

123

PORT ISABEL-SAN BENITO NAVIGATION DISTRICT  
OF CAMERON COUNTY, TEXAS

RECEIVED

OCT - 6 1937

GENERAL LAND OFFICE

San Benito, Texas,  
October 5, 1937.

Hon. Wm. H. McDonald,  
Commissioner, General Land Office,  
Austin, Texas.

Dear Sir:

Enclosed herewith is a copy of document Number 32, Committee on Rivers and Harbors, House of Representatives, 75th Congress 1st session, which is a copy of a letter by the Chief of Engineers, United States Army, to the Chairman of the Committee on Rivers and Harbors, under date of May 13, 1937, and exhibits accompanying that letter. Your particular attention is directed to page 10 of this document which relates to water surface elevation in the southerly end of Laguna Madre.

Sent you under separate cover is a map prepared by the U. S. Geological Survey, International Boundary Commission and Air Corp, U. S. Army, upon which Mr. J. V. Clark, State licensed land surveyor, has delineated the south and a part of the east boundary lines of the Santa Isabel Grant and a part of the north and east boundary lines of the San Martin Grant.

From this map and page 10 of the congressional document enclosed you will see that it is not unusual for water to be of a depth of one foot 3.6 inches in the Bahia Grande. The documents mentioned are furnished for your information and to use as you may see fit.

Respectfully,

  
James Q. Louthan.

JQL:MB  
Enc.

*Keep with Cameron Co. Rolled sk. No. 10. counter 41749*

CAMERON CO.  
Rolled Sketch No. 10A

Order 43860

CAMERON COUNTY ROLLED SKETCH " 10A  
(FLAT FOLDER)

*counter 43861*

Keep with Cameron Co. Rolled 123  
sk. No. 10.

75TH CONGRESS } COMMITTEE ON RIVERS AND HARBORS, { DOCUMENT  
1st Session } HOUSE OF REPRESENTATIVES, U. S. { No. 32

WM SHIRKIFFS

BRAZOS ISLAND HARBOR, TEX.

LETTER

FROM

THE CHIEF OF ENGINEERS, UNITED STATES ARMY

TRANSMITTING

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS ON REVIEW OF REPORTS HERETOFORE SUBMITTED ON BRAZOS ISLAND HARBOR, TEX., WITH ILLUSTRATION

WAR DEPARTMENT,  
OFFICE OF THE CHIEF OF ENGINEERS,  
Washington, May 13, 1937.

Hon. J. J. MANSFIELD,  
Chairman, Committee on Rivers and Harbors,  
House of Representatives, Washington, D. C.

MY DEAR MR. MANSFIELD: 1. The Committee on Rivers and Harbors of the House of Representatives, by a resolution adopted December 7, 1936, requested the Board of Engineers for Rivers and Harbors to review the reports on Brazos Island Harbor, Tex., printed in Rivers and Harbors Committee Document No. 16, Seventy-first Congress, second session, and subsequent reports, with a view to determining if modification of the existing project at Brownsville, Tex., is advisable at the present time. I enclose herewith the report of the Board in response thereto.

2. Brazos Island Harbor is on the south coast of Texas, 8 miles from the mouth of the Rio Grande. The project for improvement provides for an entrance channel 25 feet deep and 300 feet wide through Brazos Santiago Pass, with jetty protection, for inner channels of the same depth and 100 feet wide extending to and including a turning basin at Port Isabel and one near Brownsville. The expenditures to February 1, 1937, were \$5,398,749.71 for new work, of which \$1,683,257.70 was contributed by local interests, and \$452,542.78 was for maintenance. The estimated annual cost of maintenance is \$150,000. Local interests now request enlargement of the channels and of the Port Isabel turning basin.

Judge Sullivan

counter 73862

BRAZOS ISLAND HARBOR, TEX.

3. The harbor serves an agricultural and oil-producing area along the lower Rio Grande in which there is a population of about 175,000. Brownsville and Port Isabel have constructed port facilities and have rail and highway connections to the interior. A refinery at Port Isabel receives oil through pipe line and ships its refined products and crude oil by water. The entrance channel to the harbor was only completed in 1935, and prior to that year there was no commerce of importance. The total commerce for 1936 was 318,000 tons, the Port Isabel Channel having developed 279,000 in its first full year of operation and the Brownsville Channel 39,000 after its completion in February of the same year. The principal traffic was oil and gasoline, and the records show that it was carried in vessels with drafts ranging from 18 to 26 feet.

4. The reporting officers find that the present channels have insufficient depth for the vessels engaged in transporting the commerce of the harbor and believe that the entrance channel should have a depth of 31 feet and the inner channels and basins a depth of 28 feet, which is estimated to cost \$584,366, with no increase in the present maintenance cost.

5. The Board of Engineers for Rivers and Harbors, after a full consideration of the reports of the district and division engineers, finds that a depth of 31 feet in the entrance channel and 28 feet in the inner channels is warranted at this time but that the present traffic and that now in prospect is not sufficient to warrant widening of the channels. The Board accordingly recommends that the existing project for Brazos Island Harbor be modified to provide for a depth of 31 feet in the entrance channel and 28 feet in the inner channels and in the turning basins at Brownsville and Port Isabel, at a cost to the United States of \$585,000 for new work, with no increased cost for maintenance.

6. After due consideration of these reports, I concur in the views and recommendations of the Board.

Very truly yours,

E. M. MARKHAM,  
Major General,  
Chief of Engineers.

---

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

WAR DEPARTMENT,  
THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,  
Washington, May 10, 1937.

Subject: Brazos Island Harbor, Tex.

To: The Chief of Engineers, United States Army.

1. This report is in response to the following resolution, adopted December 7, 1936:

*Resolved by the Committee on Rivers and Harbors of the House of Representatives, United States, That the Board of Engineers for Rivers and Harbors created under section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the reports on Brazos Island Harbor, Texas, printed in Rivers and Harbors Committee Document 16, Seventy-first Congress, second session, and subsequent reports, with a view to determining if modification of the existing project at Brownsville, Texas, is advisable at the present time.*

2. Brazos Island Harbor is on the south coast of Texas, 8 miles north of the mouth of the Rio Grande. It is entered through Brazos-Santiago Pass, a natural opening in the coastal sand barrier separating Laguna Madre and the Gulf of Mexico. The ship channel has a westerly course for 1½ miles through the pass, then turns southwesterly in crossing the lagoon to Long Island, 2½ miles, then branches, one channel taking a southwesterly course through lowlands and shallow-water areas for 14 miles to a turning basin near Brownsville, and another taking a northwesterly direction for 1½ miles to a basin at Port Isabel. The lagoon is shallow and extends 111 miles north and 4 miles south of the pass. The normal tidal range in the lower end is 1½ feet. Abnormal fluctuations, however, are caused by prolonged north and south winds which drive the water toward the ends of the lagoon and cause high velocities in the pass. The pass is between Padre Island on the north and Brazos Island on the south, both of which are narrow sand-barrier formations. The existing project for improvement provides for an entrance channel 25 feet deep and 300 feet wide with jetty protection, for inner channels of the same depth and 100 feet wide extending to and including a turning basin 600 feet wide by 700 feet long at Port Isabel, and one 1,000 feet wide by 1,300 feet long in the vicinity of Brownsville. The expenditures to February 1, 1937, were \$5,398,749.71 for new work, of which \$1,683,257.70 was contributed by local interests, and \$452,542.78 was for maintenance. The approved annual maintenance cost is \$150,000.

3. Brazos Island Harbor serves an agricultural and oil-producing area along the Lower Rio Grande, in which there is a population of about 175,000. Brownsville, with 22,000, is the largest city. It has rail and highway connection to the interior of Texas and Mexico. Port Isabel had a population of 1,177 in 1930 and has rail and highway connection to Brownsville. A refinery at the port receives oil through pipe line from the Sam Fordyce oil field in Hidalgo County, and all refined products and crude oil are shipped out by water. Terminal facilities include wharves, a transit shed, a warehouse for perishable products, a corn elevator, and excellent facilities for bunkering vessels. At Brownsville concrete wharves, transit sheds, and an oil dock have been constructed. The entrance channel to the harbor was completed in 1935, and prior to that year there was no commercial traffic of importance. The commerce of Port Isabel in 1935 amounted to 85,965 tons, and in 1936 to 278,616 tons, 95 percent of the latter being oil and gasoline. The Brownsville Channel was completed in February 1936 and in that year developed 39,193 tons. The records show 66 in-bound and 66 out-bound vessel trips for the Brownsville Channel in 8 months of operation. The maximum draft was over 24 feet. The Port Isabel channel had 89 in-bound and 87 out-bound vessels in 1936, of which 18 out-bound had a draft of over 24 feet. Thirty-five tankers carried out-bound approximately 1,500,000 barrels of petroleum products, with drafts ranging from 18 to 26 feet.

4. Local interests requested various enlargements of the channels up to a depth of 35 feet and a width of 300 feet, and also enlargement of the Port Isabel turning basin. They claim that the present channels are inadequate for the commerce which is developing. The Port Isabel-San Benito Navigation District first requested that the United States provide a depth of 34 feet in the channel through the pass, 32 feet in the channels from the pass to and including the Port

Isabel turning basin, channel widening at the junction with the Brownsville Channel, and enlargement of the Port Isabel Basin to 800 feet square. Later it requested that the Government provide a depth of 34 feet in the channel through the pass and 32 feet in the channel to the junction of the Brownsville and Port Isabel Channels, upon condition that local interests furnish funds to defray the cost of providing a depth of 32 feet in either one of the branch channels.

5. The district engineer believes that deepening of the inside channels and the turning basins to 28 feet and the entrance channel to 31 feet will be adequate for handling the present traffic and such additional traffic as may be expected reasonably to develop in the next few years. He estimates the cost as \$584,366 for new work and no increase in maintenance. The total annual carrying charge is \$27,202. He finds that less than 5 percent of the tankers engaged in the Gulf oil trade can safely navigate the present channels when fully loaded, whereas a 28-foot depth would accommodate about 60 percent. On the basis of oil movements in tankers of 70,000-barrel capacity which could navigate the 28-foot channel, as compared to 50,000-barrel capacity on the 25-foot channel, the district engineer estimates a saving of 2 cents per barrel of oil, or an annual saving on present oil traffic of \$30,000 to \$40,000. Although the oil traffic originated at Port Isabel, he thinks that additional developments in the oil fields may result in use of the Brownsville Channel for oil transportation and that potential development of other cargo is considerably greater for Brownsville than for Port Isabel. He therefore concludes that deepening of both channels is warranted, but that the present vessel movements in the harbor, averaging two per day, are insufficient to warrant any widening. He recommends that the project be modified to provide a depth of 31 feet in the channel between the jetties and a depth of 28 feet in the inside channels and turning basins. The division engineer concurs.

6. Local interests were advised of the partially adverse conclusions of the reporting officers and invited to present additional information to the Board. Careful consideration was given to the communications received.

#### VIEWS AND RECOMMENDATIONS OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

7. The Board concurs in general with the reporting officers. The present channels are not of sufficient depth to accommodate the vessels now engaged in the commerce of the port, which results in partial loading and relatively higher costs for transportation. It is believed that a depth of 31 feet in the entrance channel and 28 feet in the inner channels is warranted at this time, but that the present traffic and that now in prospect is not sufficient to warrant greater channel widths. The Board therefore recommends that the existing project for Brazos Island Harbor be modified to provide for a depth of 31 feet in the entrance channel and 28 feet in the inner channels and in the turning basins at Brownsville and Port Isabel, at a cost to the United States of \$585,000 for new work, with no increased cost for maintenance.

For the Board:

G. B. PILLSBURY,  
Brigadier General, Corps of Engineers,  
Senior Member.

REPORT OF THE DIVISION ENGINEER

SYLLABUS

The division engineer recommends modification of the existing project for Brazos Island Harbor to provide a depth of 31 feet in the entrance channel and a depth of 28 feet in the inside channels and turning basins, with easement of bends and curves, at a cost for new work of \$585,000, with no increased cost for maintenance, subject to the conditions (1) that local interests shall furnish, free of cost to the United States, necessary rights-of-way and spoil-disposal areas, and (2) that no dredging shall be done at public expense within 50 feet of an established pierhead line or any wharf or structure.

WAR DEPARTMENT,  
OFFICE OF THE DIVISION ENGINEER,  
GULF OF MEXICO DIVISION,  
New Orleans, La., April 17, 1937.

Subject: Review of reports on Brazos Island Harbor, Tex.  
To: The Chief of Engineers, United States Army.

1. Authority.—This report, submitted in compliance with instructions from the Chief of Engineers dated December 14, 1936 is authorized by the following resolution adopted December 7, 1936:

Resolved by the Committee on Rivers and Harbors of the House of Representatives, United States, That the Board of Engineers for Rivers and Harbors created under section 3 of the River and Harbor Act approved June 13, 1902, be, and is hereby requested to review the reports on Brazos Island Harbor, Texas, printed in Rivers and Harbors Committee Document Numbered 16, Seventy-first Congress, second session, and subsequent reports, with a view to determining if modification of the existing project at Brownsville, Texas, is advisable at the present time.

2. Description.—Brazos Island Harbor comprehends all the improvements at and inside Brazos-Santiago Pass which is a natural inlet from the Gulf of Mexico to Laguna Madre between Brazos Island on the south and Padre Island on the north about 8 miles north of the mouth of the Rio Grande. These islands are low, narrow ridges of sand which have a meridian bearing between the lagoon and Gulf. The channel through the pass is protected by jetties in the Gulf, and inside extends about 17 miles southwest to the Brownsville turning basin. About 2.5 miles from the pass the channel branches to the north around the south end and along the west side of Long Island, 1½ miles to the Port Isabel turning basin. The normal tidal range is about 1.5 feet, but during storms the water surface may be elevated as much as 4 feet and hurricanes may raise it 12 feet or more. This part of the coast is alined with the principal direction of strong winds which prevail for long periods. As the pass is near the south end of Laguna Madre which is closed except for the intermittent outlet, Boca Chico, the south wind depresses the water causing a prolonged flow of high velocity from the Gulf while a north wind produces the opposite effect. These winds and currents and limiting channel depths constitute the principal difficulties attending navigation. No bridge crosses any channel of the harbor and navigation is unobstructed by any other obstacle. A map showing the harbor and its environs accompanies the district engineer's report herewith, and the coastal area including the harbor is found on United States Coast and Geodetic Survey Chart No. 1288.

3. Existing project.—The existing project, authorized in 1930, provides for a channel 25 feet deep and 300 feet wide through Brazos-Santiago Pass with jetty protection at an estimated cost of \$2,358,000

counter 43866

Label turning basin, channel widening at the junction with the Brownsville Channel, and enlargement of the Port Isabel Basin to 500 feet square. Later it requested that the Government provide a depth of 31 feet in the channel through the pass and 27 feet in the channel to the junction of the Brownsville and Port Isabel Channels, upon condition that local interests furnish funds to defray the cost of providing a depth of 27 feet in either one of the branch channels.

5. The district engineer believes that deepening of the inside channels and the turning basins to 28 feet and the entrance channel to 31 feet will be adequate for handling the present traffic and such additional traffic as may be expected reasonably to develop in the next few years. He estimates the cost as \$584,466 for new work and no increase in maintenance. The total annual carrying charge is \$27,202. He finds that less than 5 percent of the tankers engaged in the Gulf oil trade can safely navigate the present channels when fully loaded, whereas a 25-foot depth would accommodate about 80 percent. On the basis of oil movements in tankers of 70,000-barrel capacity which could navigate the 25-foot channel as compared to 50,000-barrel capacity on the 27-foot channel, the district engineer estimates a saving of 5 cents per barrel of oil or an annual saving on present oil traffic of \$20,000 to \$40,000. Although the oil traffic originated at Port Isabel, he thinks that additional developments in the oil fields may result in use of the Brownsville Channel for oil transportation and that potential development of other cargo is considerably greater for Brownsville than for Port Isabel. He therefore concludes that deepening of both channels is warranted, but that the present vessel movements in the harbor, averaging two per day, are insufficient to warrant any widening. He recommends that the project be modified to provide a depth of 31 feet in the channel between the jetties and a depth of 28 feet in the inside channels and turning basins. The division engineer concurs.

