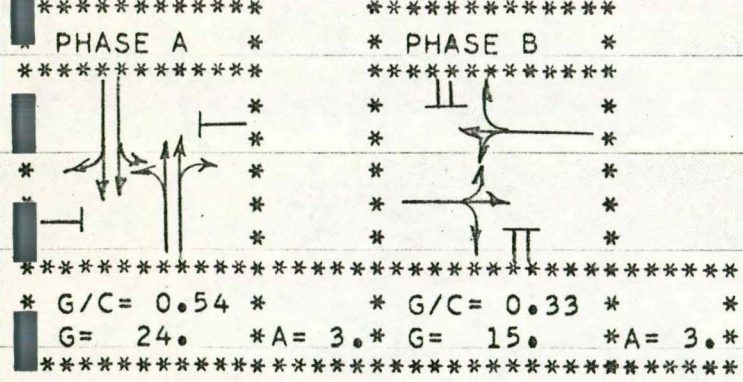
INTERSECTION SKETCH



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C RATIO REQD	G/C RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	ANNUAL GROWTH
A	12	0.07	0.66	0.54	0.54	928	1123	1.01	F	1993	2.921
A	32	0.07	0.59	0.54	0.54	962	1164	0.91	D	1996	2.909
B	22	0.07	0.40	0.33	0.12	195	235	1.02	F	1993	2.986
B	42	0.07	0.25	0.33	0.11	308	348	0.67	A	2009	2.899

V/C RATIO = 0.946 (OVERALL INTERSECTION)



BEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 5TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.75	10.68	11.78	8.35	1.0144
A	32	0.70	9.36	0.00	0.00	0.9143
B	22	0.75	2.25	17.15	12.17	1.0211
B	42	0.39	1.15	0.00	0.00	0.6735

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	3.7	94.3	3.2	81.2	7.0	175.6
A	32	4.8	122.0	3.0	77.0	7.9	199.0
B	22	0.9	24.2	1.9	49.2	2.9	73.4
B	42	0.6	17.3	1.9	49.2	2.6	66.6

CYCLE FAILURE ANALYSIS

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES
A	12	28.73
A	32	22.73
B	22	18.47
B	42	7.77

TURNING LANE CHECK

PHASE	MOVE CODE	QUEUE MAX LENGTH	STORAGE TAPER LENGTH	TOTAL LENGTH
-------	-----------	------------------	----------------------	--------------

PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	28.0	7.0	4.0	7.0	5.2	12.2	27.1	YES
A	4	28.0	7.0	4.0	7.0	5.2	12.2	27.1	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	17.8	YES
B	3	48.0	6.0	4.0	7.0	10.5	17.5	17.8	YES

END OF PROGRAM

KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 5TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

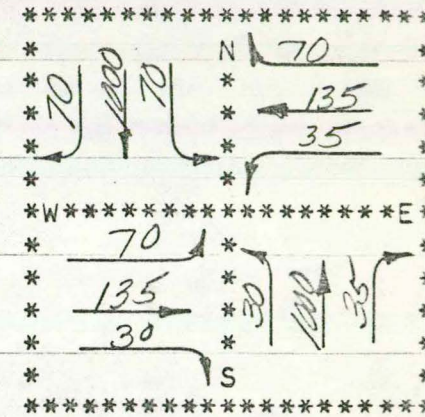
BASIC CONDITIONS

CYCLE LENGTH = 45 SECS
 METRO POPULATION = 75000
 PEAK HOUR FACTOR = 0.85
 BASE YEAR = 1975
 DESIGN YEAR = 2000
 AREA = CBD

CODE TRAFFIC MOVEMENT

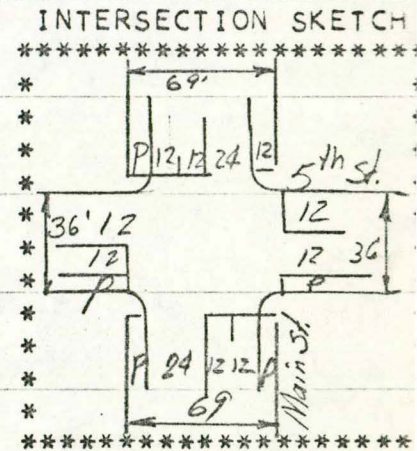
12 MAIN ST SB
 22 5TH ST WB
 32 MAIN ST NB
 42 5TH ST EB

2000 DHV TRAFFIC



INPUT DATA

MOVE CODE	K	D	T	LB	DSL	DHV	URNS R	URNS L	WIDTH APPR	WIDTH EXIT	N TURN L	TURN CHART ANG	CHART CODE
12	10	50	4	0	E	1140	6	6	35	35	2	0	5
22	10	50	4	0	E	240	29	13	12	12	1	0	1
32	10	50	4	0	E	1065	3	3	35	35	2	0	5
42	10	50	4	0	E	235	13	29	24	24	1	0	5

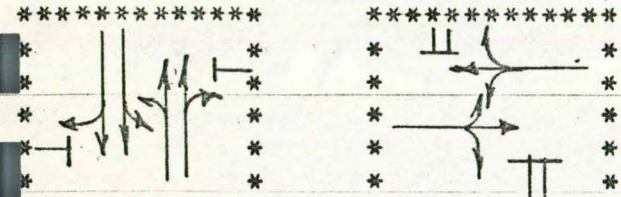


OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C RATIO REQD	G/C RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	12	0.07	0.55	0.54	0.45	1120	1120	1.02	F	1999		2.921
A	32	0.07	0.49	0.54	0.45	1161	1161	0.92	D	2003		2.909
B	22	0.07	0.34	0.33	0.10	236	236	1.02	F	1999		2.986
B	42	0.07	0.22	0.33	0.09	350	350	0.67	A	2014		2.899

V/C RATIO = 0.947 (OVERALL INTERSECTION)

 * PHASE A *



 * G/C = 0.54 * * G/C = 0.33 *
 * G = 24 * * A = 3 * G = 15 * * A = 3 *

KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 5TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.75	10.68	14.35	10.18	1.0176
A	32	0.72	9.68	0.00	0.00	0.9172
B	22	0.75	2.25	12.99	9.22	1.0159
B	42	0.38	1.13	0.00	0.00	0.6701

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	3.7	93.7	3.2	81.3	7.0	175.0
A	32	5.0	127.1	3.0	77.3	8.1	204.4
B	22	0.9	24.4	1.9	49.3	2.9	73.8
B	42	0.6	17.0	1.9	49.1	2.6	66.1

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE MAX LENGTH	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
A	12	28.73						
A	32	22.73						
B	22	18.47						
B	42	7.77						

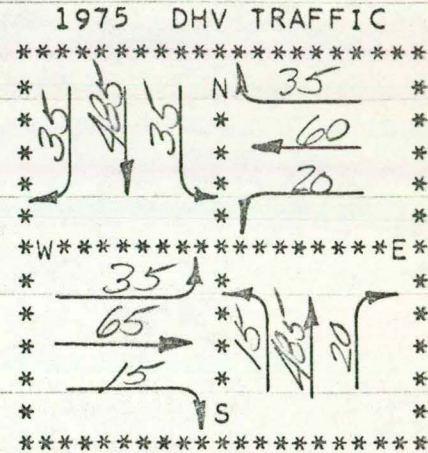
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	28.0	7.0	4.0	7.0	5.2	12.2	27.0	YES
A	4	28.0	7.0	4.0	7.0	5.2	12.2	27.0	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	17.9	YES
B	3	48.0	6.0	4.0	7.0	10.5	17.5	17.9	YES

END OF PROGRAM

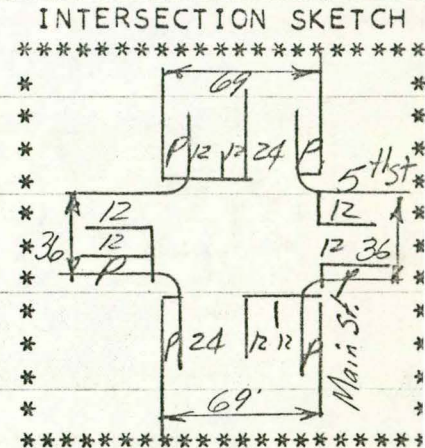
KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 5TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 5TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 5TH ST EB
 DESIGN YEAR = 1975
 AREA = CBD



INPUT DATA

MOVE CODE	K	D	T	LB	DSL	DHV	TURN R	TURN L	WIDTH APPR	WIDTH EXIT	N TURN L	TURN ANG	CHART CODE
12	10	50	4	0	C	555	6	6	35	35	2	0	5
22	10	50	4	0	C	115	29	13	12	12	1	0	1
32	10	50	4	0	C	520	3	3	35	35	2	0	5
42	10	50	4	0	C	115	13	29	24	24	1	0	5



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C RATIO REQD	G/C RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	12	0.07	0.32	0.54	0.26	934	1130	0.49	A	1975	0.000	
A	32	0.07	0.29	0.54	0.26	968	1171	0.44	A	1975	0.000	
B	22	0.07	0.19	0.33	0.06	194	232	0.50	A	1975	0.000	
B	42	0.07	0.12	0.33	0.05	305	345	0.33	A	1975	0.000	

V/C RATIO = 0.458 (OVERALL INTERSECTION)

PHASE A * * PHASE B *

* G/C = 0.54 * * G/C = 0.33 * *

* G = 24. * A = 3. * G = 15. * A = 3. *

LEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 5TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.15	1.10	0.00	0.00	0.4909
A	32	0.14	0.94	0.00	0.00	0.4437
B	22	0.32	0.47	0.00	0.00	0.4941
B	42	0.23	0.33	0.00	0.00	0.3328

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	0.2	5.9	1.5	39.8	1.8	45.7
A	32	0.1	4.4	1.4	37.3	1.6	41.7
B	22	0.2	6.0	0.9	24.2	1.2	30.2
B	42	0.0	2.0	0.9	24.2	1.0	26.2

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE STORAGE	TAPER	TOTAL
					MAX LENGTH	LENGTH	LENGTH
A	12	0.93					
A	32	0.62					
B	22	1.57					
B	42	0.36					

PEDESTRIAN CHECK

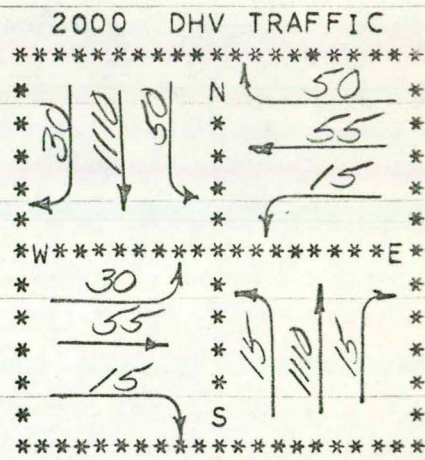
PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	28.0	7.0	4.0	7.0	5.2	12.2	27.3	YES
A	4	28.0	7.0	4.0	7.0	5.2	12.2	27.3	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	17.6	YES
B	3	48.0	6.0	4.0	7.0	10.5	17.5	17.6	YES

END OF PROGRAM

LEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 6TH ST
 MAIN ST ALTERNATE MADE BY GAM 11-02-76

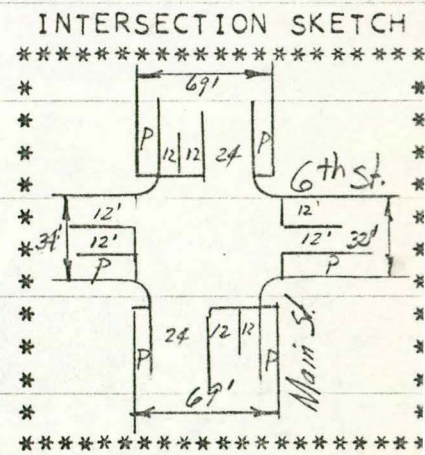
BASIC CONDITIONS **CODE** **TRAFFIC MOVEMENT**
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 6TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 6TH ST EB

DESIGN YEAR = 2000
 AREA = CBD



INPUT DATA

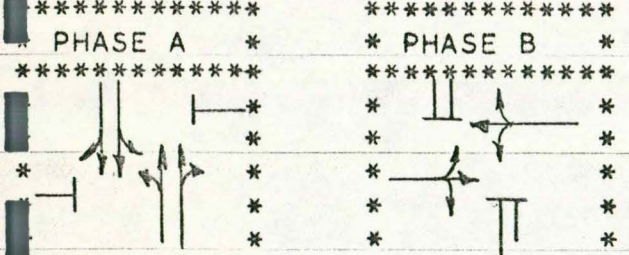
MOVE CODE	K	D	T	LB	DSL	DHV	URNS R	L	WIDTH APPR	EXIT	N L	TURN ANG	CHART CODE
12	10	50	4	0	C	1190	3	4	35	35	2	0	5
22	10	50	4	0	C	120	40	12	12	12	1	0	1
32	10	50	4	0	C	1140	1	1	35	35	2	0	5
42	10	50	4	0	C	100	14	29	22	22	1	0	5



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C REQD	RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	12	0.07	0.67	0.67	0.60	1186	1435	0.83	D	2000		2.881
A	32	0.07	0.62	0.67	0.60	1225	1482	0.77	A	2003		2.921
B	22	0.07	0.20	0.20	0.05	120	143	0.84	D	2000		2.811
B	42	0.07	0.12	0.20	0.05	168	188	0.53	A	2019		2.811

V/C RATIO = 0.791 (OVERALL INTERSECTION)



* G/C = 0.67 * * G/C = 0.20 *
 * G = 30 * * A = 3 * * G = 9 * * A = 3 *

LEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 6TH ST
 MAIN ST ALTERNATE MADE BY GAM 11-02-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.29	4.36	0.00	0.00	0.8292
A	32	0.21	3.10	0.00	0.00	0.7687
B	22	0.75	1.12	0.00	0.00	0.8335
B	42	0.44	0.56	0.00	0.00	0.5310

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	2.0	50.3	2.4	61.7	4.4	112.0
A	32	1.2	31.9	2.3	59.1	3.6	91.0
B	22	0.2	7.4	1.2	30.0	1.5	37.5
B	42	0.3	7.5	1.0	25.0	1.3	32.5

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE	STORAGE	TAPER	TOTAL
					MAX	LENGTH	LENGTH	LENGTH
A	12	13.24						
A	32	10.76						
B	22	6.56						
B	42	3.82						

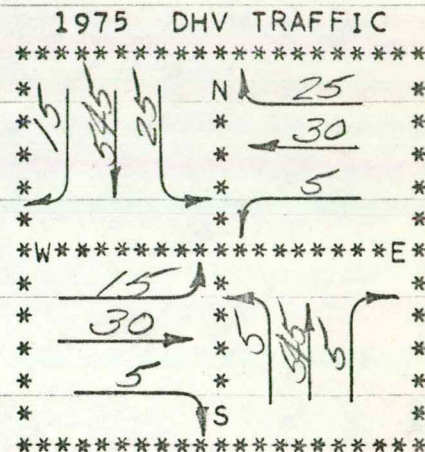
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	32.0	8.0	4.0	7.0	6.0	13.0	33.0	YES
A	4	34.0	9.0	4.0	7.0	6.2	13.2	33.0	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	11.9	NO
B	3	48.0	6.0	4.0	7.0	10.5	17.5	11.9	NO

END OF PROGRAM

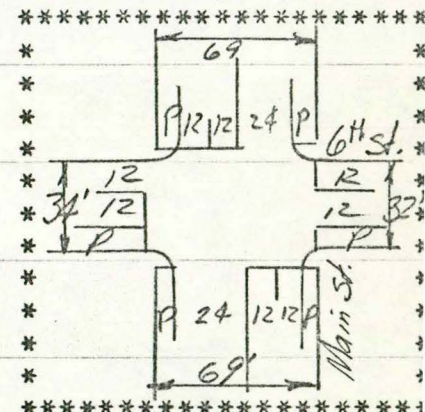
EOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 6TH ST
 MAIN ST ALTERNATE MADE BY GAM 11-02-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 6TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 6TH ST EB
 DESIGN YEAR = 1975
 AREA = CBD



INPUT DATA

MOVE CODE	K	D	T	LB	DSL	DHV	TURN R	TURN L	WIDTH APPR	WIDTH EXIT	N TURN L	TURN ANG	CHART CODE	INTERSECTION SKETCH
12	10	50	4	0	C	585	3	4	35	35	2	0	5	*
22	10	50	4	0	C	60	40	12	12	12	1	0	1	*
32	10	50	4	0	C	555	1	1	35	35	2	0	5	*
42	10	50	4	0	C	50	14	29	22	22	1	0	5	*



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C RATIO REQD	G/C RATIO USED	EXIT	SERVICE VOLUME	SERVICE CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	ANNUAL GROWTH
A	12	0.07	0.33	0.67	0.29	1181	1429	0.41	A	1975	0.000
A	32	0.07	0.30	0.67	0.29	1220	1477	0.38	A	1975	0.000
B	22	0.07	0.10	0.20	0.03	121	145	0.41	A	1975	0.000
B	42	0.07	0.06	0.20	0.02	170	190	0.26	A	1975	0.000

V/C RATIO = 0.388 (OVERALL INTERSECTION)

* PHASE A * * PHASE B *

* G/C = 0.67 * * G/C = 0.20 * *

* G = 30. * * A = 3. * * G = 9. * * A = 3. *

OKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 6TH ST
 MAIN ST ALTERNATE MADE BY GAM 11-02-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.08	0.63	0.00	0.00	0.4092
A	32	0.08	0.55	0.00	0.00	0.3757
B	22	0.40	0.30	0.00	0.00	0.4113
B	42	0.30	0.19	0.00	0.00	0.2621

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	0.1	3.5	1.2	30.5	1.3	34.1
A	32	0.1	2.8	1.1	29.0	1.2	31.8
B	22	0.1	3.5	0.5	14.9	0.7	18.5
B	42	0.0	1.1	0.4	12.4	0.5	13.6

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE MAX LENGTH	STORAGE TAPER LENGTH	TOTAL LENGTH
A	32	0.09					
B	22	0.72					
B	42	0.38					

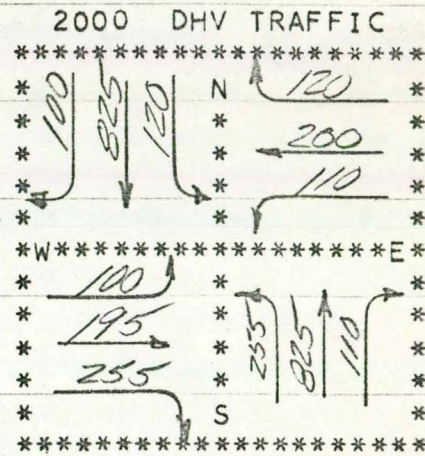
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	32.0	8.0	4.0	7.0	6.0	13.0	32.9	YES
A	4	34.0	9.0	4.0	7.0	6.2	13.2	32.9	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	12.0	NO
B	3	48.0	6.0	4.0	7.0	10.5	17.5	12.0	NO

END OF PROGRAM

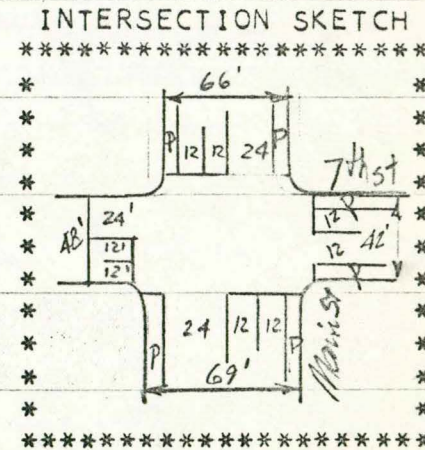
WOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 7TH ST.
 MAIN ST ALTERNATE MADE BY GAM 11-02-76

BASIC CONDITIONS
 CYCLE LENGTH = 60 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 7TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 7TH ST EB
 DESIGN YEAR = 2000
 AREA = CBD



