Dix Bascule Bridge
Spanning the Rouge River at Dix
Avenue between the Cities of
Detroit and Dearborn
Wayne County
Michigan

HAER No. MI-32

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
MID-ATLANTIC REGION, NATIONAL PARK SERVICE
DEPARTMENT OF THE INTERIOR
PHILADELPHIA, PENNSYLVANIA 19106

HISTORIC AMERICAN ENGINEERING RECORD

DIX BASCULE BRIDGE HAER No. MI-32

Location: Spanning the Rouge River at Dix Avenue between the Cities of Detroit and Dearborn in Wayne County, Michigan.

UTM: 17.322570.4684670
Quad: Dearborn

Date of Construction: 1925-1926. Rehabilitated 1984

Present Owner: County of Wayne
Wayne County Building
600 Randolph Street
Detroit, MI 48226

Present Use: Vehicular and pedestrian drawbridge. Vertical draw accommodates navigation on the river.

Significance: The Dix Bascule Bridge is the newest of three double-leaf trunnion drawbridges constructed over the Rouge River in the 1920's. It is important in local history for its relation to the economic development of the Detroit area. This drawbridge allows Great Lake ore boats to supply steel mills and foundaries, specifically the Ford Motor Company's River Rouge complex to which it is adjacent. It is a simple trunnion bascule and is eligible for the National Register of Historic Places. An important feature of this bridge is its beautiful balustrade approach railings which must be replaced because of their structural inadequacy.

Project Information: This documentation was undertaken in December, 1988 in accordance with the Memorandum of Agreement by the Wayne County Department of Public Services as a mitigative measure prior to the rehabilitation of the bridge and the replacement of the balustrade approach railings.

George R. Schneider
Division of Engineering
Wayne County Department of
Public Services
Detroit, MI

OVERVIEW OF BRIDGE AND PROJECT

The Dix Avenue Bridge crosses the Rouge River through a highly industrialized area and connects the Cities of Detroit and Dearborn. (See Location Map). Dix Avenue is a Wayne County primary road which carries approximately 10,000 vehicles per day. This drawbridge also allows Great Lakes ore boats loaded with coal, iron, and limestone to supply steel mills and foundries, specifically the Ford Motor Company's River Rouge complex. It is located just below the turning basin of the Rouge River and next to the Ford blast furnaces.

"The former bascule bridge at this crossing of the Rouge was constructed prior to the improvement of the Rouge River, and in those days it spanned a stream of insufficient depth or regularity for any but inconsequential navigation. At that time, the great Rouge plant of the Ford Motor Company was in its infancy, and the mammoth expansion which extends from the very shadow of the bridge as far as the eye can reach, was inconceivable." (1)

The increasing demands for commerce along the Rouge River following World War I resulted in the dredging and straightening of this river by the Federal Government. Thus by 1923, the narrow winding stream of former days had become a 300' wide, 22' deep, channel navigable by the largest lake freighters. Pursuant to the orders of the War Department of the United States, former swing bridges along the Rouge River at Jefferson Avenue and Fort Street (See Location Map) had been replaced by bascule bridges in that same year. (2)

With the increase in size of vessels using the channel, the War Department found that the existing single-leaf, Dix Road Bascule Bridge had become an obstruction to navigation. The requirements of highway traffic were also increasing and it was apparent that the existing two-lane bridge would soon be entirely inadequate for both weight and volume of traffic. In 1924 the War Department ordered that the narrow (100-foot clear span) single-leaf Dix Bascule Bridge be rebuilt as a bridge giving 125-foot clear span and located at the middle of the channel. It further stipulated that the reconstruction be completed by July 1st, 1926. (3)

The Board of Supervisors of Wayne County therefore took action at its June 1924 meeting authorizing the reconstruction of this bridge as required by the War Department. In order to finance the reconstruction they further arranged that the issuance of bonds for one million dollars to defray the cost should be placed before the electors on the ballots in the

September election. (4) After a favorable vote on the bond issue, and after sale of the bonds and upon completion of the detail plans, contracts were awarded for the superstructure on January 6, 1925 and for the substructure and foundation work on April 24, 1925. A contract for the electrical work was awarded on January 26, 1926 and another for the architectural and stone work on March 12, 1926. Due to an unavoidable delay, related to the bond issue, an extension of time to complete the project was granted to November 1, 1926. Once underway, construction proceeded rapidly and the project completion date was met.

