Lower Bank Road Bridge
Spanning the Mullica River, 8 miles northeast of Egg Harbor City, connecting Washington Township, Burlington County, with Egg Harbor City
Atlantic County
New Jersey

HAER No. NJ-73

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
Mid-Atlantic Regional Office
National Park Service
U.S. Department of the Interior
Philadelphia, Pennsylvania 19106

HISTORIC AMERICAN ENGINEERING RECORD

Lower Bank Road Bridge

HAER No. NJ-73

Location: Spanning the Mullica River, 8 miles northeast of Egg Harbor City, connecting Washington Township, Burlington County, with Egg Harbor City, Atlantic County, New Jersey

UTM: 18.538500.4382500
Quad: Green Bank, New Jersey

Date of Construction: 1926 - Completed in 1926.
1975 - Electrification of opening mechanism
1989 - Steel plates added to racks
1990 - Crossing bracing on bascule replaced
1990 - Trunnion posts reinforced

Builder: Hill Construction Company

Present Owner: Atlantic and Burlington counties, New Jersey

Present Use: Highway bridge

Significance: In 1926, the bascule bridge replaced an earlier swing bridge at the same location. The present bridge was erected by Hill Construction Company. The bascule portion of the bridge is an excellent example of a patented Strauss short span bascule bridge with an overhead counterweight. The Strauss Company was a national leader in the design of bascule bridges. This bridge was executed during the company's flourishing period. As one journeys up the Mullica River from its mouth at Great Bay, the Lower Bank Bridge is the second one passes under. It serves as an essential link for both land and sea commerce in this portion of the scenic Pine Barrens of New Jersey.

Project Information: This documentation was undertaken in the summer of 1990 on behalf of the New Jersey Department of Transportation, and the Atlantic and Burlington counties, New Jersey, and in compliance with a Memorandum of Agreement as a mitigative measure prior to the removal of the bridge. A new bridge is to be constructed on the same alignment.

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DESCRIPTION OF THE SITE

The Lower Bank Bridge is located on a segment of the lower reaches of the Mullica River that has been identified in the Nationwide Rivers Inventory (NRI) as meeting the minimum criteria for further study and/or potential inclusion in the National Wild and Scenic River System. To be listed in the NRI, rivers must be free flowing, relatively undeveloped, and possess outstanding natural and cultural resources. the Mullica was found to have met the first two criteria and to have possessed significant recreational, natural, and historic resources. On the Atlantic County end of the bridge is a salt marsh, part of the Pine Barrens of lower New Jersey, which is now protected as a natural resource. The Burlington side has a much more settled appearance with a number of houses along the river bank and a large boat-building enterprise, now closed but apparently to be adaptively reused by a soft drink bottling company. Boat building has been a feature of the Burlington County side of the bridge for more than a century. An 1844 report states:

> Lower Bank, 6 miles below Batsto, on the Little Egg Harbor River (i.e.: Mullica River), has a Methodist Church and about 30 dwellings. Once you've come to the bridge, very like the one at Green Bank, you have your choice of going over the river and on to Egg Harbor City, the village that deserted a river for a railroad, to the clearing that was the Old Gloucester Furnace, or to the sand holes and decaying timbers of Clark's Landing further down. Or you can keep along the Lower Bank side of the Mullica, close to the gray and amber water of the river, although the pathway eventually peters out. Charlie Leek builds his ships beside the bridge for a very good reason. Every now and then Charlie has to drop tools and hurry out to man the capstan to open the bridge, the signal being either a shrill whistle or a raucous horn.[1]

The area also was the location of Eric Mullica's home which was established in the late 18th century and for which the river is named. A unique aspect of the agricultural life of the area was the harvesting of salt hay. This was gathered from islands in the river by taking horses and hay mows aboard a scow, cutting the hay, and returning it to the farmsteads by river. The area has long been associated with commercial fishing including the gathering of shellfish. In earlier days, there were schooners, sailing barges, and even a steam packet service to New York City, which plied these lower reaches of the Mullica River.

A DESCRIPTION OF THE LOWER BANK BRIDGE

From the structural point of view, the Lower Bank Bridge is composed of three distinct parts, two of which are constructed in timber and the third is a steel bascule span, all built in 1926. From the river banks, timber sheet piling was driven on both sides of the roadway and closed off to the end, thus forming a cofferdam which was backfilled with river gravel and sand. From the end of the bulkheads, the roadway was extended on a series of thirty-one pile bents. The bents themselves are of traditional trestle construction with the addition of five pairs of tenders which serve as icebreakers. The trestle work and bulkhead are shown in a photograph taken from the South Side Bridge at the Atlantic County side. The total length of the bridge, including bulkheads, is approximately 1,284 feet.

The Lower Bank Bridge's most striking feature is a bascule span which opens to permit river traffic to pass up and down the river. It is a single span, overhead counterweight Strauss-type bascule bridge, constructed in 1926 to replace an existing swing span bridge.