INPUT DATA

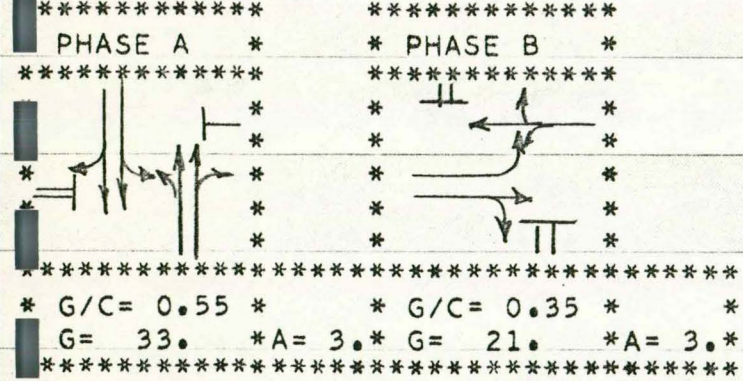
MOVE CODE	K	D	T	LB	DSL	DHV	TURN R	TURN L	WIDTH APPR	WIDTH EXIT	N TURN L	TURN ANG	CHART CODE
12	10	50	4	0	C	1045	10	11	33	35	2	0	5
22	10	50	4	0	C	430	28	16	21	21	1	0	5
32	10	50	4	0	C	1190	9	21	35	35	2	0	5
42	10	50	4	0	C	550	46	18	24	12	2	0	1



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C RATIO REQD	G/C RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	ANNUAL GROWTH
A	12	0.05	0.68	0.55	0.45	837	1003	1.04	F	1992	2.870
A	32	0.05	0.81	0.55	0.45	806	976	1.22	F	1986	2.881
B	22	0.05	0.52	0.35	0.22	291	323	1.33	F	1986	2.908
B	42	0.05	0.44	0.35	0.23	445	533	1.03	F	1993	2.886

V/C RATIO = 1.144 (OVERALL INTERSECTION)



OKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 7TH ST.
 MAIN ST ALTERNATE MADE BY GAM 11-02-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	1.00	17.41	33.12	23.50	1.0416
A	32	9.42	186.96	148.71	105.51	1.2190
B	22	18.78	134.63	205.29	145.66	1.3299
B	42	1.00	9.16	24.16	17.14	1.0300

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	4.5	114.1	3.7	94.8	8.3	209.0
A	32	74.8	1871.4	3.6	92.3	78.5	1963.7
B	22	99.4	2488.0	3.4	87.0	102.9	2575.1
B	42	1.5	39.3	2.8	71.9	4.4	111.2

CYCLE FAILURE ANALYSIS

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES
A	12	37.42
A	32	53.16
B	22	57.48
B	42	31.13

TURNING LANE CHECK

PHASE	MOVE CODE	QUEUE MAX	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
-------	-----------	-----------	----------------	--------------	--------------

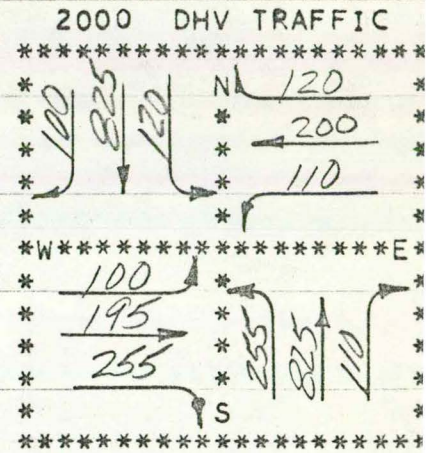
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	40.0	6.0	4.0	7.0	8.5	15.5	35.7	YES
A	4	48.0	6.0	4.0	7.0	10.5	17.5	35.7	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	24.2	YES
B	3	48.0	6.0	4.0	7.0	10.5	17.5	24.2	YES

END OF PROGRAM

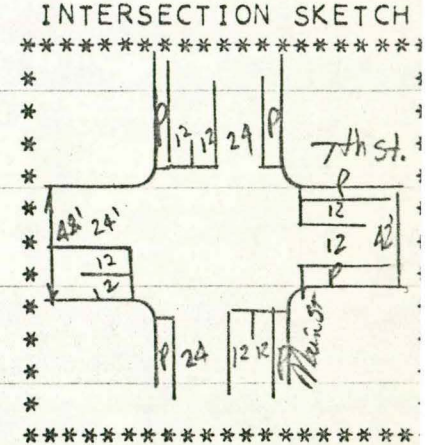
KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 7TH ST.
 MAIN ST ALTERNATE MADE BY GAM 11-02-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 60 SECS 12 MAIN ST SB
 METRO POPULATION = 75000 22 7TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 7TH ST EB
 DESIGN YEAR = 2000
 AREA = CBD



INPUT DATA

MOVE CODE	K	D	T	LB	DSL	DHV	TURN R	TURN L	WIDTH APPR	WIDTH EXIT	N TURN L	CHART ANG	INTERSECTION SKETCH
12	10	50	4	0	E	1045	10	11	33	35	2	0	5
22	10	50	4	0	E	430	28	16	21	21	1	0	5
32	10	50	4	0	E	1190	9	21	35	35	2	0	5
42	10	30	4	0	E	550	46	18	24	12	2	0	1



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C RATIO REQD	G/C RATIO USED	EXIT RATIO	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	ANNUAL GROWTH
A	12	0.05	0.57	0.53	0.37	968	968	1.08	F	1997	2.870
A	32	0.05	0.67	0.53	0.37	942	942	1.26	F	1992	2.881
B	22	0.05	0.47	0.37	0.20	340	340	1.26	F	1992	2.908
B	42	0.05	0.36	0.37	0.19	562	562	0.98	E	2001	2.886

V/C RATIO = 1.155 (OVERALL INTERSECTION)

* PHASE A * * PHASE B *

* G/C = 0.53 * * G/C = 0.37 * *

* G = 32. * * A = 3. * * G = 22. * * A = 3. *

KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 7TH ST.
 MAIN ST ALTERNATE MADE BY GAM 11-02-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	1.57	27.50	60.85	43.18	1.0793
A	32	13.04	258.81	172.40	122.33	1.2631
B	22	12.58	90.17	171.79	121.89	1.2619
B	42	1.00	9.16	0.00	0.00	0.9774

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	10.8	270.9	3.8	95.3	14.6	366.3
A	32	100.5	2515.3	3.7	92.8	104.3	2608.2
B	22	69.6	1742.2	3.5	89.0	73.2	1831.3
B	42	1.7	42.7	2.8	71.8	4.5	114.6

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE	STORAGE	TAPER	TOTAL
					MAX	LENGTH	LENGTH	LENGTH
A	12	37.42						
A	32	53.16						
B	22	42.61						
B	42	17.97						

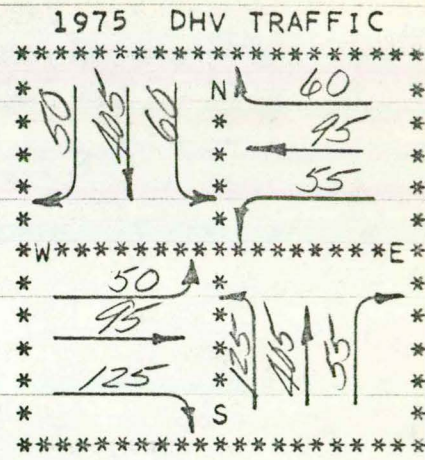
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	40.0	6.0	4.0	7.0	8.5	15.5	34.6	YES
A	4	48.0	6.0	4.0	7.0	10.5	17.5	34.6	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	25.3	YES
B	3	48.0	6.0	4.0	7.0	10.5	17.5	25.3	YES

END OF PROGRAM

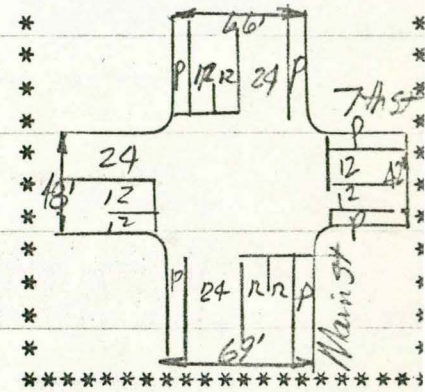
KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 7TH ST.
 MAIN ST ALTERNATE MADE BY GAM 11-02-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 60 SECS 12 MAIN ST SB
 METRO POPULATION = 75000 22 7TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 7TH ST EB
 DESIGN YEAR = 1975
 AREA = CBD



INPUT DATA

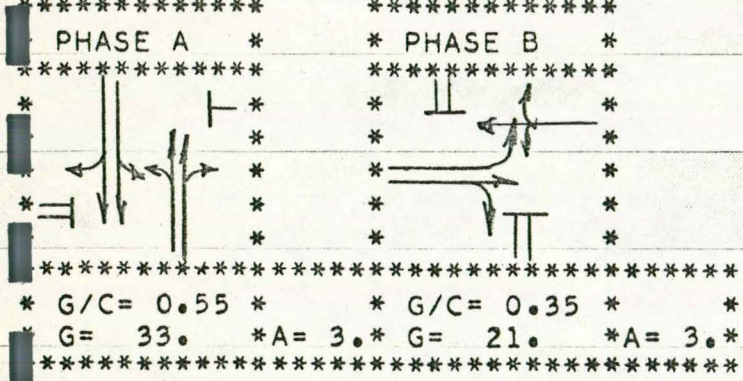
MOVE CODE	K	D	T	LB	DSL	DHV	URNS R	L	WIDTH APPR	EXIT	N TURN L	CHART ANG	INTERSECTION SKETCH CODE
12	10	50	4	0	C	515	10	11	33	35	2	0	5
22	10	50	4	0	C	210	28	16	21	21	1	0	5
32	10	50	4	0	C	585	9	21	35	35	2	0	5
42	10	50	4	0	C	270	46	18	24	12	2	0	1



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C REQD	RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	12	0.05	0.34	0.55	0.22	839	1005	0.51	A	1975		0.000
A	32	0.05	0.40	0.55	0.22	808	978	0.60	A	1975		0.000
B	22	0.05	0.25	0.35	0.11	290	322	0.65	A	1975		0.000
B	42	0.05	0.21	0.35	0.11	443	531	0.51	A	1975		0.000

V/C RATIO = 0.562 (OVERALL INTERSECTION)



EOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 7TH ST.
 MAIN ST ALTERNATE MADE BY GAM 11-02-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.20	1.75	0.00	0.00	0.5120
A	32	0.24	2.36	0.00	0.00	0.5977
B	22	0.44	1.55	0.00	0.00	0.6520
B	42	0.37	1.67	0.00	0.00	0.5076

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	0.2	6.7	1.9	48.5	2.2	55.2
A	32	0.4	11.1	2.2	55.1	2.6	66.2
B	22	0.6	15.2	2.2	56.6	2.8	71.9
B	42	0.2	6.5	1.4	36.4	1.7	42.9

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE	STORAGE	TAPER	TOTAL
					MAX	LENGTH	LENGTH	LENGTH
A	12	1.27						
A	32	2.75						
B	22	6.52						
B	42	2.73						

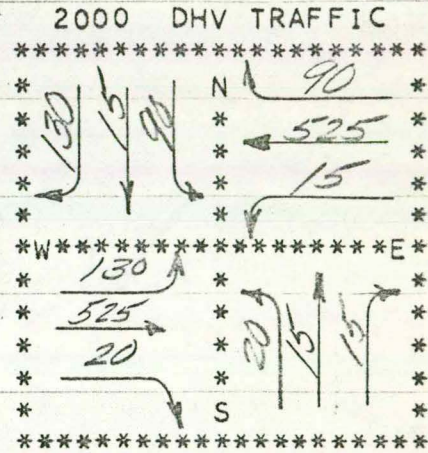
EDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	40.0	6.0	4.0	7.0	8.5	15.5	35.8	YES
A	4	48.0	6.0	4.0	7.0	10.5	17.5	35.8	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	24.1	YES
B	3	48.0	6.0	4.0	7.0	10.5	17.5	24.1	YES

END OF PROGRAM

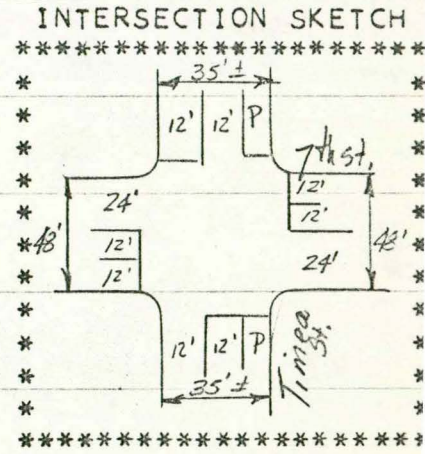
EOKUK NEW BRIDGE EVALUATION - 7TH ST AND TIMEA ST
 MAIN ST ALTERNATE MADE BY GAM 11-04-76

ASIC CONDITIONS CODE TRAFFIC MOVEMENT
 YCLE LENGTH = 45. SECS 12 TIMEA ST SB
 METRO POPULATION= 75000.22 7TH ST WB
 PEAK HOUR FACTOR = 0.85 32 TIMEA ST NB
 ASE YEAR =1975 42 7TH ST EB
 DESIGN YEAR = 2000
 AREA = CBD



INPUT DATA

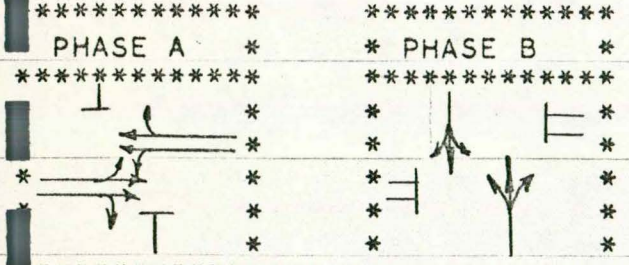
MOVE CODE	K	D	T	LB	DSL	DHV	TURN R	TURN L	WIDTH APPR	WIDTH EXIT	N TURN L	TURN ANG	CHART CODE
12	10.	50.	4.	0.	C	235.	55.	38.	12.	12.	1	0.	2
22	10.	50.	4.	0.	C	630.	14.	2.	24.	24.	2	0.	2
32	10.	50.	4.	0.	C	50.	30.	40.	23.	23.	1	0.	6
42	10.	50.	4.	0.	C	675.	3.	19.	24.	24.	2	0.	2



OUTPUT DATA

HASE	MOVE CODE	A/C RATIO	G/C RATIO REQD	G/C RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	22	0.07	0.31	0.44	0.24	874.	1048.	0.60	A	2012		2.877
A	42	0.07	0.38	0.44	0.24	777.	933.	0.72	A	2005		2.903
B	12	0.07	0.37	0.43	0.01	271.	325.	0.72	A	2005		2.899
B	32	0.07	0.05	0.43	0.01	438.	492.	0.10	A	2078		2.811

V/C RATIO= 0.655 (OVERALL INTERSECTION)



* G/C= 0.44 * * G/C= 0.43 *
 * G= 20. * A= 3. * G= 19. * A= 3. *

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	22	0.24	1.94	0.00	0.00	0.6006
A	42	0.34	2.87	0.00	0.00	0.7231
B	12	0.41	1.21	0.00	0.00	0.7223
B	32	0.13	0.08	0.00	0.00	0.1015

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	22	0.4	11.2	2.2	55.6	2.6	66.9
A	42	0.9	23.6	2.3	59.5	3.3	83.1
B	12	0.9	23.5	1.6	41.7	2.6	65.2
B	32	0.0	0.1	0.3	8.8	0.3	9.0

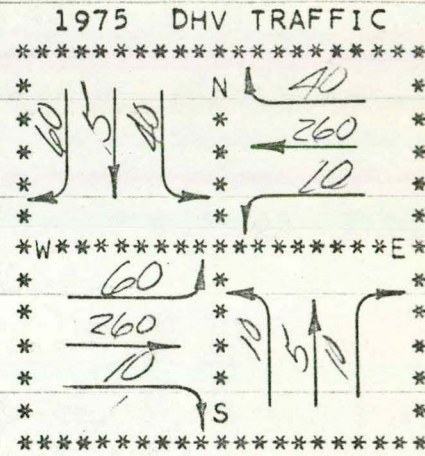
CYCLE FAILURE ANALYSIS			TURNING LANE CHECK			
PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE STORAGE TAPER	TOTAL LENGTH
A	22	1.95				
A	42	6.52				
B	12	7.77				
B	32	0.00				

PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE

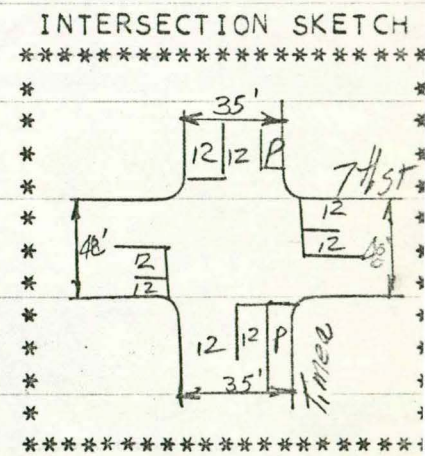
END OF PROGRAM

ASIC CONDITIONS CODE TRAFFIC MOVEMENT
 YCLE LENGTH = 45 SECS 12 TIMEA ST SB
 METRO POPULATION= 75000.22 7TH ST WB
 PEAK HOUR FACTOR = 0.85 32 TIMEA ST NB
 ASE YEAR =1975 42 7TH ST EB
 DESIGN YEAR = 1975
 AREA = CBD



INPUT DATA

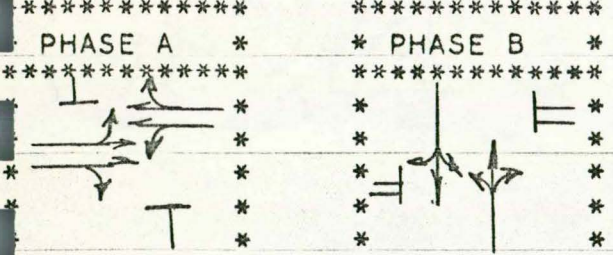
MOVE CODE	K	D	T	LB	DSL	DHV	TURN R	TURN L	WIDTH APPR	WIDTH EXIT	N TURN L	CHART ANG	CHART CODE
12	10	50	4	0	C	115	55	38	12	12	1	0	2
22	10	50	4	0	C	310	14	2	24	24	2	0	2
32	10	50	4	0	C	25	30	40	23	23	1	0	6
42	10	50	4	0	C	330	3	19	24	24	2	0	2



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C REQD	G/C USED	RATIO EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	ANNUAL GROWTH
A	22	0.07	0.15	0.43	0.12	873	1048	0.30	A	1975	0.000
A	42	0.07	0.18	0.43	0.12	777	933	0.35	A	1975	0.000
B	12	0.07	0.18	0.43	0.01	271	325	0.35	A	1975	0.000
B	32	0.07	0.02	0.43	0.00	438	492	0.05	A	1975	0.000

V/C RATIO= 0.321 (OVERALL INTERSECTION)



* G/C= 0.43 * * G/C= 0.43 * *
 * G= 20. * A= 3. * G= 19. * A= 3. *

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	22	0.16	0.62	0.00	0.00	0.2956
A	42	0.17	0.72	0.00	0.00	0.3536
B	12	0.19	0.27	0.00	0.00	0.3533
B	32	0.12	0.03	0.00	0.00	0.0507

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	22	0.0	1.5	1.0	27.3	1.1	28.9
A	42	0.0	2.4	1.1	29.1	1.2	31.5
B	12	0.0	2.4	0.8	20.4	0.9	22.8
B	32	0.0	0.0	0.1	4.4	0.1	4.4

CYCLE FAILURE ANALYSIS

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES
A	22	0.01
A	42	0.13
B	12	0.36
B	32	0.00

TURNING LANE CHECK

PHASE	MOVE CODE	QUEUE MAX LENGTH	TAPER LENGTH	TOTAL LENGTH
-------	-----------	------------------	--------------	--------------