The Dix Avenue Bridge is a Simple Trunnion Bascule Bridge that was designed by the engineers of the Wayne County Road Commission. The substructure was built by the Missouri Valley Bridge and Iron Company of Leavenworth, Kansas, and the superstructure by the Wisconsin Bridge and Iron Company of Milwaukee, Wisconsin. The Kuehne Electric Company of Detroit, Michigan was responsible for the electrical work while the architectural and stone work (including the balustrade approach railings which are to be replaced) was constructed by George P. Cullen, Inc., of Chicago, Illinois. (5) It is on the Michigan Department of Transportation's Critical Bridge List, and it is eligible for the National Register of Historic Places. The bridge has a span of 164 feet measured from center to center of each trunnion. The roadway measures 56 feet between curbs and carries four lanes of traffic. The bridge also provides two 8 1/2 feet wide sidewalks.

The bridge consists of two movable leaves and two supporting abutment complexes symmetrically located about the center of the river. Each movable leaf consists of four movable trusses framed and working together as a unit. Each movable truss has a trunnion integrally constructed in it. The trunnions are supported by trunnion bearings (two for each trunnion, total of eight). The trunnion bearings are attached to and supported by six trunnion trusses and two longitudinal girders, the longitudinal girders being at the outermost locations of the eight supports.

Next to the longitudinal girders, towards the outside of the structure, are the machinery girders, which together with the longitudinal girders, support the operating machinery, motors, gears, pinions, etc.

The years have taken their toll on this bridge. By the 1970's it was evident that a major rehabilitation effort would soon be needed for the bridge to continue to provide safe and efficient service for its users as well as to reduce maintenance costs for public agencies. Much of its mechanical and electrical equipment was outdated and obsolete and many of its structural

components were experiencing deterioration.

The rehabilitation effort was begun in 1976. In that year, the electrical controls were converted to a system that controls the lifting operations of both bridge leaves from one location rather than the two locations provided in the original installation.

Then in 1984, Part One improvements (of the major rehabilitation effort) were undertaken by Wayne County to rehabilitate the Dix Bascule Bridge including the structural reconditioning of the trunnion trusses, river pier bearing and rest pedestal; miscellaneous steel rehabilitations; the replacement of rivets; and the painting of the structural steel. Structural members were all replaced in similar shape and kind as the original bridge.

Part One improvements were of an emergency nature and were needed to keep the bridge in operation. The proposed Part Two improvements are less critical but more extensive in nature and will complete the rehabilitation of the bridge. As with Part One improvements, replacement of structural members and reconditioning of the bridge will be done in such a way that the historic integrity of the bridge will not be destroyed. Replacement will be done with similarly shaped and sized parts, and reconditioning will leave the physical appearance and operation of the bridge unchanged.

Part One improvements were accomplished at a cost of $770,752.22. The estimated cost of the Part Two improvements is $5,765,000.00, thus bringing the total cost of completely rehabilitating the bridge to approximately $6,536,000.00. This can be compared to the original construction cost of $1,088,678.70 back in 1926.

The Dix Avenue Bridge is critical to the viability of the nearby industrial and commercial establishments, and, therefore, its reconstruction is imperative.

REPLACEMENT OF BALUSTRADE APPROACH RAILINGS

One of the more beautiful features of the Dix Bascule Bridge are its cut stone balustrade approach railings. The original materials specifications for these ornamental railings included the following requirements:

1. That they be constructed from Indiana Oolitic Limestone building stock, free from all defects that would materially impair its strength, durability or appearance.

2. That the Standard Buff Bedford Stone to be used shall conform with the specifications of the Indiana Limestone Quarrymen's Association of Bedford, Indiana.

3. That all stone be cut to rest on its natural bed.

4. That all stone delivered at the site of work be pre-drilled for all anchors and dowels.

5. That each and every stone shall ring clear when struck with a hammer.

The workmanship specified in the cutting, dressing, jointing and setting of the stones was also very exacting and required skillful workmen to accomplish it. Upon completion of the setting, all cut Bedford stone work had to be carefully cleaned and neatly pointed with stainless mortar of La Farge cement (or Engineer approved equal).

The faces of all stonework were then cleaned again, this time with soap powder boiled in clean water, and applied vigorously with stiff fiber brushes. After cleaning, all exposed surfaces of the stone were drenched with clean water. The resulting appearance of the railings was one of uniform color and near perfect condition.