The bascule span is constructed to two girders that span a distance of 40 feet 3 inches from toe bearing to trunnion. These girders are tapered from approximately four feet in depth at the toe to six feet in depth at the trunnion. The back of the bascule is tapered from the trunnion to approximately 1 foot 3 inches at the counterweight post support. The overall girder length is 49 feet 5 inches. Several photographs of the bridge, showing its extent, were taken both upstream and downstream, as well as up and downstream views of the bascule section of the bridge only. These elevation photographs, all included as part of this report, are further supplemented with a series of detailed views of the bascule girders and their supporting trunnions.

A distance of 22 feet 10 inches separate the two girders. At 9 feet 6 inch spacing, 26 l 91 floor beams frame into the girders. In addition, there are steel cross braces which act as stiffening members for the bascule span. The floor beams support nine 4x4-inch timber stringers which are spaced at 2 feet 3 inches. A timber plank deck is nailed to these stringers. The roadway width is 18 feet. The structural system for the bascule span can best be seen in the photograph with the span in its open position.

the photograph taken from the deck with the bascule span open also gives a clear indication of the gearing used to open and close the bridge. In its original design, the bridge was opened manually with a capstan mounted in the deck connecting the gearing through a drive shaft. This mechanical linkage can still be used in an emergency. In 1975, the gearing was modified to be operated electrically. The electric motor and vertical shaft are shown in several of the photographs included in this report.

Each bascule girder is supported on a trunnion, which, in turn, is supported by two trunnion posts, one terminating at the trunnion elevation and the other extending upward to the link which connects the tower to the overhead counterweight. This is illustrated in the photograph showing the upper link mechanism. Connections of this link to the tower and to the counterweight are through the pin connections which permit movement of both the counterweight and the bascule span. The concrete counterweight is supported on the counterweight post which is pinned to the rear end of the bascule girder.

When the bridge is being opened, the concrete counterweight moves downward and laterally towards the stationary trunnion post. This counterweight motion compensates for both the vertical and horizontal shifting of the center of gravity of the bascule span. In his well-known book entitled Movable Bridges, Hovey presents the following description of the operation of a patented Strauss bridge:

> Vertical overhead counterweight type. [The attached figure] is a diagram of this type. The center of gravity of the moving leaf is at g and that of the counterweight of g'. Trunnion A and joint B are in the same plane as g, and link CD is parallel to gAB. ABDC is a parallelogram. Hence, in any position, closed or in motion, Px = Wy, or Px' = Wy'; and a balance is maintained throughout the movement of the leaf. In this type the dead load of the trunnion is P + W, and the reaction is always positive and constant. The introduction of the parallelogram permits the center of gravity of the counterweight to be at any convenient height above B, while in a simple trunnion bridge it must be at B, in the plane of gAB. The break in the floor is in front of the trunnion.[2]

HISTORY OF THE STRAUSS OVERHEAD COUNTERWEIGHT BASCULE BRIDGE

The movable bridge, in the form of bascule, lift and swing structures, constitutes a special category of bridge, combining both civil and mechanical engineering technologies. They are erected where navigation demands vertical clearance and the surrounding landscape does not permit elevated approaches. They are most commonly found in low lying coastal areas and in urban locations. Thus, there are numerous movable bridges in New Jersey. Although the bascule bridge is of ancient origin, its modern steel configuration did not appear until the 1890s in Chicago. The most prevalent types of movable bridges are the Scherzer and Rall rolling lift bridges, the Chicago City, and the Strauss Trunnion Bascule types, together with other numerous patented types. Strauss bascule bridge was one of the most widely accepted types. The first Strauss bascule bridge was constructed in the 1890s and was protected by a series of patents shown in Table 1. Not only did the Strauss Company build numerous short span single and double lift bascule bridges, it was also responsible for a series of notable bridges completed before the Lower Bank Bascule Bridge. These are presented in Table 2. Thus, the design utilized in the Lower Bank Bridge displays typical details found on most other Strauss bridges. There are no unique details on the bridge that were not included in the Strauss patents.

Although many bascule bridges were built in New Jersey, the total number has not been determined. There are, however, seven remaining, including the Lower Bank Bridge. The Lower Bank Bridge was erected during the flourishing period of the Strauss Company. All of the other extant bascule bridges, except for the Wading River Bridge, were built during the same period. The present Wading River Bridge is a reconstruction, dating from 1983.