6. Local interests were advised of the partially adverse conclusions of the reporting officers and invited to present additional information to the Board. Careful consideration was given to the communications received. The Board concurs in general with the reporting officers. The present channels are not of sufficient depth to accommodate the vessel now engaged in the commerce of the port, which results in partial block and relatively higher costs for transportation. It is believed that a depth of 31 feet in the entrance channel and 28 feet in the inner channels is warranted at this time, but that the present traffic and that now in prospect is not sufficient to warrant greater channel widths. The Board therefore recommends that the existing project for Brazos Island Harbor be modified to provide for a depth of 31 feet in the entrance channel and 28 feet in the inner channels and in the turning basins at Brownsville and Port Isabel, at a cost to the United States of \$584,466 for new work, with no increased cost for maintenance.

7. The Board concurs in general with the reporting officers. The present channels are not of sufficient depth to accommodate the vessel now engaged in the commerce of the port, which results in partial block and relatively higher costs for transportation. It is believed that a depth of 31 feet in the entrance channel and 28 feet in the inner channels is warranted at this time, but that the present traffic and that now in prospect is not sufficient to warrant greater channel widths. The Board therefore recommends that the existing project for Brazos Island Harbor be modified to provide for a depth of 31 feet in the entrance channel and 28 feet in the inner channels and in the turning basins at Brownsville and Port Isabel, at a cost to the United States of \$584,466 for new work, with no increased cost for maintenance.

8. The Board concurs in general with the reporting officers. The present channels are not of sufficient depth to accommodate the vessel now engaged in the commerce of the port, which results in partial block and relatively higher costs for transportation. It is believed that a depth of 31 feet in the entrance channel and 28 feet in the inner channels is warranted at this time, but that the present traffic and that now in prospect is not sufficient to warrant greater channel widths. The Board therefore recommends that the existing project for Brazos Island Harbor be modified to provide for a depth of 31 feet in the entrance channel and 28 feet in the inner channels and in the turning basins at Brownsville and Port Isabel, at a cost to the United States of \$584,466 for new work, with no increased cost for maintenance.

9. The Board concurs in general with the reporting officers. The present channels are not of sufficient depth to accommodate the vessel now engaged in the commerce of the port, which results in partial block and relatively higher costs for transportation. It is believed that a depth of 31 feet in the entrance channel and 28 feet in the inner channels is warranted at this time, but that the present traffic and that now in prospect is not sufficient to warrant greater channel widths. The Board therefore recommends that the existing project for Brazos Island Harbor be modified to provide for a depth of 31 feet in the entrance channel and 28 feet in the inner channels and in the turning basins at Brownsville and Port Isabel, at a cost to the United States of \$584,466 for new work, with no increased cost for maintenance.

G. H. Patterson,  
Major General, Corps of Engineers,  
Senior Member.



with \$60,000 annually for maintenance, and a channel 25 feet deep and 100 feet wide from the pass to a turning basin 1,000 feet square near Brownsville, and branching south of Long Island to a turning basin 500 feet square at Port Isabel, at a total estimated cost of \$4,783,000, with \$150,000 annually for maintenance. On February 20, 1937, the Chief of Engineers, acting under section 5, River and Harbor Act of March 4, 1915, authorized increasing the depth of the entrance channel to 28 feet. The total cost of the existing project has been \$5,052,075.52 of which \$2,916,275.04 was Federal funds expended for new work and \$452,542.78 for maintenance, while contributed funds amount to \$1,683,257.70, all spent for new work.

4. *Other improvements.*—In 1933 a channel 12 feet deep by 120 feet wide, to connect the turning basin at Port Isabel with the private channel along the south side of Port Isabel and the yacht basin was completed by local interests at a cost of \$9,000.

5. *Tributary area.*—Brazos Island Harbor, situated between Corpus Christi 125 miles north and Tampico 260 miles south, serves the lower Rio Grande Valley; an area which includes the very fertile and productive counties of Cameron, Willacy, Hidalgo, and Starr at the southern extremity of Texas, and part of the States of Tamaulipas, Nuevo Leon, and Coahuila in northeastern Mexico. The four counties named had a population of 176,452 in 1930 and have a combined area of 4,317 square miles, practically all of which is susceptible of irrigation. Canals from the Rio Grande now serve a large portion. The principal crops are citrus fruits, cotton, and vegetables. Starr and Hidalgo Counties contain producing oil fields. Brownsville, population 22,021 in 1930, is the largest town in the area. It is situated on the Rio Grande 20 miles from the mouth and 22 miles from Brazos-Santiago Pass. It is a port of entry and is served by the National Railways of Mexico with terminals in Matamoras across the river, the Southern Pacific and Missouri Pacific Railway Systems, Pan American Airways, and improved highways. Port Isabel, situated 2½ miles from the pass, had a population of 1,177 in 1930. It is served by paved highways and the Port Isabel and Rio Grande Railway. Both terminals are provided with modern facilities adequate for the character and volume of traffic. The tributary area in Mexico is noted principally for its mining and cotton production but considerable industrial activity centers in Monterrey, 180 miles directly west of Brownsville, and about 100 miles closer to Brownsville than to Tampico, the nearest Mexican port. Monterrey had a population of 132,577 in 1930 and ranked as the third largest city in Mexico.

6. *Commerce, vessel traffic.*—Before 1934 the traffic of Brazos Island Harbor consisted of small fishing boats. The Port Isabel channel was completed to a depth of 25 feet September 15, 1933, but the controlling depth in the entrance channel was 14 feet in 1933 and 22 feet in 1935. The commerce is given as follows:

Year	Tons	Value
1934 <sup>1</sup>	147,845	\$1,292,559
1935	85,965	1,734,779
1936	278,616	3,797,411

<sup>1</sup> Practically all 1934 commerce was receipt of materials used in constructing jetties and channels.

counter 43867

The division engineer recommends modification of the existing project for Brazos Island Harbor to provide a depth of 31 feet in the entrance channel and a depth of 25 feet in the inside channels and turning basins with a maximum of \$4,783,000, with an increased cost for maintenance, subject to the conditions (1) that local interests shall furnish the cost to the United States necessary rights-of-way and special-drawal areas, and (2) that no dredging shall be done at public expense within 50 feet of an established navigational line of any kind or structure.

WAR DEPARTMENT  
OFFICE OF THE DIVISION ENGINEER  
GULF OF MEXICO DIVISION  
New Orleans, La., June 15, 1937.

Subject: Review of reports on Brazos Island Harbor, Tex.  
To: The Chief of Engineers, United States Army.

1. *Introduction.*—This report, submitted in compliance with instructions from the Chief of Engineers dated December 11, 1936 is authorized by the following resolution adopted December 7, 1936:

Resolved, That the Board of Engineers for Rivers and Harbors be and is hereby authorized to review the reports on Brazos Island Harbor, Texas, prepared by the Board of Engineers for Rivers and Harbors, and to report thereon to the Chief of Engineers, United States Army, and to the United States Coast and Geodetic Survey, with a view to determining if modification of the existing project at Brownsville, Texas, is advisable at the present time.

2. *Location.*—Brazos Island Harbor comprehends all the improvements at and inside Brazos-Santiago Pass which is a natural inlet from the Gulf of Mexico to Laguna Madre between Brazos Island on the south and Padre Island on the north about 20 miles north of the mouth of the Rio Grande. These islands are low, narrow ridges of sand which have a median bearing between the lagoon and Gulf. The channel through the pass is governed by tides in the Gulf and inside extends about 15 miles southwest to the Brownsville turning basin. About 2½ miles from the pass the channel branches to the north toward the south end and along the west side of Long Island. The normal tidal range is 1½ miles to the Port Isabel turning basin. The normal tidal range is about 1½ feet, but during storms the water surface may be elevated as much as 4 feet and hurricanes may raise it 12 feet or more. This part of the coast is allied with the principal direction of strong winds which prevail for long periods. As the pass is near the south end of Laguna Madre which is closed except for the intermittent outlet Boca Chica, the south wind depresses the water causing a prolonged flow of high velocity from the Gulf while a north wind produces the opposite effect. These winds and currents and shifting channel depths constitute the principal difficulties attending navigation. No bridges cross any channel of the harbor and navigation is unobstructed by any other obstacle. A map showing the harbor and its environs accompanies the district engineer's report herewith, and the coastal area including the harbor is found on United States Coast and Geodetic Survey Chart No. 1282.

3. *Existing project.*—The existing project, authorized in 1930, provides for a channel 25 feet deep and 300 feet wide through Brazos-Santiago Pass with jetties protection at an estimated cost of \$2,568,000

About 95 percent of the 1936 commerce was petroleum products. The traffic to Brownsville for 7½ months in 1936, following the opening of the Brownsville Channel in May of that year, was 39,193 tons, valued at \$4,335,176, making a total for the harbor last year of 318,000 tons, valued at over \$8,000,000. There were 31 steamers and 3 motor vessels with out-bound drafts greater than 20 feet and 3 steamers with drafts greater than 26 feet. Of 35 tankers loading out of Port Isabel during 1936, 15 were loaded to drafts or capacities less than those for which they were designed, 13 of these partial loadings being apparently due to insufficient depths in the channels provided. These 13 cases showed loaded drafts varying from 19.5 to 23 feet, with designed drafts varying from 24.3 to 26.7 feet. The average designed draft which was not utilized in these 13 cases was 4.24 feet. The total cargo which was actually loaded in these 13 tankers was 271,000 barrels less than their total designed capacity.

7. *Improvement desired.*—The consensus of opinion at a public hearing held at Brownsville on January 20, 1937, was that the existing project is inadequate and increases in depth to 30 or 35 feet and in width to 200 or 300 feet with enlargement of the Port Isabel turning basin were requested. Local interests claim that the present inside channels are not deep enough, nor wide enough, and in addition are adversely affected by existing bends, so as to prevent navigation by ships of sufficient size to develop the commerce of the area tributary to Brazos Island Harbor in competition with other ports. No local cooperation is offered but local interests state that the rights-of-way and spoil disposal areas which they provided when they dredged the existing inside channels should be sufficient to accommodate the modifications desired.

8. *Special subjects.*—There is no question of water power, flood control, irrigation, drainage or shore-line changes involved in the improvement requested.

9. *Views and recommendations of the district engineer.*—Though no great immediate increase of commerce through Brazos Island Harbor is anticipated by the district engineer, he does believe that a steady and appreciable increase will occur. He considers the 1936 commerce a good showing for a newly opened waterway and believes the growth of industry, agriculture, and mineral production in the Rio Grande Valley will continue. The tonnage predicted by local interests in former briefs appear to him to be as susceptible of ultimate development as ever. He notes that actual oil shipments totaled in 1936 nearly 2,000,000 barrels, and that an equal amount is under contract for shipment in 1937 and 1938. The claims of local interests, that sufficient channel depth to accommodate the average tanker engaged in the Gulf trade would effect material savings in the transportation of petroleum products, seem to him well founded. In the absence of definite evaluation by local interests of the benefits from greater channel depth, the district engineer made a study of current shipping conditions in the Gulf oil trade and finds that less than 5 percent of the tankers can safely navigate the existing 25-foot channels fully loaded, whereas a 28-foot depth would accommodate 60 percent. He estimates that provision of the latter depth would involve an expenditure for new work of \$585,000 and no increase for maintenance, with annual carrying charges for this work of \$27,000. He concludes also that 70,000-barrel tankers could navigate the

About 85 percent of the 1936 commerce was petroleum products. The traffic to Brownsville for 72 months in 1936, following the opening of the Brownsville Channel in May of that year, was 38,184 tons valued at \$4,232,176, making a total for the harbor last year of \$12,000,000. There were 31 steamers and 3 motor vessels with out-bound drafts greater than 20 feet and 2 steamers with drafts greater than 25 feet. Of 35 tankers loading out of Port Isabel during 1936, 13 were loaded to drafts or capacities less than those for which they were designed. 12 of these partial loadings were apparently due to insufficient depths in the channels provided. These 12 cases showed loaded drafts varying from 19.5 to 23 feet with maximum drafts varying from 24.5 to 26.7 feet. The average designed draft which was not utilized in these 12 cases was 4.24 feet. The total cargo which was actually loaded in these 12 tankers was 271,000 barrels less than their total designed capacity.

7. *Unsubstantiated claims.*—The consensus of opinion at a public hearing held at Brownsville on January 30, 1937, was that the existing project is inadequate and increases in depth to 30 or 35 feet and in width to 200 or 300 feet with enlargement of the Port Isabel turning basin were required. Local interests claim that the present inside channels are not deep enough, nor wide enough, and addition is definitely affected by existing bends, so as to prevent navigation by drafts of sufficient size to develop the commerce of the area tributary to Brazos Island Harbor in connection with other ports. No local cooperation is offered but local interests state that the rights-of-way and spoil disposal areas which they provided when they designed the existing inside channels should be sufficient to accommodate the modifications desired.

8. *Views of subject.*—There is no question of water power, flood control, irrigation, drainage or shore-line changes involved in the improvement proposed.

9. *Local and representative of the district engineer.*—Through an exact immediate increase of commerce through Brazos Island Harbor is anticipated by the district engineer, he does believe that a steady and appreciable increase will occur. He considers the 1936 commerce a good showing for a newly opened waterway and believes the growth of industry, agriculture, and mineral production in the Rio Grande Valley will continue. The tonnage produced by local interests in former years appear to him to be as susceptible of ultimate development as ever. He notes that actual oil shipments valued in 1936 only 2,000,000 barrels, and that an equal amount is under contract for shipment in 1937 and 1938. The claims of local interests that sufficient channel depth to accommodate the average draft engaged in the Gulf trade would effect material savings in the transportation of petroleum products seem to him well founded. In the absence of definite extension by local interests of the benefits from greater channel depth, the district engineer made a study of current shipping conditions in the Gulf oil trade and finds that less than 2 percent of the tankers can safely navigate the existing 25-foot channels fully loaded, whereas a 28-foot depth would accommodate 20 percent. He estimates that provision of the latter depth would involve an expenditure for new work of \$2,585,000 and no increase for maintenance, with annual carrying charges for the work of \$27,000. He concludes also that 70,000-barrel tankers could navigate the

28-foot channels as compared to the 50,000-barrel maximum loading in the 25-foot channels, at a saving of 2 cents a barrel or \$40,000 annually. He considers the volume of traffic insufficient to warrant further widening of the channels at this time, as the maximum delay for any vessel would be about 2 hours at Port Isabel and 4 hours at Brownsville. While there is no tanker traffic with Brownsville at present, a considerably greater volume of other commerce appears to him as more probable of development there than at Port Isabel with the additional possibility of future petroleum traffic. He recognizes the inability of local interests, burdened with relatively large financial obligations in behalf of the existing project, to achieve this development or to make any substantial cash contribution toward it. In his opinion, since the United States is committed to the prosecution of the existing project in the hope that sufficient commerce would develop to justify such action, the Government should take the requisite additional steps to accomplish its purpose. The district engineer concludes that further deepening and widening of the harbor channels is necessary to insure the continued growth of commerce through the harbor and that deepening of the channels is warranted at the present time. He recommends, therefore, that the depth of the entrance channel be increased to 31 feet and the depth of the inside channels and turning basins be increased to 28 feet with easements of existing bends and curves at a total cost for new work of \$584,366, and no increased cost of maintenance, subject to the condition that no dredging shall be done by the Federal Government within 50 feet of an established pierhead line, wharf or structure, and provided that local interests shall furnish, free of cost to the United States, all necessary rights-of-way and spoil-disposal areas.