The Contractor was responsible for repairing any defects or cracks in the stone work that developed in the stone work for a period of one year after completion and acceptance of the work. The entire job of stone work and the setting of same had to be first class in all respects, equal to the highest grade of such work and completed to the entire satisfaction of the Engineer.

The existing original balustrade approach railings were cut from Bedford Stone supplied by the Inter-State Cut Stone Company of Bedford, Indiana. (6) Fabrication and erection of the railings was done by the George P. Cullen, Inc., firm of Chicago,

Illinois. (7)

It has been determined by the State Historic Preservation Officer (SHPO) that these original cut stone approach railings are a significant feature of the Dix Avenue Bridge and should be replaced with duplicate or near duplicate balustrades. The original cut stone balustrade railings are located only on the east approach to the bridge. The west approach railings have previously been replaced by standard concrete parapets complying with American Association of Highway and Transportation Officials (AASHTO) Standards.

The existing balustrade approach railings are seriously deteriorated and functionally obsolete. They must be replaced to comply with current AASHTO strength and safety standards. A duplicate or near duplicate railing as suggested by the SHPO will not comply with current AASHTO requirements. Since the proposed replacement approach railing will not duplicate the original railing, the SHPO has determined this action will have an adverse effect on the bridge.

After exploring various alternatives for an replacement approach railing, the Wayne County Department of Public Services settled on an open, picket-type concrete railing that will satisfy AASHTO strength and safety requirements while retaining the see-through feature of the existing balustrade design. It is proposed to place this railing design on both the east and west approaches to the bridge. It is felt that this will result in a balanced and aesthetically pleasing appearance to the rehabilitated structure. The use of this replacement railing is in accordance with a Memorandum of Agreement, signed by the Federal Highway Administration, State Historic Preservation Officer, Wayne County Department of Public Services, Michigan Department of Transportation and the Advisory Council on Historic Preservation.

BIBLIOGRAPHY

1. Nineteenth Annual Report of the Board of County Road Commissioners of Wayne County, Michigan. (Wayne County, Michigan 1924-1925), p. 72.

2. Seventeenth Annual Report of the Board of County Road Commissioners of Wayne County, Michigan. (Wayne County, Michigan 1922-1923), p. 69.

3. Eighteenth Annual Report of the Board of County Road Commissioners of Wayne County, Michigan. (Wayne County, Michigan 1923-1924) p. 89, 91.

4. Ibid.

5. Twentieth Annual Report of the Board of County Road Commissioners of Wayne County, Michigan. (Wayne County, Michigan 1925-1926), p. 69.

6. Twenty-first Annual Report of the Board of County Road Commissioners of Wayne County, Michigan. (Wayne County, Michigan 1926-1927) p. 113.

7. Twentieth Annual Report, Board of County Road Commissioners, p. 69.

Note: Copies of the pertinent pages of the documents included in this bibliography have been included as attachments to this report.

HISTORIC AMERICAN ENGINEERING RECORD

'DIX BASCULE BRIDGE'

LOCATION PLAN

This great river and highway traffic, however, introduces many new problems in the successful operation of the bascule bridges. Our bridge operators are all men who have grown up with these bridges and with this increasing traffic, and each of them feels a pride in his bridge and in its successful operation—without damage from on-coming boats, without accident to highway traffic, and with the least practical delay or inconvenience to such traffic.

It is no simple matter to stop such highway traffic to open a bridge. Imagine 6 lines of traffic, each carrying an automobile every 9 seconds, or 1 automobile per second and a half on the bridge—and you have a picture of the traffic involved at rush hours.

With a million-dollar bridge at stake and a vessel (with the legal right-of-way of navigation) steadily and fearlessly approaching, and with such heavy traffic to contend with, an operator must obey the War Department's orders, which are to the effect that when a vessel blows for a bridge, it must be opened immediately. Such vessels, even though moving slowly, cannot be stopped in a short distance.

So the operator must set about closing his gates to the traffic and raising his bridge—and, expert as he may be, he cannot avoid the fool who will crash the gates, or who will make a last-moment dash to cross the bridge.

It has occurred before now that, while attempting such dashes, the autoist has had cold feet and abandoned his car midway of the bridge. Under such circumstances, only quick action on the part of the operators avoids serious consequences.