HISTORY OF THE LOWER BANK BASCULE BRIDGE

A photograph (ca. 1905) shows the predecessor to the Lower Bank Bascule Bridge, a swing bridge in its open position. In most cases, even for short span swing bridges, a truss configuration was used. However, in this bridge, a central tower supports cable stays fastened along the side of the roadway. Like many bridges located in rural areas, this one apparently suffered from lack of adequate maintenance. A resolution by the bridge committee of Atlantic County stated that "the bridge spanning Mullica River between Atlantic and Burlington counties at Lower Bank has been for a long while in a questionable position to carry modern travel, the bridge not having been originally constructed for such use. And, whereas Atlantic County has for a long time been providing each year for reconstruction for the bridge and has been continuously urging Burlington County to agree to bear its share of the cost of such reconstruction without successful results and whereas an accident has recently occurred on the Burlington County end of the bridge, which accident resulted from the giving way of one of the supporting bents and which accident might very easily have been accompanied by an extremely serious result. Now therefore be it resolved that the County Engineer be and is hereby authorized and directed to permanently blockade the road which leads to the aforesaid bridge." This resolution was adopted by Atlantic County on September 14, 1921, and effectively begins the history of the Lower Bank Bascule Bridge, which was not completed until 1926. Two months later, on December 14, Judge Higbee reported to the Board of Chosen Freeholders of the County of Atlantic, in connection with the trial of Bennett vs. Counties of Burlington and Atlantic, "I beg further to report there's an outstanding difference between Burlington and Atlantic Counties for the building of the bridge." Throughout the years leading up to the award of the contract for the Lower Bank Bascule Bridge, differences of opinion between the two counties delayed the construction of the bridge for a number of years. In all of the legal documents, it appears that Atlantic County was the leader in efforts to secure the construction of a new bridge, with Burlington County

being the reluctant partner. In a separate action, on January 2, 1922, Atlantic County authorized and directed the County Engineer to contact the Strauss Bascule Bridge Company for a bascule span to be erected over Nacote Creek. It is interesting to note that the Strauss Company was to be reimbursed in the amount of ten percent of the cost of the superstructure for plans and specifications, checking of working drawings, and inspection. This apparently was a pattern used by the counties, since exactly the same conditions were stated for the Lower Bank Bridge and probably for other such structures, including the Green Bank and the Wading River bascule bridges. On May 10, 1922, the Board of Chosen Freeholders of Atlantic County reported that their corresponding corps in Burlington County had expressed its willingness to proceed with the reconstruction of the bridge at Lower Bank. A resolution was then authorized to proceed in conjunction with the Bridge Committee of Burlington County in the preparation of plans and specifications for a new bridge. Apparently nothing came of this proposed joint venture, for on May 24th, the Board of Chosen Freeholders of Atlantic County, noting that there had been no satisfactory rearrangement arrived at between the two boards, "resolved that unless the Board of Chosen Freeholders of the County of Burlington will agree with the Atlantic County Board on or before 11:00 AM June 12, 1922, to rebuild the bridge according to plans satisfactory to our board, then our County Solicitor is hereby instructed to take legal proceedings as he may deem necessary to bring about the desired results."

Legal action was taken and, on May 5, 1923, the Board noted that the commissioners, appointed by Judge Black, one of the Justices of the Supreme County, had not yet reported on the character and materials elating to the reconstruction of the bridge, and "resolved that the County Engineer be instructed to arrange with the County Engineer of Burlington to prepare plans and specifications for the rebuilding of said bridge in accordance with the report of the commissioners and to submit progress at the new meeting of the board."

The board, at its meeting on July 11th, adopted a resolution authorizing core drilling on the site of the Lower Bank Bridge. Thus, by the middle of 1923, preliminary field work was underway, which would finally result in the Lower Bank Bascule Bridge. By September 1923, the board has been informed unofficially by the War Department that a permit for a new bridge would be approved.

On behalf of the Bridge Committee, a resolution was presented and adopted, authorizing the County Engineer in connection with the Board of Chosen Freeholders of Burlington County to contact the Strauss Bascule Bridge Company in the preparations of plans and specifications in connection with the Lower Bank Bridge. In this October 10th resolution, the fee to the Strauss Company would be ten percent of the contract of the superstructure, including the counterweight and its support.

At its meeting on June 11, 1924, the board approved the plans and specifications, and directed the clerk of this board to advertise for bids. On August 13, the following bids were received: Hill Construction Company, $114,996.60; Rancocas Construction Company, $137,741.59; Kolyn Construction Company, $135,950.00; Lewis J. Seiling, $128,300.00; F. W. Schwiers, Jr., Company, $119,665.00; J. J. Terry & Company, $124,950.00. In addition, two bids were rejected for failing to meet the bid requirements. With the information, the bridge committee recommended the award to the Hill Construction Company. Each of the counties was to share the $114,996.60 contract equally. In Atlantic County, the money was to be raised by issuing bridge bonds, paying 4-1/2 percent per annum.

With the award of the contract, on September 10th, the Board of Atlantic City approved a resolution terminating the employment of the bridge tender, effective October 1. At the same meeting, the County

Engineer was instructed to inspect the creosoted materials which had been delivered from Toledo, Ohio. On November 5th, the bridge committee presented a resolution which was the first of many change orders to be approved by the board, in this case, the shortening of the first span in the trestle bent adjacent to the supporting pier and increasing the Burlington County bulkhead fill by the same amount. This resolution was passed and was to be undertaken without additional compensation to the contractor. At the meeting of the Atlantic County Board on May 13, 1925, a resolution was moved by the bridge committee for a no-cost extension on the project on behalf of the contractor claiming that winter weather conditions had delayed his work. The resolution was adopted to extend until July 15, 1925, with the provision that the extended time after May 1, 1925, shall include inspection costs, which would be borne by the contractor. On May 13th, another change order was authorized, modifying the design of the guardrail in the bulkhead portions of the bridge.