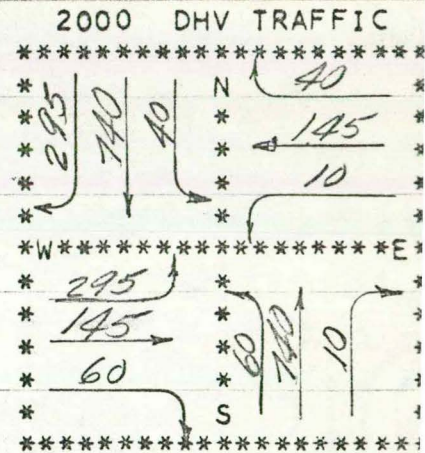
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
-------	------	---------------	--------------	----------------	----------------	-----------------	-----------------	-----------------	-------------------

END OF PROGRAM

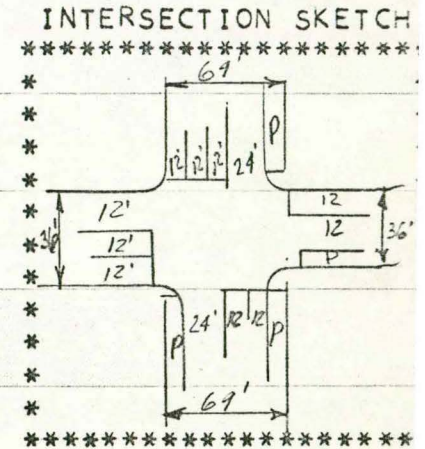
KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND THIRD ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

BASIC CONDITIONS	CODE	TRAFFIC MOVEMENT
CYCLE LENGTH = 60 SECS	12	MAIN ST SB
METRO POPULATION = 75000.22	32	3RD ST WB
PEAK HOUR FACTOR = 0.85	32	MAIN ST NB
BASE YEAR = 1975	42	3RD ST EB (SHOPPING CENTER)
DESIGN YEAR = 2000	43	3RD ST EB LT TURN
AREA = CBD	11	MAIN ST RT TO SHOPPING CENTER



INPUT DATA

MOVE CODE	K	D	T	LB	DSL	DHV	TURN R	TURN L	WIDTH APPR	WIDTH EXIT	N TURN L	TURN ANG	CHART CODE
11	10.	50.	4.	0.	C	295.	0.	0.	12.	12.	1	90.	23
12	10.	50.	4.	0.	C	780.	0.	4.	24.	24.	2	0.	1
22	10.	50.	4.	0.	C	195.	21.	0.	12.	15.	1	0.	1
32	10.	50.	4.	0.	C	810.	7.	5.	35.	35.	2	0.	5
43	10.	50.	4.	0.	C	295.	0.	0.	12.	24.	1	90.	23
42	10.	50.	4.	0.	C	205.	29.	0.	12.	12.	1	0.	1



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C REQD	G/C USED	RATIO EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	12	0.05	0.46	0.40	0.43	682.	819.	0.95	E	1995		2.918
A	32	0.05	0.47	0.40	0.38	703.	851.	0.95	E	1995		2.914
B	11	0.05	0.26	0.23	****	256.	333.	0.89	D	1995		2.881
B	43	0.05	0.26	0.23	****	256.	333.	0.89	D	1995		2.881
C	22	0.05	0.23	0.22	0.10	186.	224.	0.87	D	1998		2.918
C	42	0.05	0.25	0.22	0.13	178.	214.	0.96	E	1995		2.912

V/C RATIO = 0.931 (OVERALL INTERSECTION)

* PHASE A *	* PHASE B *	* PHASE C *
*****	*****	*****
* *	* *	* *
*****	*****	*****

* G/C = 0.40 *	* G/C = 0.23 *	* G/C = 0.22 *
* G = 24. * A = 3. *	* G = 14. * A = 3. *	* G = 13. * A = 3. *

KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND THIRD ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	1.00	13.00	0.00	0.00	0.9518
A	32	1.00	13.50	0.00	0.00	0.9512
B	11	1.00	4.91	0.00	0.00	0.8846
B	43	1.00	4.91	0.00	0.00	0.8846
C	22	1.00	3.25	0.00	0.00	0.8702
C	42	1.00	3.41	0.00	0.00	0.9575

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	2.6	65.6	3.8	96.8	6.5	162.5
A	32	2.7	68.2	4.0	100.5	6.7	168.7
B	11	1.1	28.8	3.7	97.0	4.9	125.8
B	43	1.1	28.8	3.7	97.0	4.9	125.8
C	22	0.7	17.6	2.5	63.6	3.2	81.2
C	42	0.7	18.5	2.6	66.8	3.4	85.4

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE MAX	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
A	32	23.89						
B	11	12.48	B	11	4	153.	96.	249.
B	43	12.48	B	43	4	153.	96.	249.
C	22	11.11						
C	42	13.15						

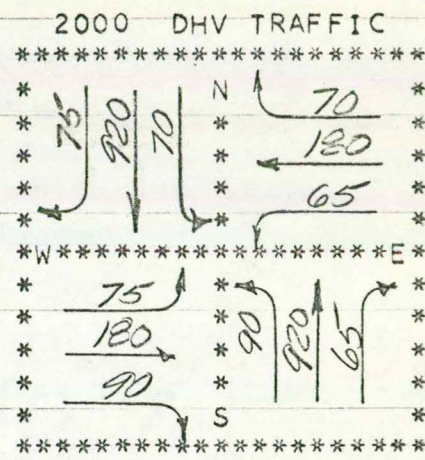
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	29.0	7.5	4.0	7.0	5.3	12.3	27.2	YES
A	4	30.0	7.5	4.0	7.0	5.6	12.6	27.2	YES
C	1	48.0	6.0	4.0	7.0	10.5	17.5	16.0	NO
C	3	48.0	6.0	4.0	7.0	10.5	17.5	16.0	NO

END OF PROGRAM

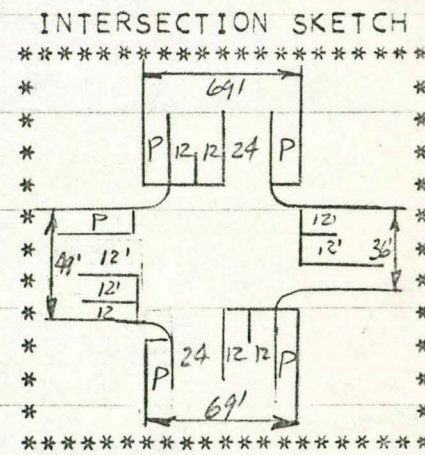
WOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 4TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

BASIC CONDITIONS
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 4TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 4TH ST EB
 DESIGN YEAR = 2000
 AREA = CBD



INPUT DATA

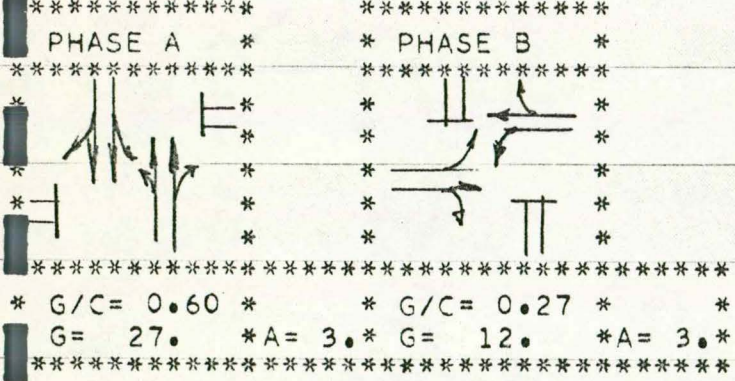
MOVE	DESIGN FACTORS	TURNS	WIDTH	N	TURN CHART
CODE	K D T LB DSL DHV	R L	APPR EXIT	L ANG	CODE
12	10. 50. 4. 0. C 1055.	8. 7.	35. 35.	2 0.	5
22	10. 50. 4. 0. C 315.	22. 22.	24. 24.	2 0.	1
32	10. 50. 4. 0. C 1070.	7. 9.	35. 35.	2 0.	5
42	10. 50. 4. 0. C 350.	27. 23.	24. 24.	2 0.	1



OUTPUT DATA

PHASE	MOVE	A/C	G/C RATIO	SERVICE CAPACITY	V/C	SERVICE YEAR	DSL	ANNUAL
	CODE	RATIO	REQD USED EXIT	VOLUME	RATIO	LEVEL	EXCEEDED	GROWTH
A	12	0.07	0.62 0.60 0.48	1021. 1235.	0.85	D	1999	2.870
A	32	0.07	0.64 0.60 0.48	1004. 1214.	0.88	D	1998	2.889
B	22	0.07	0.25 0.27 0.10	339. 407.	0.77	C	2003	2.877
B	42	0.07	0.28 0.27 0.10	328. 394.	0.89	D	1998	2.930

V/C RATIO = 0.859 (OVERALL INTERSECTION)



LEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 4TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	-12	0.40	5.31	0.00	0.00	0.8536
A	32	0.48	6.53	0.00	0.00	0.8806
B	22	0.75	2.95	0.00	0.00	0.7729
B	42	0.75	3.28	0.00	0.00	0.8872

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	2.4	62.2	2.6	66.0	5.1	128.2
A	32	3.2	81.2	2.6	66.9	5.9	148.2
B	22	0.5	13.1	1.4	36.0	1.9	49.2
B	42	0.5	14.6	1.6	40.0	2.1	54.7

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE MAX	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
A	32	13.92						
B	22	4.98						
B	42	17.81						

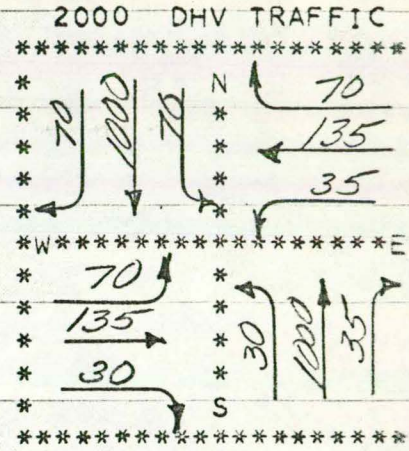
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK	HALF LANE	WALK SPEED	WALK TIME	CLEAR TIME	TOTAL TIME	PHASE TIME	IS PHASE ADEQUATE
		FT	FT	FPS	SECS	SECS	SECS		
A	2	30.0	6.0	4.0	7.0	6.0	13.0	29.9	YES
A	4	36.0	6.0	4.0	7.0	7.5	14.5	29.9	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	15.0	NO
B	3	48.0	6.0	4.0	7.0	10.5	17.5	15.0	NO

END OF PROGRAM

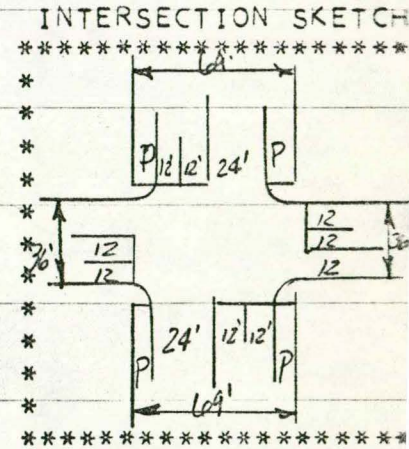
KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 5TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 5TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 5TH ST EB
 DESIGN YEAR = 2000
 AREA = CBD



INPUT DATA

MOVE CODE	K	D	T	LB	DSL	DHV	URNS R	L	WIDTH APPR	EXIT	N TURN L	CHART ANG	CODE
12	10	50	4	0	C	1135	6	6	35	35	2	0	5
22	10	50	4	0	C	240	29	13	22	12	2	0	1
32	10	50	4	0	C	1055	3	3	35	35	2	0	5
42	10	50	4	0	C	240	13	29	24	12	2	0	1



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C REQD	RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	ANNUAL GROWTH
A	12	0.07	0.66	0.67	0.54	1153	1395	0.81	C	2001	2.829
A	32	0.07	0.59	0.67	0.53	1195	1446	0.73	A	2004	2.870
B	22	0.07	0.20	0.20	0.16	244	292	0.82	C	2001	2.811
B	42	0.07	0.19	0.20	0.16	255	306	0.78	C	2002	2.811

V/C RATIO = 0.778 (OVERALL INTERSECTION)

* PHASE A * * PHASE B *

* G/C = 0.67 * * G/C = 0.20 * *

* G = 30. * A = 3. * G = 9. * A = 3. *

WEEKUK BRIDGE LOCATION EVALUATION - MAIN ST. AND 5TH ST
 MAIN ST ALTERNATE MADE BY GAM 10-20-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.27	3.92	0.00	0.00	0.8135
A	32	0.19	2.52	0.00	0.00	0.7295
B	22	0.75	2.25	0.00	0.00	0.8192
B	42	0.75	2.25	0.00	0.00	0.7821

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	1.7	44.3	2.3	59.0	4.1	103.4
A	32	0.9	24.6	2.1	54.9	3.1	79.5
B	22	0.2	7.4	1.2	30.0	1.5	37.5
B	42	0.2	7.4	1.2	30.0	1.5	37.5

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE MAX	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
A	32	7.22						
B	22	6.56						
B	42	6.56						

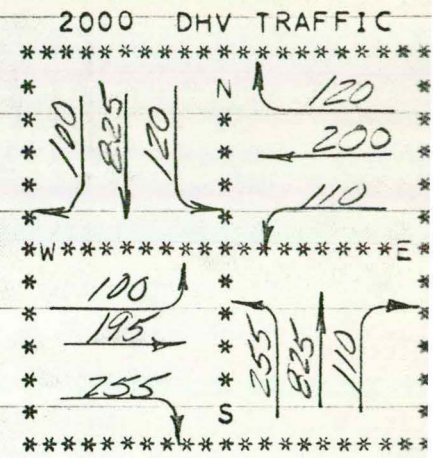
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	28.0	7.0	4.0	7.0	5.2	12.2	33.0	YES
A	4	28.0	7.0	4.0	7.0	5.2	12.2	33.0	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	11.9	NO
B	3	48.0	6.0	4.0	7.0	10.5	17.5	11.9	NO

END OF PROGRAM

KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 7TH ST.
 MAIN ST ALTERNATE MADE BY GAM 11-02-76

BASIC CONDITIONS	CODE	TRAFFIC MOVEMENT
CYCLE LENGTH = 65 SECS	12	MAIN ST SB
METRO POPULATION = 75000	22	7TH ST WB
PEAK HOUR FACTOR = 0.85	32	MAIN ST NB
BASE YEAR = 1975	42	7TH ST EB
DESIGN YEAR = 2000	33	MAIN ST NB LT
AREA = CBD	13	MAIN ST SB LT
	43	7TH ST LT EB
	23	7TH ST LT WB
	41	7TH ST EB RT (US136 EAST)



INPUT DATA

MOVE	DESIGN FACTORS	URNS	WIDTH	N	TURN	CHART	INTERSECTION SKETCH
CODE	K D T LB DSL DHV	R L	APPR EXIT	L	ANG	CODE	
12	10. 50. 4. 0. C 925.	10. 0.	24. 24.	2	0.	1	
22	10. 50. 4. 0. C 320.	38. 0.	24. 24.	2	0.	1	
32	10. 50. 4. 0. C 936.	12. 0.	24. 24.	2	0.	1	
33	10. 50. 4. 0. C 255.	0. 0.	24. 24.	2	90.	23	
13	10. 50. 4. 0. C 120.	0. 0.	11. 12.	1	90.	23	
23	10. 50. 4. 0. C 110.	0. 0.	10. 10.	1	90.	22	
43	10. 50. 4. 0. C 100.	0. 0.	10. 10.	1	90.	22	
41	10. 50. 4. 0. C 255.	0. 0.	12. 12.	1	90.	23	
42	10. 50. 4. 0. C 195.	0. 0.	24. 12.	2	0.	1	

OUTPUT DATA

PHASE	MOVE	A/C	G/C RATIO	SERVICE CAPACITY	V/C	SERVICE	YEAR	DSL	ANNUAL
	CODE	RATIO	REQD USED EXIT	VOLUME	RATIO	LEVEL	EXCEEDED		GROWTH
A	13	0.05	0.12 0.14	149. 193.	0.62	A	2008		2.811
A	33	0.05	0.16 0.14	230. 299.	0.85	D	1996		2.892
B	12	0.05	0.55 0.51	853. 1024.	0.90	D	1997		2.878
B	32	0.05	0.57 0.51	845. 1013.	0.92	D	1996		2.882
C	22	0.05	0.21 0.21	309. 371.	0.86	D	1999		2.942
C	42	0.05	0.11 0.21	360. 433.	0.45	A	2021		2.918
C	23	0.05	0.14 0.21	111. 111.	0.99	-	2000		2.811
C	43	0.05	0.24 0.21	111. 111.	0.90	-	2004		2.811
C	41	0.05	0.23 0.21	230. 299.	0.85	D	1996		2.892

V/C RATIO = 0.862 (OVERALL INTERSECTION)

* PHASE A * * PHASE B * * PHASE C *

* G/C = 0.14 * * G/C = 0.51 * * G/C = 0.21 * *

* G = 9. * * A = 3. * * G = 33. * * A = 3. * * G = 13. * * A = 3. *

KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 7TH ST.
 MAIN ST ALTERNATE MADE BY GAM 11-02-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	13	0.68	1.48	0.00	0.00	0.6198
A	33	1.08	4.98	0.00	0.00	0.8510
B	12	0.78	13.07	0.00	0.00	0.9031
B	32	0.95	16.07	0.00	0.00	0.9231
C	22	1.08	6.25	0.00	0.00	0.8618
C	42	0.48	1.72	0.00	0.00	0.4502
C	23	1.08	2.15	0.00	0.00	0.9885
C	43	1.08	1.95	0.00	0.00	0.8987
C	41	0.98	4.52	0.00	0.00	0.8510

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	13	0.5	12.9	1.8	47.4	2.3	60.3
A	33	0.3	8.5	1.9	50.3	2.3	58.9
B	12	4.2	105.2	4.0	102.1	8.2	207.3
B	32	5.5	138.5	4.1	103.3	9.6	241.8
C	22	0.5	14.8	2.2	57.3	2.8	72.2
C	42	0.1	4.6	1.3	34.9	1.5	39.5
C	23	0.4	10.4	1.5	40.3	1.9	50.8
C	43	0.3	9.5	1.4	36.7	1.8	46.2
C	41	2.4	62.2	3.6	93.6	6.0	155.8

CYCLE FAILURE ANALYSIS

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES
A	13	6.89
A	33	8.39
B	12	22.03
B	32	23.11
C	22	16.64
C	42	0.93
C	23	14.03
C	43	10.96
C	41	18.25

TURNING LANE CHECK

PHASE	MOVE CODE	QUEUE MAX	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
A	13	2	76.	88.	164.
A	33	2	76.	192.	268.
C	23	2	76.	80.	156.
C	43	2	76.	80.	156.
C	41	4	153.	96.	249.