Thus, it is apparent that, at times, a bridge may appear to have been opened to navigation and closed to heavy highway traffic for a longer time than necessary, but even so, the operator of the bridge may have done the best possible.

Dix Bascule Bridge

The former bascule bridge at this crossing of the Rouge was constructed prior to the improvement of the Rouge River, and in those days it spanned a stream of insufficient depth or regularity for any but inconsequential navigation. At that time, the great Rouge plant of the Ford Motor Company was in its infancy, and the mammoth expansion which extends from the very shadow of the bridge as far as the eye can reach, was inconceivable.

With the approval of the War Department, the first bridge was therefore built to provide a clear channel 100 feet wide over the river, as it then existed.

Later, the Ford Motor Company constructed at great expense a massive concrete dock, several thousand feet long in line with the east abutment of our bridge.

When the War Department dredged the Rouge River to a bottom width of 200 feet and a top width of 300 feet, it therefore adopted the line of the Ford Motor Company's concrete dock as the east dock line for the top width of 300 feet, thus leaving our bridge on one side of the center of the new channel—the west end of our bridge did not then reach even to the center of the new channel.

At the time of improving the channel, the War Department did not require the removal of our bridge, but indicated that should our bridge become an impediment to navigation, we would be required to provide a channel of 125 feet wide as was being required at other bridges.

With the increase of navigation on the Rouge, and particularly with the use of the largest boats on the lakes, with lengths exceeding 612 feet and beams of 62½ feet or more, the bridge created an impossible situation which involved a constant menace to navigation and the ever-present possibility that the bridge itself would be accidentally demolished by the larger boats.

The War Department thereupon ordered the bridge to be abandoned or to be rebuilt so as to provide a clear channel width of 125 feet located at the center of the 300-foot channel, setting July 1st, 1926, as the time for completion.

Accordingly, in June of 1924, the Board of Supervisors of Wayne County authorized that plans be prepared by us, and that a bond issue for $1,000,000.00 be submitted to the electors in September of 1924 to defray the cost of construction.

After a favorable vote on the bond issue, and after the sale of the bonds and upon completion of detail plans, we received bids for the construction of the superstructure on December 30, 1924, and the contract was awarded to the low bidder, The Wisconsin Bridge & Iron Company of North Milwaukee, Wisconsin, at a price of $340,822.08.

Bids for the substructure and foundation work were received April 21, 1925, and the contract was awarded to the Missouri Valley Bridge & Iron Company of Leavenworth, Kansas, who were the lowest bidder at a price of $390,235.60.

Two other contracts for electrical equipment and for houses and architectural features are yet to be let when our plans therefor are completed.

The new bridge will be very similar to the Fort Street Bascule Bridge, and will provide for a roadway 56 feet wide between curbs and two 9-foot sidewalks.

The very difficult work involved in constructing the massive foundations, supported on piers extending to rock almost 80 feet below water level, is now progressing favorably, and the superstructure of the bridge is being built at the shops of the bridge company.

The old bridge was raised on June 13, 1925, to permit dredging operations for the new foundation work, and the crossing became closed to highway traffic.

The expenses of maintenance and operation of the old bridge this year, prior to its abandonment, were as follows:

Labor Operating	$5,131.35
Electric Power and Light	123.00
Miscellaneous Maintenance	1,406.00
TOTAL	$6,601.25

The expenditures towards the construction of the new bridge during the past year have been as follows:

Engineering—Design and Field	$ 16,077.33
Blue Prints and Miscellaneous Expense	2,297.89
Shop and Mill Inspection	15.00
Property Acquired for Approaches	48,216.23
Property Surveys, Etc.	337.80
Expenses on Old Bridge	1,058.80
Construction of Siding	865.65
Cement	2,506.92
Construction of Substructure of Bridge	64,504.80
TOTAL	$135,880.42

Jefferson Avenue Bascule Bridge

The operation of this bridge during the past year has proceeded without incident worthy of note.

The bridge was operated 1068 times during the year for the passage of boats.

To show the steady increase in highway traffic we are repeating the tabulation made in our report last year and bringing this tabulation up to date:

The bridge is surmounted by a cast stone handrail of pleasing spindle design.

The bridge has been completed, and was built by our own forces.

The expenditure on this bridge was $15,937.36.

Bridge Maintenance and Other Expenditures

We now have about fifty bridges, exclusive of grade separations and bascule bridges, under our jurisdiction or supervision. We make an annual inspection of each bridge, in order to ensure that they are properly maintained.