In April 1925, the Council of Egg Harbor City, anticipating the completion of the Lower Bank Bridge, resolved that the Board of Chosen Freeholders of Atlantic County be urged to take on the Lower Bank Road as a county road. Shortly thereafter, on September 1, sensing the "impassibility of the road in its present condition," the Council authorized $2,000 to the Department of Highways to improve the access road.

At the July 8, 1925, meeting of the Atlantic County Board, the Hill Construction Company asked for a no-cost extension until August 15. The bridge committee, however, submitted a resolution refusing the request which was approved by the board. At its August 12th meeting, the board considered a number of items related to the bridge. First, it urged the city of Egg Harbor to work with the board and its engineer in locating a new access road from the Egg Harbor-Green Bank Road to the Burlington County end of the bridge. A small change order, in the amount of $271.48, was approved for minor work to be completed on the bridge. In addition, in a change of heart, the board reconsidered an extension of time for completion of work by the Hill Construction Company, so that they would not suffer liquidated damages. This resolution was passed, noting hat $503.00 was owed by the company for additional inspection costs and a small amount would be retained to insure completion of incidental work on the bridge. Time extensions had been approved earlier by Burlington County. The liquidated damages were remitted in a unanimous voted by the board. With little fanfare, on January 8, 1926, the board resolved to accept the Lower Bank Bridge as entirely completed except for the lowest line of wales on the icebreakers. This latter work could not be completed in place until the return of favorable weather, including low tide.

It is not clear exactly when the bridge opened for traffic, but on March 17th the board authorized the county engineer, in cooperation with the county engineer of Burlington County to advertise for a bridge tender. The incidental work, including installing the lower wales on the icebreaker had been completed and, on November 10, 1926, the final $500.00 payment was made to the contractor.

No historic views of the bridge were found, although Atlantic City Library, the Atlantic County Historical Society, the Atlantic County Library, the Atlantic City Press, Burlington County Library, Bass River Clerk's office, and the Washington Township Clerk's office were consulted.

Little of historical note has occurred at the bridge site during its more than half a century of service to the local community. Although the bridge has suffered from lack of maintenance and displays many deteriorated members, it is in essentially good condition. The original condition of the bridge was confirmed by comparing the present structure with available original drawings.

The only significant modification was the installation in 1975 of an electric, motor-driven gearing system to augment the original, manually-operated gear train for opening the bridge. The electric power drive was installed with a minimum of alteration to the original structural system or to the gear train.

Another modification, though not as significant, is the installation of steel plates to the racks with bolts and welding to strengthen the deteriorated areas of the existing racks. This work was completed in 1989. In 1990, new steel cross bracing replaced badly rusted original members, together with a strengthening of the trunnion posts.

Not only is the bridge in essential original condition, but its location is unaltered since its erection, thus enhancing the historical significance of the bridge.

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Minutes, Council of Egg Harbor City, February 5, 1919 to August 3, 1932.

Rafferty, Bill, "Unusual Bridges Across the Mullica," The Batsto Citizens Gazette, Vol. XXII, No. 1, Winter and Spring 1988.

Reichmann, A., "American Bridge Type, Bascule Bridge," Western Society of Engineering, Vol. 29, No. 4, April 1924.

Waddell, J. A. L., Bridge Engineering, New York: John Wiley and Sons, Inc., 1916.

ENDNOTES

1. Henry Charlton Beck, Jersey Genesis, The Story of the Mullica River, p. 72.

2. Otis Ellis Hovey, Movable Bridges, p. 116.

STRAUSS PATENTS

PATENT NUMBER	SUB-CLASS	TYPE
738954	38	Bascule
894239	39	Bascule
995813	..	Bascule
1124356	36	Bascule
1150643	38	Bascule
1150975	38	Bascule
1157449	41	Bascule
1170703	38	Bascule
1171553	38	Bascule
1211639	36	Bascule

TABLE 1

Source of Table: Hool and Kinne, Movable and Long Span Bridges, p. 29.