10. *Views of the division engineer.*—The conclusion of the district engineer that increased channel depth is essential to the commercial growth of Brazos Island Harbor is concurred in by the division engineer. The prospect of considerable growth in the commerce of the harbor is, he believes, indicated by the increasing development of the lower Rio Grande Valley. He finds that the development of oil fields, agriculture, mining, and industry have reached a point where their further progress depends upon the ability of their products to compete commercially with those from areas tributary to adjacent ports. He further finds that an increase of 3 feet in the depth of the inside channels would afford a material saving in transportation costs, the saving on oil alone being estimated at \$40,000 annually, and assist greatly in developing an increased commerce for the waterway. He believes that further widening of the interior channels will ultimately be necessary, but that such widening being relatively quite expensive, can well await the development of increased commerce anticipated to follow the deepening recommended herein, in which case, if commerce develops as anticipated, the additional cost of widening might be justified at a later date.

11. *Recommendation.*—The division engineer recommends modification of the existing project for Brazos Island Harbor to provide a depth of 31 feet in the entrance channel and a depth of 28 feet in the inside channels and turning basins with easement of bends and curves at a cost for new work of \$585,000, with no increased cost for maintenance, subject to the conditions (1) that local interests shall furnish, free of cost to the United States, necessary rights-of-way and spoil disposal

25-foot channel as compared to the 50,000-barrel maximum loading in the 25-foot channel at a saving of 2 cents a barrel or \$40,000 annually. He considers the volume of traffic insufficient to warrant further widening of the channel at this time as the maximum delay for any vessel would be about 2 hours at Port Isabel and 4 hours at Brownsville. While there is no tanker traffic with Brownsville at present, a considerably greater volume of other commerce appears to him as more probable of development there than at Port Isabel with the additional possibility of future petroleum traffic. He recognizes the feasibility of local interests, but believes that the financial obligations in behalf of the existing project, to achieve the development or to make any substantial cash contribution toward it, in his opinion, since the United States is committed to the prosecution of the existing project in the hope that sufficient commerce would develop to justify such action, the Government should take the requisite additional steps to accomplish its purpose. The district engineer concludes that further deepening and widening of the harbor channels is necessary to insure the continued growth of commerce through the harbor and that deepening of the channels is warranted at the present time. He recommends, therefore, that the depth of the entrance channel be increased to 31 feet and the depth of the inside channel and turning basins be increased to 28 feet with easements of existing bends and curves at a total cost for new work of \$284,200, and no increased cost of maintenance, subject to the condition that dredging shall be done by the Federal Government within 50 feet of an established pierhead line, wharf or structure, and provided that local interests shall furnish one of cost to the United States, all necessary rights-of-way and spoil disposal areas.

10. *Views of the district engineer.*—The conclusion of the district engineer that increased channel depth is essential to the commercial growth of Brazos Island Harbor is concurred in by the division engineer. The prospect of considerable growth in the commerce of the harbor is believed indicated by the increasing development of the lower Rio Grande Valley. He finds that the development of oil fields, agricultural raising and industry have reached a point where their further progress depends upon the ability of their products to compete commercially with those from areas tributary to adjacent ports. He further finds that an increase of 3 feet in the depth of the inside channels would afford a material saving in transportation costs, the saving in oil alone being estimated at \$40,000 annually, and that the development of increased commerce for the waterway. He believes that further widening of the interior channels will ultimately be necessary, but that such widening being relatively quite expensive, can well wait the development of increased commerce anticipated to follow the deepening recommended herein, in which case, if commerce develops as anticipated, the additional cost of widening might be justified at a later date.

11. *Recommendation.*—The division engineer recommends modification of the existing project for Brazos Island Harbor to provide a depth of 31 feet in the entrance channel and a depth of 28 feet in the inside channels and turning basins with easement of bends and curves at a cost for new work of \$284,200, with no increased cost for maintenance, subject to the condition (1) that local interests shall furnish one of cost to the United States, necessary rights-of-way and spoil disposal

areas, and (2) that no dredging shall be done at public expense within 50 feet of an established pierhead line or any wharf or structure.

F. B. WILBY,  
Colonel, Corps of Engineers,  
Division Engineer.

## REPORT OF THE DISTRICT ENGINEERS

### SYLLABUS

The district engineer concludes that the project known as Brazos Island Harbor, Tex., is worthy of further improvement by the Federal Government. He recommends that the project depth of the jettied entrance channel be increased to 31 feet; that the project depth of the connecting channels and the turning basins at Brownsville and Port Isabel, Tex., be increased to 28 feet; and that the bends in the connecting channels be eased.

WAR DEPARTMENT,  
UNITED STATES ENGINEER OFFICE,  
Galveston, Tex., March 12, 1937.

Subject: Review of Reports on Brazos Island Harbor, Tex.  
To: The Division Engineer, Gulf of Mexico Division, New Orleans, La.

1. *Authority.*—This review of reports on Brazos Island Harbor, Tex., is submitted in accordance with instructions from the Chief of Engineers, United States Army, dated December 14, 1936, and a letter, dated December 7, 1936, from the Hon. J. J. Mansfield, Chairman, Committee on Rivers and Harbors, United States House of Representatives, transmitting a resolution adopted December 7, 1936, by the said committee, as follows:

*Resolved by the Committee on Rivers and Harbors of the House of Representatives, United States, That the Board of Engineers for Rivers and Harbors created under section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the reports on Brazos Island Harbor, Texas, printed in Rivers and Harbors Committee Document, Numbered 16, Seventy-first Congress, second session, and subsequent reports, with a view to determining if modification<sup>11</sup> of the existing project at Brownsville, Texas, is advisable at the present time.*

2. *Scope.*—The existing project at Brownsville, Tex., consists of a turning basin 1,000 by 1,300 feet by 25 feet deep. Since no useful navigation purpose would be served by any modification of the turning basin alone; and, further, since the reports to be reviewed covered the entire Brazos Island Harbor project, it has been assumed that it was the intention of the House Committee on Rivers and Harbors to request a review of the reports heretofore made on Brazos Island Harbor, Tex., with a view to determining if modification of the existing project is advisable at the present time. Therefore, the scope of this report is considered to cover the entire project.

3. *Description.*—The Brazos Island Harbor project includes all the navigation improvements at and westward of the Brazos-Santiago Pass. This pass is a natural outlet from the southern portion of Laguna Madre into the Gulf of Mexico. It is located about 8 miles north of the mouth of the Rio Grande and approximately 125 miles south of Aransas Pass. Padre Island, a long, narrow sand barrier formation separating Laguna Madre from the Gulf of Mexico lies to the north of the pass. Brazos Island, a like formation, lies to the south of the pass and extends to Boca Chica, a small natural outlet

at the lower end of Laguna Madre. Boca Chica is about 3 miles north of the mouth of the Rio Grande. It, like many other small outlets along the Gulf coast, opens up during hurricane tides but soon recloses under normal conditions, usually remaining open no longer than 1 year. At Brazos-Santiago Pass there is maintained a channel 25 feet in depth with a bottom width of 300 feet. This channel which is protected by jetties leads from deep water in the Gulf of Mexico to deep water inside the pass. Inside the pass a channel 25 feet deep by 100 feet wide extends in a generally south-western direction for about 16½ miles to a turning basin near Brownsville. At Long Island, about 2½ miles from the pass, a similar channel takes off to the westward curving northwest along the western edge of Long Island to end at the Port Isabel turning basin after covering a total distance of about 1½ miles. The Brownsville turning basin, 1,300 feet long by 1,000 feet wide with a depth of 25 feet, and the Brownsville Channel were completed in February 1936; the Port Isabel turning basin, which is 700 feet long by 600 feet wide and 25 feet deep, and the channel thereto were completed in September 1933.

4. The normal tidal range is about 1½ feet, but strong winds which frequently blow along this portion of the coast cause a much greater range in water surface elevations. This portion of the coast lies practically north and south and is parallel to the strongest winds. Prolonged south winds drive the water northward in Laguna Madre which results in a depression of the water surface in the lower end of the laguna. As these winds normally cause a piling up of the water along the Gulf shore, water rushes in from the Gulf through Brazos-Santiago Pass resulting in high velocities in the pass. The reverse condition is obtained in the case of strong north winds. The water is driven from the upper end of the laguna into the land-locked lower end below the pass and the water surface there is sometimes raised as much as 3 feet above normal. The resulting difference in head between the water in the lower part of the laguna and that in the Gulf, which has been depressed below its normal level by the norther, causes an outward discharge of high velocity through the pass. On the wane of the northers unusually low water surface elevations are found in the vicinity of the pass, the depression sometimes being as much as 2 feet below mean low tide and at such times high velocities again occur in the pass as water rushes in to restore the partially emptied laguna to its normal level. Hurricanes sometimes cause even greater variation—water surface elevations 12 feet above normal have been known to occur. Strong coastwise winds cause the water in the exposed pass and in that portion of the channel to the east of Long Island to become quite rough and at times difficult of navigation. The Brownsville Channel and the Port Isabel Channel are both somewhat protected and do not become so rough as the more exposed portions of the waterway.

5. The location of the various channels of the waterway with respect to other points mentioned in this report are shown on the map, File No. 11-7-32, which is attached as Appendix No. 1. The southern part of Laguna Madre and the adjacent coastal areas are shown on United States Coast and Geodetic Survey Chart No. 1288.

6. *Tributary area.*—The Brazos Island Harbor project is located near the extreme southern tip of Texas, about 125 miles south of the port of Corpus Christi and about 260 miles north of the Mexican port

of Tampico. The area which lies nearer to the ports of Brownsville and Port Isabel than to the adjacent Gulf ports includes all of Cameron, Hidalgo, and Starr Counties and a part of Willacy, Brooks, Jim Hogg, and Zapata Counties in the State of Texas, and a large area in northeastern Mexico within the States of Tamaulipas, Nuevo Leon, and Coahuila.

7. Cameron, Hidalgo, Starr, and Willacy Counties in the lower Rio Grande Valley are remarkably fertile and highly productive agriculturally. These counties have a combined area of 4,317 square miles, and had in 1930 a combined population of 176,452. Practically the entire area is subject to irrigation, and a large portion is now provided with canals leading to the Rio Grande which furnish water to the developed portion. Principal agricultural products are citrus fruits, cotton, and vegetables, including large quantities of tomatoes and cabbages. There are producing oil fields in Starr County in the vicinity of Rio Grande City and in Hidalgo County near Sam Fordyce, Mission, and Mercedes. Principal cities and towns within this area and their 1930 populations are as follows:

County	City	1930 population	County	City	1930 population
Cameron.....	Brownsville.....	22,021	Hidalgo.....	Pharr.....	3,225
Do.....	San Benito.....	10,753	Do.....	Edinburg.....	4,822
Do.....	La Feria.....	1,594	Do.....	Mission.....	5,120
Do.....	Harlingen.....	12,124	Do.....	Mercedes.....	6,608
Do.....	Port Isabel.....	1,177	Do.....	Weslaco.....	4,879
Hidalgo.....	Donna.....	4,103	Starr.....	Rio Grande City.....	2,283
Do.....	McAllen.....	9,074	Willacy.....	Raymondville.....	2,050

Brownsville, the county seat of Cameron County, is the largest and most active city commercially of those listed. It is located at the southwestern end of the Brownsville Channel about 22 miles inland from the pass, and on the Rio Grande about 20 miles from the Gulf. It is not only an increasingly active Gulf port, but also a port of entry and a gateway into Mexico, being connected to the interior by the National Railways of Mexico, which has a terminal in the city of Matamoras just across the river from Brownsville, as well as by improved highways. The Southern Pacific and the Missouri Pacific Railroads serve the city, and it is connected to other points in the valley by a system of hard-surfaced highways. Port Isabel, the other terminal point on the waterway, is only about 2½ miles distant from the pass. It is connected to Brownsville, and there with the other railroads serving that city, by the Port Isabel & Rio Grande Railroad, and is served by concrete highways connecting with every community in the Valley. The Coastal Refineries, Inc., has a refinery at Port Isabel. The output of the Sam Fordyce oil field is transported by pipe line to this refinery. The other cities listed are modern growing communities. They and the area surrounding them are amply served by railroads and concrete highways, and have ready access by these means to the turning basins at Brownsville and Port Isabel.

8. That portion of northeastern Mexico which is geographically tributary to the waterway is only partially developed. There is a considerable area devoted to cotton production in the lower Rio Grande Valley. Monterrey, the capitol of the State of Nuevo Leon,

The area which lies nearest to the ports of Brownsville and Fort Isabel has to the adjacent Gulf ports includes all of Cameron, Hidalgo, and Starr Counties and a part of Wilbrey, Brooks, and Harris Counties in the State of Texas, and a large area in northeastern Mexico within the States of Tamaulipas, Nuevo Leon, and Coahuila.

A Cameron, Hidalgo, Starr, and Wilbrey Counties in the lower Rio Grande Valley are remarkably fertile and highly productive agriculturally. These counties have a combined area of 4,317 square miles and had in 1930 a combined population of 176,452. The valley is a fertile area subject to irrigation and a large portion is now provided with canals leading to the Rio Grande which furnish water to a developed portion. Principal agricultural products are citrus fruits, cotton, and vegetables including large quantities of tomatoes and cabbage. There are extensive oil fields in Starr County in the vicinity of Rio Grande City and in Hidalgo County near San Antonio and Mercedes. Principal cities and towns within this area and their 1930 populations are as follows:

City	1930 Population
Brownsville	22,000
Fort Isabel	1,000
Port Isabel	1,000
San Antonio	1,000
Mercedes	1,000
Del Rio	1,000
Del Mar	1,000
Del Norte	1,000
Del Sur	1,000
Del Valle	1,000
Del Norte	1,000
Del Sur	1,000
Del Valle	1,000
Del Norte	1,000
Del Sur	1,000
Del Valle	1,000

Brownsville, the county seat of Cameron County, is the largest and most active city commercially of this State. It is located at the western end of the Brownsville Channel about 23 miles inland from the Gulf and on the Rio Grande about 20 miles from the Gulf. It is not only an increasingly active Gulf port, but also a part of a gateway into Mexico, being connected to the interior by the national highways of Mexico, which has a terminal in the city of Brownsville. The Southern Pacific and the Missouri Pacific crossed highways. The Southern Pacific and the Missouri Pacific highways serve the city and it is connected to other points in the State by a system of hard-surfaced highways. Fort Isabel, the other terminal point on the waterway, is only about 23 miles distant from Brownsville. It is connected to Brownsville and there with the other roads serving that city by the Fort Isabel & Rio Grande Railroad, and is served by concrete highways connecting with every community in the Valley. The Coastal Railway, Inc. has a terminal at Fort Isabel. The output of the San Antonio oil field is transported by pipe line to this refinery. The other cities listed are other growing communities. They and the area surrounding them are being served by railroads and concrete highways and have ready access by these means to the turning basins at Brownsville and Fort Isabel.

That portion of northeastern Mexico which is geographically adjacent to the waterway is only partially developed. There is a considerable area devoted to cotton production in the lower Rio Grande Valley. Monterrey, the capital of the State of Nuevo Leon,

is one of the most important industrial centers in Mexico. With a population of 132,577 in 1930, it was the third largest city of Mexico. It is reported that there are over 500 factories located there. Perhaps the largest single industry in the Mexican tributary area is mining. Minerals and ores which are exported include gold and silver bullion, refined lead and zinc, lead and zinc ore, iron ore, and copper matte. Some of the mines are operated in conjunction with smelters; the ores from others are shipped by rail to smelters or to seaports for export to foreign smelters or refineries. Major shipping points within the tributary area are the cities of Saltillo, Torreon, Parral, and Monterrey. Although these points located on the National Railways of Mexico are closer to Brownsville than to the Mexican port of Tampico it appears doubtful if much of the mineral products will be available for export from Brownsville. It appears reasonable to expect, rather, that the Mexican Government will take every possible action to prevent deflection from the port of Tampico of the commerce of this area within its borders.