Among other things during the past year, we have repainted four steel bridges.

The expense of maintenance of bridges during the past year, exclusive of grade separations and bascule bridges, has been $2,272.07.

Among the miscellaneous items of expense are the surveying of new bridge sites and preparing of bridge plans, etc. for bridges to be constructed in the future. The cost of such work in the past year has been as follows:

For Bridges	$554.45
For Grade Separations	837.03

Michigan Avenue Retaining Wall

A further item of expense not covered elsewhere of $3,594.15, expended during the past year in connection with the construction of a retaining wall in the Rouge River just east of Dearborn. This retaining wall was practically completed in the previous year.

Rouge River Bascule Bridges

During the past year the final dredging of the Rouge River has been completed by the Federal Government, and thus the narrow, winding stream of former days has become a wide, deep, channel navigable by the largest lake freighters.

Pursuant to the orders of the War Department, we have replaced the former swing bridges at Jefferson Avenue and at Fort Street by bascule bridges, which are now in operation, and have rebuilt the foundations of the Dix Road bascule bridge.

Dix Bascule Bridge Maintenance and Operation

This bridge is located just below the turning basin of the Rouge River at the Ford blast furnaces, and soon after the first large lake freighters began navigating the river, it became evident that the bridge would need additional protection against the possibility of having its foundations struck by boats leaving the turning basin.

Accordingly heavy clumps of piles have been driven to protect the foundations. Our foresight in this regard was soon rewarded, when a large freighter struck one of these pile clumps with sufficient force to destroy the clump. This clump has been made larger, and part of the cost of rebuilding has been paid for by the vessel.

The bridge was opened 2,090 times during the past year for the passage of boats.

During the past year the expense of maintenance and operation at this bridge has been as follows:

New Machinery	$ 200.00
Labor Operating	3,378.42
Electric Power and Light	140.13
Miscellaneous Maintenance	2,975.62
Total	6,694.17

Jefferson Avenue Bascule Bridge

The construction of this bridge is now complete, and the bridge has been in use by highway traffic since October 17, 1922.

The opening of the bridge prematurely was forced on us by the condition of the operating machinery on the temporary swing bridge which served as a detour. We therefore undertook the paving of the approaches to the bascule bridge with our own forces, and the work was carried on under the difficulty of maintaining the excessively heavy traffic of Jefferson Avenue during our operations.

Immediately after opening the new bridge to highway traffic, the temporary bridge and concrete detour road were demolished and removed. Early in the spring of 1923 all construction work was practically completed.

The rapid growth in highway traffic at the Jefferson Avenue bascule bridge is indicated by traffic counts which have been made from time to time by the Board of County Road Commissioners.

At the Jefferson Avenue bridge, while no count is available on the old bridge, it is highly improbable that the traffic exceeded 4,000 vehicles in 14 hours, from 7.00 a.m. to 9.00 p.m. By actual count in August, 1921, after the detour bridge was in use, the traffic reached an average of 5,660 vehicles, exclusive of street-cars, in the same 14 hours. In August, 1922, this traffic had increased to 7,300. Since the opening of the new bascule bridge, a traffic count, made on Sunday, May 6, 1923, showed a total of 12,171 vehicles in the same hours, including 163 street-cars.

The temporary bridge was opened 634 times during the year and prior to its abandonment, and the new bascule has been opened 2171 times for the passage of boats since it was put into commission.

Bridge Maintenance and Other Expenditures

WITH fifty bridges under our jurisdiction, a thorough inspection of their condition is carried out annually and our forces are organized to maintain them in proper condition at all times.

This maintenance includes, among other things, the painting of steel structures, repairing of wearing surfaces of floors, beautifying the approaches, etc. Our expenditures on such maintenance during the past year, exclusive of work on the bascule bridges or on grade separations, has been $7,896.76.

In addition we have expended $1,393.13 on miscellaneous engineering work including the planning of new bridges not yet under construction or reconstruction.

The following expenditures have been made in closing out the construction cost of certain bridges completed in 1923:

Bridge at Mile 0.1 Elizabeth Park Drive	$ 533.00
Bridge at Mile 4.3 Michigan Ave. Road	466.05
Bridge at Mile 5.3 Wayne Road North	2,569.58
Bridge at Mile 13.01 Sumpter Road	1,924.78
TOTAL	$5,493.41

Rouge River Bascule Bridges

THE steady increase in the use of Rouge River as a heavy freight artery for Detroit is witnessed by the tonnage which government records of navigation show as passing through this river in vessels. During the past year in excess of 511,000 tons have been so transported.