Information Sheet 1

STRAUSS BASCULE BRIDGES

Railroad Bridges

Name or Location:	Wheeling & Lake Erie R.R., Cleveland, Ohio
Design:	Thro. Riv.
Number of Leaves:	1
Clear Channel:	120
Span, e. to c. Feet:	150 skew
Counterweight Span, Feet:	----------
Tracks, Number or Roadway Feet:	1
Sidewalks, Number, Width:	----------
Weight of Structural Steel, Pounds:	899,006
Weight of Machinery, Pounds:	50,000
Machinery to Structural, Per Cent:	5.50
Total Weight, Pounds:	949,000
Date Built:	1905

Name or Location:	Chicago & Western Indiana R.R.
Design:	Thro. Riv.
Number of Leaves:	1
Clear Channel:	----------
Span, e. to c. Feet:	180
Counterweight Span, Feet:	50
Tracks, Number or Roadway Feet:	2
Sidewalks, Number, Width:	----------
Weight of Structural Steel, Pounds:	2,011,000
Weight of Machinery, Pounds:	108,000
Machinery to Structural, Per Cent:	8.22
Total Weight, Pounds:	2,212,000
Date Built:	1910

Name or Location:	Buffalo Creek R.R., Buffalo, NY
Design:	Thro. Riv.
Number of Leaves:	1
Clear Channel:	----------
Span, e. to c. Feet:	105 skew
Counterweight Span, Feet:	45
Tracks, Number or Roadway Feet:	2
Sidewalks, Number, Width:	----------
Weight of Structural Steel, Pounds:	1,753,000
Weight of Machinery, Pounds:	153,000
Machinery to Structural, Per Cent:	8.73
Total Weight, Pounds:	1,906,000
Date Built:	1913

Name or Location:	Illinois Central R.R., New Orleans, LA
Design:	Thro. Riv.
Number of Leaves:	1
Clear Channel:	----------
Span, e. to c. Feet:	99.25
Counterweight Span, Feet:	62
Tracks, Number or Roadway Feet:	1
Sidewalks, Number, Width:	----------
Weight of Structural Steel, Pounds:	633,000
Weight of Machinery, Pounds:	20,000
Machinery to Structural, Per Cent:	4.11
Total Weight, Pounds:	639,000
Date Built:	1914

Name or Location:	Baltimore & Ohio R.R., Whiting, IN
Design:	T.P.G.
Number of Leaves:	1
Clear Channel:	----------
Span, e. to c. Feet:	83.5
Counterweight Span, Feet:	----------
Tracks, Number or Roadway Feet:	2
Sidewalks, Number, Width:	----------
Weight of Structural Steel, Pounds:	572,000
Weight of Machinery, Pounds:	118,000
Machinery to Structural, Per Cent:	20.19
Total Weight, Pounds:	690,00
Date Built:	1914

Name or Location:	Chicago & Northwestern Ry., Deering, Chicago, IL
Design:	Thro. Riv.
Number of Leaves:	1
Clear Channel:	115
Span, e. to c. Feet:	132.5 skew
Counterweight Span, Feet:	45
Tracks, Number or Roadway Feet:	1
Sidewalks, Number, Width:	----------
Weight of Structural Steel, Pounds:	1,039,000
Weight of Machinery, Pounds:	115,500
Machinery to Structural, Per Cent:	11.12
Total Weight, Pounds:	1,154,500
Date Built:	1914

Name or Location:	Yazoo & Mississippi Valley R.R., Allen, MS
Design:	T.P.G.
Number of Leaves:	1
Clear Channel:	61
Span, e. to c. Feet:	75
Counterweight Span, Feet:	75
Tracks, Number or Roadway Feet:	1
Sidewalks, Number, Width:	----------
Weight of Structural Steel, Pounds:	390,000
Weight of Machinery, Pounds:	23,500
Machinery to Structural, Per Cent:	6.03
Total Weight, Pounds:	413,500
Date Built:	1917

Name or Location:	Cleveland, Cincinnati, Chicago & St. Louis Ry., Cleveland, Ohio
Design:	Thro. Riv.
Number of Leaves:	1
Clear Channel:	110
Span, e. to c. Feet:	173 skew
Counterweight Span, Feet:	45
Tracks, Number or Roadway Feet:	1
Sidewalks, Number, Width:	----------
Weight of Structural Steel, Pounds:	1,039,000
Weight of Machinery, Pounds:	115,500
Machinery to Structural, Per Cent:	11.12
Total Weight, Pounds:	1,154,500
Date Built:	1919

Name or Location:	New York, New Haven & Hartford R.R., Thames River, New London, Connecticut
Design:	Thro. Riv.
Number of Leaves:	1
Clear Channel:	----------
Span, e. to c. Feet:	158
Counterweight Span, Feet:	On fixed span
Tracks, Number or Roadway Feet:	2
Sidewalks, Number, Width:	----------
Weight of Structural Steel, Pounds:	1,603,000
Weight of Machinery, Pounds:	205,000
Machinery to Structural, Per Cent:	12.53
Total Weight, Pounds:	1,838,000
Date Built:	1919

Name or Location:	Illinois Central R.R., et. al., 10th Street, Chicago, Illinois
Design:	Thro. Riv.
Number of Leaves:	1
Clear Channel:	200
Span, e. to c. Feet:	260 skew
Counterweight Span, Feet:	58
Tracks, Number or Roadway Feet:	2
Sidewalks, Number, Width:	----------
Weight of Structural Steel, Pounds:	3,105,000
Weight of Machinery, Pounds:	356,000
Machinery to Structural, Per Cent:	11.47
Total Weight, Pounds:	3,616,000
Date Built:	1919