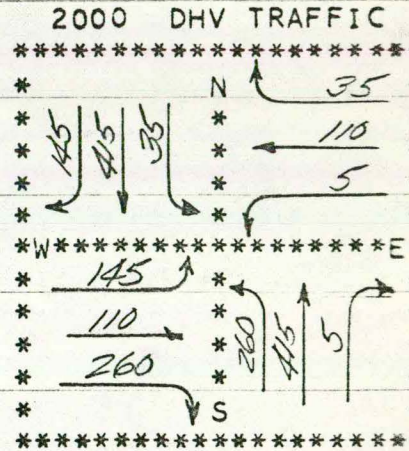
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
B	2	41.7	1.0	4.0	7.0	10.1	17.1	36.2	YES
B	4	48.0	6.0	4.0	7.0	10.5	17.5	36.2	YES
C	1	48.0	6.0	4.0	7.0	10.5	17.5	16.3	NO
C	3	48.0	6.0	4.0	7.0	10.5	17.5	16.3	NO

END OF PROGRAM

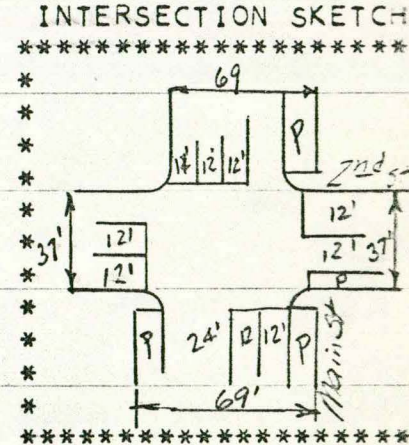
KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST & SECOND ST
 MAIN ST BRIDGE WITH CBD BYPASS MADE BY GAM 11-05-76

BASIC CONDITIONS
 CYCLE LENGTH = 75 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 2ND ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB (FROM BRIDGE)
 BASE YEAR = 1975 42 2ND ST EB
 DESIGN YEAR = 2000 33 MAIN ST LT TO BYPASS
 AREA = CBD



INPUT DATA

MOVE CODE	K	D	T	LB	DSL	DHV	R	L	WIDTH APPR	WIDTH EXIT	N TURN L	CHART ANG	CHART CODE
12	10.	50.	4.	0.	C	595.	24.	6.	35.	35.	3	0.	1
22	10.	50.	4.	0.	C	150.	23.	3.	12.	24.	1	0.	1
32	10.	50.	4.	0.	C	160.	1.	0.	12.	35.	1	0.	1
34	10.	50.	4.	0.	C	260.	0.	0.	12.	24.	1	0.	1
33	10.	50.	4.	0.	C	260.	0.	0.	12.	24.	1	90.	23
41	10.	50.	4.	0.	C	260.	0.	0.	12.	24.	1	90.	23
42	10.	50.	4.	0.	C	255.	0.	57.	12.	12.	1	0.	1



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C REQD	G/C USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	ANNUAL GROWTH
A	33	0.04	0.23	0.24	****	268.	348.	0.75	C	2001	2.811
A	41	0.04	0.23	0.24	****	268.	348.	0.75	C	2001	2.811
A	34	0.04	0.23	0.24	0.11	275.	330.	0.79	C	2002	2.811
B	42	0.04	0.36	0.37	0.10	262.	315.	0.81	C	2001	3.061
B	22	0.04	0.19	0.37	0.05	293.	351.	0.43	A	2024	2.811
C	12	0.04	0.26	0.27	0.18	612.	753.	0.79	C	2001	2.916
C	32	0.04	0.14	0.27	0.05	306.	367.	0.44	A	2021	3.077

V/C RATIO = 0.723 (OVERALL INTERSECTION)

*****	*****	*****
* PHASE A *	* PHASE B *	* PHASE C *
*****	*****	*****
* *	* *	* *
*****	*****	*****

* G/C = 0.24 *	* G/C = 0.37 *	* G/C = 0.27 *	*
* G = 18. *	* A = 3. *	* G = 28. *	* A = 3. *

LEOKUK BRIDGE LOCATION EVALUATION - MAIN ST & SECOND ST
 MAIN ST BRIDGE WITH CBD BYPASS MADE BY GAM 11-05-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	33	0.69	3.74	0.00	0.00	0.7464
A	41	0.69	3.74	0.00	0.00	0.7464
A	34	0.77	4.19	0.00	0.00	0.7857
B	42	0.75	3.99	0.00	0.00	0.8085
B	22	0.35	1.11	0.00	0.00	0.4254
C	12	0.86	10.75	0.00	0.00	0.7895
C	32	0.43	1.46	0.00	0.00	0.4349

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	33	1.0	28.1	4.1	105.5	5.2	133.6
A	41	1.0	28.1	4.1	105.5	5.2	133.6
A	34	1.4	36.0	4.1	103.0	5.5	139.0
B	42	1.7	42.6	3.3	83.6	5.0	126.3
B	22	0.1	3.9	1.9	49.1	2.1	53.1
C	12	1.4	37.0	3.0	75.3	4.4	112.4
C	32	0.1	4.1	2.4	60.8	2.5	64.9

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE	STORAGE	TAPER	TOTAL
					MAX	LENGTH	LENGTH	LENGTH
A	33	9.87	A	33	5	192.	96.	288.
A	41	9.87	A	41	5	192.	96.	288.
A	34	9.87						
B	42	9.04						
B	22	0.49						
C	12	12.48						
C	32	0.23						

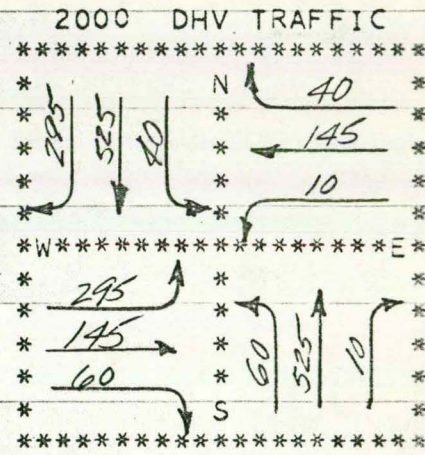
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE

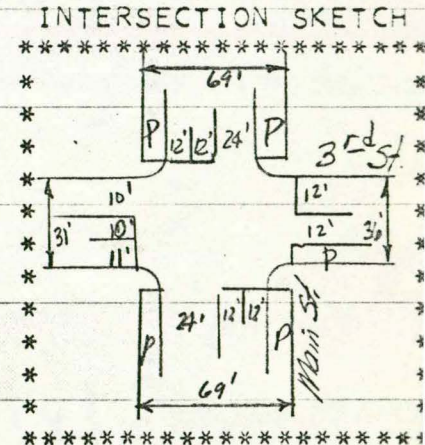
END OF PROGRAM

KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND THIRD ST
 MAIN ST BRIDGE WITH CBD BYPASS MADE BY GAM 11-05-76

BASIC CONDITIONS	CODE	TRAFFIC MOVEMENT
CYCLE LENGTH = 45 SECS	12	MAIN ST SB
METRO POPULATION = 75000.22	32	3RD ST WB
PEAK HOUR FACTOR = 0.85	32	MAIN ST NB
BASE YEAR = 1975	42	3RD ST EB (SHOPPING CENTER)
DESIGN YEAR = 2000	43	3RD ST EB LT TURN
AREA = CBD		

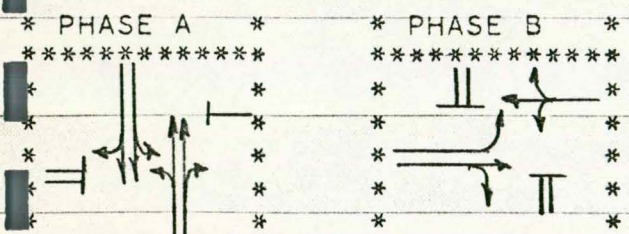


MOVE CODE	K	D	T	LB	DSL	DHV	R	L	APPR	EXIT	L	ANG	CHART CODE
12	10.	50.	4.	0.	C	860.	34.	5.	35.	35.	2	0.	5
22	10.	50.	4.	0.	C	195.	21.	5.	12.	10.	1	0.	1
32	10.	50.	4.	0.	C	595.	2.	10.	35.	35.	2	0.	5
42	10.	50.	4.	0.	C	205.	29.	0.	11.	12.	1	0.	1
43	10.	50.	4.	0.	C	295.	0.	0.	10.	24.	1	90.	22



PHASE	MOVE CODE	A/C RATIO	G/C REQD	RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	12	0.07	0.50	0.53	0.28	909.	1100.	0.78	C	2002		2.908
A	32	0.07	0.35	0.53	0.28	883.	1069.	0.56	A	2010		3.875
B	22	0.07	0.26	0.34	0.15	258.	310.	0.63	A	2010		2.918
B	42	0.07	0.28	0.34	0.13	252.	303.	0.68	A	2007		2.912
B	43	0.07	0.32	0.34	****	323.	323.	0.91	-	2003		2.881

V/C RATIO = 0.713 (OVERALL INTERSECTION)



* G/C = 0.53 * * G/C = 0.34 *
 * G = 24. * * A = 3. * * G = 15. * * A = 3. *

EOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND THIRD ST
 MAIN ST BRIDGE WITH CBD BYPASS MADE BY GAM 11-05-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.33	3.60	0.00	0.00	0.7811
A	32	0.18	1.40	0.00	0.00	0.5563
B	22	0.36	0.90	0.00	0.00	0.6277
B	42	0.41	1.06	0.00	0.00	0.6754
B	43	0.75	2.76	0.00	0.00	0.9126

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	1.3	34.8	2.5	63.6	3.9	98.5
A	32	0.3	8.7	1.7	44.0	2.1	52.7
B	22	0.5	13.2	1.6	40.2	2.1	53.4
B	42	0.7	17.5	1.6	42.2	2.3	59.8
B	43	1.2	32.1	2.4	62.2	3.6	94.3

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE MAX	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
A	32	1.41						
B	22	3.79						
B	42	4.63						
B	43	16.81	B	43	4	153.	80.	233.

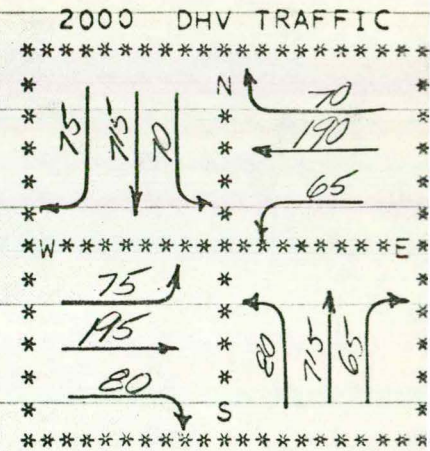
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	29.0	7.5	4.0	7.0	5.3	12.3	26.6	YES
A	4	30.0	7.5	4.0	7.0	5.6	12.6	26.6	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	18.3	YES
B	3	48.0	6.0	4.0	7.0	10.5	17.5	18.3	YES

END OF PROGRAM

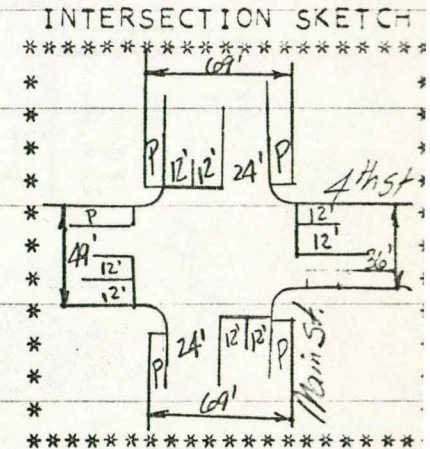
KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 4TH ST
 MAIN ST BRIDGE WITH CBD BYPASS MADE BY GAM 11-05-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 4TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 4TH ST EB
 DESIGN YEAR = 2000
 AREA = CBD



INPUT DATA

MOVE CODE	K	D	T	LB	DSL	DHV	R	L	APPR	EXIT	L	ANG	CODE
12	10.	50.	4.	0.	C	860.	9.	8.	35.	35.	2	0.	5
22	10.	50.	4.	0.	C	325.	22.	20.	24.	24.	2	0.	1
32	10.	50.	4.	0.	C	860.	8.	9.	35.	35.	2	0.	5
42	10.	50.	4.	0.	C	510.	23.	21.	24.	24.	2	0.	1



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C RATIO REQD	G/C RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	ANNUAL GROWTH
A	12	0.07	0.51	0.49	0.38	819.	991.	0.87	D	1998	2.908
A	32	0.07	0.51	0.49	0.38	813.	984.	0.87	D	1998	2.908
B	22	0.07	0.25	0.38	0.11	488.	585.	0.56	A	2014	2.875
B	42	0.07	0.40	0.38	0.16	482.	579.	0.88	D	1999	4.492

V/C RATIO = 0.832 (OVERALL INTERSECTION)

* PHASE A * * PHASE B *

* G/C = 0.49 * * G/C = 0.38 * *

* G = 22. * * A = 3. * * G = 17. * * A = 3. *

EOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 4TH ST
 MAIN ST BRIDGE WITH CBD BYPASS MADE BY GAM 11-05-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.56	6.04	0.00	0.00	0.8671
A	32	0.58	6.33	0.00	0.00	0.8735
B	22	0.30	1.25	0.00	0.00	0.5550
B	42	0.75	4.78	0.00	0.00	0.8805

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	2.8	70.7	2.7	68.9	5.5	139.7
A	32	3.0	75.4	2.7	68.9	5.7	144.4
B	22	0.3	8.6	1.2	31.5	1.6	40.1
B	42	1.2	30.2	1.9	49.4	3.1	79.7

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE	STORAGE	TAPER	TOTAL
					MAX	LENGTH	LENGTH	LENGTH
A	12	17.53						
A	32	17.53						
B	22	1.77						
B	42	10.39						

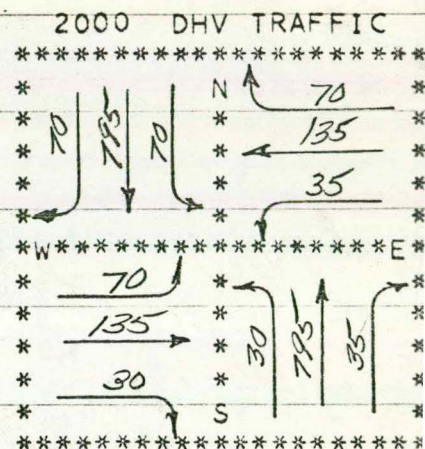
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	30.0	6.0	4.0	7.0	6.0	13.0	24.9	YES
A	4	36.0	6.0	4.0	7.0	7.5	14.5	24.9	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	20.0	YES
B	3	48.0	6.0	4.0	7.0	10.5	17.5	20.0	YES

END OF PRJGRAM

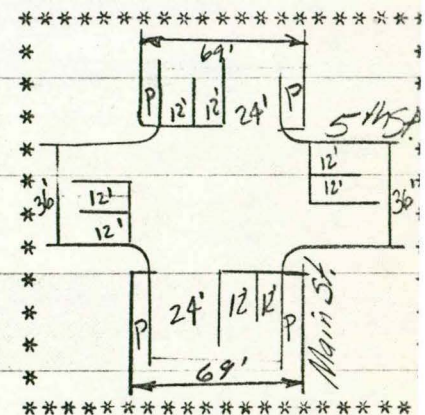
KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 5TH ST
 MAIN ST BRIDGE WITH CBD BYPASS MADE BY GAM 11-05-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 5TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 5TH ST EB
 DESIGN YEAR = 2000
 AREA = CBD



INPUT DATA

MOVE CODE	K	D	T	LB	DSL	DHV	URNS R	L	WIDTH APPR	EXIT	N TURN L	CHART ANG	INTERSECTION SKETCH CODE
12	10.	50.	4.	0.	C	935.	7.	7.	35.	35.	2	0.	5
22	10.	50.	4.	0.	C	240.	29.	15.	22.	12.	2	0.	1
32	10.	50.	4.	0.	C	860.	4.	3.	35.	35.	2	0.	5
42	10.	50.	4.	0.	C	235.	13.	29.	24.	12.	2	0.	1



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C RATIO REQD	G/C RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	12	0.07	0.55	0.63	0.43	1083.	1310.	0.71	A	2005	2005	2.877
A	32	0.07	0.48	0.63	0.43	1133.	1371.	0.63	A	2010	2010	2.908
B	22	0.07	0.20	0.23	0.16	278.	333.	0.72	A	2005	2005	2.811
B	42	0.07	0.18	0.23	0.16	297.	357.	0.66	A	2008	2008	2.899

V/C RATIO = 0.675 (OVERALL INTERSECTION)

* PHASE A *	* PHASE B *
*****	*****
* *	* *
*****	*****
* G/C = 0.63 *	* G/C = 0.23 *
* G = 29. * A = 3. *	* G = 10. * A = 3. *
*****	*****

KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 5TH ST
 MAIN ST BRIDGE WITH CBD BYPASS MADE BY GAM 11-05-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.20	2.39	0.00	0.00	0.7134
A	32	0.15	1.68	0.00	0.00	0.6270
B	22	0.72	2.16	0.00	0.00	0.7186
B	42	0.58	1.71	0.00	0.00	0.6579

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	0.8	22.2	2.1	53.4	3.0	75.6
A	32	0.5	13.1	1.9	49.1	2.4	62.3
B	22	0.9	22.9	1.1	28.7	2.0	51.7
B	42	0.6	15.8	1.1	28.1	1.7	44.0

CYCLE FAILURE ANALYSIS

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES
A	12	7.35
A	32	2.18
B	22	6.56
B	42	6.17

TURNING LANE CHECK

PHASE	MOVE CODE	QUEUE MAX LENGTH	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
-------	-----------	------------------	----------------	--------------	--------------

PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	28.0	7.0	4.0	7.0	5.2	12.2	31.5	YES
A	4	28.0	7.0	4.0	7.0	5.2	12.2	31.5	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	13.4	NO
B	3	48.0	6.0	4.0	7.0	10.5	17.5	13.4	NO

END OF PROGRAM

KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 6TH ST
 MAIN ST BRIDGE WITH CBD BYPASS MADE BY GAM 11-05-76

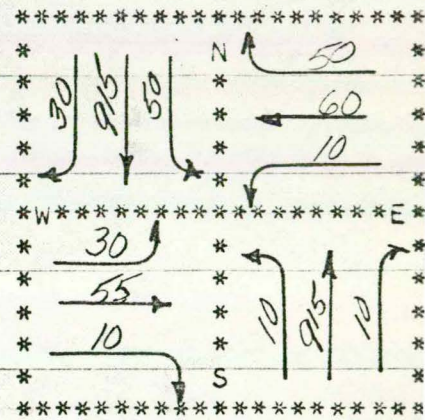
BASIC CONDITIONS

CYCLE LENGTH = 45 SECS
 METRO POPULATION = 75000
 PEAK HOUR FACTOR = 0.85
 BASE YEAR = 1975
 DESIGN YEAR = 2000
 AREA = CBD

CODE TRAFFIC MOVEMENT

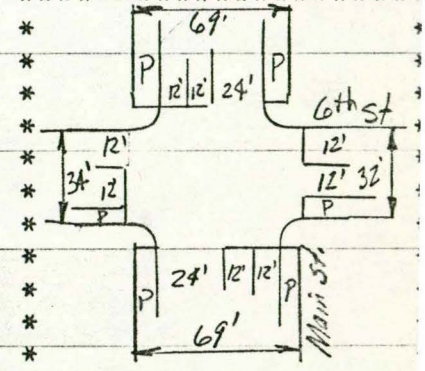
12 MAIN ST SB
 22 6TH ST WB
 32 MAIN ST NB
 42 6TH ST EB

2000 DHV TRAFFIC



INPUT DATA

MOVE CODE	K	D	T	LB	DSL	DHV	TURN R	TURN L	WIDTH APPR	WIDTH EXIT	N TURN L	TURN CHART ANG	CHART CODE	INTERSECTION SKETCH
12	10	50	4	0	C	995	3	5	35	35	2	0	5	*
22	10	30	4	0	C	120	43	9	12	12	1	0	1	*
32	10	50	4	0	C	935	1	1	35	35	2	0	5	*
42	10	50	4	0	C	95	14	29	12	12	1	0	1	*



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C REQD	G/C USED	RATIO EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	12	0.07	0.57	0.65	0.49	1147	1388	0.72	A	2005	2005	2.873
A	32	0.07	0.51	0.65	0.49	1197	1448	0.65	A	2009	2009	2.877
B	22	0.07	0.19	0.21	0.05	138	166	0.72	A	2005	2005	2.811
B	42	0.07	0.17	0.21	0.05	122	147	0.65	A	2010	2010	2.600

V/C RATIO = 0.683 (OVERALL INTERSECTION)