That the facilities to meet the increasing demands of navigation are none too large is witnessed by the fact that two of the largest freighters of the lakes now make regular trips to the Ford Rouge Plant. These vessels, the Benson Ford and Henry Ford II, are each 612 feet long by 62½ feet wide and they carry in excess of 12,000 tons each when loaded with ore.

With this increase in size of vessels using the channel, the War Department of the United States has found that the present Dix Road Bascule Bridge has become an obstruction to navigation.

EIGHTEENTH ANNUAL REPORT

The present Dix Road Bascule Bridge affords a clear channel width when fully opened of about 100 feet. This width itself is inadequate and the inadequacy is further enhanced by its location at one side of the stream rather than in the middle thereof. All other bridges along the Rouge have clear channel widths of 125 feet or more and are located in the middle of the 300-foot space reserved for navigation between the lines for future dock walls.

This condition is further aggravated by the fact that the dock line, which meets one side of this 100-foot channel through the bridge, angles out toward the stream at that point and a concrete dock several thousand feet long has been built along this line. This combination of circumstances makes navigation conditions not only dangerous but almost impracticable for the larger boats. It is thus a practical certainty that if we do not remove this bridge from its present location a serious accident will result sooner or later and the bridge will be rendered useless thereby.

Under the circumstances, therefore, the War Department has ordered that Dix Bascule Bridge shall be rebuilt as a bridge giving 125-foot clear span and located at the middle of the channel, and has further stipulated that the reconstruction must be complete by July 1st, 1926.

The Board of Supervisors of Wayne County therefore took action at its June meeting authorizing the reconstruction of this bridge as required by the War Department, and in order to finance the reconstruction they further arranged that the issuance of bonds for one million dollars to defray the cost should be placed before the electors on the ballots in the September election.

It may be added that the requirements of highway traffic at the Dix Bridge are increasing and that with the plan for a Dix-High-Waterloo thoroughfare in Detroit, this crossing assumes great importance as a future gateway into the city. The present bridge is entirely inadequate, both for weight and volume of traffic, and regardless of the requirements of the War Department the reconstruction cannot be delayed much longer.

Dix Bascule Bridge

Orders have been received from the War Department to reconstruct this bridge and the Board of Supervisors have submitted to the electors a bond issue to defray the cost.

In the meantime we have proceeded with surveys and are starting plans for the new bridge. Our expenditure on such preliminary work to date has been $328.59.

During the year our pile protections have suffered seriously from collisions of boats and we have just completed rebuilding and strengthening of a part of this protection.

During the year this bridge has opened 475 times for the passage of boats.

A traffic count taken this year at this bridge shows the following results between 7:00 a.m. and 9:00 p.m.

Average Daily Count, 1924	Maximum Recorded Count for 14-hour day	Maximum Recorded Count for a two-hour period
1409 (July)	1428 (Mon., July 28)	418

The expenses of maintenance and operation of this bridge during the past year have been as follows:

Labor Operating	$6,197.47
Electric Power and Light	188.37
Micellaneous Maintenance	1,124.13
TOTAL	$7,509.97

We have also expended $328.59 up to date on preliminary engineering work looking towards the reconstruction of the Dix Bascule Bridge.

Jefferson Avenue Bascule Bridge

The electrical and mechanical operation of this bridge during the past year has proceeded without any difficulties worthy of note, but the usual number of jay-drivers have smashed through our traffic gates in the face of ringing alarm bells, flashing lights and other contrivances to warn them of their danger. The fact that half of the street is full of vehicles which have stopped and are waiting for the bridge to raise sometimes fails to deter these dauntless spirits from darting around the outside and attempting a dash for liberty.

However, our bridge operators are deputized as special officers and having obtained the necessary details of car number, driver's name, license number, address, etc., the wheels of justice are set in motion, with the result that soon thereafter Mr. John Jay-driver receives a bill for damages and if necessary, he receives a summons to court.

During the past year, this bridge has been operated 922 times for the passage of boats.

The increase of highway traffic at this crossing is shown by the following figures for traffic between the hours of 7:00 a.m. and 9:00 p.m.