9. Within the immediate tributary area there are numerous cotton gins, vegetable packing and canning plants, fruit packing plants, fruit-juice extraction plants, ice and cold-storage plants and several small crude-oil refineries (topping plants).

10. *Bridges.*—There are no bridges over the waterway.

11. *Prior reports.*—The report printed in Rivers and Harbors Committee Document No. 16, Seventy-first Congress, second session, was a review of reports previously submitted on Brazos Island Harbor, Tex., by the Board of Engineers for Rivers and Harbors. The Board's report submitted January 15, 1930, recommended the provision of a channel 25 feet deep and 300 feet wide through Brazos-Santiago Pass, with jetty protection; a channel 25 feet deep and 100 feet wide from the pass to a point on the westerly side of Long Island; a channel 25 feet deep and 100 feet wide from the end of the Brazos-Santiago Pass-Long Island Channel to and including a turning basin 500 feet square at Port Isabel; and a channel 25 feet deep and 100 feet wide from the end of the Brazos-Santiago Pass-Long Island Channel to and including a turning basin 1,000 feet square in the vicinity of Brownsville. Provision of the above channels was to be subject to certain conditions of local cooperation including the donation of either or both of the sums of \$2,175,000 before work would be undertaken on the channel to Brownsville, and \$450,000 before work would be undertaken on the channel to Port Isabel. This recommendation was approved by the Chief of Engineers and a project embodying the features recommended was incorporated in the River and Harbor Act passed by Congress on July 3, 1930.

12. There have been two subsequent reports on Brazos Island Harbor as follows:

(1) The report printed in House Document No. 10, Seventy-second Congress, first session, was a review of reports heretofore submitted with a view to determining whether the provision in the project adopted July 3, 1930, requiring the contribution of specific sums of money might be eliminated substituting therefor the provision that local interests contribute funds sufficient for the execution of either or both the channels to Port Isabel and to Brownsville, all other conditions of local cooperation heretofore established to remain in full force and effect. The district engineer's report submitted February

29, 1932, recommended the proposed modification of the project. This recommendation was concurred in by the division engineer, the Board of Engineers for Rivers and Harbors, and the Chief of Engineers. The Public Works Administration, May 24, 1934, and the River and Harbor Act of August 30, 1935, modified the project as recommended.

(2) A review of reports with a view to determining if further improvement of the harbor were advisable at that time was made by the district engineer under date of May 20, 1935. He recommended that the existing project be modified to provide for a depth of 28 feet in the jetty channel through Brazos-Santiago Pass, and that the deepening of the inside channels (the latter was the modification sought by local interests) await the completion and tryout of the existing project. This recommendation received the approval of the division engineer; the Board of Engineers for Rivers and Harbors while agreeing that the pass channel should be deepened to 28 feet expressed the opinion that this work could be provided under the existing project, and no modification of the existing project would be required. This opinion was based upon section 5 of the River and Harbor Act approved March 4, 1915, which reads in part as follows:

\* \* \* and the channel dimensions specified shall be understood to admit of such increase at the entrances, bends, sidings, and turning basins as may be necessary to allow of the free movement of boats.

The Chief of Engineers concurred in this opinion, and under date of February 20, 1937, authorized an increase in the dimensions of the channel at the entrance to Brazos Island Harbor to provide a depth of 28 feet.

13. *Existing project.*—The history of Federal assistance in improvement of the Brazos Island Harbor dates back to 1878, when an appropriation was made for removing a wreck from the channel between Padre Island and Brazos Island. The original project for improvement adopted in 1881 contemplated the construction of two jetties extending out into the Gulf of Mexico about 1,500 feet apart. Work was suspended in October 1884, and the subject of a new improvement was reported on by a board of engineers. The new project reported provided for two parallel jetties about 1,100 feet apart. Appropriations ceased in 1888. During the fiscal year 1905 a channel 70 feet wide on the bottom, with a least depth of 10 feet, was excavated from deep water inside the bar on a straight line across the Laguna Madre to the end of the railroad wharf at Port Isabel with a turning basin at its inner end. The River and Harbor Act of March 2, 1919, adopted a project providing for dredging a channel 18 feet deep at mean low tide and 400 feet wide through the entrance and its maintenance for a period of 5 years, the question of continuing or modifying the improvement to be then determined. Under this project two short stone dikes extending out into the Gulf were completed June 1927, one 1,400 feet long from Brazos Island and one 1,700 feet long from Padre Island. Some dredging was done between them and across the bar with a sea-going dredge to form the channel, but as the channel opened by this dredging soon shoaled up again the dredge was stopped January 1928, and no further dredging was done under the project. The costs on the original and modified projects prior to the adoption of the existing project in 1930 were \$675,855.30. In addition, \$123,361.67 was expended from contributed funds for new work.



1918, recommended the proposed modification of the project. This recommendation was concurred in by the division engineer, the Board of Engineers for Rivers and Harbors, and the Chief of Engineers. The Public Works Administration Act of July 24, 1934, and the River and Harbor Act of August 30, 1935, modified the project as recommended. A series of reports with a view to determining if further improvement of the harbor were advisable at that time was made by the district engineer under date of May 20, 1935. He recommended that the existing project be modified to provide for a depth of 25 feet in the pass channel through Brazos-Santiago Pass, and that the deepening of the inside channels (the latter was the modification sought by local interests) await the completion and report of the existing project. This recommendation received the approval of the division engineer, the Board of Engineers for Rivers and Harbors, and the Chief of Engineers. It was agreed that the pass channel should be deepened to 25 feet and the opinion that this work could be provided under the existing project, and no modification of the existing project would be required. This opinion was based upon section 5 of the River and Harbor Act approved March 4, 1915, which reads in part as follows:

and the channel dimensions specified shall be understood to admit of such increase at the entrance, inside basins, and turning basins as may be necessary to allow of the free movement of boats.

The Chief of Engineers concurred in this opinion, and under date of February 20, 1937, authorized an increase in the dimensions of the channel at the entrance to Brazos Island Harbor to provide a depth of 25 feet.

13. Existing project.—The history of Federal assistance in improvement of the Brazos Island Harbor dates back to 1878, when an appropriation was made for removing a wreck from the channel between Padre Island and Brazos Island. The original project for improvement adopted in 1881 contemplated the construction of two jetties extending out into the Gulf of Mexico about 1,500 feet apart. Work was suspended in October 1884 and the subject of a new improvement was reported on by a board of engineers. The new project reported provided for two parallel jetties about 1,100 feet apart. Appropriations ceased in 1888. During the fiscal year 1905 a channel 70 feet wide on the bottom, with a least depth of 10 feet, was excavated from deep water inside the bar on a straight line across the Laguna Madre to the end of the railroad wharf at Fort Isabel with a turning basin at its inner end. The River and Harbor Act of March 2, 1919, adopted a project providing for dredging a channel 18 feet deep at mean low tide and 400 feet wide through the entrance and its maintenance for a period of 7 years, the question of continuing or modifying the improvement to be then determined. Under this project two short stone jetties extending out into the Gulf were completed June 1927, one 1,400 feet long from Brazos Island and one 1,700 feet long from Padre Island. Some dredging was done between them and across the bar with a sanding dredge to form the channel, but as the channel opened by this dredging soon shoaled up again the dredge was stopped January 1928, and no further dredging was done under the project. The cost on the original and modified projects prior to the adoption of the existing project in 1930 were \$277,857.80. In addition, \$123,541.47 was expended from contributed funds for new work.

14. The existing project for the waterway was authorized by the River and Harbor Act of July 3, 1930, which provided for the creation of a harbor for deep-draft vessels at Brazos Island, Tex., in accordance with the report submitted in Rivers and Harbors Committee Document No. 16, Seventy-first Congress, second session. The project so authorized provides for an entrance channel through Brazos-Santiago Pass 25 feet deep and 300 feet wide with jetty protection; for a channel 25 feet deep and 100 feet wide across the shallow waters of Laguna Madre to Long Island; thence branch channels 25 feet deep and 100 feet wide, one to Port Isabel with a 500-foot square turning basin at its extremity and the other about 14 miles in length to the vicinity of Brownsville with a 1,000-foot square turning basin at its extremity. The project was adopted subject to the following conditions of local cooperation:

(a) That local interests donate to the United States the north end of Brazos Island from a due east and west line 2,000 feet south of the old Coast Guard station, and the south end of Padre Island from a due east and west line 500 feet north of the quarantine station.

(b) That local interests give assurances satisfactory to the Chief of Engineers and the Secretary of War that suitable terminal facilities would be made available.

(c) That no work should be undertaken on the channel to Brownsville until the sum of \$2,175,000 had been contributed to the cost of the project and the necessary rights-of-way and spoil-disposal areas had been furnished free of cost to the United States.

(d) That no work should be undertaken on the channel to Port Isabel until the sum of \$450,000 had been contributed to the cost of the project and necessary rights-of-way and spoil-disposal areas had been furnished free of cost to the United States.

(e) That no work should be undertaken on any part of the project until local interests had contributed either or both of the sums aforesaid.

15. The act further provided that no expense should be incurred for the acquiring of any lands required to be donated to the United States for the purpose of this improvement or for other purposes; that the channel from the inner side of the pass to Long Island and thence to the turning basin near Brownsville should be situated entirely in what is known as the Brownsville navigation district, and should take the most direct practicable route toward Brownsville; that if both the Brownsville and Port Isabel channels and turning basins were to be constructed, the amount to be contributed in cash by local interests should be the sum of \$2,425,000 thus avoiding duplication of the expense of constructing the channel from the inner side of the Pass to Long Island, estimated at \$200,000; and that the width of any or all inner channels may be widened at any time provided such proposed widening meets the approval of the Chief of Engineers and all expense incident thereto is paid by local interests.

16. Holding that the sums of money specified for their contribution to the cost of the project represented the cost of the interior channels, local interests requested modification of the project authorized by the act so as to eliminate the provision requiring the contribution of specific sums of money and to provide in lieu thereof that local interests contribute funds sufficient to cover the entire cost of the original dredging of all channels and turning basins inside the entrance channel

through Brazos-Santiago Pass. The Chief of Engineers recommended the proposed modification under date of April 2, 1932, as set forth in House Document No. 10, Seventy-second Congress, first session, providing that no work should be undertaken on the channel through the Pass until local interests had contributed sufficient funds for the execution of either or both the channels to Port Isabel and to Brownsville, all other conditions of local cooperation previously established to remain in full force. The Public Works Administration, May 24, 1934, and the River and Harbor Act of August 30, 1935, modified the project as recommended.

17. As set out in paragraph 12 (2), the Chief of Engineers under date of February 20, 1937, authorized an increase in the dimensions of the channel at the entrance to Brazos Island Harbor to provide a depth of 28 feet without modification of the existing project.

18. Under this project the channel from inside Brazos-Santiago Pass to Long Island, and thence to a turning basin 600 feet wide and 700 feet long at Port Isabel, was completed in September 1933 with funds contributed by the Port Isabel and San Benito Navigation District including funds necessary for increasing the size of the turning basin from 500 feet by 500 feet to 600 feet by 700 feet. The jetties were completed in February 1935 and the jetty channel was completed in the summer of 1935 under the Public Works program authorized by the National Industrial Recovery Act. The dredging of the Brownsville Channel, carried on with funds contributed by the Brownsville Navigation District, was completed in February 1936. This dredging included a 1,000-foot wide by 1,300-foot long turning basin near Brownsville. Under the adopted project the Government is charged with the maintenance of the several channels of the waterway. The channel between Port Isabel and the pass was dredged in February and March 1935 for the first time since its completion at a total cost of \$80,606.08. It is probable that the necessity for a major part of this maintenance dredging resulted from storm damage as this channel experienced three tropical hurricanes during the summer of 1933. Again in January 1936 the channels from Port Isabel to Long Island and from Long Island to the pass were dredged, this time at a cost of \$41,899.33. In February and March 1936 the point between the Port Isabel and Brownsville Channels was dredged away at a total cost of \$18,305.31. Subsequent to its completion in February 1936 a dredge was employed in maintenance of the Brownsville Channel from March to June at a cost of \$133,290.47. The total cost of permanent work on Brazos Island Harbor to February 1, 1937, was \$5,851,292.49 of which \$5,398,749.71 was for new work and \$452,542.78 was for maintenance; these sums include all funds, both governmental and contributed, for both the existing and previous projects. Costs of the present project include Government funds of \$2,916,275.04 for new work and \$452,542.78 for maintenance, and contributed funds of \$1,683,257.70 for new work. The approved annual maintenance cost of the adopted project is \$150,000.

19. *Local cooperation.*—The River and Harbor Act of July 3, 1930, which authorized the project for a 25-foot channel for the waterways of the Brazos Island Harbor required that certain local cooperation be provided as a condition precedent to beginning work on the project. The items required are listed in paragraphs 14 and 15. Subsequently, that provision which required that specified sums of money

through Brazos-Santiago Pass. The Chief of Engineers recommended the proposed modification under date of April 2, 1932, as set forth in House Document No. 10, Seventy-second Congress, first session, providing that no work should be undertaken on the channel through the Pass until local interests had contributed sufficient funds for the execution of either or both the channels to Port Isabel and to Brownsville, all other conditions of local cooperation previously established to remain in full force. The Public Works Administration, May 24, 1934, and the River and Harbor Act of August 30, 1935, modified the project as recommended.

17. As set out in paragraph 12 (2), the Chief of Engineers under date of February 20, 1937, authorized an increase in the dimensions of the channel at the entrance to Brazos Island Harbor to provide a depth of 25 feet without modification of the existing project.

18. Under this project the channel from inside Brazos-Santiago Pass to Long Island, and thence to a turning basin 600 feet wide and 400 feet long at Port Isabel, was completed in September 1933 with funds contributed by the Port Isabel and San Benito Navigation District including funds necessary for increasing the size of the turning basin from 500 feet by 500 feet to 600 feet by 700 feet. The jetties were completed in February 1935 and the jetty channel was completed in the summer of 1935 under the Public Works program authorized by the National Industrial Recovery Act. The dredging of the Brownsville Channel, carried on with funds contributed by the Brownsville Navigation District, was completed in February 1936. This dredging included a 1,000-foot wide by 1,300-foot long turning basin near Brownsville. Under the adopted project the Government is charged with the maintenance of the several channels of the waterway. The channel between Port Isabel and the pass was widened in February and March 1935 for the first time since its completion at a total cost of \$20,000. It is probable that the necessity for a major part of this maintenance dredging resulted from storm damage to the channel experienced three tropical hurricanes during the summer of 1933. Again in January 1936 the channels from Port Isabel to Long Island and from Long Island to the pass were retouched, this time at a cost of \$11,500. In February and March 1936 the point between the Port Isabel and Brownsville Channels was dredged away at a total cost of \$18,300. Subsequent to its completion in February 1936 a dredge was employed in maintenance of the Brownsville Channel from March to June at a cost of \$133,300. The total cost of permanent work on Brazos Island Harbor to February 1, 1937, was \$2,561,392.19 of which \$2,307,497.71 was for new work and \$253,894.48 was for maintenance; these sums include all funds, both governmental and contributed, for both the existing and previous projects. Costs of the present project include Government funds of \$2,916,375.04 for new work and \$452,742.78 for maintenance, and contributed funds of \$1,082,257.70 for new work. The approved annual maintenance cost of the adopted project is \$130,000.

19. Local cooperation.—The River and Harbor Act of July 2, 1930, which authorized the project for a 25-foot channel for the waterways of the Brazos Island Harbor required that certain local cooperation be provided as a condition precedent to beginning work on the project. The terms required are listed in paragraphs 14 and 15. Subsequently, that provision which required that specified sums of money

be contributed to the cost of the project was modified upon recommendation of the Chief of Engineers under the Public Works program, as contained in House Document No. 10, Seventy-second Congress, first session, to provide that instead of specific sums of money local interests should contribute funds sufficient to cover the entire cost of the original dredging of all channels and turning basins inside the entrance channel at Brazos-Santiago Pass. This recommended modification provided further that no work should be undertaken on the channel through the pass until local interests had contributed sufficient funds for the execution of either or both the channels to Port Isabel and to Brownsville. As modified, all the requirements for local cooperation were complied with.