* PHASE A * * PHASE B *

* G/C = 0.65 * * G/C = 0.21 * *

* G = 29. *A = 3. * G = 10. *A = 3. *

KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 6TH ST
 MAIN ST BRIDGE WITH CBD BYPASS MADE BY GAM 11-05-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.19	2.40	0.00	0.00	0.7166
A	32	0.15	1.78	0.00	0.00	0.6455
B	22	0.73	1.10	0.00	0.00	0.7206
B	42	0.63	0.75	0.00	0.00	0.6461

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	0.9	22.6	2.1	54.0	3.0	76.6
A	32	0.5	14.6	2.0	50.7	2.6	65.4
B	22	0.9	23.2	1.1	29.4	2.1	52.7
B	42	0.5	14.7	0.9	23.3	1.5	38.0

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE	STORAGE	TAPER	TOTAL
					MAX	LENGTH	LENGTH	LENGTH
A	12	5.23						
A	32	3.64						
B	22	6.56						
B	42	3.26						

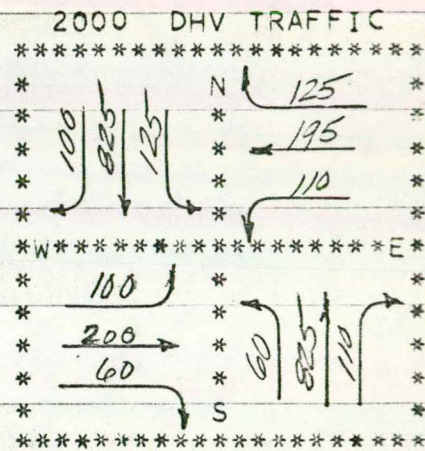
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	32.0	8.0	4.0	7.0	6.0	13.0	32.3	YES
A	4	34.0	9.0	4.0	7.0	6.2	13.2	32.3	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	12.6	NO
B	3	48.0	6.0	4.0	7.0	10.5	17.5	12.6	NO

END OF PROGRAM

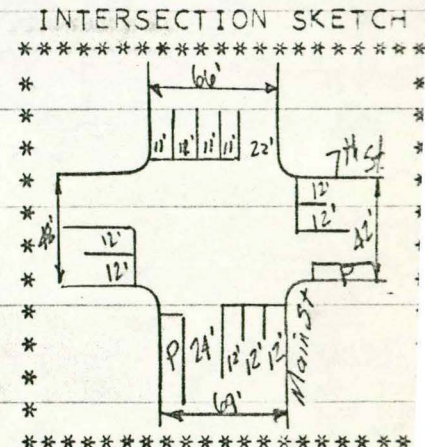
KEOKUK BRIDGE LOCATION EVALUATION - MAIN ST & 7TH ST
 MAIN ST BRIDGE WITH CBD BYPASS MADE BY GAM 11-05-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 60 SECS 11 MAIN ST SB RT TO US136 WEST
 METRO POPULATION = 75000.12 MAIN ST SB
 PEAK HOUR FACTOR = 0.85 13 MAIN ST SB LT
 BASE YEAR = 1975 22 7TH ST WB
 DESIGN YEAR = 2000 32 MAIN ST NB
 AREA = CBD 33 MAIN ST NB LT TO US136 WEST
 42 7TH ST EB



INPUT DATA

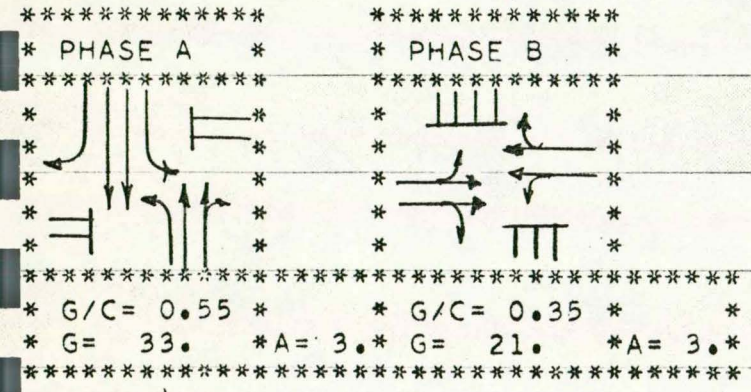
MOVE CODE	K	D	T	LB	DSL	DHV	R	L	APPR	EXIT	L	ANG	CODE
11	10.	50.	4.	0.	C	100.	0.	0.	11.	24.	1	90.	23
12	10.	50.	4.	0.	C	825.	0.	0.	22.	24.	2	0.	1
32	10.	50.	4.	0.	C	935.	12.	0.	24.	22.	2	0.	1
13	10.	50.	4.	0.	C	125.	0.	0.	11.	12.	1	90.	22
33	10.	50.	4.	0.	C	60.	0.	0.	12.	24.	1	90.	22
22	10.	50.	4.	0.	C	430.	29.	26.	24.	24.	2	0.	1
42	10.	50.	4.	0.	C	360.	17.	28.	24.	12.	2	0.	1



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C RATIO REQD	G/C RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	ANNUAL GROWTH
A	11	0.05	0.10	0.55	****	564.	733.	0.14	A	2062	2.811
A	12	0.05	0.51	0.55	0.47	883.	1060.	0.78	C	2002	2.886
A	13	0.05	0.72	0.55	****	132.	132.	0.95	-	2002	2.979
A	32	0.05	0.57	0.55	0.51	909.	1091.	0.86	D	1999	2.877
A	33	0.05	0.63	0.55	****	144.	144.	0.42	-	2032	2.811
B	22	0.05	0.36	0.35	0.11	418.	502.	0.86	D	1999	2.908
B	42	0.05	0.29	0.35	0.23	441.	529.	0.68	A	2007	2.927

V/C RATIO = 0.748 (OVERALL INTERSECTION)



LEOKUK BRIDGE LOCATION EVALUATION - MAIN ST & 7TH ST
 MAIN ST BRIDGE WITH CBD BYPASS MADE BY GAM 11-05-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	11	0.11	0.19	0.00	0.00	0.1362
A	12	0.37	5.13	0.00	0.00	0.7781
A	13	1.00	2.08	0.00	0.00	0.9433
A	32	0.51	8.05	0.00	0.00	0.8556
A	33	0.27	0.27	0.00	0.00	0.4152
B	22	1.00	7.16	0.00	0.00	0.8552
B	42	0.51	3.10	0.00	0.00	0.6801

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	11	0.0	0.2	0.7	19.1	0.7	19.4
A	12	1.3	34.1	3.0	77.3	4.4	111.4
A	13	1.1	29.3	0.9	23.9	2.0	53.3
A	32	2.5	64.0	3.5	87.6	6.0	151.6
A	33	0.1	3.7	0.4	11.5	0.5	15.2
B	22	1.2	31.3	2.3	58.2	3.5	89.6
B	42	0.7	18.0	1.9	48.7	2.6	66.8

CYCLE FAILURE ANALYSIS

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES
A	11	0.00
A	12	8.98
A	13	15.82
A	32	16.39
A	33	1.89
B	22	15.35
B	42	8.39

TURNING LANE CHECK

PHASE	MOVE CODE	QUEUE MAX	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
A	11	2	76.	88.	164.
A	13	2	76.	88.	164.
A	33	2	76.	96.	172.

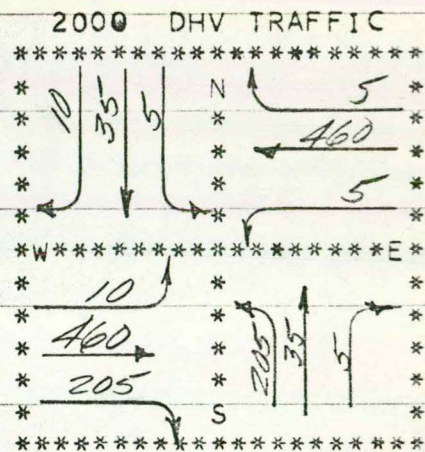
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE

END OF PROGRAM

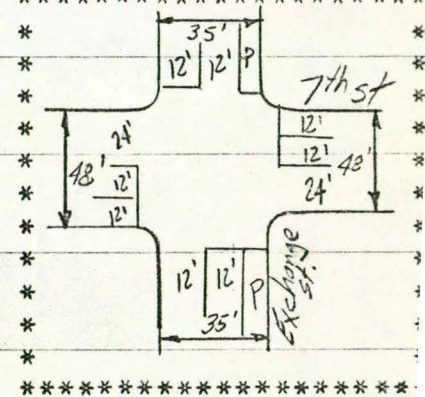
WOKUK NEW BRIDGE EVALUATION 7TH ST (US136) & EXCHANGE ST
 MAIN ST BRIDGE LOCATION WITH CBD BYPASS MADE BY GAM 11-05-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 45 SECS 12 EXCHANGE ST SB
 METRO POPULATION = 75000.22 7TH ST US136 WB
 PEAK HOUR FACTOR = 0.85 32 EXCHANGE ST NB
 BASE YEAR = 1975 42 7TH ST US136 EB
 DESIGN YEAR = 2000
 AREA = FRINGE



INPUT DATA

MOVE CODE	K	D	T	LB	DSL	DHV	TURN R	TURN L	WIDTH APPR	WIDTH EXIT	N TURN L	TURN ANG	CHART CODE	INTERSECTION SKETCH
12	10.	50.	4.	0.	C	50.	20.	10.	12.	12.	1	0.	2	*
22	10.	50.	4.	0.	C	470.	1.	1.	24.	24.	2	0.	2	*
32	10.	50.	4.	0.	C	245.	16.	0.	12.	24.	1	90.	2T	*
42	10.	50.	4.	0.	C	675.	30.	1.	24.	24.	2	0.	2	*



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C REQD	G/C USED	EXIT RATIO	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	22	0.04	0.22	0.51	0.21	1098.	1318.	0.36	A	2030		2.899
A	42	0.04	0.36	0.51	0.21	946.	1135.	0.59	A	2012		2.903
B	12	0.07	0.06	0.38	0.02	316.	379.	0.13	A	2067		2.811
B	32	0.07	0.27	0.38	0.07	343.	412.	0.59	A	2012		2.896

V/C RATIO = 0.500 (OVERALL INTERSECTION)

* PHASE A * * PHASE B *

* G/C = 0.51 * * G/C = 0.38 * *

* G = 23. * A = 2. * G = 17. * A = 3. *

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	22	0.13	0.79	0.00	0.00	0.3565
A	42	0.20	1.74	0.00	0.00	0.5944
B	12	0.16	0.10	0.00	0.00	0.1316
B	32	0.29	0.89	0.00	0.00	0.5940

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	22	0.0	2.4	1.4	36.1	1.5	38.5
A	42	0.4	10.8	2.0	51.8	2.5	62.7
B	12	0.0	0.2	0.3	9.6	0.3	9.9
B	32	0.4	11.1	1.8	48.5	2.3	59.6

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES		PHASE	MOVE CODE	QUEUE MAX LENGTH	STORAGE TAPER LENGTH	TOTAL LENGTH
A	22	0.09						
A	42	2.86						
B	12	0.00						
B	32	3.67						

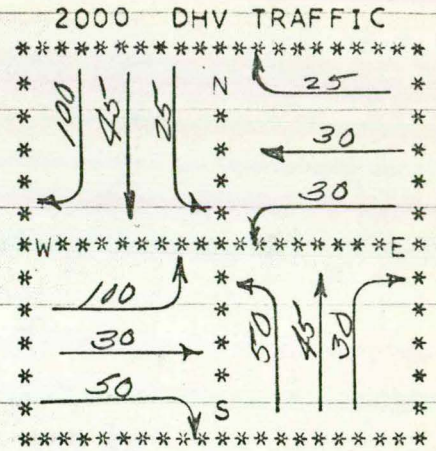
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE

END OF PROGRAM

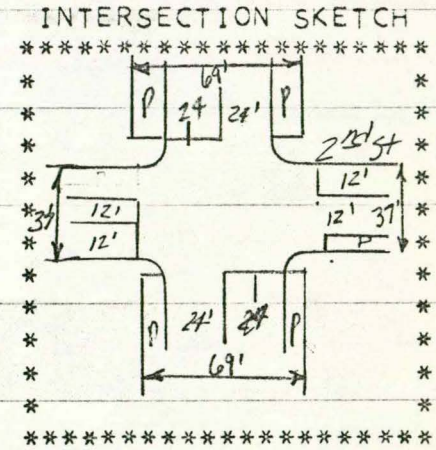
OKUK BRIDGE LOCATION EVALUATION - MAIN ST AND SECOND ST INTERSECTION
 ANK-TIMEA ST. ALTERNATE MADE ABY GAM 10-19-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 SECOND ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 SECOND ST EB
 DESIGN YEAR = 2000 43 SECOND ST EB LT
 AREA = CBD



INPUT DATA

MOVE	DESIGN FACTORS	URNS	WIDTH	N TURN	CHART
CODE	K D T LB DSL DHV	R L	APPR EXIT	L ANG	CODE
12	10. 50. 4. 0. C 170.	59. 15.	35. 35.	2 0.	5
2	18. 50. 3. 0. C 85.	29. 35.	12. 12.	1 0.	1
32	10. 50. 4. 0. C 125.	24. 40.	35. 35.	2 0.	5
43	12. 50. 3. 0. C 100.	0. 0.	12. 22.	1 90.	22
2	12. 50. 3. 0. C 80.	63. 0.	12. 12.	1 0.	1



OUTPUT DATA

PHASE	MOVE	A/C	G/C RATIO	SERVICE CAPACITY	V/C	SERVICE YEAR	DSL	ANNUAL
	CODE	RATIO	REQD USED EXIT	VOLUME	RATIO	LEVEL	EXCEEDED	GROWTH
A	12	0.07	0.11 0.34 0.02	535. 647.	0.26	A	2066	1.756
A	32	0.07	0.09 0.34 0.02	471. 570.	0.22	A	2086	1.554
	22	0.07	0.17 0.52 0.03	267. 321.	0.26	A	2045	2.576
	42	0.07	0.10 0.52 0.03	432. 518.	0.15	A	2061	2.811
B	43	0.07	0.08 0.52 ****	906. 906.	0.11	-	2079	2.811

V/C RATIO = 0.210 (OVERALL INTERSECTION)

* PHASE A * * PHASE B *

* G/C = 0.34 * * G/C = 0.52 * *

* G = 15. * * A = 3. * * G = 24. * * A = 3. *

OKUK BRIDGE LOCATION EVALUATION - MAIN ST AND SECOND ST INTERSECTION
 NK-TIMEA ST. ALTERNATE MADE ABY GAM 10-19-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.21	0.44	0.00	0.00	0.2625
A	32	0.20	0.32	0.00	0.00	0.2189
B	22	0.13	0.14	0.00	0.00	0.2644
B	42	0.10	0.10	0.00	0.00	0.1541
B	43	0.09	0.11	0.00	0.00	0.1103

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	0.0	1.1	0.6	17.4	0.7	18.6
A	32	0.0	0.7	0.5	12.8	0.5	13.6
B	22	0.0	1.1	0.5	12.6	0.5	13.8
B	42	0.0	0.3	0.4	11.8	0.4	12.2
B	43	0.0	0.1	0.5	15.1	0.6	15.3

QUEUE FAILURE ANALYSIS

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	TURNING LANE CHECK				
			PHASE	MOVE CODE	QUEUE MAX LENGTH	TAPER LENGTH	TOTAL LENGTH
A	12	0.08					
A	32	0.01					
B	22	0.08					
B	42	0.00					
B	43	0.00	B	43	2	76.	96. 172.

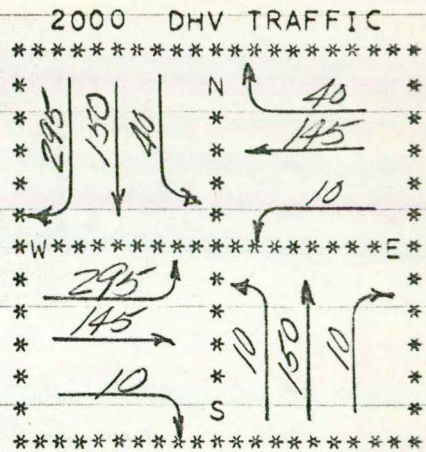
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	48.0	6.0	4.0	7.0	10.5	17.5	18.3	YES
A	4	48.0	6.0	4.0	7.0	10.5	17.5	18.3	YES
B	1	24.0	6.0	4.0	7.0	4.5	11.5	26.6	YES
B	3	40.0	6.0	4.0	7.0	8.5	15.5	26.6	YES

END OF PROGRAM

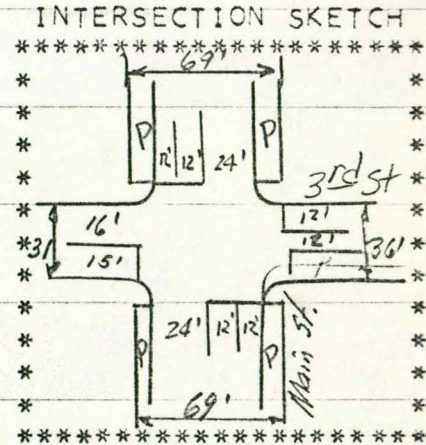
POKUK BRIDGE LOCATION EVALUATION - MAIN ST AND THIRD ST
 ANK-TIMEA ST. ALTERNATE MADE BY GAM 10-19-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 3RD ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 3RD ST EB (SHOPPING CENTER)
 DESIGN YEAR = 2000
 AREA = CBD



INPUT DATA

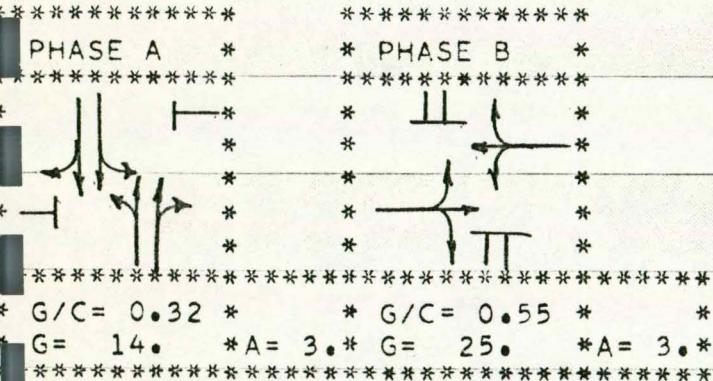
MOVE	DESIGN FACTORS	URNS	WIDTH	N TURN	CHART	INTERSECTION SKETCH
CODE	K D T LB DSL DHV	R L	APPR EXIT	L ANG	CODE	
12	10. 50. 4. 0. C 485.	61. 8.	35. 35.	2 0.	5	*
22	10. 50. 4. 0. C 195.	21. 0.	15. 15.	1 0.	1	*
32	10. 50. 4. 0. C 170.	0. 5.	35. 35.	2 0.	5	*
42	10. 50. 4. 0. C 450.	1. 66.	15. 15.	1 0.	1	*



OUTPUT DATA

PHASE	MOVE	A/C	G/C RATIO	SERVICE CAPACITY	V/C	SERVICE YEAR	DSL	ANNUAL
	CODE	RATIO	REQD USED EXIT	VOLUME	RATIO	LEVEL	EXCEEDED	GROWTH
A	12	0.07	0.29 0.32 0.08	531. 643.	0.75	A	2004	2.447
A	32	0.07	0.10 0.32 0.09	560. 678.	0.25	A	2069	1.756
B	22	0.07	0.18 0.55 0.10	607. 729.	0.27	A	2039	2.918
B	42	0.07	0.50 0.55 0.10	493. 591.	0.76	C	2003	2.903

V/C RATIO = 0.617 (OVERALL INTERSECTION)



OKUK BRIDGE LOCATION EVALUATION - MAIN ST AND THIRD ST
 NK-TIMEA ST. ALTERNATE MADE BY GAM 10-19-76

TERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.51	3.11	0.00	0.00	0.7540
A	32	0.21	0.46	0.00	0.00	0.2505
B	22	0.10	0.25	0.00	0.00	0.2673
B	42	0.28	1.62	0.00	0.00	0.7603