Name or Location:	U. S. Govt., Mare Island Navy Yard
Design:	D.P.G.
Number of Leaves:	1
Clear Channel:	74
Span, e. to c. Feet:	94
Counterweight Span, Feet:	11
Tracks, Number or Roadway Feet:	1 and highway
Sidewalks, Number, Width:	----------
Weight of Structural Steel, Pounds:	301,000
Weight of Machinery, Pounds:	53,000
Machinery to Structural, Per Cent:	17.13
Total Weight, Pounds:	357,000
Date Built:	1919

Highway Bridges

Name or Location:	Elizabeth, NJ, Elizabeth River
Design:	Pony Riv.
Number of Leaves:	1
Clear Channel:	60
Span, e. to c. Feet:	53
Counterweight Span, Feet:	----------
Tracks, Number or Roadway Feet:	1 @ 25
Sidewalks, Number, Width:	none
Weight of Structural Steel, Pounds:	233,00
Weight of Machinery, Pounds:	33,00
Machinery to Structural, Per Cent:	17.17
Total Weight, Pounds:	266,00
Date Built:	1908

Name or Location:	Petaluma, Cal., Petaluma Creek
Design:	D.P.G.
Number of Leaves:	1
Clear Channel:	50
Span, e. to c. Feet:	60
Counterweight Span, Feet:	2 @ 25
Tracks, Number or Roadway Feet:	1 @ 24
Sidewalks, Number, Width:	2 @ 6
Weight of Structural Steel, Pounds:	111,500
Weight of Machinery, Pounds:	33,500
Machinery to Structural, Per Cent:	23.67
Total Weight, Pounds:	175,000
Date Built:	1914

Name or Location:	Buffalo, NY., Black Rock Harbor
Design:	Thro. Riv.
Number of Leaves:	1
Clear Channel:	----------
Span, e. to c. Feet:	103
Counterweight Span, Feet:	55.5
Tracks, Number or Roadway Feet:	1 @ 30
Sidewalks, Number, Width:	2 @ 8
Weight of Structural Steel, Pounds:	1,028,000
Weight of Machinery, Pounds:	132,500
Machinery to Structural, Per Cent:	12.83
Total Weight, Pounds:	1,001,000
Date Built:	1914

Name or Location:	Walnut Grove, Cal., Sacramento River
Design:	Thro. Riv.
Number of Leaves:	2
Clear Channel:	220.5
Span, e. to c. Feet:	226
Counterweight Span, Feet:	2 @ 57
Tracks, Number or Roadway Feet:	1 @ 18
Sidewalks, Number, Width:	----------
Weight of Structural Steel, Pounds:	521,000
Weight of Machinery, Pounds:	51,000
Machinery to Structural, Per Cent:	10.37
Total Weight, Pounds:	575,000
Date Built:	1915

Name or Location:	Rio Vista, Cal., Sacramento River
Design:	Thro. Riv.
Number of Leaves:	2
Clear Channel:	220.5
Span, e. to c. Feet:	226
Counterweight Span, Feet:	2 @ 57
Tracks, Number or Roadway Feet:	1 @ 21
Sidewalks, Number, Width:	_____
Weight of Structural Steel, Pounds:	512,000
Weight of Machinery, Pounds:	56,000
Machinery to Structural, Per Cent:	10.33
Total Weight, Pounds:	598,000
Date Built:	1913

Name or Location:	New Brunswick, NJ, Albany St.
Design:	D.P.G.
Number of Leaves:	1
Clear Channel:	----------
Span, e. to c. Feet:	58
Counterweight Span, Feet:	----------
Tracks, Number or Roadway Feet:	1 @ 23 83
Sidewalks, Number, Width:	2 @ 10
Weight of Structural Steel, Pounds:	166,000
Weight of Machinery, Pounds:	27,000
Machinery to Structural, Per Cent:	16.27
Total Weight, Pounds:	193,000
Date Built:	1919

Name or Location:	Elizabeth, N.J., Elizabeth River
Design:	Thro. Riv.
Number of Leaves:	1
Clear Channel:	----------
Span, e. to c. Feet:	131.63
Counterweight Span, Feet:	----------
Tracks, Number or Roadway Feet:	1 @ 18
Sidewalks, Number, Width:	1 @ 1
Weight of Structural Steel, Pounds:	102,000
Weight of Machinery, Pounds:	60,000
Machinery to Structural, Per Cent:	12.99
Total Weight, Pounds:	522,000
Date Built:	1921