20. *Other improvements.*—In addition to finishing the shipping terminal, the Port Isabel-San Benito Navigation District, at a cost of about \$9,000, completed in September 1933, a channel 12 feet deep and 120 feet wide, connecting the turning basin with the private channel along the south side of the town of Port Isabel and the yacht basin, a distance of about one-half mile.

21. *Terminal and transfer facilities.*—Terminal facilities located along the Port Isabel turning basin include a steel sheet-pile wharf about 550 feet long provided with a 100 by 300-foot sheet-metal transit shed, a corn elevator of 50,000 bushels capacity, a 100 by 300-foot sheet-metal warehouse, a concrete and sheet-metal plant for precooling perishable products with a capacity of 24 cars every 10 hours. An oil refinery of 5,000-barrel capacity and a tank farm with a storage capacity of 264,000 barrels are located near the turning basin. The refinery is served by a pipe line with a capacity of 6,000 barrels per day from the oil fields at San Fordyce in Hidalgo County. There is an oil dock 300 feet long on the turning basin equipped for receiving and loading oil cargoes.

22. Terminal facilities at Brownsville include three concrete wharves each approximately 400 feet long along the north side of the turning basin, two of which are provided with sheet-metal transit sheds each approximately 80 feet wide and 400 feet long. To the eastward of the general cargo terminal there is a creosoted-pile oildock for loading and unloading both crude oil and refined oil cargoes. Departmental permits have been issued for the construction of another 440-foot wharf at the west end of the turning basin and it is understood that a 120- by 400-foot transit shed is to be built at this wharf.

23. All docks and wharves at both of the terminals are equipped with fresh water and electricity. The Port Isabel terminal has excellent facilities for bunkering ships. Both terminals have railroad and highway connections and are open to the public on equal terms.

24. *Improvements desired.*—In order to allow all interested parties to present their views concerning modification of the existing project for Brazos Island Harbor and to develop what local cooperation could be relied upon the district engineer held a public hearing in the city of Brownsville, Tex., on January 20, 1937. Notices of the hearing, dated December 24, 1936, were sent to all organizations, agencies, and persons believed to be interested.

25. A full report of this hearing is presented as appendix 2<sup>1</sup> herewith. Exhibit 1<sup>1</sup> of the report is a copy of the notice of public hearing and a list of parties to whom the notice was sent. A list of those present at

<sup>1</sup>Not printed.

the hearing is contained in a preface <sup>1</sup> to the report which presents in full the evidence developed at the hearing. Attached thereto as exhibits 2 to 7, <sup>1</sup> inclusive, are the letters and briefs submitted in support of statements made at the hearing, or forwarded for inclusion by parties unable to be present.

26. The manager of the Continental Steamship Co. in a letter (enclosed as exhibit 2) <sup>2</sup> stated that vessels of this company which operates tankers between various Gulf and North Atlantic ports had during 1936 made 13 trips into Port Isabel to load. These tankers, with an average loaded draft of approximately 28 feet and an average width of 55 feet, due to the shallowness of the channel had been forced to restrict their draft to 25 feet; on several occasions the vessel had been forced to go to Corpus Christi to complete loading. Such restriction had thus resulted in 2 days' lost time on the ship for each such trip, considerable additional port charges, and to Port Isabel a reduction in cargo shipments. He, therefore, advanced the opinion that a channel less than 35 feet deep and 300 feet wide is inadequate for tanker service, and that, as a result of their inadequate channels, the ports of Brownsville and Port Isabel are at a distinct disadvantage as compared to other Gulf ports.

27. A letter from Moore & McCormack Co., Inc., steamship agents, of New York City, who have a branch agency in Brownsville is enclosed as exhibit 3. <sup>1</sup> In this letter it is stated that as operators and owners of the Mooremack Gulf Lines—a steamship freight service which operates a total of 12 or 13 ships between United States Atlantic and Gulf ports—they are keenly interested in the enlargement and deepening of the channel through the pass, the channels to Port Isabel and Brownsville, and their turning basins. Their larger steamers are vessels of 8,000 tons deadweight capacity, approximately 400 feet in length, with a draft of over 27 feet aft when loaded. Under their present schedule (a copy of their January schedule is attached to the letter) they have at least one ship into Brownsville and Port Isabel each week. These vessels, it is stated, have experienced considerable difficulty and delay because of the limited depth of the channels, particularly in the pass during rough weather, and because the narrow inside channels preclude vessels passing each other. The narrow width together with the channels being unlighted, it is stated, prevent navigation of these waters by night.

28. Exhibit 4 <sup>1</sup> is a letter dated January 12, 1937, from the Coastal Refineries, Inc., which, since December 1935 has been operating a refinery with a plant capacity in excess of 150,000 barrels per month. This refinery handles the entire output of the Sam Fordyce oil field. In 1936 it shipped by water from Port Isabel 1,776,650.70 barrels of petroleum and petroleum products. It states that under existing contracts it will purchase all crude oil produced in the Sam Fordyce field for the 2 years beginning January 1, 1937, and will transport this oil by pipe line to Port Isabel whence its products will be shipped by water. It expects such shipments to approximate 2,000,000 barrels per year. Due to the limiting depth of 25 feet, tankers engaged in this shipping during 1936 were forced to move out only partly loaded. The average tanker, it is stated, has a capacity of 75,000 barrels and a draft up to 32 feet when fully loaded. Tankers cannot load more

<sup>1</sup> No. printed.

than 53,000 barrels or to a draft exceeding 25 feet, with the existing channel depths. This results in increased transportation charges, and the ports of Port Isabel and Brownsville cannot properly compete with other Gulf ports. The company therefore recommends that the channels to Brownsville and Port Isabel be deepened to a minimum depth of 34 feet so as to provide a minimum of 32 feet usable water, and that the turning basin at Port Isabel be both widened and lengthened so as to permit the safe maneuvering of vessels at least 485 feet in length.

29. A letter from C. D. Mallory & Co. (exhibit 5)<sup>1</sup> states that this company operates 17 large oil tankers, each capable of carrying over 1,000,000 barrels of oil a year in the United States Gulf to north of Hatteras trade. One of these vessels is now under charter to the Petroleum Heat & Power Co., Inc., which is interested in the movement of oil from Port Isabel. The company states in the letter that it had been advised by an oil company that if the channel were deepened sufficiently to permit deep-draft vessels to load full cargoes, production would be increased to a volume requiring the services of this and several other large tankers. C. D. Mallory & Co., therefore, urges that this channel be deepened to a minimum draft of 30 feet, as it is an improvement which should result in the increasing of shipments of petroleum, and its products, and dry cargoes from the Brownsville district.

30. Mr. R. F. Ransome, attorney for the Brownsville Navigation District, presented at the hearing a brief prepared by that organization requesting the deepening and widening of the Brownsville Channel. This brief, attached as exhibit 6,<sup>1</sup> outlines specific instances from actual experience in the use of the channel, during the 8 months since its opening, where extra depth and width has seemed to be necessary. Enclosed as a part of the brief are letters from interested parties as follows:

(a) The Board of Underwriters of New York through its surveyor at Brownsville, recommends the widening by at least 100 feet, deepening to 32 feet and cutting away of points of sharp turns of the Brownsville Channel, citing specific instances of delays occasioned by the inability of ships to pass in the present channel, and the difficulties imposed by the 25-foot depth. It states that from an insurance point of view the hazard to ship and cargo would be greatly reduced by the proposed improvements.

(b) Capt. Joe A. Kelly, branch pilot of the Brazos-Santiago pilots, urges the same improvements as recommended by the Board of Underwriters of New York, stating that on several occasions the pilots had been forced in the interest of safety, on account of the shallow narrow channels combined with unfavorable wind and tide conditions, to hold up ships that were waiting to enter the Pass or leave the port.

(c) Capt. A. D. Shaw, another branch pilot of the Brazos-Santiago pilots, stated that with the present width it is very difficult to navigate the channel during a moderate to hard breeze because of the danger of the ship sheering into the bank, and that it is, therefore, often deemed advisable to delay the ship movement until favorable weather occurs for navigating the channel. Further delay is frequent because the channel is too narrow for ships to pass each other. There are three turns in the channel where, with its present width, it is very

<sup>1</sup> Not printed.

than 50,000 barrels or to a draft exceeding 25 feet, with the existing channel depths. This results in increased transportation charges and the ports of Port Isabel and Brownsville cannot properly compare with other Gulf ports. The company therefore recommends that the depth of the channel be increased to a minimum of 32 feet below mean low tide, increasing the bottom width an additional 100 feet, and easing the turns. The master of the steamship *Texas Trader*, of the Newtex Steamship Corporation, recommends the widening of the channel to permit two-way traffic.

(e) Lallier & Co., steamship agents, with offices in Brownsville and Port Isabel, in a series of letters to the director of the port at Brownsville cites specific instances of difficulties encountered in navigating the channel by ships chartered by them, and difficulties experienced in chartering refrigerator ships for exporting citrus fruits to European ports; all because of the limiting width and depth of the channel. They recommend a 32-foot channel with sufficient width to permit two full-sized ships to pass each other.

(f) Philen, Miller & Co., steamship agents, with headquarters in Brownsville, relate similar difficulties in persuading steamship lines to make Brownsville a port of call, and relate specific instances of difficulties encountered by ships operating under their charter. They anticipate that a channel with a 200-foot bottom width, 32-foot depth; and with easy turns would solve their difficulties.

31. In view of the difficulties cited by these letters and other difficulties not cited, and in view of the fact that the tonnage handled through the port of Brownsville in the 8 months of its use had exceeded the anticipations, as set forth in the original brief covering the request presented at the hearing held in 1929 for the construction of the port (the brief submitted in connection with the proposed further improvement of Brazos Island Harbor which was covered in the district engineer's report dated May 20, 1935, contained a transcript of the proceedings of this hearing. A copy of this brief was included as an exhibit to the current brief by the Brownsville navigation district), and further considering that considerable additional business (principally goods for export to foreign countries, in which traffic boats drawing from 26 to 30 feet or more are necessary for safe navigation) tendered the port had to be refused because of the inadequacy of the channel, the Brownsville navigation district feels the improvement of the Brownsville Channel to be justified and recommends that the channel be deepened to 32 feet and widened sufficiently to permit the ready passage of ships.

They point out the fact that the cooperation promised in the construction of the present channel to Brownsville and through Brazos-Santiago Pass had been fully complied with, that the promised terminal facilities had been provided and construction now being pushed would increase the capacity 33½ percent or more. They state that the district had borrowed from the Federal Emergency Administration of Public Works moneys needed for terminal facilities and the contributions to the costs of the channels and, having pledged a large part of its future taxes and income to take care of this obligation, it was without funds to contribute to the proposed channel improvements. Mr. Ransome stated that the district could, however, be counted upon to provide the rights-of-way and spoil-disposal areas necessary to the proposed improvement. They also point out that their competing ports, Tampico and Vera Cruz in Mexico, and their

by the proposed improvements.

(5) Capt. Joe A. Kelly, branch pilot of the Brazos-Santiago pilots, urges the same improvements as recommended by the Board of Indenturers in New York, stating that on several occasions the pilots had been forced in the interest of safety, on account of the shallow narrow channels combined with unfavorable wind and tide conditions to hold up ships that were waiting to enter it. Loss or leave the port.

(6) Capt. A. D. Shipp, another branch pilot of the Brazos-Santiago pilots, stated that with the present width it is very difficult to navigate the channel during a gale to haul crews because of the danger of the ship striking the bank and that it is therefore often deemed advisable to delay the ship movement until favorable weather occurs for navigating the channel. Further delay is frequent because the channel is too narrow for ships to pass each other. There are three turns in the channel which with its present width, it is very

difficult and hazardous to navigate with a long ship of deep draft. He, therefore, recommends increasing the depth to 32 feet below mean low tide, increasing the bottom width an additional 100 feet, and easing the turns.

(d) The master of the steamship *Texas Trader*, of the Newtex Steamship Corporation, recommends the widening of the channel to permit two-way traffic.

(e) Lallier & Co., steamship agents, with offices in Brownsville and Port Isabel, in a series of letters to the director of the port at Brownsville cites specific instances of difficulties encountered in navigating the channel by ships chartered by them, and difficulties experienced in chartering refrigerator ships for exporting citrus fruits to European ports; all because of the limiting width and depth of the channel. They recommend a 32-foot channel with sufficient width to permit two full-sized ships to pass each other.

(f) Philen, Miller & Co., steamship agents, with headquarters in Brownsville, relate similar difficulties in persuading steamship lines to make Brownsville a port of call, and relate specific instances of difficulties encountered by ships operating under their charter. They anticipate that a channel with a 200-foot bottom width, 32-foot depth; and with easy turns would solve their difficulties.

31. In view of the difficulties cited by these letters and other difficulties not cited, and in view of the fact that the tonnage handled through the port of Brownsville in the 8 months of its use had exceeded the anticipations, as set forth in the original brief covering the request presented at the hearing held in 1929 for the construction of the port (the brief submitted in connection with the proposed further improvement of Brazos Island Harbor which was covered in the district engineer's report dated May 20, 1935, contained a transcript of the proceedings of this hearing. A copy of this brief was included as an exhibit to the current brief by the Brownsville navigation district), and further considering that considerable additional business (principally goods for export to foreign countries, in which traffic boats drawing from 26 to 30 feet or more are necessary for safe navigation) tendered the port had to be refused because of the inadequacy of the channel, the Brownsville navigation district feels the improvement of the Brownsville Channel to be justified and recommends that the channel be deepened to 32 feet and widened sufficiently to permit the ready passage of ships.

They point out the fact that the cooperation promised in the construction of the present channel to Brownsville and through Brazos-Santiago Pass had been fully complied with, that the promised terminal facilities had been provided and construction now being pushed would increase the capacity 33½ percent or more. They state that the district had borrowed from the Federal Emergency Administration of Public Works moneys needed for terminal facilities and the contributions to the costs of the channels and, having pledged a large part of its future taxes and income to take care of this obligation, it was without funds to contribute to the proposed channel improvements. Mr. Ransome stated that the district could, however, be counted upon to provide the rights-of-way and spoil-disposal areas necessary to the proposed improvement. They also point out that their competing ports, Tampico and Vera Cruz in Mexico, and their

<sup>1</sup> Not printed.

difficult and hazardous to navigate with a long ship of deep draft. The therefore recommends increasing the depth to 32 feet below mean low tide increasing the bottom with an additional 100 feet and casing the turns.

(4) The master of the steamship *Vesta*, *Vesta*, of the *Vesta* Steamship Corporation, recommends the widening of the channel to permit two-way traffic.

(5) *Lally & Co.*, steamship agents, with offices in Brownsville and Port Isabel in a series of letters to the director of the port at Brownsville cites specific instances of difficulties encountered in navigating the channel by ships chartered by them, and difficulties experienced in chartering refrigerated ships for exporting citrus fruits to European ports; all because of the limiting width and depth of the channel. They recommend a 32-foot channel with sufficient width to permit two full-sized ships to pass each other.

(6) *Ellis, Miller & Co.*, steamship agents, with headquarters in Brownsville, relate similar difficulties in permitting steamship lines to make Brownsville a port of call, and relate specific instances of difficulties encountered by ships operating under their charter. They anticipate that a channel with a 300-foot bottom width, 32-foot depth, and with easy turns would solve their difficulties.