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	1.1	28.9	2.0	51.8	3.2	80.7
A	32	0.0	1.0	0.7	18.1	0.7	19.2
B	22	0.0	1.2	1.0	27.4	1.1	28.6
B	42	1.2	30.1	2.5	63.2	3.7	93.4

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE STORAGE	TAPER	TOTAL LENGTH
					MAX LENGTH	LENGTH	
A	12	8.71					
A	32	0.08					
B	22	0.00					
B	42	11.65					

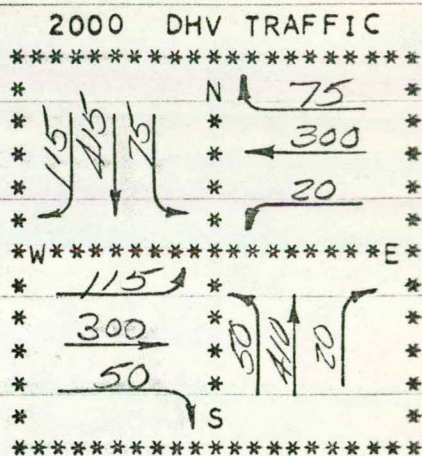
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	29.0	7.5	4.0	7.0	5.3	12.3	17.2	YES
A	4	30.0	7.5	4.0	7.0	5.6	12.6	17.2	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	27.7	YES
B	3	48.0	6.0	4.0	7.0	10.5	17.5	27.7	YES

END OF PROGRAM

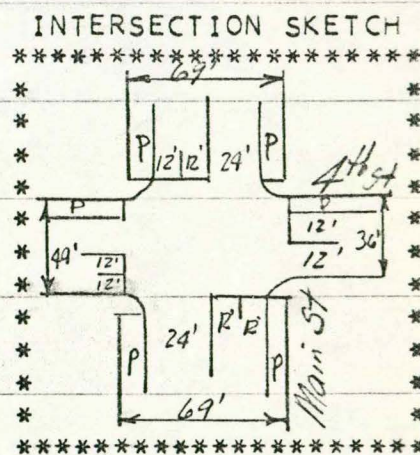
EOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 4TH ST
 ANK-TIMEA ST. ALTERNATE MADE BY GAM 10-20-76

ASIC CONDITIONS CODE TRAFFIC MOVEMENT
 YCLE LENGTH = 45 SECS 12 MAIN ST SB
 RETRO POPULATION= 75000.22 4TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 4TH ST EB
 DESIGN YEAR = 2000
 AREA = CBD



INPUT DATA

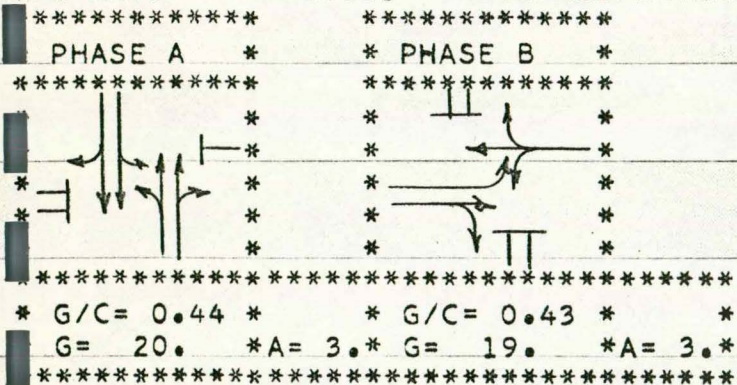
MOVE CODE	K	D	T	LB	DSL	DHV	URNS R	L	WIDTH APPR	EXIT	N TURN L	CHART ANG	INTERSECTION SKETCH
12	10	50	4	0	C	605	19	7	35	35	2	0	5
22	10	50	4	0	C	395	19	5	24	25	1	0	5
32	10	50	4	0	C	485	4	10	35	35	2	0	5
42	10	50	4	0	C	465	11	25	24	12	2	0	1



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C REQD	RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	ANNUAL GROWTH
A	12	0.07	0.37	0.44	0.24	728	881	0.69	A	2007	2.580
A	32	0.07	0.29	0.44	0.22	734	888	0.55	A	2017	2.447
B	22	0.07	0.36	0.43	0.22	475	538	0.73	A	2007	2.863
B	42	0.07	0.35	0.43	0.35	565	677	0.69	A	2007	2.855

V/C RATIO= 0.661 (OVERALL INTERSECTION)



EOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 4TH ST
 ANK-TIMEA ST. ALTERNATE MADE BY GAM 10-20-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.31	2.39	0.00	0.00	0.6865
A	32	0.23	1.42	0.00	0.00	0.5459
B	22	0.33	1.63	0.00	0.00	0.7336
B	42	0.36	2.12	0.00	0.00	0.6858

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	0.7	18.8	2.1	53.0	2.8	71.8
A	32	0.3	8.2	1.6	42.4	2.0	50.7
B	22	1.0	25.2	2.8	70.7	3.8	95.9
B	42	0.7	18.7	1.6	41.6	2.4	60.3

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE MAX	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
A	12	3.91						
A	32	1.25						
B	22	6.40						
B	42	7.47						

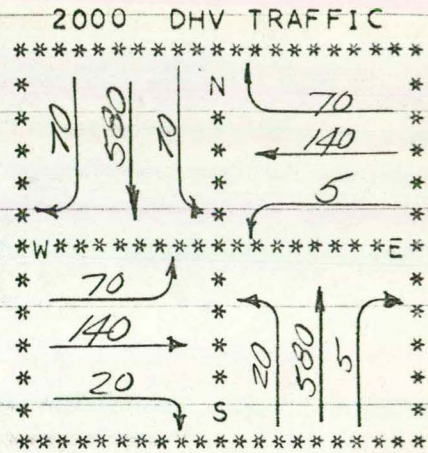
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	30.0	6.0	4.0	7.0	6.0	13.0	22.7	YES
A	4	36.0	6.0	4.0	7.0	7.5	14.5	22.7	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	22.2	YES
B	3	48.0	6.0	4.0	7.0	10.5	17.5	22.2	YES

END OF PROGRAM

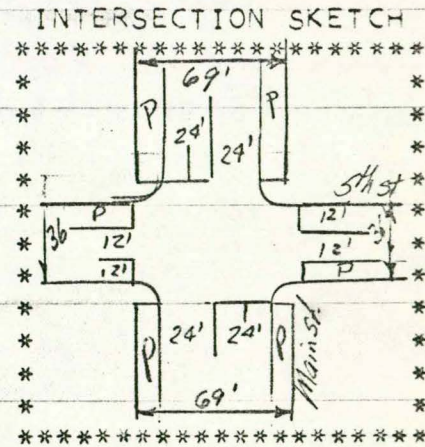
FOKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 5TH ST
 ANK-TIMEA ST ALTERNATE MADE BY GAM 10-20-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 60 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 5TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 5TH ST EB
 DESIGN YEAR = 2000
 AREA = CBD



INPUT DATA

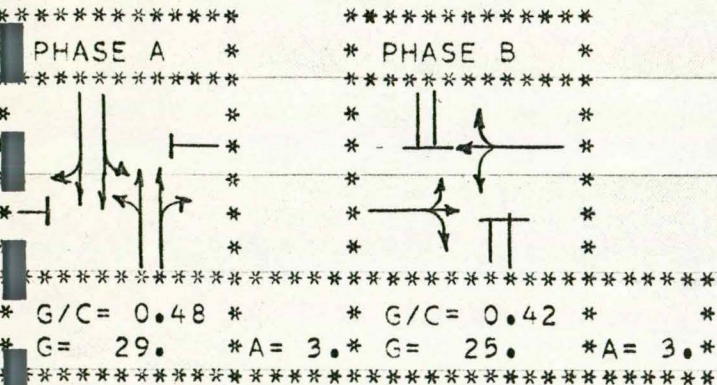
MOVE	DESIGN FACTORS	TURNS	WIDTH	N TURN CHART
CODE	K D T LB DSL DHV	R L	APPR EXIT	L ANG CODE
12	10. 50. 4. 0. C 720.	10. 10.	35. 35.	2 0. 5
22	10. 50. 4. 0. C 215.	32. 2.	12. 12.	1 0. 1
32	10. 50. 4. 0. C 605.	1. 3.	35. 35.	2 0. 5
42	10. 50. 4. 0. C 230.	9. 30.	12. 12.	1 0. 1



OUTPUT DATA

PHASE	MOVE	A/C	G/C RATIO	SERVICE CAPACITY	V/C	SERVICE YEAR	DSL	ANNUAL
	CODE	RATIO	REQD USED EXIT	VOLUME	RATIO	LEVEL	EXCEEDED	GROWTH
A	12	0.05	0.44 0.48 0.31	791. 957.	0.75	A	2004	2.643
A	32	0.05	0.34 0.48 0.31	865. 1047.	0.58	A	2014	2.580
B	22	0.05	0.28 0.42 0.12	326. 391.	0.55	A	2016	2.716
B	42	0.05	0.38 0.42 0.12	253. 303.	0.76	C	2003	2.811

V/C RATIO = 0.669 (OVERALL INTERSECTION)



OKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 5TH ST
 NK-TIMEA ST ALTERNATE MADE BY GAM 10-20-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.39	4.79	0.00	0.00	0.7521
A	32	0.26	2.66	0.00	0.00	0.5777
B	22	0.31	1.11	0.00	0.00	0.5484
B	42	0.55	2.12	0.00	0.00	0.7575

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	1.1	28.5	3.1	77.9	4.2	106.4
A	32	0.3	9.8	2.6	65.4	3.0	75.3
B	22	0.3	8.3	2.0	52.0	2.4	60.3
B	42	1.1	29.6	2.2	55.6	3.4	85.2

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE MAX	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
A	32	1.44						
B	22	1.13						
B	42	9.40						

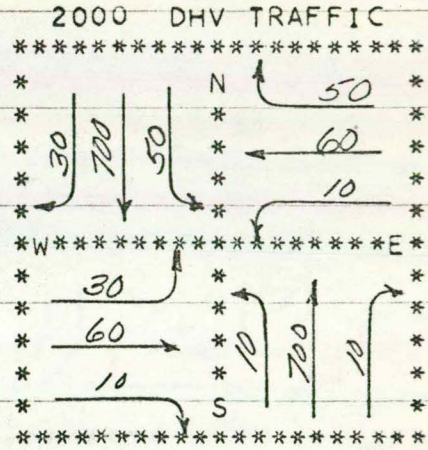
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	28.0	7.0	4.0	7.0	5.2	12.2	31.8	YES
A	4	28.0	7.0	4.0	7.0	5.2	12.2	31.8	YES
B	1	48.0	5.0	4.0	7.0	10.5	17.5	28.1	YES
B	3	48.0	6.0	4.0	7.0	10.5	17.5	28.1	YES

END OF PROGRAM

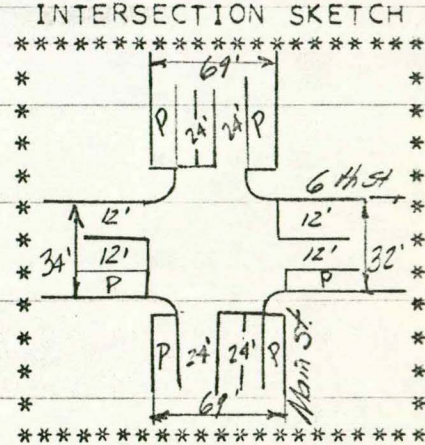
OKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 6TH ST
 ANK-TIMEA ST ALTERNATE MADE BY GAM 10-19-76

BASIC CONDITIONS CODE TRAFFIC MOVEMENT
 CYCLE LENGTH = 45 SECS 12 MAIN ST SB
 METRO POPULATION = 75000.22 6TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB
 BASE YEAR = 1975 42 6TH ST EB
 DESIGN YEAR = 2000
 AREA = CBD



INPUT DATA

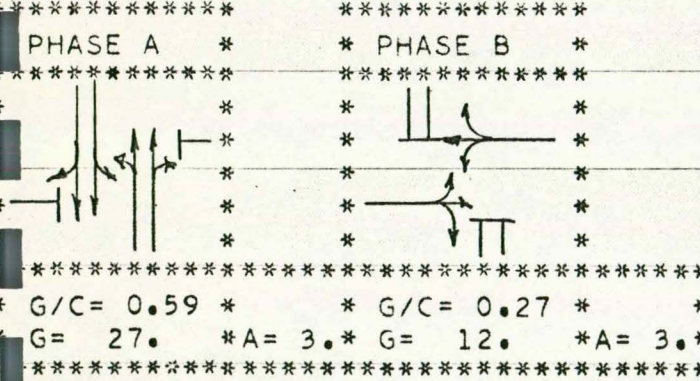
MOVE	DESIGN FACTORS	TURNS	WIDTH	N TURN CHART	INTERSECTION SKETCH
CODE	K D T LB DSL DHV	R L	APPR EXIT	L ANG CODE	
12	10. 50. 4. 0. C 780.	4. 6.	35. 35.	2 0. 5	*
32	10. 50. 4. 0. C 125.	40. 12.	12. 12.	1 0. 1	*
22	10. 50. 4. 0. C 720.	1. 1.	35. 35.	2 0. 5	*
42	10. 50. 4. 0. C 105.	14. 29.	12. 12.	1 0. 1	*



OUTPUT DATA

PHASE MOVE	A/C	G/C RATIO	SERVICE CAPACITY	V/C	SERVICE YEAR	DSL	ANNUAL
CODE	RATIO	REQD USED EXIT	VOLUME	RATIO	LEVEL	EXCEEDED	GROWTH
A 12	0.07	0.45 0.59 0.38	1029. 1246.	0.63	A	2011	2.656
A 32	0.07	0.39 0.59 0.38	1087. 1315.	0.55	A	2016	2.643
B 22	0.07	0.21 0.27 0.05	165. 198.	0.63	A	2009	2.979
B 42	0.07	0.18 0.27 0.05	156. 187.	0.56	A	2013	3.012

V/C RATIO = 0.589 (OVERALL INTERSECTION)



OKUK BRIDGE LOCATION EVALUATION - MAIN ST AND 6TH ST
 WINK-TIMEA ST ALTERNATE MADE BY GAM 10-19-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.17	1.74	0.00	0.00	0.6259
A	32	0.14	1.32	0.00	0.00	0.5472
B	22	0.49	0.77	0.00	0.00	0.6298
B	42	0.43	0.57	0.00	0.00	0.5585

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	0.5	13.0	1.9	49.6	2.5	62.7
A	32	0.3	8.2	1.8	45.8	2.1	54.1
B	22	0.5	13.3	1.1	28.3	1.6	41.7
B	42	0.3	8.8	0.9	23.8	1.3	32.6

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE MAX LENGTH	STORAGE TAPER LENGTH	TOTAL LENGTH
A	12	2.75					
A	32	1.70					
B	22	7.37					
B	42	4.43					

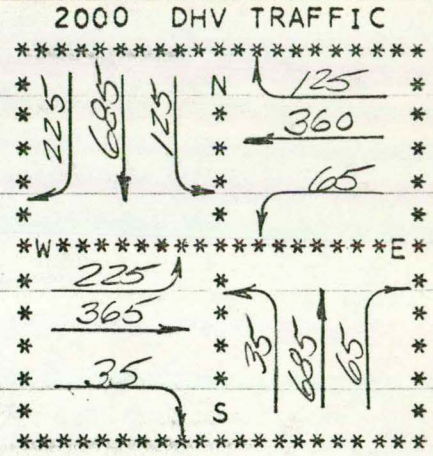
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
A	2	32.0	8.0	4.0	7.0	6.0	13.0	29.6	YES
A	4	34.0	9.0	4.0	7.0	6.2	13.2	29.6	YES
B	1	48.0	6.0	4.0	7.0	10.5	17.5	15.3	NO
B	3	48.0	6.0	4.0	7.0	10.5	17.5	15.3	NO

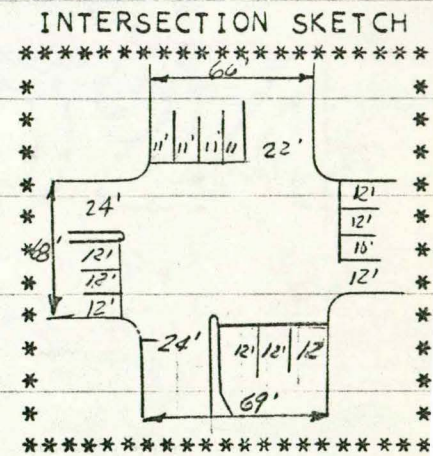
END OF PROGRAM

EOKUK-NEW BRIDGE EVALUATION - MAIN ST AND 7TH ST
 ANK-TIMEA ST ALTERNATE MADE BY GAM 11-08-76

ASIC CONDITIONS	CODE	TRAFFIC MOVEMENT
CYCLE LENGTH = 60 SECS	11	MAIN ST SB TO US136 W-RT.
METRO POPULATION = 75000	12	MAIN ST SB THRU
PEAK HOUR FACTOR = 0.85	13	MAIN ST SB LT
BASE YEAR = 1975	22	7TH ST WB
DESIGN YEAR = 2000	32	MAIN ST NB THRU & RT
AREA = CBD	33	MAIN ST NB LT TO US136 W
	42	7TH ST EB (US136) THRU & RT
	43	7TH ST EB LT
	23	7TH ST WB LT



MOVE CODE	K	D	T	LB	DSL	DHV	TURN R	TURN L	WIDTH APPR	WIDTH EXIT	N TURN L	TURN ANG	CHART CODE
11	10	50	4	0	C	225	0	0	11	24	1	90	23
12	10	50	4	0	C	685	0	0	22	24	2	0	1
23	10	50	4	0	C	65	0	0	10	24	1	90	23
22	10	50	4	0	C	485	26	0	24	24	2	0	1
32	10	50	4	0	C	750	9	0	24	22	2	0	1
33	10	50	4	0	C	35	0	0	12	24	1	90	22
13	10	50	4	0	C	125	0	0	11	12	1	90	22
42	10	50	4	0	C	400	9	0	24	12	2	0	1
43	10	50	4	0	C	225	0	0	12	22	1	90	23



PHASE	MOVE CODE	A/C RATIO	G/C RATIO REQD	G/C RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	ANNUAL GROWTH
A	11	0.05	0.22	0.39	****	404	526	0.43	A	2020	2.903
A	12	0.05	0.43	0.39	0.39	633	759	0.90	D	1997	2.902
A	13	0.05	0.61	0.39	****	132	132	0.95	-	2002	2.979
A	32	0.05	0.45	0.39	0.43	661	794	0.95	D	1996	2.922
A	33	0.05	0.51	0.39	****	144	144	0.24	-	2063	2.263
B	23	0.05	0.07	0.18	****	165	215	0.30	A	2030	3.141
B	43	0.05	0.20	0.18	****	198	258	0.87	D	1996	2.903
C	22	0.05	0.32	0.28	0.20	428	513	0.95	D	1996	2.854
C	42	0.05	0.24	0.28	0.43	467	561	0.71	A	2005	2.915

V/C RATIO = 0.798 (OVERALL INTERSECTION)

PHASE A	PHASE B	PHASE C
G/C = 0.39	G/C = 0.18	G/C = 0.28
G = 24	A = 3	G = 17
A = 3	G = 11	A = 3

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	11	0.26	0.98	0.00	0.00	0.4277
A	12	1.00	11.41	0.00	0.00	0.9014
A	13	1.00	2.08	0.00	0.00	0.9433
A	32	1.00	12.50	0.00	0.00	0.9444
A	33	0.26	0.15	0.00	0.00	0.2422
B	23	0.41	0.45	0.00	0.00	0.3017
B	43	1.00	3.75	0.00	0.00	0.8706
C	22	1.00	8.08	0.00	0.00	0.9441
C	42	0.58	3.92	0.00	0.00	0.7128