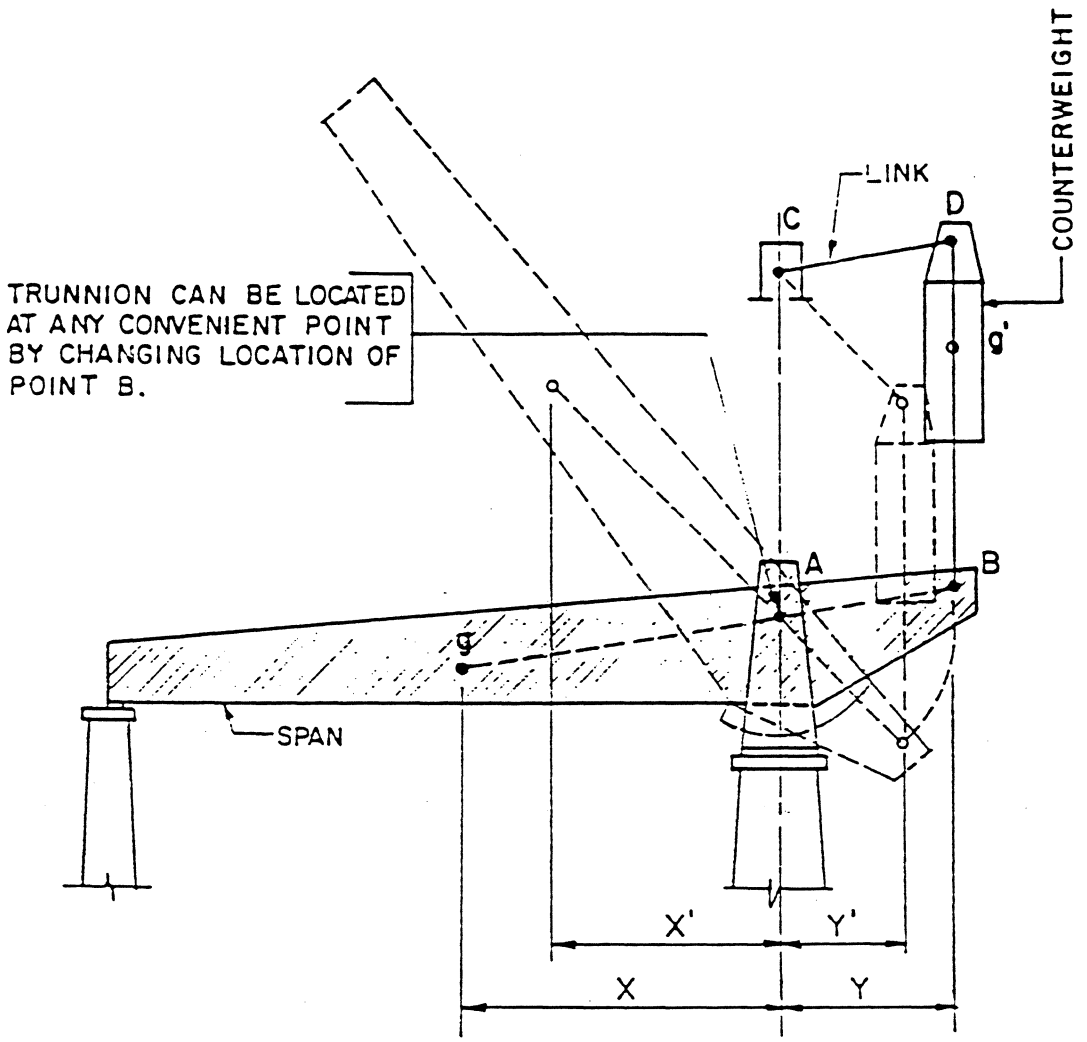
Name or Location:	Troy-Cohoes, N. Y.
Design:	Thro. Riv.
Number of Leaves:	2
Clear Channel:	----------
Span, e. to c. Feet:	221
Counterweight Span, Feet:	----------
Tracks, Number or Roadway Feet:	1 @ 26
Sidewalks, Number, Width:	2 @ 6
Weight of Structural Steel, Pounds:	1,129,000
Weight of Machinery, Pounds:	105,000
Machinery to Structural, Per Cent:	11.55
Total Weight, Pounds:	1,504,000
Date Built:	1922

Name or Location:	Isleton, Cal., Sacramento River
Design:	Thro. Riv.
Number of Leaves:	2
Clear Channel:	220.5
Span, e. to c. Feet:	226
Counterweight Span, Feet:	2 @ 57
Tracks, Number or Roadway Feet:	1 @ 18
Sidewalks, Number, Width:	----------
Weight of Structural Steel, Pounds:	512,000
Weight of Machinery, Pounds:	56,000
Machinery to Structural, Per Cent:	10.33
Total Weight, Pounds:	598,000
Date Built:	1922