(7) In view of the difficulties cited by these letters and other authorities, and in view of the fact that the tonnage handled through the port of Brownsville in the 8 months of its use had exceeded the anticipations as set forth in the original brief covering the request presented at the hearing held in 1929 for the construction of the port (the brief drafted in connection with the proposed further improvement of Brazos Island Harbor which was covered in the district engineer's report dated May 20, 1933, contained a transcript of the proceedings of this hearing. A copy of this brief was included as an exhibit to the current brief by the Brownsville navigation district) and further considering that considerable additional business (especially goods for export to foreign countries in which traffic boats ply) from 25 to 30 feet or more are necessary for safe navigation, the port had to be refused because of the inadequacy of the channel, the Brownsville navigation district feels the improvement of the Brownsville Channel to be justified and recommends that the channel be deepened to 32 feet and widened sufficiently to permit the ready passage of ships.

They point out the fact that the cooperation promised in the construction of the present channel to Brownsville and through Brazos-Santiago Pass had been fully complied with, that the promised terminal facilities had been provided and construction now being pushed would increase the capacity 25 percent or more. They state that the district had borrowed from the Federal Emergency Administration of Public Works money needed for terminal facilities and the contributions to the costs of the channels and having pledged a large part of its future taxes and income to take care of this obligation, it was without funds to contribute to the proposed channel improvements. Mr. Hanson stated that the district could, however, be counted upon to provide the rights-of-way and spoil disposal areas necessary to the proposed improvement. They also point out that their competing ports, Tampico and Vera Cruz in Mexico, and their

domestic competitors, the ports of Houston, Galveston, and Corpus Christi, all have greater depths largely paid for by the respective Federal governments.

32. Judge James Q. Louthan, counsel and general manager for the Port Isabel-San Benito navigation district, submitted a brief covering the improvements desired by this district. This brief, attached as exhibit 7,<sup>1</sup> urges that (1) the channel through Brazos-Santiago Pass be dredged to and maintained at a depth of 34 feet; (2) the channel from the pass to and including the turning basin at Port Isabel be dredged and maintained at a depth of 32 feet; (3) the Port Isabel Channel be widened between stations 14+000 and 17+000; and (4) the turning basin area be increased to the east and south to provide a basin 800 feet square.

33. In support of their contention that these improvements are needed and justified the district points out—

(a) That the bar at Brazos-Santiago Pass is considered one of the roughest on the Texas coast and that during rough weather the water level in the pass is subject to sudden changes of as much as 5 or 6 feet, and during strong northerly winds the water surface in that portion of the channel in Laguna Madre may be depressed as much as 2 feet below mean low tide. Capt. A. D. Shaw, branch pilot of the Brazos-Santiago pilots, stated at the hearing that navigation during rough weather was very difficult and dangerous and recommended as necessary for safe navigation the deepening of the channel in the pass to 35 feet, easing of the turn at the inner end of the pass, deepening of the channel from the pass to Port Isabel to 32 feet, and widening it at least another 100 feet. He further recommended enlarging the Port Isabel turning basin to the same size as that at Brownsville.

(b) That since October 23, 1935, 69 vessels have called at Port Isabel for petroleum and petroleum products. The loaded capacities of these vessels ranged from 30,000 to 90,000 barrels with lengths up to 435 feet and drafts to 29 feet. The 25-foot channel prevented their loading to capacity, and the tankers with a total capacity of 2,437,000 barrels were loaded with only 1,831,223.7 barrels, a loss of more than a fourth of their capacity. Coastal Refineries, Inc., have the only refinery and the only pipe line in the valley. Mr. James L. Sewell, manager, stated at the hearing that this refinery was handling all the oil now produced in the Sam Fordyce field and would process any additional oil it could secure. Its pipe line with a present capacity of 6,000 barrels per day could be altered to carry as much as 10 or 12 thousand barrels if the allowable production for the field were increased, or if new fields should be developed.

(c) That Port Isabel has more than adequate terminal facilities, that it has the only precooling plant for vegetables on the Texas coast, and is equipped to handle properly the increased commerce which it anticipates the improved channel would bring. Having practically exhausted its funds in providing these facilities, and in making its contribution toward the costs of the existing channels, the district states that it cannot contribute funds for the proposed improvements but that the rights-of-way and areas for spoil disposal provided for the existing channel are available and sufficient for the proposed work.

34. In a letter to the district engineer dated February 25, 1937, the Port Isabel-San Benito navigation district supplemented the state-

ments made in its brief with reference to local cooperation by suggesting that:

\* \* \* if the funds necessary to be expended in making the whole requested improvement are not at this time available, the Government proposes to provide a depth of 34 feet of water through Brazos Santiago Pass and 32 feet through the waters of Laguna Madre and to the west side of Long Island, upon condition that Port Isabel furnish the funds to defray the cost of providing a depth of 32 feet of water through its separate channel from Long Island to and including its turning basin or that Brownsville furnish the funds to defray the cost of providing a depth of 32 feet of water through its separate channel from Long Island to and including its turning basin.

35. *Commerce.*—Prior to 1934 the only traffic in the vicinity of Brazos Island Harbor was carried on by the small fishing boats operated in the Laguna Madre. During 1934 there was some traffic through the partly completed channel through the Pass and through the completed inside channel to Port Isabel. Considerable traffic was handled over the inside channel from the Pass to Port Isabel by the contractors engaged in the construction of the jetties and light-house structures and in the dredging contracts. The total freight traffic utilizing the Port Isabel Channel since its opening is as follows:

Year	Tons	Value
1934.....	417,845	\$1,292,559
1935.....	85,965	1,734,779
1936.....	278,616	3,797,411

The principal items included in the above-listed tonnage are as shown in the following table:

Character of cargo	Tonnage and value					
	1934		1935		1936	
	Short tons	Value	Short tons	Value	Short tons	Value
<b>FOREIGN</b>						
Exports:						
Nonmetallic minerals: Oil, crude.....			26,661	\$180,518	6,481	\$47,765
<b>DOMESTIC</b>						
<b>Constwise receipts:</b>						
Nonmetallic minerals:						
Oil:						
Gas and fuel.....	485	\$3,580	36,946	234,470		
Lubricating.....					50	1,900
Ores, metals, and manufactures of:						
Iron and steel, rolled forms of:						
Bars, bands, rods, etc.....					21	903
Structural.....					81	2,916
Plates and sheets.....			723	34,885		
Tubular products and fittings.....	200	5,000	1,986	197,307	153	10,863
Tin and tinware.....			9	1,530	10	3,990
Machinery and vehicles:						
Machinery, miscellaneous.....			32	10,250		
Autos and parts.....					153	61,200
Wood and paper: Lumber.....			153	3,429		
Vegetable food products:						
Beverages.....					17	3,834
Rice.....					10	880

<sup>1</sup> All materials used in construction of waterway and harbor improvement.



ments made in its brief with reference to local cooperation by sug-

If the funds necessary to be expended in making the whole project a reality are not at this time available, the Government proposes to provide a depth of 25 feet of water through Brazos Santiago Pass and 22 feet through the waters of Laguna Madre and to the east side of Port Isabel, upon condition that the Federal Government furnish the funds to carry out the project. It is proposed that the Federal Government furnish the funds to carry out the project, including the cost of providing a depth of 25 feet of water through the separate channel from Port Isabel to and including the training basin.

5. Commerce.—Prior to 1934 the only traffic in the vicinity of Brazos Island Harbor was carried on by the small fishing boats operated in the Laguna Madre. During 1934 there was some traffic through the partly completed channel through the Pass and through the completed inside channel to Port Isabel. Considerable traffic was handled over the inside channel from the Pass to Port Isabel by the contractors engaged in the construction of the jetties and light-house structures and in the dredging contracts. The total freight traffic utilizing the Port Isabel Channel since its opening is as follows:

Character of cargo	1934		1935		1936	
	Short tons	Value	Short tons	Value	Short tons	Value
Domestic—continued						
Coastwise receipts—Continued.						
Chemicals: Fertilizers, complete			173	\$5,225		
Unclassified:						
General merchandise			16	6,400	165	\$57,750
Miscellaneous					1,253	374,841
Roofing, asphalt					117	6,201
Total	685	\$8,580	40,038	\$93,496	2,030	\$525,248
Internal receipts: <sup>1</sup>						
Wood and paper:						
Logs	4,600	103,000				
Lumber	1,200	44,600				
Nonmetallic minerals:						
Gasoline	310	10,000				
Oil:						
Lubricating	50	3,479				
All other	10	200				
Stone (for jetties)	410,000	1,100,000				
Ores, metals and manufactures of:						
Iron and steel:						
Rolled forms and structural steel	50	\$3,200				
Tubular products	200	3,000				
All other	740	16,500				
Total	417,160	1,283,979				
Coastwise shipments:						
Animals and animal products: Hides and skins			18	3,699		
Vegetable food products:						
Canned goods			356	62,838	2,332	410,432
Fruits					633	91,152
Vegetables					1,309	83,940
Corn			15,919	513,861		
Corn, kafir			306	5,359		
Milo maize			33	484		
All other			15	695		
Vegetable products, inedible: Broom-corn			659	59,729		
Wood and paper: Paper, miscellaneous					52	8,476
Nonmetallic minerals:						
Gasoline					15,349	275,361
Oil:						
Bunker					22,227	137,801
Gas and fuel					207,156	1,677,964
Unclassified: Miscellaneous					1,001	309,425
Total			17,306	646,665	250,149	2,994,551
Local:						
Wood and paper: Lumber					17	374
Nonmetallic minerals:						
Oil:						
Bunker					2,578	15,880
Gas and fuel					17,100	138,510
Ores, metals, and manufactures of iron and steel, rolled forms of:						
Castings and forgings					3	300
Structural					27	972
All other					22	1,796
Machinery and vehicles: Machinery, miscellaneous					5	5,000
Animals and animal products:						
Fish			1,605	353,100		
Shrimp			350	56,000		
Unclassified:						
General merchandise					117	43,875
Miscellaneous					37	10,650
Total			1,960	414,100	19,956	229,847
Grand total, all traffic	1,417,845	1,292,559	1,85,965	1,734,779	278,616	3,797,411

<sup>1</sup> Excludes 2,315 tons bunker oil, value \$14,098.

<sup>2</sup> Excludes 6,389 tons bunker oil, value \$35,993.

Coaster 73883

36. The port at Brownsville was opened for traffic May 16, 1936. Total traffic utilizing the port in 1936 amounted to 39,193 tons valued at \$4,335,176. Principal classes of products included in this traffic were as follows:

Classes of cargo	Short tons	Value
<b>Imports:</b>		
Nonmetallic minerals: Coke.....	4,475	\$22,733
Ores, metals, and manufactures of: Iron and steel, rolled forms of.....	1,030	36,503
<b>Total.....</b>	<b>5,505</b>	<b>59,236</b>
<b>Exports:</b>		
Vegetable food products: Cottonseed cake.....	2,163	49,056
Textiles: Cotton, raw.....	5,954	1,471,012
<b>Total.....</b>	<b>8,117</b>	<b>1,520,068</b>
<b>Coastwise receipts:</b>		
Animals and animal products.....	12	25,468
Vegetable food products.....	2,853	527,815
Vegetable products, inedible.....	93	23,251
Textiles.....	190	108,010
Wood and paper.....	548	96,662
Nonmetallic minerals.....	12,183	247,604
Ores, metals, and manufactures of.....	2,593	402,254
Machinery and vehicles.....	652	263,638
Chemicals.....	1,195	114,384
Unclassified.....	353	98,970
<b>Total.....</b>	<b>20,672</b>	<b>1,911,053</b>
<b>Coastwise shipments:</b>		
Animals and animal products.....	256	64,525
Vegetable food products.....	3,326	552,687
Vegetable products, inedible.....	139	21,684
Textiles.....	476	53,769
Wood and paper.....	31	1,452
Nonmetallic minerals.....	618	142,274
Ores, metals, and manufactures of.....	4	370
Machinery and vehicles.....	4	1,354
Chemicals.....	27	504
Unclassified.....	18	6,110
<b>Total.....</b>	<b>4,899</b>	<b>844,819</b>
<b>Grand total, all traffic.....</b>	<b>39,193</b>	<b>4,335,176</b>

Since the port at Brownsville has been in operation only since May 1936, there are no records of other years' traffic for comparison. For this reason the various commodities under the different classes were not listed; for no comparison being possible, it would give no information as to cargo trends. The class "Vegetable food products" under coastwise receipts included beverages, canned goods, coffee, feeds, prepared and mixed, rice, sirup, sugar refined, vegetables, and other products. The same classification under coastwise shipments included canned goods, kafir-corn, fruits, cottonseed cake, cottonseed meal, sirup, and vegetables.

37. Though there are available records of the traffic handled through the port of Port Isabel for 3 years, because of the fact that most of the freight handled in 1934 was that used by the contractors engaged in work on the waterway, and that the refinery began its shipments only in 1936, the records are of little value in predicting future cargo trends. It is of interest to note that the considerable receipts of oil, gas, and fuel, in 1935 were followed by no receipts of these commodities in 1936, because the refinery could supply these products. The movement of grains in 1935 was discontinued in 1936 indicating that this shipment is likely to be spasmodic. There was a considerable in-

36. The port at Brownsville was opened for traffic May 10, 1936. Total traffic utilizing the port in 1936 amounted to 32,133 tons valued at \$4,332,176. Principal classes of products included in this traffic were as follows:

Class of cargo	Tons	Value
Crude oil and petroleum products	27,500	\$3,500,000
Refined petroleum products	1,500	\$1,500,000
Vegetable food products	1,000	\$1,000,000
Mineral products	500	\$500,000
Chemicals	300	\$300,000
Iron and steel	200	\$200,000
Grain	100	\$100,000
Other	133	\$133,176
<b>Total</b>	<b>32,133</b>	<b>\$4,332,176</b>

37. Though there are available records of the traffic handled through the port of Port Isabel for 3 years, because of the fact that most of the freight handled in 1934 was that used by the contractor engaged in work on the waterway, and that the refinery began its shipments only in 1936, the records are of little value in predicting future cargo trends. It is of interest to note that the considerable receipts of oil, gas and fuel in 1935 were followed by no receipts of these commodities in 1936 because the refinery could supply these products. The movement of grain in 1935 was discontinued in 1936 indicating that this shipment is likely to be sporadic. There was a considerable increase in the port at Brownsville has been in operation only since 1936, there are no records of other years' traffic for comparison. For this reason the various commodities under the different classes were not listed; for no comparison being possible, it would give no information as to cargo trends. The class "Vegetable food products" under coastwise receipts included oranges, canned goods, coffee, feeds, prepared and mixed rice, sirup, sugar, refined, vegetables, and other products. The same classification under coastwise shipments included canned goods, fair-corn, fruits, cottonseed cake, cottonseed meal, sirup, and vegetables.

crease in the coastwise shipments of vegetable food products in 1936 over 1935, and it appears probable that there will continue to be some increase in future years. Of the total tonnage of cargo handled at Port Isabel in 1936, over 95 percent was oil and oil products. The refinery at Port Isabel refined the greater part of the oil produced by valley fields during 1936, and its manager stated, at the hearing, that it would process any additional oil it could secure. It does not appear probable that any appreciable increase in the allowable production of the existing fields will be made in the near future, so any large increase in the amount of oil for processing and, subsequently, for shipment will have to come from the development of new fields. It appears, then, that increase in oil-cargo movement at the port of Port Isabel is speculative.

38. Lacking records for determination of the trends in cargo movement for the port of Brownsville, it is necessary to consider the tributary area and to base estimates of future increase of traffic upon its potentialities. A cursory examination of the resources and possibilities of development within the tributary area indicates that the port of Brownsville may expect a gradual increase in its shipping. General business recovery will aid in this, as will the continued development of the several quite progressive towns in the valley. No large or rapid increase in general cargo tonnage is indicated, and the prospect of diverting large ore shipments from the Mexican ports to the port of Brownsville is believed not probable.