	Average per Day	Maximum Recorded Count for a 14-hour day	Maximum Recorded for a two-hour period
1918	2,628 (March)	2,628 (Sat. March 23)	503
1920	5,117 (October)	5,360 (Sat. Oct. 16)	974
1921	5,879 (August)	6,108 (Sun. Aug. 14)	1,433
1922	7,188 (August)	7,338 (Wed. Aug. 30)	1,545
1923	10,101 (May)	12,171 (Sun. May 6)	3,197
1924	12,155 (July)	*13,093 (Sat. July 12)	*2,626

* (No Sunday count available. Probably 15,000 for a 14-hour day and 3,500 for two hour period.)

Rouge River Bascule Bridges

CONSTRUCTION of the Dix Road Bascule Bridge is now fully completed and within the past two weeks the pavement on the Detroit-Toledo Drive connecting Dix Road and the bridge to Oakwood Boulevard has been opened to highway traffic.

Thanks to the open conditions existing at the Dix crossing of the Rouge and the lack of property development adjacent thereto, the bridge site at the Dix crossing offered possibilities for the proper development of the approaches. We have taken the fullest advantage of these possibilities with the result that the Dix bridge is by far the most beautiful of the three bascule bridges which we have constructed over the Rouge River.

The wide paved approaches are flanked on each side with strips of well cared for sod to the full width of the right-of-way.

The bridge proper is a deck structure whose lines are those of a graceful arch spanning the river. The roadway on the bridge is 56 feet wide, and in addition, the bridge accommodates two 9-foot sidewalks.

The right-of-way of Dix Road along the northeast approach has been widened to 120 feet and is paved with concrete to a width of 74 feet.

The southwest approach spreads out from the end of the bridge to receive the Detroit-Toledo Drive at one side and a city street at the other side of the approach thus offering a possibility to develop a broad plaza at this end of the bridge.

The Operators' Houses and the bridge approaches in general are finished in Bedford stone.

In its location immediately adjacent to the Ford Motor Company Rouge Plant the bridge is already attracting hundreds of visitors daily.

We expect that highway traffic will not be long in discovering the advantage of this crossing of the Rouge River linking Dix Road and the Vernor Highway on the northeast and through Detroit with the Detroit-Toledo Drive to Toledo and the southwest.

The operation of our other two bascule bridges at the Fort Street and Jefferson Avenue crossings of the Rouge River has proceeded smoothly and without noteworthy incident during the past year.

The highway traffic at the Fort Street bridge now averages about 24,200 vehicles per 14-hour day and that at the Jefferson Avenue bridge about 13,800 vehicles.

River traffic aggregating 1,800,000 tons and 15½ million board feet of lumber has required 1368 openings of the Fort Street bridge and 1780 openings of the Jefferson Avenue bridge for the passage of boats during the past year.

Dix Bascule Bridge

THIS bridge is now nearing completion, and provides a clear channel width of 125 feet centered on the 300 foot channel as ordered by the War Department.

The original order of the War Department required that the reconstruction be completed by July 1, 1926, but, in view of the unavoid- able delay entailed in submitting a million dollar bond issue to the electors to cover the cost, an extension of time has been granted to November 1, 1925.

It is probable that all construction which would interfere with navigation will be completed before this extended date, but it is inadvisable to pave the approaches before next Spring.

In addition to the contracts for substructure and superstructure which were let last year to the Missouri Valley Bridge and Iron Company of Leavenworth, Kansas, and the Wisconsin Bridge and Iron Company of Milwaukee, Wisconsin, respectively, we have let contracts this year to the Kuehne Electric Company of Detroit for the electrical work and to George P. Cullen, Inc., of Chicago, for the architectural and stone work.

The new bridge will be of the same general type and dimensions as the Fort Street bascule bridge.

The bascule is a double leaf, simple trunnion with fixed counter weight, of deck type and will provide a roadway 56 feet wide between curbs and two 9-foot sidewalks. The distance center to center of trunnions is 164 feet and the overall length between abutments which includes short fixed approach spans is 288 feet and 6 inches.

In addition to abutments for the fixed approach spans supported on long piles reaching to hard pan 75 feet below the bottom of the footings, the foundations for each bascule leaf consist of an immense reinforced concrete box or counter weight pit supported on four massive reinforced concrete sub-piers, each 13 feet 6 inches in diameter, reaching through the blue clay to solid foundations 80 feet below water level. These sub-piers were constructed as pneumatic caisson piers.