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	11	0.1	4.0	2.2	58.1	2.4	62.2
A	12	2.2	56.2	3.4	86.4	3.7	142.7
A	13	0.8	21.0	1.2	32.3	2.0	53.3
A	32	2.4	61.6	3.7	94.6	6.2	156.2
A	33	0.0	0.9	0.3	9.0	0.3	10.0
B	23	0.0	1.6	0.8	22.8	0.9	24.4
B	43	0.6	17.0	3.0	78.9	3.7	95.9
C	22	1.1	28.1	2.9	72.9	4.0	101.0
C	42	0.8	22.1	2.4	60.1	3.2	82.2

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE MAX	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
A	11	0.17	A	11	4	153.	88.	241.
A	12	21.69						
A	13	15.82	A	13	2	76.	88.	164.
A	32	17.96						
A	33	0.30	A	33	2	76.	96.	172.
B	23	0.08	B	23	2	76.	80.	156.
B	43	17.71	B	43	3	115.	96.	211.
C	22	22.14						
C	42	5.32						

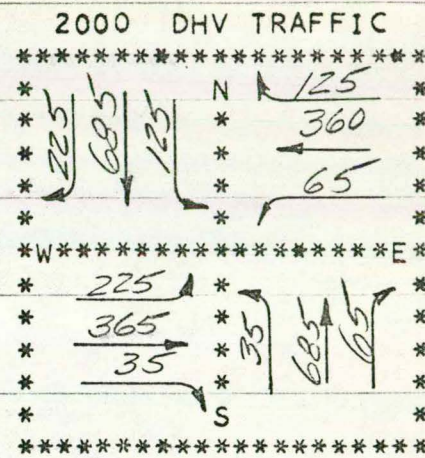
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE

END OF PROGRAM

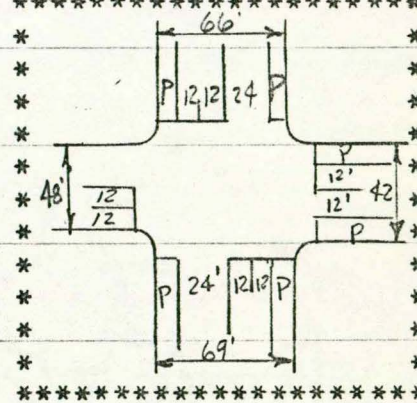
EOKUK-NEW BRIDGE EVALUATION - MAIN ST AND 7TH ST
 ANK-TIMEA ST ALTERNATE MADE BY GAM 11-08-76

ASIC CONDITIONS CODE TRAFFIC MOVEMENT
 YCLE LENGTH = 60 SECS 12 MAIN ST SB THRU
 ETRO POPULATION= 75000.22 7TH ST WB
 EAK HOUR FACTOR = 0.85 32 MAIN ST NB THRU & RT
 ASE YEAR =1975 42 7TH ST EB (US136)THRU & RT
 ESIGN YEAR = 2000
 REA = CBD



INPUT DATA

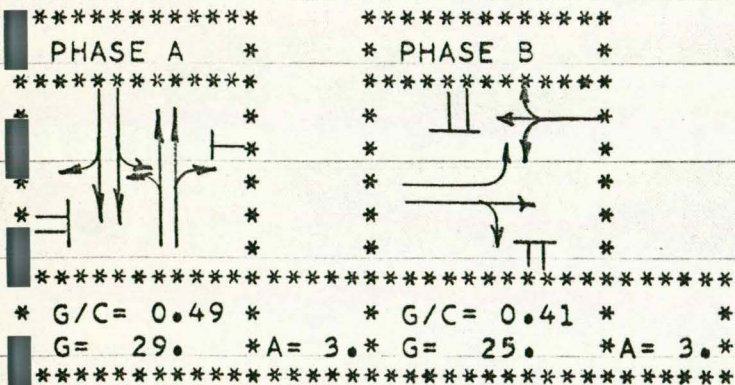
MOVE CODE	K	D	T	LB	DSL	DHV	URNS R	L	WIDTH APPR	EXIT	N L	TURN ANG	CHART CODE	INTERSECTION SKETCH
12	10	50	4	0	C	1035	22	12	33	35	2	0	5	*
22	10	50	4	0	C	550	22	12	22	24	1	0	5	*
32	10	50	4	0	C	785	8	4	35	33	2	0	5	*
42	10	50	4	0	C	625	36	3	24	12	2	0	1	*



OUTPUT DATA

PHASE	MOVE CODE	A/C RATIO	G/C REQD	RATIO USED	EXIT	SERVICE VOLUME	CAPACITY	V/C RATIO	SERVICE LEVEL	YEAR EXCEEDED	DSL	ANNUAL GROWTH
A	12	0.05	0.70	0.49	0.37	724	867	1.19	F	1988		2.911
A	32	0.05	0.45	0.49	0.40	854	1033	0.76	A	2003		2.890
B	22	0.05	0.59	0.41	0.28	385	429	1.28	F	1987		2.886
B	42	0.05	0.44	0.41	0.43	586	704	0.89	D	1998		2.911

V/C RATIO= 1.032 (OVERALL INTERSECTION)



EOKUK-NEW BRIDGE EVALUATION - MAIN ST AND 7TH ST
 ANK-TIMEA ST ALTERNATE MADE BY GAM 11-08-76

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	7.40	127.65	133.60	94.80	1.1925
A	32	0.39	5.10	0.00	0.00	0.7595
B	22	14.41	132.14	180.72	128.23	1.2793
B	42	0.93	9.78	0.00	0.00	0.8874

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	51.6	1292.0	3.7	92.7	55.3	1384.8
A	32	1.1	29.9	3.3	83.9	4.5	113.8
B	22	101.1	2530.2	4.2	105.1	105.3	2635.4
B	42	3.4	87.4	3.0	76.4	6.5	163.9

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE MAX	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
A	32	6.91						
B	22	56.60						
B	42	15.60						

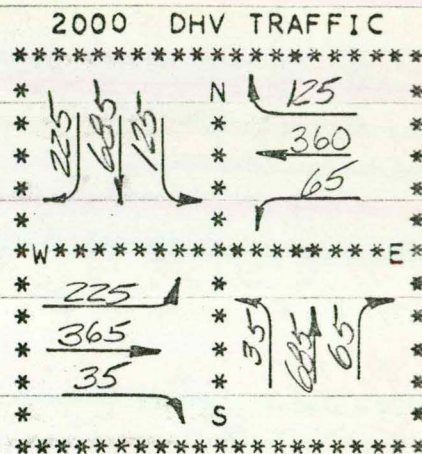
EDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE

END OF PROGRAM

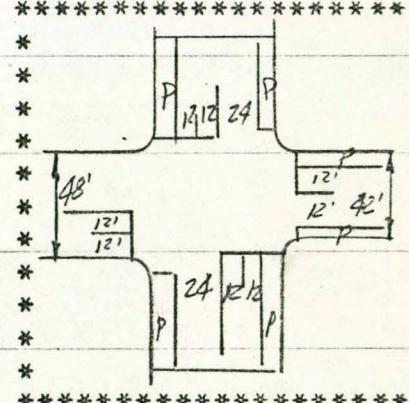
EOKUK-NEW BRIDGE EVALUATION - MAIN ST AND 7TH ST
 ANK-TIMEA ST ALTERNATE MADE BY GAM 11-08-76

ASIC CONDITIONS CODE TRAFFIC MOVEMENT
 YCLE LENGTH = 60. SECS 12 MAIN ST SB THRU
 ETRO POPULATION= 75000.22 7TH ST WB
 PEAK HOUR FACTOR = 0.85 32 MAIN ST NB THRU & RT
 ASE YEAR =1975 42 7TH ST EB (US136)THRU & RT
 DESIGN YEAR = 2000
 AREA = CBD



INPUT DATA

MOVE	DESIGN FACTORS	TURNS	WIDTH	N	TURN CHART	INTERSECTION SKETCH
CODE	K D T LB DSL DHV	R L	APPR EXIT	L ANG	CODE	
12	10. 50. 4. 0. E 1035.	22. 12.	33. 35.	2	0. 5	*
22	10. 50. 4. 0. E 550.	22. 12.	22. 24.	1	0. 5	*
32	10. 50. 4. 0. E 785.	8. 4.	35. 33.	2	0. 5	*
42	10. 50. 4. 0. E 625.	36. 6.	24. 12.	2	0. 1	*



OUTPUT DATA

PHASE	MOVE	A/C	G/C RATIO	SERVICE CAPACITY	V/C	SERVICE YEAR	DSL	ANNUAL
	CODE	RATIO	REQD USED	VOLUME	RATIO	LEVEL	EXCEEDED	GROWTH
A	12	0.05	0.58 0.47	839. 839.	1.23	F	1993	2.911
A	32	0.05	0.37 0.47	999. 999.	0.79	C	2008	2.890
B	22	0.05	0.53 0.43	446. 446.	1.23	F	1993	2.886
B	42	0.05	0.37 0.43	731. 731.	0.86	D	2005	2.911

V/C RATIO= 1.037 (OVERALL INTERSECTION)

PHASE A * PHASE B *

* G/C= 0.47 * * G/C= 0.43 *

* G= 28. * A= 3. * G= 26. * A= 3. *

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	10.36	178.72	156.22	110.85	1.2327
A	32	0.43	5.74	0.00	0.00	0.7851
B	22	10.40	95.35	155.87	110.60	1.2320
B	42	0.73	7.66	0.00	0.00	0.8545

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	70.6	1766.5	3.6	92.5	74.3	1859.0
A	32	1.4	35.8	3.4	86.4	4.8	122.3
B	22	75.2	1882.1	4.2	106.2	79.5	1988.3
B	42	2.5	62.7	2.9	74.3	5.4	137.1

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

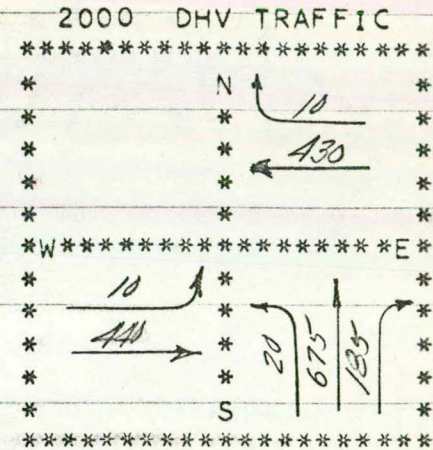
PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE MAX	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
A	12	49.40						
A	32	12.62						
B	22	56.60						
B	42	15.60						

PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE

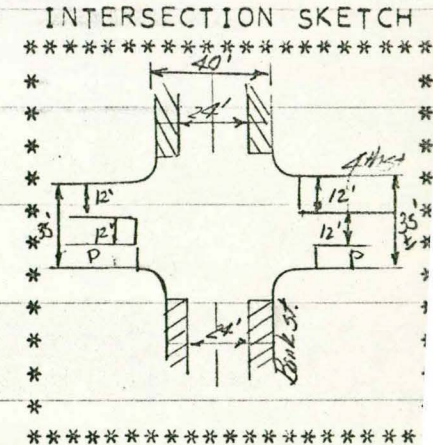
END OF PROGRAM

ASIC CONDITIONS CODE TRAFFIC MOVEMENT
 YCLE LENGTH = 45 SECS 22 4TH ST WB
 ETRO POPULATION= 75000.32 BANK ST - US61 NB
 EAK HOUR FACTOR = 0.85 42 4TH ST EB
 ASE YEAR =1975
 ESIGN YEAR = 2000
 REA = FRINGE



INPUT DATA

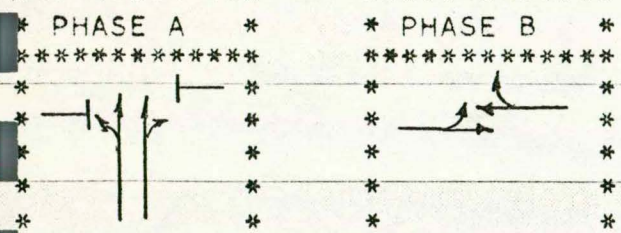
MOVE	DESIGN FACTORS	TURNS	WIDTH	N	TURN	CHART
CODE	K D T LB DSL DHV	R L	APPR EXIT	L	ANG	CODE
22	10. 50. 4. 0. C 440.	2. 0.	12. 12.	1	0.	2
32	10. 50. 4. 0. C 675.	27. 3.	40. 40.	2	0.	18
42	10. 50. 4. 0. C 265.	0. 4.	12. 12.	1	0.	2



OUTPUT DATA

PHASE	MOVE	A/C	G/C RATIO	SERVICE CAPACITY	V/C	SERVICE	YEAR	DSL	ANNUAL
	CODE	RATIO	REQD USED	VOLUME	RATIO	LEVEL	EXCEEDED		GROWTH
A	32	0.07	0.36 0.46	866. 1100.	0.61	A	2009		2.903
B	22	0.07	0.32 0.41	565. 677.	0.65	A	2009		2.905
B	42	0.07	0.20 0.41	530. 636.	0.42	A	2024		2.889

V/C RATIO= 0.587 (OVERALL INTERSECTION)



* G/C = 0.46 * * G/C = 0.41 * *
 * G = 21. * A = 3. * G = 18. * A = 3. *

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	32	0.23	2.00	0.00	0.00	0.6134
B	22	0.26	1.43	0.00	0.00	0.6490
B	42	0.19	0.63	0.00	0.00	0.4162

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	32	0.4	12.4	2.2	58.2	2.7	70.6
B	22	0.6	15.0	3.2	81.7	3.8	96.7
B	42	0.1	3.7	1.9	50.3	2.1	54.1

CYCLE FAILURE ANALYSIS

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES
A	32	2.86
B	22	5.37
B	42	0.22

TURNING LANE CHECK

PHASE	MOVE CODE	QUEUE MAX	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
-------	-----------	-----------	----------------	--------------	--------------

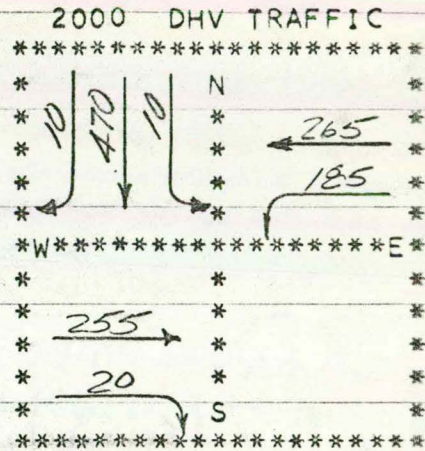
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF WALK LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE
-------	------	---------------	-------------------	----------------	----------------	-----------------	-----------------	-----------------	-------------------

END OF PROGRAM

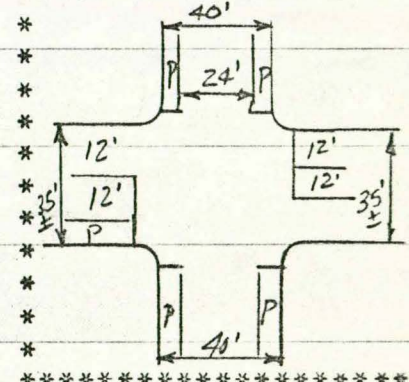
EOKUK NEW BRIDGE EVALUATION TIMEA & 4TH ST
 ANK-TIMEA ST BRIDGE MADE BY GAM 11-05-76

ASIC CONDITIONS CODE TRAFFIC MOVEMENT
 YCLE LENGTH = 45 SECS 12 TIMEA ST SB(US136)
 ETRO POPULATION= 75000.22 4TH ST WB
 EAK HOUR FACTOR = 0.85 42 4TH ST EB
 ASE YEAR =1975
 DESIGN YEAR = 2000
 AREA = FRINGE



INPUT DATA

MOVE	DESIGN FACTORS	TURNS	WIDTH	N TURN	CHART	INTERSECTION SKETCH
CODE	K D T LB DSL DHV	R L	APPR EXIT	L ANG	CODE	
12	10. 50. 4. 0. C 470.	2. 2.	40. 40.	2 0.	18	*
22	10. 50. 4. 0. C 450.	0. 41.	24. 12.	1 0.	2	*
42	10. 50. 4. 0. C 275.	7. 0.	12. 12.	1 0.	2	*



OUTPUT DATA

PHASE	MOVE	A/C	G/C RATIO	SERVICE CAPACITY	V/C	SERVICE	YEAR	DSL	ANNUAL
	CODE	RATIO	REQD USED EXIT	VOLUME	RATIO	LEVEL	EXCEEDED		GROWTH
A	12	0.07	0.25 0.42 0.24	790. 1003.	0.47	A	2018		2.899
B	22	0.07	0.27 0.45 0.25	756. 907.	0.50	A	2018		2.903
B	42	0.07	0.22 0.45 0.18	568. 681.	0.40	A	2025		2.886

V/C RATIO= 0.464 (OVERALL INTERSECTION)

* PHASE A * * PHASE B *

* G/C = 0.42 * * G/C = 0.45 * *

* G = 19. * A = 3. * G = 20. * A = 3. *

The output data section includes two small diagrams labeled PHASE A and PHASE B. PHASE A shows a traffic flow pattern with arrows indicating movement. PHASE B shows a different traffic flow pattern. Below these diagrams are several lines of text providing G/C and A values for different phases, and a series of asterisks at the end.

INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	12	0.20	1.23	0.00	0.00	0.4684
B	22	0.17	1.01	0.00	0.00	0.4957
B	42	0.16	0.58	0.00	0.00	0.4034

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	12	0.2	5.2	1.7	43.6	1.9	48.8
B	22	0.2	6.0	3.1	77.8	3.3	83.9
B	42	0.1	3.4	1.9	47.5	2.0	50.9

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE	STORAGE	TAPER	TOTAL
					MAX	LENGTH	LENGTH	LENGTH
A	12	1.06						
B	22	0.53						
B	42	0.08						

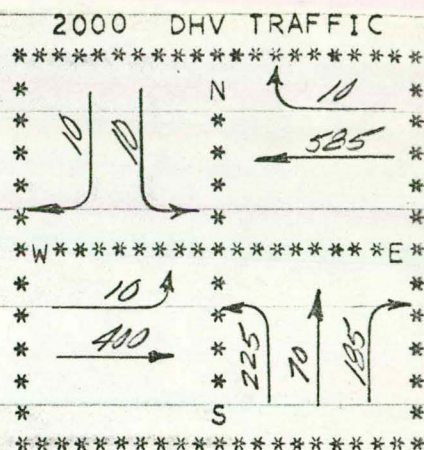
PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE

END OF PROGRAM

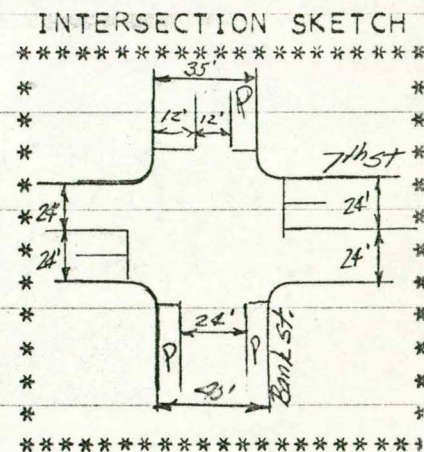
EOKUK-NEW BRIDGE EVALUATION 7TH ST (US136) & BANK ST
 ANK-TIMEA ST BRIDGE MADE BY GAM 11-05-76

ASIC CONDITIONS CODE TRAFFIC MOVEMENT
 YCLE LENGTH = 45 SECS 12 BANK ST SB
 ETRO POPULATION= 75000.22 7TH ST WB
 EAK HOUR FACTOR = 0.85 32 BANK ST NB(FROM BRIDGE)
 ASE YEAR =1975 42 7TH ST EB
 ESIGN YEAR = 2000
 REA = FRINGE



INPUT DATA

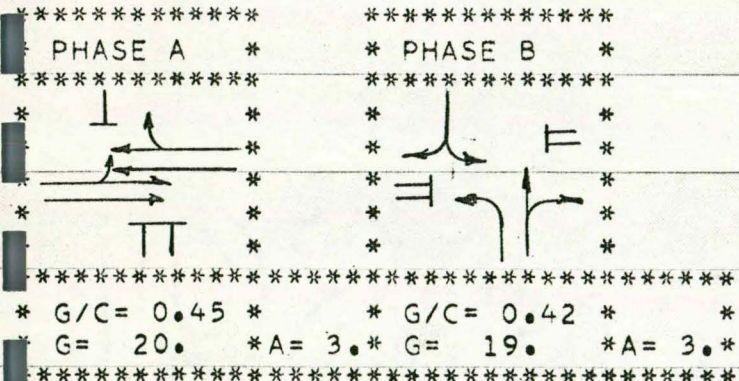
MOVE	DESIGN FACTORS						TURNS		WIDTH		N TURN		CHART
CODE	K	D	T	LB	DSL	DHV	R	L	APPR	EXIT	L	ANG	CODE
12	10.	50.	4.	0.	C	20.	50.	0.	12.	24.	1	90.	2T
22	10.	50.	4.	0.	C	595.	2.	0.	24.	24.	2	0.	2
32	10.	50.	4.	0.	C	480.	39.	47.	40.	28.	2	0.	18
42	10.	50.	4.	0.	C	410.	0.	2.	24.	24.	2	0.	2



OUTPUT DATA

PHASE	MOVE	A/C	G/C RATIO			SERVICE CAPACITY		V/C	SERVICE	YEAR	DSL	ANNUAL
	CODE	RATIO	REQD	USED	EXIT	VOLUME	RATIO	LEVEL	EXCEEDED		GROWTH	
A	22	0.07	0.27	0.45	0.27	974.	1168.	0.51	A	2017	2.916	
A	42	0.07	0.19	0.45	0.18	965.	1158.	0.35	A	2030	2.912	
B	12	0.07	0.02	0.42	0.00	341.	409.	0.05	A	2102	2.811	
B	32	0.07	0.26	0.42	0.07	786.	998.	0.48	A	2017	2.897	

V/C RATIO= 0.451 (OVERALL INTERSECTION)



INTERSECTION DELAY ANALYSIS

PHASE	MOVE CODE	AVERAGE DELAY MINS/VEHICLE	TOTAL DELAY MINS/CYCLE	CONGESTION PERIOD(MINS)	DISSIPATION PERIOD(MINS)	DEGREE OF SATURATION
A	22	0.20	1.49	0.00	0.00	0.5090
A	42	0.16	0.83	0.00	0.00	0.3538
B	12	0.13	0.03	0.00	0.00	0.0488
B	32	0.21	1.28	0.00	0.00	0.4809

AVERAGE QUEUE SIZE ANALYSIS

PHASE	MOVE CODE	FOR STOPPED VEHICLES AT END OF GREEN PHASE		FOR ARRIVALS DURING RED PHASE		FOR STOPPED VEHICLES AT END OF RED PHASE	
		NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)	NUMBER	LENGTH(FT)
A	22	0.2	6.5	2.0	51.2	2.3	57.8
A	42	0.0	2.4	1.4	35.3	1.5	37.7
B	12	0.0	0.0	0.1	3.7	0.1	3.7
B	32	0.2	5.7	1.7	44.6	1.9	50.4

CYCLE FAILURE ANALYSIS

TURNING LANE CHECK

PHASE	MOVE CODE	PERCENTAGE OF CYCLE FAILURES	PHASE	MOVE CODE	QUEUE MAX	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH
A	42	0.13						
B	12	0.00						
B	32	1.19						

PEDESTRIAN CHECK

PHASE	APPR	CROSS WALK FT	HALF LANE FT	WALK SPEED FPS	WALK TIME SECS	CLEAR TIME SECS	TOTAL TIME SECS	PHASE TIME SECS	IS PHASE ADEQUATE

END OF PROGRAM

EVALUATION 7TH ST AND TIMEA ST
 MADE BY GAM 11-05-76

ANALYSIS TOTAL
 AVERAGE DELAY
 PER VEHICLE
 EVALUATION BY GAM
 TRAFFIC MOVEMENT
 7TH ST AND TIMEA ST
 TRAFFIC MADE BY GAM
 TIMEA ST SB (US1366)
 TIMEA ST WB (US1366)
 7TH ST EB
 7TH ST

NS 45 SECS
 15000
 22
 42
 0.85
 42
 TOR =
 2000
 AGE

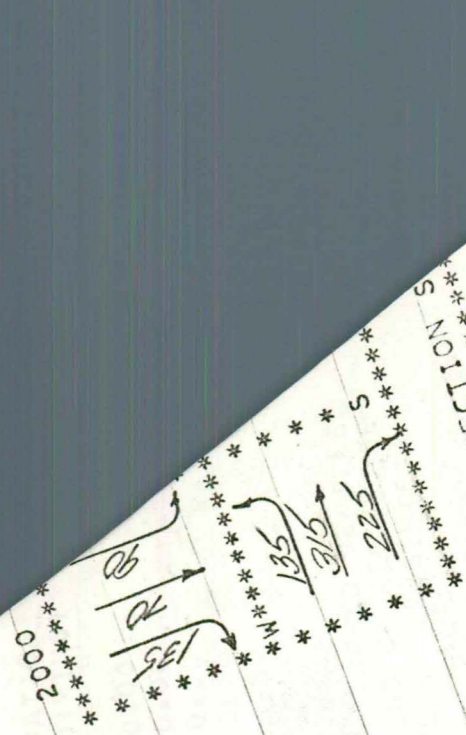


CHART INTERSECTION

TURN	ANGLE	CODE
L	0	2
R	0	2
L	90	22
R	90	22

DATA	DESIGN	T	L	B	C	F	FACTORS	DHVN	DSL	ANNUAL
K	50	4	0	0	0	0	0	295	2	909
10	50	4	0	0	0	0	14	635	2	888
10	50	4	0	0	0	0	42	540	2	924
10	50	4	0	0	0	0	0	185	2	29
10	50	4	0	0	0	0	0	135	2	88

DATA	OUTPUT	PHASE	CODE	A/C	RATIO	REGD	USED	EXIT	VOLUME	CAPACITY	RATIO	LEVEL	YEAR	EXCEEDED
22	A	A	22	0.07	0.31	0.29	0.53	0.25	1092	1310	0.48	A	2019	2022
42	A	A	42	0.07	0.33	0.33	0.53	0.14	1003	473	0.39	A	2022	2033
23	A	A	23	0.07	0.47	0.47	0.33	0.20	473	192	0.70	A	2011	2017
43	A	A	43	0.07	0.20	0.20	0.33	0.20	192	575	0.51	A	2011	2017

PHASE A
 PHASE B
 PHASE C
 PHASE D
 PHASE E
 PHASE F
 PHASE G
 PHASE H
 PHASE I
 PHASE J
 PHASE K
 PHASE L
 PHASE M
 PHASE N
 PHASE O
 PHASE P
 PHASE Q
 PHASE R
 PHASE S
 PHASE T
 PHASE U
 PHASE V
 PHASE W
 PHASE X
 PHASE Y
 PHASE Z
 PHASE AA
 PHASE AB
 PHASE AC
 PHASE AD
 PHASE AE
 PHASE AF
 PHASE AG
 PHASE AH
 PHASE AI
 PHASE AJ
 PHASE AK
 PHASE AL
 PHASE AM
 PHASE AN
 PHASE AO
 PHASE AP
 PHASE AQ
 PHASE AR
 PHASE AS
 PHASE AT
 PHASE AU
 PHASE AV
 PHASE AW
 PHASE AX
 PHASE AY
 PHASE AZ
 PHASE BA
 PHASE BB
 PHASE BC
 PHASE BD
 PHASE BE
 PHASE BF
 PHASE BG
 PHASE BH
 PHASE BI
 PHASE BJ
 PHASE BK
 PHASE BL
 PHASE BM
 PHASE BN
 PHASE BO
 PHASE BP
 PHASE BQ
 PHASE BR
 PHASE BS
 PHASE BT
 PHASE BU
 PHASE BV
 PHASE BW
 PHASE BX
 PHASE BY
 PHASE BZ
 PHASE CA
 PHASE CB
 PHASE CC
 PHASE CD
 PHASE CE
 PHASE CF
 PHASE CG
 PHASE CH
 PHASE CI
 PHASE CJ
 PHASE CK
 PHASE CL
 PHASE CM
 PHASE CN
 PHASE CO
 PHASE CP
 PHASE CQ
 PHASE CR
 PHASE CS
 PHASE CT
 PHASE CU
 PHASE CV
 PHASE CW
 PHASE CX
 PHASE CY
 PHASE CZ
 PHASE DA
 PHASE DB
 PHASE DC
 PHASE DD
 PHASE DE
 PHASE DF
 PHASE DG
 PHASE DH
 PHASE DI
 PHASE DJ
 PHASE DK
 PHASE DL
 PHASE DM
 PHASE DN
 PHASE DO
 PHASE DP
 PHASE DQ
 PHASE DR
 PHASE DS
 PHASE DT
 PHASE DU
 PHASE DV
 PHASE DW
 PHASE DX
 PHASE DY
 PHASE DZ
 PHASE EA
 PHASE EB
 PHASE EC
 PHASE ED
 PHASE EE
 PHASE EF
 PHASE EG
 PHASE EH
 PHASE EI
 PHASE EJ
 PHASE EK
 PHASE EL
 PHASE EM
 PHASE EN
 PHASE EO
 PHASE EP
 PHASE EQ
 PHASE ER
 PHASE ES
 PHASE ET
 PHASE EU
 PHASE EV
 PHASE EW
 PHASE EX
 PHASE EY
 PHASE EZ
 PHASE FA
 PHASE FB
 PHASE FC
 PHASE FD
 PHASE FE
 PHASE FF
 PHASE FG
 PHASE FH
 PHASE FI
 PHASE FJ
 PHASE FK
 PHASE FL
 PHASE FM
 PHASE FN
 PHASE FO
 PHASE FP
 PHASE FQ
 PHASE FR
 PHASE FS
 PHASE FT
 PHASE FU
 PHASE FV
 PHASE FW
 PHASE FX
 PHASE FY
 PHASE FZ
 PHASE GA
 PHASE GB
 PHASE GC
 PHASE GD
 PHASE GE
 PHASE GF
 PHASE GH
 PHASE GI
 PHASE GJ
 PHASE GK
 PHASE GL
 PHASE GM
 PHASE GN
 PHASE GO
 PHASE GP
 PHASE GQ
 PHASE GR
 PHASE GS
 PHASE GT
 PHASE GU
 PHASE GV
 PHASE GW
 PHASE GX
 PHASE GY
 PHASE GZ
 PHASE HA
 PHASE HB
 PHASE HC
 PHASE HD
 PHASE HE
 PHASE HF
 PHASE HG
 PHASE HH
 PHASE HI
 PHASE HJ
 PHASE HK
 PHASE HL
 PHASE HM
 PHASE HN
 PHASE HO
 PHASE HP
 PHASE HQ
 PHASE HR
 PHASE HS
 PHASE HT
 PHASE HU
 PHASE HV
 PHASE HW
 PHASE HX
 PHASE HY
 PHASE HZ
 PHASE IA
 PHASE IB
 PHASE IC
 PHASE ID
 PHASE IE
 PHASE IF
 PHASE IG
 PHASE IH
 PHASE II
 PHASE IJ
 PHASE IK
 PHASE IL
 PHASE IM
 PHASE IN
 PHASE IO
 PHASE IP
 PHASE IQ
 PHASE IR
 PHASE IS
 PHASE IT
 PHASE IU
 PHASE IV
 PHASE IW
 PHASE IX
 PHASE IY
 PHASE IZ
 PHASE JA
 PHASE JB
 PHASE JC
 PHASE JD
 PHASE JE
 PHASE JF
 PHASE JG
 PHASE JH
 PHASE JI
 PHASE JJ
 PHASE JK
 PHASE JL
 PHASE JM
 PHASE JN
 PHASE JO
 PHASE JP
 PHASE JQ
 PHASE JR
 PHASE JS
 PHASE JT
 PHASE JU
 PHASE JV
 PHASE JW
 PHASE JX
 PHASE JY
 PHASE JZ
 PHASE KA
 PHASE KB
 PHASE KC
 PHASE KD
 PHASE KE
 PHASE KF
 PHASE KG
 PHASE KH
 PHASE KI
 PHASE KJ
 PHASE KL
 PHASE KM
 PHASE KN
 PHASE KO
 PHASE KP
 PHASE KQ
 PHASE KR
 PHASE KS
 PHASE KT
 PHASE KU
 PHASE KV
 PHASE KW
 PHASE KX
 PHASE KY
 PHASE KZ
 PHASE LA
 PHASE LB
 PHASE LC
 PHASE LD
 PHASE LE
 PHASE LF
 PHASE LG
 PHASE LH
 PHASE LI
 PHASE LJ
 PHASE LK
 PHASE LL
 PHASE LM
 PHASE LN
 PHASE LO
 PHASE LP
 PHASE LQ
 PHASE LR
 PHASE LS
 PHASE LT
 PHASE LU
 PHASE LV
 PHASE LW
 PHASE LX
 PHASE LY
 PHASE LZ
 PHASE MA
 PHASE MB
 PHASE MC
 PHASE MD
 PHASE ME
 PHASE MF
 PHASE MG
 PHASE MH
 PHASE MI
 PHASE MJ
 PHASE MK
 PHASE ML
 PHASE MM
 PHASE MN
 PHASE MO
 PHASE MP
 PHASE MQ
 PHASE MR
 PHASE MS
 PHASE MT
 PHASE MU
 PHASE MV
 PHASE MW
 PHASE MX
 PHASE MY
 PHASE MZ
 PHASE NA
 PHASE NB
 PHASE NC
 PHASE ND
 PHASE NE
 PHASE NF
 PHASE NG
 PHASE NH
 PHASE NI
 PHASE NJ
 PHASE NK
 PHASE NL
 PHASE NM
 PHASE NN
 PHASE NO
 PHASE NP
 PHASE NQ
 PHASE NR
 PHASE NS
 PHASE NT
 PHASE NU
 PHASE NV
 PHASE NW
 PHASE NX
 PHASE NY
 PHASE NZ
 PHASE OA
 PHASE OB
 PHASE OC
 PHASE OD
 PHASE OE
 PHASE OF
 PHASE OG
 PHASE OH
 PHASE OI
 PHASE OJ
 PHASE OK
 PHASE OL
 PHASE OM
 PHASE ON
 PHASE OO
 PHASE OP
 PHASE OQ
 PHASE OR
 PHASE OS
 PHASE OT
 PHASE OU
 PHASE OV
 PHASE OW
 PHASE OX
 PHASE OY
 PHASE OZ
 PHASE PA
 PHASE PB
 PHASE PC
 PHASE PD
 PHASE PE
 PHASE PF
 PHASE PG
 PHASE PH
 PHASE PI
 PHASE PJ
 PHASE PK
 PHASE PL
 PHASE PM
 PHASE PN
 PHASE PO
 PHASE PP
 PHASE PQ
 PHASE PR
 PHASE PS
 PHASE PT
 PHASE PU
 PHASE PV
 PHASE PW
 PHASE PX
 PHASE PY
 PHASE PZ
 PHASE QA
 PHASE QB
 PHASE QC
 PHASE QD
 PHASE QE
 PHASE QF
 PHASE QG
 PHASE QH
 PHASE QI
 PHASE QJ
 PHASE QK
 PHASE QL
 PHASE QM
 PHASE QN
 PHASE QO
 PHASE QP
 PHASE QQ
 PHASE QR
 PHASE QS
 PHASE QT
 PHASE QU
 PHASE QV
 PHASE QW
 PHASE QX
 PHASE QY
 PHASE QZ
 PHASE RA
 PHASE RB
 PHASE RC
 PHASE RD
 PHASE RE
 PHASE RF
 PHASE RG
 PHASE RH
 PHASE RI
 PHASE RJ
 PHASE RK
 PHASE RL
 PHASE RM
 PHASE RN
 PHASE RO
 PHASE RP
 PHASE RQ
 PHASE RR
 PHASE RS
 PHASE RT
 PHASE RU
 PHASE RV
 PHASE RW
 PHASE RX
 PHASE RY
 PHASE RZ
 PHASE SA
 PHASE SB
 PHASE SC
 PHASE SD
 PHASE SE
 PHASE SF
 PHASE SG
 PHASE SH
 PHASE SI
 PHASE SJ
 PHASE SK
 PHASE SL
 PHASE SM
 PHASE SN
 PHASE SO
 PHASE SP
 PHASE SQ
 PHASE SR
 PHASE SS
 PHASE ST
 PHASE SU
 PHASE SV
 PHASE SW
 PHASE SX
 PHASE SY
 PHASE SZ
 PHASE TA
 PHASE TB
 PHASE TC
 PHASE TD
 PHASE TE
 PHASE TF
 PHASE TG
 PHASE TH
 PHASE TI
 PHASE TJ
 PHASE TK
 PHASE TL
 PHASE TM
 PHASE TN
 PHASE TO
 PHASE TP
 PHASE TQ
 PHASE TR
 PHASE TS
 PHASE TT
 PHASE TU
 PHASE TV
 PHASE TW
 PHASE TX
 PHASE TY
 PHASE TZ
 PHASE UA
 PHASE UB
 PHASE UC
 PHASE UD
 PHASE UE
 PHASE UF
 PHASE UG
 PHASE UH
 PHASE UI
 PHASE UJ
 PHASE UK
 PHASE UL
 PHASE UM
 PHASE UN
 PHASE UO
 PHASE UP
 PHASE UQ
 PHASE UR
 PHASE US
 PHASE UT
 PHASE UY
 PHASE UZ
 PHASE VA
 PHASE VB
 PHASE VC
 PHASE VD
 PHASE VE
 PHASE VF
 PHASE VG
 PHASE VH
 PHASE VI
 PHASE VJ
 PHASE VK
 PHASE VL
 PHASE VM
 PHASE VN
 PHASE VO
 PHASE VP
 PHASE VQ
 PHASE VR
 PHASE VS
 PHASE VT
 PHASE VY
 PHASE VZ
 PHASE WA
 PHASE WB
 PHASE WC
 PHASE WD
 PHASE WE
 PHASE WF
 PHASE WG
 PHASE WH
 PHASE WI
 PHASE WJ
 PHASE WK
 PHASE WL
 PHASE WM
 PHASE WN
 PHASE WO
 PHASE WP
 PHASE WQ
 PHASE WR
 PHASE WS
 PHASE WT
 PHASE WY
 PHASE WZ
 PHASE XA
 PHASE XB
 PHASE XC
 PHASE XD
 PHASE XE
 PHASE XF
 PHASE XG
 PHASE XH
 PHASE XI
 PHASE XJ
 PHASE XK
 PHASE XL
 PHASE XM
 PHASE XN
 PHASE XO
 PHASE XP
 PHASE XQ
 PHASE XR
 PHASE XS
 PHASE XT
 PHASE XY
 PHASE XZ
 PHASE YA
 PHASE YB
 PHASE YC
 PHASE YD
 PHASE YE
 PHASE YF
 PHASE YG
 PHASE YH
 PHASE YI
 PHASE YJ
 PHASE YK
 PHASE YL
 PHASE YM
 PHASE YN
 PHASE YO
 PHASE YP
 PHASE YQ
 PHASE YR
 PHASE YS
 PHASE YT
 PHASE YZ
 PHASE ZA
 PHASE ZB
 PHASE ZC
 PHASE ZD
 PHASE ZE
 PHASE ZF
 PHASE ZG
 PHASE ZH
 PHASE ZI
 PHASE ZJ
 PHASE ZK
 PHASE ZL
 PHASE ZM
 PHASE ZN
 PHASE ZO
 PHASE ZP
 PHASE ZQ
 PHASE ZR
 PHASE ZS
 PHASE ZT
 PHASE ZY
 PHASE ZZ

STATE LIBRARY OF IOWA



3 1723 02118 7307