39. No statements as to freight savings already made or as to anticipated additional savings which might result from the proposed improvement were made at the hearing. Local interests had made statements in connection with previous reports that a saving of 20 cents per barrel in freight rates on oil would be effected by providing a project depth of 30 feet and estimated a saving of about \$4,000,000 per annum on prospective commerce. This estimate of savings and the estimates of prospective commerce on which it was based were worked up in detail by the Brownsville navigation district for presentation before the Board of Engineers for Rivers and Harbors on June 18, 1929, in connection with their petition that the construction of a channel to Brownsville be undertaken. The prospective commerce of several classes and the estimated savings on each were listed as follows:

Item	Tonnage	Saving to shippers	Saving per ton
Exports from northern Mexico	500,000	\$1,689,000	\$3.38
Imports into northern Mexico	50,000	415,000	8.30
Exports from the valley	165,000	1,723,000	10.45
Imports into the valley	60,000	306,000	5.10
<b>Total</b>	<b>775,000</b>	<b>4,133,000</b>	<b>5.34</b>

The brief submitted by the district in 1935 listed additional prospective tonnage based on the development of the tributary area in the interim as follows:

Additional prospective Mexican tonnage:	Tons
Sulphur	187,500
Industrial and agricultural	100,000
Additional prospective domestic tonnage: Oil (allowable)	292,000
<b>Total additional 1935 over 1929</b>	<b>579,500</b>

Coenter 73885

It estimated the potential oil production at 18,250,000 tons annually. Savings to shippers on the new prospective tonnages were estimated to be at essentially the same rate as set out for similar items in the 1929 estimate.

40. The present waterway is amply large for the small fishing boats, motor boats, yachts, or other pleasure boats that have occasion to use it.

41. *Vessel classification.*—The following vessel classification shows the draft of all steamers, sailing vessels, tugs, barges, and launches using the waterway after the opening of the 25-foot channels, through 1936:

## Trips and drafts of vessels

## PORT ISABEL CHANNEL

Year	Draft	In-bound					Out-bound				
		Steamers	Motor vessels	Sailing	Barges	Tugs	Steamers	Motor vessels	Sailing	Barges	Tugs
1934	Under 18 feet		1		1,390	21		1	1,390		20
	(Tons <sup>1</sup> )		8		468,430	1,008		8	468,430		960
1935	22 to 24 feet						1				
	20 to 22 feet	1					4				
	18 to 20 feet	3					6				
	Under 18 feet	13		3	197	190	6			3	198
	Total	17		3	197	190	17		3	198	191
	(Tons <sup>1</sup> )	42,955		60	200,801	4,020	42,949		60	200,961	4,120
1936	26 to 28 feet						3				
	24 to 26 feet						15				
	22 to 24 feet						2				
	20 to 22 feet						9				
	18 to 20 feet	16					19				
Under 18 feet	64	9	1	107	98	31	8	1	108	95	
Total	80	9	1	107	98	79	8	1	108	95	
(Tons <sup>1</sup> )	193,925	1,682	500	13,600	9,840	190,338	1,700	500	13,800	9,600	

## BROWNSVILLE CHANNEL

1936	24 to 26 feet		1				1			
	22 to 24 feet		2				2			
	20 to 22 feet	2					2			
	18 to 20 feet	9	1				9	1		
	Under 18 feet	45	6		4	4	45	6		4
Total	56	10		4	4	56	10		4	4
(Tons <sup>1</sup> )	100,252	18,205		2,428	300	100,252	18,205		2,428	300

## BRAZOS ISLAND HARBOR

[Includes vessels to both Brownsville and Port Isabel]

1936	26 to 28 feet						3			
	24 to 26 feet		1				15	1		
	22 to 24 feet		2				2	2		
	20 to 22 feet	2					11			
	18 to 20 feet	25	1				28	1		
Under 18 feet	109	15	1	111	102	76	14	1	112	99
Total	136	19	1	111	102	135	18	1	112	99
(Tons <sup>1</sup> )	303,177	19,887	500	16,028	10,140	299,590	13,905	500	16,228	9,900

- <sup>1</sup> Total net tonnage, figures for 1934 were partly estimated.  
<sup>2</sup> Includes 8 steamers, net registered tonnage of 33,528 tons, of foreign registry.  
<sup>3</sup> Foreign vessels included were 2 steamers, net registered tonnage of 6,620 tons.  
<sup>4</sup> Foreign vessels included were 4 steamers, net registered tonnage of 13,180 tons, and 10 motor vessels, net registered tonnage of 32,050 tons.  
<sup>5</sup> Foreign vessels included were 6 steamers, net registered tonnage 19,800 tons, and 10 motor vessels, net registered tonnage 32,050 tons.

counter 13886

It estimated the potential oil production at 18,250,000 tons annually. Savings to shippers on the new prospective tonnage were estimated to be at essentially the same rate as set out for similar items in the 1933 estimate.

40. The present waterway is amply large for the small fishing boats, motor boats, yachts, or other pleasure boats that have occasion to use it.

41. The following vessel classification shows the draft of all steamers, sailing vessels, tug barges, and launches using the waterway after the opening of the 25-foot channel, through

Types and drafts of vessels

PORT ISABEL CHANNEL

Type	Name	Draft, feet	1934		1935		1936	
			No.	Tonnage	No.	Tonnage	No.	Tonnage
Steamer	Recco	25.1	1	51,895	1	51,895	1	51,895
Steamer	E. J. Nicklos	25.1	1	51,895	1	51,895	1	51,895
Steamer	Pueblo	24.3	1	51,895	1	51,895	1	51,895
Steamer	E. J. Nicklos	25.1	1	51,895	1	51,895	1	51,895
Steamer	Pueblo	24.3	1	51,895	1	51,895	1	51,895
Steamer	Amaleo	24.3	1	51,895	1	51,895	1	51,895
Steamer	E. J. Nicklos	25.1	1	51,895	1	51,895	1	51,895
Steamer	Pueblo	24.3	1	51,895	1	51,895	1	51,895
Steamer	Alpha	24.3	1	51,895	1	51,895	1	51,895
Steamer	E. J. Nicklos	25.1	1	51,895	1	51,895	1	51,895
Steamer	Do	25.1	1	51,895	1	51,895	1	51,895
Steamer	Agwiworld	25.1	1	51,895	1	51,895	1	51,895
Steamer	E. W. Sinclair	26.7	1	80,000	1	80,000	1	80,000
Steamer	E. J. Nicklos	23.5	1	50,290	1	50,290	1	50,290
Steamer	Henry M. Dawes	25.1	1	51,895	1	51,895	1	51,895
Steamer	Phoenix	24.9	1	51,340	1	51,340	1	51,340
Steamer	E. J. Nicklos	25.1	1	51,895	1	51,895	1	51,895
Steamer	Do	25.1	1	51,895	1	51,895	1	51,895
Steamer	Henry M. Dawes	25.1	1	51,895	1	51,895	1	51,895
Steamer	Chiloil	24.9	1	51,340	1	51,340	1	51,340
Steamer	E. J. Nicklos	25.2	1	49,783	1	49,783	1	49,783
Steamer	Chiloil	25.1	1	51,895	1	51,895	1	51,895
Steamer	J. J. Coney	25.2	1	49,783	1	49,783	1	49,783
Steamer	E. J. Nicklos	24.4	1	52,941	1	52,941	1	52,941
Steamer	Chiloil	25.1	1	51,895	1	51,895	1	51,895
Steamer	Do	25.2	1	49,783	1	49,783	1	49,783
Steamer	Caloria	25.2	1	49,783	1	49,783	1	49,783
Steamer	E. J. Nicklos	22.8	1	51,190	1	51,190	1	51,190
Steamer	Chiloil	25.1	1	51,895	1	51,895	1	51,895
Steamer	E. J. Nicklos	25.2	1	49,783	1	49,783	1	49,783
Steamer	Chiloil	25.1	1	51,895	1	51,895	1	51,895
Steamer	Do	25.2	1	49,783	1	49,783	1	49,783
Steamer	Edward L. Doheny	25.2	1	49,783	1	49,783	1	49,783
Steamer	Caloria	26.9	1	63,000	1	63,000	1	63,000
Steamer	Do	22.8	1	51,190	1	51,190	1	51,190
Total				1,861,306		1,861,306		1,861,306
Average				24.9		23.2		1,497,946

BROWNSVILLE CHANNEL

BRAZOS ISLAND HARBOR

As has already been pointed out, the Brownsville Channel was opened to traffic for only 8 months during 1936. Since only the Port Isabel Channel was open prior to 1936, the trips and drafts of vessels for Brazos Island Harbor for 1934 and 1935 would be the same as shown for the Port Isabel Channel.

42. The vessel drafts shown in the above tabulation are not necessarily fully loaded drafts but rather actual drafts. Local interests at Brownsville state that a number of ships, particularly refrigerator ships, have refused to navigate the channel because of its shallow depth. And local interests at Port Isabel believe that the 25-foot channel by preventing average-sized tankers from loading to capacity works a hardship upon the shippers of oil products. The following list is a record of all tankers used in the shipment of refinery products from Port Isabel during 1936, as furnished by the Port Isabel-San Benito navigation district:

Name of ship	Date of sailing	Designed draft, feet <sup>1</sup>	Designed capacity, barrels <sup>1</sup>	As loaded	
				Approximate draft	Refined cargo
E. J. Nicklos	Jan. 2	25.1	51,895		
Recco	Jan. 5	25.7	70,000	21.5	40,375
E. J. Nicklos	Jan. 25	25.1	51,895	20.0	39,045
Pueblo	Jan. 30	24.3	51,895	22.0	42,478
E. J. Nicklos	Feb. 20	25.1	46,625	17.7	22,266
Pueblo	Feb. 23	24.3	51,895	20.0	37,789
Amaleo	Mar. 13	24.3	46,625	20.0	24,817
E. J. Nicklos	Mar. 14	20.6	23,000	20.2	26,971
Pueblo	Mar. 24	25.1	51,895	20.5	36,235
Alpha	Mar. 26	24.3	46,625	20.5	31,812
E. J. Nicklos	Apr. 15	26.5	77,000	19.5	35,561
Do	Apr. 15	25.1	51,895	20.4	36,938
Agwiworld	Apr. 27	25.1	51,895	22.0	43,174
E. W. Sinclair	Apr. 30	26.7	80,000	22.0	53,257
E. J. Nicklos	May 10	23.5	50,290	24.5	42,565
Henry M. Dawes	May 26	25.1	51,895	25.7	53,092
Phoenix	June 1	24.9	51,340	25.0	45,367
E. J. Nicklos	June 13	26.0	77,024	23.0	40,027
Do	June 14	25.1	51,895	25.7	52,007
Henry M. Dawes	July 3	25.1	51,895	25.8	52,337
Chiloil	July 8	24.9	51,340	25.5	47,106
E. J. Nicklos	July 19	25.2	49,783	25.0	51,494
Chiloil	July 25	25.1	51,895	25.5	50,855
J. J. Coney	Aug. 7	25.2	49,783	26.0	56,651
E. J. Nicklos	Aug. 12	24.4	52,941	22.0	25,020
Chiloil	Aug. 16	25.1	51,895	25.2	50,568
Do	Aug. 26	25.2	49,783	26.2	53,669
Caloria	Sept. 16	25.2	49,783	26.0	51,959
E. J. Nicklos	Sept. 22	22.8	51,190	25.2	39,702
Chiloil	Sept. 28	25.1	51,895	25.5	51,594
E. J. Nicklos	Oct. 5	25.2	49,783	25.3	35,684
Chiloil	Oct. 19	25.1	51,895	25.4	52,125
Do	Nov. 27	25.2	49,783	26.0	56,714
Edward L. Doheny	Dec. 18	25.2	49,783	26.0	52,189
Caloria	Dec. 24	26.9	63,000	16.5	26,475
Do	Dec. 30	22.8	51,190	24.9	40,054
Total					
Average			1,861,306	23.2	1,497,946

<sup>1</sup> Taken from Standard Oil Co.'s Register of Tankers.

43. *Difficulties attending navigation.*—In addition to the difficulties imposed by the 25-foot channel, it is stated that navigation is made hazardous to ships over 400 feet long because of the three bends in the Brownsville Channel and the difficult entrance to the Port Isabel Channel. The present 100-foot width precludes the safe passage of two full-sized ships in the channel and port authorities, recognizing

this, refuse to permit two such ships moving in opposite directions in the channel at the same time.

44. *Survey.*—No field survey was made for this report as the necessary information could be obtained from surveys made in connection with the existing improvements. A map entitled "Brazos Island Harbor, Tex. (file no. 11-7-32)", prepared to illustrate the existing waterway is enclosed as appendix 1.

45. *Plan of improvement.*—As has been set out in paragraphs 26 to 34 several different plans for improvement were proposed by the local interests. A composite plan which incorporates most of the items proposed by the local interests has been set up for the purpose of estimating the cost of the proposed work. This plan includes the following modifications of the existing project: Deepening of all inside channels, including the turning basins, to 32 feet and widening the inside channels to a 200-foot bottom width; easing the turn at the inner end of the jetty channel; and deepening the jetty channel to 35 feet. An estimate of the cost of executing this plan with Federal funds is as follows:

(a) Federal investment:	
(1) Construction costs: Dredging 22,185,100 cubic yards, at \$0.0961	\$2,132,806.00
(2) Interest during construction (improvement would be completed within 1 year)	-----
(3) Total Federal investment	<u>2,132,806.00</u>

(b) Federal annual carrying charges:	
(1) Interest on Federal investments: 4 percent of \$2,132,806	85,312.24
(2) Amortization in 50 years: 0.655 percent of \$2,132,806	13,969.88
(3) Increased cost of operation and maintenance	120,000.00
(4) Total annual carrying charges	<u>219,282.12</u>

46. An alternate plan of improvement based upon what is considered necessary for adequately handling the present traffic and such additional traffic as may be expected reasonably to develop within the next few years was given consideration. This plan entails deepening all inside channels, including the turning basins, to 28 feet; easing the turn at the inner end of the jetty channel, the curve at station 13+250, which is the entrance to the Port Isabel Channel, and the bends at stations 21+954, 34+447, and 62+986; deepening the jetty channel to 31 feet. The estimated costs of executing this plan, using Federal funds, is as follows:

(a) Federal investment:	
(1) Construction cost: Dredging 5,182,300 cubic yards, at \$0.1128	584,366.00
(2) Interest during construction	-----
(3) Total Federal investment	<u>584,366.00</u>

(b) Federal annual carrying charges:	
(1) Interest on Federal investment: 4 percent of \$584,366	23,374.64
(2) Amortization in 50 years: 0.655 percent of \$584,366	3,827.60
(3) Increased cost of operation and maintenance	-----
(4) Total annual carrying charges	<u>27,202.24</u>

47. It will be noted that neither of the above plans of improvement include the item of enlarging the Port Isabel Turning Basin, which

this refuse to permit two such ships moving in opposite directions in the channel at the same time.

41. Survey.—No field survey was made for this report as the necessary information could be obtained from surveys made in connection with the existing improvements. A map entitled "Brazos Island Harbor, Tex. (file no. 11 7 32)", prepared to illustrate the existing waterway is enclosed as appendix I.