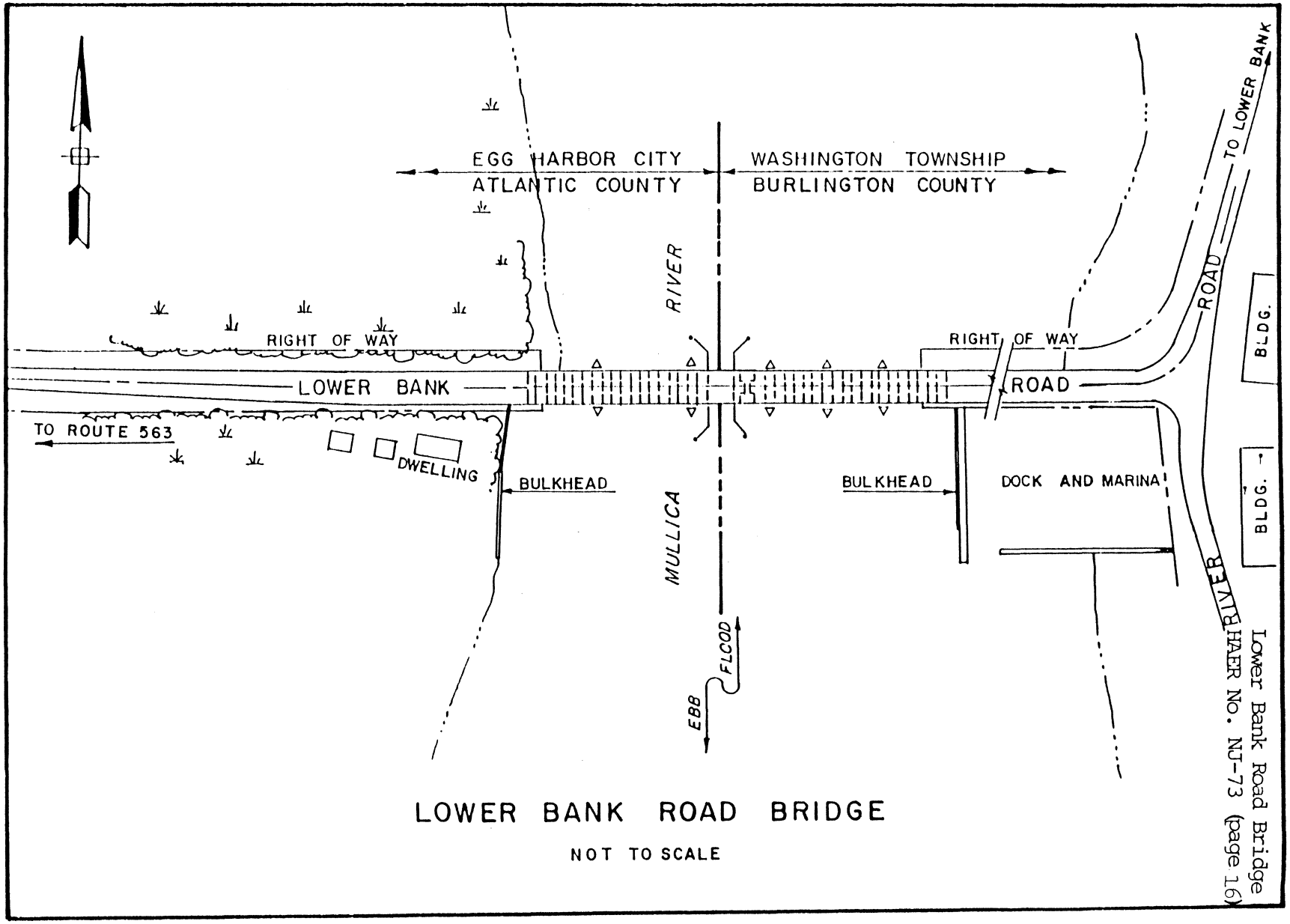
Name or Location:	Cohasset, Minn., Mississippi River
Design:	Thro. Riv.
Number of Leaves:	1
Clear Channel:	----------
Span, e. to c. Feet:	68
Counterweight Span, Feet:	----------
Tracks, Number or Roadway Feet:	1 @ 10
Sidewalks, Number, Width:	----------
Weight of Structural Steel, Pounds:	152,000
Weight of Machinery, Pounds:	22,500
Machinery to Structural, Per Cent:	14.81
Total Weight, Pounds:	174,500
Date Built:	1923

Name or Location:	Los Angeles, Cal., Badger Avenue
Design:	Thro. Riv.
Number of Leaves:	2
Clear Channel:	187.92
Span, e. to c. Feet:	220
Counterweight Span, Feet:	2 @ 50
Tracks, Number or Roadway Feet:	2 @ 15.5
Sidewalks, Number, Width:	1 @ 6
Weight of Structural Steel, Pounds:	4,761.000
Weight of Machinery, Pounds:	342,000
Machinery to Structural, Per Cent:	7.18
Total Weight, Pounds:	5,103,000
Date Built:	1923

Name or Location:	Lower Bank Bridge
Design:	
Number of Leaves:	1
Clear Channel:	30
Span, e. to c. Feet:	40.25
Counterweight Span, Feet:	22.8
Tracks, Number or Roadway Feet:	18
Sidewalks, Number, Width:	----------
Weight of Structural Steel, Pounds:	99,000
Weight of Machinery, Pounds:	----------
Machinery to Structural, Per Cent:	----------
Total Weight, Pounds:	----------
Date Built:	1926



Source of Figure: Otis Ellis Hovey,
Movable Bridges p. 117



Lower Bank Road Bridge
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