42. Plan of improvement.—As has been set out in paragraphs 38 to 41 several different plans for improvement were proposed by the local interests. A composite plan which incorporates most of the items proposed by the local interests has been set up for the purpose of estimating the cost of the proposed work. This plan includes the following modifications of the existing project: Deepening of all inside channels including the turning basins to 32 feet and widening the inside channels to a 300-foot bottom width; easing the turn at the inner end of the jetty channel; and deepening the jetty channel to 35 feet. An estimate of the cost of executing this plan with Federal lands is as follows:

(a) Federal investment:	
(1) Construction cost: Dredging 22,125,100 cubic yards at \$0.0001	\$2,212,510.00
(2) Interest during construction (interest would be completed within 4 years)	5,132,808.00
(3) Total Federal investment	7,345,318.00
(b) Federal annual carrying charges:	
(1) Interest on Federal investment, 4 percent of \$7,345,318	\$291,812.92
(2) Amortization in 50 years, 0.655 percent of \$7,345,318	47,922.88
(3) Increased cost of operation and maintenance	130,000.00
(4) Total annual carrying charges	470,735.80

43. An alternate plan of improvement based upon what is considered necessary for adequately handling the present traffic and such additional traffic as may be expected reasonably to develop within the next few years was given consideration. This plan entails deepening all inside channels, including the turning basins, to 28 feet; easing the turn at the inner end of the jetty channel; the four at station 13+350, which is the entrance to the Fort Isabel Channel, and the piers at stations 21+951, 24+447, and 62+950; deepening the jetty channel to 31 feet. The estimated cost of executing this plan using Federal lands is as follows:

(a) Federal investment:	
(1) Construction cost: Dredging 5,125,300 cubic yards at \$0.0001	\$512,530.00
(2) Interest during construction	681,302.00
(3) Total Federal investment	1,193,832.00
(b) Federal annual carrying charges:	
(1) Interest on Federal investment, 4 percent of \$1,193,832	\$47,753.28
(2) Amortization in 50 years, 0.655 percent of \$1,193,832	7,821.86
(3) Increased cost of operation and maintenance	27,300.00
(4) Total annual carrying charges	\$82,875.14

44. It will be noted that neither of the above plans of improvement include the item of enlarging the Fort Isabel Turning Basin, which

56. A 32-foot depth for the Brazos Island Harbor project, such as was requested by local interests, is believed to be greater than is warranted at present. It is estimated as set out in paragraph 45 that a project involving a 32-foot depth for the inside channels and other requisite accompanying improvements would require a Federal investment of \$2,132,806 and would involve annual carrying charges of \$219,218.12. However, in view of the present oil shipments from Port Isabel and the potential additional commerce in oil and general cargo, it appears that a channel depth of 28 feet, which is adequate to accommodate about 60 percent of the tankers in the Gulf trade would be justified. Adoption of a complete plan of improvement with 28-foot deep inside channels as described in paragraph 46 would involve an investment of \$584,366 and annual carrying charges of \$27,202.24. An examination of the drafts of the tankers regularly engaged in the Gulf trade reveals that they range from about 20 feet to about 32 feet. If it be assumed that the existing 25-foot project channel provides for a safe navigation depth of 24 feet, this examination shows that less than 5 percent of the tankers engaged in the Gulf Atlantic trade can use the channel fully loaded. The possibilities offered by a 27-foot project channel were studied in some detail. Such a project would involve an investment of \$430,334 and annual carrying charges of \$20,032.05. However, if it be considered as providing safe navigation for ships with a maximum draft of 26 feet, it would accommodate only about 20 percent of the tankers. In view of the fact that a 28-foot channel would accommodate nearly three times as great a part of the tankers and would cost only about a third more for construction and would require carrying charges about a third greater, it appears that it would be more economically feasible for oil transportation than the 27-foot channel. With respect to the general-cargo ships trading at Brownsville the 28-foot project would also give considerable advantage over the 27-foot project since a relatively large percentage of general-cargo ships have drafts between 26 and 27 feet.

57. Though no adequate estimate can be made of monetary benefits which a 28-foot channel would provide, it appears that the benefits would be definitely greater than the annual carrying costs for such a project. In fact, studies of the economics of tanker transportation of oil from Gulf ports indicate that the savings on the shipment of the existing oil tonnage from Port Isabel, alone, would be great enough to warrant serious consideration of the proposed improvement. The existing 25-foot project channel permits safe navigation by 50,000-barrel capacity tankers and the proposed 28-foot project would provide for ready navigation by tankers of approximately 70,000-barrel capacity; investigation of the operating costs of tankers of these two sizes indicates that the 28-foot project would result in a saving in transportation costs of approximately 2 cents per barrel of oil. This saving applied to the 1,500,000 to 2,000,000 barrels to be shipped annually would result in an annual saving of \$30,000 to \$40,000 and in addition to this monetary saving the shipper would be given an appreciable commercial advantage in securing charters.

58. The amount of traffic using the channels is considered not sufficient to warrant further widening at this time. It may be noted that a total of only 734 vessels, in-bound and out-bound, of all sizes used the channels in 1936, an average of 2 per day. Not more than 4 hours delay should be occasioned to ships traveling the 16½ miles to

counter 43889

Brownsville nor more than an hour to those traversing the 4 miles of 100-foot channel to Fort Isabel. Considering these facts with the fact that the widening of the channel to even a 125-foot bottom width would cost, it is estimated, at least \$250,000 and involve a considerable additional annual maintenance cost, it is believed that the proposed widening is not warranted.

59. While the port of Brownsville does not have the tanker traffic which constitutes the major portion of the traffic of the Port Isabel Channel, it appears that the potential development of other cargo for this port is considerably greater than for Port Isabel, and there is the very reasonable possibility that additional developments in the valley oil fields may also result in the use of the Brownsville Channel for oil transportation.

60. It will be noted that the estimates of cost prepared for the 28-foot project anticipate no contribution of funds by local interests. On account of the large contributions that have been made by local interests toward the existing project and the financial burdens which they have assumed, in order to make these contributions, it appears that all new work recommended herein and the subsequent maintenance costs should be undertaken wholly at Federal expense. As set out in paragraph 34 the Port Isabel-San Benito navigation district offered to furnish the funds for providing 32 feet of water through the Port Isabel Channel and in the turning basin if the Government would provide a depth of 34 feet through Brazos-Santiago pass and a depth of 32 feet thence to the west side of Long Island. No effort has been made to determine whether the district would contribute to the cost of providing a 28-foot project depth as herein recommended. In lieu of requiring their contribution to such cost, it has appeared better from the standpoint of the whole project to expect the authorities at Port Isabel to use any available local funds for enlarging their turning basin, which will be more needed than heretofore with the advent of larger ships, than to require local contributions toward the proposed enlargement of the ship channels.

61. *Water power.*—The waterway under consideration in this report is wholly tidal, and the desired improvements are such that the question of water power does not enter into consideration.

62. *Other special subjects.*—There are no questions of land reclamation, flood protection, drainage, or other special features which would have material bearing on the proposed improvements. The proposed improvements would cause no change in the configuration of the shore line.

63. *Conclusion.*—The district engineer concludes that there is a considerable potential traffic for the waterway in the tributary area, which the improvement of the waterway should assist in developing; that the present depth of the Port Isabel Channel is not sufficient to permit the average sized tankers operating in the Gulf to load to capacity; and that the traffic already developed within the short life of the project indicates a need for improved shipping facilities in this area. He believes that the further improvement of this waterway is warranted and that such improvement would assist in attracting new shipping operators, and, ultimately, through lower freight rates or better shipping services, in the attraction of new industries to the immediate tributary area. In view of the fact that such improvement is predicated largely upon future development, he believes it is



townsville not more than an hour to those traversing the 4 miles of 100-foot channel to Fort Isabel. Considering these facts with the fact that the widening of the channel to even a 125-foot bottom width would cost at least \$2,500,000 and involve a considerable additional annual maintenance cost, it is believed that the proposed widening is not warranted.

60. While the port of Brownsville does not have the tanker traffic which constitutes the major portion of the traffic of the Fort Isabel Channel, it appears that the potential development of other cargo for the port is considerably greater than for Fort Isabel, and there is the very reasonable possibility that additional developments in the latter of both may also result in the use of the Brownsville Channel for transportation.

61. It will be noted that the estimate of cost prepared for the 22-foot project anticipates no contribution of funds by local interests. On account of the large contributions that have been made by local interests toward the existing project and the financial burdens which they have assumed, in order to make these contributions, it appears that all new work recommended herein and the subsequent maintenance costs should be undertaken wholly at Federal expense. As set out in paragraph 51 the Fort Isabel-San Benito navigation district offered to furnish the funds for providing 22 feet of water through the Fort Isabel Channel and in the turning basin if the Government would provide a depth of 24 feet through Brazos-Santiago pass and a depth of 32 feet thence to the west side of Long Island. No effort has been made to determine whether the district would contribute to the cost of providing a 22-foot project depth as herein recommended. In view of retaining their contribution to such cost, it has appeared better from the standpoint of the whole project to request the authorities at Fort Isabel to use any available local funds in enlarging their turning basin, which will be more needed than elsewhere with the advent of larger ships, than to require local contributions toward the proposed enlargement of the ship channels.

62. *Water survey.*—The waterway under consideration in this report is wholly tidal, and the desired improvements are such that the question of water power does not enter into consideration.

63. *Water special subjects.*—There are no questions of land reclamation, flood protection, drainage, or other special features which would have material bearing on the proposed improvements. The proposed improvements would cause no change in the configuration of the shore line.

64. *Conclusion.*—The district engineer concludes that there is a considerable potential traffic for the waterway in the tributary area, which the improvement of the waterway should assist in developing; that the present depth of the Fort Isabel Channel is not sufficient to permit the average sized tankers operating in the Gulf to load to capacity; and that the traffic already developed within the short life of the project indicates a need for improved shipping facilities in this area. He believes that the further improvement of this waterway is warranted and that such improvement would assist in attracting new shipping operators and ultimately through lower freight rates or better shipping services in the attraction of new industries to the immediate tributary area. In view of the fact that such improvement is predicted largely upon future development, he believes it is

unnecessary to provide, at this time, a waterway sufficient to care for the ultimate traffic. Although it is possible that a 30- or 32-foot channel may eventually be necessary to care for available shipping he believes that a channel of the present width with a project depth of 28 feet in the inside channels and turning basins, and a project depth of 31 feet in the jetty channel will be adequate for such traffic as will develop in the near future. The short delay caused to a few ships by their inability to pass in the channels he considers not sufficient justification for the widening of the channels and believes that most of the delay is a result of the channels not being lighted. He considers that the easing of the bends in the present channel alignment is justifiable as an aid to navigation and as a safety measure. He further concludes that the enlarging of the turning basin at Port Isabel should be done by local interests.

64. *Recommendations.*—The district engineer recommends that the existing project for Brazos Island Harbor be modified to provide a depth of 31 feet in the channel between the jetties and a depth of 28 feet in the inside channels and turning basins, and that the bends and curves in the present channel be eased to eliminate the navigation hazards which they now offer, at a total cost of \$584,366, with no increase in the present allotment for maintenance. He further recommends that all new work required to deepen the waterways and maintain the modified project be undertaken at Federal expense subject to the condition that no dredging shall be done by the Federal Government within 50 feet of an established pierhead line or within 50 feet of any wharf or structure; and that local interests shall furnish, free of cost to the United States, all necessary rights-of-way and suitable areas for the disposal of material excavated in the enlargement and in future maintenance as and when needed, and shall, as required by the Chief of Engineers, furnish releases from adjacent landowners covering damage to their property that may result from the excavation and disposal of the material.

E. H. MARKS,  
Lieutenant Colonel, Corps of Engineers, United States Army,  
District Engineer.

was requested by local interests. This item was omitted because it appears that such enlargement of this basin as may be required should be done by local interests as set forth hereafter.

48. *Discussion.*—An examination of the improvements proposed by the several interests at the hearing reveals that those interests were unanimous in asking for wider and deeper channels for the waterway. They differed, however, as to how much deepening and widening is needed; proposed depths ranged from 30 to 35 feet, and proposed widths from a width sufficient to permit passage of two ships to 300 feet. Channels 35 feet deep by 300 feet wide are obviously unwarranted at this time, for these dimensions are greater than those of any of the inland channels along the Texas coast.

49. In their briefs the local interests represented at the hearing stated that the proposed improvements were needed or warranted because:

(a) The present channel with a 100-foot bottom width is not wide enough to permit passage of two full-sized ships. Because of this several hours' delay is often caused to ships utilizing the channels. And this condition, coupled with the fact that the channel is unlighted, and navigation by night is unsafe, sometimes causes delays of the greater part of a day.

(b) Most foreign boats or foreign-bound American boats need depths of 26 to 30 feet for safe navigation. The limiting depth of 25 feet in Brazos Island Harbor prevents partially loaded foreign-bound ships from completing their cargoes there, and prevents ships with drafts greater than 25 feet from taking on full cargoes.

(c) The tonnage already developed in the 8 months of operation of the Brownsville Channel has exceeded anticipations as set out in earlier briefs. A large amount of additional tonnage tendered the port could not be handled, partly because of the limiting size of the channel.

(d) Efforts to develop new markets for the citrus fruits produced in the Rio Grande Valley by exporting such fruits to Europe on refrigerated ships have been handicapped because the drafts of such ships exceed the depth available.

(e) Tankers used in the shipment of oil from Port Isabel have largely been unable to carry full loads. Nearly 2,000,000 barrels of oil were shipped from the refinery at Port Isabel in 1936, and an equal amount is under contract for 1937 and 1938. Brownsville interests stated that there appears to be an excellent chance of the construction of a refinery near their turning basin.

(f) The Ports of Brownsville and Port Isabel are at a distinct disadvantage as compared to their competitors, the ports of Tampico and Vera Cruz in Mexico and the domestic ports of Corpus Christi, Galveston, and Houston, which have deeper channels largely provided with Federal funds.

50. The above statements contain the reasons set forth as warranting the proposed improvement. No statements were made as to the actual monetary benefits derived from the existing project in the savings on freight charges or of anticipated benefits other than general statements that additional shipping would be attracted and shipping delays and difficulties in navigation would be largely eliminated.

51. Though no great immediate increase in traffic is anticipated for the project, it does appear likely that a steady and appreciable in-

crease will occur. All of the major ports along the Texas coast have a record of continued growth. The area adjacent to the coast has been developing at a rapid rate, and continued development is indicated. It is altogether reasonable to believe that there will be a continuation of the growth of industry and agriculture in the valley, and that the underdeveloped area in northern Mexico which is tributary to the project will share in this general growth. The oil fields in the valley have been opened up, only, within the past few years, and their possibilities have not been determined.

52. Since the Government was committed to the development of the present project upon the premise that sufficient commerce would develop to justify its construction, it appears fitting that the Government take such additional steps as necessary to expedite and assist this development. The traffic utilizing the project in 1936 might be considered a very good showing for a newly opened waterway. Local interests believe that improvement of the existing channel would attract new shipping operators and would permit the handling of additional cargoes such as have already been tendered, but have had to be refused because of inadequate depth of water to accommodate the ships.

53. The estimated potential tonnages set forth by local interests in previous briefs appear to be as capable of ultimate development as ever. The available oil tonnage which is principally a function of the allowable rate of production set up by the Texas Railroad Commission has been materially increased since 1935. Present allowable production for the Sam Fordyce field is between 6,500 and 7,000 barrels per day or nearly double that in 1935 (set out in the 1935 brief as 3,710 barrels per day). This field is at present the principal producer in the valley, but other smaller fields have a combined allowable production of several hundred barrels per day, and extensive drilling operations are in progress.

54. The claims made by the Port Isabel-San Benito navigation district and by the Coastal Refineries, Inc., that a channel with sufficient depth to accommodate the average tankers engaged in the Gulf trade would effect material savings in the transportation of the products of the refinery appears to be well founded. Detailed analyses of the drafts and capacities of tankers used in the Gulf trade made in connection with other studies show the average draft to be approximately 27 feet and the average capacity about 77,000 barrels. Thus, it is apparent that the tankers using the channel to Port Isabel must be smaller than the average or else they must load to less than full draft and capacity which obviously makes the transportation more expensive. The list of tankers which carried cargoes of refined oil from Port Isabel in 1936, set out in paragraph 42, shows that the actual loaded draft of over 50 percent of the 35 vessels was greater than 24 feet which is normally the limit of safe draft for ships in a channel with 25-foot depth. This overloading was made possible by taking advantage of the overdepth dredging which was available during a part of 1936.

55. The Port Isabel-San Benito navigation district proposes that the Port Isabel Channel be deepened to 32 feet and offers to contribute funds necessary for constructing the channel from Long Island to Port Isabel to that depth if the Government will provide a channel of like depth across Laguna Madre to the point of connection with the Port Isabel Channel and a depth of 24 feet in the jetty channel.